Footnotes

1 Cf. the article 'Préjugés' in Voltaire's *Dictionnaire philosophique.*
2 *XIIe Congrès International d'Histoire des Sciences, Colloques, Textes des Rapports*, Actes, Tome IA, Paris, 1970, p.34.
3 T.S. Kuhn, *The Copernican Revolution*, Cambridge, Mass., 1957; Angus Armitage, *The World of Copernicus*, Wakefield, 1972; Alexandre Koyré, *From the Closed World to the Infinite Universe*, Baltimore, 1957, and *The Astronomical Revolution*, London, 1964 (trans.).
4 George Sidney Brett, *A History of Psychology* (3 vols.), London, 1912 (trans.).
5 The word *ideology* was first used by the French philosopher Destutt de Tracy (1755-1836) in his *Eléments d'idéologie* (4 vols.), Paris, 1801-15. See Raymond Williams, *Keywords*, London, 1976, under 'Ideology' (trans.).
6 'His [Napoleon's] scorn of industrial *hommes d'affaires* was the complement to his scorn of *ideologists*." K. Marx, 'The Holy Family', in Karl Marx and Frederick Engels, *Collected Works*, Vol.4, London, 1975, p.123.
7 According to Marx, the political ideologies of the French and English during the 18th century were less far from their real foundations than the religious ideology of the Germans.
8 In the *Communist Manifesto* the illusion which consists, for the bourgeoisie, in believing those social relations in which it is dominant to be eternal is qualified by the notion of an 'interest-governed conception'.
9 See, for example, Bentley Glass, 'Maupertuis, Pioneer of Genetics and Evolution', in *Forerunners of Darwin 1745-1859*, B. Glass, O. Temkin, W.L. Straus (eds.), Baltimore, 1959. A discussion of Maupertuis' *Venus physique* more in line with Canguilhem's can be found in Jacques Roger, *Les Sciences de la vie dans la pensée française du XVIIIe siècle*, Paris, 1971 (2nd edition), pp.468-487 and *passim* (trans.).
10 Cf. Jacques Piquemal, *Aspects de la pensée de Mendel*, Paris, 1965.
11 Von Baer (1792-1876) was the greatest of the early 19th-century comparative embryologists and the most able proponent of epigenetic thinking. The best survey of his work remains untranslated: Boris Raikov, *Karl Ernst von Baer 1792-1876. Sein Leben und sein Werk*, Leipzig, 1968, but Jane M. Oppenheimer, *Essays in the History of Embryology and Biology*, Cambridge, Massachusetts, 1967, is reliable. J. Arthur Thomson still offers the fullest account of Spencer's biological views: *Herbert Spencer*, London, 1906. Also useful is J.W. Burrow, *Evolution and Society. A Study in Victorian Social Theory*, Cambridge, 1966 (trans.).
12 On Buffon (1707-88) see Jacques Roger, *op.cit.*, pp.527-84; R. Wohl, 'Buffon and his Project for a New Science', *ISIS*, 51, 1960, and P.L. Farber, 'Buffon and the Concept of Species', *Journal for the History of Biology*, 5, 1972. For Bonnet (1720-93) see B. Glass et.al., *op.cit.*, p.164ff, and Arthur O. Lovejoy, *The Great Chain of Being*, Cambridge, Massachusetts, 1936, pp.283-7 and *passim* (trans.).
13 See G. Bachelard, *L'Activité rationaliste de la physique contemporaine*, Paris, 1951, pp.35-40 and 'L'Actualité de l'histoire des sciences' in *L'Engagement rationaliste*, Paris, 1972, pp.137-52 (trans.).
14 For an example of this approach, see Lester G. Crocker, 'Diderot and Eighteenth Century French Transformism', in B. Glass et.al., *op.cit.*, pp.114-44 (trans.).

REVIEWS

Women and Political Thought

Susan Okin, *Women in Western Political Thought*, Virago, 1980, £4.50

One of the central tasks of classical political theory has been to consider what kinds of social organization are necessary, or possible, in the light of human nature. A particular conception of human nature (e.g. that humans are naturally aggressive) carries with it a host of implications about the kinds of institutions which are required to regulate social life. This book explores the way in which four political philosophers - Plato, Aristotle, Rousseau and Mill - have characterised the nature of both men and women. It also shows how some of their ideas live on in the works of modern thinkers (Talcott Parsons and Erikson) and in sexually discriminatory US court decisions.

Okin's central thesis is that, to arrive at a conception of human nature, two quite different kinds of questions have been asked, depending on whether men or women are at issue. To establish the nature of the male, the question 'What are men like?' has been posed. Typically, men are seen as having a more or less limitless potential, as individualistic, assertive, rational and creative. To establish the nature of the female, however, the question asked has been 'What are women for?'. Women's nature has been defined (by men) in terms of her perceived function, in particular, her function as child-bearer *and* child-rearer. The social institution in which these functions are to be enacted is the family. It is as mother and wife that woman fulfils her essence, caring for her children and her husband, to whose authority she is subject.

Both of these conceptions are prescriptive, though in somewhat contradictory ways. Rousseau, for example, condemned slavery as degrading to man's essence. It was, he said, both offensive to nature and to reason 'for a man to give up his life, freedom, and right to himself, to another' (quoted p.143). Here a conception of man's essence is used to condemn an oppressive social institution. When it comes to women, however, the situation is reversed. The married woman is *expected* to renounce her freedom. She is subject to her husband's will, even to the extent that 'if he blames her, she is blameworthy; and if she has acted innocently, she is guilty as soon as she is suspected; for even preserving appearances is part of her duty' (quoted p.165). Rousseau is not (generally speaking) critical of this situation. He is critical of women who refuse to accept their 'natural' role and to act in accordance with it. Loosely, it is wrong for a man, but right for a woman,

to sacrifice his or her autonomy to the dictates of another; it violates the essence of the male, but consecrates the nature of the female, for one to do so.

Rousseau is typical of a large number of liberal political theorists who make general-sounding claims about humanity and its rights and needs, and then promptly deny their applicability to women, who are usually thought of as embedded as wives and mothers in the patriarchal family. Okin traces the functionalist approach to women back to Aristotle and beyond. She shows how radical were some of Plato's views about women in the *Republic*, and how he subsequently retreated to a more conventional position in the *Laws*. She analyses Rousseau's work at length, drawing out the contradictions in his approach, while remaining sensitive and sympathetic to his difficulty in transcending them. And she both praises Mill for his sincere attempts to apply liberal principles to women, and exposes the limits of his analysis imposed by his assumption that women's place is in the home. Despite the vast amount of ground covered, Okin never relies on rhetorical flourish to make her points: she doesn't need to. Her book is closely argued, immensely readable, and very persuasive. It should be prescribed reading for everyone who is interested in the development of political theory - theory which has taken the 'male-headed family, rather than the individual adult, as the primary unit of political analysis' (p.10), assuming that a woman's interests are (or ought to be) entirely convergent with her husband's.

It is clear from this book that the sanctification of the family, and the related conception of women's rightful function, is tied up with the institution of private property. Men needed chaste and virtuous wives - who were simultaneously sexually exciting in the marital bedroom - so as to be sure that her children were their rightful heirs. As Okin points out, socialist theorists have been far less inclined to take the family as a natural institution and have been aware of its links with particular forms of economic, and specifically property, relations. She sees this book as laying the foundation for a further study of their work. I look forward to its promised sequel with keen anticipation.

John Krige

Social Darwinism

Greta Jones, *Social Darwinism and English Thought*, Harvester, 1980, £22.50 hc.

This book has been timed right. Its appearance coincides with two trends that redouble its importance. There are the obvious disputes about whether sociobiology has political consequences, or is a political theory fullstop. That alone, given the spread of sociobiology in many countries, would make a reassessment of social Darwinism (henceforth SD) in 'England' important (I find the geographic limit a little puzzling, though). But also there has been a revival of disputes about the status of evolutionary theory generally, leading to many scientists doing the rare thing of taking seriously philosophers' objections to the standing of the general tenets of Darwinian theory. The disputes within philosophy about verification, falsification, paradigms and research programmes have echoed sufficiently that quite a few biologists now seem to be prepared to query whether the theory of evolution ever has been, or could be, proved. Coupled with this a revival of religious fundamentalism, always ready to batten on the slightest stutter over the validity of the naturalistic theory of evolution in order to trumpet, without any interest in evidence, a renewed creationism. The book is relevant to both themes.

