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Dot Griffiths, John Irvine and Ian Miles

Social Statistics: Towards a Radical Science

Where do we go from here?

Preceding chapters in this book have examined the historical development of statistical practices, the philosophy of quantification, the nature and role of official statistics. Taken together they constitute a cogent critique of the role of statistics in our society. This critique is much more than an academic exercise: it goes beyond posing issues of theory, to pose important implications for action. Critical social theory alone is insufficient: a critical practice is also necessary to challenge and change the practices with which we have taken issue. As Marx might have said: 'the statisticians have only quantified the world; what counts is our success in changing it'.

Critical statistical practice cannot be developed by pen, paper and calculator alone. While we should not understate the importance of theoretical work, critical practice is needed to sharpen, test, deepen and extend its analysis. Much of the form of such a practice can only be created through actually using statistics in political struggle. Here we can learn some useful lessons from the applications of statistics which have already been made in radical politics as well as from the parallel experiences of scientists and technologists working in other fields of radical science.

In this chapter we attempt to formulate some guidelines for radical statistical practice. We shall first look at the development of critical responses to science and technology (S and T), for we can learn much from the successes and shortcomings of these responses that is relevant to the attempt to develop a radical statistics. We shall argue that radical approaches to S and T need to be related to the struggle for a structural transformation of society and to an understanding of how S and T are constituted within the existing structure of society. The fate of a radical statistics is intimately bound up with the development and use of forms of analysis effective for this struggle and the critical understanding that should

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accompany it. We shall then consider what elements are necessary for the theory and practice of radical statistics in capitalist society.¹

1. Critical approaches to science and technology

a. Anti-science, anti-technology

An understandable first reaction to the problems people experience with statistics is to seek to discard them altogether. Statistical approaches may have limited use in the physical and biological sciences, it is argued, but their use in social analysis is anathema: quantification reifies social processes, inevitably turns people into objects to be manipulated and controlled, and is thus contrary to basic human values. This anti-statistics approach is perhaps most fully developed by 'humanistic' psychologists and 'interpretative' sociologists, but it is also a fairly common gut response among a wider public reacting against being 'reduced to numbers' in official statistics and social science (see Irvine and Miles, section 1, this volume).

This reaction to statistics shares much with a broader response to some of the social problems of contemporary science and technology, which achieved clearest expression in the anti-S and T approach promoted extensively in the late 1960s. This was a time of general questioning of the dominant values and cultural institutions of Western society, and for many young people this took the form of attempting to build, or declare the existence of, a 'counter-culture'. (See, for example, the work of Musgrove, 1974; Nuttall, 1970; and Roszak, 1968. For critical commentary, see Hall and Jefferson, 1976; and Silber, 1970). Based largely on middle-class youth, the counter-culture sought to establish an 'alternative society' of communes, digger shops, psychedelia and rock music. The focus was largely upon individuals and ideas: Charles Reich, for example, argued that a new consciousness-which he termed consciousness III-was in the making (Reich, 1970; for assessments of Reich, see Nobile, 1971). Leary, the 'high' priest of hippiedom, concentrated on the use of psychedelic drugs to create such a consciousness: according to him, each individual needs to

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Particular criticism was directed by the 'counter-culture' at technology, or at least to what were seen as its archetypically Western versions. Modern technology was itself seen as directly

responsible for the uglier products of contemporary capitalismthe ravages of the Vietnam War, contemporary patterns of illness and disease, environmental pollution, impoverished personal relationships, and a host of other modern horrors (or modern versions of ancient horrors). Science, on the other hand, was attacked more for its approach than its products. The 'counter-culture' regarded the scientific approach as inherently bearing an oppressive mode of consciousness. Science was seen as leading on directly to the perception and treatment of nature and human beings alike as mere mechanical objects to be toyed with at the whim of unfeeling scientists. Critical commentary on science abounded, and Bacon's dictum of 'Knowledge is Power' was quoted ironically. The root of modern horrors was identified, not as an oppressive mode of production but as an oppressive organisation of knowledge. From 'Knowledge is Power' the 'counter-culture' drew the conclusion 'Science is Oppression'.

Commentators such as Theodore Roszak (1968, and 1973) provided the intellectual foundations for this critique. (The work of Marcuse (1964, 1969) was also often mined-and frequently underestimated-in this context). Roszak argued that the amoral and manipulative scientific consciousness has become the dominant mode of understanding in advanced industrial societies. It undervalues or excludes experience and knowledge resistant to scientific. analysis, treating them as unreal or unacceptable. The 'counterculture' rejected this as an immensely restrictive vision of human social development and of what counts as knowledge. Some of the vitality needed restoring to our arid life: a liberated consciousness should overthrow scientific rationality, opening up 'the province of the dream, the myth, the visionary rapture, the sacramental sense of reality, the transcendent symbol' (Roszak, 1973, p. 379). The remedy, it seemed, lay in rejecting the whole methodological basis of modern science. Statistics, moreover, was taken to be the most extreme manifestation of the anti-human, repressive tendencies of the scientific approach. For Roszak, 'this doctrinaire mathematisation of person and society, this statistical manipulation of human beings as if they were so many atomic particles' (Roszak, 1973, p. 33) was the quintessence of technocratic rationality.

The rejection of Western science gave a new prominence to subjectivism, mysticism, occultism and parascience. In many cases the 'destruction' of an overripe ego, or the undermining of an established outlook, left the individual with little more than a cynical disdain for the possibility of change, or ready for recruitment by anyone from Charles Manson to Guru Maharaji. While

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the 'counter culture' had raised awareness of alternative ways of life, it could do little to enable the mass of people to create and choose between such alternatives. It achieved no structural change in the society whose rationality it sought to question—the flamboyance of hippie lifestyles may even have reinforced the belief that every person in modern capitalist society is given a free choice as to how to organise their lives. Nor was it ever made exactly clear to the non-hip population how it could be that a rejection of Western S and T could be reconciled with extensive use of stereo-systems, light shows and credit cards.

The anti-S and T perspectives, like other innovations of the 'counter-culture', had important effects. The 'counter-culture' waned as a recognisable movement during the 1970s, but many of its attitudes, like the antipathy to statistics, are widely reproduced.

Despite the inheritance the counter-culture has left us with in the continuing tradition of anti-S and T^2 , it has long lost its momentum—although ageing hippies, and occasional new recruits, may still be seen travelling to and from cults and gurus in search of cosmic consciousnss. Many of its adherents have returned to 'hip' (or not so 'hip') variations of orthodox careers. Some are still trying to recover from the collapse of their ideals. Others have sought new ways to advance these ideals.

The failures and defeats of many of its social experiments, and the rapid transformation of much of its style and ingenuity into commercial wares (many fashions were derived from the hippie lifestyle), led many of the counter-culture's most energetic proponents to a profound questioning of the viability, within technologically advanced societies, of strategies for social change which took as their starting point the transformation of individual consciousness. Often their conclusion was that reality cannot be magically changed just by thinking about it in new ways, and they have sought to realise their ideals through other social movements. The most important of these for the present discussion was the alternative technology (AT) movement.

b. Alternative science and technology

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As is evident from the contributors, content and audience of magazines like Undercurrents and the Journal of the New Alchemists, the movement to develop alternative S and T has drawn upon members of the 'counter-culture' who have recognised the futility of a total rejection of S and T, as well as other people more concerned with specific problems they see to be linked with modern S and T—like ill-health, environmental pollution and resource depletion. Instead

of focusing only on changing consciousness and experience, the task here has been presented as one of developing

a *new* science and a *new* technology (which should)... operate on low amounts of energy; not irreversibly disperse non-renewable resources; use local and easily accessible materials; recycle materials locally; not produce waste products at a greater rate than they could be absorbed by the natural cycling processes; not liberate novel chemical compounds in more than trace amounts; fit in with existing culture patterns; satisfy those who operate it; lend itself to control by those who operate it; have safeguards against misuse. (Harper, 1973).

The diversity of the groups considering themselves to be part of what is commonly referred to as the AT movement is reflected in the varied forms taken by AT. These range from the search for occult and paranormal phenomena (e.g. flying saucers and extrasensory perception) to the exploration of novel or non-Western scientific systems (e.g. the medical alternatives of naturopathy and acupuncture or the alternative psychology of group therapies and 'personal growth'). At the extremes, these approaches are often oriented to suprasocial cosmic forces or to the asocial 'essence' of individuals; in general they tend to offer no social programme other than one of gradual conversion and personal commitment. Nevertheless, the more environmentally-oriented groupings, and particularly those concerned with the hardware of AT, have often been explicit in their recognition of the need for broad social changes, focusing on the threat of major environmental crises if this does not take place.

In general the AT movement has taken a 'technological determinist' view of social change. In other words, it is believed that in S and T lie the motor forces of society, the roots of modern social problems and the germs of change. S and T are largely treated in isolation from their social determinants. It is believed that they can be transformed simply by convincing people of the social, environmental and health hazards of such high technologies as supersonic aircraft, nuclear reactors, factory farms and automated production lines, and by providing them with alternatives. S and T must be taken to the people; they must be small-scale and controlled by the individual or community. With the diffusion and widespread acceptance of AT, small communities would be able to grow their own food, and produce ample energy, shelter and everyday necessities (e.g. Bookchin, 1970). A changed S and T would in turn change production patterns, consumption patterns and lifestyles: in place of bureaucratised large-scale society with all its social

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problems would be a simple life-style in harmony with nature. S and T, then, are seen as capable of being changed independently of other social conditions; the way to achieve an ecologically-sound world is through *technical* rather than social change.

Like the 'counter-culture', the AT movement has had some effects, especially in terms of introducing important issues into public debate. Some of the technological alternatives it has promoted—for example, solar energy devices—have proved sufficiently profitable to be incorporated into the mass market, although many others remain curiosities or toys for the rich. The associated political alternatives which have gone beyond mere information campaigns have largely centred around the 'Ecology' parties of several Western European countries, but these are rarely tied to any strategies of mass involvement (although they have made electoral gains which in some cases have alarmed traditional parties). More often, their inward-looking and anti-growth philosophies have meant that their success has been based upon alliances with unlikely, and often reactionary forces—particularly national capital against transnational interests.

Thus, although the AT movement has produced valuable assessments of the deleterious consequences of many modern technologies, these have rarely been carried through to an examination of their social roots (see Dickson, 1974, and Elliot and Elliot, 1976, for a more general, while sympathetic, critique of AT strategies). This is despite the links between some members of the AT movement and workers' struggles concerning the processes and results of capitalist production (e.g. the Lucas Aerospace workers' attempts to develop socially useful products, Elliott, et. al., 1977), and despite attempts to develop the concept of 'radical technology' (Boyle and Harper, 1976). Lacking an analysis of the social relations underlying contemporary systems of production and consumption, the AT movement has mainly been restricted to exhorting politicians, industrialists and the public to change their ways, coupled with threats (that often appear to be irresponsibly alarmist) about the likely consequences of failing to do so.

