on the President to end the moratorium, but this tactic failed when Kistiakowsky got scientists to show that nuclear tests were not necessary for establishing safety.

As Assistant Director for Science and Technology for the Central Intelligence Agency at that time, I worked very closely with Kistiakowsky and PSAC on the nuclear testing issue. The intelligence community was under great pressure to estimate that the Soviet Union was already violating the moratorium, and Air Force intelligence even set up a special group whose sole purpose was to twist intelligence to prove this thesis. It was very difficult for the CIA to prove the negative, that is, that the Soviets were not testing. Frequent reports and special studies were made for the White House on this question.

It is to Kistiakowsky's credit that he managed to keep U.S. policies on nuclear testing on a relatively even keel. The moratorium actually continued until the Soviet Union recommenced testing in September 1961, thus refuting those who had claimed it was testing all the time. Even though no test ban treaty was signed during the Eisenhower Administration, some of the differences between the U.S. and Soviet positions were narrowed during that period. Unfortunately, since 1963 virtually no progress has been made in this area, despite revolutionary advances in seismic detection and identification technology resulting from research programs started in the late 1950's. This failure is in no small part due to a lack of will and expertise in the White House.

The diaries make clear how uneasy is the life of a science adviser to the President. Kistiakowsky was frequently in the middle of the battles over the federal budget—sometimes fighting with the perennial economizer Maurice Stans, Director of the Bureau of the Budget, on behalf of greater support for basic research, and at others used by Stans to help control expenditures for new weapons and space vehicles. When a national furor exploded over Secretary of Health, Education, and Welfare Fleming's announcement that cranberries were contaminated with toxic chemicals and Secretary of Agriculture Benson became incensed because of the financial consequences to the cranberry growers, President Eisenhower turned to Kistiakowsky for a study of what should be done about carcinogenic chemical additives in food. This was the forerunner of many similar crises that beset our society today and for which there are no easy answers.

In the waning days of his Administration, Eisenhower asked Kistiakowsky to review the methodology used by the Strategic Air Command in developing its first Single Integrated Operations Plan (SIOP). I was privileged to participate in this thankless but nevertheless very interesting task. Armed with a strong Presidential directive, we were able to get some understanding of how the plans were drawn up and why they resulted in requirements for many megaton bombs on a single-target city when only one 15-kiloton bomb had devastated the city of Hiroshima. Kistiakowsky indicates that his report on this review was passed on to President Kennedy and Secretary McNamara, but it is not apparent that any lessons were learned, since the number of strategic nuclear weapons has continued to multiply since then.

The diary includes some interesting and heretofore untold episodes dealing with the loss of the U-2 on 1 May 1960 and the subsequent collapse of the planned Paris summit. Kistiakowsky reports what a blow this was to the President's strong desire to improve relationships with the Soviet Union and to bring the nuclear arms race under control. The diary poignantly shows how from that date the Eisenhower presidency was like a slowly deflating balloon and how his Administration became more and more only a caretaker for a future one.

In sum, *A Scientist in the White House* provides a personal insight into a vast panorama of events in the late 1950's. While scientists will be intrigued by the roles played by Kistiakowsky and his scientific colleagues, it is by no means a book for scientists alone. It will be fascinating and valuable to all those who are curious about how the government really works—or doesn't work.

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Trends in Pest Control

The Future for Insecticides. Needs and Prospects. Proceedings of a conference, Bellagio, Italy, April 1974. ROBERT L. METCALF and JOHN J. MCKELVEY, JR., Eds. Wiley-Interscience, New York, 1976. xvi, 524 pp., illus. $21. Advances in Environmental Science and Technology, vol. 6.

The Future for Insecticides is an outgrowth of a conference convened by the Rockefeller Foundation at which scientists pursuing research (many of them with support from the foundation) on alternatives to the pesticides currently in use were asked to assess the state of the art. We are fortunate that the proceedings have been made available to the scientific community at large.

The need for chemical control of insects detrimental to agriculture and to human health is clearly documented by Furtick of the Food and Agriculture Organization and by Wright of the World Health Organization. The major challenge in pest control that faces the entomologist is described by Furtick, who notes that the depletion of world food reserves in this decade has made the food supply particularly dependent on current production. Concurrent with this development has been a continued reliance on insecticides in the developed countries and an increased reliance on chemical control in the developing ones. At the same time the use of many conventional insecticides has been restricted or eliminated because of their effects on the environment or for other reasons (such as increased resistance on the part of target insects). Therefore, as Furtick points out, there has been heightened interest in integrated pest management that would involve "more specific, narrow-spectrum pesticides that could have the greatest possible impact on target species while at the same time causing minimum effects on other species in the environment."

