data not otherwise accessible in such a compact form. Several other chapters discuss the biological actions of interferons on cell growth (Ito and Buffett), on viral infections (Billiau and DeSomer), and on the immune system (Johnson). A chapter on the effects of interferons on cell growth reviews some data on interferon-induced inhibition of the growth of tumors in mice; such findings led to current efforts to treat human cancers with interferons. At best, it would seem at present that interferons will serve as adjuncts to chemotherapy of tumors, although it is still possible that some human tumors will be found to respond to interferon alone. One advantage of interferon treatment of tumors is that interferon has very limited toxicity. However, we still do not know whether the possible anticancer properties of interferons are based on their growth-inhibitory, immunoregulatory, or antiviral effects—or some combination of them.

In the chapter by Billiau and DeSomer herpes B virus is given the designation HB (p. 114); then, HB is used throughout the chapter to refer to what is clearly work on hepatitis B virus. Also on p. 114, the authors suggest that perhaps interferons should not be used to treat chronic hepatitis B infections, since an efficient vaccine for preventing hepatitis B infection is being developed. The millions of patients now afflicted with the disease will not be helped by the vaccine, however, and interferon treatment might prevent them from suffering the worst consequences of the disease as well as from spreading it. On p. 116, the authors state that exogenous administration of interferon "should not achieve more than what is achieved by interferon spontaneously produced during virus infections, a delay in virus replication and virus spread and an alleviation of symptoms." With a natural substance, however, it is sometimes possible to achieve desirable pharmacological effects not seen with the normal physiological production of the substance; take for instance the therapeutic application of adrenal steroids.

The strength of this volume is a series of six chapters on interferon inducers. There is a general chapter on interferon inducers by Stringfellow, and there are chapters on polynucleotides (Levy), tilerone and related compounds (Mayer and Krueger), propanediamines (Betts and Douglas), and polyanions and other polymers (Breinig and Morahan). These chapters are a compilation of useful information on interferon inducers and as such are valuable.

Although therapy with interferon inducers sounds like a good idea, this book points out a number of problems associated with their use. Many inducers are not terribly effective in humans; they tend to be very toxic; it is sometimes not clear that their therapeutic activity is due to their ability to induce interferon; their use is often followed by a period of hyporeactivity during which interferon production cannot be induced by the particular chemical involved; and potentiation of virus disease, a paradoxical response, sometimes is associated with their use. With all of these problems, it is no wonder that many have opted to work on the application of exogenous interferon as a form of therapy. With the cloning of the genes for alpha and beta interferons, there should soon be enough interferon available to carry out the critical studies that will establish whether it indeed has a role in the therapy of human diseases.

ROBERT M. FRIEDMAN
Laboratory of Experimental Pathology, National Institute of Arthritis, Metabolism, and Digestive Diseases, National Institutes of Health, Bethesda, Maryland 20205

Factors Predisposing to Cancer

Genetic and Environmental Factors in Experimental and Human Cancer. Proceedings of a symposium, Tokyo, 1979. HARRY V. GELBOIN, BRIAN MACMAHON, TAIJIRO MATSUSHIMA, TAKASHI SUGIMURA, SHOZO TAKAYAMA, and HIRAKU TAKEBE, Eds. Japan Scientific Societies Press, Tokyo, 1980. (U.S. distributor, ISBS, Forest Grove, Ore.). xvi, 370 pp., illus. $49.

This volume contains the papers presented at the 10th international symposium of the Princess Takamatsu Cancer Research Fund. The subject is approached predominantly through epidemiologic studies, with additional papers on carcinogen metabolism, DNA repair, and the genetics, pharmacogenetics, and immunogenetics of human and experimental examples. The extremely important but little appreciated topic of the genetics of carcinogen metabolism in the human is discussed by E. S. Vesell. The role of the immune system in ultraviolet carcinogenesis of the skin, a topic of recent interest and importance, is covered by M. L. Kripke. Equally interesting and timely is a report by a group from the People's Republic of China headed by M.-H. Li on experimental investigations of the carcinogenicity of presumed fungal products found in contaminated food obtained from Linxian County, where the incidence of esophageal cancer is extremely high. These studies should serve as a model for the investigation of the role of dietary contaminants in human disease.

The discussions of specific examples and systems of DNA repair are good but somewhat dated because of the rapid advances that have been made in this field since the time of the symposium. Papers on several genetic conditions in the human predisposing to cancer as well as a paper on cancer mortality and morbidity among 23,000 unselected twin pairs are highlighted by an interesting new look at hereditary retinoblastoma by Matsunaga. He suggests that the development of this disease may be the result of altered differentiation rather than of somatic mutation as was originally postulated by Knudson.

The epidemiologic studies reported in the book range from investigations of specific cancers, such as mammary carcinoma in several geographic locations, to investigations of the incidence of a variety of neoplasms in selected human populations, such as the Mormons and Hutterites and the Japanese in Hawaii. The report from Honolulu by Kolonel and his associates and from Fukuoka, Japan, by Hirohata, who has worked closely with the group in Honolulu, present interesting cancer incidence rates in Japanese migrants to Hawaii. In view of the major differences between the United States and Japan in the incidence of stomach, breast, and colon cancer, these investigations, which have been aided by the excellent Hawaii Tumor Registry and the cooperation of the Hawaii Department of Health, are among the most promising for the elucidation of specific environmental factors in the causation of these cancers.

HENRY C. PITOT
McArdle Laboratory, University of Wisconsin School of Medicine, Madison 538706

The Case for Conservation

Extinction. The Causes and Consequences of the Disappearance of Species. PAUL and ANNE EHRLICH. Random House, New York, 1981. xiv, 305 pp. $15.95.

In this volume Paul and Anne Ehrlich consider the soaring extinction rate and the implications for society of what could become the first major reduction in total world species number in human history. In their usual readable fashion, they have prepared a careful and well-