The limited appeal of, and response to, these formulae has led many AT proponents to decide that their own energies would best be spent improving their own lives and/or setting examples to others. They have, for example, attempted to develop environmentallysound subsistence life-styles in farms, to find ways of conserving urban resources by recycling, and so on. But while this has involved changing their own patterns of consumption, the patterns of production they have retreated from remain dominant—in fact, they often depend upon them for scrap engines and copper wire for windmills, etc. Proponents of AT have thus often become resigned to creating only limited individual change; and their practical innovations have frequently been little more than free research and development for progressive firms.

These are major problems for the AT movement, but it would be both churlish and shortsighted to ignore its positive contributions to date, some of which have potential for considerable further development. First, as already pointed out, the AT movement has introduced new questions about S and T into public debate. In the case of nuclear power, in particular, both the direction and use of a major new technology are being questioned, bringing into play arguments covering such diverse issues as future requirements for energy (and thus the struggle over the provision of public, as opposed to reliance on private, transport) and the security of toxic radioactive material (thus illuminating the steady development of paramilitary police and security forces). Opposition to some forms of nuclear power has already been a focus for radical political initiatives, which raises the possibility of a more sustained conflict between elements of the AT movement and state power. Second, it would be incorrect to see all AT activities as relying on individual change or parliamentary pressure. The nuclear power issue has provoked mass demonstrations in some countries-and has led on occasions to violence and counter-violence. A different type of initiative has been displayed in the use of 'Green Bans', pioneered by Australian trades unions and now extended to other countries. 'Green Bans' entail a refusal by trades unionists, particularly in the construction industry, to work on socially or environmentally damaging projects.3 The orientation of the campaigns of groups like the Lucas Aerospace workers around the right to socially useful work represents a more affirmative version of this strategy. Third, it is clear that contact with the AT movement has been a valuable stimulus to the efforts of radical scientists to develop an adequate critical approach to S and T (see, for example, Dickson, 1974; Elliott and Elliott, 1976). By raising awareness that the forms of S and T with which we are most familiar are not the only conceivable options for future society, the AT movement has contributed to our understanding of the social basis of S and T and of possible dimensions of social transformation."

be in There are good grounds, then, for believing that the potential be the AT movement is not exhausted. An AT-type approach to intatistics might well perform useful functions, if in a more limited sphere. But it would also have to contend with the problems

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engendered by any approach which tends to treat an area of science as if its theories and techniques can simply be replaced by alternatives, independent of any struggle to change the social structures which underpin the dominant forms and roles of S and T. Furthermore, the view of statistics as the hard core of positivistic science (see section 2, this volume), or as the ultimate in reification and dehumanisation, is likely to discourage any substantial attempt to promote an 'alternative statistics' in such terms.

Nevertheless, an 'alternative statistics' of sorts does exist, in the field of mathematical statistics rather than that of data production. This is Bayesian statistics, which has existed practically as an underground tradition for some two centuries. Some statisticians and social scientists have argued that this is an appropriate statistics for radicals to use, for it explicitly recognises that statistics has assumptions, and attempts to integrate these into the analysis (see, for example, Poirier, 1977, who also argues that the more familiar non-parametric statistics are more appropriate for radicals than conventional approaches). Certainly the Bayesian approach should be brought to the attention of critical social scientists, both as a possible tool for analysis and as a means of raising consciousness concerning the assumptions that are built into existing statistical practices. But as Atkins and Jarrett (this volume) point out, this approach is in itself no panacea. While it allows 'subjective' judgements to enter into the use of mathematical statistics, this may be used to justify relativism or a misguided search for consensus. without bringing into question the social sources of these judgements. Much interest in the Bayesian technique has actually stemmed from managers and technocrats seeking to incorporate their own presuppositions more directly into decision-making procedures. (For a general outline of Bayesian statistics for social scientists, see Phillips, 1973.)

There are also examples of AT-type strategies in data production in social research—particularly among psychologists, whose discipline is tied more firmly to quantitative methods than is sociology (in the UK at least). Humanistic psychologists, and clinical and social workers, have paid much attention to the use of 'personal construct' techniques (see Bannister and Fransella, 1971; Bannister and Mair, 1968, for overviews). The supposed advantages of these techniques is that, unlike conventional psychological tests, they allow the people whose perceptions are being researched to provide their own categories rather than forcing them to make judgements in terms of supplied categories. These techniques may facilitate communication in one-to-one situations, although there is a tendency for psychological researchers to apply them merely as more efficient means of extracting information from their 'subjects', so that the latter are simply presented with a more complicated version of the usual questionnaire.

Furthermore, while personal construct methods can, as their proponents argue, be used to move psychological research some way towards a more interactive project which avoids a crude categorisation of individuals into pre-ordained types, these methods may themselves be recuperated into the mainstream psychological programme. Thus a great deal of effort has been put into developing ways of processing the data produced by personal construct methods (by factor analysis, for example) so as to be able to grade the individuals involved along supposed personality dimensions such as 'cognitive complexity'). Social psychology has been remarkably quick to assimilate what at first appeared to be a subversive approach, and to divorce personal construct methods from the theory within which they were first developed. While the approach itself may have much to offer researchers and practitioners who recognise that human beings take a more constructive part in creating the social world than do most psychologists, the techniques it offers can, in and of themselves, effect no substantial change.

Attempts to develop new approaches to social statistics along AT lines may in principle contribute to the task of developing a radical statistics—not only by contributing to our understanding of the problems of existing statistical data and techniques, but also by suggesting some of the directions in which statistics could be transformed away from the practices presently dominant. But unless the development of new ideas and techniques is linked to more general attempts to bring about radical social change, they can carry little weight in a society whose S and T are likely only to change insofar as they can incorporate ideas and techniques useful to ruling class interests.

c. Social responsibility in science and technology

A rather more popular critical response to the problems with S and T among practicing scientists and engineers has been that of 'social responsibility' (SR). SR seeks to deal with the problems of modern society by calling for more and better S and T, rather than for abandoning them in pursuit of dubious alternatives. S and T are there are seen as essentially rational activities: the problems arise only from their misuse. The role of radical scientists, and engineers, should be to work within S and T, and to make sure their work is used responsibly.

The notion of 'social responsibility' originated with the failure of a group of the scientists working on the initial development of the atomic bomb (the Manhattan Project) to dissuade the politicians and military from using it against Japanese civilian targets (Jungk, 1964), and their subsequent campaign to generate a wider public awareness of the consequences of nuclear warfare.

The events surrounding the use of the atomic bomb changed, forever, the relationship of many liberal scientists to science. Although the creators of the nuclear bomb had warned of its horrific power, it had still been used: the traditional separation between science and society could no longer be easily assumed. The awesome consequences of their work raised severe doubts in their minds about the control of S and T; doubts compounded by the growth of state planning of national research and development policies. As the 'pursuit of knowledge' became transformed into 'science in the national interest', the idea of the typical scientist working in splendid isolation from social pressures increasingly came under attack. Many liberal scientists saw social responsibility as the way to prevent their work being misused.

A second major impetus to the development of SR approaches to S and T came in the 1960s with the campaigns against nuclear weapons (e.g. the Campaign for Nuclear Disarmament (CND) in Britain), and, later, through the massive American involvement in Vietnam and the application, with gruesome results, of S and T to biological and chemical warfare. The concern of scientists about the napalming of innocent civilian populations and the defoliation and despoliation of vast areas was expressed in the formation of groups like 'Scientists and Engineers for Social and Political Action' (SESPA) in the USA, and the 'British Society for Social Responsibility in Science' (BSSRS) in Britain (see Rose and Rose, 1976).

The scientists and engineers who initially joined these groups covered a wide political spectrum; their differences were made relatively unimportant at first by the immediacy of the problems at hand. Both liberal and radical elements were able to unite under a common conception of S and T as ethically neutral, asocial, bodies of knowledge and technique: they could be used for good purposes or abused for bad ones. This conception of S and T—now commonly termed the 'use-abuse' model—takes problems, such as atomic warfare, as deriving from the abuse of S and T by elites for the inappropriate end of destroying life (whereas the scientists developing nuclear power were seen as intending it to enrich human life by providing cheap and unlimited sources of energy). Thus it was not S and T per se, but their abuses, that came under attack.

The ways in which scientists and engineers should organise to press for socially responsible science and technology were, however, the subject of debate. Most saw SR as a matter for the conscience of the individual scientist; others argued that what was needed was a more informed (scientific) awareness on the part of state authorities of the need to develop more rational S and T policies; and a minority of radicals argued that SR was best fostered by scientists organising with other workers to press for rather broader-based institutional changes.

The main thrust of the SR movement was thus to argue that scientists have a duty to educate themselves about the adverse effects and likely abuses of their work. Only then would they be in a position to forewarn society of the potential hazards associated with particular directions of scientific research and development. Rather than questioning the bases for the social production of particular forms of S and T-other than condemning the leve's of expenditure on military research and on the development of wasteful luxuriesthe SR movement has restricted its criticism to abuses in the consumption of S and T. The main weapons in this campaign to prevent misuse of S and T have been information drives aimed at shaping the opinions of both the general public and the political elites, together with codes of practice to prevent irresponsible actions by deviant scientists and technologists. It was hoped that such criticism would enlighten the elites, and, if and when necessary, awaken public opinion through the mass media to such an extent that government and industry would be dissuaded from perpetuating these abuses.

An SR-type approach has been adopted by many statisticians and users of statistics, attempting to counter what they see as the widespread misuse of statistics. Gritical commentaries on statistics —Reichmann's Use and Abuse of Statistics and Huff's How to Lie with Statistics, being perhaps the two best-known examples—tend to take a similar line. In these accounts, statistics is treated as a set of neutral technical procedures for processing data and assessing links between different sets of data: the problems encountered in statistical usage are seen as arising from technical ineptitude or deliberate misrepresentation. Both problems can be solved relatively easily the first by improving standards, through professionalising statistical practice and developing a higher level of public knowledge about basic statistical techniques and conventions; the second by SR in statistics. The socially responsible statistician would, typically.

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help develop and follow 'codes of practice', thus making public the bases and assumptions on which s/he has produced and assessed data. In this way, possible misuse of statistical work—especially misinterpretation of figures by politicians—would be thwarted and 'bias' and 'inaccuracy' removed. Thesocially responsible statistician would also have a duty to criticise offenders against this code publicly. Social scientists and others using statistics would need to guard in a similar fashion against political or journalistic 'distortion' of their analyses.

Such an approach has proved appealing to many scientists concerned about the problems associated with their work. Undeniably, SR has had its share of successes-its proponents have, for example, contributed to the demystification of specialised (or secret) knowledge and techniques, in respect of health and safety at work, for example. It has also been possible to effect, at least for a while, controls and/or changes in certain areas of scientific research-genetic engineering being a recent example. In some cases (e.g. environmentalism), dramatic appeals by individual scientists and technologists have helped stimulate major public debate over the effects of S and T. Mobilising the mass action necessary to reverse public policy is, however, generally beyond the scope of the SR approach, which relies on the willingness and ability of the mass media to stimulate awareness and structure action. Since the media will only rarely exert influence beyond the terrain staked out by party politics and the capitalist economy, effective action beyond these limits requires a degree and form of organisation that cannot be provided from above by scientific, engineering or journalistic elites or would-be elites.

