

The Achievements of Science.

Dr. Oliver Holmes, the poet, author, scientist, inventor of the popular stereoscope instrument, recently delivered an address before the Boston Microscopical Society. It was mainly an illustration of the progress of microscopy—in the construction of the instruments and in the discoveries by their aid. "To those of my generation," he began, "this modern world which most of you take as a matter of course, it being the only condition of things of which you have had experience, is a perpetual source of wonder—a standing miracle. Science and art have in our time so changed the aspect of every-day life that one of a certain age might well believe himself on another planet or in another stage of existence. The wand of Prometheus is in our matchboxes; the rock of Horeb gushes forth in our dressing rooms; the carpet of Arabian story is spread in our Pullman car; our words flash from continent to continent; our very accents are transmitted from city to city; the elements of forming worlds are analyzed in our laboratories; and, most wonderful and significant of all, the despotic reign of tradition received its deathblow when the angel of anæsthesia lifted from womanhood the worst terrors of the primal malediction."

Mind and Health.

The *Science of Health* says on this subject: "The mental condition has more influence upon the bodily health than is generally supposed. It is no doubt true that ailments of the body cause a depressing and morbid condition of the mind; but it is no less true that sorrowful and disagreeable emotions produce disease in persons who, uninfluenced by them, would be in sound health—or, if disease is not produced, the functions are disordered. Not even physicians always consider the importance of this fact. Agreeable emotions set in motion nervous currents, which stimulate blood, brain, and every part of the system into healthful activity; while grief, disappointment of feeling, and brooding over present sorrows or past mistakes, depress all the vital forces. To be physically well one must, in general, be happy. The reverse is not always true; one may be happy and cheerful, and yet be a constant sufferer in body."

Curious Electrical Experiment.

If an ebonite electrophorus be whipped with a fox tail, it is negatively excited, and the condenser gives positive sparks. If, again, the electrophorus be rubbed with leather on which is some mosaic gold, the ebonite disk is positively excited, and the condenser gives negative sparks. It is stated by M. Schlosser, however (*Poggendorff's Annalen*), that if the same ebonite disk be excited on one side with the fox tail, on the other with mosaic gold on leather, one may at any moment obtain from the same disk positive or negative electricity, according as the one or the other surface of the electrophorus is used as the source. The most important point in this double excitation is the very much greater length of spark, as is readily observed by the eye. On the other hand, considerably shorter sparks are obtained from the same electrophorus when both sides are similarly excited, for example, whipped with the fox tail.

NEW YORK ACADEMY OF SCIENCES.

A regular meeting of the Academy was held in its rooms, at 64 Madison Avenue, on Monday evening, May 1, 1877, Dr. J. S. Newberry, President, in the chair. The audience, drawn together by the announcement of an exceedingly important paper on a new and interesting subject by one of our leading chemists, was unusually large and intelligent, and included several ladies.

After the transaction of some routine business, Dr. H. Carrington Bolton read a paper on the

ACTION OF ORGANIC ACIDS ON MINERALS.

The speaker at first described the use of organic acids in quantitative analysis to prevent the precipitation of certain metals, and the use of tartaric acid in Fehling's sugar test, and to dissolve antimony, etc. The use of organic acids for decomposing minerals is, however, a novel one. While on a mineralogical tour in North Carolina, he had frequently felt the inconvenience and danger of carrying a bottle of mineral acid for recognizing the carbonates; and he determined, on his return, to try to substitute for it some crystalline organic acid. To his surprise, the results were very satisfactory; and he extended his investigations to a dozen different carbonates, eighteen sulphides, twelve oxides, twenty-four silicates, and several miscellaneous minerals, in all 120 specimens, embracing 90 different species. The action of citric, tartaric, oxalic, malic, pyrogallic, benzoic, and other acids was studied. The following are a few of the points noticed: Organic acids act more slowly than mineral acids, and frequently some time elapses before effervescence begins. Citric acid acts most rapidly and satisfactorily; next to this is tartaric acid; oxalic acid acts in a similar manner, but more frequently forms insoluble compounds, which are sometimes characteristic of the mineral. Acetic acid does not have any effect on the carbonates; and when heated to boiling, the acid distills off, whereas the other acids are concentrated by boiling. Glacial acetic acid does not act unless somewhat diluted. Formic acid is more active than acetic. Propylic acid decomposes several carbonates; pyrogallic acid decomposes calcite. A few experiments were made with metals. Citric and tartaric acids dissolve iron; and citric acid, with zinc, can be employed to generate arseniuretted hydrogen.

