such tables. In Table IV. will be found all of the useful constants used in mathematics, chemistry, engineering, physics, and weights and measures. This table is a very complete one, containing as it does, reference to almost every standard and constant used in the arts and science. Table V. is a reprint of the Gaussian six-place addition-subtraction logarithms. For determining trigonometric functions, there are two tables, the four-place already mentioned, and also a six-place table. The latter is a departure from the usual method. Generally, in a six-place table, the functions are given for each ten seconds. Professor Jones has made up the table for each minute of the quadrant, the proportional part being given for each second. The tables that follow those just explained consist of prime and composite numbers, squares, cubes, square-roots, cube-roots, reciprocals, and quarter-squares. Finally, we have Bessel's table of coefficients for interpellation, and a table containing the integral for finding the mean or probable error of a result in least squares. We judge from our examination that Professor Jones has prepared the tables with great care. He seems exceedingly anxious to free them of all errors, and to induce that condition of things he offers a reward for an error found in the tables. We have not critically examined the tables, but we note a slight error in the text. On the first page the reference to the pages containing Table IX. should read 118-119 instead of 114-113. We would commend these tables to the computer as being a help to have on one's desk.

G. A. H.

Pioneers of Science. BY OLIVER LODGE, F. R. S., Professor of Physics in Victoria University College, Liverpool, with Portraits and Illustrations. London, Macmillan & Co. 404 p. 8°. $2.50.

In this work, Dr. Lodge has given the general public and the student a very interesting and readable book. As he states in his preface the book had its origin in a course of lectures delivered in the history and progress of astronomy, delivered by the author in 1887. As is often the case with books based on a course of lectures, it is somewhat disjointed. It is full, however, of interesting matter, and is lavishly illustrated, an unusual feature in such books. The author does not attempt to cover the whole ground of scientific knowledge, but confines himself to astronomy. The book, however, is unique in the endeavor by means of plain, unaffected writing and a wealth of illustration to bring the pioneers of celestial knowledge into almost personal acquaintance with the reader, tracing the history of their discoveries and the dependence of one discovery upon another. It is to be commended to students of the history of science as a most useful reference book, and to the general reader as a book at once entertaining and instructive.

J. E. I.

AMONG THE PUBLISHERS.

The career of the late Sir Richard Burton, the distinguished traveller, was most adventurous and romantic. He was an encyclopedic scholar, and much more than a scholar. He knew and had seen more of dark Africa than most men, and more of Mohammedan lands than any man. His biographer, by Lady Burton, will be published shortly by D. Appleton & Co. The book will be decorated with illustrations and maps, as well as portraits. The first part of the story, it is said, will in the main be told in Sir Richard's own words.

—The weekly paper known for the last twenty-five years as The Christian Union with its first issue changes its title to The Outlook. It will remain unchanged in other respects, except in the line of improvement and enlargement. It will be, as before, a family paper, non-denominational in religious matters, and giving large space to the current history of our times; to literature, economics and progressive movements of all sorts, and to the practical work of life.

The Rev. Dr. Lyman Abbott will remain as its editor-in-chief, with Mr. Hamilton W. Mabie as his associate, and an editorial staff of several members.

Delicious Drink.

Horsford's Acid Phosphate with water and sugar only, makes a delicious, healthful and invigorating drink.

Allays the thirst, aids digestion, and relieves the lassitude so common in midsummer.

DR. M. H. HENRY, New York, says: "When completely tried out by prolonged wakefulness and overwork, it is of the greatest value to me. As a beverage it possesses charms beyond any thing I know of in the form of medicine."

Descriptive pamphlet free.

Horsford Chemical Works, Providence, R. I.

Beware of Substitutes and Imitations.

SCIENCE.

Exchanges.

[Free of charge to all, if satisfactory character. Address N. D. C. Hodges, 84 Broadway, New York.]

I have a free-proof safe, weight 1,500 pounds, which I will sell cheap or exchange for a gasoline engine or some other things that may happen to suit. The safe is nearly new, has been used a short time only, takes offers. A. Lagerstrom, Cannon Falls, Minn., Box 907.

For exchange—Hudson River fossils in good condition from the vicinity of Moodna's Hill, Ind., and land and fresh water shells. Desire fossils and shells from other localities. Address Geo. C. Hubbarz, Moore's Hill, Ind.

For sale at low price—Beautiful old-fashioned photographic camera, rosewood box, one foot square, in fine working condition. Made by C. C. Barretson. Plateholders, troughs, baths, etc., all in large wooden cases, formerly the property of the late President Moore, of Columbia College. This is a fine example of an instrument of the best make for the old wet-process method, and valuable to any institution of amateur interested in the history of photography in the U. S. Address M. S. David, 596 W. 44th St., New York.

