

soon as the current reached the ground, the wet earth being a good conductor?

2. Why did not the lightning strike the trees on the summit rather than one several feet below, and why not the top of the latter?

3. Why did it indent the pipes, and why the edges facing the current rather than the other? Is electricity material? Can anything not material manifest such a *vis viva* or working energy? Why was the iron melted when electricity has no inherent heat?

4. Do not the effects at the junctions of the pipes indicate a sort of damming up of the current by the cement until the pressure became sufficient to burst the barrier, and then it struck the following edge with its accumulated flood?

MARSHALL HENSHAW.

Amherst, Mass., Apr. 21.

[The phenomena presented in lightning strokes have heretofore appeared so lawless that it may be well to call attention to the fact, which has been repeatedly observed, that but little damage is generally done to portions of trees on the same levels as the foliage. It has also been observed that the presence on any level of a conductor of considerable surface, and consequent large electrical capacity, mitigates the effects on that level. Whether the large conducting surface presented by the wet leaves of a tree is a parallel case is, of course, a question; but the fact as

stated is among those well authenticated in regard to lightning effects.—Ed.]

### Periodicity of the Aurora.

ON Saturday night, April 23, there was a fine Aurora seen in this locality whenever the clouds broke away until after midnight. This display is specially interesting because it is the sixth consecutive return of an aurora at the precise interval of twenty-seven days, the dates being as follows: Dec. 9, Jan. 5, Feb. 2, Feb. 29, March 27, and April 23. The display will be due again upon May 20. It has been associated with reappearances at the sun's eastern limb of an area south of the equator which has been much frequented by spots and faculae. In like manner a record now before me shows that reappearances at the eastern limb of disturbed areas in the sun's northern hemisphere have their chief magnetic effect during the autumn months. From this it would seem that in order that a solar disturbance may affect the earth's magnetism it must be in a particular location, namely, at the eastern limb and as near as possible to the plane of the earth's orbit. Certainly such disturbances do not have their magnetic effect promiscuously in all locations, or at present we should have auroras and magnetic storms continuously, which is very far from being the case.

M. A. VEEDER.

Lyons, N. Y., April 25.

### CALENDAR OF SOCIETIES.

#### Philosophical Society, Washington.

April 23.—G. M. Searle, On a Simple Form of Double-Image Micrometer; Arthur Keith, The Geology of Chilhowee Mountain in Tennessee; B. E. Fernow, Timber Physics.

#### Chemical Society, Washington.

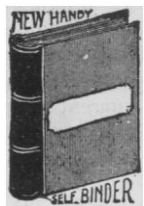
April 14.—Wm. H. Krug, On Behavior of Acetone and Carbo-Hydrates; F. W. Clarke, On the Decomposition of Certain Silicates by Heat; Thomas Taylor, Smokeless Powder.

### Publications Received at Editor's Office.

BRYANT, WILLIAM C. Sella, Thanatopsis and other Poems. Boston, Houghton, Mifflin & Co. 16°, paper. 95 p. 15 cts.  
GORE, J. HOWARD. A German Science Reader. Boston, D. C. Heath & Co. 12°. 196 p. 80 cts.  
MILLER, OLIVE THORNE. Little Brothers of the Air. Boston, Houghton, Mifflin & Co. 12°. 271 p. \$1.25.  
POSSE, NILS. Handbook of School Gymnastics of the Swedish System. Boston, Lee & Shepard. 18°. 192 p. 50 cts.  
WEED, CLARENCE M. Spraying Crops. New York, Rural Pub. Co. 16°. 110 p. Ill.

### A TEMPORARY BINDER

for *Science* is now ready, and will be mailed postpaid on receipt of 75 cents.



This binder is strong, durable and elegant, has gilt side-title, and allows the opening of the pages perfectly flat. Any number can be taken out or replaced without disturbing the others, and the papers are not mutilated for subsequent permanent binding. Filed in this binder, *Science* is always convenient for reference.

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

### BABY.

An Illustrated Journal for Mothers.  
PUBLISHED FORTNIGHTLY.

\$1.00 a year.

Send for Sample Copy.

Charles Robinson, 907 Broadway, N. Y.

