

except by more constant and systematic observation than has ever yet been attempted.

The Smithsonian observers make only three observations per day: viz, at 7 A. M., 2 P. M., and 9 P. M., and even these meager observations are not entirely reliable. Observations ought to be made at least hourly, and at once transmitted to headquarters. The postal telegraph will, upon its establishment, afford facilities for this observation, and with a system of symbols specially adapted to the purpose, it might apparently be done with little trouble.

Editorial Summary.

A BUSINESS FACT.—The mechanical engravings that embellish the weekly issues of the SCIENTIFIC AMERICAN are generally superior to those of any similar publication, either in this country or in Europe. They are prepared by our own artists, who have had long experience in this branch of art, and who work exclusively for us. There is one pertinent fact in connection with the preparation and publication of an illustration in our columns that needs to be better understood by many inventors and manufacturers who pursue a shortsighted policy in bringing their improvements to public notice. They often go to a large expense in printing and circulating handbills, which few care either to read or preserve. Now, we undertake to say that the cost of a first-class engraving, done by our own artists, and printed in one issue of the SCIENTIFIC AMERICAN, will amount to less than one half the sum that would have to be expended on a poorer illustration printed in the same number of circulars, and on a sheet of paper in size equal to one page of our journal. A printed handbill has no permanent value. Thousands of volumes of the SCIENTIFIC AMERICAN are bound and preserved for future reference—beside, we estimate that every issue of our paper is read by no fewer than one hundred thousand persons. Considered, therefore, as a mere advertisement, an illustration in the SCIENTIFIC AMERICAN is a paragon of cheapness.

ACCORDING to the *Tribune*, everything at the approaching Boston Musical Peace Jubilee, promises to be upon a lovely scale of largeness. The big drum to be used upon the occasion has been finished, and O'Baldwin, the Irish giant, has also been engaged to beat it. This mastodonian drum is three feet through from head to head; the heads are about eight feet in diameter; for the skins, two mammoth oxen yielded up their hides, it being found impossible to procure the hide of an elephant, and upon each head is ironically painted "Let Us Have Peace!" Whether this drum will make any more noise than six smaller ones beaten in unison we do not know, but we are sure that it will cut a much larger figure in the advertisements.

A COMFORTABLE CHAIR.—Mr. F. A. Sinclair, of Mottville, N.Y., has sent to this office a specimen of the chairs made at his manufactory, which, he says—and we believe him—meets the requirements of a recent inquirer in the *American Builder* for a good chair. The specimens received are of the same primitive style as those of the days of our grandmother. The seats are of split ash, very capacious in size, and the chair, with its high arms and easy-fitting back, is a perfect embodiment of comfort.

NEW PUBLICATIONS.

STEAM VADE MECUM. A Compendium of Simple Rules and Formulæ, based on Original Investigation for the Solution of all Problems in the Application of Steam, with Examples. By Julien Deby, Civil and Mechanical Engineer. Late Professor at the *Ecole Centrale*, Brussels, and at the Georgia Scientific Institute. New York: Julien Deby, 37 Park Row.

We have been favored by the author with the advance sheets of this publication, which is now in press, and shortly to be issued. We have not yet found time to review the numerous formulæ, based upon the law of steam, which the author claims to have discovered, and an unification of which was published on page 246, current volume, of the SCIENTIFIC AMERICAN. The formulæ, of course, stand or fall with this law. If it prove in future to be a fallacy, its truth has not yet been disputed, so far as we have learned. The formulæ seem concise, and are in each case interpreted and expressed in plain language, so as to meet the wants of the practical man as well as the mathematician. A supplement is also added containing useful tables and a short essay on boiler explosions.

THE MISSISSIPPI VALLEY: its Physical Geography, including Sketches of the Typography, Botany, Climate, Geology, and Mineral Resources; and of the Progress of Development in Population and Material Wealth. By J. W. Foster, LL.D. Illustrated by Maps and Sections. Octavo, cloth. Price, \$3.50. Chicago: S. C. Grigg & Co. London: Trubner & Co. Sold in New York city by D. Van Nostrand.

