science for PEOPLE

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PHD

BSC

technician

NRC

junior technician

A LEVEL

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HEY-LETS PLAY SCIENTISTS

WOMEN'S COLLECTIVE ISSUE
We are Anne Cooke, Zoe Fairburns, Dot Griffiths, Brigid Hogan, Zoe Reed, Hilary Rose, Esther Saraga, Li Shen, Lesley Walker, Judith Walker, Nancy Ann Worcester.

We share a number of concerns. We have all experienced science as a sexist activity, and are concerned to articulate and attack the sexist dimensions of science. We feel that women are particularly vulnerable to exploitation by appeals to scientific expertise, because they tend not to understand very much about science. We therefore intend to make an attempt to demystify science as it affects women. Finally we believe that the Women's Movement is itself inconsistent in its attitude towards science and technology, and we should like to initiate a more balanced discussion of their potential contribution to our liberation.

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ABOUT THIS ISSUE

STATEMENT

BY THE

COLLECTIVE

This issue has been produced collectively. Consequently in opposition to the individualism and competitiveness of science under capitalism the articles have been written by the group as a whole, and we accept collective responsibility for them. Working together in a collective is to create a new learning process in which we learn to share, rather than to appropriate knowledge as part of the pursuit of personal careers. We are not utopians, all of us earn our living, working in deeply hierarchical, class divided, racist and sexist institutions, nonetheless we believe that our political practices should develop new structures and new social relationships. As a collective of women we are devoting this issue of Science for People to beginning the overdue analysis of the position (or rather the exclusion), of women in science, and the ways in which science adds ideologically and technology to the oppression of women.

Over the last decade the radical movement of scientists has moved from a concern with the abuse of science, to a critique of science under capitalism. The movement began by trying to understand why horrors such as atomic, biological and chemical warfare, and DDT pollution had been produced, and attempted to explain the appearance of such abuses in terms of either ignorance, or accident, on the part of those who applied science. When the implications of this argument were explored more carefully it was recognised that the so-called abuses of science were neither accidental nor the result of ignorance. Instead they are the logical consequences of the deliberate and systematic manipulation of science by one group, the ruling class, to further its own interests against those of the majority of the people. Since then the radical critique of science has begun to examine the manufacture of scientific knowledge, and to document the ways in which class and racist values have penetrated the knowledge-system itself. The 'neutrality' of science has thus come into question. Some 80% of the scientific activity in this country is financed, and hence owned and controlled, in the interests of industry and the military complex who use it to develop ever more lethal and repressing technology, to produce a growing array of consumption goods, which all too often make no contribution to the satisfaction of real human need. Similarly the race and IQ campaign has shown how science is being used, by the same class, to justify the apparent inferiority of certain racial groups.

What the male-dominated radical critique has hitherto ignored, and what this issue of Science for People is concerned to do, is to examine the sexist dimension of capitalist science.

WOMEN IN SCIENCE

Women in science rarely work as scientists, more commonly they work as technicians, secretaries and cleaners, their work in the laboratory echoing the unpaid service work they perform within the family. For the mass of women, whatever paid jobs they hold, have also as a primary occupation under capitalism, unpaid domestic labour within the family. When she works in the factory or the laboratory it is a second occupation. Thus almost all women are engaged in housework: caring for children, preparing meals, cleaning the laboratory, mending clothes, shopping, and creating an environment of affection where the worker can renew himself and future workers be satisfactorily reared. While the level of domestic technology has in some wealthier countries modified the gross burden of the labour, nonetheless it does not modify the essential nature of the work, nor has it changed the uneven share of the burden borne by women. Research carried out in both state socialist and capitalist countries shows that women in full-time employment and with families do twice as much domestic labour as against men similarly situated.

Thus for all women, work outside the home means double labour and double oppression. Nevertheless an increasing number of married women are seeking to enter the labour market, driven by economic pressure and the desire for some personal independence. Given this drive we must ask, why there are so few women working in the laboratories as scientists, and why even when they have become scientists, why so few are in the 'elite' strata of science as research directors, university professors and so forth and why even fewer achieve scientific 'eminence'.

If the question is asked 'why don't blacks do science' and is answered in terms of the congenital inferiority of blacks, most of us recognise that we are discussing scientific racism, and that while it is necessary to defeat the racist science, we also seek to understand the significance of the question being put at a particular historic time, yet if the question Why Don't Girls Do Science? (see article) is asked, it is all too often seen as an interesting scientific issue and not recognised as scientific sexism. Nor is the social significance considered at a time when capital wishes to force part of its 'reserve labour' back into the home. Our article discusses the way complex social issues are depoliticised through being reduced to biological problems. We also go onto examine the social pressures which discourage women from entering science: a socialisation which conditions them to under-achieve in science and image (and reality) of science as a male activity.
Male professor to female candidates for a technician’s post: “You’re female, married and you’ll probably have children, why should I employ you?”

It concludes with a discussion of the conflicts which a career in science poses for women and some of their experiences.

Another aspect of this experience, that of the sexual and power relations between men and women scientists is described in the piece, *Power and Sex in the Laboratory*.

Some of these problems are to do with the overt sexism of science and its practitioners, others are to do with the internalised subordinate feminine ideology of women. These problems are exacerbated by inadequate socialised care for children (see *The Political Implications of Creches*). Unless the liberation of women is merely to mean double labour for women—and poor care for the children—the demand for creches and nurseries becomes a precondition for liberation. However in the present situation when capitalism does not need so many scientists, there will be an attempt to persuade male scientists (and some will not need much persuading) that a creche is a luxury, after all it keeps the size of the competition for jobs down. For this reason we have given space and priority to a discussion which affects all women and their children.

**SCIENCE AGAINST WOMEN**

The sexist nature of science is also revealed in the way in which science is used against women. We are, for example, faced with ‘scientific’ biological studies which suggest that through our menstrual cycles we are victims of hormonal vagaries which render us unable to hold responsible jobs, (although they do not prevent us from labouring on the factory floor, at the typewriter, or in the home). Science, that paragon of rationality and hence of objectivity, is thus used in capitalist society to justify the inferiority of women and our continued oppression.

Our article *Women, Food and Nutrition* discusses the vulnerability of the woman to manipulation by the food industry through her responsibility for her family’s nutrition. The daily interaction of women with food and the food industry places us in the heart of a contradiction. Thus the woman with a new baby who perhaps would like to breast-feed it, is faced with the pressures from the dried milk merchants who somehow suggest that their milk is better for the child, and also from a male-dominated culture (see the adverts) which treat breasts only as sexual objects. Problems of ‘obesity’ and ‘anorexia nervosa’ have their origins in similar contradictions.

From most of the literature on industrial health hazards it would appear that within the home the workers are sexless, and that within the factory they are all male. The relationship between the manufacture of femininity, the concrete risks of domestic labour and those facing women in paid employment are singularly unexplored. We have made a start with *The Hazards of Home and Women at Work—Women at Risk*.

**THE TECHNOCRATIC THREAT**

The technocratic tendencies of this society have been well-documented by the radical critique. What it has failed to recognise however, is that the technocracy is male-dominated, and that women are invariably amongst its victims.
nuclear power or a new soap powder. For women as the official consumer for the family, this means that when men in white coats appear on the TV flashing enormous test-tubes telling us that this is the wonder new ingredient 'X' (which looks like white chalk), we believe them and docilely buy some next day. If women understood more about science such manipulation would be less easy.

To understand why a technocracy is possible, in addition to recognising the role of the production system and its social relations we must also examine the educational process. Science, as taught in most schools, appears to many pupils but especially to girls, as a subject which is difficult, boring and unrelated to the world in which they live. The 'science of common things' does not get taught. Consequently most people leave school with an image of science as an esoteric and distant activity. It is this mystification of science, together with its impressive jargon, which provides the foundation for the cult of the expert on which the technocracy depends.

Specialist science education is insidious in other ways. It reflects the hierarchical and authoritarian institutions of capitalist societies. It is dogmatic. Students 'learn' by sitting at the feet of learned—and almost invariably male—professors, whose words of wisdom they are expected to regurgitate faithfully at regular intervals in a series of hurdles known as examinations. Criticism is allowed but only within narrowly constrained boundaries. Students are eventually allowed to challenge accepted ideas for this is how science develops. But they can never challenge the identification of important areas for scientists to work in, or the social context in which their work is conducted. These are problems of 'value' and

as such, are carefully defined as outside the scientist's concern. Science education is thus ideological for it instils into its recipients the notion of the value-neutrality of science, making a rigid distinction between the realm of 'fact' and the realm of 'value'. It thus aims to produce the acquiescent cogs who will work on biological warfare or on producing consumer goods which consumers don't need, and who will never question the nature of their work.

