feature of the equatorial electrojet is now understood, and is in harmony with the dynamo theory. The brief chapter on the upper atmosphere and meteors, contributed by J. S. Greenhow and A. C. B. Lovell, deals mainly with radar observations of meteor trails.

A final chapter is supposed to give the advances made during the IGY, and provides something of a catch-all to relate recent results. Except for a discussion of the detailed shape of the solar Lyman-alpha line, this chapter is somewhat disappointing. The rapid pace of development is shown by the fact that the exosphere is still described as an isothermal region. More recent work has shown that this concept is not justified and that the distribution of density in the exosphere varies considerably from that of a gas at constant temperature and in thermodynamic equilibrium.

Except for such rather minor shortcomings, the book constitutes a most useful and up-to-date compendium on upper atmosphere physics. It is a must for the specialist, but is written so that the nonspecialist or student can inform himself authoritatively of the state of this important subject.

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The Policy Machine. The Department of State and American foreign policy. Robert E. Elder. Syracuse University Press, Syracuse, N.Y., 1960. 238 pp. $4.50.

In *The Policy Machine*, Robert Elder examines the structure and procedure by which American foreign policy is made and administered. The "policy machine," he says, "which grinds out American Foreign Policy is one of the most intricate and complex mechanisms of modern democratic government." Not so long ago the Department of State was a relatively modest agency in which sons of "good families," trained at Ivy League colleges and ignorant alike of their own country and the world at large, could carve out fashionable careers in Washington or abroad. Today this same agency is a bureaucratic behemoth among behemoths. With over 6500 employees in Washington and New York, it operates 277 overseas posts, staffed by over 6000 American citizens and nearly 10,000 alien employees. It is a vastly complex communication center which on an average day receives over 1200 telegrams, dispatches, and operation memoranda and sends more than 1500 communications by telegraph and diplomatic pouch. "During the fiscal year of 1958, a quiet one diplomatically, 7,500,000 words a month flowed in and out of the Department's telegraph room. Some 80% of this communication flow is classified for official eyes only."

Nor is foreign policy contained wholly within the Department of State. The International Cooperation Administration, the Export-Import Bank, the Development Loan Fund, and the United States Information Agency are independent or semiautonomous cogs in the vast foreign policy machine of the United States. So, too, are the overseas representatives of the departments of Agriculture and Treasury, Commerce and Labor. At the summit of this structure, the President, as the sole constitutional voice of the United States in its international relations, must somehow shape, coordinate, and direct people, policies, and programs.

In the conduct of foreign relations, as in other areas of his responsibility, the President must make a kind of Hobson's choice between a manageable number of unmanageable agencies, or an unmanageable number of manageable ones. Even the President's "span of control" has outer limits, and in striving to keep on top of the vast policy machine over which he presides, he must rely on, not one, but a hierarchy of coordinating agencies which stand between him and his agents at the level of operations. His communication with our major diplomatic missions, consular offices, and delegations to international organizations carried on through the Secretary of State, is reasonably direct and, in emergency, can be swift and sure. But for the most part the President's knowledge of events in the field is filtered through an elaborate sieve.

The "low men on this totem pole," if I may mix a metaphor, are the 114 country desk-officers in the State Department, who are "the eyes and ears, the brain and voice of America in a troubled world." Standing between these officers and the President is a veritable wilderness of coordinating agencies and officials including assistant secretaries in charge of African, Inter-American, European, Far Eastern, Near Eastern, and South Asian affairs and bureaus of International Organization, Economic Affairs, International Cultural Relations, Intelligence and Research, Public Affairs, Administration, and Consular Affairs. There are also assistant secretaries responsible for policy planning and Congressional relations. At the apex of this structure is, of course, the official on whom the President must mainly depend, the Secretary of State, with his undersecretaries and deputy undersecretaries for political affairs and administration, who, with the directors of the ICA and the Foreign Service, make up the high command of the Department of State.

But since foreign policy is no longer the exclusive prerogative of the State Department, other interdepartmental agencies of coordination have emerged. Most important of these are the National Security Council, the National Security Council Planning Board, the Central Intelligence Agency, the United States Intelligence Board, and an Operations Coordinating Board. Under President Eisenhower the National Security Council became a kind of supercabinet in which major problems of both foreign and domestic policy were discussed. Included in this body, either by law or invitation, are the President, the Vice President, the secretaries of State, Defense, and Treasury, the directors of Defense Mobilization, the Bureau of the Budget, the U.S. Information Agency, and the Central Intelligence Agency, and the chairman of the Joint Chiefs of Staff.

This, in rough outline, is the policy machine which Elder strives to describe and to evaluate. Although Elder knows that our foreign policy is a complex of diplomatic, economic, military, and cultural relations, his major concern in this volume is with its diplomatic and cultural aspects. His book is more than a study of structure and organization, although its main emphasis is on problems of administration and personnel. But in dealing with these problems, Elder takes us behind the scenes to look with a friendly but critical eye at some of the more dynamic aspects of politics and administration as they affect our foreign policy. His analysis of the role of public information officers, public opinion analysts, and legislative liaison specialists in the foreign policy machine is informative and perceptive. All students of public administration will find the author's chapter on personnel management of particular interest, since he does not hesitate to grasp the Wriston nettle with a firm hand.

