GENDER AND SUBJECT IN HIGHER EDUCATION

KIM ELISABETH THOMAS

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SUMMARY

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KIM ELISABETH THOMAS

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This thesis is concerned with the issue of gender inequality in higher education. It examines the relationship between gender and subject specialisation, looking in particular at the reasons for the predominance, at undergraduate level, of men in the physical sciences, and of women in the humanities. It investigates ideas of 'masculinity' and 'femininity' and how these relate to constructions of 'science' and 'arts'.

The thesis argues that students choose which subject to study on the basis of certain qualities these subjects are seen to hold, and that these qualities have close connections with beliefs about 'masculinity' and femininity'. It examines this through an interview study of male and female students on six higher education courses: two university courses of physics, two university courses of English, a polytechnic course in communications and a polytechnic course in physical science.

The interview study demonstrates that the science subjects are perceived by science students as more certain, more useful and more important than the humanities, and emphasise the value of their degree in gaining a well-paid and important job. Female science students, however, experience conflict between being 'a good scientist' and being 'feminine'. English and communications students emphasise the breadth, uncertainty and individuality of their subjects, and find science restrictive and narrow. They make little link between their degree and their future career. Men, however, feel no conflict between their identity as men and their chosen subject.

It is argued that there is a close link between the construction of masculinity and the construction of physical science, but that English and communications are more ambivalent: in some senses 'masculine', in some 'feminine'. Men are advantaged in these subjects because of their greater visibility and assertiveness.

The thesis concludes that the division between 'science' and 'arts' reinforces ideas of masculinity and femininity, and argues that female 'failure' in education is in part the result of higher education's inability to transcend that division.

Key Words: gender; higher education; gender and subject; gender and education.

DEDICATION

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CHAPTER 1: INTRODUCTION

1.1. Introduction

i. Why Gender and Subject in Higher Education?

The decision to study gender in higher education was based on a variety of different factors, both personal and academic. As a result of pressure from the Women's Group (formed by a group of female lecturers at the university), Aston University decided in 1983 to fund a Ph.D. on the subject of 'Women in Higher Education.' There had been little research on the area, and it was decided that work was needed on the subject of inequality.

The research topic appealed to me, partly because of my own involvement in campaigning on women's issues as an undergraduate, and partly because of my disillusion with my experience of higher education: in the English department in which I took half of my degree, for example, nobody thought it worthy of comment that most of the students were female, and all but two of the lecturers male; nobody else, it seemed, noticed that after a two-year literary theory course, in which all the critics studied had been men, two lectures on 'feminist literary criticism' had been stuck on almost as an afterthought.

The research grew, as much research probably does, out of a desire to explain and understand my own experiences. After a while, it became an arts/science comparison - and even that was the result of my irritation with a body of literature that seemed to assume that girls who didn't take science were feeble-minded. I didn't consider myself feeble-minded; and I wanted to explore more deeply the reasons why more men than women choose what we call 'science', and why more women than men choose 'arts.'

ii. The Research

The research is concerned both with examining the concrete experiences of male and female students, and with the meanings and significance students attach to those experiences. The thesis suggests that these meanings arise from everyday discourse, which habitually makes use of oppositions such as masculinity/ femininity, science/arts - oppositions which only make sense in relation to each other. Within these oppositions, one is rated more highly than the other: in this case, masculinity and science. Thus, for example, is masculinity defined by

what it is not, and the meaning of 'masculinity' is defined by a negative evaluation of 'femininity'.

This thesis looks at these two divisions - masculinity/femininity, and arts/science - and examines the interaction between them in higher education; it regards the terms as social constructions, not as givens. It examines students' understanding of these divisions and how this understanding relates to the role of education in society. The next sections of this chapter will indicate the issues discussed in the thesis and outline the content of the later chapters.

1.2 The issue of gender

Gender is a social construction; it concerns the differing qualities culturally attributed to women and men (Oakley, 1972). Sociologists, Acker (1981) has argued, have often failed to recognise that sex differences are the result of cultural and social influences:

> "Writing of men, sociologists show an acute awareness of the social constraints upon their actions. Writing of women, or of sex differences, they frequently switch to psychological or biological levels of explanation." (p. 78)

An important premise of this thesis is that people's actions are socially constrained, although not socially determined; people make decisions which are based on an awareness of the potentialities and limitations of certain courses of action. The choices made by men and women are limited, amongst other things, by social expectations of masculine and feminine behaviour; this is not to say, however, that people passively accept their socially allocated roles.

The study of gender is, like the study of class or of race, also the study of inequality; we are interested not only in why women do not occupy positions of power, status or responsibility in the same numbers as men, but the process by which this occurs. Whether we believe that inequality of the sexes is the result of genetic differences, the desire of men to control and dominate women, outdated attitudes and prejudices or historical struggle, it is undoubtedly the case that there is a continuous process of producing and reproducing inequality.

The use of the word 'gender' denotes not only an emphasis on the social (as opposed to biological) attributes of women and men; it indicates a recognition of the relationship between masculinity and femininity.

Some researchers, particularly in the sociology of education, who have been interested in inequality between men and women have often researched only women; they have sought to correct an imbalance noted by Acker (1981) who, in her review of articles published on the sociology of education between 1960 and 1979, showed that, whereas 37% of those reporting on empirical research had used all-male samples, only 5% had used all-female samples. Thus, studies by feminists, such as those by Sharpe (1976) and Delamont (1980), have looked at the educational experiences of girls, rather than those of girls and boys, treating the quality of education received by girls as a serious issue, in a way that was rare before the late 1970s.

However, by focusing exclusively on girls, researchers have ignored the important premise that gender only has any cultural meaning because it is based on *difference*. (Hollway, 1982). As Belotti puts it:

> "The superiority of one sex is based exclusively on the inferiority and weakness of the other." (quoted in Walden and Walkerdine, 1982, p. 21)

Researching gender, then, requires an examination of the cultural creation of male dominance as well as the creation of female subordinance.

Clearly, there are a number of institutions which play a part in the reproduction of inequality, whether at a material or an ideological level. The family and the media, it can be argued, both work at an ideological level in perpetuating inequality of the sexes, whilst firms which pay lower wages to female workers operate at a material level. However, the institution which many sociologists have regarded as central in perpetuating inequality - and also, crucially, central in potentially *eliminating* inequality - is education. From the 19th century reformers who pressed for universal schooling to today's schemes for increasing the numbers of girls studying science, education has been the site of the struggle for equality of opportunity.

However, sociologists have not agreed on the relationship between inequality in society at large and inequality within the education system. Explanations for the failure of working-class children within the system, for example, have ranged from the 'cultural deprivation' theory (e.g. the Plowden Report, 1967) to the vulgar Marxist belief (e.g. Bowles and Gintis, 1976) that the primary function of education is to instill in working-

class pupils the docility and passivity necessary for participation in the labour force.

Theories of gender and education have, to some extent, mirrored those on class and education: there are those who believe that inequality is caused by the differential socialisation of girls and boys (in a sense, that girls are "culturally deprived") and that this can be overcome through removing prejudice; there are also those (e.g. Spender, 1982, Mahony, 1985) who believe that schools both reflect and reproduce patriarchal relations.

However, it is generally recognised that gender inequality in education is in many respects different from inequality of class. Whereas the proportion of working-class students succeeding in passing A-levels and entering higher education is very small, girls generally pass as many O-levels as boys, almost as many A-levels, and a relatively high proportion enter higher education (See Chapter 6.)

The emphasis amongst researchers on gender, therefore, has not been on increasing the participation of girls in education. Rather, attention has been focused on the issue of subject choice. Most researchers (e.g. Sharpe, 1976) have argued that the occupational segregation of men and women which takes place after education is completed is related to the subject segregation which takes place at school. Few girls take physical science subjects; few boys take languages. Thus, it is argued (by e.g. Kelly, 1981b; Harding, 1983; Whyte, 1986), that reducing the imbalance is an important step in reducing inequality. The crux of the argument - the impetus of the GIST and WISE schemes - is that more girls must take up science subjects; *girls must do as well as boys.* One assumption of research which examines girls' 'failure' in science is not only that girls are inadequate - not measuring up to the standard of boys - but that physics and chemistry are more difficult, more worthwhile and more important than English, languages, history, geography and biology. In this model, it is believed that education can bring about positive change in the balance of power in the social system.

Before taking a closer look at the relationship between gender and subject choice, and the implications of that relationship for a study of inequality, it is necessary to examine the possible role of higher education in perpetuating (or eliminating) inequality of opportunity between the sexes.

1.3 The Significance of Higher Education

In recent years, there has been a major debate about the relationship between the State, ideology and schooling. In particular, it has been argued (by e.g. Althusser, 1971) that schooling plays an important role in the reproduction of social inequality. Initially, as we have seen, the arguments centred around education's part in the reproduction of class inequality; educationalists of the 1950s and 1960s noted that working-class children were less successful in school than middle-class children. Douglas (1964), for example, found that a smaller proportion of working-class children than of middle-class children won grammar school places. More recently, attention has been turned to the inequalities of race and gender; Spender (1982) has argued that schools play an important part in reproducing the patriarchal relations of wider society. However, the inequalities in higher education have rarely been the subject of close and critical attention; far from arguing that higher education serves to reproduce inequalities, commentators (e.g. Wolpe, 1978) have argued merely that higher education functions to train middle-class students to take up positions of status and responsibility in society, such as civil servants, managers, teachers and doctors. Analyses tend to stop at higher education; they note that few working-class pupils or few black people or few women go on to university or polytechnic; they fail to look at what happens to those who do. This exclusion of higher education from consideration by sociologists of education must in part be due to the fact that higher education is not compulsory; it is perhaps difficult to argue that something which is a matter of choice can in any sense be repressive. It is no doubt also due to the reluctance of academics critically to examine their own institutions.

Yet finding out what happens in higher education is of utmost importance in understanding the patterns of gender inequality that exist. Despite the fact that 42,4% of university undergraduates in Britain are now women, only 37.3% of postgraduates are women: women are outnumbered by men at postgraduate level in every subject apart from Education, Librarianship and Medical Studies (i.e. subjects such as nursing - not inclusive of Medicine) (UGC, 1986). Few academics are women; few high-ranking civil servants, managers or politicians are women. Despite the growing numbers taking part in higher education, women are still under-

represented in the majority of jobs with any claim to status and responsibility.

Clearly, something does happen in higher education; it is not enough to argue that it trains an élite and to leave it at that. It is not, as most appear to believe, the end of a process, but in many ways a beginning. Conventional explanations of female 'failure' to perform well in higher education or to enter high-ranking jobs afterwards have centred around women's innately inferior intelligence (e.g. Rudd, 1984) or, more plausibly, the concentration of women in arts and social science, rather than science, subjects (e.g. Lockhart, 1986). Subject choice, the focus of much feminist concern in recent years, must then be a potential area of interest if we are to compare the experiences of men and women in higher education.

1.4 Subject Choice - Arts or Science?

So far, it has been suggested that the major difference in the education of men and women is not the difference of attainment (which, compared to the difference of attainment between middle-class and working-class pupils, is small), but the difference of specialisation. To consider this a problem entails accepting that the areas in which women tend to specialise - English, languages, sociology - are of lesser status and importance than those in which men tend to specialise - physics, chemistry and engineering. (The word 'specialisation' is, of course, relative; in general, the higher up the educational ladder, the greater the proportion of men. Men outnumber women at physics O-level; they also outnumber women in French Ph.D.s. It is *early* specialisation which worries most feminist educationists.) However, the criteria by which we judge certain subjects to be of more value than others often go unquestioned; further, the demarcation lines between certain subjects - what makes something a 'science', what makes chemistry different from biology - are so taken for granted by educationalists that they remain unchallenged by those who wish to persuade more women to study science.

Those who argue for the superiority of physical science over biological sciences, social sciences and humanities subjects usually base their arguments on two grounds: first, that physics and chemistry are the most intellectually demanding academic disciplines (e.g. Whyte, 1986); and second, that the physical sciences are more functionally beneficial, both

for society at large and for the individual. Society - industry - needs physicists, chemists, engineers; those who train as physicists, chemists and engineers will have the pick of good, well-paid jobs. At its extreme, this view argues that subjects like English and history are an irrelvance because they have no direct application in society.

At one very basic level, the belief that the physical sciences are intellectually more difficult than other subjects can be challenged. If it were the case that the humanities were very much easier than the sciences, then it would also be the case that those who were capable of high achievement in the sciences would have no trouble at all in performing well in the humanities. That this is not the case should be self-evident; indeed, many of the physics students interviewed for the research reported here, simply said: "I was no good at writing essays." Other research evidence points to the same conclusion; Hudson (1967), for example, noted that many pupils in his research sample who scored highly on scientifically-biased IQ tests did badly on 'open-ended' tests, and vice versa. Similarly, while it is true that boys generally do better than girls on tests of scientific ability (Johnson and Murphy, 1986), it is also true that girls generally do better than boys on tests of verbal ability (Curran, 1980). Nonetheless, the belief in the difficulty of physics and chemistry is remarkably widely-held. (That said, it is a significant measure of the division we have made between the arts and the sciences that we regard writing essays and deriving equations as mutually exclusive activities - as if intelligence were always limited to one sphere of activity.)

However, the belief that the physical sciences are more functionally important than the humanities is even more deeply-rooted than the belief that they are more difficult. An engineer learns skills which can be usefully applied, for the benefit of all; an English student reading medieval poetry apparently learns nothing which is of the least benefit to anyone. Liberal humanist subjects such as English, history and sociology have generally been defended on two grounds: that they cultivate the mind, and should therefore be valued for their own sake; and that the skills of critical analysis, independence of thought which they develop are as much of an asset to an employer as technological skills. Historically, however, the teaching of liberal humanities - and in

particular, English - developed in schools because they were seen to have an important social function in quelling rebellion: a point we shall discuss further in Chapter 4.

The debate about which subjects are most important and most useful must surely take place in the context of the kind of society we live in. The reality is that very little money spent on science is spent on improving social welfare; as Rose (1986) has pointed out, 50% of the government's science and technology budget in 1981-2 went on military research and development. In industry, we can note that most scientific research effort is directed at improving profit. "Usefulness", then, does not generally refer to improving the rate of progress - this is not to deny that science has improved the quality of people's lives in many ways - but to increasing the wealth of a minority. Further, it is possible to argue, as Millett (1983) has done, that because science and technology are instrumental in maintaining male dominance, women are deliberately excluded from them.

However, even if we accept the argument that the "best" subjects are those which are most useful to industry, this does not necessarily mean that all physical scientific subjects are more useful than all humanities subjects. For example, in 1986, Kenneth Baker, the Education Secretary, said:

> "A new start is needed in foreign language teaching in schools. If we are to compete effectively in world markets and to communicate on equal terms with our European partners we need to increase substantially the numbers of young people leaving school with a good grounding in at least one foreign language." (Reported in the Guardian, June 17, 1986, p. 32)

Baker was particularly concerned that so few boys were taking O- and A- levels in languages. It would seem, then, that girls, who outnumber boys by about four to one in A-level French, are at an advantage; if subject choice is so clearly related to career, then those women with modern language qualifications should be occupying important positions in industry. However, that this is not the case had been pointed out by Professor Lodge, of the Department of French Studies in Newcastle University, in a letter to the *Guardian*, in which he argues that it is a matter of concern that "A-level presentations in modern langauges are falling away sharply, particularly among boys." He added:

> "This would matter little if decision-making positions were occupied by women possessed of the requisite linguistic knowledge, but unfortunately for all of us, they are not." (January 24, 1986, p. 12)

Being possessed of a 'useful' qualification does not guarantee entry into important jobs; either because women with language qualifications are not particularly ambitious (or are ill-advised) or because employers simply aren't interested in employing female linguists. Part of the problem with encouraging girls to take 'useful' subjects is that we do not know whether it makes any difference to the kinds of jobs they eventually do; and whether, indeed, these jobs would still be highly rated if women did them: Feiffer has argued:

> "Whatever ground woman manages to establish for herself, man abandons, denying its importance." (quoted in Richards, 1982, p. 196)

Whilst not necessarily accepting the fatalism of this argument, it would be wrong to assume that the balance of power between the sexes can be changed simply by persuading more girls to take "boys' subjects": the issue is clearly too complex to justify simplistic remedies. Arguably, certain kinds of jobs (such as those in the Civil Service) have historically been reserved for male Oxbridge graduates in such 'useless' subjects as History and Classics: sex and class may sometimes be greater indications of a person's 'worth' than degree subject.

1.5 Gender, Higher Education and Subject Specialisation

Feminists, then, have noted that, whilst there is near parity of numbers of male and female undergraduates, they are unequally distributed among different subject specialisations. This inequality of subject specialisation is a cause of wider social inequality between the sexes; it can be remedied by ensuring that, at an earlier age, girls choose to study traditionally male subjects rather than traditionally female ones. Thus, for most feminist educationists, higher education is not an area of interest; it is seen as the outcome of a process, and not as a process which itself can influence social equality.

It has already been argued that this view is misguided because higher education, as part of the education system, continues to influence the lives and prospects of students; it is part of a continuing process.

Further, it has been argued that to lay the blame for women's failure at the door of subject specialisation is too simplistic and indirectly blames girls for their apparent inadequacies.

It is necessary, then, if we are to grasp the significance of subject specialisation, to take the choices made by women seriously: not to assume the student who chooses physical science is "right" whilst the student who chooses the humanities is "wrong." More importantly, it is necesary to understand why certain subjects have become associated with men, and others with women. It is not only the case that some subjects have been numerically dominated by men and others numerically dominated by women; as Keller (1983) has argued, science is generally regarded as more masculine than the arts:

> "To both scientists and their public, scientific thought is male thought, in ways that painting and writing - also performed largely by men - never have been." (p.188)

Hudson's (1972) work has also demonstrated the association of science with the masculine, the arts with the feminine, and his research will be discussed more fully in Chapter 4. Understanding the gender-specific connotations of certain fields of learning is crucial if we are also to comprehend the process by which gender inequality is produced in education. As Becher (1981) has argued, academic subjects are not neutral, they are "cultures", each with its own way of perceiving and interpreting the world. The aim of this thesis, then, will be to look at the relationship between the "culture" of subjects and our commonsense constructions of masculinity and femininity; and the implications of this relationship for gender inequality in higher education.

1.6 The thesis

This thesis consists, conventionally, of a literature review, a methodology chapter and a report on research. The literature review, which comprises Chapters 2, 3 and 4, is not intended as an exhaustive survey of research on gender in higher education, even less gender and education in general. Rather, it draws on a variety of ideas from a fairly wide body of literature which help to illuminate the relationship between gender, higher education, and subject specialisation. Chapter 2 looks briefly at the history of women's entry into education, and at the

theoretical and policy issues surrounding higher education today. Chapter 3 examines the issues surrounding the participation of men and women in education - and attempts, through examining the competing explanations of liberal, radical and Marxist feminists, to devise a theoretical framework which will account for gender inequalities in education, and in particular, higher education. Chapter 4 examines the distinction which has been made historically between the arts and the sciences, arguing that this division is a social construction, which is not arbitrary or inconsequential, but value-laden. It looks at the connections between our beliefs about 'masculinity' and 'femininity' and our beliefs about 'arts' and 'science.' In addition, it discusses the differences between science education, on the one hand, and arts education - as typified by English - on the other. It looks at the relationship between the two paradigms and the social construction of gender. Chapter 5 summarises the issues, and explains the design of the research project. Chapter 6 reports on the statistical survey of the numbers of women and men participating in different subject areas at different levels of education, and on the comparative achievement of women and men. Chapter 7 presents the data from a questionnaire conducted amongst admissions tutors about numbers of male and female students admitted. Chapter 8 is a report on interviews conducted with staff on three physical science and three humanities courses; it examines the differing construction of science and arts and the views of the lecturers on the participation of women and men in their discipline. The first half of Chapter 9 presents some quantitative data about the 96 students in the interview sample - their educational and academic background. The second half presents interview data on the students' schooling, and their reasons for choosing their degree subjects. Chapter 10, also using the interview data, is a more extensive report on the construction of science and arts in higher education by students, and it compares students' beliefs about their disciplines with their experience of studying them in higher education. Chapter 11 examines the relationship between subject specialisation and gender identity, looking at the implications of the construction of arts and science for students' sense of themselves as men and women. Finally, Chapter 12 draws some conclusions from the fieldwork and makes some policy recommendations.

CHAPTER 2: HIGHER EDUCATION

2.1. Introduction

This chapter will provide a context for the thesis - a background to the issue of gender in higher education. Chapter 3 will concentrate much more specifically on feminist theory and its application to education. This chapter is divided into two main sections: the first looks at the history of women's entry into education in this country, with particular reference to higher education, whilst the second looks at the state of higher education in Britain today.

2.2. The history of women's entry into education

The history of education in the nineteenth century and in the first half of the twentieth century is largely a history of expansion, of widening of access. Although the quality and content of education was a contentious issue, more important was the question of *who* should be educated.

Before the nineteenth century, and in the early years of the century, the situation was neatly divided on class and gender lines. Whilst boys of the upper and upper-middle classes attended public schools and sometimes universities, in which they could read classics or study for Medicine and Law, working-class children of both sexes were lucky if they could attend a Sunday school where they would learn to read and write; some were able to attend parish schools if they lived in an area which provided one. As Williams (1975) has noted, there was widespread opposition to extending the education of working-class children; in the words of one Justice of the Peace of 1807, teaching children writing and arithmetic "would produce in them a disrelish for the laborious occupations of life." (p.135)

Upper-middle-class women, in the early years of the century were confined to acquiring literacy and 'accomplisments' - French, drawing, piano playing. They did not attend schools and were barred from entrance to the universities; instead they were taught in the home. A girl was unlikely to learn skills of numeracy unless taught by her brother's tutor (Dyhouse, 1981). Later on in the nineteenth century, certain sectors of the middle-class began to send their daughters to small, select private schools, where the education they received differed little from the one they would have received at home. The Taunton Commission of 1868 found

that the education received by girls in fee-paying schools was of a lower academic standard than that received by boys in fee-paying schools.

The movement for reform of education in the 19th century was largely aimed at improving the schooling received by working-class children; by the latter half of the century most children could claim to have had some education - consisting largely of reading, arithmetic and religion - if only for two or three years, and the Education Act of 1870 established school boards, thus giving official approval to an already existent reality of almost universal schooling. In 1880, elementary schooling was made compulsory (although it was not to become free until 1918), and in 1893, the school-leaving age was raised to eleven. This expansion of primary education, Deem (1978) has argued, was not so much the result of a desire to increase the opportunities of working-class children as to "minimally educate, impose morals upon and control working-class children so that they did not aspire beyond the social class or employment held by their parents." (p.9)

Clearly, the schooling received by the working-classes was still very basic and higher education continued to be the preserve of the middle-class male. Indeed, it was widely believed that education should be tailored to the pupils' later occupations; the Taunton Commission proposed a three-tier system, whereby upper-middle-class boys, middle-class boys and lower-middle-class boys would each receive separate educations, which would prepare them for their adult roles.

Girls, too, were to be trained for their role in life, which for both middle-class and working-class girls was that of wife and mother. For those middle-class girls who were sent to school, education was not intended to be a broadening experience. Girls were sheltered from the world of politics and science (excepting, sometimes, botany and geography.) French, English and history were considered suitable, as were music and art and, of course, religion. These schools did not encourage intellectual rigour; in fact certain 'scientific' beliefs of the time held that adolescent girls should be prevented from hard work, either physical or mental, because it would retard their physical development and damage their reproductive systems. (Dyhouse, 1981 remarks that nobody worried about the reproductive systems of working-class girls who were in service from about the age of ten, doing physically demandng jobs twelve hours a

day.) Thus were middle-class women effectively reduced to the status of dependents on their fathers, brothers or husbands. In addition, married women were allowed no independent source of income.

The education of working-class girls was more limiting still. The inclination of the middle-classes at the time was to blame the poor for their own misfortunes: drink, lack of thrift and above all the laziness and incompetence of the working-class wife were responsible for the appalling conditions in which the working-classes lived. Thus their solution was to train working-class girls in the skills needed to become responsible wives and mothers. Chief amongst these was needlework; girls could spend as much as half of their time at school in sewing-classes. (Despite the advent of the sewing-machine, only hand sewing was taught.) In 1878 domestic economy was also made compulsory for girls in the board schools. In reality, 'domestic economy' meant cooking, although arguably, the teaching of the subject, and the facilities provided, were so poor that girls would have done as well to remain at home. In fact, many of them did, and many inspectors turned a blind eye to female truants who stayed at home to help their mothers. The same leniency was not, apparently, exercised towards male truants, whose education was considered more important. The argument that girls should be educated for their future role as housewives and mothers did not diminish as the century wore on; on the contrary, when the school leaving age was raised to fourteen in 1900, an inter-departmental committtee recommended that cookery and household management should be made compulsory for board school girls.

At the same time that an education system was being developed that sought to train people for their inevitable role in life, another battle was being fought by middle-class women, for their right to enter the universities. There had already been a great deal of expansion of higher education earlier in the century. In the 1830's University College, London and Durham University were founded; and then in the 1870's and 80's, the universities of Manchester, Reading, Birmingham, Leeds, Southampton, Nottingham, Sheffield and Wales were founded. These new universities provided an alternative to the exclusive Oxbridge colleges, and were open

to a wider social class. It was not surprising, then, that women began to demand a share in the education enjoyed by men of the same class as themselves. Opponents of the idea (who included the Minister for Education, Robert Lowe) pointed out that it was fruitless for women to study for the professions, since they were not allowed to enter them:

> "In its earlier stages education is general; in its final stages it is, or ought to be, a preparation for the calling in life; and to send men and women to the same universities is to pronounce that their calling in life is the same." (Robert Lowe, 'Women at the Universities', Saturday Review, 1877, quoted in Burstyn, 1980, p.53)

Women agreed. They argued, along the same functional lines, that they should be allowed to study for the professions for the very good reason that they wanted to enter them. The arguments put forward by the opponents of women's entry to higher education - that educated women were 'unfeminine', sexually licentious' or incapable of having children (in contradiction of their allotted rôle of bringing up the next generation) - have been documented by Burstyn (1980). She argues that the eventual success of middle-class women in gaining access to the universities (and, more importantly, to the professions) was due neither to a sudden nor a gradual enlightenment on the part of men as to the necessity for women to have equal rights to education, but a concession to economic necessity. Men, she says, could no longer afford to support their unmarried daughters or sisters, and thus single women had to be allowed to find a means of supporting themselves. (Even feminists did not try to argue that married women should work. Female teachers in girls' schools were all single.) Just as the acceptance of the importance of 'education for all' was a result of the realization that "upon the speedy provision of elementary education depends our industrial prosperity" (Forster, 1870, quoted in Williams, 1975, p. 141), so the opening up of higher education for women was more the consequence of practical and economic reality than of moral or egalitarian principles.

Women's acceptance into the universities was gradual. The first important step, the result of a campaign organised by Emily Davies, was the opening of the Cambridge local examinations to women in the 1860s. The effect of this was both to prove that women were capable of reaching the academic standard required to take a degree, and of increasing demand amongst women for higher education. A group of women, headed by Maria

Grey, set up the Girls' Public Day School Trust to establish schools for girls which would provide an equivalent academic grounding to that received by boys, and which would prepare girls for the local examinations of Oxford and Cambridge. By 1900. thirty-six such schools had been opened. (Burstyn, 1980). The first women's colleges - Girton and Newnham - were opened in Cambridge in the late 1860's and 1870's. Oxford followed in 1879 with the opening of Lady Margaret Hall and Somerville. The victory, however, was limited: although legislation was passed in 1875 allowing universities to award degrees to women, many universities chose to allow women to follow degree courses without allowing them to become graduates. It was not until 1920 that Oxford admitted women to degrees, and it was as late as 1948 in Cambridge. At London it was easier; women were admitted as graduates there from 1882. In the 19th century, the advantage for women of obtaining a London degree was that it conferred on them an *official* qualification which would enable them to qualify for the professions.

It must be noted here - it is a point we shall return to in Chapters 3 and 4 - that, from the beginning of women's entry into higher education, there was a good deal of subject segregation between the sexes. If women were largely excluded from studying science in secondary education, then they would not be qualified to study it in higher education. The development of 'English' as a subject in the late 19th century was both, as Baldick (1984) has shown, an attempt to subdue the working-classes by imbuing them with a sense of national unity, and a means of guiding women away from the professional subjects they demanded into a gentler and less threatening subject: as Eagleton (1983) has caustically put it:

> "The rise of English in England ran parallel to the gradual, grudging admission of women to the institutions of higher education; and since English was an untaxing sort of affair, concerned with the finer feelings, rather than with the more virile topics of *bona fide* academic 'disciplines', it seemed a convenient sort of non-subject to palm off on the ladies." (Eagleton, 1983, p.28)

Literature, for middle-class women, became another 'accomplishment'; "literary appreciation", Baldick says, "was seen as useful in helping to train a wife in her duties of sympathy and understanding." (p. 68) To protect women from exposure to harmful ideas, texts studied by women were usually bowdlerized. The establishment of English as a 'women's subject'

was rapid; Baldick says that even at the beginning of English as a university subject, sixty-nine of the candidates for the new examinations at Oxford were women, as opposed to only eighteen men. A *Times* article of 1893 apparently advocated the School of English on the basis that,

> "the women should be considered, and the second and third-rate men who were to become schoolmasters" (quoted in Baldick, p.74)

The opening of higher education to women, then, was not an unqualified good; Dyhouse (1984), too, has argued that "the new institutions for the higher education of women functioned...to reinforce...what girls had already learnt about 'femininity'." (p. 55)

In the 19th century, and for a good part of the 20th century, higher education was a middle-class preserve. Although women were admitted to higher education in the 1870s and 1880s, in practice it was only a very small number of upper-middle class women who were able to take advantage of it. In the twentieth century, women's participation in higher education is clearly related both to the changes in provision of secondary education and the expansion - particularly in the 1960s - of higher education. Let us briefly outline the major changes.

In 1902 Board schools were abolished, and control of primary and secondary education passed over to the Local Education Authorities (LEAs). Although primary education was now compulsory, secondary education was open only to those who passed a scholarship examination, or whose parents could afford to pay for their education. In practice, even those working-class children who were clever enough to win a scholarship could not always take their place in secondary school because their parents were unable to bear the extra cost of uniform and books. If this was the case for working-class boys, it was even harder for working-class girls, whose education was considered less important. The majority of children, therefore, remained in elementary education until the age of fourteen. However, a series of reports - the Hadow Report of 1926, the Spens Report of 1938 and the influential Norwood Report of 1943 - recommended that all children should receive a secondary education after the age of 11.

The 1944 Education Act, based on the recommendations of the Norwood Report, was in many ways a radical step and a movement towards the meritocratic ideal that people be judged on the basis of their ability, not their class or sex. Everybody was to be entitled to a free secondary

education. The most able eleven year olds would be sent to grammar schools where they would have the opportunity to develop their talents to the full. The others would attend either technical schools or modern schools, depending on their aptitudes. However, the determining examination which children were to sit was the 11+, which tested only academic, not practical, aptitude, despite the fact that children with a more 'practical' bent were to be sent to technical schools. In the event, the technical schools never really took off, and most education authorities practised a simple bipartite division of grammar and secondary schools.

The 11+ examination, with its categorization of children into 'able' and 'not able' has been criticized on many grounds. One of these was that the distribution of children into modern and grammar schools was somewhat arbitrary and varied from authority to authority. On average, about twenty per cent of eleven year olds 'passed' the examination and went to grammar school, but the figure was much greater in some authorities, and much smaller in others. (Douglas, 1964) Halsey, Heath and Ridge (1980) have noted that "the supply of places was determined largely by historical accident" rather than by the ability and aptitudes of the children.

Another problem was that girls tended to perform better on the tests than boys, with the consequence that they were expected to gain a higher pass mark than boys in order to attend grammar school. Yates and Pidgeon (cited in Walden and Walkerdine, 1982) are among the defenders of this system, on the grounds that differences which exist between male and female achievement at age 11 disappear during adolescence. Further, the IQ tests on which the examination was based have been discredited as being unfairly loaded towards white middle-class experience (e.g. Rose, 1976)

Clearly, the failure of the 1944 act to abolish the private sector, and the fact that the grammar schools themselves were predominantly middle-class (Douglas, 1964), meant that the new system was not particularly fair or meritocratic. Nonetheless, it did have certain successes. One of the effects of the Act, combined with the raising of the school-leaving age to fifteen in 1947 and the introduction of O-levels and CSEs into secondary modern schools, was to increase the number of students wishing (and qualified) to enter university. Equally importantly, by making secondary education compulsory for *everyone*, the Act reduced inequality between the

sexes; although girls' grammar schools were often inadequately resourced and funded (Shaw, 1980), at least girls now had the same opportunity as boys to sit and pass public examinations.

The 1944 Act, the raising of the school-leaving age to fifteen, and the decision by the secondary modern schools in the 1950s to allow pupils to prepare for GCE examinations, all had the effect of increasing demand for higher education. This demand was initially met in two ways. First of all, the technical colleges at Leicester, Hull, Exeter, Nottingham and Southampton were given university status, although their students were already taking external degrees from the University of London. At the same time, plans were made to establish the universities of East Anglia, Sussex, York, Warwick, Kent, Lancaster and Essex. Secondly, the 1956 White Paper legitimized the already existent growth of higher education outside the universities, in technical colleges, and proposed the founding of Colleges of Advanced Technology. There was a wide class divide between the universities and the technical colleges; whilst the universities were established in the élitist tradition of Oxford and Cambridge, the CATs were founded, and the technical colleges developed, in the tradition of the Mechanics' Institutes of the nineteenth century. Despite this, Scott (1984) has been able to make a distinction between the "liberal" universities of the 19th century and previously, which were characterised by their emphasis on culture and the pursuit of the "truth", and the "modern" universities which regarded knowledge as "product or commodity." The dominance of subjects such as Classics, Medicine and Law was replaced by the dominance of subjects such as physics, chemistry and economics. It is worthy of comment - but perhaps no more - that the apparent decline in prestige, noted by Scott, of the older disciplines, has gone hand-in-hand with their large-scale "infiltration" by women.

As well as expanding higher education, the government introduced, in 1963, a system of mandatory grants for students; higher education was now no longer open simply to those wealthy enough to pay for their own education or those able enough to win a scholarship; it was open to all who could meet the entrance grades required by the universities. One can speculate that this put an end to the practice of some families, only able to afford to send one child to university choosing to send the son rather than the daughter.

2.3 Higher Education Today

i. Historical developments since 1963

In 1963, the Robbins Report, which is discussed below, recommended and secured a large increase in the number of higher education places available, on the basis that higher education courses should be "available to all who are qualified by ability and attainment to pursue them and who wish to do so": a maxim which came to be known as the "Robbins principle." The Report made projections for the likely demand of those "qualified by ability and attainment" and make recommendations for an increase in places on the basis of those projections. Given the huge post-war increase in students gaining GCE passes, the likely continued growth of this increase, and, finally, the post-war baby boom, it was obvious that the demand was going to rocket. Although the Robbins Report anticipated an increase in demand, its projections, as Robinson (1972) has pointed out, fell short of the eventual numbers demanding higher education. In fact, if we base "standards" on 'A'-level grades, standards of entry to higher education have risen since the 1960's. At the time, Robbins was criticized from both sides: by those, like the authors of the 'Black papers' who believed that 'more means worse' and those who saw the Report as an essentially conservative document. Robinson (1968), for example, has argued that "The Robbins Report...assumed that higher education was only for an élite minority and that we should merely try to increase the size of the élite." (p.12)

However, not all of Robbins's recommendations were carried out. The Report had recommended the creation of six new universities, but this did not happen. The CATS became universities, and many of the existing technical colleges, already teaching degree-level work, were turned into polytechnics, thirty in all, and the CNAA became the validating body for the degree courses which they ran. The reason for the creation of the polytechnics was given by Tony Crosland in his Woolwich speech in 1965:

> "There is an ever-increasing need and demand for vocational, professional, and industrially based courses in higher education - at full-time degree level, at full-time just below degree level, at part-time advanced level and so on. This demand cannot be fully met by the universities. It must be fully met if we are to progress as a nation in the modern technological world. In our view it therefore requires a separate sector, with a separate tradition and outlook within the higher education system." (quoted

in Scott, 1984, p.161)

The polytechnics were created, then, with the aim of giving students the qualifications necessary to help Britain become a successful economic force; to "progress as a nation in the modern technological world." The polytechnics were to provide a 'relevant', vocational education which, apparently, the universities were incapable of providing themselves. Given the circumstances of their creation, it is perhaps not surprising that the polytechnics have been seen as heirs to the working-class, vocational tradition of the technical colleges, and perhaps this was the intent behind their foundation. (See Burgess, 1972) The fact that they lay outside the university sector enabled the polytechnics to introduce new and varied degree courses, such as sandwich courses, applied courses and inter-disciplinary humanities courses at a time when the new universities were struggling to establish themselves as 'real' universities, providing very traditional degrees.

The result, however, is a binary division which has entrenched the existing distinction of pure/liberal on the one hand, and applied/vocational on the other. Part of the responsibility for this must lie with Robbins which, by its very failure to tackle the question of the technical colleges, implied that only a university education could properly be called a 'higher' education. As Tyrrell Burgess (1972) puts it:

> "The question which the Robbins Committee should have asked and answered was which one of these two traditions was the more apt for the expansion of higher education. It did not do so, but saw the future of higher education numerically and academically dominated by the universities. Indeed, higher education was to be a kind of club, with the universities as full members, the colleges of education (training colleges) as associate members and a few technical colleges always on a gratifying waiting list." (p.15)

The position of the colleges of education, as recommended by Robbins, and implemented by the government, was a rather strange one. These had previously been teacher training colleges, but were now to be allowed to run degree courses, including the new degree of Bachelor of Education. Whilst existing in the public sector, under the control of the LEAs, their degrees were to be validated by the universities. The three sectors were not distinguished by different spheres of interest and clearly-defined roles; there was a good deal of overlap between what was taught in the

universities, the polytechnics and the colleges of education. All three could teach degree courses; all three could provide a vocational training; and all three could provide a traditional 'liberal' education. The differences were ones of degree, not of kind. Despite this, there was still a hierarchy of 'excellence' with universities at the top, polytechnics in the middle and colleges of education at the bottom.

As a consequence of the 1960s expansion, the increase in students entering higher education in the 60's was dramatic. The proportion of eighteen year olds entering higher education doubled from 6.9% in 1960/61 to 13.8% in 1970/71. (Farrant, 1981) This was not a case of 'more means worse', however, for during that same period, the proportion of seventeen year olds with five or more 'O'levels increased from 15.3% to 22.1%; whilst the proportion of the relevant age group gaining two or more 'A'-levels increased from 6.9% to 13.9% (ibid). These figures have shown a slight levelling off in the seventies, and the proportion of the relevant age group entering higher education has decreased since the imposition of UGC cuts.

These statistics conceal two other important points, however. One is that much of the expansion in higher education was in the arts and social sciences, rather than in the the pure and applied sciences. The other is that the proportion of women entering higher education increased very quickly indeed - from 30.6% in 1970/71 to 42.3% in 1984/85. (Statistics for 1963 are not available, but it is likely that the proportion of women then was about 25%). These two facts are no doubt linked, although it is also worth noting that the proportion of women to men has increased in science areas - particularly in Medicine, where the removal of the sex bar after the 1974 Sex Discrimination Act opened the flood-gates, with the result that Medicine is now the most popular university subject amongst women. (See Chapter 6). Farrant (1981), however, suggests that some of the increase in middle-class women entering higher education was at the expense of working-class men, and this has also been argued by Halsey et al (1980). Despite Robbins's supposedly egalitarian aims, there has been only a small increase in the proportion of working-class students in university (Williamson, 1986b)

In the 1970s another major educational change took place which might be expected to influence both the proportion of students qualified to enter

higher education and the kind of students doing so. This was the comprehensivisation of secondary education. This, however, has had less impact on the demand for higher education than the initial introduction of universal secondary schooling in 1944. The Labour Party had adopted a policy of comprehensivization in 1951, but it was not until the Party regained power in 1964 that it was able to issue a letter, 'Circular 10/65' to the Local Education Authorities, requesting them to implement a scheme of comprehensivization. The implementation of the recommendations in the circular was slow and patchy, meeting resistance in particular from the Conservative-controlled LEAs, and the Conservative government of 1970-74. The two systems co-existed uneasily for a long while, and even now, the 11+ has not completely disappeared; indeed, under the present government's new proposals for "opt-out" schools, it may be due for a comeback. As we shall see in Chapter 6, the number of students passing A-levels - and thus becoming qualified to enter higher education - has increased only slightly during the 1970s and 1980s. There has, however, been a major shift during this period in favour of women in the proportions of women and men passing A-levels.

The expansion of higher education in the 1960s and 1970s was halted in the late 1970s by a Labour government which made cuts in educational spending. The Conservative government of the 1980s has proceeded to make further cuts which has resulted in a decrease in the number of places available. The University Grants Committee implemented the first major cuts in 1981, whilst the National Advisory Board imposed similar cuts (through a cut in grants to local education authorities) on the polytechnics and colleges of higher education. Consequently, the number of students admitted to universities fell by 6,000 between 1981/2 and 1983/4, despite an increase in demand. Public sector institutions managed to protect access and made cuts elsewhere. Since the first major round of university cuts in 1981, there has been a steady decrease in the money made available to universities, and the 1985 Green Paper 'Higher Education into the 1990s' forecast a reduction, rather than an increase, in the number of higher education places available. To understand government policy on higher education, it is necessary to examine the philosophy behind both the Robbins Report and the 1985 Green Paper.

ii What is higher education for?

The debate about the purpose of higher education has been marked by confusion and a lack of clarity. Whilst there may be a continuing debate about the secondary school curriculum, there is at least widespread agreement on some aspects of compulsory education: that all children up the age of sixteen should receive a primary and secondary education, for example; that children should at the very least learn basic skills such as literacy and numeracy and in addition should acquire some understanding of science, humanities and languages. In addition, compulsory education serves to teach children the common (or dominant) culture and values of a society; what Durkheim (1961) referred to as "the essential similarities which collective life demands." In higher education, however, the situation is different; there is a lack of consensus about who should receive higher education, what should be taught in higher education, and what role higher education should play in society.

It is possible to make a crude but useful distinction between two educational philosophies. One is that education should be functional - training people to take their place in society and to perform certain tasks. Frequently emphasis is put on the needs of the economy for certain skills (e.g. Davis and Moore, 1970). As we have seen, this functional viewpoint dominated educational thought in the 19th century. The second is that education should be liberal, providing students with a common culture and a broad, general knowledge not directly related to their post-school occupations. A "liberal" education is generally seen to comprise the arts and social sciences rather than the sciences. It is not necessarily the case that the former philosophy is reactionary and the latter progressive; it is at least arguable that, in a society based on consensus rather than conflict, a genuinely functional education system, geared to the needs of society and the economy, would ensure that students of all backgrounds could succeed on the basis of their ability; whilst a liberal education, as we have seen, was directed at women in the late 19th century as a way of diverting them from a training in the professions. In that sense, the idea of a "liberal" education can be an ideological front masking a functional intent. Both philosophies can, of course, be used to justify the exclusion of certain groups of people from education (Williams, 1975, argues that in the 19th century, many defenders of 'liberal'

education were opposed to allowing the working-classes to benefit from such an education, because "liberal education would be vulgarised by extension to the masses." (p.142)). However, liberalism has often been equated with egalitarianism - a widening of access - and functionalism with élitism; and this has particularly been the case in higher education.

The Robbins Report of 1963 is, in its own words, "the first comprehensive survey of the field of higher education" (paragraph 13.) Robbins quite clearly sets out what it believes to be the aims of higher education. It says that there are "four objectives essential to any properly balanced system" (paragraph 24) and that these are:

1. "Instruction in skills suitable to play a part in the general division of labour";
2. "to promote the general powers of the mind...to produce not mere specialists but cultivated men and women";
3. "the advancement of learning" (the report adds, "the search for truth is an essential function of institutions of higher education");
4. "the transmission of a common culture and common standards of citizenship".

Point one is clearly functional in emphasizing both the need for the individual to train for a career, and the need of society to benefit from that individual's training ("Progress - and particularly the maintenance of a competitive position - depends to a much greater extent than ever before on skills demanding special training"); the report also argues that women are a wasted resource which should be tapped, in the cause of economic efficiency. The other three points are in the liberal, rather than the functional, tradition and are very vague, and thus difficult to assess: it is hard to argue with the belief that higher education should "advance learning." We might, however, query the reasoning behind one or two of the points. For example, in point four the Report calls for "the transmission of a common culture and common standards of citizenship" and explains this by addding that:

> "it is a proper function of higher education, as of education in schools, to provide in partnership with the family that background of culture and social habit upon which a healthy society depends. This function, important at all times, is perhaps especially important in an age that has set for itself the ideal of equality of opportunity. It is not merely by providing places for students from all classes that this ideal will be

> achieved, but also by providing, in the atmosphere of the institutions in which the students live and work, influences that in some measure compensate for any inequalities in home background." (Para 28)

This is the higher educational equivalent of Durkheim's "essential similarities" and "homogeneity". However, Robbins evades an important point, which is the extent to which "the transmission of a common culture and common standards of citizenship" can be achieved in the élitist environment of higher education. Although "equality of opportunity" may be a goal, the vast majority of people who do *not* enter higher education, will be excluded from this common culture that is to be shared by those *in* higher education. It seems that those entering higher education are to be initiated into a culture which is "common" only in the sense that it is common to that small group of people. If that is the case, those people who have been highly educated are presumably to hold a different set of values and beliefs from those who have not been highly educated. What these values and beliefs are, or indeed, what is meant by the term "culture" is never made explicit. In some ways, it echoes Matthew Arnold's use of the term "culture" in, for example, *Culture and Anarchy*; culture appears to be synonymous with civilisation and decent, middle-class values. This sense is reinforced by the curious term "social habit"; it suggests the cultivation of certain ideas, manners and acts which are essential to the upholding of decency and common sense. The same criticism can equally validly be made of the idea that higher education should produce "cultivated men and women"; it begs the question: Are the only cultivated people to be those who have received a higher education?

The Robbins Report sits fairly and squarely in the tradition of the liberal educationalists. Its aims are egalitarian; it believes in the ultimate value and goodness of higher education both for the individual and for society at large; and it believes (like the Plowden Report of 1967) that education is *compensatory*; it can "compensate in some measure for any inequalities in home background" by providing those from different backgrounds with the same education.

If the Robbins Report is by and large a liberal document, concerned with "the search for truth" and a "common culture", the 1985 Green Paper, *The Development of Higher Education in the 1990s* is straightforwardly functionalist, concerned almost solely with the part played by higher

education in the division of labour. The 1978 discussion document 'Higher Education into the 1990's' had set forward options for coping with the boom in numbers of qualified students demanding higher education in the early 1980s, followed by an anticipated decline in the number of students demanding higher education in the late 1980s and early 1990s. The 1985 Green Paper outlined the government's response to this decline. Universities must recognise that their aim should be to produce graduates capable of serving industry and thus improving the economy. Our higher education establishments need:

> "to be concerned with attitudes to the world outside higher education and in particular to industry and commerce, and to beware of 'anti-business' snobbery. The entrepeneurial spirit is essential for the maintenance and improvement of employment, prosperity and public services." (p.4)

Universities must also be ready:

> "to go out to develop their links with industry and commerce... More recent innovations which bear particularly on the transfer of technology include teaching companies, science parks, business clubs and industrial professorships." (p.4)

The decline in the size of the eighteen-year old population will not mean that a higher proportion of that population will be allowed the chance to study. In particular, they will not be encouraged to embark on non-vocational humanities courses, or, as the document puts it:

> "Competition for university places has increased over recent years, and, provided the criterion of ability to benefit is strictly applied, a modest increase in opportunity to enter university as demand falls is to be welcomed. But a move in this direction should not lead to automatic admission to the universities, and particularly onto humanities courses, of those who might be more likely to profit in terms of personal development and future employment prospects from the vocational and technological courses offered by the public sector." (p.14)

Whereas Robbins had put some emphasis on the value of higher education to the individual, the 1985 Green Paper concentrates almost entirely on the value of higher education to the capitalist economy. This value is seen to lie mainly in the scientific and technological disciplines. Whilst paying lip-service to the idea that "the whole graduate body can make a contribution to the development of the economy...employers value broadly based personal skills", students who feel that their aptitude and interest lie with the humanities will be ill-served:

> "...admission to the arts in the universities will continue to be

> highly competitive...Those responsible for counselling intending students (and, perhaps, particularly girls) about their subject choices should be aware that the proportion of arts places in higher education as a whole can be expected to shrink." (p.9)

The paper, therefore, marked a rejection of the Robbins Principle. Not only did it not take the opportunity of a falling birth-rate to achieve a genuine expansion of choice for many students, it in effect proposes a cut in the number of places available. As the AUT's document *The Real Demand for Student Places* (1983) has argued, if the increase in demand by women, mature and part-time students for places continues at the present rate, then we can expect a steady rise in the demand for student places, not a falling-off, despite the decline in the birth rate.

Williamson (1986a) has argued that the Green Paper's emphasis on the contribution higher education must make to the economy is simply a muddled attempt to justify cutting higher education spending in order to enable the government "to cut taxes in the interests of electoral advantage." He comments:

> "It [the Green Paper] is a thoroughly ideological document with a deceptively pragmatic tone. The ideological bedrock on which Joseph required his civil servants to draft their more precise claims about higher education is an unstable compound of free market economics, a *dirigiste* view of the state and a wilfully myopic view of the role which public sector institutions play in the economic life of this society." (p.273)

Williamson's argument is that the Green Paper's analysis is not correct even on its own premises; that, in fact, humanities graduates are as essential to the economy as science and technology graduates. This is not an easy argument to prove; graduate contribution to the economy is not something which can be quantified. Certainly the government appears to be of the belief that only science graduates can make a contribution to the economy which would justify spending large amounts of public money on their education.

In defence of the Conservative government, it can be argued that at least it appears, unlike previous governments, to have a clear, sharply-defined sense of the purpose of higher education; higher education is there to serve the needs of industry and thus to improve, in a much more direct way than previously, the country's economy. However, the government's apparent commitment to this ideal was severely undermined by the fact that many of the UGC cuts in 1981, four years before the Green

Paper, were aimed at technological universities such as Aston and Salford, rather than, say, the 'liberal' universities such as Oxford, Cambridge and Durham (although it ought to be pointed out that the technological universities implemented those cuts in their social science and arts departments as well as in their engineering departments.) Either the UGC deliberately ignored the government's intentions or the government's apparent commitment to technology rather than the arts was simply a cover for a desire to make cuts in public spending, regardless of the consequences. It could also be seen as a deliberate attempt to stem the growth of egalitarianism - such as it has been - and to restore the élitist nature of higher education.

The Robbins Report and the 1985 Green Paper were, first and foremost, policy documents which attempted to formulate or justify government policy on higher education. Independent commentators, however, have also discussed the aims of higher education. Goodlad (1976), for example, has suggested that there are "four types of goal...commonly proposed for higher education." These are: one, "a socially defined goal of equipping idnividuals with the knowledge and skill suitable for given occupations"; two, the "social goals of the 'consumers' of higher education...for the social status of a degree...a job qualification to be achieved as quickly and as efficiently as possible"; three, "the personal goals of some students to achieve independence in criticism or to acquire a philosophy of life"; four, "academic goals of unhurried and careful elaboration of theory supported by minutely detailed observation." (p.6) These goals are in essence the same as those outlined by Robbins. Similarly, Warren Piper (1984) identifies three different views of higher education - the 'functional' view; the 'cultural' view; and the 'social service' view (that higher education should exist chiefly for the benefit of the student.) The significance of these goals is that they can be seen, and have been seen, historically, as conflicting rather than complementary. The needs of society, for example, may be in opposition to the aims of the student. Further, implicit in the functional/liberal divide already noted is the belief that a particular discipline cannot be both *useful* and *broadening*: despite attempts by Williamson (1986) and others to defend the role of arts graduates in the economy, there appears to be a general agreement that a degree which encourages "independence in criticism" will not also

be a degree which will enable the graduate to perform important functions for the economy. Warren Piper (1984) argues that "all educational systems try to encompass all three purposes" (p. 23); he implies that higher education should achieve both goals (a cultural and a vocational education) - but through separate disciplines. In other words, the aims of higher education are not the same for all those who receive it; on the one hand, there are many disciplines whose students are not learning skills which will directly equip them to play a part in the division of labour, whilst on the other, it is difficult to argue that a mechanical engineering student (say) and a classics student are acquiring a "common culture."

This division of purpose between disciplines has caused comment and concern in many areas - from C.P. Snow's *The Two Cultures* in 1956 (further discussed in Chapter 4) to the Leverhulme Report (1983), which criticised the "early specialisation" of the British education system and called for the introduction of two-year broad-based degree courses. However, far from this occurring, our education system has become increasingly specialised in recent years.

Even from a brief sketch such as this, it is possible to see that higher education has been characterised by a plurality of aims, and that these aims have not had an easy co-existence. The 1985 Green Paper, for example, emphasised the importance of science and technology (and therefore vocational qualifications) *at the expense of* the liberal humanities. The cultural and educational implications of this plurality will be further examined in chapter 4; however, the issue of the diversity of aims is closely connected with another issue: that of access.

ii. Who is higher education for?

It is because there is so little agreement about the purpose of higher education that there is equally little agreement about who should receive it. A functional view, which looks only to the needs of the economy, would clearly wish to limit numbers who are highly educated. If higher education is merely about equipping graduates with the necessary skills to perform certain specialised jobs - such as jobs in management, medicine, law and engineering - then, clearly, there has to be a limit to the number of people who should be allowed to enter higher education. Society only has need of a certain number of specialists. As the Green Paper puts it:

> "So long as taxpayers substantially finance higher education...the benefit has to be sufficient to justify the cost...Immediate entry to higher education should not automatically be seen as the next step for young people who have just successfully completed A-levels." (p. 10)

Conversely, if higher education is about providing a "common culture", or meeting the needs of the individual for self-development, then there could, arguably, be an almost limitless supply of higher education places. The view of deterministic Marxists, such as Bowles and Gintis (1976), is that the chief purpose of education, higher education included, is not to equip people with skills but to legitimate inequality by making it appear that the people who are most successful are so because they are more intelligent and hard-working; the supply of higher education places is restricted precisely because it must appear that only a few people are capable of high achievement. Further, the restriction of access to courses by certain professional bodies (in this country, the BMA, for example), increases the prestige (and hence pay) of those jobs.

It is precisely because many educationalists are unclear about the aims of higher education that arguments over access are sometimes muddled. Liberal egalitarians who may instinctively feel that, for the sake of social equality, access should be widened, often find themselves arguing on their opponents' grounds. For example, Fulton's (1981b) argument for widening access is based partly on the fact that there are many able working-class students who never reach higher education; "this untapped pool", he says, "constitutes not only a social injustice but also a severe wastage of scarce talent which the nation can ill afford." (p.14) He also says, however, that there is a "lack of hard evidence to associate educational expenditure with economic growth." (p.6) Higher education here, then, is seen as beneficial both for the individual and for society as a whole. However, Fulton's reasoning is somewhat faulty. If one wanted to rectify the class imbalance in students entering higher education, it would be possible to increase the proportion of working-class students without increasing the total numbers of students entering higher education. It is debatable too, whether society can "ill afford" such a "severe wastage of scarce talent;" it surely depends on whether one sees "the nation" as a more or less homogeneous group of people with shared interests, or as consisting of many diverse groups with conflicting

interests. If the latter, then it is very difficult to argue that the expansion of higher education would be in *everybody's* interests.

It would be wrong to suppose, however, that the higher education system as it exists at present has a clear set of criteria about the entry qualifications it demands of would-be students. A-level entry requirements are decided both by supply and demand (the numbers of students applying for particular courses) and by the desire of departments to manage a convenient and efficient - if not always fair - admissions system. Consequently, the A-level entry grades required of prospective students varies from university to university, polytechnic to polytechnic, subject to subject, department to department and may even vary within one department from year to year (depending on the number of applications) or from student to student. This is not to argue that requiring everyone to gain the same A-level grades would be "fair"; research by Martini, Mortimore and Byford (1985) shows that different examination boards have widely varying standards, whilst other researchers (e.g. Bagg, 1968; Sear, 1983) have found very low correlation between A-level grades and degree classes. (While this has generally been seen as a failure of the A-level system, it could equally plausibly be seen as a failure of the degree examination system.)

Clearly, neither the potential ability of students nor the needs of the economy are the sole determinants of access to higher education. It is perhaps more appropriate to regard the current higher education system as the product of a particular historical process in which some groups have had more influence than others. There are several interested parties in the area of higher education; these include the colleges themselves, academics, students, potential students, schools, tax-payers, government, education authorities, employers and capital. Even the government is not all-powerful here; we have a tripartite system in which the universities are relatively autonomous, but whose relationship with government is mediated by the UGC; whilst the polytechnics and institutes of higher education are (at present) funded by local education authorities. (Since the research on which this thesis is based was completed, moves have been made to tighten the control of central government through proposals to abolish the UGC and to remove polytechnics and colleges of higher education from the control of local authorities.) Each interest group may

attempt to block or advance change; for example, it is arguable that the reason that a loans system has not replaced a grants system is because of the pressure exerted on government by middle-class parents (who are also electors.) It is not, therefore, possible to regard higher education as 'pure'; it has no single purpose, and hence no single policy on access; it is subject to the wishes of a variety of more or less powerful interest groups: this is not to deny that the Marxist view of education (discussed more fully in the next chapter) has some force, but it is to suggest that higher education, at least, has a degree of autonomy from the State.

This chapter has looked at the entry of women into higher education and the currrent state of higher education. It has noted that the history of higher education, since the 19th century, has been one of expansion, followed by recent contraction. As higher education has expanded, so has the proportion of female students increased; however, attempts were made in the 19th century to channel women into the liberal humanities subjects and women have remained dominant in these areas whilst being less well-represented in vocational scientific areas. *Higher education itself has* not been the subject of clear and reasoned policy-making, but has been characterised by a plurality of aims and beliefs, some of which have conflicted. Chief amongst these is the division between those who believe education should 'functional' and those who believe it should be 'liberal.'

This chapter, then, has raised issues for further exploration. One of these is the 'functional'/'liberal' division and its association with a science/humanities division. Chapter 4 will consider the implications of these divisions for a study of gender and will examine their importance in education. Another issue raised is that of women's position in higher education today: has the entry of women into higher education in large numbers meant increased equality? Does the differing subject specialisation of the sexes have any significance for gender inequality? Does the feminist perspective have anything unique to add to our understanding of higher education? Finally, is higher education a goal to which women should aspire, or part of a continuing process of excluding women from the most desirable employment? Chapter 3 wil examine these issues.

CHAPTER 3:
FEMINIST APPROACHES TO EDUCATION

3.1. Introduction

This chapter will look at feminist theory, and the contributions that it has made to educational debate about gender inequality. It will not deal with the anti-feminist arguments, such as those put forward by the sociobiologists, because it is felt that the debates between feminists are more interesting and more constructive for this research than the rather sterile debates between feminists and anti-feminists. Maccoby and Jacklin (1974), in a wide-ranging review of the literature on sex differences demonstrated fairly conclusively that there are very few genuine psychological or mental differences between men and women. This chapter will take it for granted, then, that arguments which suggest that women are genetically less intelligent than men, or that they are more 'mediocre' (Heim, 1970) are incorrect.

Neither will this chapter be a comprehensive review of the literature on gender and education. It will be selective, examining the ways in which feminism (and the different strands of feminism) can help us to understand the inequalities of gender that exist within the education system. The aim is to provide a working paradigm for the research project itself.

Put at its simplest, and its broadest, feminism states that the position of men and women in society is unequal, or, as Janet Radcliffe Richards (1982) puts it, that "women suffer from systematic social injustice because of their sex" (p. 13). Feminists want to rectify that injustice. In reality, however, the situation is more complex; while most feminists are agreed that women are disadvantaged in the family, in the labour market and in the education system, they do not agree on the causes of injustice, nor on the means of tackling it. These divisions within feminism are reflected clearly in writings on sex inequality in education. In order to discuss the differing positions on education, it is helpful first to categorise the different types of feminism. For the purposes of this chapter it is convenient, if not entirely accurate, to divide the different positions into three main groupings: liberal, radical and socialist/Marxist. Frequently, the divisions between the groupings are blurred (it is, for example, fairly difficult to categorize someone like Germaine Greer, who has remained outside the mainstream of the women's movement), but for the purposes of discussing education, such groupings can help clarify the difference between certain writers and place them within a wider framework.

Until recently, most of the research work on sex inequality had been undertaken by liberal feminists, and thus it is with the ideas of liberal feminism that the discussion will begin.

3.2 Liberal Feminism

Betty Friedan, author of *The Feminine Mystique*, first published in 1963, has often been called (despite the publication in 1949 of Simone de Beauvoir's *The Second Sex*) the "founder of modern feminism." There is no doubt that *The Feminine Mystique* did make an enormous contribution to the modern women's movement, although it is likely that the impetus for that movement was already under way when the book was published. It was important in that it articulated the discontent of well-educated, middle-class women who had graduated from college only to find themselves in the limited and unfulfilling role of wife and mother - a job with few rewards, either financial or intellectual, and one which entailed complete dependence on another human being for survival. Friedan found that those women whom she interviewed suffered a loss of identity, a sense of not knowing what they wanted to do or why they were in the position they were in. Her description of the lives of these women is chilling: it is a picture of emptiness and regret. Time and again she quotes them as saying "You do want more, only you don't know what it is" and "Sudddenly there was this feeling of emptiness."

Friedan referred to this as "the problem with no name"; women were unable to give a label to the feeling they experienced, and were unaware that other women might feel the same way. Friedan, however, attributed the problem to the "feminine mystique"; the idea perpetuated by newspapers, women's magazines, advertisements and television that a woman's sole function in life, her sole method of gaining happiness was through marriage and the bearing and rearing of children. The problem was "simply the fact that American women are kept from growing to their full human capacities" (p.318). Her solution to the problem is to open up for women the chance to go back to college and train for interesting professional work:

> "The executive's wife or the scientist's wife at thirty-five or forty, whose children are all at school is hardly going to be helped to the new identity she needs by learning to take a more detailed, vicarious share of her husband's world. What she needs is training for creative work of her own. " (p. 316)

The limitations, both of Friedan's definition of the problem, and her solution to it, are immediately apparent. She is attacking the *ideology* of a society, not its power structures. She partly blames Freud, for example, for the creation of the "feminine mystique"; and she blames advertisements and women's magazines for its perpetuation. One might say that she mistakes cause and effect. Friedan does not ask *why* the feminine mystique exists; why men should try to persuade women to stay at home and rear children. She puts it all down to prejudice and attitudes:

> "We need a drastic reshaping of the cultural image of femininity that will permit women to reach maturity, identity, completeness of self, without conflict with sexual fulfilment. (p.318)"

She implies that if attitudes are changed, then everything else will be all right; and, curiously, it is the attitudes of *women*, not of *men* that need changing:

> "A massive attempt must be made by educators and parents - and ministers, magazine editors, manipulators, guidance counsellors - to stop the early-marriage movement, stop girls from growing up wanting to be 'just a housewife', stop it by insisting, with the same attention from childhood on that parents and educators give to boys, that girls develop the resources of self, goals that will permit them to find their own identity." (p.318)

Thus, there is no hint that women's subordination, their confinement to the home and the private sphere, might be in someone's *interests*; it simply appears as an historical accident, the result of prejudice and attitudes. And it is just as easily removed by changing those prejudices and attitudes. Friedan's solution - to send women back to colleges to receive an education - is equally short-sighted. It is an individualistic solution. Women, she suggests, must change as individuals; she does not posit a collective solution. In line with America's competitive ethos, it is, of course, only possible for a few to succeed. Not only that; it is a solution which it was impossible for the majority of American women even to attempt. White, middle-class women were not the only ones to feel trapped; there was a huge number of black and working-class women - and for that matter, men - who felt similarly trapped and who had no way of escaping their prison. Friedan did not seem to realize that it was not only middle-class housewies who needed self-fulfilment and a sense of identity; very many people in dull, badly-paid and unchallenging jobs also needed it; and they lacked even the material benefits of those women married to scientists and executives.

Another flaw in Friedan's solution was that it simply advocated 'equal rights'; it did not look at the question of *values*. In other words, women should become like men; they would pursue the same goals, follow the same career structures and lead the same lifestyles, despite the obvious difficulties of this, given women's position as non-paid childminders and workers in the home. She does not suggest a radical reshaping of the way lives and careers are structured; instead, middle-class women could become like middle-class men, with other women being employed to look after the children.

Friedan's thesis was, then, severely limited by her inability to tackle the issue of power relations and the interests at work in the perpetuation of the 'feminine mystique'. Nonetheless, she did make an important contribution in her recognition that there *was* a problem - no mean feat in the America of the 1950s and 60s - and in her description of the forces shaping the lives of so many middle-class women. Her bald cataloguing, for example, of the contents of one issue of a woman's magazine in Chapter 2, is enormously effective in demonstrating the sheer extent of the oppressive ideology at work to keep women in the home and out of the public sphere.

The Feminine Mystique was extremely influential; its description of the emptiness of the lives of middle-class housewives struck a chord in the hearts of many women who felt similarly unfulfilled; and the "equal rights" feminism it advocated was eagerly taken up by organizations which were set up to campaign for *more* women - more women politicians, more women scientists, more women in top jobs. Amongst these, of course, was the organization Friedan herself set up; the "National Organization of Women" (NOW). One of the central tenets of the liberal viewpoint was that education could bring about important changes in society, and in particular, the elimination of inequality between the sexes. If women could be educated to the same level as men, then, it seemed, all would be well.

The "equal rights" feminism of Friedan's book provided a paradigm for many of the initiatives and ideals of the 'second wave' of feminism, when much attention came to be devoted to the issue of education. A good deal of the early American literature on gender and education was rooted in the liberal framework - a framework which argued that women had to change, and women had to be better educated in order to succeed, to be "as good as

men". The emphasis was on individual achievement, not on improving the lives of women as a group.

Liberal feminism has, however, made a large contribution to the debate on education in Britain as well (although, interestingly, where there is a large American literature on women and higher education, the literature in Britain is very small.) Education was perceived as important, not only because it had the power to change society, but because in its present state it seemed to embody so many of the attitudes and values of a society in which the sexes were deemed unequal. Thus a great deal seemed to rest on Education; on the one hand it was partly responsible for the inequities of society; on the other, by changing Education, one could remove the inequities. Thus liberal feminism operated within a similar paradigm to that of the liberal educationalists of the 1950s and 60s, who believed that change in the education system could bring about an increase in the proportion of working-class children obtaining good, 'middle-class' jobs.

Liberal feminists tend not to challenge the economic system under which we live, believing it to have the potential for fair and meritocratic treatment of indivdiuals. They have often, therefore, justified their belief in greater equality through a functionalist appeal to the demands of the economic system. For example, Woodhall (1975) uses the idea of 'human capital' to prove that if society invests in women's education, the benefits will be as great as if it invests in men's education; her view of the economic system itself is, therefore, completely uncriticial. As O'Donnell (1984) has rightly argued, however, employers are not always interested in taking on the 'best educated' candidates; she points to the fact that in areas such as veterinary science and architecture, female graduates experience far higher levels of unemployment than their male peers. In addition, 'human capital' arguments take place on the opponents' terms: if it could be proved that society does *not* gain as much from educating women as it does from educating men, then feminists would have lost the argument.

Just as liberal educationalists put their faith in interventionist programmes such as the Educational Priority Areas, initially recommended by the Plowden Report (1967), so it should not surprise us that some liberal feminist research has attempted intervention, two major projects being Girls Into Science and Technology (GIST) and Women Into Science and Engineering (WISE). (INSIGHT courses which encourage 6th form girls to take

engineering are also run annually.) These two schemes are particularly interesting, because their aim was not to increase the numbers of women going to university or polytechnic or passing O-levels (because girls were achieving near-parity with boys in these areas), but to increase the numbers of girls taking up *science* subjects, GIST being chiefly directed at the under-14s, pre-'O'-level, and WISE being aimed largely at sixth formers. Both GIST and WISE appeared to be motivated by four beliefs: one, that women would only achieve equality with men if they could enter traditionally male-dominated jobs, and therefore earn as much money as men; two, that science qualifications were the key to entering these male-dominated jobs; three, that the country was short of trained scientists and engineers and women were an untapped resource; four, that because girls had been 'socialised' into holding stereotypical beliefs about what was appropriate behaviour for their sex, they had to be actively persuaded to make non-traditional (i.e. scientific) subject choices. As an article on WISE in 'New Scientist' made clear:

> "During 1984, WISE will be aimed chiefly at schoolgirls. The object is not to belittle an arts education, but to encourage those girls who simply drift into arts subjects because they think they are easier or more feminine, to think again." (Ferry, 1984, p. 10)

The same point is made by the EOC (1982):

> "If girls are taught from an early age that science is a subject to be studied by all pupils, and is not 'only for the boys', then some of the problems relating to girls' under-achievement in science in the secondary school will be resolved." (EOC, 1982, p.4)

The assumption that girls only take arts subjects because they regard them as more 'feminine' or because they do not appreciate that science is open to all students pervades the literature on the GIST and WISE projects. It can be seen particularly clearly in Whyte's (1986) report of GIST. The explicit aim of GIST was to increase the numbers of girls opting for science and craft subjects at age fourteen in ten Manchester schools. It attempted to do this through promoting a more positive image of science that would appeal to girls, and through helping science teachers develop a more 'girl-friendly' teaching style. The final results were largely inconclusive in that, in some of the schools, the numbers of girls opting for science increased, whilst in others, they decreased. A similar pattern - or non-pattern - emerged in the control schools. Part of the problem was undoubtedly the attitude of many of the teachers, who regarded the GIST

project as motivated entirely by a misguided feminism, and who resented any implication that they did not treat all children equally. However, part of the problem was also the attitude of the GIST team themselves. They seem to have held the naïve belief that changing female pupils' attitude towards science was a simple matter; worse, they disregarded any concern that women in science can face severe problems. This can be illustrated by one intervention in particular, the decision that several female scientists and other women in 'non-traditional' jobs would visit the schools and give talks about their work. Whyte is here discussing the briefings given by the researchers to the female volunteers:

> "Occasionally, a woman attended the briefing whom we felt would not present a positive image to the highly stereotyped sub-teenage population they [sic] were going to meet. Some indeed fitted the 'typical scientist' image and either dressed with cheerful disregard for the latest fashion trends or obviously found it difficult to communicate with people. One or two appeared to have a 'chip on their shoulder' about discriminatory treatment they had experienced because of their choice of a non-traditional career. We stressed the need to appear positive, and for the women to present themselves as 'rounded' feminine beings, i.e. mention how they combined home and family life with their jobs." (p.74)

This condescension seems to have been typical of the GIST project. While one can understand the team's reluctance to have people who were not good communicators or who were not well-dressed, the aim seems to have been to present to students a distorted picture of reality. Any woman who might complain about discrimination was not allowed to speak to the pupils, with the result that students were, in effect, deceived about the difficulties of being a woman in a 'non-traditional' job. (Whyte reports later that many pupils asked the women whether they'd experienced discrimination or difficulties). There was also obvious anxiety that women should emphasise their "femininity" - the fact that they were married and had children - thereby reinforcing, rather than dispelling, the pupils' ideas of what women's lives should be like. The GIST team also seems to have taken an extraordinarily ingenuous attitude towards the issue of 'role-swapping'; men in non-traditional jobs were also brought in to speak to children, and these included a 'house husband', a 'male cleaner' and a 'male nursery nurse' talking favourably about their work. It seems that the issue of economic power was not tackled. Caring jobs are the most underpaid and exploited in our society; there is a certain piquant irony in

the idea that GIST workers thought that they could persuade boys to become nursery nurses by showing them what a wonderful job it was.

So keen were the GIST team to ensure that girls had a positive image of science that they brushed aside any moral issues raised by science itself. For example, a female metallurgist working for British Nuclear Fuels visited the schools to talk about her work and to explain why we need nuclear power; in a footnote Whyte says that "it would have been beyond our brief to try and balance such talks with alternative views." Why it should have been beyond their brief is unclear; Whyte says elsewhere that girls were particularly interested in the social effects of science; perhaps a discussion of nuclear power would have been the ideal forum for bringing those interests to the fore. The problem lies in the word "image"; the GIST team wanted the pupils to have a "positive *image*"; similarly, the Physics Education Committee (1982) states that science has a "masculine *image*" and that efforts should be made to give it a more "feminine *image*". This constant emphasis on image begs the question: what about the reality?

Because the GIST team were anxious to persuade girls to take science, and because their framework assumed that girls' failure to do so was the result of stereotypes and prejudices held by girls and teachers alike, they failed to take any sorts of initiatives which might challenge those assumptions. For example, they appear not to have asked pupils themselves about their reasons for their subject choice, being much more concerned with questionnaires about attitudes to science. Neither did they look at those subjects where girls do well and are 'over-represented': French, for example, or biology. They were not able, therefore, to find out whether boys dominated, bullied and intimidated girls as much in the modern languages classrooms as they apparently did in the science labs; nor were they able to find out how the pupils themselves explained and interpreted their own decisions.

The key to the GIST team's approach was their belief in *socialisation*: the idea that individuals are conditioned into certain forms of behaviour and holding certain beliefs which determine their roles in later life. No sociologist would dispute the existence of socialisation: it is an inevitable part of social existence. In feminist thought, the emphasis is on the socialisation into sex rôles, that is, the acquisition of gender-appropriate behaviour. The problem is really a question of how

socialisation works; whether it is a matter of imposing an identity on a passive child, who willingly accepts it (and who can then, just as easily, be 'de-socialised'), or whether it is at best limiting and confining, a process which can be accepted, rejected or adapted by children as they grow older. If we concede the possibility of the latter, then it is much more difficult to blame girls' 'failure' on their socialisation.

The idea of 'socialisation' has long been a central one in feminist theory. Delamont (1980), for example, spends a chapter discussing socialisation in the early years of a child's schooling, noting the way in which girls are discouraged from being independent, assertive or talkative, and the way in which they are encouaged to be passive, pretty and 'feminine'. She argues:

> "schools develop and reinforce sex segregations, stereotypes and even discriminations which exaggerate the negative aspects of sex roles in the outside world, when they could be trying to alleviate them." (Delamont, 1980, p.3)

Byrne takes a similar stand:

> "A child will learn to behave following the praise or criticism of parent, teacher, other children. Girls are praised for being quiet, clean, tidy, helpful; and criticized for being muddy, rough, noisy, lazy and untidy." (Byrne, 1978, p. 84)

The socialisation process is held responsible for girls' under-representation in science subjects; Johnson and Murphy (1986), for example, conclude their review of the literature on girls and physics by saying:

> "it should be clear from the evidence...that the root of the problem most probably lies...in differences in early socialisation experiences." (p.26)

- a conclusion which would no doubt be echoed in most of the eighty or so references they cite.

It is recognized, then, by most feminist writers on education, that passive, docile, nurturant behaviour is encouraged in girls, whilst assertive and dominant behaviour is encouraged in boys. Most also note that in educational terms, boys are encouraged to develop a bias towards mathematical and spatial reasoning, whilst girls are encouraged to develop a verbal and linguistic bias. This is reflected in the toys children are given to play with in infants' school: girls are encouraged to take part in 'people-centred' activites - dolls, Wendy houses and so on; whilst boys play with Meccano and lego sets. What is interesting about the liberal

feminist viewpoint in all this, however, is that most of the criticism of socialization into sex rôles is directed at the socialization of *girls*. Like Friedan, many liberal feminists believe that it is girls who must change. Boys' socialization is almost perceived as not important; if boys grow up to be 'successful', then the socialization of boys need not be changed. Girls, in other words, should be more like boys. Here, for example, is Kelly (1981b):

> "Socialisation is not a crude matter of repressing young girls' natural curiosity and independence." (p.83)

One then expects her to say something like, "it is also a matter of repressing boys' emotions and nurturative instincts." Instead, she says:

> "It is a subtle and delicate process in which the developing child plays an active part." (p.83)

Thus, only *girls'* socialization is seen as important, and thus it is *girls* who must change. Attitudes are seen as more important than actual structures:

> "I would argue that sexist attitudes are fundamental to patriarchy, and that a campaign to change attitudes can be truly revolutionary." (p.83)

Five major criticisms can be made of this approach. The first, as Walden and Walkerdine (1982) point out, is that it ignores the question of gender *relations*. If for example, we say that women are nurturant, what we mean is that they are so in comparison to men. Similarly, if we argue that women are subordinate, then it must be because we believe that men are dominant. The significance of one sex's possessing certain characteristics is entirely dependent on the other sex possessing different characteristics; changing one sex is less important than changing the relationship between the two. If feminists fail to grasp this, then their efforts will be fruitless. (One could equally say that working-class children should adopt middle-class attitudes towards education, whilst failing to recognise that we cannot all be middle-class; the two classes exist by virtue of their relationship to each other.)

The second problem with the socialisation approach is that it assumes that what men do is better. As Kelly's (1981) account of the IEEA study shows, boys generally do better at science; but they also do worse, on average, at languages and tests of verbal ability. Yet there are no schemes called "Boys into Arts and Languages". We are rarely told *why* scientific

ability is more important than linguistic ability; it is a taken-for-granted fact that it is.

Thirdly, if we emphasise girls' socialisation at the expense of boys' socialisation, and other factors, we subtly load the responsibility for change on to girls themselves. We suggest that because they want to become nurses or mothers instead of engineers, that they do not "really" know what is best for them. If they were free from socialisation, we argue, they would of course want to do all the jobs that men do now. Thus we fail to take girls' attitudes seriously, whilst believing that boys possess the "correct" attitude. As Acker (1981) astutely puts it:

> "Researchers must guard against any temptation to regard the relatively low aspirations of girls compared to boys as resulting from girls' short-sighted perceptions or sluggish motivations... Such arguments often blame the victim, without appreciating that such decisions are made by rational individuals who may well make the best of a particular situation or even opt for a future that despite its devaluation by society allows the pursuit of important values." (Acker, 1981, pp. 91-2)

The point Acker is making is not that girls should be encouraged to remain at the bottom end of a sex-segregated labour market but that, as Blackstone (1976) has argued, the traditionally low-status female occupations should be revalued and their importance recognised.

Fourthly, by over-emphasising girls' socialisation, we fail to recognize that women do not always behave according to the dominant sex-role stereotype. For example, as Walden and Walkerdine (1982) have again pointed out, girls do better than boys at mathematics and other subjects at primary school, when the effects of socialisation should be at their strongest. A relatively high proportion of women (comparative to men, that is, not as a proportion of the whole female population) despite their socialisation, do go on to become lawyers, doctors, opticians and teachers. In fact, the most noticeable sex differences occur at the top of those professions, not at the bottom. If socialisation is so important, it would prevent these women taking up these occupations in the first place, not preventing them from aiming higher after they had entered them. It may be that the discriminatory structures that exist in society are more important than the 'internalised' attitudes of women themselves.

Finally, the socialisation/sex-role approach, particularly as manifested in projects such as GIST, makes the mistake of thinking that, just as

children are easily socialised into certain attitudes and types of behaviour, so they are easily socialised out of them. The GIST researchers thought that if science held negative, masculine connotations for girls, then it would be an easy matter to make science hold positive, feminine connotations for them. They failed to recognise that people are complicated, that gender identity (whatever form it may take) is an important part of an individual's personality. It is not something that can be shaken off; it is a complex part of the individual. As Segal (1987) in her discussion of role-theory, puts it:

> "Another problem with the role theory approach was, and remains, the passivity and infinite malleability it attitributes to human social behaviour. It leaves little space for appreciating the types of understanding, improvisation, resistance and psychic conflict that indivdiuals bring to the social roles expected of them...role theory analysis, which sees people as inevitably conforming to the social expectations surrounding them, cannot adequately explain the over-riding significance we each attach to our sense of gender identity, its force and power over us, despite all the personal confusion and insecurities which surround it." (Segal, 1987, p. 120)

Gender identity is, perhaps, something we construct and re-construct in our daily lives; not something static, malleable, entirely the result of social expectation, but fluid, changing, made from our interactions with other individuals and with institutions. Once we begin to examine the ways in which individuals construct their identity and meanings in every day life, we can learn far more about the ways in which society operates to perpetuate sexual inequality. We need, perhaps, to take people's decisions seriously: rather than asking Why Don't Girls do Science? we might ask how girls and boys construct the meaning of 'science' and of 'arts', and whether this is related to the way they construct their identity as girls and as boys. Perhaps we could begin to find the answers to these questions by *asking* people about their decisions, rather than through making prior assumptions about them.

3.3. Liberal Feminism and Higher Education

Liberal feminism's emphasis on socialisation has resulted in a neglect of the issue of higher education. Because socialisation takes place in childhood and adolescence, the damage has been inflicted by the time girls are ready to enter higher education, and therefore little can be done about those who have made the "wrong" choices. Action must be directed at girls

when they are young. In addition, higher education is seen as an end to which to aspire; Byrne (1978) argues that women in higher education are a successful elite and that therefore their position is unproblematic. Our attention, she argues, should be turned to those women who do *not* make it to higher education. Similarly, Friedan is optimistic in seeing higher education as a solution for those women who feel trapped and unfulfilled in their roles as wives and mothers.

Few attempts have been made to theorise the the relationship between gender and higher education. The analysis of Deem (1978) - generally a more astute critic of the education system than the liberal feminists - illustrates the problems of the overemphasis on socialisation. She identifies three barriers to the access of women into higher education: women's tendency to specialize in very popular subjects such as the arts, for which there is a lot of competition; parents', teachers' and friends' tendency to encourage girls to lower their aspirations; and women's internalization of the sexual division of labour. She thereby unwittingly blames women for their 'failure' to reach higher education; the only solution to the problem as posed by Deem is to change women's attitudes. Similarly, Chisholm and Woodward (1980) identify early socialisation and channelling as the barrier to female graduates competing in the labour market on equal terms with men. Thus the process of higher education itself - and the mechanisms of the labour market - are not regarded as instrumental in determining women's future occupations.

In this sense, the broad position of liberal feminism has little to offer to a study of higher education. Those studies that do exist (e.g. those collected in Perun, 1983) over-emphasise both sex differences in the attitudes of male and female students and the 'prejudice' of those in authority, whilst paying little attention to the experience of women in coping within male-dominated educational structures. That said, there have been studies examining the attitudes of female students which are potentially useful for this research.

Komarovsky (1946), in her classic study of female students, found that female students experience a good deal of conflict between the experience of higher education as prepation for a career and the social expectations that women should be passive, 'feminine' and marriageable. Pressure to do well in examinations and get a good career comes from tutors, whilst

pressure to be attractive and to get engaged comes from family, male peers and non-university female friends. The result was that many of the women "played dumb" when they were with male students because they knew that the men didn't like clever women: clearly, cleverness and femininity were seen as mutually exclusive. Similarly, Harris (1974), in an anecdotal account, found several instances of female undergraduates being dissuaded by male academics from doing post-graduate work on the grounds that they ought to get married instead; for example:

> [To a young widow who had a five-year-old child and who needed a fellowship to continue at graduate school] "You're very attractive. You'll get married again. We have to give fellowships to people who really need them." (p.298)

It can be hypothesised that when the subject studied by women is considered particularly 'masculine' - physics, for example - the pressure to conform is even greater. Those women who do try to shed their 'femininity' (that is, what society regards as 'femininity') in order to be taken seriously, may have a hard time of it; Watson's remarks on the scientist Rosalind Franklin, in his book *The Double Helix*, are directed not at her scientific abilities but at her lack of "femininity" and the fact that she did not wear lipstick or smart dresses.

Lewis (1984) has conducted research on the experience of female physics undergraduates at York University, and he raises this same issue, that "girls are presented with a dilemma between maintaining their feminine identities or becoming closely identified with the study of physics." Lewis's study is useful; he started from the premise that the opinions and attitudes of the female students were of interest and value in themselves; his use of unstructured interviews enabled students' accounts to be heard in a way that questionnaire studies, for example, don't. Interestingly, he found that female physics students do not fit the stereotype of 'introverted scientist' or 'conservative scientist' described by other researchers; rather, the women the interviewed were outgoing, had many and varied hobbies, such as music, reading and theatre, and led an active social life outside of physics. Unfortunately, Lewis did not interview male physics students as a comparison; we have only the word of the women that the male students were more introverted, less outgoing and had hobbies, such as computing and car mechanics, which were related to the course. The women apparently felt that it was more worthwhile to have a wide range of

interests outside of physics, depsite the fact that the boys' hobbies had 'functional' benefits in helping them do well in their work. One woman, for example, said:

> "I think that a university education should be a general education. It's not just as if we're here only to do physics, there are so many other things to do. We would become very narrow-minded if all we were interested in was our subject." (p.118)

However, Lewis does not pursue this issue in any detail. Although these findings raise interesting questions about the nature of physics - whether the study of physics demands a single-minded dedication to the subject - and about masculinity and femininity - whether for example, women felt conflict between 'feminine' pursuits like theatre and their course work - Lewis tends to skirt around these issues, noting the differences but not exploring them.

Lewis also, however, made other important findings: that women tend to be competitive, because they feel a need to 'prove themselves' in a male-dominated subject; that most women, unlike the male students, do not intend to go on to do Ph.D.s (because "universities are so much out of contact with the real world that I couldn't possible stay on"); that women felt their male peers to be immature and incapable of coping with life outside the discipline. The irony of this is, of course, that in rejecting the academic environment, in questioning the all-embracing importance of the subject one is studying, in having broader interests, women do not go on to do academic work, and the masculine domination of physics at university level is maintained. Lewis concludes that,

> "the result of women physics students developing the perspectives we have outlined can only serve to ensure that the university sector will play a substantial part in the continuing role of education as a contributor to social differentiation." (p. 127)

This conclusion is important because it is critical of higher education, seeing it as instrumental in the reproduction of inequality - a position very different from those so far outlined in this section.

Lewis's work contains much which is of interest, and it is a pity that he does not go beyond some of the findings to question our definitions and our understanding of academic disciplines. For example, he accepts that physics is "one of the hardest subjects to study", and looks at women's experience in the light of that belief, rather than questioning why physics is considered to be so difficult - and how that is correlated with the

small numbers of women taking it. Similarly, he rejects the women's belief that staying on at university to do postgraduate research in physics is a sign of immaturity: yet their belief that universities are 'artificial' and not part of the 'real world' is surely of interest and needs further exploration.

Lewis believes that women who choose to study physics are, generally, more able than their male counterparts because they are better-motivated. Leaving aside for the moment the issue of whether this is borne out by A-level results and degree results (to be examined in detail in Chapter 6), it is worth noting that a study by Clay (1982) found that female undergraduate students in physics did not do better in term examinations than the male students. He finds this surprising because he had expected "girls who are capable of performing well in school physics to be more likely to continue in physics than their peers." He suggests that the reason for the women's lack of brilliance may be the result of the university's "socialising effect" which means that

> "students pace themselves with their peers and achieve only what is necessary to keep pace and retain their place in the peer group" (p.234)

or it may be that, as physics is a subject which has been created and developed by men, we cannot reasonably expect women to do well in it. He argues that women should perhaps develop a "physics-female" (i.e. as opposed to the current subject "physics-male") which is more suited to a majority of women and useful only for a small number of men. Clay doesn't tell us what "physics-female" will look like, though he suggests that astronomy is less sexist than physics, and he has earlier argued that women are more successful at "bookwork" questions than at "problem type" questions. His study leaves much unsaid, but the issue of women's achievement in science is an interesting one - as is the complementary issue of men's achievements in the arts.

3.4 Radical Feminism

Both radical feminists and Marxist feminists tackle the issue of sexual injustice in a very different way from the liberal feminists. Both groups begin from the premise that sexual inequality is a *political* issue, that it concerns power relations. Where they differ is on the question of *who*

holds power in society, who ultimately has control. For radical feminists, the answer is simple. As Millett (1983) puts it:

> "the military, industry, technology, universities, science, political office and finance - in short, every avenue of power within our society, including the coercive force of the police, is entirely within male hands." (Millet, 1983, p. 25)

Patriarchy, in the radical feminist analysis, is the system by which men maintain power over women. This system of power relations is perpetuated both at the *material* level - that is, by the military, police, industry and so on, as Kate Millett argues in the extract quoted above - and at the *ideological* level - the media, education and socialisation. It will be clear that the radical feminist view of socialisation differs from the liberal feminist in that it regards socialisation, not merely as perpetuating misplaced attitudes and prejudices, but as a necessary tool in maintaining male dominance.

This theory of the complementary rôles of material and ideological forces in maintaining dominance has much in common with that put forward by Althusser (1971), who argues that education is instrumental in reproducing the relations necessary for the functioning of the capitalist state. Indeed, as a parallel theoretical analysis, radical feminist thought has much in common with traditional Marxist thought. The work of Shulamith Firestone (1979) provides a lucid example of this parallel in that she borrows extensively from Marx and Engels, using their theory of the dialectic and transposing it on to the historical division of the sexes; in this analysis, sex oppression is not a result of the class society, but the reverse. Here, for example, is Firestone's paraphrase of Engels:

> "Historical materialism is that view of the course of history which seeks the ultimate cause and the great moving power of all historical events in the dialectic of sex: the division of society into two distinct biological classes for procreative reproduction, and the struggles of these classes with one another; in the changes in the modes of marriage, reproduction and child care created by these struggles; in the connected development of other physically-differentiated classes [castes]; and in the first division of labour based on sex which developed into the [economic-cultural] class system." (Firestone, 1979, p.20)

Firestone sees women's oppression as being rooted in their biology; men were only able to seize power, she argues, because women were handicapped by child-bearing. The overthrow of oppression (and it doesn't do justice to her complex book to summarise it in this way) will be achieved by the

ending of biological maternity and the advent of technological reproduction. The unlikelihood of this happening - or if it does happen, of its being used for the benefit of women - means that Firestone's analysis presents a fairly hopeless picture.

Millett, too, recognizes the analogy with class, but argues, like Firestone, that the sex division is more important than the class division:

> "it is possible to argue that women tend to transcend the usual class stratifications in patriarchy, for whatever the class of her birth and education, the female has fewer permanent class associations than the male. Economic dependency renders her affiliations with any class a tangential, vicarious and temporary matter." (Millett, 1983, p.38)

Thus, Millett argues, women's class position is almost completely dependent on the social position of their husbands or fathers. This, however, does not have the effect of radicalising women; on the contrary, women are deeply conservative because:

> "they identify their own survival with the prospects of those who feed them." (p.38)

Women thus identify with their husbands rather than with other women, because men have been successful in creating divisions amongst women, in particular the

> "antagonism between whore and matron...between career woman and housewife." (p.38)

Women's identification with their husbands is, therefore, reactionary; women must identify with each other, before progress can be made. But Millett also recognizes another facet to women's oppression: that "knowledge is power". She argues that the continuation of patriarchy is dependent upon women's being kept in ignorance. Men, she says, have appropriated knowledge - that of technology in particular - and excluded women, rendering them powerless:

> "a large factor in their subordinate position is the fairly systematic ignorance patriarchy imposes upon women." (p 42)

She notes the correlation of the male/female division with the arts/science division, pointing out that, in the fields of science and technology,

> "the exclusive dominance of males in the more prestigious fields directly serves the interests of patriarchal power in industry, government and the military." (p.42)

And of the arts/science divide:

> "since patriarchy encourages an imbalance in human temperament along sex lines, both divisions of learning (science and the

> humanities), reflect this imbalance. The humanities, because not exclusively male, suffer in prestige: the sciences, technology and business, because they are nearly exclusively male reflect the deformation of the "masculine" personality, e.g. a certain predatory or aggressive character." (pp.42-43)

The fact that women and men are driven into widely differing, and opposing spheres, not only in material ways (such as the exclusion of women from public life), but in the pursuit of knowledge itself results in men's and women's experience of the world being very dissimilar:

> "Because of our social circumstances, male and female are really two cultures, and their life experiences are utterly different - and this is crucial" (p.31)

Indeed, it *is* crucial; and this idea of the "two cultures", echoing Snow's "two cultures" (1959) is extremely important in radical feminist thought. It is particularly so when we discuss the feminist response to education. Here, for example, is Germaine Greer:

> "most educated women have simply been admitted to the male academic culture" (Greer, 1979, p. 107)

Later she says:

> "If women understand by emancipation the adoption of the masculine role then we are lost indeed. If women can supply no counterbalance to the blindness of male drive the aggressive society will run to its lunatic extremes at ever-escalating speed." (p. 114)

Thus we see a clear rejection of the equal rights feminism of the liberals; Greer, like Millett, is arguing that women should not aim to be like men, but should make use of the values which have become "feminised" through centuries of oppression. For example,

> "Male logic can only deal with simple issues: women, because they are passive and condemned to observe and react rather than initiate, are more aware of complexity. Men have been forced to suppress their receptivity, in the interests of domination." (p.109)

There are three points to be made here. The first is that Greer is saying that men are *not* better; it is quite wrong to want to imitate men, because masculine values, around which society has been constructed, have brought us to the brink of disaster. The second is that Greer recognizes that success in this society usually means success in male terms; if women succeed, they usually succeed, not as women, but as honorary men. The third is that she is clearly rejecting the idea that male and female socialisation are equal; in fact, they are asymmetrical. Women are able, not only to

perceive the way in which they themselves experience the world; they are able, because of their constant exposure to the male viewpoint, to perceive the way in which men experience it.

These ideas have important implications for a radical feminist critique of education. Education is both about culture, and about knowledge. Children bring with them to their education their differing experiences of life and their differing cultural values and beliefs, which may or may not coincide with the cultural values imparted to them in their schooling. It is in the area of education that we can examine Millett's idea that women are kept in "systematic ignorance", and Greer's that "educated women have simply been admitted to the male academic culture."

In contrast to the view of gender and education which seeks to encourage more girls into science, and enable girls to achieve "equally" with boys, much radical feminist work has concentrated on the ideas of "culture" and "knowledge". They have argued that knowledge, as defined by our society and taught in our schools, is *androcentric* - biased towards men's experience of the world. Women's experience, argues Spender (1981), is systematically excluded from what is known as "knowledge". Worse, what is merely "male knowledge" has historically been presented as objective and value-free. When women try to get their own experience recognized on the curriculum, argues Spender,they are accused of being "subjective", when in fact they are trying to redress the balance:

> "Men have provided us with a false picture of the world... not just because their view is so limited, but because they have insisted that their *limited* view is the *total* view. They have insisted that their *male* experience of the world is the *human* experience, and this has necessitated denying the experience of women where it is different from the experience of men. Women have raised the problem, again and again, but because it is not a problem of male experience, men have dismissed it." (Spender, 1982, p.16)(emphasis in the original.)

One example given by Spender is that of history: if we look at history textbooks about the nineteenth century, we will see few or no references to the women's movement; yet women were fighting to be accepted into the universities and to receive the franchise. Women's experience, as Spender puts it, has been turned into "non-data".

Because of the tendency of male researchers to view the male as 'norm', (Walker, 1982), many have been puzzled when their results for women are

different from those for men. Instead of modifying their theory, as one would reasonably expect, they decide to ignore women altogether or dismiss the women's results as an 'anomaly':

> "A famous example of this kind of occurrence in psychology is the research on achievement motivation, where early studies showed predicted results for boys, but confusing ones for girls. Rather than modify their theories, researchers thereafter excluded girls from their samples." (Acker, 1981, p.86)

It is not simply the exclusion of women and women's experience from what is deemed 'knowledge' that is significant to feminists; it is the fact that all 'knowledge' is seen from a male perspective. Lewis (1981), for example, noting that the French Revolution has conventionally been designated a period of liberation by historians, has argued that, for women, it was a regressive period. Thus changing history as a discipline is not simply a matter of writing women in; it is a question of altering the whole framework and perspective from which we look at it.

Education and knowledge are closely linked. Spender, like Young (1971), challenges the *content* of education, the curriculum itself. Recognition is not given in schools to the female perspective; knowledge is taught from the oppressor's viewpoint. The example about history cited above could not be more clearly illustrated than by this exchange between a male teacher and a female pupil in a London comprehensive:

> *Female Student:* But why did they go to war? They didn't really have a reason. It seems such a stupid thing to have done.
> *Male Teacher:* Yes, well I don't expect *you* would understand. It's the men who make these decisions and they had lots of reasons, didn't they? *(Appealing to the boys).* That's why women look after the home and men look after the nation. *(Laughter)* (quoted in Spender, 1982, p. 104)

The above example shows a male teacher putting a female pupil firmly in her place and such incidents are, argues Spender, not uncommon. She sees the mixed sex classroom as an arena where men control women; the teacher's authority concerning what knowledge is taught means that girls' 'knowledge' can be easily devalued; and teachers can use other methods of trivializing girls. For example, teachers, according to Spender, spend far more of their time talking to boys than they spend with girls. Having recorded certain lessons, Spender found that even when teachers were making a conscious effort to interact with girls, they spent 65% of the time talking to boys - and the boys complained that they were being ignored.

