servatism (*Public Administration Review*, Sept., 1964). Lindblom answered that the alternative model of rationalism leads to inaction and confusion.

In my judgment, Lindblom's central mistake is to imply that the world is limited to a choice between rationalism and disjointed incrementalism. Actually, incrementalism—as a strategy—is an over-reaction to the limitations of rationalism; empirical reality and political ethicality lie somewhere between these two. Lindblom is correct: rationalism is not a valid descriptive or prescriptive model. He deserves a front seat in the academy for having shown that alone. But it does not follow that effective decision makers do or should follow an incrementalist strategy.

What really happens can well be illustrated from a study that purports to support Lindblom's thesis with hard statistical evidence (Lindblom himself deals in qualitative evidence). Richard F. Fenno, Jr., showed that for 12 years, for 37 federal agencies, in the majority of the cases the budget of one year was an increment of that of the previous year. [Fenno's unpublished study is quoted by Aaron B. Wildavsky in *The Politics of the Budgetary Process* (Little, Brown, 1964).] That is, despite all the congressional hearings, presidential directives, public demands, international developments, and technological breakthroughs, the best predictor of an agency's appropriation for one year was what it had gained the year before. Several authorities have cited this evidence to show that the federal government is one big incremental decision maker. In fact, the evidence is somewhat more complicated: in 233 out of 444 budget-agency years, the change from one year to the next was ten percent or lower, but there was a similar number of "years" (211, to be accurate) in which the change was ten percent or larger—actually, in 67 budget-years it was 31 percent or more, a very nonincremental increment.

More importantly, it is a mistake to view each annual decision as an independent event. For instance, when Congress created NASA (1958) or subscribed to the goal of putting an American on the moon and of returning him safely (1961), it in effect committed itself to a whole set of increments over the next decade. True, Congress reserved the right of annual review and left room for "remedial" steps, but most Congressmen realized that they were making a 10-year, 20-billion-dollar-plus commitment, not a decision for 1 year and a few billion. Similarly, the defense budget was "incremented" to the level of 9.5 percent of the gross national product between 1955 and 1960, after the Korean war, but it was almost doubled during the Korean war itself; it was only 5.0 percent in 1950. In short, incrementalism often is the elaboration and spelling out of *fundamental* decisions made at critical turning points.

Moreover, if we compare decision makers who are more successful, in terms of achieving their goals, with those who are less successful, it seems that the former follow several "rules" that are not in line with Lindblom's noninnovative, short range, consensus strategy. Chess playing might illustrate these rules. The more effective players explore several alternative strategies sporadically, looking *several* steps ahead for a "crisis" that might lie ahead in their anticipated course, and search for *better* strategies even if they do not see anything wrong with the one that they follow. No player ever follows a rational model of examining all possible strategies, nor do players who explore many strategies necessarily do better than those who explore fewer, although it appears that some degree of strategic scanning is better than mere incrementalism. Scanning proceeds not by studying those alternatives explored in full detail, but by checking them against a list of what we call "obviously crippling disadvantages." Those that pass such checking are explored more in detail for defects until all but one are eliminated. This is pursued for a while, until strategic scanning is reopened.

The whole process is somewhat like the work of those satellites in which there are two cameras, a broad angle and undetailed camera, and a narrow angle and detailed one; the sky is first scanned by the broad angle camera, and when spots of trouble appear, the second camera is turned on such spots. (Incrementalism would turn its lenses only on spots where recent hurricanes had gathered.) Mixed scanning is far from perfect; for instance, a strategy rejected because of an "obviously crippling disadvantage" might, if followed despite cost or risk, have been the optimal one. But as examining all strategies in full detail at each step—that is, the rationalistic approach—is not feasible, mixed scanning seems to provide a more effective strategy than does incrementalism.

As to whose values are to be pursued, the consensus model does not take into account the creative role of political leadership. Mere response to "incoming" pressures of all the "partisans" of a system will lead to a myopic policy; somebody must speak up for the longer run. Mere response to the pluralism of power will tend to neglect the underprivileged and community needs; somebody has to represent these. The real intelligence of democracy is to provide for one center of power that derives its special interests (for example, reelection) from being less partisan and more national, less myopic and more depth prodding, less "political" and more normative than other participants in the political process. These, for instance, are the qualities of great presidents. Such leaders are especially needed because the various groups participating in societal decision making do not come to it with a firm set of interests and viewpoints which Lindblom, who comes to political analysis from economics, tends to assume; this set itself is molded in part under the guidance of national leadership.

Lindblom stresses, in much more detail and finesse than can be recorded here, that "mutual accommodation of partisans" accounts for much more and better decision making than often is assumed; he opposes it to "central coordinated decision making" which, he correctly states, has many deficiencies. He also is aware that practically all decision making processes are "mixes" of these two types, although he is too busy contrasting the two to fully explore the more common "mixes." Above all, he underestimates the relative weight and the merits of strategic and national factors in societal decision making. Nevertheless, he has done more than any social scientist to focus the debate on how we do make decisions and on how we ought to make them.

