Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

☞ *The publishers of this paper guarantee to advertisers a circulation of not less than 50,000 copies every weekly issue.*

NEW BOOKS AND PUBLICATIONS.

CIVILIZATION: IS ITS CAUSE NATURAL OR SUPERNATURAL? Philadelphia: Chas. H. Marot. 8vo, pp. 140.

The author describes himself as a wayfarer in search of the truth, but it is very clear that he had made up his mind on that score long before he began these sermon-like chapters. He holds the origin of civilization to be supernatural, and pronounces the theory of evolution a dream. Christianity, as popularly taught, he describes as no better than Darwinism; but holds, notwithstanding, that true Christianity is the sole foundation of human progress.

MINES OF MAINE, 1879–80. By F. L. Bartlett, State Assayer. Portland: B. Thurston & Co. Price 25 cents.

Describes the present condition and future prospects of the mines of Maine. Four years ago such a book would have been an impossibility, for there were then no developed mines in Maine. Now there are half a hundred in full operation, yielding gold, silver, and copper. Tin, zinc, arsenic, iron, nickel, and cobalt are also found. There is besides an abundance of non-metallic minerals of value; so that Maine promises soon to take rank among our great mining States. Mr. Bartlett's well made little book will be likely to attract much attention to these long-neglected sources of wealth.

REVISTA CIENTIFICA MEXICANA. Tomo I., Num. 1. Mexico, Diciembre de 1879.

We have here the first number of a New Mexican publication which gives promise of being a valuable addition to the already large list of journals devoted to general science. It contains an illustrated article on the "Different Species of Maguey (Agave) which are cultivated on the Plains of Apam and in the District of Cholula," by Professor Ignacio Blazquez; on the Aneroid Barometer, by Sr. Miguel Perez; on the Sierra Mojada," by Sr. Antonio G. Cubas; on the "Ores of Bismuth of Mexico," by Professor Mariano Barcena, and on "Cenozoic Porphyries," by the same; articles on the "Weather" and on "Geography," and various shorter scientific notes. In size the journal is quarto; the paper is good, the typography excellent, the articles are well written, and the editors have our best wishes for the success of their venture.

SALISBURY'S NEW PHYSICAL SIGN OF SYPHILIS. By Ephraim Cutter, M.D. Reprinted from the *American Journal of Dental Science*. 12mo., paper, pp. 12.

A verification of Dr. Salisbury's discovery of the fungoid origin of syphilis.

A TREATISE ON THE HORSE AND HIS DISEASES. By B. J. Kendall. Enosburg Falls, Vt.: J. B. Kendall & Co. 16mo, paper, pp. 89.

Contains an "index of diseases," with directions for treatment, a list of drugs used by farriers, and a large number of recipes, etc.

RELATIONS OF EDUCATION AND INDUSTRY TO CRIME AND PAUPERISM. By Henry W. Lord. Lansing, Mich: W. S. George & Co.

This is an address by the Secretary of the Michigan State Board of Charities to the Michigan Superintendents of the Poor in their sixth annual convention. Mr. Lord takes the ground that idleness is more demoralizing than ignorance, and supports it with a sufficient array of fact and logic to justify his opposition to the provision of the Michigan constitution forbidding the teaching of mechanical trades in the State prison.

THE FRANCO-AMERICAN TREATY OF COMMERCE. Pamphlets by Leon Chotteau. New York and Paris.

1. Reports and resolutions relative to a treaty of commerce between the United States and France, adopted in the Chambers of Commerce of the United States and France. 2. Report by Leon Chotteau, delegate of the French committee, of his two campaigns in the United States to secure a lowering of the customs tariffs of France and America, with an introduction by the Secretary of the French Committee, Auguste Desmolins. 3. Translation of "My two Campaigns."

RECENT GOVERNMENT REPORTS. United States. Washington: Government Printing Office.

United States Commission of Fish and Fisheries. Part V. Report of the Commission for 1877. Annual Report of the Secretary of the Treasury on the State of the Finances for the year 1879. Annual Report of the Director of the Mint for 1879. Statistical Abstract of the United States, first number, 1878, Bureau of Statistics. Annual Report of the Chief of the Bureau of Statistics for 1879. Quarterly Report of the Bureau of Statistics relative to imports, exports, immigration, and navigation, to June 30, 1879. Annual Report of the Operations of the United States Life Saving Service for 1878.

REPORT ON EXPERIMENTS IN BOILER BRACING. U.S. Navy Department, Bureau of Steam Navigation. Washington: Government Print.

Contains plates, tables, etc., with a short résumé of the work and results of a series of test experiments to determine the value and resistance of screw stay bolts for boilers under different conditions, using iron, steel, and copper plates of different thicknesses, etc. Bolts not riveted drew out at an average strain of 32,785 lb.; those riveted with the ordinary low conical head required an average strain of 35,033 lb. to draw them through the plate, the rivet head giving an additional strength of 2,248 lb. to a 1 inch stay bolt. The gain in favor of the button head bolt over the ordinary conical head ranged from 23 to 36 per cent.