I wish to exchange a collection of 7,000 shells, 100 species and varieties, American and foreign, land, fluvial and marine, for a good microscope and accessories. Address, with particulars, Dr. Lorenzo G. Yates, Santa Barbara, California.

For exchange—I wish to exchange Lepidoptera of South Dakota and other sections, for Lepidoptera of the world. Will purchase specimens of North America. Correspondence particularly with collectors in the Rocky Mountains, Pacific coast and Hudson's Bay regions. P. C. Freeman, Volga, Brocking county, South Dakota.


For sale or exchange—One latest complete edition of Watt's Dictionary of Chemistry, in fair condition; one thirty-sixth edition (9th) of Allen's Encyclopaedia Britannica, almost new. Will sell cheap for cash or will exchange for physical or chemical apparatus. Address Prof. W. S. Leavenworth, Ripon College, Ripon, Wis.

Exchange.—One cephalopod, one terrestrial globe, one luminous and photographic maps, diagrams and ephemeris from 1580 to 1890, astronomical work, all in good condition. Will sell cheap or exchange. Make offer. C. H. Van Dorn, 79 Nassau St., New York.

Wants.

A GRADUATE of an American Polytechnic Institution and of a German university (Göttingen), seeks a position to teach chemistry in a college or similar institution. Five years' experience in teaching chemistry. Address Chemist, 707 City St., Brockton, Mass.

A wealthy man desires to see a position in a first-class college or university. Three years' post-graduate study. Extensive reading. Experience, strong endowments. Address E. W. Smith, of N. Y., 26 W. Washington, D. C.


A ZOOLOGICAL collector and taxidermist of ten years' experience in the field is now open to offer either field or laboratory work. References furnished. Address Taxidermist, Box 75, White Sulphur Springs, West Va.

A WANTED.—A set of Allen's Commercial Organic Analysis, 4 vols. Vol. I. and II. particularly desired. Condition not important. All leaves being present and in place. Address Charles Platt, 84 Lewis Block, Buffalo.

A WANTED, as principal of a flourishing technical school, a gentleman of education and experience who will be capable of supervising both mechanical and chemical work, and who can command the confidence of his pupils. Address, giving age, qualifications, etc., J. B. Bloomfield, Fifty-ninth street and Third avenue, N. Y.

A WANTED.—A young man as assistant in our state hospital department, queen & Co., Philadelphia.

THE undersigned desires specimens of a species of Euphorbia, of which I have but little information. The species is epiphyllum. The genus is euphorbia. The plants are to be grown and studied in this country. Address, giving all the information you can, to S. M. Faxon, 2330 Fifth Avenue, Pittsburgh, Pa.
LIGHTNING DESTROYS!

Shall it be your house or a pound of copper?

Entirely new departure in protecting buildings from lightning. One hundred feet of the Hodges Patent Lightning Dispeller (made under patents of N. D. C. Hodges, Editor of Science) will be sent, prepaid, to any address, on receipt of five dollars.

Correspondence solicited. Agents wanted.

AMERICAN LIGHTNING PROTECTION CO.,
874 Broadway, New York City.

Fact and Theory Papers

I. THE SUPPRESSION OF CONSUMPTION. By Godfrey W. Hamilton, M.D.
II. THE SOCIETY AND THE "FAD." By Appleton Morgan, M.D.
III. PROTOPLASM AND LIFE. By C. F. Cox. 1st. 75 cents.
IV. THE CHEROKEES IN PRE-COLUMBIAN TIMES. By Charles Thomas. 1st. $1.
V. THE TORNADO. By H. A. Hassen. 1st. $1.
VI. TIME-RELATIONS OF MENTAL PHENOMENA. By Joseph Jastrow. 1st. 50c.
VII. HOUSEHOLD HYGIENE. By Mary Taylor Humml. 1st. 75 cents.

N. D. C. HODGES, Publisher,
874 Broadway, New York.

“BUSY FOLKS’ GYMNASIUM.”

A few minutes’ daily exercise on our fascinating apparatus clears the brain, tones up the body, develops weak parts. Our cabinet contains chest weights, rowing-weights, lifting-weights, clubs and dumb-bells, adjustable for old and young. It is the only complete exercising outfit in the world suitable for use in living rooms. All prices. You can order on approval. Chest machine separate, $1.50 and up. Educated agents wanted. PHYSICAL CULTURE CHART, with illustrated directions for developing every part of the body healthfully, 50 cts. Sent for half price to those naming this paper.

WHITNEY HOME GYMNASIUM CO., Box D, Rochester, N. Y.