This work is the production of an earnest worker in the field of science, and is deserving of a cordial welcome as a valuable addition to our treatises on natural history. Every topic in a range of subjects singularly wide is discussed with such a mastery of its essential features that the reader is always presented with a clear, sharp, and well-defined mental conception of the author's arguments. Possessing, as it does now, so important a bearing, and destined to exercise a still greater influence on the industries, commercial and material, not only of the United States, but of the civilized world, the region of the Mississippi is eminently deserving of careful study. The student, the agriculturist, and the engineer will find in Mr. Foster's book facts and phenomena, as observed by a disciplined mind, of great practical utility; while the physicist and the political economist will discover therein food for much profitable thought, and a key to the solution of not a few problems in their respective spheres of investigation. In order that the work might be adapted to all classes of readers, the learned author dispensed with technicalities so far as was consistent with perspicuity. The typography and binding do credit to the publishers.

HAND-BOOK OF CHEMISTRY FOR SCHOOL AND HOME USE. By W. J. Rolfe and J. A. Gillet. Boston: Woolworth, Ainsworth & Co. New York: A. S. Barnes & Co.

The attempt to reduce the science of chemistry to so elementary a form as to make the science generally available to youth is worthy of praise. This book seems to be as successful an effort to accomplish that desirable object as we have met with. We have always been doubtful, however, whether such facts as may be given in the form adopted by books of this character could not be better taught by familiar lectures, illustrated by such simple experiments as may be necessary, without the employment of text-books at all. Certainly there is no science to which the principles of

object teaching can be more successfully applied than this, or one which is more difficult to acquire by the use of books alone.

HAND-BOOK OF NATURAL PHILOSOPHY FOR SCHOOL AND HOME USE. By W. J. Rolfe and J. A. Gillet, Teachers in the High School, Cambridge, Mass. Published by Woolworth, Ainsworth & Co., 117 Washington street, Boston, and 111 State street, Chicago.

A small elementary treatise like the one before us, fully brought up to the latest discoveries in physics, is very much needed in the public schools of the United States. So far as we have found time to examine it, this book seems well calculated to supply this need.

THE ELEMENTS OF THEORETICAL AND DESCRIPTIVE ASTRONOMY FOR THE USE OF COLLEGES AND ACADEMIES. By Charles J. White, A.M., Assistant Professor of Astronomy and Navigation in the United States Naval Academy, Philadelphia: Claxton, Remsen & Haffelfinger, 819 and 821 Market street.

We have carefully examined this work, and regard it as one of the very best elementary text-books we have seen. It is an octavo of moderate thickness, bound and printed in an excellent manner.

GUIDE TO THE STUDY OF INSECTS. By A. S. Packard. Price, 50 cents. Published by the Essex Institute, Salem, Mass.

We have received a part of this truly valuable work. It is full of interesting and useful information pertaining to the propagation and habits of all kinds of insects. The number before us contains nearly one hundred illustrations.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The Commissioners have reported upon the Central Pacific and Union Pacific Railroads. They compute that, at the date of their examination, in February last, an expenditure of \$2,900,000 would be required to bring the Central Road up to a first-class road and equip it for through business with rolling stock, depots, machine shops, engine houses, etc. Two of the Commissioners, Messrs. Warren and Blick, refer, also, to an expenditure of \$1,600,000 required to improve its location. Upon the Union Pacific road they report that at the time of their examination, the sum of \$6,700,000 was necessary to complete and equip the 1,035 miles, according to the first-class standard, since which time the Company has been constantly at work completing the road and placing upon it the material necessary fully to equip the same according to the requirements of the Commission and the law. The report states that the haste in which the roads have been constructed has resulted in defects of location and construction, which must be remedied to bring the roads to the standard of efficiency required by law.

An English paper says that much light is thrown on the interesting question, whether railway traveling is injurious to health, by the statistical investigations of Dr. Wiegand, of Halle. His inquiries are based on the reports of thirty-eight companies, and the results for 1868 are as follows: Of 11,125 engine drivers, stokers, and other officials traveling with the train, 115 or 1.03 per cent died; while of the 43,353 other officials employed, only 408 or 0.93 per cent died in the same period. It will be seen that the rate of mortality is somewhat higher in the first than in the second class, but the difference is not great enough to lead us to suppose that the occupation is more than usually dangerous or unhealthy.

The *Omaha Republican* says that moss-agate jewelry is becoming quite fashionable in the West. The cell like moss-like tracery observed in them is exquisitely beautiful, and when properly set in a ring or pin is an ornament that can hardly be surpassed for looks. The opening of the Pacific Railroad has brought these stones from the mountains into the market.

The President of the St. Louis Iron Mountain Company, has received a dispatch from the President of the Memphis Commercial Convention, informing him that the people will subscribe the 1,000,000 acres asked for the extension of the Iron Mountain Railroad to Memphis.