When sulphides are subjected to the action of citric acid, sulphuretted hydrogen (H₂S) is evolved; carbonates yield carbonic acid, CO₂.

In the case of minerals not attacked by an organic acid alone, the experiment was tried of mixing citric acid with saltpeter (KNO₃), whereby nitric acid is generated on boiling. Chlorate of potassium was also mixed with the citric acid, but with less satisfactory results.

When silicates are boiled in a solution of citric acid, silicic acid (Si O₂), either pulverulent or gelatinous, separates.

By mixing citric acid with fluoride of ammonia (NH₄F) hydrofluoric acid is evolved, which is able to attack most of the silicates not otherwise decomposed, including all the constituents of our common rocks. The following table shows at a glance the

MINERALS DECOMPOSED BY CITRIC ACID ALONE AND WITH REAGENTS.

The mineral tested is to be in a fine powder.

In the cold.

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| <p>A. Without evolution of gas.</p> <p>Brucite. Anglesite. Pyromorphite.* Vivianite.</p> | <p>B. With liberation of CO₂.</p> <p>Calcite. Dolomite.* Ankerite.* Gurhofite. Rhodochrosite.* Smithsonite.* Witherite. Strontianite. Barytocalcite. Cerussite. Malachite. Azurite.*</p> | <p>C. With liberation of H₂S.</p> <p>Stibnite. Galenite. Sphalerite. Pyrrhotite.</p> |
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On boiling.

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| <p>D. Without evolution of gas.</p> <p>Zincite. Gypsum.* Apatite.* Cuprite. Limonite.* And those in A.</p> | <p>E. With liberation of CO₂.</p> <p>Magnesite. Siderite. Pyrolusite.† Wad.† Hausmannite.† Manganite.† Psilomelane.† And those in B.</p> | <p>F. With liberation of H₂S.</p> <p>Bornite. Bournonite.* And those in C.</p> |
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| <p>G. With formation of a jelly (SiO₂).</p> <p>Willemite. Datolite. Pectolite. Calamine. Natrolite.</p> | <p>H. With separation of SiO₂.</p> <p>Wollastonite. Chrysolite. Chondrodite.* Chrysocolla. Prehnite.* Apophyllite.* Rhodonite.</p> | <p>I. Decomposed by boiling with citric acid + KNO₃.</p> <p>Argentite. Chalcocite. Pyrite. Marcasite. Nicolite. Smaltite. Chalcopyrite. Ullmannite. Arsenopyrite. Tetrahedrite. Uraninite. And those in F. and C.</p> |
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| <p>J. Decomposed by heating with citric acid + NH₄F.</p> <p>Olivine. Wernerite. Orthoclase. Albite. Labradorite. Augite. Diopside. Hornblende. Kyanite. Talc.* Spodumene.* Almandite. Epidote. And those in G. and H.</p> | <p>L. Minerals not decomposed by the above reagents.</p> <p>Molybdenite. Cinnabar. Magnetite. Hematite. Chromite. Franklinite. Cryolite. Fluorite. Samarskite. Muscovite. Spodumene.* Ripidolite. Tourmaline.</p> |
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The gases evolved are examined with acetate of lead test paper; the solutions with appropriate reagents.

The next chemical meeting of the Academy is to be held on May 14, 1877.

NEW BOOKS AND PUBLICATIONS.

DRAUGHTSMAN'S ALPHABETS. Price \$2.00. New York city: A. J. Bicknell & Co., 27 Warren street.

An excellent collection of alphabets suitable for titles, etc., to drawings and maps. Many of the old styles of letters given are rarely found in books of this description, and in their quaintness and beauty form pleasing variety as compared with the fancy alphabets now conventionally employed. Modes of shading charts, and the various signs for meadows, woods, gardens, etc., used in chart drawing, are added.

AN OUTLINE OF THE STRUCTURE OF THE PIPE ORGAN. By William H. Clarke. Illustrated. Price \$1.50. Boston, Mass.: Oliver Ditson & Co.

There is very little literature on the organ suitable for conveying to organists, church committees, and musical students, a clear, simple, and comprehensive view of the instrument. Such, however, is the aim of the present work; and the author has accomplished his task with much success. To the student of the organ, the book can be especially commended, as it abounds in useful practical hints, and contains a valuable list of the best classical music for the instrument.