THE TASK BEFORE US

To combat the problems which women experience in science, and at the hands of science, it is not enough merely to try to reform certain aspects of the educational process so that women are no longer encouraged to under-achieve. Nor is it sufficient to redirect scientific research so that it is no longer used oppressively against women. The position of women in science can only be changed by changing the position of women in society as a whole. And the sexist nature of science, as with its class and racist nature can only be changed by a fundamental re-orientation of science itself. We live in a capitalist society, and are faced with a capitalist science. The problems we discuss in this issue of Science for People are all manifestations of this situation. Our task therefore, is to work for the creation of a society in which sex, race and class no longer divide humanity, in which hierarchy, authoritarianism and competition are replaced by collectivity and co-operation. That is, for a socialist, non-sexist, non-racist society in which we can begin to build a science which serves the needs and interests of all people.
Did you know that: in 1971 the ratio of men to women doing physics at O level was 4:1, at A level 5:1, and at new graduate level 7:1?

By 1973–4 at the Imperial College of Science & Technology out of an undergraduate population of 2,619 there were just 267 women.

There are 5 male doctors for every female doctor, 16 male chemists for every female chemist, but only 1-6 male laboratory technicians for every female technician.

Are these figures a reflection of ability differences between women and men or are they the consequences of social and economic forces which discourage women from entering science? Psychologists have only recently become interested in sex differences. Early IQ tests, for example, were actually constructed to remove any sex differences in the final scores, since these were assumed to be due to environmental factors. So what accounts for the sudden interest, in the last few years, in sex differences and intellectual abilities?

This sudden interest may not be unconnected with the current recession which capitalism is experiencing. In a period of unemployment women are to be discouraged from seeking employment outside the home; hence the value of productivity. This may explain cuts in spending, for example, less science for girls.

From studies of intellectual abilities it has been concluded that girls excel at verbal skills whereas boys excel at spatial skills (the latter being assumed to be important for achieving success in science, although little research has been done on this). This difference is generally interpreted as purely qualitative - females and males are 'equal but different'. More thorough study, however, has shown that the term 'verbal' is misleading. Girls are only better at the aspects of language (grammar, spelling, punctuation etc) and at verbal fluency (that is, they talk more). Boys are better at all kinds of 'reasoning' including verbal reasoning. More generally, one reviewer has described female skills as those requiring 'little or no higher thought processes and no insight', whereas male skills require 'extensive use of higher processes of thought' - which is roughly translatable as 'women are inferior to men!'

Clearly these differences do exist in the sense that girls and boys on average perform differently on certain kinds of tests. The differences are attributed purely to ability - virtually no attention being paid to other factors which influence test scores such as anxiety, motivation and expectations. This is not surprising since the aim of this recent work (by Hutt and Gray in particular) is to show the biological determination of these differences and to explain them in evolutionary terms, i.e. they are said to have adaptive significance in terms of female and male reproductive roles (female superiority in linguistic ability is said to arise from the need for the growing infant to be exposed to an adequate linguistic environment; while male superiority in spatial ability is due to the male's role in dominance interactions and his role in protecting the group).

This work is open to criticisms on a number of levels; for example, it contains many ad hoc assumptions, it uses extrapolations from animal studies, and a wide variety of measurements are used. More generally, like all 'biology versus culture' debates it assumes that the relative contributions of biology and culture can be distinguished, and worse still, fails to recognise that human beings are social animals and that all behaviour takes place within a social context, and thus that social and biological factors interact in a complex way in their effect on the developing child.

The emphasis on biological determinism has often obscured the large overlap in the test scores of girls and boys. It is clear that ability differences alone could never account for the small numbers of girls doing science. It has been estimated that, if spatial ability were the sole criterion, only 1/130 of the test scores of boys and girls could provide a useful justification for selective cuts in spending, for example, less science for girls.

"WOMEN ARE EQUAL BUT DIFFERENT"

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SOCIALISATION AND SCIENCE

The stereotype of 'femininity' (passive, dependent, emotional, interested in people rather than things) is in direct conflict with the stereotype of a scientist (male, rational, persevering, unemotional, interested in things rather than people).

The socialisation of women is well-documented elsewhere. At this juncture we would simply wish to emphasise those factors which are particularly important in drawing girls away from science. For example, look at the toys children are given - dolls for girls and Meccano sets for boys. Children's reading books are sexist in content and exactly the same is true of science text-books. Boys are shown doing things while girls passively watch. Boys predominate in the illustrations and one book, describing balance by the use of a see-saw, actually used two girls to balance one boy.
In childhood male activities are preferred, and the male role is seen as more prestigious by both sexes. Girls internalise their feelings of inferiority, and femininity is associated with low self-evaluation. This is especially the case with scientific activities. Torrance examined the performance and attitudes of 10-12 year old girls and boys in an experiment involving the use of scientific toys. Many of the girls shrank from participation and the experimenters frequently heard the comment, "I'm a girl, I'm not supposed to know anything about science". As a result the boys performed better and both sexes evaluated the boys' performance higher. This research was done in the post-sputnik era when, unlike the present, there was a great deal of concern to encourage more people, regardless of sex, to enter science. The results therefore caused concern and both parents and teachers adopted a more positive approach to girls and science. A year later the children were retested. This time girls and boys performed equally well and the girls enjoyed the task as much as the boys. However, both sexes evaluated the boy's performance more highly.

This devaluation of female achievements continues into college. College women attach a lower value to articles attributed to women (although it is significant to note that children of employed mothers are more egalitarian in their attitudes to sex roles, and these women are less likely to down-grade articles attributed to female authors).

Up to adolescence girls perform as well, if not better, than boys in school, but in adolescence and adulthood women experience a direct conflict between academic and vocational achievement, and not a successful femininity. As a result the majority of women underachieve relative to their academic ability. They show clear signs of 'fear of success', the need for social approval, and defensive reactions to achievement in traditional male spheres such as science.

**BEING A WOMAN IN SCIENCE**

So what kind of experiences do the few women who manage to become scientists have? They face a number of problems: they find it difficult to get themselves taken seriously,

- Male interviewer to female candidate for industrial sponsorship: "We didn't intend to consider you for sponsorship, we only invited you to interview so that we could see what a woman who wanted to be an engineer looked like."

they experience social isolation from their male peers, they get poorer jobs, and they meet major difficulties if they wish to combine their career in science with having kids.

Male scientists find the idea of women scientists amusing. We are treated as sexual and social objects who are incapable of having ideas—'cos women don't have the proper minds for science, do they? The experience of being a woman scientist is most poignantly summed up in this quote from a woman who wanted to be a theoretical physicist.

"When I turned in particularly good work it was suspected, indeed sometimes assumed that I had plagiarised it. On one such occasion I had written a paper the thesis of which provoked much argument and contention in the department. This I learned, by chance, only several weeks after the debate had been ongoing. In an effort to resolve the paradox created by my results, I went to see the professor for whom I'd written the paper. After an interesting discussion, which did incidentally resolve the difficulty, I was asked innocently and kindly, where I had taken it from."

Another experience which women in science encounter is what has been described as "the sea of seats". You go into a lecture and sit down and find that none of the seats in your immediate vicinity are occupied. Your male colleagues treat you as if you have some kind of infectious disease. They find it difficult to discuss work with you because you are, by definition, their intellectual inferior. If you're accepted as an intellectual equal then this occurs at the expense of your femininity, you must become an honorary man.

Women scientists, we shouldn't be surprised to learn, find it hard to get 'good' jobs. We've done some work on women with medical degrees and found that although women on average perform better than men in their undergraduate
courses and receive a disproportionately high number of awards and honours, this good academic performance seems to bear little relation to their prospects after graduation. All the surveys of women in medicine show that the great majority of them end up working as GPs in public health or in family planning. While these are areas in which women find it easiest to combine family and professional responsibilities, and are areas of medicine of particular importance to women, it is perhaps not without significance that these are also the areas of medicine which hitherto have been most limited in scope and have offered the fewest opportunities.

