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basis then their predecessors and laments the "inability or unwillingness of scientists to examine the social preconceptions inherent in the organization and conduct of their own work."

Although Chorover has done an impressive job of drawing the connections between his different topics, there are times when the attempt to unite all of the issues seems strained, as represented, for instance, by the title of one chapter "Genocide: The Apotheosis of Behavior Control". Further, although the role of sociobiological theories in justifying an inferior status for women is mentioned at several points, this subject deserves much

more extensive treatment, particularly in the light of the recent resurgence of such ideas. These defects, however, do not seriously detract from the unusual service that this well-documented and well-referenced book performs for biologists, social scientists, psychologists and the public at large. For, to this reader, one is not equipped to evaluate these issues as they appear without an analysis which considers the social context and historical background to particular questions at the interface of science and society. □

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Instantaneous expertise

Thomas H. Jukes

Malignant Neglect. By the Environmental Defense Fund and Robert H. Boyle. Pp275. (Alfred A. Knopf: New York, 1979.) \$10.

THE dust-jacket of this book modestly states that it "is based upon the enormous resources and scientific knowledge and authority of the Environmental Defense Fund (EDF), the nation's leading force in the field of environmental health". One author is a journalist, one a biochemist, one a science associate, and the qualifications of the other four are not listed.

A normal metabolite, acetaldehyde, is called a "known or suspected carcinogen" (page 105), and ammonia a "toxic organic vapor". The familiar litany is recited that no level of a carcinogen is insignificant, and that the latent period for development of cancer is 5-40 years (page 6). Actually, the risk and length of time required for appearance of symptoms are both dose-related.

A graph (page 21) compares increase in cancer mortality rate for 1940-1975 (uncorrected for smoking, page 214) with increases in production of plastics and other organic chemicals. Compared with plastics, similar increases have occurred in skateboards, tomato production and pocket calculators.

Chapter 3 is about polychlorobiphenyls (PCBs). There is no lack of public information on this topic. But what is the record of the EDF on PCBs? Jensen's publication in 1966 (page 64) attracted wide attention to contamination by PCBs. The EDF virtually ignored PCBs and campaigned against DDT, so that in 1969, the "end of the ocean" by 1979 was predicted as a result of the arrest of photosynthesis in marine algae by DDT. However, Harvey *et al.* in 1973 reported

that PCBs were present in surface water of the North Atlantic Ocean at about 20 p.p.10¹², and the level of DDT was less than 1 p.p.10¹². Scott found in 1975 that DDT, 100 p.p.m. of diet, had no effect on hatchability and shell thickness in laying hens, as compared with lethal effects produced by PCBs at 20 p.p.m. PCBs were dumped promiscuously, because they were never subjected to the justifiably careful regulations that govern insecticides.

Page 102: "Driving through New Jersey... On U.S. 1, ... one begins to detect a pungent odor, like that of rotting fruit. At first the odor is faint, but as the car swings into the New Jersey Turnpike, the smell grows stronger... Closing the windows does no good; the stench pours through the vents. The sky become visibly darker, like the twilight or an eclipse of the sun. At last, ... the source comes into view. It is perhaps the largest complex of oil refineries and petrochemical plants in existence... At night the flares atop the refineries produce an eerie light that transforms the scene into something from Dante's *Inferno*... Fourteen thousand people die each year from cancer in New Jersey".

On September 24, 1979, I drove south from Newark on the New Jersey Turnpike. I passed through the "refinery complex" at 6.45 p.m. There was no odour, there were no flares, and the only visible emission from the refinery was a few wisps of steam. To the west, there was a brilliantly clear sunset in which a range of hills, 30 miles away, was sharply etched against the sky.

Alarming statements are made about diethylstilboestrol (DES) used in meat production, and it is said (pages 149-151 and 219) to be detected in 1-2% of table meat and in pancreas. It has been detected only in liver, and only 0.6% of 8,293 beef livers sampled contained more than 0.5 p.p.b. The DES intake from meat is less than 0.001% of the equivalent daily oestrogen production by a nubile woman. Page 151 infers erroneously that nitrofurans are antibiotics, and states "Even minute residues of antibiotics in meat and poultry can sensitize people and cause allergic reactions, such as rashes and shock, when one of these antibiotics is medically administered". I know of no evidence for this. Insufficient emphasis is given to the carcinogenic role of alcohol.