MESSRS. GEORGE P. ROWELL'S "AMERICAN NEWSPAPER DIRECTORY" for 1877 has been issued, and forms as usual a huge volume of over a thousand pages. The brief history of newspapers for the year, contained in the preface, is not a particularly agreeable record for publishers, since, instead of the steady increase in the number of journals which has taken place hitherto from year to year, during 1876 there has been a falling off of one hundred and ninety. This is one result of the unsettled state of public affairs due to the election difficulties, and of the general retrenchment and economy practised by all classes. It should not be supposed that there is any lack of newspapers, despite this diminution, as the total still aggregates 8,427; so that newspaper readers need not fear any lack of their favorite literature. The only question is, and we confess the problem puzzles us as much as any one, where the material all comes from to fill so many sheets. Perhaps statistics, showing how many times a given article is published in them by the 8,427 editors, would throw some light on the matter. The present "Newspaper Directory" is fully as good as its predecessors, possibly better, as, in addition to the facts relating to newspapers, the editor has added useful information concerning the population, etc., of the localities where they are published. Of course the volume is invaluable to advertisers. Messrs. Rowell & Co. have removed from 41 Park Row to 10 Spruce street, New York city.

MESSRS. S. M. PETTEGILL & Co.'s "NEWSPAPER DIRECTORY AND ADVERTISERS' HANDBOOK" for 1877 tells in compact and trustworthy manner about everything advertisers want to know concerning newspapers which they had best select for advertising their business. The work contains a

*Feebly attacked. †The CO₂ evolved is derived from the citric acid.

complete list of newspapers and periodicals published in the United States and British Provinces, with the frequency and days of issue, the politics and other distinctive features, and in most cases a statement of the amount of circulation. For advertisers desiring to reach certain sections of the country, there is a carefully prepared list of periodicals arranged by counties. Catalogues of daily, weekly, religious, and agricultural papers are appended. To this is added much valuable information as to the peculiar advantages which each periodical offers to the subscriber or advertiser. The volume is handsomely printed and bound, and is embellished by portraits of leading journalists. It is sent to any address for one dollar. Messrs. S. M. Pettengill & Co. have been our neighbors for several years, occupying offices in the same building with the *SCIENTIFIC AMERICAN*. We can speak well of their integrity and good ability in conducting their business with both advertisers and publishers.

Inventions Patented in England by Americans.

From April 10 to April 23, 1877, inclusive.
BREECH-LOADING GUN.—B. Fasoldt *et al.*, Albany, N. Y.
CARTRIDGE SHELL.—C. D. Leet *et al.*, Springfield, Mass.
CIGAR LIGHTER, ETC.—R. R. Moffatt, Brooklyn, N. Y.
CIGAR LIGHTER, ETC.—G. Selden, Erie, Pa.
COAL OIL STOVE.—J. A. Frey, New York city.
FIRE EXTINGUISHER.—H. S. Maxim, New York city.
FLUTING MACHINE, ETC.—C. M. Meserole, New York city.
FRUIT JAR.—A. Dickey, Middletown, Ohio.
HORSE CAR POLE, ETC.—S. A. Otis, Boston, Mass.
LIGHTING GAS, ETC.—E. Lindsley, Cleveland, Ohio.
PRINTING PRESS.—W. M. Clark *et al.*, Philadelphia, Pa.
LOOM.—J. V. D. Reed, New York city.
METALLIC PACKING.—W. H. Floyd, Boston, Mass.
PULLEY, ETC.—G. G. Lobdell *et al.*, Wilmington, Del.
PUMPING ENGINE.—G. F. Blake, Boston, Mass.
PUTTING UP POWDERS, ETC.—C. R. Doane, Brooklyn, N. Y.
REFRIGERATOR, ETC.—J. C. Maack, Brooklyn, N. Y.
REFRIGERATOR CAR.—W. H. Klapp *et al.*, New York city.
ROCK DRILL.—W. W. Dunn (of San Francisco, Cal.), London, England.
SHEET METAL.—C. D. Leet *et al.*, Springfield, Mass.
SUGAR MACHINERY.—F. O. Matthiessen *et al.*, Irvington, N. Y.
WINDING THREAD.—A. C. Carey, Malden, Mass.