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## Arid Zone Research

**Methodology of Plant Eco-Physiology: Proceedings of the Montpellier Symposium** (UNESCO, Paris, 1965. 555 pp., $20), edited by F. E. Eckardt, is the 25th volume in the UNESCO series on Arid Zone Research; it is similar in size, format, and appearance to those that have preceded it. The volume includes most of the papers presented at an international symposium held in April 1962. Forty-six of the 57 papers are in English, with summaries in French; the remaining papers, plus an intro-

duction by Professor Eckardt, are in French, with English summaries. Each paper is supplemented by a transcript of the discussion by participants in the symposium and by a bibliography which ranges from 2 to 120 titles, with a median of 20 titles.

"Eco-physiology" is defined broadly as the study of "all relationships existing between living beings and their physical and biotic environments." It comprehends studies of structural and functional features that link the organism to its specific environment as well as studies of all aspects of energy transformation and transfers of energy and mass concerned in ecosystem dynamics. The breadth of this definition is reflected by the variety of topics covered in papers included in the volume. Emphasis is placed on the description and comparison of techniques of analysis and instrumentation, although details of hardware are sparse. Some papers are strictly reviews of research approaches to measurements of well-defined physiological or environmental parameters; others are reports on specific research projects and contain original data.

The papers are grouped in three sections. In the section on environmental factors (21 titles, 187 pages), radiation, wind, atmospheric and soil water, dew, interception of precipitation (which seems more appropriate to the third section of the volume), and lysimetry are considered. Measurement of precipitation is considered only incidentally in papers on interception.

Topics covered in the longest section, "Physiology of Plants Considered Individually" (26 titles, 225 pages), include leaf temperatures, transpiration, internal water dynamics, drought resistance, dew utilization, carbon dioxide exchange, stomatal characteristics, heat resistance, and plant chamber techniques. The third section, the shortest, "Physiology of the Plant Cover" (10 titles, 97 pages), is devoted to methods of determining evapotranspiration losses, dry matter production, and to the heat, water, and the carbon dioxide budgets of vegetated areas.

The book is well printed and typographical errors appear to be minimal. Occasionally, in the discussions, homonyms seem to have been transcribed, but these are not likely to mislead a reader familiar with English. In general, the discussions are well edited and, in many cases, add to the comprehension of the original papers.

Many papers in this volume presume too much background to serve as introductions to their subjects, and most do not treat their subjects intensively enough to be of great or lasting value to one involved in research. However, as a collection they complement one another and thus can be of value both to the novice and the researcher. The price of the volume probably will restrict its purchase by individuals.

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## Fifth International Thyroid Conference

This symposium volume represents an attempt to bring together the diverse fields of thyroid research ranging from the most basic to the clinical. **Current Topics in Thyroid Research** (Academic Press, New York, 1965. 1247 pp., $42), edited by C. Cassaro and M. Andreoli, present a massive number of short communications of varying quality, rather than critical reviews by a few experts. A number of the papers represent the presentation of little more than one experiment, and in some instances this is only a single statement in the text.

Another feature that must be criticized is the fact that the organization of the various subsections is rather arbitrary. Calcitonin has little in common with iodine metabolism in the hyperplastic hamster thyroid, but they are treated together.

The most useful parts of the book are the closing remarks at the end of each session in which a designated individual attempts to critically review the proceeding contributions. These vary in detail and orientation, but in general each one provides enlightenment as well as a few critical and thoughtful remarks.

This compendium is certainly not intended for the uninitiated, but for interested research workers who are seeking a critical evaluation of current trends in thyroid research. It may be of some value to those who are working in the field in keeping them abreast of what others are doing. But even these individuals will find it difficult to assess much of the information presented. The volume does not live up to the expectations expressed by Cassano in his opening address, for he hoped it would indicate that the study of the thyroid gland is in the forefront of modern endocrinology.

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## Entomology

**A Handbook for the Identification of Insects of Medical Importance** [British Museum (Natural History), London, ed. 4, 1965. 340 pp., £3] by John Smart, with chapters by Karl Jordan and R. J. Whittick, is the fourth edition of a very useful work that was published in 1943 and considerably revised in 1948. When it first appeared there was a need for a volume that would aid in the identification of insects capable of transmitting disease in the war theaters. The military needs greatly stimulated the study of insects of medical importance—the result has been a continued interest in the organisms involved. It was quite evident that the book must be revised if it was to be republished, and because it was one of the best textbooks on the subject, a new edition was highly desirable. It is unfortunate that it was not possible to completely rewrite the work, incorporating the large quantity of new information gathered during the last 15 years, but that was evidently too costly a procedure. Instead we have a photolithographic reproduction of the second edition (1948) with changes made without altering the format or typeface, plus three pages of addenda and corrigenda provided by the author, and four pages (in two parts) on mosquitoes by Dr. Mattingly. That a considerable amount of time lapsed between the preparation of the addenda and the publication of this edition is shown by the statement that the third volume of Oldroyd's *Horseflies of the Ethiopian Region* was in press. As that work was published on 6 March 1957, and the present edition of Smart's *Handbook* appeared December 1965, it seems that more than 8 years passed while the volume was awaiting publication. Much has happened in the field of taxonomic medical entomology during that time, not the least of which