More often than not these problems cannot even arise—for the most part, individual scientific workers are relatively powerless. A socially responsible conscience can in fact often turn out to be little more than an expensive liability, as was the case in a recent example of SR in which an engineer working for a large British electronics company wrote to the *Guardian* explaining his refusal to work on a contract to supply communications equipment to the South African Defence Department. The engineer in question was at first informed that, since he could not be trusted, his opportunities for promotion would be limited. The Company then suspended him from work; and while he was later reinstated, it would seem unlikely that he has a very rosy future with them—nor, for that matter, with any other electronics company.

Similar problems would surely be encountered if a few government statisticians decided to become 'socially responsible'.

In Britain, the Official Secrets Act could be hurled at them immediately: the statistician's role is to produce and process the data required by the state in an 'objective and dispassionate' manner, not to divulge them publicly as a matter of course, nor to interfere in political debate over interpretation of their significance. In the case of a scrious breach, the offending statisticians could conceivably find themselves biding Her Majesty's pleasure in prison. If a significant number of statisticians were to organise themselves to take collective action this would have a far greater impact—but, for the reasons outlined by the Government Statistician's Collective (this volume), the hierarchical organisation, the fragmentation and the isolation of statistical work, make this seem extremely unlikely. Within groups like BSSRS, a recognition of problems with the SR approach was not slow in developing, and this critique of SR can help extend our analysis of statistics.

2. Towards an analysis of science and technology as social products

From its inception, there was an internal tension in BSSRS between liberal and radical elements. Among the liberals were the vast majority of BSSRS's more eminent members. They believed both in the neutrality of science and in the efficacy of SR in countering 'abuses'. The radicals, in contrast, argued increasingly that this notion of SR was insufficient. Environmental pollution, biological warfare and atomic bombs could be explained adequately neither in terms of accident nor ignorance. As the then chairman of BSSRS (sexual politics had not penetrated far in BSSRS by 1972) wrote in *New Scientist* on the organisation's third birthday:

We have found ourselves driven to understand not just the particular abuse, but the social system which despite the benevolent potential of science somehow manages to produce abuse after abuse. (Rosenhead, 1972, p. 135).

The radicals saw scientific production as bound up with the class nature of capitalist society: a society oriented towards production for profit rather than need was bound also to produce continual abuses of science. The neutrality of science, with its beneficent potential, was seen to be systematically distorted under capitalism into a malevolent reality. Only with fundamental social and political change would this potential be realised.

Not surprisingly, such radical analyses did not appeal to the liberal membership who saw the radicals as arguing that S and T



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were necessarily warped in capitalist society, and began to define them as subversive opponents of the mixed economy and its pluralist polity. Having seen political controls undermining the autonomy of science in what they regarded as socialist states, many scientists and engineers were virulently anti-communist: problems with S and T were their responsibility, not those of politicians. They remembered the Lysenko affair in the Soviet Union all too well (see Lewontin and Levins, 1976; Young, 1978). The radicals, in turn, argued that the ethos of professionalism and individual SR were at best utterly impotent. The result was a predictable mass exodus of the liberals from BSSRS, with some subsequently regrouping in 1973 in the Council for Science and Society. This self-selected and openly elitist body (e.g. see J. Ziman, 1975), aided by thousands of pounds of Leverhulme Foundation money, continues to explore the social implications of certain areas of science in the way the BSSRS might have done in its early days. In line with the politics of SR, its deliberations are presented to the establishment in the form of expensive pamphlets (e.g. Council for Science and Society, 1976).

This exodus also had a profound effect upon BSSRS itself. From a pluralist pressure group arguing primarily for SR in S and T, it had become a radical group of scientists, engineers and others explicitly committed, in the main, to revolutionary social transformation. The recomposition of its membership meant that BSSRS's policies and strategies needed thoroughly rethinking. With its debate over the role of radical scientists and engineers in society concentrated in the revolutionary left, the critique of S and T under capitalism took on new dimensions.

Until the early 1970s the radical position on science and technology had been based, like that of SR, on the 'use-abuse' model. The questions for radical scientists and engineers were: how can we demonstrate that the problems with S and T lie in their misuse in a class-divided capitalist society? What form of societal organisation is needed to best realise the beneficent potential of S: and T? In which organisations could radicals best bring about the political and social changes needed to provide the environment for their S and T to be better used?

Providing answers to these questions became increasingly difficult as, with the progress of the debate within BSSRS, emphasis was placed more and more on the *production* of S and T, as well as on their consumption. The debate drew in politicised elements from both the old counter-culture and the AT movement, who sought a critical examination of the *nature* of S and T in capitalist socier Was it not the case, they argued, that science was more than a set of methods and techniques; was it not also a system of concepts and social practices? Was it not the case that non-polluting and less alienating technologies, like solar energy, were not used—nor hardly dreamed of—in capitalist society because there was little or no incentive to actually adopt and produce them?

The crystallisation of the debate over S and T around overly radical nuclei, enriched by the infusion of these other elements, finally resulted in the displacement of the 'use-abuse' model. S and T began to be seen in much broader social terms—as forms of social knowledge, social practices, and social applications developed within the framework of capitalist society. Scientific concepts were profoundly linked with other sets of concepts, which all reflected ideological elements. The hierarchical, elitist and sexist practices of science paralleled other social practices in capitalist society; the orientation and utility of S and T could not be divorced from the social and economic factors that conditioned their development. S and T as a whole needed to be seen in terms of their development, reproduction and roles within capitalist society.

This meant a major reorientation of the role of organisations like BSSRS (whose name was by now rather anachronistic). The development of the liberating potentials for S and T was thus more than just removing their mis-use through the purgative of a revolutionary social transformation. While certain forms of scientific knowledge and technique, and certain technologies, developed within capitalist society will surely be put to good use in a future socialist society, much might not. New sciences and technologies, a whole new concept of S and T, more appropriate to the needs of pocialist society, may need to be created and developed. Just as society needs to be thoroughly transformed, so do the scientific and technological practices which are constituted in it. This analysis suggested that an important aspect of the work of organisations like BSSRS was to develop a critique of both the nature and practices of S and T, not as 'S and T under capitalism' but as 'capitalist S and T'.

Developments concerning statistics, similar to those in the radical science movement, have been occasioned by the more meently formed Radical Statistics Group (RSG) in Britain. As in the case of BSSRS, many of its founding members were drawn from in stablishment professional organisation—In this case the Royal Statistical Society (RSS). Liberal members of this largely contribute society hoped to form a ginger group within it in order both to democratise it and to promote discussion on previously preduded issues such as politically motivated 'misuse' of statistics.

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Indeed, largely as a result of pressure from RSG members, elections for the RSS council and presidency were held, for the first time in many years, in 1977. The establishment candidate, Sir Campbell Adamson, was embarrassingly beaten. (For details see various issues of *Radical Statistics Neusletter*, between 1975-77).⁵

Many RSG members saw their role as being mainly to develop a statistician's 'code of practice' which would ensure that the technical and theoretical assumptions in their work were made clear in the presentation of data—in short, statisticians should become socially responsible. Other areas of work seen as important have been in the area of 'misuse' of statistics—for example, in criticising the government's use of statistics in pruning the NHS⁶—and, to date less successfully, providing expert statisticial help to community groups and others in struggles through what was dubbed a 'statistical fire-brigade'.

As with BSSRS, there has been an uneasy tension in the group between those who advocate a liberal SR strategy with a focus on the 'misuse' of statistics, and the radicals, more concerned with a critique of statistical practice in capitalist society. Even though the RSG's policy statement and its affiliation to BSSRS seem to indicate that its aims go beyond stopping abuse to a scrutiny of the class nature of contemporary statistics, these issues have not yet been confronted adequately.

As has also been the case for other areas of S and T, a general critique of the role of statistical practices in capitalist society is needed. Such a general critique has begun to be developed within the radical science movement, and is indispensible if scientists and engineers—and statisticians—are to work out how they can best facilitate social transformation. Strategies for the radical science movement can only be effective if based on such knowledge.

3. Science and technology in capitalist society

S and T can be seen as *integral* to both the maintenance and reproduction of modern capitalist society in two major ways. Scientific knowledge and techniques, as used to produce technological innovations, are vital to the search for profit and competitive advantage among business enterprises. And both S and T play a central role in facilitating social control: to suppress and repress threats to the existing social order, and to legitimate that order as humane and rational. S and T, then, are elements in a wider social system, whose operation needs to be evaluated in detail in developing perspectives on radical S and T.

a. Science and technology for profit within the capitalist enterprise

In capitalist production scientific research is the foundation on which both new products and new production processes are developed. Old products for new markets, new products for both old and new markets, and more efficient ways of producing them are the key to success in capitalist production. Both advertising and the elimination of existing alternatives help to create markets for new products, with profit rather than social need the watchword for their introduction. Completely new needs are created to serve an increasingly technologised production process—e.g. for deodorants, tranquillisers and goods purchased as status symbols as much as for other uses—often by playing on insecurities themselves engendered by capitalist society.

The nervous 'macho' of capitalist man is defined and reinforced by artefacts symbolising male dominance, the 'femininity' of capitalist woman by consumer goods-particularly cosmetics and fashion-reinforcing her role as mother, domestic labourer and sex object. Meanwhile, the basic needs of those people without sufficient resources to pay for commodities remain unfulfilled; for poverty goes completely unrecognised by market forces. The basic science needed, for example, to deal with many of the problems of age-related illness have just not been developed by the multinational pharmaceutical companies. Old people with meagre pensions just cannot generate demand for the expensive technological products the companies depend upon for their high profits. Similarly, the social and ecological consequences of capitalist production are ignored in the calculations made in deciding whether or not to develop and introduce new products, unless they are forced upon companies by political pressure. The psychological effects of assembly-line and shift work are problems to be dealt with only by paying marginally higher wages. Macho-man becomes an even more unthinking, uncaring and underdeveloped person; feminine woman as housewife retreats into pep-pills for the day, 'sleepers' for the night, doubly oppressed as both housewife and wage-labourer. Both are induced to become slaves to production at work, puppets to consumption at home. These stresses are made even worse by the pollution and disregard for health and safety which are similarly direct by-products of capitalist production.7

Statistics plays various roles in all of this, too. Market recearch, for example; attempts to quantify the extent of viable arthets and the prices they will bear for different products—and ampling theory is particularly useful here. Many of the techniques

of mathematical statistics were in fact initially developed for agricultural and industrial applications, notably to assess the relative efficiencies of different operations, (see Pearson, 1973; and Rosenhead and Thunhurst, this volume). Seen in wider historical terms, the development of the capitalist mode of production stimulated and structured a vast demand for quantification (see Shaw and Miles; and Young, this volume). The range and nature of statistical technique and practices with which we are now presented should be understood as intimately related to these social forces.

The wider application of S and T to the production process has not merely been a matter of increasing the efficiency (that is, profitability) of particular production methods; it has also involved facilitating and extending management control over labour.

Historically, the development of the factory system, and the consequent division of labour into a series of fragmented tasks, represented a major change in the organisation of production; one which had among its effects the shifting of control of the labour process away from craft workers. S and T both created the conditions for these changes and were stimulated in their development by them. Craft skills were first fragmented into constituent elements, each of which could be performed individually and more rapidly by different workers, and then machines were developed to take over specific simple tasks. Multi-function machines were introduced to take over whole groups of tasks; and it is now possible for an extensive production process to be automated---complete with fail-safe devices and cybernetic monitoring.