### Exchanges.

[Free of charge to all, if of satisfactory character. Address N. D. C. Hodges, 874 Broadway, New York.]

For sale or exchange, Das Ausland, 10 vols., 1832 to 1891, including 6 vols. bound, 4 in numbers. Wheeler Survey, vol. 1. Geog. Report; also vol. 6. Botany; Production of gold and silver in the United States, 1880, '1, '2, '3, '5; Selfridge Isthmus of Darien. Will sell at very low prices. J. F. James, 1443 Corcoran St., Washington, D. C.

For exchange.—A fine thirteen-keyed flute in leather covered case, for a photograph camera suitable for making lantern slides. Flute cost \$27, and is nearly new. U. O. COX, Mankato, Minn.

To exchange: Experiment Station bulletins and reports for bulletins and reports not in my file. I will send list of what I have for exchange. P. H. ROLFS, Lake City, Florida.

Finished specimens of all colors of Vermont marble for fine fossils or crystals. Will be given only for valuable specimens because of the cost of polishing. GEO. W. PERRY, State Geologist, Rutland, Vt.

For exchange.—Three copies of "American State Papers Bearing on Sunday Legislation," 1891, \$2.50, new and unused, for "The Sabbath," by Harmon Kingsbury, 1840; "The Sabbath," by A. A. Phelps, 1842; "History of the Institution of the Sabbath Day, Its Uses and Abuses," by W. L. Fisher, 1859; "Humorous Phases of the Law," by Irving Browne; or other works amounting to value of books exchanged, on the question of governmental legislation in reference to religion, personal liberty, etc. If preferred, I will sell "American State Papers," and buy other books on the subject. WILLIAM ADDISON BLAKELY, Chicago, Ill.

Wanted, in exchange for the following works, any standard works on Surgery and on Diseases of Children: Wilson's "American Ornithology," 3 vols.; Coues' "Birds of the Northwest" and "Birds of the Colorado Valley," 2 vols.; Minot's "Land and Game Birds of New England"; Samuels' "Our Northern and Eastern Birds," all the Reports on the Birds of the Pacific R. R. Survey, bound in 2 vols., Morocco; and a complete set of the Reports of the Arkansas Geological Survey. Please give editions and dates in corresponding. R. ELLSWORTH CALL, High School, Des Moines, Iowa.

To exchange Wright's "Ice Age in North America" and Le Conte's "Elements of Geology" (Copyright 1882) for "Darwinism," by A. R. Wallace. "Origin of Species," by Darwin. "Descent of Man," by Darwin. "Man's Place in Nature," Huxley. "Mental Evolution in Animals," by Romanes. "Pre-Adamites," by Winchell. No books wanted except latest editions, and books in good condition. C. S. Brown, Jr., Vanderbilt University, Nashville, Tenn.

For Sale or Exchange for books a complete private chemical laboratory outfit. Includes large Becker balance (200g. to 1-10mg.), platinum dishes and crucibles, agate motors, glass-blowing apparatus, etc. For sale in part or whole. Also complete file of *Silliman's Journal*, 1862-1885 (62-71 bound); Smithsonian Reports, 1854-1883; U. S. Coast Survey, 1854-1860. Full particulars to enquirers. F. GARDINER, JR., Pomfret, Conn.

### Wants.

Any person seeking a position for which he is qualified by his scientific attainments, or any person seeking some one to fill a position of this character, be it that of a teacher of science, chemist, draughtsman, or what not, can have the "Want" inserted under this head at 10 cents a count line. Nothing inserted at less than 50 cents a time prepaid by stamps, if most convenient.

TRANSLATOR wanted to read German architectural works at sight (no writing). One familiar with technical terms desired. Address "A," Box 148, New York Post Office.

WANTED.—A position in a manufacturing establishment by a manufacturing Chemist of inventive ability. Address M. W. B., care of *Science*, 874 Broadway, N. Y.

WANTED.—Books on Anatomy and Hypnotism. Will pay cash or give similar books in exchange. Also want medical battery and photo outfit. DR. ANDERSON, 182 State street, Chicago, Ill.

WANTED.—A college graduate with some normal training, to teach the sciences, at \$1,800 per year, in a Southern college. A Baptist or a Methodist preferred. Must also be a first-class Latin scholar. A. H. Beals, Box K, Milledgeville, Ga.