THE NEW DEPARTURE IN THE COMMON SCHOOLS OF QUINCY. By Charles F. Adams, Jr. Boston: Estes & Lauriat. Price 25 cents.

Contains three papers: 1. The Public Library and the Public Schools; 2. Fiction in Public Libraries and Educational Catalogues; 3. The New Departure in the Common Schools of Quincy, Mass. The new departure is in a direction which the SCIENTIFIC AMERICAN has long advocated, and the results are of such importance as to call for a fuller consideration than there is space for here.

VAN NOSTRAND'S SCIENCE SERIES. New York: D. Van Nostrand. Price 50 cents.

The recent addition to this series of reprints are as follows: No 47. Linkages; the different forms and uses of Articulated Links; by J. D. C. DeRoos. No. 48. Theory of Solid and Braced Elastic Arches, applied to arch bridges and roofs in iron, wood, concrete, or other material; Graphical Analysis; by Wm. Cain, C.E. No. 49. On the Motion of a Solid in a Fluid, and the Vibration of Liquid Spheroids; by Thos. Craig, Ph.D.

HOW AND WHEN THE WORLD WILL END. By Rev. Joseph Wild, D.D. New York: James Huggins, 372 Pearl street.

A course of sermons delivered in a popular church in Brooklyn, the title of the book being that of the last discourse. The entire series is remarkable for the evidence it furnishes of the survival of a phase of culture that most men imagine to have long since passed away.

THE WORLD'S TIME.

A table showing equivalent local time every ten minutes during the day at prominent cities in the Eastern and the Western Hemisphere. Issued by the Baltimore and Ohio Railroad Company, 315 Broadway, N.Y.

VAN NOSTRAND'S ENGINEERING MAGAZINE. Volume XXI. July to December, 1879. New York: D. Van Nostrand.

The bound volumes of this well conducted magazine include a wide range of original and selected articles of permanent value to engineers.

REPORT OF PROFESSOR SPENCER F. BAIRD, SECRETARY OF THE SMITHSONIAN INSTITUTION, FOR THE YEAR 1878. Washington: Government Printing Office.

THE SMITHSONIAN INSTITUTION; JOURNALS OF THE BOARD OF REGENTS, REPORTS OF COMMITTEES, STATISTICS, ETC. Edited by Wm. J. Rhees. Washington: The Smithsonian Institution.

A documentary history of the origin and progress of the Smithsonian Institution, with collateral matter relative to its officers and their work.

THE SCIENTIFIC WRITINGS OF JAMES SMITHSON. Edited by Wm. J. Rhees. Washington: The Smithsonian Institution.

Embraces twenty-seven papers contributed by the founder of the Smithsonian Institution to scientific periodicals between 1791 and 1825; with reviews of the scientific character of Mr Smithson's writings by Professor W. R. Johnson and J. R. M. D. Irby.

BOLETIN DE LA SOCIEDAD DE GEOGRAFIA Y ESTADISTICA DE LA REPUBLICA MEXICANA. Tomo IV. Nos. 6 and 7 Mexico, 1879.

The present double number of the Mexican Geographical Society's Bulletin, which has just come to hand, is mainly taken up with orations delivered by different members on the occasions of the two sessions held in honor of M. Thiers and of Father Secchi. The scientific paper in this issue is by Sr. V. Reyes, and entitled Statistico-Geographical Teachings as to mortality in the State of Morellos. This article, which must prove of considerable local interest and value, is illustrated with well executed colored charts showing the percentages of death in the different municipalities of the State from various prominent diseases. As with former numbers of this Society's publications, the general make up of the Bulletin is most excellent, and the taste displayed in the typography reflects great credit on the editors and printers.

PROTECTION OF FORESTS A NECESSITY. By S. v. Dorrien. New York: B. Westermann & Co. Paper, pp. 33.

Discusses the devastation of forests in Europe and the lessons learned therefrom, and argues that the protection of forests is a matter of immediate serious solicitude, the existence of forests being absolutely necessary to our national prosperity and life.

Notes & Queries

HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from $1 to $5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

(1) J. B. W. asks: Would there be danger of springing or breaking a circular or crosscut saw with a press gummer, or would it be safer to use an emery wheel? A. We think it would be safer to use an emery wheel.

(2) W. H. C. asks: (1) In using insulated wire for secondary coil, in that described in your SUPPLEMENT, No. 160, how many layers are necessary to make a spark of about one inch? A. About 30. 2. Would not the extra current and its effects be increased if there were more layers (than two) in the primary? A. Not seriously. 3. Will not a carbon button pressed by a platinum tipped screw make a good commutator? A. No; the carbon will soon burn out. 4. What mixture is used on a copper disk for engraving glass? A. Emery and oil.