The skill, creativity and autonomy of craft workers were thus gradually and systematically eroded: workers were transformed first into machine appendages, then into machine monitors, and now, perhaps, into mere midwives and maintainers of machines. Skills which are passed on from one generation to another, and which take years for each worker to acquire, are made redundant overnight through their incorporation into machines; many skilled workers are replaced by the very machines they have helped to create.

The trivial, monotonous and stressful labour which characterises so many people's work experience, and is epitomised by the modern assembly line, is thus not a simple *abuss* of technical possibilities. The machines, the systems of production, have been designed and produced within the constraints of capitalist efficiency and control, not to provide rewarding jobs or useful products. Much of the monotony, toil and danger of modern industry would persist even if workers owned and controlled the machines in their

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existing workplaces. Monotony, toil and danger are consequences of the systematic development of technologies in a capitalist productive system where the criterion of profit overrides that of welfare, and where the initiatives and interests of workers are subordinated to those of an *efficient*, albeit alienated, labour process.⁸ The scientific infrastructure servicing the demand for technological change is similarly no neutral end-product of the logic of scientific advance; nor are current scientific practices the only way of organising and carrying out scientific work.

One particularly significant facet to the process of deskilling involves the historical growth and subsequent change in the nature of scientific and technical work. Indeed, the displacement of labour by machines is often portrayed as if all workers were becoming more skilled, and, freed from the worst aspects of backbreaking labour, more able to develop and use their mental capacities at the workplace. Although this argument vastly overstates the extent to which a demand for trained, expert workers was created, the growth of sections of scientific and technical workers was important in the development of capitalist production. As the labour process was 'rationalised' by an elaborate division of labour, so design and technical work were separated from production, which was being reduced to repetitive, simplified jobs. Specialised and technical tasks of design and co-ordination were thus created, generating an expanding requirement for appropriate specialist workers. Research and development functions in firms were dramatically expanded, with increasing state support through the provision of scientific training in universities and colleges and the funding of basic scientific research.

The development of new scientific and technical workers' skills and knowledge was set in motion largely by and for capital, but these workers did, and often continue to, possess special status by virtue of their expertise. Often, they gain a greater measure of satisfaction and security from their work than shop-floor workers. Indeed, because of this, they often isolate themselves from the struggles of other workers, seeing themselves as professionals, and in some cases as a branch of management—even though their pay may now be little different from that of other workers.

In recent years, however, some industrial scientists and engineers (like many 'professionals' in service sector employment) have found that the processes of deskilling and redundancy have begun to threaten them too. Computer-aided design is a case in point: with it, standard components no longer have to be redrawn afresh on each design. Thus, the design staff are left to spend all their

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time drawing non-routine items. While this may release them from the drudgery of routine work, at the same time it takes the form of a speed-up; working continually on tasks requiring considerable concentration, the workers are now employed in more demanding and tiring work. And as the design process becomes increasingly rationalised, and more design items become either standardised or amenable to computerised treatment, so a smaller workforce is required. (See Cooley, 1976; and Gorz, 1976b).

This kind of experience has begun to undermine the 'professional' ideology of many scientific workers, for their work increasingly resembles that of shop-floor workers. Provided with less job satisfaction, they have clearly become little cogs in a big wheel whose movement they are in no position to control. Rather than being the autonomous and creative force they once thought themselves to be, scientists and engineers are now finding themselves subjected to the same threats of redundancy, speed-up and control as other workers.

As a result, scientific and technical work is acquiring a new political significance. The answer is not to opt out, or to become 'socially responsible': workers are finding it necessary to organise, to protect themselves from the growing 'rationalisation' of Sand T for profit. Thus it comes as no surprise that the Association of Scientific, Technical and Management Staffs (ASTMS) is now Britain's fastest growing union—although like similarly fast growing unions of scientific and technical workers in other countries it still carries with it much of the baggage of 'professionalism'. Recruitment, significantly, has been particularly high in the computer field, one of the leading areas of recent deskilling.

b. Science and technology for social control: state and ideology

S and T have not only been central in the development and reproduction of the productive forces and relations of capitalist society. They have also been crucial to the development and reproduction of the everyday social practices which are necessary conditions for its existence, and which structure and maintain it. In liberal democratic capitalist states, educational and cultural institutions (often in the state apparatus) have proved remarkably effective in establishing and maintaining acquiescence—the 'consensus' of the 'silent majority'—to the established order, despite class divisions and exploitation. But there are contradictions within this complex balance of forces, which when exposed and politically acted upon can sometimes upset this apparently stable system. The development and use of S and T in social control—that is, to preserve the hegemony of capitalist social relations in cultural and social matters—is of vital importance. Statistical science plays a particularly, and increasingly, important role here.

Of course, physical coercion-let alone the potential for such coercion in the form of armies, etc.-is never completely absent, even in the most politically 'stable' state. In their military applications, S and T are instrumental in producing ever more sophisticated ways of killing, maiming and incapacitating the socalled 'enemies of the nation'. These means of destruction are not just developed and used in conflicts between nation states, but also in suppressing wars of liberation, and in controlling insurgent civilian populations. In Northern Ireland, for example, the British Army and police have in recent years introduced a variety of new techniques-CS gas, rubber bullets, sophisticated spying devices, and tortures such as sensory deprivation, designed to maim mentally while leaving no physical scars (see BSSRS, 1974; and Ackroyd et al., 1977). In addition, partly in order to facilitate the existing operations of the state repressive apparatus, and partly as insurance for future emergencies and as an investment in a 'strong state', techniques for the surveillance and monitoring of behaviour have been developed. Making use of recent developments in computer technology (and in turn developing them even more), the British police has recently established large, centralised data-banks which hold information on millions of people-on immigrant groups, trades unionists and political militants in addition to convicted criminals.9 This is backed up by a sophisticated network which gathers the information to feed into the system, and involves various state agencies in Britain-notably MI5 and the Special Branch. Applied social research is busy, too, trying to place at the disposal of the political police a whole host of statistical techniques, often borrowed from the armed services but developed and improved upon in the course of civilian use. OR techniques, for example, are used to regulate and plan activities and operations (see Rosenhead and Thunhurst, this volume); techniques of quantitative social research have been developed and used to study and simulate civilian strife and insurgency so as to forecast and develop the best strategies to deal with them (e.g. see Horowitz, 1967. For a British example, see Noton et. al., 1974); and opinion-polling has been used to obtain information on such issues as levels of acceptable force in dealing with civilian strife or in planning strategy in publicly unpopular wars like that in Vietnam (where the USA turned to attitude surveys of the 'friendly' population and content analyses of interrogations of Vietcong prisoners). Again,

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these coercive uses of S and T--whether arbitrary or systematic-are no 'misuse'. They represent a body of scientific concepts, knowledge, techniques and practices, and technologies, in advanced capitalist society. They are the *products* of huge state investments in this area of S and T, and the horrors associated with them are nothing less than *necessary* by-products.

A less obvious, but also significant, role played by S and T in Western capitalist society is in the creation and reproduction of cultural meanings. As several chapters in this book have already shown, the contribution of statistics to maintaining the dominance of ruling class ideology is particularly important-in, for example, reinforcing elements of common sense which are both derived from and support the status quo (see, in particular, Irvine and Miles; Krige; Marsh; and Young, this volume). But scientific knowledge as a whole is presented as being free from political and ideological factors, as dealing with the realm of facts rather than that of values. and therefore as being free from the influence of particular narrow sets of interests. The sciences often seem inherently difficult and esoteric-especially when, as in statistics, mathematics is involved. Many people, mystified by science, defer to the allegedly disinterested opinions of scientific experts. Science thus simultaneously takes on the character of the most rational and reliable guide to decision-making-even in the social arena-and as something whose definition and practice should be left to experts. This deference reinforces the power of those in whose interests S and T have been developed and used-the class that owns and controls the means of producing S and T. Encouraging deference certainly pays dividends, as is indicated by the increasing application of the techniques of natural science (or at least their paraphernalia and terminology) to the analysis of social issues, in an attempt to render decision-making more 'rational'-and thus placing it above politics (Miles and Irvine section 4; and Rosenhead and Thunhurst, this volume; see also Blackburn, 1972; Mills, 1961; Pateman, 1972; and Shaw 1975, for related critiques of bourgeois social science).

Scientific authority is also invoked in support of the absence of decisive activity: for example, when science is used to provide arguments and evidence suggesting that inequalities of class, race and sex are essentially unalterable. The social division of labour between the sexes is explained in terms of innate biological differences in abilities and temperament between women and men (for example, see Eysenck, 1973; and Hutt, 1972. For a critique see Krige, this volume; Fairweather, 1976; and Griffiths and Saraga, 1979). Race and class divisions are similarly explained, respectively, in terms of the supposed innate intellectual superiority of whites over blacks, and of the ruling class over the working class differences which are then used to justify the unequal distribution of reward and privilege in society (for a survey and critique of these ideas, see Kamin, 1977; and Rose, 1976).

Political challenge can be defused if these inequalities are seen to be founded upon fixed biological differences rather than as effects of the social structuring of peoples' education and opportunities, attitudes and aspirations. (See, especially, Science for the People, 1977). Statistically processed data are often used to provide the 'factual' evidence to back up such theories. Modern mathematical statistics was crucially shaped (as MacKenzie, this volume, demonstrates) by the attempt to provide rigorous quantitative formulations for the biological explanations of social inequalities.

This is not to say that the scientists and statisticians whose work is used in this way are all colluding in a gigantic capitalist plot to run (or ruin) society. But the body of more-or-less 'pure' scientists and academics that has developed along with the advance of capitalist industry did not develop as the spontaneous manifestation of an asocial, dispassionate thirst for knowledge. While individual scientists are sometimes motivated, in part at least, by the desire to produce knowledge for its own sake or because it might be useful for humanity, the choices which are available to them are limited in many respects. Scientists are part of a scientific community whose norms and sanctions influence their activities; they are constrained by pre-existing structures of scientific language, convention and practice; they cannot ignore the body of accepted scientific knowledge; moreover, the instruments and techniques available to them will delimit their endeavours. In addition, the concepts and practices of S and T are indirectly influenced by, and in turn influence, other social concepts and practices (see for example, Foucault, 1970; Sohn-Rethel, 1978).

This is to say nothing of such obvious factors as the constraints imposed by funding patterns—which, since they are largely controlled by industry and the state, reflect quite strongly the needs, of capital rather than the needs of the mass of humanity.¹⁰ Conflicts do arise, of course, between the professionalism of scientific researchers and these interests: for example, researchers often complain about the lack of investment in certain areas. But as we have seen, scientists are typically able to exercise little control over the nature and use of their product; social and economic factors structure their activities both directly and indirectly.

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control demonstrates the crucial importance of an assessment of S and T for understanding the powerlessness and deprivation in so many people's lives. And, as we have argued, statistics forms a particularly fine (precise) and tough (reliable) thread in the cloak of scientific neutrality behind which the basic structures of capitalist society operate. The power which statistics, as a means of creating, organising and assessing knowledge, brings to the capitalist production process is thus also invaluable in legitimating its class system.