For women who want to combine a career in science with having a family yet more problems await them. Scientists just don’t nip off and leave their research for a couple of years to have a baby. Making the decision to have a baby in the present context thus means making an implicit decision not to follow a serious career in science. Few women who have tried to do both can speak with anything but bitterness about the struggles which confronted them.

The answer to the question of why don’t girls do science is thus to be found in the female socialisation process which systematically brainwashes women in accepting a definition of themselves as inferior to men, and into accepting a role for themselves as bearers of children rather than as creators of ideas. We are subjected to an educational process which encourages us to underachieve in science (it being an unfeminine activity) and which mocks us, or denies our femininity when we do show an interest in science.

At a drinks session after a scientific meeting a woman was told by a new male acquaintance how much he admired her husband’s brilliant research. SHE is unmarried, DOES NOT have any brothers or namesakes in her academic field, and is one of the very few female Fellows of the Royal Society.

P.S. Fellows is sexist.
POWER AND SEX IN THE LABORATORY

In all technologically advanced countries scientific research is ultimately controlled by the State and large industrial organisations, and scientists are increasingly aware of how their work and their jobs are manipulated and exploited by the forces of political and economic expediency. It is therefore of immense importance that scientists develop a political awareness, and continually question the uses to which their work is put. However, it is not enough just to see things in terms of political or economic forces acting externally to control jobs and research projects; it is also important to be aware of how powerful psychological forces can be mobilised to limit internally our freedom to work and our view of ourselves and others as creative human beings. We feel that little attention has been given to the personal interactions of scientists, their expectations and motivations, and the factors which affect their ability to solve problems and think creatively. In this context it is particularly interesting to compare the ways in which women and men see themselves as scientists, and how they each cope with the problem of fitting into the social organisation of their place of work, such as the research laboratory.

THE PATRIARCHAL HIERARCHY OF THE LABORATORY

Like the family, school and university, and indeed like most other aspects of our society today, the social organisation of the research laboratory is almost always a patriarchal hierarchy. The head of the group is usually a man between 40 and 60, who is married with several children, is often highly articulate and "charismatic", and above all is the originator of several ideas which in their time altered current attitudes to a particular problem. Indeed, groups financed by the research councils are specifically built up around one man and his ideas. Obviously there are cases where the leader of a group is a woman, but at present it is unusual for her to be married or have children or to have the articulate and charismatic personality of the male leader.

This sort of patriarchal hierarchy presents many problems, as well as some advantages, for the younger members of the group and for the leader. The conflicts of interests and emotions so aroused reflect the struggles that go on within the nuclear family and school, and depending on how these past situations were coped with, an individual's present experience may be more or less rewarding or destructive.

For example, to develop new ideas and to question accepted beliefs may be seen symbolically as overthrowing the parental figure, and younger scientists may be inhibited from creative or innovative thought because of the fear of doing this. For his part, the leader may unconsciously discourage new ideas for fear of being displaced. On the other hand, the parental figure may act as a source of inspiration and experience for the younger scientist and a steady foil against which to test out new found strengths. The leader in his turn may obtain pleasure from facilitating the independent growth of his protege(e)s. Almost certainly, at one time or another, these different feelings will be shared by both men and women at all levels of the hierarchy. We feel that in some cases women scientists may interpret adverse experience as evidence for specific discrimination against them as women, rather than as evidence for forces at play within a hierarchical organisation in which siblings both fear and strive to emulate their 'parents', who in turn both nurture and envy their 'children'. Whether these sorts of psychological paradoxes are an inevitable consequence of our basic cultural system is a matter of debate, but it seems clear that the organisation of science as it is today places undue emphasis on competitiveness and rivalry, rather than on other human values.

THE SELF-IMAGE OF WOMEN SCIENTISTS

In this sort of climate both men and women may find creative work impeded, but more women than men will have internalised a whole set of past experiences negating their ability to make decisions, to solve practical or mechanical problems, to successfully challenge male authority or to have an independent career, and this will inevitably add to their psychological load. It is also more difficult for a woman to develop a self-image as both a creative scientist and a complete human being, since success at work tends to make her less desirable as a sexual partner to her male peer group and less able to fulfill her biological creativeness as a mother. This is in direct contrast to the male scientist, for whom success at work can be a remarkable aphrodisiac to female peers and completely compatible with conventional ideas of fatherhood. These conflicts tend to make a woman scientist vulnerable to a subtle kind of exploitation by the patriarchal hierarchy in which she
works. In our experience it is surprisingly common for the male leader of a research group to enter into an extramarital sexual liaison with a female subordinate, such as a graduate student,

"I won't read the next chapter of your thesis until you give me a kiss"—male supervisor to female PhD student.

post-doc or technician. On his part this may be largely a defence against what he sees as the hostility of the younger males, fear of failing creative powers (both intellectual and sexual), and dissatisfaction with his wife and family with whom he cannot share his scientific interests and from whom he has often excluded himself by work. For the younger woman a sexual relationship with her mentor is a dangerous trap. It shelves or even exacerbates the problem of confronting the challenge of independent intellectual development, it alienates her further from her male peers and, contrary to appearances, it does not solve the problem of combining sexual and intellectual creativeness, since the liaison usually denies the possibility of spontaneous companionship and child-bearing. Exploitation of this kind is almost inevitable as long as men find it difficult to accept women as equal partners and to play an active role in family life, and as long as women unconsciously seek out men who can dominate them intellectually, and are themselves hindered from combining family life with scientific work.

Obviously what we have described here (though surprisingly common) is an extreme example of sexual exploitation; it usually takes the form of innuendo and flirtation which are difficult for a woman to ignore since they provide a way of circumventing the aggressiveness or defensiveness of male colleagues. Moreover, in saying all this, we do not wish to deny the difficulties younger male scientists may have in coping with the competitive atmosphere of the research laboratory.

THE "MACHISMO" ELEMENT IN RESEARCH

Another consequence of the patriarchal hierarchy of science is the fostering of what may be called the "machismo" element in research. By this we mean the undue respect which is paid by the scientific community to the articulate and aggressive presentation and manipulation of ideas, and the immediate potency of new techniques. "Penetrating insight", "making a breakthrough" and "probing into the dark" are all things associated with the popular image of a successful scientist and are the essence of what we may call the "masculine mode" of thinking from the linguistic link between sexual and intellectual creativity. The corresponding "female mode" of thinking would include such things as the integration of ideas from many different sources, and the ability to gradually develop a theory over a period of time while tolerating the absence of any immediate and tangible solution. This sort of slow gestation of ideas is less obvious than the dramatic breakthroughs for which most recognition is received, but is no less necessary. In fact, it can be argued that the truly creative scientist must be able to freely combine both modes of thinking.

While the "machismo" element in science stresses the achievements of the individual and technical advances, there is obviously a desperate need for a complete reappraisal of the effect of science on societies, and of the assumption that purely technological solutions to complex medical, biological and social problems are necessarily the most valid ones. Women scientists should be in a particularly good position to fight for such changes in the aims of science rather than seeking to become fully integrated into the pre-existing structure. They must also fight for the breakdown of the hierarchical organisation of science (as well as universities, schools and families) and agitate for a more democratic running of laboratories and a greater understanding of the emotional needs of scientists as human beings.
Political implications of crèches

THE PRESENT

We are faced with the situation now in science, as indeed in all other forms of employment, that equal opportunities and equal job fulfilment are not available to all women, especially those who want to have children. This is particularly marked at the present in scientific research where great significance is placed on one's ability to publish. In a field in which competition is strong and individualistic, a two or three year leave for motherhood, even when combined with keeping up with the scientific literature, is, in reality, a conscious choice never to occupy a serious and responsible position within the field. In order that women should be economically independent, obtaining satisfaction both through work and the family, it is imperative to secure widespread day-care facilities for children. These should be accompanied by flexible hours and employment patterns and a general improvement of many other benefits such as paid maternity leave for both parents and child-care allowances. The achievement of such psychological and economic independence by women should in turn lead to an expansion of horizons and freedom for both sexes.

