

SCIENCE IS SOCIAL RELATIONS

by Robert M. Young

When I think back on all the crap I learned in high school

It's a wonder I can think at all,

And my lack of education hasn't hurt me none:

I can read the writing on the wall.

Kodachrome — it gives the nice bright colours,

Gives us the green of summers,

Makes you think all the world's a sunny day

Oh yeah

I got a Nikon camera.

I love to take photographs,

So mama don't take my Kodachrome away.

If you took all the girls I knew when I was single

And brought them all together for one night

I know they'd never match my sweet imagination:

Everything looks worse in black and white.

Kodachrome... (*chorus*)

Mama don't take my Kodachrome

And leave your boy so far from home

Mama don't take my Kodachrome away.

*There Goes Rhymin Simon*

CBS 569035 (1973)

**Gearing Up**

It is time to move on both in theory and in practice. It is time that our critiques of authoritarian and hierarchical societies - both capitalist and nominally socialist - and of their science, went on the offensive. It is time that our theories and our lives expressed struggle towards socialism and prefigured that social order in the process. We have had (or at least proclaimed) our counter-culture and our alternative technology. We now need to embark on the construction of a counter-reality and an alternative cosmology. Only socialist theory based on attempts to move toward socialist lives as a way to a socialist society, can produce socialist science.

A clearer, starker awareness of the full integration of science and technology - at *all* levels - into capitalism, can help us to achieve real solidarity between scientific and technological workers and the working class as traditionally conceived and to develop strategies for struggle for the mediators of authority, expertise and power in industrial societies. Scientific and technological staffs in teaching, research and industry are becoming proletarianized, but they remain incompletely so. Unless we are to wait and cheer and indulge in struggles which are unrelated to our mediating roles, we must look closely at the theoretical and practical struggles which are integral to scientific settings but arise from new left, student movement, feminist and life-style perspectives. But in order to do this in a way which has promise for contributing to revolutionary struggle - in order, that is, to avoid mere self-indulgent idealism - we must learn to see those settings in a new light which owes almost everything to the critique of traditional industrial struggles and settings.

There are three themes in this exploratory argument for seeing science as social relations. The first is the strategic exhortation that we move on, both in theory and in practice. The second is the conception of an alternative cosmology or counter-hegemonic world view, which I offer as a large step beyond recent preoccupations with questions which still lie inside an ontology and an epistemology which contain and express our alienated world view in modern science and society. We need to become much more aware of the metaphysical assumptions underlying modern science and to transcend that metaphysics and put meaning and value back into our conceptions of

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nature, science and society: to revive life and to reinvest nature and comradeship with our values. The third theme concerns the lives of radical scientists and technologists and argues that those lives should involve prefigurative struggle toward socialism by getting priorities right and letting other activities find their own level. For some of us this means self-protection from backsliding by means of burning some boats and/or biting some hands that have fed us or might do. For all it means combining trades union work with other prefigurative strategies in our lives and our institutional settings. For the most part these strategies have yet to be developed, and this essay is an exploration towards a working programme for radical scientists and technologists. It began life as a talk delivered to a British Society for Social Responsibility in Science conference on 'Is There a Socialist Science?', February 1975. Since then it has been much expanded and changed in the light of discussions and criticisms. Its shortcomings reflect my own background, which has been overwhelmingly more academic than industrial. I hope that comrades who are in solidarity with the basic orientation of the argument will redress the balance.

I know that the style of this essay is sometimes weird. I am trying to develop a way of writing which treads a new path between the didactic and the evocative and which aims, above all, to persuade. I know that in this essay I haven't got very far and am often most assertive when I am trying out a new idea and most heavy and evangelical when I would prefer to be gentler and more seductive. And there are repetitions as I try to win over comrades by different ways of illuminating a point in an attempt to be moving. I am trying to move on from earlier exploratory pieces in ways which reflect my own changing politics and life situation (I'm thinking, in particular, of 'Evolutionary Biology and Ideology: Then and Now', 'The Historiographic and Ideological Contexts of the Nineteenth Century Debate on Man's Place in Nature', and 'The Human Limits of Nature'). At least I've managed to get away from long discursive footnotes. The bibliography at the end of the article only includes items quoted or alluded to in the text. An annotated resources list which includes a wider range of intellectual means of production on issues raised by this and other articles in the *Radical Science Journal* has been prepared by the RSJ Collective and is available by post.

Lots of people have helped me to revise and rethink the position and presentation. I have managed to benefit from almost all comradesly critics, though I still haven't got right the interface between by argument and trades union and working class struggles. I hope, though, that I've made it possible for others to move forward on that front by raising the issue for scientific workers. Anyway, thanks especially to David Albury, Vic Seidler, David Dickson, John Goodman, Karl Figlio, Jonathan Cooke, Michael Young, Brian Hurwitz, Maureen McNeil, Luke Hodgkin, Charlie Clutterbuck, Les Levidow, Anne Cooke, Mike and Pauleen Hales, Bob Eccleshall, Simon Pickvance, Dot Griffiths, Michael Green, Brian Easlea, Jeremy Mulford, Loup Verlet, Gianna Pomata, Harvey Brown, Edward Yoxen. Gary Werskey, Margot Waddell, Joseph Schwartz.

If you ever feel lost in what I'm saying, it may help to note that my approach is to describe science as much as possible in terms drawn from marxist political economy and from the critique of industry and the division of labour. The economy and the factory are known by socialists to be social relations, that is, they are manifestations of the relations between social classes. I want to begin to familiarize us with talking about science in that way. An additional advantage of this approach is that it may help the radical science movement to bring into closer relations several tendencies which have recently begun to drift apart: theoretical and agitational, university and industrial, research and applied, trades union activities and life-style politics. I'm trying to improve communication and comradeship among these tendencies. For too long it has seemed that radicals who were also scientists were faced with two alternatives: separate their science from their political work in solidarity with the working class (seeing the science as relatively progressive) or abandon their science for full-time politics involving some mixture of industrial agitation and political work and expression in other areas of their lives. I am suggesting that there is much to do in our own labs and other institutions, in our own research and teaching and in our own lives and that when we have got into this radicalization our relations with the industrial working class in our own lives and labs and other sectors will be less patronising, voluntaristic and artificial. Once again, the project is to elaborate a strategy of revolutionary practice for people whose mediating role is based on expertise in a way which brings some of the advantages of that position to bear on struggle.

In the period between writing the first and the second drafts of this essay I have been attending a series of open meetings in London on aspects of 'Science and Socialism'. They were well-attended, though it was very difficult for people working in industry or for women with children to come at the set time. (A later time was agreed for a session by the Women and Science collective on the politics of contraception.) The meetings were deliberately held in a room over a pub in preference to an academic setting. The talks and the orientation were biased in favour of industrial issues, thereby rightly counteracting the theoretical and academic bias of many similar series. Yet it remained true that the overwhelming majority of the participants were earning their livings and spending their working lives in tertiary education and / or academic research. There is something faintly ludicrous about a group of people who teach and do research talking largely about industrial 'point of production' politics and not about struggles in their own places of work and in their own lives. There are - as I argue below - important lessons for such people to learn from and about industrial struggles in non-academic settings. But it is also important not to pretend that there are no special issues for such people. It is often stressed that more scientists work in industry than anywhere else. But many also work in education and academic research. I haven't seen the figures for chemistry, though I'd expect them to be biased toward industry. But there are 14,800 research biologists in the United Kingdom; 10,800 work in universities; 1,000 for the Agricultural Research Council; 900 for the Medical Research Council; 600 for the government; 1,500 in industry - 10%.

Yet the discussions were not concerned with problems of union organising and struggle in academic and research settings; the relations between research and teaching on the one hand and industrial struggles on the other; the needs and problems of research assistants; the exploitation of junior staff and students; the structure of teaching and laboratory situations; the production, reproduction, socialisation and maintenance of labour power; productive vs unproductive labour; direct vs indirect exploitation. I list these themes because they seem to me to be among those which need to be explored under the general strategy of where and how radical scientists can organise and struggle effectively.

**Socialist Science**

But in putting the issues this way I am already assuming that the argument is finished and that the title of the conference was rhetorical. I'm sure, however, that to most scientists, the answer to the question 'Is there a socialist science?' is either No, or at best, 'Maybe one day'. So let me briefly (because, as I said, it's time to move on) review the argument. We have moved on to the extent that most radicals would no longer wish to argue that science is neutral, value-free or exempt from ideology. There are still many who have not systematically applied that conclusion to all science, to their science, to their research or to their lives, but the conclusion is there - at least in theory. (I'll deal later with those who may not care much about science but certainly want to claim 'scientificity' for their brand of marxism.) We have also moved on in the sense that many radical scientists are trying to develop practices which are in solidarity with working class struggles, e.g., work on industrial health and safety and community science and technology. But many are still hung up on the special claims and status of science and experts.

If science is not value-neutral, then what values does it reflect, reinforce and reproduce? For a marxist there can be only one answer to that question: the ruling ideas of any epoch are the ideas of its ruling class. (In case you are wondering what I'd say about societies whose ruling class is not capitalist, I'd reply that I am talking about all hierarchical and authoritarian societies, both capitalist and nominally socialist. I know of societies which have begun to deviate from that norm but none which has got very far.) If we say that science is not value-neutral, then we must mean that science thereby gets included in the critique of values. In its radical form the critique of values is the critique of ideologies. Then science - not some science or some sciences some of the time, but *science* - is ideological. We live under capitalism, so we have capitalist science. We want to bring a different set of values into being, to bring about a new set of ruling ideas—ideas of a society without rulers, a part of a different ideology or world-view. We want to bring about a socialist society. It will, if we are vigilant, have a socialist science. I can imagine it, or some of it.

So: Is there a socialist science? No; no more than there is a socialist society. But is socialism possible? Yes, we are struggling to bring it into being. I can imagine it, or some of it. To repeat: science is not value-neutral; it embodies capitalist and other hierarchical values. Our values are aimed at bringing about a different world-view - an alternative cosmology - that of socialism. Our scientific practice is therefore aimed at becoming part of socialist science. If so, we'd better get on with it in that scientific practice. (By the way, if you don't think that science is part of the world-view in which it is practiced, then you think it's value-neutral and cannot believe in a specifically socialist science, only in science under socialism. You don't really have to disturb yourself at work until the industrial working class has produced the revolution. That's a relief, isn't it?) The problem is to move from science which *is* capitalist to science which *is* socialist. In practice, in our work and lives, the problem is to place our work in science - our social relations at work and in other settings - inside (not alongside) our socialism. That is the second sense in which it is time to move on: to change our work and the rest of our lives so that our socialism comes first. Not many self-styled radical scientists have got round to that.

#### No Relations Between Things

My title is meant to be provocative but not facetious. If we say that science is not value-neutral, that it is value-laden or ideological, then we say it expresses in complex ways - or mediates - how people treat each other. Ideology is not, on this argument, mere distortion or false-consciousness. World-views are ideological, and an ideology is a world-view. Science *is* ideological, though it is about the real world we live in as well. But that needn't be puzzling: capitalism is ideological, and I find that very real as well, don't you? Ideologies are based ultimately on conceptions of social relations. Comrades who find my conception of ideology (in which both science and marxism are ideological) strange may feel more at home with the Gramscian concepts of ideological hegemony and counter-hegemony, in which the stark science/ideology split is not so startling. On this view, hegemony is 'an order in which a certain way of life and thought is

dominant, in which one concept of reality is diffused throughout society in all its institutional and private manifestations, informing with its spirit all taste, morality, customs, religious and political principles, and all social relations, particularly in their intellectual and moral connotations.' (Williams, *Gramsci's Concept of Hegemony*, p.587.) I realise that I am going to the limit in extending the anti-scientism of Marx and of certain tendencies in the marxist tradition to include science itself. Much of the point of what I am exploring is to see the political consequences of that extension.

The struggle for socialist science prefigures how people should treat one another and relate to nature in a non-hierarchical and non-authoritarian world. The structure and practice of how people treat one another is called their social relations. So science mediates — ultimately *is* — social relations. Our world-view includes conceptions both of nature and society, with 'society' as a category which is more fundamental than, and more basic to, that of 'nature' (Lukács). It must follow that our science, however unobtrusively, is an expression of our social relations. Let me put the point another way. If we want to learn to talk about, and to bring into being, socialism and socialist science, then we have two tasks at the theoretical level. The first is to demystify capitalist society. Marxist writings (or at least the parts which are not scientific) have done a good job of demystifying capitalistic society. Now we must have the imagination, the nerve and the will to do that for capitalist science. It is part of the same task, but it is harder to see and to do. We are all successfully socialised into the separation of fact and value, of science and society. Now we have to put our world back together. Modern science and modern capitalism arose as a single cosmology in which fact and value are separated and upon which modern society and its scientific foundations were erected as a single edifice. This will have to be dismantled, brick by brick, including and especially those metaphysical foundations, since they, in turn generated the ideas of truth, objectivity, progress, rationality and human nature with which we continue to operate in science and technology.

There are concepts in marxist theory which are central to this task: *fetishism and reification*. Both are concerned with the representation of the relations between people as though they were relations between things. It sounds a bit strange at first, but socialist science means that we must learn to see that ultimately it is reification to treat the relations between things as though they were relations between things. I don't mean that as mere paradox: let me try to spell it out. If science is social relations, then the demystification of science entails the demystification of its reifications. In economics, the fetishism of commodities means that we see the thing the commodity-in a

mystified way and forget that it is human labour in a frozen form. Making a commodity transparent means seeing it as social relations-seeing how it came to be from nature (unqualified) by means of the process of human labour. Well, science reifies nature; it treats nature as things without values. (In the language of technical philosophy, it banishes final causes and seeks to explain all phenomenal experience in terms of primary qualities. But it's time to move on from conducting the analysis in that language.) If we are to make transparent the values in science and make explicit its ideological nature, then we must stop treating things only as things and see them as social relations as well. Different social relations - socialist ones - are inseparable from different science, different facts, a different nature and society. A separate category of 'science' would probably, it seems to me, become unthinkable once the reintegration of facts and values was complete. But that's trying to look farther over the horizon than I can see at present.