(3) F. F. writes: I am replating spoons which have been in use and become badly scratched. How can the surface be made smooth again most expeditiously? A. Use emery wheels of different forms and grades of fineness. 2. How is the fine polish seen on new work obtained? A. By burnishing.

(4) C. M. writes: In Vol. xli., No. 25, page 392, SCIENTIFIC AMERICAN, near the bottom of right hand column, I find this: "The concrete is composed of 5 parts sand and gravel as found in the river, 3 parts broken stone, and 1½ barrels Rosendale cement." In this case is the 1½ barrels taken as a unit? And is the composition made up of 1½ barrels cement; 3x1½, that is, 4½ barrels of broken stone; 5x1½, that is, 7½ barrels sand and gravel? When parts are spoken of, is weight or measure intended? When the expression parts is used, as in parts of a compound, parts of an estate, is anything definite said unless a definite unit is given? A. The constituents of concrete mixtures are generally measured. In compositions of matter, when parts are mentioned without reference to a definite unit, weights are usually implied. 2. What is the composition of the potato flour spoken of in the No. 5, present volume, page 72, as being extensively used for sizing and other purposes? A.

Composition of	Newly dug potatoes	Potatoes dried at 100° Fah.
Water	75·1 per cent.	
Starch	21·0 "	83·8
Albumen	2·3 "	9·6
Salts	1·0 "	4·1
Cellulose	0·4 "	1·7
Fatty matters	0·2 "	0·8
	100	100 (Wagner)

3. What is the composition of the thick and heavy fluid sold by the grocers under the name of golden sirup—it is retailed at about 80 cents per gallon? A. An aqueous solution of cane and inverted sugar and glucose, with a small quantity of sugar impurities.

(5) F. A. W. asks: Is there any way of cutting China or porcelain (vases, for instance) so as to leave a comparatively smooth edge to cut? I have a valuable pair of vases, the top edges of which are badly broken, and I desire to cut the flaring tops off, leaving a straight neck. Can you give me a simple way of cutting it? A. Place on a mandrel in a lathe a thin disk of copper or iron 3 inches in diameter. Supply it with rather fine emery and oil, and while revolving it at a speed of 400 or 500 revolutions per minute, hold the vase against the periphery of the disk. The disk should be often supplied with emery and oil.

(6) C. A. B. asks how an egg (common hen's egg) can be put in a bottle, whose neck is smaller than the egg, and have the egg in perfect shape in the bottle. A. Soften the shell with acetic acid. It may subsequently be hardened by means of lime water.

(7) M. S. asks how the crystals on tin plate are got. I can bring out crystals with acid in the common way, or I can fuse the tin and cool by dashing cold water on it, then applying the acid. The first brings out a large coarse crystal, the second a small square star shape pattern. What I wish is different; it is called acid crystals, to distinguish from the other water crystals. It comes out equally brilliant on each side, as if the whole sheet was dipped in acid. Have tried nitric, muriatic, and sulphuric acids, both with salt and sal ammoniac, but without the required effect. A. Dip the warm plate in nitro-muriatic acid diluted with 2 volumes of soft water just long enough to develop the larger figures; then immediately plunge into a large quantity of cold water, after which dip in boiling water, which on removal will cause the plate to dry spontaneously. Lacquer immediately. A similar result is obtained by exposing the plate as it comes from the tin bath, and while the metal is still in a semi-fused condition, to jets of cold air for a few moments.

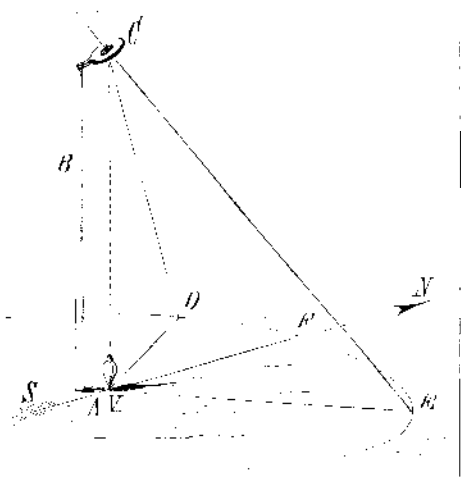
(8) C. A. R. writes: I am putting up electric bells in my house, and the ideas I wish to obtain are these: 1. What kind of battery shall I use in preference to any other? I mean, of course, among the constant condensing. A. The gravity. 2. Which battery would give the strongest current: 2 Leclanche cells, 1½ pints, 2d size, or 2 Callaud, such as are used in the telegraph offices; and which one of the two would last the longest? A. The Leclanche cells. 3. Will 3 cells of the first battery, or two of the last, be sufficient to work the bells? The wire I have is about No. 24, and the longest stretch from battery to push button and back is about twice 40 or 50 feet. A. Yes, but No. 18 wire would be ratherbetter. 4. What number of wire is generally used for the magnet of house bells, and that of the connections from battery to button? A. Nos. 18 to 24. 5. Can Leclanche cells, I mean the porous cups, be refilled so as to possess the same power as when new? A. Yes. 6. If so, what is the best way to clean them? A. Soak them in warm water. 7. Must the oxide of manganese be pure, or is it better impure? Should it be powdered fine or coarse (like cracked corn)? A. It should be pure and granulated, or coarsely powdered. 8. Are the zinc rods better when amalgamated or not? Must they have a smooth or rough surface? A. They are more easily cleaned if smooth. They should be amalgamated. 9. Can you give me an idea of how I can make myself a small indicator of about 6 numbers? A. Cover each number with a small hinged cover arranged to drop by its own gravity. Hold this cover in place by a small catch. Attach to the catch an armature, and above the armature place an electro-magnet capable of raising the catch and the armature. Connect the wires of the magnet with the circuit, closing the device in the door or window to be indicated.