Integral though statistics may be to the operation of capitalist society, its practices are not invulnerable to radical criticism nor totally resistant to change. Like other areas of S and T, statistics can to some extent be fashioned in opposition to the social and economic factors which shape the dominant sets of scientific practices. The concepts, techniques, instruments and practices of S and T are strongly structured but not completely determined by society; the social practices of scientists and engineers are not mechanical reflections of some more real all-powerful 'base'. There exists some room for the development and practice of a radical science—but to what degree and under what conditions is the vital issue. One of the conditions which can facilitate this practice is a critical understanding of the role of S and T, just as a failure to make a critical analysis can facilitate the dominant practices of S and T.

Armed with this understanding, radicals can both make interventions in the critique of capitalist society and begin to develop radical scientific practice. The development of a radical statistics, or for that matter any radical science, cannot wait for the fundamental social changes to take place that will provide structures for the development of an entirely new S and T—for the development of radical science practices may itself help effect, and can indeed form, a vital part of such changes. It is to these possibilities for developing a radical statistical practice, and the strategies needed to do so, that we now turn.

4. A radical statistics?

By stressing the political and economic roles of S and T in general, and statistics in particular, we can see how limited are the three common responses to their problems that were considered earlier. For a refusal to make use of quantitative data, or to counter statistical practices directly, is nothing less than disarming: a focus on developing 'alternative statistics' which does not confront the reasons for the dominant forms of statistical practice flourishing is unlikely to establish its own roots securely; and whilst a 'socially responsible statistics' might achieve some support, at best it could contain only the most overt of the continuing 'abuses' of statistics. Even the radical version of the 'usc-abuse' approach is, as we have seen, severely limited insofar as it colludes with the view of S and T as neutral and latently beneficent—fighting for changes in the structures in which S and T are used, but not in the production of S and T themselves, can lead to extremely reactionary political positions and strategies.

It has only been through the development of an analysis of S and T as social products and practices that the radical science movement has really begun to formulate effective theory and practice. This experience can usefully be taken into account in looking at the possibilities and problems associated with the development of a radical statistics.

Radical scientists and engineers work in a great many political organisations, but in Britain two organisations in particular have shared S and T as their focal point: BSSRS and the Radical Science Journal Collective (RSJ).11 While these groups have different working styles and objectives, they both seek to develop a better understanding of the production and use of S and T and to integrate this into political struggle. They have found it necessary to develop their work on several different fronts. First, they have had to deepen the critique of S and T beyond the traditional stress on their uses, to embrace a wide range of concepts, techniques and practices. Second, they have had to work out ways of disseminating this knowledge, of making it available in particular to scientists and engineers, so as to help raise political consciousness and, in turn, to increase the effectiveness of political struggle. Third, they have had to formulate strategies for the use of S and T in furthering political struggle. Critical re-use of existing concepts and techniques, within existing practices, is sometimes extremely effective-as is shown by BSSRS' work in the field of occupational health and safety. Here, BSSRS has published a number of useful handbooks (on noise, oil and vibration as health hazards to workers) and produces Hazards Bulletin, a magazine which contains information on, and news of, workers' struggles over health and safety issues;12 these publications draw together and reinterpret existing knowledge on health and safety. Fourth, on the basis of a critique of the limitations of 'radical re-use', they have sought to explore the prospects for developing a radical S and T-and to identify and facilitate the parts which scientific and technical workers may play here. (See Rose and Rose, 1976; and Werskey, 1975 and 1978, for differing assessments of the potential strategies for the radical

science movement). They have thus had to take up, albeit at a fairly speculative level, the possible nature and role of S and T in a future socialist society as well as considering the forms and uses of S and T in non-Western societies.¹³

Radical approaches to statistics can learn from these objectives and strategies. Informed by, and working towards, a more incisive critique of the role of statistics in capitalist society, it should be possible to relate and further develop the interventions that may be made in the field of social statistics, and to assess the results that might be obtained by adopting different strategies in radical practice. We can make only a preliminary analysis of some possible interventions that may be considered. We examine, in turn, the critique of statistics, the possibilities for and limitations on its radical re-use, and, lastly, the potential for developing new forms of statistical data, techniques and practices.

a. The critique of statistics

It is to the critique of statistics that much of this book has necessarily been addressed-for without knowledge of the dimensions and roots of the problems with statistics, action to remedy the situation becomes pointless, and, by and large, doomed to failure. Attacking the notion that statistics is a surety for truth and objectivity in scientific knowledge of society, and a guarantor of rationality and freedom from bias in planning and policy-making, is an important political task. This position of privilege is rarely questioned: close inspection is normally forestalled by people who treat quantitative analysis as something for experts only, and/or as something which can safely be left to experts given the 'neutrality of numbers' and the impartiality of statisticians. Yet, as previous chapters have shown, such close inspection reveals that arguments for the objectivity and rationality of statistics cloak a social framework of control and exploitation, which itself conditions the development and application of statistical data and methods. Thus, for example, the section of this book which assessed official statistics demonstrated that these data are preconceptualised and produced according to both the ideology of the ruling class and its interests, articulated and co-ordinated through the state.

Other chapters showed that much can be learned about mathematical statistics through a study of their social origins (e.g. MacKenzie's account of the development of the correlation coellicient by eugenicists) and the conditions promoting their later development and expanded use (e.g. Atkins' and Jarret's account of the treatment of significance tests as guides to the discovery of 'social

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laws' and McLean's discussion of the use of computers as aids to 'objective' analysis). Other chapters attacked the increasing dependence upon technical experts using the latest statistical decisionmaking tools to provide supposedly scientific, rational solutions to social problems—thus limiting active, political discourse (e.g. Marsh on opinion-polling; Miles and Irvine on forecasting; and Rosenhead and Thunhurst on operations research).

But while it is certainly necessary to challenge the scientism and elitism inherent in the use of social statistics in these ways, it is important to extend this critique beyond exposing abstractly the foundations of statistics in the institutions and ideologies which articulate the dominant social interests. It must be linked to concrete political struggle. If not, the result may be merely to foster the 'anti-statistics' position which sees the problems with contemporary society as rooted not in capitalist exploitation and oppression, but in the scientific organisation of 'technological' society. Radicals might unwisely try to tap peoples' disaffection from the state bureaucracy, for example, by attacking quantification and statistics per se-there is some evidence that the degree of cooperation with national censuses and social research is declining. But such opposition can at most be limited, and may be countered by moves such as the annual 'Statistics Day' in Japan-with statistics competitions for schoolchildren and other paraphernalia -which have been instituted to overcome criticisms of the scale and burden of official statistical enquiries.

To change the forms and uses of statistics on any large scale means developing and presenting this critique in the light of the goal of achieving fundamental transformation in society. Political and social change on this scale can be produced only by the actions of a working class identifying its prime enemy as capitalism itself, rather than any particular group of 'bad' capitalists or politicians (both of whom 'misuse' statistics when it suits their ends), or any particular failure to rationalise the exploitative relations of capitalism (the 'rationality' of which is often demonstrated in statistical terms). Thus, the critique of statistics must be linked to the needs of the working class movement and the struggle of groups oppressed by imperialism, racism and sexism—moving beyond a critique of the inadequacy or oppressive use of statistics to demonstrating the class interests and assumptions underlying the claims made for objectivity of data and rationality of decisions.

Theoretical critique is not an end in itself: it should aim to facilitate radical social action. This involves showing not only that such claims for statistics further ruling class interests, but, encially,

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that they oppose the long-term interests of other classes, and of women and other oppressed groups. A fair day's work for a fair day's pay may already be a powerful ideology supporting thesystematic exploitation of workers (e.g. see Hyman and Brough, 1975; Mepham, 1972); when the level of fair pay is worked out using the latest statistical techniques and computers, the traditional fight between capitalist and workers over division of resources between profits and wages can be further depoliticised and seemingly reduced to a technical problem. Expert statisticians from management confront expert negotiators from union headquarters, and the rank-and-file workers see their interests reduced to one factor in a mathematical equation. Providing a theoretical critique of the scientism and elitism of such statistical practices is one thing; but their demystification-for example, by revealing the crucial assumptions of the methods to the people who are their targets-is also a practical activity.

b. Radical re-use

While there are many problems associated with existing statistical practices, there are nevertheless many occasions when radicals may need to use them—both in developing critical theory and analysis, and in political struggle. In this book, for example, Ridgers has demonstrated the utility of secondary analysis and the re-presentation of extant data for purposes of providing counterinformation. The radical re-use of existing statistical data and techniques may be seen as taking three main forms: undermining the validity of dominant ideologies; developing radical theory; and applying these theories in political struggle.

In the first of these strategies, existing data are used to call into question theories or viewpoints that are used to promote conservative, or to oppose radical, theory and practice. Counteracting racist ideology is an important case in point. It is often argued by fascists in Britain that immigration is the prime cause of the current housing and unemployment crises; a component of much rightwing Tory propagaida, such arguments are fairly widely accepted. Yet statistics can be used to undermine these arguments on their own technical and ideological terms—by citing official data to show that unemployment is not correlated with immigration over time, and so on. The Anti-Nazi League has made particularly effective use of statistics in this way in their leaflets and other presentations. Obviously, a committed fascist is not going to be swayed by any amount of statistics, but many people who unreflectively accept racist polities on the basis of common-sense arguments about overcrowding, strains on welfare services, etc., may be receptive to such 'technical' criticism. This will apply to other political issues, too, especially where apathy and reactionary attitudes largely reflect the ability of the ideological apparatus of the mass media and the state to maintain a vacuum of ignorance and half-truth. It is particularly relevant as a strategy in circumstances where opportunities to develop and present a coherent alternative approach to the issue involved are restricted, and especially where the re-use of data may actually stimulate the interest and resources necessary to do so.

Thus, this strategy may be crucial in winning support in an immediate struggle, and may be an important first step to a more thoroughgoing ideological critique. But this is all: as a strategy it is limited. It criticises only the surface forms of bourgeois ideology because it almost always operates within the terms set by that ideology. While exposing the self-contradictions of an ideology can be useful, there are frequently enough variants of the ideology and opportunities for willing hands to claborate them, that little is achieved beyond the receding memory of a debating point won. Where deeply entrenched views are confronted, the debate may easily become a mere technical argument which can be extended endlessly. The many strands of conservatism and liberalism are like the heads of the hydra: when chopped off, more are produced to return to the attack. So this use of data in 'technical' criticism, important though it is, is not enough. It certainly cannot substitute for an attack on the hydra's body, on the social roots of these ideologies.

This brings us to the second way in which statistics may be re-used—in the furtherance of radical analysis. Radicals should be able, in debates such as those discussed above on racism, to provide alternative theoretical explanations of the causes of unemployment and lack of housing, and to relate these to the statistics—drawing on data such as the numbers of unemployed construction workers and unoccupied houses. Like conservatives and liberals, they need data to support, and indeed to improve, their theories and arguments, which are otherwise liable to remain unconvincing, inadequate, or trapped at the level of pure abstraction.