#### By Stages

We can take the point by easier stages (stages many of us have travelled), from the demystification of capitalist economic relations by successive approximations, to nature itself, i.e., from the alienation at work to the alienation of reality. We have little problem in understanding that commodities are fetishised social relations. As we tell that story, we can start with raw materials and carry the analysis all the way to the factory and the shop and the consumer. We can see the production, exchange and consumption. Marx, Engels and Lukács have made transparent the formerly opaque expression of social relations as economic ones, i.e., in the mystified form of inevitable and inescapable laws of nature. Sets of human conventions are presented in bourgeois economic theory as unalterable, natural determinations, and marxism demystifies these. Now we must apply that same analysis to the laws of nature themselves and demystify the existing conceptions of unalterable natural determinations and the attendant scientism, fatalism and deference to powerfully authoritarian experts. (At this point I always have to make a ritual reassurance: Newton's laws and the internal combustion engine 'work', and I don't think the external world ceases to exist when I close my eyes.)

[As David Dickson and others have argued, the same analysis applies to technology, which plays a central part in the construction of social reality. He and Edward Thompson and Andre Gorz and Stephen Marglin and others have shown that the claims of technological determinism in the development of the factory system and the division of labour, turn out to have much more to do with work discipline and authority than with anything inherent in the productive process, sources of power, access to raw materials and markets, or efficiency. And Loren Baritz, Alex Carey, Mike Hales, Harry Braverman and I have tried to generalise this critique to demystify scientific management and the management sciences. Notice that the argument is moving outward from bourgeois economics to industrial society and its products, which turn out to be social relations.

At this point in the argument we move on to various tendencies in the social sciences, from the avowedly bourgeois to the more symbolically marxist ones which concentrate on the social and ideological and cosmological constructions of reality. The unifying theme in these otherwise diverse tendencies is the perception that social worlds are negotiated and constructed and are the products of interactions among contending interests, groups and classes. The radical critique of science can thus draw support from such disparate tendencies as phenomenology, cognitive sociology, symbolic interactionism, labelling theory, ethnomethodology, the sociology of educational knowledge and its institutionalisations (including scientific knowledge and institutions), the study of socialisation, and the critique of everyday knowledge and everyday life.

My theoretical understanding, my imagination and my morale are helped most in this way by deviance theory - the study of those who are in some respects outside the prevailing norms of the society - since it helps me to envisage (and to bring about in small ways) the replacement of a vile norm with liberated deviations. I don't think I'm alone in this, since the theme plays a large part in our popular culture and fantasies. In recent films the theme of deviance has been pervasively appealing. Deviants who 'win' in a completely individualistic way: *The Graduate*, *M.A.S.H.*, *Catch 22*, *Paperchase*, *Charlie Varrick*, *Death Wish*, *Rollerball*, most cowboys. Deviant losers with whom we identify strongly: *Bonnie and Clyde*, *Cool Hand Luke*, *Hombre*, *Easy Rider*, *Steelyard Blues*, *Pat Garrett and Billy the Kid* (including *Alias*), *Thieves Like Us*, *California Split*, *Sugarland Express*, *Thunderbolt and Lightfoot*, *Mean Machine*, *Spirit of the Beehive*, *Lacombe Lucien*, *The Man Who Fell to Earth*, *Dog Day Afternoon*, *One Flew Over the Cuckoo's Nest*. These are complemented by deviance films in which the power of the normative social forces is ultimately crushing, in which reality (cops) is totally overwhelming (= robbers): *Serpico*, *Chinatown*, *Lenny*. Then there is, finally, the appeal of helplessness films, in which the natural or occult processes consume us or threaten to: *Don't Look Now*, *The Exorcist*, *Towering Inferno*, *Earthquake*, *Jaws*, *The Incredible Shrinking Man* and other fatalistic Sci-fi. An analogous domain which invites analysis of its reconciling versus its potentially liberating aspects is science fiction, in which science and technology are at the centre of our ambivalent fantasies.

Here we come to the borderlands between sociology and anthropology, where the critique of the constructed conventions of social reality reach out to embrace all of reality. Thus, the illuminating relativism of the anthropology of exotic peoples, when shined on our own society, may make the academic epistemologists nervous, but it is heartening for ideologues of the Left, Right and Centre because they can thereby imagine a society based on their respective values. The anthropology of knowledge invites us to see our educational and research institutions as social systems, our training as, e.g., doctors and scientists, as a process of socialisation, and our knowledge as a belief system. Instead of thinking of research labs and teaching hospitals solely as relatively congenial and efficient settings for discovering, propagating and applying natural knowledge, we must also come to see them as social institutions in which apprentices, manual workers, patients and other subjects are socialised into a belief system which we have hitherto thought to be a neutral and relatively transparent body of methodology and procedure, knowledge and therapy. The three elements - social system, socialisation, and belief system - are congruent with, mediate and reinforce (both directly and indirectly) the existing framework of order, power and ideology. In these factories for hierarchical and authoritarian ideologies, manner, matter and structure interpenetrate at all levels of theory and practice and training, including the definition and 'nature' of facts, findings, diagnoses, theories and therapies. The social relations of such institutions are the social relations of the society, so also are the things and therapies with which they are concerned. Bourgeois social sciences fail to make explicit the ideological role of the processes they interpret.

[The result of this perspective is that we can see science (I always mean to include technology and medicine, but it's tedious to go on

repeating them all) as part of the ideology of class societies. We can also - if we are serious utopians—see an alternative cosmology over the horizon: socialist science in a socialist society (if the category of 'science' remains). If we are to move into that world, we must cease to believe that inevitable historical processes will see us through or that one great push will do so. 'The Crisis of Monopoly Capitalism' is not something to count on in political struggle any more than 'the proletarianisation of scientists' is in our politics. Similarly, 'the Student Movement' of the late 1960s marched round the walls of Jericho seven times and even levitated the Pentagon, but both still stand. Instead of believing that capitalism's crises or youthful voluntarism will do the revolutionary job for us, I am suggesting that we take up those aspects of bourgeois social analyses and turn them to our own purposes, whatever their authors may have intended, and use the widespread perception that social and natural realities are negotiated, constructed, conventional and historically alterable - to get on with it in our own lives and institutional settings. (What we now know is how long and difficult and slow and shattering such struggles are and how many will be pushed too far and leave the struggle, perhaps to return, perhaps not.) The social sciences which offer us these perspectives tend to keep their consequences safely in the realm of theory and interpretation and fail to confront the issue of power (or do so in a way which has no agitational intent). Surely we can recontextualise them in subversive ways in order to demystify and disrupt in the service of a human world. In so doing, we can convert the so-called 'behavioural' and 'social' sciences' of psychology, sociology, criminology and anthropology into human practices, thus transforming their contemplative stances into constructive subversion in our own work and our own institutions. Of course, once these changes begin the arbitrariness of the disciplinary boundaries from the point of view of human use value, becomes apparent.

The main bulwark against seeing these disciplines as freely available for radical rip-offs is their own falsely conscious deference to the natural sciences as the locus of the ideal of certainty, of hard facts and reliable methods and theories. Many people who are convinced anti-positivists in the social sciences are, at a deeper level, positivistic in their deference to the methods, assumptions and (at least potential) certainty of the natural sciences. We need to reverse this perception, to remove the foundations from both the superficial and the deeper versions of the positivists' separation of facts from values and their naive belief in the 'empirically given'. In the sociology of knowledge an exception was made of mathematics and portions of the natural sciences: their knowledge was said to be on the whole exempt from relativism in terms of the social origins and location of theories and findings. As to the question of whether or not an exception is to be made of any portion of science, the very possibility of a specifically socialist science or specifically socialist sciences is predicated in the assumption that the answer must be: no exceptions.

### Marxism

In the previous section, I was taking the argument by stages: from commodities to technology and the division of labour; to the social sciences and the social construction of social, and then natural, reality; to the anthropology of knowledge, including scientific knowledge; and finally to alternative cosmologies. Or we can move on from these pathways. When I said it is time to move on theoretically, I meant that we should stop retracing all those steps every time. We know the path, but it is a long one, and we are very tired when we get to the end, when what we really want to do all lies ahead of us, and weariness too often overcomes us just there. A better way is to get straight to the point - to miss out the bourgeois sociology and anthropology of knowledge and its setting and go straight to marxism (always reserving the right to do a bit of review if it helps in a particular argument).

Thus:

A scientific fact appears, at first sight, a very trivial thing, and easily understood. Its analysis shows that it is, in reality, a very queer thing, abounding in metaphysical subtleties and theological niceties .... A scientific fact is therefore a mysterious thing, simply because in it the social character of men's labour appears to them as an objective character stamped upon the product of that labour, because the relation of the producers to the sum total of their labour is presented to them as a social relation, existing not between themselves, but between the products of their labour, i.e., between scientific findings. .... A definite social relation between people assumes the fantastic form of a relation between things.... This fetishism of scientific facts has its origin in the peculiar social character of the labour that produced them. (1:71-2)

In that passage I merely quoted the famous section of *Capital* on 'The Fetishism of Commodities and the Secret There of,' substituting 'scientific fact' or 'finding' for 'commodity'. The whole section reads very well when conceptions from science are slipped in place of ones from capitalist economic relations. For example,

The recent ideological discovery that the products of labour, so far as they are values, are but material expressions of the human labour spent in their production, marks, indeed, an epoch in the history of the development of the human race, but, by no means, dissipates the mist through which the social character of labour appears to us to be an objective character of the products themselves. (1:74)

These scientific formulae, which bear it stamped upon them in unmistakable letters that they belong to a state of society, in which the process of production has the mastery over men, instead of being controlled by him, such scientific formulae appear to the bourgeois intellect to be as much a self-evident necessity imposed by Nature as productive labour itself. (1:80-81)

I hope that you will agree that the substitution is an illuminating way of alluding to the growing marxist literature on fetishism and extending it to the natural sciences Here is Marx looking back over his shoulder at bourgeois epistemology: 'To what extent some radicals are misled by the fetishism inherent in scientific findings, or by the objective appearance of the social character of labour, is shown, amongst other ways, by the dull and tedious quarrel over the part played by Nature on its own in the formation of scientific theories' (1:82) Lest it be thought that only Marx invites this substitution of the scientific for the economic fetish, here are a few (similarly modified) lines from J. Friedman on 'The Place of Fetishism and the Problem of Materialist Interpretations' from the first issue of *Critique of Anthropology*: 'Fetishism of scientific facts and theories is defined, then, as the transformation of underlying social relations of production into the form in which they appear as the subject of those relations .... Social relations of production are primary and the fetishised facts and theories are the only way in which these relations appear.' (31-2) For people in society, things are social

relations We do not encounter nature unfashioned and unmediated. Just as commodities are social relations, facts are both commodities and social relations and science is an integral part of the capitalist mode of production.

The task of freeing ourselves from deference to hierarchical society and its science is a unified one. At the theoretical level, that task will be complete when we see that the following expressions are synonymous, when we grasp their inward meaning and realise that they represent a set of eminently alterable conventions: fetishism, reification, alienation, division of labour, private property, hypostatisation, misplaced concreteness. In the paradigm of explanation of modern science, alienation is built into the fabric of ultimate reality (or 'ontologised') by the substitution of a reified version of what we consider to be real. In our socialisation into a scientised cosmology we learn to *experience* this as the most concrete rendering of reality: this is misplaced concreteness, an ontology of reification. As David Dickson and Michael Young have helped me to see, we are socialised via the hidden curriculum of schools and in our later scientific education into 'a system for producing explanations in a particular *form*, one that can be linked to the *forms* of technology (the means of production) on the one hand, and the *forms* of social exploitation (the social relations of production) on the other' (Dickson). The cosmology of modern science lays down the metaphysical assumptions in terms of which scientists and other experts think, ask questions, evaluate answers, control nature and other people and are controlled. David Dickson sometimes calls it the

'coding mechanism' or 'generative structure'. It is very deep and abstract and not on the surface of everyday life and science, at the same time that its forms define and generate the rules, vocabulary and definitions of what we experience as the stuff of experience itself, of facts, of theories, of sciences, of worlds, of the cosmology: the logos of our cosmos is the scientific cosmology. We learn it by living it.\*

Once we begin to think of science as part of the problem of freeing ourselves from the cosmology of hierarchical societies, we get two immediate benefits. The first is that science no longer has a privileged place, inducing deference and fatalism, serving as a spurious reservoir of authoritarian claims by experts. The fruits of that demystification grow and deepen the roots of our socialism as the awareness penetrates through our attitudes, beliefs and 'certainties'. The second benefit is that all sorts of alliances between science and power get demystified, and radical critiques of them become apparent.

