

Government, has aroused much etymological discussion. The author is satisfied that the earliest of the many forms is that of Walvisch Baai, which appears on Rochette's map of 1782.]

SCHWARZ, E. H. L. **The fault systems in the south of South Africa.** *South African Journ. of Sci.*, Vol. 12, 1916, No. 9, pp. 367-382.

SPENCE, J. O. **Mozambique province.** 6 pp. *Suppl. to Commerce Repts.*, Ann. Series, 1916, No. 76a. Bur. of Foreign and Domestic Commerce, Dept. of Commerce, Washington, D. C.

STEWART, T. A. **Swaziland: Report for 1915-16.** 15 pp. *Ann. Colonial Repts.*, No. 901. London, 1916.

TOIT, P. J. DU. **South African agriculture: An analysis.** *South African Journ. of Sci.*, Vol. 12, 1915, No. 5, pp. 145-155. [The principal agricultural industries are briefly surveyed, some attention being paid to the complicated human factor in the history of the development. That population is a prerequisite for further expansion is the conclusion of the writer.]

VERSFELD, WILLEM. **Notes on the chemistry of the !naras (*Acanthosicyos horrida hook.*).** Ills. *South African Journ. of Sci.*, Vol. 12, 1916, No. 6, pp. 232-238. The !naras (! represents a palatal click) is a cucurbitaceous plant flourishing in the same region round Walvis Bay. The features of its habitat are a dry, warm climate, incessant winds, loose sandy soil extraordinarily rich in potash, and a good deep-seated water supply. In its adaptation to desert conditions the plant has naturally become highly specialized. It is characterized by enormous roots and the elimination of leaves. It produces as fruit a small melon, an excellent nutritive food which with fish forms the exclusive diet of the Hottentot and Bushmen dwellers of the region. (See also reference in the note on "The Physical Subdivisions of Southwest Africa" in the August, 1916, *Review*, pp. 155-156.)]

WAKEFIELD, E. A. **Port Elizabeth.** *Suppl. to Commerce Repts.*, Ann. Series, 1916, No. 66a, pp. 32-37. Bur. of Foreign and Domestic Commerce, Dept. of Commerce, Washington, D. C.

## ASIA

### TURKEY IN ASIA, ARABIA, CAUCASIA, IRAN

WARFIELD, WILLIAM. **The gate of Asia: A journey from the Persian Gulf to the Black Sea.** x and 374 pp.; ill. G. P. Putnam's Sons, New York and London, 1916. \$2.50. 8½ x 6.

At the beginning of his book Mr. Warfield states that the object of his expedition was to pursue certain scientific studies" because he believes that "the unnoticed and comparatively insignificant mountains of Kurdistan form an important link between the mountain systems of Europe and Asia." The reader is nowhere troubled by these scientific studies, however, for the author devotes himself almost exclusively to a pleasant account of his experiences, interlarded with discussions of history. Before the war he started from the head of the Persian Gulf, went up the Tigris to Bitlis and Van, and came back to civilization by way of Urmi and the Russian Caucasus. His volume is a typical book of travel. No remarkable adventures were experienced, no new routes were discovered, and no discoveries were made. Nevertheless it is worth reading.

Certain little episodes are highly illuminating. For example, Mr. Warfield saw an old Nestorian woman who was stolen from her Christian home in childhood, lived in a Turkish harem, and had not seen a Christian for sixty years. He entertains no very high idea of the Armenians, although he acknowledges their ability. He thinks that the village Armenians are largely of Parthian descent, and that the town Armenians are partly Jewish. The Kurds and Yezidis seem to appeal to him. His descriptions of people are excellent.

One of the few scientific points upon which Mr. Warfield expresses an opinion is changes of climate. Many facts, such as the vast armies of Darius, and still more the fact that he brought to Arbela fifteen elephants from the present deserts on this side of the Indus, "provide one of the most striking proofs of the tremendous variations which have taken place in the climate of the whole northern hemisphere in historic times." He states that "conditions in the southern hemisphere are of course the exact opposite" of those in the northern, but of this he gives no proof.

ELLSWORTH HUNTINGTON.

BADER, R. H. **Persia.** 7 pp. *Suppl. to Commerce Repts.*, Ann. Series, 1916, No. 57a. Bur. of Foreign and Domestic Commerce, Dept. of Commerce, Washington, D. C.