A PROFESSORSHIP in Chemistry is wanted by one who has had five years' experience in that capacity. Would prefer to give instruction by lectures and experiments rather than by text-book methods. Would like a position in a college or university where there is a good student's laboratory. Special points of strength claimed are: (1) Thorough control of a class and good order during lectures and recitations. (2) Accuracy in experimenting with chemicals and skill in the manipulation of chemical apparatus. The permission of several distinguished educators has been given to refer to them if required. Would not care to accept a position paying less than \$1,500. Address B. E., care of *Science*, Advertising Dept., 47 Lafayette Place, New York.

ADDRESS WANTED.—Will some one please send the address of the Secretary of the American Philological Society. Also that of Herbert Spencer. "ADDISON," Room 84, 164 Madison St., Chicago, Ill.

ADDRESSES of Old Book Dealers wanted.—Wishing to obtain a number of old books out of print. I very much desire the addresses or catalogues of rare second-hand book dealers. If there is a directory or list of such dealers I should like to obtain possession of one. W. A. BLAKELY, Chicago, Ill.

WANTED.—(1) A white man versed in wood and iron working, able to work from specifications and plans, suited for an instructor of boys; his business to have charge of shops of school, outline and direct the work for foremen and students; salary to be \$1,000 per annum (nine months). (2) A man (black preferred) to teach the colored, iron working and forging, subordinate to the preceding; salary, \$720. (3) A man (white) competent to take classes in engineering (assistant's position), but with the ability to perform any of the work required in any of the ordinary engineering courses of our universities; salary from \$1,000 to \$1,500. A. H. BEALS, Milledgeville, Ga.

## AMONG THE PUBLISHERS.

*Babyhood* continues in its May issue the medical articles on catarrhal affections and their complications in children, and the treatment of the headaches of childhood.

—The recent discussion over Jewish immigration to this country imparts a timely interest to Mr. Joseph Pennell's volume entitled "The Jew at Home." This artist has visited and studied the Jewish towns of the Austro-Hungarian Empire, and the results of his observations will be found both in his text and in a series of illustrations. "The Jew at Home" will be published immediately by D. Appleton & Co.

—*The Chautauquan* for May presents the following among other articles: "Physical Culture," IV., by J. M. Buckley, LL.D.; "The United States Patent Office," Part I., by Helen Frances

Shedd; "The Natural History of Plants," II., by Gerald McCarthy; "Flower Shows in the United States," by Samuel A. Wood; "Phrenology," by Garrett P. Serviss.

—In *Lippincott's Magazine* for May, Mr. Floyd B. Wilson has a paper on "Personal Economics in our Colleges," and Mr. Philemon Hemsley, in "After-Dinner Botany," traces the relationship between certain edible and other plants not usually connected in our thoughts.

—Professor Jowett's translation of "The Dialogues of Plato," the second edition of which has been for several years out of print, will appear in May in the third edition, forming five 8vo volumes. The work has been revised and corrected throughout and in great part rewritten. Macmillan & Co., the publishers, have copyrighted the new edition by resetting the entire work in this country.

## Exhaustion

### Horsford's Acid Phosphate.

A wonderful remedy, of the highest value in mental and nervous exhaustion.

Overworked men and women, the nervous, weak and debilitated, will find in the Acid Phosphate a most agreeable, grateful and harmless stimulant, giving renewed strength and vigor to the entire system.

Dr. Edwin F. Vose, Portland, Me., says: "I have used it in my own case when suffering from nervous exhaustion, with gratifying results. I have prescribed it for many of the various forms of nervous debility, and it has never failed to do good."

Descriptive pamphlet free.

Rumford Chemical Works, Providence, R. I.

Beware of Substitutes and Imitations.

**CAUTION.**—Be sure the word "Horsford's" is on the label. All others are spurious. Never sold in bulk.



**WORLD-ENGLISH.**  
25 Cents.  
**HANDBOOK OF  
WORLD-ENGLISH.**  
25 Cents.

Ex-President Andrew D. White, of Cornell University, says: "I believe that the highest interests of Christian civilization and of humanity would be served by its adoption."