The problems presented by currently available pesticides are then discussed. In particular, the authors consider resistance by target insects, pollution, and toxicity. Research on synthetic pyrethroids and the development of biodegradable insecticides focus our attention on the improvement of present classes of insecticides. A fourth portion of the book deals with the development of new classes of pest control chemicals such as insect growth regulators and pheromones.

Anyone concerned with chemical control of insect pests will want to examine these chapters on current trends in pesticide research. The insect integument as a possible site of action for insecticides (suggested in Locke's chapter) has already become a subject of intense research. The shortcomings of hormone mimics (discussed by Bowers) have not impeded progress in this area. The first insect growth regulator (methoprene) and the first pheromone (house fly attractant) have now been registered by the Environmental Protection Agency. The discovery of antihormones by Bowers, another major breakthrough in the development of new classes of insecticides, occurred after the conference.

There are, of course, many sources of information available (and some more current) on research activities with pesti-

cides. What sets this book apart is its frank assessment of the contributions likely to be made by various lines of research and its concern with the international aspects of pest control.

The authors recognize that special efforts will have to be made to bring into use chemicals that would not be developed by traditional commercial means. Clearly, a highly selective insecticide has a smaller market than a broad-spectrum chemical. Also, Roelofs discusses the difficulty of patenting natural products such as pheromones.

The Future for Insecticides reminds us that we cannot as yet do without insecticides; that new biodegradable, selective chemicals are needed; that industry should be assisted in the development of a new generation of insecticides; and, finally, that international coordination of university, governmental, and industrial efforts to improve chemical control is highly desirable—even essential.

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Proteins and Nucleotides

Structure and Conformation of Nucleic Acids and Protein-Nucleic Acid Interactions. Proceedings of a symposium, Madison, Wis., June 1974. M. SUNDARALINGAM and S. T. RAO, Eds. University Park Press, Baltimore, 1975. xxiv, 752 pp., illus. $44.50.

During the past decade enormous strides have been made in research on nucleic acid conformation and protein-nucleic acid interactions, owing in large part to the development of excellent systems and methodology for high-resolution x-ray diffraction and nuclear magnetic resonance studies and also to the improvement of theoretical procedures for analyzing preferred conformations of nucleic acids. These developments and the excitement of this field are well captured in the book under review, which comprises 44 articles contributed by investigators from around the world who met at the fourth annual Harry Steenbock symposium.

Some of the most exciting advances in the study of nucleic acid structure have centered around transfer RNA. High-resolution structures of yeast-phenylalanine-specific transfer RNA have been obtained by Kim and Rich and collaborators at the Massachusetts Institute of Technology and by Klug and co-workers at the Medical Research Council Laboratories in England. Simultaneously, intensive physical studies of transfer RNA in solution have been conducted by many groups. Particularly prominent among these studies have been high-resolution nuclear magnetic resonance investigations, although relaxation kinetics and laser Raman spectroscopy have also played an important role. The volume provides a good overview of many of these important approaches and of some of the major conclusions obtained from such studies.

Another section of the volume contains an unusually attractive integration of crystallographic studies on a number of different protein-nucleotide or protein-nucleotide-coenzyme complexes. One of the major developments in biological crystallography during the past few years has been the discovery of homologous structural elements in a diversity of nucleotide-binding enzymes. This subject is nicely reviewed by Rossmann, a leader in this field. In addition to Rossmann's contribution, there are a variety of other articles dealing with various complexes in which important structural information has emerged. This section, summarizing the exciting work on complexes, is an outstanding feature of the book.

Another major portion deals with conformational features of nucleic acids. This is a broad treatment of principles and general features and is not restricted to a particular system such as transfer RNA. In this case the articles span a wide range of related topics. Much of the material has to do with stereochemical and other factors that are determinants of nucleic acid conformation. Also included are experimental results on simple systems that can be subjected to detailed theoretical analysis. Thus, this section may be viewed as a summary of the foundation that currently exists for a rational understanding of nucleic acid conformation. Some of this material should be of long-lasting value.

The book clearly provides good coverage of some of the most exciting work on nucleic acid conformation and interactions. The quality of the contributions of course varies. However, throughout the book the emphasis is on key results, with experimental details generally omitted, and the reader can quickly extract the crucial ideas. Unfortunately, much of the work on transfer RNA's that is summarized is out of date. This is due in part to the fact that high-resolution structures for transfer RNA were not announced until after the meeting. Also, the volume omits consideration of many of the most important protein-nucleic acid systems. For example, detailed discussions of the interactions of aminoacyl transfer RNA synthetases with transfer RNA's, of *lac* repressor with *lac* operator, and of ribosomal proteins with ribosomal RNA are lacking. However, the excellent and broad coverage given to many other areas offsets some of these omissions, and the value of some of the material makes up for that which has been outdated.

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(Continued on page 214)