CAPRA, GIUSEPPE. **La colonizzazione agraria in Siria e Asia Minore.** Ills. *Alta Gens*, Vol. 6, 1915, No. 3-6, pp. 65-89. Turin.

FRANCHETTI, LEOPOLDO. *Il futuro assetto dell' Asia Minore e le giuste aspirazioni italiane.* *L'Esplorazione Commerciale*, Vol. 31, 1916, No. 8, pp. 290-292.

LUKACH, H. C. *Cyprus: Report for 1915-1916.* 23 pp. *Ann. Colonial Repts.* 903. London, 1916.

RAEBURN, HAROLD. *A further list of peaks ascended in the Central Caucasus in 1912, 1913, 1914, and 1915.* *Alpine Journ.*, No. 212, Vol. 30, 1916, pp. 194-196.

SCHULTZ, ARVED. *Afghanistan: Auf Grund einer Reise des Persers Rustam-b-Petermanns Mitt.*, Vol. 62, 1916, Sept., pp. 330-333.

TOTAH, K. A. *Palestine and the Allies.* *Journ. of Race Devel.*, Vol. 6, 1916, No. 3, pp. 315-323. [Russian pilgrim, French economist, British politician have had interests in the Holy Land.]

WATSON, A. G. *Aden.* 7 pp. *Suppl. to Commerce Repts.*, Ann. Series, 1916, No. 49a. Bur. of Foreign and Domestic Commerce, Dept. of Commerce, Washington, D. C.

— *Asia, 1:1,000,000. Compiled at the Royal Geographical Society under the direction of the Geographical Section of the General Staff.* Sheets: North—I—*Bagdad*; North—K—37, *Batum*; North—I—36, *Beirut*; North—J—37, *Erzerum*; North—J—35, *Izmir (Smyrna)*; North—J—36, *Konia*; North—K—36, *Sinob*; North—J—38, *Tabriz*. War Office, London, 1916. [These sheets represent a southeastern extension of the Map of Europe, 1:1,000,000, discussed in detail in the *Bull. Am. Geogr. Soc.*, Vol. 47, 1915, pp. 776-777.]

— *Asia Minor, Egypt, Mesopotamia and Persia, Bartholomew's map of.* 1:4,000,000. John Bartholomew & Co., Edinburgh, 1916. [Excellent hypsometric map on a relatively large scale. The altitude tints, in the pleasing greens and browns generally employed by this firm, are bounded by the following contours: 0, 500, 1,000, 1,500, 2,000, 3,000, 6,000, 10,000, and 15,000 feet.]

— *Syrie, Carte de la (partie septentrionale), dessinee d'apres les cartes hydrographiques de la Marine francaise, le Palestine Found [sic], les itineraires de E. G. Rey, Max Blankenhorn [sic], Sachau, Diener, les cartes de H. Kiepert, le Guide de Terre Sainte du P. Barnabe, et les documents les plus recents.* 1:400,000. Inset: Plan de Beyrouth 1:25,000. Missions Catholiques, Lyons, 1915. [Relief in brown shading.]

— [*Turkey, etc.:*] *Les operations russo-turques: Mer Noir, Crimee, Caucase, Dardanelles.* 1:850,000. Berger-Levrault & Cie., Paris, [1916].

#### WORLD AS A WHOLE AND LARGER PARTS

FERNOW, B. E. *A brief history of forestry in Europe, the United States, and other countries.* 3rd revised edit. xi and 506 pp.; index. American Forestry Association, Washington, D. C., 1913. \$2.50. 8 x 6.

Why a history of forestry? Doctor Fernow gives the answer and the history.

The need of wood is universal, but the form that the forest problem takes varies from place to place and from time to time. It varies locally within the same country because of many conditions, prominent among which are the means of transport, the local abundance of trees or of men. Changes in one of many factors may make a new forest situation.

Thus, the people of the eastern United States in 1800, though scanty in number, developed in some localities a keen appreciation of forest care because they depended on wood for fuel and timber and had only wagons and rivers for transport. Then came the railroad and the steamship, and the Pennsylvania farmer, like the people of England, drew upon the world. Forest care was forgot in the sense of plenty that the world market gave.