Although this finding is supported by Megarry (1981) it has been challenged by other researchers (see e.g. Kelly's (1986) meta-analytic review of the literature); perhaps Spender's lack of a systematic research framework should make us cautious of accepting all her claims.

However, another of Spender's observations, that male teachers in particular were often unable to remember girls' names and tended to see them as an homogeneous mass, whilst treating boys as individuals, has been supported by Clarricoates (1978) and Stanworth (1981). Clarricoates, in her work in primary schools, found that teachers deliberately tried to involve boys more than the girls both because of "the problem teachers have in controlling boys and the fact that girls consistently score higher in intelligence". One teacher quoted by Clarricoates said:

> "It's a bit harder to keep the boys' attention during a lesson... at least that's what I've found so I gear the subject to them more than I do the girls who are good at paying attention in class." (p. 357)

Other quotes from teachers showed that they expected girls to be passive, obedient, neat, tidy and less imaginative than boys; in fact, many teachers insisted that girls *were* these things. Spender (1982) demonstrates the fallacy of this when she shows how teachers' judgment is affected by their beliefs about gender:

> "Confronted with elaborately prepared projects where much time and attention had been given to setting out the work, teachers are inclined to be contemptuous if they think the work is by a female. Comments such as 'I think she could have spent more time on getting some facts than on making it look pretty' or 'Typical, isn't it? All that effort just to make it look nice - you can't beat girls for being concerned with appearances' were common. But when I indicated that the same work was the product of a *boy's* effort, the praise was almost overwhelming: and it wasn't just the presentation that caused comment, for invariably the content, the 'facts', were seen to be more substantial as well." (Spender, 1982, p.79)

Not only are teachers biased against girls, however; Spender (1982) and Mahony (1985) show evidence that boys harrass and intimidate girls in the classroom. Boys, it seems, appropriate space, appropriate the teacher's time, and subject any girl who breaks their rules - for example, by being 'too clever' or talking too much in class - to severe intimidation, sometimes to the extent of actual sexual assault; and such assault or harrassment is often ignored by male teachers who regard it as harmless

fun. That harrassment is a widespread problem is supported Whyte (1982), hardly a radical feminist herself, who noticed during her work on the GIST scheme that boys persistently intimidated girls in the science labs and refused them access to equipment. Wolpe (1977) noted that, in the school she studied, sexual harrassment of female pupils by male pupils was regarded as a trivial problem.

Both Mahony and Spender regard this constant harrassment as boys' means of controlling girls. They are simply exercising their patriarchal authority. As radical feminists, they believe that the answer is to segregate girls and boys into single-sex schools, freeing girls from the trivializing of their ideas, allowing them to develop as individuals, and removing the assault and harrassment to which they are subject in co-educational schools:

> "By removing the group which dominates and excludes the experience of women, single-sex schools can allow women to express and validate their own experience, to develop some autonomy, to build some confidence." (Spender, 1982, p.121)

Research generally supports this opinion; girls do, in fact, achieve better, particularly in mathematics and science subjects in a single-sex environment. An NFER study (Pidgeon, 1967), in which maths tests were given to 12,000 pupils attending all types of secondary school, showed that girls from single-sex schools had a better maths performance in each of the age groups tested compared with girls from co-educational schools. Steedman (1980) found that girls from single-sex grammar schools performed better in maths than girls from mixed grammar schools, although she went on to say that the single-sex grammar schools "creamed" the best pupils from the mixed grammar schools. In an experiment in Stamford School (Smith, 1984), it was shown that whereas girls' mathematics scores were equal to those of the boys on entry in the first year, by the end of the year, boys were scoring more highly. When, however, some of the classes were put into single-sex groups, the girls in these groups started to score more highly again, whilst the girls in the mixed sex groups fell further behind. Mahony (1985), too, cites several instances in which girls do better in a single-sex environment than in a mixed-sex one. Deem and Finch (1986) have argued, on this basis, that women in higher education should be entitled to a single-sex education.

Because the relationship between the sexes is based on power, Spender (1981b) is scathing about liberal feminist attempts to attract women into science:

> "It has become 'fashionable' to speak in terms of traditional and non-traditional careers and occupations in relation to women, and to advocate counselling females to enter non-traditional areas, as if the problem were simply one of women's incapacity to appreciate that they too were permitted entry to the scientific and technological establishment. The implication often is, that all is required is the provision of some sympathetic and supportive advice designed to acquaint women with the fact that physics or engineering, for example, are open to them. Such superficial analyses and solutions are not only insulting to women, they also ignore the distribution of power in society and the academic world, and the way in which males have appropriated and defended that power." (p.110)

The radical feminist position, then, is that men hold power in society which they exert over women. Women are oppressed and rendered powerless. At the level of ideology, men present this situation as being entirely normal and natural; if women wish to change it, then they are "abnormal" or "denying their natural instincts." In education, men control what is taught; partial, male knowledge is presented as the whole truth; and tactics are used to exclude women from the more prestigious forms of knowledge, such as science. Education is a means of reproducing the existing social relations and controlling women, forcing them to accept their own inferiority.

3.5 Radical Feminism and Higher Education

This analysis of education is extended to include higher education in the radical feminist framework. Radical feminists have tended to see higher education as a continuing process in the reproduction of gender relations (e.g. Acker, 1984b). Women who reach higher education are not deemed to be successful by virtue of having done so; on the contrary, higher education continues to exclude and marginalise its women students, pushing them further into 'female' jobs or marriage and family. That female graduates do not follow the same career paths as male graduates is supported by empirical evidence: Kelsall et al (1970) found that six years after graduating, only 56% of their sample of female graduates were in paid employment; of those, 68% were working in education (almost entirely school teaching) and "very few women were employed outside teaching, social work

or scientific research." Crompton (1986) has argued persuasively that a general increase in women gaining academic qualifications "may not necessarily result in any changes in the gender composition of the occupational structure" (p.34), although she also argues that the large numbers of women reading professional subjects will mean a substantial increase in numbers of women in the professions.

Radical feminists argue that higher education, like the education system in general, is a bastion of male power and dominance; Rich (1979b), for example, says that the university is "a system that prepares men to take up roles of power in a man-centred society" (p.127) Radical feminists would therefore expect to find that higher education discriminated against women and regarded women's experience as irrelevant.

The findings of Spender and Clarricoates that teachers regard female students as academically inferior is, by and large, supported by the evidence on higher education; Harris (1974), for example, quotes a male lecturer as saying:

> "We expect women who come here to be competent, good students, but we don't expect them to be brilliant or original." (p.298)

This is significant, because it is possible, as Rosenthal and Jacobson (1968) have argued, that expectations affect academic performance. The research of Goldberg (1968), Spear (1984), Bradley (1984) and Spender (1984) all suggest that teachers may judge students' work on the basis of students' sex rather than solely on the merit of the work. Similarly, many radical feminists (e.g. contributors to Spender, 1982 and to Bowles and Duelli-Klein, 1983) have shown that higher education curricula are as biased towards male experience as secondary education curricula.

If we note, too, that women are less likely to obtain first-class honours degrees or to do postgraduate work (see chapter 6), then the evidence points to the conclusion that higher education does reproduce gender inequality. However, whilst this conclusion is more interesting and suggestive than seeing higher education merely as the training of an 'elite', it is somewhat problematic in that it begs the question: *Why* should higher education reproduce gender relations? It seems very wasteful that women should enter higher education at the expense of the state and then not take their place in the top professions. It is implausible that it could be functional for the state for women to 'waste' their

qualifications either by leaving the labour market to raise children or by entering jobs which do not require graduates. On the contrary, it would appear to be dysfunctional for the State; and, indeed, perhaps the government, in its decision to cut university places in female-dominated arts subjects, recognises this. Clearly, if the patriarchal State of the radical feminist analysis were particularly anxious to keep women out of good jobs, then it would be more sensible to stop women entering higher education altogether. In reality, society is more complex than many radical feminists allow; the State, the government, employers, higher education institutions and individuals may all experience conflicting interests. We shall return to this point in the conclusion to this chapter.

3.6 Marxist Feminism

Radical feminist theory is not, therefore, without its problems. Just as Young (1971), Bowles and Gintis (1976) and other radical or socialist educationalists have ignored the issue of gender, or have tried to relegate it to the status of a function of capitalism, Spender and other radical feminists ignore the issue of class. Thus, although Spender would probably agree that class is important, she does not choose to discuss it, and would regard the oppression of women by men as being the prime power relationship in society. The result of this is a theoretical over-simplification in her work. Whilst she demonstrates quite clearly that girls are discriminated against in the education system, and whilst her arguments that education serves to maintain male dominance are cogent, she does not acknowledge the complexity of the interactions between sex and class. For example, it is an undeniable fact that whilst 42% of university students are women, only a tiny proportion of university students are working-class. Spender also fails to tackle the arguments of Marxists like Bowles and Gintis (1976) who believe that passivity and docility are rewarded in the classroom: according to Spender, it is aggression which is rewarded; yet it is surely the case that at least in extreme instances, aggression is punished; and remedial classes tend to be full of boys, not girls. Similarly, one's chances of entering higher education or getting a well-paid job are affected not so much by one's sex as by the type of school one attends: pupils from public schools are far more likely to stay on in the sixth form, take 'A'-levels and go to university than pupils from

a comprehensive school (Social Trends, 1984). Although *within* each class, men are more likely to succeed (in terms of education, job status and so on) than women, it cannot be said, for example, that working-class men exert any real power over, or even have any significant advantage over, middle-class women. Kate Millett's assertion that women are classless ignores the fact that many women do take on well-paid professional jobs, and thus do have very definite class interests. Further, Millett's belief that the "life experiences" of men and women "are utterly different" is surely wrong; it is difficult to see that the life experiences of a wealthy, educated white woman are more like those of a black, working-class cleaning woman than they are like those of a wealthy white male.

The problem with radical feminism is not just, however, that it ignores the mediating experiences of race and class, or sees them as secondary. It is that it regards the system of male dominance - patriarchy - as universal and unchanging. It ignores the different forms male dominance has taken in different cultures in different eras; it therefore accepts patriarchy as inevitable, not something to be fought or challenged. Many feminist theorists (e.g. Stanley and Wise, 1983), therefore, seem to be advocating a retreat into the personal and the subjective. This defeatism is also apparently accepted by Spender who argues that whatever women do, "it can be arranged to suit patriarchy" (quoted in Segal, 1987, p.26) As Segal (1987) has pointed out, Spender seems to be arguing that men's power over women is simply a matter of controlling definitions, and nothing to do with the material (and changeable) realities of oppression. (We can see what Spender's answer to this would be in her comments on Mary Daly in *For the Record*; she answers criticisms of Daly's failure to look at the material side of oppression on the absurd grounds that such a criticism "evaluate[s] her work against patriarchal standards." (p.205))

Because patriarchy is seen by some radical feminists as inevitable, many appear to have accepted traditional male views of women as *naturally* and *essentially* more gentle, more in touch with Life, more morally aware. Having accepted this, there is no need to do anything to change society, because the problem is not society, but men; and men are unchangeable. (Daly, 1978, is one of the most persuasive exponents of this view.) No longer are masculinity and femininity social constructions, but biological realities.

Despite my reservations about radical feminism, it is nonetheless true that the relationship between the sexes is a political one, and changing that relationship is not simply a matter of changing attitudes and getting rid of prejudices. A crude Marxist analysis, which reduces the oppression of women to the demands of capitalism is also unacceptable; to argue that women are oppressed simply because it is advantageous to capitalism is to deny that men benefit in any way from women's subordinate position. As Hartmann (1981) has argued:

> "Just as capital creates these places indifferent to the individuals who fill them, the categories of Marxist analysis, 'class', 'reserve army of labour', 'wage-labourer', do not explain why particular people fill particular places. They give no clues about why *women* are subordinate to *men* inside and outside the family and why it is not the other way around. Marxist categories, like capital itself, are sex-blind." (Hartmann, 1981)

Marxist feminists are, then, faced with the problem of reconciling an analysis which states that women are systematically oppressed by men with one which states that the working-class is exploited by capitalism. In recent years, many such attempts have been made; for example, the contributors to Eisenstein's *Capitalist Patriarchy* (1979), to Kuhn and Wolpe's *Feminism and Materialism* (1978) and to Sargent's *Women and Revolution* (1981). Such attempts have been fraught with difficulty, chiefly because conventional Marxism does not accommodate feminist theory. Marx does not take women's unwaged labour, or their servicing of men, into account, and thus Marxism, as a theory, is unable in itself to explain women's oppression. In addition, Marxism's claim to 'scientificity' must meet with serious objections from those who believe that knowledge is socially constructed, and that claims to 'objectivity' are usually a means of avoiding certain disturbing questions.

It is perhaps easier, then, to avoid attempting an all-encompassing theory of women's oppression, but to recognize, as Barrett (1984) has done, that whilst women's oppression is almost universal, it has taken different forms in different types of society. Thus, under capitalism, women's oppression is not simply a question of individual men oppressing individual women, nor of men in general oppressing women in general; it takes the form of exploitation in the labour market, which has become essential to maintaining capitalism - low wages, harsh working conditions, little job

security - as well as exploitation in the home and family. Barrett puts it more lucidly than I can:

> "A model of women's dependence has become entrenched in the relations of capitalism, in the divisions of labour in wage work and between wage labour and domestic labour. As such, an oppression of women that is not in any essentialist sense pre-given by the logic of capitalist development has become necessary for the ongoing reproduction of the mode of production in its present form. Hence, the oppression of women, although not a functional pre-requisite of capitalism, has acquired a material basis in the relations of production and reproduction of capitalism today." (Barrett, 1984, p.249)

Thus, Barrett argues, it is not possible to simply explain women's oppression as a function of capitalism; women's oppression is not necessary to capitalism *per se*, although it has become necessary to it historically, through "the historical struggles of men and women, both within the working class and the bourgeoisie." Neither is it possible, however, to state simply that patriarchy is a universal and unchanging system, to which all others are reducible:

> "It follows that although important dimensions of women's oppression cannot be accounted for with reference to the categories of Marxism, it is equally impossible to establish the analytic independence of a system of oppression such as the category of 'patriarchy' suggests. The resonance of this concept lies in its recognition of the trans-historical character of women's oppression, but in this very appeal to longevity it deprives us of an adequate grasp of historical change. How useful is it to collapse widow-burning in India with the 'coercion of privacy' in Western Europe, into a concept of such generality? What we need to analyse are precisely the mechanisms by which women's oppression is secured in different contexts, since only then can we confront the problem of how to change it." (Barrett, 1984, p.250)

Smith (1981) makes a similar point:

> "To...understand the contemporary relations between men and women in ways that can lead to fundamental changes, feminists must be prepared to explain how and why such historical processes take place and how and why old forms of domination are supplanted by new ones. By asserting the existence of a system of social relations theoretically immune from capital, although empirically caught up in it, we ignore the presence of that process and its effects on our lives." (Smith, 1981,p.106)

Thus to see patriarchy as an universal and unchanging system is usually to reduce women's oppression to biological differences (as Firestone does) or to men's psychological need for power. Such a reduction leaves little hope for change, and leads to the separatist philosophy of the radical feminists

and an emphasis on individual and personal change rather than on attempts to confront the specific oppressions of male domination under capitalism.

Whilst there has been a good deal of Marxist theorising about the role of education in perpetuating capitalist relations, little has been written specifically by Marxist-feminists - perhaps partly because of the difficulties of bring two philosophies to focus on the subject of education at once. Straightforward Marxist analyses have, on the whole, been deterministic, arguing that education trains people to take their place in capitalist society. Althusser (1971), for example, argues that the continuation of the capitalist state depends on relations of dominance and subordinacy. These relations are reproduced on the one hand by active repression - in the case of the army or the police - and on the other, by ideological state apparatuses, the prime example of which is the education system. Capitalist society could not function unless workers were willingly passive and subordinate; they had to be agents in their own repression. Schools train children to take their place in capitalist society by making them passive and submissive; the majority are trained to take their place as workers, a few (those already belonging to the ruling-class) as leaders. It would be wrong to assume that all children learn in school is "knowledge":

> "...children at school also learn the 'rules' of good behaviour, i.e. the attitude that should be observed by every agent in the division of labour, according to the job he is 'destined' for: rules of morality, civic and professional conscience, which actually means rules of respect for the socio-technical division of labour and ultimately the rules of the order established by class domination." (Althusser, 1971, p. 127)

Wolpe (1977) is one of the few to attempt a Marxist feminist analysis of secondary education; her article 'Education: the Road to Dependency' deals with the ways in which educational reports (e.g. the Norwood Report and the Crowther Report) have legitimated curriculum differences for boys and girls. Wolpe's argument appears to be directly derived from that of Althusser; she argues that the functions of the education system are both to train pupils in skills appropriate to the "concrete division of labour" and to transmit the dominant ideologies; and she sees the two processes as being "inextricably linked". Ideologies themselves are, she says, "profoundly unconscious." While Wolpe's article convincingly demonstrates that the dominant ethos of educational reports has been to reinforce the sexual

division of labour, through advocating physical science and crafts for boys, and humanities and domestic sciences for girls, her analysis is perhaps weak, because it fails to examine what actually happens in schools; educational reports do not, after all, *make* education. A later theoretical article by Wolpe, 'Education and the sexual division of labour' (1978) moves away from an Althusserian argument to one which suggests that there are contradictions in the ideology of the British education system. In this, she argues that changes in the labour process have resulted in a disjunction between the skills taught by the education system and the skills (or, in a sense, lack of skills) demanded in the labour market. The consequence of this is that contradictory demands are placed on schools and colleges; and the attempt to "mould educational and training policies to suit particular types of demands" thereby "becomes the site of political and ideological struggles which have consequences for the system of education." In other words, there is no simple functional 'fit' between education and the demands of the labour market; change comes about through 'struggle' (this includes struggle between different factions in the dominant classes as well as the struggle of teachers, workers and other interested groups.) Through an extension of this argument, education is seen as a 'mediator' which mediates pupils and students to their appropriate roles in the capitalist system; girls, for example, are allowed to study physical science in school, but are also channelled into subjects such as home economics which instill in them their future role as wives and mothers. There is, then, a contradiction and a tension between the differing aims of the education system.

Barrett (1984) has strong disagreements, both with Wolpe's position and with Althusser's analysis. She begins her chapter on 'Education: Gender and Class' by looking at Althusser's theory of ideology and ideological state apparatuses. She castigates Althusser for referring to the education system as an ideological apparatus which is like all other ideological apparatuses present in society; education, she argues, is not determined by the economy solely in the last analysis; it is determined by the economy all the time. Education is quite explicitly an object of state policy in the way that 'ideology' in general is not. She does agree with Althusser that education is functional in reproducing class relations, but she argues that it is not possible simply to transpose a theory of the reproduction of

male dominance and female oppression onto a rigid theory of the reproduction of class relations. This is because, as argued above, gender relations are neither simply a *result* of the class system nor do they exist outside of it, so that

> "it would be difficult to argue, for instance, that the qualifications and skills imparted to a girl at a major independent school would in any sense 'equip' her for a place in the division of labour that was subordinate to that of a working class boy who left school at the minimum age with no formal qualifications." (Barrett, 1984, p. 139)

Thus Barrett attempts to show that education reproduces gender relations within each class; women, she says, have a dual relationship to the class structure:

> "The education and training that a woman receives by virtue of her class background provide a highly significant contribution to the position she will occupy in the labour force. Yet it is equally clear that the relationship she has to the class structure by virtue of her wage labour (or her ownership of the means of production) will be substantially influenced by the mediation of this direct relationship through dependence on men and responsibility for domestic labour and childcare. For working-class women this may result in simultaneous direct exploitation by capital via their own wage-labour and indirect exploitation via vicarious dependence on the wage of a male breadwinner. For bourgeois women this may result in simultaneous ownership of, yet lack of control over, capital." (p.139)

Thus Barrett argues that education serves to reproduce gender relations within a very specific class context - neither outside the class system nor reducible to it. Barrett argues that the process of reproduction of gender relations works at four basic levels: one, ideology; two, the structure and organization of schools and colleges; three, mechanisms which channel pupils into a sexual division of labour; and four, definitions of legitimate knowledge. Much of what Barrett says about these four categories has already been discussed in this chapter; under ideology, for example, she argues that children are socialized by teachers into appropriate 'feminine' or 'masculine' behaviour. Under structure and organization, she notes that the majority of head-teachers and heads of university departments are men, whilst women are at the bottom of the teaching profession. On the question of subject choice and the division of labour, she points to statistics which show that there are fewer women than men in higher education, and that they, like female school students, are concentrated in the arts and social

sciences, which obviously has implications for the jobs taken up by both women school leavers and women graduates. Most of this is fairly uncontroversial in the sense that it would be readily accepted by feminists of all political persuasions. It is on point four, however, that of knowledge and curriculum, that she differs from many other feminists. Although Barrett argues that what is often considered neutral, legitimate knowledge is androcentric and sexist, she rejects the idea, put forward by Michael Young (and, of course, many feminists), that "all knowledge is socially derived." Barrett believes that this leads to a totally relativist position, which would prevent us from being able to have definite knowledge about anything; even Young's own ideas, we would be forced to argue (and many writers have argued this), are only products of a specific time and place. Barrett believes that such a relativism is "a high price to pay for the demystification of existing bodies of knowledge" (p.150); in particular she argues that many feminists' denial of claims to objectivity for their knowledge, has led to a tolerance and a marginalization of 'women's studies' within colleges: because no special claims to truth are made for women's studies, they are easily tolerated and dismissed. Barrett believes that Marxism is a "'realist' science"; that objectivity is possible. Acker (1984b) has answered this by saying that "the aim is not to relativize knowledge but ultimately to replace pseudo-objective knowledge with a more truthful version that reflects human experience". (p. 40) In a thorny area such as this, compromise is difficult; Barrett's claims for the scientificity of Marxism are dubious; equally, Acker is right to reject a complete relativism. Barnes's argument (1977) is more satisfactory: that, although 'objectivity' in knowledge may be unattainable, this need not stop us from evaluating constantly the competing claims of theories to represent reality; there is no need for us to "value all knowledge equally" or to "provide a licence for any kind of nonsensical thought"; but as sociologists we ought to "recognise the *sociological* equivalence of different knowledge claims." Moreover, whilst we may accept that there is a reality "out there",

> "this reality should not be identified with any linguistic account of it, or, needless to say, with any way of perceiving it, or pictorial representation of it." (p.25)

Any existing reality is always mediated by our senses, our representations of what we see, and our cultural, historical and ideological

situation: a view which has significant implications for our understanding of the education system.

3.7 Marxist Feminism and Higher Education

So far, we have noted that radical feminists tend to regard higher education as instrumental in reproducing gender relations, whilst liberal feminists (on the whole) regard it as the training of an elite. Perhaps surprisingly, the Marxist position has more in common with the liberal position than with the radical feminist position. Althusser, for example, believes that higher education trains the ruling-class to take their position in society. Similarly, Wolpe, a Marxist feminist, says quite baldly that:

> "Those children who comprise the élite section of the education system are destined via higher education to fill the managerial, professional and higher executive posts of the country." (Wolpe, 1977, p. 20)

Wolpe is unusual in that she mentions higher education; others - Barrett (1984) and Macdonald (1980), for example - pay it no attention at all. Given the Marxist belief that education coerces, restricts and channels children, this is perhaps to be expected; it is more difficult to accuse higher education of coercion and channelling when most undergraduates have *chosen* to continue their education. The problem for Marxist and socialist feminists is that, whilst it can be legitimately argued that higher education trains the middle-classes whilst excluding the working-classes, the high proportion of women at undergraduate level means that male dominance is not similarly perpetuated by the exclusion of women. On the other hand, the small proportion of women in important and well-paid jobs suggests that women are 'failing' or being failed in some way, either in higher education or after it.

One possible Marxist-feminist position on higher education would be to suggest that the State has two conflicting needs, and that middle-class, educated women are the focus of the clash between these needs. On the one hand, the State requires that women work in the home; they should sustain and provide for male workers to enable them to work in the labour market. (e.g. Barrett, 1984; Hartmann, 1981). On the other hand, the State needs a pool of qualified engineers, managers, doctors, and so on, drawn from the middle-classes. It was inevitable, once access to higher education was

opened to women, that women should take up some of those positions, particularly when, as at present, there is a shortage of men willing to take up certain engineering jobs (many Marxist feminists have argued that women act as a "reserve army of labour" for capitalism, and there is no reason why this might not also be true in the higher status jobs, as well as manual ones.) As a result many middle-class educated women have undoubtedly internalised this conflict, undecided over whether they should start families (and take the most convenient work to combine with family raising, e.g. teaching or part-time work) or use their education to enter high-status, traditionally 'masculine' jobs. (For a discussion of this, see Chisholm and Woodward, 1980)

This is, however, merely an attempt to theorise a Marxist feminist position on higher education. In the final section of this chapter, I shall argue that there are problems with all the positions so far outlined, and suggest ways of arriving at an alternative position.

3.8 Summary

The account given in this chapter of different feminist theories is to a certain extent schematic. There are feminist theorists who do not fall clearly into any of the three camps; in particular there are left-wing and socialist feminists such as Deem (1978, 1980) who, whilst not as uncritical of the education system as some of the liberal feminists, would not accept all the premises of Marxist feminism. Further, as Acker (1984a) points out, "there are a significant number of individuals...who identify themselves in party political terms as 'socialists' but in sexual political terms as 'radical feminists'" (p.68) - amongst whom, Acker probably includes herself.

However, despite the variety of theoretical positions - and the potential variety of positions - what is remarkable is is that there has been no serious attempt to develop a feminist theory of higher education. Partly this must be due to the neglect of higher education by sociologists of education in general; partly it is due to the particular difficulties of theorising the role of higher education as a relatively autonomous institution. Perhaps the mistake of many feminists is in assuming that higher education must in some way be directly functional, either training an élite or reproducing gender inequality. Higher education does not necessarily operate in such a straightforward way - and its *intended*

functions (as outlined in Robbins, for example), may be quite different from its *actual* functions. It is possible that the autonomy of higher education, both from the state education system and from the LEAs, makes its relationship with the rest of society more complex and more open to change than that of secondary education: there is no law which says that women *have* to fail or succeed in higher education.

At this point, it is worth taking a brief look at the work of Michael Young, who has challenged both the optimism of liberal and reformist educationalists (such as Halsey) and the determinism of Marxist commentators (such as Althusser.) He argues that, in the past, sociologists of education concerned with inequity have concentrated on the deficiencies of working-class 'culture', and ways in which working-class attitudes to education could be improved, instead of looking at the real problem, which is the education system itself. Until now, he says, the education system had been regarded to some extent as neutral, providing value-free knowledge and assessment. What Young tries to do is show that 'knowledge' is socially determined, and that 'knowledge' taught in schools is simply part of ruling-class ideology. Unlike Althusser, however, he argues that "a recognition that the curriculum is a social construction could initiate change in schools with wide-ranging social consequences." (Young and Whitty, 1971) He rejects the view that a simple distinction can be made between the school as a 'determined', passively receptive, as in Althusser's model, or as 'determining' a force for social change, as in the old liberal model:

> "Only in a society in which 'theory' is institutionalized as separate from practice, and in which thought itself is separated from action, can abstract categories such as 'determined' and 'determining' counterpose each other as opposites." (Young and Whitty, 1977, p.12)

The 'new' sociologists of education, then, see the relationship between education and society as being a dialectical one, not a simple causal one. They see cause for optimism; unlike other radical, non-Marxists such as Illich (1973), they do not believe that the education system is inevitably stifling or repressive.

What is refreshing about Young's analysis is not simply that he moves from a crude deterministic model to a more variable one, but that he also moves away from a concentration on the selection of pupils and the organisation of schools to a concentration on the selection and

organisation of knowledge. Previous studies, argues Young, have overlooked this aspect of edudcation and have concentrated almost solely on the issues of why some children 'fail'.

Young has been criticised both for being over-optimistic (Sharp, 1980) and for adopting a completely relativist position which is ultimately anti-Marxist and regressive (e.g. Barrett, 1984) Nonetheless, Young's work is valuable to those who would make a critique of the education system because it makes a shift from looking at working-class children as 'failures' to examining the very meaning of 'success' and 'failure' in our society; from taking the value of knowledge for granted to examining the ideological nature of knowledge.

Although Young does not consider the issue of higher education, his non-deterministic analysis can be used very fruitfully to examine higher education, and in particular the problem of gender within higher education. Because universities have a relative amount of autonomy (more than polytechnics) and are - or rather, were - answerable to the UGC rather than directly to central government or local authorities, then it is clearly sensible to examine ways in which they can respond to, and initiate, social change. It is, therefore, possible to see higher education as an institution which only in an indirect and haphazard way reflects the dominant ideology. Further, Young explicitly stresses the organisation and selection of knowledge, rather than the selection of people. As Young suggests:

> "Research possibilities...might examine how 'subjects' or disciplines are socially constructed as sets of shared meanings." (p.5)

Given that there have also been studies, outside higher education, of knowledge, particularly scientific knowledge and how it is created, it might be possible to examine the practice of teaching and learning in higher education. The suggestion that we examine the social construction of disciplines has particular resonance when we consider the issue of gender; for, as we have seen, a major point of contention amongst feminists has been the reason for the exclusion of women from science (and the parallel, but much less frequently discussed, predominance of women in the arts.) Given, too, that many attacks on the androcentric nature of school curricula and of academic disciplines (e.g. Spender, 1981c) have come from feminists, it might also be useful to examine the way in which women and men experience the process of learning in higher education, and the significance

of social ideas of 'masculinity' and 'femininity' in the construction of disciplines in higher education.

Briefly, then, let us consider ways of approaching a study of gender in higher education which have arisen out of the study of different theoretical positions in this chapter.

First, we must tackle the issue of male and female subject choice and the experience of women and men within different disciplines. Rather than seeing men and women as passive recipients of the dominant social ideology, we can see them as active agents, making considered choices. Cockburn (1983) has argued that, instead of blaming women for not entering engineering and technology in large numbers, we should look at their reasons for not doing so. She suggests that women and girls are deliberately rejecting this sort of work, because they understand the hostility which will face them if they take it up, and because they see technology as being inhuman and irrelevant to them. Unlike Baroness Platt who says: "They must get over that [women's dislike of industry], because they're going to work in teams of people and they'll *love* it" (Ferry, 1984), Cockburn argues:

> "I would suggest that women know very well both where we are unwelcome and what we are rejecting. We are not failing, we are on strike." (Cockburn, 1983, p.17)

Cockburn's argument is that people are capable of acting rationally; they are not passive automatons obeying social pressures. They may *respond* to social pressure, but that is not the same thing. To follow up Cockburn's work will entail looking at the more positive aspects of women's choices; why, for example, they *choose* to study English or French, rather than maths or engineering, instead of assuming that they do so simply because they think it's more "feminine". We must view women and men as actively constructing their social world, not as passively determined by it.

Further, instead of seeing disciplines as absolutes, we can regard them as social constructs. We cannot take it for granted that the study of science is about the disinterested search for truth, nor that the humanities are concerned solely with subjective speculation. We should not be unduly concerned with the question of whether is not whether higher education is in any absolute sense functional, but with the ways in which both staff and

students create meanings, curricula and definitions in their everyday interactions and perceptions of what they are doing.

Finally, we must turn our attention to a group of people often neglected in studies of gender: men. We must understand the relationship between male experience of education and female experience; between male 'success' and female 'failure'; between the concepts of 'masculinity' and 'femininity' in different disciplines.

In order to design a framework for understanding male and female experiences of scientific and humanistic education, the next chapter will examine our commonsensical definitions of 'arts' and 'science', the history of their social construction and the place of these constructions in the education system.

CHAPTER 4: 'ARTS' AND 'SCIENCE'

4.1.Introduction

The previous chapter discussed the ways in which feminist theory can be used to develop an understanding of inequality of gender in higher education. This chapter will examine in more detail a topic introduced in Chapter 3: that of the issue of 'knowledge' in education. In that chapter, it was argued that some feminists had adopted an uncritical approach to science; this chapter will argue that terms such as 'science' and 'arts' should not be taken for granted, and that we should critically examine our ideas of what constitutes 'arts' and 'science'. It will be argued that the division which exists between different subjects, and in particular between the arts and the sciences, is not simple or straightforward, but related to our ideas of masculinity and femininity. That this is the case has significant implications for a study of gender and education. Young (1971b), talking of the debate about arts and science specialisation, has argued:

> "The whole 'subject-choice' and 'swing from science' debate presupposes taking as 'given' the social definitions implicit in our commonsense distinction between 'arts' and 'sciences'. What 'does' and 'does not' count as 'science' depends on the social meaning given to science, which will vary not only historically and cross-culturally but within societies and situationally. The dominant English cultural definitions of science might be characterized by what Habermas (1970) calls 'objectivistic', by which he means that we accept the scientists' claim that they 'apply their method without thought for their guiding interests'. In other words, an idea of science has developed in which what is thought of as scientific knowledge is abstracted from the institutional contexts in which it is generated and used." (p.21)

We are prone to see the arts/science divide as unproblematic, whilst at the same time endowing each grouping (for want of a better word) with a set of very specific, and opposing, values. To summarise these values, as identified by Hudson (1972), Weinrich-Haste (1986) and others, we can say that science is perceived as rational, objective, useful, masculine and, paradoxically, lower-class; whilst the arts are perceived as subjective, irrational, feminine and upper-class. Indeed, there is some degree of truth in these caricatures in that science as a discipline is more likely to be studied by men than women, whilst the reverse is true for that group of subjects we refer to as the arts; and, as Hudson (1972) found out, scientists are more much more likely than arts scholars to come from lower or lower middle class backgrounds.

Within these simple divisions however, there are yet more hierarchies. The pure scientist is rated higher than the engineer; the physical scientist higher than the biologist (e.g. Becher, 1981). Classics are considered more difficult than English or history. The novelist or the poet - that is, the *creative* artist - is more 'valuable' than the scholar or literary critic. There is a tendency to regard vocational courses - Law and Medicine aside - as 'lower-class' and non-vocational courses as upper-class - with the implication that the upper classes can afford to study for degrees that are not in any obvious sense 'useful'.

Social sciences seem to fall mid-way between the sciences and the arts, although many practitioners of the social sciences (in particular, psychologists) would like to be regarded, first and foremost, as scientists, because science has peculiarly strong claims to 'validity' and 'truth'. In particular, physics is seen as the most fundamental and objective of all sciences; all other knowledge, it has been argued, is reducible to physics. Physics, the study of the observable material world, seems to provide certainties in the way no other science is able.

Within these commonsense beliefs about knowledge, however, there are a number of assumptions: that it is possible, for example, to discover the 'truth' by certain scientific methods; that certainty is preferable to uncertainty; that knowledge about 'things' is more valuable than knowledge about 'people'; rationality is more important than feeling; the discovery of scientific phenomena is a more worthwhile activity than the application of them; and so on. We shall now explore the reasons for these assumptions and to suggest their relationship to our everyday notions about masculinity and femininity. We begin by looking at the idea that there are 'two cultures'.

4.2.The Two Cultures

C.P. Snow, in his 1959 lecture, 'The Two Cultures and the Scientific Revolution' drew attention to the ever-widening gulf between the practitioners of the arts and the practitioners of the sciences. As a starting point for a discussion of the arts/science dichotomy today, it is particularly useful, for it hints at much whilst leaving a great deal unsaid; it is also interesting for the fact that, as Rose (1987) has argued, he inverts the hierarchical relationship between the arts and the sciences.

Snow argues that the growing divide between the arts and the sciences is harmful and unnecessary. Academics in the humanities, he argues, are snobbish and elitist in their attitude towards the sciences, refusing to recognize scientists as 'intellectuals', whilst at the same time demonstrating appalling ignorance of basic science themselves. Scientists, on the other hand, did not understand much about the arts, but at least, to summarize Snow's argument, they were less likely to hold socially objectionable views; and they were also at the forefront of human progress.

Snow suggests that the practitioners of the humanities and of the sciences inhabit two completely different worlds, each with its own language, values and beliefs: in short, its own *culture*:

> "...the scientific culture really is a culture, not only in an intellectual but also in an anthropological sense. That is, its members need not, and of course, often do not, always completely understand each other; biologists more often than not will have a pretty hazy idea of contemporary physics; but there are *common attitudes, common approaches and assumptions*. This goes surprisingly wide and deep. It cuts across other mental patterns, such as those of religion or politics or class." (my emphasis) (Snow, 1959, p.9)

This passage is important, because in it Snow is hinting at, but not developing, the possibility that science is not simply a process of rational or objective discovery. Whilst we might easily associate the term 'culture' with art or artists, Snow is suggesting that the 'culture' of the sciences is even more tightly-knit than that of the humanities; that to practise science entails accepting a set of values and beliefs, whether implicit or stated. In this short paragraph, and in the lecture's title, he is anticipating the innovatory work of sociologists of science of the 1960s and 70s. Snow does not actually identify the features of the scientific "culture", although he says that its unifying characteristic is that scientists have "the future in their bones". The "traditional culture", on the other hand, "responds by wishing the future did not exist." In other words, science progresses inexorably; artists would rather it did not. Snow, although himself both a novelist and a science graduate, is firmly on the side of the scientists, and is happy to regard the scientific process as both linear and benevolent. He regards with some contempt the desire of 'intellectuals' to turn the clock back to the pre-industrial age, when in fact, the suffering amd hardship of the poor were much greater than in

industrial societies. "Industrialization", he says, "is the only hope of the poor".

Snow, of course, is right when he says that "young scientists now feel that they are part of a culture on the rise while the other is in retreat" (p.17) The status of science and scientific knowledge is forever increasing. He is no doubt also right to condemn arts scholars for their self-imposed isolation from science, their retreat into nostalgia and their unwillingness to contemplate scientific progress. But it is unfortunate that his view of science itself is strangely uncritical. Despite his recognition of science as a 'culture', embodying certain values and beliefs, he does not entertain the possibility that that culture might be other than progressive or beneficial to humankind. Snow argues that the beliefs of certain literary intellectuals - like Yeats - brought Auschwitz nearer; and yet he does not note that most of the atrocities of the Second World War were made possible by science.

The scientific culture of which Snow speaks does have one noticeable distinguishing feature, to judge from his lecture, which is that it is predominantly masculine. Women are not mentioned in the text, although they are generously accorded a footnote which reads: "It is one of our major follies that, whatever we say, we don't in reality regard women as suitable for scientific careers. We thus neatly divide our pool of potential talent in two." Although Snow does not pursue this further, the cultural exclusion of women from science does suggest that science might not be progressing in the objective and benevolent way Snow himself would have us believe. Let us now examine the characteristics of the two 'cultures' of which Snow speaks: first, science.

4.3. The 'Culture' of Science

i. The traditional view of science and nature

Merchant (1982) has pinpointed the mid-seventeenth century as the time when mechanistic notions about Nature, and hence our belief in scientific objectivity and rationality, began to take root. It was then that the belief in Nature as an organic and harmonious unity was abandoned, and replaced by a belief that Nature was external and chaotic; the rôle of science, as put forward by Bacon, was to control and exploit it. This, in turn, argues Merchant, was related to the increasing subjugation of women, and the denial

of women's rights through witch-hunts. Nature was frequently likened to the feminine, and science to the masculine; Nature was to be exploited in the same way that women were. As Brown and Jordonova (1982) put it:

> "...men possessed power through their identification with scientific knowledge. Simultaneously, women were conceptualized as the passive recipients of scientific manipulation." (p.398)

This changing view of nature went hand in hand with the industrial revolution and the growth of capitalism. It grew in force throughout the nineteenth and twentieth century; domination of Nature was seen to be the only path by which Man could progress. Freud expresses this view succintly:

> "Against the dreaded external world one can only defend oneself by some kind of turning away from it, if one intends to solve the task by oneself. There is, indeed, another and better path; that of becoming a member of the human community, and, with the help of a technique guided by science, going over to the attack against nature, and subjecting her to the human will. Then one is working with all for the good of all." (Freud, 1963, p. 14)

In contrast to the scientific view, the Romantic poets of the late eighteenth and early nineteenth century, in particular Wordsworth, regarded the relationship between Man and his environment as an extremely close, even unified, one. Wordsworth's poetry argues the necessity for harmony between humans and Nature. Thus a tension between the cold 'objectivity' of the scientist, and the subjectivity of the creative artist, was already apparent. It is perhaps not without significance that, even in this century, many creative writers, such as T.S. Eliot and D.H. Lawrence, have urged a return to a golden, pre-industrial era; whilst at the same time science has been moving us farther and farther away from the possibility of such a return.

In the nineteenth century, it was easy to see science as the arbiter of progress through objective observation of the natural world. In particular, the belief that science was objective and impartial was reinforced by the erosion of religious faith. Darwin's *Origin of Species* and *Descent of Man'* challenged the biblical creation myths, thus removing one great certainty and replacing it with another. Science was seen by many radicals as a force sweeping away myth and superstition, and bringing enlightenment (and perhaps revolution); Marx himself apparently wanted to dedicate 'Capital' to Darwin. Scientific knowledge has also been held in some awe by

sociologists of knowledge; whilst other forms of knowledge had been recognized as social constructions science, until recently, has been accorded a special status.

ii Alternative Views of Science

The special status accorded to science has, however, been challenged, by Kuhn (1962) and other philosophers, sociologists and historians of science.

Kuhn (1962) suggested that scientific progress was far from linear and orderly. Logical positivists had argued that it was possible to 'prove' hypotheses by means of empirical testing; in this way our understanding of the physical world was cumulative; one gradually came to 'know' more and more about reality. Popper had argued that, on the contrary, science progressed through 'falsification'; by trying to prove a theory wrong, instead of trying to prove it right, theories were strengthened and gained validity. His view, however, was still of a linear and orderly science:

> "Thus in science, as distinct from theology a critical comparison of the competing theories, of the competing frameworks, is always possible. And the denial of this possibility is a mistake. In science (and only in science) can we say that we have made genuine progress: that we know more than we did before." (Popper, 1970, p.57)

Kuhn's view, as set out in *The Structure of Scientific Revolutions* is quite different from that of either the logical positivists or of Popper. He argues that science begins as a series of competing theories, struggling for acceptance. Gradually one theory becomes dominant and ousts all the others, and scientific research proceeds within the framework - termed 'paradigm' by Kuhn - of that one theory. Kuhn characterizes this work as 'puzzle-solving' and refers to it as 'normal science'. Scientists working within a paradigm do not look for major new discoveries; they simply try to solve the problems posed by the current paradigm. Any anomalies tend to be accommodated by the ruling paradigm, as opposed to challenging it:

> "Normal science, the activity in which most scientists inevitably spend most of their time, is predicated on the assumption that the scientific community knows what the world is like. Much of the success of the enterprise derives from the community's willingness to defend that assumption, if necessary at considerable cost. Normal science, for example, often suppresses fundamental novelties because they are necessarily subversive of its basic commitments." (Kuhn, 1962, p.5)

Indeed, new theories may well be regarded unfavourably, and rejected out of hand. When a crisis comes, that is, when a paradigm no longer seems valid, a multitude of competing theories may arise again, and the scientific community is in a state of disarray. A 'revolution' occurs when the old paradigm is displaced and a new one takes over. The most obvious examples of scientific revolutions, says Kuhn, are those associated with the names of Copernicus, Newton, Lavoisier and Einstein, because these " necessitated the community's rejection of one time-honoured scientific theory in favor of another incompatible with it" and transformed both the "scientific imagination" and "the world within which scientific work was done." (p.6)

Kuhn's book itself initiated a revolution in the way philosophers, historians and sociologists of science think about scientific discovery. No longer, it seemed, could scientific knowledge be divorced from the specific historical circumstances in which it was produced. It was only one step from the idea that scientific discovery takes place within the context of a ruling scientific paradigm to the idea that it takes place within the context of the dominant social ideology. Ravetz (1971) has argued that the transition from the production of science on a craft basis, to the production of science on an industrial basis, has resulted in the subordination of science to the aims of capitalism; this means that it is increasingly difficult to challenge the dominant views within science. Some Marxists have also put forward powerful critiques of science and capitalism:

> "Because of the industrialisation of science and its overwhelming orientation towards accummulation and control, science has become ever more closely and directly emmeshed in the machinery of state and government, so that today there has developed a correspondence between the nature of the state and the institutions and content of science and technology." (Rose and Rose, 1976b, p.15)

While Marxists had always been ready to perceive an indirect relationship between base and superstructure when the superstructure had been seen to include Literature, Law, Education and the arts, science had previously been accorded a special status; it was value-free, untainted either by History or the means of production. Since Kuhn, however, both Marxists and feminists have pointed to a relationship between the modes of production and science (in the case of Marxists), and between patriarchal values of dominance and control and science (in the case of feminists).

Kuhn's work carried an implicit criticism of the way science is taught in schools: scientific progress is still presented as linear, with the individual great scientist occasional pushing back the boundaries of knowledge with a brilliant new invention or discovery - a distortion of they way science in fact proceeds. Feyerabend (1974), however, has carried this criticism much further. He argues that one of the problems with Kuhn's thesis is that it is not explicit whether it is intended to be prescriptive or merely descriptive. If the former, says Feyerabend, then science would be restrictive and stultifying. Instead, he argues, science does and should proceed by a variety of methods. He argues that to proceed only by rational means, by verification or falsification, for example, would hinder progress. In fact, the great scientists such as Galileo have proceeded by the use of ad hoc hypotheses, propoganda, rationality, imaginative leaps of judgment and appeals to emotion to win support. Attacking the idea that science should proceed by meticulous hypothesizing and empirical testing, he says:

> "Any such method is, in the last resort, a method of deception. It enforces an unenlightened conformism, and speaks of truth; it leads to a deterioration of intellectual capabilities, of the power of imagination, and speaks of deep insight; it destroys the most precious gift of the young - their tremendous power of imagination, and speaks of education." (p.45)

Capra (1979) has carried the arguments of Kuhn and other philosophers of science a stage further, in arguing that physics itself proves the inadequacies of the 'scientific' method. He argues that the discoveries of modern physics do not support the view that the world is discoverable by observation and testing; on the contrary, they support the earlier, Wordsworthian view (and the Eastern view) of nature as harmonious and organic; quantum theory shows that the universe is dynamic and interconnected, not mechanistic and separate. Thus complete knowledge of the natural world is never possible:

> "All natural phenomena are ultimately inter-connected, and in order to explain any one of them we need to understand all the others, which is obviously impossible." (Capra, 1979, p.303)

As Capra points out, however, modern scientists do not realize the implications of the world they have discovered, and still see Nature - and society - as fragmented and mechanistic. Indeed, the view of Nature as external and exploitable is integral to our beliefs about science today. To

quote Brown and Jordanova again:

> "The belief in human capacity to control nature is, in our culture, linked to the development of science, medicine and technology, and to the rational, refined analysis on which they are based." (p. 389)

Only if Nature is seen as being distinct from humanity can we argue that our knowledge of it is objective and rational; to accept the possibility of inter-connectedness is to allow for the possibility of subjectivity.

iii. The Challenge of Feminism

That science had to demonstrate its superiority by banishing the personal and the subjective is of the utmost interest. Why should impersonality and objectivity be considered more worthwhile than subjectivity and an interest in people? Given the evidence that scientific ability is developed in childhood and artistic ability in adolescence, when the emotions come to the fore, (Hudson, 1972, p.65), one might reasonably argue that an interest in people rather than things (to put the dichotomy at its crudest) is a sign of maturity, not worthlessness.

In the past fifteen to twenty years, feminist philosophers and sociologists of science have tackled this issue. Science, it has been argued, works within a patriarchal framework of control and dominance. The authority of the 'objective' legitimates the abuse of knowledge.

Historically, women's concerns have been with the bearing and rearing of children, looking after the old and the sick, whilst men's activities have been, as Hudson (1972) has put it, to "wage war, hunt animals and wield political authority." (p. 87) Women's activities, those concerned with caring for people, have been devalued, whilst men's activities in the public arena have been elevated. Thus an exclusion of personal feeling - or an *apparent* exclusion of personal feeling - has become a prerequisite for a science which is to serve the interests of one group.

Some feminists believe that science would change if more women practised it. There are those, such as Kelly (1981) who have tried to encourage more girls and women into science, believing that this would make science less 'masculine', whilst others, such as Keller (1983), have argued that science's 'masculinity' is a cause, not an effect, of the small numbers of women in science:

> "Objectivity is itself an ideal which has a long history of identification with the masculine. The fact that the scientific

> population is, even now, a population that is overwhelmingly male, is itself a consequence rather than a cause of the attribution of masculinity to scientific thought." (Keller, 1983, p. 188)

Keller's argument, although interesting, is impossible to prove or disprove, and perhaps it it is not fruitful to look at the equation of 'science' and masculinity in terms of cause-and-effect. It is impossible not to acknowledge, however, that this equation exists, and that a further equation, the association of power, control and impersonality with masculinity, and emotionality, feeling and subjectivity with femininity has continued into a modern capitalist society. Indeed, as Hartmann (1981) has argued, the values of capitalism are similar to those of patriarchy - and, indeed, science. Capitalism is concerned to put profit before people, to control and to exploit rather than to unite and co-operate. Science, whilst possessing great potential to improve the quality of the lives of the majority of the population, is used more and more to centralise power in the hands of a small number of people; despite the fact that fifteen million people die of starvation each year, "half of the world's scientists and engineers are engaged in the technology of making weapons". (Capra, 1983, p.2.)

Only a society in which domination and control are considered more important than the lives of its people could this be allowed to happen. Rose (1982) has argued, from a socialist feminist standpoint, that a two-pronged fight, against both capitalism and patriarchy is needed, in order to change the values of science. A feminist science, which restored the personal and the subjective to the practice of knowledge, would be a more *human* science. Similar ideas have been explored by feminists such as Overfield (1981), Wallsgrove (1980) and Fee (1983). These writers regard the Nature/Culture, subject/object, rational/emotional dichotomies as harmful, and believe that they must be overcome in order to produce a more humane science. Hubbard (1980) demonstrates that Darwin's theory of evolution is permeated with the values of a patriarchal, capitalist society. Rose and Hanmer (1976) point to the possible abuses of modern biological science against women. The message is the same, however: that the association of science with masculinity and objectivity is iniquitous and should be fought. Most point too to the enormous difficulties facing a woman scientist who might wish to change the challenge the 'masculinity' of

science. To argue this is not, of course to accept the essentialism of radical feminism; to argue that there is any real sense in which women are closer to Nature, whilst men are arbiters of destruction, is to tread on very dangerous ground, and to ignore the constantly changing nature both of human societies and of those societies' constructions of 'masculine' and 'feminine'.

We might ask: what of the scientists themselves? Why do they allow science to be used for the purposes of exploitation and control, instead of human progress? The answer of the scientists might be that science is objective and value-free; that the uses and abuses of science are not the responsibility of scientists.

It is now that we begin to see even more clearly the relationship between the 'objectivity' of the natural sciences and the concept of impersonal control which is so integral to their practice. The argument that science is neutral denies that scientists have moral responsibility; if scientists can divorce their practice from the use to which their discoveries are put, then they need feel no personal obligation if their discoveries are used immorally. Shulamith Firestone has said, of science, "Could one actually decide what to discover or not discover?" (Firestone, 1979, p.172) The question is naïve; as Kuhn argues, scientists working within the framework of normal science know exactly what they want to find out; and when scientists are funded by government or military organizations, they are usually told (sometimes quite specifically) what to discover. Gone are the days of the lonely scientist working in his lab on mysterious and indeterminate substances; now the scientist is very much a part of the organization that employs him. That this reality is not presented in the teaching of science in schools is, it can be argued, an important part of the socialization of the young scientist, who can grow up believing that his work is morally neutral.

4.4 The Culture of the 'Humanities'

By 'humanities' or 'arts', we usually mean the disciplines of English, history, philosophy, education and perhaps modern languages. The humanities are conventionally those subjects which are concerned with critical enquiry about human nature and human existence. Obviously such a definition is immediately problematic; why does history qualify as an

humanities subject, whilst sociology, politics and psychology do not? Conversely, could not history and philosophy have some claim to be social sciences? The distinction is not particularly fruitful. However, it is a *social*, commonsensical distinction, not one descriptive of an external 'reality': and it is as such that it shall be discussed.

The very idea of the 'liberal humanities', as distinct from the sciences, grew up in the 19th century. The belief that men should be trained for a narrow role in life came to be challenged; it was argued that they should have some knowledge of the liberal arts, the 'finer' things in life. Raymond Williams puts it thus:

> "it was argued that man's spiritual health depended on a kind of education which was more than a training for some specialized work, a kind variously described as 'liberal', 'humane' or 'cultural'."(Williams, 1975, p.141)

The central discipline of this new liberal education was to be English; as we have already seen in chapter 2, it was used as a sop to women demanding higher education. However, it was also seen by certain middle-class educators such as Matthew Arnold as a means of subduing the masses. Arnold, like many in the middle-classes frightened at the thought of working-class revolution, argued for the need to "win the sympathy" of the working-classes, for "society is in danger of falling into anarchy." (Matthew Arnold, 'The Popular Education of France', quoted in Eagleton, 1983, p.24) Arnold genuinely believed that the transmission of a common culture could help unite the classes and promote fellow-feeling. English would reduce conflict between the social classes, whilst maintaining the status quo. Arnold was not the only, nor last, proponent of this view. Baldick (1984) quotes the much later Newbolt report (1921) which said that a liberal education based on English

> "would form a new elemnt of national unity, linking together the mental life of all classes."(p.95)

'English' in the twentieth century, however, hasn't simply been a sop to the masses; it has grown to be the second largest university subject. (See Chapter 6). It is concerned chiefly with the study of 'great' authors; unlike other subjects concerned with the creative arts, such as Music or Drama, there is usually little first-hand experience of practical creation and the creative writer has traditionally been regarded with some reverence.

Some large claims have been made for 'English' as a discipline, and most of these have derived their authority from the work of F.R. Leavis, who regarded English, not simply as the central humanities subject, but as the central university subject. Despite the fact that the bulk of Leavis's work was written in the 1930s and 1940s, his influence has never been shaken off; it has been claimed that:

> "English students in England today are 'Leavisites' whether they know it or not...There is no more need to be a card-carrying Leavisite than there is to be a card-carrying Copernican". (Eagleton, quoted in Bowen, 1985, p.11)

What Eagleton means by this is that the influence of Leavis is so profound, his paradigm of English as a humanistic, moral subject so far-reading, that students accept it as a definition of the subject without recognising that it is only one possible definition of many. As Bowen has argued, many literary critics appear to believe that:

> "the question of 'English' is essentially 'the question of Leavis' and that once one has examined that phenomenon and defned one's position in relation to it, all that needs to be said has been said." (Bowen, 1985, p.11)

Leavis has been seen as a direct intellectual descendant of Matthew Arnold. As Bowen has rightly pointed out, to look at the history of literary theorising in this way is to ignore the development of English as a university discipline during the fifty years between the two figures, and in particular the massive influence of I.A. Richards, and his prescriptions of "close reading." Nonetheless, it is easy to see why Arnold and Leavis have (even if mistakenly) been regarded as central figures. They both provided English with a *raison d'etre*; in the true liberal tradition, they believed in the power of education to change people, to make society "better". Leavis firmly believed that to study literature was to become engaged in morally serious issues; further, that through studying literature one could become a more sensitive, a more moral person. As one of Leavis's disciples, L.C. Knights, has put it:

> "I value literature because, through something in the nature of play, it deepens our humanity by helping us towards a necessary, a centrally important, kind of knowledge." (Knights, 1975, p. 130)

The study of literature, then, should not be concerned with the merely aesthetic, or with the understanding of literary terms, but with *human*

issues and (to a lesser extent) with social issues. This point is made more explicitly by Knights when he says:

> "It is impossible to indicate all the humanly important matters that literature gives us knowledge of...It is enough to say that it is through literature that we grow into a particular kind of awareness of ourselves and - an inseparable corollary - of our manifold relations with each other and all that is not self, without which there is really not much 'self' to talk about." (ibid., p. 133)

Studying literature, then, is a serious business; it is concerned with close examination of those authors who can bring us to a deeper (and more moral) understanding of humanity. Leavis himself was partisan in the extreme when it came to deciding which writers could be awarded the accolade of "moral seriousness." The "great tradition" consisted of only five writers: Austen, Eliot, James, Conrad and Lawrence. Many other major writers - Shelley, Defoe, Sterne, Fielding, for example - were derided as "trivial" or "not serious". This rather authoritarian form of elitism was usually defended by an appeal to the "sensitive" or "discriminating" reader; anyone who read closely and intelligently enough would be bound to agree with Leavis's judgement. Naturally enough, this lays Leavis open to the charge of "unfalsifiability" (as Popper would put it); his unwillingness to provide a set of standards by which to judge literature meant that his own critical judgements were always irrefutable.

Despite Leavis's eccentricity of judgment , and the dubiousness of most of his claims for Literature (there is no proof, after all, that reading literature makes one either a better or a worse person, morally), his undoubted influence is due precisely to his concern with morality and his belief that literature could provide some opposition to the dehumanising effects of modern industrial society. Studying literature does, after all, appear to most people to be an essentially trivial activity; it is difficult to see that studying literature is going to have much impact on the future of the world.

It is here, of course, that we see an essential paradox at the heart of the arts/science divide. Science, as we know, has tremendous potential to change the way we live; this has been shown to be the case time and time again. Yet science professes not to concern itself with moral issues; it continually insists upon its own objectivity. The humanities, on the other hand, regard a concern with moral issues as central to their meaning;

philosophers, historians, literary critics, consistently make explicit their interest in morality - whilst the study of philosophy, history or English appears to have had little impact on the lives of the mass of people. As Bowen has said:

> "It is clear that Marxist literary critics...feel acutely their impotence as individuals to change the world". (p.36)

It hardly needs pointing out, too, that this division between doing and achieving on the one hand, and thinking and feeling on the other, is not only a science/arts dichotomy but, in a general way, a male/female dichotomy; whereas most important political actions that have really affected people's lives have been taken by men, women, who have historically been excluded from decision-making, have been concerned with the subjective and the personal. Just, therefore, as it is rather difficult to believe that "the hand that rocks the cradle rules the world", so it is difficult to believe that literary intellectuals (be they Marxists, liberals or anything else) could have much influence on, for example, the decision to pursue, or not to pursue, the arms race.

Perhaps it is this sense of impotence - and the sense that English's image of "effeminacy" or "femininity" makes it appear trivial - that has led post-war literary theoretical movements to espouse ideals of "objectivity" and "scientificity". In contrast to Leavis's haphazard approach of determining which writers were important, and which were not, literary theory was going to be rigorously objective. Foremost among the new movements was Structuralism: a literary theory which believed in the necessity of examining the "deep structures" of a literary work. Structuralists did not believe in examining the text in relation to society - although they did believe in examining the relationships within texts and between texts - nor in examining it as a work with moral significance; the aim was simply to lay bare the universal structures which were hidden within it. Although structuralism is more complex than this account appears to allow, the heart of the theory is its claim to objectivity; Scholes (1974) has described structuralism as a "complete, self-regulating entity" which is trying "to establish for literary studies a basis that is as scientific as possible."(p.10)

Whilst many Marxists would be horrified to be bracketed with Structuralists, they too have sought credibility for their theory through claims to a scientific objectivity. Eagleton could not put it more simply:

> "Marxism is a scientific theory of human societies and the practice of transforming them" (Eagleton, 1976, p. vii)

Elsewhere he mocks the liberal humanists:

> "Many literary critics dislike the whole idea of method and prefer to work by glimmers and hunches, intuitions and sudden perceptions. It is perhaps fortunate that this way of proceeding has not yet infiltrated medicine or aeronautical engineering..."(Eagleton, 1983, p.198)

The point to make in answer to this is that science often *does* proceed by "glimmers and hunches, intuitions and sudden perceptions." It seems ironic that, at precisely the time when radical philosophers and sociologists of science were dismantling science's claims to an absolute objectivity, Marxist literary theorists based their claims for their theory on its scientificity. The peculiar awe in which Marxist literary critics hold science is demonstrated time and time again. Juliet Mitchell, for example, renowned as a Marxist literary critic and feminist theoretician, makes the following extroardinary claim about the work of Freud:

> "That Freud, personally, had a reactionary ideological attitude towards women in no way affects his science - it wouldn't be a science if it did." (Mitchell, 1973, p.167)

Marxism *is* different from other major theoretical movements in one sense, in that it makes its political concerns plain, even whilst claiming a scientific basis for those concerns. The problem with Leavis, and with most critics before and since, is that the political concerns which inevitably shape their view of literature and art have *not* been made explicit. Marxist criticism itself, as a result, no doubt of its claims to "scientificity" has, as Parrinder (1979) has pointed out, often been sterile and inhuman.

The most recent theoretical movements in literary criticism have, however, rejected the notions of objectivity and scientificity. (In this, they show parallels with phenomenological and interactionist rejections of positivism and structural functionalism in sociology.) Deconstructionism has pointed to the inherent flaws in structuralism - that, for example, binary oppositions are not inevitable, but are dependent on their social meaning - and has celebrated the idea of 'subjectivity' and the notion that

it is impossible to reach at the 'truth' of a text, because every interpretation of a work is itself open to interpretation - endlessly. Similarly, feminism has stressed the importance of subjectivity, arguing that in the past men's experience has been presented as the objective truth. Feminists have called for an acceptance that subjectivity is inevitable and that it should therefore be acknowledged and brought to the fore. (e.g. Kolodny, 1980). Perhaps the most important achievement of feminist criticism, however, has been to attack the *canon*: that liberal notion of a body of great writers and texts which is both universal and immutable. For, in the view of critics such as T.S. Eliot, I.A. Richards and F.R. Leavis, the 'great' writers are those who have universal value, whose greatness is self-evident in all places and at all times, at any rate to the morally serious reader. The argument is circular, of course; for, if a writer is great, then (s)he will be in the canon; if a writer is not in the canon, then (s)he can't be any good, and to try to put him/her there would be an act of mindless obstinacy. As Kolodny has said:

> "The fact of canonization puts any work beyond questions of establishing its merit and, instead, invites students to offer only increasingly more ingenious readings and interpretations, the purpose of which is to validate the greatness already imputed by canonization." (Kolodny, 1980, p. 30)

Most writers in the canon are male; even more are middle-class and can be said, on the whole, to represent establishment views. This is not to argue that it is impossible to enjoy or to value writers with whom one disagrees; as Kolodny herself says, it is possible to enjoy *Paradise Lost*, even if one "can subscribe neither to its theology nor to its hierarchy of sexual valuation". It is possible to gain pleasure from *Paradise Lost* through "learning to effectively manipulate [certain] critical strategies." Even so, it is crucial to point to the fact that it is easier to respond to a text if its ideological assumptions are the same as one's own - even if one likes to pretend that this responsiveness is entirely aesthetic and literary (or in the case of Leavis morally serious) rather than political.

Perhaps one of the small achievements of feminist theorists is that they have, through Women's Studies courses, managed to place lesser-known writers on the curricula of university English courses; this has provided a genuine, if marginal, challenge to the 'canon'. Marxist theorists, on the other hand, have usually taken the 'canon' as a starting-point, and rather

than challenging its content, have merely interpreted it in new ways.

4.5 Arts, Science and Education

i.Subject choice and personality: convergers and divergers

Snow (1959) argued that science and arts represent "two cultures". The work of Liam Hudson (1967, 1970, 1972) develops this idea, and suggests that differing types of personality are attracted to different subjects. Hudson, working in the field of educational psychology, found significant personality and IQ differences between schoolboy arts specialists and schoolboy science specialists. Not only did he find an arts/science difference, he was able to use test scores as a fairly accurate predictor of a pupil's specialization in classics, history, modern languages, physics and biology. Despite the range of specialisms predicted by the tests, Hudson was still able to divide pupils into two basic types: convergers and divergers. Convergers tended to be more conformist, more authoritarian in their views, have a high IQ, do badly on the open-ended tests (i.e. ones which demanded a certain amount of free expression and imagination) and specialise in the physical sciences. Divergers were the opposite: liberal, imaginative, slightly rebellious, with low IQ scores, good on open-ended questions and inclining to specialise in the arts. Divergers were also, significantly, more tolerant of ambiguity and contradiction. Hudson argues that intolerance of ambiguity may, in fact, be a prerequisite for studying science; the young convergent schoolboy wishes to "specialize in work which enables him to be unambiguously right or wrong". Indeed,

> "We should recognize, too, that the ability to think in highly conventional terms may be of the greatest importance to a young scientist in his work. Far from being a fault, it may be essential that he should accept massive bodies of conventional knowledge on trust; not merely assimilating it as a chore, but thoroughly enjoying it." (Hudson, 1967, p.104)

In addition to this, Hudson found that the out-of-school activities of divergers were likely to involve people, whereas the interests of convergers were more likely to involve mechanical objects - cars, computers and so on.

Most of Hudson's tests were conducted with schoolboys. He did, however, conduct some tests on schoolgirls, amongst whom he found a different pattern:

> "The relation of convergence and divergence to arts/science specialization amongst girls proved to be far from clearcut. As with boys, divergent girls tend to avoid science subjects, but convergent girls are equally likely to go into the arts or physical sciences." (Hudson, 1970, p.37)

Hudson argues that the reason for this anomaly is social pressure. It is considered more conventional for girls to take arts subjects than sciences; as convergers tend to be more conventional in outlook, girls are in something of a double bind - they have to decide whether to follow their inclinations or to make a 'conventional' choice. Many choose the latter.

Head (1980) has also discussed the differences between male and female pupils of science. He argues that subject choice is related to an adolescent's psychological development. What he seems to suggest is that choosing science is, for many adolecents, a way of delaying the usual adolescent self-doubt and questioning of social values. Science's masculine image makes it more appealing to boys who are likely to be less emotionally mature. Science becomes less appealing to boys as they get older (and to girls, it seems, at all stages of adolescence) and become interested in issues as varied as "the meaning of life, the existence of God, ideologies, their emerging sexuality, their future career and life style." (Head, 1980, p.298) Science as it is presented in schools, he argues, seems irrelevant to most 13-16 year olds, and if we are to recruit more pupils into scientific careers, then science should be shown to have some relationship to the issues that concern them.

The idea that a dislike of science can be equated with emotional maturity is not confined to Head. Lockhart, in an article purporting to explain why female students ought to (but don't) study science, makes the following puzzling statement:

> "Just as teachers find it hard to dispel the legend that ballet dancing and music are too 'sisssy' for boys, so it is not easy to persuade girls that engineering is feminine. Perhaps it is true that girls are for the greater part more interested in arts and literature by nature, and not merely by upbringing. Certainly they are more emotionally mature at the age when A-levels are taken." (Lockhart, 1986, p. 512)

The statement is extraordinary both because it implies that the difference in numbers of women and men taking science subjects is essentially an innate biological difference, and because it equates a desire to study arts subjects with emotional maturity and, by implication, a desire to study science subjects with emotional *immaturity*. As

Lockhart evidently regards the study of science a more worthwhile pursuit than the study of humanities, it can only be deduced that women will have to become less mature before they will be able to take science degrees.

ii. Science and Arts: Masculinity and Femininity

Hudson's concerns are of a more serious nature than those of Lockhart: not recruiting students to science, but delineating the difference between the scientific mind and the artistic mind. His first two books, *Contrary Imaginations* and *Frames of Mind* contain useful insights into the nature of the arts/science divide and its relation to personality types. They do, however, suffer from Hudson's tendency to take his categories for granted, as natural phenomena, rather than social constructs. He does not ask, for example, why certain types of personality should be related so closely to certain academic subjects, or why indeed the binary opposites of arts and science exist in the first place. It may have been fruitful to inquire why science demanded the ability to think in "highly conventional terms" rather than the ability to think creatively and imaginatively. To some extent, too, Hudson's results are an artefact of his test design. For example, in *Frames of Mind* he describes a test to look at the stereotypes school pupils had of artists and scientists (also psychologists, barristers and a few other categories). Pupils were given several pairs of adjectives - intelligent/stupid, dull/exciting, valuable/worthless, feminine/manly - and they had to decide at which extreme of the opposites they would place the category under question. Thus, in the pair feminine/manly, one could describe an artist as being either extremely feminine, mildly feminine, extremely manly, and so on. As is evident, the test only allows people to have stereotypes. It does not allow one to reply that one judges people as individuals, not on the basis of their occupation, unless one were willing to run the risk of looking foolish by ticking 'don't know' all the way through. The consequence is that pupils appear to hold the stereotypes they are expected (and probably know they are expected) to hold.

In another test, Hudson asks his pupils to describe, on a seven-point scale, the qualities possessed by two other types: the research scientist's wife and the novelist's wife. The assumptions behind this can at best be described as unfortunate. Perhaps if Hudson had asked for a description of the 'Novelist's husband' or the 'Research Scientist's husband' (and even

those include the assumption that 'normal' people are married) his results might have been more puzzling.

However, Hudson confronts many of these problems in *The Cult of the Fact* (1972), in which he looks much more closely at the gendered nature of the arts and the sciences. He had already found that school pupils and students associated science with masculinity and arts with femininity (or effeminacy):

> "Artist, poet and novelist are all seen in my studies as warm and exciting, but as of little worth. Mathematician, physicist and engineer are all seen as extremely valuable, but also as dull and cold. It is clear too, that the arts are associated with sexual pleasure, the sciences with sexual restraint...Yet the scientist is seen as masculine, the arts specialist as slightly feminine." (Hudson, 1972, p.83)

These stereotypes have a much wider set of connotations. 'Science', 'masculinity', 'hardness', 'difficulty' and 'value' are all apparently associated ideas, whilst 'arts', 'effeminacy', 'softness', 'easiness' and 'lack of worth' are also related concepts. Hudson points to the fact that, not only are these terms applied by pupils to the arts and sciences, they are recognized to a large degree by those, like himself, working within psychology. In psychology, higher status is accorded to the 'hard' tradition within the discipline, the tradition which shows "a preocuppation with behaviour: with the organism - its physical, corporeal presence, and what it can be seen to do". The 'soft' tradition is, apparently, concerned to "treat people as people, and [is] concerned less with law-making and more with speculative exploration". It is not difficult to see the connection between the former tradition and the stereotyped model of physical science - a model which, Hudson says, "physical scientists themselves have long abandoned."

Weinrich-Haste (1984) has conducted a useful study which examines the political beliefs and values of male and female undergraduates in a variety of different subjects. Briefly, she found that sociologists, at one extreme, tended towards liberalism and radicalism, whilst engineers were the most politically and socially conservative of the groups she looked at. In addition, she found that women were more egalitarian, public-minded and humane than men, and she suggests that "women are more people-oriented, and place more emphasis on community and interpersonal values, less on institutions and less on hierarchical organization." Significantly, she

found that differences between students of different disciplines were greater than differences between the sexes - a finding which supports Hudson's arguments about the relationship between personality and subject choice.

The two stereotypes we have of science and arts, of hard and soft, do not present a simple and unproblematic dichotomy. They are value-laden. Hudson looks at this dichotomy in the light of the instrumental/expressive division made by Talcott Parsons and other sociologists:

> "The instrumental approach is one essentially concerned with the impersonal control, the subjugation, of the environment; the expressive with relationships between one person and another." (Hudson, 1972, pp 87+88)

As we can see, this distinction is very similar to one we cited earlier, made by Merchant and Capra. They posed a dichotomy between viewing the human relationship to Nature as harmonious and interactive (expressive); and viewing it as exploitative and dominating (instrumental). Capra argued that whilst the latter view was traditional in western science, the New Physics was much better suited to the former view. Hudson cites Norman Brown, who takes this division much further, relating it to Freud's belief in the existence of the life extinct, Eros, and the death instinct, Thanatos, which are continually in conflict. Brown argues that science as it is now practised is an expression of the death instinct, and he calls (in Hudson's words) for "a 'non-morbid' science, 'erotic' rather than 'sadistic' in aim. Its purpose would not be mastery over nature, but union with it." (p. 91) Although the distinction between instrumental and expressive is particularly valuable in helping us to understand the meaning of the 'arts' and the 'sciences' in our society (and particularly within our education system), Brown, in positing two basic human drives, a life instinct and a death instinct, perhaps loses sight of the way in which ideas of 'value' and 'pleasure', 'science' and 'arts', 'masculine' and 'feminine' have been constructed by society.

Before we look a little further at the implications of according a very specific set of values to the disciplines of arts and science, it is worth drawing attention to Hudson's argument that the arts are associated with femininity or effeminacy. What Hudson does not point out is that his schoolboys and, indeed, he himself, see the arts as being practised, not by women, but by 'effeminate' men. The sciences are practised by 'masculine'

men. This no doubt explains Hudson's test, mentioned earlier, which asks for a description of the novelist's *wife*, not the novelist's *husband*. In other words, the practice of discovering knowledge, of creating works of art, in short, of making the world we live in, is seen to be conducted entirely by men: masculine men or feminine men - but not women. This is surprising in view of the numbers of women practising or studying the arts. This finding is borne out, however, by a study by Weinrich-Haste (1986) which found that, whilst some subjects were rated by school-children and undergraduates as definitely masculine, and some as neutral, none were rated as definitely feminine: a finding which suggests that the arts/science divide is not a symmetrical feminine/masculine divide, but one which is distinctly asymmetrical. It points to the difficulties that might face even those women who venture into the field of the arts, let alone those who wish to pursue the sciences.

The stereotypes accorded to the arts and sciences are in part a result of the necessity for science to validate its status by using what might be termed a 'negative reference group'. Science can only demonstrate its superiority if it has something to be superior to. First science was opposed to religion as a method of revealing the truth; later it could be contrasted with the arts as embodying values of impersonality and objective search for truth, rather than 'mere' subjective emotion. Despite the demonstration of Kuhn, Capra, Feyerabend and others that science is neither impersonal nor objective, it is still presented as such in schools and by its own practitioners. Scientific papers consistently use the passive voice; the subjective 'I' is abolished. Similarly, any hint that a research experiment did not proceed in an orderly or tidy way is banished from the finished paper; the experiment is shown as having progressed neatly and objectively. The reality, as scientists themselves know, is quite different; and James Watson's book *The Double Helix*, about the most famous biological discovery this century, quite clearly shows that scientists proceed by such human methods as hunches, mistaken hypotheses, occasional inspiration, luck and hard work.

iii. 'Framing' and 'Classification'

This chapter has so far argued that there exists a very strong, and very clear social boundary between what we call the 'arts' and what we

call 'science'. Bernstein (1970) has argued that those subjects which have very tight definitions of knowledge and which have clear boundary lines marking what is considered relevant 'knowledge' and what is either considered not relevant or belonging to another subject, are also those subjects where hierarchical relationships between teacher and pupil are strongest. He says:

> "Strong frames reduce the power of the pupil over what, when and how he receives knowledge, and increase the teacher's power in the pedagogical relationship...The stronger the classification and the framing, the more the educational relationship tends to be hierarchical and ritualised, the educand seen as ignorant, with little status and few rights. These are things which one earns, rather like spurs, and are used for the purpose of encouraging and sustaining the motivation of pupils." (Bernstein, 1971, p. 58)

It is clear that this description is particularly aimed at science teaching. (Bernstein would probably agree with Feyerabend's description of science education as "producing an unenlightened conformism.") It also has strong affinities with Marxist claims that education aims to inculcate students with a passive acceptance of hierarchical relationships. What is original about Bernstein's thesis, however, is the equation between the organisation of *knowledge* and the organisation of relationships between people. This clearly raises issues for higher education: are science departments in universities and polytechnics characterised by hierarchical staff-student relationships or are they characterised much more than school departments by a common pursuit of interests and knowledge? And do humanities departments allow greater freedom to the student, with a correspondingly lower degree of hierarchy?

Bernstein also has interesting points to make about the construction of identity in education and its relation to subject divisions. He argues that students are taught to make identifications with their chosen subject(s) and to form a disdain for other types of knowledge. The English education system is a narrowing down, rather than a broadening out; and disciplines outside one's own are not looked upon as worthwhile or potentially interesting, but as completely outside one's sphere of practice; indeed, they are often regarded simply as invalid knowledge:

> "*Subject loyalty* is then systematically developed in pupils and finally students, with each increase in the educational life, and then transmitted by them as teachers and lecturers. The system is self-perpetuating through this form of socialization.... Specialization very soon reveals *difference from* rather than *communality with*...Specialized versions of the colleciton code tend

> to abhor mixed categories and blurred identities, for they represent a potential openness, an ambiguity, which makes the consequences of previous socialization problematic." (p. 55)

Students, then, are taught to identify very strongly with their own discipline, and to accept the boundaries that have been constructed between it and other disciplines. The consequence is that many students, and even academics, are severely limited in their conception of knowledge.

Bernstein's argument is well-illustrated by Becher (1979), who looks at the differences between the "cultures" of various disciplines: both at the differences between, for example, the way historians construct their discipline and the way physicists construct theirs; and at the different opinions practitioners of the various disciplines have of each other. Becher's article is simply a preliminary outline of the findings of the research he undertook amongst academics. What he found, however, is significant. Academics showed a remarkable intolerance of each other's disciplines. For example, most academics regarded sociology as "fragmented and pseudo-scientific, dubious in its methodology and 'open to ideological exploitation'." Physics was regarded as "the extreme of pure science" but its practitioners are thought of as "boffins living in Cloud-Cuckoo land." Engineers were seen as "dull, conservative, conformist and mercenary". Becher also makes some interesting points about the way in which work is assessed and evaluated in different disciplines: "scholarly" and "original" are the highest terms of praise amongst historians, whilst "elegant" and "economical" denote approbation amongst physicists. Within each field certain sub-fields are regarded as more prestigious than others; in phsyics, theoreticians are rated higher than experimentalists: in Law, mere academic specialists are not as highly thought of as those who have practised the profession. A notable exception to this was sociology, which had little sense of hierarchy: what Bernstein would call "weak framing".

Becher's research suggests that academic disciplines are fragmented; and academics who, on the face of it, should have much in common, appear to have a strong contempt for other academics, and other academics' specialisms. Subject areas are not simply specialisms; they are areas endowed with specific qualities and values, both in the eyes of their practitioners and in the eyes of those from other disciplines.

iv. Objectivity and Conformism

Hudson argued that conformity and deference to authority was a feature of the science specialist. It is arguable that the conformism inculcated by the education system (and by science teaching in particular) prevents the individual from asking searching questions about the social framework within which scientific activity takes place. Hudson is not, therefore, correct in arguing that certain types of personality are simply attracted into certain types of subject. Hudson presents the arts/science division, in his first two books at any rate, as basically interesting, but harmless. On the contrary, it can be argued that science teaching in schools serves to encourage conformity, whilst suppressing the individuality that may exist in the pupil. In *The Cult of the Fact*, Hudson tackles the issue of conformity, but argues that the individuality encouraged by too much freedom and too little conformism, may take undesirable forms. He quotes both Einstein's and Hitler's angry remarks on the restrictions of their own educations to show the differing extremes to which individuality may lead. While it is a point worth making, it is surely also true that a conformism which leads to passivity and a lack of any real understanding is an undesirable attribute of any democratic education system.

Kuhn (1963) is of the belief that science students are not expected to work ideas out for themselves, but to accept what the textbook tells them. He points to the various differences that exist between university level teaching of science, and university level teaching of other subjects, such as the social sciences, or humanities. Science students are not expected, for example, to read the classics in the field; nor are they expected, until the dissertation stage, to try to find things out for themselves, nor to reach conclusions about certain issues through reading recent articles in the area. Kuhn describes the typical science textbook:

> "...the various texts that the student does encounter display different subject matters, rather than, as in many of the social sciences, exemplifying different approaches to a single problem field. Even books that compete for adoption in a single course differ mainly in level and in pedagogic detail, not in substance or conceptual structure. Last, but most important of all, is the characteristic technique of textbook presentation. Except in their occasional introductions, science textbooks do not describe the sorts of problems that the professional may be asked to solve and the variety of techniques available for their solution. Rather these books exhibit concrete problem-solutions that the profession

> has come to accept as paradigms, and they then ask the student, either with a pencil and paper, or in the laboratory, to solve for himself problems very closely related both in method and substance to those which the text or accompanying lecture has led him through. Nothing could be better calculated to produce 'mental sets' or 'Einstellungen.' Only in their most elementary courses do other academic fields offer even a partial parallel." (Kuhn, quoted in Edge, 1975, p.48)

It is arguable that the rate of scientific discovery is much faster if all science's practitioners are able to accept the 'truth' of the existing state of knowledge in the field. (The opposite, of course, is also arguable). The issue here, however, is that any subject which is taught in this way demands an uncritical acceptance from students that what they are being taught is true. The last quality expected of a science student, it would seem from Kuhn's account, is a critical, enquiring mind. Further, it suggests that some success in science is possible without understanding much of what is taught.

One empirical study which argues just this - that students understand very little of what they learn - is that of Barnett et al (1983). Barnett and his colleagues tested undergraduate and postgraduate students of Biology on their understanding of some of the major debates in their subject. They found that most of the students were completely unaware of the existence of such debates, and had difficulty handling philosophical aspects of their subject. In addition, roughly half were happy to accept the idea that biological science was ultimately explicable by physical science. Similarly, Halloun and Hestenes (1985) found that students embarking on physics degree courses had quite mistaken notions of the meaning of such terms as 'force', 'velocity' and 'mass' in physics. They showed very little real understanding of physical terms:

> "Most of the interviewed students had acquired a rote knowledge of Newton's laws, either from the physics course in which they were enrolled at the time, or from a previous course. They could enunciate Newton's laws on request, but usually they were unable to see how the laws applied to a particular question." (Halloun and Hestenes, 1985, p. 1059)

Asked to justify some of the answers they gave to problems, the following response was typical:

> "Galileo did the [free fall] experiment in Pisa and said they [falling objects] reach a speed limit. I guess...because Galileo did it, or at least if what I know about him is true, this must be true." (p. 1061)

Halloun and Hestenes comment:

> "[this statement] reminds us that students are all too ready to justify their beliefs by an appeal to authority, one of the achievements of teaching passive rote knowledge." (p.1061)

The fact that these students (in both the studies) had all reached university suggests that conformity and passive rote learning had not hindered their academic progress; on the contrary, it may, as Keddie (1971) would have argued, helped it.

If science subjects such as physics appear to demand a high degree of conformity, and acceptance of authority, then a subject such as English may appear to allow greater room for non-conformity and the expression of individual opinion. The liberal humanist tradition in English has, as we have seen, been associated with subjective personal response. A glance at any 'A'-level syllabus will reveal that English literature, as taught in schools, is firmly located in that liberal humanist tradition. 'Great' authors are taught; students are expected to respond to them in a way which is to some extent personal, but which must also acknowledge their 'greatness.' In an article examining two school departments of English, Caroline St. John-Brooks says of one of them that,

> "The Crossley Hill English department stood squarely in the literary tradition of Arnold and Leavis which has emanated from the English school at Cambridge University." (St. John-Brooks, 1983, p.43)

However, what is interesting about St. John-Brooks's is article is not simply that she points to the teaching of texts as part of the 'great tradition', but that she shows that the teachers in the two departments she looks at are possessed of a missionary zeal to improve the quality of their pupils' lives; they do not want an English education to be useful in a functional way, but to be useful in enabling them to think critically about themselves, about life, and about society: as one of them memorably puts it,

> "I am not worried they'll be sold a duff car. I am worried that they'll be sold a duff life." (p.37)

The attitude of the English teachers is contrasted heavily with the attitude of the teachers in the other departments (particularly those in modern language departments, who think that English should be about

learning grammar); the dominant attitude in the schools towards education appears to be utilitarian.

There is, however, a paradox within the Leavisite tradition, as Bowen (1985) has argued. Students are expected to respond in a subjective and emotional way to texts; however, they must also accept the 'objective' judgment of the canon. The subjectivity is limited by the conventions of the discipline; in Bowen's words, I.A. Richards enjoined students of English to "emotionality and detachment, expression and mimesis, individuality and objectivity." (p.311) Students of English, then, may be treading a tightrope between too much personal response, and too little. Like science students, they are expected to conform. Unlike science students, however, they are also expected to develop an awareness of the values and standards on which literary judgements are based: the Leavisite tradition does not claim to be value-free - it simply claims that its values are right.

4.6 Summary

This chapter has suggested that our perceptions of the arts and sciences are shaped by notions of femininity and masculinity. These perceptions, far from being simple or accidental, are intimately related to issues of authority and control and the need to concentrate power in the hands of certain groups of people. Women, it has been suggested, have been historically excluded from the making of knowledge, in particular science, and this is related (not necessarily causally) to women's powerlessness. Even in the 'feminine' arts, however, dominated at undergraduate level by women since the 19th century, women have been subject to more subtle pressures: arts, it is believed, are considered to be the domain of 'feminine' men, not women, and there have been attempts in recent years to render the arts more 'masculine'.

However, it has also been argued, more optimistically, that recent developments in the philosophy of science and in science itself (for example, quantum physics), and in English Literature allow for a greater freedom and flexibility, and indeed, humanity, in the education of students. Whereas it seems unlikely that these concerns have penetrated school syllabi, it is not impossible that they have had a greater influence on higher education syllabi.

It now has to be asked whether arts and sciences disciplines, as they are taught and practised in higher education, 'match' the account given of them in this chapter. In chapter 2 we saw that English was considered particularly suitable for women, and, in the nineteenth century at least, was considered as an 'accomplishment', much the same as music or drawing. Physical sciences have been seen as 'hard', 'masculine' subjects. We know, however, that the liberal humanities and physical sciences have changed in recent years; we also know that higher education has undergone considerable changes in the past twenty-five years, first expanding and then contracting. The position of the sexes in education appears to have changed too, with a greater number of women entering higher education. The research project must, then, look at the state of higher education, and the position of women and men within it, *today*: we shall begin, in Chapter 5, by summarising the issues raised in Chapters 2-4, and by constructing the methodology for a research project.

CHAPTER 5: DESIGN AND METHODOLOGY

5.1 Introduction

The survey of the literature in Chapters 2 to 4 revealed several gaps in the research on gender and education, and highlighted areas of particular interest and difficulty. The gap lay both in the lack of work undertaken in certain areas and in a failure to come to terms with some important issues in the field. I wish briefly, then, to review some of the issues raised by the three chapters and to discuss their relevance for the methodology used.

Chapter 2 looked at the history of women's participation in education in Britain, a history marked by increased equality of opportunity, which had been realised side by side with the expansion of education generally. It was also noted, however, that women's presence had been more marked, since the early days of their entry into higher education, in the "liberal" humanities than in scientific and professional subjects. Initially, subjects like English and French were regarded as a natural extension of the "accomplishments" of the middle-class woman; decorations, rather than rigorous academic subjects. More generally, it was suggested that the history of education in this country had been marked by a division between a "functional" or "vocational" education, imparting necessary skills for the division of labour, and a "liberal" or "cultural" education, which has no direct use in the labour market, but which enables people to think critically and to make judgments about the world around them. These two ideals of education, although not necessarily mutually exclusive, had become entrenched through an association of the former with a scientific education and the latter with an arts education. They had been further reinforced by two separate higher education traditions: the technical colleges and polytechnics on the one hand, apparently "training" people in technical skills, and universities on the other, providing a "liberal" education. It was argued that, partly as a result of this division, policy-making on higher education had not been informed by a clear-sighted view of its aims.

Chapter 3, noting the predominance of women in the liberal arts, and the predominance of men in the physical sciences, looked at the work of feminist writers on the causes of gender inequality in society and in education. It argued that liberal, equal rights feminists suffered from an inability to recognise "arts" and "science" as social constructs, and therefore called uncritically for programmes to attract women into science.

Liberal feminists saw education (in this case, science education) as a potentially important force in eliminating inequality. Radical feminists, on the other hand, saw "patriarchy" as universal; this ahistorical perspective resulted in the view that all social institutions, education included, existed to perpetuate male dominance. They were thus unable to provide useful presciptions for change. Marxist feminist writers, with their emphasis on the material and the historical, provided a more useful paradigm for studying the lived experiences of women and men in the education system; it was argued, however, that deterministic Marxist accounts of education were inadequate, and that higher education in particular had a relative degree of autonomy from the State.

Chapter 4 looked at the arts/science division, and argued that social constructions of "arts" and "science" closely matched social constructions of "feminine" and "masculine". Of particular importance was the idea that science is "objective"; this had served as a justification for ignoring the moral issues which scientific practice constantly raises. It was argued that the perception of science as superior is only possible because the arts are perceived as *inferior*; similarly, science's superiority is strengthened by its association with masculinity, whilst the arts are devalued because of their feminine association. There had been challenges to the view that science was "objective" and "impartial"; however, it was suggested that these challenges had not affected science education, and that science educators demanded a high degree of conformity from their students. The idea that the teaching of science was characterised (in Bernstein's words) by "strong frames" and "strong classification", and the teaching of the arts by "weak frames" and "weak classification" might be significant in understand why women apparently predominate in the arts and men in the sciences.

5.2 Research Questions

This research is interested principally in whether women are disadvantaged in higher education. It has been suggested that in order to examine whether that is the case, we need to look at that area where gender difference is most apparent: subject specialisation. We are interested in the issue of whether it is easier to be a woman in one discipline than another: and whether women and men make their choices because they are

more comfortable in a discipline which has been socially constructed as "feminine" or "masculine". Indeed, it is possible that women are advantaged, and men disadvanaged in a subject numerically dominated by women.

We also want to know how students themselves construct their disciplines: whether they regard their chosen disciplines as having particular values or qualities, or whether subject choice is the result of parental pressure or having been "good" at a subject in school. Not only do we want to examine students' constructions of disciplines, however, but the constructions of disciplines by lecturers and the beliefs and assumptions implicit in curricula and their organisation of knowledge. By doing this, we can come to understand why men and women make different choices, and whether this is significant in a society in which men and women are unequal. More specifically, we are interested in the quantifiable issues of the numbers of women and men admitted to higher education and how successful they are in obtaining degrees.

The framework of the research project to look at gender in higher education is, then, one which allows for the de-reification of the terms "masculinity", "femininity", "arts", "science." Further, it will look at the ways in which these terms are constructed by students themselves and experienced as a lived reality. A single concentration on women, or on science, as an area of interest is not acceptable; we are interested in gender *relations*, the construction of femininity in direct relation to the construction of masculinity; and in the construction of disciplines through their reference to other disciplines. As Hollway (1982) has argued: "Difference is...the principle on which meaning is based." (p.204) For example, we know that the idea of "social science" has little meaning without another, pre-conceived idea of "science"; similarly, the apparent qualities of the "arts" can be perceived as direct oppositions to the apparent qualities of science - "subjectivity", frequently seen as a component of humanities disciplines, only has meaning when counterposed to the supposed "objectivity" of the sciences.

To say that the literature review highlighted an arts/science dichotomy is not strictly accurate; both "science" and "arts" have many meanings. However, it was argued that the science today regarded as the most "scientific", that is, the most objective, the most rigorous, the most succesful in the results of its enquiry and, probably, the most "masculine",

is physics. If, therefore, we are to make a comparison between the experience of male and female students in the sciences and arts, it would seem that physics, as the extreme representative of science, is the ideal area to study. Physics has the added interest of a discipline which has undergone a dramatic Kuhnian revolution in world-view: it allows us investigate the extent to which this century"s developments in quantum mechanics have affected students' and lecturers' construction of the disicpline: whether physics courses are concerned with beliefs in objectivity and verification. Choosing an arts subject to compare it with is not so easy. History, English, modern languages, philosophy, all present themselves as candidates. English, however, seems to possess advantages not owned by the other humanistic disciplines. It has been the focus of liberal humanist attention for many years - it was regarded by Matthew Arnold, as shown in Chapter 4, as a vehicle for overcoming class divisions; it is the most popular humanities discipline in the universities; the overwhelming majority of its students, since its inception, have been women. Additionally, it has been regarded by commentators (e.g. Scott, 1984) as the central "liberal discipline." Compared with physics, English can be safely said to have a multiplicity of "paradigms": liberal humanism, Marxism, structuralism and post-structuralism, for example. At the level of theory, certain critics have tried to make English more "scientific", whilst others have retreated into a complete relativism. At the level of teaching, however, we can ask: Do these different paradigms co-exist peacefully? Is there one dominant paradigm, which students accept, and are expected to accept? (Eagleton was seen in Chapter 4 to argue that all English students are "Leavisites, whether they know it or not.") Or is there visible conflict in what is taught in university departments of English?

Physics and English are, essentially, university subjects: we are also interested in the new tradition of the polytechnics and the emphasis they have put on applied knowledge and vocational degrees. Polytechnics have created new subjects with different boundaries from the older ones; their gender associations may, therefore, be weaker (or at least different). The research project will also, therefore, compare new polytechnic subjects (communications and physical science - the reason for this choice is discussed later) with university English and physics courses.

Given that physics and English are also of particular interest because

of the numerical domination of men in physics and of women in English, it is possible to look at the ideas of Hacker (1977) in researching students' experiences of the disciplines. Hacker's article, entitled 'Women as a Minority Group' argues that the position of women in society is analagous to that of minority groups such as immigrants and blacks. Like black people, for example, women often accept their supposed inferior status; they use tactics of "helplessness" and "wiles" as a means of accommodation. Like blacks, they are thought to be less intelligent and more easily pleased; the jobs they are allowed to do are limited. Like some blacks, some women may try to dissociate themselves from their group and "fondly imagine" their identity to be "different from what others hold it to be." In other words, women, like blacks, are not seen as individuals, but members of a group, all of whom share certain characteristics.

Hacker's account is descriptive rather than explanatory, that is, it does not explain *why* women are treated as a minority group: it should not be considered as replacing a socialist feminist analysis. It is, however, a very useful description. It allows us to look, for example, at whether women in the environment of education are treated as, or feel themselves to be a minority group. This is praticularly important in areas (such as the sciences) where women are *literally* in a minority. Do women who live their lives in a predominantly male world develop "accommodation attitudes" such as shows of helplessness and "feminine wiles"? Are they felt to be "all right in their place", as long as they don't provide a threat to the established order? Do they break off ties with other women and attempt to become like men, whilst being unaware that they are still regarded primarily as women?

Hacker's account is useful in another way, however. Because she implies the a minority group is qualitatively different from a numerical minority (e.g. one might argue that left-handed people are a minority, but they are not a minority group), it is possible to look at men in education in the light of her theory. For example, men are in a numerical minority in English, just as women are in a numerical minority in physics. It is therefore possible to examine whether men experience minority group status in an area which is dominated by women.

Gibbs, Morgan and Taylor (1984) have made a useful distinction between "extrinsic" and "intrinsic" attitudes to taking a degree in their

examination of the responses of Open University students to their courses. Students with an extrinsic attitude were concerned mainly with other people's recognition of their qualifications, or with using the qualification to get a job. Students who had an intrinsic motivtion, however, were interested in becoming "more broad-minded" and improving the quality of their lives. This intrinsic/extrinsic distinction appears to coincide with a distinction made in Chapter 4, between the instrumental attitude, which is concerned with dominance and control, and the expressive, concerned with harmonious relationships with the external world. These concepts can be usefully related to the distinction between functional and liberal ways of looking at education. "Instrumental" suggests using education as a means, for an end purpose, whilst "expressive" suggests "education for education's sake", an attitude more concerned with the quality of education than its usefulness. As the ideas of "instrumental" and "expressive" have connotations of a science/arts divide, as well as a masculine/feminine divide, it is possible to examine the attitudes and beliefs of four groups of students - male physicists, female physicists, male English students and female English students - towards their subjects and assess the degree to which those attitudes reflect that division. For example, we can look at whether physics and English students respectively have instrumental and expressive attitudes; further, whether those students whom we might expect to experience conflict if such a division exists - male English students and female physics students - hold what we might call "gender-appropriate" attitudes, or "subject-appropriate" attitudes. (It will be remembered that Weinrich-Haste (1984) found that subject differences in students' attitudes were greater than the sex differences found.) However, rather than using quantitative methods, which might only produce superficial data, to research this, it will be necessary to draw out the ambivalences and tensions experienced by students. The research design, then, will have to be one which allows us to explore these constructs (arts/science; masculine/feminine) as clearly as possible.

5.3. Developing a Methodology

This part of the chapter will look at the positivist/interpretivist debate that has centred around methodology, and will evaluate the competing claims of these two perspectives.

