extrapolate climatic sequences from phenomena observed in far-off Western Europe.

The senior authors draw a clear and coherent picture of cultural development in the area, from the assemblage of "pebble-tools, flake-tools, and Upper Acheulean type hand axes" which were still in vogue there "at the beginning of the Würm glaciation" or shortly before, through the following "Mousterian," "blade-tool," and microlithic industries down to the dawn of "incipient cultivation," which was heralded by the development of equipment for grinding grain and polishing stone celts and ornaments. They draw an interesting distinction between the "food gathering" procedures of "middle paleolithic" and the "food collecting" systems of "upper paleolithic" communities. They also note the presence of an apparent hiatus between the "era of incipient cultivation" and the emergence of "primary village-farming" communities; but they go on to show that this is only a gap in a demonstrable continuum, which can doubtless be filled by further excavations. What seems to me their most important conclusion is that "the transition to the food-producing" stage was not correlated with any "radical change in climate or fauna."

This is not an easy book to read, but it is invaluable for reference: no student of southwest Asian archeology can afford to pass it by. The maps are numerous and excellent, the illustrations good, and the presentation as a whole is highly satisfactory from the practical point of view.

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On Motion and On Mechanics. Comprising *De Motu* (c. 1590) (translated with introduction and notes by I. E. Drabkin) and *De Meccaniche* (c. 1600) (translated with introduction and notes by Stillman Drake). Galileo Galilei. University of Wisconsin Press, Madison, 1960. 193 pp. $5.

The publication of these two early treatises by Galileo, well translated and helpfully annotated, and with fine introductions, is indeed welcome. Those whose knowledge of Galileo has been confined to the two major Dialogues and the papers which Stillman Drake has previously translated (in *Discoveries and Opinions of Galileo*) will find in these texts the methods and concepts later sharpened and clarified by Galileo in his more mature works. There is a sense in which Galileo's biography synopsizes the transition from the old science to the new. The *De Motu* comprises not only a series of arguments directed against various aspects of Aristotelian mechanics, but is itself Aristotelian in style. Although a scholastic impetus theory prevails and Galileo still speaks of natural and violent motions, the method of analysis of real motions, which he later employs more successfully, is there.

Galileo's tortuous arguments in these treatises are necessary for airing a number of questions ancillary to the development of "two new sciences," for the death pangs of old theories are also the birth pangs of the new. For example, to what and how will mathematics apply, and how can experiment be used to decide upon certain problems? Here we see Galileo groping toward the necessary deployment of mathematical idealizations and toward the application of what Mach calls a "principle of continuity," which are perhaps the most important prerequisites to a mathematical science of nature.

Among the more interesting chapters of the *De Motu* are those in which Galileo employs the logical analysis of time and continuity in refuting certain Aristotelian views on motion. These enable us to understand why, although Galileo held so many mistaken and confused views at this date on such matters as the behavior of bodies in free fall and on inclined planes, he was yet ultimately able to achieve so much. For the essential conceptual clarifications were to follow upon repeated applications of these early critical methods.

Of interest in the *De Meccaniche* is Galileo's use of incomplete inertial and conservation principles, prior to their articulation as principles, restricted though their application may be. On the whole, these texts reveal the thorny road which is scientific inquiry, of which we cannot be too often reminded. I recommend them to the general reader as well as to the historian and philosopher of science. We are indeed indebted to I. E. Drabkin and Stillman Drake for executing admirably a difficult and worthwhile task.

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Marine Biology. B. [sic] N. Nikitin, Ed. *Transactions* of the Institute of Oceanology, vol. 20, U.S.S.R. Academy of Sciences Press, Moscow, 1957. American Institute of Biological Sciences, Washington, D.C., 1960. 302 pp. Illus. Nonprofit libraries and AIBS members, $7.50; others, $10.

