particular distinctive regional stands (for example, "larch forests of Central Yakutia"). For each region there is presented valuable local detail on the history of forest exploitation and the extent, age, quality, and yearly increment of the forests, and such questions as the connection between age of felling and the process of natural regrowth are discussed. Although due attention is paid to ecological conditions, the orientation is generally toward the economic appraisal of particular stands. The text is liberally interspersed with meaningful statistical tables and photographs, and the end-pocket contains 11 original maps, based on recent data, showing the growing periods of the various species, quality grades, reserves, the state of forest survey, and the extent of reforestation.

The translation is, in general, satisfactory and runs smoothly, in spite of occasional ambiguities such as the rendering of the Russian *kedr* as "cedar," but it would have been well worthwhile to provide this version with certain extra "editing" services—in particular an index, considering that the book is likely to be a prime source of reference on the subject for some time to come.

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Automatic Control in Space Flight

Peaceful Uses of Automation in Outer Space (Plenum, New York, 1966. 601 pp., illus. $22.50), edited by John A. Aseltine, is the proceedings of the First IFAC (International Federation of Automatic Control) Symposium on Automatic Control in the Peaceful Uses of Space, held in Norway in 1965. All but two of the 44 papers in this volume can generally be classified in two allied fields: space flight mechanics, and guidance and control. In the first category, papers are included which deal with thrusting and nonthrusting phases of translational motion, rotational dynamics, and optimal flight-control policy. Papers in the second category concern the conceptual design, techniques, functional configuration, performance, operating characteristics, and equipment descriptions of guidance and control systems. The two papers whose subjects range outside of these two related fields are descriptions of the reactor power control for a nuclear rocket and low-power circuit designs using metal oxide transistors.

This collection of papers will be a valuable reference for designers of guidance and control systems. A considerable quantity of data on the design of components and systems is presented. These data include performance and operating characteristics for sensors, attitude-control torquing devices, and computers. A wide variety of equipment—star, lunar, and planetary trackers, infrared earth horizon scanners, sun sensors, optical and Doppler radars, a cryogenic gyro, a solar pressure reference, reaction wheels and jets, magnetic and fluid dampers and torquers, and gravity gradient stabilizers and dampers, as well as special- and general-purpose digital computers and data processors—is described. The state of development of this equipment can be identified with the space vehicles in which the components and systems were installed and tested. Past, present, and future space vehicles cited in this connection are Vanguard, Explorer, Tiros, Vostok I, Mercury, Telstar, Mariner, Alouette, Relay, Syncom, OGO, Surveyor, Saturn V, and Apollo. A noteworthy feature of this volume is the brief discussion which follows most of the papers and contains, in many cases, important clarifications as well as additional data.

In the last decade or so, an increasing number of international symposiums on aerospace technology have been held in Europe. With respect to the origin and contents of the papers presented at these meetings, several patterns have evolved. First of all, the greatest number of papers is usually presented by authors from the United States, with the Soviet Union sending the next largest contingent to present papers. This pattern is not at all surprising. However, another trend is that the Soviet contributions at international meetings tend to be theoretical, whereas the American papers stress the development and testing of working systems. This pattern was borne out at this IFAC meeting: 14 of the 15 Russian papers were in the field of space-flight mechanics, and 18 of the 21 American papers treated tested guidance or control techniques. For a meeting whose theme was the peaceful uses of space, it would have been of real interest to the international community of aerospace engineers and scientists to learn more about Russian flight-tested equipment design and performance.

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Hydrology by Computer

Simulation Techniques for Design of Water-Resource Systems (Harvard University Press, Cambridge, Mass., 1966. 230 pp., illus. $7.50), by Maynard M. Hufschmidt and Myron B. Fiering, is a summary report on a study conducted for the Corps of Engineers and is an extension of the concepts presented in *Design of Water-Resource Systems* by the Harvard Water Program Group. As such, its subject is not as broad as the title implies, for the only technique discussed is that of the Harvard Group —the use of principal component analysis of correlation data for historical records to generate synthetic hydrologic sequences which maintain the statistical properties of the historical data. No mention is made of other techniques for hydrologic modeling, either stochastic or parametric, nor of problems inherent in this particular method, such as the built-in time-sampling error.

The reader is led step by step through the construction of a conceptual model for simulation of two river-basin systems, the Lehigh Basin in Pennsylvania, and the Delaware Basin, of which the Lehigh is a sub-basin. Each necessary component in the model is described, and the simplifying assumptions used are stated, with some discussion of possible refinements. The programming of the conceptual models for digital-computer simulation is outlined in some detail, with several flow diagrams. Although the programs described are for particular basin configurations, what is presented is of general interest to anyone interested in hydrologic simulation. The desire for generalization is discussed, with the aim being to design as general a program as possible.

Surface flow only is considered, with no consideration of bank storage in reservoir design or operation. Because of the current state of the art, estimates of both recreation costs and