This is, of course, not a new insight from the opposing point of view of the wielders of power. In one of the earliest theoretical apologies for the vile system under which we live, Andrew Ure's 1835 treatise on *The Philosophy of Manufactures or an Exposition of the Scientific, Moral, and Commercial Economy of the Factory System of Great Britain*, we find the following conclusion to a long, rhapsodic exposition of automation in spinning: 'This innovation confirms the great doctrine already propounded, that when capital enlists science in her service, the refractory hand of labour will always be taught docility.' (368) The same expansive enthusiasm for using the reifications of science and technology to produce the reification of people shines through the theoretical and autobiographical writings of apologists for successive developments of industrial capitalism, for example, Adam Smith, Josiah Wedgwood, W. Thompson, Charles Babbage, F. W. Taylor, Elton Mayo, Henry Ford, Alfred P. Sloan Jr. (GM), Thomas J. Watson (IBM), Harold Geneen (ITT), Eric Trist - covering the two centuries from 1776 to the present. The opposite approach to the role of science in industry lies at the heart of Marx's critique of the relations of

\*Lest it be thought that these claims can find no warrant in marxist exegetics and that I make it up as I go along, have a look at Lucio Colletti's lucid 'Introduction' to the Pelican edition of Marx's *Early Writings*, especially pp. 37-8, 47, 49, 50, 54; cf. pp. 26, 33, 39 and, for a fuller development of a relational interpretation of Marx's synonymy, see Ollman's *Alienation, passim* and his 'In Defence of "Internal Relations"', in which he points out that although Marx sometimes distinguishes things from relations at another level he characteristically treats things *as* relations. See also Arato, *Telos* 11, p. 25; Hernandez, *NLR* 72, p. 103; Eccleshall, *Radical Philosophy* 11, p. 9. Finally, if my conceptions of ideology as a world view, of alternative cosmology and of prefiguring seem weird and without precedent in marxist writings, try thinking of them as developments from Gramsci's critique of scientism in marxism in his conceptions of 'ideological hegemony', 'counter-hegemonic world-view' and 'prefigurative struggle'. See Boggs, G. Williams and Gramsci, among other writings in the bibliography and resources list.

production under capitalism. One statement of his conception of the role of science in this system is:

[In capitalist society] all means for the development of production transform themselves into means of domination over, and exploitation of, the producer: they mutilate the labourer into a fragment of a man degrade him to the level of an appendage of a machine, destroy every remnant of charm in his work and turn into hated toil; they estrange from him the intellectual potential of the labour-process in the same proportion as science is incorporated into it as an independent power, they distort the conditions under which he works, subject him during the labour process to a despotism the more hateful for its meanness. (*Capital*: 1:645; cf. p. 361)

The common matrix of the social relations of production, including nature, science, human nature and industry is already clear, as Colletti shows, in Marx's *Economic and Philosophic Manuscripts* of 1844:

In the section entitled "Private Property and Communism" Marx describes how "man's relation to nature is directly his relation to man, and his relation to man is directly his relation to nature", and this should be placed alongside his subsequent remarks on industry: "Industry is the actual historical relationship of nature, and thus of natural science, to man . . . the history of industry and industry as it objectively exists is an open book of the human faculties and human psychology which can be sensuously apprehended." That is, just as inter human or social relationships are inconceivable apart from man's relationship to nature, so his relationship to nature (and hence industrial production) is inconceivable apart from men's social relationships among themselves. Introduction to Marx's *Early Writings*, p.56)

Our conceptions of these issues are, as well, part of a single problematic matrix. As Murray Bookchin points out, both people and nature have always been the common victims of hierarchical society; the concept of dominating nature emerged from the domination of some

people by others. (*Post-Scarcity Anarchism*, p. 17). Once we transcend the separation of science from society, we can see that having demystified commodities in the economy as well as efficiency, authority and technology in the factory, we must move on to demystify science in order to reunite nature and humanity.

### Science and the Division of Labour

In some areas it is relatively easy to see that science is social relations. Once we demystify the myth that in a lab 'We are all a team working together', we can see the caste and class structure of the workbench and the tea room. We learn to notice the structures of who can tell whom what to do, who makes decisions about appointments and tenure (i.e., who has the power, however much 'consultation' may occur), whose names go on papers (and in what order), who decides the direction and priorities of research, who gets paid how much and on what length of contract. Science perfectly reflects the existing division of labour in a class, hierarchical and authoritarian society. How many of us know (much less alter) the spread of pay at their place of work; how many have an equal say about appointments; how many take it in turns to scrub toilets or even wash glassware in a lab or empty bedpans in a hospital, much less fix the tea and make and serve meals? These may seem merely naive and utopian questions: I intend them to be both, but not merely so. We may have become aware of and begun to change aspects of the division of labour in the family as a result of the women's movement, but I think it's a rare scientist who has applied the same attitudes and critique to his or her place of work, as are by now becoming commonplace when thinking about the division of labour in the home and in industrial factory settings. Something seems special, exempt from critique, about the hierarchical division of labour in scientific and medical settings. At the cinema we can laugh sympathetically with Charlie Chaplin tightening nuts at speed in *Modern Times* or be moved by the woman in *Family Life* monotonously putting chocolates in a box. But how many of us fully grasp that the production of scientific knowledge involves the same hierarchical division of labour and proliferation of sub-specialities as the production of any other commodity? Yet if you ask a scientist almost anything, the reply will be, 'That's not my field'. Specialisation and fragmentation of knowledge and research - and journals - grow and grow. By 1967 there were 26,000 scientific and technological periodicals; there were 4 in biochemistry in 1900 and 201 in 1960. Even the division of labour among summarising and abstracting journals is getting out of hand.

The power relations which we deplore in Beynon's *Working for Ford* exist closer to home, as André Gorz has recently stressed:

The subordination of the laboratory technician or anonymous researcher to his or her boss, and of the latter to the head of the research department, is not very different, in most cases, from the subordination of the assembly line worker to her or his foreman, and of the foreman to the production engineer, etc.... The hierarchy in the production of science is as oppressive as that in factory production.

Science reflects, reinforces and, more over, is an integral part of the social division of labour, the capitalist relations of production and capitalist power politics. ('The Scientist as Worker', pp. 15-17) A central aspect and a pre requisite of solidarity between scientists and other workers is that both come to see their involvement in a common political and economic structure.- the general one of a commodity society and the specific one of a factory for producing commodities and their attendant social relations.

Another area in which it is relatively easy to see science as social relations of the same sort as in other parts of the economy, is in the funding and conduct of research, but this can be done at very different levels. The arguments for seeing science as responding to the needs of the people's rulers rather than to those of the people themselves, have been well-illustrated in the critiques of the Rothschild 'customer-contract' government proposals in Britain as well as in specific areas of research, for example, sickle-cell anaemia in America and sensory deprivation in Britain and Ireland. Financial pressures on research institutions from Science Research Councils and other funding agencies are increasingly causing a shift to areas called 'fundamental applied science' where the ideological/political component is becoming more explicit through direct attempts to cater for the needs/demands of a market economy. Science cities oriented toward research-based industry, e.g., in the Boston/Cambridge area and now being built in the other Cambridge as a speculative college investment, are tangible signs of the growing integration of formerly-ivory towers with high technology industry. No one should oppose research based on use-values, but the emphasis seems to be on exchange-values in these cases.

Bourgeois fashions and capital's requirements in research and the technology of repression and of consumerism are familiar and important topics. So also is the ideological nature of certain other areas of research, but here, as in work on the hazards of work, it is often possible to stop at the level of use/abuse and fail to see that the whole underlying rationale is ideological. Thus, in the British Flixborough disaster in which 28 people were killed and 150 injured on a Saturday, the whole process for making caprolactam was ideological. The official enquiry blamed a dogleg in a 20" temporary bypass pipeline carrying cyclohexane past no. 5 storage tank. There was said to be no failure of management even up to the level of the board of directors of Nypro UK Ltd. The 'modifications were the real root of this' said the Chairman on BBC TV, and the explosion was explained as 'a series of errors unlikely ever to be repeated.' But this whole process for making Nylon 6 was based on the need to get round a rival firm's patent, even though the synthetic route was highly explosive. Not, therefore, a problem of careless maintenance: the whole basis of the plant, its siting, its product, and its processes were manifestations of capitalist ideology. An analogous critique of the Seveso disaster in Northern Italy could be made.

Analogous things can be said of the so-called 'scientific' research on IQ. As Les Levidow is showing, the point is not merely that the concepts of race, heredity, and environment and their relative proportions, are ideological and that the statistical methods are dubious and the selection of tests and cases biased. The deeper issue is the ideological basis of the whole set of assumptions projected onto (human) nature about ordinal, meritocratic, quantitative and competitive intellectuality, whether seen as a single factor 'g', whether 'convergent' or 'divergent', whether measured by culturally or linguistically biased tests or not. 'Such assumptions reify a bourgeois social relation, "intelligence", as a "thing", i.e., as a natural form of private property possessed in varying quantifiable degrees by all human beings and produced proportionately in relation to other "things": genetic endowment and environmental conditioning,' (sez Les). In my utopia such traits are not experienced: the collective works together with mutual aid until everyone is satisfied.

In all these cases- in technology and in science - the ideology establishes not only the details but the conceptual framework within which

the work is conceived.

### What Needs Doing—Theoretically?

In the previous sections on 'Science as Domination' and 'Science and the Division of Labour' I have been discussing aspects of the social relations of science which are not familiar to most scientists who are also radicals in their politics but which benefit from being considered in the same framework as the critique of the factory. However, though unfamiliar, they are not particularly novel or unpalatable for socialist scientists, even though many have not as yet seen the need to act by joining trades unions and actively struggling with other workers to overthrow capitalism. The deeper claim that the theories and findings and world view of science should be seen as social relations is, of course, much more unfamiliar and challenging. I don't know what other meaning to attach to the conception of a socialist science, and it is intrinsic to that position that the theoretical vision is inseparable from bringing it into being by prefiguring the end in the means in the work and lives of radicals. That is the revolutionary meaning of saying that real history is not about ideas or machines or people: it is about where they meet, about practice. In the light of the unfamiliarity of the conception that science is social relations it will be hard for many radicals to move to that position from the one I have been reviewing, in which the social relations of science are like other social relations in a capitalist society. How, then, can we make it more accessible? It may help to connect it to a controversy which is more familiar: the philosophy of nature of Herbert Marcuse and the criticisms of it. His conceptions of science, of nature and of the necessity to change them in order to bring about liberation, are most forcefully expressed in chapters 6, 7 and 9 of *One Dimensional Man*. Many of the controversies about science and ideology in recent years are importantly related to the issues which he discusses there, e.g., relevant work by Habermas, Schroyer, Schmidt, Leiss, Cohen. Marcuse is certainly the fountainhead for many aspects of recent libertarian views on science and ideology. It may therefore be useful to give a sharp criticism of his position as away of helping sceptical comrades to find their critical bearings, and also as an introduction to the theoretical tasks imposed by this perspective.

It is a thesis which my argument shares with Marcuse's that 'the scientific undertaking itself projects a specific set of ideological and societal assumptions.' In his essay on 'Natural Science and Human Theory: A Critique of Herbert Marcuse', Peter Sedgwick complains that Marcuse draws his examples from easy prey:

The only examples he quotes from actual scientific work come from the conformist wing of applied sociology, a field where the social values of the researcher obviously have a specifically determining role. Investigations from physics, chemistry, biology or psychology are never instanced in the text. Without some such exemplification, Marcuse is hardly justified in speaking of a general 'shift in theoretical emphasis from the metaphysical 'What is . . . ?' to the functional 'How . . . ?'." If he had taken a look at some general texts in physics or biochemistry, for example, he would have found that the actual objective language in which sub-nuclear particles or protein molecules are discussed suggests that the scientist's continuing concern is, as ever, with a highly *non*-metaphysical 'What is . . . ?' Until he can provide some harder detail (similar to that, e.g. which links medieval scientific concepts with the total medieval world-view), Marcuse's intriguing suggestion that in a liberated society 'science would arrive at essentially different concepts of nature and establish essentially different facts' is utterly vacuous. (175)

Here, then, is a trenchant challenge. In the decade since Sedgwick wrote, a lot has been published to meet his call in the areas of psychology and biology, and some suggestive work has been done in mathematics and physics by Bloor and Forman, though their analyses are limited by their stopping a long way short of marxist analyses. Nevertheless, Sedgwick's challenge still stands. It brings us to the holy of holies—to the point where those who don't want to radicalise their science and their lives always go fastest. 'What about physics? What about molecular biology?' One feels frog-marched up to a fractionation column, an ultracentrifuge or a linear accelerator: 'OK, smartass, what's ideological about that? Show me *my* science, *my* findings, are mediations of social relations.' At the conference where an earlier version of this paper was first presented, an old left communist professor of physics made a snide joke about over-enthusiastic pioneers in new cities in Siberia claiming that revolutionary zeal could change the second law of thermodynamics, while a liberal professor of molecular biology claimed that there are still congenial labs in which one can work on relatively untainted research problems. But at the same conference Luke Hodgkin on physics, Simon Pickvance on molecular biology, Mike Cooley on trades union struggle and Althea Jones on scientific imperialism, made contributions which begin to answer Sedgwick. In fact, Althea Jones even taught us about colonialism and deference in scientific apparatuses. Even so, the demand is fair and sets a hard task for analysis and struggle, though it is worth noting the alacrity with which it is made, the framework for an acceptable answer, and the criteria which are self-serving and positivist: 'Until you convince me, I'll go on cultivating my garden, my status, my salary, my power and patronage and loving it.' We must ask, in a hectoring way if necessary, 'Why spend so much time and energy attempting to exonerate physics if special claims aren't (however implicitly) being based on it for ultimately scientific purposes?'