GOVERNMENT POLICY—FACTS & FIGURES

It is important to examine the present situation in terms of the movement of women into work and the current provision of pre-school care. There was a 76% increase in the 1960's in the number of employed mothers with young children, a continuing trend which has in no way been matched by corresponding expansion of local authority child-care facilities. Government targets of eight day nursery places per 1,000 children under 5 shows clearly that it is not envisaged that crèches will play a significantly larger role than at present in the care of children of employed mothers. This point is further emphasised by a study of the 1973 figures for legal day-care provision in England and Wales.

| Local authority day nurseries | 23,838 places |
| Registered private/voluntary premises providing all day-care (i.e. private voluntary, factory nurseries) | 25,247 maximum number |
| Registered day minders providing full-time care | 57,042 maximum number |
| Total | 106,127 |

When it is considered that in 1971, about 176,000 mothers with over a quarter of a million children under five, were employed over 30 hours a week (Office of Population Census, 1973) it can be seen that the gap to be filled by relatives, friends and illegal child-minders is enormous. It should also be pointed out that existing local authority provision in limited to those cases 'they' recognise as priorities, principally unsupported mothers but even this allocation falls short of need.

The State therefore must make some changes in its attitude towards the family and attempt to lift the unequal burden from women. For as long as women continue to be discouraged from taking opportunities that every man would consider to be his inalienable right, and as long as women continue to be bombarded with statements emphasising their fundamental maternal role on the one hand and the detrimental effects of maternal absence on the other, such government policies as implementation of the Equal Pay and Sex Discrimination Acts will combat only the superficial aspects of inequality.

BASIS OF GOVERNMENT POLICY

How can the existing government neglect of such basic services be explained? Lack of funds is no justification, as the answer is to be found in underlying government attitudes exemplified by the following reports. The Ministry of Health Circular 37/68 tells us that "day care must be looked at in relation to the view of medical and other authority, that early and prolonged separation from the mother is detrimental to the child, that wherever possible the younger pre-school child should be at home with his (!) mother and that the needs of older pre-school children should be met by part-time attendance at nursery schools or classes". Accordingly the Minister saw no responsibility for arranging day care for such children. It was further suggested in a more recent document (Department of Health, 1974a) that "women in particular should be helped to appreciate that staying at home with their children was not a waste of their education and talents". The Plowden Committee (Central Advisory Committee, 1966) "deplored" employed mothers and thought that "it is no business of the educational service to encourage these mothers", that is those who were not obliged to work because of financial need. However, there were no adequate plans to provide for those who did fall into the category of financial need and no estimate of the numbers of children this would involve. It is also interesting that the report recognised that the lack of facilities would inevitably result in the use of less suitable child-care arrangements by many mothers. Statements such as these show adherence to the tenets laid down by the WHO
Expert Committee on Mental Health (1951), one of which was that serious and permanent deleterious effects will result from the use of creches and day nurseries and thus, from maternal employment.

**THE POLITICAL MACHINE**

When it is remembered that the Departments of Health and Education actively sponsored day-care and full-time nursery places in the 1960's to help recruitment of teachers and nurses, the blatant contradiction in the government stance is revealed. Are we to presume that these categories of workers are somehow exempt from those evils resulting from the separation of mother and child for the whole day, or is it just that the governing bodies see fit to waive all controversy in order to combat chronic staff shortage in government services? This mirrors the situation found during the Second World War when it was necessary to mobilise the female work force. Positive propaganda was put out by the State to encourage the use of nurseries. However, at the end of the war the dissolution of these centres was seen as expedient and was rationalised by the use of so-called scientifically proven facts. Popularisations of research saturated in the ideology of the family which were anyway studies of grossly deprived children in institutions, were and still are responsible for much unnecessary anxiety and guilt on the part of many mothers. Such research will be used, or ignored, according to the labour requirements of capital. For instance, in the face of a contracting labour market (including the scientific labour market) where women and men are potential competitors for the same job, such generalisations will be used to substantiate the need for women to stay at home. However, the converse exists where commerce and industry rely on a pool of cheap labour (women), here the introduction and expansion of nurseries is on the increase and has become a business in itself, hence 'Kindergartens for Commerce' and 'Kiddy Kare' (the newest British example of the profit motive moving into the social service sector). Although these company creches alleviate for individual mothers those inadequacies of the local authorities, such facilities bring with them particular dangers. In a situation where there is a combination of weak unionisation and poor state provision, such inducements to work might well be more oppressive than liberatory. For example, (and we quote an opinion expressed in the brochure *Company Day Nurseries*), "Young mothers were sometimes prepared to accept less skilled work rather than vegetate at home".

**IMPLICATIONS OF MATERNAL EMPLOYMENT FOR MOTHERS AND CHILDREN**

Why are an increasing number of women seeking outside employment? Need we contrast the various benefits of going out to work with the economic dependence, low status and isolation of housework, its incessant, trivial nature and the unrelenting demands of small children, resulting in a state where many women live only through the lives of their husbands and children? As families with young children are twice as likely to be in the group living just above the 'poverty' line, a second source of income can be seen as an economic necessity and is also important in a period when all women are looking for some personal independence.

What about the children of such employed mothers? It is clear that we should seriously re-evaluate the evidence for the detrimental effects of maternal employment on children. Most of the researches supposedly demonstrating the effects of such deprivation were not properly controlled. Distinctions were not drawn between the effects of a broken home in general, the low standard of living of the family, and an unfavourable family situation on the one hand, and maternal absence on the other. There has been little comment on the effect of the absence of the father due to work commitment, and indeed how could this be assessed when it is the normal situation in our society. Furthermore there is now good evidence which indicates that where adequate substitute child-care is provided, the children of employed mothers do not suffer (Rutter, 1972; Wallston, 1973; Yudkin and Holme, 1969) and that day-care need not necessarily interfere with normal mother-child attachment. The quality of parental interaction appears to be more important than the quantity.

![Infant-care cartoon](image-url)
Day nurseries ideally offer the child a rich environment with increased companionship, stimulation, interaction, play possibilities and tuition where appropriate. Children in this situation are thus freed from the potentially oppressive effects of unrelieved maternal presence and the isolation of the modern family. However, we should not be complacent about the quality of existing facilities. Inadequate pay scales have necessitated the recruitment of young unqualified staff and lead to a high turnover of trained nursery nurses. The low salaries further discourage entry of men into the profession, especially in a society where they are seen as the breadwinners. This is particularly regrettable since it is becoming apparent that many of the role differences between men and women can be attributed to early socialisation processes. The quality and continuity of care in creches should be helped by payment of realistic salaries and men should be positively encouraged to enter training for posts such as nursery nurses and infant school teachers. Sex role stereotypes might then be broken down and a more balanced attitude to the sexes be initiated at an early age.

Further Reading


THE FUTURE

The acceptance of role divisions on a sexual basis in both the family and society puts the onus on women themselves to bring about a change in their own situation. Adequate provision of satisfactory day-care facilities would go some way in enabling women to change their status and increase their independence. It has been shown that sex role differences are evened out in the homes of employed mothers and both boys' and girls' concepts of the female role are altered. Thus it can be seen that one of the effects of maternal employment would be the gradual movement towards a more equitable society. This alone is not enough, for in most homes at present, when a woman goes out to work she takes on the dual role of unpaid housewife and paid worker (often in boring and unskilled jobs). A system where both parents are employed less than full-time, share housework and childcare and supplement this with pre-school provision would be not only preferable but more liberating on both a particular and universal basis. Moving towards such a system would of necessity lead to a weakening of the oppressive character of the family and to an eventual break in the entire socio-economic cycle with its careerism, exploitation and manipulation.

Further Reading

Confronted in the media with the frightening evidence of food shortages in the third world, the average British family will turn with relief to their own comforting diet prepared with such loving care by Mum. But what really lies behind this cosy picture? On the one hand there is the whole agricultural system of the technologically developed countries by which large amounts of energy, in the form of fossil fuel, are converted with low efficiency into energy in the form of palatable, pre-packaged carbohydrate food. Along with this is the conversion, also with low efficiency and high energy expenditure, of already nutritious protein (soya beans, fish meal, cereal) into animal meat with high status and monetary value within the context of the rigid eating habits of our society. The politics of world agriculture and food supplies are thus closely interwoven with the exploitation of the resources of the third world.

On the other hand, very little attention has been paid to the contradictory nature of a woman’s relationship to the nutrition of herself and others within the technological society, and it is this aspect which we wish to develop further here.

In our society most of our eating is done within the family, and it is generally accepted that the buying, preparing, cooking, serving and clearing away of the food is the sole responsibility of women. It is not surprising, therefore, that food becomes loaded with all sorts of values other than nutritional, and can become both for the woman and those dependent upon her, a very effective means of control and manipulation by virtue of its life sustaining role.