Jones' book does many useful jobs. It begins with a good, balanced view of Darwin's own hesitations and uncertainties. On the one hand was that side of Darwin's style that would spend weeks studying orchids, fascinated by the apparently absurd convolutions of their petal structures: a cautious empirical observer, deeply delighted but puzzled by natural history. On the other hand, and at times in his later life increasingly important, was the social commentator who had listened well at Malthus' knee, who knew Galton, and who carried close to his British passport some typical imperialist attitudes to natives of other countries. I am also grateful for the insights Jones provides into the views of evolution's other discoverer, Alfred Wallace: his odd socialism; but most significantly how, after his visits to the Malay Archepelago, he hesitated on the brink of passing beyond a reductionist account of human evolution. It was there that he became perplexed over the low levels of human population in areas rich with food resources. Wallace was not able to think through the implications of his realisation that the low population was related to such things as division of labour, patterns of work and levels of technology.

Jones takes us through the variety of forms that SD took, and rightly does not underplay their complexity. Each strand sought to recast laws of human nature, and to derive these recast laws from the 'nature of the evolutionary process'. She sums up the general object of her book at the end as having been to

> show how these 'known laws' were remarkably fluid and how their constitution was an historical and social process rather than a scientific one.
> (p.195)

We are therefore shown how the earliest social users of the theory of evolution were able to interpret it in a Spencerian manner, implying classically that acts of state charity run counter to the law of nature; on the other hand how others began to present a case that it was whole populations that were selected for, and that therefore action to preserve the well-being of the whole could be evolutionarily justified. This latter spilled over into forms of (paternalistic) socialism. Jones nicely illustrates how each of these positions was forced to negotiate with the basic tenets of evolutionary theory itself

in order to make itself plausible. The theory could be neither purely scientific nor purely political, but had to come to terms with developments on both sides.

So, for example, when the work of Gregor Mendel was rediscovered at the turn of the century, each strand of SDian interpretation had to find a way of coping with it, whilst maintaining the desired political stance. Those who had tried to promulgate a theory of the nation on the basis of a neo-Lamarckian use-inheritance (if you live long enough in one sort of society, it gets to your gonads) had particular problems. On the other hand, socialists who questioned the Fabian, smooth movement to utopia took heart from its apparent emphasis on discontinuities rather than gradual changes.

Creating this sense of the striving to keep good footing in both camps is the strong point, to my mind, of Jones' book. At the same time Jones does not fully satisfy me that she has done what is necessary to extract the common themes in the many forms of SD. She does (p.187ff) suggest that sociobiology is continuous with all the classically recognised forms of SD in having a strong streak of theoretical individualism, meaning that society is understood as a system of interacting individuals, whose interactions are a function of their individual natures. (But then, the grosser biological nationalisms would be an exception.) She also identifies a Malthusian concern with population in sociobiology. But it is not shown why this is an essential part of SD; and it is not intuitively obvious that, for example, post-war ethological SD in the hands of Lorenz etc has displayed this concern. If anything, the core of her position seems to be just the interaction of biology and politics, rather than particular substantive content to that interaction. Now that is important in itself, but it has costs.

First, it makes it easier for sociobiologists to claim that they, at least, have left behind this interaction for a more purely scientific theory. After all, as many reviewers of E.O. Wilson have said, he is 'so impressive' in his collection of evidence. Could we not see the modern theory as an attempt at cleaning out the politics? We can easily imagine a Dawkins admitting that they haven't totally succeeded yet. But perhaps their *project* is purely scientific. For critics of the theory to be able to respond satisfactorily, we must be in a position to identify the nature of the interaction between biology and politics.

Secondly, she notes the debate that followed Richard Hofstadter's *Social Darwinism in American Thought*. Hofstadter had tried to show that SD was linked with a very specific kind of politics, harsh competitive individualism. His critics replied that, while that connection did exist, a complete range of other political practices had sought warranty in evolution. In essence, the dispute was over whether SD constituted a single ideology with a particular conceptual direction, or whether the theory of evolution was a sort of mythical resource to which virtually any interest group could turn. Jones' comment on this is revealing. She accepts that there were many varieties of interpretation, but

> in politics some ideas survive and grow and others do not. There were political and social limits on the 'free market' of ideas.... So it is possible to identify, even given the wide spectrum of social Darwinists represented in British and American society, a certain political direction which Social Darwinism took as far as its general social influence is concerned. (p.ix)

I find Hofstadter's critics' case too much conceded by this. For he was arguing, as I understand it, that the *form of the ideas* made them pre-eminently available to the defence of combative capitalism. And I think that there remains a substantive truth in that case. Many of the pointers to this are in Jones' book, but are not developed. In particular she reveals again and again the aprioristic style of the SDists, without discussing its significance. This is an important beginning-point. For surely there is a significant difference in style between an a priori discussion of whether there is an immanent teleology in evolution, and particular investigations of animal species conducted by believers in such a direction. Just because the two were often practised by the same individuals does not make it necessary for us to see them as a single practice. The interaction of biology and politics arises from the intersection of these styles. It is important that, over and again, SD schools have sought to *deduce* fundamental principles, expectations, and moral and political rules from the most general and abstract principles of evolutionary theory. This enabled its practitioners to treat human culture in very particular ways: marginalising some aspects (work and production in particular, as Jones makes clear (p.67)), finding some practices unnatural (as both ethologists and sociobiologists have done), or ordering human societies on an evolutionary scale (something still common if more concealed than of yore). The fact that this style of aprioristic derivation is rarely if ever totally divorced from a style of empirical research (which may on occasion be enormously illuminating - the history of SD is full of examples of this) does not alter their separate beginnings. But it does help to explain something of the nature of the biology/politics interaction.

So, when she discusses the impact of Bergson's *Creative Evolution* with its notion of an immanent psychic process, we can see this as an example of aprioristic style. It embodies a process of argumentation that runs as follows: there is a belief current in the significance of social psyche (national spirit or etc.). This is taken as a problem of evolutionary theory. Commitment to an ontology in which all parts of nature are functions of identical processes requires that if psychic processes are present in humans they have to be present everywhere. Therefore 'nature' is examined for evidence of psychicness. Which is why thinkers such as William MacDougall studied instinctual processes for what they will feel like to an animal. Up until the last stage all is aprioristic. But it allows the SDists to reflect back on human life aspects of their original definition of ideas about the psyche, as though they were *empirical discoveries*.

This is *the* common pattern par excellence among Social Darwinists. Identical things happen with the concept of selfishness in sociobiology, and the concept of ritual aggression with Lorenzians. (Incidentally, the minimal discussion of this last school, well represented in England by Desmond Morris and others, is surprising). It is a mechanism for the production of politics out of evolution, and it is also the basis for the scientific interest of the work of the SDists as well as the distortions in their empirical research. Considering sociobiology for a moment, it is without doubt true that as a motive to research some of the deduced hypotheses have been very fruitful. Equally it is true that by the logic I described above, 'descriptions' that reek of human normative life, and therefore invite the return of those descriptions, now naturalised, onto human life, keep cropping up to falsely inform their scientific research. An example from Barash will illustrate. He discusses the tendency of male mallards to force

themselves on isolated females reproductively, as a piece of evidence of the weakness of pair-bonding among them. But he calls it 'rape'. The nasty irony is that rape among humans has absolutely nothing to do with reproductive chances. But by its application to ducks, whose activity *is* dictated by reproductive strategies, the term tends to return to human life naturalised. And it then chimes in with all those notions of male sexuality as an outpouring of impulses which can get out of control - all because it is 'laid down' in male nature so to behave.

A piece of political commonsense goes through the SD logic mill. Barash also discusses the fact that among humans there is constant sexual receptivity. Using the apriori logic of reproductive strategies, he insists that women must be permanently arousable as a way of cementing human pair-bonds, as a way, crudely, of holding on to men. A priori interpretation via analogising with animals leads to a clear political result: female sexuality is there for the purposes of men, not for the pleasure of women. Out of the end of the logic mill comes the reformed commonsense, now with the imprimatur of science. As I write this, I have in front of me an article on makeup for women: 'But surely an essential motive for display is competition for the best mate in the tribe, the deeply programmed need to ensure that it is your genes that make it through to the next generation' (*Guardian*, 12 December).