In spite of all the questions we may want to ask in return, the challenge remains important and brings us to another sense in which we have to move on. We need to conduct the theoretical analyses—not because they require it and not via the traditional history, philosophy and sociology of science and technology, but—for our own purposes as marxist revolutionaries. We must analyse ideologically the scientific world-view, particular sciences, particular traditions, particular theories and particular diseases, showing how they mediate and come to reinforce the formations and socio-economic structures of particular epochs and settings. In his criticism of Marcuse, Sedgwick grants the link between medieval scientific concepts and the total medieval world-view. We must analyse that same connection in the succeeding period, since it was the one in which the metaphysical foundations of modern science were being laid. Radicals—and even radical scientists—who are fairly well-up on what Lacan or Althusser or Mandel or Colletti was thinking last Wednesday, who feel that they should know something about pre-capitalist economic formations—still know little or nothing about the metaphysical assumptions of the modern world-view and have no sense of needing to know anything about them or their ideological role. In order to change this situation and meet the challenge about the development and deepest assumptions of modern science and society, we must move on to make more subtle and more political the existing marxist analyses of the so-called 'Scientific Revolution'. For example, we should show the structural congruence between the political theory of possessive individualism and the development of seventeenth century atomism; the identity of the movements which enthroned the commodity form and exchange value at the expense of

use-value on the one hand and enthroned modern scientific explanations and banished purposive explanations on the other; the ideological compromise inherent in Cartesian mind-body dualism; the relations between the 'mechanical philosophy' and the development of capitalism and the Protestant ethic; the relationship between *forms* of analysis in science and the forms and stages of economic activity, e.g. in the histories of mathematics and statistics. We must also look at the claims and the politics of the alternative cosmologies of, e.g., the Hermeticists, the alchemists, the millenarians the neo-Platonists and study the ideological struggles which were involved.

These are not new topics for historians, even marxist ones. But they are new ones for the second generation of the New Left, who look to history with a transcendent eye and with a richer framework of interpretation than the 'vulgar marxist' theory of one-to-one correspondence between the intellectual and cultural 'superstructure' and the socio-economic 'base'. We are interested in history for the agitation we can get out of it, for the knots it can untangle about the origins and structure of our present forms of deference and mystification. For example, the critique of the banishment of final causes in science helps us to understand and combat current bureaucracies; the critique of Cartesian mind-body dualism helps us to struggle against medical hegemonies and to develop our sense of being a person. We look to history for lessons and warnings and morale-boosting precedents—all thoroughly disreputable motives for all but a few old left scholars. And the warmth of those few shines through their work so that they can speak directly to younger people; I am thinking particularly of E. P. Thompson, Raymond Williams and Stuart Hall. Conversely, a new brittleness and desiccation radiates from some of the certainties of their putatively 'New' Left successors.

Moving on into the eighteenth century, we need to examine the links between biological and medical theory on the one hand and the development of social and political institutions and philosophies, looking deeper and more overtly politically than, e.g., Michel Foucault. Looking at diseases in particular (in this and later periods) Karl Figlio suggests examining the relationship between the 'recognition' of a disease and the social niche for it—a convergence between role theory in illness behaviour and the socio political construction of reality. In the late eighteenth and nineteenth centuries the relations between biological and social and economic theories in the context of radical and revolutionary movements, have begun to be investigated, as have later developments in evolutionary, psychological, imperialist and entrepreneurial theory, e.g., from Malthusianism to social evolutionism via Darwinian and Spencerian evolutionism, and from the Idéologues and Lamarck to French biological, psychological and social theory and clinical medicine. As we consider the ideological nature of science we shouldn't forget that the concept of ideology itself is also historical. The original Ideologues were people in France at the end of the eighteenth century who were posed psycho physiological problems (via the 'mind-body interaction') when the blade of the guillotine fell. They saw it as their general task to subject the ideas of science to their science of ideas—*idéologie*. Successive layers of pejorative connotation were added by Napoleon's opposition to their influence and then by Marx and Engels' analyses, which almost led to the equation of ideology with false consciousness. Similarly, 'positivism' was originally a term and a secular religion coined by Auguste Comte, who was greatly influenced by physiology and phrenology. Emile Durkheim's classical treatise on *The Division of Labour* owed much to Comte, to his master Saint-Simon and to Herbert Spencer's theories on the 'physiological division of labour'. American reactionary social theory, e.g., Talcott Parsons, was inspired by an eminent physiologist, L. J. Henderson, who was able to lend strength to his ultra conservative reaction to radicalism in the American depression by serving up Pareto's fascistic social theories buttressed by physiological analogies. I know that I'm sketching; all I want to convey is that at every level there are important links between scientific traditions and the growth of urban industrialism and the division of labour (in France, Germany, USA and Britain) which must be made more explicit and then tied firmly to the development of modern sociology, anthropology, economics, psychology, ethology, physiology, medicine and biology. After all, Nobel Prizes have been awarded to the creator of pre-frontal leucotomy (Moniz), to a reactionary theorist of reactionary theories of brain function (Eccles), and to an ex-apologist for Hitlerian racism who won fame as an interpreter of nature's inevitable hierarchical ways and who applies the same framework to the interpretation of young radicals and society's ills (Lorenz). Various forms of biologism continue to thrive, the most recent being E. O. Wilson's *Sociobiology*, hailed in the London *Sunday Times* as 'a new branch of science' (6 June 1976) and Richard Dawkins' *The Selfish Gene*. All of these manifestations of social Darwinism seek to turn our gaze from human praxis toward biological determinants.

Once we have removed our blinkers and looked deeper into the constitutive role of social formations in science and the dialectical relations between science and social formations at every level, we must also reconsider the alternative visions of, e.g., William Blake, William Morris, John Ruskin, A. R. Wallace, Peter Kropotkin. It is as well to remember that there have ever been alternative cosmologies and also unsung radicals whose histories have been minimised or ignored. In Dallas I studied more Texas history at school than the US, and the rest of the world put together, but it wasn't until recently when I read my son's copy of *Harvey Wasserman's* beautifully biased paperback *History of the United States* that I learned that in my home town there had existed one of the earliest and most effective radical newspapers and the earliest farmer's revolt against the marketing cartels. Similarly, the discovery in the wake of recent agitation that real black history was lost or stolen and women's history hidden, should encourage us to look both backwards and more broadly for solidarity.

Analogous studies have been conducted in the bourgeois sociology of knowledge with respect to the development of quantum mechanics and molecular biology. We must radicalise them. Similarly, the gamut of disciplines in the second industrial revolution—scientific management, operational research, cybernetics, computer science, systems theory—along with attendant developments in mathematics, await ideological critique, just as do their palliative expressions in industrial relations: job enrichment, workers' participation, industrial sociology and psychology. Moving closer to home, their radical critiques which are helping us to demystify the social relations of science and technology must not remain unexamined. The study of the labour process is itself becoming a candidate for a scientific radical orthodoxy. As David Albury is showing, we must not consider our sources of radical insight to be immune from political scrutiny—the work of Gorz, Marglin, Braverman. When we learned from Gorz that scientific labs should be seen from the perspective of the factory, we must return to discover the roots of the mediations which give scientific workers their false consciousness. When we have learned from Marglin that discipline was more basic than the needs of the mechanical processes of the new technology in the industrial revolution, we must look again at the technology and convert it into social relations. The history of technology is not a history of gears and mules and jennys alone: it is the history of choices and of practice. When we have learned from Braverman how pervasive the reification of the labour process has become, we must return and study the history of struggle and generate strategies for subversion.

Do we look at the past as though the present was not available for comment? No, we do so because these conceptions are alive in the present, but their oppressive political roles and ideological meaning are somewhat less difficult to discern if we analyse them by way of the unravelling of historical study; moreover, epochs from which we have some of the perspective of distance, help us to see more clearly where and how to attack in our own. Finally, showing that ideas and institutions and structures of social relations in other forms, have histories, helps us to recall that they are humanly created conventions which can be un-made by other people. They were thought up, created or 'discovered' by particular people in particular places at particular times. The weight of tradition *can* be lifted, and analysis can help us take its measure. Failure to do so in the 1960s produced the painful false euphoria which led radicals to believe that all bourgeois institutions are paper tigers, and many of us are pretty chewed up as a result.

I'll just mention one or two other examples of theoretical work which can help to demystify the ruling ideology and to contribute towards confidence that once a set of conventions can be seen as such, another set can be fought for. We need to look much more closely at the prevailing ideas of health, disease, adaptation and maladaptation and at particular aspects of the medical model and particular diseases. We think it not very controversial to consider Victorian fainting and Viennese hysteria as reflections of the lot of women in those societies. We must vigorously pursue feminist analyses of a current analogue-anorexia nervosa. Similarly, we must develop a medical sociology which looks at the relations between medical knowledge and medical hierarchies.

### Theorising Our Experience

Now, who is to do all this? I know someone working on some aspect or other of very topic I have mentioned. More importantly, perhaps, a growing number of them are not experts or professionally employed in the history, philosophy or sociology of science but are working scientists or people trying to live in non-conventional ways, who are attempting to break out of their positivist careerism and see the political nature of their work (or former work) and its setting. After I'd been doing this sort of thing for over a year I returned to an academic seminar in a department where I'd worked for a decade. I could feel the constraints closing in on what I felt able to say and even get myself together to think. The conventions of the academic division of labour and the pseudo-neutrality of discussion-astringently removing one's values from discourse to remain as vapours in the atmosphere-reasserted themselves with no trouble. Non-specialist are doing something to break down the existing division of intellectual labour., in which it's no accident that science and its social and political relations are studied in different departments and often in different institutions and in different ways, and this occurs in a way hermetically sealed from the rest of everyday ('private') life. In looking at their own research and settings, those conducting such studies are not becoming experts in a new meta-discipline. Rather, they are (often working collectively) learning to theorise their own experience. This seems to me to be another important respect in which the second generation of New Left radicals differ from their predecessors. What they have to say has to do with their own struggles and ambitions, their own intellectual, social, sexual, class and familial settings. They are breaking out of reading habits which consisted of a few key, highly specialised journals, one or two abstracts, plus 'cultural leavening' with *Nature*, *Science*, *New Scientist* and perhaps *Scientific American*, and are reading other things which aren't escapes from their work but attempts to integrate that context with their politics. That is, they are attempting to make sense of their own experiences, to interpret them as part of a set of relations. As Francois George has rightly pointed out, 'The division of labour is, first of all, the prohibition of access to the totality. (*Telos* 18, p.59)

We have to face the experience that becoming aware of the contradictions in scientific work is a painful process and that having embarked on a programme of theorising their experience, many people slip away, dragged down, demoralised, discouraged, defeated, dropping in. The problem of not pushing too far is very acute all along the front of the left, and providing sufficient support and solidarity to sustain commitment is a large task to which we have to devote more thought, caring and energy. At the personal level it is the problem of keeping collective work going in a way which is sufficiently rewarding and sustaining to compensate for the heightened contradictions in the rest of life.

Complementing this problem at the theoretical level is the need to make widely available a steady diet of counter-course materials for the sciences, technology and medicine-annotated reading lists for use by working scientists to bring to bear on their own work and settings. Historical, philosophical, politico-economical and other explicitly marxist writings must be produced, reproduced and critically interpreted. This, of course, is one of the main justifications for the existence in Britain of the *Radical Science Journal* and other radical theory publications and for their listing one another's contents and keeping in touch through the Radical Publications Group and disseminating their work more widely through the Publications Distribution Co-op. The aim is not to reproduce the existing division of labour and narrow distribution of publications. We want to fight against isolated specialists producing and reading narrow, though nominally radical, journals in each field.

### Which Marxism?

Once we move on from the use/abuse model, the bourgeois social sciences and the sociology of knowledge and go beyond the social relations of science and social relations in science, and seek to approach radical science as marxists, we discover that our troubles are only beginning. Anyone who is still awake and is in rapport with the spirit of my argument won't be surprised at this point, since it would only be a new version of scientism to claim that there is a unique, correct answer to the question, 'Which marxism?' One's reading of Marx, like one's philosophies of nature, science, individuals and society, depends on one's socialisation and class and hence one's essentially political and ideological perspectives. Of course, to say that is to reject

(notice that I don't say 'disprove' or 'show to be incorrect') those readings of Marx which make a sharp distinction between science and ideology and replace the authoritarianism of science allied with capital with the authoritarianism of science allied with a vanguard party. There are a number of interpretations of marxism which seek to base themselves on scientific certainty, beginning with Engels' more emphatic claims for 'dialectical materialism' and extending through Stalinism and its current theoretical scientism in the work of Althusser and his growing body of interpreters and followers. I am not suggesting that we have nothing to learn from this tendency but

am pointing out that the separation of the early 'anthropological', 'humanistic' and 'ideological' writings from 'mature', 'objective' and 'scientific' writings cannot be squared with the thesis that science is ideological. Put another way, if we could pay sufficient attention to the role of the sciences in serving and providing conceptual support for what Althusser calls 'Ideological State Apparatuses', we would find his distinction between scientificity and the ideological, unravelling until it is clearly seen to be merely the yarn that it is.

There are, of course, other claims for 'scientific' support for different readings of Marx. In the week during which I was preparing this, I turned to the AgitProp page in London's *Time Out* and found the following notice for Friday: 'Marx Memorial Library Spring programme starts with a lecture by Maurice Cornforth on "How Marxist Philosophy has its Basis in the Sciences" Adm. Free'. Thus, the orthodox Communist Party author of a three-volume treatise on *Dialectical Materialism* can quieten our uncertainties. I would argue that for a socialist the problem is the reverse: how to bring about a situation in which 'scientific' philosophy has its basis in marxism. I should also like to mention that various revisionist tendencies leading to the 'democratic socialist' position of parliamentary parties, also lay claim to a scientific basis for their socialism. Indeed, the original marxist revisionist, Eduard Bernstein, claimed that his doctrine of *Evolutionary Socialism* (1899) was based on biological evolutionism, and it was on this foundation that the German Social Democratic Party was founded (1898). G. B. Shaw and the British Fabians found the same arguments appealing, as did the first Labour Prime Minister, Ramsay MacDonald. Biological evolutionism was claimed as the solid foundation for quite a range of political positions-Kropotkin's Russian anarchism, Hitler's National Socialism, Mussolini's Fascism, British Imperialism, American Robber Barons, etc., etc.