In recent years, the issue of methodology in sociological research has been the subject of much disagreement in a way that has never been the case in the natural sciences: positivist claims to "scientific objectivity" were seriously challenged in the 1950s and 1960s; first, on the grounds that sociology dealt with a different field of enquiry from the physical sciences, and that therefore it could not hope to replicate the objectivity attained in the study of a static, unchanging universe (e.g. Phillips 1971); second, on the grounds that physical science itself is not an objective, value-free science. As Hammersley and Atkinson (1983) have indicated, advocates of ethnography and participant observation have often based their claims for the validity of their methods on their greater access to the 'truth': the idea that in-depth observation of people in their natural environment provides a superior version of reality to that provided by questionnaire surveys and statistical analyses. However, Hammersley and Atkinson argue that this is misguided because:

> "The first and most important step towards a resolution of the problems raised by positivism and naturalism is to recognize the reflexive character of social research: that is, to recognize that we are part of the social world we study...This is not a matter of methodological commitment, it is an existential fact. There is no way in which we can escape the social world in order to study it; nor, fortunately, is that necessary. We cannot avoid relying on 'common-sense' knowledge nor, often, can we avoid having an effect on the social phenomena we study. There is, though, as little justification for rejecting all common-sense knowledge out of hand as there is for treating it as all 'valid in its own terms': we have no external, absolutely conclusive standard by which to judge it. Rather, we must work with what knowledge we have, while recognizing that it may be erroneous and subjecting it to systematic inquiry where doubt seems justified. Similarly, instead of treating reactivity merely as a source of bias, we can exploit it. How people respond to the presence of the researcher may be as informative as how they react to other situations." (p.15)

The argument is an important one: like Barnes, who was discussed briefly in Chapter 3, Hammersley and Atkinson reject a relativism which sees all knowledge as equally valid, but recognise that we have no "absolutely conclusive standard" by which to judge knowledge claims. Their argument that the social researcher is inextricably involved in the social world s/he studies is similar to that of Capra, outlined in Chapter 4, who notes that the physicist cannot observe the movement of sub-atomic particles without affecting it. Even in observing the physical world, the

observer cannot be detached or uninvolved.

Some writers have claimed that a rejection of "objectivity" and a commitment to subjectivity and personal involvement is a prerequisite of feminist research; even that the very notion of "objectivity" is a 'male' concept:

> "Modern social science has tried to out-science science, so to speak. It has attempted to provide proof, to be 'objective'. Feminist academics have been attacking the God Objectivity ever since we entered the fray, but He is still very much with us and will be for some time. Social science, inspired by a view of natural science as objective and value-free, has tried to build air-tight, provable theories about human behaviour. Humanists and the new feminist social scientists think people are too complicated and interesting to be divided into manageable categories...this kind of scholarship is proving the obvious, focusing on what is clear rather than upon what is not clear and important. This preoccupation with proving the obvious has far-ranging implications; in studying what is, bad social science also *promotes* what is, substantitates the status quo." (Bowles, 1983, p.36)

Bowles is right here to argue that the traditional positivist model of social research focuses on the clear and the superficial, rather than on the ambiguous and the complex. Questionnaires and experiments can categorise human behaviour, but they can't always interpret it and understand it in all its depth. However, the idea that 'objectivity' is purely a male concept, whilst commitment to subjectivity and involvement is the preserve of feminist researchers, an idea espoused not only by Bowles, but by other radical feminist writers like Spender (1981a), Daly (1978) and Stanley and Wise (1983), is more doubtful. Although feminist research should examine the complexities of social interaction, it is neither accurate nor desirable to label 'positivism' as a *male* philosophy and qualitative research methods as the preserve of feminists. In order to avoid the essentialism of labelling men as 'bad' and women as 'good', we need to preserve that useful distinction made by Oakley (1972), the distinction between 'male' and 'masculine' and between 'female' and 'feminine'. Whilst it is reasonable to argue that the imputed values of positivism - objectivity, impartiality, scientificity - are 'masculine' (i.e. socially constructed as 'male') values, and that subjectivity, humanity, sensitivity are 'feminine' (socially constructed as 'female') values, it is not correct to argue that all female researchers are somehow, magically, more humane, sensitive etc. than all male researchers.

Clearly, a methodology which emphasises the ability of individuals to construct the social world and to create meanings, is preferable to one which imposes the categories of the researcher onto the world she is observing. However, there are problems with interactionist research methods. Small-scale studies, valuable as they are in examining socially constructed meanings, are often unable to link observations to wider findings or theories. Willis's (1977) study of Wolverhampton schoolboys has been more than usually successful in using Marxist theory to inform and explain an ethnographic research project.

The problem of whether to use small-scale, in-depth studies or large-scale, more superficial studies is not easy to resolve, if indeed it is possible to resolve at all - and it has to be said that this study, like many others, was influenced by the limitation of resources, particularly an unwillingness of my funding body to provide travel expenses. However, it is possible to use a plurality of methods which work at different levels, and which provide a wide picture as well as a detailed one. For this reason, the project consisted of three components, the main element of which was the qualitative interview study:

a) an analysis of published and unpublished statistics relating to the participation of men and women in higher education;

b) a postal questionnaire sent to university admissions tutors in English and physics which asked for information on admissions policy and numbers of men and women admitted to the courses;

c) an interview study which looked at six undergraduate courses (two English courses and two physics courses, one physical science course and one communications course) in two universities and a polytechnic, which included interviews with ninety-six students and twelve lecturers.

The decision to use three research methods can be justified in terms of theoretical commitments. First, the decision to look at official statistics is not (apart from the data on social class, discussed later) open to the usual methodological objections to the use of statistics. The statistics used were concerned solely with actual numbers of men and women sitting examinations, passing examinations and entering higher education; whilst they cannot be adjudged entirely reliable because of the difficulties involved in counting (different institutions and differing examining boards having to supply numbers), they are not open to the objections confronting

the use of, for example, crime statistics or suicide statistics, (see e.g. Atkinson, 1971). The latter depend entirely on pre-set definitions of 'crime' and 'suicide' and can not therefore provide an objective account of a situation. The numbers of men and women accepted to study French or History at university can, on the other hand, be said to exist independently of an observer and can be measured with a reasonable degree of accuracy. The aim of studying the statistics was similar to that of reviewing the literature: to raise questions rather than to answer them. For example, once one has found out how many men and women there are taking differing subjects, or has examined the trends of the sexes' participation in higher education over a period of years, one still has to ask the question: *Why* is this the case? *How* are these patterns experienced by people themselves? Having found out, for example, that only a small proportion of English students are male, we want to know why it is a subject more popular amongst women than amongst men, and how that gender ratio affects the experience of women or men studying the subject.

It was decided to carry out a questionnaire survey because of a perceived gap in the literature: there was an obvious need to look at the process of admissions and the way this process affected access. A questionnaire was used rather than small-scale qualitative research because it was hoped it would be possible to look at the admissions procedure in the departments of a number of different universities, and thus make a comparison between the proportions of male and female students admitted in different places, maybe even effecting a correlation between the procedure used by departments and the proportions of male and female students admitted. The questions asked in the survey form were almost entirely factual, being concerned with the numbers of male and female students applying, being offered places and being accepted; entrance grades required; and method of selection. (The questionnaire is located in the appendix of this thesis.)

Finally, the main part of the research was the interview study conducted in six departments. Although the research was in some degree ethnographic, involving the collection of departmental materials and spending some time in each department, the bulk of the work consisted of in-depth, semi-structured qualitative interviews with students. These provided the kind of information it was impossible to gain from

questionnaires or structured interviews; I was able to explore ideas with students, ask questions about the decisions they had taken, and why they had taken them, follow up any ambiguous answers, and gain an insight into individuals' ways of thinking and making sense of their experience. I was not, and had no intention of being, the 'objective' interviewer of the research text-books; I was aware that students responded to me as an individual, and often asked me questions about myself and my research that I had to answer. This reflexive approach is advocated by Oakley (1981), who argues persuasively that any feminist research project has to treat the research subjects as rational and sensitive human beings. She quotes an extract from the particularly dry and humourless text, *Methods in Social Research* by Goode and Hatt, which advises an interviewer on what to do when the respondent persists in asking him (sic) questions:

> "Should he give his honest opinion, or an opinion which he thinks the interviewee wants? In most cases, the rule remains that he is there to obtain information and to focus on the respondent, not himself. Usually, a few simple phrases will shift the emphasis back to the respondent. Some which have been fairly successful are 'I guess I haven't thought enough about it to give a good answer right now', 'Well, right now, your opinions are more important than mine', and 'If you really want to know what I think, I'll be honest and tell you in a moment, after we've finished the interview.' Sometimes the diversion can be accomplished by a head-shaking gesture which suggests 'That's a hard one!' while continuing with the interview. In short, the interviewer must avoid the temptation to express his own views, even if given the opportunity." (Goode and Hatt, 1952, p.198)

Oakley ironically looks at the implications of carrying out Goode and Hatt's advice when interviewing pregnant women in research on the experience of motherhood:

> "The dilemma of a feminist interviewer interviewing women could be summarised by considering the practical application of some of the strategies recommended in the textbooks for meeting interviewee's questions. For example, these advise that such questions as 'Which hole does the baby come out of?' 'Does an epidural ever paralyse women?' and 'Why is it dangerous to leave a small baby alone in the house?' should be met with such responses from the interviewer as 'I guess I haven't thought enough about it to give a good answer right now' or 'a head-shaking gesture which suggests "that's a hard one"' (Goode and Hatt, quoted above) Also recommended is laughing off the request with the remark that 'my job at the moment is to get opinions, not to have them.' (Sellitz et al, quoted above)." (Oakley, 1981, p. 48)

If a researcher genuinely wants to find out about people's experiences

and to give their accounts of those experiences some validity, then it is impossible to maintain a cool distance from the research subject, because the research subject will only talk freely and easily with someone who shows that she understands and sympathizes with their experiences and does not pretend to be above or 'outside' them. Any interviewer, then, who wishes to gain 'deep' data about personal beliefs, values and experiences, rather than superficial data, must be prepared to engage with the interviewee as an individual, and abandon the pretence to 'detachment'.

5.4 Conducting the Research

i Quantitative analysis of statistics

In order to find out the realities of numbers of men and women participating in higher education, their concentration in different subjects and the historical changes in numbers entering higher education, it was necessary to look at the published national statistics on secondary and higher education. The following sources of data were used: the University Council for Central Admissions annual reports and statistical supplements; the University Grants Committee; the Council for National Academic Awards annual reports; 'Social Trends'; the Department of Education and Science's annual 'Education Statistics', and statistical bulletins; the Universities Statistical Record, who collated data on request. It was decided to compare the numbers of women and men entering higher education, and their social class; to look at what subjects they favoured, to compare their 'A'-level scores, to determine whether there was a gender difference in the numbers of qualified school-leavers entering higher education; and to look at degree classifications of male and female graduates, with the aim of finding out whether men or women, in simple academic terms, are more successful, and where these differences are greatest and smallest. It was also decided to look at the social class of students, because of the possibility that this information might show interesting sex differences and give an indication of the interaction between sex and class. As far as possible, the data used were for the years relevant to the interview sample: for example, tables showing numbers accepted in university are for 1984, as the first year of the sample were all accepted in that year. A very thorough examination of the available statistics was conducted; however, there were several gaps in in those statistics published by the bodies already

mentioned. These included a lack of information about polytechnic students comparable to the wealth of information about university students (and no information at all on students in colleges of higher education); a lack of data on social class; a lack of national statistics on A-level results of school-leavers and university entrants; and a discontinuity, after 1979, in statistics on degree classes broken down by gender. Some of these gaps were overcome by contacting the Universities Statistical Record, who provided me with information on degree classes and some data on social class. Obtaining the latter proved to be an excellent demonstration of the problems involved in interpreting statistical data. Data on the social class of students were available in UCCA's statistical supplements; these, however, used only a 1 in 10 sample. When I contacted the Universities Statistcal Record, who use UCCA date to provide statistical analyses for enquirers, to provide full statistics on the social class of students, I was told that UCCA data was unreliable (because of students' inaccuracies in naming parental occupation) and that therefore they would be unable to provide me with statistical analyses. They did not want their name associated, they said, with potentially inaccurate statistics. This is despite the fact that the same data are used in UCCA's published statistics, using the 1 in 10 sample. They were willing to provide a breakdown into 'Professional' and 'Other' - i.e. Social Class I and the rest. Even this, however, was subject to limitations. Groups such as 'Engineer' and 'Civil Servant' would not be included under 'professional' because it was equally likely that they had come from social classes II or III; thus in the data on social class in the next chapter, the proportion shown as coming from the professional class is much lower than the proportion shown in published UCCA data.

However, the results of this survey raised interesting questions which in part led to the formulation of the next stages of the methodology. This analysis of statistics provided basic background information about the participation of women and men in higher education, and was useful in determining the important issues that I should try to explore in the main part of my research. Thus the qualitative and quantitative aspects of my research are complementary; the quantitative work provided general data about the numbers of men and women gaining A-levels, entering higher education and specialising in different areas; the qualitative work provided

data about people's attitudes, feelings and experiences within higher education. The background information provided by the statistics also helped me, of course, to find out whether the departments I studied were 'typical' in terms of numbers of male and female students, proportions of different degree classes and so on.

The data from this part of the research will be presented in the next chapter, Chapter 6.

ii. Postal Questionnaire

Much of the statistical information, as predicted, raised interesting questions about the participation of men and women in higher education. For example, it was noticed that in certain subjects, women had a better chance of being accepted than men, and in other subjects, the reverse was the case. Such statistics only throw up the bare facts; they do not show what happens between a person's applying for a course and that person being accepted or rejected. It was hoped that the questionnaire would serve two uses:

i) as a check against the data culled from the statistical survey; it was possible that the statistics on applications and admissions were unreliable and therefore ought to be checked against information from the universities themselves;

b) to bring to light new information about admissions procedure. Very little work had been previously conducted on the admissions process, and it was thought that a questionnaire on the subject might provide some interesting information on the relevance of gender in admitting students. It was hoped that it would be possible to correlate the proportions of women admitted to a course with the ways in which universities organized their admissions procedure and admissions requirements; and it was also possible that a questionnaire sent out to each university might highlight interesting differences in the numbers of women and men admitted to courses in different places.

Consequently, a questionnaire was sent out to all admissions tutors in English and physics in universities and university colleges in England and Wales, bar Oxford and Cambridge. Oxford and Cambridge were excluded because their admissions system is rather different from that of other universities, involving colleges as well as the university departments, and

often replacing 'A'-level requirements with an entrance examination. It was simply too complicated to amend the questionnaire in a way that would include Oxbridge. The Scottish universities were excluded, again because of the differences in entrance requirements and the differing nature of Scottish courses. Regrettably, polytechnics and colleges of higher education also had to be excluded because of the difficulties, before the introduction of PCAS, inherent in their admsissions procedure, with students often applying for polytechnic or college of education places without the slightest intention of taking up a place if they attained university standard 'A'-level grades.

English and physics were decided on because those were to be the two subjects examined in the qualitative research. It was felt that a questionnaire of all university departments would simply be too ambitious and unmanageable. Even within the limitations already set out, however, I had to make further modifications. For example, physics courses can include degrees in theoretical physics, nuclear physics, physics and astrophysics, applied physics and medical physics as well as straightforward 'physics'. It was decided therefore, for simplicity's sake, to send out questionnaires only to admissions courses for physics, theoretical physics and applied physics. Fortunately, no such problems existed with English. The questionnaire was computer coded and 104 copies were sent out altogether.

The questionnaire itself was divided into five sections. Section A asks about the role of the admissions tutor. Section B asks questions about how students are attracted to courses - whether through publicity material in libraries, open days, posters and so on. Section C, the most important section, was optimistic in that it asked for detailed information about numbers of male and female students applying to the course over the past five years, numbers who were made offers, and numbers admitted. Section D asks about the specifics of the admissions process - whether 'O'-level grades, expected 'A'-level grades, headteachers' recommendations or interviews are used as methods of assessing candidates' suitability. and also whether admissions procedures had changed in recent years, what grades were required, and whether exceptions were made to general admissions qualifications. Section E asked about the Clearing process.

The questionnaire was sent out in September 1985, and a reminder was

sent out, with another copy of the questionnaire, in January 1986. As the response rate was slightly less than 50%, and as many of those returned were not completed in full, it was decided to analyse the results without the use of a computer.

The results of the questionnaire survey will be discussed in Chapter 7.

iii. An interview study

It was decided that the bulk of the research would be undertaken in the form of a qualitative, broadly ethnographic study. In order to make an arts/science contrast, and to compare different departments, I decided to look at six different courses:

a) a three-year physics degree course in a traditional redbrick university;
b) a three-year English degree course in the same university;
c) a three-year physics degree course in a modern university;
d) a three-year English degree course in the same university;
e) a four-year 'sandwich' physical science degree course in a polytechnic;
f) a three-year 'communications' course in the same polytechnic.

The decision to look at six courses was a difficult one. It obviously meant that it was not possible to look in depth, in the classic ethnographic method, at one group of people in one environment; to stay, for any length of time in all six places, was impossible. However, it was decided to make the research as broad as possible because of the possibilites of comparison and contrast. It also meant that the potential for generalizing the findings was greater; not only could I distinguish results which were specific to a course from results which were specific to a discipline, I could gain useful insights into the sort of academic environment which students found most (and least) stimulating.

The choice of two polytechnic courses was significant. They did not correspond to 'English' and 'physics' directly; few polytechnic courses do. Because they were much more broadly-based, they provided an interesting site for examining Bernstein's ideas about weak and strong "frames." The four year physical science course combined physics and chemistry and strongly emphasised applied science: students took a year out in industry. It was a marked contrast to the two university courses which put a great deal of emphasis on theoretical work and which did not make direct links with industry. The communications course had some connections with

English - most of its students have arts 'A'-levels - but was very broad-based, including sociology and psychology amongst the subjects studied. Although not totally vocational, there is a vocational emphasis, and some of its students do enter the media afterwards. Both the physical science and the communications course were part of larger departments. In the universities, the two English departments each ran only one course - single honours English - but the physics department at 'A', in addition to running a single honours physics course, ran a course in joint physics/ astrophysics, whilst the physics department at 'B' ran a physics/physics education course and a combined maths/physics course, as well as the single honours physics.

From each course, I interviewed sixteen students - eight first years and eight final years, eight men and eight women: ninety-six in total (See table) The figure of ninety-six allowed me to look at each course in some depth, whilst maintaining a broad overview. Both first years and final years were interviewed as a means of getting a full picture, rather than a partial one. It was also possible that there would be interesting differences between the expectations of the first years and the more considered and perhaps cynical judgment of the final years.

Physics Course University A

	Men	Women
First Year	4	4
Third Year	4	4

(This was replicated then in the other 5 courses.)

The students' names were taken at random (every tenth name, every sixth name, depending on the size of the department) from lists of names supplied to me by the department. I wrote to the students through their departmental pigeonholes, enclosing a stamped postcard, addressed to myself, with a selection of times suitable for interview written on the back. In the letter, I asked the students to tick a time, or suggest a more convenient one, and to post the card back to me. Unfortunately, some students did not reply initially. (This was a particular problem in the English department at 'B', where students simply never seemed to look in their pigeonholes.) On at least one occasion I had the bad luck to write

to a student who had dropped out. The result was that I had to write to some students twice or, when that failed, continue picking students' names out at random from the lists. Eventually, I was able to interview ninety-six students, although it took longer than expected; I started in October 1984 and finished in the summer term of 1985. I was also initially hampered by the fact that I had decided to interview students in their homes, in the hope of making them feel relaxed. This, however, proved very time-consuming - students always seemed to live in quite inaccessible places - and after a few weeks I asked the departments to allow me a room for interviewing, in which it was possible to conduct three or four interviews in a day.

The interviews were semi-structured. There were set questions for each interview which were concerned with obtaining information such as parents' occupation, type of school attended, 'O' and 'A' levels taken (with grades) and any work undertaken before coming into higher education. There were, however, also themes which were explored through more unstructured enquiry into students' experiences of school education, their reasons for entering higher education, their reasons for choosing that particular course and institution, their experience of the course to date, criticism and praise of the course, ideas for improving education, their non-academic interests, their feelings about the 'value' of their discipline (whether they thought science was more worthwhile than the arts, and vice versa), and their future plans. The average length of interview was about three quarters of an hour. (This varied, interestingly, between groups: by far the longest interviews I conducted were with male arts students, who had a lot more to say for themselves.)

In addition to interviewing students, I interviewed two lecturers from each course. The aim of this was to examine in a little more detail the construction and 'culture' of the discipline: to form a picture of official views of the discipline: in what direction lecturers thought their discipline was going, what they thought of new trends in the subject, whether they like the way it was taught in their own department, what modifications they would like to see, and how effective they thought it was in teaching students. (Past examination papers were also studied in order to find out more about the discourse of each discipline.) Lecturers were also asked about their views on the gender ratios in their discipline and

about the comparative achievement of men and women. The interviews with lecturers tended to be slightly longer than those with students, usually lasting over an hour. The data from these interviews are reported on in Chapter 8.

In order to get a greater 'feel' of the courses, I also attended some lectures on each course, and examined coures materials (handouts, syllabi etc.) but these are not written up in the thesis.

I should, finally, mention one other activity I undertook with the aim of improving the research. I do not have a scientific background, but I do have a degree in English. This imbalance worried me, and in order to gain some small understanding of physics, I went to night-class, during the year of the field-work, to study for an O-level in the subject. (Until then, I had no scientific O-levels at all.) This proved to be a worthwhile exercise, mainly because it gave me an insight into the way physics is taught at that level. (It was useful in another respect; I sometimes used it as a talking-point with physics students when they asked about my own academic background. If I mentioned that I was taking an O-level in physics, I was invariably met with the reply that O-level physics was based on half-truths, and that doing a physics degree meant forgetting a good deal of what was learnt in school and starting over again. This set me thinking about the idea and status of 'truth' in science, the need for students to accept knowledge on trust, and so on.)

For the record, I took the O-level in June 1985, and passed with a B.

5.5. The Experience of Interviewing

The interviews themselves proved, initially, to be a nerve-racking experience. I had never previously undertaken any kind of social research, and I was not completely sure what I ought to be looking for. Initially, too, there seemed to be no pattern emerging in the responses I was getting, and I found myself sympathising with the central character of Margaret Drabble's novel, *The Middle Ground*, a journalist called Kate who has been making a programme about 'modern women', which consists of a series of interviews with her contemporaries from secondary school. She is unable to discern a pattern in their experiences and is forced to conclude "Shapeless diversity, what was wrong with that?" Paradoxically, the

recognition that each and every student was an individual with an unique mixture of experiences, beliefs and attitudes, helped me to understand that patterns can be found through students' uses of common discourses to interpret those experiences. As the interviewing progressed, I developed more confidence, and more insight into the issues I was interested in. Interesting responses from some students in the early interviews ensured the inclusion of certain new questions in later interviews; at other times, my continued reading of the literature helped shed new angles on certain themes that were developing; or the themes themselves sent me back to look at the literature. The process of research, I realised, was much more circular than most sociological accounts reveal; the typical pattern of 'literature review - methodology - data' (used in this thesis for the sake of convention) belies the fact that some literature only gets read because of what has been discovered in the process of research.

For the positivist researcher, the attitude of my respondents, the students, might have proved a problem. Students are not usually deflected from asking questions by "a head-shaking gesture which suggests 'That's a hard one!'". They can be well-informed, argumentative, suspicious of social scientific research or simply eager to know what the research is *really* about and how it is going to be used. Some of them will openly criticise the validity of the interviewer's questions. Frequently, for example, I finished the interview with the question "What do you think you will be doing in about ten years time?" and on more than one occasion this was turned back on me: "What do you think *you'll* be doing in ten years time?", indicating some resentment at having to answer what they saw as an unfair question.

I decided that the best way of dealing with this was to be as honest as possible about what I was doing, and to remove the barriers between "researcher" and "researched". The best interviews were those which evolved into discussions about ideas and theories, and in which I had allowed myself to follow a line pursued by the interviewee.

I also gained practical experience of what I already believed in theory: that interviewing is a subjective process. I could not get away from the fact that there were some students whom I liked, and some whom I disliked. I tried very hard not to let this affect my response to students, but inevitably, it was much easier to be receptive and enthusiastic with

students to whose point of view I was sympathetic than it was with those with whom I had disagreements.

5.5. Analysing and Writing Up the Data

i. Statistics

The analysis of the statistics was not entirely straightforward, partly for reasons explained earlier. There were a few curious anomalies in some of the published statistics; for example, in one table on 'Qualifications and Destinations', three figures were given; 10,000, 17,000 and 8,000 - which clearly add up to 35,000. The total given in the table, however, was 34,000. This made the task of calculating percentages a little more difficult.

Certain decisions had to be made about which statistics had to be included and which left out. It was decided, in the analysis of secondary education statistics, to leave out Scottish examination results as these are not directly comparable with 'O' and 'A'-levels. In the university statistics, only the data on home students were used; as overseas students had not been through the British education system, it would not be appropriate to compare them with students educated in Britain.

The social class data, as expected, provided problems. The accuracy of the statistics provided by USR was a little doubtful, particularly as the total numbers admitted in the social class statistics differs from the total numbers admitted in the other statistics provided by USR. All that could be gained from these data, eventually, was a very general picture.

These problems aside, the rest of the analysis was relatively easy, although mundane - a pocket calculator helped with the conversion of numbers into percentages. Some parts of the analysis were difficult - particularly when different statistics showed contradictory information. In writing about the statistics, I have tried to present the information in as clear and as "qualitative" a way as possible.

ii. The questionnaire

The questionnaire survey presented greater problems. Although I had a 43% response rate, most admissions tutors had been unable to answer the crucial part of the questionnaire, Section C, which asked for information about the numbers of male and female students applying to, and being

accepted by, departments over a period of five years. It was not, therefore, possible to carry out the detailed statistical analysis I had originally hoped to conduct; the small numbers answering Section C meant that tests of statistical significance and so on were pointless. In some cases it was particularly irritating that Section C had been completed without a gender breakdown - total numbers were given, but not separate numbers for men and women. One can only speculate as to whether this was the result of reluctance to reveal information about gender, or because the information was not kept on record.

The analysis of the questionnaire survey presented in Chapter 7 is, therefore, limited. Certain questionnaires had to be abandoned; one university physics department, for example, had filled in two questionnaires (perhaps I had accidentally sent a reminder where none was needed); in another university, copies of the questionnaire had made their way both to the departments and to the central admissions office, with the consequence that I received replies from both the physics department and from the admissions office on behalf of the physics department. The curious feature of this was that the replies from the two sources were completely different; the questionnaire from the central office was abandoned as probably being the less reliable. (The incident, I think, sums up nicely the limitations of postal questionnaires). After this sorting process, I was left with twenty-seven physics questionnaires and twenty English questionnaires which, because of the size of the response, were then analysed manually, rather than by computer, as had originally been planned.

iii. The interviews

The interviews, after transcription, provided me with a more difficult analytic task. The first step in the analysis was to sort through data about parental occupation, type of schooling, and A-level grades. Initially this was done by using a card index of students; there was a card for each student, on which information about parents' occupation, type of school attended, A-levels taken and career plans, was recorded. In addition, when I felt that, on first reading of the transcript, there had been a particularly interesting quote, this was put on the card as well. Some of this information (on schooling and social background) is presented quantitatively in Chapter 9.

The second step was to extract themes relating to gender, the arts/ science dichotomy, and attitudes towards education. The quotations from the student card index were extracted and put on to separate cards. I then went through the transcripts again, selecting what seemed interesting or relevant and putting those on cards. When a constant theme seemed to be emerging, I went back to the transcripts and looked for more information; I was also influenced by the fact that I was still reading the literature, so that that, too, sent me back to the transcripts. In fact, it was a fairly messy process and not at all clear-cut. It soon became apparent that it was impossible to present this data quantitatively, as students' feelings were so often ambivalent, complex or contradictory. It was decided therefore to use quotations as much as possible, and to organise the relevant chapters of the thesis around certain ideas and responses which cropped up during the interviews. Consequently, much of the data presented in Chapters 9 and 10 and 11, are biased towards the interesting, the articulate and the thoughtful. Organising Chapters 9, 10 and 11 was rather difficult, as students' comments didn't always fall into recognisable, easily definable, categories. The organisation of those three chapters into different topics and sub-topics is, inevitably, a little arbitrary, but I feel that the scheme I have chosen does have the merit of clarity. Chapter 9 is divided into two sections, the first of which presents the quantitative data on schooling and background, and the second of which presents qualitative data on the background to students' subject choice and decision to enter higher education. Chapter 10, Arts and Science, is also divided into two main sections: the first looks at scientists' construction of their discipline, and then at arts' students construction of theirs, and then examines the mutual perceptions of artists and scientists of each other. The second section concentrates on students' feelings and criticisms of the courses. Chapter 11, which examines the construction of students' identity through gender, presents separate data for four different groups: male science students, female science students, male arts students and female arts students. It was felt that this would facilitate comparison between the four groups. As much as possible, I have tried to allow the students to speak for themselves and to present their accounts sympathetically. Although my interpretation of students' accounts of their experiences is often located in a different discourse from *their*

interpretations of those experiences, it is important that their voices are heard; just as Oakley, in *Becoming A Mother* allows women a voice through quoting them at length, and through refusing to categorise them or to explain their experiences away, so I hope my account of the research does not 'explain away', but attempts to understand, clarify and make sense of the interviews.

The process of analysing the data from the interviews with the lecturers was different from that used to analyse the student data. As there were only twelve such interviews, a card index system did not seem necessary. Instead, interesting remarks were simply noted by underlining. The whole process was much simpler, because the lecturers' interviews were trasncribed straight on to a word processor, and it was possible to extract chunks from a transcript file and add it to another file (i.e. Chapter 8.) Chapter 8 makes greater use of some of the interviews than others; as with the student interviews, some lecturers had a good deal more to say than others and this is reflected in the presentation. Chapter 8 also makes use of examination papers to illustrate certain points; if this had been a more deeply ethnographic study, I should have liked to have presented a more detailed analysis of the content of examination papers; as it was, I had to content myself with selecting examples to demonstrate certain themes. Chapter 8 will be largely discursive, comparing and contrasting the six courses: it does not aim to make a definitive statement about each discipline as it is taught in universities and polytechnics around the country.

I do not claim to an absolute 'scientific' objectivity in my research findings; I believe it wrong to pretend that research can be value-free. Like Becker (1967), I believe that sociologists must ask 'Whose side are we on?' and I have not disguised the fact that my own commitment is to a fairer and more equal society. The research design I have chosen is shaped by that commitment, and I have tried here to present as honest an account as possible of the reasons for choosing that design and the process of carrying it out. I do not believe that I am more subjective or more biased than the next researcher; I do believe that in recording my subjectivity and my theoretical beliefs, I allow the reader a greater opportunity to evaluate the findings of my research.

CHAPTER 6: STATISTICS OF EDUCATION

6.1 Introduction

This chapter will provide an overview of the statistics relating to gender in higher education. The survey will be both historical - comparing the proportions of men and women in education in the past ten to fifteen years with the situation today - and up-to-date, examining recent statistical information on the comparative participation and success rates of men and women.

The literature review raised questions about the relationship between gender and arts/science specialisation; about the comparative access to higher education of men and women; and about the relative achievement of men and women in education. Therefore the statistics in each section cover three main areas: the comparative numbers of men and women at each level of education - O-level, A-level and degree level over a period of time; the comparative numbers (and proportions) of men and women specialising in arts and science subjects over a period of time (given our interest in the arts/science division, there will be few statistical tables concerned with the social sciences or non-academic subjects); and the comparative academic achievement - 'A'-level scores and degree classifications - of women and men.

This survey is broken into two sections: Section 1 will look at 'O'- and 'A'-level passes, as these provide a base for decisions about entering higher education, and the destinations of school leavers. Section 2 will look at statistics of higher education: access, subject specialisation and attainment. These data will show a detailed picture of both the similarities and the differences in male and female participation and achievement, and will give an indication of future trends.

Caution must be taken in interpeting the statistics presented here. As stated in the previous chapter, the statistics are drawn from a variety of sources, and different methods are used of presenting information. For example, if one wishes to examine the numbers of 17 year old school-leavers with A-levels, one has to note that some tables show the number of 17 year olds obtaining A-levels as a proportion of the whole school-leaving population, as a proportion of the 17 year old population, or as a proportion of the 17 year old school-leaving population. Some tables give figures for Great Britain, some for England and Wales, some just for

England. In the analysis, I have tried to indicate as clearly as possible the nature of the data shown in the tables.

6.2. O and A-levels

i. Trends

This section examines the change in the numbers and proportions of school-leavers obtaining qualifications between 1972 and 1983. Given the raising of the school-leaving age in 1973, and the introduction of CSE examinations, we would expect to find that the proportion of school-leavers with examination qualifications has increased. Because of the moves towards equal opportunities in the 1970s, we might also expect to find that the proportion of female qualified school-leavers has increased.

This is exactly what has happened. In the case of those taking and passing CSEs and O-levels, the increase has been quite dramatic; in the case of A-levels it has been slow but steady. The percentage of school leavers who have not attempted examinations has fallen from 42.4% in 1972 to 8.7% in 1983, the major part of that decrease taking place during the seventies - undoubtedly the consequence of the introduction of the CSE examination and the ROSLA. Similarly, the proportion of school leavers with no graded examination result has fallen from 43.0% to 9.6% in the eleven year period - a proportion which is continuing to fall. The percentage of school leavers with five or more O-levels (or grade 1 CSEs) has risen over the eleven year period from 8.4% to 10.3%, whilst the proportion with one or more A-levels has risen from 16.2% to 17.1%.

Unfortunately, the earlier years in Table 6.1 are not broken down into male and female, but the 1982/83 results show interesting differences. Slightly more boys than girls (17.4% to 16.9%) leave school with one or more A-levels, whilst a greater proportion of girls leaves school with no A-levels but five or more O-levels. This suggests that girls with good O-levels are less likely to stay on in the sixth form than boys with good O-levels, although this is not necessarily the case. At the other end, a greater proportion of boys than girls - 11.3% to 7.9% - leave school with no graded result at all.

In Table 6.2 we see an increase, from 1972 to 1983, in the proportion of female school leavers intending to remain in full-time education. Whilst the proportion of boys intending to remain in full-time education

has increased from 19.1% to 23.0%, the proportion of girls intending to do so has increased from 24.0% to 31.8%. The greater proportion of girls than boys intending to remain in full time education in 1972 is almost entirely accounted for by the large numbers intending to enter teacher training or secretarial courses - options which only a very small or non-existent proportion of boys took up. The increase in the proportion of girls intending to remain in full-time education in 1983, as compared to the proportion of boys intending to do so, is accounted for partly by the greater proportion of girls hoping to enter degree courses (an increase from 4.6% to 6.5%; the figures for the boys remain constant at 8.5%), and partly by a doubling in the proportion of girls intending to take professional or vocational courses compared to an increase of 50% in the proportion of boys intending to enter those courses. Part of this large increase for both sexes must be due to diminishing employment opportunites and the introduction of YOP and YTS schemes; this would also account for the small numbers available for work. The current bleak employment situation, the increase in school-leaving age and the greater number of students passing O-levels, must all account for the great increase in numbers of both sexes staying on to take A-levels.

Table 6.3 shows the change, over a period of eight years, from 1976 to 1984, in the proportion of the seventeen year old population obtaining A-levels. There is a very slight general increase in the proportion of people gaining A-levels, but the increase is much greater amongst girls than amongst boys, with 6.8% of 17 year old girls gaining three or more A-levels in 1975-6 and 8.6% doing so in 1983-84: an increase of 11.5%. The proportion of boys gaining three A-levels during the same period increased only from 9.7% to 10%, although the proportion of boys gaining three or more A-levels is still higher than the proportion of girls doing so. The proportion of boys gaining exactly two A-levels decreased slightly, whereas the proportion of girls gaining two A-levels increased by a small amount. The main change was in the proportion of girls gaining one or more A-levels; this increased from 14.4% to 16.5%, whereas the proportion of boys went up from 16.5% to 16.6%. Thus in 1984, the proportions of boys and girls leaving school with one or more A-level were virtually identical.

ii. Subject Choice

In the early '70s, there was much debate about the 'swing from science', and today there is still concern about the apparently small numbers of students, particularly women, taking scientific and technological subjects. This section will examine the statistical evidence on the change in numbers of pupils choosing science subjects.

Tables 6.4, 6.5 and 6.6 show the differences in the subject choices of male and female students. There are some significant differences between boys and girls in the subjects attempted and subjects passed. For example, although 84% of boys and 89% of girls had attempted an O-level or CSE in English, only 34% of boys, compared to 45% of girls obtained an O-level pass in the subject. Similarly, in maths, 81% of boys and 83% of girls attempted an examination in the subject, but 32% of boys, compared with 27% of girls attained an O-level pass. This is partly due to the fact that more boys than girls took CSE rather than O-level English, and vice versa for maths.

There are large sex differences in other subjects, too: far more girls than boys left school with an O-level grade in biology, French, history, creative arts and commercial and domestic subjects; whilst more boys left school with physics, chemistry , CDT and geography. The greatest differences were in CDT and commercial and domestic subjects, which are still sometimes timetabled opposite each other in schools. Amongst academic subjects, the biggest differences were in physics (22% of boys and 8% of girls had an O-level grade) and French (19% of girls, and 11% of boys had an O-level grade). The subjects in which shcool-leavers had most passes were English, maths and geography, in that order. Girls were more likely than boys to leave school with a pass in any subject (58% to 51%.)

Despite these differences, there has been a levelling out since 1972. (Table 6.5). There has been a large increase in the proportion of girls leaving school with science O-levels - an increase of 110% in physics and 111% in chemistry. The highest percentage increase amongst boys was also in the sciences - biology, physics and chemistry - although the highest increase of all was the 200% increase in the proportion of boys with passes in commercial and domestic subjects. This increase is no doubt largely due to the passing of the Sex Discrimination Act and the decision

of many schools to make domestic science compulsory for both sexes. This didn't seem to work the other way, however: there was actually a decrease in the proportion of female school-leavers with passes in CDT. The only other decrease was in the proportion of boys leaving school with O-level passes in French. Clearly the 'swing from science' is no longer a reality; and the supposed decline in standards is not apparent in examination results. The proportion of boys with a pass in any subject increased by 19%, whilst the proportion of girls with an O-level pass increased by 31%.

The figures for A-level passes in Table 6.6 show some interesting similarities to, and some significant differences from, the figures in Table 6.5. The most striking difference is that the proportion of 17 year old girls with an A-level pass in CDT shows a 200% increase from 1972 to 1984, compared with a decrease in the proportion passing O-level. This discrepancy is probably the result of the smallness of the figures in the first place, which exaggerates the difference when translated into percentages. The swing towards science at O-level, however, is reflected in A-level, with the swing much greater amongst girls: 84% more girls passing A-level maths, compared to 16% more boys; 69% more passing A-level chemistry compared to 13% more boys. Curiously, the increase in the proportion of girls gaining physics A-level was much smaller than the increase in maths and chemistry: only 29%. Whereas girls comprise about a third of all maths and chemistry students, they comprise only a quarter of all physics students. This is unexpected, because the three subjects are usually taken together at A-level. The figures may indicate a trend amongst girls to take maths, chemistry and biology together - more girls than boys leave school with A-level biology.

Amongst both boys and girls, there was a swing away from the arts, although this swing was much greater amongst boys than amongst girls. For example, there was a 6% decrease in the proportion of 17 year old girls with A-level English, but a 22% decrease amongst boys. There was also a 21% decrease in the proportion of boys with A-level French, compared to a 3% decrease amongst girls. There was a general increase in the proportion of students with one or more A-levels, which was almost entirely accounted for by the 15% increase in girls with an A-level (as compared to an increase of 1% amongst boys.)

In some subjects, differences were small. These were history, general studies, biology and geography: the extremes are represented by physical sciences on the one hand and languages on the other.

Despite the fact that there was a general levelling out, however, there are still large differences. Over twice as many girls (proportionately) as boys have A-level English, for example. In 1983, the three most popular A-level subjects for boys, to judge from passes, were maths, physics and chemistry (in that order), whereas for girls they were English, biology and maths. The figures, then, do not point to a simple concentration of girls in arts contrasted with a concentration of boys in science; although boys *are* dominant in the physical sciences, girls tend to be slightly more spread out over the range of subjects; the number of girls obtaining physics, for example, was higher than the number of boys obtaining French.

The overall picture, then, shows that differences between the subject choices of the sexes, although great, are lessening, but there is a growing tendency for boys to shun the arts and languages.

iii. Type of School

Tables 7 and 8 show the qualifications of school-leavers from different types of schools in 1982/3. The vast majority of school-leavers (85.1%) attended comprehensive schools. Only 2.8% of school leavers had attended grammar schools, and the proportion from the maintained sector as a whole was 94.3%. Only a tiny minority - 5.7% had attended independent schools. It is this minority, however, who leave school with the highest qualifications. 63.1% of independent school leavers left with more than one A-level, whereas only 13.7% of comprehensive school leavers did so. Even the 'élite' grammar schools only managed 56.8%. It must be remembered, of course, that many comprehensive schools do not have sixth forms, and many of their pupils will later take A-levels in technical colleges or sixth form colleges. Nonetheless, the differences are still substantial; table 8 shows that whereas 45% of boys and 41% of girls from sixth form colleges obtained two or more A-levels, 60% of boys and 51% of girls from independent schools did so. Not surprisingly, the results even out in the middle, in the percentages of school-leavers with O-levels but no A-levels: 10% in the maintained sector five or more O-levels but no A-levels, compared with 14.6% in the independent sector. At the other end, however, the proportion

of pupils who leave school with no graded result - i.e. not even CSE grade 5 - varies greatly from the schools with the worst figure, Other Secondary (mainly secondary modern) with 10.9% to the independent schools where only 1.8% of pupils leave school with no graded qualification.

As indicated earlier, there are interesting sex differences in these results. Boys attending an independent school are more likely to leave school with A-levels than girls attending an independent school. The same is true of sixth form colleges and grammar schools. The type of school where differences in numbers of girls and boys obtaining A-levels are least - i.e. non-existent - are ordinary comprehensives.

The overall differences between the maintained sector and the independent sector are, however, enormous: much greater than the differences between the sexes. The independent schools still manage to ensure a greater proportion of school-leavers with A-levels than the sixth form colleges.

iv. Qualifications and Destinations

Tables 9 and 10 enable us to compare the destinations of male and female school leavers relative to their qualifications. Table 6.9 shows that in 1984, of the 43,000 boys who had three or more A-level passes, 24,000 - i.e. 55% - went to university. Only 50% of girls, however, with three or more A-levels, entered university. A high proportion of leavers with three or more A-levels - about a quarter - do not continue with education in any form. Approximately the same number of boys and girls with two A-levels went to university, although slightly more girls obtained two A-levels. Girls with two or three A-levels, or with O-levels only, were more likely than boys to enter full time further education, whilst boys were more likely to be available for work.

The information is presented in more detail in Table 6.10. This shows that male 17 year old school-leavers were more likely than female 17 year old school leavers to have three or more A-levels - 48.2% compared with 40.5%. 40% of the male 17 year olds went on to take degree courses, compared with only 30.6% of the girls. A far higher proportion of girls, however, entered teacher training or secretarial courses, whilst a slightly higher proportion of girls also entered other professional or vocational courses or were available for employment.

The pattern shown in these tables, then, is that boys are more likely to pass A-levels than girls; highly qualified boys are more likely to go to university than highly qualified girls.

v. Summary and Discussion of Section 1: Tables 6.1 - 6.10

This first section has preesented data relating to 'O' and 'A'-level achievements (and failures) of male and female school-leavers. In the discussion of each table, several themes recurred.

The first of these is that, on the whole, boys leave school with higher qualifications than girls. Boys are more likely to leave school with three or more 'A'-levels, and with one or more 'A'-level. The picture is more complicated than this, however. A greater proportion of girls than boys leaves school with 5 or more 'O'-levels, or with any qualification at all. Boys are more likely to leave school with no qualifications whatsoever.

It is also a picture which is changing. Since the early seventies, there has been a large increase in the numbers of both sexes taking, and passing, an examination of some sort. The increase has largely been in the area of 'O'-levels and CSEs, not 'A'-levels. However, a great deal of this increase, and in particular the increase in numbers passing 'A'-levels, is due to the huge increase in girls passing these examinations. Table 6.5, for example, showed that the increase in boys gaining an 'O'-level in any subject between 1971-2 and 1982-3 was 19%, whilst for girls it was 31%. Similarly, the change over the same period in students gaining an 'A'-level in any subject was only 1% for boys, but 15% for girls: a quite dramatic increase.

Figures for 1982-3 and 1983-4 showed differences in the destinations of male and school-leavers. Boys were more likely to enter degree courses than girls, and girls were more likely to go into teacher training, secretarial or other vocational courses. Again, however, there had been a large increase since 1971-2 in the proportions of women going on to degree courses, whilst the proportion of boys had remained constant. Even when boys and girls have similar qualifications, they train for very different kinds of jobs. Clearly, factors other than ability or achievement influence the jobs taken up by boys and girls.

The other major difference between male and female pupils was in subjects studied. At 'O'-level, boys were much more likely than girls to have passes in physical science subjects than girls, whilst girls were more likely to have passes in arts subjects and biology. This difference is reinforced at 'A'-level, obviously with more boys dropping out of the arts and more girls dropping out of the physical sciences. However, the arts/science division is not a simple one, and there are other significant differences. Although far fewer girls than boys take physics at 'A'-level, the gap is much smaller in maths (about 65% to 35%) and chemistry (again about 65% to 35%). Similarly, in the arts, the gap is much wider in French than it is in history.

It is important to look at the A-level data in the light of the historical trend. There is a great increase in the number of girls taking science subjects - greater than the increase in boys taking science subjects - and a great decrease in the numbers of boys taking arts subjects, but only a relatively small decrease in the numbers of girls taking arts subjects: i.e. the swing towards science for girls is not compensated for by a similar sized swing away from arts amongst girls. This, of course, is because more girls as a whole are staying on to do 'A'-levels. Thus there is now a greater proportion of girls to boys now than there was ten years ago in just about every subject, arts and science. In no area, apart from that of commercial and domestic studies, has the increase in boys taking a subject been greater than the increase in girls taking that subject.

The important thing to emphasise, then, is change. The picture is not a static one: it changes yearly. In some cases, the changes have been quite dramatic, and this indicates that we can not be reductionist - either biologically reductionist or economically reductionist - in our explanations of the education system.

This section provides a basis on which to examine the data on higher education. We have some idea of the differences, and the similarities, between the examinations which boys and girls pass, and the subjects which they take. The pattern of change revealed in this section suggests that similar changes will have taken place at the level of higher education. It is now possible to examine in some detail the subject choice and academic performance of women and men in university.

6.3 Higher Education

i.Trends

Tables 6.11 and 6.12 show the increase both in the numbers of women entering universities and in the proportion of women as a whole. In Table 6.11 we see that women increased as a percentage of the total undergraduate population from 30.6% in 1970-71 to 42.4% in 1985/6. The numbers of male undergraduates increased during this time as well; but whilst the numbers of male undergraduates increased by only 3.8%, the numbers of female undergraduates increased by 42.4%. It is clear that during the expansion of higher education that occurred in the 1970s, most of the new places were taken by women. (If the numbers had increased equally, an increase of 3.8% amongst men would have been equivalent only to an 8.2% increase amongst women.) A similar increase occurred at postgraduate level; women formed only 25% of all postgraduates in 1970-71, but 37.3% of postgraduates in 1985-6. The number of women postgraduates increased by 54.4% during this period, whilst the number of men postgraduates in fact decreased by 13.0%

Women also increased as a proportion of the undergraduate students entering university in most subject areas, as classified by UCCA, between 1974 and 1984. The only subject area in which they declined as a proportion was Other Arts (i.e. non-language arts), in which they dropped from 52.4% to 52.1%. This was also the only area in which the numbers of students of both sexes fell, although the numbers of men declined in five of the nine subject areas: Medicine, Dentistry and Health; Agriculture, Forestry and Veterinary Science; Social, Administrative and Business Studies; Architecture; and Languages, Literature and Area Studies. The numbers of women increased most dramatically in Engineering and Technology: by about 350%. They also increased by almost 300% as a *proportion* of the total students in Engineering and Technology. The proportion of women students also increased significantly in Medicine, Dentistry and Health - from 39.0% to 48.5% - and in Architecture - from 28% to 41.7%. The increase in proportions of women in traditionally male subjects was not offset by a decrease of women in 'female' subjects - women increased as a proportion from 64.8% to 76.3% in Education, and from 62.8% to 69.6% in Languages and Literature. Despite this, there was still a higher proportion of men than women entering university in 1984; 57.7% of entrants were men. This, however, shows a proportional decrease from 1974 when 63.6% of entrants were men.

The general position, then, is very similar to the one we saw in O-levels and A-levels. Women are gaining greater access to education, including higher education. Their participation in the sciences is increasing more quickly than their participation in the arts; even so, the increase in the number of women taking arts subjects has been greater than the increase in the number of men taking arts subjects. Thus whilst women seem to be catching up in scientific areas, men are falling behind in language and literature subjects.

ii. Entering university

Table 6.14 shows the percentage of women and men passing an A-level subject compared with the percengage applying through UCCA for an university place in that subject. This is a somewhat artificial exercise, as many of those students taking A-level will be applying for polytechnic places, dropping out of education altogether, or applying for vocational university subjects such as law, medicine and business studies. However, it is a useful indicator to which subjects men or women are most likely to drop out of or stay in. Note that the table does not use numbers; there may be, for example, very many women applying to take history, but there are still fewer of them than men; or there may be few women applying for French, but there are still more of them than men. The idea is to show women's and men's participation relative to each other.

The patterns revealed are interesting; they are not entirely expected. It is not surprising that the proportion of women (as a percentage of total students) applying to university is smaller than the proportion passing 'A'-levels. What is surprising is that there is no simple arts/science divide in which numbers of men increase and numbers of women fall, and vice versa. For example, we would expect to find that, although women make up a fifth - 20.9% - of all A-level passes in physics, they make up only 13.7% of applications to take physics at university. Similarly, women are 36.4% of all chemistry A-level passes, but only 27.5% of applications to take chemistry at university. Yet women comprise 28.9% of maths A-level passes but 34.8% of applications to take maths at university. This suggests a tendency amongst women with A-levels maths, physics, chemistry, for example, to continue with maths, and for men with A-levels in those subjects to continue with physics or chemistry. There can be no pat explanation for why this happens; certainly it does not accord with the belief that women avoid abstract

disciplines; maths is generally regarded as more abstract than physics or chemistry.

In most subjects, there is a higher proportion of men relative to women applying for university places than there were gaining A-level places. In English, for example, men formed 29.3% of A-level passes, but 31.7% of university applications; in biology, men formed 40.6% of A-level passes but 50.6% of university applicants. The major exception is French, where men drop from forming 26.6% of A-level passes, to 18.9% of the applicants for university places.

There are no dramatic shifts in the numbers of men or women turning away from a subject, although the drops in the proportion of women taking physics, and of men taking French, are quite high. Students do, however, have other options open to them. Table 6.15 shows the numbers and percentages applying for selected vocational scientific disciplines. This provides a much sharper picture. All the subjects listed require scientific A-levels - three out of maths, physics, chemistry and biology. Yet in each of the top five subjects: medicine, dentistry, opthalmics, pharmacy and veterinary science, between roughly 40% and 60% of applicants were women; whilst in the lower five subjects: aeronautical engineering, civil engineering, chemical engineering, mechanical engineering and electrical engineering, only between 5% and 17% of applicants wre women. So it is not simply enough to say that women don't take science, or even that they don't take physical science. It is more precise to say that they don't take physics or engineering. They are quite well-represented (amongst applicants) in the other professional subjects, including veterinary science, which is generally regarded as the most demanding of all degree courses, requiring normally 14 points at A-level. The size of the difference can be pointed to by the fact that more women applied for opthalmics, a relatively small discipline, than for any of the large engineering subjects. It is also noticeable, if we compare applications for 1984 and 1985, that the proportion of women applying for engineering courses went up quite substantially in the same year - for example from 4.3% to 6.7% in aeronautical engineering. Another interesting feature is that the proportion of women applying for chemical engineering in 1985 - 17.7% - was much higher than in any other of the engineering courses. Part of the explanation for this must surely be that chemical engineering is the only engineering subject which does not require A-level physics for entry.

Similarly, physics, although desirable, is not a requirement for the five non-engineering courses listed. Chemistry is normally a requirement, along with two other sciences. Given that about 20% of A-level physics students are women, however, it does seem highly probable that women with A-levels in any scientific combination, including ones studying physics, tend to opt for the 'human' or 'biological' sciences rather than the physical or engineering side. Tables 6.16 and 6.17 display in some detail the numbers and percentages of men and women applying and being accepted for a university place through UCCA in 1985. The first column in Table 6.15, 'Applications', shows the number of each sex applying for a place, and the percentage of each sex of the total applying. Thus, for the first subject grouping mentioned, Medicine and Dentistry, we see that 5920 men and 4734 women applied, a total of 10,654, and that therefore men made up 55.5% and women 44.6% of the total applicants. The next column, 'Acceptances', shows that 2595 men and 2156 women were accepted for Medicine and Dentistry, a total of 4751 and that 54.6% of these were men, and 45.4% women. In Table 6.17, we see that 43.9% of the male applicants were accepted and 45.4% of the female applicants were accepted.

The tables, taken together, show interesting differences between the acceptance rates in different subject groupings. For example, a high proportion of applicants to take physical science subjects were accepted - 70.6% of men and 70.5% of women - whereas only 28.8% of male and 27.6% of female applicants for business and administrative subjects were accepted. The average, as we see from the Grand Total, lies near the 50% mark - 49.5% of all male applicants and 47.2% of all female applicants were accepted. There are few significant sex differences in proportions accepted. The only glaring one is Education where only 16% of male compared to 32.1% of female applicants were accepted. There is also a significant difference, however, in both the Mathematical Sciences and Engineering and Technology: 56.4% of men compared to 63.2% of women accepted in the former, and 52.7% of men compared to 63.2% of women accepted in the latter. This may be due to the desire of engineering and mathematical sciences to attract more women, or it may be due to the fact that women who apply for these subjects have better A-level grades.

The proportions of men and women finally being accepted differed widely between subject groupings. The subject grouping in which the proportion of

men was highest was engineering: 89.7% of its intake were men. The subject grouping with the lowest proportion of men was Education (mainly teacher training); only 17% of its intake were men. Also with low proportions of men were Mass Communications (29.9%), Other Medical (e.g. Pharmacy, Nursing, Opthalmics) (31.0%), Languages (31.5%). Subject groupings which tended to have equal numbers of men and women were Humanities, Biological Science and Agriculture and related subjects (which includes veterinary science.) The most popular subject grouping for men - i.e. which admitted the highest numbers of men - was again Engineering and Technology (8427) - and the subject grouping which admitted the highest numbers of women was Languages (5870). Admittedly, this is somewhat misleading as subject groupings are by nature artificial, and if social science, for example, were grouped with business and administration as it had been in previous years, then *that* would have been the grouping which admitted most women.

The patterns of acceptance do not, then, show obvious signs of discrimination in the admissions procedure against women or men, although it would be impossible to make a definitive statement about this unless one knew the A-level grades of all students applying and being accepted. They do, however, suggest interesting differences amongst the popularity of subjects applied for, which do raise issues about gender. It is by no means the case, for example, that women are most weakly represented in the subject areas most difficult to get into. They are indeed quite well represented in Medical Science, Creative Arts and Business and Administration. Another way of looking at this is to examine the proportion of students in various subjects who were accepted into the subject they wanted to do, rather than a subject they had not originally applied for. This is what Table 6.18 shows. Like Table 6.15, it concentrates on science subjects rather than arts subjects, because at the moment we are interested in the choices facing men and women with science A-levels, between medicine and related medical subjects on the one hand, and physical science and engineering subjects on the other.

If we take the 'Percentage Preferred' column as an indication of which subjects were most difficult to get into, then we find that the most demanding subject was Veterinary Science, where 100% of all applicants, male and female, had preferred that subject. This is not surprising; a subject which requires AAB grades at A-level is hardly likely to take people through clearing. Medicine, Dentistry and English all scored very highly, also

probably because of their high entrance requirements.

The subject that scored lowest was electrical engineering: only 30.9% of male accepted candidates and 23.1% of female accepted candidates had originally preferred that subject. Table 6.15 showed that there were only 403 male and 24 female applicants for electrical engineering, so it is probable that large numbers were recruited through Clearing. Other subjects which presumably admitted a high proportion of students through clearing were French (68.1% of women but only 53.0% of men preferred that subject), chemistry (65.1% of women and 72.8% of men) and chemical engineering (67.4% of women and 75.1% of men). In chemical engineering, women formed 19% of candidates accepted.

It is likely that many of the people who finally entered physics, chemistry and biology were those who had failed to enter the more competitive subjects such as medicine and dentistry. Women, however, are well-represented in these more competitive subjects; although their participation in scientific subjects is uneven, they are by no means outnumbered in all scientific disciplines.

iii Social Class

The problems in attempting an analysis of the social class of students are considerable. There are few published data on social class. The information that UCCA publishes is based on a one in ten sample of students, and is not broken down by subject studied. The data also relies on students' own description of parental occupation, which may not be entirely accurate or which may not provide full information - e.g. describing one's father as a civil servant, or a manager, which could be anything from Social Class I to Social Class IIIN. The UCCA data use *father's* occupation as an indicator of social class, which is in itself problematic, failing as it does to make use of the mother's occupation. The Registrar-General's classification itself, which tends to group unlikely occupations together, is a somewhat arbitrary yardstick. Other occupations such as 'musician' or 'small businessman' potentially cover such a wide range of activities that they are well nigh unclassifiable.

Some of the difficulties in obtaining the data on social class from USR were outlined in the previous chapter. USR did agree to provide a breakdown into 'Professional' and 'Other' - i.e. Social Class I and the rest. Even this, however, was subject to limitations. Groups such as

'Engineer' and 'Civil Servant' would not be included under 'Professional' because they might equally likely be from social classes II or III; thus the actual proportions shown as coming from the Professional class in Tables 6.19 and 6.20 are much lower than the proportions shown in published UCCA data (usually about 20%) It should also be noted that the numbers given of total students accepted in Tables 6.19 and 6.20, actually differ from the UCCA statistics of candididates accepted in Table 6.12. Thus to say that caution must be taken in interpreting the figures in Tables 6.19 and 6.20, is an understatement. While they may give an idea of the picture, they can by no means be relied upon as an accurate indicator of the numbers of students from Social Class I.

What these tables do show is a large difference in the proportions of students coming from Social Class I in varying subjects. Table 6.19 shows that the subject grouping in which the smallest proportion of students comes from Social Class I (according to the definition) is Education, with only 3.7% of men and 4.7% of women coming from that class. The subject grouping with the highest proportion of men and women from Social Class I is Medicine (21.6% men and 17.3% women.) On the whole, women were slightly more likely to come from a professional background than men (11.3% to 10.7%). Most of the subject groupings fall quite near the 10% mark; and the only dramatic difference between women and men is in Architecture: 13.1% of men, but only 6.9% of women from Social Class I - and this discrepancy may well be due to the low numbers involved. In Engineering, quite a low proportion of men come from Social Class I - 7.3% - whilst an average proportion of women - 10.8% do so.

Table 6.20 looks at specific subjects. Here we see that a very high proportion of law undergraduates - 18.6% of men and 16.3% of women - is from the professional class as is a high proportion of Veterinary Science undergraduates (20.6% of men and 16.2% of women). Three interesting male/female differences are in physics, where 8.8% of the men but 13.5% of the women appear to come from Social Class I, geography, where 6.3% of men and 12.4% of women are from Social Class I and chemical engineering, where 12.7% of the men are from Social Class I, but only 5.9% of the women are. Again, this may be due to a distortion because of the small numbers involved. The other subjects - English, French, history, biology all seem to lie around the 12% mark. It should not surprise us that the subjects

with the greatest proportion of students from professional families are the professional subjects - law, medicine, veterinary science.

Table 6.21, which uses information from the UCCA Statistical Supplements, and is based on a 1 in 10 sample, shows more clearly how the distribution of students from different social classes does not reflect the distribution in the population at large. We can also see from this table that the USR statistics do in fact underestimate the proportion of students from Social Class I; UCCA statistics show that 23.9% of students come from that class. Social Classes I and II are over-represented amongst university students, whilst Social Classes IIIN, IV and V are greatly under-represented: whilst 6.0% of the 18 year old population comes from Social Class V, only 0.9% of university students come from that class. Given the information in Tables 7 and 8, which shows that a greater proportion of pupils from independent schools leave school with A-levels, such a difference, large as it is, is to be expected. Whilst inequities in access amongst men and women appear to be disappearing, there is no sign of inequities in social class doing so. Indeed, as table 6.22 shows, the proportion of students from a working-class background entering university has declined between 1956 and 1980.

iv. Academic Achievement

This section looks at how women and men achieve in higher education: at their comparative qualifications on entry, and their comparative attainment in degree classifications.

Table 6.23 shows the mean A-level score, in different subjects, of male and female students entering university in 1982. A higher proportion of women than men enter university with only two A-levels - 9.7% compared to 7.6%. Their mean score, however, is only slightly lower - 10.5 points on average compared with men's 10.8 points. (With A grades equalling 5 points, B grades 4 points, etc.) The average entry grades for both men and women in 1982, then, were BCC/BBC. The mean scores were highest for both sexes in the groups Medicine, Dentistry and allied subjects, and Languages and Literature. This picture is probably distorted by UCCA's practice of grouping unlike subjects together - e.g. agriculture with veterinary science, law with sociology and business studies. The discipline admitting the greatest proportion of students with only two A-

levels, and thus the one with the lowest mean score, was education. There are no striking sex differences, although it is worth noting that women's mean score is slightly lower than men's in every grouping apart from Education, and Agriculture and Veterinary Science.

It is in the degree results of women and men, in Tables 6.24 to 6.26 that very large differences can be seen. Table 6.24 shows that in each of three years taken - 1967, 1979 and 1984, a much higher proportion of men than women gained first class honours degrees - almost double in each year. (It is interesting that the proportions of both sexes gaining 1sts has declined in that period.) Similarly, a much higher proportion of men than women get 3rds - and again the proportion of both sexes doing so has declined during that period. In 1984, the proportion of men gaining thirds was almost double the proportion of women doing so - rather neatly corresponding to the ratio of women to men gaining firsts. Women, however, are much more likely to get second class degrees. Rudd (1984) has posited an explanation for the higher proportion of men obtaining firsts, although his analysis only includes figures up to 1979; rejecting sociological explanations, he argues that the larger numbers of men than women obtaining firsts is the directly related to the larger numbers of men with very high IQ scores. Rudd's argument has been challenged elsewhere (Bradley, 1985); however, it need only be said here that this kind of reductionist explanation fails to take into account the variations both over a period of time and between different subjects.

Tables 6.25 and 6.26 show fairly substantial variations from subject to subject. Although a much higher proportion of men than women gained firsts in the groupings Science, Languages and Literature and Other Arts in 1984, a higher proportion of women than men gained firsts in Education; Medicine and Dentistry; Agriculture, Forestry and Veterinary Science. The proportions were nearly equal in Engineering and Technology. Further, the proportions of firsts vary greatly between subject groupings; a far higher poroportion of students gets firsts in Engineering, for example, than in Other Arts. Another curious point is that the proportion of men gaining thirds is higher than the proportion of women gaining thirds in *every* subject grouping, although the differences are smallest in Languages and Literature. Generally, the subject areas which award the highest proportion of firsts (mainly sciences) also award the highest proportion

of thirds and conversely, subject areas such as Languages which award a low number of firsts also award a low number of thirds.

The data also show that, Education excepted, the areas in which women get fewest firsts compared with men are those where they are numerically strongest: the arts and social sciences. They generally do better (with the exception of the Science grouping) in areas where they are numerically weak. One possible explanation for this is that women and men who enter subjects dominated by the opposite sex have to be particularly talented or committed to a subject in order to overcome social pressure to take 'traditional' subjects; another is that staff show favouritism toward the 'minority' sex. However, it must be remembered that there is an asymmetry; men in the arts have a higher proportion of firsts than women, whilst women in male-dominated subjects receive a roughly equal proportion of firsts.

Table 6.25 shows only subject groupings. Table 6.26 shows the same data for certain subjects only. Again, the differences between men and women in arts subjects are quite large, but they do vary. In English, proportionately 250% more men than women gain firsts (10.5% to 4.0%), yet in French the difference is smaller - 3.8% of men to 2.3% of women gaining firsts. Similarly the differences are quite large in maths (16.2% to 10.8%) and chemistry (16.2% to 12.3%) but small in biology (7.8% to 6.8%) and physics (15.7% to 13.9%). Although women did not perform better in engineering as a whole, in chemical engineering, 12.5% of women compared to 11.2% of men gained 1sts. In the subjects shown here, the differences in proportions gaining 3rds is small (e.g. 20.4% of men, 20.2% of women in physics, 4.3% of men, 4.6% of women in English) apart, again, from chemical engineering (15.3% of men and 7.8% of women.)

Although Table 6.26 showed that women in general are more likely to get upper seconds than men, this was not the case in every subject. In English, for example, a higher proportion of men than women gained upper seconds, and the same was true in history, French, physics and geography. It is difficult to draw any definite conclusions from these tables; while a pattern may emerge from comparing groupings, differences within a grouping may be quite large. As a general rule, it is only possible to say that women do worst (in terms of the proportions they get of firsts compared with men) in subjects where they are well represented; and in

subjects where they are *not* well represented, they sometimes do quite well, but still usually worse than men. And as Table 6.26 shows, on the whole men are more likely to get very bad degrees than women.

The lack of a pattern suggests that what Rudd (1984) refers to as "elements of custom" in determining degree results varies from subject to subject; in some disciplines a first can only be awarded to a small minority of the highest ability, whilst another discipline's definition of 'excellence' may be much wider. These differences may also be related to perceptions of male and female ability, particularly in the humanities where marking is generally considered to be more subjective.

Table 6.27 illustrates this point further. It shows the degree results for 1984, this time broken down not by subject grouping, but by type of university. Not only does the proportion of firsts gained vary from type to type, but the male/female differences also vary. At one extreme, Oxford and Cambridge, 19.5% of men and 9.4% of women obtain firsts; at the other, the Welsh university colleges, 4.3% of men and 2.3% of women obtain firsts. The most extreme difference is in the new universities, where, despite an almost equal ratio of men to women, 6.2% of men, but only 2.8% of women gain firsts. To make a completely fair evaluation, it would be necessary to control for differences such as the number of science and arts subjects studied at the different universities. Bee and Dolton (1984) have done this, and found that differences beteween types of university were still fairly large. This does suggest, then, that different universities have quite different ideas about what constitutes a 'good' or a 'bad' degree, and that there is a strong 'element of custom' in assessment and marking.

Finally, if we look, in Table 6.28, at the results for polytechnics for 1984 - altogether a newer tradition, with presumbaly different 'customs' - we find a rather different pattern. Degree results in polytechnics are, on the whole, not as good as in universities. There are fewer firsts and upper seconds, and a greater proportion of lower seconds and thirds. However, the differences between men and women are much smaller. As a proportion of total degrees gained, 5.0% of men gained firsts and 4.0% of women did so - a considerably smaller difference than in the university results. Interestingly, the differences remain fairly large at the other end - 13.0% of men gaining thirds compared to 9.9% of women. CNAA, unlike

UCCA, does not group the subjects, so the groupings here have been imposed in an attempt at uniformity, although there are a variety of subjects studied in polytechnics not studied in university, and vice versa. However, many of the patterns found in the UCCA statistics are not apparent here. For example, in the CNAA table, a greater proportion of women than men gets firsts in Science. Whereas in the university statistics, a greater proportion of women than men obtained firsts in Education, the reverse is true for the CNAA statistics. Similarly, although a greater proportion of men than women gained firsts in the humanities, the gap was much smaller than in the university statistics. A more general point about this table, not related to the degree results, is the very small number of women in Engineering - only 71 female honours graduates, 3.4% of the total number. (In the university table, women formed 7.9% of all honours graduates in engineering.) This suggests that women with good A-level grades are more likely to make the unconventional choice of engineering; women with lower grades may feel deterred from taking the subject up at a polytechnic.

It is possible, then, that polytechnics are using standards and means of assessment that allow women to do as well as men at the top end of the scale. Or perhaps the atmosphere of polytechnics and the content of the courses are simply more more amenable to women than an university environment. The statistics do not lend support to the psychological theory of the "greater variability of the male."

Finally, Table 6.29 shows the proportions of male and female postgraduates in universities in 1985/86. Women are outnumbered by men in every grouping apart from Studies allied to medicine (e.g. pharmacy, nursing), librarianship and Education (mainly teacher training). In all other areas, including those such as Languages and Literature and Humanities, where women are dominant at undergraduate level, women are outnumbered by men. Part of this must be due to the fact that women do obtain fewer firsts than men; it may also be due to a process Deem (1978) refers to, by which men are picked out as undergraduates for postgraduate work, because they are more argumentative and outspoken in discussion groups.

v. Summary and Discussion of Section 2: Tables 6.11 - 6.29

The tables discussed in this section have provoked more questions than they have provided answers. The statistics show a pattern of change: more women entering unviversity, more women entering traditionally male subjects, more women, in fact, entering traditionally female subjects. Despite these trends, however, we still saw that only about 42% of undergraduates are women (although this is increasing) and that women are under-represented in physical science, and men in languages and literature. There was a tendency for women with A-levels in science to move into medical and biological sciences, rather than physical science and engineering, at university. Two explanations for this may be that, for the reasons discussed in Chapter 4, women are more interested in human, 'expressive' subjects involved with people and caring, rather than instrumental ones; and also that disciplines like medicine, dentistry, pharmacy allow a greater amount of autonomy and individuality. These professions allow wider scope for deciding one's own working hours and taking a couple of years out for children.

The issue of social class was also discussed. It was found that students from the professional classes were over-represented at university, whilst students whose fathers were manual workers were greatly under-represented. Women were more likely than men to come from Social Class I. It seems that the expansion of higher education has favoured middle-class women, rather than working-class students of either sex, a conclusion supported by Farrant (1981) and Williamson (1986).

Whilst there was no apparent discrimination in admissions, with proportionately the same numbers of male and female applicants being accepted, and women and men entering with similar points scores, there was a large difference in the final degree results achieved by men and women, with a greater proportion of women gaining second class degrees, and a greater proportion of men gaining first and third class honours. The differences were greater in the arts than in the sciences. When the results were broken down by type of university, it was found that in most types of university, men still gained more firsts and thirds than women, but there was a wide variation in the distribution of degree classes between types of university. When the university results were compared with results for polytechnics, however, it appeared that, although a

greater proportion of men than women in polytechnics gained firsts, the gap was much smaller than in the universities, but that the gap between men gaining thirds and women gaining thirds was as great as in the universities. It was suggested that some of the sex differences could be accounted for by differing customs in marking from university to university, depratment to department, and between universities and polytechnics. However, the differences in degree classifications have important consequences, one of which is that fewer women than men go on to take postgraduate degrees (and, consequently, become academics.) Probably female graduates also have less chance of entering high status jobs for this reason. In one important sense, then, higher education - at university level - does reproduce gender inequality. Women and men may enter university as equals, but they do not leave as equals. The process of higher education must, in a significant way, be disadvantaging women.

Although we have stressed sex differences, there are also important *similarities*. Many of the differences - in numbers, performance and achievement - are slowly being eroded and we *may* be gradually approaching a position of equality (in the narrow sense of equality between the small band of people who enter higher education.)

Some of the points raised in this chapter will now be taken further. The issue of access will be discussed in Chapter 7, whilst issues of differential attainment, differential participation and the experiences of women and men in humanities and science subjects will be discussed in Chapters 8 to 11.

TABLE 6.1

SCHOOL LEAVERS IN ENGLAND, 1972-1983. PERCENTAGE WITH DIFFERENT LEVELS OF QUALIFICATION

	1971-2	1979-80	1980-81	1981-82	1982-3		
					BOYS	GIRLS	TOTAL
Total leavers	606.6	750.7	734.0	751.1	389.9	375.6	765.5
Exams attempted							
No exam	42.4	11.0	10.4	9.7	10.2	7.1	8.7
CSE, but not GCE	14.7	30.9	30.7	29.5	29.7	26.9	28.3
'O' but not 'A'	24.4	40.5	40.5	41.6	40.6	46.7	43.6
GCE 'A'	18.5	17.5	18.5	19.3	19.6	19.2	9.4
Exam achievements							
1 or more A	16.2	15.6	16.5	17.0	17.4	16.9	17.1
No As, but 5 or more Os (A-C)*	8.4	9.4	9.6	10.1	9.2	11.4	10.3
1-4 Os	19.3	27.0	26.6	26.7	25.1	29.7	27.4
1 or more other grade	13.0	5.8	35.9	35.5	37.0	34.2	35.6
Total with graded result	57.0	87.8	88.6	89.4	88.7	92.1	90.4
Total with no graded result	43.0	12.2	11.4	10.6	11.3	7.9	9.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

*Also Grade 1 CSE

Source: DES Statistical Bulletin, 10/84

TABLE 6.2

SCHOOL LEAVERS IN ENGLAND. PERCENTAGE OF LEAVERS BY INTENDED DESTINATION

	BOYS		GIRLS	
	1971/2	82/83	1971/2	82/83
Degree courses	8.5	8.5	4.6	6.5
Teacher train	1.3	0.1	5.0	0.6
A-level	1.5	3.3	1.4	3.6
O-level	1.8	1.6	1.3	2.0
Secretarial courses	-	-	4.0	4.3
Other prof and vocational	6.0	9.6	6.9	14.8
Total FE:	19.1	23.0	24.0	31.8
Available for work:	71.2	65.5	68.6	56.9
Not known	9.7	11.5	7.3	11.3
Total leavers (000)	312.6	389.9	294.0	375.6

Source: DES Statistical Bulletin. 10/84

TABLE 6.3

STUDENTS ACHIEVING A-LEVEL QUALIFICATIONS AT SCHOOL BY SEX IN ENGLAND AND WALES AS A PERCENTAGE OF TOTAL 17 YEAR OLD AGE GROUP AT 31 AUGUST

Percentage

	1975-6		1980-81		1983-84	
	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS
3 or more A-levels	9.7	6.8	9.8	7.9	10.0	8.6
2 A-levels	4.0	4.4	3.7	4.3	3.7	4.6
1 A-level	2.8	3.2	2.7	3.1	2.9	3.3
Total	16.5	14.4	16.1	15.2	16.6	16.5

Source: Education Statistics for the United Kingdom, 1985 Edition, HMSO

TABLE 6.4

SCHOOL LEAVERS IN ENGLAND, 1982-3. GCE 'O'-LEVEL AND CSE ATTEMPTS AND PASSES (A-C, or grade 1 CSE) IN SELECTED SUBJECTS

	BOYS		GIRLS	
	%Attempt	%Pass	%Attempt	% Pass
Eng	84	34	89	45
Math	81	32	83	27
Phys	52	22	18	8
Chem	32	15	23	10
Biol	29	13	58	20
CDT	60	18	16	3
French	26	11	43	19
Hist	36	14	41	16
Geog	50	19	39	15
Creat Arts	30	11	36	17
Comm + Domest	11	3	55	17
Any sub	90	51	93	58

Source: DES Statistical Bulletin, 10/84

Notes: 1. Statistics are for England only.

2. The first and third columns show the percentage of school leavers who have attempted an 'O'-level or CSE. The second and fourth columns show the percentage of school leavers who had obtained a pass in the subject. i.e., the second and fourth columns are not percentages who passed of those who tried, but of the school-leaving population as a whole.

3. The '% Attempt' column includes those who attempted CSEs.

TABLE 6.5

SCHOOL LEAVERS IN ENGLAND. LEAVERS WITH PASSES AT O-LEVEL OR CSE GRADE 1 IN SELECTED SUBJECTS.

Percentage of all leavers.

	1982-3		% change 1971-2 to 1982-3	
	BOYS	GIRLS	BOYS	GIRLS
English	33.5	45.0	+10	+22
Maths	31.9	26.9	+17	+42
Physics	21.5	8.4	+37	+110
Chemistry	15.2	9.9	+32	+111
Biol. sci	12.7	19.7	+40	+15
CDT	18.2	3.2	+7	-6
French	10.7	18.9	-14	+7
History	14.1	16.1	+10	+10
Geography	18.6	14.6	+9	+4
Creative arts	10.7	16.8	+19	+22
Commerce & domestic	2.7	17.3	+200	+24
General Studies	2.7	2.9	+13	+45
Any subj	51.5	57.6	+19	+31

Source: DES Statistical Bulletin, 10/84, TABLE 6.8

TABLE 6.6

SCHOOL LEAVERS IN ENGLAND.

LEAVERS WITH A-LEVEL PASSES IN SELECTED SUBJECTS

PERCENTAGE OF THE 17 YEAR OLD AGE GROUP.

	1982-83		% change 1971-2 to 1982-3	
	BOYS	GIRLS	BOYS	GIRLS
English	2.8	6.5	-22	-6
Maths	7.1	3.5	+16	+84
Physics	6.0	1.8	+5	+29
Chemistry	4.5	2.7	+13	+69
Biology	2.4	3.7	+20	+54
CDT	1.1	0.3	-15	+200
French	1.1	3.0	-21	-3
History	3.0	3.2	-9	-9
Geography	3.2	2.4	-	-8
Creative Arts	1.3	2.5	-	+14
Commercial & domestic	0.3	1.0	..*	+43
General Studies	3.9	3.0	+44	+114
Any subj.	16.7	16.5	+1	+15

* '..' means infinity; there were no boys with A level passes in commercial and domestic subjects in 1971-2.

Source: DES Statistical Bulletin, 10/84

TABLE 6.7

SCHOOL LEAVERS IN ENGLAND, 1982-83

QUALIFICATIONS BY TYPE OF SCHOOL

Percentages

	COMP	GRAM.	OTHER. SEC.	ALL MAIN.	IND.	ALL SCHOOLS
Total leavers (000s)	652.1 (85.1%)	21.3 (2.8%)	48.4 (6.3%)	721.8 (94.3%)	43.7 (5.7%)	765.5 (100%)
Exam. passes						
At least 1 'A'-level pass	13.7	56.8	4.5	14.4	63.1	17.1
No 'A'-levels,						
5 or more Os*	9.8	21.6	7.7	10.0	14.6	10.3
1-4 Os*	28.2	18.2	30.3	28.0	16.5	27.4
1 or more other grades[1]	38.0	2.8	46.6	37.5	4.0	35.6
No graded result	10.3	0.6	10.9	10.1	1.8	9.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

*i.e. 'O'-level grades A-C, or CSE grade 1

[1] 'O'-level grades D,E, CSE grades 2-5

Source: DES Statistical Bulletin, 10/84

TABLE 6.8

SCHOOL LEAVERS - HIGHEST QUALIFICATION: BY SEX AND TYPE OF SCHOOL, 1982-3

Percentages

	BOYS		GIRLS	
	2 or more As	1 A	2 or more As	1 A
Type of School				
6th form coll.	45	8	41	9
Other comp.	9	3	9	3
Grammar	50	6	46	9
Other main.	3	1	3	2
All main.	11	3	12	3
Independent	60	7	51	7
All Schools	14	3	13	3

Source: Social Trends, 1985

TABLE 6.9

QUALIFICATIONS AND DESTINATIONS

GCE/CSE QUALIFICATIONS AND DESTINATIONS OF PUPILS LEAVING SCHOOL DURING THE ACADEMIC YEAR 1983-84

	DESTINATION				Thousands	
	UNIVERSITY		FURTHER ED.		AVAIL. FOR WORK	
	B	G	B	G	B	G
Qualifications held on leaving school						
3 or more As	24	17	9	10	10	8
2 As	1	1	7	10	7	7
1 A	-	-	5	5	7	8
No As;						
5 or more Os	-	-	15	22	25	24
No As; 1-4 Os	-	-	22	40	78	75

Source: Education Statistics for the United Kingdom, 1985 Edition, HMSO

TABLE 6.10

QUALIFICATIONS AND DESTINATIONS: SCHOOL LEAVERS OVER 17* IN ENGLAND 1982/3

Percentages

	BOYS	GIRLS
EXAMINATION ACHIEVEMENTS		
3 or more A-levels passes	48.2%	40.5%
2 A-levels passes	18.7%	22.0%
1 A-level pass	14.0%	15.8%
At least 1 A-level pass	80.9%	78.3%
DESTINATIONS		
Degree Courses	40.0%	30.6%
Teacher Training	0.5%	3.1%
A-level	5.6%	4.7%
O-level	0.3%	0.4%
Secretarial	-	2.7%
Professional & vocational	10.3%	12.9%
Available for employment	34.0%	37.5%
Not known	9.4%	8.1%

*Age at previous August

N.B. the percentages are, of course, of 17 year old school leavers: not of school leavers in general, nor of the 17 year old population as a whole.

Source: DES Statistical Bulletin, 10/84

TABLE 6.11

WOMEN AS A PERCENTAGE OF FULL-TIME HOME UNDERGRADUATES AND POSTGRADUATES IN UNIVERSITIES IN GREAT BRITAIN

	UNDERGRADUATES			POSTGRADUATES		
	MEN	WOMEN	W. as %	MEN	WOMEN	W. as %
70-71	124004	54718	30.6	23447	7847	25.0
74-75	123540	67436	35.3	22387	9438	29.7
79-80	139469	88216	38.7	19647	10546	34.9
82-83	136682	95996	41.3	18822	10637	36.1
85-86	128942	95068	42.4	20383	12119	37.3

Source: The Real Demand for Student Places, AUT, 1983 and *UGC, University Statistics, 1985-6, vol. 1*

TABLE 6.12

A COMPARISON BETWEEN NUMBERS ACCEPTED THROUGH UCCA IN 1974 AND NUMBERS ACCEPTED IN 1984 BY SEX AND SUBJECT GROUPING (home students only)

	1974		1984	
SUBJECT GROUP	MEN	WOMEN	MEN	WOMEN
EDUCATION	112	206	266	856
%	35.2	64.8	23.7	76.3
MEDICINE, DENT. & HEALTH	3308	2108	3035	2864
%	61.0	39.0	51.5	48.5
ENGINEERING & TECHNOLOGY	7716	324	8422	1119
%	96.0	4.0	88.3	11.7
AGRIC, FORESTRY & VET. SCI.	823	298	733	525
%	73.4	26.6	58.3	41.7
SCIENCE	11629	4937	12515	6120
%	70.2	29.8	67.2	32.8
SOCIAL, ADMIN & BUSINESS STUDIES.	10041	6119	9788	8167
%	64.6	35.4	54.5	45.5
ARCHITECTURE	702	273	660	472
%	72.0	28.0	58.3	41.7
LANGUAGES, LIT. & AREA STUDIES	3335	5618	3061	7007
%	37.2	62.8	30.4	69.6
OTHER ARTS	3257	3584	2951	3207
%	47.6	52.4	47.9	52.1
TOTAL	40946	23473	41431	30337
%	63.6	36.4	57.7	42.3

Source: UCCA 12th Annual Report and 22nd Annual Report

TABLE 6.13

A COMPARISON BETWEEN NUMBERS ACCEPTED THROUGH UCCA IN 1974 AND 1984 BY SEX IN SELECTED SUBJECTS

SUBJECT	1974		1984	
	MEN	WOMEN	MEN	WOMEN
ENGLISH	1065	1589	980	2019
%	40.1	59.1	32.7	67.3
FRENCH	269	916	195	756
%	22.7	77.3	20.5	79.5
HISTORY	1182	1006	1396	1204
%	54.0	46.0	53.7	46.3
GEOGRAPHY	1077	865	1142	879
%	55.5	44.6	56.5	43.5
MATHS	2425	1042	1957	969
%	70.0	30.0	66.9	33.1
PHYSICS	1809	255	2279	373
%	81.7	12.3	86.0	14.0
CHEMISTRY	1630	391	1766	769
%	80.1	19.3	69.7	30.3
BIOLOGY	821	587	1009	1078
%	58.3	41.7	48.3	51.7

Source: UCCA 12th Annual Report and 22nd Annual Report

TABLE 6.14

A COMPARISON OF THE PROPORTIONS OF MEN AND WOMEN PASSING 'A'-LEVELS IN 1984 WITH PROPORTIONS OF MEN AND WOMEN APPLYING THROUGH UCCA IN THE SAME YEAR

Percentage

SUBJECT	PASSING A-LEVEL		APPLYING TROUGH UCCA	
	MEN	WOMEN	MEN	WOMEN
ENGLISH	29.3	70.7	31.7	68.3
HISTORY	47.7	52.3	53.9	46.1
FRENCH	26.6	73.4	18.9	80.1
GEOGRAPHY	58.3	41.7	59.3	40.7
MATHS	71.1	28.9	65.2	34.8
PHYSICS	79.1	20.9	86.3	13.7
CHEMISTRY	63.6	36.4	72.5	27.5
BIOLOGY	40.6	59.4	49.4	50.6
ALL SUBJECTS	53.2	46.8	57.0	43.0

Calculated from Education Statistics, 1984, Table C32, and UCCA, 22nd Annual Report

TABLE 6.15

A COMPARISON OF THE PROPORTIONS OF MEN AND WOMEN APPLYING THROUGH UCCA FOR SELECTED SCIENCE SUBJECTS, 1984 & 985

	1984		1985	
SUBJECT	MEN	WOMEN	MEN	WOMEN
MEDICINE	4680	3903	4585	3857
%	55.5	44.5	54.3	45.7
DENTISTRY	1467	951	1335	877
%	60.7	39.3	60.3	39.7
OPTHALMICS	338	433	295	327
%	43.9	56.1	47.4	52.6
PHARMACY	1267	1565	1304	1683
%	44.7	55.3	43.7	56.3
VET. SCI.	486	615	450	598
%	44.1	65.9	42.9	57.1
AERON. ENG.	1054	47	997	72
%	95.7	4.3	93.3	6.7
CIVIL ENG.	2283	208	2060	235
%	91.6	8.4	89.7	10.3
CHEMICAL ENG.	779	117	724	156
%	86.9	13.1	82.3	17.7
MECH ENG.	2860	149	2486	164
%	95.0	5.0	93.8	6.2
ELEC. ENG.	5532	300	403	24
%	94.9	5.1	94.4	5.6

Calculated from UCCA, 22nd and 23rd Annual Reports

TABLE 6.16

APPLICATIONS AND ACCEPTANCES THROUGH UCCA IN 1985

No.s and .

SUBJECT GROUP	APPLICATIONS			ACCEPTANCES		
%	M	W	Total	M	W	Total
MED. & DENT.	5920	4734	10654	2595	2156	4751
%	55.5	44.6		54.6	45.4	
OTHER MED.	2030	4146	6176	586	1299	1855
%	32.8	67.2		31.0	69	
BIOL. SCI.	4483	5214	9697	2588	2976	5564
%	46.2	53.8		46.5	53.5	
AGRIC. ETC.	1457	1296	2753	699	609	1308
%	52.9	47.1		53.4	46.6	
PHYS SCI.	7558	2328	9886	5336	1746	7112
%	76.4	23.6		75.4	24.6	
MATH SCI.	6456	1977	8442	3649	1249	4898
%	76.6	23.4		74.5	25.5	
ENG & TECH.	15989	1533	17522	8427	969	9396
%	91.2	8.8		89.7	10.3	
ARCH & BUILD.	2496	747	3243	790	320	1110
%	77,0	23.0		71.2	28.8	
SOC. SCI..	13213	11773	24986	5974	5136	11110
%	52.9	47.1		53.7	46.3	
BUS. & ADMIN.	6691	4940	11631	1930	1367	3297
%	57.5	42.5		58.5	41.5	
MASS. COMM.	238	401	639	56	131	187
%	37.2	62.8		29.9	70.5	
LANGUAGES	4744	10616	15360	2697	5870	8567
%	30.9	69.1		31.5	68.5	
HUMANITIES	4096	3744	7840	2575	2292	4867
%	52.2	47.8		52.9	47.1	
CREAT. ARTS	1330	2156	3486	497	741	1238
%	38.1	61.9		40.1	59.9	
EDUCATION	822	1911	2733	131	613	744
%	30.1	69.9		17.6	82.4	
COMB. SCI.	2704	1386	4090	1484	742	2226
%	66.1	33.9		66.6	33.4	
COMB. SOC. SCI.	1789	1336	3125	809	503	1312
%	57.2	42.8		61.7	38.3	
COMB. ARTS	1465	2984	4449	646	1186	1832
%	32.9	67.1		35.3	64.7	
SCI./ARTS/ SOC. SCI.	1636	1091	2727	712	490	1202
%	60.0	40.0		59.2	40.8	
ARTS/SOC. SCI.	2204	2880	5084	1071	1228	2299
OTHER GEN & COMB STUDS.	1218	1344	2562	560	716	1276
%	47.5	52.5		43.9	56.1	
GRAND TOTAL	88548	68537	157085	43842	32339	76181
%	56.3	43.7		57.5	42.5	

Source: UCCA 23rd Annual Report, 1985

TABLE 6.17

PERCENTAGE OF APPLICATIONS ACCEPTED THROUGH UCCA IN 1985: MEN AND WOMEN

SUBJECT	MEN	WOMEN
MED AND DENT	43.8	45.4
OTHER MED.	28.9	31.3
BIOL. SCI.	57.7	57.0
AGRIC. ETC.	48.0	47.0
PHYS. SCI.	70.6	70.5
MATH. SCI.	56.4	63.2
ENG. AND TECH.	52.7	63.2
ARCH. AND BUILD.	31.6	42.8
SOC. SCI.	45.2	43.6
BUS. & ADMIN.	28.8	27.6
MASS. COMM.	23.5	32.6
LANGUAGES	56.9	55.3
HUMANITIES	62.8	61.2
CREAT. ARTS.	37.3	34.4
EDUCATION	16.0	32.1
COMB. SCI.	54.9	53.5
COMB. SOC. SCI.	45.2	37.6
COMB. ARTS.	44.1	39.7
SCI./ARTS/SOC. SCI. COMB.	48.6	42.6
OTHER GEN & COMB. STUDS.	46.0	53.2
GRAND TOTAL	49.5	47.2

Source: Calculated from UCCA 23rd Annual Report, 1985

TABLE 6.18

PREFERRED SUBJECT OF STUDY AND SUBJECT OF ACCEPTANCE, ALL ACCEPTED CANDIDATES, OCTOBER 1985

SUBJECT	Numbers Accepted		Pref. that Subject		% Pref. that Subj.	
	M	W	M	W	M	W
ENGLISH	914	1886	833	1702	91.0	90.2
HISTORY	1521	1249	1294	1066	85.1	85.3
FRENCH	219	703	116	479	53.0	68.1
GEOGRAPHY	833	685	730	603	84.4	88.0
SOCIOLOGY	235	499	175	338	74.5	67.7
LAW	2130	1924	1796	1615	84.3	83.9
MATHS	1862	859	1626	714	87.3	83.1
PHYSICS	2149	395	1646	286	76.6	72.4
CHEMISTRY	1668	727	1215	473	72.8	65.1
BIOLOGY	863	974	666	666	70.2	68.4
MEDICINE	2116	1791	2097	1775	99.1	99.1
DENTISTRY	479	365	463	344	96.7	94.2
OPTHALMICS	93	138	81	124	87.1	90.0
PHARMACY	251	442	236	419	94.0	94.8
VET. SCI.	162	169	162	169	100.0	100.0
AERON. ENG.	368	30	318	23	86.4	76.7
CIVIL ENG.	1091	163	868	129	79.6	79.2
CHEM. ENG.	587	138	441	93	75.1	67.4
MECH. ENG.	1487	113	1129	82	75.9	72.6
ELEC. ENG.	269	26	83	6	30.9	23.1
TOTAL	43842	32339	32945	24016	75.1	74.3

Source: UCCA 23rd Annual Report, Table 5

TABLE 6.19

SUBJECT BY SEX AND PARENTAL OCCUPATION GROUPS (PROFESSIONAL/OTHERS) OF FULL-TIME AND SANDWICH NEW ENTRANT UNDERGRADUATES WHO ARE AIMING FOR A FIRST DEGREE OR FIRST DEGREE AND FIRST DIPLOMA WITH UK DOMICILE - AS AT 31 DECEMBER 1984

SUBJECT GROUP	SEX	PARENTAL OCCUPATION		% PROF	TOTAL
		PROF	OTHER		
EDUCATION	MEN	9	232	3.7	241
	WOMEN	45	657	4.7	702
MEDICINE ETC.	MEN	694	2521	21.6	3215
	WOMEN	562	2676	17.3	3238
ENG./TECH.	MEN	679	8559	7.3	9238
	WOMEN	122	1001	10.8	1123
AGRIC. ETC.	MEN	82	647	11.2	729
	WOMEN	68	150	12.7	535
SCIENCES	MEN	1251	11810	9.5	13061
	WOMEN	690	5630	10.9	6320
BUSINESS ETC.	MEN	1168	8927	11.6	10095
	WOMEN	900	7730	10.4	8630
ACHITECTURE	MEN	86	569	13.1	655
	WOMEN	45	603	6.9	643
LANGUAGES ETC.	MEN	336	2447	12.0	2783
	WOMEN	710	5654	11.1	6364
OTHER ARTS	MEN	381	3081	11.0	3462
	WOMEN	431	3592	10.7	4023
TOTAL	MEN	4693	38926	10.7	43619
	WOMEN	3584	28247	11.3	31831

Source: Universities Statistical Record

TABLE 6.20

PARENTAL OCCUPATION BY SUBJECT AND SEX - AS TABLE 17, BUT IN SELECTED SUBJECTS

SUBJECT	SEX	PARENTAL OCCUPATION		% PROF	TOTAL
		PROF	OTHER		
ENGLISH	MEN	116	774	13.0	890
	WOMEN	206	1634	11.2	1840
FRENCH	MEN	19	163	10.4	182
	WOMEN	71	621	10.2	692
HISTORY	MEN	178	1116	13.7	1294
	WOMEN	127	977	11.5	1104
GEOGRAPHY	MEN	119	1049	6.3	1880
	WOMEN	103	728	12.4	831
MATHS	MEN	310	3150	8.9	3150
	WOMEN	128	1074	10.6	1202
PHYSICS	MEN	198	2052	8.8	2250
	WOMEN	50	321	13.5	371
CHEMISTRY	MEN	132	1621	7.5	1753
	WOMEN	74	671	9.9	745
BIOLOGY	MEN	130	838	13.4	968
	WOMEN	121	888	12.0	1009
VET. SCI.	MEN	32	123	20.6	155
	WOMEN	29	150	16.2	179
CHEM. ENG.	MEN	46	584	12.7	630
	WOMEN	6	95	5.9	101
LAW	MEN	323	1405	18.6	1728
	WOMEN	248	1274	16.3	1522

Source: Universities Statistical Record

TABLE 6.21

ACCEPTED HOME UNIVERSITY CANDIDATES IN THE UNITED KINGDOM (BASED ON 10% SAMPLE) BY SOCIAL CLASS, 1982

SOCIAL CLASS	PERCENTAGE AT UNI 1982	% OF TOTAL 18 YEAR OLD GB POPULATION
I PROFESSIONAL	23.9	7.0
II INTERMEDIATE	49.0	22.0
IIIN SKILLED NON-MANUAL	9.1	10.0
IIIM SKILLED MANUAL	12.2	38.0
IV PARTLY SKILLED	4.9	18.0
V UNSKILLED	0.9	6.0

Source: UCCA Statistical Supplements, 1983

TABLE 6.22

HOME UNIVERSITY CANDIDATES IN THE UNITED KINGDOM BY SEX AND SOCIAL CLASS, 1956-1980

	1956		1980	
	MALE	FEMALE	MALE	FEMALE
Working-class	26.8	19.1	20.1	18.5
All candidates	70.6	29.2	59.4	40.6

Source: Williamson (1986), p. 78

TABLE 6.23

SUBJECT BY MAIN ENTRY QUALIFICATIONS AND SEX OF FULL TIME & SANDWICH NEW ENTRANT UNDERGRADUATES ENGLAND AND WALES AS AT 31 DECEMBER 1982

	MEN			WOMEN		
SUBJECT GROUP	3 As	2 As	Mean	3As	2As	Mean
EDUC.	175	84	7.8	375	97	8.6
		32.0%			20.0%	
MED. & DENT.	2574	56	12.3	2430	54	11.8
		2.0%			2.0%	
ENG. & TECH..	6319	335	10.6	719	29	10.4
		5.0%			4.0%	
AGRIC & VET. SCI.	619	69	9.8	388	34	10.1
		10.0%			8.0%	
SCIENCE	10000	715	10.8	4739	393	10.2
		6.5%			7.5%	
SOCIAL & ADMIN.	6896	694	10.6	5254	663	10.2
		9.0%			11.0%	
ARCHIT.	386	37	10.1	244	35	9.7
		8.5%			12.5%	
LANGS & LIT.	2294	232	11.2	4987	523	10.9
		9.0%			9.5%	
OTHER ARTS	1971	344	10.2	2324	469	9.9
		15.0%			16.5%	
TOTAL	31234	2566	10.8	21460	2297	10.5
		7.0%			9.5%	

Source: Universities Statistical Record

TABLE 6.24

DEGREE CLASSIFICATIONS BY SEX, FROM 1967-84, GIVEN AS A PERCENTAGE OF TOTAL HONOURS GAINED

YEAR	SEX	TOTAL HONS	1st	2:1	2:2	2nd	3rd
1967	MEN	19785	10.6	26.8	34.4	9.4	18.9
	WOMEN	7957	5.4	28.7	45.1	6.7	14.1
1979	MEN	33446	8.8	29.8	39.4	7.2	14.8
	WOMEN	19733	4.8	34.7	46.0	5.6	8.9
1984	MEN	32517	9.1	35.3	39.5	4.6	11.5
	WOMEN	23505	5.1	40.5	44.5	3.7	6.2

Sources: University Statistics (UGC) and Universities Statistical Record

TABLE 6.25
DEGREE RESULTS BY SUBJECT AREA AND SEX, GIVEN AS A PERCENTAGE OF TOTAL HONOURS GAINED, 1984

SUBJECT	SEX	TOTAL HONS	1st	2:1	2:2	2nd	3rd
EDUC.	MEN	244	3.7	34.8	51.3	1.6	8.6
	WOMEN	601	5.2	42.4	46.9	0.3	5.2
MED. &	MEN	466	8.6	37.8	42.2	2.6	8.8
DENT.	WOMEN	792	9.7	49.5	35.6	0.5	4.7
ENG. &	MEN	6978	11.9	31.3	38.4	2.2	16.1
TECH.	WOMEN	628	11.0	33.1	40.4	2.6	12.9
AGRIC &	MEN	642	2.8	41.4	46.9	2.5	6.4
VET.SCI	WOMEN	355	4.5	48.2	41.1	2.3	3.9
SCIENCE	MEN	9732	12.7	31.5	34.1	5.1	16.6
	WOMEN	4959	8.7	37.3	37.3	5.0	11.7
SOCIAL	MEN	8690	4.2	38.4	47.2	3.8	6.4
ADMIN.	WOMEN	7039	3.4	42.7	47.2	2.5	4.1
ARCHIT.	MEN	374	6.1	31.8	49.5	0.3	12.3
	WOMEN	289	5.5	50.9	39.4	0.0	4.2
LANG. &	MEN	2764	9.2	39.7	35.7	9.7	5.6
LIT.	WOMEN	6033	3.8	38.5	47.9	4.6	5.2
OTHER	MEN	2627	7.0	43.8	35.7	8.5	5.0
ARTS	WOMEN	2809	3.1	41.5	46.7	5.1	3.6
TOTAL	MEN	32517	9.1	35.3	39.5	4.6	11.5
	WOMEN	23505	5.1	40.5	44.5	3.7	6.2

Source: Universities Statistical Record (1986)

TABLE 6.26

DEGREE RESULTS BY SEX, GIVEN AS A PERCENTAGE OF TOTAL HONOURS GAINED, 1984, IN SELECTED SUBJECTS

SUBJECT	SEX	TOTAL HONS	1st	2:1	2:2	2nd	3rd
ENGLISH	MEN	956	10.5	40.6	34.8	9.8	4.3
	WOMEN	1784	4.0	37.7	47.2	6.5	4.6
FRENCH	MEN	209	3.8	40.2	48.8	0.0	7.2
	WOMEN	818	2.3	38.5	58.6	0.0	0.6
HISTORY	MEN	1299	6.9	45.0	32.6	11.8	3.7
	WOMEN	1170	2.1	41.7	45.5	7.7	3.0
GEOGRAPHY	MEN	975	4.3	40.0	45.0	4.6	6.1
	WOMEN	932	3.5	40.8	48.9	2.8	3.9
MATHS	MEN	2551	16.2	25.7	32.7	5.6	19.7
	WOMEN	1062	10.8	28.2	34.6	6.0	20.3
PHYSICS	MEN	1901	15.7	28.1	29.6	6.2	20.4
	WOMEN	337	13.9	26.4	30.6	8.9	20.2
CHEMISTRY	MEN	1541	16.2	26.6	29.5	7.6	20.1
	WOMEN	584	12.3	27.4	35.2	6.8	18.2
BIOLOGY	MEN	766	7.8	44.3	37.2	2.2	8.5
	WOMEN	843	6.8	47.7	40.0	0.7	4.9
CHEM. ENG.	MEN	562	11.2	33.5	39.5	0.5	15.3
	WOMEN	64	12.5	40.6	39.1	0.0	7.8

Source: Universities Statistical Record

TABLE 6.27

DEGREE RESULTS BY SEX AND TYPE OF UNIVERSITY, GIVEN AS A PERCENTAGE OF TOTAL HONOURS GAINED, 1984

UNI	SEX	TOTAL HONS	1st	2:1	2:2	2nd	3rd
EX-CATS	MEN	5690	8.3	34.1	42.5	1.4	13.7
	WOMEN	2830	6.1	44.7	41.3	0.6	7.2
NEW	MEN	4617	6.2	36.2	45.6	0.0	12.0
	WOMEN	3867	2.8	40.8	50.5	0.02	5.8
OLDER CIVIC	MEN	10798	8.7	37.2	41.7	0.03	12.3
	WOMEN	8076	5.5	42.6	45.8	0.01	6.1
NEWER CIVIC	MEN	5450	6.7	36.6	44.8	0.2	11.8
	WOMEN	4446	4.3	39.3	49.9	0.04	6.5
OXBDGE	MEN	3335	19.5	23.0	10.4	40.5	6.6
	WOMEN	1740	9.4	24.7	12.9	45.5	7.6
WELSH	MEN	941	4.3	38.3	44.5	1.2	11.7
	WOMEN	821	2.3	40.7	49.6	1.0	6.5
SCOT.	MEN	1716	12.3	43.6	35.3	2.7	6.1
	WOMEN	3967	6.2	42.0	44.6	3.5	3.7
TOTAL	MEN	32517	9.1	35.3	39.5	46.2	11.5
	WOMEN	23505	5.1	40.5	44.5	37.3	6.2

Source: Universities Statistical Record (1986)

TABLE 6.28

DEGREE RESULTS BY SUBJECT AREA AND SEX, GIVEN AS A PERCENTAGE OF TOTAL HONOURS GAINED, THROUGH CNAA, 1984

SUBJECT	SEX	TOTAL HONS	1st	2:1	2:2	3rd
EDUCATION	MEN	504	5.7	29.3	53.2	11.7
	WOMEN	1172	4.3	35.4	54.3	6.0
HEALTH ETC.	MEN	277	3.6	39.7	47.3	9.4
	WOMEN	425	5.2	42.3	48.2	4.2
ENGINEERING	MEN	2017	9.1	34.4	41.4	15.1
	WOMEN	71	4.2	36.6	40.8	18.3
SCIENCE	MEN	2596	5.2	31.2	50.4	13.2
	WOMEN	1398	5.4	31.2	53.6	9.7
SOCIAL & BUSINESS	MEN	4164	1.7	25.9	59.5	12.9
	WOMEN	3253	1.5	29.2	58.7	10.5
ARCHITECT.	MEN	650	4.1	30.5	49.7	15.7
	WOMEN	104	1.9	17.3	67.3	13.5
LANG & LIT.	MEN	237	6.3	35.4	48.5	9.7
	WOMEN	579	1.5	27.1	61.1	10.2
HUMANITIES	MEN	1361	3.5	35.6	52.0	8.8
	WOMEN	2153	2.3	34.7	56.7	6.3
CREATIVE ARTS	MEN	2184	8.4	37.1	41.4	13.1
	WOMEN	2652	7.5	33.8	44.6	14.0
MISC	MEN	403	5.5	21.8	57.3	15.4
	WOMEN	540	4.1	32.6	50.7	12.6
TOTAL	MEN	14393	5.0	31.3	50.7	13.0
	WOMEN	12347	4.0	32.5	53.6	9.9

Calculated from CNAA Annual Report, 1984-5

TABLE 29
FULL TIME POSTGRADUATES (UK DOMICILE) in GREAT BRITAIN, 1985-6

SUBJECT AREA	MEN	WOMEN
MEDICINE AND DENTISTRY	907	504
%	60.4	39.6
STUDIES ALLIED TO MED.	507	606
%	45.5	54.5
BIOLOGICAL SCIENCE	1615	1140
%	58.6	41.4
VETERINARY SCIENCE	278	200
%	58.2	41.8
PHYSICAL SCIENCE	3635	867
%	80.7	19.3
MEDICAL SCIENCE	1345	314
%	81.0	19.0
ENGINEERING AND TECH.	3000	335
%	90.0	10.0
ARCHITECTURE	349	108
%	76.4	23.6
SOCIAL SCIENCE	2237	1935
%	53.6	46.4
BUSINESS & ADMIN.	1172	543
%	68.3	31.7
LIBRARIANSHIP	139	286
%	32.7	67.3
LANGUAGES & LITERATURE	832	713
%	53.8	46.2
HUMANITIES	869	452
%	65.8	34.2
CREATIVE ARTS	222	157
%	58.6	41.4
EDUCATION	2689	3691
%	42.1	57.9
MULTI-DISCIPLINARY	287	118
%	70.9	29.1
TOTAL	20383	12119
%	62.7	37.3

Source: UGC, University Statistics, 1985-6, vol. 1

CHAPTER 7: THE QUESTIONNAIRE STUDY

7.1 Introduction

This chapter reports on the questionnaire which was sent out to university admissions tutors in physics and English, and examines the implications of the results for the participation of women and men in higher education.