Whether "the need for specialization can be met without a major retreat from Wristonization," whether the Government should "create its own undergraduate Foreign Service Academy," whether the merit system should be so extended as to exclude political appointments altogether are but some of the ticklish issues which Elder discusses with vigor and insight. Not everyone will agree with the answers he suggests, but no one can quarrel with his statement that "a creative adaptation of organization and policy to a world . . . in flux is essential if America and Western Civilization are to avert a decline similar to that of so many great nations and civilizations of the past."

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The Grasses of Burma, Ceylon, India and Pakistan (Excluding Bambuseae). N. L. Bor. Pergamon, New York, 1960. xviii + 767 pp. Illus. $25.

The Grasses of Burma, Ceylon, India and Pakistan replaces volume 7 of Sir Joseph Hooker's *Flora of British India.* It is a must for anyone interested in agrostology, for it contains a wealth of carefully compiled, concise information on most phases of the subject. Moreover, it is of much importance to the agriculturist interested in forage crops, grazing, or soil conservation: there are many notes on these subjects, as well as lists of species adapted to these purposes. The foreword, written by George Taylor, director of the Royal Botanic Gardens at Kew, includes a brief history of work at Kew on Indian grasses and a paragraph about the author.

The book is divided into a general part and a systematic part. The general part includes a chapter on the morphology of the grass plant which the author divides into the vegetative shoot, the reproductive shoot, and the flower. Numerous examples are given to illustrate the terms. There follows a chapter on dispersal of grass fruits and seeds, by wind, water, and special devices, also with illustrative examples. The third chapter discusses the uses of grasses for food, grazing, and fodder. A list of introduced and exotic fodder grasses is provided, among which are some of our own native grasses. Grasses for essential oils include 15 species of *Cymbopogon.* A brief account of the oil and oil production from each is given. Other genera producing aromatic oils are *Vetiveria, Bothriochloa,* and *Capillipedium.* Grasses used for paper making, lawns, soil binders, and miscellaneous uses are noted briefly. It is of interest that *Pennisetum clandestinum* has been "an astonishing success in hills where rainfall is high, and is one of the most valuable introductions. It provides an excellent fodder, forms a close turf, and wears well." The final chapter on obnoxious grasses mentions poisonous grasses, grasses causing mechanical injury, and weeds. Two of the worst weeds are *Imperata cylindrica* and *Saccharum spontaneum*; both are aggressive.

The systematic part presents a brief history of the "old systematics," which covers the period from pre-Linnaean times down to about 1930. The change from the old concept of large genera such as *Andropogon* and *Panicum* to smaller, more homogeneous ones is given as an example of advancement during this time. "No matter how perfect that system may become from the standpoint of the cytogeneticist, anatomist, physiologist and so on, the task of the taxonomist will still be the correct identification of his plants. That task will not be helped by knowing the chromosome number of the plants before him . . ., but will be based upon easily observable characters from which keys can be constructed. . . . After all, the taxonomist's business was to name plants, and in his classification it must be remembered that the remarkable thing about it was not that so much was wrong, but that so much has been proved right."

In the "new systematics" a taxonomist considers, in addition to gross morphological characters, the following topics: size and basic number of chromosomes, leaf anatomy, first seedling leaf, lodicules, embryo, hilum, root hairs, starch grains, nucleoli, and the nature of the shoot apex. A brief account of the importance of each and what has been accomplished is given. There is a brief discussion of the origin of grasses, and the several phylogenetic arrangements that have been proposed. Of particular interest is the statement attributed to C. E. Hubbard, that "the ancient primary grass consisted of leafy-branched flowering shoots, each of which was many-noded and bore at each node a sheathing leaf. In the axil of each leaf would be found a prophyllum-like scale and between it and the leaf-base a typical monocotyledonous flower."

In the systematic list, the grasses are divided into two groups, the Panicoideae —consisting of the tribes Maydeae, Andropogoneae, and Paniceae—and the Pooideae, consisting of 36 tribes, most of them relatively small. The arrangement is strictly alphabetical throughout, an arrangement which greatly increases the volume's usefulness as a ready reference work. It is also a very commendable plan because of the rapid changes taking place in the concepts of grasses. "It seems obvious that a great deal more information must be gained, before even a tentative scheme with a moderate chance of acceptance can be produced."

There are dichotomous keys to the groups, tribes, genera, and species. A complete citation, important synonyms, geographical distribution, uses, principal exsiccatae, and chromosome number, if known, are given for each species. Numerous pertinent taxonomic discussions are included when they are necessary to explain the reasons for using a given name. There are no species descriptions. These would have been very desirable, but they would have doubled, at least, the size of an already large volume. An appendix contains the Latin descriptions of new tribes, genera, and species, including a rather large number of species of *Agropyron.*

The book is well printed and easy to read. There are 80 full-page illustrations, most of them drawings taken from the *Flora of West Tropical Africa, East African Pasture Plants,* and *The Cultivated Races of Sorghum.*

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Miscellaneous Publications

(Inquiries concerning these publications should be addressed, not to Science, *but to the publisher or agency sponsoring the publication.)*

Carnegie Institution of Washington. The report of the president, 1959–1960. Carnegie Institution, Washington 5, 1960. 74 pp.

Protein Structure and Function. Report of a symposium held 6–8 June 1960. Biology Department, Brookhaven National Laboratory, Upton, N.Y., 1960 (order from Office of Technical Service, Department of Commerce, Washington 25). 266 pp. Illus. $2.50.

La Recherche Scientifique aux U.S.A. Report on a study made under the auspices of the Ford Foundation. André Molitor. Conseil National de la Politique Scientifique, Brussels, Belgium, 1960. 61 pp.