But, you will say, the point is to determine which of these claims is the basis for the 'correct line'? Behind this question lies the asserted need for a basis for imposed discipline, and alongside that lies the fused metaphysical/ psychological need for ontological security. Without theoretical unity and discipline with an authoritative basis, how can we bring about socialism? My own answer to this cluster of closely-related problems is that imposed authority cannot bring about what I intend by socialism, so the development and propagation of a 'correct line' loses its hegemonic appeal. Ways to achieve socialism and the range of acceptable values and priorities within a socialist society require as permissive an atmosphere and framework as is consistent with the task of destroying capitalism and constructing socialism. I find a close affinity between the search for a 'correct line' on the one hand and the claims for 'scientific socialism' on the other. These, in turn, go hand in hand with competitive, dismissive and manipulative political processes on the Left which reproduce the very hierarchical and authoritarian structures and attitudes which we are trying to transcend. So, I am arguing against those versions of marxism which claim to be scientific, and I want to demystify what I take to be their scientism-a scientism which provides as spurious a basis for experts and authoritarians on the Left as it does in bourgeois societies and their nominally socialist hierarchical counterparts.

We are therefore left with the problem of generating our practice from experience instead of from the guidance offered by a 'correct line'. If we could spend a fraction of the energy gaining and theorising that experience as we do in arguing about 'conjunctures' and the like, we'd be on our way. I have spelled out my conception of the relationship between socialist science, the problem of ideology and the question of 'Which marxism?' as sharply as I can in the hope of making the debate on these issues an explicit one. My experience has been that certain theoretical and other sectarian advocates react to libertarian positions and discussions of science and ideology as though there is nothing to discuss and much to dismiss as snidely and offhandedly as possible. This, of course, can be seen to flow naturally from certainty. My point-which follows from my position-is to attempt to get it granted that there is something to debate. If there is nothing to debate on this front what follows below is pointless, since the conception of an alternative cosmology and the importance of prefigurative struggle embodying the ends in the means, become superfluous luxuries (an 'unscientific humanistic problematic', I think it's called) which socialists, in their urgent need to 'seize power' as 'efficiently' as possible, cannot afford. The sort of exploration I have in mind is a lot messier and is caught well in the matter and manner of the following passages from Christopher Gray's anthology of Situationist writings, *Leaving the Twentieth Century*:

All the main tactical and strategic debates between different groups of revolutionaries, all the possibilities they neglected at the time, should be re-examined: re-examined in the light of the failure of the whole traditional revolutionary movement. Marx is obviously the first person whose thought must be rediscovered; nor should this present much difficulty in view of the extent of the documentation and the enormity of the lies that have been told about him. We must also reassess the attitude of the anarchists in the First International, Blanquism, Luxembourguism, the Council movement in Germany and Spain, Kronstadt, the Makhnovists, etc. etc. Nor should there be any mistake about the practical importance of the utopian socialists. Nor, as should be obvious, is this just a question of a whole lot more books to read. Its sole purpose is to help in the construction of the new revolutionary movement-the new revolutionary movement of which we have seen so many signs over the last few years, including last but not least ourselves. It will be utterly different. We must understand these signs by reference to the classical revolutionary project, and vice versa. We have to rediscover the history of the movement of history itself, which has been so well concealed and distorted. Besides, when all is said and done, it is only the revolutionary project-plus a few experimental artistic groups which are, in any case, generally pretty closely linked to it-that offers any hope of truly living at all today: which allows us to take an objective interest in modern society and in the possibilities it contains.

There is no other way to be faithful to, or even to understand, our comrades of the past than to reinvent the problem of revolution. Why does this seem so difficult? Starting from the experience of a free everyday life-it isn't so difficult as all that; and more over it seems to us that a number of young people today are quite acutely aware of this. And to feel it strongly enough enables us to rediscover, to redeem, *our own lost history*. It is not difficult for the kind of thought which is prepared to question everything that exists. It is not enough not to have abandoned philosophy, as almost all philosophers have - or not to have abandoned art, as almost all artists have - or not to have abandoned real opposition to *contemporary reality*, as almost all political activists have. And those who have not abandoned philosophy, art and politics will find that all three lead to the same transcendence. It is only specialists, whose individual power depends on the power of a whole society of specialisation, who have abandoned the *critical* truth of their various disciplines in order to enjoy the more positive wages of their *function*. But all real forms of research flow together into one totality, just as the people will get together one more time to try to escape from their prehistory. (pp. 42-3)

### Experiencing Our Theories

If we turn to the question of what needs doing in practice, I want to argue that we must not only learn to make our lives and politics more coherent and attack the division of labour by theorising our experience. We must also develop an alternative social and natural cosmology which we strive to bring into being by experiencing our own theories. Thus, another way of putting the dialectical relations between theory and practice so that it embraces the essential notion of prefigurative struggle is to say: theorise our own experience and experience our own theories. Among the experiences we must learn to theorise are our theoretical experiences and their relations with our research and teaching, our trades union, our social, sexual, familial and most intimate experiences. In order to theorise those experiences, we must be in touch with them. That is, we must see the role of a vision of a socialist totality or counter-hegemonic world-view and try to implement aspects of its coherence as we attempt to dismantle the reifications, fragmentations and alienations of the existing cosmology and the lives it imposes upon us. The conception of a socialist science seems to me to lead directly to a call for this sort of cunningly utopian behaviour. Once we move from the belief that science is value-neutral, we must ask what values it involves. Once we move from the abstract relativism of the bourgeois sociology of knowledge, we are in the realm of competing ideologies which embrace all departments of knowledge, belief and living and are mediations of class struggle. Philosophies of nature, human nature and society are sets of conventions elaborated in the service of hegemonic sets of human values and social relations. People conceived of and shaped nature and society in particular ways as a result of their practical activities. 'As individuals express their life, so they are. What they are, therefore, coincides with their production, both with *what* they produce and *how* they produce.' (*German Ideology*, p.32)

If we want nature and society to have a different shape, we must make different productions and in different ways. Not only is science not neutral, but its role in bolstering and mediating authority and deference also helps us to see the need to address ourselves to cosmology itself. Once again, ideology is not-as is so often claimed by various marxists and certainly by bourgeois apologists-distortion. It is a hegemonic world-view embracing all of nature, life and society. The philosophy of nature of modern science and society is not an exception to that claim but an example of it, and positivism is its most potent social expression. Positivism claims to separate facts from their network of relations, evaluations and meanings. People who separate facts from values, science from society, and claim that their thinking is not ideological, are positivists. As E. A. Burt has pointed out,

There is an exceedingly subtle and insidious danger in positivism. If you cannot avoid metaphysics, what kind of metaphysics are you likely to cherish when you sturdily suppose yourself to be free from the abomination? Of course, it goes without saying that in this case your metaphysics will be held uncritically, because it is unconscious. Moreover, it will be passed on to others far more readily than your other notions, inasmuch as it will be propagated by insinuation rather than by direct argument.(p.225)

Burt was putting this point in his classical study of *The Metaphysical Foundations of Modern Physical Science*. We learn capitalist metaphysics in the same way as we learn all our other assumptions, and there is no point at which we will reach the 'end of metaphysics' any more than we had reached the 'end of ideology' when the agents of the CIA announced that we had in the early 1960s. Once we realise the inescapability of metaphysics at every level of experience, including scientific experience, we should relate it to the question of the evaluative and purposive dimension in science. Burt says, 'Now it may well be that science, despite its rejection of final causes, reveals the presence and functioning of values in the fundamental categories it selects and the ways it applies them. If so, then an adequate scientific metaphysics will not be able to manage without teleology in some form, and it becomes a question of first-rate importance what that form is to be.' (308)

It may appear that I am carelessly and repetitiously drifting back into bourgeois philosophy of science. My point in reverting to Burt's analysis of the origins and foundations of the modern scientific world-view, is to remind us that the critique of the deepest assumptions of scientific metaphysics leads directly to the problem of values. Now the next move is the big one. Once that problem is before marxists it can only be seen in terms of ideology, and we are then faced with an urgent task. If nature does not exist for us (in that we cannot relate to it) value-free, then we bring values to nature: we create and discover them in our interactions with nature. This is a process which calls for us to bring a world-view into being which competes with and replaces the existing cosmology of science and society. The critique of the most abstract features of scientific metaphysics here unites with the most concrete call for a liberating politics of everyday life at work, in the home and in other social relations. In order to attack repressive structures, we must learn to see them and to see how deep they go into the innermost recesses of our most abstract theories and of our interpersonal and psychological being.

#### Stock-Taking Interlude

I'm starting to lose my nerve, so I'd better try to stand back for a bit. I think that what follows has real strengths on the side of demystification but profound weaknesses on the side of specific practices which will bring into being an alternative cosmology or counter-hegemonic world-view. Much more development of strategies and techniques to generate and sustain prefigurative struggles is required, and I think I've only glimpsed at the problems. But I still think I've seen enough to make a beginning. Since writing the early drafts of this exploratory working programme, I've found that study of, and struggles about, the labour process provide a very fruitful orienting perspective which promises to unite industrial struggles and the New Left concentration on the politics of process (see below and my review of Braverman in *RSJ* 4). This perspective can avoid the extreme theoreticism of the history of ideas and the extreme anti-theoretical activism of a purely workerist strategy. By this I mean that the special claims made for science have led us to treat it and its history and its social relations (both 'inside' the scientific community and in its history and its relations with the rest of society-ultimately a false distinction since the deep structures of those sets of relations are the same) as different from other human practices by virtue of its scientificity. At the other extreme, the focus of many marxist groups and perspectives on the exclusive revolutionary role of the industrial working class (and the growing proletarianisation of scientific workers) has prevented us from seeing the need to develop strategies for praxis for the mediators-the experts in education, in scientific research and in science-based industry. (Time for another reminder that I always want to imply technology and medicine when I say 'science'.) So on the one hand I want to move toward the industrial model in saying that science isn't fundamentally different from industry and should be subjected to the same political and ideological analyses, while on the other hand I want to maintain that scientific politics need not be industrial proletarian

('point of production') politics alone. (This is a slightly misleading way of putting the position, since I would also want to say some things about enriching traditional models for industrial struggles.) Mediators of power and ideology have their own struggles which should be closely integrated with-but still have distinct aspects from-those of other workers.

One of the main reasons I have had for developing these arguments is to begin to search for a practice for these mediators. At the level of theory and related activities, some of us have been trying to get scientists out of the atheoretical and sometimes antitheoretical backwater in which it has operated, by working closer to other left groups in the areas of greater solidarity and cooperation in theoretical work and distribution of publications (e.g., Radical Publications Group and Publications Distribution Co-op). At the same time, we are trying to say to the rest of the Left that there is nothing very special about science deserving of the sort of deference it gets from radicals whose education led them to hold science in awe. So, we've had to get going in teaching ourselves some political theory, in working with other radical groups and in demystifying science to others. This is a beginning within the Left, but it leaves open the question of what expert mediators in science, education and science-based industry should be up to in their own work and living settings. It's no accident that on the one hand there are many highly-qualified people who have tried and failed to achieve some sort of voluntary proletarianisation, on the other the attraction of life-style and community politics has been very great often with painful results. What are they/we to do? How can we convert these insights and energies into politically relevant struggle?

I am arguing that our left perspectives after the collapse of the student movement, efforts of voluntary proletarianisation and the counter-culture, still have something to offer through analytical work and other aspects of prefigurative struggle to develop towards a counter-hegemonic world view. This is to be done by confronting bourgeois ideology and capitalist power in our homes, communities and institutions. Thus, sexual and life-style politics are central to the task. Our programme is certainly to join and work with whatever traditional trades union structures exist, but I think we have something else to offer as well. The existing metaphysical assumptions of science (which I've discussed at length in earlier writings) continue to play a central role in the ideological hegemony of the existing social order via its provision of claims to certainty and objectivity, underpinning and constituting hierarchical and authoritarian structures and social relations. It is as true at the level of theory as it is at that of other areas of life. As Marx says in a crucial passage in *The German Ideology*,

The production of ideas, of conceptions, of consciousness, is at first directly interwoven with the material activity and the material intercourse of men, the language of real life. Conceiving, thinking, the mental intercourse of men, appear at this stage as the direct efflux of their material behaviour. The same applies to mental production as expressed in the language of politics, laws, morality, religion, metaphysics, etc., of a people. Men are the producers of their conceptions, ideas, etc.- real, active men, as they are conditioned by a definite development of their productive forces and of the intercourse corresponding to these, up to its furthest forms. Consciousness can never be anything else than conscious existence, and the existence of men is their actual life-process. (p.37)

The union of the conceptions of metaphysics, including the metaphysics of science; the 'furthest forms', including the most esoteric and abstract science; and the rooting of these in life process-makes the essential connections for which I am arguing.

Thus scientific workers and other experts have a key task in beginning to demystify science and its role in authoritarian societies, both in theory and in practice. This is likely to be a relatively special task for them *because of* their mediating role, their education, their reading and theoretical understanding. If they conduct this work out of touch with trades union struggles, their own work will degenerate into idealist self-indulgence. But if it is done in challenging and changing the labour process in institutional settings in concert with working-class struggles, they may have an important contribution to make to progressive politics and revolutionary struggle. Now, having sketched some of the problems of the rest of this essay, what do I mean by New Left and process politics? Once again, it's only a beginning-an invitation to others to generate strategies and take the argument and the struggles further.