This chapter will not present a complete breakdown and analysis of all the data obtained from the questionnaires. As noted in Chapter 5, not enough admissions tutors completed Section C of the questionnaire - the section dealing for numbers applying and admitted to the courses - to make a full analysis of those which were completed useful. This chapter will deal chiefly with the data obtained from those sections of the questionnaire dealing with admissions policy and numbers of students admitted.

Of the fifty-two questionnaires sent out to admissions tutors in physics, twenty-seven were returned; of the fifty-three sent to tutors in English, twenty were returned. Of the physics questionnaires, most of those returned were for straight physics (i.e. not theoretical or applied physics) courses. In some cases, where I had sent out two questionnaires to a department because it ran two courses, one questionnaire only was completed because the same information applied for both courses. In two cases, however, the questionnaires were filled in separately, in the first case for the straight physics course and the applied physics course in the same department, and in the other case for a straight physics course and a theoretical course in the same department. Amongst the English departments, there were three instances where two questionnaires were returned for the same department; one from a department which ran a single honours English course and an English and Medieval English course; and one which ran an English literature course and a combined language and literature course; and one which ran an English/American Literature course as well as English. In all, tutors from thirty-two universities replied to the questionnaire; there was an overlap of nine universities where replies were received from both departments.

University departments are referred to here by letters. It should be noted, however, that the lettering used for English has no correspondence with that used for physics; Department D, for example, in the English data, is not in the same university as Department D in the physics data.

Where two courses are run by the same department, I have used the same letter for each: e.g. C and C1.

7.2 Analysis

We will look first at the data from Section D of the questionnaire, on entrance grades and admissions policy. The great majority of the universities who replied said that they had standard offers - twenty-five of the twenty-seven physics courses and seventeen of the twenty English courses. The standard offer varied from department to department, although there was more consistency amongst the English departments than amongst the physics departments. The standard offers named by the respondents asked for the following A-level grades:

Physics	English
BBC (B))	BBB (O)
AB (N)	BBC (A, C, C1, D, F, E, G, I, J, M, M1, N, P)
BCC (Q, Q1, R, F, J)	BCC (H, D1)
BCD (A, S, E, T, I, U)	BCD (L)
BC (K, C, C1, H, G, V)	
CCC (L, W, X, M)	
CDD (Y)	

(One of the physics respondents refused to name the standard offer.)

The most popular offer for English is BBC, whilst the most usual offers for physics are BCC, BCD and BC - slightly lower than the English grades, no doubt because of difference in demand. Not all respondents named the subjects necessary, but of those who did, the English tutors not surprisingly named English, and specified that at least one of the Bs must be in English; whilst the physics tutors named physics and maths, naming the B in either of those two subjects. There was one exception, a department which offered BCD and specified the B in physics and the C in maths, whilst five departments said that points score equivalents (e.g. CCC instead of BCD) were acceptable.

In response to the question, 'Has there been a major change in admissions policy in the past five years?' twenty-three of the physics respondents and twelve of the English respondents replied that there had been a change. The change, in fifteen of the physics courses and nine of

the English courses, was a raising of entrance grades - usually by one point. Other changes related to policies about interviewing (or not interviewing) all candidates and moving from literal grades to points score offers. In addition to this, one physics department had actually lowered the required grades, whilst one had first raised grades, and then lowered them again.

Despite this general raising of entrance grades, there was still some flexibility in the enforcement of requirements. Of the twenty-five physics departments which had a standard offer, twenty-four admitted to relaxing the offer occasionally, whilst sixteen of the seventeen English departments also did so. Similarly, all of the twenty-seven physics departments and sixteen of the English departments said that applicants were sometimes admitted with lower grades than they were originally offered. In addition, ten of the physics tutors and thirteen of the English tutors said that there were special circumstances in which entrance requirements could be considerably reduced or removed altogether.

The criteria used by the departments for lowering a standard offer were particularly interesting. Amongst the physics departments, six said that a reduction of grades (sometimes to EE) was offered to exceptionally able candidates. Four physics departments also mentioned a shortage of candidates meeting the grades in August. Other exemptions mentioned included students with a handicap or recent ill health, mature students with different qualifications (but only one department mentioned this) and to boost female student numbers (this was mentioned by two). The pattern was different amongst the Engish departments. Mature students were mentioned by seven of the English respondents; and four of the English departments (compared with only one of the physics departments) mentioned inadequacies of a pupil's school, schooling or home background. There were also, of course, unhelpful comments from both English and physics respondents, such as 'Special circumstances' or 'at the discretion of the admissions tutor.'

In reply to the question, 'If you specify A-level subjects for entry, is the requirement ever waived?' seventeen of the physics departments, and twelve of the English departments replied Yes. Exemptions from the requirement were again given to mature students (mentioned by four of the

physics respondents and six of the English ones) exceptionally able candidates, handicapped students and candidates offering alternative qualifications such as BTEC. One English department said "Where the candidate has been working at a disadvantage which is not likely to continue at university,and shows interest and potential."

The physics respondents replied to the question, 'Who do you make standard offers to?' as follows:

Two replied (a) to all candidates who apply;

Six said (b) to all candidates who seem suitable from the UCCA form;

Seven replied (c) to selected candidates after interview;

Seven specified (d) a combination of suitable candidates from the UCCA form and selected candidates after interview

Three gave (e) other methods of making offers to candidates.

The alternatives specified under (e) were given as 'Occasionally offers made without interview if there are valid reasons for not attending interview' by two tutors; and 'at the discretion of the admissions tutor' was given by another. Of the English respondents,

three indicated (b);

seven indicated (c);

seven indicated (d);

two indicated (e).

One alternative given under (e) was that "offers were made to the best of many suitable candidates" (Dept. M.); whilst the other department made offers to candidates on the basis of a school essay which was requested from the better candidates after the worst had been rejected from the UCCA form. (Dept. G)

Therefore what may have been common practice some years ago is now unusual; few departments are willing to make offers to all candidates who apply. The usual practice, it seems, is to select the most able candidates from the UCCA form, interview them, and then make an offer on the basis of a combination of apparent ability from the UCCA and interview performance. The English department which asked to look at students' school work was unusually imaginative.

Section E asked questions about Clearing. Eighteen of the physics departments, and eight of the English departments said that they sometimes took students through Clearing. Of the eighteen physics

departments, eight said that the standard offer was still a requirement in Clearing, eight said that the standard offer no longer applied, whilst two did not have a standard offer. A minimum offer was, however, still used in Clearing even if the standard offer was abandoned. In English, five of the departments said that a standard offer was maintained in Clearing, whilst the other three said that a lower, minimum offer was required. In answer to the final question, 'Is there anything you look for in candidates through Clearing not normally taken into consideration during the application process? e.g. Do you try to get a more equal ratio of male/female students, students from different backgrounds or students with unusual qualifications?' only three of the physics departments said Yes, whilst none of the English respondents did so. The different criteria specified by the three physics departments were:

"We like to attract female students and students from disadvantaged backgrounds"; (Dept. S)

"Women are given preferential treatment, but especially so in Clearing"; (Dept. E)

"Mainly balance between our three courses: physics, physics with astro physics, and physics with Microelectronics" ." (Dept. T)

(This last, of course, is not really an answer to the question.)

However, certain other comments were made. These from the physics respondents:

"No - all are treated as equals." (Dept. O)

"Male/female ratio is totally irrelevant - as are political views and skin colour" (Dept U)

"No - except females are always welcome - we usually only get ≤ 3" (Dept. W)

"Just good candidates worthy of a place." (Dept. J)

"This is done at Faculty level" (an ambiguous comment: does he mean Clearing, or trying to get a broader mix of students?) (Dept. X)

And from the English respondents:

"No, we look for able students" (Dept. L)

"We generally only consider very high standard candidates at Clearing." (Dept. M)

"English students are predominantly female" (Dept. N) (Obviously it did not occur to this admissions tutor that one might want to have more men on the course.)

Thus, although a small amount of consideration is given by some departments to factors such as personal background (e.g. maturity, bad schooling, illness, etc.), it seems that in Clearing, grades are usually the most important factor. Nonetheless, a few physics departments are making an effort to attract women to their courses. Two quoted above tried to get more women in through Clearing, whilst one wrote a long letter to me explaining that a successful effort had been made in previous years to get more women on to the course, by offering them lower grades than the men. Women had, for a time, formed 25% of undergraduate entrants, compared with an average of 15% for the rest of the country. However, this was stopped when it was discovered that the practice might be in contravention of the Sex Discrimination Act; but it would be started again if dis pensation under Section 47 could be obtained. Similarly, another university stated that they held special 'women and physics' courses to attract women. However, the responses to questions in Section A about attracting students to the courses did not on the whole show that departments were making an effort to attract women; the only special groups targeted by departments were mature students and overseas students.

Question 10 in Section C asked 'How many students are admitted to the course annually?' Several tutors who did not complete the rest of the section were able to fill this in. Table 7.1 shows the responses from physics tutors, enabling us to look at the change in the proportions of men and women entering between 1980 and 1984. Although the percentages of women vary greatly from department to department - from 0% to 20%! - account must be taken of the very small numbers involved. In 1984, only five of the seventeen departments contained more than ten female undergraduates - and all those departments contained over sixty men. The one department (University F) which, in 1984, admitted over 100 men, only admitted nine women - well below the national average. One university which mentioned giving preferential treatment to women was University E - 17.8% of the students it admitted were women. Whether it was attracting women from other subjects (it ran 'women and physics' courses)

Table 7.1 MEN AND WOMEN ENTERING PHYSICS DEPARTMENTS 1980 and 1984

DEPARTMENT	1980			1984		
	MEN	WOMEN	W as %	MEN	WOMEN	W. as %
A	44	4	8.3	37	6	14.0
B	36	4	10.0	24	6	20.0
C	35	5	12.5	34	7	17.0
C1	5	0	0.0	3	0	0.0
D	13	1	7.1	15	2	11.8
E	58	8	12.1	60	13	17.8
F	115	16	12.2	104	9	8.0
G	39	5	11.4	33	2	5.7
H	47	8	14.5	46	10	17.9
I	34	5	12.8	16	4	20.0
J	88	14	13.7	82	16	16.3
K	24	2	7.7	23	4	14.8
L	37	11	22.9	64	12	15.8
M	10	2	16.6	11	0	0.0
N	N/A	-	-	90	15	14.3
O	N/A	-	-	36	4	10.0
P	N/A	-	-	64	12	15.8
Q	N/A	-	-	63	13	17.1

(Universities N, O, P and Q were unable to provide data for 1980, although N and O provided data for 1981, as follows:

N	Men:	Women:	women as %
	65	30	31.6
O	23	1	4.2

University N was the one which had made the deliberate effort to attract women by lowering entrance grades, which explains the high proportion of women in 1981)

or whether it was simply taking women from other physics courses is a debatable point. In most of the universities, the number of women studying hadn't increased by very much, and had decreased in some cases. Percentages are deceptive here; for example, the percentage of women at

university K increased from 7.7% to 14.8%; what this in fact meant was that the number of women had gone up from two to four. If we add the numbers in those universities which provided information for both 1984 and 1980, we find that the percentage of women admitted increased from 12.7% in 1980 to 14.2% in 1984. (The numbers were as follows: 1980, 585 men, 85 women; 1984, 552 men, 91 women.) Thus a very gradual increase is taking place. (It will be remembered from Chapter 6 that the national figures for acceptances in physics showed that 14% of students accepted in 1984, and 15.5% in 1985, were women)

One interesting point that arose in the correspondence received from tutors was in a letter from university C above. I had asked for information about the physics and theoretical physics courses that the department ran, but had not asked, for reasons set out in Chapter 5, about the physics/medical physics course run by the department. In his letter, however, the admissions tutor volunteered information about this joint honours course; the figures, he said, although small, showed a different pattern from the usual; the figures are shown in Table 7.2.

TABLE 7.2 MEN AND WOMEN IN MEDICAL PHYSICS: DEPARTMENT C

1980		1981		1982		1983		1984	
M	W	M	W	M	W	M	W	M	W
4	6	2	1	2	6	3	6	6	8

This suggests very strongly that a physics degree with a higher than usual 'human' or social content holds more appeal for women than it does for men; even though it is a very small course, it must be the only physics degree course in the country which takes more women than men.

Some of the physics admissions tutors were also able to provide information about numbers of students applying (see Table 7.3). If we compare these figures, for numbers applying, with numbers eventually admitted, we can judge how female applicants fare in comparison with men. Table 7.4, using the data from Tables 7.1 and 7.3, shows the percentage differences for numbers of men and women admitted in relation to numbers applying, in 1984.

TABLE 7.3 NUMBERS OF MEN AND WOMEN APPLYING FOR PHYSICS

UNIVERSITY		1984	1983	1982	1981	1980
A	M	253	302	353	246	N/A
	F	40	28	42	31	N/A
D	M	144	119	98	102	88
	F	25	17	14	16	15
E	M	519	665	654	624	547
	F	84	91	78	109	91
F	M	572	548	582	538	528
	F	69	80	93	76	87
H	M	388	466	479	450	429
	F	84	117	146	138	73
J	M	543	523	538	425	463
	F	90	89	92	72	79
K	M	144	272	285	270	247
	F	36	68	71	58	49
L	M	387	390	N/A	N/A	N/A
	F	46	54	"	"	"
M	M	110	N/A	"	"	"
	F	10	"	"	"	"
N	M	561	547	650	622	650
	F	91	86	104	110	86

TABLE 7.4 MEN AND WOMEN ACCEPTED TO STUDY PHYSICS IN 1984

UNIVERSITY	w. as % applicants	w. as % admitted
B	13.6	14.0
D	14.8	11.8
E	13.9	17.8
F	10.8	8.0
H	17.8	17.9
J	14.2	16.3
K	20.0	14.8
L	10.6	15.8
M	8.3	0.0
N	14.0	14.3

In most cases, the difference between the percentage of women applying, and the percentage accepted, is not great. There are noticeable differences, however, in universities E and L, where the percentage admitted was greater than the percentage applying and universites K and M, where the percentage admitted was much smaller than the percentage applying. Without information about grades, it is impossible to know whether any of these differences are due to deliberate policies in favour, or even against, women by the departments. Two departments were able to fill in information about the numbers of candidates who were made offers. This information, for 1984, is shown in Table 7.5. From this, we see that, in University E, a higher proportion of female than male applicants was offered a place - 95.2% compared to 87.9%. In University H, 76.2% of female applicants, and 75.8% of male applicants, were offered places.

TABLE 7.5: ADMISSIONS in 1984

UNIVERSITY	No.s applying		No.s offered places		No.s admitted	
	M	W	M	W	M	W
E	519	84	456	80	60	13
H	388	84	294	64	46	10

The final difference, however, in the proportion of women admitted, was negligible.

The figures from the English respondents provide an expected contrast (See Table 7.6), although, unfortunately, very few were able to provide figures for as far back as 1980. The proportion of men (and the actual numbers of men) in English is far higher than the proportion of women in physics. There is still great variety, however: ranging from 18.9% at University C to 47.7% at University F. There is no obvious explanation for this; in fact, the two universities representing these extremes were very similar: both were large, Northern universities in the middle of a big city. It may simply have been due to yearly fluctuations; as we can see from the table, in 1980, the proportion of men admitted by University C was 36.6%

It may be significant that university F, where 47.7% of students admitted were male had the biggest intake of all the departments shown

in this table; perhaps there is a correlation between number of students admitted and the proportion of men.

TABLE 7.6 WOMEN AND MEN ADMITTED BY ENGLISH DEPARTMENTS

DEPARTMENT	1980			1984		
	MEN	WOMEN	M as %	MEN	WOMEN	M as %
A				20	40	33.3
B	12	28	30.0	15	29	34.1
C	15	26	36.6	7	30	18.9
D	13	30	30.2	13	28	31.7
E				8	25	24.2
F				51	56	47.7
G	9	32	22.0	11	29	27.5
H				2	11	15.4
I				10	52	16.1
J	17	21	44.7	9	23	28.1
K				19	53	26.4

If we take the total figures from universities providing information for both years, we find that the proportion of men fell from 32.5% to 28.3%. This is not, however, representative; the national figures showed that men made up 32.7% of accepted students in English in 1984. Nevertheless, the pattern shown in Table 7.6 may indicate a general trend of fewer men applying to take English at university. Unfortunately, not enough English departments provided information on applications to enable me to look at this.

7.3 Conclusion

The questionnaire study did not provide as much information as originally hoped, and was thus less useful than it might have been had respondents been able to complete the questionnaire in full. However, there *are* things to be learned from this part of the research, some of which can be discussed briefly.

The first is that the present political and economic climate is not conducive to developing radical or open admissions systems. That may seem like a large conclusion to draw from a small survey, but the lack of

any detailed response to questions about selection criteria, or of any comments about the need to attract less traditional types of student to the course, indicated that changing the present balance of students is not a priority for most universities. It was very clear from the questionnaire responses that most tutors rely very heavily on A-level grades as the definitive selector. When demand increased and places fell in the early 1980s, the response of most departments was to raise the grades required; only two chose to interview more applicants as a means of selection. Although there were exceptions to the rule that certain grades had to be achieved - generally, mature students, handicapped students and very able students - these were named by only a few tutors and there did not appear to be any positive approach towards encouraging disadvantaged students into the department. English departments were rather more liberal than physics departments in the respect that far more of them actively encouraged mature students. Whereas seven English departments, for example, produced publicity material aimed specifically at mature students, only one physics department did so; and one suspects that the eleven departments (six physics, five English) who produced publicity material for overseas students, did so more for economic reasons than egalitarian ones. (Not one respondent mentioned any attempt to attract more black and Asian *home* students.) Clearing, which does provide an opportunity to redress existing imbalances was not used for that purpose by the majority of the departments.

The second point is that, for most departments, gender is not an issue. Only five departments (all physics) mentioned wanting to change the balance of the sexes, whereas most regarded it as irrelevant or unproblematic. As one physics tutor acerbically wrote on a note attached to the questionnaire: "Male/female ratio is irrelevant at university. If girls can be persuaded to take A-level physics, we will welcome them here." Thus there is no policy, it seems, amongst most departments, of actively encouraging or persuading girls to take up physics. It is more hopeful that there is at least a recognition amongst five departments that there *is* a problem that needs to be addressed, although only one had tackled it very effectively (the department which made girls lower offers.) A future research project might look at the women who entered that department, and to compare their performance (particularly those who

came in with lower grades) with that of the men and with that of women in more standard physics departments. One could also find out whether they felt any benefits from taking that course, and whether it influenced their career decisions in any way - whether, indeed, women working in a more 'female' atmosphere felt more inclined to continue with careers in physics than with careers outside it.

It certainly seems, however, that WISE in 1984 did not on the whole penetrate physics departments nor their admissions procedures. University departments appear complacent; they do not see their role as one of changing ratios but merely of accepting what is offered to them. Perhaps a more effective WISE campaign would be one which concentrated on the universities rather than on schoolgirls.

The third point is that differences do exist between universities; amongst the English departments, for example, the proportion of men admitted varied between 19% and 48%. This suggests either that women and men look for different qualities in the kinds of departments to which they apply, or that some English departments consciously strive for a higher proportion of women or of men.

We saw in Chapter 2 that the issue of who should receive higher education was a controversial one. From the data shown in this chapter, it appears that most departments, both of English and physics, are biased towards the 18-year old school-leaver with good A-level results. Methods of selection other than A-level results were rare; there were few avenues available for the mature student or the school leaver who had done badly at A-level (but who might show potential in other ways.) Physics departments in particular made few allowances for mature students.

The conclusions, then, are rather negative. I do not believe that most university departments actively, deliberately discriminate against women or against other groups of people. But neither do most of them make deliberate attempts to redress inequality. Most are set in traditional ways of selecting students, more so since the cuts in higher education.

There is, however, a great deal of potential in this area for further study. Admissions procedures in higher education have never been looked at critically or in great detail. Some polytechnics are experimenting with new types of admissions procedures, including more open ones, which do not rely entirely on A-level grades. (One such is the Communciations

course discussed in Chapter 8 which normally asks for A-level grades of CC, but which also asks applicants to write an essay and takes people from a wide variety of backgrounds.) It might be possible in the future to devise a large scale survey which compares admissions procedures in different institutions and which takes in the viewpoint of the applicant as well as that of the department.

My aim now, however, is to narrow the research much further, and the next chapter will look specifically at the courses researched, and the stated (and implicit) aims of each.

CHAPTER 8: THE CONSTRUCTION OF ACADEMIC DISCIPLINES

8.1 Introduction

This chapter, through the use of data from the interviews conducted with two lecturers on each of the six courses studied, will examine the construction of the four disciplines: English, communications, physics and physical science. Reference will also be made, where relevant, to course materials and past examination papers. The aim is to build a picture of the dominant beliefs and ideas of practitioners in each discipline, about the nature of that discipline. In addition, the issue of gender, and its significance in the construction of a disciplinary world-view, will be discussed. The chapter will examine lecturers' perceptions of gender differences and the differences (and similarities) in perception between science staff and humanities staff. Through this, it will be possible to build a picture of the concerns of the disciplines; the aim is not to provide quantitative information about staff attitudes to men and women, but to examine how *ideas* about disciplines interact with ideas about gender.

The chapter begins with a look at the construction of English, and a brief exposition of the curriculum of the two courses studied.

8.2 English

Given that the past twenty to thirty years have seen both the growth of a world-wide debate about the role of literature in society and how it should be studied, and a great increase in the number of texts produced in English, in a number of countries, it is worth our asking whether these two occurrences have had any influence on the way English Literature is taught and studied in English universities.

The question is not an irrelevant one for this study; for part of the issue, if we are to examine the importance of gender in higher education, is whether disciplines are flexible and adaptable to change: if the organisation and teaching of disciplines do not change when there are new debates within the subject, it is at least open to question whether they will respond to social pressure (such as the greater emancipation of women) outside the discipline. In addition, many of the new pressures from within the discipline have been challenges to the idea of 'canon' (which comprises the 'great' authors, usually male, considered worth studying) and have come from Marxists, who have tried to demystify the

status of the author, and feminists, who have argued that texts which are considered central are often regarded are so simply because of the relations of dominance and subordinacy at a particular point in history. In this section, therefore, we shall focus on the selection of 'knowledge', what is considered worth knowing, in Departments A and B.

8.3 The Departments

i. Department A

The English department at A is large; the first year consisted of fifty-five women and sixteen men (i.e. 22.5% men) whilst the third year consisted of fifty-five women and eleven men (16.6% men). The proportion of men is therefore unusually low compared with the national average. The standard offer is officially BBC, but some students are admitted with lower grades. Since the research was completed, the course has been reorganised, but the description of it will be as it stood when the fieldwork was undertaken.

All first year courses in A are compulsory. These include the following: a seminar course on Old English; a seminar course on language and grammar; a lecture course on critical approaches to literature (e.g. phenomenological, structuralist, psychoanalytical, feminist) and a course on 16th and 17th century writing, mainly drama and poetry, taught by weekly lectures and tutorials. This core course covers established writers such as Milton, Dryden, Shakespeare, Marlowe, Donne, Marvell and Pope. In addition, students take one option, which can be from a range of topics as varied as bibliography, German, computing and psychology. The option chosen in the first year is studied through to the final year and is examined in the Finals papers. Students are examined on the work at the end of the first year, and they also write an assessed essay on a topic of their choice for the critical approaches course.

In the second and third years, students continue with the core lecture/tutorial course, which covers literature of the period 1700 to 1840 in the second year, and literature from 1840 to the present day in the third year. Instead of taking this course, however, it is possible to study literature from before the Renaisssance period, such as Old English and Medieval English, and a small number of students choose to do this. Despite the fact that both courses consist of tutorials and lectures, there

is little connection between the two elements; tutors (and students) have a certain amount of autonomy to decide what is studied in tutorials, but the lecture course is fixed beforehand and sometimes bears no relation to what is studied in tutorials.

In addition to the tutorial/lecture course, students take two seminar courses in both the second and third years. There is a wide range of choice which includes options on James Joyce, D.H. Lawrence, Chaucer, Langland, T.S. Eliot, Fitzgerald, Hemmingway and Faulkner, the Short Story, post-war American Literature, Modern Drama, Narrative before the Novel, Women and Literature and Literary Theory. Whilst there are several seminar courses on individual male writers, there is no seminar course on an individual female writer; indeed, 'women' are awarded one seminar course between them. The choice of authors for specific seminar courses is interesting; mainly modern, they are very much part of the established 'canon'; whilst they are a mixture of English, Irish and American, there is no course on, for example, African, Canadian or Australian writers.

The second year has no examinations, and is assessed on the work done for the seminar courses. This work counts towards about 35% of the final degree mark, whilst the rest is based on the final year examinations. There are six final year papers, three of which are on the work covered in the lecture/tutorial course (i.e., one paper each for the 1st, 2nd and 3rd year's work covered), two of which are on the final year's seminar courses, and one of which is a language paper. Thus, a seminar course may usually be taken in the second year or in the third year; if it is taken in the second year, it will be assessed by essays; if it is taken in the third year, it will be assessed by the final examination. The method of assessment, then, is reasonably flexible in comparison with many university departments.

ii Department B

English Literature as a single course is not offered by Department B; students must study with it either an American Literature option (taught by the department) or an European Literature option (taught partly by the appropriate language department and partly by the English department). The course, if we include both the American and European strands (but ignore the Joint honours) is about the same size as that of University A: 56 women and 24 men in the third year and 55 women and 16 men in the

first year (a decrease in the proportion of men from 30% to 19.5% over the two years.) Students are usually offered entry grades of BBC, with the B specified in English.

In the first year, there are three compulsory lecture courses, in Medieval English, the Epic Tradition (i.e. Virgil, Homer, Dante, Milton) and Modern Literary studies, which introduces different ways of looking at texts, although not in an explicitly theoretical context. These three lecture courses are all complemented by weekly seminars.

In addition, students take one other course. If they are studying the European option, this will be the study of a foreign langauge, either at a basic level or with a more literary emphasis, depending on their previous knowledge of the language. If they are taking the American option, they may also study a language, or they may choose to take a seminar option such as 'Romantic Poetry', 'Culture and Society' or 'Modern British Theatre', or they may take a course from another department. All four courses are examined at the end of the first year; the mark does not count towards the final degree, but a fail will not enable a student to carry on into the second year without a resit.

In the second year, all students follow a lecture/seminar course in English Poetry from 1600-1800, which is assessed by a 3-hour examination worth 50% of the total marks and two essays (25% each.) Students then have to take two out of three courses offered: a lecture/seminar course in the European Novel (examined by a 3-hour paper), a lecture/seminar course on European Theatre (examined by a short dissertation and a 3-hour paper) one of a range of seminar courses such as Creative Writing, Women's literature, T.S. Eliot, 19th century fiction or a course from another department (usually assessed by two or three essays written during the year). Students of European Literature will also take a course in comparative literature (English Literature compared with the literature of a foreign country), whilst American Literature students study American Literature up to 1880.

The third year continues with the English poetry course of the second year, looking at poetry from the 18th to 20th century. Other compulsory courses are the 'Shakespeare and contemporaries' course, assessed by 3-hour written examnation and a continuation of the comparative literature course for European students or a continuation of the American Literature

course, to the present day for the American students. Students also choose from the same range of options as in the second year.

8.4 Constructing the discipline

The courses at A and B are broadly similar. Both put an emphasis on 'traditional' English literature and both put more stress on the study of individual 'great' writers than on the study of a variety of writers within a social context. Similarly, both courses have core components which are organized chronologically. The debate that exists within English can best be illustrated by two contrasting views on what students should gain from the study of English, from two lecturers at A:

> "Skills, certainly. Knowing how to read, I suppose, knowing the varieties of reading which are necessary and available is perhaps the most important thing, I mean, not to turn out little critics or anything, because most people when they leave university after doing an English degree are not going to pursue English professionally in that way...the majority of them one hopes will continue to read for their own pleasure and one ought to have given them the skills to maybe carry on reading poetry or modern novels, or traditional novels, or being more aware of what's happening, being more critical if you like when they go to the theatre, that sort of thing, so the skills are important, and even, I think a very important basic skill is the ability to write and even the mechanics of writing, not just writing well in the sense of style, but I do think that students who go out with an honours degree in English really ought to have a fairly good command of the spelling conventions of the English langague and ought to know how to use commas, full stops and apostrophes." (R)

> "What I'm interested in is people thinking. And in a sense it happens to be English language and English literature that I teach, but I don't really think I'm teaching that, what I'm doing is helping people to think, hopefully, and have ideas and excite them about ideas and think about themselves and they way they live." (S)

The difference between these two views is important; the first view is concerned with acquiring a set of skills integral to the practice of English, whilst the second view is not so much concerned with English itself, but with the ability to think and to be critical. It is important to grasp what is meant by 'skills', and to understand that the study of English at university is about the acquisition of certain skills and of a certain discourse; what follows is an attempt to understand what that discourse is through looking more closely at the courses themselves and at what lecturers said about them.

The dominant idea in the liberal ideology of English is that of 'universality'; great literature is universally 'great' for different peoples in the world and at different times in history. This ideology is reflected both in the content of the courses (which consist mainly of individual 'great' writers) and the types of questions asked on these writers in the final examination paper. The following questions, for example, come from an examination paper at A on the first year 17th century literature course. They demand an ahistorical approach, asking about genres and 'universal' themes:

> "In the course of the Elizabethan-Jacobean period, comedy moves from the romantic to the satiric, and tragedy from the heroic to the ironic." Discuss and illustrate this view, with reference to two or more plays in EITHER genre.
>
> "Elizabethan sonnet sequences present a psychology of love." Discuss ONE OR MORE sequences from this point of view.

Both these questions, but the second in particular, assume that the Elizabethan view of the world was similar to the modern one; that we can, for example, talk about 16th century writers writing about a 'psychology of love' in the same way that we can talk about D.H. Lawrence, post-Freud, writing about the 'psychology of love.' This type of question is a result of a view which regards literature as an imparter of 'universal truths' rather than as a selective and specific presentation of an historical reality.

The following examples are again taken from the final examination papers of University A, on the second and third year core course. These too are concerned with generic definitions, and the universality of the writer's productions:

> "Satire remains worth reading if it succeeds in transcending the contemporaneity of its material." Discuss with reference to any one or more satirists of this period.
>
> "It is only literary-historical convenience that allows us to talk of 'Romantic poetry': the poets in question had little in common with each other." Discuss with reference to ONE or MORE poets.
>
> What connections can be made between Victorian poetry and the Victorian novel, or between either of these and non-fictional prose of the period?
>
> What has struck you as being characteristic of ONE or TWO of the followng kinds of Victorian poetry: 'nature' poetry; elegaic poetry; narrative poetry?

> "Flouting the conventions of realism has itself become a conventional feature of the contemporary novel." Discuss.

The questions dislocate the literature of each period from its social background; indeed, its social background is often seen to be transcended, thus making the work "relevant" to us today. By the same token, the successful reader is one who can transcend her social background to make a sympathetic adjustment to a writer whose norms and values may be those of a different age. This was explained by R, a lecturer at A:

> "It's a useful way of getting a perspective on the present, to realise that people think and feel in such different ways, in totally alien ways, that are completely unsympathetic, which is why feminism is an interesting development, because the ability to read something written in a totally patriarchal tradition, and to make the sympathetic adjustment, giving him his due, recognizing that he couldn't have thought what you think, because people didn't think like that then, and you know, it's not just feminism, all sorts of...as I've just mentioned, I've been teaching *Paradise Lost* with a 1st year group, and we had a fascinating session with one group; there's a girl in the group who's a Muslim, who said, well, she had problems with Paradise Lost because the Koran didn't give quite the same sort of version that Genesis did, and it turned out that in the same group we had a Jew, and an evangelical Christian, and a Roman Catholic, all in the same group, and all looking at *Paradise Lost*, so the whole question of belief in poetry, whether it's religious belief, political belief and so on, is raised. And what do you say, do you say, 'I don't agree with what that man says, it's a bad book, I don't like it or I won't read it', or do you say, 'it's probably useful for me to try to make the imaginative judgment to see things the way he sees them, to see the way the world loooks like from his point of view, and I may reject that, but at least one ought to have some tolerance and some understanding, and it seems that that's where the study of literature meets life, carries over into life, and without taking on the full Leavisian moral line and reading books is good for you, that sort of thing, it does seem to me that a lot of it is important spin-offs."

This quote successfully manages to disguise *who* is making the sympathetic adjustment. Much of the literature studied on the course comes from a Christian tradition; even more of it comes from the middle-class, from whites and from men. It is those who do not come from those dominant traditions who have to make the sympathetic adjustment. To put it more crudely, those students who are male, white, middle-class and Christian, will very rarely have their views challenged or have to make sympathetic adjustments as a consequence. The idea, too, that "people didn't think like that then" is significant; we do not know, of course, how

many people, who were contemporaries of Milton, were, for example, feminists or atheists, but were prevented from writing about their views, or whose writings have been forgotten or lost. Arguing that we should only criticise literature on 'literary' grounds rather than political, or personal, grounds, ignores the difficulty of making boundaries between the purely literary and the political. The assumption is that of I.A. Richards: that it is possible to disengage oneself from one's own prejudices, beliefs, experiences, indeed, one's own historical and social location, in order to shape a purely aesthetic or literary response to the text. Further, we must acknowledge that writers and readers outside the mainstream have always had to make some 'sympathetic adjustment'; whilst Milton may not have been aware of feminism, feminists have always been aware of the writing that has taken place within a framework of male dominance. Thus while the writing of male white middle or upper-class Christian writers is considered to have 'universal' relevance (and is thus put on the curricula of university English departments), the work of writers outside that tradition is considered of 'local' rather than 'universal' relevance (and hence terms such as 'woman writer' or 'black writer'). If such writers appear on the curriculum, they are often marginal.

The course at B is very much concerned with the writer as *individual* rather than with the writer as part of a wider social system. Like the examination papers of University A, its examination papers are interested in ingenuity in analysing and dissecting the work of particular writers:

> "Wordsworth's solitude issues from an attitude towards personality: from an eagerness to accept the fact that I am myself first because I am not anything else: to be me is to be always apart." Discuss.
>
> "Love is best." Show how important and how precise this affirmation is in Browning's poetry.
>
> "Keats is so usually so emotionally self-indulgent that his art suffers." Discuss.

These questions are remarkable, more than anything, for their lack of sophistication - the rather crude style/content dichotomy in the Keats question, for example. Like A, the obsession with generic classification is prevalent in some of the questions in B:

> How appropriate is the term "satire" to describe adequately the work of one of the following authors: Nathanael West, Norman Mailer, Joseph Heller, Thomas Pynchon, Vladimir Nabokov.
>
> What do you understand by the term 'hard-boiled' fiction?

Answering these types of questions does require certain skills and abilities. It requires the ability to manipulate material, to find new and fresh ways of looking at much-studied authors, often to find original ways of interpreting a question. More than anything, it requires a certain *cleverness*. What it does not require is an understanding that poetry and fiction have any *context*; it is as if the 'meaning' of Wordsworth's poetry, for example, is completely static and unchanging. Paradoxically, the supposedly 'universal' nature of the meanings found in the literature examined makes them less immediate and less relevant; one cannot help wondering at the sheer triviality of some of the questions. They exist in a world remote from everyday life and experience.

Like the first year course at A, the first year course at B mixes the traditional and the modern. Unlike A, however, B has, not an Old English course, but a Medieval English course and an Epic course. The reason for this was explained by one of the lecturers at B:

> "Our first year is a foundation year in the sense that there's a common body of reading that they will all have done before they pass on to the other two years...so it's generally settling in and acquiring practice, and acquiring a certain body of common reading which can then be appealed to or built on in subsequent years... Over the course of three years all our students read through the changing historical phases of English literary sensibility through the poetry...the medieval in a sense is the first year in way of that, so although it's called medieval studies and it has some drama in it, it's 90% verse: Gawain and Langland and lots of Chaucer...The other thing they all do is to try to acquire a kind of sketch map of literary development outside the English or British context, and so we have a string of courses which are more European based, which focus on a major literary genre, which has an important bearing for English literature, though English literature may not be the literature in which the high points of that genre are being counted, so the Epic which they read in the first year is followed in the second year by the choice of either European novel or European theatre...So Epic is really the first part of that sequence." (M)

This particular passage is quoted in such detail because of the particular values embodied in it. It is a statement of consensus, an appeal to the norms and ideas of what the practice of studying Literature should be. M says, for example, that the first year is concerned with

"settling in and acquiring practice, and acquiring a certain body of common reading which can then be appealed to or built on in subsequent years." He is suggesting that English can be regarded as a "practice" which is "common"; that the sorts of things that students should be doing are established and, to an extent, beyond dispute: not only what they should be doing, but how they should be doing it. Literature, both English and European, is static; there is a firm foundation which has been built on by Tradition. By that token, a study of the Epic is indisepensable to an understanding of English literature.

The Modern Studies course is justified on a similar basis. According to the course handbook:

> "The purpose of this course is to prepare students for the rest of their degree by practice in the close reading of literature in a context designed to make the activity more disciplined, principled and self-aware. It is explicitly a preparation and a 'shop-window' for the core second and third year English courses in poetry, drama, the novel and Shakespeare. However, it will be suitable in its content and purpose for all students of literature."

The course itself consists of both seminars and lectures, which introduce critical terms such as "symbol", "rhythm" and so on through the study of a short series of texts, poems, plays, short stories and one or two novels. It is not a survey of modern literature, but an "introduction"; as M. puts it, "a way of opening up rather more general questions, about literature". The purpose of the course is *not* that students acquire a body of knowledge about modern literature (given the vastness of modern literature this is, in any case, an impossible task), but that they acquire the ability to write about literature, to distinguish the important issues, which issues it is possible to write about in essays. It is, as this lecturer said earlier, about "acquiring practice": a practice which involves developing taking certain ideas, a certain language, certain techniques, for granted.

What is left out of a degree course is as important as what is included. Given the importance attached to theory by many modern critics - arguably, all readers have some theory about what they are reading in any case - the lack of theoretical courses in Departments A and B is striking. A does offer a "critical approaches" course in the first year, which provides an introduction, but only an introduction, to theoretical

perspectives. There is also a "theoretical perspectives" seminar course which runs in the second and third years, but this is optional. The "critical approaches" course is taught by a variety of lecturers; each specialist lectures on his/her favoured critical approach. Thus the department's structuralist lectures on structuralism, the department's feminist lectures on feminism, and so on. The different approaches are thus seen to be distinct, but perhaps not in conflict: each approach is seen as an area of specialism, rather than as an area of political commitment.

B, however, does not include any courses on theory. The reason for this was discussed separately with two lecturers at B:

> "I think that is partly a matter of accident; it's also partly a sense I think that the theoretical dimension gets covered or ought to get covered as the ordinary way of business...when we do the European novel a lot of modern theorising about literature is actually focused on questions about fiction, ideology, that kind of thing... so I think it's partly accidental, and partly a matter of a sort of consensus policy. I mean, I think there are some people in the department who actually like to have a more theoretical course actually highlighted, there it is, you know, that's what you do, like history of criticism, theory of criticism. Others would probably feel that that might even be mischievous at the other end of the scale; most of us would feel that there must be some turning over of what you're doing at the level of principle, and the way it has tended to come together as a compromise is that there's a sense that you do it as required rather than you do it as a speparate exercise." (M)

Again, we see the language of consensus being used; M talks of 'compromise' and 'a matter of accident'; the whole picture suggests a group of academics happily muddling along without ever needing to make their ideas about the practice of literature and criticism explicit. It appears that the department is going out of its way to avoid antagonism or conflict. By saying that some members of staff think that teaching theory is 'mischievous', whilst others think that it is important, he manages to suggest that the department has struck a happy medium. Similarly, Lecturer B, in the same department, appears to suggest that a regard for theory is a little dangerous:

> "My experience is that students of literature, and teachers of literature, too, I would even put myself in that category, are not very good conceptually, they respond more to actual texts in a sort of affective way, or quasi-sensuous way. When you start talking about arguments in literature, conceptualising, generalising, a lot of people get rather lost, one would have to admit that. So I mean,

> maybe they need a course in theory all the more for that reason, I don't know, I think a lot of them would have real problems with it."

This is the language of Richards, of Practical Criticism: the sensuous response to the text, the words on the page. It is surely only in English that an academic would admit to finding "conceptualising" difficult. By refusing to include theory, the department is, in effect, refusing to declare its own theoretical standpoint: it must *have* a standpoint, for it is impossible to judge or measure the correctness of someone's "affective" or "quasi-sensuous" response; yet English departments do examine and judge people's performance, just like any other department. We need not devalue subjective, affective response to understand that subjective response is partly determined by theoretical (if unacknowledged) preconceptions.

Lecturer B was asked what effect the growth of English literature all over the world, and the advent of modern literary criticism, had had on English teaching in universities:

> "Well, I think academics are quite good at resisting what they don't want to deal with you know, so in many departments, it's not had very much. People are quite good at covering things up; they say, I don't know very much about literary theory, you talk to so and so down the corridor; or Well, I don't know African writing, but So-and-So does, and then people offer options on them, that to some extent is what we do here, within a framework of a fairly traditional English structure, although as I said at the beginning, it's not absolutely traditional, but it's still got this historical element in it, and the more pressure you get to bring in this or bring in that, you see, the more complicated the situation becomes, but as I said, people manage by excluding what they don't want to deal with, really." (B)

What is so interesting about this is the way in which it both resembles, and differs from, Kuhn's account of changes in 'paradigm'. On the one hand, there is certainly a resistance to change and to new ideas; academics appear quite happy to continue teaching the same old syllabi as if there had been no 'explosion' (in B's words) in English studies; at the same time, there is no resistance to allowing other people within the same department to teach quite different things to students, and to do quite different types of research. There is a great tolerance towards a multiplicity of paradigms, provided those paradigms never challenge the mainstream in any serious way. Thus, as in A, matters such as Literary Theory or non-mainstream areas of literature (such as African literature)

are considered 'specialisms' which need not interfere with the traditional way in which English has been, and is, taught. B. admits that "if someone was starting absolutely from scratch a degree in English now, it would be very hard to work out what they'd manage to put in" (though this recognition does not, apparently, necessitate changing an already existent English course.) However:

> "Shakespeare I think tends to be a stable item, and I have a letter here from a former student, who is teaching in South Africa, and he is looking ahead to after the revolution, as it were, and he says, 'I've recently become involved with the Shakespeare Society of Southern Africa, and one of our most challenging projects is the production of a series of Shakespeare texts, with the educational and cultural situation of the black school student in mind. Those available at present and the educational thinking behind them is simply inappropriate. It seems to be accepted by most black educators out here that Shakespeare will still be on the syllabus in post-revolutionary South Africa. This has certainly been the case in the rest of Africa.'... It does suggest that what people say about Shakespeare, about his universality, is still there."

The 'universality' of Shakespeare absolves critics and teachers, to a great extent, from trying to understand him in his cultural and social context; there is no need to understand Shakespeare as a product of his particular era. Of course, in teaching Shakespeare, it is important to encourage students to understand the relevance of his writings and his insight for our own age; it is also important, however, that students understand that that insight was also shaped and limited by the historical circumstances of his time. The latter understanding is less frequently communicated than the former; and for B., at least, it would represent a degeneration into Relativism. B. makes it very clear that one must accept that certain pieces of writing are superior to others; but the criteria for judging superiority are, interestingly, not very specific:

> "What I think is happening, I find this interesting, people are rejecting the idea of the aesthetic, and I'm not quite sure why; I don't know whether they think it's élitist or whether they've got no taste of their own, or what, I don't know, but people read poems not as poems which convey aesthetic emotion, which is the way I tend to think about poems ultimately, but simply as ideological statements and political texts, or at least, things that give you some understanding of the way people thought or so on at the time...If you take out the idea of the aesthetic, you're just left wiht communication. Then people, for some ideological reason, people might say, well, you know, you can't say one form of communication is better than another, so that say, I don't know, I suppose, a kind of feminist belief is better than 'Paradise Lost' or something -

> well, it might be more acceptable to some people for various reasons, but I say some writing is more rewarding, ultimately some things are better than other things. If you say, how do you know they're better, then how do you know one football team is better than another, it plays better, gets more results, you know, and people respond to that."

He concluded:

> "In terms of institutional study, there is a dislike of what I think is rather sourly thought of as high culture and high art, and in favour of communications, which can be awfully boring and not terribly rewarding. But yes, it is going on, and certainly in polytechnics."

The idea that certain analyses of literature reject aestheticism is, in fact, a fairly crude parody of the Marxist and feminist positions. However, the belief that good poems are like good football teams, in that they get 'better results', is undoubtedly novel. Certainly *Paradise Lost* does get 'better results' for some people; Sylvia Plath gets 'better results' for others, whilst Catherine Cookson gets 'better results' for even more people. People from different backgrounds, different eras and with different levels of education will inevitably respond in a variety of ways to the same texts. B's argument is that in a piece of 'good' writing, there are certain qualities, above and beyond the techniques s/he uses to communicate an experience or belief, that make that piece of writing instrinsically superior to other pieces of literature. If one asks the question, 'Who decides what is a piece of 'good' writing?' one is back to Leavis's statements about the 'morally sensitive' reader. B's argument disguises the reality that, as has been pointed out by writers as diverse as Spender (1981a) and Eagleton (1983), only a small group of people, historically, have participated in deciding which literature gets the best 'results'.

For an alternative view of what the study of literature is concerned with, the comments of the tutor on the 'Women and Literature' course at A may prove useful:

> "I try and make women's history clearer, because obviously they've done history A-level so they've probably learnt about wars and all the male sort of things, so what women were doing and thinking and the way in which that has been suppressed; as much as possible I like to teach by not putting very much of what I think across but trying to get other people to produce it; that's becoming less and less easy over the years, and I think we're in a very post-Thatcherite situation really, and I find I'm having to show people what to do much more than I used to; but I like to try and mix, I

> like them to come out of the end of the year knowing more than they did before, that's for sure, but also encouraging them to share as an experience and personal responses and talking about things one wouldn't normally talk about in the department, the emotional side of things, in quotes 'irrational', 'intuitive' and all of that, and valuing that; allowing a bit of space for talking about work in the rest of the department, which is very clearly defined by patriarchal norms but trying not to let that take hold because you could go on moaning about that for term after term and never actually learn anything; it's good every now and then to express it but I try and keep a very tight hold on that and not let it get too out of hand really, and try and make it a space where people can say whatever they want to say; I suppose value things that would not be valued elsewhere." (S)

In S's view, the discourse of the emotional is devalued in the rest of the department, and she thus tries to bring it to the fore. She sees this course as explicitly challenging some of the accepted norms of the rest of the course, and argues that students who were normally "high-flyers" find this course harder because, as she put it,

> "they find it difficult to relax and to say what they really want to say as opposed to saying what they know will get them brownie points."

In that sense, the course is intended to be non-competitive and less about following rules than allowing people to express their own feelings and ideas. In theory, this is what happens in the rest of the course; in practice, what is considered "valuable" is pre-defined.

A look at the issues raised by the 'Women and Literature' course, through its examination paper, reveals that there are no questions at all on individual writers, and the questions locate the study of literature firmly in the social world:

> "Men look at women. Women watch themselves being looked at." Do you agree? How is your opinion supported by texts you have studied?

> "Language is a system which pre-exists the individual and in which the individual produces meaning. In learning its native language, the child learns a set of differentiating concepts which identify not given entities, but socially constructed signifieds." In what ways do the women writers you have read work with these ideas?

This examination of the relationship between the text and the external world could quite easily be put to use in other courses, other papers; yet by and large, it is not. The examination of social issues, the relationship between women's account of their experiences, and men's account of their experiences - a central theme of literature - is put to

the side, left to one seminar course. In addition, the 'Women and Literature' course, unlike most of the other courses, does not take for granted that certain texts, or certain ideas, are more worth studying than others; the examination questions start from the premise that our concepts of Literature, genre, worth and so on, cannot be taken as given. The following question, for example, leaves the examinee a great deal of freedom to answer within her own, rather than the examiner's, framework:

> "Consider the interweaving of themes, ideas and observations in both the fiction and non-fiction writing produced by any woman writer of this period."

An obvious limitation of this course is that, in dealing with 'women', rather than 'gender', it turns 'women' into a specialism, in the same way that 'T.S. Eliot' or 'D.H. Lawrence' are specialisms. If a discussion of gender focuses only on those texts written by women, then it appears that texts written by men are not concerned with issues of masculinity, femininity and the construction of a social identity in a patriarchal society - although, of course, they are. The result is that 'male' again appears as 'norm', 'female' as 'deviant.'

8.5 Assessment

An issue arising from the plurality of opinions existing within a department about the nature of English and the study of English, is the extent to which differences are resolved, and whether these differences have any effect on the assessment of students' work. This is particularly important in the light of the differences between the degree results of men and women. Are departments able to reach a consensus on what constitutes a 'good' degree? The two lecturers in A - R and S - gave very different answers when asked their opinions:

> "I think in the department there's certainly different views about what students should be doing, should be writing and so on, but I think as far as examining goes, or marking essays, I assume that most of my colleagues take the sort of line that I do, that what we're looking for is not a particular interpretation of something, but an ability to get to grips with texts, to produce an argument that's logical, coherent, well-written and is supported from the texts. Now whether or not it's an argument one agrees with is neither here nor there in the end, I mean that's not what you're marking, you're marking the skills really. I mean, obviously, it's quite open to you to say, 'Look, you say that there, but you haven't proved it, I don't think you're right; if you think you're right, prove it to me; and if you've simply asserted something, without

> providing evidence from the text, to show me how you've arrived at that idea, then I have no obligation to accept that idea, prove it to me.' I think that's all one can ask for, all one should ask for really from a student essay. I mean, historical facts, you can point out if a reading is based on something which is historically inaccurate, then you can mark that and say that's wrong, but I think the areas in which you can say that's wrong are fairly limited; it's a matter of skill in argument and support for the argument." (R.)
>
> "It [marking] is almost impossible. For me, that's the big contradiction really. I do have to mark essays and they do contribute towards finals and I do have to mark finals papers as well, from the third year group, and it's just hideous really, it just makes a mockery of the whole thing, particularly with essays. I really try and encourage them to be experimental, to do different things, to say what they really feel instead of what will please me. With the exams, I just try and be very clear to them about what will get good marks and what won't, to try and make the exam paper as challenging as possible, and as interesting as possible, and make it clear that they can choose to play the game or not, it doesn't matter. But it never really works, it's always a dilemma, and that's why I want to get out of academic life really." (S)

Lecturer R sees the practice of English as a skill which can be assessed. Knowledge, or opinion, does not really matter, as long as the student can use certain skills and abilities in presenting a case. From that, it follows that there can be a consensus amongst staff about how to mark; because whilst staff might not hold the same opinions about certain writers or texts, they can still be agreed on the necessary skills for writing essays. Lecturer S, however, finds assessment problematic, because it involves judging not only another person's understanding of a text, but that person's expression of it - i.e. the 'skill' with which s/he expresses an opinion - and also the theoretical framework within which that person has located the essay. Interestingly, she makes a distinction between what she feels about essay-writing - which is that assessment is not as important as helping students to think about what they are doing - and what she does when she is marking essays which is, as she later put it, to "give the rules, and then stick to the rules that I've given." The implication of that statement is that other lecturers do *not* give rules - with the further implication that the rules might in fact be unclear, variable or unconscious. She regards assessment as a game, which takes place not within an objective reality, but within a set of arbitrary rules which must be obeyed.

It is not simply, then, that R and S disagree on how to mark papers, but that they disagree on whether there is a consensus on how to mark papers. S, for example, when asked whether the differences in theoretical standpoints of members of the department were somehow resolved, said:

> "They're not resolved really; they continue as quite big arguments; and there are quite big camps really of those who believe in theory and those who believe in scholarship, I suppose; and we pretend that you can just muddle along and it doesn't matter, but the crunch comes at things like marking exam papers, because if you've got a student who's heavily into theory, writing for a marker who's heavily not into theory, then they tend to say things like 'oh, he's just read Terry Eagleton, so blah blah blah' or 'she's just read Cate Belsey and regurgitated that' so someone can get a bad mark because they've written for the wrong person."

This is a direct contradiction of what R says, which is that "most of my colleagues take the sort of line that I do, that what we're looking for is not a particular interpretation or something, but an ability to get to grips with texts."

Lecturers B and M, however, in Department B, saw the issue of assessment as unproblematic. When I raised the question with M of a student's theoretical perspective in an essay, he said,

> "I would feel that the proper stance really of a marker is that you're not actually in a sense looking for any positive pre-identified thing when you're marking undergraduates. It's partly the skill of a marker to be open to things that come along, very often to things which are still perhaps very undigested and very unclear to the student, so that although you've got to be clear about your marking in how far it's gone now, you also want to send signals about whether the student's grappling with something worth grappling with. So really, I feel that marking should be as it were as unbiased in terms of what it's looking for as possible. Having said that, there are obviously certain kinds of principles within which you expect things to work. I mean, one would want anything that is said to be clearly demonstrated or grounded in the evidence; whether the argument depends on very theoretical structures or not, I don't think we have any views on that; if it is and it's successful, that's good; if it is working on a much more empirical sort of basis, but it makes its point clearly and the point is worth making and understood, then that's OK as well".

From this, we can see how difficult it is for the marker in English to be fair: not to be looking for any "positive pre-identified thing" apart from a basically sound argument grounded in evidence is bound to make a marker's task a very demanding one. Given the fact that we generally do come to a text, whether a novel, or a poem, or a student essay, with pre-

conceptions and prejudices, expecting markers to do this is something of a tall order. At the same time, M seems remarkably confident that it is possible for the marker to be as "unbiased as possible." His feelings about the use of theory in students' essays are, however, ambivalent:

> "What I would say is that, for me to speak rather personally, that I'm always glad to see students who have thought the thing through theoretically and are able to talk at that level; on the other hand, I see the dangers in it, that you can sometimes get drawn into rather arid sorts of theoretical arguments and distinctions as a substitute for actually engaging in what you might call the challenge of the text, the experience; in fact, to put it strongly, you might say that there are forms of folly, to which only the functionally intelligent are really susceptible, and I think it's one of the functions of education to make that clear, that not everything which is clever is intelligent, as it were, so that's why I would be very wary of having an attitude which said that you positively encourage people to be, you know, highly theoretical, but at the same time if they can actually handle sophisticated theoretical conceptions, and make them work, then of course that's absolutely wonderful, that's what you want." (M)

Again, the specific text is seen as more important than general beliefs about literature which guide one's view of the text; it is as if one's view of different texts were not informed by wider beliefs about literature. The theory/empirical distinction implies that students do not make use of theory in understanding and writing about a text. In reality, students do use theories, although they might not be very explicit or sophisticated ones. M's emphasis, however, is on responding in a personal way to "the challenge of the text"; yet it is also apparent that to respond in an entirely personal way, without consideration for the implicit guidelines or theories of the dominant English discourse, would be to risk failure. For M, it is the discourse or practice of English that is important, not the individual ideas: in the realm of discourse, consensus reigns:

> "It's a curious feature that I've noticed in any department that people will have quite different principles and attitudes and temperaments, and if they're thrown a poem and asked to arrive at some consensus on it, you'll very often find that they can't arrive at a consensus, there are very strong differing views. At the same time, if you ask them to mark someone else's discussion of a poem, what is then remarkable is the degree of consensus with which they can actually do this. Now I think there is in a sense a level of

> consensus about the nature of the activity, the mode of discourse, what constitutes a good argument, what doesn't constitute a good argument, that kind of thing; in other words, what you're really responding to is the medium, the activity, rather than the particular outcome. Whereas when colleagues are discussing these things they're taking for granted as it were the practice of certain kinds of discourse and are disagreeing about the large ends of this discourse. So what I would say to students is, 'you are being trained in a craft as far as you can do it which would enable you to conduct your own arguments; you are politically free to believe anything you want and to argue anything you want, and it's not our job to mark your arguments or your beliefs. What it is our job to do is to mark your ability to conduct those arguments.'"

This is a reasonable statement of practice; and it is probably true, too, that most academics in an English department would agree on how an essay should be written, on "what constitutes a good argument, what doesn't constitute a good argument." (Although what constitutes a good argument in English might not constitute a good argument in sociology, or history - the discourse is different.) The significant point is that the mode of discourse itself is *not* objective, not simply a matter of a 'good argument'; that arguments themselves are limited by the essay titles or examination question, and that the practice of discourse must always be confined to a certain type of cleverness and ingenuity, which can answer questions such as this (quoted earlier):

> "Satire remains worth reading if it succeeds in transcending the contemporaneity of its material." Discuss.

We are reminded of Kolodny's argument (1981), quoted in Chapter 4:

> "The fact of canonization puts any work beyond questions of establishing its merit and, instead, invites students to offer only increasingly more ingenious readings and interpretations, the purpose of which is to validate the greatness already imputed by canonization."

Students can only answer essays in the framework offered by the question; it would be very difficult, for example, to answer the 'satire' question by arguing that satire was worth reading if it did not transcend the contemporaneity of its material, or that no work of literature ever transcended the contemporaneity of its material, or that one didn't accept the idea of 'satire' as a generic term, or that one didn't think satire was worth reading at all.

8.6 Gender

The issue of gender has already pervaded the discussion of English in this chapter; however, it is important to clarify the issues. Let us begin by comparing two quotations, both from an interview with M (and, lest it seem an unfair juxtaposition, I must point out that in the interview itself they were separated only by my question 'Why do so many women do English?'):

> "I think that literature is actually the most intimate and complex and comprehensive account we have of the lives of men and women who have lived on this planet because it combines a philosophy in an essential sense, it combines social science in an essential sense, social studies, a study of culture, and it combines the modes of artistry that music and painting have, but it's verbal, so it's got this mixture of being both profound emotional structures, and sentences that *mean* things, that refer to things in the world, so it has a way of bringing together and balancing off as it were of the inner psychological direction and the outside dimension, and however people articulate it to themselves, that is what they come to literature for, however people articulate it, or however it gets articulated in the public sphere is a matter of theory. My perception of it is that people come because they think there is a rich store of past experience in literature, and I think that's what they intuitively go for."

This is a very large, very Leavisite claim for literature: to say that English is about the study of the "most intimate and complex and comprehensive account we have of the lives of men and women", that it is about "profound emotional structures" is to put it, as Leavis did, at the centre of the academic disciplines. Logically, perhaps, we might expect M's answer to the next question would be concerned with explicating women's greater intuitive understanding, their ability to grasp complex and intimate accounts of life, or to get to grips with "profound emotional structures". However, he replied as follows:

> "Well, I think there are well known factors in the culture at large; whether they are, you know, ultimately cultural or biological or natural none of us really know, everyone has their private view on that subject. It is the obverse of the question, isn't it, of why more women don't do physics, and you know that I don't know that I've got any special wisdom to add to what's already been said on that topic, because you're partly dealing with whether people go to the *subject*, and whether people go to a *perceived* subject, whether it will be thought of in some ways as a slightly effeminate thing to do, and that might affect the choices, but it might be that people aren't affected by that, that they actually go for the nature of the thing itself. There may also be differences in career expectations; males may feel that they have to go into something which has a clear sort of career purpose, and it may be that there is still a very strong

> traditional sense that a career in that sense is somehow a lower priority for the female school-leaver; certainly I think it's probably the case that our students are still not so career-minded as some of the students that go into other subjects, that they come because they want to do that subject; maybe there's a kind of luxury element in that that perhaps young male school-leavers don't feel that they can afford. That's speculative of course."

The answer is a series of negatives; a career is not a priority for a woman, women don't do physics; maybe it's cultural or biological or natural. Considering the importance, to English, of the fact that it is studied by vast armies of women, M has given the subject remarkably little thought; and his answer is entirely unrelated to his earlier eulogy of English as a discipline. Consider, too, B's answer to my question, 'Why do women do English?':

> "It may well be that this element of the aesthetic, the emotive, the playful, etc. is something women take to more readily than men, I don't know. One hesitates to make gender-based generalisations now because you're liable to be attacked for it, but yes, I think there is something in it actually; there may even be something physiologically; there have been thoughts passed around about different sides of the brain and so on, with some slight but possibly significant difference between the male and the female brain in this regard, but that is very theoretical. But I suppose I tend to say, it's not just cultural...I think there is something else, deeper."

Quite simply, then, women are biologically more disposed to studying English than men; if that is the case, then it is only reasonable to assume that women would be more successful at the subject than men. However, as we saw in Chapter 6, women are notably *less* successful in English than men. Before looking at how B and M explain women's lack of success in English, however, it is useful to look at M's comments on a seminar discussion about 'Ulysses', in answer to a question about whether men and women have clearly differentiated responses to the discipline:

> "I find that very very difficult to generalise. I mean, ideally when people are engaging with literature, they are engaging wholly, that two girls can be very different from each other, they can be more different from each other than they're different from one of the boys in the class, so that I feel they ought to engage as it were from where they are, personally, which must include their sexuality, but I mean, for example, I took a class yesterday and we were discussing 'Ulysses', and there was quite a strong spectrum of view opened up in the room; one girl was very as it were straight up and down feminist,you know, that Joyce had a bloody cheek to think he could do Molly Bloom, and you know he was locked within the stereotypes of the female etc., which I

> sexuality, but I mean, for example, I took a class yesterday and we were discussing 'Ulysses', and there was quite a strong spectrum of view opened up in the room; one girl was very as it were straight up and down feminist,you know, that Joyce had a bloody cheek to think he could do Molly Bloom, and you know he was locked within the stereotypes of the female etc., which I think, you know, broadly is right, but at the same time the problem is you have to decide whether that really is Joyce that you're taking that fact to, or whether it's just Molly Bloom's sense of herself, and you could argue that that's what it is, that that's what's dramatised and put there. Now it wasn't a boy in the class who was arguing the counter-case, it was another girl, at the other end of the spectrum, and you know, they're both intelligent and sophisticated readers, it wasn't any matter of misunderstanding of what the issue was or anything like that; this girl really felt that this somewhat ideological, fixed feminist position was really rather blinkered in terms of actually responding to what was on the page; and it was a slightly older, slightly more mature, married student who said, who first commented on Joyce's achievement, you know, she was recognising this, as this really was, you know, a woman speaking, as it were, and this was what was remarkable about it, so there was a body of female view that this really was quite an achievement, and there was a body of equally female view that it wasn't, so it depends how you want to generalise that then, you might say that at least they had strong views on the subject, that may be the common element, rather than that they shared the same view. I find it very hard to detach my whole sense of the one girl very strongly committed to her view, and the other one equally strongly committed to her very different view, and to sort of construct a generalisation that adequately holds both of them and distinguishes them from myself or the other chap in the class. So there must be differences, but I suppose I'm just very aware of the individual factor."

This is an example of what Bowen (1985) has described as "the regulation of women's 'response' by older men." (p.370) It illustrates perfectly, on the one hand, the freedom and individuality of English - in what other academic discipline could women discuss representations of their sexuality? - and, on the other, its constrictions and limitations - the absurdity of that discussion being centred around a male defintion of female sexuality. The situation is so normal in English that it will perhaps only strike us as odd if we try to imagine a group of male students, guided by a female tutor, sitting around discussing, say, Marge Piercy's portrayal of male sexuality. What is of particular interest in the quote is M's response to the situation. While initially appearing to agree with the feminist's position, the language he goes on to use actually denigrates that position: "ideological, fixed", "blinkered", his description

the debate were defined and limited by this one male author. In any case, the discussion itself, centred as it is around whether Joyce's representation of Molly Bloom is really a part of his perception of women, or whether it is Molly Bloom's "sense of herself" - as if the character were now at one remove from the author - seems to be one of those fruitless and ultimately self-defeating exercises which only take place in Eng. Lit. seminar groups.

We have already seen that three of our four lecturers believe that markers can be 'unbiased' and that there is a 'strong degree of consensus' about how to mark an essay. If that is the case, then the issue of the different degree classifications attained by men and women is not a problem; as it cannot be grounded in marking systems or the pre-conceptions of the marker, then it must be grounded in the students themselves. Both B and M regarded the issue of differential degree classes as unproblematic:

> "I would think that that is true [that more men get firsts in B university]. It would make sense, wouldn't it? In a way, if the drift of the culture is to perceive this as a female subject, then the males that go in for it are males who have very positively chosen it or even quite a large number of such, so there will be a strong element of some selection of them wanting to do that, whereas if it's a female-perceived subject, then many girls may just go into it as part of the drift, just on that ladder." (M)

This is reasonable, up to a point; it does not of course account for why the reverse does not happen in male-dominated subjects such as physics. B's comment on the greater proportion of men obtaining firsts was:

> "More men tend to be academic high-flyers, yes, vastly more. Basically, this is true. I think it's a subject that a lot of women drift into it, let's just say that. Able but weakish students who quite like English. Perhaps for these people the affective emotional thing is probably a bit too strong, they could do with a bit more intellectual stiffening, the rather weaker students. Men are often not encouraged to do English at school. If they do English, it's because they want to, because they've got some real commitment, some interest, it's slightly against the grain for them. But then once they get into it, if men are that much more competitive than women, which I'm inclined to think, then they start pushing ahead and advancing and so on. With firsts, I suppose there are more men, we don't get many anyway, two or three a year, I don't know. I think there probably is a preponderance of males, but not a vast preponderance. I always get the impression that the women high achievers are increasing in number, and have been somewhat over the years. You do notice

> it higher up in academic life, where certainly the majority of people in senior positions are male, but then the majority of people who apply to senior positions are male."

B. has already suggested that women are genetically more predisposed to study English than men. To go on to argue, then, that many women who do English only do so because they "drift into it", and not because they are any good at it, is a doublethink of some magnitude. It is, simply, an evasion of the problem; it is convenient to believe that women are biologically more suited to English, and it is also convenient to believe that women do worse at it because they are not really as good as men. Either way, the end result is nothing to do with the practices of the department. B. makes use of dominant assumptions about men and women to explain differences in achievement: for women, the "affective emotional thing" is "too strong" - a phrase which conjures up images of Victorian hysterics being overcome by reading too much Keats - whilst men are more "competitive". Thus are asssertion and aggression (positive masculine emotion) rewarded, whilst affective response (negative feminine emotion) is penalised.

It seems that the issue of the proportions of men and women doing English, and their relative performance in English is, in fact, a non-issue. By setting the department up as objective and impartial, it is possible to abdicate responsibility for inequalities of achievement amongst the students. It is possible to blame schools, society, biology, women themselves: but English departments themselves remain beyond doubt. The dissenting voice in all this came from S, in department A. Talking about the discussion of marginal cases at examination meetings, she said;

> "Some male tutors' reports on female students say absolutely classic things, you know, about 'she is a rather sweet but unassuming person, who only reports ideas that she's found in books' and even when they're saying complimentary things, it's all about how sweet somebody is, or how unaggressive they are. Obviously what they're seeing and what they're looking for and even what they're praising, are in fact very non-competitive things, whereas some of the lads who make a good impression are clearly doing something else; they're talking a lot, being aggressive in argument and all the rest of it, and therefore very in quotes 'impressive', and I think a lot of them are into the whole competition anyway and can do that, and there are very few young men students, so they're special to start with, they're noticeable. So if you've got four girls called Sarah in your group and they're all quite shy and diffident about talking, then it's quite difficult to remember which Sarah is which, and if you've

> got one lad there, who's got a good sense of humour and a loud voice, then he does stand out and you think, 'this is a really good student who's contributing a good deal'; so I think when it comes to discussing students, the young men do stand out in that way."

Again, in S's account, aggression and competitiveness are being rewarded - at least in men; and men, by virtue of their conspicuousness, are necessarily more interesting. It would seem, from this version of events, that women are in a double-bind, caught between trying to be unassuming and feminine or competitive and masculine.

Clearly, there is *not* a consensus in either department on what is regarded as deserving of a good mark or, indeed, of what students should be learning. What is interesting, however, is that it could quite easily appear to an outsider - or to a student - that there *is* a consensus. Courses change little from year to year; Medieval English, the plays of Shakespeare, the Romantic poets and so on continue to be taught, and by a variety of people; and examination papers get marked, with each year a similar proportion of 1sts, 2:1s, 2:2s and 3rds. It is this appearance of consensus which gvies the study of English an immutable and objective quality: certain texts, certain ideas, it appears, must have value because everyone (i.e. all members of the department) thinks they have value. A lecturer might give a lecture expressing the opinion that (for example) some of Wordsworth's poetry is not very good, but it is not likely that Wordsworth would be removed from the course altogether. In the following remark, R is talking about an experiment which involved allowing fairly open discussions between students, without the presence of a tutor, on different literary topic, during the first few weeks of term:

> "We had an open discussion at the end of the first five weeks, about what we'd been doing and whether they thought it had been useful, and there were quite a few students, that they thought on the one hand that we were connning them, that we knew what the answers were and were annoyed that we wouldn't let on, what we thought, an we were trying to put over, 'We don't know, you know. If we told you what we think, we would all say different things, just as you think different things, there is no one answer', so they find that a bit hard to take."

In reality, there is a 'right' answer, in that courses could never be designed, examination papers never marked, if lecturers could not agree on

a 'right' answer, or, indeed, if all lecturers could have an equal say in what was taught in the department, without constraints from the university itself, or from the outside world. The job of the student is to find out what that right ansewr is - and the right ansewr is not, for example, whether Keats's poetry is, or isn't emotionally self-indulgent, but that there is an accepted way of writing about Keats and about poetry. Traditional ideas about what should be taught and how work should be marked still maintain a fairly tight grip on the departments, whilst allowing some diversity, some challenges to the mainstream, regarded as 'specialisms', through courses such as the 'Women and Literature' option.

There is, then, a continual tension between the claims of the departments to objectivity, and their emphasis on subjectivity. Despite this tension, there is also a refusal to examine curricula or practices: student failure, therefore, is the fault of the student's inability to make the necessary sympathetic adjustment to the requirements of literary judgement; not the failure of the departments in setting those requirements.

8.7 Communications

The Communications course at C Polytechnic is relatively new - it was set up in 1979 by staff who taught in the arts department, of which the Communications course is only one part. It is immensely popular, partly no doubt because of its rarity, partly because of the keenness of many students to enter the media or advertising. The course attracts approximately 2,000 applicants a year (though this number may have fallen since the introduction of PCAS in 1986), of which only about sixty can be admitted. Entry requirements are usually two Cs, but this is flexible; students on the course have a tremendous range of qualifications and some are mature students with few formal qualifications. Part of the sifting process occurs at the interview; students are given an essay to write on which part of the final decision to make or not to make an offer is based. When I looked at the course, there were 37 women and 19 men in the first year and 25 women and 12 men in the third year - a testament to the high drop-out rate.

The course does not claim to be directly vocational: most of its graduates will not find jobs in the media. However, many go into jobs

where communications skills are considered important, such as Public Relations or Advertising, and a few do go into journalism or television.

The course is very different from the two English courses, in several ways. First, and most obviously, it is a different discipline and therefore teaches quite different things; it is about means of communicating, the practice of communications, not about literature. In addition, the atmosphere on the course is more casual and intimate; it is a friendlier course than either of the English courses.

As in departments A and B, all first year modules are compulsory. There are five altogether: Media Studies; Sociology: Cultural Studies; Psychology of Communications; History of Press and Broadcasting. Apart from Media Studies, these are all taught by lecture but the Sociology, Cultural Studies and Psychology courses are also supplemented by weekly two-hour seminars, whilst Media Studies is taught by workshop. In the first year, then, the course is, as D says, multi-disciplinary; there is some sociology, some psychology, some history, but all these subjects are taught by emphasising their relevance to communications.

In the second year there are four compulsory modules: Research methods; Psychology; Sociology of Mass Communications; Language, Culture and Community, again taught both by lecture and seminar courses. Students also take two out of the following six options: advertising; film studies; graphic design; art; photography; analysis of media organisation. In the second year, therefore, there is an opportunity to choose between an academic and a practical bias, or to combine the two elements. The assessed work in the second year is taken as 35% of the final degree.

In the final year, there are two compulsory lecture courses: Mass Communications, and Culture and Ideology. Students must also take three modules out of the following: popular forms in film and television; contemporary art; media policy; journalism. In addition, students must write a dissertation of 10,000 to 15,000 words on a topic of their choice, which will be supervised by a member of staff. This counts for about 15% of their final mark, the rest of which is determined by final examination at the end of the year.

8.8 Constructing the Discipline

Lecturers see the course as chiefly concerned with the development of critical skills combined with promoting an understanding of the vocational areas on which communications has a bearing:

> "I think any student going through higher education is getting something from it if they come out as some measure sceptical, in some measure critical, that they're not prepared to take things at face value. If you are encouraging them all the time to consider propositions or arguments and then what evidence has been marshalled in support and the like, then you want them to come out like that, but that's what they expected me to come out like after doing English Literature; so, I think that's commmon...We don't pretend in any way to professionally train students...[but] they are expected to understand something of what professional training would consist of, some of the implications of that, and I guess what we would be dealing with are more of the implications, or this is how, for whatever reasons, it has come to pass that people write journalistic stories in this kind of way - might there not be other, better, more adequate ways of writing journalistic stories? Those kind of questions...it makes them, should they become practitioners, better practitioners." (C)

Despite the clarity of this statement of intent, staff still regard both the course and the discipline of communications as emergent, rather than complete:

> "Our general philosophy about the area hasn't changed. We still think that communications arguably, whilst still emerging as a discipline, is best approached from a range of disciplines. So it's still, if you like, at the beginnning, a multi-disciplinary exercise which progressively becomes inter-disciplinary." (D)

Unlike English, which is an established discipline, communications is still in the process of finding a language and an identity; it is not yet a discipline in itself. Having said that, it is beginning to gel as a discipline and staff are, apparently, thinking less now about what 'communications' is than when courses first started:

> "It's one of the things, it's occurred to me quite often, going around looking at other places, it's one of the things, we very rarely do, which is to sit down together and say, What should this course be about? Because that happened, I suppose about 7 or 8 years ago now, and in a way, the ground rules were generally agreed and given that people themselves haven't changed very much, and actually the personnel haven't changed, then there's a general assumption that the ground rules are more or less the same. I mean, the point about communications being initially better approached through disciplines, and then becoming an inter-disciplinary exercise, generally held. There obviously have been senses in which some people have pushed rather more production work, more manufacture of artefacts, more practical if you like, so

> we've debated those, if you like, but we've never actually sat down and debated that kind of thing for years, what communications ought to be about...I wouldn't say there's a consensus, but there are various consensuses, that's the plural, which overlap, which aren't in opposition, about what communications ought to be about." (D)

The awareness that there is not a discussion about what communications is, and that perhaps there should be, is rather different from the viewpoint of some English lecturers, who believe that English is established as a practice and therefore has no need of a debate about its development as a discipline. Communications is different in another important sense which is that innovation and change are more difficult to bring about, as the course has always to be ratified by the CNAA; in the English departments, new options could be introduced with relative ease by lecturers who wanted to offer seminar courses in their specialisms.

The multi-disciplinary/inter-disciplinary nature of communications can, however, make it very disjointed, particularly in the first year when sociology, psychology and so on, are studied as separate subjects between which little connection is made. In the second and third years, the course begins to gel, because it is concerned not so much with giving students a grounding in the different disciplines and so on, but with looking at areas of communications and taking the discourse of sociology and psychology much more for granted:

> "Often you have third year students saying to first years, now hang on, it actually does come together, you just have to wait till next year. I've heard them say that quite spontaneously, I've heard them say that as well on Open Days, and I can't imagine our students saying that unless they thought it." (D)

> "I think it's getting better. I think for a while, I don't know whether it's a problem exclusive to our course, you still hear examiners talking about their expansion of other courses; I think for a while it was very much that there were discreet avenues through - you did the sociology strand, you did the psychology strand, you did the language strand, you did the cultural strand and the arts strand, and anything that managed to cross the frontiers really was fortuitous." (C)

Communications, as taught at C, is more overtly theoretical than either of the English courses: more, perhaps, like a social science discipline than a humanities subject, although some of the staff came originally from English Literature backgrounds. Despite the many points of contact between the study of film or media and the study of literature, despite the fact that major theorists such as Barthes have made important contributions to

the study of film and the study of literature, the following question, from a final year Film Studies paper, would be most unlikely to appear on the examination papers of English Departments A and B:

> Roland Barthes has said that the author is dead. What sense does this statement make in relation to the developments in auteur theory?

The following question - again one which has relevance for the study of English Literature is from the Culture and Ideology paper:

> Marx is frequently cited in connection with the concept of 'ideology'. What do you see as his most important contribution to the development of this concept? Specify reasons for your choice.

The teaching of communications demands that students approach the subject in a way that entails thinking, not just about individual ideas or issues, but about the relationship between those ideas and also the social location of those ideas. It is assumed that a text, or a film, is not something which has a set of meanings which can be extracted from it, but something whose meanings only exist because they are part of a wider social world; people can only find meanings if their world shares some common meanings with that of the text. For example, another question on the Film Studies paper asks:

> How is masculinity constructed in any of the films you have studied this year?

- a question interesting not only because it suggests a world wider than that of the film itself, but because it focuses on the issue of 'masculinity'. This again provides a contrast with many of the English papers which had the occasional question on 'Discuss Rosetti's/Dickens's/ Browning's representation of women', but never had anything on an author's representation of *men*. The response of Dr. B to communications, it will be remembered, is that it ignores the aesthetic, that it is so obsessed with "ideological statements and political texts" that it can no longer make a distinction between good and bad. It is true that, for example, questions on the communications examination papers tend not to be structured around the assumption that an individual film or text is 'good' (questions on indiviudal works of art are rarely set); but the *issue* of aesthetics, the question of why we get pleasure from certain works *is* discussed, as in the following question from an Arts and Communications paper:

> "The difficulty does not lie in understanding the fact that Greek art and Greek epic poetry are linked with certain forms of social

> evolution, it lies in explaining the fact that they still offer us artistic pleasure and are to some extent recognised by us as a norm and an unattainable model." (Marx) Discuss.

Communications, then, appears to be more concerned to question conventional wisdom than English, and this is undoubtedly connected with its status as an emergent discipline. Part of the process of becoming a discipline must be that it defines itself differently from other disciplines. Lecturer D was asked if communications was a challenge to orthodox subjects such as English; whether it demanded a more critical awareness:

> "I don't think academic subjects do that, anyway. I don't think they take things for granted. I don't think, for example, if you take English, it would be the case that you take at face value the poems of Wordsworth, for example, and you don't bypass questions about the material conditions of its production, why Wordsworth wrote as Wordsworth did, where Wordsworth was situated socially and economically and culturally as it were, I think those sorts of questions do get asked. I don't think it's a question of questioning, and in that sense I don't think you're offering anything that's academically different to traditional academic disciplines. On the other hand, if you're saying is it a challenge, it's a challenge because arguably students see it as something a bit different and they see these vocational skill areas in communications and media studies, and in that sense arguably it's a challenge. So you might get the very good A-level candidate who perhaps ten years ago might have done English, now says, 'O.K., I'm going to do communications.'" (D)

This is interesting precisely because it doesn't make large claims for communications; in fact, as we have seen, questions about "where Wordsworth was situated socially and economically and culturally" *don't* always get asked, and there is even some hostility to asking such questions. The only claim made for communications is essentially a modest one - that it has some vocational appeal; there is nothing here about engaging in "profound emotional structures". The course, is however, seen as essentially different from traditional disciplines *as they are taught in schools:*

> "I think there's some value in trying to wrestle with a range of disciplines, in trying to come to terms with a range of disciplines' demands and having to work with competing perspectives and pull them together. There is a sense in which as well it does open up a wide range of areas, which they hadn't thought about before, which perhaps A-level disciplines don't consider issues. Questions of relationships between ideology and media and, at the other end of the scale, questions about non-verbal behaviour which they've not really thought about very much. But more substantially, questions about the production of meaning, how central meaning is to social existence, without notions of

> 'meaning', social existence would be impossible, it would be chaotic." (D)

Essentially, what the communications course does is to bring to the fore issues which had hitherto been considered marginal; it brings the perspectives of a variety of disciplines to bear on one subject. To a greater degree than any other discipline - may even than sociology - it is concerned with the social construction of meaning, with dispelling certainty about knowledge.

8.9 Consensus and Assessment in Communications

English departments are apparently tolerant of competing ideas and paradigms; lecturers, however, argued that assessment of students was more concerned with assessing students' grasp of a discourse, their ability to *practise* English, than with judging the validity of their opinions. In communications, given that the course deals with a variety of political relationships, disagreement between staff would have to be more overtly ideological and the course itself is easily open to charges of left-wing bias. D was asked if such political conflict existed:

> "Well, that's true. It would depend on what the topic is, but that's true, but, in overall political terms, you have to say that the communications part of the deptartment is left of centre, but there's a wide range of 'left', and some people over the years have shifted their position quite substantially, and if you like, there are people who might be described as being on the right wing of the Labour Party, if you look at them from the point of view of Militant tendency, say, and the students know exactly who those people are and it does affect what gets taught and how it gets taught. I mean, those marginal political differences actually translate quite well into academic differences, because around questions of texts, for example, there are arguably people who support broadly positivist content analysis approaches to texts, probably politically in the right wing of the Labour Party, to put it in those terms, and whilst not embracing, if you like, all of positivist traditions, will broadly put themselves into that sort of camp, whilst not exactly being structural functionalists in sociology, will at least be aware of the material, and say, well it has something, and then there are others who will come from quite different, quite radical traditions, who will say that content analysis is pretty well useless as far as getting into texts is concerned, and you've got to have some kind of structuralist semiotic approach to texts, which raises different kinds of quetsions about the nature of texts and their origins and their effects. So I reckon that's one area where you do get these differences, I suppose it's good the students recognise them. I think, though, what we're trying to say to students is that these

> are competing perspectives and you have to evaluate them, there is no orthodoxy about it, it is not the case that if you embrace A rather than B, you will get it right, rather it's the case that if you embrace A convincingly, you'll get it right, of if you embrace B convincingly, you'll get it right, but if you embrace A or B crudely and assertively, then you'll get it wrong. So, yes there are conflicts, you're right."

Although this is in essence the same response as that given by the English lecturers - that there are disagreements, but they don't affect the way work is assessed - it recognises that political differences are closely allied to academic differences. It doesn't give the impression of staff muddling on regardless: differences in theoretical perspectives are made explicit. The extent to which these differences should be made obvious to students is less clear:

> "What you're trying to do is indicate to them how best you might be able to work your way through those controversies to be able to make some statement of policy or some recommendation and the like. I think there are some occasions when it's appropriate if they know exactly where I stand and there's no point in pussyfooting around. I don't subscribe to the view that only people who have read books by Marx and Marxists are the only ones with a political perspective. I've got a political perspective and where it's appropriate, and where I think it leads me to take a particular view of the issues I'll let them know that, and then they can read my views on it in the light of that. There's no point, I don't think, in that kind of pretension to an absolute objectivity, and some of my colleagues in the department do, and I think that's regrettable, and I don't think it serves any useful function. What I'm saying is that I think there is a certain kind of objecvtivity. I can put some of the political views and perspectives to one side if I'm studying as it were, the significance of the fact that 'Dallas' is a programme which regularly attracts a certain kind of audience. I can take a certain view of that which is informed by my political perspective and will say so, but only if I feel that they can come back at it, and if people have divergent views then they too have space to put them and to try and defend them, and defend them in a systematic way rather than in the ways we might defend them if we were having a drink together about it. " (C)

According to C, the real disagreement lies between those who pretend to an "absolute objectivity" and those who don't:

> "What I should be trying to do is strain students' credibility at every conceivable point, so that whatever they come out of the course feeling 'That's firm and certain knowledge', then they've been put through some tests. What that means is, there's an example at the examiners' meeting where someone said of an extended essay 'But this is written from a *Christian* point of view!' and I thought, Well, yes, it is written from a Christian point of view and it's actually argued quite well in that kind of

> formal sense, in terms of the presentation of evidence and the handling of evidence, and I suppose with my teaching I cannot do more than that. If they've done all the formal things, that's basically what I'm here to ensure that they do. And if that leads them to Christian conclusions rather than the sorts of conclusions I might arrive at, that's a different problem, and I'll meet them for a drink and argue about it there. I don't see myself in business here to advocate this or that view - that's not strictly true, I think I'm in business here to kind of suggest why it is that a particular view of how the media work might be more plausible, might be more adequate than others, but I can't enforce that, I can't say, 'Therefore you should adopt that view' - I think that other people might be prepared to do that."

There's a much greater sense here of tolerating plurality and diversity than there was in the English departments, although obviously there *is* conflict amongst staff about the extent to which such plurality can be tolerated. Students are encouraged to challenge orthodoxy, to be critical. Having said that, it would presumably be very difficult for a student who held particularly strong right-wing views to survive on the course. There is a sense in which the challenge to convention can become a convention in itself; it is easier to say that a multitude of views will be tolerated than to put it into practice. I put it to D that the course really demanded a left-wing perspective:

> "Yes. Probably. You don't have to accept it though. You can see the force of the argument, but at the end of the day in your heart of hearts, you can still be a member of the SDP! You have to accept that there's likely to be overall a political inclination in toto in a course of this kind, but students will see very quickly that that doesn't come over as any kind of indoctrination or any kind of crude conspiracy theory, you can assume that the staff are fairly left of centre, you can assume that you're going to get a radical, critical perspective on the media, but that's not the same as saying you're going to get a conspiracy theory of the media thrown at you, which is clearly flawed, clearly nonsense, as it stands without qualification, and that would be intellectually quite unacceptable, and no one here would want to argue that, so you can recognize people for what they are, though I don't think the political dimension in this course is very strong at all, quite frankly. I've seen other courses where it's much stronger, much more overt, than maybe we... there are one or two individuals who are politically more visible than others, with a capital P. I mean, I don't think that matters one jot. I wouldn't go so far as to say that we're an apolitical lot, but I don't think political standpoint has much impact on the course as a whole. I think views about what communications ought to be about, and people's backgrounds and interests have a much much wider influence than their particular political position.

It is significant that in this quotation, a political perspective (the "conspiracy theory") with which D disagrees is characterised as "intellectually quite unacceptable" and "clearly flawed." Clearly there is a problem as to when a point of view which one disagrees with can be shown to be "wrong" in a scientific sense. When there are staff members on the course, as there are, who tend to present the study of media very much in terms of a "conspiracy theory", then it is just as clear that they haven't been convinced that their ideas are "intellectually quite unacceptable." The difficulty of reaching a consensus, or consensuses, is as apparent in communications as it is in English; it is simply more explicit in communications.

8.10 Gender and Communications

The issue of gender, of why more women (and fewer men) do communications, as of why more women do English, is one which clearly impinges on a discipline which is concerned both with the social construction of people's identities, and with the practices of the media. I asked C. why so many women came on to the communications course:

> "That might have something to do with, this seeming to have career opportunities that other humanities/social science degrees don't have, and that that then becomes attractive to women...I think that it means that a lot of your examples are drawn in terms of our sexual identities so that you're trying to say that apart from evident biological differences there are also cultural differences and you can use that as it were, the raw material for seminar discussions and papers and the like, and a lot of them do. And there are again sometimes arguments and debates about that, and again to some extent you're having to throw up things and let them make of it what they will. Some courses, I think, will say, 'This isn't a sexist course, this is a feminist course'; I wouldn't make those claims about this course. But it is a course, nonetheless, where feminism and sexism as culural phenomena can be discussed and analysed and criticized. "

The course, then, is explicitly aware of feminism and sexism as *issues*,: issues which can be brought into the course and discussed and made open. In addition, C is conscious of the need to make *men* aware of their position:

> "That means you have to address it as an issue and do it and not just in a kind of limp-wristed way which is 'I've got it sussed, I'm laid back, I know that women ought to be treated in a certain kind of way'; it also means getting the blokes to think about themselves

> as 'cultured' men, and how they arrived at that position, and how there might be problems about having arrived at that."

