come down because "climatologists are no longer content with the analysis of data designed only for weather forecasting." They have gone beyond, developing budgets of energy and water that render "the seemingly noncomparable climatic elements amenable to precise and unifying physical interpretation." Chang's experience with such climatologists as C. F. Brooks and C. W. Thornthwaite, his own research on soil temperature, evapotranspiration, and geographic-scale distributions, and his association with the advanced agriculture of Hawaii and its university have enabled him to make an important contribution toward our fuller understanding of those indispensable organisms, the domesticated plants.

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Ecosystems

Fundamentals of Forest Biogeocoenology. V. SUKACHEV and N. DYLIS. Translated from the Russian edition (Moscow, 1964) by J. M. Maclennan. Oliver and Boyd, Edinburgh, 1968. viii + 672 pp., illus. £ 12. 12s.

Twentieth-century Russian scientists have contributed importantly to the development of the science of forest ecology, and now English-reading ecologists have access for the first time to the data and thinking of the current generation of Soviet scholars in this field. Sukachev and his colleagues write about the forest ecosystem, but describe it as a "biogeocoenose," preferring the latter term as specifically emphasizing "the fact that here we have a unit of organisms closely inter-related with their environment" and avoiding the term "ecology" in dealing with community studies because in the Soviet Union it is identified primarily with autecology.

The ten chapters are separately authored by scientists in the Forestry Laboratory and in the V. L. Kamarov Botanical Institute of the Academy of Sciences of the U.S.S.R. The late V. N. Sukachev wrote the first and last chapters and is listed as the senior editor. N. Dylis, his senior research assistant, is senior author of the longest chapter (156 pp.), dealing with the vegetation component of the forest ecosystem, and junior editor of the entire work.

Chapters 2 through 6 deal separately and in detail with the atmospheric, plant, animal, microorganism, and soil components of the forest ecosystem. They provide an individual guide into much basic Russian work, which is fully covered by the excellent Russian bibliography presented. The data derive from studies similar to those carried out contemporaneously in Europe and North America, and so afford important comparisons from a major portion of the world's temperate forests. Such matters are dealt with as evapotranspiration losses from different types of forests, leaf mass and leaf surface in various forest stands, and characteristics of microorganisms in forest soils. Both forest animals and soil microorganisms are dealt with exhaustively.

The treatment of succession (chapter 7) is brief and general, as is that of the other synthetic elements of ecosystem (or biogeocoenose) analysis. The reader will look in vain for a treatment of forest geography in the U.S.S.R., but the development of the principles of forest classification is traced from Morozov's 1912 book on "forest science" to the All-Union Congress on Forest Typology in 1950 and on to the Ninth International Botanical Congress in Montreal in 1959. Russian plant sociologists have made unique contributions in the classification of forest types. Their more comprehensive approach should be compared to the use of lesser vegetation as type indicators in similar boreal forests by the Finns and Scandinavians.

Compared to much Russian writing on ecology, *Fundamentals of Forest Biogeocoenology* is remarkably free from political dialectic, personal attacks on other scientists, and nationalistic bias. Sukachev does attack Nesterov as making statements which are "often undefined, indecipherable, and occasionally ill-written" but dismisses his classification of forest merely as "an unsuccessful eclectic combination of several of Morozov's suggestions." Those Western scientists whose views are quoted are generally treated with intelligence and respect.

The reading is heavy, for Russian ecology has a dialectic all its own and considerable space is devoted to its elucidation or perhaps confounding. Nevertheless, this is by far the most readable, intelligible, and complete guide to Russian forest ecology available. As such, it will be an essential part of the library of every serious English-speaking ecologist concerned with forests.

It is notable that a lengthy "non-Russian" bibliography is appended and that the 14 collaborators have gone to considerable effort to select illustrations from these listed works. A kind conclusion is that this commendable effort is no more unsuccessful than that of English and German authors with regard to Russian literature in the same field. Much important U.S. work is ignored, and the items that are listed appear to have been chosen at random or perhaps because the library of the Botanical Institute happened to have the reprints. At least the authors tried, and this is about all I can say for my coverage of Russian research in my own book on the same topic.

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Biochemical Agents

Antimetabolite des Nucleinsäure-Stoffwechsels. Biochemische Grundlagen der Wirkung. PETER LANGEN. Akademie-Verlag, Berlin, 1968. 220 pp., illus. DM 38.

The last major book on antimetabolites, by the late D. W. Woolley, appeared in 1952 when only a few nucleic acid base analogs were available. In the meantime many of these drugs have become useful chemotherapeutic agents in the treatment of cancer (6-mercaptopurine, 5-fluorouracil, cytosine arabinoside), immune reactions (azathioprine), virus diseases (iododeoxyuridine), and gout (allopurinol). In addition, many antimetabolites have become of considerable interest as biochemical tools. A book evaluating the contribution of these agents to biological and medical science would be most welcome if it treated the subject in depth. Langen's specialized monograph, however, only summarizes the biochemical actions of the structural analogs of purines, pyrimidines, and a few related compounds. The author reviews enzyme inhibition due to substrate replacement by analogs at the active and allosteric sites, the incorporation of the drugs into DNA or RNA or both, mechanisms of resistance, and routes of degradation. Another chapter describes the problems associated with the relative nonselectivity of these agents in tumor chemotherapy and the approaches that are being considered to improve their effectiveness on the basis of an understanding of their biochemical properties. The last section of the book lists the major