### The Old Left, The New Left and the Politics of Process

What I want to say now is all jumbled up, and I haven't got the right style or vocabulary to say it. But that doesn't mean that I think there are no stones for a solid foundation in it. I want to give some meaning and content to the conception of prefigurative struggle - to evoke a conception which I can't make properly explicit. I had thought of expressing it in terms of differences between the Old Left and the New Left, but it goes beyond that. Let me move backwards in time and try to creep up on it. What is so exhilarating and moving about Marx-even at his driest - is that he takes the framework which people experience as 'the way things are', the apparently unalterable laws of society imbedded in laws of nature, and he shows that although experienced as real and although historically necessary, they are part of a terrible, oppressive and exploitative confidence trick which will change partly as a result of its own developmental processes and partly as a result of people joining together in sustained revolt. Political economy is shown to be amenable to critical evaluation (hence the subtitle of *Capital*) and therefore to transcendence through struggle. What characterised the movement which was called the New Left was that it broke out of the restricting framework of Stalinism, preoccupation with the Soviet Union and official communist parties and laid great stress on participatory democracy and spontaneous initiatives by interested groups nationally and inter-nationally, involving direct action and confrontation with bureaucratic and police powers. Some aspects: Hungary; Krushchev's denunciation of Stalin; Castro's revolution; civil rights struggles; Campaign for Nuclear Disarmament; anti-Vietnam War demonstrations; Free Speech Movement and a growing number of student protests and occupations around the world but especially in America, Britain and Europe-as a significant new experience for that generation and for most of their teachers; revival of shop steward and related shop floor militancy; willingness to drop-out and experiment with new ways of living and new experiences, e.g., drugs and the further reaches of rock and progressive music; community struggles and particularly powerful interest-group struggles-blacks, women, gays.

All of these-in various combinations for different people-led to a revival of transcending and transforming strategies which moved further and further away from traditional revolutionary strategies with centralised organisations with hierarchical structures. A lot of the main texts of the period were written by the young participants, but there was also a significant revival and translation of authors such as Rosa Luxemburg, Karl Korsch, Antonio Gramsci, Georg Lukács, along with the increasing penetration of the early writings of Marx and

exploration of other dimensions of culture in the greater awareness of the Frankfurt School, especially Marcuse's efforts to draw upon and radicalise Freud and marxist social psychology. Much of the New Left goes on with its theoretical work, its fashions in translation and its increasing rigour and sophistication.

But there were elements in the above list which seem to me not to be adequately characterised by the label New Left, although they owe a great deal to the general ambiance. If we emphasize the libertarian and situationist and life-style aspects at the expense of the hyper-intellectual and formal ones, we get nearer to what I mean. The tendency I want to evoke has origins and a manner which is less relentlessly theoretical and priorities which are at once more immediate and more visionary. It involves a greater fusion of the personal and the political-making political work and relations more personal and personal relations more political. I recall someone once saying that he couldn't see how the production of a publication-questions of some people doing only editorial work and others doing only production-had anything to do with the significance of its contents. That's the sort of point of view I'm *not* trying to evoke. Efforts towards socialism should, as far as we can manage it, be examples of what we advocate. Above all, political and personal work should be *reflexive*. This perspective owes much to the principled naivety of the student movement and the struggles of the women's movement which had important roots in the way women were treated in the early 60s student movement. Opposers of oppression in one sphere, e.g., black Africans, Vietnamese peasants - should not oppress in other spheres, e.g., women, children, shy people. Music and/or drugs and/or altered life-styles and sexual relations were important for many people who share these reactions and use them as more important indices of others' politics than their supposed theoretical positions. Anti-authoritarians should not be in positions of authority in our own movement. Our conferences on self-management should be self-managed. Opponents of the hierarchical division of labour should not be heads of departments or labs. The hypocrisies of traditional parliamentary socialists and reformers produce endless examples of the issues-a Labour Minister of Health who is phasing out private beds in hospitals is found to have hired one recently. A Campaign for the Advancement of State Education finally passes a rule that none of its officers can have children in private, fee-paying schools, but only after protracted debate. Only socialist processes can produce socialist results.

Thus, competitive, individualist, sexist, patriarchal, authoritarian and hierarchical attitudes, ways of behaving and structures should always be struggled against in ourselves and throughout the movement. It may be very irritating and may break your train of thought, but it's always relevant for a woman to correct you when you say 'he' when it should be 'or she'. Discipline and work should come from commitment rather than from authority and hectoring. No mental labour without manual labour. Criticism and self-criticism are central to struggle. Those are some of the aspects of what I'm trying to convey under the heading of prefigurative struggle in the politics of process.

I wish I could think of a memorable phrase to put next to New Left. It's a new generation of consciousness and practice. 'Politics of process', 'politics of intimacy', 'politics of everyday life', even 'permanent cultural revolution' express aspects of the altered approach and commitment, but none of those phrases come trippingly off my tongue. 'Textures' versus 'structures', we called it in a commune I once tried to live in. If we cast our minds back to the Red Scientists of the 1930s Gary Werskey has studied, we later find them in charge of large labs with professorships and many other markers of hierarchical status and power. Some became heads of Oxbridge colleges and other elitist institutions. The same is true in the liberal arts. I recall one (who would not call himself a socialist but sees himself as radical) who said that he was elitist but not authoritarian. The approach I am trying to convey finds that claim absurd.

Power is not to be seized but dissipated: knowledge is to be socialised. Different aspects of one's life are to be considered in relation to the others: how and where one lives; who does what at home and at work; what boundaries are there/should there be between home and work? What characterises this approach is that it builds on Marx's analysis of the conventional framework of bourgeois economic and social relations, the New Left's analysis of the conventional framework of twentieth-century marxism, but it goes on to consider what aspects of other frameworks and boundaries are to be altered in bringing about socialism. And then it sets out to prefigure the ends in the means. This includes, by the way, the sort of exploratory and tentative way I'm trying to write, knowing that there are false starts and wrong trails and blunders. If we abandon the 'one right way' search for the correct objective line, we see the search for paths as a much more loose process. It's the antithesis of the hyper-clever and articulate philosophers who live off scoring. I used to encounter them in Cambridge with a mixture of fear and despising. They took great pride in stamping on tentative shoots, lest they turn out to be weeds. Never mind nurturing them in the hope that they might flower: we have to police the garden.

This is all an attempt to convey the second sense in which it's time to move on-the need for our socialism to penetrate and transform our science. But it cannot do that unless it is at the same time penetrating and trans-

forming the rest of our lives. That, perhaps, is the chief difference between new left intellectuals and prefigurative struggle. As Arlo Guthrie said of the inspecting sergeant at his military recruitment, 'leaving no part untouched'. Another expression of the same theme-relating theoretical work and the right to an opinion-is the Italian mother of ten's observation on the Pope's latest ban on contraception: 'He no plays da game, he no makea da rules'. I am still trying to find expressions which evoke the central reflexive or self-referential feature of the development beyond New Left politics, attempting to diminish the distance between theoretical work and practical struggles on the one hand and one's own life on the other. André Breton captured part of it in his 1935 'Speech to the Congress of Writers'. "'Transform the world,'" Marx said; "Change life," Rimbaud said. These two watchwords are one for us.' (*Manifestos of Surrealism*, p.241) Nearly forty years later Jerry M. Cohen caught the central point in a 'Discussion' in *Radical Philosophy*: 'Many of us, especially those on the libertarian left, believe that the character of the revolutionary movement must as far as possible be made to reflect and display the character of the society we want to build, that the character of that society will be largely determined by the character of the struggles of which it is the outcome.' (*RP* 4, p.25) Perhaps, then, I'm talking about what distinguishes libertarian socialists from other socialists: I'm not sure. Another evocation of the impulse I'm after is from a Situationist article on 'The Transformation of Everyday Life':

In fact, everything depends on the intransigence with which one is prepared to ask oneself. How am I living? ... In these circumstances, to evade the political problem posed by the poverty of everyday life can only mean to evade the complete boundlessness of one's own

demands to live life to the full—demands which could not lead to anything less than the reinvention of revolution itself. ... Alternatively, if we see everyday life as the frontier between the dominated and the non-dominated sectors of life, and therefore as its most problematic area, then it is vitally important we succeed in replacing the present ghettos by a frontier constantly expanding in every direction, ceaselessly creating new possibilities. (Gray, *Leaving the 20th Century*, p.36)

Yet it is painfully obvious to those of us who have tried, that we cannot advance on all fronts at once: we haven't got the resources and are too screwed up by our own socialisation and the contradictions in the society in which we live. We need to leaven our struggles with large reserves of compassion for ourselves and realise how crippled we are by our own contradictions. On reading this, Brian Hurwitz wanted it stressed even more and asked me to add a greater sense of the experience of struggle—'perhaps nausea—the hell and difficulty involved. One's depression and despair, feelings of fragility and helplessness. The whole tone is exceedingly gentle but working with people who hold to different aspirations and views of the world is an immensely lonely experience. A point of disagreement spreads into ever-widening rings of different and supportive beliefs, every one of which you want to stop at to sort out, but that just leads to more, and the original point is lost. You walk around wondering what the hell you're doing spending your life amongst such people.' He is a medical student, working in a hospital.

The problem is to avoid using this anti-millennarian realism as an excuse for doing nothing and to avoid the sort of violent reactivity which leads one to take out all one's frustrations with oneself and one's work situation on comrades, rejecting them because it's the only outlet when one is stuck with oneself and can't see a way forward in the job situation. Somehow we must combine relentless with forgiving struggle and to decide which contradictions to confront and which to live with for now (knowing full well what they are). The hope of transcending all at once is naive and romantic and denies that the hierarchical, authoritarian capitalist system is a *system* and therefore systematically expressed in the world in which we live, including our most intimate relationships and our secret hopes and fears. So, we are caught between, trying to move towards socialism by socialist means at the same time that we are constrained, squeezed and fucked-up in all sorts of ways by our contexts and ourselves. Reiche has captured the ghastliness as well as the promise of the situation:

Though therefore it may be true that the qualitative difference between the existing and a free society can only be established through a 'break in the historical continuum', it is equally true, firstly, that this break can only be theorized about in advance in categories, modes of thought and dreams bearing the hallmark of the existing society, and the oppression, exploitation and deprivation of liberty practised in it. Secondly, that it will have to be carried out by people who, though they suffer under this oppression, exploitation and deprivation of liberty, recognize them for what they are, and want to do away with them, are also marked, and maimed by them, in their most minute feelings and habits. And thirdly, that the free society can only be built up on the basis of the maimed and fettered capacities of unfree societies. Otherwise it would be meaningless to say that we already have the intellectual forces necessary for the realisation of a free society. (*Sexuality and Class Struggle*, pp. 165-6)

#### **Stark Alternatives: Productive Change or Reproductive Stasis**

So we're caught. But there really isn't any alternative to change except the reproduction of existing ways and structures, and we're supposed to be against that. As it is, radicals find themselves too often and in spite of their best efforts, reproducing aspects of competitive, defeatist and hierarchical structures in their radical work, while some groups even advocate such ways in the name of efficiency. It is very difficult indeed to make progress toward the production of socialist ways of doing things and away from the reproduction of existing social relations—even in our attempts to transcend them. If we turn this insight into the question, 'Is there a socialist science?' we find that there cannot be as long as we find it possible to separate our conception of socialist science from that of the rest of life. We see the need for our socialism to become the basis for our scientific practice (= social relations), but how can it possibly do that if it isn't becoming the basis for the rest of our lives? Similarly, the struggles which we undertake in our political work outside the narrowly scientific settings—in 'political groups' and in our social relations at home and elsewhere—must penetrate into our scientific work. Struggling against sexism, racism, ageism, division of mental from manual work, hierarchical division of labour, and so on in political groups and the home must not be sequestered, hobby-like, from the same issues 'at work'. Similarly, if we consider with care what practice to undertake in our political work outside the 'work' setting, why not inside it? What about careerism, what research, what status, what agitation? One begins to see why the claims for value-neutrality of science and for the use/abuse model had great appeal for scientists: they permitted the sequestration of scientific work and careers from the political process, just as it did for so long in industrial settings under the banners of 'production' and 'efficiency'. So, instead of walking the path of value-neutrality and the parallel one of isolated theoretical work, we need to define clearly and to pursue specific struggles, realising once again that one can't get on one's horse and ride off in all directions at once. If we don't prefigure, we'll reproduce the existing society, with all its division of labour, theory/practice split, sectarianism, careerism, and so on. How many radical activities have ground to a halt over structures inside the heads of the participants, soon after the excitement of the first wilful enthusiasm? So we must plan, always stretching ourselves but staying short of pushing too hard and too fast, breaking off and losing comrades whose frailties are different from our own. Of course, it is a high art to know others' breaking point and a higher one to recover comradeship once it has been discovered by going beyond it. Raymond Williams has touched the core of the separations which socialists must break down:

If socialism accepts the distinction of "work" from "life", which has then to be written off as "leisure" and "personal interests"; if it sees politics as "government", rather than as the process of common decision and administration; if it continues to see education as training for a system, and art as grace after meals (while perhaps proposing more training and a rather longer grace); if it is limited in these ways, it is simply a late form of capitalist politics, or just the more efficient organisation of human beings around a system of industrial production. The moral decline of socialism is in exact relation to its series of compromises with older images of society and its failure to sustain and clarify the sense of an alternative human order. (*The Long Revolution*, p.133)

#### **Some Examples: Factory and Lab**

Many activists in the radical science movement are impatient with liberal dithering and with theory divorced from action. Some of them have turned to the factory as an area for relevant intervention, believing that they have moved forward and shaken the dust of academicism from their feet. This process is parallel to moves made by political activists who became disillusioned and disgusted with the student movement and turned directly to working class neighbourhoods and industrial settings. The same has happened to certain radical publications, e.g., *Radical America*. There is so much to be done on so many fronts that this tendency can only be welcome, but must it be insulated from our understanding of research and academic settings? Scientists and technologists who have chosen to struggle on that front and make themselves available in the areas of industrial health and safety need not leave behind the critique of the university laboratory and the scientific research institute. On the contrary, experience in an area in which the social and ideological nature of science and technology are more direct and obvious should allow them to apply their critiques and their agitational programmes to the academic and research settings with devastatingly demystifying and subversive effects. This is particularly true at a time when the research being conducted at such institutions is being increasingly explicitly directed to capital's ends. Insight and agitation in the hazards of industrial work should therefore be brought back and applied to the disruption of the comforts of research careerism.