That sense of plenty is passing, never to return. The north temperate zone contains the world's important forests, for, as Doctor Fernow well points out, the tropical woods are so hard that their uses are ornamental rather than economic. Of this temperate-zone forest, 800,000,000 acres are in Europe, 800,000,000 in Asia, and 900,000,000 in North America. Already all Europe, except Norway, Sweden, Russia, and Austria-Hungary, is importing, and North America with its heavy industrial development has made a woody scarcity in an amazingly short time. This present economic life of ours, despite seeming mitigation of invention, demands ever-increasing piles of wood. Even Germany, the fatherland of forestry, now imports a sixth of her supply and, like other European countries, increases her demand 1½ to 2 per cent per year. This import to Germany comes in spite of the experience of centuries, with 25 per cent of her area in forest nearly all well cared for and with the unusual output of over 50 cubic feet of wood per acre per year.

The ray of hope for the race lies in the fact that only 10 per cent of the temperate forests, 250,000,000 acres, are under any care that may be called forestry. This is not a quick hope, as shown by the experience of the city of Nürnberg in one of the first recorded cases—a crop of pine, spruce, and fir was planted in 1368, and harvested in 1459, eighty-one years later.

Germany, populous and inaccessible (in comparison to the rest of Europe), early met the need for forestry. Her scores of states and cities with independent forest administrations have made her a storehouse of experience, practice, and schooling. This and the experience of the rest of the world has been brought together in good German style by one eminently fitted for it, Professor Fernow, brought up in the schools and atmosphere of Germanic forestry and fortified by decades of observation, practice, and teaching in America.

J. RUSSELL SMITH.

## MATHEMATICAL GEOGRAPHY

### ASTRONOMICAL GEOGRAPHY

LAMBERLIN, T. C. **The origin of the earth.** xi and 271 pp.; diags., ills. (The University of Chicago Science Series.) University of Chicago Press, Chicago, 1916. \$1.50. 7½ x 5.

This book is an interesting illustration of where one may be led in a scientific search. An inquiry into the cause of the Ice Age led to an investigation of the origin of the atmosphere and from that to the origin of the solar system. The nebular hypothesis proving unsatisfactory, the author advanced what he has called the "planetesimal hypothesis." This was first published in 1897; since then many papers have been written in developing the hypothesis into a theory. This volume is the first general exposition of the theory that has appeared.

The matter may be divided for review into four parts: (1) criticism of the nebular hypothesis; (2) development of a spiral nebula by the close approach of two stars, and its evolution into the solar system; (3) origin of the larger features of the earth; (4) speculations on the beginnings of life.

(1) The nebular hypothesis was never developed into a theory; and during the second half of the last century so many objections were found to it in the exact form given by Laplace that astronomers looked to the irregular nebulae and later to the spiral nebulae as a more probable prototype of the solar system. The author and Professor T. R. Moulton, his collaborator, showed that the distribution of mass and momenta in the solar system were not compatible with the usual simple assumptions of Laplace's hypothesis; they also emphasized the difficulty offered by the nearly universal forward rotation of the sun, the planets, and their satellites.

(2) The solar prominences consist of matter erupted from the sun by some not clearly understood force. The author assumes that, if the pressure a little below the sun's surface could be reduced, a sufficient mass would be ejected to form the planets and their satellites, which, all told, only amount to about 1/745 of the sun's mass. The author ascribes to the tidal forces due to the approach of a star the role of reducing the pressure.

There are three objections to this hypothesis: (a) The cause of the eruptions is unknown, and therefore a reduction of pressure might or might not increase their violence. (b) The action of the tidal forces is inadequately described; the radial components of these forces have little effect in producing the tides, which are principally due to a heaping up of matter from the surrounding regions by the actions of the tangential components of the forces; and they are more apt to cause an increase than a decrease of pressure on the levels from which the eruptions start. (c) The author does not tell us how large the star must be, nor how near the sun it must come, but he speaks of it as "massive" and its approach to the sun as "quite distant." In his "Geology," he instances a star of the same mass as the sun and the nearest approach at about ½ the distance of Neptune. The maximum ratio to the sun's gravity of the tidal forces on the sun (due to this star) is one part in 32,000 million. If the star had four times the mass of the sun and approached to within half the above distance, the ratio would only be one part in a thousand million. Does any one doubt that the ordinary storms on the sun cause much greater changes in the pressure than this would?