I am not saying that this is incompatible with Jones' presentation, only that it remains wholly implicit. In many ways, this is a pity since she has bettered other accounts of such histories. For example, she has rightly refused to allow the eugenicist and racist arguments to be detached from their roots in SD (contra Chase, Gossett, Barzun and many others). But at the end I am not left with a clear view as to why it is important not to detach them. If the critics of Hofstadter were right, then detachment is the answer. For racism, for example, would just be a nasty motive in search of a spurious justification; the Darwinism has no logical connection with the racism, and could as well by turned to anti-racist purposes (an argument now in use by the sociobiologists).

The reason for not detaching them is, once again, implicit in Jones' account. The continuity of politics that I find in her clear, well-evidenced accounts of all the varieties of social Darwinism; the politics that makes eugenics and racism only aspects of a programme; the politics that subsumes all the differences between Adam Smith liberals, collectivists, and Fabian socialists, is the *politics of the nation*. All the themes embroidered on the cloth of SD are themes of national strategy. It may be strategies of imperialism and colonialism, in which case the evolutionary backwardness of the colonial peoples becomes centred; it may be the threat from trade unions, in which case either the moral unity of the nation, or the bad breeding habits of the lower classes, are given primacy. The hidden premise throughout social Darwinism has been nationhood. I believe that it is just as true now of sociobiology, for all the apparent emphasis on this latest SD on the genetic unity of humankind. In their theory the idea of the evolutionary stable strategy for a genetic population performs the central role; and that shows a strong tendency to convert into a political theory of the nation.

Tracing out the implications of this for SD as an ideology is beyond all possible confines of this review article. But it certainly throws light on many little parts of this history. For example, Jones quotes C.W. Saleeby in 1906 as attacking collectivism:

> I stand here as a biologist and my objection to collectivism, for the present, is a biological and philosophical objection.... The one final objection to the trade union which says that a clever workman may not work faster nor an energetic workman longer than his neighbour is that such a practice is fundamentally opposed to natural selection.

The theme of nationhood is not apparent in such a quotation until you realise that the premise of Saleeby's argument is that there is an apriori virtue for the 'whole' in ensuring that the best succeed. Otherwise, without question, the workmen who combine to keep work comfortable, to keep piece rates good, are clearly increasing their fitness!

So could socialism legitimately seek its justification in SD terms? I do not think it can, consistently. For the ends of socialism are not progress or survival (the two metaphors for the nation that underpin SD more than anything else), but human fun, happiness and creativity. It is only a notional object, the nation, that can have goals inscribed for it that have such metaphorical meaning.

Jones' book, I have suggested, keeps such themes implicit. I believe that they need spelling out. For all this, it is a remarkably good book. Well-written and researched, it deserves better than a typical Harvester price that makes it a cert. for inclusion only in academic libraries. Also in my paper today was this sentence by author Mervyn Jones: 'Publishers are hopelessly caught up in what may be called the British Rail syndrome: you raise prices, so you lose customers, so you raise prices, so you lose...' Too true, too true.

Martin Barker

Women and Science

The Brighton Women and Science Group, *Alice Through the Microscope: the Power of Science over Women's Lives*, Virago, 1980, £11.95 hc, £4.95 pb

It is now something of a truism that science is an activity undertaken by a community which is welded together by a shared network of commitments. In particular, the scientific investigation of reality takes place within a theoretical or conceptual framework which underpins one's fact-gathering. When inanimate nature is being studied there may be little

or no connection between this framework and the taken-for-granted assumptions of everyday life. But when the object of investigation is itself an element of a society into which one has been socialised since birth, those assumptions can easily serve as an unquestioned backdrop for empirical research.

One of the aims of this book is to show how such assumptions and value-judgements about women have been built into the 'scientific' exploration of their behaviour. For example, heterosexuality is the 'normal' way of expressing one's sexual drives in contemporary Western culture. Coincident with this, scientists have tended to assume that it is normal to be straight and that what requires investigation - and social control - are lesbianism and homosexuality. More generally sex differences have often been studied with a view to identifying, and stigmatising, those who do not fit into conventional role stereotypes. This is part of a tradition of research which has assumed that a woman's only legitimate role is as a wife and mother, and that her education and her social opportunities and responsibilities should all be dictated by that role.

It struck me while reading this book how important the male's perception of the female's reproductive system has been in shaping his attitudes to women. It is not simply that the fact that women give birth to children is used as a basis for the argument that their proper place is in the home. It goes much deeper than this. For example, one 19th-century physician alleged that women's reproductive organs drew 'vital energy' from her brain. The development of mind was discouraged as it would produce a 'repulsive and useless hybrid' with undeveloped 'maternal organs' (quoted p.6). Furthermore, the changes in mood and temperament associated with the menstrual cycle have long been linked with female inconstancy, emotionality and irrationality. Man is sun, woman is moon - dark, changing, romantic, sensual - and always in need of control and discipline by rational, logical, objective male-scientific investigation.

Very few women enter science, as Curran shows in her first contribution to the collection. One reason is that science allegedly requires just those qualities which our culture identifies with masculinity - rationality, objectivity, emotional neutrality, individuality, etc. Women who enter science find, by contrast, that there is a great deal of intuition, commitment and downright prejudice in it. They also find it competitive, self-assertive and bombastic, as well as socially irrelevant. As one put it, in the scientific world she entered 'emotional dishonesty is blatant under guises of reason, objectivity and abstraction, and ... the social reasons for doing science are lost among the emotional needs of Western men to achieve, perform and acquire status in the eyes of their own sex' (quoted pp.40-41).

Like many such collections of articles, this book does not quite have the cohesion or unity of theme which my comments above might suggest. Put in a positive light this means that there is likely to be something of interest in it for people with widely divergent concerns about the social impact of science and technology. Personally I found the articles by Birke and Best on Menstruation and the Menopause, and by Walsh on the historical growth of contraceptive technologies the most rewarding. This is not to say, of course, that there aren't other valuable contributions in the collection. In some cases, though, I did feel that quotations about women were being presented in isolation so that it was very difficult to assess just how representative and influential they were. Be that as it may, this is an interesting and stimulating book, and it serves as a tribute to collective work, and to the Brighton Women and Science Group in particular.

John Krige

Easlea: Witches, Magic and Philosophy

Brian Easlea, *Witch-Hunting, Magic and the New Philosophy*, Harvester Press, 1980, £25 hc, £8.50 pb

It used to be thought, or hoped, that the acceptance or rejection of scientific theories could be achieved on the basis of logical and empirical considerations alone. This assumption was challenged forcefully by Kuhn, whose historical studies indicated that quite different considerations were, in fact, also involved. During periods of revolutionary upheaval the founders of modern science, it seems, were swayed by forces over and above the imperatives of logic and of empirical evidence, forces hinted at in Kuhn's gestalt-switch metaphor, but not analysed by him. This fascinating and important book develops that insight, in particular by exploring the social pressures that were brought into play along with the rise of modern science. The new philosophy, as it was called, never did exist in some abstract 'third world' nor was it simply a new system of discourse. It was embedded in the hearts and minds of ruling class men whose allegiance to it was, in part, dictated by a struggle for power: power over nature, power over women, and power over subversive social elements - this, in a nutshell, is Easlea's argument.

One major stimulus to his analysis is an awareness of the historical trajectory of witch-hunting in Europe. The persecution of witches steadily gained momentum in Europe in the 16th century, it peaked between 1580 and 1650, and it subsided dramatically towards the end of the 17th century. During this period tens, perhaps hundreds of thousands of people, mostly women, died agonising deaths at the hands of men who believed they were curing the world of a diabolical scourge. Yet even as the witchcraze peaked Galileo was publishing some of his most important work Persecutions declined at the same time as the mechanical philosophy was articulated by Descartes and others, and modified by Newton under the influence of the so-called Cambridge Platonists. Is this mere coincidence?

In his *Religion and the Decline of Magic* Keith Thomas suggested that it was not. He attributed the

disappearance of the belief in witchcraft to the rise of the mechanical philosophy, which banished spirit from the material world. For the magician nature was suffused with vital principles which could be tapped for good or evil; for the mechanical philosopher it was dead and inert, its sole essential property being extension. In a universe purged of spirit, and of mysterious, occult forces, there was no longer a medium through which witches could exert their diabolical powers. The 'absurdity' of witchcraft was therefore made manifest, and that 'by reference to the achievements of the Royal Society (founded early in the 1660s - JK) and the new (mechanical - JK) philosophy' (Thomas, quoted pp.41, 197).