Recent American and Foreign Patents.

Notice to Patentees.

Inventors who are desirous of disposing of their patents would find it greatly to their advantage to have them illustrated in the *SCIENTIFIC AMERICAN*. We are prepared to get up first-class WOOD ENGRAVINGS of inventions of merit, and publish them in the *SCIENTIFIC AMERICAN* on very reasonable terms.

We shall be pleased to make estimates as to cost of engravings on receipt of photographs, sketches, or copies of patents. After publication, the cuts become the property of the person ordering them, and will be found of value for circulars and for publication in other papers.

NEW MISCELLANEOUS INVENTIONS.

IMPROVED DIE FOR CUTTING LEATHER.

Albert Warren, Jefferson, O.—This die, which is made of steel, of the shape of the article to be cut, and a little smaller at its cutting end than at the other, so that the pieces cut may pass through it freely, is fitted into a hole in a block of wood, so that its rear edge may be flush with the lower surface of the said block. A block of wood having a hole formed through it of the same shape as the cutter serves as a base support for the die. In using the device, it is laid upon a table or counter, over a hole in said table or counter, for the pieces to drop through. The material to be cut is then laid upon the edge of the die and is struck with a wooden mallet. With this construction the whole force of the blow is expended in making the cut, as the die does not have to be moved by the force of the blow.

IMPROVED HARNESS PAD.

Miron V. Longworth, Delphos, O.—The object of this invention is to improve the construction of the harness pad for which letters patent were granted to same inventor July 18, 1876, so as to make it stronger and more durable, and less liable to get out of order. The device consists in the crossbars upon the upper ends of the flanged pad plates to receive and hold the saddle strap.

IMPROVED ICE AX.

William H. Coleman, Salisbury Mills, N. Y.—This tool combines in a single instrument an ax for cutting ice, a pike for pushing it from place to place, and a hook for drawing it from the water.

IMPROVED CRAYON FOR MARKING ON GLASS.

Bernard J. Clarke, New York city.—This crayon is adapted for marking on porcelain, glass, or other smooth surface; and it consists in a composition formed by mixing a pigment with melted beeswax, suet, and oil of cedar. The marks made may be readily erased by rubbing.

IMPROVED PHOTOGRAPHIC BURNISHER.

James H. Ferguson, Leavenworth, Kan.—This consists in the combination of a bedplate, to which a burnisher is attached, a feed roll, and an adjustable frame for supporting the feed roll over the burnisher. The object of the invention is to provide apparatus for burnishing photographs, in which the burnisher may be heated without the common and annoying difficulty of the roll becoming moist from the condensation of the vapor from the lamp used.

IMPROVED STEAM TANK FOR COOKING FISH AND MEAT IN CANS.

Francis M. Warren, Portland, Oregon.—One end of this tank, which is of boiler iron, is left open, and around its edge is formed a rim having a groove to receive the edges of the door, and to it are pivoted a number of cams, which, when the door is in place, may be turned to press the said door to its seat steam tight. In the bottom of the tank is coiled a steam pipe, which is perforated with numerous small holes, to allow the steam to escape into the said tank freely. To the bottom of the tank is attached a track for the hand cars, upon which the cans are piled, to be run in and out upon.

IMPROVED TEN PIN BALL.

William Woods, Brooklyn, E. D., N. Y.—The object here is to improve the construction of ten pin balls, to prevent the balls from being chipped off or splintered around the finger holes, and to accurately balance the balls, so that they will roll perfectly true. To this end, metallic bushes are inserted in their finger holes.

IMPROVED APPARATUS FOR DRYING HIDES.

James N. Duffy, Newark, N. J.—This invention furnishes an improved means for drying and stretching hides. It is so constructed that the hide may be stretched in any desired direction and to any desired extent, and thus dried without fold or wrinkle.

IMPROVED CAST IRON EXTERIOR COFFIN OR VAULT.

Robert Beachman, Lyons, N. Y.—This is an improved individual vault or grave which shall be airtight, so as to keep the coffin and body from the air, and thus preserve them. It protects the body and enables the vault and body to be removed.

IMPROVED BUTTON.

Benjamin Bailey, Yale, British Columbia.—This consists of a button with recess for attaching a spring steel hook of the suspenders, the button being secured by a hook-shaped shank, nickel plate, and concave spring plate, to the waistband of the pants.