Once more, this contrasts with the English departments: A has a 'women and literature' course, not a 'gender and literature' course; understanding the construction of masculinity is not part of this English curriculum. C believed that there were differences between the approach of men and women to communications, however:

> "I think, and again I suppose it's a wider reflection, there seems to be a group of women each year who, as it gets nearer to the exams, are constantly saying to you, 'If I do such and such, if I write that and do this, do you think that would help?' and you very rarely get blokes doing that. And I think that's got something to do with, 'Oh well, that's my problem I'll tackle that head on,'; it's to do with that accumulation of attitudes and the like men have, as to how they tackle the problem. I think by and large, actually, the ones who turn out not only to be the most enthusiastic but the most diligent are the women. At the same time, they can both be among the weakest of students, also more often than not, they're amongst the strongest of students, in the sense that they're prepared to live with those uncertanties we were talking about earlier, and go for it. You find that the ones who stand out tend to be the women, and that's quite nice, and maybe that's got something to do again with they fact that they're in a broadly supportive environment."

C clearly sees the differences as being the result of social processes. Men are less openly anxious about examinations because of their cultural environment, whilst women might often do better because of their being on a course where women predominate. These differences are seen, not as inevitable, but as cultural and social, and therefore varied and changeable. Interestingly, too, he says that women are both the "strongest" and the "weakest" of students: a complete reversal of the orthodoxy on the subject, (e.g. Rudd, 1984, Heim, 1971) which says that men tend to be found at the extremes and women in the middle. Nothing could show more clearly the relationship between an understanding of texts and an understanding of the social world: where the lecturer in Department B, for example, saw certain qualities of literature as being immutable and inevitable (not socially produced), he also saw differences between men and women as being immutable and inevitable. To some extent, the immutability and inevitability of male/female differences will be reflected in those texts

which are universally 'good'. The communications lecturer, however, sees both text and individuals as inextricable from a social world - which is not to say that texts and people are totally conditioned by society, but that there is a relationship which cannot be broken. The belief of the communications course that "there are no certainties" can be carried over - *is* carried over - into the belief that there are no certainties about the attitudes, abilities or behaviour of men and women. Once that is recognised, it is possible to question social differences, and to change them.

Communications, as a new and emergent discipline, has many potentialities which have perhaps been lost by English. It can challenge existing orthodoxies; it can borrow from a wide range of disciplines; it can find new ways of studying texts and media. It can, because of its newness, afford to be self-critical: there is still time for it to develop and change. Unlike English, as it is taught in universities, it has taken note of and used the new developments in theoretical approaches; it utilises semiotic theories of the text and applies them to Film; it looks at Marxist theories of art and of ideological apparatuses; it takes account of feminist contributions to the study of films and advertising; it makes students aware of traditional sociological approaches such as functionalism. It tries to reject ideas of orthodoxy. In many ways, it can be said that where English has failed, communications has filled the gap.

It is obvious, however, that communications cannot fill that gap completely. The traditional material of English literature - i.e. books - is not part of the study of communications. There is a gulf between two disciplines which should, in principle, be very similar; perhaps there is even a modicum of truth in the charge that communications has rejected the aesthetic. There is a potential for a discipline that would borrow from both and be like neither, that would both apply a wide range of theoretical approaches to a diverse body of literature - the traditional stuff of English literature as well as Film, newspapers and so on - and would recognise the social character of writing. The possibility of that happening, however, seems fairly remote whilst English still clings to the 'Great Tradition'.

8.11. Physics

Physics obviously presents different problems from those of English. The gender ratios are more than reversed, for example: men outnumber women by about five to one. As in the English and communications departments, however, almost all the staff are male. Unlike English, physics is not in a state of 'crisis'; as a discipline physics could be said to be flourishing. In addition, the English lecturer is one step removed from the actual practice of writing literature; the physics lecturer is typically closer to the developments taking place in the discipline. As suggested in Chapter 4, the advent of quantum mechanics, although no longer a novelty, might, because of its emhasis on uncertainty, have changed ways of approaching physics teaching.

Physics has the appearance of being a much more tightly-knit discipline than English; whereas English literary critics may disagree profoundly on certain issues and agree only on the discourse itself (and often not even that), one can hypothesise that there will, in physics, be a much greater unspoken consensus both about the issues and about the discourse.

8.12 The Departments

Physics department A takes in a large number of undergraduate and post-graduate students. The main course which it runs, single honours physics, admits approximately a hundred students each year. The entrance requirement is BCC at A-level, with the B in maths or physics; but most of the students I interviewed had higher grades. Of those admitted, about 15-20% are usually women (higher than the national average.) The first year course in 1984, when I conducted my interviews had sixteen women and eighty-three men (16.2% women), whilst the third year had seventeen women and seventy-one men (19.3% women). The course itself lasts for three years.

In the first year, all courses are compulsory. Students take courses in classical mechanics, but are also introduced to relativitiy and quantum physics. Students spend six hours a week doing laboratory work, and students also follow a self-taught course in computer programming (BASIC and FORTRAN). Courses are taught by lectures, but small group 'skill sessions' in mathematics are also held weekly.

Assessment is by formal examination in the summer term, but lab work is also assessed and is included in the final mark at the end of the first year.

The second and third years are more flexible. There are still compulsory core courses, but students can also choose from options. Each core course and each option is accorded a certain number of 'units', and the number of units a student takes depends on his/her ability; 'lower ability' students take only thirteen or fourteen units, whilst the higher achieving students are encouraged to take sixteen or seventeen units. In the third year the options offered include external options from other science departments. Students in both the second and third years have to conduct a project, and in the third year this may be theoretical rather than practical. Whilst the weekly skill sessions continue in the second year, in the third year, these are discarded, but weekly tutorials are continued.

The final assessment is mainly by examination; second year exams count as 30% of the final mark, and the project mark is included in the final degree classification.

The physics department at B university offers eight different courses, some of them joint with other departments, but we are interested here only at the single honours physics. This course is much smaller than the one at University A; in 1984, there were four women and thirty men in the first year, (11.8% women) and six women and thirty men in the third year (16.6%). This obviously has implications for the way the courses is experienced individually by the students (e.g. whether it has a more intimate atmosphere, or whether women are more conspicuously a minority). The standard offer for students entering the course is BCD, with the B in maths or physics. This is higher than the offer which had been made to the third year students I interviewed, when the standard offer was CCD.

In the first year, all courses are compulsory; there is a basic core of classical physics (Mechanics, Waves, Matter, Electricity) and modern physics (Relativity, Quantum Mechanics, Thermal Physics), taught through lectures, as well as courses in mathematics, computer programming and the obligatory lab work, to which a whole day every week is devoted. The final first year assessment is mainly by examination in the summer, but

25% of the final mark comes from the lab work which is assessed throughout the year. The first year result counts for 10% of the final degree mark. As well as lab work and lectures, students have weekly problem classes and tutorials.

In the second year, students are expected to take thirteen core courses and three or four options, chosen from a fairly varied group which includes, among other things, Astrophysics, Structure of Materials, Modern Microscopy, Information Theory, Science and the environment and Theoretical Physics. 30% of the second year work, based on a mixture of examination, lab work and written assessments counts towards the final degree.

In the third year, students take three core lecture courses and eight or more optional courses, out of a choice of about 30 which includes Quantum Chemistry, Elementary Particles, Ceramics, Robot Technology and Superconductivity. Some non-physics options are also available, such as Law, Psychology and Business Studies. A major part of the third year work is a project, usually experimental, but occasionally theoretical. Students do not devise their own project, but choose from a list offered by the department. The project work replaces the normal lab work, and students have to write it up as a dissertation. This project contributes substantially to the third year assessment, which forms 60% of the final degree mark.

During the summmer vacation of the second year, students are expected to gain some eperience in an industrial research laboratory for six or more weeks. Some students, however, are allowed to gain their experience by working in the physics department itself as a research assistant.

8.13 Constructing 'Physics'

This section will examine the two attitudes identified in Chapter 4 as "instrumental" and "expressive"; the instrumental (or functional) attitude could be said to regard physics as a *useful* subject, both for individuals and for society, whilst the more expressive, or liberal, attitude, regards the discipline as valuable for its own sake. Physics is, as suggested elsewhere in this thesis, interesting in having connotations of both: as a physical science, its discoveries (and the skills it gives to its graduates) have obvious uses for industry; whilst its status as a "pure"

rather than an "applied" science gives it the appearance of being removed from the uses to which it may be put.

The introductory course booklet of Department B talks solely in instrumental terms about the benefits of the courses it runs (which include joint Physics/Business Studies courses as well as other more conventional physics degrees):

> "The number and variety of physics-based courses offered at B is a reflection of the demands of industry and society for science graduates with a broader spectrum of interests and abilities than was traditionally the case. The majority of our graduates either take up immediate scientific employment (e.g. health physics, process and software engineering, the aerospace and chemical industries, defence and seismic surveying) or improve their professional qualifications by studying for a higher degree (M.Sc. or Ph.D.) Some of our graduates have taken up employment with local authorities and the armed services whereas others have gone into computer programming, technical writing and accountancy. Some take up courses in areas which hitherto were considered the preserve of graudates in the arts and humanities, e.g. banking, insurance, management etc. Currently a woefully small number enter the teaching profession where there is a desperate shortage of physics teachers. It is in the light of this diversity of employment that the logic behind the B. course structure becomes evident."

Perhaps surprisingly for a university (as opposed to a polytechnic) department, the courses seem to be devised explicitly for students entering a degree with future employment in mind. The structure of the courses, from reading this account, would appear to be geared to the needs of industry, rather than to the intellectual interests of students. It would be a mistake, however, according to a lecturer at A, to think that students choose to study physics with a future career in mind:

> "I think an awful lot of them come to university just through a process of 'I did physics at school, so I'll carry on with that'. I don't think that's probably the main reason. My impression is that most of them have been attracted by things like astronomy and nuclear physics, and they're interested in the ideas; they also come, I remember having the same feeling, it shouldn't be too difficult to get to the frontiers, and one of the depressing things they discover is it's very hard to get to the frontiers, and they don't realise how complicated and large physics is, and how much better the good people are than all the rest of us. That, I think, can be quite depressing, but it is, an awful lot of intellectual interest, about half of them. Then quite a large fraction come in because they've carried on from school, and then there's a minority who know that they want to follow a career, probably in industry or the armed services, or something like that, where they know that

> a physics degree will be a good general background, my impression anyway." (G)

Whilst a lecturer at B said:

> "There are two groups of answer [in an interview] that you get; one is that they've read in 'New Scientist' that they've discovered a certain particle in Cerne, Switzerland, and there are signs of great quantum gravity and so on, and others say, 'Well, I can get a job in it.'" (J)

For some students, then, it appears that the reasons for taking physics are vocational; but it is also the case that many other students are motivated by intellectual considerations. In particular, these intellectual considerations are a result of exciting developments in astronomy and nuclear physics. We shall look later at the teaching of quantum physics, but it is important first to identify two differing intellectual views of physics: one which sees physics as being concerned with learning certain fundamental rules and laws, and the other which sees physics as more fluid. The orthodox view was expressed by the chairman of the physics department at B.:

> "I mean, students come here primarily to get a degree, but also they should get an understanding of the basic laws of the universe. That's the ideal thing. We don't do any astronomy in this department, but we teach an elementary astronomy course, and astronomy of course now is just the physics of outer space; astronomy has stopped being a separate subject. It's a branch of physics now basically. And if you want to understand the stars or the planets you've got to understand your physics. So we expect people to have some idea of the nature of the world, and the fact that if you go 200 miles vertically upwards you're out of the atmosphere and in more or less empty space, and the laws of physics still apply there." (L)

Dr. L emphasised several times that the "laws" of physics were absolute, and applied everywhere, all the time. His view of science was reductive; not only was astronomy a part of physics, rather than a separate subject, so was chemistry:

> "All of chemistry now basically is becoming explicable in terms of quantum theory. We've got some theoretical chemists in the chemistry department, we've got some people in the physics department here that are doing applications of quantum theory to 3, 4, n, atom systems, and we are at once getting, have been getting in the past 20 years, into the age where a sizeable amount of basic chemistry can now be properly understood from basic quantum theory. Once you know the thing consists of electrons and atoms, you can more or less calculate what structure it has, what

> properties the molecule will have. That's still got an awful long way to go."

The language used by L implies that it is wholly desirable that one discipline should ultimately be explicable in terms of another. He also suggests that this reductionism should be an end goal of physics; scientific discovery is not about an expansion or a reaching out, but a narrowing in. He goes on to explain how the understanding of the physics student is superior to the understanding of the chemistry student:

> "The average physics student should understand, should have done enough quantum theory to understand why particular molecules stick together and behave the way they do. The average chemistry student has to take an awful lot of quantum theory on trust. He's got to be told, well, there are people in the physics department who do this in greater detail, and who will be able to calculate the properties of the simplest molecules, but the physicist still can't do the more complicated molecules, and of course, the chemist actually going into the laboratory and doing the experiment can work out the more complicated molecules including biologically interesting ones, that pharmaceutical companies are prepared to spend an awful lot of money in preparing and making an awful lot of money in selling. So on that level, a basic training in physics is still: Learn the laws of Nature, see how they're applied."

Not only is chemistry reducible to physics; biology is, as well - or would be if physicists put any effort into making it so:

> "We haven't gone, in physics, seriously into trying to understand the biological aspects, but then you see biology is becoming dominated in the last ten years by the understanding of basic biochemistry of cells. The biochemistry of cells is basically just the chemistry of the larger molecules that the physicists can't yet deal with through quantum theory calculations. Give it another fifty years or so, and one should then be able to understand much more the system."

This view of physics sees it as a body of knowledge, or a system, which can explain all other bodies of knowledge. Chemistry is a part of physics; biology is a part of chemistry. Chemists often have to take things "on trust" because, it is implied, the physicists are working on the harder, more fundamental problems. I asked Dr. L. if he thought physics were more fundamental than the other sciences:

> "Oh, yes, the average physicist is rather arrogant, you know: physics covers the whole of understanding, all of nature, the whole of the universe. Chemistry is just that very tiny bit of physics which deals with the interactions of different atoms with each other to make molecules. Biology happens to be that branch beyond chemistry where the large molecules interact with each other to

> make cells, and then multi-cellular organisms and then of course animal life. The average physicist is not really earth-centred... ... On a physicist's time-scale, you're prepared to work in the millionth of a second, or hundreds of millions of years, it's all within the compass of physics. The really arrogant physicist would regard the human experience on earth as a minor thing that's happened, and physics will still be true without it. Philosophers of course may argue about that. "

This assessment of physics - only partially tongue-in-cheek - assumes the absoluteness of physics, its ability to encompass most areas of knowledge. The aim seems to be to reduce, to simplify; even though chemistry and biology may deal with more complex structures, they are still only a part of physics. This all-encompassing view of science seems to allow for a greater 'detachment' from the problems of human existence; if physics works on such an enormous spatial and temporal scale, then human experience really does seem quite 'minor'. Indeed, L. talked at some length about the attempts of physicists to make contact with intelligent life in other solar systems - attempts which might seem to others of us to be both fantastic and pointless.

In view of this reductionism, it is not surprising that Dr. L.'s view of the arts was less than complimentary:

> "The difference between arts and science is enormous. You can go over to our arts faculty and sign on for history, and you may choose to do the medieval options, or you may choose to do 18th and 19th century French history as your main bit, and you know, display quite appalling ignorance of other parts of the subject, and that doesn't seem to matter too much to the arts faculty or the historians, that you concentrate on something here and know nothing about quite important things elsewhere; in the sciences things are a bit different. The basic law of science is that all the laws of physics apply everywhere all the time, and you cannot get away with, let us say, just knowing electro-magnetic theory and pretending that gravity doesn't exist. If you do you find your radio aerials fall down and so on, because you know they have to obey the laws of gravity as well as all the other laws."

The difference between this view and the view of the English lecturers is that the English lecturers saw English as a "practice", and not as a body of knowledge. For them, the issue was not so much that one could know about 17th century poetry without knowing about 20th century drama, but that there was a certain way of "doing" English that, once acquired, could be applied to most areas in the discipline. Dr. L defines science through its difference from the arts; the sciences are about the

acquisition of absolute truths, not the acquisition of - as he sees it - unconnected patches of knowledge.

It is, however, possible to see physics as a "practice", as well as a body of knowledge. Dr. G., of department A, regarded physics as a much wider subject, which was about acquiring certain skills and abilities, not just a set of laws. His view of physics was more tolerant and much less reductive. In the following quote, Dr. G. is talking about intuition in science:

> "I'm sure it does [work at an intuitive level], though the intuition has to be educated. One's quantum theory intuition is quite different from one's classical theory intuition and again relativity theory intuition is another thing again. So obviously one won't know the answers to these things until one's done sufficiently many specific examples to build up one's intuition, to build up some common sense in an area that isn't common sense, so how this intuition grows I'm not quite sure, but I think it is probably via a whole load of sequence of examples, building themselves up into understanding." (G)

As well as being interesting for the idea of "building up" - the belief that physics is a process of acquiring knowledge - Dr. G's view is interesting for its expression of a belief in the importance of 'intuition' in physics. Science, according to conventional wisdom, is not supposed to be intuitive; it's supposed to be about Method and Logic. A junior lecturer at B, when asked what qualities she thought went to make a good physicist, said:

> "Well, whatever the abilities are that make a person fluent in mathematics, I suppose, is one of them; I think that there's also an intuitive element about physics as well; I'd like to see it put across more at school level, to make it slightly more attractive to women. It's not entirely this cold, dry logic - sometimes you have to use your intuition to make progress, or at least, the real greats have always done that, Einstein for example." (J)

Both these lecturers go against the grain to some degree; both thought, for example, that their courses could be improved by having fewer lectures and more discussion and more reading outside the course. Both had, in a sense, a more *open* view of what physics should be. In the following quote, G is refreshingly open about the failings of teaching methods (I had asked about the relative merits of different methods of teaching used in the department: lectures, labs and skill sessions):

> "The skill sessions: the staff are convinced these are useful, the students less convinced that they're useful - is the general impression. We tend to enjoy them; it may be partly timetabling,

> but they tend to be stuffed into three hours of lecture sitting down, and then you get a skill session, so it's quite hard to engage the mind and start thinking in an open intuitive sort of fashion. It may do more good than is immediately apparent because hopefully what they're discovering is how a person is a physicist; how they think, and they may pick up ways of approaching subjects without even realising they're doing it - that's what I hope anyway. If they see a member of staff floundering because they haven't thought hard enough about the problem, they may discover in the way they get out of the floundering, if they do, how to do this. "

This is both an admission that sitting in lectures taking notes is not conducive to "thinking in an open intuitive sort of fashion" and that even staff members can be fallible in their reasoning. This is a far cry from the idea that departments are imparters of absolute knowledge. Dr. G argued strongly that students should be able to think for themselves, and learn for themselves, not simply sit and listen. Talking of an essay students are expected to write as part of their coursework he says:

> "the student chooses their own [essay] subject; most of these subjects are right on the fringes of the course, or overlap several different courses, and what surprised me when I sent round a questionnaire was how much the students said they enjoyed essay-writing. And I'm sure it's because they're in charge of what they're learning - that they've chosen something interesting to them and are following it up."

To Dr. G, it is very important that students have some control over their own learning. Yet, in physics, students are as a rule much less in control of their learning than students of English or communications. A physics student may spend about 25 hours a week in lectures, tutorials and lab, whereas an English student may only have eight or ten hours in total. The English student is simply expected to work far more on her own initiative. This difference is crucial, in that students who are *not* in control of their own learning are dependent on receiving their knowledge from lectures and tutorials. There is little call for them to think critically or independently. Dr. G was aware of this, and in his assessment of physics as a discipline he explicitly rejects the idea that it is merely a "useful" body of knowledge:

> "The reason I went into physics and what I try to inculcate is that the ideas themselves are interesting and that seems to me to be the main justification for it, so that when people try and justify scientific research by saying it's good for the economy, the country and so on, or who knows what applications are going to come of it, I'm inclined to sit rather quietly when that's said

> because I'm not convinced that some of the research that is done nowadays can have any practical application at all in that direct sense...So I try to justify it in terms of training the intellect to think in an abstract and critical way, so I regard it as a general education. I have on occasion told students that they're doing an arts subject, and tried to encourage them to think in those terms, because if they're constantly thinking of the job at the end of it, then I don't think they're getting the most out of it that they can do...However, it sometimes depresses me, and again I'm expressing a very personal view I guess, that having tried to teach the students the subject as about ideas, they then insist on learning the subject as things to be learnt and then going off and applying their knowledge to new and more expensive ways of killing people or stopping other people killing us. So that's rather depressing actually, that a lot of students will go into RADAR and various other sorts of defence things which don't seem to me to be increasing the sum of human happiness."

This rather sad quote illustrates very sharply a point made in Chapter 4, which is that a field of learning such as physics, which has great power to change our lives, is usually divorced from a consideration of moral issues. This is Dr. G's dilemma: that although he tries to inculcate students with a sense of the beauty and joy of the subject, and to stimulate their minds, they often refuse to think, or to be critical and regard physics in an entirely instrumental way, as a degree to be gained, which will enable them to do something "useful", namely defence research. Dr. G's emphasis on the creative potential of physics leads him to see it as an "arts subject"; Dr. L, on the other hand, sees the the differences between the sciences and the arts as "enormous." Dr. G is in something of a minority; his department is very much geared to getting students to pass examinations and not worrying too much about the implications of what they're doing.

A problem in teaching physics at university level is that students, despite their eagerness to learn about quantum physics, enter the department with only a partial knowledge of it. I therefore asked Dr. G, who teaches the quantum mechanics course to first years at A, whether the increasing complexity of physics had made it a more difficult subject to teach to students who had just done A-level physics:

> "There has been a distinct trend, I think, because of the influence of Nuffield particularly, to put at least the basic ideas of quantum theory into school, so they come here having been told half-truths, because that's all that's possible to tell them at that stage, amd thinking they understand it quite often when they don't. So one has to try and persuade them that a lot of what they know is lies,

> and that's quite fun. I've tried to make the course fairly light, in that I've not attempted to get them to cover vast quantities but try and get them to feel some of the excitement of the bit that I do cover." (G)

It's interesting that physics has to be built on from 'half-truths': that students are expected only, as it were, to see through a glass darkly before seeing face to face. Students who never get beyond 'O' or 'A'-level physics are presumably destined never to know the "truth". This view, that school physics is essentially composed of "half-truths" was expressed by other lecturers, and indeed by students; but there was a consensus that it was impossible to tell school students the full facts, because they would not understand them; the way to educate students was to give them partial explanations which they must understand before having the *real* truth revealed. Just as Dr. L. said that chemistry students have to take it on trust that physicists understand certain important and basic truths that they, the chemists, can not, so physics students are also often expected to take things on trust. This is particularly true in the case of laboratory experiments; frequently the *theory* for the experiments is not taught until months after the experiment has been conducted; so students simply follow instructions and take it on trust that the result they're "supposed" to be getting has some signficance. They are given some idea of what the result is supposed to be, and therefore the work is less experimental than illustrative - except the theory it's supposed to be illustrating might not come till much later or much earlier:

> "In the first year, they just come in and get on with it, it's very much following recipes, do this, do that...because of the logistics of each week trying to get each student doing a different experiment, you obviously therefore can't relate the experiment to each of the courses, so I suppose at the beginning of the year they'll find that they don't see too much connection between the courses and the experiments; once they've got into the middle of the year or so, they find more links. I suppose the major part of it is to learn how to be an experimental physicist." (J)

The process of doing a degree course is seen, then, by lecturers, as a process of coming to a full understanding; students start off ignorant and come out knowing. In order to achieve that knowledge, though, students have to be prepared to accept that what they are being told is truthful and correct, and that they will, at a later stage, be able to

find these things out for themselves. The structure of these physics courses, then, supports Kuhn's (1963) argument; that students are not given alternative ways of looking at things but are only given the *conclusions* of the debates between physicists in the field; they find out about the victory, not the battle. Further, physics can be seen, in this light, as a subject which Bernstein (1971) described as having "strong frames"; there is tight control by the teacher over what is taught.

Given that the courses taught both classical mechanics and quantum mechanics, it was possible to speculate whether it was a simple matter to persuade students to accept the two alternate sets of ideas, or whether there was any conflict. Dr. G. explained at some length the differences and similarities between quantum and classical physics:

> "Classical mechanics, say, applied to a planet in an orbit, even to calculate the orbit, you have to say that particle is at a certain point at a certain time, and moves round following a definite path. If you try and apply those ideas to an electron in an atom there is no way, and it can be proved using Heisenberg's Uncertainty Principle, that there's no way you can say that electron is following a definite path; because if you attempt to localise it on that path at one moment, you completely muck up its motion, that it never follows the path that it was following. So the approach of quantum mechanics is to say, If you can't actually see the particle without disturbing it, then you should write down your mechanics in such a way that you don't say the thing had a definite path, and therefore, a particle can be in two different places at once, can go from A to B by two different means in quantum mechanics. And this isn't just playing with words, this has actually noticeable effects. And that they find extremely hard to cope with. But there's another way in which classical mechanics and quantum mechanics interact, in that an awful lot of one's thoughts about quantum mechanics actually rely on classical notions like energy and momentum. So they've got to take things that they can imagine for material big particles like the amount of punch that it carries, and realise that even something as unobservable and unclear as a photon can still carry energy and momentum. So they've got to understand the classical mechanics in order to do the quantum mechanics. And that's one of the difficulties with the course, is thinking about things like potential energy, which they should understand but don't really, in order to think about what happens to waves in similar situations." (G)

The final comment that students don't really understand fully even the basic ideas such as potential energy is revealing; it indicates the extent of students' reliance on lecturers for explanations and definitions. It is also interesting because it indicates that an understanding of modern physics is predicated on an understanding of classical physics, but that

the notions of classical physics are useful in a quite different way; that they can only help one think in terms of probability and likelihood, rather than in terms of an absolute reality. The same question, about the difficulties of understanding the two systems, was put to Dr. L:

> "There are still people who find problems with the wave-particle duality. It depends how you're brought up in school, but most people are brought up with Newtonian mechanics and billiard ball models, and every particle has to go on a predictable path and has got a precisely predictable position after two billard balls collide...quantum theory in individual atoms is different. There is a statistical element involved; on the other hand, once you get into engineering structures in general, when you're dealing with sufficiently large numbers of atoms, then the quantum aspects are not so easy to see. Unless of course, it's very very small structures like quantum semi-conductor devices, where the whole thing may work only because of quantum effects...for any quantum structure there's always the classical limit; if you get a large enough lump of material, then in due course the quantum result will converge with the classical result; similarly with any classical system, if you get to a sufficiently small region, then the classical laws will break down and you've got to use quantum theory."

Here, quantum physics is not seen as in any way opposing the ideas of classical physics; it is simply that one is useful for studying small structures, and the other useful for studying large structures. The idea, which most of us find difficult to grasp, that sub-atomic particles can only be studied and understood in terms of mathematical probability, is regarded by Dr. L as just a feature of dealing with those types of particles. Thus, there is no philosophical import attached to the discoveries of quantum mechanics; it was simply another way of looking at a problem. Dr. L then went on to reject the idea that quantum mechanics were "useless" in terms of practical utility (a point made by Dr. G), and he argued quite forcefully that physics was important in making discoveries which would only be used by engineers twenty or thirty years later.

8. 14 Assessment

A distinction already made in this chapter is that between seeing education as a body of knowledge which needs to be learned, and between seeing it as a practice or a discourse; a way of solving problems. In the examination papers of department A, we can see a distinction made

between different ways of answering questions, a distinction which mirrors the body of knowledge/practice division. For example:

> By considering the motion of an element of an ideal fluid, derive the equation
>
> $$\frac{\partial w}{\partial z} + \frac{1}{\rho}\frac{\partial p}{\partial z} + \frac{\partial u}{\partial x} = 0$$
>
> making clear the circumstances in which it is valid. Hence obtain Bernoulli's equation.
>
> Give simple qualitative arguments to show why, when moving through still air, a spinning ball experiences a force perpendicular both to its direction of motion and to its axis of rotation, a phenomenon known as the Magnus effect. Suggest other ways in which the effect might be exploited.

The first part of the question is mathematical, indicating very clearly what is needed (if the student didn't recognise the equation itself, s/he is told to obtain Bernoulli's equation which gives some clue.) It is possible to answer this part of the question by having learnt derivations by heart (some lecturers told me, despairingly, that this is what first year students are often inclined to do.) The second part of the question specifically demands a *qualitative* answer, rather than a quantitative one, demanding therefore that the student understands what s/he is doing.

In contrast, another question asks students to,

> Give a quantiative theoretical explanation of this motion, making clear any simplifying assumptions which you may make.

Many of the questions begin by asking students to state laws (e.g. "State Newton's three laws of motion") before giving the problem to be worked out, or asks students to describe certain principles or experiments. The following two examples are taken from an optics paper:

> Describe the principles of operation of a Michelson interferometer. The description of the apparatus should include a clearly labelled diagram.
>
> Explain carefully how this apparatus can be used to measure the difference in wavelength between two spectral lines of similar wavelength. Assume that the average wavelength of the two spectral lines is known.
>
> Explain the special conditions that must be fulfilled if interference fringes are to be oberved when a white light source is used with this device.

> Explain carefully what is meant by *circularly polarised light*. State *Malus' Law* and describe an experiment to verify it.
>
> Linearly polarised light with initial intensity I is passed at normal incidence through two successive polaroids. The transmission directions of these polaroids make angles of 20° and

> 90° respectively with the original polarisation direction. Calculate the final transmitted intensity.

Both these questions operate within a framework of received knowledge. It would be quite easy to answer them through learning one's notes by rote beforehand. There are obviously correct answers to the questions, such as 'State Malus' Law'. Despite Karl Popper's argument that falsification is the job of the scientist, students are asked here to "verify" a law.

The typical question in the examination papers of Department A begins by asking for a description or a statement, and then goes on to give a problem to be solved within the framework of that statement. For example, a question which begins "State the two postulates on which Einstein based the theory of Special Relativity" is followed by a relativity problem; later the question asks "Use Einstein's postulates to justify [the following equation]." Or a question beginning "Explain carefully what is meant by the term *moment of intertia*" is followed by a problem concerning moment of inertia. Similarly, a question beginning "Explain briefly how the wavelength of an electron is defined." continues:

> What is a) the speed, b) the effective wavelength, of an electron in a vacuum after being accelerated in a 0.5 MV electron microscope? What value is found for the wavelength assuming Newtonian mechanics?

Just as English examination questions tend to follow a pre-set pattern (typically a controversial quotation such as "Keats is an immature adolescent" followed by "Discuss"), so these physics questions follow a pre-determined order. Whereas the English and communications questions do allow some freedom for the examinee, the physics questions give much clearer signposts to the answer that is expected. Students know how to work the question out, because the appropriate law or experiment is named for them first. The implication is that if students were not given the name of the law, then they might attempt to work the problem out using the wrong principles.

According to Dr. L, the problem that students might learn certain principles by rote, is resolved in part by the final year General paper, which asks questions such as:

> A person jumps as high as possible from a small, earthlike planet. *Estimate* how small the planet would have to be for them to be able to jump off altogether.

Dr. L says:

> "...the general paper insists that they know something about a fairly wide range of things, and that basically they can think things through ab initio without having swotted up beforehand. And that basically is what the general paper tests: unseen problems that you've got to solve from first principles, which have never been discussed in the lecture courses. And the performance of students in the general paper shows a very different spread from the performance of students in the written paper...it's more of an intelligence test or an ability to think test without learning things by rote. One of the problems with physics exams, particularly in the first year, is that they can get rather a long way by learning things through rote. You can often remember the formulae and apply them without really understanding them. "

An alternative way of solving this "problem" might be, not to ask students to *state* laws, but to discuss them, to examine the principles and experiments by which a "law" is arrived at; it seems strange, to say the least, to set five papers of one type, and one paper which demands completely different skills.

The examination papers of the two physics departments show the subject to be very tightly constructed. Assessment, not really considered a problem in English, would appear to be even less of one in physics. To quote Dr. L again:

> "It's partly the inability in the arts marking to have reasonable consistency, so if you do double marking - typically there's a fair amount of essay writing - and if you do double marking on essays, then the individual people if they're marking it unseen will have a reasonably wide spread. If you take the typical science exam paper, they have a significant numerical part, and whoever marks it, if the answer is right, it's right, pretty near full marks. If it's wrong, you may have to look through and see how far along the way it was before they went off the trail and started getting it wrong."

The consequence of this is that physics graduates are much more likely to gain marks at the extremes:

> You can mark a mathematical-physics type question with a marking scheme which gives you a much wider spread of marks. You can get people who get 90% on a question if they know the subject, they do the mathematical bit, it's not too unusual to find questions where people get 80%, 90%. And equally they can make a complete hash of it. It's not like writing an essay where you can write something which may have *some* relevance and you may still end up with a beta minus, or a Gamma plus. If there's a specific question, and you cannot answer what it asks for, and if you write something else which may be perfectly true but not relevant you will get nought. And it's much easier to fool an arts examiner that you have some faint acquaintance with the particular text, that you've heard of

> Shakespeare or something, and get a gamma plus on the strength of it."

As in an earlier quote, in which he said that it was possible to do well in history without having a breadth of knowledge of the subject, Dr. L is here confusing the two types of understanding. To talk about "fooling an arts examiner" suggests that "being good at" something is all about "knowing" a lot about it. In fact, it is often the case that one can write fluently about a text, using it as a vehicle for discussion of certain ideas; and in this sense it is possible (just about) to do this without "knowing" a text in great detail. This is not to say that Dr. L does not have a valid point, which is that it is hard to be completely wrong in an arts subject, whereas it is quite easy to be completely wrong (or completely right) in physics, at least in the sorts of physics and English examination papers which are currently set. It is not inconceivable, however, that it would be possible to devise an English examination paper which would produce marks at the extremes, or a physics paper which would produce moderate marks.

Despite Dr. L's contempt for the subjectivity of the arts marking scheme (a charge which, as we have seen, would be vehemently denied by his colleagues in the English department) he concedes the arbitrariness of the physics marking scheme; the following is his answer to a question on whether the dividing line between a first and an upper second was 70/69:

> "That's the nominal dividing line, but there is much more agreement as to what the standard is for a first, and the standard for a 2:1; how do you adjust the marking scale to get you there? It is not so much that you start off with a purely arbitrary marking scale, you know, you look at it and say give 20 marks for that, divided as 3, 5, 4 and 8 or something for different sections. You choose your marking scale to bring you to the notional thing, it is a notional thing that we call 70 the dividing line between 1sts and 2:1s, and the marking scale is adjusted to get you there. But if you put all the candidates in in order of marks attained in the final exam, which may not be in order of merit of course, because some have a good day and some a bad, then you've got a continuous distribution; it will always be to a certain extent arbitrary as to where you put the line. All British universities have got this external examiner system. Our external examiners have always come for a sufficiently long time, so that they've spent typically 6 hours interviewing students, so that the people who are 2 or 3 above or 2 or 3 below the notional borderline will be seen by the external examiner...and it calls for rather different skills."

At one level, this is just common sense. We all know that there is nothing absolute or immutable about marking schemes. But the admission that the scheme *is* arbitrary, that "the marking scale is adjusted to get you there" belies all those claims of objectivity he was making earlier. In reality, he and his colleagues in the physics department are doing exactly the same as their colleagues in English: using an unspoken consensus on what is "good" and what is "bad". They can tacitly agree on what is a "first-class" paper and need never make that explicit; they can simply adjust the marking scheme as appropriate. Indeed, as suggested in Chapter 6 in the discussion of the proportion of first class honours degrees, this is probably what happens in most departments most of the time.

Interestingly, Dr. G noted the need for a rigid marking scheme in examinations, because otherwise "by the end of a hundred scripts your attitudes will have changed"; but says that the first time essays were given to students, the staff were completely unable to agree on the marks essays should be given - perhaps illustrating the difficulty of arriving at a consensus on something which is not a usual part of the subject's discourse.

8.15 Gender

All four physics lecturers were agreed that the absence of women in physics was a problem. One of the lecturers, the admissions tutor at A, said that attempts were made (through, for example, inviting most female candidates for interview, making them slightly lower offers and interviewing a lot of women on the same day, so that they didn't feel left out) to get more women in the department. Department B was also keen to get more women in:

> "Well, we've tried very very hard to get extra students. We managed to get one lady into our electronics course last year...We try very hard. I think the problems must be in schools. We just don't get the applicants. Chemistry gets a significantly higher proportion. We must have about five or six altogether in a class of seventy. I can't remember when we exceeded 10%. We have done once or twice, but typically it's 10%...half our female graduates go into teaching, but less than 10% of the men. " (L)

Although Dr. L. sees it as a problem, he has little idea about why it exists (except that the problem probably arises from the schools), or what can be done about it. Dr. G, however, had several ideas:

> "I think it's a multi-stage filtering process. I have two girls, one is in the O-level year at school, one is two years below, and I've seen our local comprehensive school, the attitudes of the school and some of the teachers, tending to push them away from technical subjects; for instance, in the practical-type classes, there is an implicit assumption that there is timetabling pressure to force all the girls to do needlework and domestic science and all the boys to do metalwork and woodwork, and our girls have fought against this as strongly as they can because they can do as much needlework and domestic science at home as they like, but metalwork particularly, they're unable to do at home because we don't have the facilities, so they feel very much they're being deprived, and so are the boys I think, in not discovering how to look after themselves"

The first problem, then, is that of the schools; girls are actively discouraged from taking up scientific and technical subjects. This particularly disadvantages girls because needlework and cooking, which they are encouraged to take, are the sorts of things they could learn at home anyway. (It seems absurd that schools still place subjects such as metalwork and needlework in opposition to each other, when they could easily be complementary.) Dr. G then identifies peer-group pressure as a problem:

> "That sort of attitude which is not only the school, but also the kids themselves, means that there's a strong social pressure on girls not to take scientific subjects. And the boys will tell the girls, 'you can't be any good at physics', and so, if they are any good, they come home extremely jubilant, saying 'I showed them up'. And so, I think that happens already at O-level and then again at A-level, and it's not an absolutely forbidding pressure, it's just that at each stage you have a fraction of the girls who might have carried on into a scientific career. And again, there's a difference in the number of girls who do physics at university and who take A-level and there's another filtering process that takes place when they go on to do Ph.Ds., so it happens all the way through."

This view tends to support the research of people like Whyte (1986) who have argued that boys intimidate girls in the classroom, particularly in science lessons. Girls have to prove, not that they are capable, but that they are *as good as boys*. Dr. G's daughters are able to compete and assert their equality or superiority (when a girl does well in physics, it is therefore much more loaded with significance than when a boy does

well); but it is no doubt more difficult for those girls whose fathers are not university physics lecturers. Note also that Dr. G has suggested that there is a "filtering process" which takes place *at each stage* of the education system: O-level, A-level, degree and Ph.D. He goes on to identify a further barrier:

> "I think there may be also apart from, shall we say, society's pressure, an image has got something to do with it, that the jobs that physicists go into, an awful lot of them are defence-orientated, in various ways, and there may be a feeling that therefore it has that male, slightly violent image, at least in the terms of the jobs he can do, but whether that's true or not I don't know. Certainly if you look at the sorts of magazines that are available, the ones that talk about technology are aimed at boys, and the ones that are aimed at girls tend to be more beauty, pop-star orientated. So I think there's all sorts of pressures which are all having their effects, and there's very little we can do about it. I think we're all sexist here among the staff, in the sense we want more girls."

Finally, then, physics has an image of being 'male' and 'violent'. (There is an ambiguity here: is it simply the 'image' of physics that needs correcting, or the reality?) All these are reasonable explanations, up to a point, of why women, on the whole, don't become successful physicists. Dr. G also felt that the introduction of co-education had had an adverse effect on the numbers of girls doing science. After we had discussed the miniscule number of working-class students in the department, Dr. G commented jokingly that "all the boys are called Nigel" and added:

> "All the girls are called Fiona! It's actually more so with the girls than with the boys, I think, because I think the place where the pressures on girls to do science are strongest is the single-sex schools. I can remember one girl telling me, a few years back, 'I never realised there were so few girls in physics till I came here'; she was most amazed by it. And so we have a lot of girls who are Catholics, because they might very well be single-sex schools, and others who have been to that sort of, either direct-grant or convent type schools, where they've been encouraged in an all-female environment to consider all the subjects equally. Although co-ed seems to be the growing trend, it actually, if anything, is something that is going against girls in science subjects."

Up to this point, Dr. G has explained the lack of women in physics mainly by reference to schools: schools discourage girls from taking scientific subjects; boys make fun of girls' supposed lack of ability to do science. Obviously, however, these will not suffice as attempts to

explain the lack of women continuing with physics *after* degree level. After all, Dr. G noted that:

> "My impression is that the girls are all looking at teaching and biophysics, and the boys much more into other areas. I suppose that's either their or society's view of what women are good at.

When I commented that few of the women seemed to go into research, he agreed:

> "No, that's true. I think we've got just one girl research student in the department at the moment - that sort of fraction; it's fairly rare I must say. There is a tendency, if you look at the distribution of the girls over the class list, there is a tendency for quite a fair fraction of them to be fairly much straggling with the course. There are girls of all abilities, and you get them right up at the top of the class, certainly, but there does seem to be a bigger tail of girls who for whatever reason find the physics fairly hard, so they're not going to end up doing research anyway."

Thus we have moved from an explanation which lays the blame on the immediate environment (i.e. schools and fellow pupils) to one which notes that women don't achieve as highly as men at degree level. However, there must also be an explanation of why women don't do as well:

> "I think maybe that they just don't have the general background of physics that maybe boys have picked up because it's been expected of them. When I was at school, perhaps I was atypical, I used to read physics books for fun, and maybe that's a particularly male thing to do, to get involved in one's school subjects for fun, and that sort of thing is incredibly useful, if you've got a feel of what physics is all about, it can help a good deal. And then maybe that's the reason, but I don't know at all."

Again, this is a reasonable explanation up to a point, except that one would expect that sort of handicap to have been overcome by degree level; or if it hadn't, that the department would do something to rectify it. As this interview was conducted after my interviews with students, I commented that some of the female students had said that they disliked the abstract nature of much of the physics they studied. Dr. G replied:

> "It may be that there is a real difference between the minds of males and females, but men do tend to prefer abstractions more. Maybe so, I don't know. It does seem to happen at least, in what we see in how they achieve at the moment; the blokes manage to cope better with the abstractions and actually are attracted to it, but whether that really is an intrinsic difference or not, I wouldn't know."

The difficulty faced by Dr. G in trying to find an explanation is that, while understanding the *social* problems facing girls in schools, an

admission that those problems continue at university would appear to be an acceptance of a criticism of the department. Thus whilst recognising that women face obstacles at every stage, it is far less easy to explain why women drop out at the hurdle of higher education than it is to explain why they drop out at the schools level. Dr. G's tentative suggestion that there may be an intrinsic difference between the minds of males and females is a way of avoiding the issue of women's experience of physics at university. The parallel with the comments of the English lecturers are striking; men do better at English because there are fewer of them and therefore they must have been more intelligent in order to have gone against social pressure in choosing the subject; men do better at physics because, although there are more of them than women, they have taken a wider interest in science and may anyway have minds which are more capable of abstract thought. It is not so much that male staff discriminate against women as that they fail to see a problem which exists. Even the sole female physics lecturer interviewed was tenative about the reason for the lack of women in physics:

> "I think it must stem from the way it's presented in school. I don't know much about the subject at all. It's presented in a very dry way; the examples that are given are of ballistics, or throwing cricket balls and things like that, trying to understand the dynamics, whereas I think if it could be presented by explaining problems slightly more representative of other areas of life, it might be more attractive." (J)

Asked her how students responded to her as a woman, she said:

> "you get a knock on the door, and you see this person say, Dr. J?' and you say, 'Yes', the look on their face, and they jump backwards 'oh!' and then they ask their question, but again I think it's a bit early to say. I think, I don't know, possibly the women find it easier to relate."

Female lecturers in physics are even more rare than female lecturers in English; perhaps the very idea of a woman in authority is challenging. That most lecturers, particularly science lecturers, are male, is so much of the taken-for-granted reality of higher education, it is unlikely that anyone ever tries to imagine what it would be like if the male-female ratios amongst staff were reversed. If they did, they might reflect upon the isolation experienced by male students and staff if they made up only 5% of the department. In practice, however, gender is seen as a non-problem in physics as it is in English; where it is regarded as posing

difficulties, the difficulties are seen as lying with students rather than with departments.

In this section, we have seen that there is not a simple unity of thought amongst physics lecturers as to how physics should be taught. The division in the English departments between those who believed in teaching theory, and those who felt part of the non-theoretical liberal humanist tradition, was mirrored by a difference between seeing physics as a liberal, broadening subject, and seeing it as a narrow, difficult, useful discipline. We shall now examine whether physical science has succeeded in broadening the base of physics through the introduction of new ideas and possibilities.

8.16 Physical Science

The physical science degree course is one course run by the Applied science department at C Polytechnic. It is one of only two physical science courses in the country, the other also being run at a polytechnic. Unlike the other courses in the department, most of which are quite popular, the physical science course has difficulty in making up the numbers each year. Run alongside it is a materials science course, and students who take the physical science degree are expected to study materials in their first year, and vice versa.

The entry requirements are two Es at A-level. These should normally be in two out of physics, maths and chemistry; however, students are sometimes accepted on to the course who have, for example, A-levels in chemistry and General Studies, but who have studied physics or Maths to A-level standard. Not surprisingly, most of the students on the course are those who have applied after their A-level results have come through; most students interviewed had originally applied to take a university science course.

The stated aim of the course is to provide students with a broad base in physics and chemistry, and to show that these are inter-related. The course is not a joint physics/chemistry degree; rather, it takes three themes: energy, matter and the interaction of energy and matter, and studies them from both a physics and a chemistry perspective. The idea is that this will produce better qualified graduates; in the words of the

course booklet: "In the current employment situation, graduates with broad rather than specialised knowledge can compete for a wider variety of jobs and can adapt to novel situations." The course, then, is explicitly vocational in intent.

In the first year, students take six compulsory modules: Mechanics, Fields and Waves; matter; Laboratory work; Materials; Technology and the Environment; and Computing. The second module is a basis for the physical science degree, whilst the fourth is a basis for the Materials degree. Students must pass the first three modules to enter the second year.

Teaching is mainly by lecture, although the lectures tend to be more informal than university ones, and students can ask questions. There are few tutorials and problem groups, however.

In the second year, all eight modules are again compulsory. These include 'physics'- type courses such as Thermodynamics, Nuclear interactions and Wave Mechanics, as well as 'chemistry' ones such as Inorganic chemistry and Fuels. Included in the eight modules is an Energy Studies course which looks at some of the social aspects of science and the implications for managers in scientific companies. In addition students do lab work in chemistry and physics. Six of the modules are assessed partly by examination (worth 75%) and coursework (25%), whilst two are assessed 100% on coursework. The second year mark counts towards 30% of the final degree classification.

The third year is spent in industry, and a placement is arranged with the help of the department. Placements are commonly in industrial research laboratories or in hospitals.

There are four compulsory final year modules, but these are each split into several parts. The four are Energy Studies 2, Investigative Techniques, Solid State Science and Surface Science. Each of these is assessed 75% on examination and 25% on coursework. There is, however, only one three hour exam for each module. In addition, students undertake an experimental project, usually chosen from a list provided by the department. 30% of the final mark for the project comes from a Viva Voce.

8.17 Constructing 'Physical Science'

The reason for the existence of a physical science course in the polytechnic is pragmatic, rather than educational. The polytechnic was originally formed from three colleges, two of which ran applied physics degree courses. When the colleges merged, it would obviously have been ludicrous to run two applied physics courses, and therefore the staff on one of the courses were kept on to teach a physical science course which was

> "supposed to be an inter-disciplinary mixture of physics and chemistry, in other words, not a bit of physics and a bit of chemistry that you did in isolation, but to be integrated." (H)

Like the communications course, the first physical science course which ran was "not very integrated"; staff feel that since the course was revised in the early 1980s, it has become more integrated. The aim, according to Dr. H. is to provide students with a broader degree which will be more useful in industry:

> "There is a quotation which I've made in the last submission and in the recent submission: the Swann Report of 1968 which says that 'although the universities and colleges tend to turn out 85% specialists and 15% generalists, what industry really wants is 85% generalists and 15% specialists.' And we are hopefullly turning out some of those generalists, people who can look at things not just from the physics angle, or from the chemistry angle, but can cope with things from both."

The advantage of a physical science degree over a conventional physics or chemistry degree is that:

> "...there's a wider range of jobs available...I think they go for more sorts of jobs, it's difficult to list them, but a lot are going into computing and electronics today, but we have people - we had one student who's gone into accountancy, Royal Navy, weapons research, gas board, chemical side as opposed to physical side, video discs, hospital physics, where I would have thought the chemical aspects would be of use to them as well as the physics. " (H)

The vocational aspects of the course are clearly the most important consideration when it comes to recruiting new students. Changes in the course occur because of the need to attract a great number of students; recently there has been a move to introduce a greater element of electronics in the course because:

> "The more you can make your course look like another branch of electrical engineering, the better your chances are." (H)

The staff believe that the course is unpopular because physical science is rarely taught in schools; there is no longer, for example, a physical science A-level. Teachers and careers advisers tend to push students towards single honours physics or chemistry degrees, or, more usually, engineering.

The course avoids being two separate disciplines running alongside each other through making energy and matter the core themes of the course: energy and matter are then examined from physical and chemical aspects; as Dr. H. puts it, energy and matter are "pegs to hang the course on."

> "...when you study matter, you've got to study the energy aspects of matter, whether things react, whether they form, how much heat you've got to throw in to form them, how do you break compounds up into elements...why do you get rusting, because either the oxygen has to go through to the iron, or the iron has to go throuh to the oxygen, to form iron oxide, and it's all to do with energy whether it does go through or whether it doesn't go through...so energy and matter are fundamental both to physics and to chemistry."

The CNAA requires all science courses to have some measure of social scientific content; on the physical science course, this is the Energy Studies module, which examines social scientific aspects of energy. The module deals with the kinds of problems students might face as scientific managers in industry: issues like risk management, the problems of pollution, dealing with pressure groups, preparing public reports. The following questions from an Energy Studies examination paper give an idea of the emphasis:

> Write an essay entitled:
> Either a. combustion-generated pollution and its control;
> Or b. Detonation waves in gases.
>
> Discuss the suggestion that public fears concerning nuclear power could be reduced by a comparison of risks from nuclear power with those from cigarette smoking.
>
> Energy policy in the UK has undergone substantial changes in the past five years; outline the major factors, within the UK, in the EEC and in the world energy economy, which have brought about these changes.

The discussion of social problems related to science is, then, somewhat limited; the dominant perspective is that of the company which wishes to protect its interests. Certainly the problems of pollution and waste disposal are discussed, but there is no room for more radical

critiques of modern science. Even so, there is unease about the module in the department; some members of staff would prefer that it did not exist. In addition, many students felt disillusioned with the module:

> As I'm sure you'll realise, that [energy studies] is the area over which there is most controversy. There's also controversy on how successful it is. Because the staff, not only the social science staff, believe that it's successful. I'm sure the students will tell you that it's not. Then that comes down to the fact: is it part of the blinkered view of scientifically-trained students? It isn't as successful as it should be. That isn't for want of trying by the staff - both sets of staff - and it is a partly the historical perspective of the students. And the dilemma comes that in a scientific degree course these days you try to put a quart into a pint-pot. Something loses out. What loses out is the social aspects. " (N)

It is certainly true that the course itself is over-burdened; students are expected to do a great deal of work on a variety of subjects, none of which they have any choice about. It is also true, as became apparent in the interviews with students, that the Energy Studies course is regarded, metaphorically speaking, as the last straw; already having to study several scientific areas in depth, the Energy Studies seems like an irrelevant addition, designed to annoy students. Mr. N, explaining the students' dislike of the module, said, referring to local controversy over the building of a coal mine:

> "They [students] are cynical. They know at the end of the day the scientific and social issues will go out of the window and it will be decided on political grounds. So, why bother?"

A possible answer to that question - 'Why bother?' - is that it is intrinsically worthwhile for students to have to get to grips with different issues, to understand debates and to reach conclusions about them. The attitude of staff, however, is very much that physical science is a *useful* degree, preparing students for industry; while it is a broader degree than a traditional physics or chemistry degree, covering a wider base of subjects, it is also a narrower degree, which focuses mainly on preparing students for careers in industry.

8.1§ Assessment

In English, communications and physics, staff argued that there was consensus on the evaluation of students' work. In English and communications, emphasis was placed on the fact that there was consensus

amongst staff about the practice of the discipline, what constituted a good argument and what didn't. In physics, the emphasis was more on the drawing of grade boundaries at certain marks. This was also the case in physical science, as Mr. N.'s answer to the question of whether there was a consensus in the assessment of student work made clear:

> "The first thing to remember is you end up with a mark of 61.4% or what have you; where the controversy starts is where it's 59.6%. But I think the first thing to remember is just how many small assessments have gone into producing that mark. Start with the fact, for example, that it might be twelve modules, each of which has a 30% coursework assessment, and that coursework assessment may well have been eight practicals and three tutorial sheets. Now that means that there's perhaps been eleven elements for each of twelve, so there's a hundred and twenty, before you decide that if the coursework has actually got three problems to do, those themselves are separate assessments. Then think of the fact that the same student has answered five questions on ten exam papers - fifty questions, each of which is subdivided into three sections, so that's a hundred and fifty sections, each of which has worried whether it's three out of seven or four out of seven. So I certainly don't have any confidence that it's definitely three and not four out of seven, but I have a lot of confidence that the sum of all those figures has some value - particularly in an experimental discipline. I would have more worry if I was faced with marking a great army of historical perspective essays." (N)

The precise quantitative nature of this answer is illustrative of the gulf in thinking between the science lecturers and the humanities lecturers. Whereas an English lecturer could talk about "taking for granted the practice of certain kinds of discourse", the discourse itself is *so* taken for granted in physical science that assessment is largely about making sure the marks add up and are rounded off nicely. Mr. N. argued that to get a high grade, a first or an upper second, demanded certain qualities:

> "If you've constructed your examination papers properly...to get high marks requires you to demonstrate those higher levels of synthesis, analysis, testing hypotheses and reaching conclusions, whereas the first forty marks are probably available to actually knowing something and reproducing it.

Assessment, then, is regarded as unproblematic, although the difficulty in constructing appropriate examination papers to test the necessary skills, is acknowledged. The distinction is made, here as by some of the physicists, between "knowing", that is acquiring a sum of knowledge, and "skills" - such as analysis, testing hypotheses and so on. "Knowing" is

less highly regarded than the application of skills, although at the same time, it is the acquisition of knowledge which is seen as the distinction between science and arts; knowledge is easy to test, but skills are not.

8.19 Gender

The science department at C, like the two physics departments at A and B, is aware of the significance of gender, and collates statistics on the numbers of men and women in the department (roughly a ratio of 60:40, mainly because of the biological science course) and the relative achievement of the two sexes. Mr. N. summarised the most recent findings:

> "Based on the last three years' graduates, if you entered the scheme as a woman, you stood a 56% of getting a two-two or better; a man stood a 45% of getting a two-two or better. There was also a very slight thing, not enough to count, you actually stood a slightly better chance of getting a first. "

This is in line with national trends in both universities and polytechnics; as we saw in chapter 6, women are generally more likely than men to get a 2:2 degree or above. However, we also saw that in universities women are less likely to obtain firsts but they are almost equally likely to gain them in polytechnics. Mr. N's explanation for the rather better performance of women in the science degrees was:

> "There are those who say the women work harder, and there are those who say the women get the benefit of the doubt, because we're mostly middle-aged men, who will accept course-work late, whereas some bloke they've had a row with will get short shrift...I end up saying that in the sciences, it is just possible that if the A-level grades mean anything, the A-level grades of the women do not reflect their true potential as well as the A-level grades of the men, because on average the quality of the teaching they've had, particularly if they've been in girls' schools, particularly in physics and maths, has not been as good. Therefore if you take a hundred girls with five points and a hundred fellows with five points, one of the reasons the girls did better at the end might have been that they should have had an average of five and a half points, if they'd had the opportunities previously."

This explanation is plausible up to a point, although it raises more questions than it answers. One of these, of course, is that there generally appears to be very little correlation between A-level grades and degree classification, in which case the evidence loses much of its validity; another is that one would expect girls who have been less well

taught in school to be more likely than badly-taught boys to give up science, simply because the weight of convention is on the side of boys doing science, and against girls doing it. One would assume that girls who do choose to do science are those who have been motivated to do so by better than average teachers. It is possible that this argument has less force on a course like physical science with low entry requirements than on a traditional physics course demanding high A-level grades. Mr. H said he did not know why girls were less likely than boys to take science in higher education, although he suggested that the system of Scottish highers, in which all students take five, rather than three subjects, has the effect of encouraging girls to do science; he pointed to the fact that in Edinburgh University, 50% of maths students are women. Mr. H noted the early experiences of children playing with mechanical toys:

> "One question I often ask people on the course when they come just to see round, is do you do anything yourselves, thinking back to my own time when I used to play with meccano and that. I get the usual answers about motorbikes and that sort of thing, which is fair enough, because we quite often find people in the lab whose fingers are all thumbs and I'm sure that's because they're not used to doing delicate things with their hands. Now I always think that the equivalent for the ladies who come is in fact whether they do sewing or that sort of thing, which is just as delicate on the fingers, just as precise on the fingers as playing with little nuts and blots. Now whether in that is the answer, that they're not used to mechanical things even though their dexterity is good, I don't know. It could be that we're going back years and years in their life to how they're conditioned when they're young... when they don't have meccano and mechanical toys like that. "

Obviously it is true that boys generally have more experience of playing with mechanical toys than girls, and that must have some influence on their development of scientific skills, and practical laboratory skills in particular. Dr. H.'s explanation is only unusual in its combination of perception - that a skill like sewing is of equal utility to a scientist as mending motorbikes - and datedness - that men mend motorbikes and "ladies" sew. It is a measure of the fact that although science departments are aware of the problem of the small numbers of women, and desirous of doing something about it, they have not yet got to grips with causes and solutions.

8.20 Conclusion

This chapter has looked at the viewpoint of lecturers on the six courses concerning the nature of their discipline as it is practised in their department. It has found significant differences between the construction of the arts and the construction of the sciences. However, there was not complete agreement amongst humanities lecturers about the purpose of their discipline, nor amongst science lecturers about the purpose of theirs.

Amongst the English lecturers, two opposing strands were detected. On the one hand, there was the dominant view, which could be labelled anti-theory, which held to traditional liberal humanist precepts about the study of literature, emphasising the importance of individual, affective response to a canon of great texts. The opposing view, as put forward by Dr. S. of department A, was that English should be about developing critical, enquiring minds and that this could best be done through exposing students to a range of theoretical perspectives and texts. It was noted that, whilst there was a range of theoretical opinions in each of the departments, these were usually regarded as specialisms which could be taught - Dr. S's own 'Women and Literature' course, for example - without challenging the dominant liberal humanist practice. It was argued that, whilst there was an appearance of consensus on the surface of English, underneath there were significant disagreements about the nature of the subject which only came to the fore when it was necessary to grade and assess students.

Two opposing viewpoints were also detected in physics. The dominant view saw physics largely in instrumental terms, regarding it as concerned with the acquisition of an absolute and truthful body of knowledge, to which other "knowledges" such as chemistry or biology could at least partially be reduced. The minority view was that physics was about the discovery of skills and ideas which, though not directly useful, were of value in themselves. The first view is closely allied to a traditional Baconian perspective, whilst the second has links with the philosophical ideas of Capra (1982).

It was suggested that the more recent courses in the polytechnic, communications and physical science, could escape the confines of traditional practices in English and physics. It was argued that

communications had overcome some of the difficulties of English, through applying itself to a range of texts (including films and newspapers) beyond that of the traditional 'Eng. Lit.' set books; it was able to look at the social relations surrounding texts and use new theoretical perspectives to shed light on those relations. Physical science, however, whilst having a broader base than physics, was far more instrumental, aiming chiefly to train students for jobs in industry, rather than pursuing knowledge for its own sake.

More significant was the attitude of lecturers towards gender. Gender differences were, by and large, seen either as the result of biolgoical determinants, or influences of school, society and media. They were *not* seen perceived as having any relation to the practices of the department. Departments were seen largely as neutral imparters of objective knowledge, and thus not responsible for the 'failure' of women to choose a subject or to continue with it. In English, particularly, the fact that the curriculum is biased towards male experience is regarded as unproblematic because curricula are shaped by the 'canon': texts which have 'universal' appeal and value. If students fail to respond appropriately to these texts it is because they are in some way deficient.

There are, then, three major points at which we can compare students and lecturers. First, we must examine the similarities and differences between students' constructions of disciplines and lecturers' constructions of those disciplines. Second, we can look at students' perception of the success of departments in fulfilling their aims. Finally, and most importantly, we will look at students' experience of those courses through gender: their experiences of being women and men in different disciplines. Through doing that, we shall learn whether departments are right to view themselves as beyond the social processes - taking place in schools and in the media and in socialisation - of creating gender inequality.

CHAPTER 9: SCHOOLING AND SUBJECT CHOICE

9.1. Introduction

The last chapter looked at the views of lecturers about their disciplines and about gender differences. It was argued that 'English' was still taught as a liberal humanist discipline, concerned with 'universal' values, whilst communications was concerned with the specific relationship between means of communications (such as media or art) with society. Physics was taught and perceived as a means of communicating (like English) 'universal' truths about the physical world, whilst physical science was regarded as a discipline which provided useful scientific knowledge which could be applied by students in their future careers.

The chapter will use data from interviews with the ninety-six students - thirty-two English students, sixteen, communications students, thirty-two physics students and sixteen physical science students. Part of the purpose of this chapter is to examine students' perceptions of these disciplines. This will be only introduced in this chapter, however; chapter 10 will deal much more specifically with students' construction of their subjects. The other purpose of this chapter is to look at the kinds of students who made up the sample: their background, their schooling and the influences on their decisions to enter higher education.

This chapter will be split into two parts: the first half will look at demographic data about the students' social and educational background, whilst the second half will examine students' own perceptions of their pre-university or polytechnic education, and the routes by which they came to make decisions about studying physics, English, physical science or communications in higher education. This will be followed in Chapter 10 by a discussion of how 'science' and 'arts' are constructed by the students in higher education.

9.2. The Students: Education and Social Class

The data in this section are not generalisable, since they refer only to the sample of 96 students - 16 from each department. However, this information is useful for highlighting points which will be relevant to the thesis, and for indicating areas of potential interest

in our understanding of the relationship between gender and subject specialisation in higher education.

There were important differences in social and educational background between male and female students, arts and science students, and students from the three different institutions in the sample. Table 9.1 shows the type of school attended by the science students from the three different institutions. As some students changed schools at sixteen, the table shows the type of school attended until the age of sixteen. University A had by far the highest proportion of students from independent schools - six in all, with four having attended comprehensives and four grammar schools. Only one physics student in B and one physical science student in C had attended a fee-paying school. In both B and C, more students had attended comprehensive schools than had attended grammars. The 'other' column refers to a male student in A who had attended a variety of school, both in this country and abroad, as his father was an army officer; to a female student in A who attended a single-sex Church high school; to a female student in B who had attended a Baccalaureat school in Germany; and to a male student in C who had attended a secondary modern school (one of only 2 in the sample of 96 to have done so.) 23 of all science students - almost half - had attended either a fee-paying or a grammar school.

Comparing these with the figures for arts students (Table 9.2), we find that the proportion of arts students having attended an independent school is slightly smaller, and evenly spread across each college (3, 3 and 2 respectively.) The proportion attending grammar schools is biggest in A, and smallest in B, whilst the B sample had the largest proportion of comprehensive school students - 12 in all. One student, in C, had attended a secondary modern school. Thus 19 out of the 48 English/communications students had attended either a grammar or a fee-paying school. This is a far higher proportion than the proportion of the general population attending such schools (see Chapter 5.)

Tables 9.3 shows that, amongst the science students more women than men had attended single-sex schools. There is an exact symmetry between the two sides: 16 women had attended single-sex schools, whilst

8 had attended mixed schools; and the exact opposite was the case for the men. The highest proportion of students coming from a single-sex school was in 'A': a fact related to the very high proportion in 'A' coming from independent schools. Amongst the arts students (Table 9.4), the proportions are slightly different: again 8:16 amongst the men, but 9:15 amongst the women. The two tables concord with the generally held belief that girls in single-sex schools are more likely to take science subjects than girls in mixed schools.

Table 9.5 shows a gender breakdown, rather than a subject breakdown, of the types of school attended. This shows that over twice as many women as men in the sample (11 to 5) had attended an independent school, and that a higher number of women than men (15 to 11) had attended grammar schools. If this held good for a wider sample, it might suggest that high social class is necessary to compensate for the disadvantage of sex (or in the case of men, that advantage of sex overcomes disadvantage of class.)

However, tables 9.6, 9.7 and 9.8 show a slightly different picture. In these, social class is measured using the Registrar-General's classification, and is broken into social class I and social classes II-V. 41 of the total sample of 96 came from social class I: 43%. Again, this is much higher than the proportion of people in that social class in the population at large. It should also be noted that only six students in the sample came from social classes IV or V: a very low proportion. The picture is an exaggerated version of that drawn from the UCCA statistics in Chapter 6.which showed that 24% of university students were from Social Class I, and 6% from Social Class V.

When broken down by institution, the figures show that the highest proportion of social class 1 students was in A, and the lowest in C. When broken down by sex and subject area, however, the figures show almost no difference between men and women, science and arts - surprising in view of the higher proportion of women from independent schools.

Thirteen of the science students - eight women and five men - had fathers who were scientists, whether research scientists, engineers, doctors, or science lecturers in university. Five students in the whole

TABLE 9.1 Types of Schools Attended by Science Students

	INDEPENDENT	GRAMMAR	COMPREHENSIVE	OTHER
'A'	6	4	4	2
'B'	1	5	8	2
'C'	1	6	8	1
TOTAL	8	15	20	5

TABLE 9.2: Types of Schools Attended by Arts Students

	INDPENDENT	GRAMMAR	COMPREHENSIVE	OTHER
'A'	3	6	7	-
'B'	2	2	12	-
'C'	1	4	9	2
TOTAL	6	12	28	2

TABLE 9.3 Schools Attended by Science Students (Mixed or Single-Sex)

	WOMEN		MEN	
	Single-Sex	Mixed	Single-Sex	Mixed
'A'	7	1	4	4
'B'	4	4	2	6
'C'	5	3	2	6
TOTAL	16	8	8	16

TABLE 9.4 Schools Attended by Arts Students (Mixed or Single-Sex)

	WOMEN		MEN	
	Single-Sex	Mixed	Single-Sex	Mixed
'A'	3	5	4	4
'B'	4	4	2	6
'C'	2	6	2	6
TOTAL	9	15	8	16

TABLE 9.5 Proportions of Women and Men Attending Different Schools

	WOMEN				MEN			
	A	B	C	TOTAL	A	B	C	TOTAL
INDEPENDENT	6	3	2	11	3	1	1	5
GRAMMAR	5	4	6	15	5	2	4	11
COMPREHENSIVE	4	8	8	20	7	12	9	28
OTHER	1	1	-	2	1	1	2	4
TOTAL	16	16	16	48	16	16	16	48

TABLE 9.6 Social Class of Students: Professional/Other

	A	B	C	TOTAL
Social Class 1	18	13	10	41
Social Classes II-V	14	19	22	55

TABLE 9.7 Social Class of Science Students by Sex

	WOMEN	MEN
Social Class 1	11	9
Social Classes II-V	13	15

TABLE 9.8 Social Class of Arts Students by Sex

	WOMEN	MEN
Social Class 1	10	11
Social Classes II-V	14	13

TABLE 9.9 A-level Entry Grades of Science Students

	A	B	C
1st year	AAA (15.1)	BBC (10.6)	DD (4.0)
Final year	AAA (15.3)	BBC (11.0)	DD (4.4)

TABLE 9.10 A-level Entry Grades of Arts Students

	A	B	C
1st year	AAB (13.8)	ABC (12.1)	CCD (7.6)
3rd year	BBC (11.3)	AAA (14.6)	BCC (10.5)

sample had fathers who were university lecturers, while an additional eleven had at least one parent who was a teacher. Not only, then, are the professional classes over-represented, but within that the occupations of teaching, lecturing and science are also over-represented. Few of the sample, for example, had parents who were lawyers, accountants or civil servants. Only twelve of the sample had mothers whose occupational status was equivalent to, or greater than, that of their fathers. Thirty-one students described their mothers as "housewives."

Tables 9.9 and 9.10 show how A-level entry grades differ between the institutions. The averages were deduced by using the UCCA points system (A=5 points, B=4 points, and so on), adding the points up and dividing by the number of students. General Studies was counted as an A-level, which partly accounts for the very high average grades (three 'A's) in University 'A', although some students had taken Further Maths, not General Studies, as a fourth A-level. ABBD might have been a nearer approximation of what students had achieved - 8 of the 16 in the sample of physics students at A had 4 A-levels. The figures in brackets show the actual points average of the students, along UCCA lines.

There is a very neat gradation in the results of science students from 'A' through 'B' to 'C'. The grades average was the same in each institution for both the first and third years: AAA in 'A'; BBC in 'B' and DD in 'C'. As pointed out earlier, most of the physical science students came to the polytechnic after failing to get to the grades necessary for university; this did not seem to affect their degree performance adversely, however. It is interesting that Universities A and B require roughly the same entrance grades - BCC and BCD - yet A still manages to get the better qualified students. It suggests that the physics department in A has a well-established reputation, particularly in the independent schools, who encourage their abler students to apply for civic, rather than modern, universities.

The same does not appear to hold true for the English students. There is not a very big gap between the three institutions. The communications students are better qualified than their physical science counterparts, communications not being a 'second choice' for

them in the same way as physical science is for the science students. Communications does not have an obvious counterpart in the universities, although English is perhaps the nearest equivalent. However, three of the first years in C had to be excluded from the calculations, as two had HND, not A-level, qualifications, whilst one had Scottish highers. A and B had similar averages, although the 3rd year average of B was unusually high; 7 of the 8 had at least 1 A grade, whilst 3 had 4 A-levels. (It may also be worth noting that 6 of the 8 had come from comprehensive schools, and only one from an independent school.)

The data presented so far give some guide to the type of students whose views, ideas and experienced are discussed in the thesis. They are overwhelmingly middle-class (also, though not apparent from the figures, overwhelmingly white), over half are public school or grammar-school educated; the university students have a background of high academic achievement; most have highly educated parents. In the next section we shall look at students' own views about their schooling, and their interpretation of the process by which they entered higher education to read for a degree in English, physics, communications or physical science.

9.3 Subject Choice and Higher Education

This section will concentrate on the influences which led to students deciding to enter higher education to study a particular subject. It will look in particular at students' schooling, insofar as their schooling influenced their decisions; we shall not look in detail at students' descriptions of their schools in matters such as quality of teaching, numbers of pupils or streaming. Such matters, although interesting, are beyond the scope of this thesis which is concerned with *higher* education, and therefore students' accounts of their schooling are useful chiefly in their ability to illuminate the main issue.

i. Science Students

Three major influences can be identified in students' decision to study science in higher education: parents or family, individual inclination and schooling. In practice, these are not usually separable, and personal inclination often arises from being taught by an exceptional teacher, or having a scientist parent who helps with homework. However,

for the purpose of this discussion, it is convenient to treat them separately.

It is more difficult to isolate the factors that led to students deciding to enter higher education than it is to isolate those determining subject choice. For the majority of students, and particularly for the university students, higher education was not a matter of *choice* as such; it was taken for granted. Some students had been to independent schools where almost all the pupils went on to university; others had been to very academic comprehensives or grammar schools and had parents who were graduates themselves; many, therefore, simply said: "It never occurred to me not to go." However, there were a few students for whom a desire to enter higher education was against the grain, and who had had to struggle. One polytechnic student who had had to re-take her A-levels, when asked why she had wanted to enter higher education, said:

> "There is nothing else you can do. You go on the dole or you go into higher education, but most people failed their A-levels." (Dawn, 1st year, C)

Dawn's father was unemployed with few prospects; she herself had had no advice from careers teachers about higher education. Contrast this with the first year physics student at A, late of public school, who had been able to make her choice after being advised by a friend who was a physics lecturer that A had one of the best physics departments in the country. This is illustrative of another interesting point, reflecting the class differences in the two universities, which is that students in A - particularly those in the physics department - almost always gave the quality of the course as a reason for coming to the university, whereas students in B invariably cited the attractiveness of the campus and the modern facilities as the important factors.

As we are particularly interested in the influences on women who choose science, we shall begin by looking at the women's experiences of single-sex education. It has often been argued that girls in single-sex schools are likely to have higher educational achievements than girls in mixed schools, and in particular that they are more likely to do well in scientific subjects (e.g. DES, 1975, Mahony, 1985). We have already seen that more female science students had attended single-sex schools than

any other group in the sample; it may be that their single-sex schooling had been a major influence in their decision to study science at degree level. Certainly some of the female science students felt that they had benefited from a single-sex education. For example, Felicity, who had attended an independent girls' school where all the academic staff were women, said:

> "There was never any 'girls don't do science' and I'm glad I didn't have that sort of pressure on me, because I think it's a load of bosh, basically." (1st year, A)

Although this is phrased negatively, it was clear from the interview that the school had been very influential in shaping her enthusiasm for physics. Another student said of her boarding school:

> "I don't really agree with boarding schools. I think in some ways it's better, because girls are meant to get on better in the sciences in girls' schools; they're meant to be pushed backwards a bit in boys' schools." (Suzanne, 1st year, A)

The term "boys' schools" rather than "mixed schools" is revealing; however, this is still hardly a ringing endorsement of single-sex schools. Part of the problem is that as most women who had attended single-sex schools had not known anything else, their comments will focus on the school itself rather than the fact of its being single-sex. One physics student who had attended a convent school was full of praise for the school:

> "I think the teachers did influence me a lot in their own enthusiasm for the subject; it seemed to rub off on me, you know; whenever they taught me something, a new concept or something, I'd come away feeling enlightened by it, and wanting to know more, just this curiosity for more knowledge. But that is true of a lot of subjects I did at O-level." (Jane, 3rd year, B)

Another student, who had attended a girls' grammar, felt that there were important differences between single-sex schools and mixed schools. Explaining why she thought there were so few women in science, she said:

> "I think it's school's fault and/or parents. I think it goes back to when you're *this* big. I think that's why so many people from our school went into scientific things - they pushed you that way, but I know from my friends that the secondary school where a lot of my friends went to, the girls were encouraged to do typing, hairdressing, home-economics, all the rest of it. I really think that schools are at fault. That's why I'm glad that WISE thing, I mean it's about time they bloody realised - I'm convinced that once a woman gets

> into science she's just as good as if not better than, any man." (Linda, 4th year, C)

This discourse of "as good as a man" was to recur frequently in interviews with the women; certainly there were some schools which had taught their pupils to think in those terms. However, there was also severe criticism of single-sex schools from some female science students. Many, although appreciative of the education they received, felt that their schools were too strict in imposing petty regulations - a comment rarely made by students from mixed or comprehensive schools. In addition, two female science students who had attended girls' grammar schools felt that they had been disadvantaged:

> "If I'd done English, geography and history, I might have done a lot better, but they just didn't seem to bother about you if you were doing science - perhaps it was an old-fashioned school." (Fay, 4th year, C)

> "At the male grammar school in town, they *had* to do O-level physics, but we didn't have to do it. I think they were encouraged more...[there was discrimination] not directly, but in subtle ways, like when you're choosing your options, no matter what you're doing there's always a group where you can do cookery or needlework, but if you're doing physics you have to put that down, and that means that you can't do something else that you might want to do, like history or something; you've got to make a positive choice to do science whereas it's quite easy to drift into doing history and things like that." (Louise, 3rd year, B)

In both these cases, science departments were under-resourced and under-staffed, and there was therefore more pressure on girls to do arts subjects, not science subjects. The same would not be true of independent schools, which at least are well-resourced.

The men who had attended single-sex schools - seven of them - did not talk about their schooling in the same terms as the women. That is, they rarely mentioned the fact of the schools' being single-sex as having significance: for women, attending a single-sex school had given them confidence, or had made them rebellious, but men tended only to mention the quality of the education they had received. Generally, as all of these schools were grammars or independents, the comments were favourable ones. Richard, a working-class student, recognised that he had been privileged to go to a grammar school:

> "Whether you like the pros and cons of it, I was just lucky in that they're all comps now, and I'm not saying nothing against

> that, it's just that comprehensives schools tend, certainly in our area, the kids there come out at sixteen and that, and those that fail just don't go to university." (Richard, 3rd year, B)

Even so, Richard thought that only about 25% of the students in the upper sixth had gone on to university; in many of the other schools attended by students, it was nearer 75% or 80%.

There were also some students who felt uneasy about their privileged education, who disliked fee-paying or selective education. One student, for example, who had attended a gramamar school which had converted to comprehensive, said:

> "There were a lot of people in our school who tended to feel it was some sort of elite, and I think that people who get sent to secondary modern schools are bound to feel inferior in some way which is not true - everybody's got talents in different areas." (Patrick, 1st year, A)

Some of the comprehensive schools students had attended were also middle-class and academically successful; several students had attended comprehensives which had only recently been converted from grammar schools, and which maintained the grammar school ethos. There was, however, often a kind of inverted snobbery amongst the ex-comprehensive school students; a combination of the belief that comprehensives were more in touch with "reality" and a feeling that they had had to work harder to get to higher education. Having attended a comprehensive was a matter of *pride*:

> "I think I did have a bit of an advantage over them [public school students]; I think, in terms of actually having a correct view of what people are like - because they were all head-boys and everything - I think I do appreciate a bit more what maybe class - the lower strata of society almost - are like." (Colin, 3rd year, A)

In reality, Colin had attended a comprehensive school with a good academic records and few problems: he said that staying on at A-level and entering higher education was the norm, rather than the exception, at his school.

Although most of the university students were happy about the schooling they had received, and recognised the schools' influence on them, it was a different story amongst the physical science students. Most had done badly at A-level, and some were unhappy about their

education. Many were angry about the attitude of their schools to polytechnics; as one ex-grammar school pupil put it:

> "Our school was a business. You had to get the grades and get the people off to Oxford and Cambridge, and then the rest to universities; and then, you dregs that go to the polys, you know." (Lesley, 1st year, C)

Certainly some of the polytechnic students - particularly physical science students - regarded themselves as "failed candidates" and a recurring theme in the interviews was that polytechnic had given them the freedom to get away from that label, and to re-define themselves. The reverse was true for some university students; students who had done spectacularly well at school often felt anonymous and unregarded in large university departments which were full of other people who had done spectacularly well.

For most students, the decision to follow an arts path or a sciences path is made at the age of 16, when choosing A-levels; for some students, it is made earlier, at 14, or, for a very few students, those who have kept their options open, later, after A-level. For some science students, the decision was a straightforward one, a matter of following ability and inclination. For others, it was a hard choice to make, and different factors had to be taken into account. Clearly, schools played an important, and direct, part in the actual choice of subject, as well as providing the appropriate educational stimulation. Some students, when making a choice, had been strongly aware of peer-group pressure and pressure from teachers who said that a science qualification led to jobs:

> "I was very all-round at school. I got virtually equal marks across arts and sciences for O-levels, so making a choice at A-level was difficult, but I felt a bit swayed by the fact that people said it's best to do science subjects as far as jobs and university places go; it's difficult to get onto arts courses, but it's easier to get onto science courses...that's really why I chose science, ultimately." (Jane, 3rd year, B)

> "I found the two [arts and sciences] equally interesting, so the career edged it." (Patrick, 1st year, A)

> "I did enjoy physics, but I found geography a lot easier, and I went and spoke to my careers worker at school. She said to me, 'there aren't many jobs for geographers, you should go into something more science-y', so I just drifted into it basically." (Linda, 4th year, C)

Thus for many students, choosing science was not a simple matter of inclination or ability; many felt happy and at ease with both areas. However, schools did not like students to feel at home in arts and science: a rigid division between the two prevailed:

> "I liked English. At A-level, I toyed with the idea of doing physics, maths and English, and if I was just doing it for pure enjoyment I would have done it at that stage. But people said to me, 'Well, the English won't be a lot of good to you if you do a science degree and you'll find it difficult to split your time between the arts and the sciences.'" (Paul, 3rd year, B)

That, at least, is a clear statement of the belief that the arts and sciences were incompatible; for one thing, the arts and the sciences are considered so different that it is difficult to concentrate one's energies on both; for another, English is not *useful* - and, therefore, by implication, worthless - to someone studying science. Almost all of the science students in the sample had taken A-levels in physics, maths and chemistry or physics, maths and further maths; one had A-levels in physics, maths and English, whilst two had A-levels in geography, and some physical science students had biology, rather than maths A-level: these, however, formed a very small minority of the whole. There was also one student who had taken the baccalaureat, a combination of ten subjects, arts and science: she had considered changing to English in her first term at university.

Another common theme was that a decision to study science came naturally because of family interests:

> "It was always that sort of science area because my dad's a design engineer, my sister's doing a chemistry degree, but I've always wanted to do a science-based thing rather than an arts-based thing."(Barry, 1st year, C)

A number of students had come from scientific backgrounds; fathers (usually) were nuclear physicists, engineers, doctors or maths lecturers, and often provided an impetus to study science through discussion of it at home or through help with homework. One first year student, whose father was a nuclear physicist, referred constantly to him during her interview, even on one occasion prefacing an answer with "I know what my father would say..." Father had, apparently, told her she was "too stupid" to take a degree in maths, told her she couldn't do a joint degree in physics and German because he couldn't afford to pay for the year out,

and had influenced her to apply for A university because that was where he had taken his degree. At home, she would argue with him about physics:

> "I don't talk to my father about physics; it's always a mistake because he gets cross when I say silly things, but the rest of the family get cross because they can't understand. Whatever he tells me seems to go in one ear and out the other." (Natalie, 1st year, A)

(Of course, Natalie wasn't silly; she was, in fact, a year younger than the rest of the first year students, having kept a year ahead at school.) Other women mentioned their fathers as direct influences; for example:

> "If I'd followed my own path, I'd probably have done something like that [arts]. But my dad was always saying, 'you're going to do sciences.' So that's why I ended up doing science and I've got this far so I can't be bad at it." (Marianne, 4th year, C)

Another said that her father had made her more aware of science,

> "in normal everyday things which I wouldn't otherwise have been aware of, and he's been someone to have arguments with about science, and it's nice to have someone who understands what you're going on about." (Felicity, 1st year, A)

Some fathers seemed to have invested hopes in their daughters of the kind we normally expect to be invested in sons:

> My father's sort of said to me that if I want a job afterwards, and if I want a decent job and a job with a future, it's got to be on the engineering side of the works." (Lesley, 1st year, C)

This kind of pressure had not been confined to the women; some of the men had been encouraged by their fathers to take science, too. The women, however, were more aware of being pushed, of being expected to be unusual. Men were more likely to regard it as natural that they should take science.

However, to say that students were directly influenced by their families and their schools in choosing science is not to say that they were unenthusiastic about science itself. Students were able to identify a number of factors that appealed to them about science. One was that science subjects were easier; more concerned with 'understanding' than 'learning':

> "I really enjoyed physics, and I liked maths as well, and I couldn't face taking a subject where you just had to learn everything, I didn't see the point of it." (Mary, 1st year, B)

> "French wasn't for me, there was too much learning in it. I like subjects where you can read through and understand it...That's why I did science, it was a lot less effort." (William, 3rd year, B)

Physics in particular is perceived as a subject which can be understood easily, and applied; other subjects are concerned not with understanding, but with learning. This was the perception, not only of arts subjects like French and history, but of chemistry, to which there was a strong antipathy amongst the physics students:

> "I hate subjects where you just have to fill your head with facts. What's the point of teaching something if you can go and look it up in a book?" (Ronald, 1st year, A)

> "I just thought of it as learning what other people have already thought of a subject...physics seemed so much more dynamic somehow." (Jane, 3rd year, B)

"Dynamic" is an important word here; students said they were attracted to physics because of its vibrancy, the sense of discovery surrounding it. "Curiosity" was often mentioned as an important part of the enjoyment of physics:

> "I want to know what makes things go, what makes them happen...it's basic curiosity." (Pauline, 3rd year, B)

> "I liked messing about in the lab and I was always inquisitive and I wanted to know why things happened, why things worked...I found I'm much more logically minded, I can't write stories." (Fay, 4th year, C)

However, there was a recognition amongst some students that physics's aura of excitement and discovery was more to do with the presentation of it in the media and in literature than in the practice of it in school:

> "I think if I hadn't read about physics in popular-type books, I probably wouldn't have done it because it's really quite boring at O and A-level." (Tim, 1st year, B)

Many of the science students regarded science as "useful" and were intolerant of anything not "useful"; unlike science subjects, arts subjects did not provide an entry to the job market:

> "I found languages difficult - and they're not much use to you either. I don't like doing things for the sake of doing them, I like something with an aim." (Vicky, 4th year, C)

When it came to making a choice on which course to study at degree level, there was a high level of consensus in the responses from physics students. Only one of the physics students, had, for example, considered taking a degree in chemistry. Several had considered maths or

engineering, or both; maths was generally dismissed as "too theoretical", whilst engineering was dismissed as "too applied": physics was held to be the perfect happy medium - applied enough to be "relevant" (a favourite adjective amongst both the science and the arts students), but theoretical enough to be stimulating and demanding. Engineers, it was often said, only carried out ideas that other people had thought of first. Through the use of these negatives (engineering and maths), we can see students' construction of an identity as "physicist": a person who is not too remote from reality, but who is at the same time capable of independent and abstract thought - a point we shall return to in Chapter 11. Physics, I was often told, was a "general degree", one which opened up a range of possibilities; it was also, many students said, "one of the best degrees you can get." In addition, it was held by some to combine the advantages of generality (a perceived feature of humanities degrees) with the advantages of usefulness (a perceived feature of science degrees.)

Amongst physical science students, "usefulness" had greater centrality. Although many of the students had not originally applied to take physical science, the applied nature of the course, and in particular the year in industry, was always cited as its most important asset - an advantage it possessed over conventional three year science courses as well as over courses like maths.

For many students, then, the decision to take science, and even to specialise in physics, was an easy one. They had been successful in science at school, they had enjoyed it and were motivated by a sense of curiosity in the subject and the job prospects provided through studying it. However, not all students were happy about having had to make an early choice between scientific subjects and humanities subjects. Even at degree level, there were some who had their doubts. Some students had considered courses other than those they were taking; these included most of the polytechnic physical science students, who had frequently applied to take other courses, and had come to the polytechnic after doing badly at A-level. Most had previously applied to take physics or engineering courses; one had applied to study medicine, and one to do business studies. Some of the physics students, too, had considered other options. One final year student at B, for example, had considered taking psychology, whilst another on the same course had applied for a transfer

to English in her first year, but had changed her mind. Others had originally intended to take joint courses in physics/maths and physics/business studies; one had started a medicine degree but had changed her mind. The almost haphazard way in which important choices were made at an early age was summed up, with some resentment, by a fourth year physical science student:

> "I sometimes look back and think my life's been ruled by the decisions I made at O-level, and I don't really think I was ready to make that decision, some of the things I decided. I mean, I was more or less ruled from then to take a science degree, and although I did enjoy it, I sometimes think I might have been better taking art or something like that...but at that point it didn't seem much of a decision." (Jeremy, 4th year, C)

Some science students, then, were aware of a process of narrowing down, a process of shutting out parts of the personality; Jeremy conceded, too, that if he had chosen to pursue art rather than science, he might have regretted that too; any choice inevitably involves a reduction of possibilities. Some of the science students had artistic interests - like reading, painting or music - and insisted that the advantage of studying science was that it was possible to keep up with these interests in their spare time, whereas it was not possible to maintain an interest in science as an extra-curricular activity. Some students had begun to find, however, that, faced with a heavy and demanding timetable, keeping up with the arts was easier said than done. We shall return to the subject of this conflict in the next chapter.

ii The Arts Students

A number of the female arts students had also attended single-sex schools. As amongst the science students, feeling about them was mixed. There was a general belief that girls' schools were too strict; however, one student compared her experience at a girls' grammar school favourably with her experience as a sixth former at a boys' independent school which took on girls to make up numbers. Of the boys' school she said:

> "Being a boys' school, it was very chauvinistic, very traditional, women weren't allowed to do anything. It was very difficult, coming from an all-girls' school...we were just there to fill up the numbers." (Sharon, 1st year, B)

In this environment, she found it necessary to "prove" herself:

> "We had to prove that we were as good. It wasn't until we got our first essays back and our first tests back and we were coming in the top few that they started really to respect us and to understand that we should have been there; a lot of them had come from prep schools and hadn't had any girls about."

In contrast, she said of the girls' school:

> "Although I didn't like my first school, it did give me confidence, boosted my opinion of myself, being a woman, because they were very feminist, they believed that women were as good as men, really pushed us, and it did us a lot of good. I couldn't have gone to the boys' school without that background - it was a terrible place, you're right down at the bottom, because you're down at the bottom because you're a woman, you're the scum."

For Sharon, as for many other women, gaining confidence meant believing that she was "as good as a man": not feeling intelligent or able in one's own right, but measured against a male standard. Part of the ethos of girls' schools would seem, from the evidence of the interviews, to be competition with men: a battle to prove that women are "just as good." Whilst this means that women are pushed in a way that they are not in mixed schools, this competitiveness did not suit everyone:

> "I went to an all-girls' school and the headmistress was terribly into competition with the all-boys' school, and we all had to be into chemistry and physics, and go to university, and be career women and be successful and dynamic and not get married and all this sort of thing and it just didn't agree with me at all." (Vera, 3rd year, C)

When an all-girls' school tries to mimic boys' schools in this way, rebellion can take the form of asserting traditional "femininity": some of the female students - Vera was one of them - said that they had rebelled against the authority of single-sex schools by having lots of boyfriends, wearing jewellery and make-up with school uniform and so on. Paradoxically, the school can produce exactly the opposite result to that intended; this is because girls' schools like Vera's, through their definition of themselves as in competition with boys' schools, as having to reach a 'masculine' ideal of achievement, reinforce commonsense notions of 'masculinity' and 'femininity'.

A major problem in understanding students' comments about single-sex schooling, however, is disentangling the single-sex aspect from the

grammar-school/independent aspect. Only one female student in the whole sample had attended a single-sex comprehensive, whilst two had been to mixed grammars; therefore, when students say that their schools gave them "confidence", or that they encouraged them, or that they were too strict or too petty, it is impossible to say whether these factors were the result of their being single-sex schools, or the result of their being selective or independent schools (or whether these factors could in any case be isolated; part of the character of independent schools is surely that they are single-sex.) The experience of Sharon, who switched from a girls' school to a boys' school, might suggest the former; however, it is hardly fair to bracket a boys' fee-paying school with mixed comprehensives.

Few students from mixed schools remarked on the fact that they were mixed, although several made comparisons between comprehensive schools and grammars, or comprehensives and independent schools. One woman who had attended a mixed comprehensive commented that the girls were discouraged from doing science and that "the maths teacher, I always remember disliking him, because he was very biased towards the boys"; but comments of this kind were very rare.

Of the twenty-four male arts students, eight had also attended single-sex schools, again, only one of which was a comprehensive. One male student had attended a mixed grammar school and one a mixed private school. Fewer men than women who had been to single-sex schools remarked on the single-sex environment, but those who did were unfavourable; for example:

> "It did seem quite different coming here [to university]; it made me regret I didn't go to a mixed school; I'm sure I'd have been much happier...I didn't like the atmosphere in an all-boys school." (John, 3rd year, A)

It was rather different with independent schools. Most students who had attended independent and grammar schools were aware that they had been privileged, even to the extent that entering higher education was not a decision which had to be made, but an implicitly accepted fact. In University A, many students in both the English and physics departments said that they had tried the Oxbridge entrance examination or that a high proportion of pupils from their schools had gone to Oxbridge. In stark contrast to this is that minority of students (mainly in the

polytechnic) who had attended schools where university application was considered unusual, and who had had to make active choices about their future.

Someone who was fairly typical of the students at A was Jennifer. She told me that, despite her grades of ABDD at A-level, she had felt stupid in her school because ten grade As at O-level were quite common; of the five people in her A-level English group, one had gone to Oxford, one to Cambridge, one to LSE, one to Durham, and herself to A. She herself was glad to have gone to public school - and was also very defensive about it:

> "I know people criticize them, but I can't, because I don't think it did me any harm. In fact, it did me a lot of good. I liked it, I really did. It would be trendy of me to say it was awful, and it was bourgeois, and it was privileged, it probably was, but I still enjoyed it, and they *are* better schools, I really do believe that." (Jennifer, 3rd year, A)

This defensiveness was echoed elsewhere:

> "People have preconceptions if you've been to public school, they have preconceptions about what slot they're going to fit you in, but that's what everyone does." (David, 1st year, A)

Many of the grammar schools, drawing from a socially narrow catchment area, had similar academic records. One student, who had attended a boys' grammar school, for example, said that the school's links with one Cambridge college were so good that the college would phone the school up if not many applications had been received in a particular year. He himself had failed the Oxbridge examination, but had never considered *not* going to university. However, the university bias of the public and grammar schools caused considerable resentment amongst some of the polytechnic students who were ex-grammar or ex-independent school pupils. One ex-private school pupil said:

> "They had no polytechnic prospectuses in the careers library - it was university, and if you didn't get to university you're a failed candidate." (Rebecca, 1st year, C)

As amongst science students, there was some inverted snobbery amongst the arts students who had attended comprehensives:

> "I was glad, the school I went to in town; there was a girls' public school, a boys' public school and a comprehensive; my father was a teacher and a union man, so he'd never have dreamt of sending me to a public school." (Carole, 1st year, B)

A striking, and unexpected, feature of the arts students was that ten of the forty-eight interviewed had at least one science or science-related A-level. Of these, three had biology A-level only, five had maths A-level, one had biology and chemistry; and one had both maths and physics, but had low grades and had later taken Arts A-levels at night school with excellent results (he had seven A-levels in all). In addition, one communications student had an HND in engineering and had worked for several years as an engineer. For some of them at least, the decision to specialise in arts had not been a simple or straightforward one, a point we shall come back to later.

Those students who had not taken scientific A-levels were often very negative about their decision to specialise in arts - not because they put a low value on the arts, but because they apparently felt that other people did. Several of them, particularly the women, defined their decision in terms of lack of ability in science:

> "I'm not very good at maths or science. I tend to have a mental block against it, I still have a mental block against anything mathematical...it was something that even if I tried, I couldn't seem to grasp." (Michelle, 3rd year, C)

> "I'm not logical at all. I'm hopeless at sciences...English came much more naturally to me. (Kate, 1st year, A)

Some women were very apologetic about their interest in English and their lack of ability in science:

> "I've always really enjoyed English; it was my best subject at school...chemistry lost me on the equations. I suppose I could do them, yes, I just didn't have the confidence to be able to work them out quickly enough. I don't have a terribly scientific mind, I don't think...I suppose in a way English is a bit self-indulgent." (Diane, 3rd year, B)

There were one or two, however, who were more spirited about their dislike of school science:

> "I had no interest in it. I could do it if I really wanted to but I just wasn't interested. I couldn't care less, you know. We had rotten teachers, to begin with, which put me off it, then I was nervous about bunsen burners and explosions, and I didn't like dissections much either." (Sandra, 1st year, C

> "There were no people involved, personalities and things that you can latch on to. It was just test-tubes and experiments, and also I wasn't very practical either; I used to blow things up. It just wasn't about people or what I understand to be about life and things, I just wasn't interested remotely...it just didn't interest me at all. I just can't stress how much it

> didn't interest me, it really did bore me rigid. It was wasn't just a mild distaste for it, I really hated it." (Jennifer, 3rd year, A)

The theme of science's lack of involvement in people - its lack of "relevance" - recurred again and again in my interview with arts students; even so, this last student quoted, who "really hated" science, was still able to tell me that she thought English "really quite meaningless" and "a rather self-indulgent way to spend three years" - a recognition of the introspective nature, and perhaps the triviality, of the English degree. It is significant that some of the students, both male and female, favourably contrasted biology with the physical sciences:

> "I couldn't see the point of it. I couldn't see the point of knowing what reacted with what and what blew up. In chemistry, I used to have such a mental blockage. I liked things that I could see around me, and relate to, rather than pure fact. That's why I liked biology." (Helen, 3rd year, C)

> "I just prefer to sit down with a book and read...I enjoyed biology more because I could related it more to everyday life...chemistry totally lost me." (Carole, 1st year, B)

> "Biology is a more arty sort of science" (Ken, 3rd year, C)

> "That's why I did biology O-level rather than physics or chemistry, because biology is studying something that is actually happenining in the world, studying life, whereas physics is just machines, and bits of chemicals, it didn't really turn me on as much."(Simon, 1st year, A)

Biology is, therefore, contrasted with the other sciences as a more relevant discipline, more 'human'; more like English, in fact. Saraga and Griffiths (1981) have argued that:

> "Biology...with its concern for living things, appears more personal and alive, and closer to the everday world of values and emotion, which women are expected to inhabit. Choosing the biological as opposed to the physical sciences thus involves girls in fewer contradictions and they receive more encouragement and support in their choice." (p. 85)

This is certainly borne out by the remarks of some of the female arts students. However, biology, as we have seen, was also perceived as more "human" by some of the *male* arts students; this preference was not the result of social pressure, but the consequence of an interest in people and in life over an interest in "things." In other words, students of both sexes articulated a preference for biology which was based on a

rational and coherent set of values, rather than a response to sex-stereotyping or "sex-role expectations."