I am exploring this form of industrial activism, because it has led to a near-polarisation within the British radical science movement between industrial and community activists on the one hand and academic and theoretical tendencies on the other. Once again, we find ourselves in the radical movement reproducing the very divisions of labour which we are dedicated to breaking down. Let's try to reverse that process. Those of us whose work has hitherto been primarily in the history, philosophy and social studies of science and technology have much to learn from scientists and technologists who have learned to theorise their own experience and from those who have begun to work in particular technological struggles. I am thinking, in particular of Charlie Clutterbuck's work on vinyl chloride monomer and cancer and on agribusiness, Tony Fletcher's work on noise, Alan Dalton's on oil sprays, Pat Kinnersly's on hazards of work, Tim Shallice's on the technology of repression in Northern Ireland. And they have something to learn from research scientists and students of science who are working on historical, conceptual and social aspects of science and industry, including marxist studies of science as ideology and as production. Critiques of the mainstream of science and those of technology must become part of a single movement or we will merely reproduce the sectarianism which plagues the traditional left. The answer is not for those still at work in research and teaching to adjust their blinkers and remain preoccupied with abstract theory. Nor is it for BSSRS activists to devote all their energies to problems of industrial health. Theory without action is arrogant and empty, action without theory is truculent and blind. The need, once again, is to combine the important work being done in industry with agitation in research and academic settings and for academics to engage in agitational work and theoretical and applied aspects of industrial settings. We must have both critiques and militancy in both sorts of setting. If we can once see that the factory and the laboratory are part of a single mode of production and that the critique of the factory applies equally to the laboratory, we will have overcome one of the major obstacles to a unified critical and agitational strategy.

One example of bringing back the fruits of the analysis of the factory and applying them to the scientific setting, was the conference on 'Workers' Self-Management in Science' mounted by BSSRS in 1972. In the light of recent renewed interest in the industrial sector, the documents and approaches of that conference and related publications should be reconsidered. The critique of 'job enrichment' and the need for struggles toward self-management are more timely now than they were then, and more radicals appear ready to see the relevance and the limitations of that approach. Questions of undermining hierarchies, sabotage of authoritarian structures, the socialisation of knowledge and expertise, the collectivisation of decisions and the rotation of menial tasks are all part of an approach which is suitable to both the factory and the lab. Also common to both is the need to look again at the 'product' and to bring its nature and development into the realm of democratic debate among all producers and potential consumers (particularly important in the case of medicine). Similarly, the demystification of the means of production is a common theme: they confront the worker/researcher as objective and unalterable but are the results of decisions, priorities, struggles and human histories which can be changed. This is as true of ultracentrifuges and kidney

machines as it is of assembly lines and harvesting machines. Finally the conditions of work and hours are themes for common perception and change, just as are the mystifying and alienating dichotomies between work and leisure, factory and home. All of the arrangements about when one works, what one does 'at work' and 'at home' are alterable and negotiable human conventions. What we lack is the imagination, the will and the solidarity to change them. Why isn't ex-Prof. Driver in the crèche this afternoon while (post-doc) Anne is unloading the lorry and (ex-caretaker) Andrew is having a read or fondling with someone?

That example may strike you as feeble and wet. I don't want to disown it, but I do realise that the examples of what needs doing in this section are less textured and convincing than those in the section on what needs doing theoretically. This isn't surprising, since I'm obviously in a better position to make relevant subversive proposals in that domain because of my own socialisation. Activists in lab settings and in industry will have to develop their own struggles changing the relations of production, undermining authority, struggling to change research priorities. An excellent model for such struggles is the Lucas Aerospace Combine Shop Stewards Committee (see accounts in *Undercurrents* Nos. 12-16 or write directly for information to E. F. Scarbrow, Secretary, 86 Mellow Lane East, Hayes, Middlesex, England).

Scientists and technologists in industry are in the best position to learn directly from militants in trades unions and are increasingly seeing the point of doing so, as Mandel has pointed out:

The massive reintroduction of intellectual labour into the process of production ... has created the pre-requisite for a much broader layer of the scientific intelligentsia to regain the awareness of alienation which it had lost through its removal from the process of direct production of surplus value and its transformation into a direct or indirect consumer of surplus value .... This is the material basis . . . for the possibility of involving increasing numbers of scientists and technicians into the revolutionary movement. (Quoted in Gough, 'Marx's Theory of Productive and Unproductive Labour', p.71)

The further one gets from industry, the less obvious and the more mediated are the controls capital exerts. Consequently, the more

difficult it is to find and to pull the levers of change. In universities scientists and technologists, research students, and technicians are beginning to see the point of organising and joining the relevant trades unions, while the university authorities have already taken clandestine steps to forestall working class trades union power in their governing bodies. Under the headline 'Dons' secret memo against a "voice" for unions', the following item appeared in the *Guardian* on 11th June 1976:

Unions representing non-teaching staff in universities have been incensed by the discovery of a confidential memorandum from the Committee of Vice-Chancellors and Principals opposing trade union representation on university governing bodies.

The memorandum advises university authorities not to change their statutes to permit participation by non-academic staff, and to be "cautious about entering into commitments" in cases where the statutes would already allow it ....

The committee decided that universities were "quite distinct from companies" and should not draw parallels with "other organisations" which are actively moving towards employee participation.....

The memorandum went on to say that although individuals could be appointed to university councils "there were objections to the appointment of trades union representatives as such or to any formal commitment that a proportion of members of council would be chosen from non-academic staff, whether or not as representing trade unions."

The strength of the authorities' objections is sometimes a good sign that the radicals are doing something right. Surely this is a place to try to close the gap between staff, students and other workers—a point the *Times Higher Education Supplement* granted in an unusually shrill leader (25 June 1976):

... the idea that non-academic staff should be in a constitutional position to influence policy decisions which even indirectly affect academic questions probably seems wrong to all but a minority of young and radical lecturers - who may, after all, be members of the same trade union ....

But there are weightier objections to applying the principles of industrial democracy to higher education. Higher education is not (quite) an industry .... Universities must not be governed by a collection of representatives of assorted selfish interest groups, many of which have only a peripheral interest in the basic purposes of a university .... In a specific sense the government of higher education is best left to those who have devoted their lives to academic pursuits. In a general sense its government is the business of every citizen expressed through the democratic process. What it is most definitely not is the exclusive business of ASTMS, NUPE, NALGO -or even NATFHE or the AUT — in spite of their many good qualities. Corporate syndicalism, even dressed up in the demure clothes of industrial democracy, should not be allowed too much weight in higher education-or anywhere else.

The last time I heard that sort of rationalising rhetoric in such a pure form was in the American South before the days of the civil rights movement - 'Though nigras are fine people, we know best how to look after them, because we've devoted ourselves for generations to upholding the Southern Way of Life.' The feudal parallels are not accidental. The barriers that university workers at all levels have to overcome in their own minds are as great as the barriers they will have to break through in the government of these institutions.

On the other hand, no one who has had much experience of an industrial setting will be mystified about bosses. They have power and patronage. Even enlightened ones get to decide how generous to be, e.g., about technicians doing research for degrees, taking 'time off', and so on. The official democratic rhetoric about science as a cooperative community pursuing disinterested researches after truth persists in the face of the realities of competitive old-boy (not girl) networks. The idea that merit and truth will make their own way has also persisted in spite of the experiences of e.g., Mendel, Semmelweis, Florence Nightingale, Rosalind Franklin and any number of 'troublemakers'. How many professors fill their labs with competent but unthreatening junior colleagues or promise tenure for work as a (not very) glorified research assistant? And then often don't deliver that security in compensation for the alienation and deference? We know all these things about industry, but we somehow manage to avoid facing them with respect to science. Comrades from the industrial sphere can help us to see more clearly.

Breaking down the barrier between the substance of science and its social relations and between theory as discussed and as lived, would also make the position of 'senior' scientists intolerable. It's just not on to be in that relationship with other people and to call oneself a radical. Not on; it's that simple. There's no way to abrogate the real power of the position by voluntarily laying it aside, since the rest of the institution still confers it, and one can choose to revert to it at any time. Consider the analogy if a militant shop steward made that sort of move. Here's what one said about being offered a supervisory job at Ford: 'You might as well stab me in the back. I'd sooner be dead.' (Beynon, *Working for Ford*, p. 124) But in a scientific lab the professor can be a member of the same union as the technicians - ASTMS — whose membership card says, 'Welcome to the fastest-growing union in Britain. We are recruiting scientists, managerial staff, supervisors, technologists and technicians of all grades in industry and in the public service. So you can be sure that you will be in good company and are joining a union that caters for the elite of white-collar workers.' Scientific settings and scientific trades unions are perfectly capable of mystifying hierarchies and perpetuating elitism, while a healthy dose of insights from a straightforward, unmediated industrial setting could help us to see more clearly. For example most universities have two ASTMS branches—one for technicians and one for research staff. The same sort of professor who can claim to be elitist but not authoritarian can claim that there are still areas of scientific research relatively untainted by ideology. It suits such people not to perceive the unity of science and society, of theory and practice, especially including their own. A richer interchange of insights and struggles between the workbenches of the factory and the lab and their respective relationships with unions could cause quite a subversive commotion.

#### Some Examples: Transcendent Life Styles

I want to move from the industrial setting to the freaky fringe - to what might be seen as the other extreme of the continuum of radical

politics. Having touched on the dangers of mutual intolerance between academics and industrial agitators and having tried to show some of the potential gains of greater comradeship, I now want to try the same sort of thing with the approaches of those who are often dismissive of both industrial agitation and 'heavy academic theory'. I am thinking, in particular, of *Undercurrents* and alternative technology on the one hand and the antiscience movement on the other. Both approaches are symptomatic of a visionary attempt to

see beyond the confines of an alienated science and society and to reach out for the paraphernalia and consciousness of a new cosmos and cosmology. Many of those who were most inspired and then most maimed by the radicalism of the 1960s turned to pure consciousness in seeking gurus or in disappearing without trace into mannerism—converting their revolt into style and their revolutionary long marches into head trips and - latterly - body trips. The phenomenal world became too much for them, so they became religious freaks, swapping the struggle toward a utopia for a 'reality' in consciousness alone. These people are a real loss to the movement for a better world, and it must be said that their solution is very regrettable and objectively reactionary. Nevertheless, there is something in their unwillingness to go straight that still ought to be taken seriously as a form of defiance that radical movements engaged in socially constructive and progressive struggles ought to address by setting out to earn the commitment of such people. Their sense of alienation and revolt - their refusal-is valuable, but its direction must be changed. There is a new grouping in Britain-Alternative Socialism-which might contribute towards this reintegration.

The strength of the antiscience movement and of alternative technology is that their advocates have managed to retain utopian vision while still trying to create concrete instances of it. It is an uncertain enterprise, liable to degenerate at any moment into mere business or mere opting out or being co-opted. But those who can maintain the tension between the vision of a better world and the instruments which can serve it, have much to teach those of us who work inside institutional frameworks and traditional anti-establishment organisations. They are actively prefiguring, however uncertainly, ways of life and consciousness and are constantly probing and providing a critique—often in the form of piss-taking — or orthodox scientific and technological thinking. They show again and again that the boundaries and the foundations of existing science, technology, life-styles and consciousness are — like the arrangements in the factory and the laboratory—eminently alterable sets of human conventions.

These tendencies also show us that not only the relations of production but also the means of production must be changed: a society's technology reflects and sustains its ideology (see Peter Harper in *Undercurrents* 5, p.5 and David Dickson's work). The danger of both the alternative technology movement and of antiscience, is that they have been so put off by heavy theory that they will not avail themselves of marxist critiques of the existing ideological, social and industrial order (see, for example, Robin Clarke's review of David Dickson's book in *New Scientist* 16 May 1974, p.423). This is a great shame, since marxism needs freaks, as any reader of the *New Left Review* whose smiling muscles have atrophied could tell you. Unlike the antiscientist Theodore Roszak, Peter Harper has stressed the point that one can only place one's alternative technology and altered consciousness within one's radical politics, if it is to be effective. The politics must be basic, and the alternative technology must find its place within that context. There are some signs that the alternative technology movement is becoming very satisfyingly split between those seriously interested in becoming involved in radical struggle and solidarity with the working class, and the rest (see *Undercurrents* 14, pp. 10- 14 and *UC* 16, pp. 12- 14).

It is very important to see that the people's technology movement has got a lot further than the Radical Science/BSSRS/Science for (the) People ones in *conducting* lives which break with old patterns and producing things and writings which actively prefigure socialism. Conversely, some who complain most about lack of contact between these freaky tendencies and the working class, are often among those who have done the least to change their own social relations. Couldn't we all devote at least as much energy to asking what we can learn from other ways of trying to achieve socialism, as we do to putting down others' struggles and strategies? As Dylan once said, 'You can be in my dream if I can be in yours.' That was after the bomb had fallen and long after Abraham Lincoln epigrammed on fooling people. We can't wait for or depend on cataclysms.

#### Alternative Cosmologies: Forms of New Vision

What is it about the writings of Carlos Castañeda, about the Situationists International, about R.D. Laing's celebrations of mad perceptiveness which has been so attractive to the alienated but politically uncommitted bourgeoisie? All of them offer a loosening of the grip, which the norms of normality of the world we live in, has on our consciousness, the fetters on our imagination, our will, our daring, our organisations. In the drugs and the nutty people and the zany deviants we find hope and space and occasional whiffs of air to breathe. This was, of course, the liberating appeal of rock music and hippies and flower power and communes before they were crushed by the vice whose jaws were commercial control (and tanks where necessary) and contradictions in the heads of the participants. We mustn't let the essential liberating insight get away as we address the problem of organising our revolting behaviour.

