

Because of the diversity of the book's contents, it is difficult to discuss detail without resorting to a large manuscript, therefore a general overview must suffice. In spite of its faults, which include an inadequate index, it is a remarkable book, by an authoritative worker in a field that sadly needs the discipline of publication.

J. B. LARGE

## Exposed to Pesticides!

*Aldrin, Dieldrin, Endrin and Telodrin: an Epidemiological and Toxicological Study of Long-Term Occupational Exposure.* By K. W. Jager. Pp. 233. (Elsevier: Amsterdam, London and New York, 1970.) £3.50.

In all discussions on pollution the role of pesticides never fails to receive mention. Dieldrin is one of the persistent insecticides which has fulfilled a very useful role in agriculture and public health. By the skill of the analytical chemists, however, we have learnt that measurable amounts may be present in our diet and, because of its relatively long half-life, it can be detected in our body fat. As it is impossible to determine whether or not such a small exposure as the British or American citizen receives (6-7  $\mu\text{g}/\text{man}/\text{day}$ ) is harmful, it is useful to study a population whose daily intake is 50-100 times greater and whose health and activity are under constant surveillance.

This book from the medical department of the Shell Refinery and Chemical Plant at Rotterdam contains a wealth of detail about the men who were exposed to dieldrin and the related compounds—aldrin, endrin and telodrin—during their manufacture and formulation. That these men were at times seriously exposed to these compounds is indicated by the fact that there were 34 people who developed convulsions and 54 who had other clinical evidence of intoxication of a less severe degree. There were no fatalities and no irreversible neurological changes.

Originally the exposed group were monitored by electroencephalogram determinations, but with the improvement in analytical methods and better knowledge of the metabolism and half-life of the compounds, obtained by planned studies on volunteers by UK scientists, the routine use of blood levels became the method of determining whether or not occupational exposure was excessive.

For the general reader the most significant section is the study of 106 men with an average of 7 years (4-13 years) continuous exposure chiefly to dieldrin, aldrin and endrin. No less than 20 clinical tests, ranging from body weight and blood pressure to the determination of half a dozen serum enzyme activities,

failed to show evidence of abnormality associated with exposure. By comparison with the refinery workers in the same plant, those exposed to insecticides showed no greater sickness absence.

While the medical reader may wonder why a manufacturer persisted for so long with a compound like telodrin when so much was already known about dieldrin, he can have nothing but admiration for the author who provides such a full and frank account of the health of the men under his care while making these insecticides. Although 7 years of exposure is not a life-time, nor 160 a great population, the fact that their daily intake was so much greater provides a good measure of reassurance for the general population ingesting their daily dieldrin. The company's management is to be congratulated on sponsoring the publication of this account and it is to be hoped that their example will be followed by manufacturers who have information on occupational exposure to other toxic chemicals.

The book includes a comprehensive summary of the toxic properties of insecticides derived both from experimental studies on animals and from accidental and planned exposure of man.

J. M. BARNES

## Assessing Technology

*Technological Change: Its Impact on Man and Society.* By Emmanuel G. Mesthene. (Harvard Studies in Technology and Society.) Pp. ix+127. (Harvard University: Cambridge, Massachusetts; Oxford University: London, December 1970.) £2.40.

IN 1964, IBM endowed a programme of research at Harvard University on the impact of technological change on man and society. The title is important. Although lip-service is paid to reciprocity, the primacy of technological change is in fact the basic working assumption.

This short and readable little book does not report the results of the Harvard programme, but is rather an essay on the philosophy which underlies it. Starting with the now conventional critique of the optimists and pessimists with respect to technical change, Mesthene argues persuasively for a balanced assessment which recognizes both light and shadow. He also dismisses the third view, attributed to unidentified historians and economists, according to which there is really nothing new in technological change as it has been with us throughout history. He argues that the nature and scale of contemporary technological change distinguish it from earlier varieties and call for a special type of response.

In terms of contemporary American society, the response which he calls for is in fact a revolutionary one, but the

argument is presented in such an unprovocative, urbane style that nobody would notice; and it is scarcely surprising that the radical American left regard him as part of the establishment. He is, in fact, arguing that the private market mechanism is increasingly inadequate to cope with the consequences of modern technology, and for a greatly enhanced role for public decision-making in relation to the economy and technology. Because the free enterprise system cannot effectively assess or control the introduction of new technologies, and as their disruptive effect may be very great, this must be a public function. Indeed, according to Mesthene, it is already so to a large extent.

Unlike many other Americans, Mesthene does not view this prospect with dismay. The brave new world apparently holds few terrors for him, and he is optimistic about the possibilities of participatory democracy in relation to advanced technology. Although he makes perceptive comments on the wilful determinism of the pessimists, who have made up their minds to see only the negative side of technical change, he is himself vulnerable to the criticism that he skates too lightly over the pessimistic critique. Aspiring to a judicious balance between optimism and pessimism, he actually comes down decisively on the optimistic side. Occasionally this comes close to a facile optimism, as in his frequent failure to distinguish between the decision-making of the individual and that of the large corporation in relation to the economy and his omission of any real indication of how public decisions in relation to technology are to be made.

As, however, nobody else has solved these problems either, it would be unfair to be over-critical, and one must be grateful that the Harvard programme is approaching these problems in an inquiring and undogmatic spirit. Mesthene refers to a number of interesting projects in their programme which suggest that there is still some hope that technological change might one day become the dependent variable. But they obviously do not look at it like that.

C. FREEMAN

## A Vital Statistic?

*The Divine Proportion: a Study in Mathematical Beauty.* By H. E. Huntley. Pp. xii+186. (Dover: New York; Constable: London, September 1970.) £1.25.

A SEGMENT AB is said to be divided internally at C in "the divine proportion" if  $AB/AC = AC/CB$ . This ratio, which the author calls  $\phi$ , is then equal to  $(\sqrt{5}+1)/2$  or, approximately, 1.618. The author has written a paean in praise of the divine proportion, drawing