By having to accept responsibility for her family’s nutrition, the woman is placed in a very vulnerable position upon which the food industry has brilliantly capitalised. Despite the fact that excessive protein is broken down by the body and used simply as an energy source, propaganda is directed towards the need for a high protein diet and plays upon a woman’s fear that she may seriously deprive her family if she does not give them plenty of meat. Scientific jargon is used to persuade the woman what to buy, and the mystification involved has gone a long way towards alienating the public from what could be the most relevant and easily comprehensible of the sciences. Thus, the science of nutrition is being used mainly to further the interests of the food capitalists and will be used most effectively against the poorly educated. This, including the over emphasis on expensive protein-rich food, places the heaviest burden on women in low income groups.

Another point to consider is the nutritional relationship between capitalism, the housewife and the medical profession. By placing such emphasis on food consumption, our society has increased the number of people suffering from heart disease, and enormous amounts of money are spent on trying to find technological solutions to what is essentially a social problem. However, the responsibility for planning, buying and cooking the special, and often expensive, diets for people once they have this disease (and other ailments such as peptic ulcers and diabetes) falls largely on the overburdened housewife and mother. Meanwhile, little is done through education and restraint of food advertising to prevent over-eating.

The daily interaction of women to food thus provides a contradictory set of demands and responsibilities. A brief exploration of three topical nutritional subjects—breastfeeding, obesity and anorexia nervosa—provides further examples of how these contradictions can manifest themselves in our society.
BREAST-FEEDING

A massive advertising campaign by producers of artificial milks, confused attitudes toward the feminine body, and general lack of information on the advantages and techniques of breast-feeding have all contributed towards widespread acceptance of bottle feeding for babies. In 1946, it was estimated that 60% of babies born in this country were breast-fed for at least one month; in 1971, studies showed that only 8-14% of babies ever tasted breast milk.

In part this trend away from breast-feeding is due to the increased objectification of the female body. A woman's body is seen as something to stimulate men with—but the stimulation takes place when the female is posing herself in a provocative manner. To switch from using the breasts as 'ornaments' to making them functional causes far too many conflicts for the woman and her man.

Another point to consider is the vested interests of the manufacturers of artificial milk who use scientific jargon to convince mothers that Brand X is as nutritionally good as breast milk. Since no one stands to make money out of breast-feeding it is difficult for the expectant mother to find out the advantages and techniques of breast-feeding, while the virtues of bottle milk are widely extolled. In spite of the manufacturers' emphasis on the healthiness of artificial milks, there are many reasons to question the validity of their claims. Firstly, the use of artificial milk is much more likely to result in infant overfeeding and there is evidence to suggest that once this pattern is set it may lead to adult obesity. Secondly, the salt, fatty acid and sugar contents of most baby milks are radically different from the composition of human milk and the long term effects of feeding these mixtures is not known. For example, a recent study showed that rats weaned on high sugar diets had marked changes in their metabolism (increased blood insulin and triglyceride values) in adulthood even if the diets had only been fed for a short time. In line with the 'more means better' world that we live in, most mothers make up powdered milks too concentrated, which has the effect of dehydrating the baby. The baby cries because it is thirsty, the mother interprets this as hunger and gives more, thus setting up a potentially dangerous feeding cycle. Finally, the rate of infant mortality (including cot deaths) and the incidence of diarrhoea is higher in bottle-fed than breast-fed babies.
OBESITY

Both the occurrence of obesity and attitudes towards body size reflect the dilemma of women and food. On the one hand, they are told that it is their most important responsibility to keep the family well fed (spending a large proportion of their time buying and preparing food provides ample temptation for 'snacking') while simultaneously they are fed the image of the ideal woman as someone who is slim, energetic and youthful.

More women than men are obese (25% of all women are at least 30% overweight compared with 18% of men) and the proportion is highest in the lower social classes. Women are also much more aware and critical of their body size than men; women in the normal weight range are far more likely to over-estimate their weight than men, and those who are overweight are more likely to be aware of the problem and try to reduce. Other comparative studies have shown that obese women are more likely than obese men to regard food as psychologically 'very important' and whereas almost none of the men had noticed an association between anxiety and increased food intake, this was reported in over 50% of obese women.

ANOREXIA NERVOSA

At the opposite end of the scale is the person who feels she must starve herself in order to be thin, and many aspects of this disease illustrate the contradictions in the relationship of a woman to her environment and her own body in our society.

Anorexia nervosa occurs almost exclusively in adolescent girls and rarely in boys. Adolescence is the time in a girl's life when she is first becoming aware of responsibilities of the adult, sexual woman and the constraints of the female role. To an eye which has already been tutored to be aware of any slight changes in her body, the physical changes in adolescence, and particularly menstruation can appear gross and there may be a desire to revert to the pre-adolescent stage. Self-starvation halts menstruation and reduces the body to more acceptable proportions. There is evidence that anorexics consistently over-estimate their body size, while correctly estimating that of others, and only 50% of them actually have any sort of weight problem before the onset of compulsive 'slimming'.

The typical anorexic comes from a middle class family with a domineering mother, who, having come to the realisation that despite her money, education and social class her position is still inferior in the eyes of the world, will try to re-live her life through her daughter. The child will feel smothered and unable to develop in the way she wants to, rejecting food becomes a way of rejecting the mother as well as the role of adult woman. The belief that anorexia is primarily a middle class disease is, of course, open to the criticism that such families are more likely to seek medical help. It is interesting to note that in Italy the incidence of anorexia is increasing as areas become more industrialised and traditional rural patterns are broken down.

Thus, both obesity and anorexia must be recognised as social diseases. Not surprisingly, technological solutions to such diseases have not proven successful since they do not recognise the social causes.

To look at women and nutrition in our society is simply to look at women in yet another contradictory oppressive position under capitalism. We have seen that the science of nutrition, has the potential for being used to cloud the issue and increase oppression, and alone can not solve social problems.
When the 'hazards of work' are discussed the speaker is not usually thinking of the dangers faced by people who work in their own homes. Yet it is the case that the home is five times as dangerous, in terms of the number of people accidentally killed there, as factories and other places of 'real' work. According to the Royal Society for the Prevention of Accidents, twenty people, 13 of them women—die each day from accidents in the home.

Why are our homes so dangerous? Since most homes are looked after by women there must be some answers to be found in women's status, attitudes and abilities, and in the nature of housework. First of all, housework and housewives are INVISIBLE—officially. Housewives are not 'workers' and this prevents serious consideration being given to the problem of accidents in the home. No-one thinks of home as a place of work, or of housewives as workers, with the same needs as other workers for safe equipment, adequate training, and working conditions that make for a safety conscious attitude towards work. If women houseworkers were treated as proper workers they might want pay and time off, and anyway how can anyone contemplate having safety inspectors intruding into the sanctity of the home. Secondly, housewives are UNPROFESSIONAL. Women may be taught a bit of home economics whilst at school but what they don't learn is how to carry heavy bags of shopping without injury, how to wire plugs, the dangers of frayed flex, faulty appliances and so on. Few of the electrical accidents in the home would occur if the person running the home had a basic understanding of how electricity works.

Thirdly, housewives are OVER-WORKED. No factory-working male would tolerate having his children around him while he operated powerful machinery, but in the home, the housewife and mother is expected to combine the rigorous supervision that a toddler needs to keep her safe, with house-cleaning involving toxic chemicals, cooking, furniture moving and general maintenance.

Fourthly, housework is conducive to STRESS, and this causes fatigue and accidents. We aren't suggesting that working in a factory is a picnic, but even the most super-exploited factory-worker has a clocking-on time, clocking-off time, meal-breaks, holidays and a pay packet at the end of the week. And if s/he doesn't like the job there is always the option of changing jobs. The house-worker on the other hand, has been taught that her job is a noble vocation and that she is failing in love and duty if she even thinks about pay or time-off. Thus stress and overwork can't be relieved by, for example, house-workers sharing tasks—to let someone else cook the meal for your family would be a betrayal. Cooking and looking after kids are acts of love, not jobs, and strangers can't therefore do them.

Finally, mothers of young babies simply don't get enough SLEEP—lack of which is recognised as a cause of accidents in factories.