Although some students framed their decision to study arts in the context of an inability to understand science, they were generally more positive about their decision to study English at degree level:

> "It was something I had an obvious talent for at school, and the one I enjoyed by far the most." (Ben, 3rd year, A)

A common perception of English (as of physics) was that it was a 'general' degree:

> "[English] is a very universal subject, you can do anything with it, it doesn't push you towards any particular career, it's a very good grounding." (Gary, 1st year, B)

English is perceived as a general degree because of its breadth; it appeared to open up a multitude of areas. Anthony, who had seven A-levels, spoke of his decision to take arts in these terms:

> "I decided my interests lay with the artistic side rather than the scientific side. I thought English particularly covered a wide variety of subjects - you can do psychoanalysis and philosophy, things like that within the English framework." (Anthony, 1st year, A)

It also allowed unique access to an understanding of the "human condition":

> "It broadens your outlook I think - I think it makes you feel an affinity to people in the past - just like a general human condition - people were having the same conflicts and worries thousands of years ago when they were writing all these poems that we're doing now." (Joan, 1st year, A)

Joan's perception of English is of a subject which creates links between people; which allows for the possibility of a common understanding. She hopes that she will be able to gain some insight, through the study of literature, into the spiritual - or at least emotional - world of human beings; physics students wanted to gain insight and understanding of the physical world. This statement may seem so obvious as to be hardly worth making; yet its ideological implications, as we shall see in Chapter 10, are crucial to our understanding of the social construction of arts and sciences.

Virtually none of the English students mentioned their future career as a reason for studying English at university. Some said that they were doing a *degree* to help them in their career, but even these were a very

small proportion of the whole. English was perceived more frequently as a liberal degree, broadening the mind, and definitely not as a vocational degree; in Chapter 11, we shall we see that even many final year English students were vague about their future.

The response of the communications students was more mixed, however. Most students wanted to enter the media, but they did not all enter the course for that reason. Many had specifically chosen a polytechnic course because they thought it more "relevant" (not just in the vocational sense) and more interesting than traditional university subjects such as English and sociology, and had chosen the course in the face of school pressure:

> "At school they kept saying 'Do an English degree', but I was so sick of doing things like Shakespeare; it was all theory and that's why I like this; it's things that you can see around you, so it's easier to understand." (Helen, 3rd year, C)

> "Everybody seemed to think that I should go in for a redbrick university at least and do something totally irrelevant like history. (Ken, 3rd year, C)

It should be said, too, that the choice was a genuine one; many of the communications students had excellent A-level grades and would have had no problem in getting into a university. Communications was consistently described by the students as more "broad-based" and more related to everyday 'reality' than subjects like English, which was perceived as consisting of irrelevancies such as medieval literature. The development of critical awareness was considered as complementary to, rather than in opposition, too, the aim of getting a job. Helen, for example, was very keen on becoming a journalist, but that was not the most important aspect of the course:

> "It makes you think a lot, not only about the media, but about politics, and about what goes on in the world, not just burying your head in books...Before I used to tend to shut myself off from thinking because it doesn't affect me,it doesn't matter. I think it does make you think about other people and other ideas that are going round." (Helen, 3rd year, C)

I have since seen Helen's name on the byline of an article in a national magazine, so she had obviously begun to succeed in her ambition; though it must be added that only a minority of graduates of the course do enter journalism afterwards. There is some degree of tension, too, in the fact that the course encourages students to adopt a very critical

attitude towards the profession that most of them want to enter, although this had not deterred them from wanting to do so.

It is significant that none of the arts students said that they were encouraged to take arts rather than sciences by their schools or by their parents. On the contrary; the student, for example, who had switched from engineering to communications had fallen out with his father over his decision; whilst another woman studying English had frequent arguments (albeit friendly ones) with her immediate family about the respective values of arts and sciences (all her family - mother, father and sister - were scientists.) Some students, therefore, had to resist pressure from families; whereas those students who chose science were supported, encouraged or even pressurised by their parents, those choosing to do English or communications went, to some extent, against the grain. Obviously there were other influences on students' decisions; the fact that most of the arts students came from middle-class backgrounds and had highly educated parents was in itself a major factor in their decision to carry on to higher education at all. But the choice of subject seemed to be less influenced by the school or by parents than in the case of the science students.

9.4 Conclusion

This chapter has looked at the background of the students in the interview sample. We have seen that there are substantial differences in the educational backgrounds and qualifications of the students admitted to them.

Academic background differed widely as well, there being a large gap between the courses which took on highly-qualified pupils (e.g. English at University B) and those which took on the lower qualified ones (e.g. the physical science course.) A very high proportion of students had come from grammar schools, given that these had already been abolished by most authorities ten years ago. We may remember from Chapter 6 that in 1982-3, only 2.8% of all school-leavers had been to grammar school, yet 27% of those in the sample had attended grammar school. Similarly, 5.7% of all school-leavers are from independent schools, but 16% of my sample came from an independent school. More women than men had attended a grammar or an independent school.

Women were also more likely to have been to a single-sex school - twice as likely in the case of the science students. Many of them, then, were entering a mixed educational environment for the first time in seven years, and the transition from school to college, it can be hypothesised, would be fraught with more difficulties for them than it would for other students. We can also hypothesise that the same would be the case for male students from all boys schools embarking on an English degree course.

We have also looked at students' experience of schooling and their reasons behind their subject choice decisions. We have found that some students felt dissatisfaction with their single-sex education, although some women felt that they had benefited from it. University students generally felt happy about the quality of their school education, and had always expected that they would eventually enter higher education. Some polytechnic students were more bitter about their schooling, in particular about the lack of advice they had received about higher education and alternatives to university.

Science students had chosen to study science because of its greater use-value in obtaining a job and because it appeared to quench students' curiosity about the world around them. Physics in particular was preferred becuase it necessitated understanding rather than learning and because it combined theoretical understanding with practical use. However, some physics students had enjoyed studying humanities and had artistic interests, and disliked the fact that they had had to make an early choice between the two.

The humanities students preferred subjects like English because they were perceived as more "relevant" - that is, more concerned with people and society. Many arts students also felt that they had been too weak at science to study it, although some had taken combined arts and science A-levels. English was held to be a broadening, liberal degree and students were not particularly interested in studying it for its use-value in getting a job. Communications students, however, were interested in the discipline because it was perceived as less academic, and more practical and "relevant" to everyday life. It was also considered useful in helping them to get a job, although this was not the only reason for studying it. It, like English, was perceived as a "broad" degree.

In the next chapter, we can see how these perceptions are carried through into a more powerful construction of the subjects; and in Chapter 11, we shall see their relevance for the construction of students' own identity.

CHAPTER 10: STUDENTS AND THE ARTS/SCIENCE DIVIDE

10.1 Introduction

Chapter 8 looked at the 'official' views of the six courses, and examined the ways in which staff on those courses constructed their disciplines; Chapter 9 examined the routes by which students came to make their subject choices and their reasons for choosing higher education. Using the data from the interviews with the ninety-six students, this chapter will look at the debates about the relative worth of the arts and sciences, and at students' own construction of their discipline through certain discourses. We are interested in the idea that the arts/science division is value-laden, and that students' preference for one discipline over another is related to their perception of what is, and what isn't 'valuable' knowledge. We have also suggested that these perceptions of 'value' may differ significantly between men and women.

The chapter is divided into two major sections. The first section will examine students' beliefs about the importance and value of their disciplines; it will also consider students' perceptions of other disciplines: arts' students views of science and scientists' views of arts. It will be noted that students' constructions of their own discipline is to a large extent dependent, in any case, on their construction of the 'other' disciplines; as we have argued elsewhere in this thesis, meaning in language is dependent on difference. The second section will examine students' response to the courses themselves; we shall look at the disjunction between students' ideas about the nature of their discipline and their experience of the discipline as it is taught in higher education.

We begin, therefore, by examining the students' construction of their own disciplines.

10.2. Constructing the subject: beliefs and values

i. Physics

Physics students made sense of their discipline through a series of dichotomies which contrasted the values embodied by physics with the values (i.e. weaknesses) of other disciplines. Chief amongst these were the following:

Physics	'Other'
fundamental	tangential
certain	uncertain

progressive	static
infinite	finite
difficult	easy
hard	soft
concerned with understanding	concerned with rote learning
relevant	irrelevant
useful	useless

This list contains all the dichotomies, either explicit or implicit, in comments the physics students made to me about their disciplne. Not all of these dichotomies were posed in terms of a physics/humanities divide. Some, for example understanding/learning and fundamental/tangential, were posed in terms of a physics/chemistry divide. Others, particularly hard/soft, have strong masculine/feminine connotations. Some (e.g. relevant/irrelevant) can only be discussed in terms of the implied criticism of the humanities, and are part of a larger arts/science contrast, and these will be dealt with in a later section. However, there are certain qualities which are seen to be peculiar to physics and these are crucial to our understanding of the construction of physics as a discipline. The first quality is the discipline's *fundamentality*:

> "I think it's the big mystery, isn't it, the unknown, things like this, trying to understand fundamental concepts of nature, it's quite exciting stuff." (Simon, 1st yr, B)

> "I think of physics as being fundamental. The things we're doing at the moment are getting more and more fundamental...I don't necessarily think that all these particle physicists are solving the world's problems - but it's fundamental in the way the world works." (Sally, 3rd year, A)

> "I'm finding out about the world around me in a fundamental sort of way, how things work - the usual rubbish. But I guess that's what I get from it." (Pauline, 3rd year, B)

The contrast with chemistry came up frequently, and there was often more than a hint of reductionism in the comparison:

> "The physics department would tell you that chemistry's only a bit of physics anyway." (Pauline, 3rd year, B)

Chemistry was regarded as a subject which was not fundamental; the issues it examines are not fundamental to the universe in the way that the issues of physics are; in this the views of the students can be seen to coincide

with the views of Dr. L., quoted in Chapter 8, who said that "all of chemistry is becoming explicable in terms of quantum theory."

Physics was also regarded as a subject which could be "understood"; chemistry - and subjects like French, history and so on - could only be *learnt*:

> "I think you have to know a lot [in chemistry], whereas with physics, what you hope to do is get general laws and principles that are applicable widely. With chemistry, things like organic chemistry, where you had to know every reaction, you couldn't work it out, you had to know everything that was going to happen - there wasn't a lot of understanding involved, it was mainly slogging." (Paul, 3rd year, B)

Physics is not only a more important and a more fundamental subject; it is also, it seems, a more *certain* subject. One student, who had transferred to physics from Medicine, explained the difference between chemistry and physics:

> "It [chemistry] wasn't a very positive subject. You always had a few explanations for why something did something and you could never pick out which - why it did it...you could explain it in several ways, and it just wasn't positive enough for me.
> KT: Is physics more definite?
> Yes, and more definite than Medicine as well. Medicine isn't definite at all; I just call it a positive subject - you always get an answer." (Rachel, 1st year, A)

The apparent certainty of physics creates the potential for *control*:

> "I suppose it's a way of looking into things and trying to predict. You just get a certain satisfaction at realizing how something works. (Rachel, 1st year, A)
>
> "The implications of it affect the whole world, it's everything, everything you do, and demonstrates how things work and why they work. " (Rashid, 1st year, B)

This all-encompassing quality reveals a strong desire amongst students to understand and manipulate their environment. It is a Baconian view, rather than an Einsteinian view; students have a strong faith in the capacity of physics to provide explanations of the way the world works. It is seen as revealing certain truths about the universe:

> "I think it's the diversity really, the number of things you can do in it [that appeals]. The classical thing is if somebody comes up to you and asks what a physicist does, that's the hardest question to answer. Because really, you're investigating what actually happens in life. I think that's the reason you enjoy it, because you can explain most things, most things you don't normally think of. The most surprising thing is if somebody turns round and asks you, like they did last year, 'Why is the sky blue?' and a thing a

> lot of people don't even think of, you end up being able to explain - I think that's the appeal of it." (Alan, 3rd year, A)

This curiosity, this quest for knowledge, which typified the attitude of many physics students, was for the never-ending mysteries of the universe:

> "It's an open-ended subject. If you study a lot of subjects, they come to an end, there's only so much you can learn about them. But with physics, it can go on forever, virtually." (Gareth, 1st year, A)

> "I always did a lot of background reading and was interested in what's happening in research and it's happening *now*, it's always progressing and it's always going on and you're never going to reach an end point, you're never going to reach a final point, whereas with something like history, I find it's interesting, but you're always going over and analysing what's happened, it's that much more backward looking, whereas science applied has got more constructive..." (Felicity, 1st year, A)

Physics was regarded as an infinite subject; it was the embodiment of a search for the 'truths' of the universe, which although progressive - i.e. we are always finding out new things - is unending: we will never find out everything. Many students obviously gained immense pleasure from physics, and real excitement in finding out about the world around them; it was by no means seen entirely - or even mainly - in terms of a job-qualification. However, it is significant that modern physics appears to have had little impact on their philosophy of physics; they still construct it as a subject which is capable of revealing absolute truths. One or two found the ideas of relativity, for example, a little difficult to grasp:

> "I found relativitiy a bit hard to understand to begin with - because if you haven't done it before, the idea that velocity is relative to everything else, I found hard to grasp, because, before, I just said, *that* velocity *was* a definite value - now you're doing it relative to everything else." (Lorna, 1st year, B)

Relativity and, more importantly, quantum mechanics, were not seen on the whole as a challenge to the idea of the *certainty* of physics; on the contary, they were often presented as proof of the exciting inroads physics was making.

> "It's mind-boggling more than anything else. It's just different people's ideas of what matter is made from, and how waves travel, it's really mind-boggling." (Nigel, 1st year, B)

A minority of students took a more thoughtful view of modern physics however. This is one student talking about how modern physics affirmed his Christian beliefs:

> "According to classical mechanics, in theory you could write down the position and momentum of every single particle in the

> universe; you could therefore work out how everything is going backwards and forwards in time, obviously by highly complicated equations, but in theory, everything's predicted so everything's totally determined from beginning to end; but quantum mechanics says that you can never record the momentum and position of everything identically because of the Uncertainty Principle. Nietzsche, the German philosopher, adduced his argument from classical concepts - 'This proves that there's no such thing as God' - but when quantum mechanics came along, it threw all that out of the window." (Colin, 3rd year, A)

Initially, Colin's argument seems unusual; the uncertainty of scientific understanding would appear to make religious faith more difficult to come by; however, Colin argued:

> "If you look around there a lot more physicists who are Christian than people taking the arts subjects and I reckon it could be that the arts bombard you with a lot of different views and maybe you find it hard to crystallize to say what you want; whereas in physics we get told precisely the answer and we realize that we don't understand it totally. The standard example is that science has disproved God. An arts student may have no arguments either way; they've just heard of this mystical thing called Science, but once you've been doing Science, you realise that a statement like that just does not hold water, and so it enables faith to come far more easily."

Colin was the only science student who touched on the relationship between science and religion. His remarks are interesting because they demonstrate a new way of looking at that relationship. Newtonian physics at one time seemed to give support to the idea that the universe was ordered and mechanistic and, therefore, divinely made; Darwinism challenged many of the basic tenets of Christianity, thereby setting science and religion in opposition and creating an important set of dualities - rationality/irrationality, reason/faith - through which we have come to construct science. Modern physics, it has been argued (by e.g. Capra, 1975), supports the view, held by certain eastern religions, that the world is fluid and harmonious. Here, however, Colin is using modern physics to support Christianity, on the basis that science cannot provide certain knowledge, and that we must therefore look elsewhere for certainty. It is particularly interesting that he notes that science has come to hold, for some, the status of a religion: students of the arts, for example, might regard science as "mystical." We shall discuss the attitudes of the arts students towards science later; however, it is worth noting that Colin's attitude to science bore a marked resemblance to some

of the English students' attitudes towards their subject. The following remark, for example, made in the realization that physics was both something less and something more than an objective body of knowledge, was very similar to remarks made by the arts students about about English:

> "I think it's more a way of thinking than knowledge really; because, a lot of the knowledge, I won't use two-thirds of it, but almost a way of thinking, a way of tackling problems, a way of discerning things."

That is, physics is a practice, a way of doing things, a means of interpreting reality, rather than a body of fact.

As has been argued already, most students believed that there *was* an answer, that physics did provide certainty; and they did not make philosophical connections between the ideas of modern physics and the existence or otherwise of absolute truths about the universe. One or two were aware that such connections could be made, that quantum mechancis was qualitatively different:

> "With classical mechanics, things tend to be all laid on a plate, there's not a lot of scope for intuitive thought." (Paul, 1st year, A)

> "I enjoy the more wishy-washy concepts - I wish perhaps I'd had the chance to do a physics and philosophy option - and it seems to me that when we do things like quantum physics nobody bothers very much with the concepts that that presents - they just tend to give you all the theory." (Julie, 3rd year, A)

Julie's language is interesting; implied in what she said is a hard/soft dichotomy; philosophy is seen as being less serious, less important than 'hard' theory; she is slightly embarrassed about wanting to do something which is apparently less difficult (and by implication more trivial) than straightforward theory. Julie, because she accepts the discourse of the other physics students - the idea that physics is 'hard' - devalues her own philosophical interests. The language of the hard/soft dichotomy, as argued earlier, is also the language of masculinity/femininity, and Julie is uncomfortably aware of the devaluation of soft/femininity within the physics discourse. This hierarchy within physics was also noted by Becher (1984), in his examination of the 'culture' of disciplines.

ii. Physical Science

It is more difficult to talk about the construction of "physical science" than it is to talk about the construction of physics, because physical science is not recognised as a discipline in the way that physics is. For many of the physical science students, the term "physical science" referred to the specific course rather than to a wider discipline; I therefore reserve many of their comments for a later section. However, there are some interesting comparisons to be made between the discourse of the physical scientists and that of the physicists. One of these is the physics/chemistry distinction which is, interestingly, maintained by the physical scientists. The students tended not to regard physical science as a unified discipline, and often complained that they disliked either the physics or the chemistry (usually the latter) aspect of the course. For example:

> "I find it difficult to remember so many different things about chemistry, where at least with physics I seem to remember what things are supposed to be about...with physics you see it and understand it and it's stored, with chemistry...there are so many complicated formulae and whatever you've got to look at it again before you can regurgitate it..." (Debbie, 1st year, C)

Another is that they retained some of the broader arts/science contrasts of the physicists: the progressive nature of science, for example, compared with the static nature of arts:

> "English doesn't change from year to year and history doesn't change and languages are just languages but physics and chemistry are changing constantly because new things are being discovered." (Lesley, 1st year, C)

There were also differences between the physicists and the physical scientists. I suggested earlier that one element in the construction of physics was the useful/useless duality. However, this was far less significant for physics students than it was for the physical science and materials students. Amongst physics students, the intellectual appeal of the subject - its certainty, its fundamentality, its discoveries - was its most important quality. Very few students talked about their subject in terms of its social utility. Even when they did, it tended to be in flippant terms; for example, one student remarked that without physics "we'd be in a right mess for a start"; another that "we'd still be in the caves". Sometimes, as we saw in Chapter 9, they stressed the usefulness

to their own careers of studying a science degree, and this was for some the determining factor in choosing between science and arts. Amongst the physical science students, personal utility was seen as crucially important, although sometimes social utility and personal utility were confused, students not distinguishing between the two. Often, it was not only the arts which were seen as less useful, but university subjects like physics: the physical science degree was regarded as one which was more useful for getting jobs in industy. (As most of the physical science students had originally hoped to go to university, this seems to be a case of post-rationalisation.) This attitude - stressing the instrumental value of a degree course - is taken to its extreme in the following quote, where a student who wants to take up materials science is criticising physical science:

> "I can't see physical science being as useful as a materials degree. I think it's more constructive; we're always going to make weapons of some kind, ships of some kind, boats, we're always going to drive some kind of vehicle, and we're always going to need hospital equipment." (Lesley, 1st year, C)

Very few physical science students stressed the intellectual enjoyment of the degree course. They all thought that the value of studying the course lay in the career opportunities it opened up - what Gibbs, Morgan and Taylor (1984) describe as an "extrinsic" motivation. For example:

> "I think our course is quite good because of the energy situation. I think chemistry and physics students are quite a good thing to be at the moment." (Dipak, 4th year, Physical Science)

> "If you want a highly paid industrial job with a lot of responsibility you've got to do a science degree." (Linda, 4th year physical science)

"Usefulness" was a key component of the physical scientists' evaluation of their discipline; and "usefulness" referred to the capacity of the degree to get them a well-paid job. Their attitude to the course, more so than that of the physics students, was an instrumental one; the course was a means to an end. Amongst the English students, however, "use" was far from being a significant part of the construction of the discipline.

iii. English

Like the physics students, the discourse of the English students consisted of a number of dichotomies in which English was rated

positively and other subjects, particularly science, were rated negatively. However, the dichotomies of the English students only overlapped partially with those of the physics students. Those that did were the dichotomies of relevant/irrelevant and certain/uncertain; like physics, English was perceived as being more about 'real life' than other disciplines; unlike physics, it was regarded as 'uncertain', but this, interestingly, was regarded as a virtue, not a deficiency of the subject. However, English students also made use of a number of other ideas not present in the discourse of the physics students:

English	Science
Broad	Narrow
Flexible	Rigid
Tolerant	Intolerant
Individualist	Conformist
Moral	Amoral

Obviously, not all the students made use of all these dualities; and not all of them saw science as "narrow, rigid, intolerant", and so on. Some students, as we shall see later, adopted a "live and let live" attitude towards science and some had scientific interests. However, whereas physics was often seen in opposition to chemistry as well as to the humanities, there was no counterpart amongst English students whereby history, say, represented values which were in opposition to English. Where English was thought of in terms of "difference", it was always in terms of difference from science.

The dualities listed above represent a different set of values and priorities from those held by the physics students. Let us examine the first of these: 'broad' and 'narrow'. English was perceived as a subject which was not tied to one area, but which covered many different subjects:

> I think with a subject like English you can cover a lot of other areas of learning, subjects like psychology, sociology and even science in a way, but it's with an art form, so it's much looser, and yet in a way in literature you'll cover subjects like sociology and that but you're not tied to theories, it's much more interesting." (Geraldine, 1st year, B)

> "There's a certain attraction about English...it's like a Jack of all Trades in many respects because you're reading Literature, the source of all knowledge, as it were, or a good proportion of it; you've got to dabble in virtually every subject, you've got little bits of everything I think, and it's a broad subject, that's why they call it a general degree." (Ben, 3rd year, A)

'Breadth' as used by the English students had more than one meaning. Partly, it meant being able to study a lot of different subjects - such as psychology, sociology, history, philosophy - in one discipline. But also it meant 'tolerance' - understanding that other people have different viewpoints without any one view necessarily being 'right':

> "I've learnt a lot more about the way people think, the way people's thoughts are put down in literature, and I think that helps you in life generally, just some knowledge of how people have reacted to different situations." (Lee, 3rd year, A)

> "[I've gained] an improved capacity for understanding or analysing things, just a more varied approach or a more varied way of thinking ... because you're just reading someone's personal viewpoint all the time, so you have to jump about a hell of a lot...you read Wordsworth one week and his view on the imagination and Nature and then you read Blake or somebody who'll argue the opposite, but also take things from it and so you just get flexibility." (Daniel, 3rd yr, B)

Students felt that they gained from being given access to a variety of ways of looking at literature, and at life; this recognition that there is more than one perspective on a subject and that many people have different views led to a celebration of 'uncertainty' - a belief that a multiplicity of viewpoints was better than a single 'truth.' One student, when asked what he felt he had gained from the course, replied:

> "I can't say any great philosophy of what to do with my life or something - quite the opposite actually. I'm less certain than when I came here I think...English is very good as a touching stone for everything; you can do what you want with it, look at it historically, or become more politically aware, look at it through language, it's all different ways of redeveloping your notion of what reality is."(John, 3rd yr, A)

The idea parallels that of Colin, the physics student who saw physics as a "way of thinking, a way of tackling problems." John sees English as a process, a way in which we can look at and interpret the world; although many science students saw arts subjects as static, because they are not a growing body of knowledge, John sees English as fluid, ever varying and ever changing. He rejects the idea the imposition of any one point of

view; when talking about his favourite authors on the course, he gave a more precise example of what he meant:

> "I suppose I'm interested in books in which you don't feel you're getting any unified reading laid upon you - I don't like Lawrence at all because I feel there's a sense of imperatives about him which I don't like at all - someone like Virginia Woolf I'm much more interested in, the way she uses language."

This pluralist ideal was echoed by other students:

> "I like working with ideas, and I think I like the idea that literature doesn't tell you anything which is true, it doesn't make any claims, or even when it does it knows that it's lying, that's how I like things anyway, and I like things to be ambiguous, I don't like the lie of science which claims that it is true when it isn't, because even science is just based on ideas, as is literature. None of it is proved, it's proved until something else is discovered." (Terry, 3rd year, A)

This rejection of authority, this assertion that there is no absolute truth, when contrasted with the physics' students claims of certainty and objectivity for their subject, matches the divergent/convergent pattern that Hudson (1970) found amongst the science and arts specialists in his sample. However, whereas Hudson saw this as a reflection of personality differences, the English students in my sample held an *intellectual* attachment to notions such as breadth, pluralism and so on. Whereas the physics students believed their subject to be objective (and therefore more important), English students valued their subject for those qualities most devalued within the physics discourse: subjectivity and individuality:

> "...I know people are really into maths, but they have lectures where they learn most of the stuff and they have a tutor...but they don't have a seminar where they can sit down and discuss it and say *this* is my point of view, this is how *I* feel about it, this is how *I* react to it, and I think I enjoy the freedom of that, it's very much *me* reacting to it, and it's not that that's right and that's wrong, it's me as well." (Jean, 3rd year, B)

The word Jean uses - freedom - is important in the idea of individuality. The English students very much disliked being tied down to a single viewpoint; an important part of doing English was the freedom to disagree with the established point of view:

> "It's not so much being taught, it's more just developing yourself, so if you've got a completely opposing idea to what your tutor does, then it's perfectly all right, they make you feel it's all right; it's hard to do that at first, but then you learn to, you learn to form your own opinions and teach yourself -

> English is a teach yourself subject really - although you discuss it with tutors and that, you have to formulate your own ideas and your own opinions in the end." (Kate, 1st year, A)

> "I don't like going by standard opinion. If I know what the standard opinion is, I'll try and look round it to see if there's another way to interpret it." (Sharon, 1st year, B)

These four concepts - of breadth, tolerance, uncertainty and individuality - are all inter-related; they were all seen as innate characteristics of the discipline, which did not exist independently of each other. There was a fifth strand, however, running through the answers of some of the students, which indicated, for many students, the *value* of the subject, and that is its moral (in the Leavisite sense of the word) aspect. Many students clearly believed that English was a subject which dealt with moral issues, and it was important for that reason. This is one first year student, for example, enthusing about the subject:

> "Somebody said to me once, 'English is studying the soul of people' and I thought that was really good, because it *is*, and you can understand people more, and you can understand History more, the history of what happened, and people in situations, and understand things that are connected with the modern day...it's got history in it, sociology and psychology." (Kate, 1st yr, A)

Kate is arguing that English gives the student empathy, an insight into the lives and minds of other people; another student expresses the same opinion:

> "What I like about it, I think, is that it does reflect life and you can read something and it gives you a different viewpoint on things that perhaps others before you have experienced." (Joan, 1st year, A)

English, then, gives students the opportunity to engage with human issues, the experiences of a variety of people; it gives them access to a variety of ways of interpreting and understanding the world. For this reason, many students felt English to be a more moral subject, which enables them to relate to the experience of other human beings. Time and again, students said that English was more relevant because it was about people, rather than about things. Just as many of the science students said that physics was about studying 'life' or 'the world as it really is', so the arts students argued that the arts were about *reality*:

> "I think arts are relevant to the world today...you actually learn something about life, whereas science, it might get you a job, but you haven't really learnt anything about what's happening in life, have you?" (Simon, 1st year, A)

> "English has more room for feelings in it...I think maths and that are much more schematic sorts of subjects; they seemed to me to be much less connected to the real world. Maths seemed at the time to be very abstract and it was very hard for me to connect it to the real world." (Anthony, 1st yr, A)

There is a very strong feeling, then, amongst these students that English is more in touch with reality; that anything more abstract is divorced from 'life'. In Chapter 4, we noted Eagleton's comment that "English students in England today are 'Leavisites' whether they know it or not." This assertion is borne out by much of what the English students said to me about their subject. Their stress on the breadth of the subject - the fact that it could encompass so many disciplines and therefore, by implication, was superior to them - and their belief in the subject's relevance to society and people's lives, and their emphasis on the moral questions the subject raises, reflect Leavis's own views of English as a practice which, in the words of Knights, "deepens our humanity." English has to be the most important subject because it is the only one which involves students in thinking about moral problems; and the only books worth studyng are morally serious ones. That this vision is derived directly from Leavis is not, in fact, something that would be clear to most of the students who held to it. Contrary to the claims of lecturers in B (quoted in Chapter 8), who argued that students picked up literary theory as they went along, most students were quite unaware of the multitude of critical attitudes that could be adopted to the study of literature; and those who did, with a few exceptions (one or two Marxists, for example), either rejected the alternatives in favour of liberal humanism, or were very naive about the nature of those alternatives. (One first year student in A, for example, newly introduced to different critical approaches, thought that it was possible to pick and choose a critical approach as appropriate. He thought, therefore, that a feminist approach was only suitable for certain texts; the Victorian novel was open to feminist criticism, but it would be pointless to criticise 'Paradise Lost' from a feminist viewpoint because that text was written about a time when feminism was not relevant.)

It should be noted too, however, that there is an important difference from Leavis. Leavis was particularly authoritarian when it came to discussing the issue of which literature was worthwhile and which not;

the students in my sample were strong in asserting their right to their own opinions, and in rejecting the imposition of an uniform point of view. Having said that, very few of them seriously challenged the right of the departments to define the syllabus or the content of the course. The few who did, those who recognised liberal humanism as a single approach, and who chose not to subscribe to it, saw the study of literature as serving a different purpose. Anthony, a first year at A, said:

> "Most arts tend to become part of ruling-class ideology, really, they tend to support an élitist sort of social structure and one reason, as far as I'm concerned, for doing English, is to subvert that, but how far it can be done is debatable."

The wry recognition, at the end of that quote, of the impotence of the individual in the face of the social order, illustrates Anthony's awareness of the gap between his view of English and the dominant view. In Section 10.3, we shall examine the tension between the stated ideals of freedom of opinion, and the need of the department to maintain control over what is taught and believed.

iv. Communications

The communications students' construction of their discipline was similar to the English students' construction of theirs. In particular, they emphasised the breadth of their subject and the fact that it encompassed many different areas:

> "Whatever you learn about a particular subject you learn a lot more about the ways of thinking about any subject at all...On a course like this, whatever you learn is disproved the next week, so concrete-knowledge wise it hasn't given me much, but it's given me lots of ways of approaching problems." (Mark, 3rd yr C)

> "The course has made me much more socially aware. I think how much I've done that I really wouldn't have know about if I hadn't done this course. Most of the things we've done seem to be of relevance to some other area - media, sociology, psychology, political processes... there's a lot of things I look at now in a totally different way." (Ken, 3rd yr C)

> "Communications is such a vast area, you can draw from virtually any subject the polytechnic does." (Andrew, 1st year, C)

Simon's view coincides with that of certain of the lectures quoted in Chapter 8: he sees communications as a practice, rather than as a body of knowledge.

Similarly, communications students saw the discipline as subjective, individual; they felt free to make up their own minds:

> "Everything's interesting, it's not facts, it's your own view. Nothing's right or wrong, it's all debatable which is good." (Rebecca, 1st year, C)

Like English, the discipline was regarded as more "relevant", in the sense that it discussed immediate issues concerned with the lives of people:

> "It makes you think such a lot, not only about the media, but about politics, and about what goes on in the world, not just burying your head in books. Before I used to tend to shut myself off thinking because it doesn't affect me, it doesn't matter. I think it does make you think about other people and other ideas that are going around." (Helen, 3rd year, C.)

Communications was seen as a vehicle for understanding all sorts of important social issues. The issues it is concerned with, however, are more immediate than those dealt with by English; whereas English students often thought that studying the views of writers in the past could help them to a general awareness of the problems of humanity, the communications course was much more concerned with the here and now. The Clive Ponting trial in 1985, for example, was discussed on the media policy course and used as a focus for discussing a variety of political and social issues. Many of the communications students believed that communications was a more "relevant" subject than most university disciplines, as can be seen in a phrase used by Helen in the above quote: "burying your head in books." The students tended to be anti-academic and regarded traditional university arts subjects such as English or history as élitst and remote. In this, they bore some affinity with the physical science students: they believed in the practical relevance of the discipline to everyday life. In addition, they felt some extrinsic motivation in doing the subject; they stressed the intellectual aspects of the course, but also its importance in getting them jobs:

> "I wanted to do something that wasn't totally academic with a bit of practical work. I'm good at languages and communications seemed logical. And I'm interested in the media, and I think there's a growing market there and a lot of job opportunities." (Sandra, 1st year, C)

> "It's a broad-based degree. It's got so many facets to it - all the areas it covers are areas that vaguely appeal to me as areas I'd like to go into afterwards. It's basically that I can go into virtually anything afterwards." (Harry, 1st year, C)

However, the communications' students emphasis on breadth, individuality, freedom of opinion, and the importance of social issues, meant that their world-view resembled that of the English students far more than it did that of the physical science students.

Students of all four disciplines, then, had strong views on the particular qualities of those disciplines. Students of English and physics, especially, had formed coherent and consistent 'paradigms'; physics was believed to be fundamental, certain and infinite; English was seen to be broad, uncertain and subjective. Physics was regarded by most students as a body of knowledge; English was regarded by its students as a practice, a way of approaching knowledge. Whereas all students claimed "relevance" for their subject, relevance differed in meaning for arts and science students; to scientists it meant "useful in understanding the universe"; to arts students it meant "useful in understanding human society."

It would be wrong to present these two paradigms as symmetrical, however; an essential part of the physics paradigm was its belief in one truth, one unified sum of knowledge; the essence of the English paradigm was its tolerance of a multiplicity of ideas and ways to the truth. In that sense, we can suggest that a physicist will be more likely than an arts student to reject ways of interpreting the world that do not coincide with his or her own way: a proposition that we can consider in the next two sections.

10.3. Arts and Sciences: Mutual Perceptions

i. The Science Students

Given that the meaning of 'arts' and 'science' is dependent on the differences between them, it is necessary to look at scientists' perceptions of the arts, and vice versa. It has already been argued that physics is constructed through a series of dualities in which physics is rated positively, and other disciplines, chiefly the arts, are rated negatively.

One of the dualities noted was that of hard/soft; another was that of difficult/easy. These were articulated more often when students were invited to talk about the arts than when students simply talked about

physics. The mention of the word "arts" often brought out feelings of resentment in physics students about the apparently easy time arts students had of it:

> "More work has to go into a science degree than an arts degree...I see arts' students' timetables, an English student comes in for two hours a week, and he's home for the rest of the time. I just think we do a lot more work than they do." (Dipak, 4th year, C)

A first year physics student told me that he had thought of transferring to an arts subject, maybe psychology, in the first few weeks, because:

> "I thought it'd be a lot easier because arts students get about ten lectures a week...we had thirty lectures a week, or something like that." (Rashid, 1st year, B)

The same theme recurred frequently; because arts students had few timetabled hours, science students tended to assume that they did little work, although one first year physical science did note that most of her work was done in lectures and labs, whilst many girls on her corridor had a lot of background work to do outside timetabled sessions.

In addition, science students thought that arts students had freer relationships with staff, and this resulted in an attitude of some disdain towards the arts:

> "Some of the courses I know, lecturers go drinking with the students and everything, but they're all older, suits and ties and things, there's nothing wrong with that, you just know them to be a lecturer and get on with the work rather than thinking, 'we had a nice drink last night, didn't we?'" (Debbie, 1st year, C)

Implicit in that quote is the idea that science is more serious because of the more formal nature of staff-student relationships. Physics and physical science students had a strong sense of the hierarchy of different disciplines; Debbie, for example, described business studies (which she had originally hoped to study at university) as a 'soft option'; a first year physics student at A described astro-physics (a course also run by the department) as 'watered-down physics.' The language of 'hard' and 'soft' subjects - which can extend into the discipline itself, as in the derogatory description of astro-physics - reveals a perception of academic study in which subjects are tiered, with 'hard' sciences at the top and 'soft' arts at the bottom. The harder the subject is, the more work students have to do, and the more formal are relations with staff. Subjects in which it is possible to have fun are not serious subjects. These divisions made between different types of

knowledge and learning support Bernstein's (1970) view that "the stronger the classification and framing, the more the educational relationship tends to be hierarchical and ritualised".

Students also showed an impatience with the intangibility of the arts:

> "Languages and stuff seem to be boring. You're just looking at words every day. With physics, you find things about the environment, you know, things you wouldn't normally think about." (Stephen, 1st year, C)

> "Physics is more or less talking about actual things in life. That's the difference between arts and science, because you've actually got something there you can look at and study, so you're talking about facts, whereas in the arts side it's all airy-fairy and you're beating about the bush a lot. I'm not one for doing things like that. I'd rather have something there that I can look at and take hold of ideas, and actually get to grips with something that's actually there." (Nigel, 1st year, B)

The language used by Nigel is particularly revealing: "airy-fairy", "beating about the bush", "get to grips with." It reinforces the idea of science as more relevant, more concerned with reality and more certain. It shows a desire for an orderly and methodical way of examining the world, and a dislike of detached contemplation or philosophical and intuitive ways of understanding reality.

The most common criticism of the arts and the most strongly expressed, however, was that they are "useless", that is, not so much that they are useless to society, but that they are useless to the individual. This criticism was expressed most often by physical science students, but it was also made by physics students; for example:

> "You think at times that some of the arts subjects especially, they're not actually used, let's say, very few people do use them afterwards. They're more qualifications rather than something you've learned to apply." (Alan, 3rd year, A)

> "There's a friend of mine doing Anglo-Saxon, Norse and Celtic - what on earth is she going to do with that afterwards? She's going to have to work in a museum for the rest of her life!" (Natalie, 1st year, A)

Several science students seemed to believe that there was very little that an arts degree qualified graduates to do. Often, it was argued that science degrees qualified students to enter "general" jobs such as management as well as specialised scientific ones, whereas arts students could only apply for the general jobs. On more than one occasion the view was expressed that "physics is the best degree you can get" -

because employers looked on it favourably. In this emphasis on personal success and achievement we can see a strong thread of individualism in the physics students' world-view; they are keenly aware of competition between individuals both in higher education and in the labour market. Physical science students were particularly harsh in their indictment of the "uselessness" of the arts:

> "I'm not into education for education's sake. It's a waste of tax-payers' money. I couldn't motivate myself to do it just for the sake of it." (Vicky, 4th year, C)

> "...I think it's a lot more worthwhile doing a science degree because a lot of arts degrees don't lead anywhere because then you have to find a job...they're not leading to a career of any sort...I feel they're a little bit of a waste of time...the course I'm doing, I'm gaining knowledge which I can use; which, I mean, you can't really use a history degree unless you're going to be an archaeologist or an historian or a teacher." (Debbie, 1st year, C)

> "I can't see what's constructive about French or Spanish, unless you're going to be an interpreter for the European Council, but there are so many people wanting to do things like that, plus I was never language-orientated, but it never appealed to me." (Lesley, 1st year, C)

> "It seems that if you've done an arts degree, apart from social science, then really you're in line for jobs that science students go for as well, whereas arts students can't go for science degree jobs so you've got more scope to apply for. My tutor was saying to me that when he did his degree twenty odd years ago, he knew everything there was to know about chemistry, but because it's growing, because it's new, you've always got to keep up with it, whereas history doesn't change, does it, apart from you add a bit on to what happened last year; with chemistry it's constantly changing, you've always got something new to learn, you never stop really." (Felicity, 4th year, C)

A feature of all these quotes is that they conflate the social and the personal; Vicky, for example, argues that the arts are "a waste of tax-payers' money" and then says "I couldn't motivate myself to do it." The idea that education should be functional for the individual is confused with the idea that education should be functional for society. Debbie uses three ideas common to the science students: one, that science degrees are more useful in enabling students to gain jobs; two, that a degree is a process of "gaining knowledge" which can be applied (this contrasts with the view of arts students that degree courses provide students with ways of thinking about problems rather than concrete knowledge); three, that the knowledge gained in a degree such as history

can only be applied in limited ways and therefore a limited number of jobs is open to the history graduate. Debbie's view of knowledge as a body of fact means that she does not regard the acquisition of skills, ways of thinking about and approaching problems as an important part of learning and does not, therefore, consider their potential usefulness in jobs. Neither does she consider the possibility that there are reasons for doing degrees other than as qualifications for jobs; therefore humanities degrees are a "waste of time."

Like Debbie, Felicity starts from the premise that the point of doing a degree is to get a job, as we can see in her statement that science students are able to apply for a wider range of jobs than arts graduates. Obviously, if one does not start from this premise, then the point about the wider range of jobs is no longer relevant; the belief that degrees are taken in order to get jobs is so much part of the physical science students' taken-for-granted ideas about education that it remains implicit rather than explicit. Felicity's other principal assumption is the same as Debbie's: that learning is about the acquisition of a body of knowledge. When learning is viewed in this way, students often, as argued in section 10.2, regard science as progressive, and the arts as static; science as infinite and the arts as finite. It is this belief that enables Felicity to say that her tutor had at one time known "everything there was to know about chemistry" and that "history doesn't change...apart from you add a bit on to what happened last year."

The perceptions that most science students had of the arts, then, are grounded within a dicourse which regards education as as primarily functional, believes learning to be concerned with the acquisition of knowledge, and views the relationship between different types of knowledge as hierarchical. It would be wrong, however, to suggest that all the science students disliked the arts. Physics students were more tolerant than physical science students; and amongst the physicists, women were more tolerant than men. It will be remembered from Chapter 9 that some physics students had had difficulty choosing between science and arts at A-level, and these students, like those who had interests such as reading or music, were usually more broadminded than those who had always regarded themselves as scientists; for example:

> "In a way, long-term, something you do in science is possibly going to be of more value, but it's very necessary, I think, literature and things like that are very much part of your life, you'd go mad without them, I certainly would; so I don't think you can really assign values like that - it's just where your personal interest and qualities lie, what you're best at." (Felicity, 1st year, A)

> "I see education as far more than just training you to go out and do a job, and I think the whole learning process, whatever you're learning, matures you into being capable of taking responsibilities and learning other things, and I think arts subjects do that just as well as science subjects." (Julie, 3rd year, A)

Even those who, like Julie and Felicity were tolerant of the arts, were clearly aware that sciences were generally perceived as superior; Julie, for example, noted that "arts subjects do that *just as well*" , whilst Felicity went on:

> "*I don't look down* on arts students, though I do moan about their empty timetables, but then, someone doing a German degree, no way could I do that, I have the greatest respect for them." (*my emphasis*)

A physical science student showed a nice awareness of the science/arts hierarchy when, talking about her brother who was doing a Fine Art degree, she said,

> "He thinks I think I'm better than him because I'm doing a science degree and he's doing Fine Art." (Linda, 4th year, C)

These students were aware that they were being magnanimous towards the arts; very few conceded that the arts might have more to offer than sciences. One who did made the same point as many arts students:

> "I think university just trains you to think and to prove to an employer that you can apply yourself for three years; perhaps because in the sciences you learn things that will be relevant in your career, but as a training for an individual I don't think it is any more worthwhile. In some ways, in fact, it's a bit less worthwhile, in that you tend not to think about social matters, people's characters and things like that." (Patrick, 1st year, A)

Another expressed the same view:

> "Only from your own personal practical point of view is it [physics] more worthwhile, getting a job at the end...but I think a lot of people who come to university and do a degree do a job that isn't related in any way and what they should get out of university is social skills, and enjoyment, they should enjoy the course, so they should do the course they want to do, I think, in as many cases as possible." (Paul, 3rd year, B)

In Chapter 9, it was noted that some science students had made the choice between science and arts on the basis that it was easier to keep

up with arts in one's spare time than it was to keep up with science. It is perhaps interesting that some of them, because of the volume of work, had had difficulty keeping to this, and that those who had - Natalie, for example, who played a trumpet in a band - found some tension between their course work and the time they wanted to devote to their hobby. The attempt to bridge the arts/science divide was, in many cases, doomed to failure, with the result that students felt forced to make a choice between their coursework and their outside interests. This will be discussed in some detail in section 4, and also in Chapter 11, which will look at the implications of the arts/science divide for the construction of gender identity.

ii. The Arts Students

Most of the arts students were strongly aware of the hostility towards the arts felt both by society in general and other students in particular. Very many of them were defensive about their subject, and several of them mentioned having arguments with other students (usually engineers) about the value of studyng English or communications:

> "As soon as you tell somebody that you're doing an arts degree the first thing they think is you're a dosser, just not doing anything, just lazy, wasting your time. I just don't understand it because it's not like that at all." (Kevin, 1st year, B)

> "When I came here I was quite surprised at the amount of rivalry there was between different students. One night we were in our common room, and a couple of third year engineering students came in and they said, 'you're just wasting time, you know, doing a Mickey Mouse degree, you might just as well be doing drama and theatre studies or something, film studies, something like that, what job can you get at the end of it.'" (Gary, 1st year, B)

The two criticisms arts students said they received from scientists were that arts degrees didn't involve much work, and that arts degrees weren't useful. The response of the arts students to the former charge is that arts degrees demand a lot of work; not timetabled work, it is true, but independent work in one's own 'free' time - reading, using the library, writing essays. As one English student commented:

> "In science subjects you get lectures and you get told everything and taught just about everything, and it's just a question of learning it. I know everyone says English is a dossy subject, and you just get one seminar a week and one tutorial a week, but the

> science people get spoon-fed much more than we do." (Kate, 1st year, A)

Science students, of course, said that physics involved understanding, whereas the arts involved 'learning'; but it is undoubtedly the case that much of the timetabled science work was 'passive' - sitting in lectures taking notes, carrying out pre-set experiments in the lab.

Students answered the criticisms about English's 'uselessness' by arguing that getting a job was not their principal reason for doing the subject; as Gary said:

> "A lot of people have an idea that 'I'll go to university to do business studies, or accountancy, a degree where I can get a job after it.' And they always say, 'What job can you get with an English degree, you'll end up on the dole and take more money out of the state', and all this junk, and the way I see it is that I've come to university to read English and further my education, I'm not seeing it as away of getting into a job. I want to further my education, and I think that if you get a reasonable degree, whatever subject you get it in...it will show someone in the future that you have a capacity to absorb things, a capacity to learn, a capacity to just analyse; it shows you have some sort of mental capability. Though what I'm getting out of it is that, hopefully, I'll be enjoying the course, I'll be furthering my education, I'm really interested in the whole mass of literature, I find it fascinating, so I'll be trying to get better educated and in the end - I hope I'll get a job in the end." (Gary, 1st year, B)

Gary's argument is not entirely consistent: he says that he is doing English with the aim of bettering his education, not with the aim of getting a job, but goes on to say that any degree proves to employers the ability to think and to analyse. The contradiction arises because English students are aware that English doesn't fit them for a particular career, whilst also being aware that a subject which only has intrinsic worth, which doesn't provide any kind of a training for a job, is considered to have little or no value within the dominant ideology of society.

The English and communications students did not spend all their time on the defensive, however. Many felt antipathetic towards science and scientists; indeed, the very mention of "science" produced a surprising number of invectives against scientists, as we shall see shortly. The arts students' criticisms were the ones we might expect, given the comments in Section 2. Science was, firstly, regarded as too certain, too definite:

> "With science, it's so final, absolute, empirical, positivistic, there's a right answer and there are an infinite number of wrong answers, but with the arts and economics to a certain extent, there's no right or wrong answer really, it's what you feel, what you think and you can put forward a view of your own which may or may not agree with the general consensus, but which is just as valid." (Charles, 3rd year, C)

This certainty is hampering, leaving no scope for original thought or individuality:

> "They're all working at something that's already been proved, so they're just experimenting on something that's been proved and is a theory whereas on arts courses you make up your own answers and your own theories - there *are* theories that have been made, but they're debatable...it seems pretty pointless to me." (Rebecca, 1st year, C)

Many arts students wanted the freedom to think out ideas for themselves, to have control over their learning, rather than to learn a pre-defined set of ideas. The consequence of having to think for themselves, according to some of the students, was that arts students were much more broad-minded than the scientists:

> "I prefer the liberal environment of arts subjects because the sort of people who come to do arts subjects are usually the sort of people who do have broad minds, rather than - the worst thing I've noticed here is people in my kitchen just talking numbers and calculations and theorems and equations, it just drives me up the wall." (Robert, 3rd year, B)

> "I think English, arts degrees in general, demand a bit more original thought than a science degree - though I'm so biased it isn't true - though I do tend to think that artists at university are more open to ideas and tend to be better company." (Jennifer, 3rd year, A)

By "broad-minded" and "original", the arts students tended to mean, "more interested in people", and the most common criticism of science was that it was about things, not people, and was thus remote from reality. Science was perceived by many of the students as inhuman and irrelevant to 'real life'. Scientists, therefore, were commonly seen as anti-social. A number of respondents regarded science students as boring and unfriendly:

> "I think arts students tend to be a lot more amiable than a lot of the science students. You can spot a science student a mile off round here, they're horrible people." (Simon, 1st year, A)

> "I do think that there is a different temperament between arts and science students, I'm pretty sure of it. And these terrible stereotypes: we're supposed to be terribly arty, and then you get

> engineering students who are a classic stereotype - weird and introverted and strange, and they do exist, just as much as the arty English student exists. Stereotypes are perhaps wrong, but there's always a precedent for them." (Daniel, 3rd year, B)

Another student recalled his first day at the polytechnic:

> "We came up to the union the first night and everyone around us was engineers; you could tell, it was that kind of leather jackets, Motorhead albums, greasy hair, and they were all talking about sprockets and engines, really really boring, and I thought, 'Oh no, they're all going to be like this!' but all the communications people were really different - they stuck out because they talked about more interesting things." (Harry, 1st year, C)

For the arts students, however, it was not simply a question of scientists being interested in different things or being introverted. There was a strong feeling that science students were conformist (because they were not encouraged to think for themselves) and immature, as the following diatribe indicates:

> "There is a running joke that the typical science student, the typical engineering student, is wearing one of those duffle coats with hoods that look like a snorkel, an adidas bag, flared trousers, long hair ('cos he's nine times out of ten a bloke), long hair, slightly greasy, glasses and a few spots, and nine times out of ten that's what the stereotype is like because they are those sort of people who are interested in science and don't take good care of their appearance or, boys, being away from Mummy for the first time don't know they should wash their hair twice a week; they all eat beans on toast or go to the cafeteria - the cafeteria's full of people at breakfast times who are science students because they don't know how to cook their own breakfast." (Susan, 3rd year, B)

Susan's image of scientists excludes women; indeed, none of the arts students talked about female scientists - neither about their impressions of them nor about friendships with them. Ben, a third year at A, during a discussion about staff-student relationships, mentioned a male friend who did mining engineering, and the comment he made indicates the masculinity of the world inhabited by the students:

> "...there's about twenty in his year and I mean, they scream obscenities at their lecturers and throw things at them, and if I did that with mine - well, I wouldn't dream of doing that, you know, they're very much the teacher figure."

One of Dale's (1969) arguments in favour of co-educational schools was the civilising influence girls would have on boys; one wonders whether the same argument might not be equally valid in higher education.

It will by now have been noted that, for many arts students, the word "science" always conjured up images of engineers, who were the focus of much of the hostile feeling towards science. Engineers were held to be the model of instrumental, narrow-minded and conformist thinking; arts students never mentioned physicists or chemists when asked about their views on science. This distinction between engineers and other scientists may have some grounding in reality when it is remembered that the physical science and materials students (whose discipline was applied rather than pure science) were more instrumental in their attitudes towards education than the physicists.

Those arts students who saw scientists as conformist, immature and anti-social believed this to be a direct result of science itself; because the teaching of science involved so little questionining and debate its students were unable to develop normal communication skills. They saw scientists as shut up in a world which was remote from everyday concerns; one criticism was that scientists lacked a sense of the aesthetic:

> "Science is basically an aesthetically-lacking subject. The people who do it have got no appreciation of aesthetic principles. People who have done it have got very little interest outside the field." (Harry, 1st year, C)

> "It's just dead...there's no soul to it." (Jack, 1st year, B)

However, the final indictment of science, amongst the arts students, is that it is "amoral." We have already seen that many arts students talked about English as a 'moral' subject, one which raises serious issues. For them, science is incomplete because it ignores those issues. One communications student, for example, complained about the science students amongst his friends:

> "I mix a lot with the computer crowd and a lot of engineers - I don't know whether it's mere prejudice on my part, but they seem to be so insensitive, politically and morally." (Mark, 3rd year, communications)

When asked whether this insensitivity was a direct result of studying science, he said:

> "I'm sure of it. I'm absolutely sure of it. There's no reason why they should all be sexist racist fascist bigots. They're not - but it seems like that sometimes."

His explanation for the attitudes of the scientists again stressed the conformist nature of the disciplines:

> "All their lecturers wear suits, and they all work solidly all day and very little in the night. It's like the work thing, the work ethic is ingrained into them, and when they come out it's pure relief."

It is curious that the issue of whether lecturers do or do not wear suits appears to have so much significance. Dress is a potent symbol amongst arts and science students of the differences between them, representing formality, hierarchy and conformism on one side of the divide, and informality, freedom and individuality on the other.

Not all criticism was directed against scientists, however; some more thoughtful criticisms were made of the nature of science itself. In the following quote, George, an English student, gives an account of the moral failings of science:

> "I don't find that sort of definite theory all that interesting, and there are areas of physics which I just cannot make sense of. I don't particularly see the point of Newton's Third Law and when I was doing maths, I discovered the point of Newton's Third Law; it was to solve problems that had no solution any other way...There are various aspects of most of these sciences which don't seem to make any sense to me and the point of actually studying them doesn't make a great deal of sense to me. Because I think in the end that science, when carried through to its extreme limits, doesn't do a great deal of good in the world, and though there are areas in which it does do good, in farming and medicine, I would point out that a lot of money in science goes into warfare and things which aren't quite so useful, and I think scientists, in the study of science, lose sight of the more important things in life which to my mind are the aesthetic things, moral values if you like, and for those reasons that's why I stay clear of it in the end." (George, 3rd year, A)

This quote, like some of the others, seems to indicate an insuperable divide between arts students and science students. Their whole ways of thinking about life, about what is important and what is trivial, about what constitutes knowledge, seem to be completely at odds. Yet there were students who didn't experience a divide, who seemed tolerant of differences, or didn't see the differences as being very great. There was one third year English student, for example, who had A-level mathematics, and who said she enjoyed the linguistic element of her course because:

> "I suppose it's that logical element in me again. I enjoyed the maths, I love puzzles and linguistics; and sorting everything out logically appealed to me more than criticism."(Lee, 3rd year, A)

Similarly, a first year student at A, Gina, was taking a subsidiary course in computer studies, and was as enthusiastic about that as she was about English. Another typical comment (particularly from female arts students, who were on the whole less hostile towards science than the men) was:

> "I don't know. I think both of them are important; it just depends on what you prefer." (Margaret, 1st year, B)

There were, however, some students who took a more philosophical interest in science. Terry, for example, a third year at A, was particularly interested in the debate about the truthfulness of knowledge, and made the following criticism of science:

> "I think what science does is, it pretends that it's right, it pretends that it's logical, that to be logical is correct, that it's *proven*, you know, 'we've used a model to prove it', but the model is only based on a preconception, which is based on previous ones. There's no truth in it; I mean, I think science is as truthful as religion, in absolute terms."

For this reason, he saw the division between arts and science as based on a false premise, the greater truthfulness of science; as he put it,

> "both [arts and science] are equally valid; they're both equally nonsensical and both equally true. Literature tells you truth which science can't, and vice versa."

In these criticisms of science, Terry is pointing to the similarities between arts and sciences, rather than the differences; both are ways of looking at the world and interpreting it. Another student, Russell, saw parallels between arts and science, particularly in what he saw as the aestheticism of science; discussing some work he'd read on Einstein, he said:

> "he [Einstein] says there's no place in the world for ugly maths; maths is to be beautiful, simplistic, harmony, beauty; you could have the Theory of Relativity in another form and it would be mathematically ugly, there would be too many statements of proof whereas you could only have one; the point of maths is to get thing down to as simplistic a level as possible, and in that idea and that methodology there is an aesthetic and once you see that, then that changes a lot of things to do with how we see knowledge." (Russell, 3rd year, C)

That this kind of reflection on the philosophy of science should be undertaken by arts students, often ignorant of basic scientific principles, rather than by science students, is ironic. Yet another student, John, a final year at A, was also interested in the ideas about

artistic and scientific knowledge. Like Terry, he saw the arts and science as basically similar, divided only by false social assumptions about their roles. John had himself attended a boys' public school, and was very aware of the subject choice restrictions imposed on pupils; one pupil at his own school, for example, had studied biology, maths and English A-level, and had had to go to the girls' school to study the English because the school couldn't accommodate the unusual subject grouping. Like several other students, he noted that this division was also common at university:

> "It's rife...this ridiculous notion of science students denigrating arts students. I know people who say English students never do any work and so are doing a jokey degree, a Mickey Mouse degree or something like this; it's all nonsense really, a ludicrous division. And the notion that science students are useful and arts students aren't, it's prejudice that has built up."

John himself admitted to possessing an inadequate grasp of science, but was undertaking a linguistics project on Einstein's use of language in the Theory of Relativity. This is how he explained it:

> "The reason for reading the Einstein is to look at the concepts he comes up with in terms of space and time and see how this bears on traditional thinking of what is reality - like he breaks down the notion of never-ending space and defines this in terms of a metaphorical presentation of a person being in a train, this sort of thing; so I mean I'm studying it for how he redefines things using these metaphors."

This project is a clear attempt to break down the usual barriers that exist between arts and sciences and to look at science aesthetically, using methods usually applied to literature. John, however, regards the barriers as social, rather than real:

> "I see it all as different forms of knowledge, and to present life in terms of fiction and to try to discuss what's going on in the atom, are all different forms of exploration and expansion, there are overlaps in all of them..."

This insight into the affinities between arts and science is, however, more accessible to English students than it is to physics students. Although physics is traditionally seen as a more liberal, more 'arty' science than, for example, engineering, many of the physics students, as we have seen, saw physics as a subject which was about logic, consistency, the one road to the Truth; a subject which imposes one idea about knowledge, rather than admitting several different ideas. The English students (although, as we shall see in the next section, they complained

about the authoritarianism of their departments) had far more freedom to think what they wanted than the science students. If knowledge is to be about "exploration" and "expansion", then any dogmatism about the precise nature of knowledge has surely to be removed. In moving away from dogmatism, John was atypical; yet there were other students who were thoughtful and articulate about their subject and the boundaries between it and other disciplines. There were more students, however, particularly in physics, who had ideas but found them difficult to articulate - perhaps because they were in the process of breaking away from a pre-defined idea. There were also many more, of course, who were willing to accept the traditional ideas about their discipline and its aims. In the next section, we shall examine whether students' beliefs about their disciplines were matched by their experiences of them in higher education.

10.4. The Courses: Students' Experiences

This section will look at students' experiences of higher education, and the relationship between the ideas they hold about their subject, and their feelings about the teaching of the subject in higher education. It will examine students' feelings about the departments, the teaching methods and the content of the courses. In particular, it will compare the ideas and language used by science students to interpret and criticise their courses and the ideas and language used by the arts students to interpret and criticise theirs. We will begin by looking at the science students and the comments they made about their departments; first, briefly, at their comments on staff-student relationships, and then at their thoughts about teaching methods and course content.

i. Science

a. Staff-student relationships

DEPARTMENT A

The physics department at A, despite its size (over a hundred students in each year) was generally considered "friendly". Most students said that the staff were on the whole pleasant and "very approachable". One enthused:

> "I think, particularly the staff, they make a real big effort to have good student-staff relations, and I think the students are apathetic about it - the staff are really keen." (Sally, 3rd year)

Students and staff mixed in the tea-room, a much used facility in the department (unlike the common rooms in some of the arts departments, for example) However, the familiarity between students and staff had its limits; for example, staff were addressed by titles, not by first names. There was also a reluctance to go to lecturers for help; for example:

> Kim: Do you generally find the staff approachable?
> Natalie: yeah, well, I don't know, I've never actually gone and asked any of them round here about any problem.
> Kim: Do you think you could?
> Natalie: Mmm, probably. We don't - I don't know. I mean, I've got a list of all the physicists in hall, you see; I go and visit them instead...they're more obtainable."

It was commonly accepted, both in Department A and Department B, that final years could be approached by first years for help; staff were regarded as out of bounds. Some students in both departments also said that they preferred to ask postgraduate demonstrators, rather than staff, for help. The meaning of words like "helpful" and "approachable" is, then, relative; few of the students felt that they could go to lecturers for advice on specific problems. There were a few dissenting voices, too: Mark, who said that the department was "pretty unfriendly" and Colin, who said:

> "I had some bad tutors; it seemed a bit of a chore to them really...I don't think I had any help from them at all."

As a general rule, I found that the most successful students found the department friendly (Sally, for example, got a 1st), whilst the least successful found it unwelcoming (Colin, who got a 2:1 is an exception). Which is cause, and which effect, it is impossible to say.

Some first years found the size of the department intimidating:

> "It's organised very differently [from school]. There's this mass of people. That's one thing I didn't like. I still think it's too big a department, 120 people...I don't know half the faces which is a bit disconcerting." (Felicity, 1st year)

However, this was cited as a problem far less often than expected; and in other cases, it was sometimes given as a positive feature of the department. In particular, some female students welcomed the fact that the large numbers meant that there were more women, making them less conspicuous.

DEPARTMENT B

Department B, although much smaller than Department A, was considered far less friendly by the students, both by first and final years:

> "The lecturers aren't very approachable and I would never really go up to a lecturer and ask him to explain something to me." (Mary, 1st year)

> "Some are completely on another plateau, you know, they're just not in the real world; they wander round and don't make eye-contact unless they're talking to you; they just look at the ceiling all the time when they're lecturing." (Jane, 3rd year)

> "I've never really tried to approach them...we don't have any problem classes or anything, so you don't really have any contact with them." (Paul, 3rd year)

> "They seem very unapproachable, some of the lecturers, they'll say 'come and see me', but with gritted teeth." (Susan, 1st year)

Only two or three of the sixteen students I interviewed said they found the staff friendly and approachable; as at A, they were most certainly not on first name terms. Several students were surprised at how like school the atmosphere was:

> "It's more like school than I thought it was going to be. They check you in lectures, they check you in tutorials, they check your work every so often. I thought we'd be left on our own more." (Susan, 1st year)

Some posed this in terms of the arts/science contrast noted earlier:

> "You sometimes get the impression that they're just after the ones who are going to get a first or a two-one, and the rest of you can just toddle along...If you compare it with other departments, if you talk to people who do English and stuff, and they know all their tutors by their first names; I mean, it's nothing like that here, it's all Dr. So-and-So - I mean, half the lecturers, I didn't even know what their second names were, let alone their first names - maybe that's just a result of physics, nothing to do with them." (Sioned, 3rd year)

By its being "a result of physics", she meant:

> "It's not really a discussion. Physics is physics, isn't it, you can't really discuss...not in the same sense you can discuss a novel or something, you can't really discuss a formula."

As we have already seen, physics students made very strong (hierarchical) distinctions between physics and chemistry, and between physics and other disciplines - and even between sub-divisions in the department itself; one final year student noted that "on the top floor, one half is theoretical physics, one is experimental physics and they just don't seem to mix." In the above quote, Sioned is simply acknowledging the

authority of the lecturers to define what "physics" is, and accepting that this will necessarily result in formal relationships.

However, this formality has its price. Because students felt that they could not approach staff, they often had problems about what to do when they couldn't understand the work:

> "What you were saying about approachability of lecturers, I'm not afraid to ask for help, but I am reticent to ask for help more than once on the same thing, because I would hate them to think that I hadn't been listening first time round or that I was stupid." (Jane, 3rd year)

As understanding is crucial in physics, the difficulty in asking for help leads to problems with work; it is, as Chapter 11 will argue, a particular problem for women, who often feel isolated in the department. In B, the first year women had worked out a system of mutual support to help them overcome the problems they were having with work; none of them felt able to approach a member of staff in order to discuss problems.

DEPARTMENT C

The situation on the physical science course was rather different from those of the two physics departments. This is for two principal reasons: one, the students on the course, unlike the university students, had not been "successful" at school, but had come to the polytechnic as "failures" - i.e. they had failed to get into university; two, the physical layout of the department was very different from that of the two university departments. By that I mean that the lecture rooms resembled classrooms; students sat on chairs at desks and the lecturer's podium was on the same level as the desks, allowing lecturers to move about the room answering questions. This was not possible at A and B where students were seated in traditional tiered lecture halls. This generally resulted in a more intimate - and more school-like - atmosphere than at the two university departments.

Because there was a significant male-female difference in perceptions of staff on this course, we shall have more to say about it in Chapter 11. For the present, it is better simply to note that many of the women felt that relations between themselves and the staff were less formal than relations between the male students and the staff; the women said that

they found it quite easy to "get round" the male staff, whereas several men complained that staff were quite unhelpful:

> "Some you just don't want to go and talk to, really, like Mr. T. He gives you a question sheet, he says, 'Come and see me about it', which you go and do, and he says, 'Well, you haven't done much here', because, well, you can't do it, so you can't do much, so he thinks you haven't done anything, so 'go and do it again', you see. He won't help you at all. I don't like him at all. Quite a few of them are like that." (Dipak, 4th year)

Not surprisingly, certain members of staff were regarded as more friendly and helpful than others, and it is difficult to make generalisations; however, it must be noted that when the staff addressed the men, it was by surnames, but when they addressed the women, it was by their first names. It therefore seems likely that the staff were inclined to regard the women as light relief from the sombre business of teaching science.

b. Teaching Methods

LECTURES AND TUTORIALS

The lectures are still the main method of communicating information and ideas to the students, and take up a large part of the timetabled work. Although the staff regard lectures as very important - department A's prospectus, for example, states that "we find the fifty minute lecture is still one of the best ways of presenting the subjects" - many students, particularly first years, disliked lectures and didn't find them useful. Most students felt that the teaching of physics at university was not very different from the teaching of it in school:

> "It's almost exactly the same...we get everything we need for the notes written on the board so we can just copy it down...so it's just the same as school, except the homework - when you do those problem sheets, they don't bother to mark it." (Natalie, 1st year, A)
>
> "at school the teachers talk and write on the board and that's all it is here really, they talk and write on the board." (Mary, 1st year, B)

First-year students at the polytechnic also felt the teaching to be very similar to school (or technical college) teaching; one thought that polytechnic was a "cross between school and university." However, both university and polytechnic students felt that they received far less individual attention than they had had when in school:

> "...one bloke standing at the front talking to 120 people, rather than a bloke coming round telling you where you're going wrong." (Paul, 1st year, A)

> "It [the lecture system] has its ups and downs. You get through the work a lot faster, but there's less opportunity to ask questions, really detailed questions, especially some of the tutors, they get lost without their notes; if someone asks them a question, they just don't know what to do." (Alan, 1st year, A)

> "I think lectures are all right. I wasn't expecting to be given notes as we're given notes but it's basically pretty much school-wise...but I thought the tutorials would be a bit more personal, smaller groups, I imagined." (Lesley, 1st year, C)

The lack of personal attention was a particular source of anxiety to Marie, a student at B, who, in the first few weeks of term felt herself to be getting behind with work. was concerned about the lack of help provided by the department:

> "A-levels were so different. They were small groups for a start. My biggest A-level group was twelve. You could put your hand up and ask questions, and you weren't all up at a level on him, he was at the same level as you, talking, and he knew all our abilities so he explained things more clearly to us. But here they just give you a few examples and expect you to do example sheets, it really is so difficult." (Marie, 1st year, B)

It is interesting in that quote that the idea of being "on the same level" is used literally and metaphorically. The staff at B are perceived as being both physically and emotionally distant.

Several other students were concerned about their inability to understand what was being taught in the lectures; all first year students at A, for example, were critical of the wave-optics course, which was felt to be incomprehensible; the following comment was typical:

> "The w-optics course is awful, because Dr. F's dreadful; two weeks ago, he drew two diagrams on top of each other without wiping the board in between...I couldn't work out what on earth was going on." (Natalie)

For some first year students, too, the sheer volume of work presented difficulties:

> "...you go into lectures and it's given to you on such a large scale, there's so much in every lecture that you don't have chance to read it all through afterwards so you tend to get a bit behind and you don't know what he's on about in the next lecture." (Mary, 1st year, B)

Another student expressed the common view that it was difficult to follow what was being said in a long lecture whilst taking notes, and preferred lectures where pre-printed notes were given:

> "Some lecturers are good, they give good lectures and give out lecture notes, printed notes. I think that's a good idea, you've got the notes in front of you which you can read another time perhaps while you can concentrate on what he's saying. But some lecturers tend to expect you to write down the notes as he's talking along and I don't know about other people but I can't particularly write down and take in information at the same time." (Barry, 1st year, C)

This illustrates clearly the tension many physics and physical science students felt between learning and understanding. Despite students' insistence, as we saw earlier, that physics was a subject concerned with 'understanding', note-taking in lectures was necessary for learning and examination revision. This meant that preparation for future 'learning' could occur at the expense of present understanding; on the other hand, not to take notes, but to concentrate on the lecturer's words, would prevent students from being able to learn the work later. This applies not only to less able students, but to the cleverest: Paul, for example, a final year student at B, and the only first class honours of his year, remarked:

> "The strange thing is, quite often you do a lot of courses that you don't understand at the time, you think it's a load of rubbish, then you read through them, and just understanding them, they're really quite important."

Indeed, most of the science students accepted as inevitable that there were large chunks that they couldn't understand; it illustrates Hudson's (1967) argument about the need of the scientist to "accept massive bodies of conventional knowledge on trust." It can be seen again, in the words of a fourth year physical scientist:

> "Some of the lecturers keep saying in a lecture, 'this is somehow related to something else you've done somewhere else' and I wish they'd tell us how it's related to something eles because half the time we can't see that." (Dipak)

Elsewhere, Dipak contrasted personal learning and enjoyment of the subject with the formal teaching of it:

> "It's the lecturers - they don't make it interesting. For example, quantum physics that we're doing, I mean, if you read a book it sounds quite interesting; when you've got someone like Dr. P. teaching you, it's not interesting at all, you just sit there and

take it down on the paper and then you put your folder away for the night and that's it."

The student in this situation has very little power, and very little control over his or her own education. The necessity of sitting and attempting to absorb a mass of information imposes a passivity on the students - a passivity criticised by Dr. G, as we saw in Chapter 8. (Incidentally, Dr. G's lectures were much enjoyed by students at A; they were considered more lively and more clear.) Paul suggested a way of getting rid of this passivitiy; like Barry, he believed that lecturers should give out notes at the beginning of lectures and then:

> "They could go through them, and then they could encourage a more open thing, and people could - there could be a discussion going on in the class at the same time." (Paul, 3rd year, B)

This would certainly allow students to participate more in their own learning, and give them more chance to get to grips with complex ideas. In reality, however, the lectures allowed students almost no control; students were, in some ways, treated like school pupils; expected to listen and take notes, and accept the authority of the lecturer. As a result, some of them even behaved like school-children; it was not uncommon, apparently, for students at A to throw paper aeroplanes in lectures - a rather immature (but possibly understandable) response to the frustration of endless listening and note-taking.

Students generally felt happier about tutorials and skill sessions, where they had a chance to talk about difficulties with the work. However, even here there were problems. One was simply that there weren't enough of them, particularly at C:

> "When I first started I thought we'd have tutorials and seminars; you get three or four students and you discuss something. We don't do anything like that; we very rarely have tutorials." (Dipak, 4th year, C)

Another, at both A and B, was that very little genuine help was given with problems; the question and answer sheets were not marked, for example, and tutorials didn't always provide the key to understanding what the work was about:

> "The problem sheets are so difficult now nobody can do them and they usually just wait until the answers come out every week and usually it's just a case of copying them down." (William, 3rd year, B)

Students are often left to muddle along; the help they may need is not forthcoming, even in tutorials. Consequently, many students, by the final year in particular, felt that they had lost all hope of making sense of the subject or getting to grips with the work.

LABS

For at least eight hours each week, students were expected to work alone or in pairs on experiments in the laboratory, with some supervision by staff and postgraduates. In theory, this gives students more freedom to explore and find out for themselves; indeed, the final years worked on individual experimental projects. In practice, however, and particularly for the first years, what happened in labs was strictly controlled by the department. Students worked from textbooks which explain how to conduct the experiment and the sorts of results one would expect to get. As a lecturer quoted in Chapter 8 put it, it was very much about "following recipes". Or as a third year student said:

> "[It was] just exercises in following instructions...you'd end up doing a lab before you ended up doing anything about it in lectures." (William, 3rd year, B)

One fourth year at C explained to me that several experiments conducted in the lab in the first term of the year could not be written up until the second term, after the theory had been presented in the lecture course, which obviously meant a tremendous backlog of work to catch up on. Therefore, conducting the experiments often involved little understanding of the theory behind them; and, indeed, they often involved equally little understanding about how to set up an experiment to test a theory:

> "If I had my choice, I'd rather be left to work something out myself; instead of it all being set up and you just walk in and take measurements, go away and analyse them, you'd have to go in and set it all up, then you'd really learn something. There's a feeling you don't learn enough from them, not in practical experience...you can go through the labs half-asleep." (Linda, 4th year, C)

The point of the lab work was, essentially, to demonstrate the truth of a theory, rather than to allow students to experiment for themselves. The students do not conduct the experiments with a detached eye; rather, they are looking for the results predicted in the textbook. As one student

patiently explained to me when I asked him how he *knew* what results he was looking for:

> "A lot of the labs are finding physical phenomena that are already well-known, so if you're just validating facts that are already known you know they're wrong because your answers don't tally with the answers in the textbook." (Paul, 1st year, A)

This practice supports Kuhn's (1963) argument that science textbooks "do not describe the sorts of problems that the professional may be asked to solve and the variety of techniques available for their solution" but rather they "exhibit concrete problem-solutions that the profession has come to accept as paradigms" which the student is expected to solve for himself (or herself) in the laboratory. The interesting question, of course, is what happens when labs "go wrong", when they do not produce the result expected. On the one hand, students have the option of explaining *why* their results have turned out wrong:

> "a lot of the lab work done here anyway, everyone knows what the results should be, it just seems a waste of time because you know the equipment's not good enough to get the results you should be getting, so you spend most of your time writing why your results haven't come out." (Paul, 3rd year, B)

The lack of good results is here explained by faulty equipment (an explanation also offered to me by other students); however, students gain higher marks for lab work if the results are "correct" than if they are wrong but adequately accounted for:

> "Before, you might be able to say, if you haven't got the right results, you can get away with padding out your lab report and writing a lot of background, so that would bung your mark up a bit, but this year, you can do that and you still end up with a bad mark if you've got bad results. " (Stephen, 4th year, C)

The alternative to explaining faulty results, then, is to tamper with them:

> "It always seems to me that you've got a set of results, and if you come to write them up, and you know they're obviously wrong, you're going to get a lot more marks if you put down the right values - or what should be the right values - so you end up fiddling things eventually." (Alan, 3rd year, A)

Alan eventually obtained a first class honours degree, as did Paul, whom I quote again:

> "I know somebody here who got very good marks for his lab work and he's good on computers, and he just programmed the computers in random errors and stuff that gave him set results and nice graphs, and they weren't perfect so nobody noticed them, but he

> fiddled them, and that way he didn't have to do any lab work if didn't want to." (Paul, third year, B)

These two students, Alan and Paul, both very successful physicists, saw the lab work as a 'game' which has to be played. Implicit in Paul's description of another student is the idea that, although the student didn't do what was required, he got round it in such a clever and ingenious way, that he still deserved to do well in it; indeed, Paul said that "there is less understanding in lab work than there is ingenuity." Neither Alan nor Paul really accept that lab is an objective measure of ability; they simply see it as a set of rules made to be broken. Paul, in fact, had concluded that lab was a waste of time and his final year project was a theoretical one, rather than a practical one. His attitude towards lab was rather blasé; he even joked about the fact that he always managed to break vital pieces of equipment. One student who was much more critical about the lab work was Mark, a student right at the bottom of his class, who later failed his degree:

> "The experiments are not particularly relevant to anything, they're just experiments for experiment's sake, one experiment illustrating a particular bit of theory; it doesn't do anything particularly useful, you just look at an oscilloscope and take some readings and hence you can demonstrate this bit of theory." (Mark, 3rd year, A)

Mark, however, didn't bother to fake his results:

> "If they're totally wrong I don't generally bother. I don't fiddle my results really - usually it's easier to make up excuses for it being wrong than to go through and work it out to make it come out right."

Like Alan, Mark saw the practical work as a game, but unlike Alan he refused to play it. He resented what he saw as arbitrary and pointless rules, whereas Alan is, if anything, amused by them, and enjoys manipulating them. For some students, however, labs were not a game, but a set of rules to be adhered to. This was particularly the case amongst many of the female students, several of whom expressed anxiety about handling machinery or breaking expensive equipment (unlike Paul, who was able to make jokes about it):

> "As far as lab work went, I always felt very intimidated because I'd never touched anything more technical than a hairdryer, and all these boys around me were confidently plugging in their oscilloscopes, because I mean, I suppose they had their train sets and that sort of thing, and I was very scared to plug things in, in case they blew up." (Jane, 3rd year, B)

Others felt frustrated by their inability to get to grips with the lab work:

> "I always seem to get the wrong results even though I'm working as hard as possible." (Rachel, 1st year, A)

The real problem was that many students felt unable to ask for help when they were in difficulty. This was especially the case in B, where staff were considered unapproachable, and where students were expected to work individually at labs:

> "On the Thursdays in lab you have to work on your own and everybody's doing different experiments and it is really - I mean, I dread Thursdays, because it is really worrying." (Marie, 1st year, B)

If students asked for help too often, marks were deducted. For Marie, this was a constant source of worry, because she had continually to choose between understanding fully what she was doing, by asking demonstrators for help, and risking losing marks, or by not asking and flounderng further and further in the experiment. Thus the desire of the department to assess students (which meant that they had to work competitively, rather than co-operatively) conflicted with the desire of the students to understand the work: the apparent aim of the department - to improve the knowledge and understanding of the students - was being impeded by its other aim - to grade students. The four first year women at B subverted this by swopping lab books; Marie said, "We're not meant to, but we do" - as if there were some shame attached to having to ask for help. Like Jane, Marie perceived a male/female difference in attitudes to labs; when I asked her if other people on the course found the lab work difficult, she said:

> "I think other people are finding it difficult, but it's mostly boys and they tend to be more practical and keep calmer abut it and also not worry about it, which does help."

The difference between the male and the female experience of lab work is partly a difference between male and female upbringing; writers like Kelly (1981) have been quite correct to point out that women are disadvantaged in science because of their lack of experience with scientific toys, machines and so on in childhood. Yet this difference is reinforced and indeed exacerbated by the women's experience of physics at university. Although departments could dispel needless anxiety by encouraging co-operation amongst students, they strengthen women's sense

of themeslves as inadequate by making them work individually and competitively.

Some students were more positive about the final year work in lab than about the first year work; a one said, "you can do what you want; instead of being taught, you've got to learn yourself." Projects allowed some room for genuine experimentation and discovery, although the projects themselves are decided by the department, who draw up a list from which students can choose. Despite a general feeling that project work was more interesting than first and second year experiments, there was much dissatisfaction with the projects; some students, particularly at C, complained that they had received very little advice on selecting a project, others that they had not been allowed to choose the project they wanted. The most common complaint, however, was that the projects weren't working; results hadn't turned out as hoped, essential equipment had proved faulty (or in some cases hadn't arrived) and students were left writing up why their project hadn't worked out. The real limitation was time; many students, although they enjoyed the projects, felt the pressure of looming final examiantions and said that they were unable to complete their project to their own satisfaction and had to make the best of a bad job in order to work at other, equally pressing, aspects of the course.

c.Course Content:

Most students, as we saw earlier in this chapter, were very enthusiastic about physics. Physics was perceived as exciting, progressive and fundamental, in contrast to other disciplines which were perceived as routine, static and lacking substance. However, when physics students talked about the courses they were following, they were less happy. They complained both about the quality of the tuition (as we have seen) and about the content of what was taught, and the way they were expected to learn it.

Some subjects were almost universally popular; virtually everyone enjoyed quantum physics - or "weird physics" as one called it; for many it was the main attraction of studying physics. For Richard, for example, a final year student at B, quantum mechanics provided an exciting contrast to some of the other courses:

> "I went to all the lectures and they're easy to go to, bcause you're spoon-fed, they don't sit back and they don't philosphize, a lot of it, it's all material on the board, which can be a bit boring sometimes, but we've done some big courses like quantum mechanics and there have been a few other theoretical ones which have been really involved but the lecturers have been really good, you can see how excited they are, and it starts spilling over to you, you know...Some of them have got real energy and some of them haven't, which is a shame, because it put you off topics quite a lot."

There were others, too, who found physics generally at university level to be a stimulating, intellectual challenge:

> "I think it's trained me to look at things both directly and methodically going through what do I need to know, et cetera. But combined with that, looking at things, trying to look at the whole width of things, trying to look at the whole rather than looking very narrowly at things and also being quite imaginative - I mean, I never dreamt that physics could be imaginative at A-level." (Sally, 3rd year, A)

Sally's comments were typical of a small group of students: those who eventually got firsts and some of those who had upper-second degrees. For these students, studying physics had proved to be a profoundly satisfying and rewarding experience. Below that level, however, there was deep discontent amongst students in all three departments about certain aspects of the degree courses; some of these were specific to departments - for example, a dislike of a certain option or a certain lecturer - but we shall concentrate here chiefly on those aspects which were common to students across the courses.

The first cause of disenchantment has already been touched upon. This is the sheer amount of work students are expected to absorb and learn for examiantions. Despite the frequent assertion that "Physics is a subject about understanding, not learning", many students felt that they were reduced to rote-learning in order to achieve success. One student, in response to my question about what he felt he had gained from the course, said:

> "It's just proved me ability to learn chunks of knowledge, chunks of pages and books, and reproducing them the day after, then forgetting it, then you have to learn it again for next year's exams." (William, 3rd year, B)

Another that:

> "It all tends to go in one ear and out the other, and you forget it until the exams." (Donald, 3rd year, B)

This complaint was, however, more common amongst fourth year students at C, many of whom felt that they were expected to cover too much ground and do too wide a variety of things:

> "There's too much work on this course; rather than understanding things and learning things so you can apply ideas, the tendency is more to learn things parrot-fashion." (Kirk, 4th year, C)

There were no options on the physical science course; all modules were compulsory. For this reason, the course was frequently criticised for being too broad-based:

> "You become a jack of all trades, master of none on this course." (Kirk, 4th year, C)

> "Quite a bit of the course doesn't really interest me at all. It's very wide and I think it should specialise a bit more in the last year, so you could cut out a bit of the chemistry if you don't like chemistry, and do a a bit more detail in a few of the other subjects. " (Matthew, 4th year, C)

For this reason, the 'social science' modules, the Technology and Environment course in the first year and the Energy Studies course in the final year, were not well-received by students; it was not just a dislike of the content, but the fact that they were expected to do those courses on top of everything else. Resentment ran deep in some cases: when I asked Kirk how he would feel about having optional instead of compulsory modules, he said, "I think if you decided to have a choice, there'd be a few lecturers out of a job."

Related to this was a feeling amongst students that they lacked independence. The most popular work was that which allowed students freedom to work on their own - projects, for example. Students felt that the need to learn large amounts of work left no time for the challenge of individual discovery. One said:

> "I imagined it would be loads of people happily doing physics, discussing physics, but it's very like A-level, hard, generally all-in." (Simon, 1st year, B)

Physics is very rarely *discussed* on the courses; students' main aim is to get through the course and pass the examinations. This is not because they don't enjoy the subject but because of the way the courses are structured. We can see here a process that Becker (1961) identified in *Boys in White*, whereby students embark idealistically on their courses, hoping to become good doctors (or in this case physicists), but soon

abandon this ideal in favour of the short-term goal of passing examinations.

Another common criticism was that much of the work was "irrelevant." It is difficult to pin down the meaning of this word, which varies in its usage from student to student, but generally it was used to mean something like "applicable in the outside world." The criticism was often made by those who disliked the more abstract theoretical work, and who preferred more tangible ideas, which could be shown to have some application:

> "I like medical physics...I can see some use for the theory I've learnt - there's some sort of application which is indirectly helping people." (Julie, 3rd year, A)

The comments about "relevance" came more frequently from women than from men, and I shall argue in Chapter 11 that there are important differences between what female students look for in physics, and what male students look for. Some major criticisms of courses will, therefore, be postponed until that chapter; however, I shall now look at the case histories of two students, Jane and Mark, who embody many of the problems encounterd by those students who were not amongst the departments' high-flyers.

I interviewed Jane in the Easter term of her final year at B, at a time when she felt thoroughly disillusioned with the course, though not with university, which she had enjoyed. Her problems had started before university, when she had changed schools after the fifth form. In her first school, she had been considered outstanding at Maths, and had had six grade As in her nine O-levels. When she changed schools, however, the maths A-level course was different from the one she'd been following at her old school, but the new teacher expected her to catch up immediately. Jane explained the difference in terms of the schools' differing perceptions of her ability:

> "Because she [the new maths teacher] didn't know me, she didn't have any confidence in me...but because she didn't have any confidence in me, I didn't have any confidence in myself, and that is the thing that really makes me regret changing schools...at my first school all the teachers knew me and had confidence in me. I was doing very well in that school. I think I should have stayed at the old school where they had confidence in me."

Her case suggests the potency of the 'self-fulfilling prophecy'; she found maths increasingly difficult and ended up with a grade D A-level. Such was her dislike of maths by this stage that she told me:

> "I was very disillusioned when I started doing physics by the amount of maths in the course. I got to the stage where I couldn't see the wood for the trees."

Jane had experienced a downward spiral such that, by the time I interviewed her, she felt completely lost. (She eventually got a third-class honours degree.) About physics as a subject she was enthusiastic; but she was unhappy about the degree course. She contrasted her experience of school physics with university physics, and she saw the distinction as a quantitative/qualitative one. This is what she says about university physics:

> "I find it difficult in my notes that they're all so mathematical, that you just read through lines and lines of equations and there's very few sentences in between to explain what's going on. It's very difficult to draw out any physical meaning. Trying to follow a mathematical argument is very different from following an argument that's set down in plain English, in a qualitative way. It's all so quantitative, I find it difficult to relate to."

Whereas in school:

> "I couldn't see how you could get a lot of maths into physics on the grounds of the experience I'd had in school. I mean, I thought they were just nice, chatty, qualitative subjects. "

Her perception of physics as a discipline is one that is about ideas and concepts; she told me that she'd always found phyics much more "dynamic" than "static" subjects like chemistry and geography. It seems to be almost a perception of physics as an "arts" subject; and indeed, Jane was quoted in Chapter 9 as saying that she had been equally good at arts and sciences but had chosen sciences because of the job and university prospects. By the third year, she was beginning to regret her choice:

> "I'm quite an artistic person; in retrospect, I think perhaps I should have risen to the challenge and maybe applied to do a language, because I really enjoy literature and languages in my spare time. But then again, if I was forced to do them full-time permanently, maybe I wouldn't enjoy them as much. I think it's because I'm being made to do physics that I'm rebelling against it."

She concluded:

> "I think that's the problem with. degrees, they're all very specialised, and they don't give a lot of scope for broad sort of study."

Jane saw her degree as a process of narrowing down, rather than a broadening out; it shut out the creative, 'qualitative' aspect of her nature, and presented her with a set of rules and definitions which she had to conform to, or rejct, but which she could not challenge. Like many of the other female physics students, she rejected it and told me that she had no intention of contiuing with physics afterwards.

Mark, whom I have already quoted in my discussion of the lab work, was a final year student at A who, although he had obtained A-level grades of AAAB, eventually failed his degree. He told me that he found the work dull, and did as little of it as possible:

> "I find it boring, it's not particularly useful - it's very academic, more so than I would have expected it to be."

Unlike Jane, Mark did not feel that he would have been better off taking a different subject; he had decided that he was unsuited to any kind of academic work, although most of his friends were arts students. He expressed strong dislike of the department itself; it was "pretty unfriendly"; the work was "irrelevant." This much is perhaps to be expected from someone who faced insurmountable difficulties in coping with the work. What is interesting about Mark, however, is that he rejects the *values* of the physics department in their entirety, as well as what he perceives as the values of academic life generally. That is, he rejects the pervasive competitiveness and individualism; he was the only male physics student I talked to who talked in terms of doing something socially useful after finishing the course. Although he blamed himself rather than the department for his own failure, making comments like "I'm just not an academic basically" and "I don't think there's a lot wrong with the course, if you want to do an academic course", the path he saw himself as taking seemed directly opposed to the departmental ethos; stating that he didn't want to do "anything theoretical", he told me that he wanted to train to be a nurse. Reluctant though he was to talk about it, he gave the main reason as "it's just the sort of job that would suit

me really...helping people, that sort of thing." It is also, however, just the sort of job that it is most physics students wouldn't dream of entering, being part of a predominantly female profession, low-paid and low-status. The satisfaction gained from nursing, like that of the other 'caring' professions comes mainly from an intrinsic satisfaction at doing something useful rather than from external recognition of one's value. It is important to recognise that in Mark's case, as in the case of some other (mainly female) physics students, the rejection of physics was not simply due to a lack of ability or application, but a clash of beliefs and assumptions about what is worthwhile and what isn't.

If we look at it another way, we can suggest that many physics students feel that they must accept what they are told by their departments and that they find it difficult to challenge what they are told. There is little space in which students can develop individually or subvert the 'knowledge' of the department. Few students said that they found the staff approachable, and some seemed just to muddle along, hoping that all would eventually be clear. Others found that the sheer workload of the course left them unable to develop outside interests, such as reading or theatre. To do that almost seemed to entail giving up on the course altogether. For example, in B, I had tried several times without success to contact a third year female physics student who, it seemed, never looked in her departmental pigeonhole where I left the notes. It turned out, when I asked another student about her, that she spent most of her time organising the Drama Society and almost never came into the department. In the event, I interviewed someone else, but the incident is an indication of the fact that a science degree and artistic interests are often perceived as incomaptible. In this sense, a physics degree can indeed be a narrowing down rather than a broadening out. This is how one physical science student put it::

> "It [being at polytechnic] has broadened my outlook, and it's also narrowed it - science-orientated. You tend to keep to that sort of regime. I wouldn't say it was exactly narrow-minded, but you've got a position, you're given a position to hold and you get it rammed down you that 'I am now an applied scientist'. I don't feel like one, but I'm supposed to be, well, a physical scientist, so you get that sort of identity thrown at you. So you accept it, because you don't know what else to accept." (Matthew, 4th year, C)

Consequently, many students who find themselves unable to accept this definition of themeslves, who have difficulty in constructing an identity as

'physicists' or 'physical scientists', find that they are outside of the department, that they are gradually less and less successful in getting to grips with the subject. That this is a particular problem for female students will be seen in Chapter 10; for now, however, we shall look at the opinions held by English and Communictions students about their courses.

ii. English and Communications

Probably the major difference between the initial experiences of the arts students and the science students in higher education was that the arts students spent far less time in the department. Science students spend up to twenty-five hours a week in tutorials, lectures and labs: most of the work they do is timetabled by the department. The English students, however, with only approximately ten hours timetabled, found that they were expected to do a great deal of work on their own. This in practice meant two things; one, that the arts students had to adjust to independence and self-discipline in work; two, that relations with staff and other students within the departments were perceived as of less importance.

a. Staff-Student Relations

DEPARTMENT A

Like the physics department at A, the English department was very large, but it lacked a common focus (such as the physics tea-room) where staff and students met. There was a departmental society, but this was by no means attended by a majority of students. However, although staff were regarded as reasonably approachable, in interviews students lay very little stress on the friendliness or otherwise of their relations with staff. The student who said:

> "I think it's a good staff-student relationship without getting too close. I think the department's a good department, and although the staff don't get involved outside what they have to do, the English club which is run by the students is quite well-supported by the staff, they do actually turn up to things." (Mick, 1st year, A)

is probably an exception in that most students chose not to be inolved in the English club. Apart from the (wholly male) annual staff-student cricket match, relations with staff were fairly formal and confined, on the whole, to timetabled hours; none of the respondents said that they mixed

with staff (apart from in the English club) informally. Most students accepted this situation without too much complaint:

Like physics students, English students at A did not tend to go to the staff for help with problems. However, unlike the physics students, they didn't go to anyone else for help either. Because of the lack of class contact time, students were expected to work individually on the essentially private activities of reading books and writing essays. Whereas physics students could co-operate to a certain degree over things like lab work and problem-solving (the same problem sheets were often set year in, year out), English students were more isolated, and problems with work were not regarded as the kind that could be overcome through talking to staff or even fellow students.

DEPARTMENT B

Students' comments about B were similar to the comments of those at A. Students generally regarded the staff as approachable. For example:

> "They're very nice, it's quite laid back. You feel you can ask questions and that. There's no rules or anything. I quite like it." (Carole, 1st year, B)

Whilst one student who had transferred from management said:

> "I get on with most of the staff, I'm quite impressed 'cos you know, you get the feeling that it's efficient and that they do actually care about the students, which I didn't find when I was doing management." (Geraldine, 1st year, B)

This opinion was not held universally; indeed, one student at B complained that some of the staff "exude an air of authority." However, students generally seemed unconcerned about the attitude of staff; it was accepted that staff and students kept themselves to themselves. As at A, students and staff didn't generally mix informally; and the department's common room was never used, except for departmental seminars. In neither English department could it be said that staff knew the names of all the students; but this is to be expected given the few timetabled hours. In short, English is a far less *social* discipline than physics; students and staff work individually rather than in groups.

COMMUNICATIONS

Staff-student relations were noticeably less formal on the communications course than on any of the other five courses. Staff tended to dress casually, and students were on first-name terms with them. The

contrast can be illustrated nicely by Martin, a first year student who had come into communications from an HND in engineering:

> "They [the staff] are completely different from anything I've known before. I know I keep going back to this diploma I did, but that's all I can compare it with. That really was a teacher-pupil relationship...you were taught *at*, you were referred to by your surname, and you called them 'Mr. X' or whatever. You never saw them outside the lecture socially, you didn't even see them in the refectory, it was them and us. You come here, and the lecturers here are far more accessible. They treat you as adults, as opposed to students or pupils. You feel as though you could go and speak to them on any subject...they seem a lot more intelligent and aware than the staff at the college I was at, definitely more approachable."