When we found attractive the phrase 'the politics of experience', we did so because it finally expressed the rock-bottom realisation that experience itself in its apparently raw and unmediated forms is part of a totality which is in the deepest sense political. Not only this or that experience in a given power struggle in an election or at a place of work, in a committee or a neighbourhood or even a home, a family or a relationship: not only these but experience itself. This means that seeing really *is* believing. We are socialised so that it is so. Once we understand the full generality of the political foundations and nature of experience itself, it becomes odd and unconvincing to seek to make an exception of that class of experiences which we label (in the existing division of labour) 'scientific'. Indeed, bourgeois philosophies of science have reached the same conclusion but balk at its deeply political consequences. To attempt to demarcate the scientific from its illegitimate overgeneralisation to the scientific and to demarcate these from everyday experience or other forms of reasoning and reasonableness, is itself an exercise *within* the political perspective and practice of a world-view.

All experience, including perception itself, is metaphysical, and metaphysics is ideological. People learn to experience by being socialised into a socially-constructed reality of scientific facts and theories, both scientific and scientific. To create a new perception and experience and reality is the task of socialist vision, imagination and struggle. It is through recognising that scientific concepts

themselves are political that it is primarily possible not only to be a radical and a scientist, but to be a radical scientist' (Diamond, 'The Politics of Scientific Conceptualization', p. 17). This integration leads directly to the need to unite a counter-hegemonic world-view with prefigurative struggle. 'Not only must the old meanings and norms of everyday life be destroyed, but new ones must be constructed in their place. Hence the struggle for ideological hegemony has two phases: to penetrate the false world of established appearances rooted in the dominant belief system and to create an entirely new universe of ideas and values that would provide the basis for human liberation' (Boggs, *Gramsci's Marxism*, p.42).

### Connecting It All Up

Let's look at some of the consequences from the point of view of developing an alternative cosmology or counter-hegemonic world-view, for traditional epistemological and marxist issues, working our way back to the point where we were when the marxist concepts of fetishism and reification were applied to scientific facts and theories. The concept of science as social relations, i.e., as ideology, does not lead-as bourgeois epistemologists suppose — to relativism but the demystification of one cosmology and commitment to another — except for those who have distilled out value from fact and remain abstracted intellectuals. The fear of relativism is a liberal's expansion of the moment between demystifying one cosmology and commitment to another. To the liberal ditherer one can only repeat the last lines of Peter Weiss's *Marat/Sade*.

When will you learn to see

When will you learn to take sides

Of course-and incidentally-though it does not lead to relativism, it does undermine the scientific epistemologists' conception of objectivity, one which was itself only a way of conning people into believing that they had no alternative to the present system. 'Reality does not exist on its own, in and for itself, but in an historical relationship with human practice' (Boggs, p.26). 'We know reality only in relation to man, and since man is historical becoming, knowledge and reality are also a becoming and so is objectivity, etc.' (Gramsci, *Prison Notebooks*, p.446).

What does this mean for marxism? Not only is marxism not a science, but science isn't either, at least in the required sense of a value-free, objective, unequivocal and indubitable touchstone for our conceptions of nature, life, persons and society. So, when marxists speak of the 'correct line' and 'scientific socialism' and seek sharply to distinguish science from ideology and to rest their position on a firm anti-humanistic and post-anthropological basis of marxism-as-science, we can smile, since we have become persuaded that their resting-place, their foundation, is not itself factual but evaluative. Once we have noticed that much marxism is scientism, we must move on to see that science is, too, and to demystify our own scientific scientism and move on to demystify marxist scientism.

This point has analogies in bourgeois analyses. The question of whether or not hierarchical and authoritarian societies are or are not consequences of objective forces and circumstances, is a mystification, since those allegedly 'objective forces and circumstances' are themselves the outcome of human agency. Similarly, what the fetishism of commodities is to economics and knowledge, the social expression of those allegedly objective forces-bureaucracy - is to politics and administration. Both consider social relations as things to be controlled and manipulated and treated under abstract categories according to a set of procedures, under general categories shorn of their sensuous particularity and individual idiosyncrasies: objects and not subjects.

Nearly there. In the critique of commodity fetishism there are two key aspects: mystification and domination. In science, mystification prevents people from seeing that the scientific world-view and particular facts and theories are forged by their own labour from the unqualified raw materials of uninterpreted and unconstructed nature. The aspect of domination appears both in the alienated, reified world-view of science which promised to serve and to free mankind from drudgery via the progress of science and technology, and in the ways in which science and technology, scientific and technological rationality, and scientific and technological experts dominate people, their social relations and their self-perceptions. Of course, they can't be on duty all the time, so their products and artifacts in our lives, our culture and the means of production themselves (the actual buildings and machines and tools and clocks and schedules, and procedures, i.e., the environment, the means of production and the labour process) are ever vigilant: they don't *constrain* our world and our experience; they *are* our lives. People are dominated by their own products, including their philosophies of nature, persons and society, of which the paradigm of explanation of modern science is a central expression and bulwark. Both the mystification and the domination lead people to be the deferential victims of historically - created systems of ideas and their material manifestations. We treat our social relations as if they were laws of nature in economic and social theory. These, in turn, rest on a more profound mystification: treating the laws of nature as though they were laws of nature.

### Conclusion

Science is social relations. We now have one sort, namely the hierarchical and authoritarian social relations of capitalism and state capitalism. If we want another sort, we've got to make it happen. In order to do that, we must develop an alternative vision, coupled with alternative ways of living and being. Now. In order to bring about socialism and socialist science, we must become socialists. We can read, teach, do research, turn up at marches and conferences and even create talks, papers and magazines for a life time without changing our lives. Until what we read, organise, etc., is referred back into the most intimate aspects of life, until we move with that mixture of fear and exhilaration which marks real change, we're just posturing and farting. It becomes essential to take binding steps which cut off one's line of retreat, to try to do irreparable damage to one's bourgeois self and make irretrievable expressions of commitment to radical change: to become a marked person whose availability for anything that might come along and whose freedom for future change of commitment have been cast aside. In the end we have to fix it so they wouldn't have us back even if we wanted to come. To have no place to go but forward to fix *them* by dismantling the whole structure of the existing world. To take sides against the actual.

Along the way we must learn to theorise our own practice and to practice our own theories-to combine the vision of an alternative world with pre-figurative struggle in our own daily lives, including our social and sexual relations with the same and the other sex at work and at home. This involves deciding which commitments are primary and basic and orienting the rest of life around those, letting the rest find their own level, however weird and contradictory the results. Of course, some contradictions become unbearable, and relaxations and compromises become (hopefully temporarily) necessary for survival. Much collusion is inescapable, but much also can be struggled against. Systematic collusion with hierarchical and authoritarian status and career and familial structures from which one derives significant benefits for oneself is not, however, on, if one intends any serious and authentic radical commitment. But socialist solidarity must fill the gap left by removing the compensations and comforts of careerism. Otherwise comrades will fall by the wayside and get on the next factory bus that comes along or the one after if they have a phreak interlude. Struggle. Compassion. Solidarity. Organisation. Ask not if your comrade has arrived but if s/he is struggling and how you can be in solidarity with that struggle. The same is true of the need for criticism and self-criticism.

Theorising our own experience is frightening in two ways. First, it is easy to fall prey to, or be accused of, retreating into self-preoccupation and self-centredness as part of the ideology of competitive individualism. The embarrassment that greets the articulation of one's own political and intimate experiences 'in public' and the more normal reticence and speaking in the third person or of a generalised 'we' (both of which I've done here for the most part), reproduce rather than transcend the existing social ideology. This protects and husbands the political essence of intimacy and sequesters it from overt politics. To be 'impersonal' is to be alienated from oneself and one's comrades. The second problem is diffidence. If one is successful in one niche in the division of labour, it is frightening to begin anew in unfamiliar literatures, practices, relationships and adventures-to develop the nerve to enter strange domains and settings and find one's own way about. But overcoming both of these forms of insecurity and self-doubt are central to the project of living our radicalism, and mutual solidarity and support are essential prerequisites. Let's encourage one another and help those who are serious, to become stronger and those who are tourists to destroy their transit visas or move on soon.

Because we have to move on ourselves, in two ways. In our theoretical work our alternative cosmology or counter-hegemonic world-view should be reached directly via marxist arguments, not bourgeois sociology and anthropology of knowledge. In our practice, we need to move on to lives which struggle to prefigure socialism as the way of bringing it into being. It is propaganda by deed. The old anarchists used that conception as a rationale for assassination of heads of state and of large corporations. Now that we know that technological societies are much more complicated than that, we have to go in for very different theoretical and practical deeds. On the assumption that there is not going to be a violent seizure of the central organs of power in advanced technocratic societies and that we have to transform the whole of the twenty-four hour working day, we are going to have to get going a dialectic between learning to think radically and to live radically and make that very persuasive. Bruce Brown has nicely summarised the project of prefiguring the ends in the means:

Characterising this new praxis is a panorama of practical-theoretical development that can be described as follows: it begins with the individual's personal experience of oppression and of the fragmentation of experience which makes authentic experience impossible for her or him; it leads from the discovery of this alienation to the individual's refusal of it through a process which is best described as the *politicization of oneself* and which aims at a retotalization of the individual's experience; it develops further through the individual's collision with the inertia of an oppressive social reality in his or her search for authenticity; with this recognition of the social sources of the individual's malaise, it leads to the inauguration of a radical contestation of existing institutions on the level of everyday life carried out by small groups and collectives, and extended through their spontaneous multiplication as micro-social centres of resistance; it finally attains a truly social dimension, uniting the struggle for the creation of a new self with the struggle for the creation of a new society, through the emergence of new needs and capacities for self-organization within broad sectors of the population and the attempt on the part of these groups to engender the creation of new forms of self-management (or, as the French call it, *autogestion*) through every sphere of social activity. Thus, from all sides, the eruption of localized centers of contestation and the further politicization of these contesting currents lead to the demand for a new collective self-regulation of life, for a generalization of self-management throughout society. In this sense, self-management becomes both the principal means and the method for the reconstruction of everyday life and, simultaneously, the principal goal of this reconstruction. (*Marx, Freud and the Critique of Everyday Life*, pp. 189-90)

Two caveats about the intermediate position of scientists, technologists, medical and other experts: First, the attempt to find a practice for mediators needs to occur without failing to work in solidarity with the working class, whose more complete proletarianisation too often means less personal, economic and ideological space in which to choose the fronts on which to struggle. But attention to this aspect of solidarity should not blind us to the fact that most scientific workers have hitherto had no practice at all which is politically progressive, and surely equal first on our priority list must be finding a way of mobilising ourselves while ensuring that it is done in solidarity with industrial 'point of production' politics. The second caveat takes the form of the pitfalls of false-consciousness which lie in front of anti-authoritarian gestures on the part of the well-off. There's this fellow driving along in his 50mpg/50mph Citroen 2CV. High. A cop stops him and makes shove the window open. 'I think you're pissed,' says the cop. 'How dare you talk to me like that, you pathetic bosses' running dog,' says our hero. 'You're flatfooting it, and I'm feeling groovy.' 'Get out of that car,' says the cop, angrily, 'I'm going to breathalyse you.' 'Breathalyse me!' says our movement man, contemptuously. 'I'm high on the best, and all you can think of is pathetic booze.' The cop goes apoplectic. Draws a circle on the pavement and says to our revolting friend, 'Stand in that circle and don't move a fucking muscle!' Then the cop rips the steering-wheel off the column and smashes it into the vent grille, breaking the instruments and wiper motor on the way. He turns around and struggler is laughing, standing in the circle. The cop goes berserk. He runs round to the front of the car and kicks in the headlamps. Looks up at our boy standing in the circle, killing himself laughing. The cop runs round the rear of the car, clambers up the back and jumps through the canvas roof and rips out the chair springs front and back. He looks up. Counter-hegemony is laughing hysterically. 'What are you bloody laughing at?' the cop says. 'Every time you turn your back, I jump out of the circle,' he smiles prefiguratively.

#### Afterthought

If we are going to move on in theory and in practice toward a counter-hegemonic world-view via struggles which prefigure socialism and seek to bring about socialist science, we're going to have to change both our ways and our thoughts. Here's an idea. If science is not neutral, then fact and value are inextricably intermingled, just as space and time are. Fact, value, space and time meet in the *event*. So let's use that concept more. The improvement in language is noticeable. Not 'What are the facts, and whom do they serve?' but 'What events do we want to make happen, and what is our practice?' You can also concentrate on creating certain models and sorts of events—a happening, a spectacle, a scene, a life-style, a way of life: call it socialism. A revolution, of course, is a process, not an event. Processes are made up of events. If we're not waiting for a cataclysmic event, we must be engaged in a process of struggles—radicalisation of reality by means of socialist practices which prefigure and seek to bring into being an alternative cosmology—that of socialist people in a socialist society, served by socialist science and technology in a socialist world and cosmos. (Stop Press. While I was retyping this yesterday, they landed their technology = social relations on Mars.)

It is also intuitively accepted in our society that people—both witnesses and participants in them—see events differently. Although this is true of almost all facts, the relativity of facticity depending on one's viewpoint is still counter-intuitive to most people. So it may help us to purge our language of facts and learn to counsel and conjure with events—events which should never be conceived out of relation with human experience and social relations. In the end, let's try to see more clearly—as we bring it nearer—a world in which there are not facts then values then people—but one in which there are only events, all of which are human events. If we're going to get there, however, we're going to have to get a move on.

Many's the time I've been mistaken

And many times confused

Yes, and I've often felt forsaken

And certainly misused.

Oh, but I'm alright, I'm alright

Just weary to my bones

Still you don't expect to be bright and bon vivant so far away from home

So far away from home.

I don't know a soul who's not been battered

I don't have a friend who feels at ease

I don't know a dream that's not been shattered

Or driven to its knees.

Oh, but it's alright, it's alright

For we did so well so long

Still when I think of the road we're travelling on

I wonder what's gone Wrong

I can't help it, I wonder what's gone wrong.

-Paul Simon

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