Thomas' remarks, while immensely suggestive, are rather simplistic. The intellectual developments which rendered witchcraft 'absurd' raised more general doubts about the role of spirit in the universe. When Hobbes reduced spirit to matter, suggesting that God, too, was corporeal, Joseph Glanvill, an early member of the Royal Society, was scandalised: 'If the Notion of a Spirit be absurd, as is pretended; that of a God, and a soul distinct from Matter, and Immortal, are likewise Absurdities' (quoted p.203).

Glanvill was one of a number of Englishmen who were determined to preserve religion against the threats of an overly mechanistic, materialistic philosophy. Their efforts paved the way for Newton's concept of gravitational attraction - the idea that bodies can act on each other across empty space. Whereas for Bentley gravity was 'the result of "Divine energy", a manifestation of God's active presence in the world' (quoted p.182), Leibniz called it a 'senseless occult quality' (quoted p.183), and regarded Newton's innovation as a giant step backwards. As Hume stressed,

> While Newton seemed to draw off the veil from some of the mysteries of nature, he showed at the same time the imperfections of the mechanical philosophy; and thereby restored her ultimate secrets to that obscurity in which they ever did and ever will remain.
> (quoted p.193)

In England at least the decline of witch-hunting cannot therefore simply be attributed to the emergence of a mechanical philosophy which banished vital forces from nature. The connection between the two events, if there is one, must be sought in something over and above the purely intellectual aspects of the new cosmology. Easlea suggests that the persecution of witches tailed off as ruling class men gained confidence in their ability to dominate nature and society. This confidence was informed by their rejection of the magical world view, by their espousal of the mechanical philosophy in a form which was compatible with religious belief, and by their allegiance to Baconian experimental philosophy. In turning their backs on a mystical world view they consciously distanced themselves from radical sectarians who had become associated with it towards the end of the civil war. Through reconciling science and faith they scotched atheistic tendencies, while further entrenching class rule. As one of their number put it, it is 'hardly to be doubted, but that if the common people are once induced to lay aside religion, they will quickly cast off all fear of their rulers' (quoted p.221). Lastly, by modifying Bacon's methods they saw themselves as the new 'masters and possessors of nature' (Descartes). In other words, although the new philosophy undoubtedly had immense explanatory power, as Easlea shows, it was not for that reason alone that it was adopted. When scientific ideas have social and personal implications, participants in the historical process which culminates in their victory or defeat do not evaluate their merits solely in the light of logic and experience. Correlatively, to assess the rationality or otherwise of theory acceptance we need to go beyond purely internal considerations - and to ask when, or whether, an advance(?) which entrenches domination and manipulation can be defended as reasonable.

There is another aspect to the espousal of Baconian empiricism by the Royal Society. Easlea emphasises that Bacon hoped to inaugurate the 'truly masculine birth of time', and that his admirers in the Royal Society regarded the experimental philosophy as 'masculine'. Thomas Sprat, who wrote a propagandistic history of the society soon after it was founded, spoke of its members as courting a mistress, nature; through their efforts 'The Beautiful Bosom of *Nature* will be Expos'd to our view, we shall enter into its *Garden*, and taste of its Fruits, and satisfy ourselves with its *plenty*' (quoted p.213). Nature, alluring and secretive, was to be 'penetrated' by the light of reason, a prerogative reserved to men, whose intellects had not been sapped by the excessive lust and sensuality of the female. As Easlea puts it, 'Into their male sanctuary the seventeenth-century practitioners of natural philosophy not surprisingly took with them attitudes and needs reflecting an underlying preoccupation with that dangerous, mysterious, feminine sex, necessarily excluded from the sanctuary because of supposedly inferior mental ability compounded by excessive carnality' (p.245).

Witches were of course persecuted by men, who again thought of them as under the sway of undisciplined passions. The *Malleus Maleficarum*, published in 1486 and essential reading for witch-hunters, asserted that 'All witchcraft comes from carnal lust, which is in women insatiable.... Wherefore for the sake of fulfilling their lusts they consort even with devils' (quoted p.8). Easlea suggests that this desire to dominate women, which reflects the male's insecurity about his own sexuality, was an essential driving force behind intellectual and social developments in the 16th and 17th centuries. It is almost as if witch-hunting declined because men, believing that they could display their virility by dominating a female nature through the experimental philosophy, no longer needed to reassure themselves of their masculinity by persecuting helpless, hapless old women whom they accused of copulating with Satan.

As Easlea points out, the witchcraze peaked during periods of acute economic crisis. Indeed witches were held responsible for all manner of social and economic misfortunes. Also the persecution of witches decreased dramatically in Restoration England, when a substantial increase in wealth occurred. The confidence which the ruling class had was thus partly due, one suspects, to their growing economic power at the dawn of capitalism - a point to which Easlea alludes, but which could have been stressed a bit more I feel. On the other hand it would be hopelessly naive to look for a purely economic explanation for the decline of witch-hunting. To do so would be to ignore the breadth and complexity of the Scientific Revolution to which this book attests. At times I found the arguments difficult to follow. Sometimes I was frustrated because I could not see what point its author was making. On the other hand his difficulties reflect the fact that he is both breaking radically new ground, and that Easlea is sensitive to the many levels at which major historical events occur. His book is essential reading for anyone who wants to learn about the emergence of modern science and its all too familiar alliance with ruling groups who dominate and control both nature and society in the name of reason.

John Krige

The Politicization of the Police

P. Hain (ed.), M. Kettle, D. Campbell, J. Rollo, *Policing the Police*, Vol.2, John Calder, 1980, £8.95 hc, £4.50 pb

In October 1979 James Anderton, Chief Constable of Greater Manchester, was interviewed on BBC1. He remarked that he saw the role of the police changing over the next ten or fifteen years. Crime, including violent crime, would no longer lie at the centre of police activity. 'What will be the matter of greatest concern to me,' he said, 'will be the covert and ultimately overt attempts to overthrow democracy, to subvert the authority of the state, and, in fact, to involve themselves in acts of sedition designed to destroy our parliamentary system and the democratic government in this country' (p.8). This important and disturbing book describes the politicization of the police, and the associated threats to individual liberty, not to say life and limb if one crosses the path of the SPG.

The legitimation for their new role is claimed to lie with public opinion - with a 'silent majority' that needs someone to speak up for law and order in the face of the 'big guns [sic] of every minority group and sociological agency' (p.22). Parliament is too weak to act: the police are 'very much on their own in attempting to preserve order in an increasingly turbulent society in which Socialist philosophy has changed from raising the standards of the poor and deprived to reducing the standards of the wealthy, the skilled and the deserving to the lowest common denominator' (p.14), as Robert Mark put it.

To preserve law and order the police have developed a streamlined, centralised organisation which, in conjunction with sophisticated modern technologies, has, as Campbell its it, placed 'society at arms length - and under observation' (p.65). Some of these innovations can be justified in terms of the prevention and control of crime. Yet their use in practice far transcends this limited objective. Despite the veil of secrecy in which they are shrouded, Campbell describes how police computers are used as databanks on which information is stored on a vast number of people in this country who have no criminal records at all. Some of this information is based simply on hearsay and gossip (e.g. that a man 'fancies little boys'), much of it is 'unchecked bunkum' 'tinged with the calculated guesswork of the officer who has provided it' (p.120). In 1962 a Royal Commission on the Police noted, with some justification, 'that there is a kind of relationship between the policeman and the man in the street in this country which is of the greatest value' (p.166). Today, if the Hunt Saboteurs are to be believed, your friendly neighbourhood bobby may well be having the registration numbers of cars parked in your drive at meetings recorded on the Police National Computer.

As social turbulence increases, so the level of violence which the police use to 'contain' it escalates. In the third part of the book Rollo describes the horrifying activities of the SPG and other paramilitary organisations. The use of brutal violence by this outfit against blacks, pickets, and demonstrators, and to defend the National Front's 'right' to hold meetings whose prime purpose can only be to inflame local residents and to harm race relations, makes for sickening reading. 'They have,' writes Rollo, 'been either in the front line or held in reserve at every major strike and political demonstration during the last six years' (p.178). As some members of the police themselves stress, far from assisting local police, as they claim to be, the 'heavy mob' are destroying the last vestiges of trust between the police and deprived communities.

A standard legitimation for the police's increasing and often violent involvement in political issues is that Parliament is too weak to take action to curb social unrest. Of course the kind of action which is wanted is the legitimation of repression, with the police acting as agents of social control in the name of 'public opinion'. What Parliament is not criticised for, of course, is its repeated failure to curb the invasions of privacy and the threats to individual life and liberty which the politicization of the police involves. Nor is it criticised for failing to engage seriously with the root causes of social unrest and instability, viz. an economic recession which has put millions out of work and which has sent millions more skidding below the poverty line.