This is one of a series of works being translated and published by the American Institute of Biological Sciences, apparently on a trial basis. Since the *Transactions* of the Institute of Oceanology comprise the most comprehensive journal of oceanography published in the Soviet Union, it is fitting that one of the volumes should be selected for translation. Marine Biology is reproduced from clear, original, typewritten sheets, but lacks running heads. The translation is accurate, the illustrations are well reproduced, and the subject matter of this particular volume is an excellent sample of the sort of marine biological work being done in the Soviet Union. There are papers on bottom communities by such authors as Savilov, Turpaeva, and Sokolov; plankton is the subject of papers by Ponomareva and Beklemishev; there are systematic reports on mollusks by Filatova, on hyperiid amphipods by Vinogradov, and a number of papers by various authors on the age and growth of fishes.

The individual or librarian who picks up this volume 10 years from now will be somewhat puzzled. There is no indication of editorial responsibility (for the translation), and the title page implies that the volume is published directly in English in cooperation (perhaps) with the Academy of Sciences of the U.S.S.R. Nowhere is there any overt indication that this is a translation, and there is nothing to indicate who is responsible for the translation. There is no statement that this is an isolated volume, not part of an entire English series of this journal. Furthermore, it is not only translated, but it is rigorously transliterated; not a single letter of the Cyrillic alphabet has been left anywhere. As a result, there is nowhere any indication of the proper Russian spelling of the authors' names; most notably, on the title page the name of the editor should be V. N., not B. N., Nikitin. This was carried all the way through the references (which for some reason are numbered seriatim in the translation, although this was not done in the original) with the result

that all names, titles, and journals have been reduced to the straightjacket of an American IBM typewriter. Anyone who does not have access to the original journal may have trouble identifying some of the authors. (Two names were differently spelled in the English contents of the original.) Since this volume is reproduced by photo-offset, it should have been no trouble to reproduce the Cyrillic bibliographies by facsimile. In contrast, minor errors have been retained in non-Russian citations. Most noticeable is the name of C. M. Yonge, which is Jonge in one paper and Ionge in another.

While these are minor defects that do not seriously interfere with the usefulness of this translation, it would not have cost any more, on such a large page, to include the Russian table of contents along with the English and to append a list of all proper names used in the text at the end of the volume. These are simply matters of cultural courtesy. Furthermore, the purchaser of such a volume as this is entitled to a little more information about the translation: Were all the papers translated by the same person, were they referred to the authors for criticism, and so on? Perhaps the AIBS should issue a supplementary page giving this information; such a page could be pasted into each volume in its series of translations. As it stands, this book, as useful and as welcome as it is, has a certain orphaned air about it.

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Economic Atlas of the Soviet Union. George Kish. University of Michigan Press, Ann Arbor, 1960. Illus. $10.

This is essentially a set of annotated maps, 60 of which represent 15 basic economic regions, with four maps for each region; the maps cover agriculture, minerals, industry, transportation, and cities. The last of these maps also marks the boundaries of the economic regions (*sovnarkhozy*) as they were in 1959.

Much ingenuity has been expended in devising ways of showing industrial location by conventional signs. The atlas has a number of positive features, but is open to criticism on several counts. For example, it is regrettable that there are no maps of soil and climate. If these had been included, the author might not have written that the rainfall of the Ukraine is "adequate to ample"; much of this area is subject to frequent droughts. It is also unfortunate that the colored maps of the U.S.S.R. on the inside of the cover mark a number of railway lines which are nonexistent and which are (rightly) not shown on the relevant regional maps (for example, a line north of Lake Baykal, parallel to the Trans-Siberian). It would also have been desirable to indicate the *sovnarkhoz* names. To take an example among many, Map 1D shows a region in which only one town, Saransk, is marked. I know enough of Russian administrative geography to be sure that there is no Saransk *sovnarkhoz*, but not enough to identify which *sovnarkhoz* it was without consulting another atlas. In the notes on Belorussia, it is wrongly stated that Belorussia was originally named "White" to distinguish it from "Muscovite or Red Russia"; Muscovy was never known as "Red." It is also a pity that, when there are many references to railways and pipelines under construction, nothing is said about the much-publicized plan to develop a vast new metallurgical center at Tayshet, in eastern Siberia.