Arsenic and chromium, listed as

carcinogens, are nutritionally essential trace minerals, which is not mentioned. Either there is a threshold below which such substances are not carcinogenic, or there is no threshold, and therefore life is carcinogenic, but we cannot deny *both* of these possibilities. But the authors repeatedly emphasise that there is no safe dose of any carcinogen, and, on page 211, they say "'Life' is not carcinogenic". I disagree. First, there must be a threshold for certain carcinogenic stimuli (such as iodine deficiency in rats). Second, life can be carcinogenic because mutations accumulate in DNA during ageing, including mistakes in DNA replication and those caused by environmental mutagens.

Appendix A says that caffeine "may cause miscarriages or birth defects". Such a statement is pointless without being quantitative and is also irresponsible and sensational. The final chapter is "The Solution to the Problem", emphasising pages 224-232) "Personal Involvement in the Regulatory Process".

Leading experts in the field of environmental cancer are far less dogmatic than are the EDF sextet. John Higginson concludes (*Science*, 205, 1363; 1979), that the manner in which people live — diets, dress, sexual and child bearing patterns, and especially tobacco and alcohol consumption — account for the great variations in cancer rates in different countries, and may be far more important than chemical pollutants. He reports that cancer patterns within Europe show no correlations with industrialisation. He says... "people would love to be able to prove that cancer is due to pollution or the general environment. It would be so easy to be able to say let us regulate everything to zero exposure and we have no more cancer. The concept is so beautiful that it will overwhelm a mass of facts to the contrary". □

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Potency of interferon

D. C. Burke

The Interferon System. By W. E. Stewart. Pp.421. (Springer: Wien and New York, 1979.) DM98; \$53.90.

THIS book is a comprehensive review of the entire interferon literature, and fills a considerable gap. The last single-author book on interferon appeared in 1969 and the last multi-author book in 1973. Since then a number of specialist reviews have appeared, but no-one until now has had the courage and energy to tackle a survey of the field single-handed. The author is to be congratulated on a fine achievement, and the book will be greatly used.

As the author points out, interferon has received considerable recent publicity in both the scientific and popular literature as a potentially useful antiviral and antitumour agent. Its potential as an antiviral agent has indeed been obvious ever since its discovery by Isaacs and Lindenmann in 1957, but it has been slow to realise it. In retrospect, this is partly because quite inadequate amounts of interferon were available for the early trials, and partly because we did not choose the most suitable infections for treatment.

Attention has now swung away from treatment of respiratory infections to such life threatening conditions as chronic active hepatitis and viral infections of immunosuppressed or immunodeficient patients. Here useful and encouraging trials are taking place. It is, however, the potential use of interferon as an anti-

tumour agent that has attracted most recent attention, for, stimulated by a careful ongoing trial against osteogenic sarcoma in Sweden, there have been several well-publicised reports of its activity against human cancer in the USA. In addition, interferon has emerged as a cellular modulatory factor, affecting the growth of cells, the immune system and the growth of tumours; and the mechanism by which it is produced is being investigated as a model for gene derepression in eukaryotes.

The book is therefore timely. Interferon research has continued apace and we greatly need a good critical summary. The book will be invaluable for those who are starting research in the area, but also for those who, like the reviewer, have been in the field a long time but who cannot remember who did what and when. The book has a complete coverage discussing topics as disparate as the structure of double-stranded RNAs, the genetics of the interferon system, the pharmacokinetics of interferon, and its role in normal recovery from virus infection, in addition to the trials as an antitumour and antiviral agent. The bibliography contains nearly 2500 references and the author has compiled 18 tables, many of which summarise information which has not previously been drawn together — for example, a compilation of the properties of type II interferon and a seven-page table of the cross-species activities of interferons.

However, the book is more than a compilation, for the author does not hesitate to comment, often constructively. There are, for example, interesting discussions of the different hypotheses which have been advanced to explain the mechanism of virus induction of interferon, of the mechanism of superinduction, and of the various schemes for interferon purification.

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