One way of coping with this situation is to take the advice of Sir David McNee: 'Keep off the streets of London and behave yourself and you won't have the Special Patrol Group to worry about' (p.199). On the other hand, rather than capitulate to intimidation of this kind, we can strip away the myth that the role of the police is not a political issue, and that they are the impartial agents of justice. That would at least make it possible to have a 'continuing real debate about the police (with the participation of the police, of course).... [covering] subjects like police powers, operations, organization, training, accountability and - not least - spending' (Kettle, p.59). This has its limits of course. But it is surely an essential part of what is required to formulate a rational policy for police practice.

John Krige

The Republic of Mathematics

Hans Sluga, *Gottlob Frege*, Routledge & Kegan Paul, 1980, £12.95 hc.

During the 19th century, a science which Kant had deemed incapable of advancing a single step and which he styled 'a closed and complete body of doctrine' began to undergo a profound transformation. Mathematics, the queen of the sciences, began to examine its own foundations. Something of the uncertainty of the age had eaten into it; but instead of fragmenting into autonomous disciplines like medicine and biology, mathematics tried first to resecure its fundamental tenets and tighten up its own doctrines.

For two thousand years it had seemed as if mathematicians were doomed to continue reasoning without being aware of the logical principles underlying their work. Then in 1847 George Boole set a bold and desperate project into motion: in his *Mathematical Analysis of Logic* he sought to create a mathematical language which could simply, clearly, and unquestioningly lay bare all mathematical truths. More specifically, his concern was to develop an algebra of logic capable of providing a precise notation for handling the general and varied types of deduction traditionally dealt with by logic. A parallel line of enquiry, which became associated with the Boolean programme, went one step further. Whereas Boole tried to show that the notions employed in analysis could be defined in arithmetical terms, that is, in terms of integers and the arithmetical operations upon them, the German mathematician and logician Gottlob Frege attempted to subsume all mathematics under formal logic. Like Russell and Whitehead, whom he influenced substantially, Frege aimed to show that *all* arithmetical notions could be defined as purely logical ideas.

Both these projects have been described in detail before; this book is novel and quite remarkable in providing a near-complete historical background to the systematization of logic. Sluga draws the connections between the goal of Frege's work and the dream of many 17th-century thinkers who wished to discover or create a 'universal language'. In both cases, statements would be produced according to a strict set of rules; no two statements would contradict each other, making both systems consistent. Furthermore, each system would completely fill its universe; both would be complete and be capable of generating every sentence or mathematical truth. Frege's work raises many issues in logic, mathematics, linguistics and analysis; indeed, having read this account, it seems impossible to hold to the same assessment of Leibnizian rationalism or analytic philosophy. If there is one deficiency in the book it is that, apart from the rather haphazard treatment of 19th-century materialism, Sluga doesn't take Frege's impact to its (logical) conclusion.

Given the consensus of opinion that Kurt Gödel shattered the illusion of a solid foundation for mathematics by showing that even the most powerful mathematical systems could not be shown to be consistent in the way Frege imagined, the neglect of his work in this study seems to be a severe omission. Though it is quite wrong to see Gödel's proof as setting ineluctable limits to human reason (as E.T. Bell does in his *Mathematics*, London, 1966), his work as a whole might well dilute the optimistic tone adopted throughout Sluga's book. Balanced with a reading of Nagel and Newman's introductory text *Gödel's Proof* (London, 1976), this contribution to the series 'The Arguments of the Philosophers' nonetheless constitutes the best survey of the rise and gradual dethronement of mathematics and logicism.

Mike Shortland

Curti on Human Nature

Merle Curti, *Human Nature in American Thought - A History*, University of Wisconsin Press, 1980

At first glance it seems curious that Merle Curti, an American historian, has chosen apparently so philosophical a subject for his scrutiny. It remains curious only until Curti's personal motivation becomes evident. The concept of human nature has been for years at the centre of the theological and latterly philosophical/political debate. The tracing of past, redundant concepts for Curti is not only an exercise in expert sifting of historical evidence, but also, and for him more importantly, the way in which we can learn from the past to direct our future. He significantly quotes the statement (p.407), 'Without a clear-cut map of man's present understanding of his own nature, no frontier of innovation is definable.' Since such a map requires an historical account, this is the task Curti has taken upon himself to accomplish.

In this extensive and highly detailed book, Curti returns to the very founding of the 'New World' and meticulously traces the paths, both well-trodden and scarcely visible, of images of man up to the 1950s. He starts in a promising manner, stating his recognition of the relational nature of traditional 'Old World' ideas now posited in a new, strange environment and recounting the way in which the Settlers had to cope with an upheaval of conceptual terms when confronted firstly with the Indians and then with the 'Negro'. The initial (and arguably ever present) optimistic mentality, the desire to construct a 'new man' and to establish an open society were major contributors to a certain development of their views of human nature.

It is here that two main criticisms of his work emerge. As a development of consequent ideas the

book is often illuminating and stimulating, but as a work attempting to define man's position in the world it is very disappointing. Other than at the beginning of the book on Indians and Negros his ability to to relate ideas with actual circumstances in the social world is barely detectable, and when it does appear, it expresses itself in an overwhelming generalised form. For example (p.217),

> The new view [i.e. New Psychology] may be thought of as a reaction against or supplement to the stress on a self-sufficient individual, whether derived from Emersonian idealism, the frontier heritage, the competitive economic system or the death of self-sufficiency in urban life. (my brackets)

This sudden relational assessment is hurriedly inserted between description after description of who thought what about human nature. The pattern is fairly typical throughout the book and gives the impression that Curti has unintentionally been carried away by the traditional approach to history, i.e. the uni-linear detailing of consecutive events - or more accurately here, of ideas. It is here that the second criticism relates. Since very little information is given as to the actual social situations existing at any particular time, we are left dissatisfied by not being allowed to determine what makes these concepts specifically American. How do they differ from concepts in European thought, and how do these differences manifest themselves?

The third main criticism is that Curti seems aware but unable to grasp how philosophical concepts are, and especially the concept of human nature is, arguably, nothing more than a tool for legitimation. Having no express content in itself it can merely be, and often very effectively is used to propound or to disclaim certain beliefs, thus immediately giving weight to the beliefs and making them appear almost as a priori facts. It is indeed significant that people continually cling to a concept of human nature, insisting on its substance as though the very meaning of life were inextricably related to it. Yet a concept is a social/cultural creation and as such has no inherent substance but exists to fulfil a function.

The concept of human nature as a legitimizing force is clearly shown (although I suspect unintentionally by Curti) in the quashing of an emergent women's movement. The position of women, having become an issue, was suddenly turned into an eulogizing of the virtues of womanhood, putting the emphasis on the purity, goodness and benevolence of women.

> It gave many women a sense of self-esteem in the role of wife and mother by substituting dignity and uniqueness for what had often seemed to be fate or drudgery. (p.167)

Had Curti continued after the first chapter to relate the developments in 'human nature' with the developments in the social world, the force of the legitimation perspective would have been powerfully revealed.

It seems harsh to criticise the work of a person who, seemingly well-intentioned, has spent a great amount of time and effort in the accumulation and reorganization of a mass of information and who has succeeded in marking out the history of ideas in a fundamental part of philosophical thought. To this extent, Curti's book is a worthy accomplishment, but regrettably it leaves too many issues dangling and perhaps more disturbingly has an underlying assumption that hopes one day to be able to 'capture' human nature and thus make it amenable to prediction and control.

Hilary Dowber

The Fabric of Explanation

Stephen Gaukroger, *Explanatory Structures*, Harvester Press, 1978, £12.50 hc

This book provides a broad and wholly novel assessment of certain periods and figures in the early history of physics and mathematics and deals especially with the work of Aristotle, the medieval scholars in Oxford and Paris, and with Galileo. As a contribution to our understanding of this work, Gaukroger's text is a powerful and for the most part positive addition to the epistemological history of the sciences (I have examined the case studies in the book at length in *History of European Ideas*, No.3, March 1981). Equally important is that the concept of an Explanatory Structure (ES) developed here can be used in a more general way to specify the realm of the discursive, to provide something approaching a typology of discourses and a means to differentiate and appraise them, and to lay the basis for investigating how discourses are conditioned or constituted in the play of social, cultural and scientific factors. It is this concept, and its applications, which I shall examine in this review.

