tion to astronomy is far more than his very considerable research in stellar spectroscopy. At the Yerkes Observatory during the 1930's, he gathered an outstanding group of research astronomers and influenced a large fraction of the men now active in the field. He knows their work well, and he has acquainted himself with almost all other significant astronomical activity. His Russian origin provides a valuable link with Soviet astronomers, and he makes the point early in this book that astronomy has proved itself above the East-West political controversies of this century.

Otto Struve's own story, which he used to tell on rare occasions, would make another interesting book, quite aside from the astronomy involved. As an officer in the Czarist army, he barely escaped with his life from the Crimea during the Russian revolution, underwent further risks as a military refugee in Turkey, and literally lost his pants to a "con man" in Constantinople. Then the winds of fortune changed; he received a letter from the Yerkes Observatory, chanced on a man in Constantinople who could translate into Russian the enclosed offer of a job and who loaned him money for the passage, and soon established himself in Wisconsin. The stranger who helped Struve at the critical moment was a Y.M.C.A. official from a small Wisconsin town near the Yerkes Observatory.

It was more than luck, however, that brought such men as Chandrasekhar, Elvey, Greenstein, Henyey, Hiltner, Kuiper, Meinel, Morgan, Strand, and Strömgren to the Yerkes Observatory. Building on an effective tradition, and seizing on a variety of opportunities, Struve made the Yerkes Observatory a leading center of astrophysical activity at a time when American astronomy was pre-eminent. Earlier than most he recognized the significance of interstellar material and of variations in cosmic abundance of the chemical elements. In the early 1930's he learned that the University of Texas had received a bequest for a large telescope and an astronomical observatory, although there were then no astronomers at that university to plan and use such an instrument. Out of this situation, Struve devised the McDonald Observatory, located it in the high, dry Davis Mountains of Texas, and equipped it in 1938 with an 82-inch reflector, then the world's second largest. It was promptly put to work by Yerkes astronomers and by visitors from many other parts of the world.

In *Astronomy of the 20th Century* Struve has used his ingenuity and broad knowledge to pull together the many growing ideas of astrophysics, showing not only *what* has been discovered in the past 60 years, but *how*.

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Geography and Resources

Soviet Potentials. A geographic appraisal. George B. Cressey. Syracuse University Press, Syracuse, N.Y., 1962. xvii + 232 pp. Illus. $5.75.

There is a constantly growing demand for authentic information about the Soviet Union. The language barrier remains an imposing one, and the supply of Soviet publications does not yet meet the need, at home or abroad. The specialist often wishes to see the work in his own field against a background of the country as a whole. Those fortunate enough to visit the Soviet Union require some preliminary briefing, and the growing number of college courses on the country need up-to-date introductory texts.

George Cressey has provided a book that should meet most of these requirements. In little more than 200 pages he has somehow managed to distill the essence of that country's geography and to combine with it the wisdom acquired by 40 years of study and teaching. And as a former resident of China, he is able to view developments from both East and West. *Soviet Potentials* is the outgrowth of three earlier books on the U.S.S.R., but it has the great advantage over its predecessors of including statistical and other material released during the post-Stalin period.

The author's theme, put briefly, is: Does the Union of Soviet Socialist Republics have the environmental potentials with which to become the world's leading state? During his search for an answer, three main ideas are predominant—the continentality of the U.S.S.R., the physical handicaps of the country's environment, and the vast mineral resources with which it is endowed.

In ten chapters, Cressey assesses the land itself, its varied peoples, its agricultural resources, and the system under which these resources are used; he then provides regional descriptions of Soviet Europe, Middle Asia, Siberia, and the Far East. One chapter touches on international relations, with a particularly valuable, if all too brief, discussion of the future of Soviet policy toward China. The appendix contains a wide range of recent statistical material; the illustrations are many and excellent, and there are adequate maps. The list of selected readings in English is sufficient for the general reader and for introductory college courses.

How, finally, does Cressey appraise the potentialities of the U.S.S.R.? In this case, as in the case of any "thriller," the reviewer should not reveal all, but let it be said that Cressey's conclusions are possibly a shade less assured than in the earlier volumes. One wonders whether even so expert an observer has not been taken a little by surprise at Soviet economic and social progress in recent years. However, "burying" the United States is not in the cards. On balance, it seems that, irrespective of its form of government, the land of the Soviets is unlikely to match in material strength and individual welfare either Western Europe or North America.

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Emphasis on Physiography

Great Britain: Geographical Essays. J. B. Mitchell. Cambridge University Press, New York, 1962. xii + 612 pp. Illus. $7.50.

This collection of essays will inevitably be compared with *Great Britain: Essays in Regional Geography*, edited by A. G. Ogilvie and published in 1928. The early essays marked a milestone in the history of British geography, for they represented work by many of the younger geographers only recently appointed to newly established geography departments within British universities. With the exception of work by Emeritus Professor Kinvig, who also contributed to the Ogilvie essays, the present essays are by second or third generation British geographers, and it is only natural to enquire about the geographical progress made in the last 25 years. Were

these new essays to be taken as wholly representative of current British geography, the results of the enquiry would be disheartening.

