duced with a surprising lack of attention to detail. There are numerous errors of fact, partly because of the large number of printing faults, and the translation is in places not entirely clear. Even the arrangement of the chapters seems to be somewhat haphazard ("The Concept of the Species" and "Evolution of Species" are unaccountably separated by "The Living Primates"). Finally, there is frequent omission of key references from the lists at the ends of the chapters, numerous figures are reproduced without acknowledgment of the source, and the index is insufficient. In short, in spite of the valiant attempt to cover an enormous field, this book is so poorly produced that it will merely serve to confuse students taking courses in primatology.

R. D. MARTIN

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Predicting Technology

Technological Planning and Social Futures. By Erich Jantsch. Pp. xiv+256. (Cassell/Associated Business Programmes: London, March 1972.) £4.50.

THIS book is a masterpiece of overstatement. The author suffers a little from the illusion, common amongst enthusiastic proponents of complex management techniques, that the methods advocated are already successfully and widely practised in government and industry, or soon could be. Thus, for example, the book repeatedly refers to the experience of PPBS as though it played an extremely important part in the decision making of the United States government. No one would ever guess from this set of essays that the general experience of PPBS, however worthy the concept may be, has been one of disillusion, or that it has been largely discarded and down-graded. Even more important, it would apparently never occur to the author that there is more to be learnt about US policy making from the Watergate hearings than from PPBS or PERT.

Similarly, in the case of industry there is a gross overestimation of the role of "technological forecasting." All the empirical evidence shows that its actual influence on decision making both in America and Europe today is very slight. Few firms employ "technological forecasters", and those which do, take their accountants' advice far more seriously.

Only when he reaches the level of world decision making does a greater degree of realism creep in, although even here Jantsch plays with the notion of the "world corporations" filling the vacuum of rational global policy making. By and large, however, he recognizes that nation states and international corporations do not at present adopt a standpoint of global responsibility, but one of self-interest. This leads him to a position of extreme pessimism, as he accepts uncritically the naïve models of Forrester on resource depletion, population and pollution. Chapter 14 is a reprint of his review of Forrester's book. Since he irritatingly equates "rationality" with the adoption of "system dynamics" by policy makers, it is hardly surprising that this chapter strikes a "Gotterdämmerung" note markedly contrasting with the earlier chapters.

The style is somewhat ponderous and opaque. It compares in this respect rather unfavourably with the lucidity, scholarship and common sense of Vickers' discussion of similar problems, or Bright's clear, practical explanations or Gabor's lively normative approach to the choice of technology and future social change. Impatience with the unsatisfactory progress and narrowness of all the social sciences is quite understandable and legitimate, but Jantsch is too often inclined to substitute the box-diagram or the organisation chart. Not surprisingly, he has a considerable affinity with Forrester, the leading exponent of the universal application of system dynamics to social problems of all kinds. He shares with Forrester, too, an exaggerated respect for the capacity of American corporations to find solutions for social problems, whether at home or abroad.

All of which is a great pity, because underneath the jargon there is a nugget of gold. Whilst Jantsch suffers in full measure from some of the typical faults of the systems engineer in discussing social systems, his book also has the great virtues of this approach. He cuts through the trees and sees the wood as well. Many of his observations about policy making, new institutions and the complementary relationship of extrapolative and normative forecasting are extremely important.

Interdisciplinary research and functionally-based decision making are both highly desirable in many modern institutions. Although he exaggerates their contemporary influence, some of the methods and reforms which he advocates are urgently needed. If he could summarize the main theme of these essays, and concentrate on the essential message, it would be a shorter book, but a much better one. C. FREEMAN

Protective Mixture

Radiation Protection: A Guide for Scientists and Physicians. By J. Shapiro. Pp. xx+339. (Harvard University: Cambridge, Massachusetts; Oxford University; London, 1972.) £7.50 boards; £3.50 paper.

THE prospective author of a textbook or manual on radiation protection is required to provide a proper mixture of various disciplines and practices—physics, chemistry, biology, medicine, instrumentation, public relations, legislation and so on. To be truly comprehensive the mixture must be absolutely right but the author has a certain freedom in selecting the extent and the academic level of his compilation.

Dr Shapiro has aimed at a wide range of readers, including "physicians, research scientists, engineers and technicians". Part 1 is a historical prologue ranging from the primordial through the discovery of radiation to a statement of the need for radiation protection and the extraordinary measures—technical and legislative—that are necessary. Part 2 is offered as the core of the manual. It deals with the energy imparted by ionizing particles; with beta, gamma and other radiations; dose from external and internal sources and the significance relative to radiation standards, biological effects and natural background; and the calculation of radiation hazard. In the remaining parts (3–6) the following topics are covered successively: dose calculations; radiation measurements; protocol for users of radionuclides (necessary but hardly exciting); and considerations of public health (this provides valuable perspectives).

The coverage is complete, the style simple, the order logical and the whole easy to read. It is possible to criticize the disproportion in the treatment (under "Radiation Measurements") of G-M and scintillation counters (thirty pages) and that of ionization chambers (three pages). To test the academic level of this book I tried it on a young pre-university science student. He found the text intelligible and the calculations quite easy. He would have appreciated more rigorous mathematical treatments of some of the cases, inserted perhaps as appendices. This is a good manual, however, suitable mainly for the technician but with something in it for specialists from the other disciplines.

D. H. PEIRSON