Perhaps the best way of dealing with it is to look at some of the preconceptions and received opinions we might be expected to have of the history of science Firstly, the period Gaukroger covers has been almost universally defended as a progressive one. The religious and mystical characteristics of our 'scientific ancestors' have been deemed to be mere side-steps, or inconsistencies within otherwise accredited scientific theories and enterprises. Histories of the sciences - especially the 'noble', highly formalised varieties - have laboured to excuse these deviations by referring to non-scientific interferences or by invoking the idea of man's innate hostility to innovation.

Science, then, the object of such histories, embodies a powerful but unspoken assumption: that it can be reduced to the heartless pursuit of objective knowledge. Consequently, this pursuit can be relied upon to furnish us with criteria for the evaluation of other subjective, circular, manifestly non-progressive disciplines, and for the classification of the growth towards reason - or, towards the positive state.

Secondly, this history can be seen as different from other kinds of history by virtue of the fact that it alone can chart the accumulation of knowledge which evidently, and measurably, leads to an increase in our control over nature. These two historiographies may perhaps mirror the two conceptions of science. The neutral, internally coherent view encourages a restriction to the historical demonstration of internal growth; an emphasis on the biography and the primary scientific treatise. The conception of

science as a tool for forging the environment, for controlling nature stimulates interest in the external stimuli which have led to this power.

These conceptions are, of course, largely caricatural - though we can all recognise features in them. Even more striking is the fact that for both there exists a solid and immanent distinction between philosophy and science. As Bacon put it: 'The mechanical arts grow towards perfection every day, as if endowed with the spirit of life. Philosophy is like a statue. It draws crowds of admirers, but it cannot move' (quoted in B. Farrington, *Francis Bacon*, p.69). Historians of science have measured this growth, they have debated whether or not it is a continuous one, whether there are periods of incubation before a new science is born, whether its growth follows a steady path. They have, so it seems, done everything possible except question the idea of progress, of development, and of growth in the sciences itself. The debate has been an intense and in many ways interesting one but, because the notion of progress has not been examined, it has tended to mask the many levels involved in scientific change. Even when biological metaphors have been adopted to enrich the historian's repertoire, the vocabulary of maturation, incubation and evolution has been denied metaphorical effect by being used in the framework of simple contradictions like 'continuism or discontinuism', and 'external or internal'.

The great strength of Gaukroger's account is that it takes a wide step away from this cosy and tedious debate around scientific development. What is offered in its place is an account of changes in what counts as explanation in particular discourses. These changes are conceptualised by means of the notion of an ES of a particular theoretical discourse. The notion is a complex one, and one which is only fully grasped in particular case histories, but it can be understood in outline in the way it imposes constraints. Firstly, on the kinds of things that are ultimately appealed to in providing evidence; secondly, on what counts as admissible evidence both in the forming of new concepts and in the assessment of the adequacy of an explanation; and lastly, on the types of proof and argument that can be legitimately employed in explanations. The aim in analysing ESs is thus to understand the way in which explanations are generated in particular discourses, to see why scientists frame questions the way they do, answer them the way they do, and to learn why they have confidence in certain types of evidence and not in others.

Whilst this general approach can be detected in the work of historians like Clavelin, Koyré and Bachelard, Gaukroger goes some way beyond these writers in addressing problems about explanation which are not purely epistemological. He also provides a much more detailed treatment of the problem of recognising and assessing explanatory failures. More pertinently perhaps, he succeeds in avoiding a collapse into a 'logic of explanation' of the type that sets out to provide rules circumscribing the necessary and sufficient conditions to be met by 'scientific' explanations.

A theory here is described as 'anything which is, or can be articulated in the form of a statement or set of statements which purport to offer, or which can be taken as offering, an explanation of something' (p.3). A theoretical discourse is simply 'any unified set of articulated theories' (*ibid.*). Although an 'explanation of something' is 'to render it intelligible' (p.13), that process is operative only within certain discourses. Consequently, the criteria that establish and so differentiate discourses are not general methodological protocols but features specific to each discourse.

Normally such identification proceeds according to the nature of the 'real object' discourses study, and disciplines are established along pre-given 'natural' lines, e.g. physics, biology and sociology investigate the physical, biological and social aspects of nature. The problem with this form of classification is that it relies on such aspects announcing themselves to the sciences rather than being - as is manifestly the case - conceptualised by them. One might say, for instance, that far from physical phenomena carrying labels stating themselves to be such, these phenomena are physical if and only if they are the referents of concepts which specify precisely what physical phenomena are.

A common alternative to this 'natural' typology is to picture discourses as wide-ranging totalities with social, political and theoretical dimensions. This procedure clearly resists the arbitrariness of the first kind of differentiation. But there is no reason to expect social, political or theoretical accounts to do more than illuminate the social, political and theoretical elements of a discourse. This is precisely the problem with Kuhn's notion of paradigm, which is expected to provide a sociological account of epistemological issues and an epistemological account of social factors.

The term paradigm refers to a whole range of entities: a political institution, an epistemological viewpoint, a philosophy and so on. As a result, paradigm change can be viewed as 'continuous' or 'discontinuous' depending largely on what choice of definition is used in writing up that change. If a paradigm is equated with a way of seeing, the rejection of one paradigm for another is, like the gestalt-switch Kuhn compares with it, a sudden, subjective and ultimately irrational process. On the other hand, if the sociological dimension of a paradigm is stressed, and it is pictured as a network of commitments which disciplines scientific communities, paradigm-change becomes a lengthy process of conversion which can be sociologically and rationally reconstructed.

The problem here is not just that paradigms are vague and ambiguous notions, but that conflating accounts which explain the relations between epistemological structures and those that explain the relations that hold between scientific communities gives us no clear idea of how paradigms are formulated, or of the factors which play an active role in their development.

Gaukroger argues for a differentiation of discourses in terms of their ESs, whilst stressing both that such discourses are not reducible to them and that an analysis of the constitution and function of ESs illuminates only a range of conceptual problems which arise in the discourses. The constraints that an ES imposes were mentioned briefly above. A more detailed examination of the elements that make up an ES will make the form and effects of these constraints clearer. The first element, termed an ontology, is a structured set of entities in terms of which explanations are provided. Clearly, the ontology of a discourse does not in itself suffice for adequate explanation; it is rather the necessary condition for something being counted as a possible explanation.

The second constituent is the domain of evidence, which consists of a set of phenomena serving to specify what could count as the relevant information in terms of which explanations could be assessed. The domain of evidence includes what actually counts as evidence but, because it is discourse-specific, cannot itself determine that evidence. To the extent that it sets limits to the phenomena that can be

appealed to, it imposes constraints on what can be termed an acceptable explanation.

These two features of an ES are linked by a system of concepts which connects the entities used in explanations with those demarcating admissible evidence. Though this system might consist of elements which are generated by the discourse in question, a more general proof-structure might well be used to determine the form that explanations take, e.g. mathematical concepts could be used in the proof-structure of a physical discourse. This structure again imposes constraints - this time on the relations which could hold between statements in a discourse - so as well as being a guarantee for the correct formation of such statements, for logical demonstrations and so on, a proof-structure would also give guidelines to consequence and derivation relations and serve to specify how problems are posed and resolved.

An obvious condition to be met before discourses can be compared is that the references of their concepts must be, if not identical, at least overlapping. Scientific boundaries are often difficult to mark out since a theory has two different areas of reference. It relates to those entities or phenomena which are being explained, and to those entities which it invokes to explain what is being explained. The latter comprise, as we have seen, the discourse's ontology and the former is termed the domain of investigation. Such domains are often problematic because the phenomena that are being explained do not share a common and stable ontology.

For example, the attempt to trace lines of continuity between the atomism of Democritus and Dalton on the basis of similar domains of investigation is suspect since it relies on equating the concept of 'atomoi' with that of 'atom'. The first requires a distinction between space and matter, whilst the second relies on a connection between them. The same goes, as Gaukroger shows, for attempts to establish a common reference of domains of investigation between Aristotelian 'motion' and Galilean 'motion'; the first being a qualitative notion of change, the second a purely quantitative relation in space. This doesn't mean that the manifestly different sense of 'kinesis' and classical motion are incommensurable, but points to the importance of examining the domains of investigation as elements of a particular discourse rather than in an *a posteriori* fashion.

