BOOK REVIEWS

The Political Economy of Science & Technology *by Norman Clark*
(Basil Blackwell, Oxford, 1985) pp.xii + 257, £8.95, ISBN 0-631-14293-2.

As the author indicates in his Preface, this book originated in a set of postgraduate lectures given at the Science Policy Research Unit at the University of Sussex. Like a number of recent texts summarizing the "state of the art" of social science research into the dynamics of technological advance, this one is, perforce, at least partly interdisciplinary in scope. Its general approach, however, tends to be firmly rooted in economic theory. This I applaud, and not only because I am an economist. My reading of a spate of roughly similar surveys has convinced me that those without the unifying intellectural framework provided by a single discipline — be that economics, organization theory, management science, history, sociology — often contain much useful information but are not likely to serve well as teaching tools.

Given the book's wide range of coverage, I find it easiest to proceed on a chapter-by-chapter basis, offering some evaluative judgments on each topic. It is my hope that these judgments, together with some concluding assessments, will provide readers with an incentive to examine the work themselves. To make the most important point at the outset: In my opinion, this is not only a fine text for university courses but also a competent survey of issues with which managers and government officials should probably be more concerned than they tend to be, at least in my experience. The fact that most of the empirical and anecdotal material refers to British experience, and British institutions, in no way detracts from the book's general interest.

Clark's focus is on science and technology policy, which he sees first and foremost as a problem in the socially rational allocation of resources. He is properly realistic, however, in stating at the outset that economic analysis probably can do no more than to *inform* the policy-making process. For one thing, many of the economist's models are conceptually useful but incapable of empirical validation; and for another, only a very naive observer would assume that narrow group interests, ideological predispositions, and bureaucratic pressures play no more than a subsidiary role in the formulaton and execution of policies based in the first instance on sound economics. Unfortunately, there is ample evidence for the conjecture that things often work the other way round: irrational or counterproductive policies are rationalized by resort to bad economics.

This kind of cautious view obviously governed Clark's rather conventional selection of topics as well as their treatment, the contours of which are outlined in an excellent introductory chapter. The only thing I missed here was a somewhate more extensive discussion of the difficulties arising from potential conflicts between considerations of static and of dynamic efficiency in the generation and utilization of new knowledge. This conflict is clearly implicit in much of what Clark has to say later on about policy, but it might have been brought out more sharply through an initial discussion in a property-rights context. To do so might also have prevented him from committing some theoretical slips, such as the claim that ". . .technical knowledge is. . .*inappropriable* (it is difficult to treat it as a 'commodity'

which may be bought and sold at a 'market price'). . ."[p.183]. The statement clearly fails to distinguish between appropriability, which depends in the main on legal institutions, e.g., patents, as well as on the strategies of the originators of new technical knowledge, e.g., maintaining secrecy, on the one hand, and the difficulties of establishing an *efficient market* for this knowledge on the other.

In the next three chapters, which deal with the development of economic organization and with the standard models of aggregate and micro behaviour, the author manages judiciously to combine the elementary neoclassical paradigm with what has become known as the "evolutionary" view. Here he clearly addresses a non-specialist readership, even though the main features of the models are delineated very well. Anyone wishing to dig deeper into these matters would have to turn to other sources. Clark's careful discussion of the most important literture and his chapter-end bibliographies should serve as useful guides to such an endeavour.

The limitations of a broad-brush approach become apparent, however, in Chaper 5, entitled "Economic Theory and Technological Change". To cover the classical, neo-classical, Keynesian, and Schumpeterian traditions in twenty pages is a heroic undertaking indeed! What the reader gets amounts to no more than thumbnail sketches which, especially for the case of Schumpeter, border on caricature. There is little sense in quibbling with the details of the author's summary judgments about the contributions made by the various schools of thought. Even after due allowance for my own biases, I found this the only unsatisfactory part of an otherwise very satisfactory book.

The subsequent chapter's much more thorough treatment of (more or less) contemporary theories of technological change restores some balance. To the extent that present-day approaches to policy-making are assumed to derive guidance from their theories, the newer writers may of course be considered more "relevant" than the older ones, especially in the context of Clark's basic educational purpose. He will certainly get no argument from me on his assessment of Nelson and Winter, whose work may yet prove to be the beginning of a breakthrough in theorizing, along the lines the author hopes for in his rather skeptical concluding observations [p.235]. Of the other theories referred to in the chapter, only "long-wave" approaches, revived but a few years ago, seem (once again) to have run into a dead end. Setting aside all empirical difficulties, it seems to me that the search for long waves is confounded by an epistemological confusion between *recurrence* and *regularity* as ordering principles for historical phenomena. From a policy perspective, resort to Kondratiev and his followers may of course induce a certain fatalism, if not actually serving to rationalize wrong-headed measures. In any event, I can imagine that Chapter 6 would provoke a lot of discussion in a seminar, which is another way of saying I wish I had written it!

Next the author turns to a subject that is obviously close to his heart, the nature of underdevelopment and the role of science and technology in economic development. These two chapters (7 and 8), each of them an intellectual *tour de force,* are by far the best of the whole book. A brief definintion of the nature of underdevelopment is followed by a review of development theories. Although Clark is eminently fair in the assessment of the various theories, he also does not hesitate to show his own preferences. If I interpret these correctly, they strike me as much too eclectic, and therefore as

much too "practical", to be accepted by any of the standard schools with their ideological biases.

His discussion of technology's role in development policy is equally fair-minded, especially regarding the "appropriateness" controversy. Here I do want to harken back, however, to my only criticism of the introductory chapter: If Clark had outlined the general conditions for static and dynamic efficiency, much of his treatment here could have been more hard-hitting. Nevertheless, readers of these chapters should get a clear picture not only of the potentials of economic analysis in contributing to the solution of one of the world's most pressing policy problems, but also of the crucial role of good common sense in the application of such analysis. Looked at in terms of the book's overall educational objectives, the material presented here could also be considered a case study integrating theoretical, institutional, and technical considerations. That the "case" deals with problems of the third world then becomes quite incidental to its pedagogical value.

The final chapter summarizes contemporary issues of science and technology policy, covering such matters as technology-induced, structural unemployment, the planning and control of complex technology, and the evaluation of basic scientific activity. Clark also offers his own conclusions on the current state of social science research into the subject. To a certain degree, he is tilting at windmills. Who among the workers in the field, for example, would quarrel with his judgment that much of mainstream economic theory (which he calls "the ruling paradigm") has little to offer in the way of guidance for an understanding of technological change, and virtually nothing in the way of useful policy advice?

And yet, if one compares the — admittedly not fully developed — heterodox approaches in economic theorizing with the achievements of other disciplines, one cannot help being somewhat more optimistic than the author. The rule of neoclassical orthodoxy has been challenged often enough, and from enough different directions, to suggest that the current, unsettled state of affairs in the discipline may be but the preface to a Kuhnian "paradigm shift". After all this has been said, there remains the fact that Clark's own book is testimony to the usefulness of viewing a very complex set of social, technical, and political phenomena through the economist's looking glass.

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Technology, Economic Growth and the Labour Process *by Phil Blackburn, Rod Coombs and Kenneth Green*
(Macmillan, London, 1985), pp.xiv + 239, £27.50., ISBN 0-333-37496-7.

This book is an extended essay in the Marxist tradition, summarising and criticising some of the ideas originating from Mandel[1], Braverman[2] and Aglietta[3].

The content can best be comprehended by defining the terms in the title: by 'technology' the authors signify those devices which incorporate useful