The Commissioner of Mining Statistics estimates, in his report, the bullion product of the whole country at \$37,000,000. This is a decrease of \$3,000,000 from the total returns of 1867, which showed a falling off of about the same amount as compared with the product of the year before.

The people of the Neosho valley have organized a company to build a railroad from Emporia, Kansas, to Holden, Missouri. This will put Southern Kansas in connection with St. Louis by a route 150 miles shorter than the railroad connection of the same region with Chicago.

The Navy Department continues the reduction of the number of its vessels. It is expected that all the supernumerary war vessels and transports owned by the Government will be disposed of before the end of summer.

The Northern Pacific Railroad Company are making preparations for sending out an exploring party to pass over the entire route from Lake Superior to Puget Sound. The general agent of the company has called on General Sherman to arrange for a military escort for a portion of the distance.

The fastest time between California and Massachusetts has been made by a gentleman who arrived in Boston on Saturday from San Francisco, having accomplished the journey in seven days and eleven hours, including seventeen hours detention on the way.

An effort is to be made to employ capital on the immense water power in the eastern part of Maine, in other manufacturing than that of lumber. Several wealthy companies have recently purchased water powers with the intention of erecting manufacturing establishments.

The feasibility of lighting tunnels by electricity is to be tested. One hundred Bunsen elements, with Serrin's automatic regulator, are about to be used to give light to the workmen employed in the Ste. Catharine tunnel, near Rouen, France.

M. Couder has been commissioned to construct a bridge over the Nile, at Cairo. The length of this structure will be about 2,600 feet, and the cost will be about \$400,000. It is to be completed in two years.

The Hartford and New Haven Railroad Company have been authorized by the legislature to increase its capital stock \$3,000,000 by a new issue, one half of which will be expended in repairs.

The miners of Scranton, Pa., held a formal meeting on May 23, on the question of suspension. The vote stood—for suspension, 369; against suspension, 401. This is decisive; there will be no suspension there.

A bill has been adopted in the Canadian Parliament for the establishment of a telegraph line from Montreal to England by way of Greenland and Iceland.

A firm in Dalton, Mass., have made three thousand reams of bank-note paper for the Italian Government. They have another large order from the Brazilian government.

The Newfoundland seal fishery has been very successful during the past season. The number of seals landed at St. John is nearly 150,000.

There are 50,000 tons of brimstone used annually in England, and the total amount exported from Sicily is 300,000 tons a year.

On May 18, Brigham Young broke the first ground for the Utah Central Railroad near Weber river, immediately below Ogden City.

American silver cannot be taken into the Dominion of Canada in larger sums than five dollars without the payment of duty.

Last year, in Madison, Wis., one firm sold \$630,000 worth of reapers, and it has orders for six thousand machines for the coming season.

APPLICATIONS FOR EXTENSION OF PATENTS.

DESIGN FOR AN INKSTAND.—Barnet L. Solomon, of New York city, executor of the estate of Myer Phineas, deceased, has applied for an extension of the above patent. Day of hearing August 2, 1869.

MACHINE FOR ELECTROTYPING.—Joseph Alexander Adams, of Brooklyn, N. Y., has petitioned for the extension of the above patent. Day of hearing, August 16, 1869.

REFRIGERATORS.—D. W. C. Sanford, of New Orleans, La., has applied for an extension of the above patent. Day of hearing October 18, 1869.

REAPING AND MOWING MACHINE.—Henry Waterman, of Brooklyn, N. Y., has petitioned for an extension of the above patent. Day of hearing, Aug 9, 1869.

WASHBOARD.—Joseph Keech, of Waterloo, N. Y., has petitioned for the extension of the above patent. Day of hearing, Sept. 27, 1869.

MACHINE FOR TRIMMING BOOKS.—M. Fiehl, of Philadelphia, Pa., has petitioned for the extension of the above patent. Day of hearing August 9 1869.

Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notices exceed Four Lines, One Dollar and a Half per line will be charged.

Scientific Books to order. Macdonald & Co., 37 Park Row, N. Y.

Coffee Pots.—The Patent No. 90,159, for sale for the United States. See page 364, Scientific American, for description. Address W. C. C. Erskine, care Z. A. Lash, Esq., Toronto, Canada.

Great Novelty from England.—Patent Crispin Machinery for manufacture of boots and shoes. These Patents for sale. Address Caleb Huse, 17 Broad st., New York.

For the best grate bar address Hutchinson, Laurence & Co., 38 Cortlandt st., New York.