Applied to the history of physics and mathematics, the notion of an ES shows that there is a fundamental gulf between pre-classical and classical mechanics. This discontinuity is however viewed as a very specific one which involves changes in what counts as explanation in physics. The account proposed by the medieval scholars (Buridan in particular) marks an advance in Peripatetic physics insofar as it resolved a fundamental discrepancy in Aristotle's ES. Galileo's account marks an advance insofar as it resolved a discrepancy in Buridan's ES. In so doing, Galileo was led to revolutionise the manner in which physical problems were posed in such a way as to leave them open to mathematical treatment.

In sharp contradistinction to the ESs of Aristotelian and medieval physics, the concepts posed by Galileo were not simply abstracted from experience and the problems he posed did not usually correspond to 'real' accessible situations. Indeed, the role Galileo conferred on experiments involved a complete reconstitution of the domain of evidence in physics, a change in the proof-structure of the discourse and a change in its domain of investigation. The effect of Galileo's innovation is fully discussed in this book, and Gaukroger carefully and precisely documents the levels and the basis on which developments in, or of, physics took place. However, without dealing with the case-studies in detail, it is possible to point out some general drawbacks of the approach Gaukroger has suggested.

Though we are informed that ESs are only one component of a theoretical discourse and that others do exist, no indication is given of what these other elements might consist of, or how they might affect the assessments of different discourses. Even though Gaukroger has eschewed a total history of scientific development and tried to address questions relating to the types of explanation generated in different periods, the attempt to reduce these questions to the five elements of an ES has the effect of obscuring - though not precluding an analysis of - non-scientific influences on scientific discourses.

Furthermore, whilst characterising discourses in terms of their ESs suggests that traditional ways of defining truth are invalid, criteria might well be suggested to re-establish the notion of correspondance on the basis of elements of the discourse which fall outside the ES, e.g. acceptance by the scientific community. Secondly, Gaukroger rejects the general category of 'science' and the distinction between 'science' and 'non-science'. He offers instead the concepts of a theoretical and an a-theoretical discourse.

A discourse is deemed a-theoretical if it fails to operate with a domain of evidence and (as Gaukroger puts it) 'hence does not have an ES' (p.39). Following this characterisation, it would appear that common-sense, rational theology and Aristotelian physics (and Gaukroger even suggests mathematics, though tentatively) are accorded the same status and, in terms of a common lack, are indistinguishable. In fact things are, in my opinion, worse than this since by arguing that explanation consists in 'rendering intelligible' Gaukroger imples that describing and redescribing are in themselves and of themselves explanations. This, of course, cuts right across the theoretical/a-theoretical distinction since it permits 'a-theoretical' discourses to explain and theoretical discourses to be tautologies.

Finally, Gaukroger employs a referential theory of meaning and accepts that sense determines reference. Though it is difficult to judge whether we have to agree with his views on reference in order to accept and use his theory of ESs, it is unfortunate that these are presented casually as 'the only decent theory of meaning we have' (p.244). I say 'unfortunate' because Gaukroger's uncritical reliance on the work of Frege tends to import the latter's ambiguities unresolved into his own text (see note 8 of my review). If one accepts that the reference of a term is determined by its sense, only well-developed theories will be open to analysis. In many other cases there will be a considerable degree of uncertainty; enough perhaps to pose a question mark over the proof-structure of a discourse and therefore over the possibility of rationally reconstructing it.

There is, though, no reason why with some modifications, along the lines suggested above, all types of discourse could not be subjected to similar treatment to that proposed in this volume. The consequence will be to discard the view that science can be distinguished by its methodology, by its conventions or by its particular paradigm or research programme. Gaukroger ends his book by confessing that the tools he elaborated in the opening sections to specify the elements of an ES were crude but open to revision and correction. The revision he has in mind is clearly in the direction of refining these tools in other historical analyses.

There seems good reason to hope that another direction might also be taken: to examine other elements of a theoretical discourse to see how discourses

are formed within the space of the interaction of relations and forces of production. There is equally good reason to hope that Gaukroger's model would, when applied to this end, dispense with the crude model of economic determinism as effectively as it did that of one-dimensional scientific development. This being so, Gaukroger's book should - and must - have an impact far beyond the restricted confines of disciplines like the history and philosophy of science. Given the state of these disciplines, to treat *Explanatory Structures* as simply a work of pre- or scientific history would only be an excuse to maintain those debates which have kept these disciplines so barren.

Mike Shortland

Fischer

Norman Fisher, *Economy and Self - Philosophy and Economics from the Mercantilists to Marx*, Greenwood Press, 1979

This book promises much in that the intersection of the concerns of classical political economy with those of classical German philosophy, and their Marxian synthesis, is explored with the intention of illuminating the problem of self-alienation - but it delivers little. The discussion, although detailed, is confused and imprecise with no clear sense of direction - just stress on 'common actions' and 'social holism as an explanatory tool'. The book stays at the level of texts; there is, indeed, a lot of comparing one man's text with another's - but to what purpose is not clear.

A main theme of the book is the relationship of politics and economics - more particularly, Fischer believes that mercantilism's stress on the unity achieved by law for economic agencies is more paradigmatic for political economy than the attempt to 'disembed' the economy and study it as a self-acting whole. He also believes that the 'mercantilist' elements in Smith, Hegel, and Marx have been neglected.

The chapter on Hegel is particularly weak. It features a philistine attempt to carve out from the *Philosophy of Right* a 'synchronic theory' (allegedly 'contract', 'civil society', 'state') thus doing violence to Hegel's systematic presentation (and incidentally ignoring Hegel's own remarks on the relationship of this to historical sequences). This shows, as indeed is clear from the book as a whole, that the author has no sense of dialectic.

Chris Arthur

Garrett Hardin

Garrett Hardin, *Promethean Ethics*, University of Washington Press, 1980, £4.80 hc

Marx regarded the myth of Prometheus as the symbol, par excellence, of human freedom. The true, this-sided, significance of the myth would find its expression in the future society. So too for Hardin the ethically Promethean has a dual aspect; he refers explicitly to the need for an ecologically, or temporally, wise method, and implicitly to an equation of science, or rationality, with freedom.

The Promethean method refers to a long-term assessment of the cumulative effects of any specific problem. The Promethean moralist asks the question 'and then what?' before taking any action, while the Epimethean, who by and large represents the contemporary policy maker, flounders in the errors and ill-effects of immediate solutions to immediate problems. So far so good.

The method is now to be applied to the questions of death, competition and triage; and it is here that it begins to seem somewhat hollow. A residual ecological good sense with respect to death, for instance, sees it as bio-ethically beneficial in maximising survival in the long run. Add to this, however, the doctrine of natural selection, here the survival of the fittest, and we must conclude that 'such inventions as social security systems, socialized medicine, and progressive taxation' are 'romantic delusions', Epimethean attempts to escape the real world of evolution.

Consideration of the desirability of competition, in the long term it produces the higher forms of life, reinforces the above argument, while the final chapter on triage provides mathematical formulae for what is, in effect, an extension of the utilitarian dogma with regard to the 'greatest good of the greatest number'.

Were it not that it incidentally informs us of a book entitled *21 Delightful ways to commit Suicide* (the ultimate way, restricted to only those too cowardly to choose from the first 20, is to die of old age), and keeps us up to date on the dual function of the Damesfly Penis, the treatment of ethics as a statistical malfunction might lead the reader to set the book aside.

Peter Goodrich

Labica: Marxism and Philosophy

Georges Labica, *Marxism and the Status of Philosophy*, Harvester Press, 1980, £26.50 hc

This book is a prolegomenon to the subject of its title: Georges Labica never establishes the status of philosophy for Marxism, but by his method of establishing the conditions for such a relation, through an examination of the problem of philosophy for the young Marx and Engels, he proves himself to be an astute observer on a journey frequented by so many commuters that much of the scenery frequently passes unattended. Labica consciously attempts to avoid a 'germinative' or teleological reading of the early texts, and the result is a far clearer perspective on the evolution of Marx and Engels than is usually found elsewhere.

Labica's starting point is that interpretation of the origins of Marxism set forth by Engels in *Anti-Dühring*, where the materialist conception of history is held to have been formed at the meeting point of German philosophy, French political theory and socialism, and English political economy. In each country, respectively, an intellectual, political, and social revolution had taken place, and the history of this 'triarchy' can equally be seen as the history of the young Marx and Engels. We must, Labica argues, distinguish very carefully between the precise ways in which Marx and Engels learned to 'speak French' and 'speak English', for this is not only the means of understanding the European polygot that is Marxism, but equally the key to the problem of a Marxist philosophy.