The contribution statistics can make to this process of radical analysis is not restricted to the study of particular aspects of social conditions at a specific time—like the current levels of unemployment and homelessness; it can also be useful in making broad historical analyses that encompass and situate these more specific factors. In such an 'epochal' analysis of basic relations, or of social

dynamics, over a long period of time—the prime example being Marx's attempt to understand the dynamics of the capitalist system set out in *Capital* and elsewhere—data have important uses in developing and illustrating theory. Thus the nature of crises within capitalism might be illustrated by historical data on levels of production, consumption and capital formation; or the long-term tendency of the rate of profit to fall might be related to statistics on the rate of return on industrial investment (see, for example, Mandel, 1975, who attempts to provide an account of 'late capitalism'; and Hussain, 1977, for a critique of his use of statistics).

A 'conjunctural' analysis, in contrast, involves attempting to understand a specific situation at a particular time and place. Many of Lenin's writings focusing on Russia in the late nineteenth and early twentieth centuries would fall into this category. Such analyses are also useful in providing a radical analysis of contemporary Britain; one might utilise them in seeking to understand the specific causes of unemployment in a town in Northern England. Whilst this could, without much difficulty, be seen in terms of the general recession currently hitting all the world's major capitalist economies, the specific nature of the situation would also need to be taken into account. For example, what is the industrial structure of the region, how does it relate to the national (and international) economy, why have particular local firms been hit (are they less competitive than other firms), etc.? Here, official statistics at both national and local levels would be used to illustrate and advance the analysis, which would of course also draw upon the more general forms of explanation referred to previously.14

The third way in which statistics can be re-used is in the application of radical theory. Effective political struggle cannot be carried out on an intuitive basis and the theoretical perspectives that must inform such action often call for relevant statistical data. Adequate information is important at the level of even the most basic of trade-union activities-negotiating wages and conditions. For 'if today's trade unionist is to bargain effectively, he [sic] must match management's statistical sources and techniques' (coverblurb to Hedderwick, 1975). Both workers and their representatives need information on what firms could pay (i.e. what profits they are making), what similar firms are paying, what they are likely to be offered, how much their wages have been cut by inflation, and so on. Much of this information can be gained relatively easily from official statistics (see Hyman and Price, this volume) and is often available from trade-union research departments. For example, the Labour Research Department's monthly publication Labour

Research includes a digest of relevant statistics accompanied by critical commentary. Its tabulations of recent official statistics are particularly useful in this context.

The radical re-use of data is likewise often vital in developing and promoting effective single-issue political campaigns. Take, for example, the campaign to defend abortion rights in Britain coordinated by the National Abortion Campaign (NAC). Here, information was needed to support and promote the arguments put forward in public debate. By demonstrating the great need for abortions, using official statistics on operations performed, and by showing that in the absence of state provision, many women would risk a dangerous illegal operation, NAC was able to make more effective interventions. Again, this is not to say that all one has to do is to present the 'facts' and the argument is won—clearly the committed anti-abortionist, for example, is unlikely to be moved by NAC's arguments, however well presented—but well-researched and well-presented data was undoubtedly instrumental in winning support for NAC.

Some radicals may argue that the re-use of statistics is a strategy limited to reformist organisations like trade unions and issue-oriented groups which typically take their task as improving the lot of people within capitalism. Revolutionary political groups, however, also need relevant and reliable information to back up their political action dedicated to replacing capitalism with socialism.¹⁵ As we have argued before, their success here ultimately depends upon helping broad sections of those people most able to accomplish this task (i.e. the working class, supported by and supporting oppressed groups of all kinds) to realise that the root source of their alienation and oppression lies in the capitalist social system, and that their interests would be best expressed and served in a socialist society. To do this, radicals need to understand how capitalism works and how it might be changed, and to be able to demonstrate that socialism is not a utopian dream but something that can be created through a sustainable political programme. (Indeed, if the human race is to survive in an age of high technology, the creation of a world socialist order is an urgent priority).

To understand what capital and the state are doing at any particular time, a wide range of social and economic data is needed. Radicals need this information to link and to extend often fragmented struggles across social boundaries such as those separating ethnic groups, factories, industries, regions and countries. If unemployment is rising, for example, they need to know why, where and by how much, in order to plan effective campaigns like

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that conducted by the 'Right to Work Campaign' (Ridgers, this volume, discusses sources of data for re-use in this way). An understanding of international movements of capital, too, is vital for assessing current and prospective changes in imperialism and imperialist policy.

Overcoming the problems with radical re-use is sometimes quite difficult. One of the most important and common tendencies is for many oppositional groups (whether issue-oriented or revolutionary) to reproduce a technical division of labour like that found in capitalist organisations-with consequent inclinations to lapse into elitism and reformism. Elitism follows from the all too frequent emergence of a rigid hierarchical structure; those at the top of this structure may become isolated from the broad mass of members and supporters-often seeking to dictate their actions through claims to 'correct' ideas and expert skills acquired as a result of their 'practice', their advantages of information. This tendency is especially marked in issue-oriented groups where-faced with immediate practicalities-the experts who provide information and advice may become little more than the unpaid (or even paid) versions of the expert advocates who appear in planning inquiries and on parliamentary committees. Furthermore, this situation too easily fosters the illusion that such inquiries are actually an occasion for democratic political debate, rather than for the exercise of class power. Diverting resources into such areas, while sometimes worthwhile, may thus come to be seen as a viable alternative to mass activities to challenge this power, similar to the way wagebargaining has developed a system of co-opted experts at the reins of the trade-union movement, who sometimes actively combat rank-and-file militancy.

Certain steps can, however, be taken to prevent statistical expertise reinforcing the reformism and elitism that dog the radical left today. The technical skills that are needed in making useful analyses can, for example, be communicated—a 'statistics for the people' approach need not require presenting statistics as objective fact or neutral technique. Similarly, there should be more critical discussion of the often ridiculously naïve way in which radical groups use statistics in their arguments. So often in the socialist press either a 'conspiratorial plot' is 'exposed' in the presentation of data ('these damning facts are published in a drab official booklet to prevent workers from finding them out') or an alternative set of 'real' ligures is proposed to 'prove' a particular argument. The critique of statistics must be accompanied by a minimum level of technical competence if radical arguments are to be more than tubthumping—but this competence need not be confined to a few experts. Lessons might be drawn from the attempts of Claimants' Unions to spread the skills of analysing welfare legislation and the quantitative assessment of individuals' needs as a way of countering the reformist tendencies of issue-oriented groups.

However important the radical re-use strategy may be to radicals, and however hard we may try to overcome its limitations, there are problems that cannot, in general, be surmounted. In the case of statistical data, the first problem is the extremely selective nature of what is available. This, as analyses in this book have shown, is for two main reasons. First, official statistics reflect information needs, activities and priorities which often do not coincide with those of radical critics of society. Second, certain information is kept secret-supposedly in the 'national interest'. Thus, on the one hand there is little information available on poverty because its measurement and alleviation is not an important state activity; and, on the other, information on the size and budget of the political police is kept secret for reasons of 'national security'. Compounding this problem of the lack of data is the question of re-using data generated in one conceptual framework with another set of conceptual categories (see Hindess, 1973; and Triesman, 1974). The categories used to produce official statistics are frequently inappropriate to radical analysis-for example (as Hird and Irvine point out, this volume) the notion of wealth used in British official statistics does not lend itself to a direct analysis of the ownership of capital. Because of this, only relatively imprecise estimates can be made. Additionally, there often arise technical problems of disaggregating data-it is often difficult, for example, to obtain reliable spatial breakdowns of official data. Sometimes radicals can, through their involvement in 'academic' social research, extend the range and improve the conceptualisation of existing data; but often we simply have to make do with what is available.

The problems involved in re-using statistical techniques are of a rather different order. While descriptive or summary statistics are often of use to radicals, the contribution of sophisticated mathematical statistics and vast computer systems is more difficult to imagine at present; and complicated systems are particularly prone to the problems associated with expertise and the mystique of science (see above, and McLean, this volume). Apart from the restrictive and undialectical assumptions about causality underlying much of mathematical statistics, access to the use of such techniques is typically limited by their cost and the technical

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skills needed to produce or interpret analyses by such means.¹⁶

Sometimes, then, we may find that it is impossible to achieve satisfactory analyses and useful results on the basis of existing statistics. In order to provide statistical backing to a particular struggle, and to overcome the dominant social relations and practices of contemporary statistics, we may have to consider the use and production of new data and techniques.

c. 'Socialist' statistics

To accept the notions of 'radical' and 'socialist' statistics is to accept that contemporary statistical practices are to a great extent determined by capitalist social relations and interests, and that these are embedded as much in the concepts and techniques of statistics, as in its products and practices.

To make any significant changes in the nature and scope of official data will require a thorough transformation of the state; and the inspiration (not to mention the opportunity) to transform statistical techniques and practices will similarly require the commitment of a large number of people to a radical transformation of society. So, to develop a socialist statistics without changing the society of which the practice of statistics is a part is possible only to a very limited degree. Nevertheless, to accept that statistical practices are more than mere mechanical reflections of economic and ideological factors, is to accept that we can begin to fashion them into a tool to facilitate social transformation. We might more correctly term this radical statistics-that is, the critique, re-use and the limited transformation of statistical concepts, techniques, data and practices. We can, for example, go beyond the mere re-use of existing data and produce new statistics tailored explicitly to the needs of socialist politics.

In the case of poverty, for example, the Child Poverty Action Group has produced data on areas where official statistics are either sparse or non-existent. Similarly the Low Pay Unit has produced data on the earnings of workers below the tax threshold, who are not included in official statistics since they earn too little to pay income tax.¹⁷ While the surveys used here are necessarily limited in scale, through lack of resources, they can be useful information sources for radicals as well as for more immediate reformist strategies. Radical journalists and academic social scientists have also often produced important new data through their work—on the composition of ruling groups, for example (e.g. studies such as those reported in Crewe, 1974; Stanworth and Giddens, 1974; and Urry and Wakeford, 1973). While the potential for producing new data is significant, this strategy is limited by the enormous resources typically required for large-scale data production. One way of partially overcoming this problem involves striving to achieve certain changes in the data produced by and/or available from existing institutions. At one extreme, data may be 'leaked' by sympathetic civil servants or politicians; at the other, mass movements and pressure groups can press for the disclosure of information—parliamentary questions may be useful here. A longer term strategy is, of course, to struggle for more freedom of information and the removal of laws and sanctions limiting its availability (such as the Official Secrets Act in Britain).