There are three general chapters—on relief; climate, vegetation and soils; and population—then 27 regional chapters. Many of the latter have a textbook sameness about them: relief (discussed at considerable length); climate, vegetation, and soils (briefly noted); agriculture; industry; towns; and communications. All this despite the editorial claim that the individual chapters have differing themes. Several chapters devote more than half their space to (and almost half the maps in the book relate to) the relief of the areas discussed. This emphasis on physiography is at once the strength and the weakness of British geography today.

The accounts of the essentially simple agricultural regions, such as that by Edwards on Lincolnshire, are adequate. Nevertheless, in the essays as a whole, there is scant evidence that detailed annual agricultural returns exist for the whole country, that there are industrial and occupational tables in the *Decennial Census* as well as detailed population figures, and that there are annual employment returns from the Ministry of Labour. Numerous claims for the distinctiveness of agriculture or industry in small areas are made, yet we have to wait till page 464 for a map of any region showing its agricultural land use in detail. In chapter 3 we learn that 80 percent of the British population lives in towns, yet detailed maps of individual cities or conurbations showing major subdivision by, for example, age of buildings or by employment and population characteristics are virtually lacking.

However, Wise's essay on London, written with a controlled enthusiasm and attention to detail worthy of the national metropolis, is among the best in the book. Of the essays on industrial areas, those by North on the varied landscapes of Lancastria and by Alice Garnett on the area stretching from Pennine High Peak to the Humber are worthy contributions to the geography of Britain. So also are several of the Scottish essays, including those by Kirk and O'Dell, on North East Scotland and on Orkney and Shetland, respectively. Caird's essay on North West Scotland compresses great knowledge of the crofting problem into too few pages, while Joy Tivy's account of the Southern Uplands is rather marred by three of its maps being crammed onto one page.

Whether or not this is an editorial fault, the editor can scarcely escape criticism for the deplorable shortage of references, even to authors from whose works quotations are used (for example, Sharp on p. 150) or whose data have been incorporated on maps (for example, Dunham on Fig. 50 and Fawcett on Fig. 7).

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Basic Electronics

The Encyclopedia of Electronics. Charles Susskind, Ed. Reinhold, New York, 1962. xxi + 974 pp. Illus. $22.50.

The encyclopedia consists of some 500 articles, each written by a different author, and it covers broadly the basic physics and mathematics of electronics in addition to materials, devices, systems, and the fundamental applications of these systems. The 21 main topics that are treated include antennas, propagation and radiation, computers, communication theory, materials and chemistry, physical electronics, modern physics, high-energy physics, semiconductor devices, and instrumentation and measurement.

The articles are condensed (average length is about two pages), so one cannot expect to find minute details. Fundamentals, however, are clearly and adequately described and illustrated by numerous figures and photographs, and important mathematical formulas are often given. Many new discoveries, theories, and disciplines, which seem to be of present or potential technological significance, are included: for example, masers and lasers, the Mössbauer effect, antiparticles, bioelectronics, the Bardeen-Cooper-Schrieffer theory of superconductivity, and the atomic clock. As a rule, the date and place of, and the name of the person responsible for, a discovery or invention is indicated. References to additional detailed information are cited in many instances.

This volume will be valuable to many people, particularly engineers and physicists who may be seeking information outside their own areas of specialization.

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Comprehensive Textbook

Topology. John G. Hocking and Gail S. Young. Addison-Wesley, Reading, Mass., 1961. 374 pp. Illus. $8.75.

This valuable addition to topological literature covers a large number and variety of topics from areas of current research and from classical topology. The exposition is generally clear and well-motivated, but the book calls for a teacher prepared to answer questions on briefly mentioned topics, to correct occasional errors, and to select judiciously from the rich abundance of material.

There is a liberal supply of examples, counterexamples, and problems, which are designed to test, extend, and deepen the student's understanding. The illustrations are of high esthetic quality and form an integral part of the exposition.

A chapter on the fundamentals of topological spaces, metric spaces, and mappings is followed by two chapters devoted to topics in point-set topology and by a chapter on homotopy theory. The remaining four chapters are primarily algebraic. They include discussions of simplicial complexes, simplicial homology theory, Cech homology, and both singular and Vietoris homology. Other topics from algebraic topology are included for completeness, although they are not generally covered in a two-semester course.

There are advantages and disadvantages to the policy of mentioning "almost every topic of interest in topology," to quote from the jacket of the book. This almost forced the authors into rather rapid, early development of some difficult concepts that could well be more gradually approached and into merely cursory mention of a number of other topics. They partly compensate for this with the carefully selected references to the literature on the briefly mentioned topics, which render the book particularly valuable as a guide to a more advanced study of topology.

The various errors, typographical and mathematical, will doubtless be corrected in later editions. Meanwhile, they are a challenge rather than an obstacle to the careful student, who will find the study of this book a most rewarding experience.

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