etc., including America, under different dates running back to April, 1908. That it was in good standing then is shown by its inclusion in a dictionary published in that year. An extended search would no doubt develop a prior appearance.

This is adequate proof that the word Usono, as a designation for these United States, has been in active service for more than ten years, so that to-day Esperantists throughout the world are entirely familiar with the term, which is tantamount to saying that it is already used and understood in every country of any importance upon the globe.

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SCIENTIFIC BOOKS

MILITARY GEOLOGY AND METEOROLOGY

The publication of the little book on "Military Geology and Topography" which has just been issued by the Yale University Press, furnishes a useful reader in the subject for classes of the student army training courses and represents still another change due to the war—the introduction of the geologist as an integral part of a military organization.

The text, which has been prepared under the auspices of the Division of Geology and Geography of the National Research Council, is intended to give, as its title page states, a presentation of certain phases of the subjects as they are related to military purposes, and as such will prove useful in the classes for which it was prepared. It is not a text-book of geology in which the subject-matter is developed genetically as is customary in cultural or technical collegiate courses, but is essentially an empirical résumé of certain geological phenomena for prospective army officers. For example, streams are treated from a hydrographic viewpoint apart from their influence in the development of land forms and the discussion of rocks is free from detailed tables of classification and extended descriptions of igneous rocks.

The manuscript represents the cooperative work of a number of different men, authorities in their respective subjects, under the editorial supervision of Professor Herbert E. Gregory, who were called upon to prepare their respective contributions with utmost expedition in the midst of other distracting duties. Under such circumstances the product is highly creditable to both authors and editor though it is natural to expect evidence of hurried writing, lack of logical coherence, and overlapping of treatment—faults which have been eliminated with greater or less success by the self-sacrificing work of the editor.

The book includes chapters on Rocks and Other Earth Materials, Rock Weathering, Streams, Lakes and Swamps, Water Supply Land Forms, Map Reading, the Military Use of Minerals. It is well printed, indexed and generously illustrated.

On account of differing methods of treatment incident to the aims and composite authorship, teachers who use the book with S. A. T. C. classes, composed of students of widely different training, may find some difficulty in using it as a text-book for class-room work but students and teachers alike will find it very helpful in conjunction with lectures and laboratory exercises and as a compendium of illustrations of how geological and topographic knowledge is serviceable in military activities.

An "Introductory Meteorology" planned with special reference to the needs of the Students' Army Training Units has just been issued under the auspices of the Division of Geology and Geography of the National Research Council. The manuscript was prepared by the staff of the U. S. Weather Bureau and the result is a compact and well-illustrated book of 150 pages. It is extremely elementary in character but appears to lay a satisfactory groundwork for the more advanced work at military camps or elsewhere to which it is designed to lead.

Seven pages are devoted to the sources from which data are to be obtained and the composition of the atmosphere. This is followed by twenty-one pages devoted to the instruments

used for measuring the meteorological elements, and while this is well written, it is a question if the space it occupies could not with advantage be utilized for a somewhat fuller discussion of other topics. The order of development of the subject proceeds from a discussion of temperatures, pressure, evaporation and condensation to a consideration of fogs and clouds. This is followed by a brief and purely descriptive account of mirage, rainbows, halos and coronas, the chapter being labelled Atmospheric Optics. Two chapters are devoted to Atmospheric Circulation followed by what seem to be unduly abbreviated chapters on Forecasting and Climates.

A well-selected list of reference works and the international symbols are given in appendices. M.

A GREEK TRACT ON INDIVISIBLE LINES

THE development in recent years of the subject of transfinite numbers, of point sets, and theories of the continuum is directing the interest of mathematicians to kindred speculations among the Greeks. Recent historians of Greek mathematics have paid due attention to Zeno's arguments on motion as they are presented in Aristotle's "Physics," but thus far they have given no consideration to a kindred tract included among the works of Aristotle, namely, the "Indivisible Lines" or "De lineis insecabilibus." Perhaps the reason for this omission lies in the fact that the text as edited by Bekker was for the most part unintelligible. More recent collations of manuscripts, and the translation into English with careful annotations made by H. H. Joachim, of Oxford, render the tract of undoubted value in the history of mathematics.[1] It reveals the arguments on the existence and non-existence of indivisible lines, and on the possibility of constructing a line out of points, as well as those exhibiting the interaction between physical speculation about atoms and the philosophy of geometry—arguments as they were presumably presented in the most celebrated academy of the most cultured city of antiquity. Who can doubt that the divergence of views then held and the perplexing paradoxes advanced discouraged Greek mathematicians from openly using in geometry the conceptions of the infinitesimal and the infinite? Euclid was about twenty years younger than Aristotle and no doubt was familiar with the trend of philosophic thought of his time. Rigor in geometry demanded the exclusison of paradox and mysticism. Notwithstanding Euclid's total abstinence from controversial conceptions, it is evident that the infinitesimal, the indivisible and the infinite continued to command the attention of some mathematicians, as well as of philosophers, for more than two thousand years. We need only mention the title of Cavalieri's famous work, "Geometria indivisibilibus continuorum nova quadam ratione promota," 1635.

The Aristotelean "De lineis insecabilibus" contains five arguments current among the Greeks in favor of the existence of indivisibles; these are followed by twenty-six arguments supporting the contrary view, and twenty-four arguments intended to establish the impossibility of composing a line out of points. Some of these proofs are rigorous. Thus, it is argued that, if indivisible lines exist, they must be of equal length; an equilateral triangle each side of which is an indivisible line has an altitude less than the indivisible. If a straight line composed of an odd number of indivisibles is bisected, one of the indivisibles will be divided. The Greek failure to build a satisfactory theory of the linear continuum as composed of points is due to their application of metrical ideas; the addition of points could never yield length. Aristotle's failure to construct a satisfactory continuum by starting with a straight line

[1] The Works of Aristotle translated into English under the editorship of J. A. Smith and W. D. Ross. Part 2: "De lineis insecabilibus," by H. H. Joachim, Oxford, 1908. We have not seen this tract used in any history of Greek mathematics, but H. Vogt referred to it in an article on the origin of the irrational, printed in the *Bibliotheca mathematica*, 3s., Vol. 10, 1909–10, pp. 146, 153.