There is no shortage of information on home safety, nor of safe equipment, nor of warnings on the labels of toxic cleaning fluids. Accidents in the home are both mundane and predictable—falls, poisoning, burns, electrocution, cuts—and they ought to be correspondingly easy to prevent. They occur because housewives—house-workers—are being asked to do a job which is complex and demanding. Yet any move for change, be it giving housewives 'worker' status or communalising housework, will meet the resistance of capitalists, who like having their employees serviced at home for nothing, and men who like having their socks washed. It is those who have vested interests in the oppression of housewives who constitute the biggest 'hazard of home'.
When we turn to consideration of women’s exposure to toxic substances, elementary arithmetic will tell us that a lot of rum will have a far more devastating effect on a 100lb woman (or man for that matter) than on a person weighing 200lb. The increased effect may not be as great as double, but it will, nevertheless, be greater. Extending his argument to the ingestion, absorption or inhalation of toxic substances found in the working environment compels me to draw similar conclusions.

THRESHOLD LIMIT VALUES

Identification of toxic substances commonly encountered in the industrial environment has compelled industry to take measures to control their emissions. Because there are so many different substances, of widely varying toxicity, in use today, it has been necessary to attempt to determine ‘safe’ levels of exposure. The Threshold Limit Values (TLV) purports to represent this ‘safe’ level. The TLV of a toxic substance is said to be that level at which it is believed people may be exposed for an eight-hour day, five-day week, year after year, without sustaining chronic systemic injury. TLV’s have been set for about five hundred chemicals to date (current levels are revised and new compounds are added annually), and they are intended, in Britain, as guides to industry (i.e. they are not legally binding).

TLV’s have already been subjected to criticism on a number of grounds:

(1) Much of the evidence for TLV’s is based on short-term, acute exposure and/or subjective, sloppily compiled, ‘medical evidence’. In the Documentary of TLVs... published by the American Conference of Governmental and Industrial Hygienists, there are ‘documented’ TLV’s for forty-five compounds set on the basis of either no scientific evidence or evidence from one research project. (Allyl propyl disulphide is one such compound. Its TLV is that level which does not cause crying in an onion factory!)

(2) Economic considerations very often take priority over health considerations, i.e. it may be seen as ‘economically impracticable’ to reduce exposure to a medically safe level, so the TLV is set at a level which can be attained without spending too large a proportion of the company’s profits. An example of this may be seen in the unwillingness of authorities here to lower the TLV of vinyl chloride to 1 ppm (in line with the USA). An American occupational hygienist recently commented: “These (TLV’s) are political decisions, hopefully with some scientific import once in a while”.

(Dr R. Henderson, addressing the 32nd conference of the British Occupational Hygiene Society.)
The absurdity of the TLV's is further accentuated when one sees that they have invariably been set on the basis of studies examining only the male sector of the workforce. Such values are automatically applied to women. The fact that women are, on average smaller than men, and will probably, therefore, suffer greater ill effect, is almost totally ignored. (There is one exception: legislation prohibiting the employment of women and 'young persons' in processes involving the use of lead and its compounds was introduced in the early part of the century.)

The legislator may argue that as increased susceptibility of women to toxic substances has not been 'scientifically' demonstrated, he sees little impetus to introduce wide-ranging, differentiating legislation. A moot point, particularly when one realises that many of the present TLV's have not been scientifically established! It may be further argued that, when one examines the few reports in the scientific literature which have compared the effects of toxic substances in women and men, one finds evidence which demonstrates just such an increased susceptibility. Trichloroethylene, asbestos and formaldehyde may be taken as examples.

Trichloroethylene (trike) is a widely used industrial degreasing solvent. A recent publication has reported that women constantly exposed to trichloroethylene at levels (40 ppm) well below the present TLV (100 ppm) may sustain chronic poisoning.

A study of the mortality of female asbestos workers in Britain reported excessive cancer rates amongst female workers compared with male workers, the authors concluding that possible differences in smoking habits may not account for this observed excess. (Asbestos has been widely used as an insulating material for many years—substitutes are presently being introduced.)

Women are reported to be approximately three times as susceptible to the toxic effects of formaldehyde as men. (Formaldehyde is widely used in the textiles and plastics industries, and as formalin, finds wide usage as a preservative in laboratories.)

There are other substances which have been identified as causing gynaecological disorders. Amongst these we find styrene, carbon disulphide, benzene-based compounds, trinitrotoluene (TNT) and synthetic hormones (inhaled by women engaged in their manufacture).

But what about other, commonly used, toxic substances? The possibility of differential susceptibility in women has been ignored by researchers—as a consequence, it has been ignored by employers and legislators.

It is almost certain that this ignorance has been quite deliberate. In many industries, women comprise a much smaller proportion of the workforce, so that a researcher would have to either ignore the female component completely, or, in order to find a representative sample, cover a number of like work situations. The latter course would generally involve more time, expense and energy, so the researcher has almost invariably opted for the former, more expedient alternative—a fine example of scientific irresponsibility!

THE PREGNANT WOMAN....

Surely, one may ask, there are legislative provisions protecting the pregnant woman at work, for she is in an even higher risk category. There certainly should be such provisions but there are not—as far as the authorities are concerned, pregnant women do not exist!

It is estimated that approximately twenty percent of all birth defects are due to hereditary factors, twenty percent due to environmental factors and sixty percent due to a combination of these. That is, environmental factors are believed to play a major causative role in eighty percent of all birth defects.
There are three basic categories of environmental agents which may cause such teratogenesis:

1. **Physical agents**, e.g. ionising radiation.
2. **Chemical agents**, e.g. pharmaceutical preparations and other toxic substances, and
3. **Biological agents**, e.g. infectious bacteria, viruses and parasites.

1. Fortunately the risks to the foetus from ionising radiation have been recognised to some extent. These risks may be twofold. An acute, high dosage of ionising radiation may directly produce damage to the foetus. Long-term exposure to low doses may produce mutations which may not become evident for generations. With regard to these risks, women are well-protected, but only from the latter whilst they are pregnant. The risks from long-term low doses are the subject of controversy, some experts believing that such exposure may produce transmissible genetic mutations in men and women.

It is also thought that chronic exposure of pregnant women to low-frequency vibration and certain types of noise may result in retardation of foetal growth. (2) By 1946, the following chemicals and classes of chemicals were amongst those believed to be hazardous to the foetus: aniline, benzene-based compounds (benzene’s homologues, toluene and xylene are widely used as organic solvents in laboratories), carbonate compounds, carbon disulphide, carbon monoxide, chlorinated hydrocarbons (e.g. chloroform, vinyl chloride, trichloroethylene, perchloroethylene, 1, 1, 1-trichloroethane, chloroprene, diazo dyes, lead and its compounds, mercury and compounds, phosphorus, phthalic acid esters and sodium arsenate. The list of known teratogens is now much longer. Fortunately, some of these have been shown to be carcinogenic and have been replaced, but authorities have continued to ignore the risks teratogens pose for the unborn.

Examples of miscarriages, stillbirths and congenital abnormalities resulting from exposure to some of these compounds are numerous. Carbon monoxide has produced foetal deaths, chloroform may induce miscarriage at twice its TLV (and such excursions are not uncommon occurrences), vinyl chloride has been implicated as having caused congenital abnormalities. (A scientist recently claimed that vinyl chloride was responsible for an increase in birth defects in a population living near a PVC plant. Others have reported a higher incidence of abnormalities in children born to wives of PVC workers.) Nurses exposed to anaesthetic gases in operating theatres show a significantly higher rate of spontaneous abortion than nurses who are not so exposed.

3. Hospital and laboratory workers may come into contact with infectious agents, and there are many which are known to cross the placenta and cause foetal infections. Viruses such as rubella, infectious hepatitis, viral pneumonia, infectious mononucleosis, and influenza may serve as examples. All of these have been associated with foetal malformations.

A study, published in 1946, had the following to say about the pregnant worker: "It would seem that any chemical substance which is capable of producing a harmful effect on the internal systems of the body would be of greater danger under these conditions... pregnant women should not be allowed to work at occupations involving exposure to harmful chemical substances which produce systemic damage, anoxaemia, irritation of the respiratory tract and the like. Because these substances may affect adversely the pregnant woman or the foetus, the concentrations usually accepted as allowable should not be considered safe for pregnant women." (Baetjer, A.M. Women in Industry. Saunders, Philadelphia, 1946, p.186.)

The recent Thalidomide tragedy has highlighted the rights of the unborn to be protected from injury. It would not be beyond the bounds of possibility for an employer to be sued for damage occurring to the foetus via unwitting exposure of the pregnant mother to a teratogenic substance.