Assuming, however, that the ejections from the sun have occurred as described by the author, the theory accounts for the revolution of all the planets in the same directions and approximately in the same plane, and shows that the growth of the planets, by impact with small masses (planetesimals), would tend to reduce the eccentricities of their orbits, but it may be doubted whether this could produce the very nearly circular orbits which all the planets describe. One of the most serious faults of Laplace's

hypothesis, according to the author, is that it would require retrograde, and not forward rotations of the planets and revolutions of their satellites. The author explains forward rotations and revolutions as the result of impact of planetesimals on the growing planet; and points to the relative sizes of certain shaded areas in his Figure 7 "essentially decisive" of this. These areas have apparently been drawn on erroneous impression that the direction of the impulse is in the direction of motion in the plane at the moment of impact. When the true direction of the impulse is determined by the instantaneous change in velocity, it is found that the effect of the impacts is merely to reduce the speed of rotation of the planet, in whatever direction that rotation may have been. So that the direction of the axes and the directions of rotation of the planets depend on the way the matter was erupted from the sun, of which nothing is known; and the nearly universal direct rotations are not accounted for by this theory. The author apparently recognizes the accidental directions of rotation of the large planets (p. 154).

(3) The earth is supposed to have grown by slow accretions of planetesimals, which cooled rapidly by radiation on account of their small size. The interior heat is ascribed to a contraction of the mass, and a surface temperature gradient to heat brought up from molten rock from the deep interior and to radio-activity. Somewhat plausible reasons are given why the heavier matter found lodgment in the depressed regions, and, by greater compression there, made the positions of the oceans and continents permanent.

The rate of rotation of the earth is supposed, towards the end of its growth, to have been diminished by accretions, and the depression near the equator and elevation near the poles, necessary for adjustment to the new figure of equilibrium, are supposed to be accomplished, not by plastic flow, but by fractures of the earth into great segments. By analogy with the jointing of basalt columns (!) the author thinks there would be three great fractures at each pole, and that the whole earth would be broken up into six segments, diamond-shaped at the earth's surface, and interlacing in the equatorial regions; and that these segments would sway on their apices at the earth's center, adjusting the earth to its proper figure. As the earth shrinks, crushing occurs on the land segments along the lines of junction of the segments, and mountain chains are formed. The reviewer is quite incapable of understanding how the almost perfect ellipsoidal shape of the earth could be brought about by such movements of the segments; nor do the fracture lines drawn by the author, more numerous than required by the original analogy, follow the great structure lines of the earth; new hypotheses have to be introduced to account for these discrepancies. The three heavy segments of the North and South Pacific and the Indian Oceans are supposed, by their weight, to have forced the segments opposite to them to yield, "and by such yielding to have formed the land hemisphere," a perfect analogy to a man's lifting himself by his own body straps. In describing the certain forces which increase toward the earth's center the author writes: "Their action was not unlike a vial closing from below," though, of course, the forces acting on a body in the jaws of a vise are the same whichever jaw approaches the other. But perhaps the author should be forgiven this error, for it is remarkably prevalent in geologic literature.

The author recognizes the purely speculative character of many of his ideas, and writes: "We are painfully conscious of the high probability that we have fallen into some misconceptions, perhaps not a few, and have entertained views that will need to be rectified."

HARRY FIELDING REID

#### EDUCATIONAL GEOGRAPHY

HAWORTH, ERASMUS, AND OTHERS. **Should a new degree be created for proficiency in geology?** *Economic Geol.*, Vol. 11, 1916, No. 1, pp. 73-86. [Opinions elicited by a circular letter on this question.]

KELTON, M. E., AND C. W. HOTCHKISS. **An experiment in fourth-grade geography.** *Journ. of Geogr.*, Vol. 14, 1915-16, No. 7, pp. 245-251.

KIRCHWEY, C. B. **Geography in the junior high school: Its relation to elementary school and to senior high school geography.** *Journ. of Geogr.*, Vol. 14, 1915-16, No. 8, pp. 291-294.

LANGEN, GUSTAV. **Die städtebaulichen Einheitspläne als Lehrmittel.** *Geo-Anzeiger*, Vol. 16, 1915, No. 11, pp. 331-334; No. 12, pp. 364-367.

MCARTHUR, L. A. **Accuracy in geography.** *Mazama*, Vol. 4, 1915, No. 4, pp. 47-57. [Deals with the work of the U. S. Geological Survey and the U. S. Coast and Geodetic Survey, and the giving of geographic names, mainly with reference to the Pacific Northwest.]