"So set down, our tongue is the best for the world to unite upon."—*Brooklyn Eagle*.

"The idea of Mr. Bell has much to recommend it, and the presentation is charmingly clear."—*American, Phila.*

"The result is a language which cannot fail to meet with acceptance."—*Boston Traveller*.

"World-English deserves the careful consideration of all serious scholars."—*Modern Language Notes*.

Sent, postpaid, on receipt of price.

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

## ARTIFICIAL LIMBS

### WITH RUBBER FEET AND HANDS.

Durable in Construction, Natural in Action,  
Noiseless in Movement.

And the MOST COMFORTABLE for the wearer. It is not unusual to see a farmer working in the fields with an artificial leg, or a brakeman applying his brake on a fast running train, or an engineer with hand on the throttle, or a fireman, carpenter, mason, miner, in fact, men of every vocation at labor in the full capacity of their employment, wearing one or two artificial legs with rubber feet, performing as much as men in possession of all their natural members, earning the same wages, in fact, experiencing little or no inconvenience.



Over 12,000 artificial limbs of the Marks' patent in daily use. Established over 39 years. Indorsed and purchased by the United States and many foreign governments. By our formula applicants can supply us with all the data necessary to secure a fit while they remain at home. One half of the legs and arms furnished by us are made from measurements and profiles without our seeing the wearers. Fit always guaranteed. A treatise of 430 pages with 256 illustrations and a formula for measuring, sent free. Address

A. A. MARKS, 701 Broadway, N. Y.

## ESTERBROOK'S STEEL PENS.

OF SUPERIOR AND STANDARD QUALITY.

Leading Nos.: 048, 14, 130, 135, 239, 333

For Sale by all Stationers.

THE ESTERBROOK STEEL PEN CO.,  
Works: Camden, N. J. 26 John St., New York.

THE LATEST IMPROVEMENT  
FOR STEREOPTICONS. OUR PATENT  
**MULTI-FOCAL**  
ATTACHMENT.  
PRODUCES PICTURES FROM 12 TO 20 FEET AT  
ANY DISTANCE WITHOUT CHANGING THE OBJECTIVE  
SEND FOR  
DESCRIPTIVE CIRCULAR TO QUEEN & CO. PHILA.

THE CHEAPEST AND BEST  
**PHOTO ENGRAVING CO.**  
67 PARK PLACE, NEW YORK  
ENGRAVING FOR ALL ILLUSTRATIVE AND  
ADVERTISING PURPOSES

## THE WEEKLY BULLETIN OF NEWSPAPER AND PERIODICAL LITERATURE.

Catalogues and Classifies Each Week  
**THE PRINCIPAL CONTENTS OF  
THE PERIODICAL PRESS.**

That huge mass of material heretofore inaccessible to the eager student is now rendered available. Special attention is invited to the Bulletin's

## INDEX OF TECHNICAL LITERATURE

Send for a free sample copy and learn how

The Bulletin Supplies  
The Articles Catalogued.

Address **THE WEEKLY BULLETIN,**  
5 Somerset Street, - - Boston, Mass.



A perfect and practical Type Writing machine for only ONE DOLLAR. Exactly like cut; regular Remington type; does the same quality of work; takes a fools cap sheet. Complete with paper holder, automatic feed, perfect type wheel & inking roll; uses copying ink. Size 8x13 inches; weight, 12 oz. Satisfaction guaranteed; Circulars free; AGENTS WANTED. Sent by express for \$1.00; by mail, 15c. extra for postage. R. H. INGERSOLL & Bro. 65 Cortlandt St. N. Y. City.

## JOHN IRELAND'S Bookstore, 1197 Broadway

near 29th St., is convenient to the residence quarter of the city; it is a good place to drop into on the way up or down town to select books or stationery. His stock is well selected and embraces all the new and standard books as soon as issued. Out-of-town purchasers can order by mail with every confidence that their wants will be as well supplied as if buying in person.

## Course of Mineralogy for Young People.

Conducted by correspondence; minerals and books furnished.

Collection and book, "First Grade," one dollar; postage, 25 cents. Send for circulars to  
GUSTAVE GUTTENBERG,  
Central High School, Pittsburgh, Pa.