We should also investigate the possibility of developing new statistical techniques for producing and procuring data. We referred earlier to the problems radicals encounter in adopting a traditional division of labour and reproducing the hierarchical expert-client relations when using the techniques of mathematical statistics. While the problems of overcoming such barriers are enormous-given the repugnance most people feel towards even simple statistical techniques-certain steps can be taken by stimulating changes in the wider research process (of which the use of statistics is one part). Attempts have been made to reconstruct investigative techniques such as the social survey, Carr-Hill (1973). for example, attempted to transcend the limitations of the conventional survey-which typically counterposes expert enquirers against isolated, passive informants. He developed in a totally 'biased' fashion a survey on education with the assistance of people in his town, employing it as much as a political consciousnessraising tool as a source of data for academic analysis. His interview situation was intended to stimulate respondents into questioning the relevance of their schooling to their current living patterns and appears to have achieved some success, as indicated both by the quality of the answers received, and the recruitment of some of the respondents into a discussion group on educational issues. Other groups have also modified survey techniques for radical purposes, similarly turning the survey into a much more interactive instrument, in which information flows between the survey designer and the respondent, and among groups of respondents. The prime example of this is probably the 'Workers' Inquiry into the Motor Industry' (IWC, 1977), in which background material on developments in the motor industry as a whole was provided to local union branches, along with questions designed to elicit their own experiences.18

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While radical approaches to statistical technique may have much potential, they are typically limited in applicability. For reasons outlined elsewhere in this book, people rarely consider it worth their while, or even within their abilities, to attempt to comprehend statistical analysis, and it may take considerable effort to persuade them otherwise. Even 'radicalised' social surveys, which seek to reduce the distinction between researcher and subject, require that people see how their involvement in the study can be of benefit to them. Time and effort are required for such activities, and people are often rightly suspicious of the interests that lie behind social research. Even when they are convinced that statistical approaches are of practical use to a particular task, there is still the danger, without a political critique of statistics, that people may believe that 'highly technical' and 'value-free' devices are best left for sympathetic experts to worry about.

A different set of needs for statistics under socialism, and even in a heightened struggle for socialism, will generate different demands on statistical data and techniques, and different conditions for the development of new approaches. In the short term the development and application of new data and techniques can in principle contribute to the greater democratisation of skills and to undermining the mystique of statistics, thus helping raise levels of consciousness about the adequacy of radical statistical analyses. But these are likely to be significant tools of radical practice only to the extent that they can be based upon the growth of radical currents in society-those, for example, exerting pressure on the state to disclose information, or stimulating workers to consider the possibility of participating in the planning of their firm's future. Once again, we see that the practice of scientists is dependent to a large extent, in terms of both orientation and chances of success, upon wider social developments. Thus, any strategy of 'radical' statistics can hope for lasting achievements (other, perhaps, than the incorporation of alternative approaches into the dominant statistical tradition) only by being developed as part of a wider socialist practice; that is within and for an overall programme of social revolution. In the process, it will have been transformed into an explicitly 'socialist' statistics.

5. Beyond 'radical statistics'

Perhaps, a 'socialist statistics' can be developed only in a society undergoing urgent, active transformation to socialism. But perhaps, too, the notion of 'statistics' as a discrete, specialised realm of human knowledge would be increasingly problematic in a transitional society in which, with moves towards the abolition of class relations, the old division of labour would be under attack. Such speculation suggests not only that radical statisticians need to work with the socialist movement but that they need to work within it. In the same way as the battle against contemporary statistical practices should not remain the political preserve of statisticians only, so should statisticians involve themselves in other wider political struggles.

Of course, statisticians, like other scientists, have specific opportunities available to them to exercise pressures for change other than those more generally available—through both their expert knowledge and their place in the overall social and technical division of labour. There is certainly a role for scientists' and engineers' organisations in dealing directly and sensitively with S and T-related issues. These include trade unions as well as organisations such as BSSRS and the Radical Statistics Group.

While in issue-oriented groups it has often been difficult to overcome the fragmentation of political struggles, active work in trade unions provide radical scientists and engineers with the opportunity to press for the recognition and acceptance of their communality of interests with other workers. But they need to recognise the problems here-unions often treat their role as bargaining for marginal improvements and thus end up disavowing 'political action'. It is easy to become restricted to such reformist strategies, to do no more than press for higher wages for 'elite' scientific workers, as is largely the case in ASTMS. This is not to belittle the achievements of such organisations: it is often possible to win significant political gains without challenging directly the underlying framework of capitalist society, and these may themselves facilitate the development of socialist politics at a later time. However, the flexibility of capitalist society should not be overestimated: concessions are far more readily granted in some periods than at others (the current 'cuts' and increased political repression being typical of the withdrawal of 'welfare rights' and 'civil liberties' in recessionary conditions); and these concessions are typically granted on terms which render them subservient to capital (e.g. as hard-won educational provisions are applied to training a docile workforce, so the right to form unions becomes a right to belong to a bureaucratised and largely incorporated organisation). Nevertheless, unions of scientific and technical workers are important both as agents of and sites for this struggle-to defend existing rights and to fight for their extension.

But many scientists and engineers have realised that it is not enough to attempt to reform S and T from within. They have learned from the limited achievements of the SR approach to S and T and its incorporation into the establishment worldview. More than this is necessary if the ever-more manifest scale and scope of science-backed threats to human existence is to be confronted; if the increasing role of scientism is to be challenged; and if the declining conditions and opportunities in scientific and technical work are to be halted. And often they have learned from the struggles of other workers, and from the themes and political perspectives forged and sharpened in these struggles. The student and counter-culture movements have played a role, if a brief one, in raising public debate about these issues. But what is most clear is that the connections with socialist currents must be strengthened and deepened-otherwise a 'radical science' or 'radical statistics' is likely to remain a dream or at best an arcane scholastic discipline. This might have been understandable when radicalisation seemed an impossible or far distant prospect in the early 1960s, but it is irresponsible to settle for dreams or scholasticism in the turbulence of the late 1970s.

In general, statisticians have hardly been at the forefront of the radical science movement-for reasons connected both with the nature of their subject and the sorts of employment they typically obtain. But with the increasing importance of statistics in capitalist society, statistical issues are likely to become more overtly political at the same time as the statisticians' work becomes less rewarding. In such circumstances, radical perspectives on statistics may well be developed and taken up more seriously. A significant contribution to the practical critique and transformation of statistics (and science) might then be made in an organised way by statisticians linking the specific issues with which they deal to the wider political and economic processes which determine, and are in turn shaped by, them. The prospects for a significant and lasting contribution to the creation of a new society being made in this way depend upon the integration of the work of radical statisticians-and social scientists using statistics-with that of the radical political organisations of the working class and oppressed groups, 'Radical statistics' is at best a way-station in this task: radical statisticians may succeed in quantifying the world in new ways, but what really counts is whether they succeed in helping to change it.

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Notes

1. Our focus here will be on critical approaches and strategies as they have been developed within Western societies. Political struggles over S and T in 'Third World' countries, and the analyses that have been developed in these contexts, are important issues, but would inevitably demand lengthy separate treatment.

2. For a bibliography of anti-science, arcadian and other responses to industrial society, see Boyle and Harper (1976).

3. Information about Green Bans in Britain may be obtained from the Green Ban Action Committee, 77 School Road, Hall Green, Birmingham B28 8]G; developments on this front are also reported in the *Newsletter* of the Socialist Environment and Resources Association, who can be contacted e/o Tidys Cottage, School Lane, West Kingsdown, Kent; they are sometimes also covered in AT magazines like *Undercurrents*.

4. This aspect of AT is closely related to the development of interest in 'appropriate technology', a term used by development researchers in particular, to refer to the need to create products and production technologies for the 'Third World' which may be markedly different from those used in the West. The importation of techniques and products by multinational corporations has often merely exacerbated patterns of underdevelopment created in the ex-colonies. Instead of their capital-intensive technology, it is held that technologies consonant with the resource, skill and labour endowments of underdeveloped countries are needed-that is, lower-level and labour-intensive technologies (often called 'intermediate' technologies) are more appropriate to the 'Third World'. However, it is likely that, without socialism in these countries, 'appropriate technologies' will only be developed along the lines most profitable for local capital-and thus do little about local employment needs and environmental problems. Likewise, products which can meet the needs of the poverty-stricken masses are required, rather than luxuries which serve no purpose other than the consolidation of inequalities. Carr (n.d.) provides an annotated bibliography of the literature on appropriate technology; see also Boyle and Harper (1976), Dickson (1974), Disney (1976), Jequier (1976).

5. Obtainable from: Radical Statistics Group, c/o BSSRS, 9 Poland Street, London. WIV 3DG.

6. See, for example, the RSG Health Group's useful publications, Whose Priorities² (1976) and In Defence of the NHS (1977).

7. When these problems threaten the stability of capitalist society, the state is called in to mop up the worst of them. See Miles and Irvine, section 3 of this volume.

8. More comprehensive accounts of the development of industrial technology are provided by Braverman, 1974; Dickson, 1974; Gorz, 1976b; Marglin, 1974/75; (see also the articles by the Brighton Labour Process Group, 1977; Coombs, 1978); and, of course, by Marx, 1954, on which all these studies draw.

9. See Kitson, 1971, for the arguments of a 'counter-insurgency expert' as to why these developments are necessary to protect the liberal, democratic state; and, for informed critical discussion as to why there is more behind their development and use than a concern with protecting 'democratic' freedom, see Bunyan, 1976; Ackroyd et al., 1977; and various issues of *State Research Bullicuii*—which is obtainable from State Research, 9 Poland Street, London W1V 3DG.

10. For more detailed treatments see Basalla, 1968; Bernal, 1939; Bukharin et al., 1971; Mendelsohn et al., 1977.

11. Both groups can be contacted at 9 Poland Street, London WIV 3DG. BSSRS publishes the quarterly journal Science for People, and the RSJ collective Radical Science Journal. In addition to these two insu-oriented groups, a number of the left political organisations are beginning to take S and T up as important problems. The

Socialist Workers Party has a science group, as does the Communist Party (which publishes the journal *Science Bulletin*). The International Marxist Group runs a monthly column on S and T by BSSRS in its weekly newspaper *Socialist Challenge*. 12 Available from BSSRS Work Hazards Group, 9 Poland Street, London WIV 3DG.

13. BSSRS, for example, held a conference in 1975 on the theme 'Is there a socialist science?'. Both they and RSJ have also held several series of seminars on the broad area of science and socialism. The American group 'Science for the People' sent a delegation in 1973 to study Chinese S and T. Their interesting report is presented in the book *China: Science Walks on Two Legs* (1974).

14. The Union for Radical Political Economics (URPE, 1978) has produced a reader which analyses in considerable detail the consequences of the current crisis for different groups of workers, for various economic sectors, for community issues and political organisations, in the United States. In Briain, the Community Development Project (CDP, 1977a, b, c) has produced valuable studies of industrial decline, housing problems and the land and property markets; various working groups associated with the Conference of Socialist Economists have been working on related issues (e.g. CSE, 1976). Economists and geographers have so far been at the forefront of these attempts to use quantitative data in radical analysis and action, and their journals—Antipode, Capital and Class, Review of Radical Political Economics—present material that is often of interest to all critical social scientists.

15. We here refer to those political groups attempting to create a socialist society which argue that this will entail fundamental changes being made in the political, social and economic structure of contemporary society, and that this will be achieved only through revolutionary struggle extending well beyond parliamentary processes. and will require establishing a new level of democracy as well as changing the ownership of the means of production. Examples of the voluminous recent literature here include Blackburn (1977), Miliband (1977). The classic Marxist positions were most notably developed by Marx, Engels, Lenin, Trotsky, Luxemburg and Gramsci, 16. There are exceptions. One is the use of the computerised analysis to demonstrate the viability of an egalitarian world society by Herrera et al. (1976), which might, even so, be seen as simply using the mystique of the computer against more reactionary analyses which had traded on this mystique. Another is Kidron's (1974) study of unproductive labour in the US-where the complexity of the material made computer analysis invaluable. As well as the contributions to this book, other discussions of the epistemological basis of mathematical techniques in social science may be found in Willer and Willer (1973), Zubaida (1974) and Saver (in press).