This view of the staff had general accord. Students talked freely with staff, and in some cases mixed with them outside of the course time. There were criticisms of some members of staff, but these centred around intellectual differences or a dislike of certain teaching styles, rather than a feeling that they were unapproachable. The numbers on the course were comparatively small, and the atmosphere was generally friendlier than on other courses. In addition, it was noticeable that students tended to stick together much more outside of course hours than on the other courses, where students were more likely to have friends from other departments. At the opposite extreme to physics Department B, the communications course too suggests that hierarchical relationships between teacher and pupil are weakest where the boundary lines between types of knowledge are most blurred. Communications was taught as an interdisciplinary subject, covering a wide variety of areas and, as we shall see shortly, students often felt free to challenge staff's definitions; by no means was the authority of the staff beyond question.

b. Teaching Methods

LECTURES

As we have seen, the major problem for first-year science students in coping with their new courses lay in having to deal with taking in large amounts of information; they had to become adept at note-taking and at understanding what they were being told. In particular, they found it difficult to do this without receiving any individual attention or advice on work. In the English departments, the basic problem - that of getting to grips with new teaching methods and coping with the volume of work - was

the same, but the form of the problem was different. The difficulty lay in knowing exactly how much they were supposed to do:

> "At first I didn't like it because we'd never had to work out anything for ourselves before, and then suddenly we were just thrown in totally at the deep end, they didn't say anything at all, they just said, like, 'Read this book', he didn't say anything like 'make notes on it' or anything, so I just read it, and then it suddenly occurred to me that I wouldn't know what was going on for the exams, I didn't really know what was going on, because if you just read bits of things straight through you don't know what's happening and I didn't really know what to do about it, and that continued for about a month and then I suddenly realised what I was supposed to be doing so that was total panic becuase I was working twenty-four hours a day trying to catch up on the stuff I hadn't done but now I know what's expected - I think I do anyway, because they've never given us any clue about what they want really, but I suppose you'll just be able to tell in the exams at the end of the year." (Gina, 1st year, A)

Gina is quite right when she says that there is little guidance as to how much work the students are expected to do. Students are usually given long reading lists in lectures; reading all the books would be an impossible task; on the other hand, it is difficult to know whether to read one, two, three or maybe none of the books. One of the first things the first year student has to do, then, is to come to terms with independence, and to decide upon the balance of work necessary. There was, indeed, general surprise at the amount of work involved:

> "Everyone says that English is a doss degree, Mickey Mouse, you don't do any work or anything, but there's a lot of reading."(Gary, 1st year, B)

> "There's more work than I expected, I think there's a clichéd view of English that you don't do much work, or at least that's what I was led to believe, but there was more reading particularly." (Anthony, 1st year, A)

Like Gina, Anthony felt somewhat bewildered by the amount of work he was expected to cover, and felt uneasy at the lack of guidance:

> "There's one lesson per week on things like Marxism and Structuralism, and it just isn't enough to cover it in depth. They give you a huge booklist and ask you to go away and read them but there's no way you can and there's no way most people do. Most people just go away and forget about it."

First year students on all three courses, at A, B and C, commented on the difficulty of adjusting to lectures; one student at A said that he found it difficult to concentrate for more than twenty minutes, a student at

C said that she found herself still taking down notes on one point whilst the lecturer was moving on to the next point, and Gina said:

> "it [the lecture] gives you more independence but I don't really think it's as effective. In lectures most of them just talk at you, there's very few talk *to* you. So if you don't understand anything, you write it down anyway, and that's it gone. There's not an awful lot of contact between the tutorial and the lectures; the person who's doing the tutorial doesn't know what the lecturer's been saying." (Gina)

However, there was far less anxiety amongst arts students than amongst the science students about lectures. Science students were genuinely worried about getting behind with the work, whereas the English and communications students regarded lectures as a chore rather than as a source of particular difficulty:

> "They talk about a lot of things and a lot of it is not so much irrelevant as it takes a lot of getting used to." (Sharon, 1st year, B)

> "Lectures are pretty much as I thought, big lecture halls, impersonal. I prefer the multi-media presentation of lectures with slides and the use of examples, rather than someone coming in with a list of lecture notes and reading them out as sometimes happens. Not only does that get very boring, it gets very difficult to take notes. If somebody's reading out something that they've written, which might sound o.k. as an essay but doesn't sound all right being spoken." (Peter, 1st year, B)

Some students at A complained about the methods and context lecture course, because of its bad handling of difficult topics (structuralist theory was dealt with in two lectures), but the following was a more typical response to the lectures generally:

> "I quite enjoy the lectures actually, the standard of lecturing in my opinion isn't too bad." (David, 1st year, A)

There was even, on occasion, enthusiasm; one extremely popular lecturer at B. was Dr. T. who taught medieval literature; I attended one of his lectures and he did indeed communicate his subject with great enthusiasm and wit. As one student said:

> "A couple of them are absolutely brilliant but the majority of them are pretty dull, like there are some lectures that everyone will always go to - like there's this guy that does medieval...everyone comes out of his lectures saying, wasn't that brilliant, and they wish they had him for a tutor, they love his lectures, they're really good, but there are two other people who do medieval lectures and they're probably nice people and everything, but they haven't really got it. I think you've got to have a certain knack, the trouble with all the other lecturers is that they're all kind of know what they

> want to say and they know it all, but they don't set it out all right, they all tend to ramble and drift, they don't make it coherent." (Gary, 1st year, B)

Martin, quoted earlier, said of the lectures in C:

> "I have a guilt complex because I'm actually going to lectures and enjoying the lecture and it's almost like going out and talking to friends about something you really enjoy. I'm finding that a little bit difficult after six years of doing something I didn't really want to do." (Martin, 1st year, C)

The idea about "guilt" is perhaps useful in shedding light on the attitudes of some of the science students to the arts: a belief that if education is fun or enjoyable, then it can't be any good; as Hudson (1972) argues, the arts are associated with pleasure and effeminacy; and for that reason, are also believed to lack value.

Generally, students felt fairly relaxed about lectures, although some first years had difficulties of adjustment; final year students were much more blasé about the course - those who got bored with lecture courses or who disliked the teaching, simply didn't turn up:

> "A great deal of the third year is theory, critical practice and literary theory and all the rest of it, and if you want that you can go and read a book...you need lectures in the first year becuase you know absolutely nothing about what's going on and you need a lot of lectures based on the social background and history...but by the third year, you don't really need lectures." (Terry, 3rd year, A)

> "The lectures are fairly aribitrary - it's very much a case of, you've got one man's opinion of Jane Austen and it virtually turns into a reading list...Quite frequently I will skip lectures because they're not compulsory, and in some cases they're completely superfluous." (Ben, 3rd year, A)

Skipping lectures was a much more frequent occurrence amongst arts students than amongst science students, who were rightly afraid of falling behind if they missed lectures. The confidence that third year students felt about missing lectures however, the fact that they felt able to learn on their own, is an indication that they have gone through the process of becoming an "English student"; they have been successfully socialised. A major part of becoming an English student is learning to cope with independence, learning to understand what is required, getting the balance right - the processes with which Gina and Anthony, quoted earlier, were trying to engage.

TUTORIALS AND SEMINARS

Tutorials and seminars were also new to first year students, and these were regarded more favourably than the lectures. Students enjoyed the opportunity to express their ideas, and it was felt, too, that tutuorials and seminars were more like the classroom teaching they were used to. One student said:

> "I quite enjoy them actually, on the whole. We've got a good tutor and he gets us going quite a bit." (Simon, 1st year, A)

Another student had found seminars easier than he expected:

> "My expectation was that I'd really have to struggle [in seminars], that I'd be out of my depth. I wouldn't say I find it easy since I got here, but I'd say that there seem to be an alarming number of people who don't seem to be as interested as I thought they would be." (David, 1st year, A)

Others said - again there are parallels with the science students - that they would prefer to have more tutorials:

> "I personally would like more tutorial time - I'd like to have more contact with my tutor, that's the one time I have more contact with actual literature." (Diana, 1st year, A)

Obviously a lot of student opinion about seminars and tutorials was dependent on the quality of the tutor and the personalities and responses of other people in the tutorial group. Tutorials were generally regarded as preferable to lectures as a teaching method, although one highly critical student, Anthony, pointed to the artificiality of the tutorial when he said that tutors "intimidate you into silence by their intelligence" and that "it tends to become entirely one way by the end of the tutorial, with just the tutor telling you what he thinks, and nobody disagrees." Old English seminars in particular were disliked:

> "I think the method of teaching is pretty bad - it's just rote learning parrot-fashion, and it destroys all interest in the subject." (Anthony, 1st year, A)

- a complaint similar to that voiced by some of the science students about their teaching. Old English was also disliked by those students who had had difficulty with languages in school; the emphasis in the course was more on the grammar and vocabulary of the language than on the qualities of the literature.

Another problem for many students in tutorials and seminars was that of overcoming shyness. Many found it difficult, especially initially, to say very much:

> "It's difficult to have the confidence to express your own ideas but then you get used to it and I enjoy it much better now." (Kate, 1st year, A)

> "To start with one or two of them were quite intimidating. I'm fairly shy and I'm o.k now but the first term I know the report at the end said she does not talk enough in seminars, and this sort of thing. Because the one seminar, we had an awful lot of clever people in the seminar, and the people have actually changed about a bit now. And there's people I feel are more on my level, and I'm more able to talk and say what I feel without feeling too stupid about it. Seminars were quite a big shock after school, but now I've settled down." (Carole, 1st year, B)

A frequent comment was that everyone felt too intimidated to say anything in seminars and tutorials, and that these often resulted in almost total silence:

> "I think that anything I do say is going to have been said a thousand times before. I keep expecting the tutor to tell us what we should know rather than trying to work out for ourselves through discussion what we need to know. Modern Literary Studies is a little embarrassing because he asks us questions and we're not too sure of the answer and we all sit there and we don't say anything, you can actually count the minutes go by in silence as he's waiting for a reply." (Peter, 1st year, B)

This was even true for some final year students:

> "Sometimes you don't argue through because there are people who are better at arguing than you are; regardless of whether you think they're right or wrong, they're a bit more persuasive in their arguments." (Charles, 3rd year, C)

Obviously, then, the student who is prepared to talk a lot is at an advantage:

> "If you say a lot, and you're quite talkative and outgoing, you'll get quite a lot of attention from other people in the seminar." (Gary, 1st year, B)

This advantage is increased for male students; as Dr. S. pointed out in Chapter 8, male students often make an impression both because of their maleness - and therefore unusualness - and their talkativeness. In this respect, seminars are particularly important because, unlike physics or physical science, English and communications do not examine or grade their students very frequently; whereas physics students are assessed weekly on lab work, and may often have written tests or problem sheets, and thus gain some guide as to how they're doing, in English, a person's performance in a

seminar may be the only indication, apart from occasional essays, of that person's ability. As Deem (1978) has suggested, students may be selected for postgraduate research on the basis of their performance in seminars. Students who were shy, who found it difficult to talk in tutorials, often worried that their real ability was underestimated, that tutors regarded them as less intelligent because they were not very vocal. Conversely, the student who is simply a good talker may have an unfair advantage over the quiet but studious worker.

c. Course Content

ENGLISH

Like the physics students, the response of English students to their courses was mixed: some enthusiastic, some critical. Where they differed, however, was that most of the critical science students ended up with poor degrees - thirds and passes - whereas many of the critical English students came out with upper seconds. This suggests that English departments are more able to accommodate dissent and disagreement.

The most enthusiastic students were those who simply loved reading for its own sake:

> "When I was at school, I never really read much literature at all, I think perhaps that was to do with the way it was taught, but since I've come here, I'm almost becoming a literature junkie." (Simon, 1st year, A)

For students like Simon, the course was what they made of it. There were some students who enjoyed reading, enjoyed writing about literature and discussing it, and reading English had given them the freedom to do those things. However, there were substantial criticisms from other students, and these centred around the belief that courses were less intellectually stimulating than they had hoped, and that there was not enough room to develop individual interests and pursuits. Given that, as we saw earlier, most English students celebrated individuality of opinion, breadth and range of ideas as the central virtues of English, it is not altogether surprising that criticism of their departments centred around the departments' lack of tolerance, breadth and so on. Yet here we have a certain paradox. Both the English departments were, as we saw in Chapter 8, essentially

pluralist in that members of staff held differing critical viewpoints; A, for example, had a renowned structuralist critic on its staff, as well as Marxists, Leavisites and feminists. Despite this, students were not trained in a variety of ways of reading a text, but were taught in the liberal humanist tradition of close reading of set books. Students rebelled against this, not by demanding a greater understanding of critical theory, but by a stronger assertion of their rights to give *individual* opinions. Individuality was held to be the one freedom above all others; the most commonly expressed belief about English was 'Anyone's opinion is as good as anyone else's; we're all entitled to our different viewpoints.' For example, one third year woman in B, who regarded herself as a feminist, talked about how a seminar course she'd done which was taught by 'radical' left-wing tutors was different from the rest of the course:

> "They did like it much more if you wrote quite personally or quite originally and just weren't afraid to put down your enthusiasm on paper and just wrote how you felt and what your gut reaction to a book was, which is just as valid actually, as much as anybody else's, as much as a critic which you read from sixty years ago (which is always male by the way)..." (Alice, 3rd year, B)

Here, freedom of expression, the right to show gut emotional responses to literature, is seen as a radical challenge of the status quo. More intellectual, 'objective' approaches are seen as both sterile and reactionary. As another student said:

> "This routine of what is good literature, and this is how it all is don't challenge it, this is the way it's got to go, this is what the authorities say is good literature and therefore you study it, because they're the people who've got their finger on the pulse of the world, which is annoying, profoundly annoying, because I'd listen to someone who didn't give a damn about Shakespeare...I think it's perfectly in anybody's rights to say that, if they have an informed opinion. I just hate having things rammed down my throat." (Robert, 3rd yr, B)

He went on:

> "They think they've got it all sorted out; this is it, these are the absolute truths, you're here to learn and we are the people who are going to teach you."

The rejection of the idea of absolute truth leads to the idea that everyone's viewpoint is equally valid - if, of course, they have

"an informed opinion." (That qualification is always present, of course; for if everyone's opinion is equally valid, what is the point of studying English as an academic discipline at all?) For Anthony, a student at A, the problem would be resolved by allowing students to pursue their own intellectual interests, rather than following those of the department. He said that the course should be:

> "more geared to what the student requires. If I'm interested in psychoanalysis or something like that, then I should be able to read more on that than on something that doesn't interest me and be able to go to tutors who are particularly interested in that field and talk with them rather than having the same tutor who's interested in a particular type of criticism." (Anthony, 1st year, A)

Curiously, considering Anthony's Marxist beliefs, this prescription is very similar to that of the head of department B, quoted in Chapter 8, who argued that the department contained a number of specialists in different areas who co-existed harmoniously. Dr. B was also quoted in that chapter as saying that it would be very difficult to set up an English course in the 1980s, because of the proliferation of literature; courses begun in the 1960s were able to follow a very traditional path. This had not escaped the notice of some of the students, who would have liked more innovation:

> "It could be a criticism of the course that it's the same as it always has been, it's stuck to the texts and it carries on doing them, year in, year out; it doesn't go beyond them." (Terry, 3rd year, A)

Terry was also very interested in the idea that English was trying to establish itself as a rigorous, serious and scientific discipline, or as he wryly put it:

> "An English degree has to prove that it's a genuine degree, and the only way to do that is to make people suffer."

Indeed, some students felt that they were "suffering". Many complained about having to do Old English, Medieval Literature or the Epic. Most would have preferred more novels; although there were some who welcomed the opportunity to study books they wouldn't have had the opportunity of reading outside the course. One student at A was particularly cynical about the whole process of reading for an English degree:

> "I think quite frankly, I'm sick of reading now, we do so much of it, sometimes about six novels a week, or six

> things a week, you just don't want to see another book again." (Jennifer, 3rd year, A)

(This comment was echoed by a number of students who said that they had once been avid readers, but had stopped reading for pleasure since doing the degree course.) And,

> "It's very trendy, it's very self-conscious, very narrow-minded. I think they can only see as far as the English department and there's no world outside and I think, particularly English departments are like that. It's very enclosed and there are a lot of impossible boffin-type figures."

Jennifer sees the department is narrow and inward-looking, stifling rather than stimulating. Her comment, when I asked her if she felt she'd gained anything from the course, was interesting:

> "It's probably made me more analytical. I'm able to sit back and analyse things. It also means that I've read virtually every book that any sort of faintly intelligent person is meant to have read, I've just read them all. I haven't enjoyed many of them, but you know, you just read everything. It's probably made me a more observant person, and a more aware person of what's going on, but it hasn't made me work harder and it hasn't given me self-dicipline, which is probably what I came for."

Elsewhere Jennifer said that she was disappointed that the course had been, in a sense, so easy; that there had been no "mind-blowing theories" which she would "have to work really hard to understand." She is demanding the kind of rigour which physics students felt they had too much of; she felt that she'd been allowed to be lazy. She didn't feel any commitment to the degree or what was studied on it; a similar comment were made by a student at B:

> "The last thing I want to do and which I've had to do for the past three years is sit down with a book I couldn't care less about and talk about issues I couldn't give a damn about either." (Robert, 3rd year, B)

In other words, lack of "relevance" was a key criticism of many students: relevance was, after all, what many of them sought in their degrees. Some felt alienated by what Robert described as "the fast food machinery process by which you get a degree"; there was no time for genuine contemplation of the "real" issues. For many students, their degree course had been counter-productive; their real enjoyment

in literature had been lost in the process of using books to get a qualification; one, talking of the film *Educating Rita* said:

> "When Rita gets the spontaneity educated out of her, that's quite disturbing; you think 'Is that happening to me?'" (Michael, 3rd year, B)

One of the reasons students gave for wanting to take an English degree was that it would make them more "broad-minded"; yet several, like Michael, felt that exactly the opposite had happened.

However, there were certain important differences between the students at A and the students at B. As has already been noted, A ran a critical theory course in the first year, whilst B had no such course. The third year students interviewed in A were more aware of alternative ways of teaching the subject than the third years in B. Much of this is to do with the fact that students in A take a compulsory lecture course in literary theory in the first year, and have the option of taking a seminar course in theory in the second and third years, whilst the students in B do not take such a course. A student in A, for example, had a good idea of the different critical stances of members of the department:

> "[the department is] fairly diverse really, there's no dramatic conflicts, there's very much specialists in various subjects. X is a big Leavisite, and I mean, that doesn't go down well with my tutor who thinks Leavis is terrible whereas someone like Y of course is very much involved in structuralism, but there's no heavy bias, the tutors are very good, they restrain their own views quite well...there may be hidden conflicts in the staff room but we never come across them." (Ben, 3rd year, A)

Most students in B, however, if I asked them about theory or the critical perspective of the department, looked at me blankly or misunderstood the question. The consequence was that their criticisms of the department were less specific, less articulate than those of students in A. Even those students in B who were able and articulate very often held unsophisticated views:

> "People get so pretentious about modern things...it's so nice getting an old book, things that have been studied enough for you to grasp what they're about...in any case, the old stuff's better...I don't like things that are too specific to modern times. You get too overcome with literary fashion in that sense. I don't like experimental stuff...I think you should stop at 1900." (Andy, 3rd year, B)

In B, students tended to differ over the question of whether they preferred to study 'classic' texts or 'modern' texts (probably because of the structure of the course). In A, however, students were much more aware of the possibility of a plurality of ways of looking at a range of texts.

The attitude of most of the students, however, even those who were critical of their department, is not so very much at odds with the attitude of the departments themeslves. Most students subscribed to a kind of democratic liberalism whereby the individual studies literature through a combination of emotional response and detailed analysis of the text. A common complaint, for example, (whether it had any basis in fact, I do not know) amongst students was that they were marked down on essays because their view did not coincide with that of the lecturer. Despite the plurality of views amongst the teaching staff, students were taught, and expected to work, within the liberal tradition: thoughtful, affective response to the texts was encouraged. The reason that conflict exists between some students and lecturers is that, within that liberal framework, the staff - or *some* of the staff have the power; despite the liberalism, a student's opinion can never be as valid as that of the lecturer. Students are free to hold differing opinions from lecturers, but not to the extent that they can challenge the basic premises of what is and is not worth studying or how it should be studied.

COMMUNICATIONS

Communications students were notably more enthusiastic about their course than the English students were about theirs, although there were several sharp criticisms. Communications was felt to be intellectually demanding - even difficult - in a way that English wasn't. All final year students, for example, mentioned the 'Ideology' lecture course, some finding it rather too abstract, but most finding it a challenge:

> "'Ideology' is a very complex, involved subject, but I really like it because it's something which really gets you thinking in a way. Sometimes it tends to swamp you, there's no solution to it, you'll never find an answer to 'What is ideology?', but all the debates are going on, although they're very complex, you'll get a lot of satisfaction if you

> can master some of the stuff. I really quite enjoy that." (Ken, 3rd year, C)

In many other ways, the case of the communications students is very different from that of the English students. Although communications students were likely to have similar opinions about the merits of their subjects as the English students did about theirs - breadth, personal involvement, 'relevance' and so on, their criticisms were somewhat diffferent. The chief reason for this is that the course concerns itself very deeply with concepts such as 'Ideology' and the political nature of knowledge; students are taught, from the first to challenge received notions of (for example) the purpose of the media, and to question taken-for-granted assumptions about class and gender. This is not to say that all students have a highly developed awareness of these issues, but at least there is an attempt to get students to think for themselves. This does, however, lead to many contradictions and ambivalences in the course. Take, for example, this quote from a final year student:

> "I might get slated for saying this, but sometimes it gets a bit too radical for me. I'm not a Tory or anything, don't get me wrong, I'm not a right-winger or anything, but by the same token I'm not as far left as you can go. Shall we just say I'm left of centre; I agree with certain sorts of left-wing politics but sometimes I can't understand the radical lengths to which some people will go just to make a point and I think this course sometimes pushes that too much." (Charles, 3rd year, C)

The student is tentative in the extreme, apologising for not holding beliefs which, although 'normal' on the Communications course, would probably be quite unacceptable elsewhere. The following remark by the same student demonstrates the paradox:

> "Sometimes you feel obliged to agree. I don't know whether it's because of power relationships, you know, they are more knowledgeable than we are, sort of thing, because they're older, even though they try and treat us as equals to a large extent, there's still these sort of power relations implicit within the relation. And you think, I can't say what I really think, because I'm just going to get jumped on - not just by the lecturers but by other people on the course...I don't think - because the establishment, the convention, is towards a right-wing sort of viewpoint pretty well, this course tries to outline the inadequacies of that particular regime, and I think by its very nature, by trying to do that, obviously it's going to be dissenting

> from that convention, from that conventional view. So I think that's why you tend to get the left side really, the dissenting view because the left view is the dissenting view in British and American politics."

The point is that on this course, the dissenting view has become the established view, and to dissent from that is just as difficult as it is to dissent from the usual establishment viewpoint. Yet the course itself lends tools to the students with which to criticise its own paradigm; the student quoted above, for example, uses the phrase 'power relations', a phrase which is really borrowed from the Marxist discourse of the communications lecturers. So whereas the English students were sometimes rendered inarticulate in their attempts to criticise their departments, the communications students were provided with a language of criticism by the course itself. Nonetheless some students were uneasy about the course, and tried to distance themselves from it politically:

> "Politically it's a bit lefty, but I shouldn't say that, I'll get into trouble!...there's a lot of Marxism in it...I've got to detach myself from it, thinking I've got to learn this, you know, Marxism, it's a subject we're learning rather than - because people don't ram it down our throats, it's just that most of the theories are Marxist theories." (Helen, 3rd year, C)

Or a Christian student:

> "I'm a Christian and I know there are a lot of Christians who fight shy of all these Marxist theories and all the rest of it and I just thought I ought to have a bash at it and I really threw myself into the course to see if I could stand up to it and so far it's been fine. I mean, because everything in the course challenges faith or belief, not just Christianity, but all ways really, so it's been really interesting and quite difficult in places but I'm glad I did it."(Pat, 3rd year, C)

She, too, thought there was a tendency to force a single opinion on the students:

> "They're taught as the right answer, a lot of them, I think, you get the impression that what the lecturers say might well be, 'Well, you're really stupid if you don't see this, you know, because it's so obvious you've been duped by the media and all the rest of it, but I think less so now in the third year, I used to think that last year, but there's a lot more coming out of it...often if you push them they'll say, 'maybe this doesn't have to be the answer', which I think is good."

It is interesting that this particular student thought that the third year was significantly different from the previous years. Some of the other students were able to explain to me that there was a rift amongst the course lecturers which led to opposing viewpoints being presented. Unlike the English courses, which tolerated a multiplicity of opinions, there were two main factions, it seemed, on the Communications course. On the one hand, there were lecturers of the "old school" who held a fairly straightforward belief in the relationship between base and superstructure, who believed that the media were obviously biased in favour of the ruling class and were in fact ideological weapons used by the ruling class to deceive the working-class. The other faction, however, borrowing heavily from post-structuralism, believed that to view the media solely in terms of bias was simplistic and that, as one student put it, "you can't analyse a text, you can only analyse a reading of a text." According to this viewpoint, one can neither assume that the media are simply and eternally biased in favour of the ruling-class ideology, and neither can one assume that audiences are blank slates, easily duped by what they see on television or read in the newspaper. The small number of students who had noticed this division (or who mentioned) favoured the latter viewpoint; as one student put it:

> "He [one of the lecturers] was telling us, and I think he's still telling the first years, things which are patently now not true, theories that have been chucked out of the window...it's not his teaching it is bad; he's teaching it as gospel which is bad." (Mark, 3rd year, C)

Or as another student said:

> "There's not a lot of communication in this department. Sometimes some people are teaching really good stuff which could be used in a lot of ways and yet other lecturers either don't know about it or don't tend to take it up, they just use logic which maybe we left in the first year." (Russell, 3rd year, C)

The language again is interesting; neither is able to use language which suggests the absolute correctness of one view over another; but both imply that the logic of the orthodox Marxist view is old-fashioned or out of date or immature ("theories that have been chucked out of the window", "logic which we left in the first year", "now not true", "teaching it as gospel"). There is, therefore, in

communications, as in English, an uneasy tension between the idea that the opinion of each individual is equally valid, and the idea that, in order to progress, some versions of the truth have to be shown to be more valid than others. This is made more complicated in this case by the fact that the version of the truth subscribed to by these two students was that there is no one truth ("you can't analyse a text, you can only analyse a reading of a text.") The students resent the fact that any theory can, in fact, be taught as "the truth". This dilemma - the absoluteness or relativity of truth - is nothing new in literary theory; in fact, it has plagued debates in the arts and the social sciences since their inception, but it is a debate which, until recently, has not affected 'science' - and for most science students, as we have already seen, it is still not a relevant debate.

10.5. Conclusion

In this chapter, it has been argued that science and arts students construct their disciplines differently, and that both science and arts subjects do this through a series of dichotomies in which their own discipline is related positively and other discipline rated negatively. English and communications students generally saw their discipline in opposition to 'science', whereas physics students contrasted physics both with the arts and with other scientific disciplines such as chemistry. Both physics and physical science students had a keen sense of the hierarchy of different disciplines, with 'fundamental', 'useful' subjects like physics at the top, and 'wishy-washy' humanities subjects at the bottom. This hierarchy was reflected in the hierarchical relationships which existed between staff and students; lecturers were seen as possessing a body of knowledge which could be communicated to students. English and communications students, on the other hand, did not have a strong sense of the boundaries betwen their subject and other subjects.

From the picture drawn by its students, physics can best be seen as a highly organised, tightly structured set of rules which its students are expected to obey. It was part of the science students' taken-for-granted reality that physics was a certain, objective body of knowledge which had to be learned and could not be contradicted.

It was also, however, a discipline that had to be understood; and understanding was seen as the key to discovering certain fundamental truths about the nature of the universe. As physics departments, however, exist within the framework of the university, their role is not simply to instruct or elucidate, but to grade and classify. This, I have argued, leads to a contradiction within the departments' aims; classification sometimes precludes explanation and understanding. This resulted in many students experiencing anxiety about their inability to understand the work or to be successful in examinations.

The heavy workload and the difficulty of the work itself meant that a high degree of conformity was required of all but the most able students. Lab work, for example, was a matter of getting the 'right' results; failure to do so resulted in loss of marks. Some students were reduced to learning their work parrot-fashion in order to keep up to the standard, whilst at the same time lacking any real understanding of what they were taught.

Many physics students, and almost all physical science students, had an instrumental attitude towards their degree courses. Higher education was seen by them primarily as a means to an end, not as an end in itself. Those students who did not have an instrumental or single-minded attitude towards studying physics or physical science were the least successful. Mark and Jane, for example, who rejected the implicit values and beliefs of the discipline, both did badly in their degrees. Both saw the content of their degree courses as unconnected to their lives and interests; Mark wanted to be a nurse and saw the work as "not particularly relevant"; Jane regarded physics as a narrowing down: "That's the trouble with degrees, they're all very specialised and they don't give a lot of scope for broad sort of study." There were others, such as Marie, who had hoped to gain a greater understanding of a subject they loved, and found themselves bogged down in a process of constant marking and grading, passing and failing. Such students felt shackled by the narrow requirements of the degree course and wanted to escape into something which allowed more individuality and freedom: not individuality in the sense of competing as individuals for grades, but individuality in the sense of being free to think what one wishes, without fear of failing.

Those physics students who implicitly accepted the values of their subject rejected arts subjects on the basis that they were useless, irrelevant, not certain enough. Yet the arts students themselves relished the fact that their subject was neither certain nor immediately applicable; they enjoyed the scope it allowed them for individual thought and feeling and disliked the idea of having to learn a truth pre-determined and discovered by others. They rebelled against what they saw as the attempts of their departments to impose certain views on them about the nature of literature and how it should be studied. The departments, themselves, however, were able to contain and accommodate such dissent in a way that the physics departments were unable to. This was partly due to the lack of rigidity in marking and grading; students were free, to some extent, to disagree with the views of lecturers (who, in any case, disagreed amongst themselves); and students were tested and graded much less frequently than was the case in physics. In addition, the final degree classifications, fell broadly into upper seconds and lower seconds, so that students rarely 'failed' or 'succeeded' as spectacularly as the physics students. English and communications students saw higher education as an opportunity to broaden themselves and to become familiar with a range of different ideas and beliefs; it would not be too extreme to say that they also saw it as a means of improving themselves morally, in the widest sense of that word. They were highly pluralistic; very few were dogmatic. Some of them regarded the teaching and practice of science as alien to the values they themselves held; they perceived it as a discipline which wrongly attempted to pose a single view of the world on others without regard for alternative opinions, ideas and practices or the moral consequences of that view.

Few of the English students, however, were aware of current debates in the discipline, and were therefore ignorant of the multitude of ways of looking at texts and ideas. Their own attitude to the discipline emphasised 'freedom of opinion', and their criticisms of courses centred around the lack of such a freedom. However, their concept of freedom was very narrow in the sense that most of them

simply wanted to exercise a greater amount of choice within the liberal humanist framework.

Communications students were more sophisticated in their views, in the sense that they had access to ideas not available to English students, and were able to criticise the course using those ideas. Nonetheless, many of the communications students also felt that there was not enough room for dissent, and were unhappy about the 'bias' of the course.

It would be easy to present this arts/science division as a neutral one: science possesses certain qualities not possessed by the arts, and vice versa, and so they balance each other out. In fact, the division is an ideological one, and one which is, moreover, intimately connected to a masculine/feminine division. This is not solely a result of the fact that physics is studied mainly by men and English by women; indeed, the divide is lopsided, for both English and physics are taught chiefly by men. The account presented here of students' construction of their disciplines, confirms the suggestion in chapter 4 that those qualities imputed to science - objectivity and so on - are closely related to those qualities associated with masculinity, whilst those qualities imputed to the arts are related to those qualities of 'femininity.' In physics and physical science, however, it appears that the rules and values are much more tightly defined than in English and communications, suggesting that the 'masculinity' of physics is much stronger than the 'femininity' of English. Given this hypothesis, we must now look at how gender identity and subject identity (i.e. one's sense of oneself as a 'physicist' or an 'English student') are constructed by men and women in each discipline: is contradiction and tension experienced by students who are in the 'wrong' discipline?

CHAPTER 11: THE CONSTRUCTION OF GENDER IDENTITY

11.1 Introduction

In the early chapters of this thesis, it was argued that gender identity is neither infinitely malleable nor biologically determined, but something which develops and changes in response to circumstances. Gender is a social construct, but it is also an inextricable part of an individual's sense of identity. Segal (1987) has talked of "the over-riding significance we each attach to our sense of gender identity"; this chapter will look at the ways in which this identity is constructed and reconstructed for students through the experience of studying English and communications, physics and physical science.

In the previous chapter, we examined the construction of the arts and the sciences in higher education. It was found that science, and physics in particular, was constructed as hard, certain, concrete; the arts as uncertain, broad, adaptable. It was suggested that these constructions are closely related to our constructions of masculinity and femininity. The issue, then, is whether there is confusion and tension for women and men in constructing their identity through a discipline which has been socially defined as "masculine" or "feminine." In Chapter 5, we noted Hacker's (1977) argument that women are treated as a "minority group", and it was suggested that, as women in physics were numerically a minority, it would be possible to examine whether or not they were also a "minority group." Further, it was argued that men in English and communications, also numerically a minority, might also be considered a "minority group". One aim of this chapter will be to examine whether students have a sense of themselves as a minority group, and whether this affects their sense of gender identity.

This chapter examines a processs: that of the interaction between subject identity and gender identity. Weinrich-Haste's (1984) findings suggest that subject conformity is stronger than gender conformity, and we have seen some evidence to support this in Chapter 10; this chapter will examine the proposition in more detail. It will look, too, at the outcome of this process: the decisions students make about their future lives. The chapter is organised into four main sections, each of which looks at the construction of identity of the four major groups: male science students, female science students, male arts students and female arts students. This, rather than a splitting of the chapter into

male/female on the one hand, or arts/science on the other, will facilitate comparisons between the four groups.

11.2 Male Science Students

We saw in Chapter 10 that physics was perceived by students as distinctly different from other disciplines - not only the arts but also certain science subjects. Physics was constructed as certain, fundamental, useful and progressive. It was argued that this construction of physics was achieved through emphasising its difference from other subjects.

Self-identity is also shaped through emphasising difference. Male physicists construct their identity as physicists, both by contrasting the work of scientists with that of arts students, and by pointing to the differences between physicists and other scientists: mathematicians, and engineers. They see doing a physics degree as a process by which they learn to be a particular sort of person. For example, the arts, as we noted in the last chapter, were seen as "airy-fairy", soft, intangible: the kind of person who did physics was hard-working, a realist. One student said of his physics exams:

> "I think exams is where you learn everything. You might do nothing in the rest of the year, but in that period you get so pressurised, that that's when you really grow up, and that doesn't happen so much with arts students." (Edward, 3rd year, A)

Physicists are also tougher, more in touch with reality:

> "Sciences are more use in everyday life...you can tell if someone's making up something if you've got a reasonable basic understanding of physics and maths. You don't necessarily get fooled." (Ronald, 1st year, A)

The male physicists also made distinctions between physics and maths, and physics and engineering, and, within physics, between applied physics and theoretical physics. They said things like 'maths is too theoretical for me' or, as one student said of the differences between physics and engineering:

> "There's a lot less learning work in it, there's a lot more variety in the subject, the scope in physics is vast; also engineering involves a lot of work which would cut down your social life a lot." (Patrick, 1st year, A)

The male students often made distinctions between physics and maths on the one hand:

> "Physics is the most fundamental science and maths - we have trouble with maths - whatever maths is, wherever maths fits in, because maths is totally divorced from reality and physics ties it down." (Colin, 3rd year, A)

and physics and engineering on the one other:

> "I'm not an engineer because I'm not practical but I like the way physicists think, I suppose. I like the theory bit of it, but I'm not a theoretical physicist, I'm an applied physicist and I like physics because I like playing with maths as well as doing lab. work. If I was doing an applied degree I wouldn't get that" (Edward, 3rd year, A)

These distinctions reveal a process amongst students of interpreting their attitudes and abilities in a way which allows them to build up a self-image of 'physicist' and hence an image of themselves pursuing a certain career. The distinction was carried further: some students, like Edward, saw themselves as 'theoretical physicists' or 'applied physicists'. This distinction was directly related to the kinds of futures students saw for themselves:

> "...I believe this university's theory-biased. I think that places considered the best physics departments tend to be theoretical, and so this has been quite a well-established physics department, tending to be more theoretical; and so you can go for an interview for a job, and your head will be filled with quantum mechanics and you'll be no good for them to employ you." (Edward, 3rd year, A)

However, Edward's position, that the content of the course should be more applied and hence, more directly related to the kind of job he wants to do, is not accepted by all students. Alan, for example, wants to work for British Aerospace in a job where:

> "You are actually doing what they call the fundamental research; rather than just developing a problem, you actually develop it from the very basics." (Alan, 3rd year, A)

Alan dislikes the applied work on the course. Or as Colin put it:

> "I wasn't too keen on the more lab-orientated things because I like something where I can sit down and like maths, if you turn the handle you can get the answer, get the right one, but you can set up an experiment perfectly and it still wouldn't work." (Colin, 3rd year, A)

We can see this building up of identity in Paul, a final year student at B. He was one of only two final year students undertaking a theoretical project; he said that he was disenchanted with lab work. However, he also disliked pure maths:

> "I argue with pure mathematicians that it's a waste of time unless there's some application because what I'm interested in really is just understanding things, I think, and with maths you don't as much understand it as derive from what you've assumed to start with, you have to make some assumption and this is consistent with it, this is mathematically correct, whereas with physics, you have to see what's going on and work the other way, get the assumptions if you like, go as deep as you can and findout what you have to assume, to get results. That's the difference, I think. That's why I'm interested in physics more, it's more applied than maths." (Paul, 3rd year, B)

Physics was central to Paul's life, and for him, the extrinsic value (doing physics as a means to an end) and the intrinsic value (doing it as an end in itself) merged:

> "I'm lucky in that I've been here doing what I want to do. You find that most people who are doing a degree, it doesn't really matter that it's physics, it just so happens that physics has a good value on the job market; but that means that I've enjoyed it."

He intended, after his degree, to do a M.Sc. in theoretical physics, before doing a Ph.D. He then wanted to work in industry. For Paul, doing a job simply meant continuing with what he enjoyed doing already; he wanted to work

> "somewhere like BP where they've got a big project going and you can work on theoretical aspects."

In ten years time, he hoped he would still be a research scientist in industry, "involved with the problems myself", not "organising other people to solve problems." Paul has a very clear sense of identity: he already sees himself as a "physicist"; he makes no distinction between what he is now and what he will become. The same is true of most of the other male physics students, most of whom had a clear image of themselves as physicists. Their attitudes towards physics tended to be instrumental: not so much that they were only doing a physics degree because they wanted a job out of it as because they did not distinguish between being a student physicist and a qualified, working physicist. Physics dominated their lives; as one first year put it, "Physics is *the* subject for me at the moment." Thus the intellectual content of the degree was not differentiated from the use to which they intended to put their it; when students talked about their future careers, for example, it was often in terms of continuing with the aspect of physics they'd enjoyed most:

> "I would like to stay in physics, this area; I don't particularly fancy doing industrial research or anything like that. I'd prefer to do pure physics, but that's difficult, it depends on how good I am at it. I don't know yet." (Tim, 1st year, B)

They embarked on the courses with a clear idea of what they wanted to do, and why they wanted to do it; they often left with a future career mapped out. They tended to measure other academic disciplines only in terms of their extrinsic, rather than their intrinsic, value. When students were asked about whether the sciences were more worthwhile than the arts, the answer was often couched in terms such as the following:

> "Yes. I think there's more chance of getting a job in physics, or a physics-related subject, because there's a shortage of scientists and technologists at the moment." (Adrian, 1st year, A)

Adrian was a student who exuded self-confidence; he had a clear idea of what he wanted and how he was going to get it. His interest in physics was inspired by the film "Star Wars"; in ten years time, he said, he wanted "a big house, a big car, lots of money." He had come to A through a process of careful planning; first he had eliminated from his list all those universities which had more arts students than science students. Then he had gone through the physics courses of the remaining university prospectuses ticking off the elements that most appealed to him; the course with most elements he put top of the UCCA form, the next course he put second and so on. (This had backfired slightly; A was fourth on the lists, but at the interviews for his first three choices, he decided they were "dumps" and accepted A's offer.) Ronald, another student on the same course, had also planned his future carefully; he wanted to move into engineering after graduating and said that he intended to choose his final year specialisms according to the demand on the job market at the time.

Although the male physics students had developed a clear identity of themselves as 'physicists', the physical science students did not make such fine distinctions between their own discipline and others. Partly this is because physical science was a second choice for many students and partly it is because it is less clearly defined as a discipline in its own right. Physical science, as argued in Chapter 10, was seen

entirely as a *means* to an end: not an end in itself, like English, nor even part of an end, like physics. Physical science was consistently seen as more practical, more applied, more *useful* in helping students to get a job; a strong separation was made between doing the course and having a scientific career. Part of the reason for this is that the course is so broad-based, students have little sense of themselves as "physical scientists" in the way that physics students regarded themselves as "physicists". Physical science students tended to prefer those aspects of the course which they found directly useful - such as computing - and were intolerant of coursework which was not directly related to scientific skills; one student, for example, talked about the 'risk evaluation' part of the energy studies module:

> "[It was about] how do you evaluate somebody's life in terms of how much money you spend on safety and so on, which I thought was thoroughly boring and not very relevant...we could have spent the afternoon doing proper work."(Matthew, 4th year, C)

The same emphasis on intrinsic value was true of students' assessment of their industrial training. Generally, they evaluated its worth according to how useful they felt it would be for their future career.

Many male science students had interests outside physics; in the main these were sports such as rugby or athletics, although some - about four - expressed an interest in painting. None mentioned an enjoyment of literature or theatre; few, surprisingly, mentioned music. Some clearly carried science into their outside lives, through an interest in computers, for example. Generally, the outside interests - sport, for example - were not regarded as conflicting with the demands of the course. However, those who enjoyed art and painting did regret that they had no time to pursue that interest while they were doing their degree. Doing a physics degree was seen as a full-time occupation; Alan, a third year at A, regretted the fact that he had so little time to keep up with current affairs.

For these men, the physicists and the physical scientists, self-image was concerned with the particular nature of one's abilities and the sort of job one could do with them; it was rarely concerned with one's identity as a *man*, as opposed to a *scientist*: the two were one

and the same thing. There was, as we might expect, no conflict between the two. One can see this deeply ingrained idea of 'male as norm' carried over into language, in this quote from a student talking about his old further education college (which he had attended after leaving his boys' grammar school):

> "It [the college] is dropping now because they had a woman headmaster come in and she's - not being sexist or anything - she just wasn't very good. The standard went, and of couse with comprehensives coming through - not that I'm against comprehensives - but with grammar schools, you had the cream basically, that kept the rate up, they're not quite the same now." (Adrian, 1st year, A)

It is the curiousness of the term 'woman headmaster' rather than 'headmistress' or even 'woman headteacher' which is striking, and which belies his assertion that the headteacher's sex didn't matter. The unconscious slip is probably more revealing than any number of conscious qualifiers about 'not being sexist'.

Not unnaturally, most of the physics students wanted careers that needed a physics qualification - scientific research jobs in industry, for example. Four of the eight men intended to do Ph.D.s after finishing; and all four of those men said that they hoped for a career in industry either after completing their Ph.D.s or instead of Ph.D.s if they failed to get a good enough degree. One (Paul, already mentioned) intended to do a Master's degree in theoretical physics, and then do a Ph.D., and after that take up a research job in industry. Two wanted simply to go into scientific research posts in industry; only one man intended to do a job not directly related to physics - Mark, the student who wanted to be a nurse. For some students, doing a Ph.D. was simply part of the natural progression in being a physicist:

> "I've not made up me mind what I want to do with regards to a job. And I've quite enjoyed this year, I've really enjoyed the lab work and I'd like to carry on." (William, 3rd year, B)

Many students had a remarkably clear vision of their long-term futures, and these tended to be highly materialistic.

> "I'm assuming that I'll get a Ph.D...and then I'll probably want to make some money so I'm going to go to the USA for five years, so perhaps nine years, ten years [from now], probably married with two kids, living in London, working for somebody like Plessey." (Edward, 3rd year, A)

> "What I'd like would be a job in the States with a big company, and the proverbial nice house and home to go with it. Certainly something scientific. I can't see myself going into something like R and D - certainly something that uses the physics." (Ronald, 1st year, A)

> "I've not really thought what I'll be doing in ten years time. I presume I'll have entered the rat-race like everyone else and worked me way up the ladder." (Patrick 1st year, A)

Even allowing for the cynicism in the last quote, the physics students had very conventional and materialistic ambitions; almost all the first years, for example, wanted to obtain jobs in industry. One, Rashid, was slightly unusual in that he wanted to become a teacher; however his attitude towards the job was highly instrumental. When asked why he was doing a degree in physics, he said:

> "So I can get a job. You can't become a teacher unless you've got a degree." (Rashid, 1st year, B)

When I asked him if he'd always wanted to be a teacher, he said,

> "No, not always. It's just, I like an easy job."

There was little sense of doing something for the enjoyment of it; he also told me that he'd considered changing to psychology in the first weeks of term because he thought it would be easier. His comment on the respective value of the arts and sciences was:

> "It depends on what arts subjects you're talking about. Some I think are totally useless and some I think are useful. English literature I don't feel is useful, and history, I suppose, you can apply it to today, and physics you can apply it; I think it's worthwhile, it's all around you, and without it you'd be back in the caves."

In Chapter 10, we noted that Mark, who wanted to be a nurse, rejected the values of physics. It is perhaps significant that he rebelled, not simply through turning his back on physics, but by choosing such a low-status, traditionally feminine, 'caring' occupation; clearly the very subject of physics was associated, for him, with individualism and a desire for personal achievement and financial success. However, it must be noted that Colin, also a third year at A, had managed to reconcile (without apparent difficulty) a career in physics with social commitment. Although at present sponsored by GEC, and intending to do a sponsored Ph.D. after completion, he saw himself in the future working in a university behind the Iron Curtain; he said that it was "too easy to get into comfy suburbia, with a Ford Cortina

and two point four kids and half a mortgage." Whether Colin's is a realistic ambition it is hard to say, but he, unlike Mark, experienced no contradiction between being a successful physicist and being socially useful.

The future plans of the physical science students were slightly different from those of the physicists. Perhaps surprisingly, given the vocational nature of their degree, some of them had not made a final decision on what career to pursue. None of them had applied for Ph.D.s. Two of the four final years expected to go into scientific jobs in industry; one hoped to go into medical physics; one intended to go into management. Of the first years, three simply said that they wanted scientific research or engineering jobs in industry, whilst the fourth said: "Don't know...somewhere where there's money." Paradoxically, because the course is so explicitly vocational, there is a less urgent need for students to decide exactly what they want to do. Their visions of the long term are, however, similar to those of the physics students:

> "I'll probably be abroad,...the next ten years are really the beginning of what's going on...it would be nice to be, say, somewhere up the higher echelons of management or whatever I'm doing." (Matthew, 4th year, C)

> "In ten years time, I'd like to have a house, a car, a steady job which would be in the region of £10,000 to £20,000 - that should be nice and comfortable." (1st year, C)

> "I'll be doing some job possibly connected with management rather than research, and I'd like to travel around, not in England, elsewhere. I suppose I'll be doing some sort of job connected with science - not so connected with science as research - I'd rather be connected with the production side rather than research." (4th year, C)

There is one student, Richard, whose own history of developing a personal identity through studying physics, can be used to highlight the beliefs and attitudes of the male physics students. His attitude is "instrumental"; he sees physics as a means to an end, a way of bettering his chances for a career, although he also loves physics for its own sake. In some ways he is typical of most of the physics students, but he was more explicitly instrumental than the others, almost to the point of self-parody. Further, class plays an important

part in his sense of himself, and he uses his class background to highlight certain of his beliefs and attitudes.

Richard is from a working-class family, and retains a strong Liverpool accent. His mother works as a cleaner, and his father is a Labour councillor on Liverpool city council, or, as Richard put it, "he's a trouble-maker". Before that, his father worked in a factory until it was closed down. Both parents left school at 16, with no education beyond that. Richard went to the local grammar school, where he did well, gaining twelve O-levels in a variety of subjects; and he chose his A-level subjects with an eye to the job market. Having gained grades of ABB, he came to B University. As the eldest child, he is the first person in his family to enter higher education.

Richard is obviously a very able student, and his enthusiasm for physics seemed boundless. Here he is, for example, talking about the relativity and quantum mechanics courses:

> "I get really excited about some of the sub-topics. Some parts of physics aren't that interesting, I mean, I do have favourite areas, and when you go through some of the notes then, like the quantum phenomena things and mechanics where it's all physics on a microscopic level you can't see in our scale of the world and then you start studying strange effects that happen and it's really quite funny, and you think, wouldn't this be funny if you could bring it up to our level; and I read a few silly little books about it - there is one by someone which was called 'Mr. Tomkins in Wonderland' and it's like trying to imagine if a person got shrunk into a microscopic world and seeing these microscopic effects, and relativistic effects, it's all really interesting - it's hard, and you think what is the point of doing it, all this big work by Einstein, you know, there was questions of whether he should have got a Nobel prize, because what benefit is it to mankind, but it's really, like, good to think about, isn't it, because if we could do this, or if that happened to me, so I do get some subjects we've done which have been really good..."

Richard's mind worked incredibly fast and, as is obvious from this extract, he had no difficulty moving from one idea to another and back again. In the above quote we see a very old-fashioned working-class respect for intellectuality, combined with an unease about the value of studying something that's not really useful. Although most of the time he seemed to take the view that doing a degree was all about getting a job and making a success of one's life, he occasionally veered towards a belief that all intellectual pursuit was worthwhile. For the former

attittude, expressed at its most potent, this is what Richard had to say about the difference between his background and attitudes and those of the middle-class students in the university:

> "It's a funny upbringing, because you come here and everyone's so liberal, and I'm very conservative natured in me ways. I don't really know what me politics are because back home everything's just socialist stroke communist, you know, me dad's like that, and I come here and I can see a different view, but then a lot of people here are from, like, much different backgrounds and they feel much more humane and aware [*said ironically*] and things like that, and I just go Uuurgh! you know, because I don't want to know. Success is all I'm interested in, and success is spelt with a dollar, that's what I believe in. I just want to make money. I believe I can do it; I'm really going to push to get on."

His view about gaining jobs had, apparently, changed at university:

> "People say I'm narrow-minded, but I reckon in the opposite sense of what I was when I came here. I used to think, 'Oh, you'll never get a job, no, things are really bad' and I was always arguing the case the way the Socialist Workers do, but now I think the opposite way, I believe that if you just keep on working, and climbing, then you will be able to get success. Apart from all the knowledge I've learned in me subject, I've got a different outlook on life from when I came here. I look at things in a different way."

Richard firmly believed that it was possible to get on in life by working hard, despite the evidence of his own family to the contrary. ("It's horrific the amount of money my father's bringing in, I'll probably be earning double or more next year.") His immediate ambition was to work for the CEGB ("I'm very pro-nuclear power"). Despite his appetite for success, however, he was different from some of the other physics students in that he maintained a degree of respect for education for its own sake - although some of its manifestations evidently puzzled him:

> "It's wrong that people mock and laugh at the arts things when people are doing history of art or higher degrees in really specialized things, like there's a girl I know who's doing what happened to women in the French Revolution, and I mean, when she told me that, I just cracked up, but you know, you recognize then that you must be fairly clever or something to get the money to do that, but then I argue like it's totally useless and all things like that for a lot of them, but then, it's true really with physics, in that what good is some of the quantum mechanics and the theoretical stuff. It's just pure research, some of it, and can't be applied...So I always think that I couldn't imagine meself doing an arts degree, but I

> think it's wrong that people cut back on the arts, I don't support that, because a world full of scientists would be incredibly boring."

Richard's view of the world is a social Darwinian one in which people compete for success, money and power. People who chose not to compete are free to do so, but couldn't expect any reward for it. His personal vision is a purely individualist one; he hoped to succeed as an individual, regardless of anyone else. His reply to the question "What do you see yourself doing in ten years time?" was remarkably blunt:

> "Power is my main aim. Power and money. I always see meself getting more involved in politics. I'd like to see meself getting involved in local government. I reckon I could - I like the idea of selling meself, and things like that - I could see meself, modelling meself on what people want to see and doing it just to promote me own interests. I'm very selfish, I'll admit that. I'm only interested in Number One, really. It's just to get on and earn money and that, maybe when I have earned money in five or ten years, I'll be bored and want to do something different...I'd like to think that in 10 years time I'll be earning a salary that is equivalent today to around £18,000 - and having real prestige - and then maybe do something completely different."

The extraordinary thing about Richard is his self-awareness. Earning a lot of money, being successful are not taken-for-granted realities for him as they are for many of the middle-class students. He has thought quite hard to come to the conclusion he has done; having considered the alternatives, indeed, *experienced* the alternatives, he has conciously taken on a set of right-wing middle-class attitudes as the best way of achieving what he wants. He is at once atypical of the physics students - in that he is both working-class and very self-conscious about his own attitudes - and extremely representative of them, a more articulate exponent of what the others believed implicitly. Whilst many others regarded physics as a means of getting good, well-paid jobs, none of them would have characterised their attitude as "selfish": selfishness for Richard is a political philosophy.

11.3. The female science students

Women's construction of their identity was very different from that of the men. They did not, generally, think of themselves as "applied

physicists" or "theoretical physicists"; in one sense they did not see themselves particularly clearly as individuals. The female physics students were clearly aware of themselves as an homogeneous group. Women generally sat together during lectures; they were conscious of being in a minority. This does not necessarily mean that they were a minority group, but they knew that they were "different", as the following quotes indicate:

> "There aren't many girls doing the course, we're singled out much more easily, they know our names, but they don't know all the boys..." (Debbie, 1st year, C)
>
> "Because there are so few girls in the department, you tend to stand out a little bit and they get to know your names quite quickly." (Jane, 3rd year, B)
>
> "I felt a little bit self-conscious [at first], but it wasn't as if you were the only one, there's about twenty of us out of a hundred, so you didn't stick out that much. I think I might have been a bit worried about it if there'd been three, but it was quite nice, I quite liked it." (Melanie, 3rd year, A)
>
> "We're really outnumbered, but we get on with the boys all right, we have to really." (Marie, 1st year, B)
>
> "It didn't seem unusual or anything - just every now and again when you looked around, and you notice it's only you row that's got girls on it, you know, and all the rest are male but you don't notice it really." (Mary, 1st year, B)

Several of the women mentioned being "singled out", saying that staff learnt women's names before they learnt men's names and that skipping lectures was harder because lecturers noticed if there was a woman missing (if, say, there were only four women instead of five). Although some women are used to being a minority, those from single-sex schools have to adapt rapidly to this new situation:

> "The only thing I'm not used to is having man teachers and boys in the classroom, and I'm finding lessons less relaxed than they were in school; it's a lot more serious, 'let's get down to it', but I'm finding the people not as friendly as at school...and I think that gives it a cold atmosphere." (Lesley, 1st year, C)
>
> "I was surprised at first because I thought there'd be a lot of girls on it because it isn't quite physics, that there'd be a lot of girls like me who weren't sure enough of themselves to try physics." (Donna, 1st year, C)
>
> "I can remember the first day I walked in, this big massive room, full of people. I got there about five to nine, and it was absolutely packed, and I can just remember walking - I had to walk right to the back of the room - and getting redder and

> redder as I walked up, and I thought, Oh my God, there are all these lads and no girls, and I was sitting there spotting the girls and there's only five of us on the whole course." (Linda, 4th year, C)

None of these women regarded themselves as victims of discrimination in any way; all denied that being a woman in science was more difficult than being a man in science. Yet they all registered surprise, awkwardness and embarrassment at their conspicuousness in the course. No man admitted to similar feelings. Being conspicuous is not in itself a disadvantage; indeed, it could be advantageous - women might experience preferential treatment as a result of being in a minority. However, Donna thinks that "there'd be a lot of girls like me who weren't sure enough of themselves to try physics." Physical science is, for Donna, less rigidly defined as a masculine preserve; she thinks it might be more open, less difficult maybe than physics and therefore more likely to be studied by women. She introduces the element of uncertainty; she suggests that she herself lacked the self-confidence to take physics. She thinks that other women might also lack that self-confidence, implying at the same time that men do not lack confidence. There is a sense, then, amongst these women, of intruding on a masculine preserve, of being slightly unwelcome. This is reinforced by the comments of Debbie, a first year at C, talking about her male peers:

> "I find an awful lot of them, if you speak to them, it's 'aah, a girl spoke to me', you know. When you think we've been here for six months now and some of them, I've said 'hello' to them once or smiled at them, and they've looked at me like *this*, and I've thought, 'I won't bother again'. But in the lab, and computing, when you're sitting at the terminals, asking questions, that's a good way of making friends with the blokes ('cos the girls naturally are friends whether you're the same type of people or not, the girls all chat to each other), but I find you've got to make an effort with the blokes, to say, 'Mmm, I can't do this, can you help me', sort of thing."

Debbie is here developing a strategy to cope with a particular problem, in this case the problem of feeling excluded, of not having friends. There is not, as might be imagined, any deliberate deviousness in her strategy; she is simply aware that her male peers find a woman who is obviously a 'woman' (i.e. someone fairly helpless and not very good with computers) easier to cope with than someone who is both a

'woman' and a 'scientist'. From Debbie's comments, it would seem that the idea of a 'female scientist' is outside the frame of reference of many of the man on the course. Debbie resolves the contradiction of being both a woman and a scientist by becoming more 'feminine', and stepping into that frame of reference. In this way, men's idea of what constitutes "femininity" is strengthened, rather than weakened, by their interactions with female science students. (It must be noted that when Debbie was interviewed, she appeared to be neither helpless nor stupid, but lively, intelligent and self-confident.)

Debbie also says, significantly that "the girls naturally are friends whether you're the same type of people or not." This remark was borne out by the fact that most of the women in Debbie's year sat together, as a group, during lectures. (The exception was Donna, who sat with the men, of whom she said "I don't think of them as the opposite sex": an attempt to identify herself with the dominant group.) The implication of this is that these women see themselves primarily as *women*; that the fact of having femaleness in common is more important, at least in the context of the science class, than that they get on with each other or have other interests in common. This impression is strengthened by the initially puzzling remark of a female student in University A:

> "In a way it's easier for girls [to make friends] because there are only twenty girls so you can pick them out more easily." (Felicity, 1st year, A)

It is, of course, just as easy for the eighty men on the course to pick each other out as it is for the twenty women; there is also no immediately apparent reason why the women shouldn't be friends with the men. What this student seems to be saying is that the fact of having gender in common, and more particularly, of having a minority gender in common (and thus a collective identity) is more important than other shared interests or personalities. This attitude is surely part of a defence mechanism; it suggests that some of the women at least are gathering together in the face of an unwelcoming environment. Obviously some of the women do make friends with the men, but there are certainly barriers; a first year at B explained to me the nature of friendships on the course:

> "There are, on my floor, another two girls who do physics, and there's only four girls who do physics; anyway, there's three of us together, so we stay together a lot, and we get on with all the other people who do physics, but it's sometimes a bit difficult because you don't know how they're going to react - some of them have got girlfriends and if they see you talking it can be a bit bad really." (Mary, 1st year, B)

Thus male/female relationships are seen not to exist outside the realm of the sexual: there is a rigidity in the male/female distinction in which the barrier of gender is more important than the common ground of physics; women are perceived as women first, and physicists second. This is explained in greater detail by Fay, a fourth year student at C, who recalls her first weeks on the physical science course:

> "It was funny really, because when we first met the lads, they wouldn't swear or anything, they were really nice; and then, after about two or three weeks, they realised that you weren't any different to them, and just went back to normal, but the first weeks were really strange because they were so nice it was unbelievable, and you wondered what you were doing, they'd hold open the door, they wouldn't swear, if they swore they'd apologise, but after a few weeks they realised we weren't any different."

Fay makes it clear that she doesn't see her own position as a female scientist as odd, but that the men are odd because they can't accept the idea of female scientists. The easiest thing for them to do is to treat them as 'women', thereby normalising them to some extent, fitting them into pre-defined categories. They may even have been exaggerating this categorisation, because it is at least arguable that they do not treat other women in this deferential way. Fay concludes by saying: "they realised we weren't any different" - a common assertion from the female physicists and physical scientists. The assertion that, whatever problems they may be facing, they "weren't any different" was, for many women, a fundamental part of their identity and self-confidence. To admit to being different is also to admit, within their frame of reference, to being inferior ("I don't think of them as being the opposite sex"): an assertion of equality and of sameness with their male peers is a way of establishing their identity as scientists who are "just as good as the men." Marianne, also a fourth year at C, uses the same discourse of "being as good as men":

> "It doesn't bother me because I'm in less of a minority here than when I did my A-levels...I realised that you can keep up

> with the lads anyway. I mean, it would bother me if I felt stupid and if every time I said something they laughed at me, but because I know I can keep up with them it doesn't bother me at all...One of them I knew [at sixth form college], I really felt like "stupid woman", you know, every time you said something or did something wrong in the lab, there was a comment. But the lads here are great. They treat you just the same."

Here the power relations are taken for granted. Just as science students were able to say, "I don't look down on arts students", female science students are aware of the magnanimity of men in treating them "just the same". Marianne is aware of the vulnerability of women in the dominant discourse; she has to earn her right to be treated "just the same" by proving that she "can keep up with them."

If Debbie uses femininity as a strategy to get herself accepted, Lesley, a woman on the same year of the same course, tries to get herself accepted not as a woman, but as a serious scientist which, for her, meant taking on masculine traits and values. She talked at some length about another woman on her course, who she felt was too "feminine":

> "One girl seems very quiet and she's not got any confidence in herself, she's just hoping for the degree, whereas I'm hoping for honours...I don't know whether she's doing it because it's idealistic for a woman to start on this industrial sort of course, and she seems too feminine to me to be on this course. She gets dressed up every day, she gets her clothes on and her tights, and her make-up is always done immaculately; and she seems a bit too flighty, too girlish, you know, to do something like get down to cutting bits of metal up on a big machine."

Later in the interview she mentioned this woman again, saying that she'd be better in a job where:

> "she'll be admired for what she wears, a nice secretary or a manageress or something like that...because if we face what we're looking for in the future, job-wise, we're going to be in a dirty great factory, or somewhere where it's going to be dirty because it's basically manufacturing materials."

She concluded:

> "I think you've got to - especially with it being so male-dominated - sort of leave the skirt behind, and say to them, 'my brain's just as capable as yours."

Particularly significant in Lesley's description is the language she uses to make explicit her rejection of femininity. In each of the above quotes she talks in terms of clothing: "she gets her clothes on and her

tights"; "she'll be admired for what she wears"; "leave the skirt behind." The criticism Lesley makes of clothing, although intended literally by her, is also metaphorical; it suggests that femininity is something which can be removed, discarded, in order to change the sort of person one is. Femininity, or womanhood, is equated with triviality: Lesley's class-mate is "flighty", "girlish". Lesley implicitly rejects the idea that womanhood is an integral part of someone's make-up; indeed, she perceives the male as the 'norm' by which others must be judged. For Lesley, then, to be taken seriously as a scientist means leaving behind girlish things and taking on masculine values and attributes. Lesley has to be *as good as a man*; she implicitly accepts male superiority. Women cannot become equal with men unless they, figuratively speaking, become men themselves. When I asked Lesley who had been the greatest influence in her life, she replied, revealingly, "I would say Mrs. Thatcher, because she's the first woman to be Prime Minister - she's come across in a really male-dominated world." Lesley is *not*, as she says herself, a feminist: her answer to male domination is an assertion of individual superiority, not a collective opposition; she is as much in competition with other women as she is with the men.

The competitive element came out very strongly in the interview. Lesley referred several times to her ambition, her determination to do as well as men in her field, as in this exchange:

> "I'm really determined...I think being in an environment of boys as well, where it's a male-dominated field, it gives you the incentive to work harder, to say, I'm going to show them...
> K.T.: that you're as good as them?
> L.S.: Yes, if not better."

For Lesley, men are the standard against whom women's achievement is to be measured. None of the men said that they felt they had to do as well as the women; yet many of the women felt that they were being tested, that they had to prove themeslves. In the following extract, Natalie is discussing the sexist attitude of one of the lecturers:

> "He picks on the girls: he's really mean to them. He always makes rude comments when they walk in half a minute late. 'Well, you're here again, are you? So you've decided to come this week, have you?...he's always rude about their work, but not about the boys' work, except during the maths test when the girls got about twice as many marks as the boys, so he couldn't say anything." (Natalie, 1st year, A)

The point here is not just that some male lecturers are misogynist, but that for a few women there is a continual battle to prove themselves as equal through competition with the men. It is not just a question of individual competition, but that they as women have to prove themselves as equal to, or preferably better than, the men as men. The existence of this competitive aspect, this need to prove themselves, shows that women, entering university with A-level grades as good as those of men, cannot take their status as scientists in the department for granted: they have to demonstrate their worth first. Women have to choose the extent to which they wish to engage in this struggle; their involvement (or lack of it) in the battle is part of the process by which femininity is constructed and reconstructed daily. The battle is made all the more difficult by lecturers, like the one mentioned above, who would prefer not to have women in the department at all.

Many women, then, found themselves manoeuvering within the departments, trying to find an identity which would be acceptable both to them and to others. Lesley was the exception, not the rule, in taking on masculine values, in deciding to become a 'serious' scientist. There were far more women who found it easier to compromise their position and make use of what they saw as the advantages of being a woman:

> "I'm more prepared to ask for help than the boys are, you certainly get more help...you know, just doing practical or something, I'll ask my neighbour if he's done the bit before me, 'have you any ideas about how to do this?' or 'did you get things like that?', whereas I don't think boys ask as much...maybe they feel, 'I can't let them know that I can't do it, but I don't feel that at all, I just want to do it as best as I can." (Felicity, 1st year, A)

Marianne had perfected the art of using femininity to advantage:

> "Actually, it's good being a girl. It was the same when I was doing my A-levels as well. They used to say, Oh, you go and ask him for some computer paper or tell him the terminal's broken, so I think you do get a bit of preferential treatment actually. You might not, I might be imagining it, but sometimes you'll do the same work as one of the lads, and you'll get a better mark." (4th year, C)

Although Marianne had earlier said that the women were treated as equals by "the lads", it is clear that women are treated differently by the staff. Leaving aside the issue of whether always having to be the

one who tells teacher that the terminal's broken is really preferential treatment, there is a more intimate, chatty relationship between the female students and the staff, as both Debbie and Marianne explained:

> "I find they're probably friendlier towards the girls if the girls are prepared to be friendly to them, rather than, if the boys chat to them, they're not quite as chatty as with the girls." (Debbie, 1st year, C)

> I think the girls are more - not bossy, bossy's the wrong word - but we might go and say to the lecturers what we think or 'Can you give us some tutorial sheets on this', whereas the lads just sit back and take it, and if it's a crap lecture they'll just accept it's a crap lecture, whereas we won't, you see, we'll actually go and say, 'that wasn't up to much', and we'll go and ask them questions and stuff like that." (Marianne, 4th year, C)

The strategy here is to manipulate lecturers' perceptions of women to advantage; women can challenge lecturers without being threatening. Marianne recognises that this is due to women's inferior social position and that there is a sexual element to the staff's greater willingness to chat to the women. She finds it easier to accept and use this, however, than to challenge it:

> "There's no way you can get absolute sexual equality. With some of the lecturers you feel that you're being a bit sexually harrassed - not physically - but there's one who's always making comments...he says, you're in the clean room, and he says, 'Oh, it's a bit hot in here, why don't you take your clothes off.' I mean, he's only joking, he never takes it too far, but he's the only one who's actually made any comment, it's just his sense of humour, he's not really a pervert."

As with many other of the female students, Marianne's complaint about discrimination is immediately followed by a denial of the validity of the complaint, in her case five consecutive statements which rationalise the lecturer's behaviour: "he's only joking, he never takes it too far, he's the only one who's actually made any comment, it's just his sense of humour, he's not really a pervert." This rationalisation is a way of coping with the experience; she turns the lecturer's unacceptable behaviour into something acceptable by, in a sense, denying what has happened, or putting into a different context. 'Jokes', after all, are harmless; and if the lecturer is only joking, then she need not feel threatened by him.

Fay, in the same year as Marianne, confirmed Marianne's account of differential treatment:

> "We do get treated differently by some of them. I mean, you can't deny that, they call you by your first name and all the blokes get called by their second name...some of them treat you just the same as all the others - the odd one treats you *carefully* - I don't know how to describe it. It's annoying, because they think you're not quite capable of it and you might just do something silly because you're a girl. And then some of them go the opposite way - because they're frightened of being seen to treat you differently, they treat you worse, because they're scared of - you know what I mean?
> K.T.: Giving you preferential treatment?
> F.R.: Yeah, but on the whole, no discrimination really."

The staff seem to be as puzzled as the male students about how to treat the women. The women are perceived as an oddity, perhaps even a threat, and therefore they have to be treated "carefully" in case they do something really strange. Adressing women by their first name makes them seem less threatening, and less serious. For Fay, this is not enough to constitute discrimination; but it does mean that she has to tread a careful path and negotiate her identity. The issue of masculinity and femininity came up again in an interview with Louise, a third year at B:

> "I'd really like there to be more women, especially coming from an all girls school. It's something you miss, female company. It tends to be that you get to know plenty of blokes and hardly any girls, so when you go out at night, you tend to be one of the lads all the time, and it would be so nice to get dressed up and taken out for a change."

Louise is talking about a common experience: the need to blend in comfortably. She is "just one of the lads" - no longer conspicuous, no longer different, but the same as everyone else. Like Lesley, she talks about feminine identity in terms of clothing: getting "dressed up" to be taken out, rather than in terms of mixing with other women. She sees her identity as defined by men - whether they see her as "one of the lads" or as a "woman." Her notion of femininity is therefore a stereotyped one - being taken out by a man - and the alternative to it is being "one of the lads." There is no middle course; gender identity is always rigidly defined at polarities. It was not possible simply to regard one's sex as unimportant or inconsequential; it was a question of manoeuvering, becoming more 'masculine' (or more 'scientific') or

more 'feminine' as the situation demanded. Thus Louise, in the example quoted above, feels a need to assert her 'femininity' in the face of pressure to be 'masculine.' Traditional notions of masculinity and femininity assert themselves.

Women's attitudes towards physics were far less direct and precise than men's. Physics was, like a number of other things, something they did because they enjoyed it: not necessarily something which was an over-riding part of their lives. Natalie, for example, who was one of the most talkative of the science students, talked about playing in a jazz band and studying physics with equal enthusiasm, and switched from one topic to the other with apparent effortlessness.

In the same way, the women's self-image was rarely as clear-cut as that of the men's: they did not, on the whole, see themselves as ambitious or important. When they talked about the courses, for example, they were often unhappy about certain important elements. Most of the women disliked computing, which was compulsory; whereas many of the men had had previous computing experience (and hoped to use computers in their careers), most women didn't, and had difficulty with the self-taught nature of the computing course, one woman confessing to me that "I'm a bit of a Luddite really." Women also often disliked the abstract nature of the physics studied:

> "I find that there isn't enough description very often and just too many equations and numerical things and I find that if some people talked English more often, that would help." (Julie, 3rd year, A)

> "There seems to be a certain jargon to it and if you know the jargon, you're o.k., but they're used to talking to people on their level and you find it difficult to talk to people who don't really know." (Melanie, 3rd year, A)

It will be remembered from Chapter 10 that Jane said she saw physics as a "chatty, qualitative subject"; many women simply didn't regard physics in an instrumental way at all; it was just something they were good at and enjoyed. Women's preferences within the course tended to be for "relevant" options: medical physics, for example, at the "soft" end of the physics hierarchy. Far from seeing physics as central, either to their own lives, or to society, they downplayed its significance:

> "I know a science degree tends to be looked upon in better light than an arts degree because people think if you've done a science degree you must be clever - it's not the case at all, it's just what you're interested in." (Mary, 1st year, B)

This attitude also manifests itself in a greater tolerance of other disciplines:

> "You need people who are good at languages, you need people to do drama, you can't make everybody do the same." (Melanie, 3rd year, A)
> "They always seemed to say that with the arts you tend not to get jobs in the end, but I don't know, if it's something you like doing, then do it. You can't do anything else, you can't be stuck in a place for three years doing something you don't want to do. And the people who are doing these subjects, they really enjoy them." (Rachel, 1st year, A)

In other words, women lacked a strong identification with physics; they did not see themselves as "physicists", first and foremost as the men did. Their hobbies were often more diverse and people-oriented: music, theatre, reading, whilst the men tended to be more interested in computing and mechanics and sport (usually rugby). Melanie, a third year woman at A, showed a sharp awareness of the social meaning of the word "physicist" - and a clear rejection of its connotations. She had said that her school friends (she went to a single-sex school) had tried to dissuade her from doing physics and encouraged her instead to choose medicine or veterinary science. I asked her why medicine or veterinary science were considered more acceptable, and she said that she thought they were generally agreed to be more suitable subjects for women. She illustrated this by talking about a female friend on the physics course:

> "One of my friends goes up to people and says, 'What do you think I do?' and if someone says, 'Oh, English', she's really pleased and she likes them, but if someone says 'physics', she tends to be a bit doubtful."

When asked why this was, she replied:

> "Physics people have a reputation for being really boring and square and working all the time with computers and things."

The interest of this remark lies in the idea that this woman's friend, although a physics student, didn't want other people to think of her as a physics student, because she didn't like the image associated with physicists. She makes a deliberate attempt, not to contradict people's impression, but to distance herself from that image of physics, thereby tacitly accepting it. It is an image of a particular kind of

masculinity that she is rejecting: an image of someone who is introverted, uninterested in the outside world and who is involved only in his subject.

Women's lack of a strong identifcation with physics is related to a lack confidence in their ability to perform well in it. In Chapter 10, the attitude of Paul, a third year student in B, blithely joking about his propensity to break lab equipment, was contrasted with the anxieties of Jane and Marie, trying desperately to understand how to cope with the lab work. Marie, in particular, saw herself as "not intelligent but prepared to get down and work". There were other women, however, whom one might expect to be a paradigm of self-confidence, who felt very unsure of themselves. One first year student at A, for example, who had attended a girls' public school and had gained three A-grades at 'A'-level, as well as gaining a distinction in her physics 'S' paper, said:

> "It's challenging my faith in my ability to do things...I think there's a lot of readjustment. I think there's a lot of people here who are brighter than me, and it's hard to say, to have the confidence to say 'Never mind about them, concentrate on you.'" (Felicity, 1st year, A)

When asked how she knew other people were brighter than she was, she said:

> "I don't know; the way they act, I suppose. You take so much from someone else's self-confidence; if someone's really self-confident, you tend to assume that they're bright. They might not be, but you know, you've all got the grades to come here and...I don't know."

Similarly Jane, as indicated in Chapter 10, had felt her confidence being destroyed by going to a school where the teachers didn't believe she had any ability. Self-confidence, to a large degree, is a matter of other people's perceptions, and a matter of the student's own perceptions of how she is perceived by others. Felicity's self-image was shaped by a belief that she was less able than the other students; she had already decided that she probably wouldn't pursue physics as a career, even though that had been her intention when coming to university. She felt that she had been thrown in at the deep end; and felt lost in the individualistic atmosphere of the department, saying,

> "You tend to feel that everyone else knows a bit more about what's going on than you do."

The four women in the first year at B all exhibited the same lack of self-confidence in themselves as "physicists." One of them, Marie, was discussed in Chapter 10; her sense of confidence in herself had diminished rapidly since coming to university:

> "I don't mind working. I worked really hard to get my A-levels, because I knew I had to because I wasn't intelligent but was prepared to sit down and work...but here you don't feel as if you're getting anywhere when you do work, it really depresses you."

This rigid division Marie makes betewen the concept of "intelligent" and the concept of "working hard" results in a self-label of "hard-working but stupid." At university, she feels herself to be losing out on both counts, with nobody to turn to for help. The other three women, however, had all been placed in the same corridor in their hall of residence (increasing Marie's sense of isolation.) These three students, like Marie, were experiencing difficulty with the course. However, they coped with their problems by evolving a co-operative strategy:

> "They're quite good...if you can't do something you can ask one of those two, and if you all can't do it, then there's not something wrong with you, there's something wrong with the course." (Susan, 1st year, B)

And:

> "With three of us doing physics on the same floor, it's quite nice, because you can come back and say, 'God, I didn't understand a word of that', and hopefully one of the other two will have done bits of it for 'A'-level, and begin to explain it to you."

Thus they had begun to challenge the individualist ethos of the department, which tries to make students compete and succeed as individuals. They built their identity through a system of mutual support, gaining confidence from each other, not through competition or high achievement on the department's terms.

Women in physics are unable to construct a straightforward identity for themselves as physicists, because to be a physicist is to be male. A sense of identity is achieved through difference; in this case women emphasise their difference from men (at the same time distancing themselves from science), or their difference from women ("leaving the skirt behind.") Women suffer from lack of self-confidence because of their inability to match the ideal of physicist which is male,

individualist and instrumental. We shall now see how this lack of identification with the male norm led women away from the traditional career paths of physics graduates.

Only two of the female physics final years wanted careers in industry, and one of those intended to be a medical physicist - traditionally regarded as a 'softer' (and certainly a less well-paid) option. Three, however, intended to train as teachers, whilst three wanted jobs not at all connected with physics (two in management, and one who wanted to be a librarian.) Whereas ten of the men, therefore, intended to stay with science, only four women intended to do so. Wanting to go into teaching or management rather than research and development does not necessarily denote lack of ambition. However, the reasons many of the women gave for their decisions were negative:

> "I know I don't want to do research, it would drive me round the bend, basically, and I don't want to do theoretical research and that applies for doing research in a company as well - I just don't want to. It was either go into management or something like that, and then I thought I might want to do teaching, because at least it's using your physics." (Melanie, 3rd year, A)

> "I don't want to do things that a lot of people do, like production management and stuff like that." (Sioned, 3rd year, B)

The student planning a career in information science saw it as a broadening out; she didn't want to stay with her subject:

> "I dislike getting too specialised and I think if you stay with physics, you're bound to do that in some way or another." (Pauline, 3rd year, B)

The woman who was thinking of taking a year out to do VSO, or doing a Master's degree in 'science and the environment', said:

> "I can't face the thought at the moment of going into a job and having to stick it there for n years." (Linda, 4th year, C)

These women all find the idea of a typical scientific career in industry uninspiring. Perhaps Linda's attitude was influenced by her experience in the industrial year out:

> "It wasn't the bosses [who were sexist]; it was the fellows who used to work in the factory and the workshop. I used to go into the workshop and ask them to make lots of equipment and things, and they'd say, 'You shouldn't be doing things like this' - and I'd be covered in tar and grime, you know, my coat was

> filthy - and they'd say, 'you should be up in the office typing.'" (Linda, 4th year, C)

Whil a sandwich science course teaches students to handle scientific concepts and enables them to gain experience of working in industry, it does not teach them how to handle this kind of hostility in the workplace. It is possible that in some cases, industrial experience has the opposite effect of that intended.

Although some of the women were enthusiastic about working - Louise, for example, who intended to enter medical physics, was very dedicated - some were very anxious about the difficulties of following a job and having a family. Exactly half of the final year women, when asked what they saw themselves doing in ten years time, mentioned the possibility that they would be married with children. This possibility was far from unproblematic, however, as the following quote nicely illustrates:

> "I should think if I'm thirty-two I'll still be in my career, but I don't know because if I have children I don't want them till I'm about twenty-eight...so at thirty-two they'd be about four years old, so I might be at home, because I don't really believe in going straight back to work; on the other hand, you can't necessarily afford to look after children for five years before they go to school, so I might be at home, or on the other hand I might be in my career." (Marianne, 4th year, C)

Or as another woman put it:

> "I think I'd like to be married with a couple of kids, but then again I'll probably be working in a library somewhere, but hopefully I'll like it that much to stick at it." (Pauline, 3rd year, B)

Or another:

> "I'd like to have a family but I'd like to have a job as well. I wouldn't want just to have children." (Melanie, 3rd year, A)

The conflict between family and career, particularly as outlined by Marianne, is one which throws once more into sharp relief the contrast between the wider social pressures to be feminine, womanly and so on (i.e. have a family and stay at home to look after it) and the more immediate social pressure to be a successful scientist following a career. Part of being a successful physicist is having a linear career: doing well, getting promoted, making money. Staying at home to look after children is not easily accommodated in this scheme.

The fact that women were worried about combining careers with parenthood and that the men weren't, need not surprise us; parenthood

has, after all, always been regarded as a female vocation. Although one might expect that women who had made a conscious decision to take an obviously male-dominated subject as physics would be more likely to reject 'conventional' female 'roles', than arts students, this was not the case with the female science students in the sample; many were keen to have families although they were aware that this conflicted with their other plans. More surprisingly, perhaps, the female scientists viewed their long-term plans differently from the male scientists, not just in terms of marriage and children, but in terms of the sort of qualities they looked for in jobs:

> "Hopefully I'll be in a job which I enjoy which will be really interesting, which will pay relatively well. I mean, I don't want loads and loads of money, not at the moment I don't, because I've never had any so it doesn't bother me. I just want satisfaction basically, something where I'm interested. I don't want to be stuck in a job where I'm bored, so I probably won't be working! I might even have kids or something, I don't know, I haven't really thought about that yet." (Linda, 4th year, C)

> "It depends if this medical physics lives up to its expectations. If it does. hopefully I'll have been promoted - getting a decent living wage and stuff - I don't want anything spectactular, I just want a house and a car and a television, to be able to eat the kind of things I like to eat, holiday once a year, usual stuff." (Louise, 3rd year, B)

The ambitions of the female science students were, on the whole, more mundane than those of the male science students. It's not that the male students envisaged themselves as doing anything particularly exciting (as one of them ironically said to me, "I don't know what sort of ambitions you see scientists as having in life - designing a really lethal planet-splitting bomb or something?"), but they did see themselves as making their way up a career structure, which would bring financial rewards. The women, on the other hand, even though they mentioned money, were often quite negative about it, saying, like the student quoted above, that they just wanted a "decent living wage". In addition, the female students were much vaguer about what they actually expected to be doing. It would be something which entailed "job satisfaction" but it was usually unconnected with physics. Whilst many of the men appeared to have their careers mapped out already, the women lacked an image of themselves, whether as managers, scientists or parents.

The attitude of the first year female science students was somewhat different from that of the final years. Some expressed similar desires for jobs which involved working with people - Rachel, for example, wanted to become a medical physicist for that reason, whilst some were still concerned with the problems of combining career with family:

> "I'd like to have something where I could get married and have children and still go back to it, have a part time job or something, but still in the same line." (Suzanne, 1st year, A)

However, many of them were ambitious, some unrealistically so, Debbie even saying that what she *really* wanted was to be an astronaut. Even allowing for the fantasy element, the first years were more resolute in their ambitions. Like the final years, six mentioned marriage and children, but of these six, three talked in terms of *not* wanting those things. As one put it:

> "...not being a housewife with children. That's a waste of a degree, really. I think you should be able to put something back into your country after all the opportunity, all the money you can get, you've got an obligation in a way..." (Debbie, 1st year, C)

That she sees the future as a choice between those two options is in itself interesting: either a scientist or a mother, but not both. She defines herself through distancing herself from traditional ideas about women's occupation. Kate Millett's (1983) point about the antagonism created between "career woman and housewife" is valid; those women, like Debbie, who wanted careers were often hostile to those who wanted families; those who wanted families were sometimes disparaging about those who wantred careers. Other women were very materialistic, if not specific about what they wanted:

> "I'd like to have a job and a house of my own and a car. I don't know what I'll be doing - can't imagine it...I'd like to be independent, very independent." (Rachel, 1st year, A)

> "I'd like to have some really high-powered job, executive style, kind of thing, I like the image. I really want an office as well, ever since I was little I've always wanted an office. That's my personal ambition - to have an office of my own and a secretary." (Natalie, 1st year, A)

The response of the female first year physics students was much closer to that of the male physics students (as in that last quote, for example, which seems deliberately to mimic male ambition) than it was to

that of the female arts students who were, as we shall see later, distinctly unmaterialistic.

The attitude of the third year female science students was epitomised by Jane, a woman discussed in Chapter 10, and whose values were diametrically opposed to those of Richard, discussed earlier. The opinions she expressed in the interview were representative of those physics students who had decided that they did not want to continue with physics, the majority of whom were women. The most significant fact about this group of students is that, not only did they not envisage for themselves high-flying careers in physics, they did not, on the whole, envisage high-flying careers in *anything*. They were almost wholly without ambition - "ambition" in the conventional sense of earning a lot of money, gaining respect, and achieving status. Jane, it will be remembered, was a third year student who had some feelings of regret about taking physics and thought she might have been better off doing something else. She said:

> "I didn't choose physics with a view to doing physics afterwards, you know. There's no way I could see myself working in laboratories or anything for my life, but I just wanted to make sure I was doing something I enjoy."

This looks suspiciously like rationalisation; she may well have wanted a career in physics at one point. However, she had no intention of applying for scientific jobs, but was applying for jobs in retail management:

> "I've applied for retail because I like meeting people and that sort of environment."

That comment indicates that she had no real commitment to retail herself; like many of the other female physics students she vaguely wanted something connected with "meeting people". She was aware, she said, that she was expected to have a strong commitment to the company she was applying for, a commitment she felt she didn't possess. Her attitude to the degree was similar; she was involved in a variety of different projects and activities outside her course - in fact when I interviewed her, she had just taken up two more, despite being the term before Finals - and although she thought she could get a 2:1 degree if she worked really hard, she explained that she was "not that sort of person."

When she was asked how she saw herself in ten years time, her answer was clear:

> "I'll probably hopefully be married and have about two children and I will have left my job if it's financially possible. I'm

> willing to make financial sacrifices for family. I think my Mum and Dad did a wonderful job, they've had a lot of financial hardships bringing us up and I really want to be able to give the same sort of time to my children. I don't want to be a flighty career woman...I would like to have a satisfying career for about 5 years but I could quite happily see myself married when I'm about 26, 27 and hopefully with children before I'm 30. I really don't want to leave having children until late 30s or early 30s. I certainly want to have my first one or 2 before I'm 30. As long as I was able to have a roof over my head and food in my stomach and clothes for the children I wouldn't mind making financial sacrifices to be at home. I could quite happily sacrifice videos and things like that, they're not important."

The contrast with the reply from Richard hardly needs pointing out. First and foremost, it is an obviously male/female contrast. Giving up their jobs to bring up children is what women have always done. But it is not just a male/female difference; some of the women (though not many) were ambitious and did want good careers. Jane's answer is, in fact, an explicit rejection of the values that are so important to Richard. She doesn't want material possessions, or financial reward or power of any kind. Her use of the derogatory phrase "flighty career woman" (there's no such thing as a "flighty career man") indicates that she feels those sorts of aims to be trivial. She sees her future as being centred around human relationships, not individual success. It would be easy to dismiss her attitude as the result of conditioning, but to do that would be to ignore the fact that she is an intelligent woman, and that the conclusions she has reached are the result of considerable thought. Jane had already made a "non-traditional" choice in taking physics. She has now decided, just as consciously as Richard made his decision, that she will not make the pursuit of a career her main aim in life. She doesn't simply say that she wants to have a family; she gives reasons which are based on the values that are important to her. The point is that she feels that a scientific career, or any successful career for that matter, would not be able to accommodate those values. Her position is similar to that of Mark, discussed in the last chapter, who wanted to become a nurse because he rejected the anticipated career paths of his fellow students. In other words, the rejection of physics as a subject is closely related to the rejection of the typical graduate career; it can be seen as a rejection of impersonality and instrumentalism in favour of human relationships and expressivity.

Women in science, then, are faced with a particular set of problems. The chief problem is that of the dual identity; trying to be a scientist on the one hand - which means proving that one is "as good as a man" - and being a woman on the other - which, in its social definition, entails being uncompetitive. Further, while men were able to build their identity through a commitment to the coursework, to studying and pursuing a career in science, and through a self-definition as 'physicist' or 'physical scientist', women often saw science as being only one part of their lives; they had other interests which were as important to them as physics. Science was simply something they enjoyed and were good at, not an all-consuming interest, and in looking for jobs, many were keen to broaden their lives as much as possible. This confirms Lewis's (1983) findings about female physicists. The conflict of identity was strengthened when women thought about their long-term futures; whereas men saw themselves as climbing the ladder of success, women were only too aware of having to make a choice between following a career and raising a family: being a physicist or being a woman.

11.4. The Male Arts Students

The obvious difference between the position of men in English and that of women in physics was that the ratios of women to men in English were not so great as those of men to women in physics. In one department, however, the English department at A, the proportion of men was only about 20%, similar to the proportion of women in the physics department there. One might expect, then, that men there faced similar difficulties to those of the female physics students: difficulties of identity and acceptance.

The interviews with the male arts students were the most informal and relaxed of the interviews conducted. Students talked very freely about their ideas and beliefs and their criticisms of the course. One student who was particularly forthcoming was Martin, a first year student on the communications course. His account of his feelings about the course highlight clearly the contrast between the experience of higher education of the female physics students and that of the male arts students. Martin, who was mentioned briefly in Chapter 10, had attended a boys' grammar school until the age of 16, when he left to start a job in

production engineering at a car manufacturing plant where his father worked. He said, however, that

> "I realised from the first day I went into engineering that it wasn't what I wanted to do."

He spent a year trying to get out of it, and eventually took a printing apprenticeship which he also disliked, and stayed for only nine days. He then went back to his school with the aim of taking some scientific A-levels, but only stuck that out for six days. After that, he went back to the car plant and took an engineering apprenticeship, where he stayed for five years, taking an HND in the process: he came top in the course. He began work in manpower production for the company which he also hated:

> "I decided to leave the day I was offered the job."

Because of his interest in films, he decided to apply to study communications, a move in which he was encouraged by his mother, although his father was "totally against what I've done". It was a move, however, which he had not regretted: he was full of enthusiasm for the communications course, and contrasted it several times with the tedium of the HND he'd taken. He also contrasted the experience of being educated in an all-male environment with a mixed one; and he was remarkably candid about the transition:

> "It has broadened my outlook in ways I never dreamt it would, especially as far as women go, because throughout my life, going to an all-boys' grammar school and going to an engineering institute, women just don't take part at all and now I'm having to compete on level terms with women who are more intelligent - well, I don't know yet, but possibly."

Asked how he felt about having intelligent women in the group, he replied:

> "That is a real kick in the teeth, to be honest. It really is, having come from such a male chauvinist background. That has been the biggest eye-opener, it really has. And I've been pleasantly surprised by the contrast, because it can be a bit boring sometimes, competing against blokes."

The interview continued as follows:

> KT: "Does it bother you that there are more girls than boys in the group?"
> M: "Yes, there are more girls. I'd been led by people who came to the college to believe that there'd be a lot more women, but I'm not too sure of the ratio, but it's not too bad - well, I say 'bad', but that's probably the wrong word, isn't it? And when they first told me this, I thought, 'What sort of course is it going to be? It's going to be full of women? What sort of job is it going to lead to? Do I really want to do it? And I thought, 'Yeah, why

not? I'm going to go into it with an open mind,' and I'm glad I did - as I say, it certainly broadens your outlook."
KT: "Do you feel any difficulty about being in a minority?"
M: "No, not really, no. It's good fun - I think I'd rather have it this way. You find as well that if you want to have a blokes' conversation or whatever with any of my friends on the course, you can divide up into little groups anyway. That's a natural thing to happen. If you want to talk about football or something like that, the girls will soon clear off and leave you to get on with it, the same if they want to talk about whatever they want to, hairdressing or whatever, the latest pop groups; you soon get a natural division. Also, the sort of course it is, there isn't a heavy demand on your time for lectures, so you tend to divide up and bump into each other in the library and if you want to discuss anything, if they've got questions they want to ask you, you just naturally do it. You don't think, 'God, she's a girl, I'm not going to help her, I'm only going to help the blokes.' That's what surprised me, I thought there would have been more of a division between the sexes."

The implicit assumptions behind Martin's comments are particularly interesting, both in themselves, and as a contrast with Lesley's comments, quoted earlier. The most obvious feature is his view of gender differences, which appear to be very sharply defined in his account. He is surprised - he finds it a "kick in the teeth" - that there are women who might, *possibly*, be more intelligent than he is. He thinks that a course composed mainly of women must be less demanding, less useful than one dominated by men. He enjoys being on a mixed course, especially as he is also able, when he wants, to have a "blokes' conversation" - apparently about football - whilst the "girls" talk about "hairdressing" and "pop groups": quite trivial concerns. It also quite genuinely doesn't occur to him that he might ever need to ask a woman for help, even though most of the women on the course came from arts and social science, rather than engineering, backgrounds. In addition, he is very aware of "competition", in a way that most of the other arts students weren't. In fact, none of the other male arts students talked in terms of "competing" against women, and none of the women mentioned it either. Like his attitudes towards women, it seems to be a product of the engineering background: competition with fellow students was considered to be an important part of the education.

If we compare this with Lesley's account, we find some interesting similarities and differences. The similarity between them is that they both regard femininity with a certain degree of contempt: Martin does not

aim to be "as good as a woman", for example, or to prove himself in a female-dominated - a phrase that rests uneasily on the page - world. The differences are in their attitude towards being in a minority; whereas Lesley assumes that her course must be more difficult because of the number of men, that she has to work to be "as good as" the male students, Martin assumes that his course is inferior because of the number of women and is worried that it might not lead to a good job. Most importantly, Martin does not experience the sense of *being in a minority* in the way that Lesley feels it; he feels neither conspicuous nor ill at ease because of his belonging to a numerical minority.

Martin's sense of the superiority of masculinity was part both of his experience as an engineer and of his experience as a communications student. As an engineer, he could believe that men were 'better' because no women did engineering. (And, mutually reinforcing, engineering was better because no women did it.) As a communications student, he was better because he was in the privileged position of being in a minority: automatically superior as a man, and as an engineer, he could help the women with their work. The logic is circular, but it is there: as an engineer and as a communications student, Martin's identity as male is positively reinforced through rating women negatively.

Like Martin, most men regarded the fact that they were in a numerical minority as unproblematic; as this first year student said:

> "I just consider myself an individual having an understanding with my own tutors, so I don't feel myself in competition with girls. I'm aware of there being a lot of girls, but I don't know what the actual numbers are - ten to one I should think. [sic]" (Kevin, 1st year, B)

It is important that Kevin says that he considers himself "an individual." This is in contrast to some of the female science students who clearly felt part of a group, with a definite group identity, and who lacked a powerful sense of individual identity. Kevin went on:

> "I suppose there's a little bit of people regard arts degrees as 'feminine', so to speak; it doesn't really bother me, but you tend to think of arty people as being a little bit effeminate, I suppose; that's the impression you get from other people, probably more people at home, outside the system."

There was some awareness, then, of arts degrees being considered "effeminate". However, within higher education itself, this was not the case; it was simply the view of outsiders.

Some male students mentioned feeling conspicuous:

> "In my seminar I'm the only bloke. There are only two blokes doing English and French, and you get a lot of attention, people take more notice of what you say." (Gary, 1st year, B)

In this context, being in a minority sex is an advantage, not a disadvantage; men, by virtue of their conspicuousness, are more worthy of attention than women. This confirms Dr, S's comment, quoted in Chapter 8, that because men stand out they are paid more attention.

Like some of the female physics students, some of the male English students had come from single-sex schools. This did not, however, appear to be a problem. The following student, for example, had been to a boys' grammar school:

> "You didn't realise that English was a girls' subject, it was just the same as any other subject, and you didn't realise that certain subjects are orientated towards women or men; we had thirty blokes in each class, sixty in the whole year. It was unusual, yeah, unusual - and they're all so quiet, shocking...they just sit there during whole tutorials, heads down, not looking at anyone, and not saying anything." (Andy, 3rd year, B)

To Andy, English was not a gendered subject, and neither was science; the effect of finding out that English *was* gendered, however, a 'feminine' rather than a 'masculine' subject, did nothing to disturb his sense of ease or confidence in himself - and he was a supremely confident person. On the contrary, women appear as an unidentifiable mass, sitting quietly, not saying anything. It is the exact opposite of the situation of the female science students: coming from a single-sex environment to a mainly male one they felt uneasy. Men coming from a single-sex environment to a mainly female one felt more assured and more confident than before.

However, one man said that he felt isolated during seminars:

> "For the American seminar I'm the only bloke in there with another six women, and I feel intimidated because they're all very loud and they're carping on about the lack of feminine fiction, feminist fiction on the course, and I feel if I say anything I'm going to be jumped on and it's going to destroy the tone and also I never feel inspired by the tutor in that one, he seems to cloud a lot of the issues." (Michael, 3rd year, B)

I asked whether the tutor agreed with the women:

> "Yes, I think he tends to cop out sometimes, we did some Sylvia Plath and he said that he ought to feel embarrassed by it, but it was probably because he was a bloke, because of how personal it was, and all these women said how incredibly relevant it was, and I kept my mouth shut because I thought it was vaguely self-indulgent."

Asked whether he thought women's writing in general was worth studying, he said:

> "Show me a woman writer who's worth reading, then that's fair enough. I suppose the problem lies in the tutor's not giving you enough experience of who is good and who isn't. Virginia Woolf's the only woman writer we've done this term apart from Sylvia Plath. I just like to distance myself from the feminist cause a little because I think it's a bit hysterical sometimes."

This student obviously does feel left out of this group, and isolated, in much the same way that some of the female physics students did. But there are differences, the main one being that he does feel more able to challenge the authority of the tutor, if not in person, then mentally. He does disagree with what is said in the tutorials, and feels fairly sure of his own opinions. His perception of Sylvia Plath's poetry as "self-indulgent" is a conventional masculine charge against women's writing, and one which is illustrative of the differences im perceptions about literature between female students and male students; here emotional response is characterised as "hysterical." It is also interesting that Michael perceives the tutor as rather weak for tending to "cop out" - that is, not asserting his authority, and not telling the group what they ought to think about literature, or what they ought to be reading. This is not to deny Michael's sense of unease at being in the group; his response highlights the tensions invevitable in a mixed-sex discussion of an author who is concerned, at the core, with female identity and female sexuality.