\$2000 will buy the whole of a valuable patent. Address S. W. Wilcox, South Milford, Mass.

Joseph Champion's First Premium Portable Engine.—Send for Circular to Joseph Champion, 40 Cortlandt st., New York.

Patentees and makers of ice machines that are and have been working practically and profitably, address Box 518, Augusta, Ga., giving full particulars.

State Rights for sale of best Automatic Gas Machine invented. Process: combination of hydrogen and carbon. Cost one third of coal gas. One foot equals five of coal gas in light. Machines cheap. C. F. Dunderdale, 90 Wall st., New York.

Wheelbarrows—Pugsley & Chapman, 30 Platt st., New York, will send any style, C.O.D., and if not liked, when seen, may be returned on paying freight one way.

Rockwood's process for copying drawings, original size, by superposition, is thoroughly practical and successful. Address 839 Broadway, New York.

For illustrated catalogue of Croqueteries, address Milton Bradley & Co., Springfield, Mass.

Scientific American—Old and scarce volumes, numbers, and entire sets of the Scientific American for sale. Address Theo. Tusch, Box 448, or Room 23, No. 37, Park Row, New York city.

Banty & Andrews, manufacturers of Corn and Cobb Grinders, will please send their address to E. Dunn, 82 Market st., Newark, N. J.

An English machine-making firm is open to make arrangements to manufacture and introduce in England any good American invention. Satisfactory references given. Address Box 1233 Postoffice, N. Y.

For sale—The entire Right, or State and County Rights for the best Holdback for carriages out. Complete in two pieces. No tongue or spring employed. Beckwith & Graham, Oriskany, N. Y.

Wanted—Address of manufacturers of machinery for grinding old fire bricks and other hard substances. Horton & Mable, Peekskill, N. Y.

Wanted—Machinist, repairing cotton mill, Box 2638, N. Y.

Manufacturers of Arkansas Stone address A. R. Stewart, Rowlesburg, W. Va.

Wind-mill builders will please address A. P. Huntington, Lake Charles, La.

Peck's patent drop press. Milo Peck & Co., New Haven, Ct.

State Rights for sale of a new and valuable improvement on the velocipede, in successful operation. L. H. Soule, Binghamton, N. Y.

Glynn's Anti-incrustator for steam boilers—the only reliable preventive. Prevents foaming and does not attack the metals of the boiler. Liberal terms to agents. M. A. Glynn & Co., 735 Broadway, New York.

For the best hammer and sledge handles, made of carefully selected, well-seasoned, second-growth hickory address Hoopes, Bro. & Darlington, West Chester Spoke Works, West Chester, Pa.

Tempered steel spiral springs made to order. John Chatillon, 91 and 93 Cliff st., New York.

A Revolution in buying and selling, manufacturing and introducing Patents and Patent articles of all kinds. Inclose stamps. National Patent Exchange, Buffalo, N. Y.

Every Mechanic should have Baxter's Adjustable "S" Wrench No. 8, Vol. 20, this journal. Baxter Wrench Co., 10 Park Place, New York

A. A. Fesquet, practical and analytical chemist. Construction of chemical works, etc., 323 Walnut st., Philadelphia.

Builders, and all who contemplate making improvements in buildings, can save time and money by addressing A. J. Bicknell & Co Publishers, Troy, N. Y., or Springfield, Ill.

Johnson's Adjustable Hangers for shafting. Diploma awarded by the American Institute. Shop rights twenty-five dollars. Pattern castings 6 cents per lb. Address Wm. Cowin, Lambertville, N. J.

The Tanite Emery Wheel—see advertisement on inside page.

Diamond carbon, formed into wedge or other shapes for pointing and edging tools or cutters for drilling and working stone, etc. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

The Magic Comb will color gray hair a permanent black or brown. Sent by mail for \$1.25. Address Wm. Patton, Treasurer Magic Comb Co., Springfield, Mass.

W. J. T.—We think the patent asbestos roofing manufactured by H. W. Johns, of this city, is the best substitute for tin or slate. It is cheap and easily applied.

For solid wrought-iron beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

Machinists, boiler makers, tanners, and workers of sheet metals read advertisement of Parker's Power Presses.

Mill-stone dressing diamond machine, simple, effective, durable. Also, Glazier's diamonds. John Dickinson, 64 Nassau st., New York.

Winans' boiler powder, 11 Wall st., N. Y., removes Incrustations without injury or foaming 12 years in use. Beware of imitations.