**GEM OPALS.** Cut ready for setting. Having purchased a large lot at the Mexican locality, we are offering them at about one-fifth jewelers' prices; 50c., \$1, \$1.50, \$2, \$3. This is a rare opportunity to secure a fine gem very cheap. 100 pp. Mineral Catalogue 15c., in cloth 25c., Supplement 2c. GEO. L. ENGLISH & Co., Mineralogists, 733 and 735 Broadway, New York City.

## PATENTS

For INVENTORS. 40-page BOOK FREE. Address W. T. Fitzgerald, Attorney at Law, Washington, D. C.

**B**ACK NUMBERS and complete sets of leading Magazines. Rates low. AM. MAG. EXCHANGE, Schoharie N. Y.

## DRY GOODS, ETC.

# Arnold, Constable & Co. LACE MANTLES.

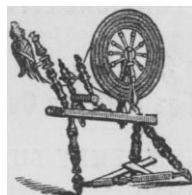
Wraps and Jackets,  
Storm Coats.

## PARIS AND LONDON

Reception and Evening Dresses,  
Carriage and Walking Costumes,  
Driving Suits, Riding Habits.

Broadway & 19th St.

NEW YORK.



## The Fifth Avenue Linen Store.

Our stock of Housekeeping Linen Goods is the most complete in America. We deal with manufacturers only, and keep nothing but pure linen. Our patrons can always rely upon getting the best makes of Table Linen, Napkins, Towels, Handkerchiefs, etc., at the very lowest price. A fine all linen initial Handkerchief, in both ladies' and men's sizes, at \$3.00 dozen. Extra large hemstitched Huck Towels, \$3.00 dozen. Hand hemstitched linen Sheets, \$5.00 a pair. Pillow Cases to match at \$1.00 a pair. We always have the latest novelties in linen table decorations. A visit to our store does not incur any obligation to buy.

## WM. S. KINSEY & CO.,

Near 36th St. 386 Fifth Avenue.

### SUMMER STUDY.

#### SEASIDE STUDY OF BIOLOGY.

#### THE BIOLOGICAL LABORATORY

OF THE

#### BROOKLYN INSTITUTE OF ARTS & SCIENCES

at Cold Spring Harbor, Long Island,

will open its Third Season on Wednesday, July 6, and will close to students on Aug. 30. Applications for admission or for circulars should be addressed to PROF. HERBERT W. CONN, Ph.D., Director, care of Brooklyn Institute, Brooklyn, N. Y.

## Amherst Summer School

of Languages, Art, Literature, Chemistry, Mathematics, Library Work, History, and Political Economy. Sixteenth session opens July 4, 1892. For program address Prof. W. L. MONTAGUE, Amherst, Mass.

## FINANCIAL.

# THE American Bell Telephone COMPANY.

95 MILK ST., BOSTON, MASS.

This Company owns the Letters Patent granted to Alexander Graham Bell, March 7th, 1876, No. 174,465, and January 30, 1877, No. 186,787.

The Transmission of Speech by all known forms of ELECTRIC SPEAKING TELEPHONES infringes the right secured to this Company by the above patents, and renders each individual user of telephones, not furnished by it or its licensees, responsible for such unlawful use, and all the consequences thereof and liable to suit therefor.

*New Method of Protecting Property from Lightning.*

## The Lightning Dispeller.

Price, \$20 to \$30.—According to size.

The Patent Lightning Dispeller is a conductor specially designed to dissipate the energy of a lightning discharge,—to prevent its doing harm,—placing something in its path upon which its capacity for causing damage may be expended.

No recorded case of lightning stroke has yet been cited against the principle of the Dispeller. So far as known, the dissipation of a conductor has invariably protected under the conditions employed.

Correspondence solicited.

### AGENTS WANTED.

## The American Lightning Protection Company

United Bank Building, Sioux City, Iowa.

### FOR RENT.

## UNFURNISHED APARTMENTS,

comprising Parlor, Bed Room, Bath Room and Closets, at 30 West 24th St., near Madison Sq. Apply to Alfred H. Thorp, Archt., 21 West 24th St., New York.

## PUBLICATIONS.

# THE LABRADOR COAST.

A JOURNAL OF TWO SUMMER CRUISES  
TO THAT REGION.