Legislation prohibiting exposure of pregnant workers to teratogenic agents cannot be seen as sufficient, or, for that matter, wise. Many women are unaware that they are pregnant for one to two months (in some cases still longer) and it is during the first trimester that the risk of damage is greatest. If the toll of congenital abnormalities is to be reduced, there are two basic alternatives:

1. All women of child-bearing age must be made aware of the dangers and, where pregnancy is not contemplated, be permitted to work in the contaminated environment. Such women would have to be assured that if accidental pregnancy occurred, they may have it terminated at the state's expense. If these women decided, at some later stage, to conceive, there should be provision for them to be transferred to an environment free from the risk of exposure to teratogens.

2. Women of child-bearing age must be prohibited from working in an environment which may be contaminated by teratogenic substances.

In both cases, the working environment must, in addition, present only minimal risk of exposure to any other toxic substances. However, in order to protect both equality of opportunity and the potentially pregnant woman, the industrial environment would have to be completely free from the risk of exposure to any toxic substances—an impossible ideal given the present state of industry.

Whether or not the women concerned are capable of falling pregnant is beside the point. The fact that women are both physically and biologically different from men demonstrates the absurdity of applying the current TLV's to them.

If the health of all people at work is to be protected, then TLV's will have to be set at truly safe levels, levels which are determined from the results of long-term research into the effects of toxic substances on both sexes. Mortality and morbidity studies should examine sufficient numbers of women as well as men. There is no room for lazy research and negligent legislation where the health of people is concerned. Until these measures are taken, women at work will remain women at risk.

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*Sisterhood is powerful.*
What's a man doing writing in the 'women's issue' of *Science for People*? I'm not sure that I know the answer to that myself. In my own defence, I could say that the Women and Science collective did invite me to contribute an article. And now I'm in very real danger of power-tripping (a common male pastime!)

So I'd like to state quite categorically that I do not believe that having been invited to contribute confers on me the status of being an 'OK' male scientist. On the contrary, I believe there is no such thing. All men are sexist and will continue to be so until the last male privilege has disappeared. Each one of us must constantly struggle with himself, must critically re-evaluate his thoughts, feelings and actions and where necessary, change them.

If we are going to be really sincere about trying to throw off our role as oppressor, it is not enough to proclaim ourselves socialist. We must listen attentively to the voices of the oppressed, not so that we can dismiss their subjective experience as diversionary or paranoid or exaggerated or mistaken, or to rationalise it away, or to accuse them of lacking a sense of humour, but in order to understand what they are saying, to see ourselves and our actions through their eyes. And perhaps we shall then begin to see our real selves (and this may come as something of a shock to most of us!)

**SEXISM**

We must listen to the poor, the blacks, the colonised, the exploited, the young, the old, the infirm, the powerless and above all, we must listen to our sisters because we have exploited and colonised them throughout recorded history and in every place on earth. One of our major weapons in this oppression has been science. And who better is there to "tell it like it is" than the women who have experienced that oppression at first hand?

But women's contribution to science will not only be that of pointing out what we're doing wrong. If we watch carefully we may discover that the traditional ways we have of doing things are not the only ways nor are they necessarily the best ways. If we can restrain our scepticism and our patronage and avoid passing judgement and enforcing our standards we might learn from women a new and better way of doing things.

It is not that we men have got science mostly "all sewn up" and that we think that women in science may be able to fill in a few of the remaining gaps. Rather I feel that we men have been responsible for developing a technology and a philosophy of science which is elitist, impersonal, anti-human, oppressive, and which we mistakenly believe to be serving our own culture, class and sex interests.

The full participation of women in science on their own terms is essential if a new science is to emerge—only then may we begin to achieve a true people's science, a life-oriented science, a humane technology. And only then will we be able to achieve a truly socialist society.

ARYÉ
local groups

meeting

Road and rail services into Sheffield managed to cope quite admirably with the throng of people surging into the city (well about 30) to attend the Local Group's meeting on 23-24th March.

On Saturday reports were received from the following Local Groups: Brighton; King's College, London; Brunel; Canterbury; Cambridge; Manchester; Glasgow; Edinburgh; Middlesex Poly; Sheffield; and the London office (which come to think of it probably doesn't qualify as a Local Group). There was a discussion on the role of the National Committee and the difficulties which non-London based members' experience in getting to its meetings, because they are held early evening and mid-week. This prevents most Local Groups from being able to participate effectively in decision-making. It was suggested that perhaps the structure of BSSRS should be changed in some way in order to reflect the increasing strength of the local groups and to increase their level of participation.

There was a discussion on the situation in Northern Ireland with some representatives from the Troops Out movement.

Sunday was given over to a Day School on Industrial Health. Poly Vinyl Clutterbuck (also known as Charlie) and Tony Fletcher gave an introductory talk on the problems associated with the determination of Threshold Limit Values for exposure to toxic substances in the workplace, noise pollution, and the role of the Factory Inspectorate. Local Groups with some experience of occupational health activity spoke about the problems they had encountered in presenting information to workers. Lab Safety was also discussed and it was generally agreed that the subject is characterised by a lack of information. The Day School concluded with an examination of the new Health and Safety at Work Act.

The next Local Groups meeting will be held in Manchester. Many thanks to Ellianne, Simon and Richard for lending their house for the Sheffield meeting. A more detailed report on the meeting is available from the London office.

next

issue

Science for People: Local Groups Issue

The next issue of Science for People is being produced by the Local Groups. John Le Corny is acting as co-ordinator. If you want further information about the issue, or can offer contributions he can be contacted at 14 Goodwin Road, Sheffield 8.

SOCIAL RESPONSIBILITY

FOR PEOPLE AT WORK

This article is written on behalf of a number of final year Mechanical Engineering students at Imperial College. As the year has progressed it has become obvious that there is a body of opinion amongst us that was not wholly satisfied with what we saw as our intended role in industry. Talking about problems is always useful, but there comes a time when the only way to maintain one's conviction is to do something, and this is an explanation of what is wrong and what we are trying to do.

We feel that the problem is best summarised by saying that, in general, there is insufficient consideration in industry (and the educational system) for the political, social, human and ecological consequences of Science and Technology. Now this in itself is not a startling new revelation but it is we who are being trained to perpetuate and perfect this state of affairs. We are aware that, of all people who could exert useful and properly directed pressure we would be the best equipped.

The process of evolution of our scheme can be summarised in a list of points:

- Although technologists of all disciplines can often see the problems and consequences of Science and Technology, they lack organisation and political muscle to implement their solution.
- The currently recognised organs of the engineering world, the Institutes, are ineffectual politically because of their charters which debar them from political activity. This is because they are registered as charities.
- The lack of engineers in the membership of BSSRS indicates that it does not cater for the industrial problems that we would be concerned with. For example, they can push for control of genetic engineering whilst we concentrate on attacking "built in obsolescence". The ultimate goals are undoubtedly the same, but the field and direction of approach are very different.
- A new form of association is required therefore, that can not only provide political pressure to instigate change, but equally vitally, can provide effective support for an individual member who stands up for his principles and suffers reprisals as a consequence. This intended trade union type of role is essential if individuals are to be able to criticise wherever they see fault, without being constrained by 'company loyalty' or job security fears.
- Necessarily our aims are rather vague at the moment and we need to be out in industry to be fully effective. We are not, however, completely without experience as the vast majority of us have spent a year in industry before coming to college. We are organising ourselves within our college and contacting other universities to involve like-minded people. Although it is engineers who have initiated this movement, we feel that we can usefully work with anyone with similar aims involved in industry regardless of qualifications.
- We would be delighted to hear from anyone with suggestions or who would like to be involved. Anyone who is interested should contact Simon Wilson, 3rd year undergraduate, Department of Mechanical Engineering, Imperial College of Science and Technology, London SW7 2AZ.
FIGHT THE ABORTION (AMENDMENT) BILL

A WOMAN'S RIGHT TO CHOOSE

'A Woman's Right to Choose' means that we demand that a woman must have control over her own body, and decide for herself whether or not to bear a child. She should be able to make that choice without the interference of friend, husband, parent, doctor, church or state. The demand does not imply that all women should want abortions; it does imply, however that women should defend each other's right to choose the pattern of their own lives.