17. Somewhere between the critique of statistics and the production of new statistics lies the sort of approach that has been used by Cowley Leyland workers in developing their own cost of living index, or in the French trade union price index (Plant, 1978). Here, workers' representatives have themselves monitored the effects of inflation, in order to strengthen arguments behind wage claims.

18. The Lucas Aerospace Workers' campaign, mentioned earlier, also involved extensive structured interaction between workers and coordinating shop stewards. In the Vickers Workers' campaign, similar production of 'data' from the shopfloor has been linked to more conventional analyses of the state of the industry (see Elliot et al., 1977; Beynon and Wainwright, 1979).

Bibliography

- Ackroyd, C., Margolis, K., Rosenhead, J., and Shallice, T., 1977, The Technology of Political Control, Harmondsworth, Penguin.
- Bannister, D., and Fransella, F., 1971, Inquiring Man, Harmondsworth, Penguin.
- Bannister, D., and Mair, J. M. M., 1968, The Evaluation of Personal Constructs, London, Academic Press.
- Basalla, G. (ed.), 1968, The Rise of Modern Science: Internal or External Factors², Lexington, Mass., D.C. Heath.
- Bernal, J. D., 1939, The Social Function of Science, London, Routledge.
- Beynon, H., and Wainwright, H., 1979, The Workers' Report on Vickers, London, Pluto Press.
- Blackburn, R. (ed.), 1972, Ideology in Social Science, London, Fontana.
- Blackburn, R. (ed.), 1977, Revolution and Class Struggle, London, Fontana.
- Bookchin, M., 1970, Post-Scarcity Anarchism, New York, Ramparts.
- Boyle, G., and Harper, P., 1976, Radical Technology, London, Wildwood House.

Braverman, H., 1974, Labour and Monopoly Capital, New York, Monthly Review Press.

- Brighton Labour Process Group, 1977, 'The capitalist labour process', Capital and Class, no. 1, pp. 3-26.
- BSSRS, 1974, The Year Technology of Repression: Lessons from Northern Ireland, London, BSSRS,
- Bukharin, N. I., et. al., 1971, Science at the Crossroads, London, Frank Cass.
- Bunyan, T., 1976, The History and Practice of the Political Police in Britain, London, Julian Friedmann.
- Carr, M., n.d., Economically Appropriate Technologies for Developing Countries, London, Intermediate Technology Publications.
- Carr-Hill, R. A., 1973, Population and Educational Services: Preliminary Report on a Social Survey, Geneva, UNESCO (reference PDEP/Ref. 7).
- CDP, 1977a, Profits Against Houses, London, CDP.
- CDP, 1977b, The Costs of Industrial Change, London, CDP.
- CDP, 1977c, Gilding the Ghetto, London, CDP.
- Cooley, M., 1976, 'Contradictions of science and technology in the productive process', in Rose and Rose (eds.), 1976a, below.
- Coombs, R., 1978, 'Labour and monopoly capital', New Left Review, no. 107, pp. 75-96.
- CSE, 1976, Houring and Class in Britain, London, CSE (55 Mount Pleasant, London, WC1.)
- Crewe, I. (ed.), 1974, The First British Political Sociology Yearbook, London, Croom Helm.
- Dickson, D., 1974, Alternative Technology and the Politics of Technical Change, London, Fontana.
- Disney, R., 1976, 'Irrelevant technology' and 'Who does what in I.T.', Undercurrents, no. 18, pp. 8-9, 11.
- The Ecologist (eds.), 1970, A Blueprint for Survival, Harmondsworth, Penguin.
- Elliott, D., 1977, The Lucas Aerospace Workers' Campaign, Young Fabian pamphlet no. 46, London, Fabian Society.
- Elliott, D., and Elliott, R., 1976, The Control of Technology, London, Wikcham,
- Elliott, D., et. al., 1977, Alternative Work for Military Industries, London, Richardson Institute for Conflict and Peace Research.
- Eysenck, H. J., 1973, The Inequality of Man, London, Temple Smith.
- Fairweather, H., 1976, 'Sex differences in cognition', Cognition, vol. 4, pp. 231-280 Foucault, M., 1970, The Order of Things, London, Tavistock.

- Gorz, A., 1976a, 'On the class character of science and scientists', in Rose and Rose (eds.), 1976a, below,
- Gorz, A., 1976b, The Division of Labour, Hassocks, Sussex, Harvester Press.
- Griffiths, D., and Saraga, E., 1979, 'Sex differences in cognitive abilities: a sterile field of enquiry', in G. Boden, M. Fuller and O. Hartnett (eds.), Sex Role Stereo-Inning, London, Tavistock,
- Hall, S., and Jefferson, T. (eds.), 1976, Resistance Through Rituals, London, Hutchinson.
- Harper, P., 1973, 'Transfiguration among the windmills', Undercurrents, no. 5, pp. 3-4
- Hedderwick, K., 1975, Statistics for Bargainers, London, Arrow.
- Herrera, A. (ed.), 1976, Calastrophe or New Society?, Canada, IDRC.
- Hindess, B., 1973, The Use of Official Statistics in Sociology, London, Macmillan.
- Horowitz, I., 1967, The Rise and Fall of Project Camelot, Cambridge, Mass., MIT Press. Huff, D., 1973, How to Lie with Statistics, Harmondsworth, Penguin.
- Hussain, A., 1977, 'Crises and tendencies of capitalism', Economy and Society, vol. 6, pp. 436-460.
- Hutt, C., 1972, Males and Females, Harmondsworth, Penguin.
- Hyman, R., and Brough, I., 1975, Social Values and Industrial Relations, Oxford, Basil Blackwell.
- Institute for Workers' Control (IWC), 1977, 'Document: A workers' enquiry into the motor industry', Capital and Class, no. 2, pp. 102-118.
- lequier, N., 1976, Appropriate Technology: Problems and Promises, Paris, OECD.
- Jungk, R., 1964, Brighter than a Thousand Suns, Harmondsworth, Penguin,
- Kamin, L. J., 1977, The Science and Politics of 1Q. Harmondsworth, Penguin.
- Kidron, M., 1974, 'Waste: US, 1970', in M. Kidron, Capitalism and Theory, London, Pluto Press.
- Kitson, F., 1971, Low Intensity Operations, London, Faber.
- Leary, T., 1970, The Politics of Ecstary, London, Paladin.
- Lewontin, R., and Levins, R., 1976, 'The problem of Lysenkoism', in Rose and Rose (eds.), 1976b, below.
- Mandel, E., 1975, Late Capitalism, London, New Left Books.
- Marcuse, H., 1964, One-Dimensional Man, Boston, Beacon Press.
- Marcuse, H., 1969, Eros and Civilisation, London, Sphere.
- Marglin, S., 1974/5, 'What do bosses do? The origins and functions of hierarchy in capitalist production', Review of Radical Political Economics, no. 6, pp. 60-110 and no. 7, pp. 30-55.
- Marx, K., Capital, 3 vols.; English translations: London, Lawrence & Wishart 1954; 1957: 1960; also Harmondsworth, Penguin/New Left Books 1976, vol. 1.
- Mendelsohn, E., Weingart, P., and Whitley, R. (eds.), 1977, The Social Production of Scientific Knowledge, Dodrecht, Holland, D. Reidel.
- Mepham, I., 1972, 'The theory of ideology in Capital', Radical Philosophy, no. 2, pp. 12-19.
- Miliband, R., 1977, Marxism and Politics, London, Oxford University Press.
- Mills, C. W., 1961, The Sociological Imagination, Harmondsworth, Penguin.
- Musgrove, F., 1974, Ecstasy and Holiness, London, Methuen.
- Nobile, P., 1971, The Con III Controuversy, New York, Pocket Books.
- Noton, M., et al., 1974, 'The systems analysis of conflict', Futures, vol. 6, pp. 114-132,
- Nuttall, L. 1970, Bomb Culture, London, Paladin.
- Pateman, T. (ed.), 1972, Counter-Course, Harmondsworth, Penguin.
- Pearson, E. S., 1973, 'Some historical reflections on the introduction of statistical methods in industry', The Statistician, vol. 22, pp. 165-179.
- Phillips, L., 1973, Bayesian Statistics for Social Scientists, London, Nelson,

- Plant, J. J., 1978, 'A workers' cost of living index', Radical Statistics Neusletter, no. 12, p. 3.
- Poirier, D. J., 1977, 'Econometric methodology in radical economics'. American Econcmic Review, vol. 67, pp. 393-399.
- Radical Statistics Health Group, 1976, Whose Priorities?, London, RSG
- Radical Statistics Health Group, 1977, In Defence of the NHS, London, RSG.
- Reich, C. A., 1970, The Greening of America, New York, Random House.
- Reichmann, W. L. 1970, Use and Abuse of Statistics, Harmondsworth, Penguin,
- Rose, H., and Rose, S. (eds.), 1976, (a) The Political Economy of Science, and (b) The Radicalisation of Science, London, Macmillan (jointly titled Ideology of/ in the natural sciences).
- Rose, S., 1976, 'Scientific racism and ideology: the IO racket from Galton to Jensen' in Rose and Rose (eds.), 1976a, above,
- Rosenhead, J., 1972, 'The BSSRS: three years on', New Scientist, 20 April 1972, pp. 134-136.
- Roszak, T., 1968, The Making of a Counter-Culture, London, Faber.
- Roszak, T., 1973, Where the Wasteland Ends, New York, Anchor.
- Sayer, R., A., in press, 'Some comments on mathematical modelling in regional science and political economy', Antipode,
- Science for the People, 1974, China: Science Walks on Two Legs, New York, Avon.

Science for the People, 1977, Biology as a Social Weapon, Minneapolis, Burgess,

- Shaw, M., 1975, Marxism and Social Science, London, Pluto Press.
- Silber, I., 1970, The Cultural Revolution: A Marxist Analysis, New York, Times Change,
- Sohn-Rethel, A., 1978, Intellectual and Manual Labour, London, Macmillan,
- Stanworth, P., and Giddens, A. (eds.), 1974, Elites and Power in British Society, London, Cambridge University Press.
- Triesman, D., 1974, 'The radical use of official data', in N. Armistead (ed.), Reconstructing Social Psychology, Harmondsworth, Penguin,
- URPE, 1978, US Capitalism in Crisis, New York, URPE (Room 901, 41 Union Square West, New York).
- Urry, J., and Wakeford, J. (eds.), 1973, Power in Britain, London, Heinemann.
- Werskey, G., 1975, 'Making socialists of scientists: whose side is history on?', Radical Science Journal no. 2/3, pp. 13-50.
- Werskey, G., 1978, The Visible College, London, Allen Lanc.
- Willer, D., and Willer, J., 1973, Systematic Empiricism: Critique of a Pseudo-Science, Englewood Cliffs, N.L. Prentice-Hall,
- Young, B., 1978, 'Getting started on Lysenkoism', Radical Science Journal, no. 6/7, pp. 81-105.
- Ziman, J., 'The Council for Science and Society', Bulletin of the Atomic Scientists, vol. 31. по. 2. рр. 18-20.
- Zubaida, S., 1974, 'What is scientific sociology?', Economy and Society, vol. 4.