A more technical problem is one of indicating the relative importance of the industries in various towns. Unfortunately, all the conventional signs are the same size, and large factories or centers are distinguished only by a somewhat darker print. As a result of this, the great textile center of Ivanovo looks no more significant than four places in the Ukraine, although in fact the Ukraine's textile output is quite small. That such things are not inevitable was shown in the Oxford regional atlas, *USSR and Eastern Europe*, published in 1956; the Oxford atlas was also superior in printing (many colors instead of black and brown only) and in arrangement.

George Kish has done a useful job, probably within a strictly limited budget, and the result, while certainly not perfect, will be helpful to students.

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New Books

Biological and Medical Sciences

Mitchell, J. S. *Studies in Radiotherapeutics.* Harvard Univ. Press, Cambridge, Mass., 1960. 281 pp. $9. The author is Regius professor of physics at the University of Cambridge. This book is based on the Dunham lectures which he delivered at Harvard University in 1958. It includes an account of the work in which Mitchell and his colleagues have been engaged since 1938.

Oberteuffer, Delbert. *School Health Education.* Harper, New York, ed. 3, 1960. 559 pp. $6.

Plunkett, Richard J., and John E. Gordon. *Epidemiology and Mental Illness.* Basic Books, New York, 1960. 143 pp. $2.75. This book is No. 6 in the series of monographs published by the Joint Commission on Mental Illness and Health.

Reitz, L. P., Ed. *Biological and Chemical Control of Plant and Animal Pests.* AAAS Symposium No. 61. AAAS, Washington, D.C., 1960. 286 pp. $5.75; prepaid order to members, $5. A symposium presented at the AAAS meeting in Indianapolis; the volume contains 19 papers on the recent advances in chemical control, on biological control, and on the public's stake in pest control.

Rose, Harry M., Ed. *Viral Infections of Infancy and Childhood.* Harper, New York, 1960. 255 pp. $8. Symposium No. 10 of the section on microbiology of the New York Academy of Medicine.

Sinnott, Edmund W. *Plant Morphogenesis.* McGraw-Hill, New York, 1960. 560 pp. $12.50.

Mathematics, Physical Sciences, and Engineering

Liebhafsky, H. A., H. G. Pfeiffer, E. H. Winslow, and P. D. Zemany. *X-ray Absorption and Emission in Analytical Chemistry.* Wiley, New York, 1960. 357 pp. $13.50.

Margen, P. H. *Nuclear Reactor Optimization.* Simmons-Boardman, New York, 1960. 91 pp. $2.75.

Nevins, Allan, *et al. Energy and Man.* A symposium. Appleton-Century-Crofts, New York, 1960. 126 pp. $3.75. Five papers on the production, use, and importance of energy in civilization; originally presented as addresses at a symposium sponsored by the Graduate School of Business, Columbia University, and the American Petroleum Institute.

Ordway, Frederick I., III, Ed. *Advances in Space Science.* vol. 2. Academic Press, New York, 1960. 463 pp. $13. The contents cover space physics, tracking, materials, electrical propulsion systems, and attitude control. The contributors include D. F. Lawden, J. R. Pierce, C. C. Cutler, J. H. Huth, E. B. Konecci, H. J. Schaefer, R. G. Toscher, and H. H. Koelle.

Ratcliffe, J. A., Ed. *Physics of the Upper Atmosphere.* Academic Press, New York, 1960. 598 pp. $14.50.

Shubnikov, A. V. *Principles of Optical Crystallography.* Translated from the Russian. Consultants Bureau, New York, 1960. $9.50.

Stephenson, Reginald J. *Mechanics.* And properties of matter. Wiley, New York, ed. 2, 1960. 377 pp. $7.50.

Termier, Henri, and Geneviève Termier. *Érosion et sédimentation.* Introduction à la géologie générale et à la paléogéographie. Masson, Paris, 1960. 412 pp. NF. 69.