THE ABORTION (AMENDMENT) BILL

James White's Bill would not only seriously restrict the availability of legal abortions, but it is one of the most repressive pieces of social legislation to be proposed in recent years: Grounds for abortion would be limited to cases of grave risk to the life of the pregnant woman or serious injury to the physical or mental health of the woman, or her existing children. The terms 'grave' and 'serious' are impossible to define legally; in practice few doctors would take the risk. It is estimated that if this Bill becomes law, 80,000 (66%) fewer legal abortions would be carried out next year.

The time limit for abortions would be reduced to 20 weeks. No woman ever wants a late abortion, and at present less than 1% of all abortions are carried out at 20-24 weeks (0.1% after 24 weeks). Most of these are for young girls. Restricted access to abortions will not only drive women to attempt self-induced abortions, and to back-street abortionists, but it will increase the number of late abortions needed. Of course middle class women who can pay will always find ways of getting safe abortions.

The 20-week limit would also be used to discriminate totally against foreign women who would have to satisfy a 20-week residence qualification.

The two doctors who give their consent to the abortion could not be in practice together, and at least one of them would have to have been registered for 5 years—a blatant attack on young doctors, and on progressive group practices.

ATTACK ON CIVIL LIBERTIES

Under this Bill any person accused of carrying out an illegal abortion would have to prove compliance with the law (guilty until proved innocent). It would be illegal to publish the name of a person giving evidence in a case of criminal abortion, thus encouraging malicious prosecutions by SPUC and other right wing groups. This secrecy would apply also to the name of anyone who had had an abortion or even sought advice on an abortion. Even the woman herself could not publish the fact. Legally 'publish' can be interpreted as telling another person.

Only registered doctors or 'approved persons' could give advice or information about abortions unless they were not paid for giving advice. This would mean, for example, that a Citizens' Advice Bureau worker could be committing a criminal offence if she said to a pregnant woman, "Go and see your doctor and ask for an abortion".

No advice at all could be given to girls aged under 16 unless one of her parents was present.

WE MUST DEFEAT THIS BILL

This Bill is not an attempt to eliminate abuses, corruption or exploitation of women (as its proposers would have us believe). On the contrary, it would make legal abortions virtually unobtainable, and shroud the whole subject of abortion in secrecy. It represents a gross attack on progressive people in the National Health Service, on counselling and advice agencies (agencies like the Pregnancy Advice Service would probably be closed), on foreign women, and on freedom of speech.

Many pro-abortionists are taking a long time to realise the full implications of this Bill, or the fact that it is likely to be passed (the Select Committee on the Bill is heavily loaded against us). Although in the long term we are fighting for free abortions on demand, as well as the right to have children and the means to bring them up, in the short term we must defeat this legislation.

TO FIGHT THE BILL

Get information about the Bill from 'A Woman's Right to Choose', 186, King's Cross Road, London WC1 (01-278 4575). Send 15p (inc postage) for pamphlet on 'Why We Must Fight the Bill'.

Join the National Abortion Campaign (set up to build a mass campaign against the Bill), 80, Raiton Road, SE24 (01-274 8498). They have a full list of local groups.

Send evidence to the Select Committee. (The 'A Woman's Right to Choose' pamphlet tells you how.)

Write to your MP—however she/he voted—the other side are very efficient at this.

DEMONSTRATE ON JUNE 21st

2.00 pm Charing Cross Embankment. March to Hyde Park.
Organised by the National Abortion Campaign.
THE POTENTIAL HAZARDS OF HAIR COLOURING

20 million women in the United States regularly dye their hair, and in their deference to society's ideal of youth and beauty generate a market of $250 million a year. Therefore, it is not surprising that the manufacturers are desperately fighting recent evidence that hair dyes contain a spectrum of chemicals potentially able to cause birth defects and cancer after being absorbed through the skin of the scalp. The possible dangers of hair dyes first began to receive wide publicity in the United States (and to a lesser extent in this country) as a result of experiments carried out in Berkeley, California, by Dr. Bruce Ames, a highly respected scientist and member of the National Academy of Sciences. Dr. Ames has developed a very sensitive test to detect chemicals which cause permanent changes or 'mutations' in DNA. DNA is found in the chromosomes, and makes up the genes which control the growth, development and inherited characteristics of every living organism. The test is simple, inexpensive and rapid, and measures alterations in the DNA of bacteria by chemicals added to the dishes in which they grow. By adding extracts of human tissues to the dishes at the same time, conditions more similar to those inside the human body can be obtained.

HAIR DYSES CONTAIN MUTAGENS

The first evidence that hair dyes contain chemicals able to cause mutations (such chemicals are called mutagens) came from an undergraduate project in Dr. Ames' laboratory, and subsequent very recent research has identified the active constituents of the 150 different dyes which gave a positive result. These 'permanent' dyes consist of two bottles; one containing the dye and the other hydrogen peroxide, which are mixed immediately before use. However, many single bottle 'semi-permanent' dyes are also mutagenic. The mutagenic ingredients in the final mixture are members of a class of complex chemicals technically known as aromatic amines and aromatic nitro derivatives, some of which are very closely related in their chemical structure to compounds known to cause cancer in man. As much as 40 milligrams of these constituents can be absorbed through the scalp at one dyeing session. Once they have entered the blood the chemicals are dispersed throughout the body but are eventually metabolised in the liver and excreted in the urine. Over a number of years the amount of dye absorbed by one woman could be very large and has been estimated by Dr. Ames to be of the same order as the documented exposure of factory workers to mutagenic chemicals in the dye industry before appropriate legislation was brought in. As many as half of these workers developed bladder cancer as a result of this exposure.

TESTING OF HAIR DYSES HAS BEEN INADEQUATE

Why, then, are these dyes not being immediately withdrawn from the market pending further investigations? To begin with, in the United States hair dyes were exempted from the relevant regulations of the Food, Drug and Cosmetic Act, as a result of commercial pressures. This means that very little testing has been done by conventional methods on the possible side effects of prolonged exposure to hair dyes by painting the mixtures on to the skins of large numbers of different animals (mice, rats, rabbits etc.) and looking for an increased incidence of tumours and birth defects. Some tests have been sponsored by cosmetic industry groups, without positive results, but Dr. Ames, in a paper recently submitted to the Proceedings of the United States National Academy of Sciences, has argued that they are totally inadequate. Other tests have been under way in this country since 1973 in the laboratory of Dr. David Harnden, in the Department of Cancer Studies at the University of Birmingham. These studies, which were initiated independently before the Berkeley experiments, were prompted by the fact that a woman patient with leukemia had a history of frequent hair dyeing with two 'semi-permanent' colourants. Early results from this study, which is still under way, show a higher incidence of malignant lymphoma in the mice exposed to these hair dyes. Such animal experiments are extremely expensive and time consuming to do, and hence unpopular with manufacturers, because enough animals must be treated to give statistically significant results. Also there is often a long delay between exposure and appearance of tumours, and certain tissues (the breasts, for example) are most sensitive to chemicals likely to cause cancer only during a relatively short period of the animal's life. In addition, the experiments are complicated by the fact that different species of animals may respond to a chemical in different ways, and many species must be tested before the compounds can be considered safe for man. It is because of these complications that Dr. Ames' simple and rapid test is so useful, particularly since extracts of human tissues can be used to reproduce some of the conditions in the body. Ideally, a whole battery of tests should be used for screening products, and a positive result in any one test should be sufficient grounds for banning or restricting the use of the chemical involved. Over 80% of chemicals already known to cause cancer in humans give a positive result in the bacterial mutation test, and it is likely that they cause cancer by altering the DNA in the chromosomes of the cells making up the tissues of the body. However, it is still not known precisely how many other changes must take place in a mutated cell before it becomes unleashed from the normal control mechanisms acting within the body, and starts to grow into a malignant tumour. In humans, as in other animals, there is usually a long delay (between 10 and 30 years) between the exposure to a chemical known to cause cancer and the appearance of the first malignant tumours, and in the past this has made the identification of cancer forming (or carcinogenic) chemicals difficult.

THOUGHTS FOR THE FUTURE

Dr. Ames' test is being used in the United States by the National Cancer Institute, the Environmental Protection Agency and the Food and Drug Administration in a number of different projects, and it is also being used to some extent in this country. These sorts of developments lead one to believe that, in the future, industrial and government agencies will be much more stringent in their testing of a wide variety of products for chemicals likely to cause cancer. However, there will still be enormous commercial and psychological pressures to overcome, and current attitudes within all sections of society (the individual, the cigarette manufacturers, the government) to smoking, a habit known for many years to cause cancer, do not encourage an altogether optimistic outlook.