One of Labica's strengths is that he attempts to give Engels full credit for the latter's independent contribution to the new language and conceptual formation. Engels stopped 'speaking German', or thinking in primarily philosophical categories, before Marx. The former's 1843 *Outlines of a Critique of Political Economy*, though it did not in itself overturn philosophy as the principal method of analysis, is nonetheless 'a text by which we can date the advent of a science' (113-14). In Labica's account Engels was also the first to begin to rework the vital concept of the proletariat, which in the *German Ideology* supplants 'species being' as that which stands opposed to modern social relations, now conceived as 'bourgeois society'. The new discourse of the materialist conception of history, moreover, is more closely approximated in Engels' *Condition of the Working Class in England in 1844* than in any other pre-*German Ideology* text. All of these arguments are valuable for rescuing Engels from a much undeserved obscurity vis-à-vis the formation of Marxism, and Labica points the way to further work on these problems.

Labica's main task, however, is to illuminate the fate of philosophy in the hands of Marx and Engels, for only when this is completed is it possible to ask whether a Marxist philosophy has any logical status. Since, in Germany, Hegel *was* philosophy, Marx's *Critique of Hegel's Philosophy of Law* must be understood as a critique of philosophy in general as well. Feuerbach, of course, offered the most useful tool for overthrowing Hegel, whose philosophical viewpoint was that of modern political economy. The latter could not be overcome by an inversion of its own terms; the outside assistance of fetishism, species being, and other categories was required.

Feuerbach, however, provided a way out of *speculative*, but not *all*, philosophy. To effect the latter required a historically-minded and politically committed political economy. In his account of this displacement Labica emphasises the key role of the *Critical Marginal Notes*, written immediately after the *Economic and Philosophical Manuscripts* and before the *German Ideology*. Here alienation is absent, 'man' is no longer 'real individual man', but 'the worker', species being gives way to 'the community' and the 'human' to the 'social', and the 'human essence' is no longer viewed as an anthropological absolute, but is instead juxtaposed to the 'essence of the state'. The stage is very clearly set for the dramatic demise of philosophy.

An audience lured to attend only on the basis of an intriguing programme may be disappointed in the final act, however. Philosophy is stabbed innumerable times with a variety of loathsome weapons ranging from the notoriously deadly division of labour to the comparatively blunt Max Stirner. Philosophy refuses to expire on-stage, however, and is carried, profusely bleeding, into the wings. From the Gods the proletariat pours down its scorn. At this price we deserve a final sobbing aria whereafter Philosophy may be quietly entombed. Alas, however, this brutal assault is neither solemn nor tragic. Director Labica cannot think of an ending; he seems instead to be asking his audience to provide one.

Labica implies, however, that there are two plausible resolutions to the drama. The entire history of philosophy becomes, in the *German Ideology*, 'ideology'. This is mystified and obscure in proportion to its severance from real human relations through the effects of the division of labour, each aspect of which produces in its participants' minds a specific view of the world and all its aspects. These ideas become 'philosophy'. In the most traditional Marxist account, ideology disappears either (in the vulgar variation) with the abolition of private property under actually existing socialism, or at some later communist stage (in the 'qualified optimism' interpretation), when its root, the division of labour, has been wholly superseded. In either case a Marxist 'science' guides ideology to its final resting place among the artefacts of pre-history. Alternately, in the interpretation usually associated with Althusser, ideology may be understood as the result of all productive activity. Hence, so long as social life is characterised by productive activity, ideology will remain inherent in human relations and thinking. Ideology in this view is the representation of material relations and necessarily accompanies these, distorting them at the same time - except for a select group of *illuminati*.

Labica's dilemma results from a lack of preference for one of these readings of the *German Ideology*. He seems to entertain no doubts as to the 'scientific' status of historical materialism, but cannot decide whether, or in what way, philosophy might bear any relation to it. 'The worker,' in Engels' phrase, 'creates even *man*', and this does appear to imply wholesale redundancy for philosophers, if solid employment for Marxian scientists. How can there be a *Marxist* philosophy when the nature of every philosophy is to produce a fixed system and distorted conception of the world? Labica considers the usual escapes from this fate: isn't a '*scientific*' philosophy possible? (Consider, for example, V. Afanasyev's standard text, *Marxist Philosophy*, Moscow, 1963, whose

first chapter is entitled 'Philosophy as a Science'). Labica thinks not: Marx believed in only a single science, history. Either we understand Marxism historically, as merely the sum of (or perhaps something a little more than) its components, in which case, for instance, we must see Marxist political economy as something occurring between Ricardo and Keynes, and Marxist socialism as occupying a position between Proudhon and Jaurès. Or, alternatively, we see Marxism as 'the advent of a conceptualisation, which at every point represents a *saltus* beyond the conditions which allowed it to exist. In that case, Marxism is neither a puzzle to which one can keep returning, nor some extra piece added to such a puzzle. It is to be judged only by the yardstick of its own fecundity' (p.362).

These seem to me a rather dubious set of alternatives, and an unhappy ending to what is, on the whole, a very good book. Even on this final point Labica's intellectual modesty and integrity are to be credited. It seems unlikely that his indecision results merely from a crisis of faith in the party. The obligatory references to Lenin and the virtues of 'party men' would not seem to indicate this either. The problem is serious in a far more general way: it is the much-touted poverty of Marxist theory. This 'issue' could fill *Radical Philosophy* for the next decade, and of course in a sense it invariably will and must. What, then, can Labica ultimately offer such a discussion?

The main possible type of Marxist philosophy which Labica fails to consider (though he points to it incredulously) is an *historical* one. This failure indicates a typical Marxist phobia: if Marx and Engels' views are historicised, their epistemological status becomes historically relative. Instead of a pure science hovering far above the squalor of actually lived history, we are left with a very useful set of theories and methods, which are nonetheless covered with a sticky, glutinous muck which, if it alters in colour and texture, can never be cleaned off. True would-be revolutionaries, of course, have retreated in horror at the prospect of such uncertainty. Like gibbering relics from a home for old millenarians they continue to ask for all or nothing, science or ideology, truth or falsehood. Marxism has never adapted well to the idea of putting grey on its easel.

It is nonetheless possible to be persuaded that a fully historicised philosophy has some logical status. To organise and systematise ideas does not preclude a recognition of their historicity, nor do historical interpretations (even of the progress of the entire human race) become useless when it is recognised that the needs of the present and the conditions creating these often dictate the ways in which we view the past, present, and future. Normatively as well as analytically, it is still possible to speak of a hierarchy of *values* from an historical point of view, appreciating both origins and an eventual passing away, but being able (most vitally) to express *preferences* in terms of values, i.e. enhancement of working conditions rather than more consumer goods, or more democracy at the expense of greater social chaos.

We should be grateful that Labica offers us no ready solutions to the problem of a Marxist philosophy. Given its price it is unlikely that his book will be widely circulated. It is, however, superior to the vast majority of its type, and is as such a very welcome contribution to a debate which, hopefully, has barely begun to take shape.

Gregory Claeys

Grassi

Ernesto Grassi, *Rhetoric as Philosophy*, Pennsylvania State University Press, 1980

Rhetoric as philosophy is a surprisingly refreshing examination of the history and significance of the Italian humanistic tradition. Its context is a reaction against rationalism. We must look at humanism again, according to Grassi, because philosophy, in the tradition that moves from Descartes to structural semiotics, has become dominated by models of scientific proof, and consequently by questions of a purely formal kind.

Grassi traces the history of what he sees as an excluded philosophical tradition. The conception of rhetoric as philosophy is more profound and forceful than is normally admitted. Rhetoric is not merely the art of persuasion, it is the study of originary thought (ingenium) and of the modes in which philosophy attempts to answer immediate human needs. Instead of studying fundamental truths, rhetoric, from Cicero to Vico, examined philosophy as a form of practice in a concrete situation of dialogue. Rhetoric is thus seen as pre-eminently historical and topical; it is an attempt to answer questions that have arisen within a social and political context; conceived as a dialogue philosophy strives for relevance and should know of no dichotomy between theory and practice because it should never function in abstraction alone.

In an atmosphere which is heavy with technical and formal languages, this suitably elegant account of another tradition is timely and ecumenical. Because all thought is motivated there are strong reasons for suggesting that its initial adoption of a purpose should be admitted. This would facilitate both honesty and criticism, it might also engender a clearer and more effective discourse.

Peter Goodrich