Michael's description of feminism as "hysterical" was not unique; feminism aroused hostility amongst several of the male students, for example:

> "The only thing that can come of it [being in a minority] is if you get involved in a feminist argument, but I wouldn't say every single girl on the course was a raving feminist. And so, however many girls there are on the course, a fairly high percentage, maybe half of them, are feminists in their point of view, but a lot aren't." (Simon, 1st year, A)

Given that there was some attempt, in University A, to raise feminist issues in the course, one might speculate whether this had any influence,

other than a negative one, on the men. One male student who discussed feminist ideas with me, said that "I've never done a tutorial with another lad, always with other women." When asked what this was like, he said:

> "Sometimes it's bad, especially when you get these amateur feminists in, they kind of expect you to say things, I don't know. I'm a bit naughty, I used to say things which would annoy people but of course you get nowhere doing that, you just get people's backs up really, but especially in the first year I'm sure I was a bit chauvinist anyway. That's something as well, I've changed my ideas as well since being at university, I've probably become a lot more sympathetic towards the femnist stance...that's a thing about our department, anyway, a large number of women are, if not feminists, that's definitely where their sympathies lie." (Terry, 3rd year, A)

And he added:

> "A career is for a bloke to write literature or to teach it and a pastime is for women to read it, to accept it and to get this indoctrination through literature."

This combination of feminist awareness, on the one hand, and mockery ("these amateur feminists") on the other, is an example of the men's ability to maintain a sense of confidence and self-assurance despite being challenged; Terry is able to accept feminist ideas whilst deriding those women who hold them. Despite being in a minority of one, he was quite able to stand out against the opinion of others in the seminar group - accetpting feminism but refusing to be threatened by it.

This self-assertion was characteristic of the male English students. For them, part of the point of English was to argue a case through, to get one's opinion across. The following two excerpts, for example, are from students talking about seminar discussions:

> "I like picking out themes and discussing various subjects like psychology, history, politics...I don't like saying things are nice and beautiful and 'isn't this a lovely image', I think that's a waste of time. I mean, English students are there to destroy and build up arguments." (Andy, 3rd year, B)

> "On an actual course level, the things I enjoy most are seminars - sitting down and putting across your arguments to someone else who puts theirs across and you just batter it around the table; I thoroughly enjoy that, I really quite revel in it." (Ben, 3rd year, A)

This attitude towards seminar discussion is not confined to English students. Russell was a final year communications student, highly

articulate, very able and self-confident almost to the point of arrogance. When asked whether he got on with other students on the course, he said::

> "Yeah, some of them, yeah, but I've personally got a bit of a name for kind of, I don't know why, but shooting people down a lot in seminars and stuff, I tend to take over a little and dominate, but I think some people are a bit worried about talking to me about work because they think that I do loads of it and I do loads of reading, you know, and therefore that I know it all; it's not true but I think that that's a kind of popular image that I've got. But I just spend most of my time talking to lecturers, seeing them outside and stuff, you know - they're more in my terms of reference than other people." (Russell, 3rd year, C)

This characteristic of intellectual aggression is highlighted when seen in relation to female academics. In the male lecturer-female student or male lecturer-male student relationship, the hierarchy is easily defined; in the case of female lecturer-male student or even female lecturer-female student, the hierarchical relationship is not so straightforward. Female academics are not invested with the same authority as male academics, and therefore the tensions between femininity and academic success are once more highlighted, as they were for the female science students. The following is an excerpt from an interview with a male English student:

> "...With my current tutor, I tend to be rather argumentative because she's a talker, she would talk if you let her - so I cut across her sometimes, which might mean she thinks I'm aggressive, but she might not have a bad impression of my academic ability, she probably respects me in that respect." (George, 3rd year, A)

One only has to imagine a female student making the same remark about a male tutor to feel the force of this inversion of authority. George clearly sees his tutor as a *woman* and therefore does not accord her the same respect as he would a male tutor. He, like the other students, equates aggression with academic ability, but he does not allow his tutor the right to be aggressive or, for that matter, to talk at any length - "she would talk if you let her." George, therefore, defines himself through his difference from his tutor, by rating her negatively.

George's attitude to his female tutor, like the attitude of Russell to the other students in his seminar group, is, more than anything, an assertion of individuality. It was argued in the previous chapter that, for the English and communications students, the freedom to express an individual opinion was an integral part of the appeal of those academic

disciplines. Individuality became an important part of the arts' students identity. Unlike the female science students, who struggled to 'fit in' with the department, who wanted to be accepted and who, on occasion developed a collective identity, the male arts students wanted nothing more than to be different. Doing English (or communications) for them meant *not* being like everyone else. One student, when asked what appealed to him about English, said:

> "I like arguing. I like being pig-headed and putting forward my own opinions and discussing large numbers of subjects which are totally irrelevant to the appropriate topic. I don't like working logically and coming out with a precise answer." (Andy, 3rd year, B)

Doing English enables students not to be uniform, and at the same time to be successful; in physics women constantly felt that they had to keep up with other people, to attain the standard set by the department. In English, however, it is possible to assert oneself through rejecting those pre-set standards:

> "It's good in that you don't have to say 'This is this' and 'this is this', all these facts are set out for you; there's a degree of personal appreciation of something. If you like something, you can tell someone why you like it, and they say 'Yes I like it becuase of this, or I don't like it because of that', but with economics or sociology or any of those subjects, it's all there and you just listen to it and you take it in." (Gary, 1st year, B)

As seen in the last chapter, some students felt that the department was unable to accommodate their individuality and self-expression; that English at university was too rigid. The expression of individuality for these students takes the form of rebellion against the departmental norms and values:

> "Our tutor was asking us last week what we were doing for the exam., and I thought, 'Well, there are so many thoughts going on in my mind the whole day, the whole week, that I just couldn't care less what the exam's like, I've got to go through it in the end, but to think that every thought you think has got to be related to your course and everything, is terribly closeted and quite grotesque, quite ugly because it doesn't give you any chance to be an individual.'" (Robert, 3rd year, B)

There is still space, however, for Robert's form of rebellion within the department. His individuality was, in one way, an asset; he was able to express himself through a creative writing course which allowed him to explore, among other things, his interest in Freudian dream theory; and he

came out with an upper second degree. Unlike the female physics students he was able to do well without having to struggle constantly to accommodate himself.

The self-confidence of male students in asserting themselves and arguing their case in seminars can also be seen in the way some of them talked about the set texts. The following quote, for example, is from a man discussing the characteristics of black and feminist fiction, and how to recognise passages from various authors in examination papers:

> "Black authors are going to be writing about things like identity and the fact of their existence and the need for recognition and the need to escape...What you're taught I think on an English literary course is to apply a few basic rules to literature, so you'll apply a few basic rules for black fiction to this piece of black writing. When you know before you go in the kind of thing you're supposed to be looking for, it's just a matter of being able to pick it out." (Daniel, 3rd year, B)

Daniel is able to see English as the application of a "few basic rules" because he distances himself from the experiences in the texts; he does not engage with them in the same way that a woman or black person would *have* to engage with them. Further, although men were willing to discuss their favourite authors - D.H. Lawrence, Kurt Vonnegut, Thomas Pynchon, Nabokov, Graham Greene, among others - they rarely talked of them in a personal or emotional way - unlike women, whose response to literature was more involved.

The desire for individuality, for freedom from social constraints, also emerged when the male arts students talked about their future lives and careers. English was certainly not perceived as a route to a career in the way that physics was. However, the English students *were* clear about the *kind* of future they wanted for themselves, and talked about their future lives in the same language that they used to talk about their subject: a language which expressed a concern with people, individuality and variety. In addition, many appeared to feel a moral repugnance towards many of the traditional graduate careers, such as management and accountancy.

Several students had considered teaching, journalism or VSO although few had done anything positive about embarking on these careers. Amongst the final year English men, there were only two who were certain about what they wanted to do: one who intended to enter advertising ("It's

earlier, he came from a working-class background where higher education was considered unusual, rather than normal. Although his parents had always encouraged him, without putting pressure on him in any particular direction, friends of his family regarded him as rather strange because he hadn't decided to enter a high-flying job. His eventual ambition was to become a child psychotherapist; he wanted to do voluntary work for a year, followed by a PGCE in primary school teaching; he then intended to teach for a few years before moving on to child psychotherapy. In about ten years time he thought he would either still be in teaching or have moved on to psychotherapy or educational psychology; he would, at any rate, be in some kind of youth work or work with children. As he says, "I always see myself in a relatively low-paid but what I think is perhaps a more rewarding job." He contrasts this attitude both with that of the other students and that of his acquaintance at home:

> "I see people rushing off, and the milk round is coming round and everybody is being chartered accountants and retail managers and things, and even that would sound better at home, if I said I was going to be an accountant. People are getting these jobs and I say, 'Well done' but I couldn't think of anything worse than being a retail manager so I don't know why everybody's desperate to get these jobs. It's partly because there's a lot more pressure, talking to students who are in their 30s now, there's an awful lot more pressure now to know exactly where you're going and know what you're going to be doing in so many years time that I don't think there was 10 or 20 years ago. I don't particularly want to settle down in 2 years time with my job and this job is going to last me till I retire...I'm not interested."

For Daniel, and for many others, variety, fulfilment, working with people and job satisfaction were all seen as more important than earning high wages or gaining social respectability. There was no difference in this between the female students and the male students; only a small number of either sex wanted to enter traditional management or executive-type jobs.

The traditional occupation of English graduates is teaching, and certainly some of the students saw their futures as teachers. Few of them expressed a great deal of enthusiasm for conventional secondary/primary school teaching, however, and other alternatives, TEFL in particular, were popular. TEFL was never regarded, however, as a permanent career, but just as something that might be done for a couple of years after graduating until something better turned up. The eventual decision on what to do

with one's life was to be postponed because English, was not, after all, that sort of subject.

Similarly, students' long-term plans tended to be vague, and occasionally unrealistic. Unlike the male science students, who generally saw their long-term futures in relation to the kind of job they would be doing, male arts students often talked in terms of friends or relationships:

> "I'd like to think that I would at least have had something published...I'd like to think I could make a living out of it, but the only way to make aliving out of something like that is to compromise yourself, just to be read and heard...I'd like to think I would be living comfortably, with a comfortable association of friends. I'd like to think I'd be more politically active, and generally a lot more optimistic than I have been in the past." (Robert, 3rd year, B)

Robert's vision of the future is untouched by materialism; he sees his needs as primarily emotional and intellectual. The same is true of John, who says:

> "I can only look in vague terms at wanting to feel I'm doing something worthwhile, and that's interesting to me, I won't feel as if I've wasted opportunities or something. I've got no financial ambitions at all, I'm quite happy living on bare means, just as long as I can afford to get some books, get some records. I'm a very unambitious person, I always was, I think, at school; it's just that I want to be perpetually interested, keep myself alive up here, feel it's all worthwhile." (John, 3rd year, A)

Some male students imagined themselves with families, but not in the same way as the women discussed earlier, who talked in terms of the conflict between career and family. Michael's own hope for the future, as he recognises himself, is completely idealistic:

> "Sometimes I'd like to be married, have a big family, live in a cottage in the highlands or something, which is hopelessly unrealistic. I don't know, I can't see myself going into big business or getting a job in the city like a lot of people do, going into middle management, becoming an executive, I can't see that really. I do have ideas of trying it, to see if I could do it, then I'd pack it in, but I don't think I'll ever try it. I'll probably end up teaching, if I was very, very realistic. I think I'll end up in a school just like me dad." (Michael, 3rd year, B)

Andy said sardonically:

> "Hopefully middle-class suburbia, working in an office, 2.4 children, wife, go holidays every six months, vote Conservative - but I'm not totally scared by such boring constraints of conformity, it's hard to tell, I've got nothing against those things; if you haven't got enough confidence to do something

> different yourself, just lead an interesting life, it's the way you make it." (Andy, 3rd year, B)

Most of the male English students were quite aware that what they wanted to do was completely at odds with the practical realities. Whilst doing English at university gave them a degree of freedom to do and think as they pleased, they recognised that this was not possible in the outside world. Most of them, however, lacked any idea of what they would like to do after graduating.

The communications students were somewhat different. Unlike the English students, all the final year students knew what they wanted to do after graduating. Of the four men, one wanted to go into television production, one wanted to be a cameraman, one wanted to be a newspaper journalist and the fourth, , a particularly able student, wanted to do postgraduate work. The first years were more vague about what they wanted to do, although they were all interested in the media: the possible careers cited were: working in video, playing in a band, being a t.v. producer and setting up a pirate radio station! Most of the students were enthusiastic and self-confident; one final year said:

> "I'd really like ultimately to get into film production. I aim to produce a film, but that's an ideal. Once you get a steady job in t.v. production, that's o.k. for a while, but then after that I'll perhaps go independent. Cinema is the ultimate thing to do in the end." (Ken, 3rd year, C)

It is highly unlikely that they all achieved their ambitions, as journalism and television are very competitive fields. (The same applies, of course, to those English students who wanted to be journalists; it is not a very realistic ambition.) However, the students did not regard the course as solely vocational. Most of them had found the course stimulating and interesting in its own right; one student said that "If I could have done any course in the entire country, I'd have done this one." In addition, hardly any of them saw their futures in terms of financial and material success. They all stressed satisfaction in their work as the most important feature of the job they wanted to do. They were, on the whole, less materialist and less instrumental in their attitude towards work than the physics students, but more so than the English students.

Not surprisingly, the male communications students also saw their long-term futures in terms of the job they would be doing, although they

generally appeared more interested in the job itself than in the material benefits it might bring:

> "Hopefully I'll be working with cameras. That's what I'd like to do, and obviously I don't know what it's like to be in that situation for any length of time, because I've never really been in that situation apart from working in projects, but I would like really to be working in cameras of some description, either cinema or video or television." (Charles, 3rd year, C)

Like the male physics students, the communications students found it easy to define themselves in terms of their future careers. They generally saw themselves as independent, creative people, who would be successful in their field (there was surprisingly little doubt amongst students that they *would* be successful); they didn't reject all the trappings of conventionality like some of the English students; rather, they thought that careers in film, video and so on, gave them freedom to express that independence.

The male arts students, then, were generally confident of their opinions and ideas and found little difficulty in settling into a largely female environment. Let us now compare their experience with that of the female arts students.

11.5 The Female Arts Students

It would appear, initially, that the female English students are in an advantageous position. English is a 'woman's subject'; the women are in a majority and hence have strength in numbers. They do not face the isolation of the female science students. Similarly, both English and communications are more 'mixed' subjects than physics and physical sciences; the sexes did not separate themselves during lectures and mixed and talked freely.

Despite their lack of isolation, however, many of the female students appeared to face other difficulties to do with their self-image, and many had doubts about their own abilities. We noted earlier that men saw in English a chance to assert their individuality; that they particularly enjoyed the cut-and-thrust of debate in seminars, for example. This assertion was not present amongst the women; indeed, many felt very reticent about participtaing in debate. In the last chapter, Carole, a first year student at B, was quoted as saying that she found seminars

"intimidating" and that there were "an awful lot of clever people in our seminar." When asked how she knew that they were more clever than she was, she said:

> "I think more confidence - probably I'm as intelligent as them really - or I tell myself, anyway - they just seemed to be very confident, and I felt really intimidated."

The contrast with the student who complained about feminist intimidation is marked; this student's doubts are much more to do with her own personal ability, or lack of it, than complaints about the behaviour of other students. Many of the female students were very self-conscious; one who was painfully self-deprecating throughout the interview managed to say something positive about herself, with several qualifications, when asked what she'd gained from the course:

> "I think it teaches you to - you wouldn't guess it from this interview - I think it teaches you to express yourself a lot better. Like I told you, I'm not very active in participating in seminars, but it's brought me out a lot and also, in actually writing essays I think my style's improved a lot and I think that's bound to come if you're reading a lot of literature a lot of the time." (Diane, 3rd year, B)

The quietness of the female students was even commented on by a male student:

> "It's amazing how quiet a lot of people are, especially girls; it's normally one or two people [who talk]; some people can sit in a seminar for one and a half hours and say absolutely nothing. I normally say more than most people...I always find it's better to say something or you get asked questions." (Andy, 3rd year, B)

Lack of confidence or assertion in seminars and tutorials can have an important influence on a deptartment's impression of a student. In physics, students make their mark by performing well in the constant 'competitions': the lab work, the problem sheets, the tests, the termly examinations. A student's achievement is usually very visible in physics: achievement is more easily measured and graded. In English, however, students are much less likely to know how other students are doing. The main form of assessment during term-time, the essay, is much more private, a matter between tutor and student. In addition, essay marks are not likely to vary greatly between students in the way that physics marks might vary. The main way in which a student can make an impression in English, then, both on staff and students, is by being talkative and (preferably) provocative or controversial in seminars: the reticence of

some women in seminars is compounded by their invisibility - by being less conspicuous than the men, they can seem less interesting and less intelligent.

On the communications course, there was much less need for students to work to make an impression; as the course was substantially smaller than the two English courses, staff tended to know most of the students individually. Even so, some of the female students lacked confidence in their own ability. There was one final year student for example, who was very negative about her abilities. Despite wanting to have a career in television production, she perceived herself as both unambitious and not terribly competent. Vera has already been quoted in this thesis on the topic of her single-sex education; her headmistress had wanted the pupils to be "career women and be successful and dynamic and not get married"; "it just didn't agree with me at all."

Deciding to go to polytechnic rather than university involved a degree of willpower and rebellion as the pressure was firmly the other way (she had A-level grades of BBD, so would have had no problem in getting into university); it was curious then that Vera had such little faith in her own ability:

> "I feel I'm a bit of a waste. The staff would like to have more inspiring and intelligent people on the course. I want the course to be really good, and want it to get better, for them to spend more money on it, and I want them to be able to say, 'Look, we've got all these wonderful people who've got so much going for them, wouldn't you like to spend some money on them'; but I know that I'm not worth it, but other people who want to do the course *are*, and that's what I'd like, I just feel a bit of a disappointment, really."

She also said:

> "I really wonder if I've learnt enough to be justified in getting a B.A. degree...it's something, you talk about people with a degree, you think they must be so clever, yet I don't feel clever at all."

These interview extracts may simply give the impression that the women in the sample were either lacking in ability, or at best, painfully shy. Yet in conversation, they were generally relaxed enough, easy and interesting to talk to, often lively. The anxieties they voiced were genuine feelings of inadequacy resulting from a social situation (finding themselves with a group of people who were superfically intellectual and articulate) in which they feel at a disadvantage. Women's sense of

inferiority is heightened and re-created through a seminar system which rates articulacy and even aggression more than thoughtfulness. Despite the arguments of Bowles and Gintis (1976) about schools, the university seminar is not a situation in which passivity and docility are rewarded.

In an earlier section, we noted an hostility towards feminism amongst some of the male students. There was an ambivalence amongst some of the female students, however, towards feminist ideas, and this is partly the result of an awareness of others' perception of feminism. For example, Diana, a first year student at A, mentioned a recent lecture on feminist criticism (by Dr. S.), of which she said,

> "All the boys got annoyed about it but I think it was really good, it was really thought-provoking, and there was a subdued silence for the whole lecture".

She said that when the lecturer had asked the female students how many of them were feminists, only a handful of students had put their hands up. She continued:

> "I was thinking, if this was say eight or ten years ago, I'm sure all the girls would have put their hands up and it just seemed to me that it was a real shame that a lot of the girls aren't feminists now, I don't know why that is...I think I am feminist in a way, I think women should have equal rights in career terms, but I'm not really interested in it enough to really do anything about it." (Diana, 1st year, A)

This perception contradicts that of Simon, who thought that half of the women were feminists; Diana hadn't been one of the students who put her hand up. Whilst being aware of sex inequality and injustice, she is also aware of the image men have of feminists. What she is prepared to say publicly, the image of herself she puts across, is limited by that awareness. This was true, too, of a final year woman at A, who enthused about the 'women and literature' course run by Dr. S. However, she went on:

> "I'm not a feminist, I'm not aggressively feminist but I do believe in equal opportunity and equal pay and I do believe women should have the chance to do things becuase I think very much that people think you should have to choose between home and career, and I don't think you should have to choose." (Gillian, 3rd year, A)

It has already been argued that students define themselves by comparing themselves with others, by trying to measure up to a pre-set standard. Carole, for example, thought that the students in her seminar

group were more intelligent than she was because they were more confident and articulate. Female physics students tried to be "as good as men". This contradiction between femininity and academic ability also emerged in an interview with a female student at B. She had been talking about the numbers of women doing English:

> "I think it's ironic, though, that it's still, in these days of equal opportunity, the department is mainly female-orientated, female students and the sciences mainly male...it's probably a lot to do with primary school level, you know, you'd give a girl a book but you'd give a boy a car engine or something, it could be that, or it could be just a genetical make up of male and female minds, we don't know enough about it, it's very interesting. I don't know how many people there are in our year, about a 100, and we know who the men are, and the boys, men and boys, we know who all the mature male students are, you know their names, and you know them by sight if you don't know them by name, but there are so many girls, I'm still meeting people today who I didn't realise had been doing my course with me for three years, and it's a very female-orientated subject." (Susan, 3rd year, A)

This confirms that the men are, by virtue of being male, more conspicuous in the department; but then I pointed out to Susan that although most of the students were female, most of the staff were male:

> "That's very ironic as well. It just goes to show that if males infiltrate into a supposedly female world of studying literature - *they're* the ones who wrote it. I mean, you look at before this century there were hardly any women writers and when there were, like the Brontë sisters, they all wrote under male pseudonyms, and it just goes to show that the males teach it as well. Because I don't think women tutors are taken seriously...there's a few of the female tutors that I do respect but there's a couple that I do think, Yes, you are useless, and you do rely on your femininity. They sit there and say, 'Well, what do you think of this?' instead of being forthright about it like a male tutor would be; they sit there and they giggle and rely on their femininity and 'Oh dear, I'm not sure what this means, ha, ha, ha' and it just makes you sick and I always hope that I'm not like that, but then I look around other female students and the female students are exactly the same in their attitude towards male tutors: 'Oh, I'm so sorry I haven't done my assessed essay, can I have an extension, please', smile, bat the eyelids, and obviously you can't help it but the sexual politics do come into contact with how you get on in the department."

This diatribe is interesting for a variety of reasons. The general thrust of it is a complaint about female tutors and female students. It is worth noting that she equates the male appropriation of the female occupation - writing - with the greater numbers of men teaching English.

(Despite what Susan says, there *were* a lot of women writers before the twentieth century, many writing under their own names; it is a measure of the success of literary critics in so rigidly defining the literary 'canon' that, not only is the work of these female writers now not studied, it is generally not known that they even existed.) Apart from attacking the 'feminine' strategy of some of the female students, she also attacks the female tutors for not being as "forthright" as the male tutors; she accepts the equation of assertion and aggression with ability. That is, she sees the situation from a male viewpoint. The female academic has the problem of coping with male students' aggression and of defining her own identity in a way that is acceptable to students and to male colleagues. Whereas a male academic's role is clearly and precisely defined, the role of a female academic - and hence her relationship with students - is much more shadowy and vague.

Like the male students, the female students regarded their individuality, the right to assert their own opinions as an important part of their identity as English students. Whereas men's enjoyment of English, however, was often expressed aggressively - as a desire to engage in, and win, an argument - women's enjoyment centred much more round the quality of their own personal responses. In the previous chapter, for example, a female student was quoted as saying that English was about 'studying the soul of people': an emotive, but not untypical response. This kind of response can also be seen in the following extract from a third year English student, who is talking about an option she did which she sees as opposing the dominant literary beliefs of the department:

> "The best course I ever did was last year, was an option called 'The Poet's Voice' and it's about modern poetry and stuff, but it's seeing videos of the poets reading their own poetry instead of getting it on a page, which is quite a cold process and just hearing what they say and how they speak, and also it was really interesting, it went into reggae and oral poetry and jazz; because I suppose that was a lot freer course in a way, because the essays you had to write on it were things that were quite personal really, your own poetry and stuff, so there was a big space for personal creativity which there is to an extent on the other courses, but not a big extent really, because it's still quite orthodox, with quite established critical opinion; you can't really write 'I feel' much or anything." (Alice, 3rd year, B)

Men, too, often objected to having established opinion pushed on them, but their criticisms were more often to do with their right to express their own ideas rather than to show their feelings. Alice's criticisms, however, went much further to include the lack of female writers on the

course. She talks, for example, about the American Literature part of the degree; it had begun with Poe and Melville until:

> "Now, at the end of a two year course we're squeezing in black writers and women writers - I mean, it is bad actually, given the overall view of the course, because, up till now, I haven't done one woman writer or one black writer, it's been, like, all these big figures and stuff, so that's interesting, but it does seem a bit of a 'Oh well, we'd better put a couple of women writers on because there's a feminist movement going on', so it's going right up to books like Marge Piercey, 'Woman on the Edge of Time.'

She also pointed out that there had not been one female author on the core English Poetry course. It is significant that issues of gender are only raised when *female* authors are studied, issues of race only when *black* writers are studied. Writers who happen to be women thus become 'women writers'; writers who happen to be black become 'black writers'; yet we never talk about 'men writers' or 'white writers'. The ideas of 'male as norm' and 'white as norm' are reinforced by a process which determines that female and black writers are studied first in terms of their identity as women or blacks, not in terms of their identity as writers. The way in which male writers construct their identity as men, or white writers their identity as whites is not considered to be worthy of study.

Alice's feelings about theorising and critical opinion are summed up by her response to my question about whether she read much literary criticism:

> "Basically I think your own opinion is just as valid, and also it tends to get a bit tainted if you read too much."

This view, which would be considered alarming in any discipline other than English, was one that seemed quite normal to Alice, and is, to a large degree, part of most English students' (if not the staff's) construction of English. In the following extract, for example, a student explains that what is important to her is the quality of her immediate, intuitive response:

> "That's a problem I find in poetry, that I can appreciate it for what it is and what it's saying and what it's *doing to me*, but actually going into it in depth and looking at the way it's all been put together and language and everything, last year I found that a problem in seminars." (Jean, 3rd year, B) (my emphasis)

A female mature student emphasised the importance of experience in enabling her to relate to and understand literature:

> "Doing English I think it is an advantage, being a bit older, because I think you can sympathise with some of the things that the authors of these texts are saying better because perhaps you've experienced them." (Joan, 1st year, A)

This stress on an affective, emotional response to literature resulted, amongst some women, in a disdain for theory. Jennifer, for example, took psychology as her subsidiary subject and I asked her if she saw any links between psychology and English:

> "When I said I wanted to do psychology, I invented some vague link between the two; I don't think there really is - apart from the fact that you can conclude that a lot of novelists are loonies, but they are anyway...You can apply Freud to a lot of things, but it doesn't really get you very far, they completely ruined 'Alice in Wonderland' doing Freud on it, because you just apply that to it and it becomes the most pornographic novel ever written, so it's just a waste of time." (Jennifer, 3rd year, A)

This reflected her more general attitude to theory:

> "To me it doesn't add anything to a novel, in fact it takes an awful lot away, it just ruins it for me - it's probably because I'm not very technical."

At most levels, the responses of the male and female students to literature are not very different; the majority of students came to English through a voracious love of reading, and felt that literature gave them an insight into the lives and ideas of others. There is, however, a profound contradiction for students in the responses they are supposed to feel towards literature. In chapter 8, the head of department at B was quoted as saying that the study of literature was about "affective, emotional response"; he then went on to say that some of the female students were *too* emotional in their response to literature. Because the curricula of English departments are dominated by the 'canon' of what is deemed worthy, one of the prerequisites of success for any English student is an acceptance of these definitions of worth. As Bowen (1985) has said of Leavis's writing, "It is an attempt to produce readings of texts but, equally importantly, to *prevent, limit* and *restrict* them." (p.371). What both Leavis and Richards did - and what liberal humanist critics continue to do - is to refuse a set of absolute standards for judging literature, whilst at the same time denying the subjective or emotional basis of their own judgements; Leavis's judgments were right

because he said they were right. The consequence is a spurious objectivity: a "claim to be able to assess by a norm, yet the the refusal to specify what that norm is." (Bowen, 1985, p.311). Similarly, Richards's injunction to students of literature was - in Bowen's words again - "emotionality and detachment, expression and mimesis, individuality and objectivity." (p.311) English students are caught between these injunctions to emotionality and detachment; this is particularly the case for women, of whom it may be said, if they are not cautious enough, "the emotional, affective thing is too strong." Whereas the male students, as we have already seen, used self-assertion and argument to establish their views, women, although not in reality more emotional, appeared so because they emphasised their spontaneous response to a text. As Gillian, a 3rd year at A, said:

> "It's like, women being more emotional than men, they get more out of reading a work of literature than a man does. A man tends to, because of the way he is, want to get something concrete out of art, and I think that's why they don't accept it. They want an answer, they want something to show for what they've done, whereas a woman will do it for the joy of it."

The same, she said, applied to staff:

> "I think they're very rational, I think they adapt to the academic way of doing English - rational, not for enjoyment - there have got to be answers, there have got to be right ways of doing it, there has got to be a meaning, they bring it down to a science, or try to."

The most striking difference between the female students and the male students of English - and the most difficult to communicate on paper - was the women's lack of a sense of self-importance. Whereas the men often talked at length about their hobbies, - such as photography, rugby or politics - and their ideas about literature, science and their own futures - many of the women appeared to think that what they did or believed could be of little interest, and in some cases spoke quite negatively about their own abilities and interests. It wasn't that they were uninteresting to talk to: simply that some of them felt that what they said could not possibly be of value. The same was true of the female communications students who, although relatively ambitious, were sometimes quite diffident about their own talents.

The attitude of the female English students towards their careers was, in the short term at any rate, very similar to that of the male students.

Few wanted conventional graduate jobs; most felt a positive distaste for anything conventional. Amongst the final year women, two had decided to enter retail management; three were interested in teaching abroad; one intended to take a Master's degree; one had considered journalism (but definitely did not want to go into business); one was completely undecided.

> "I wouldn't want to be working for the civil service or anything like that, I wouldn't like to be working for Sainsbury's, because a lot of people are doing retail management and that just bores me rigid. I don't know what I would like to be doing - it would be something that involved me writing, not a nine to five job; I know everybody says that, but something slightly more - I suppose, working with people. I know that's a bit naïve, but definitely outside business anyway, probably as far outside business as you can get." (Jennifer, 3rd year, A)

> "I can't really envisage it [the future], but I hope that I'll have done something constructive, which is good, because I don't really want to have it so mapped out that I can tell." (Alice, 3rd year, B)

Often students who didn't know what they hoped to do were critical of those making conventional career choices. Alice summed up the feeling of many when she said:

> "I'm here because I love English, not because I want a good degree or anything, but I think a lot of people are here because their daddies have said to them, you know, if you get a good degree, you can get a good job in this and that, advertising and everything." (Alice, 3rd year, B)

She went on:

> "There's nothing I could do with it really, that I want to do with it."

Alice's own plans were vague: maybe TEFL, maybe busking abroad (she sang in a band), certainly not journalism. She wrote a lot in her spare time, and hoped to have some success with that, "something creative", but as yet unspecified.

Another final-year at B, Judith, who was a Christian, had already been accepted onto a PGCE course and wanted eventually, to teach in a third world country in some missionary capacity. Diane, in the same year, had applied for store management, but she seemed not to feel any great enthusiasm for it. When asked what she hoped to be doing in ten years time, she said:

> "God, no idea. Like I said, I've been applying for these jobs, I've only done eight application forms, which is not many. This

> lad who I was telling you about earlier...he did twenty-four application forms and I think he's terribly job-orientated, money-orientated, 'I am going to have a career, going to have two-point-two children' and all this sort of stuff, which doesn't appeal to me at all. I mean, it would be nice to get a bit of money and have a career and stuff but I think you can always keep applying for that sort of thing. It's nice to get letters saying 'You've got an interview with us', but I don't think I'd be devastated if I didn't get a job because there's so many, particularly when you're so young, so many things you can still do. I quite fancy now, trying a bit of hospital radio, trying a computer course, things like that, seeing a bit of life, and I think particularly during the summer there are seasonal jobs to be had, and provided you can manage on the money, then I think it's quite a nice opportunity to get about and have a little experience of life." (Diane, 3rd year, B)

The other student who wanted to enter retail management was also keen to assure me of her lack of ambition:

> "I'm not really career-minded, I don't feel the need to get to the top of anything. My only thoughts at the moment are to be happy and successful in whatever I'm doing. I'm not really thinking that far ahead." (Lee, 3rd year, A)

Only one final year English student said that her reason for doing a degree was because she wanted a career, and she was also the only student who said that she wanted to be "successful" in conventional terms:

> "I don't want to be someone who's just another cog in the wheel, who's just working in an office, I want to do something that will make a change in either the field of art or in the field of communications or t.v., wherever I'll be working. I want to do something that is moving forward, that isn't stagnating and is challenging, and so I wouldn't sacrifice, because I mean, because women and men obviously do get married and nine out of ten women will have kids so I guess I'll have kids but I don't want them for ages yet because I think you should look after Number One first, so in ten years time, I'd like to hope that I'd have a very strong career, loads of money behind me, not wealthy, I don't want to be *wealthy* wealthy, just well off and use the money I earn to supplement my own interest in fields of work I'd be working in, whatever it's going to be, and successful basically."(Susan, 3rd year, B)

Susan was by far the most ambitious of the final-year English students but even so, she is aware of the difficulties facing any woman who has to choose between career and children - a point we shall return to shortly. Part of her desire to be successful is related to her not wanting to be the conventional housewife and mother; her ambition therefore has a

sharper, feminist edge. Her next comment may seem ironic, in view of Jane's earlier remarks about starting a family:

> "There's no way after coming to a place like this, where you get a taste of freedom, you would sit down and accept being a housewife, and I imagine every girl at the university has the same thing. I mean, if you take a female science student, I bet she's going to forge a career for herself and not sit around."

Susan was an exception. Most of the English students did not talk about their futures in terms of wealth or success, and often they explicitly rejected those criteria. The physics students, - at least, most of the male physics students, and a few of the female ones - saw wealth and success as important to them and their self-identity. This meant that they viewed their subject in different ways; for physics and physical science students, their degree was important in helping them to get a good job; for English students, the degree was often an end in itself.

Amongst the first year students, there was a similar pattern of prioritising people over money. A high number of students, both male and female - seven out of the sixteen - had considered teaching in one form or another, abroad or at home. Even the idea of teaching abroad, however, posed a moral dilemma for one student:

> "I was thinking of teaching in this country...and then going abroad and teaching but I have qualms about that because you find that with something like VSO, you're teaching, you're imposing the English culture on another country and I don't think that's right so morally I don't know whether I could do it." (Geraldine, 1st year, B)

Another student posed the choice between journalism and social work in these terms:

> "With journalism, you're not particularly serving a great purpose. Whereas with social work, you're actually doing something, helping people." (Carole, 1st year, B)

Obviously not all students experienced such angst over their careers; quite a few first years wanted to become journalists; one wanted to run her own interior design business. Nonetheless, few saw their futures in terms of status or money.

Some of the female English students clearly felt that they *ought* to be ambitious, whilst at the same time lacking any strong inclination towards a particular career. For many of them, a social conscience seemed to preclude doing any of the normal graduate jobs such as management, whilst

at the same time they wanted to do something rather more unconventional than teach. In fact, it is likely that for many of them - the men as well as the women - individuality was more important than their social consciences: they really didn't want to do the same as everyone else. The fact that *most* of them didn't want to do what everyone else was doing did make deciding what to do rather difficult.

The female communications were more decided on their futures. Amongst the final years, one wanted to be a television research, one a newspaper journalist, one a television producer, and one wanted to work in radio. The first years, understandably, were less clear: one wanted to work in public relations, while the other three liked the idea of working in television. As with the English students, the emphasis tended to be on enjoyment rather than money:

> "I haven't really planned anything, but it would be nice to think I could get a proper career, something that I would really enjoy doing. Something that involved writing probably. I think the idea of writing for t.v. is rather interesting." (Sandra, 1st year, C)

Although the short-term ambitions of the female students were not very different form those of the men, it is in talking about the long-term that major differences emerged. Women's feelings about their future were more ambivalent than those of the men; many were highly conscious of the difficulties of combining a career with raising a family. Susan, for example, although the most overtly ambitious of the female students, was also the only female final year English student to mention the possibility of children:

> "...a lot of my schoolfriends are married now and have a totally different mentality, but once you're here, all the girls I know here have a sense of freedom and a certain drive not to be tied down and to be career women in whatever fields and to make something out of their lives although they would like to get married at some stage, but we've got a standard joke that everyone gets married at about 28 and has kids at 30; I mean, that's the way it's going to be, we're going to have careers for eight years, then we're going to do this and we're going to work part-time after we have kids, it's just like a stereotyped thing."

Susan's own immediate ambitions were to teach English as a Foreign Language in Japan, and then to enter publishing or television. To her, being a "career woman" is incompatible with being married and having children, although she knows she wants to do both. Having "freedom" and

"drive" is seen to be in direct opposition to having a family, which she regards as confining.

The first year female English students were more concerned about career/family conflict than the final year students. In all, six of the eight women mentioned marriage or family. They had not, however, gone very far along the road of solving the conflict:

> "I'd like to have a job that I'm happy in and that was what I'd been aiming towards for years. I'd like to have got to where I'd aimed at. What that is, I don't know. By 29, I'd hope to have had a family, I suppose, but then again, there would be a conflict between career and family, it's frightening to think about it and I can't really say I have thought about it. Just have a job that I'm happy in, that's related to what I'm doing now." (Diana, 1st year, A)

> "It's hard really because I would like to have children and I want to travel as well...I'd quite like to see myself set up abroad somewhere, with a job..." (Geraldine, 1st year, B)

> "I want to teach and I don't know whether I'll start teaching - I'm doing TT after I've finished here but whether I'll start teaching then or get another job I just don't know. I don't want to get married or settle down with kids. I want to work for a long time becuase that's what it's all about, that's what I've come here for, to learn, to be able to get a job, to be ble to work; I don't know what I see myself doing; I suppose teaching, maybe get married later." (Kate, 1st year, A)

> "I don't know. I haven't got a clue. I don't want to get married. And I certainly don't want children for quite a while, till I'm older. I suppose 'being a career woman'. I really don't know...I want to do VSO, but that lasts for two years usually...I think it would be a good experience. You feel as if you've done something to help humanity." (Carole, 1st year, B)

In this respect, the female English students were no different from the female physics students: they experienced exactly the same conflicts about combining career with family. However, apart from its slight ambivalence about children, Carole's quote is interesting because of the contradiction between her apparent desire to be a 'career woman' and her desire to be useful and to 'help humanity.' The vagueness of many of the English students' replies when asked about future careers is perhaps because there are so few jobs in society open to graduates that are to do with 'helping humanity'; even fewer for *ambitious* graduates who want to help humanity.

Gillian, a final year, was a mature student who already had children. This, however, did not resolve the problem. Her age disadvantaged her; she was, for example, too old to enter the civil service, even though:

> "Girls of 24 or 25 are going in and they might only stay for four or five years, whereas now I've got twenty odd years to give." (Gillian, 3rd year, A)

Even the experience of working for some years, both as a mother and as a clerk in the advertising department of a newspaper, before taking her degree, was not useful in terms of getting a job; she would be considered too old to receive training. Nonetheless, she was not bitter; she intended to take a Master's degree and felt that doing English had been worthwhile. In reply to a question about what she saw herself doing in ten years time, she said:

> "I can't say what I'll be doing in ten years time because I can't see myself not wanting to learn, so probably when I've done this, I'll do something else, and I might even do the OU as an associate member, just because I enjoy learning about different things...I think once you get into this kind of field of wanting to study, it's difficult, if you enjoy it, to give it up."

Although they had far more idea of what they wanted to do than the English students, the female communications students shared the same anxieties about combining marriage and family as the female English and the female physics students. In all, six of the eight brought up the issue of whether they wanted children. The most determined woman, the one who had made a real effort to enter journalism, had thought at some length about it:

> "Hopefully I will have got on in journalism - ten years time - I'll probably have children by then. No, I can't see myself not having a family, I would like to have a family when I'm older, but I think I'm the sort of person that I can't see myself giving up my career, I'd like to work for at least that long. I'd really like to have a family but it conflicts so much. I think that's the trouble if you're having children, you have to have them young, and I think with journalism you have to really get into it, you know, ten years seems a long time but when you're training for two years it's not really long on a paper. I'd like to establish myself and be respected for my work. I'm so sure that I'm not going to do very well, I'd have to prove everyone wrong and myself wrong." (Helen, 3rd year student, C)

One first year woman said she wanted a family; she, like many of the other female arts students, was explicitly unambitious:

> "I'm not dreadfully ambitious. I don't really see myself as a really successful career woman. I'd like a job that I enjoyed.

> I think that's my main hope, but I do also want to get married and have a family eventually." (Sandra, 1st year, C)

There was also a student who defined her future in terms of *not* being married:

> "I won't be married [in ten years time], that's for sure. How old will I be? Twenty-eight. Well, I might just be married, but I don't want to get married till I'm quite old. I'd like to think I'd got on quite well in the career I'd chosen; I'm not interested in money, I'd like enough to be happy, so I don't have to worry about it, but just job satisfaction, a job I can enjoy." (Rebecca, 1st year, C)

The interest of the comments about marriage lie not in whether or not women see themselves as getting married in the future, or not, but the fact that they define themselves as 'married' or 'not married': whereas men tend to construct their identity in terms of the sort of job they'll be doing, women tend to construct theirs in terms, not only of their job, but also in terms of whether they'll be married or single. It is very important to the women, when they think about what they'll be doing, and the sort of career they'll be pursuing, whether they will be married or not; and some of them are in the process of making quite complicated calculations as to when is the best time to get married and have a family. It is a *calculating* process for women in a way that it is not for men. Although, therefore, male and female arts students do not on the surface have very different ambitions, women's anticipation of successful, or at least happy, careers is often in direct opposition to their awareness, if they have children, of the need to do 'women's work' - bringing up a family. Women had very definite images of themselves as 'career women' or as 'mothers'; having a career was not simply about having a career, but being a particular kind of person: a 'career woman'. Being a 'career woman' clearly meant, for most of the women who used the term, being ambitious, single-minded and *selfish*; some were at pains to dissociate themselves from that image. Choosing to be a mother, on the other hand, meant being a warm, caring, *unselfish* person. For another group of women, 'being a career woman' meant being someone who was independent, who could look after herself; being a mother meant being boring, unambitious and trapped by convention. These images were the same for the female arts students as for the female science students; their ideas about what female graduates could and should do with their

lives were shaped by a dominant discourse which divides women who behave like women (i.e. who become full-time mothers) and those women who behave like men ('career women'.)

11.6 Summary

This chapter has looked at the significance of gender in four different disciplines: physics and physical science on the scientific side; and English and communications on the humanities side.

It was argued that male physics and physical science students had little trouble in building an identity. They tended to define themselves much more rigidly as 'physicists' through making distinctions between physics and other subjects such as maths and engineering; some of them went further, defining themselves as 'theoretical physicists' or 'applied physicists'. There was no comflict, therefore, between their identity as men and their identity as physicists.

However, women in physics and physical science are treated as a 'minority group'. They do not feel themselves simply to be 'physics students'; they are 'women physics students.' They are therefore regarded, to some extent as 'deviant', and they have to construct an identity either through becoming more like a scientist (i.e. more 'masculine') or by becoming more 'feminine' (and hence less like a scientist.)

Although the women had overcome certain social barriers to their doing physics, being accepted onto a physics degree course did not mean that they could now be accepted simply as ordinary physics students. Women felt that they had to prove themselves, to be "as good as the men." They had to negotiate their position carefully within the department. Some women who experienced difficulty with the work and the competitive nature of the department, resorted to co-operative strategies, helping each other out and building a collective identity.

In English, the boundaries were more fluid, but despite the predominance of women, men were still advantaged. Because men were in a minority, they were regarded as 'special'; their views were considered more interesting and more valuable than those of women. Men were not treated as a 'minority group'; on the contrary, they were able to compare themselves favourably with the mass of anonymous women around them. Male arts students in both English and communications were more self-

confident than female arts students; being an arts student for them meant being an individual and having the freedom to form one's own opinions and ideas. Thus, being an individual - in the sense of being opinionated, even aggressive - is an advantage in those subjects because individuality is highly valued. Women, too, in English and communications, enjoyed the freedom allowed them by those subjects to voice their own ideas and values; but they were both disadvantaged by being part of a mass, rather than a minority, and hampered by their lack of self-confidence in expressing opinions.

In many ways, the similarities of attitude that existed between the male and female science students, and between the male and female humanities students, were greater than those between men or women in either area. For example, the science students, *on the whole*, tended to think that education should be useful, whereas humanities students saw education as valuable in its own right. However, there were differences of attitude between male and female science students, and these were greater than the differences between male and female arts students. Women in science were less materialist and less instrumental in their attitudes than the male scientists; both male and female arts students tended not to be materialist or instrumental. Women in science tended to stick together, and rarely sat with the men in lecture theatres; men and women in English and communications mixed much more easily together. The one major difference between male and female students in both areas was in their visions of their long-term futures. Men in physics saw themselves as having successfully climbed a career ladder, in management or science, and men in English saw themselves as successful individuals - not usually in a company, but as writers, or as making a living in some way that was essentially *different*; the women in all the disciplines, however, were concerned with the issue of whether they would choose family or career, or how they would combine both. Having a family rarely crossed the minds of the men; if it did, it was something they took for granted, not as something that would be a problem. Women saw the two things in opposition to each other, and never as complementary.

It was through this vision of their future lives that students' sense of themselves was most keenly expressed. Male scientists perceived themselves as ambitious and successful people, with money and

responsibility. Female scientists, on the whole, were less clear about their futures; some, who saw themselves as "caring" people rejected a career in physics altogether and stressed job satisfaction and mixing with other people over money and status. Male English students essentially saw themselves as "different" - not taking part in the rat-race, but making their mark through other means: a rather romantic image. Female English students, like some of the male English students, stressed social responsibility as a prerequisite of their jobs; some, however, were clearly uneasy because they thought they *ought* to be ambitious, whilst at the same time not wanting to be in a job which was exploitative. Both the male and female communications students wanted to achieve success - both status and job satisfaction - through working in the media.

The numerical strength of female undergraduates in English and communications, then, is not equivalent to a female dominance of the subjects. Men in those subjects distanced themselves from its feminine image and exploited the advantage of being male; the fact that they were male in a predominantly female subject marked them out as special. Whereas in physics, women had to be seen to do as well as the men, there was no such pressure for men in English to do as well as the women.

English and physics, communications and physical science are not, then, parallel or symmetrical; they are asymmetrical. The dominance of men in physics and physical science is not mirrored by a dominance of women in English and communications. More importantly, the environment of both the arts and the science disciplines ulimately favoured men, not women. The next chapter will look at how these findings relate to the hypotheses formed from the literature, and at what can be done to effect change.

CHAPTER 12: CONCLUSION

12.1 Introduction

This chapter will review the findings and ideas of the previous chapters and discuss their implications. It will also look at the potential for future research in the area and make certain policy recommendations.

The preceeding chapters have discussed the relationship between subject and gender; between academic constructions of arts and science and students' own sense of masculinity and femininity. It has been suggested that ideas about subjects, and ideas about gender, are, to a large degree, mutually reinforcing. Let us examine further the meaning and implications of that statement.

12.2 The Departments and the Organisation of Learning

In the discussion of science in Chapter 4, it was suggested that the organisation of the teaching of physical science was very tight and demanded conformity on the part of the student; Kuhn (1963), for example, argued that students were not expected to discover or investigate science for themselves, but to accept the 'truths' of the current scientific knowledge. Similarly Halloun and Hestenes (1985) had found that physics students often had very little understanding of the meaning of scientific concepts, having learnt them by rote. Hudson (1967) argued that conformism was an important personality trait of the science student. It was suggested that arts subjects, always seen in opposition to science, might be less rigid in their organisation of learning.

The research did indeed find clear differences between the arts and science departments. First, the three science departments were more rigid in the hierarchy of relationships between students and staff. This was related to the status of the staff as imparters of knowledge; the "educand", as Bernstein (1971) has it, has "little status and few rights." (p.51) Students were very dependent on staff for developing an understanding of the subject; full attendance at lectures, seminars and labs was very important. This was particularly true in physical science where learning was very closely organised: students having no choice, for example, about what modules they took. Physicists regarded academic disciplines as forming a hierarchy: the "harder", the more

"certain" and the more "useful" a discipline, then the more important it was. They believed that disciplines which could not provide "certain" truths were tangential - in the physics discourse, "soft". It was argued that students' acceptance of the superiority and the certainty of physics was crucial to success in the discipline - that non-conformity to this world-view was actively discouraged. A high degree of trust was required of the physics students; typically, the courses were seen, both by lecturers and students, as imparting a body of knowledge which students had to absorb. Students were not, generally, required to discover for themselves; the point of experiments was to illustrate a received "truth" rather than to allow students to make findings. Thus getting the "right" answer was more important than showing a clear understanding of experimental procedure. There was some degree of dissatisfaction amongst students with this method of teaching - particularly amongst the very high achievers and the very low achievers. Whilst the size of the sample does not allow us to make generalisations, we can suggest that both failure and high success are related to non-conformity in physics - a disillusionment with the practice on the one hand, and an ability to see through and manipulate the practice on the other.

Many of the science students experienced contradiction in their learning; whilst they were dependent on the department for a full understanding of the work, part of the role of the departments was to measure and classify students, and this often came into conflict with the need to ensure students' complete understanding. Although, therefore, students co-operated with each other informally, the departments had to grade students as individuals, labelling them as "successes" or "failures". Thus the science departments were both hierarchical in their staff-student relationships and in their classification of students.

Relationships between staff and students in the English departments were not so much informal as irrelevant. Students - in particular final year students - depended very little on staff for their understanding of the discipline. They worked on their own, and to a large extent used lectures and seminars as aids to learning - they attended them if they thought they might be helpful; if not, they didn't bother. English

students stressed individuality; they generally worked on their own, and relied far less either on staff or on other students for guidance. There were far fewer lectures and seminars to attend; students were expected to a large extent to organise their own learning. There was less anxiety amongst students about failing, although there was disillusionment with the courses. Students in A showed a greater independence and confidence in discussing theoretical issues in English than did those in B; this may be the result of A's greater emphasis on critical theory. In communications, students' relations with staff were very informal, and, as in English, there was little sense of students being *dependent* on staff. There was a strong emphasis in the communciations course on discussion and debate through two-hour seminars. The communications students also, generally, had a better grasp of theoretical ideas than the English students, and were better equipped to make criticisms of their own course.

The chief difference, then, between the science and arts departments, was that students in the arts departments had a greater control over their own learning, and there was less emphasis in those departments on the formalities of marking, grading and assessing. This finding does support the argumemnts of Kuhn (1963) and Bernstein (1971); indeed, it is striking that the course (communications) which had the weakest boundaries between relevant and irrelevant knowledge, also had the most informal and least hierarchical staff-student relationships.

12.3 The Subjects

i. Physics and Physical Science

It was argued in Chapter 4 that science in general, and physics in particular, has been seen historically as "objective" and "value-free" and progressing in a linear and orderly fashion. There have, however, been challenges to this view; Kuhn (1962) suggesting that "normal" science demands not originality of thought, but a strong faith in the truth of current scientific beliefs, and Capra (1979) arguing that quantum mechanics have shown that objectivity and impartiality in science are not possible.

The research found that the view of physics held by staff and students was traditional; it was seen as a "fundamental" subject, able to

reveal universal and immutable truths about the nature of the physical world. Physics was held to be a "certain" subject, and one which was forever progressing towards a complete understanding. In certain cases, other subjects, such as chemistry, were seen as reducible to it. It was also regarded as a subject concerned with "understanding" rather than "learning": awareness of certain key principles gave the key to unlocking an understanding of the discipline. The alternative view, that physics required intuition and speculative exploration, that it was an *uncertain* discipline, was expressed by Dr. G. and a handful of students. It had had little impact on the thinking of the majority of students, who made no distinction between the methods of quantum mechanics and the rest of science. Quantum mechanics was more usually characterised as "fun" and "exciting" than as a challenge to older ways of thinking.

Physical science students were more conservative in their characterisation of their discipline, regarding it as a concrete body of knowledge with useful application. The attempt to broaden the subject and blur boundaries between subjects had not been spectacularly successful: students still saw the course as being about physics *and* chemistry, rather than as a new discipline of "physical science." The course was explicitly discussed by students and staff in terms of its instrumental value: its usefulness as a job qualification. Students talked less of the excitement of discovering fundamental "truths" than of the importance of getting a job. It is difficult to see the course as a breaking-away from traditional scientific ideas and practices.

ii. English and Communications

Unlike physics, English was constructed by staff and students alike as "uncertain" and "subjective"; it was also seen by some as allowing access to artistic and universal truths about human behaviour. Students thought that English was a subject which allowed them to express their own opinions and feelings, in a way which no other subject did. There was a strong emphasis on "breadth": English's capacity to encompass a variety of related disciplines (such as history, sociology, philosophy). Women in particular attached great importance to the possibility of emotional response in English. English was constructed as a liberal humanist discipline (this could also be seen, for example,

in examination papers, as well as in interviews with staff and students): one which demanded personal and thoughtful response to the "great" writers of English literature, with their range of moral perspectives and ideas. Certainly English is not regarded by either students or staff as an "accomplishment"; it is taken very seriously indeed. Eagleton (1983) is correct to suggest that most students are unconscious Leavisites: what was interesting about English was that many of the staff were *not* Leavisites, and there was clearly some conflict of ideas and aims between staff. These conflicts were not resolved, but neither did they cause major splits: different views were tolerated and allowed to co-exist without challenging the dominant perspective.

Perhaps the most important characteristic of English, in the view of students and staff is its individualism: the possibility of holding different views from other people. Individualism is all to English departments; the aim of the seminar, for example, is not that students can reach collective agreement about a piece of writing or an idea, but that students put forward their competing perspectives in the cut and thrust of debate. It differs greatly, therefore, from physics and physical science, which demand consensus before learning can take place: English demands only consensus about the discourse, the way of talking about books. Whereas success in physics and physical science is related to the ability to understand, accept, and then (perhaps) manipulate, success in English is related to the ability to be assertive and original, to make an impression on the department. English is perhaps less about cultivating feminine sensibility (as it was regarded in the 19th century), as about tackling ideas with vigour.

Communications - perhaps surprisingly, given the different nature of the discipline - was discussed by its students and staff in very similar terms to those used by English students and staff. They talked of the wide variety of subjects encompassed by the discipline, of the potential for individual response and of the many approaches of tackling problems. They did differ, however, in that students did not talk about emotional response, as the English students did; further, they regarded communications as a more *relevant* subject, one which tackled current social issues and was not preoccupied with traditional intellectual and academic niceties. Like the physical science students, communications

students saw their course as at least partly vocational; it wasn't simply a course studied for its own sake.

In the early chapters, more attention was paid to English and physics as disciplines than to communications and physical science. English and physics are well-established disciplines, each with its own body of theory and writing. Physical science and communications, as new subjects, were studied in this research to establish whether the multi- and inter-disciplinary courses of the polytechnics were providing fresh and valuable alternatives to subjects like physics and English. I should like to suggest that, whilst physical science was dominated by traditional ideas about science - and its control over learning was more rigid even than that of physics - that communications did provide a genuinely exciting and inter-disciplinary alternative to such disciplines as English, history or sociology. Although the course certainly has its problems (the first year in particular is very fragmented), it does allow students access to a wide range of ideas and theories, and provides students with means of making sense of the modern world, through the study of film and media. It is particularly refreshing that the studies encompass both intellectual aspects (such as the meaning of "ideology") and the practical aspects of the techniques used by programme and film makers; and that these studies are firmly located in an understanding of how media institutions operate in society.

12.4 Gender

In Chapter 3, we suggested that women's and men's choices about which subjects to study were not only the result of socialisation, but were based to a large extent on a rational understanding of the options open to them, and on a prioritising of certain values above others; it was argued that to portray girls as the recipients of a socialisation process which resulted in their making certain "feminine" choices, and who could quite as easily be de-socialised, causing them to reverse those choices, was misguided. It was suggested that women who do make unconventional choices were the subject of conflicting pressures - to be "scientific" and to be "feminine". The possibility was also considered that men who made unconventional choices might be similarly under conflicting pressures. However, in Chapter 4 we noted Weinrich-Haste's

(1986) finding that whilst some subjects were rated as positively masculine, none were rated as positively feminine; similarly, Hudson (1972) had found that the image of the science practitioner was that of a "masculine" man, whilst the image of the arts practitioner was not that of a woman, but of a "feminine" man. It was hypothesised, therefore, that the arts had specific qualities which appealed more (for a variety of reasons) to women, whilst the sciences had qualities which appealed more to men. It was also hypothesised that, because we generally see the artist as male, women as a minority in science would face more difficulties than men as a minority in the arts.

We have already seen that arts students and science students found very different qualities in their subjects. Arts students found breadth, individuality, a concern with people and with moral issues in theirs. Science students found certainty, fundamentality, usefulness in theirs. We shall discuss shortly why these differences can be seen as male/female ones. First, however, let us examine the ways in which the disciplines were constructed as "masculine" or "feminine".

Both physics and physical science were implicitly perceived by students and staff as "masculine". This perception takes place on several levels. At the most basic level we have the tendency of staff to use the words "he" and "him" when referring to physics students. On another level is the discourse used by both male and female students when talking about physics and other disciplines. This discourse represents physics as "hard" and "rational" and other disciplines as "soft" and "subjective". On yet another level, the science students saw physics as part of a traditionally male career process - a linear progression from physics student to research student or research scientist in industry. For male students, physics was an integral part of their lives: success in the subject was closely connected with their sense of self-confidence as individuals. Being a "good physicist" meant, for them, "being a successful individual." Men saw their futures in terms of being successful physicists - doing physics as a career, earning plenty of money, having a lot of material possessions. Science, in short, was bound up with ideas of toughness and hardness: practicality, usefulness in the "real" world - notions of masculinity. It was valuable precisely because it was masculine. Yet the process works

too in reverse. Female scientists talked about being *as good as men*; almost as if men were "naturally" good scientists. Unwittingly, women reinforced this association between science and masculinity: through trying to be "like men", they accepted men's superior scientific ability. Women were acutely conscious of their own femininity and the need to eschew that femininity in order to be seen as competent physicists: femininity was associated with "helplessness" and scientific inadequacy. However, some women also used their femininity in order to appear less threatening: helplessness was a ruse which made them more acceptable to male scientists. The paradox of this is that, despite the fact that they were living contradiction of the myth that women were incapable of being good scientists, commonsense notions of "masculinity" and "femininity" were reinforced by women's decisions to behave in what they regarded as a "masculine" or "feminine" way. Women were less able than men to see themselves as "physicists"; part of the meaning of "physicist" was following a career in physics and making money out of it. Many women, however, were unwilling to dedicate their whole lives to physics and saw themselves as doing other things, including having families. Some, too, clearly saw physics as shutting out other areas of their lives, such as their interest in the arts: being a full-time physicist left little time for being a part-time anything else. Many of the women were interested in broadening out their lives, rather than narrowing them down.

In one sense, English can be seen as a *feminine* subject, an embodiment of those interests traditionally allocated to women - a preoccupation with human and social relationships, and subjective response. Its appeal for women lies both in its stress on the personal and the emotional, and in the freedom it allows for individual expression: at one level, there is little need for conformity to pre-defined norms. In another sense, however, English is a *masculine* subject, for its concerns are the concerns of male experience, male feeling. The curriculum is dominated by male authors; female experience is largely ignored, except insofar as it has been described or interpreted by men. Thus female students are constantly required to make an adjustment to understanding male experience in a way which male students are not required to do of female. It is a masculine subject in

another sense, however, which is that men are able to manipulate the discipline's requirements in their own favour. Masculine assertion, competition and even aggression are highly valued, whereas feminine "sensibility", or "emotionality" are less highly valued (although not to the extent of being banished as they are in other disciplines.)

This tension between masculinity and femininity was noted in earlier chapters, which referred to the continual debates in English about subjectivity and objectivity. English departments expect students to respond to texts in a subjective way; but their subjectivity has to conform to the objective and detached preferences of the department. When the students trying to respond in a subjective, individual and yet "correct" way to texts are female, and the teachers, academics and critics who have determined what that "correct" response is, are male, the result is a necessity to conform to male standards: what Bowen (1985) describes as the "regulation of women's 'response' by older men" (p.370).

Practitioners of English in the universities are unwilling to admit this differential evaluation, regarding English as a practice, a way of looking at something that can be agreed upon by all; in other words, there is a tacit consensus about the qualities required of students - and hence a conformity of sorts is demanded as it is in physics. Unlike physics and physical science, however, where the rules are clearly spelled out, English does not specify what these qualities and rules are. Indeed, as Dr. S. pointed out, the "consensus" is myth rather than reality: the marking and assessment of examination papers may be the site of a struggle between different members of the department for the dominance of their point of view.

The essential paradox of the difference between physics and English is that physics, although a "masculine" subject, through spelling out its rules, allows women to choose to follow those rules; in English, a more ambiguous subject, the rules are not specified - there may even be disagreement amongst staff about what the are - and therefore women may have more difficulty in finding the key to success. English allows women anonymity; whereas some women in physics find their high visibility a strain, women in English become part of an invisible mass. This ultimately disadvantages them in that the real high-flyers in

English (though not the majority of two-ones and two-twos) will be those who are highly individualistic and conspicuous. It might even be argued that women who have been successful in English at school misunderstand the nature of university English, which demands, not only a subjective response to texts, but an ability to defend a point of view assertively and even aggressively. That said, most women do not *fail* in English, but they are only moderately successful. This is in marked contrast to physics; many students felt completely lost in physics, but in English the worst feelings recorded were those of boredom and disillusionment.

Arguably, communications as much as English values assertion and even aggression; a significant difference from English, however, was that the issue of gender was part of the curriculum; *masculinity* as a social construct was discussed as much as femininity. Students, therefore, were encouraged to see communications in relative terms, as a social product rather than as an embodiment of absolute standards and values. It was argued in Chapter 8 that this concentration on the social character of writing allowed a greater awareness of the social character of gender. Women and men in communications are apparently equally successful; CNAA figures for 1985 show equal proportions of men and women gaining first class honours in communications.

This, then, is a summary of the findings of the interview study. The next sections will look at the possible implications of those findings.

12.5 The Significance of Gender in Society

So far, we have argued that physics and physical science are constructed as masculine subjects, whilst English and communications are perceived as neither strongly feminine nor strongly masculine, although there are elements of masculinity and femininity in both subjects. We have not looked yet at why that should be the case, although we noted in the early chapters that English was first introduced as a subject for women, and that science has a long history of association both with men and masculinity. This section will discuss the social implications of masculinity and femininity, and the reasons why masculinity and femininity are reflected in the arts/science division.

Society, we argued in Chapter 3, is organised along both class and gender lines. Gender is significant, both at a material level - the division of labour, for example - and at an ideological level - dominant beliefs about the nature of masculinity and femininity. Ideological beliefs about men and women justify existent inequalities between the sexes (e.g. "women can't do heavy work"), but also appear to have a life of their own outside the functional demands of capitalism; for example, a belief that women are inadequate scientists co-exists with efforts by the government, through the EITB, to recruit female engineers. Ideological beliefs may be contrary to material reality: it may be held that women are physically weak even whilst they do physically demanding jobs, such as cleaning or nursing.

Ideological notions of masculinity and femininity, however, are significant outside the area of male/female inequality. Willis (1977) has demonstrated that boys' definitions of mental work as effeminate or "cissy" are instrumental in their decision to do manual work, constructed by them as "masculine" and hence valuable. Willis's "lads" did not rebel against being labelled non-academic, because they thought academic work, being effeminate, was inferior to manual labour. Work itself, the idea of being a "breadwinner", is also part of the construction of masculinity. Conversely, ideas of "masculinity" amongst the middle-classes are perhaps more to do with financial success and gaining powerful positions than they are to do with physical toughness.

Similarly, it is true that many women fear being thought "masculine". However, the social stigma attached to this is generally less than that for men of being thought "effeminate". Indeed, a woman may take it as a compliment in some instances to be told that she is "masculine"; Steinem (1984) notes that she used to feel pleased to be told that she "wrote like a man"; the female physics students in this study used "being as good as a man" as their touchstone of success. A woman who becomes an engineer or an airline pilot is considered admirable; a man who becomes a secretary or a nursery nurse may be the object of ridicule.

Our notions of masculinity and femininity - and our sense of our own masculinity or femininity - are powerful in shaping the way we explain and interpret the world around us. These notions, influential as they are in every day life, have equal resonance in higher education.

12.6 The significance of Gender in Higher Education

Notions of gender permeate subjects in higher education. Ideas about the qualities needed by students in order to be successful, ideas about the particular value of studying certain subjects are informed by ideas of gender. Students construct a view of what is required of them in order to be "good physicists" or "good English students" and attempt to conform to that image. In physics, for example, the "good physicist" is one who accepts and understands the body of knowledge passed down to him. The particularly successful physicist - and perhaps this is something the majority of physics students don't realise - is one who can manipulate the requirements, and can use them to his own advantage (for example, adjusting the results of laboratory experiments). The successful physicist is also one who uses his degree, who becomes a working physicist - either as an academic or as a research scientist in industry. Whereas this may be relatively easy for a man, because all the social pressures on men are in that direction anyway, it is more difficult for women because they experience a conflicting set of pressures. At least in physics, however, the boundaries between behaving "like a physicist" and "like a woman" are very clear

It is more difficult for students to conform to the notion of a "good English student" because success in English is built around the idea of individualism. Again, however, success in English is easier for men precisely because they have the inbuilt advantage, through the smallness of their numbers, of appearing to be more individual. In one sense, many English students were trying very hard to be non-conformist. In addition, social pressure on women is not to be individualistic or aggressive or assertive; it is to be quiet, industrious and passive. English appeals to women because it appears to allow a space for feminine concerns which does not exist in other subjects; at the same time, it does not reward femininity, but penalises it. The lecturer, quoted in Chapter 8, who argued that English demanded an affective, emotional response, and who then went on to say that some women were *too* affective, *too* emotional, nicely summed up the double bind in which the female arts student is caught.

The issue of conformity and non-conformity has greater resonance than this, however. It will be remembered from Chapter 10 that many

science students criticised arts students for being too lazy, too friendly with lecturers, too pleasure-seeking: for not conforming to the scientists' view of what a student should be like (hard-working, deferential to staff, even, to an extent, ascetic). We can suggest that, for the male scientist, conformity is essential, because graduate scientists are employed, not to challenge received wisdom, but to carry out the needs of industry. The scientist is a servant of industry whereas - and this is the paradox - some arts graduates (mainly male and upper middle class) will eventually occupy the ruling-class jobs in the civil service, the media, banking, the judiciary. Yet science students are generally convinced of the superiority of science, seeing their future in well-paid, high-status jobs, and believing that arts graduates have no future. In one sense, of course, they are right, in that there are plenty of well-paid jobs available for physics graduates and few immediately available for arts graduates. As Gorz (1980) has so succintly put it,

> "intellectual workers are both the beneficiaries and the victims of the class nature of Western science and of the social division of labor that is built into it." (p. 272)

Financial success for the physicist is perhaps dependent on a limitation of the physicist's autonomy.

For men, much of the appeal for physics is its high status, its masculinity; it is regarded as an important subject (this is also the appeal for some women who study it, of course.) Studying physics affirms one's masculinity, and hence one's importance; it is a mutually reassuring circle. In the same way, physics's emphasis on certainty and on progress also provides reassurance: a sense of rightness and orderliness. The very certainty of physics gives the student a sense of confidence, of being in control. This certainty inspires less confidence in women because it depends on a negation of femininity, of those qualities which are socially acceptable but not intellectually acceptable. Men experience no such contradiction. So physics, for men, is "normal": and it provides them with the opportunities to enter well-paid jobs, a process which is an important part of the masculine identity. We can illustrate this by comparing the phrase "a successful man" - about which there is no ambiguity - with the phrase "a successful woman" - which

may mean that the woman has a highly-paid and important job, or that she is particularly "feminine".

Women are, to some extent, "outsiders" in society - in Hacker's (1977) words, a "minority group." They are constantly caught up between wanting to have highly valued social qualities and conforming to acceptable social behaviour. Women, it can be argued, see the world from two angles - their own, and men's. As Berger has said:

> "To be born a woman has been to be born, within an allotted and confined space, into the keeping of men. The social presence of women has developed as a result of their ingenuity in living under such tutelage within such a limited space. But this has been at the cost of a woman's self being split into two." (p.46)

Women in higher education are engaged in a constant process of negotiation and manipulation; their choices are, perhaps, based upon a more complex awareness of reality than those of men's. Thus women have access both to their own perception of reality and men's perception of it; they are able to manipulate men's perception both of the world and of women. This is particularly true in an area such as physics, where women manipulated men by using "femininity" and "helplessness"; it also explains women's reluctance to have a single-minded dedication to physics, either as a discipline or as a career, wishing, as they did, to combine this "masculine" concern with more traditional "feminine" concerns: the arts, looking after a family, involvement with people. Women - particularly educated women - are confronted with contradiction and uncertainty: their position is far less secure or certain than that of men.

Women's position in relation to men resembles the position of English - and other arts subjects - in relation to science. We can suggest that all arts subjects, including English, exist in the shadow of science. In one sense, they act as a "negative reference" for scientists: science is important and valuable because it is not like the arts. In another sense, they constantly measure themselves against science, wishing to come up to the standards science is perceived to have set - an ultimately fruitless aim, because science can only be superior if the arts subjects are perceived as inferior. In subjects such as English, therefore, there is a constant struggle between many modes of thoughts, but in particular, between masculinity and femininity:

between an emphasis on those negatively valued qualities such as emotion, a concern with people, uncertainty, intuition; and those positively valued qualities such as objectivity, certainty, scientific truth.

For women, the appeal of English lies precisely in those qualities society regards as feminine: subjectivity, a concern with human beings, the emotions. It is also true, however, that by allowing a space for those qualities, English allows women an escape route from an education system in which those qualities are not valued. English is one of the few disciplines (and then, as we have seen, not always) to turn those vices into virtues: to prioritise the traditional concerns of women, to provide a space where conformity to dominant social norms is not particularly highly valued. Femininity is certainly socially *acceptable* for women, but it is not as a rule *intellectually* acceptable. This is not the same as saying that women are socialised into being more humane or caring; it *is* saying that society allows women to be caring - and also to be uncertain - in a way in which it often does not allow men to be. Conformity to dominant social values is easier for men because society only makes one set of demands on them: it makes contradictory demands on women. The irony is that because English is a broader subject, with "weak frames" and "weak classification", the job opportunities of many of its graduates are limited; Shaw (1983) has explained Bernstein's statement that "behind weak classification is strong classification" by applying it to women's education, saying that weak classification and weak framing lead to:

> "strong classification (a very restricted set of job opportunities for women) and strong framing (much stricter and more extensive social control)." (p. 97)

Perhaps, then, the apparently greater freedom allowed by English is - as far as women are concerned - linked to less choice in the job market. At the same time, greater choice for women in the job market would almost inevitably be tied to an acceptance by women of traditionally masculine values.

12.7 Does Higher Education Reproduce Gender Inequality?

We have discussed the complex interaction between notions of masculinity and femininity and beliefs about arts and science. However,

we have not in detail examined the significance of the existence of these beliefs in terms of higher education. This section will discuss the problem of the relationship between higher education and gender inequality.

In Chapter 3, it was suggested that a simple functionalist model of higher education perpetuating or eliminating gender inequality was too crude to explain the role of higher education in society. It was argued that higher education has not one aim, but many, and is characterised by a plurality of competing interests and interest groups. This is not to argue that higher education exists apart from the rest of society, possessing an unique set of values which have no relationship to the prejudices, values and aims of the wider world. It is simply to argue that the relationship is a complex one: higher education is neither a mirror to society, nor simply a cause of social inequality.

In a certain, limited sense, we can say that higher education does perpetuate gender inequality. The statistics in Chapter 6 showed that, although women and men enter higher education on equal terms, men are more likely to obtain first class degrees (although women are more likely to gain upper seconds and less likely to gain thirds), and do postgraduate work. They showed that at undergraduate level men predominated in certain prestigious scientific areas, whilst women predominated in humanities and the social sciences. At postgraduate level, however, men predominated in almost all areas. Those areas where they were not predominant were in subjects such as librarianship and education which led, in the main, not to Masters and doctoral degrees, but to vocational qualifications. In one obvious sense, then, higher education is *creating* inequality, rather than merely perpetuating it. This is particularly the case in a subject such as English: in physics and other science subjects, there is a process of women dropping out at every level: O-level, A-level and degree level. In English, however, the proportion of women remains virtually constant until postgraduate level. An important finding of the statistical survey, however, is that the position is changing: that the proportion of women gaining A-levels, doing degrees and entering postgraduate work is slowly increasing, and has been doing so for some time.

What higher education does, as we have already suggested, is not to discriminate against women, but to make use of commonsense ideas about masculinity and femininity in its practices. In particular, it is the existence of the arts/science divide which in itself reinforces the inferior position of women. It is because physical science is so bound up with a particular idea of masculinity and of masculine success, and because the liberal humanities are regarded as deficient in their dissimilarity from the physical scientific model, that women are disadvantaged. Women in science felt themselves to be unsuccessful because they were in a constant battle to prove themselves equal to men. In English, women felt unsuccessful because they were taking a socially devalued subject. Arguably, those women most likely to succeed in physical science subjects are those from a high social class whose confidence their class position gives them overcomes the disadvantage of being female. As was argued in Chapter 2, higher education is held to have two quite distinct purposes: one being to educate students to be "cultured" citizens, and one being to train them to play a part in the division of labour. Whilst these two functions are regarded as separate and distinct, carried out by quite different disciplines, then it is inevitable that arts subjects will continue to be devalued at least by the middle and working-classes. This is an important qualification because, whereas English, History and so on tend to be seen by the middle and lower classes as "not useful", arts subjects have traditionally been valued by the upper and upper middle classes *because* they did not lead to a particular vocation. The role of arts degrees for these classes has historicly been to produce "cultured men" who could have the best jobs on the strength of their class position. This is not to argue that the skills provided by arts subjects are not potentially useful ones, simply that they are skills less highly valued by a profit-driven society than scientific ones.

Higher education is part of a continuing process which creates a women's sense of their own inadequacy. It is perhaps remarkable that so many intelligent and capable women in the study lacked confidence in their own abilities. Far from feeling that they had achieved a goal, they continued to feel marginalised in higher education.

Higher education does not *have* to reproduce gender inequality. There is much that could be done by departments themselves and by academics to improve the quality of the higher education environment for women. Yet the attitude of academics - as revealed in the questionnaire and the interview study - towards the issue of gender is, above all, complacent. Inequality is regarded as a problem for schools and society in general; universities are apparently immune from the taint of prejudice. Inequality of achievement is the result of student inadequacy rather than the inadequacy of individual departments or institutions.

Disciplines like English and communications are regarded by some of their practitioners as potentially, and even actually, subversive of conventional beliefs about women and men. Yet it is very rare that this subversion of the values of the outside world leads to a critical examination of the practices of the institution. The fact that the issue of the social position of women, for example, may sometimes arise during a discussion of Shakespeare's comedies or Charlotte Brontë's heroines, does not, apparently, lead academics to speculate on why a large majority of English undergraduates are women, and an even larger majority of English lecturers are men: far less to do anything about it.

Because of the variations between subjects and departments in higher education, it is not possible to see higher education as a unified entity with one function or purpose. The antagonism which exists between different subjects suggests that they often have quite different aims. Yet they are part of the same system, a system which examines and grades students and sends them out into society and the graduate labour market. It is important to stress, therefore, that higher education is *relatively* autonomous; departments and institutions can pursue independent inclinations (such as research projects or the design of undergraduate courses), whilst having to comply with the requirements of the State.

There is another sense in which higher education is not completely autonomous. I would not wish to argue that it is the aim of higher education to reproduce gender inequality, or that higher education "functions" to reproduce patriarchy. However, higher

education is a *social* institution and in that sense it continually draws on, and makes use of, the values of society in its practices. It is not always the dominant values which are drawn on; indeed, academics are arguably more liberal in their opinions than the average person. However, even those most liberal subjects, commonsense ideas about masculinity and femininity are frequently deployed; not, I would suggest, because male academics consciously wish to discriminate against women but because these ideas (such as the greater competitiveness of men, for example) appear as natural and inevitable It is not possible to say, therefore, that higher education merely reproduces or creates inequality. Higher education is partly related to the demands of capitalism in that it has to produce qualified graduates to play a part in the division of labour (mainly scientists). As far as capital is concerned, or, indeed, as far as science departments are concerned, it is irrelevant whether these graduates are male or female. Yet what is important is that these graduates are *masculine* in that they are committed to a traditionally male career pattern, committed to science, committed to the company they will be working for: not diverted by "soft", feminine concerns. It is hardly surprising, therefore, that the graduates coming forward to fill these places will, in the main, be men.

12.8 The Possibility of Change

This chapter has so far painted a rather pessmistic picture of higher education. However, we would be mistaken if we were to see higher education as a conveyor belt turning out passive and unthinking graduates. One of the key findings of the research was the degree of dissatisfaction felt by students with their courses. Significantly, for both science and arts students, the criticisms made centred around the lack of freedom to organise their own learning and to choose what they wanted to study.

Physics and physical science students were strongly critical, for example, of the experimental work. Although they generally enjoyed doing the experiments (unless they were experiencing real difficulty), they disliked the fact that there was such a time lag between theory and practice, and that the experiments were often no more than

recipes. The final year students enjoyed project work, but found themselves constrained by time. The pleasure the science students gained from their work was always tempered by the need to complete project sheets, write up lab reports, attend lectures and so on, in order to end up with a good degree. Students often wished they had more time to *think*. They were not so much troubled by the content of the course, as by the organisation of it; although it will be remembered that some of the female students found physics "too mathematical" and wished for a more qualitative course, which would look at physics as philosophy.

English students, too, were critical of the fact that the work they learnt was tied to the need to pass examinations, and that they had less freedom than they would have liked to hold their own opinions and study what they wanted to study. To a lesser extent, communications students thought that they had the views of course lecturers imposed on them. Some English students were also critical of having to study what they felt to be outdated and "irrelevant" texts.

Although physics and physical science are very different from English and communications, the criticisms of the students were similar. This is because the job of the departments is essentially the same: to grade and assess students. However much freedom students are in theory given, it remains that students will have to be examined at the end of the course, and probably during it as well. As their teachers are also their examiners, they are bound to exert a strong control over the knowledge taught. The irony is that the more freedom students have, the less likely they will be to be aware of the "rules" of passing.

Higher education is partly about learning. It is also partly about giving students a qualification which will be an indication of their worth to an employer: a useful guide to enable employers to weed out "unsuitable" students. This practice is, of course, something of a charade; many employers draw an arbitrary line below an upper second degree - even though what may constitute an "upper second" will vary from department to department and college to college. Assessment is, in fact, a convenient device, a way, as Bowles and Gintis (1976) have

put it, of making the system seem "objective and meritocratic." (p. 103)

Learning and assessing are, however, two conflicting practices. As we saw in the practices of the physics departments, the need to assess students often prevents them from learning. It is this inherent contradiction between the two aims that results in students feeling disillusioned and disenchanted - even alienated. Learning is difficult - enjoying learning even more difficult - if the pressure of examinations and assessments and gaining a job is constantly present.

To suggest that this contradiction will itself bring about radical change in the higher education system is over-optimistic; the conflict is not between the wishes of one group of people (staff) and another group (students) - both groups experience the conflict within themselves. However, by using strategies to resolve the conflict - such as co-operation over difficult work - students may subvert the norms of the university. Ideally, learning is a shared, co-operative experience, not a competitive one.

In what ways, therefore, might higher education become more equal? There are certain things which departments themselves might do to make education more attractive to women, and which might make the process of higher education fairer; although it has to be said that the present government's attempts to tighten the grip of the State on higher education makes the attempt to implement this kind of change more difficult. There are four areas in which change might be effected: curriculum; teaching methods, admissions policy and student welfare.

i. Curriculum

It would be useful for physics departments to re-examine the content and organisation of their present curricula. At present, students - women in particular - feel that the curriculum is too narrow: some students would welcome an approach which emphasised the social aspects of science and which made links between physics and philosophy. It would be particularly useful if students were allowed to investigate for themselves the ends to which scientific activity may be directed: this would both encourage social responsibility and

make the courses more attractive to women, who generally show more interest in "human" issues. Such a course would combine the acquisition of important and useful knowledge with an ability to question and criticise the uses to which it may be put.

In English, the curriculum must surely be widened. Despite the explosion that has taken place in English literature in recent years - the growth of Australian, African, Canadian, Indian literature written in English, for example, not to mention the growth in 'literary' forms such as television, film and magazines - the average Eng. Lit. curriculum remains a narrow diet of Beowulf, Chaucer, Shakespeare and Milton plus some of the "great" novelists until 1930. Obviously it is not possible to include *all* the developments that have taken place in recent years; but it is important not simply to widen the curriculum but to find new ways of approaching it. Whether one is studying Chaucer or *Coronation Street*, it is possible to look at the social character of that writing; in particular, the construction of gender in literature and media could constitute a course in itself. If curricula were to be widened in this way, of course, new specialists will be needed to teach them: in a different political climate, English departments could be encouraged to recruit new blood.

ii. Teaching Methods.

Many students, particularly in physics and physical science, felt that they were expected to learn work by rote and that teaching methods did not encourage them to think for themselves. The 50 minute lecture requires students to take down a great deal of information passively, without necessarily understanding it; many students found that they did not comprehend the work until they came to revise it (and sometimes not even then.) This contrasts markedly with the English students,who regarded the lecture as a resource which may or may not be used. A move towards an English-type use of the lecture might be useful, because it does encourage independence; the suggestion of one student in the physics sample that lecturers could give out printed notes and, working from those, give a clear explanation of the information, whilst allowing questions and discussions, is a valuable one. Similarly, in laboratory work,

students might benefit from conducting genuinely experimental work from their first year, rather than "following recipes." Further, it is surely a simple matter to help women overcome the hesitation and awkwardness which many of them feel in dealing with lab equipment. This could be done by not assessing lab work for at least two terms, and allowing students to ask for help when they need it, or to work co-operatively, in teams - as, of course, would happen in a research laboratory.

The research found that women tended to stick together for solidarity; some obviously felt intimidated by the department. The good practice of A in ensuring that no woman is in a tutorial group without another woman could be imitated; students tended to like tutorial groups and there could be more of them.

It is perhaps unfortunate that in English, the seminar system - the teaching method the students found most useful - is designed to favour those who can put forward their opinions most aggressively. In addition, the success of the seminar is variable, dependent as it is the personalities of tutor and tutees. In English, a move might be made towards co-operative, rather than competitive, methods of learning: one way of improving the confidence of women would be to make the department, especially near the beginning of the first term, more "social", setting work which allows groups of students to work together and get to know each other. (In this sense, English could learn from physics.) People generally find seminars intimidating when they do not know the other people present and are afraid of ridicule.

iii. Admissions policies.

The present political climate is not, unfortunately, conducive to widening admissions. Already, departments are relying more than previously on A-level grades. If the will to increase the numbers of women taking science degrees were strong enough, however, there are ways in which this could be done. Science departments could experiment with admitting mature students with few formal qualifications; this would present difficulties as a coherent body of scientific knowledge is usually expected, but it could be overcome by effort. There could be an increase in conversion courses for women

with weak science backgrounds, with two provisos: one, that women taking such a course could then choose to take their degree somewhere else, rather than in the institution running the course; two, that local education authorities are given the money to allow them to take four-year courses without penalising them should they wish to take a postgraduate course which requires a local authority grant.

"Admissions" does not just apply to undergraduates, of course; institutions should perhaps be examining the methods they use to recruit postgraduate students, and encouraging undergraduate women to take postgraduate places.

iv. Student Welfare

It has to be acknowledged that some students face particular dificulties in higher education, and that female students entering an all-male department often have to cope with isolation and occasionally hostility. It would be enormously beneficial if each science department had a female tutor trained to look after the needs of female students. It would be a *recognised* position; the teaching load of the person who takes it should be lighter because of it. There is also a need for staff development; lectures could be trained in how to treat women and men equally and to recognise that in certain situations women can be hampered by lack of confidence.

There are two further points to make about change. One is that assessment in higher education seems at present to be something of a lottery; reluctant as I am to advocate the greater centralisation of education, it does seem necessary that there should eventually be a change in universities towards a validating body for degrees, similar to the CNAA. It might also be worthwhile to consider the proposition that all marking of degrees should be performed externally, and "blind", without the markers knowing the name or sex of the person they are marking. Examinations are not fair; but if they are to exist, then there should at least be some attempt at standardisation.

The second point is that of the arts/science divide itself. This thesis has argued that the divide is artificial, a social construction. If anything, the divide seems to be strengthening, rather than weakening, as education becomes more and more specialised. Yet

there is no reason at all why a scientist should not be able to think and write reflectively about social issues, or why an arts students should not be able to master basic scientific skills. Science students lose writing skills and arts students scientific skills precisely because they make such an early choice, and because they are encouraged to think in terms of being "good" at one thing and not at another. I would cautiously welcome the government's efforts to broaden the school curriculum; but this could be continued further up the scale, through, for example, encouraging students to take mixed A-levels or allowing students in arts departments to take science options, and vice versa. Indeed, departments themselves might help students see the connections between artistic and social scientific ways of understanding the world, and scientific ways of doing so.

12.9 Reflections Upon the Research

i. Some problems and difficulties.

On reflection, the research project had certain weaknesses as well as strengths. The strengths lay in the project's scope, its ambition, and its use of qualitative data to discuss themes and ideas. Its weaknesses lay, I think, in its breadth: an in-depth ethnographic study of just two departments may have yielded richer data and would certainly have been easier to carry out. In the research as it was carried out, there was no middle stage between a macro analysis of national statistics, and interviews with a selected group of students. An ethnographic study would have allowed me to look at the A-level grades, degree classes and social background of all the students in the departments. In addition, I could have studied the curriculum more closely by attending lectures and examined student-staff interaction through attending seminars, and thereby gained a better understanding of the culture of the disciplines and of the departments.

Fewer variables would have resulted in a more easily testable set of hypotheses: the decision, for example, to include first years and third years in the research was perhaps a bad one - first years having, on the whole, less interesting ideas to communicate and fewer experiences to talk about. Similarly, communciations and physical

science were interesting in their own right, but were sometimes treated in this research as valuable only insofar as they shed light on physics and English.

As is probably usual in a first piece of research, I over-estimated what I was able to do. Geography alone posed a large problem: I had to catch a train and a bus to get to university B and, as buses were infrequent, it often took me an hour and a half to get there. This was particularly frustrating when students broke their appointments, as many of them did; and I was left with less time for other parts of the research.

The questionnaire proved to be a valuable lesson. With the benefit of hindsight, it is possible to see that it simply demanded too much effort from tutors to fill it in. Perhaps the best way of studying admissions quantitatively is to obtain the raw data from the Universities Statistical Record, who do possess very full information on admissions and degree classes.

It is probably true to say that many of the problems that arose in the research were the result of my lack of a social scientific background. Initially I had little idea of how to research a social scientific problem, and I had to learn as I went along; thus I naively thought that sociological research was a simple matter of designing questionnaires and interviewing schedules and then conducting them on as large a sample as possible. It was only after my first, hopelessly inadequate, attempts at designing a questionnaire that I realised what a difficult job it was. Similarly, I at first found it difficult to theorise the research, as I was unaware of the range of sociological concepts that could be employed. I should *like* to think that the absence of a sociological background was also an advantage, in that I was unencumbered by traditional ways of thinking about sociological problems; but I am less inclined to think this than I was *before* I did the research!

Being retrospectively aware of the deficiencies of a piece of research is, of course, useful, in formulating ideas for new research projects (the way I'd do the resarch if I could start again); in the following section I look at areas that could be profitably explored in future research.

ii. Future Research

There are several areas of interest highlighted by this research which need exploring in further depth. In particular, these include what happens immediately before entry to university or polytechnic - that is, subject choice and admissions procedure - and immediately after: the months and years following graduation. In addition to this, further work needs to be conducted on the relationship between gender and the 'culture' of academic disciplines. The following, then, are indications of areas which might profitably be researched in the future:

a. Admissions

In this study, a postal questionnaire was used to study admissions procedure. Given the limitations of this method, consideration might be given in future to the possibility of participant observation in admissions interviews to examine the process by which candidates are selected for places. Research could also look at alternative ways of selecting candidates; in particular, it may be that certain polytechnic departments have newer and more imaginative ways of choosing students. It might be possible to evaluate the different procedures used by departments in admissions, and therefore to suggest improvements in the admissions system: improvements which would allow for a wider mix of students from different backgrounds.

b. Graduate Employment

The research for this thesis suggests that male and female graduates may be entering different fields of employment, even when they have the same degree qualifications. It is difficult, however, to generalise from such a small sample, and further research is need in two areas related to graduate employment:

i. The kinds of jobs male and female final year undergraduates apply for; their reasons for applying for these kinds of jobs, and the stage at which they made a choice of career (whether, for example, they have changed their minds about the kind of career they want since entering higher education);

ii. The comparative succcess of male and female graduates in their job applications (this calls for a quantitative study); whether employers are specifically looking for male graduates; the process by which employers select graduates for jobs (an interview study and participant observation might be appropriate here.)

c. Gender and Subject Specialisation

This thesis has looked at subject specialisation in higher education. There is a strong need for a study which looks at subject specialisation in secondary school: at the point at which students make their GCSE and A-level choices. (After the core curriculum has been introduced, research will need to be carried out to find out if the pattern of specialisation at A-level has changed.) Research could be conducted which looks, at patterns of interaction not only in the science classroom, but in the French or history classroom; and which looks more carefully and *seriously* at the bases for pupils' subject choice. Researchers should not start from the assumption, as they have done in the past, that subject preferences are merely based on conditioned ideas of what is appropriate for males or females.

d. Ethnographic studies of departments

Closer attention needs to be given to the interactions in higher education departments, and the processes (if any) which disadvantage women. For example, studies of interactions in seminar and tutorial groups could be fruitful, particularly if comparisons were made between all-female, all-male and mixed groups, and between groups led by a female tutor and groups led by a male tutor. In science subjects, the processes of interaction in the labs could be usefully studied. A full ethnographic study might look as well at course documents, the marking of student essays, and the construction of teaching and learning. An observation study of examination board meetings to discuss students' degree classes might also highlight differential attitudes to male and female performance.

e. Curriculum

Finally, attention needs to be paid to the organisation and

design of curricula in higher education. This includes an examination of what is considered to be relevant knowledge, and what is not: the "construction" of discipline. Research could also look at the processes by which curricula are decided upon, and how the inclusion of certain things, and the exclusion of others is justified. In particular, it would be interesting to look at some of the new inter-disciplinary subjects, such as those developing in polytechnics, and the ways in which boundaries between subjects can be blurred, and students encouraged to develop an understanding of the different methods of understanding the world, or approaching problems.

This research has contributed in a small way to our understanding of a much under-researched and under-theorised area. It is to be hoped that new research will begin to fill in the many gaps in the area, and build up a body of knowledge about the experiences of women and men in higher education.

028

1

ADMISSIONS PROCEDURE IN UNIVERSITIES : QUESTIONNAIRE

		For Office Use Only CC
QUESTIONNAIRE NUMBER		1,3
Card Number	1	4

A The Post of Admissions Tutor

1 What is the procedure for deciding who shall be the admissions tutor?

2 Do you work

a) Alone	1	5
b) In conjuction with other members of the dept	2	

B Attracting Students to the Course

3 What publicity material is used to attract students to the course?
Please ring as many as are applicable.

	Yes	No	
a) Leaflets	1	0	6
b) Prospectus	1	0	7
c) UCCA handbook	1	0	8
d) Posters	1	0	9
e) Other publicity material (Please specify)	1	0	10

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4 How is publicity material distributed? Please ring as many as are applicable

	Yes	No	
a) At Open Days	1	0	11
b) Visits to schools	1	0	12
c) Libraries	1	0	13
d) Mailing lists	1	0	14
e) Other (please specify)	1	0	15

5 Who do you hold Open Days for? Please ring as many as are applicable

	Yes	No	
a) All applicants	1	0	16
b) Successful applicants to whom offers have been made	1	0	17
c) All applicants interviewed	1	0	18
d) Sixth formers interested in applying	1	0	19
e) Special interest e.g. Careers teachers; overseas students, girls into science and technology (please specify)	1	0	20
f) Other (Please specify)	1	0	21

6 Is any of your publicity material aimed at any particular group of people? (e.g. Overseas students, mature students). 22

Yes	1	
No	2	

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7 If Yes, please specify.

.....

C Numbers of students applying

8 How many students apply to the department annually?

For entry in

1984	Male	☐☐☐	23,25
	Female	☐☐☐	26,28
1983	Male	☐☐☐	29,31
	Female	☐☐☐	32,34
1982	Male	☐☐☐	35,37
	Female	☐☐☐	38,40
1981	Male	☐☐☐	41,43
	Female	☐☐☐	44,46
1980	Male	☐☐☐	47,49
	Female	☐☐☐	50,52

4

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9 How many of these did you make offers to?

For entry in

1984	Male	☐☐☐	53,55
	Female	☐☐☐	56,58
1983	Male	☐☐☐	59,61
	Female	☐☐☐	62,64
1982	Male	☐☐☐	65,67
	Female	☐☐☐	68,70
1981	Male	☐☐☐	71,73
	Female	☐☐☐	74,76
1980	Male	☐☐☐	77,79
	Female	☐☐☐	

Card 2

	QUESTIONNAIRE NUMBER		1,3
	Card Number	2	4
1980	Female	☐☐☐	5,7

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10 How many students were finally admitted to the course?

For entry in

1984	Male	☐☐☐	8,10
	Female	☐☐☐	11,13
1983	Male	☐☐☐	14,16
	Female	☐☐☐	17,19
1982	Male	☐☐☐	20,22
	Female	☐☐☐	23,25
1981	Male	☐☐☐	26,28
	Female	☐☐☐	29,31
1980	Male	☐☐☐	32,34
	Female	☐☐☐	35,37

11 Of these, how many students were admitted through Clearing?

For entry in

1984	Male	☐☐☐	38,40
	Female	☐☐☐	41,43

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11 (Continued)

1983	Male	☐☐☐	44,46
	Female	☐☐☐	47,49
1982	Male	☐☐☐	50,52
	Female	☐☐☐	53,55
1981	Male	☐☐☐	56,58
	Female	☐☐☐	59,61
1980	Male	☐☐☐	62,64
	Female	☐☐☐	65,67

D Entry Requirements

12 If you specify particular A-level subjects for entry to the course, is the requirement ever waived?

Yes	1	68
No	2	

13 If Yes, under what circumstances?

.....

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14 Do you have a standard offer to applicants?

Yes	1	69
No	2	

If Yes, please answer questions 15-18; if not move on to question 18

15 What is the current standard offer?

.....

16 Is the standard offer ever relaxed?

Yes	1	70
No	2	

17 If Yes, under what circumstances?

.....

18 Is the standard offer made:

	Yes	No	
a) to all candidates who apply	1	0	71
b) all candidates who seem suitable from UCCA form	1	0	72
c) selected candidates after interview	1	0	73
d) combination of b) and c)	1	0	74
e) Other (please specify)	1	0	75

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19 If the course does not have a standard offer, what criteria is the eventual offer based on?

Please ring those applicable	Yes	No	
a) Interview performance	1	0	76
b) Headmasters' recommendation	1	0	77
c) O-level grades	1	0	78
d) Expected A-level grades	1	0	79
e) Other (Please specify)	1	0	80

Card 3

QUESTIONNAIRE NUMBER 1,3

Card Number 3 4

20 Are applicants sometimes admitted with lower grades than they were originally offered?

Yes 1
No 2 5

21 Are there any special circumstances in which the entrance requirements may be either considerably reduced or removed altogether?

Yes 1 6

No 2

22 If Yes, what are they?

.....

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23 During the past five years, has there been any major change in admissions policy (e g. raising entrance grades, a change in the subject required)?

Yes	1	7
No	2	

24 If Yes, what was the change?

.....

E Clearing

Please answer this section if any students are admitted to the course through Clearing.

25 If the course has a standard offer, is it still a basic requirement in Clearing?

Yes	1	8
No	2	

26 If no, is a minimum offer still kept in mind in Clearing?

Yes	1	9
No	2	

27 Is there anything you look for in candidates through Clearing not normally taken into consideration during the application process? e.g. Do you try to get a more equal ratio of male/female students, students from different backgrounds or students with unusual qualifications

.....

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