WITH NOTES ON ITS EARLY DISCOVERY, ON THE ESKIMO, ON ITS PHYSICAL GEOGRAPHY, GEOLOGY AND NATURAL HISTORY, TOGETHER WITH A BIBLIOGRAPHY OF WORKS, ARTICLES, AND CHARTS RELATING TO THE CIVIL AND NATURAL HISTORY OF THE LABRADOR PENINSULA.

By ALPHEUS SPRING PACKARD, M.D., Ph.D.

Sportsmen and ornithologists will be interested in the list of Labrador birds by Mr. L. W. Turner, which has been kindly revised and brought down to date by Dr. J. A. Allen. Dr. S. H. Scudder has contributed the list of butterflies, and Prof. John Macoun, of Ottawa, Canada, has prepared the list of Labrador plants.

Much pains has been taken to render the bibliography complete, and the author is indebted to Dr. Franz Boas and others for several titles and important suggestions; and it is hoped that this feature of the book will recommend it to collectors of Americana.

It is hoped that the volume will serve as a guide to the Labrador coast for the use of travellers, yachtsmen, sportsmen, artists, and naturalists, as well as those interested in geographical and historical studies.

513 pp., 8°, \$3.50.

## RACES AND PEOPLES.

By DANIEL G. BRINTON, M.D.

"The book is good, thoroughly good, and will long remain the best accessible elementary ethnography in our language."—*The Christian Union*.

"We strongly recommend Dr. Brinton's 'Races and Peoples' to both beginners and scholars. We are not aware of any other recent work on the science of which it treats in the English language."—*Asiatic Quarterly*.

"His book is an excellent one, and we can heartily recommend it as an introductory manual of ethnology."—*The Monist*.

"A useful and really interesting work, which deserves to be widely read and studied both in Europe and America."—*Brighton (Eng.) Herald*.

"This volume is most stimulating. It is written with great clearness, so that anybody can understand, and while in some ways, perforce, superficial, grasps very well the complete field of humanity."—*The New York Times*.

"Dr. Brinton invests his scientific illustrations and measurements with an indescribable charm of narration, so that 'Races and Peoples,' avowedly a record of discovered facts, is in reality a strong stimulant to the imagination."—*Philadelphia Public Ledger*.

"The work is indispensable to the student who requires an intelligent guide to a course of ethnographic reading."—*Philadelphia Times*.

Price, postpaid, \$1.75.

## THE AMERICAN RACE.

By DANIEL G. BRINTON, M.D.

"The book is one of unusual interest and value."—*Inter Ocean*.

"Dr. Daniel G. Brinton writes as the acknowledged authority of the subject."—*Philadelphia Press*.

"The work will be of genuine value to all who wish to know the substance of what has been found out about the indigenous Americans."—*Nature*.

"A masterly discussion, and an example of the successful education of the powers of observation."—*Philadelphia Ledger*.

Price, postpaid, \$2.

## POPULAR MANUAL OF VISIBLE SPEECH AND VOCAL PHYSIOLOGY.

For use in Colleges and Normal Schools. Price 50 cents Sent free by post by

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

## THE BOTANICAL GAZETTE.

A monthly illustrated journal of botany in all its departments.

25 cents a number, \$2.50 a year.

Address PUBLISHERS BOTANICAL GAZETTE, Bloomington, Ind.

## The American Geologist for 1892.

Edited by PROF. S. CALVIN, University of Iowa; DR. E. W. CLAYPOLE, Buchtel College; JOHN EYERMAN, Lafayette College; DR. PERSIFOR FRAZER, Penn. Hort. Soc.; PROF. F. W. CRAGIN, Colorado College; PROF. ROBT. T. HILL, U. S. Irrigation Survey; DR. ANDREW C. LAWSON, University of California; R. D. SALISBURY, University of Wisconsin; JOSEPH B. TYRRELL, Geol. Sur. of Canada; E. O. ULRICH, Minnesota Geological Survey; PROF. I. C. WHITE, University of West Virginia; PROF. N. H. WINCHELL, University of Minnesota. Now in its IXth volume. \$3.50 per year. Sample copies, 20 cents. Address

THE GEOLOGICAL PUBLISHING CO., Minneapolis, Minn.