(9) W. L. W. writes: There are several bored salt wells in this section, sunk for drinking water, but cannot be used on account of the salt. One well yields a teacupful of salt to the gallon of water boiled down, say 1 lb. to the gallon. We wish to know if it will pay for the manufacture of salt. It is believed the water supply is inexhaustible at the depth of borings of 110 feet. A. The amount of salt would not permit of profitable working.

(10) F. X. W. asks: What substances can I use to make a paste or cement capable of withstanding boiling water, and at the same time soft, elastic, and pliable, used on felt and textiles, etc? A. Try a solution of gum caoutchouc in bisulphide of carbon. Dry under strong pressure.

(11) J. H. C. asks for the best way to test potato starch in regard to its quality. A. Microscopic examination is the best and quickest test, the size, shape, and markings of the granules of different kinds of starch rendering their recognition quite easy, as well as distinguishing the starch from foreign matters. See Wagner's "Chemical Technology."

(12) D H. S. writes: My watch having stopped on the 16th day of Nov., and no other timepiece being at hand, I obtained time by the following process: In the evening a board having a straight edge was leaned against the cabin and aimed at the north star. A plumb line was then suspended from the edge of the board. From the almanac I learned that upon the 17th the sun would fail on noon mark at 11:45. The instant the shadow of edge of board coincided with plumb line I set my watch at the time mentioned, 11:45. My companions said the time was too slow, and so it seemed to me. Can the true mean time be obtained in the manner described above, and if not, what corrections are necessary? A. Your failure to get a true meridian line was owing to the fact that the pole star is only on the meridian twice in 24 hours, and these times change from day to day, by reason of the difference of sideral time given by the apparent diurnal motion of the stars and solar time given by the apparent daily motion of the sun. The pole star is twice daily at its extreme eastern and western elongations, 1½ degrees from the true north. He could have obtained his meridian line and by it have set his watch as follows: Set up a stick, A B, and on its end fasten a piece of tin perforated with a hole. Let the string of a plumb bob hang through the center of this hole, and thus get a point in the vertical, marked V in the diagram. About 9 A.M. mark the center of the image of the hole at D, then with the line, A D, as a radius, describe an arc of a circle, and when in the afternoon the image of the hole falls on this line, as at E mark, then the line, N S, which bisects the angle, D A E, is the true meridian.



(13) W. M. asks what the ingredients are used by Cooper and several other glue manufacturers to make common glue white. A. Use fine, clear stock, a little alum, steam heat, and vacuum boilers.

(14) W. C. writes: 1. The recipe for violet copying ink which you give in your SUPPLEMENT, No. 157, p. 2498, is not intelligible. Please inform me what the symbols 5B, BR, etc., mean. A. The terms are those used by dealers to designate particular shades of color. 2. Please inform me whether you have published a recipe for making the copying pad which is so much used. A. See p. 325, SCIENTIFIC AMERICAN, Vol. 41.

(15) G. H. J. asks: What solution of silver is precipitated in a granular metallic form, by immersing in it a plate of copper? A. Sulphate or nitrate.

(16) H. H. asks for a good receipt for dressing for shoes, such as is sold in bottles under title of "French dressing" for ladies' or misses' shoes. A. Logwood extract, 6 oz., dissolve in soft water 1 gallon; borax, 6 oz., dissolve in soft water 1 gallon, and add 1½ oz. shellac, boil to dissolve; bichromate of potash ⅜ oz., dissolve in soft water ½ pint, and add 3 oz. ammonia water. Mix all together.

(17) W. B. P. asks: What material can I fortify with, in making a copper plate stencil, by allowing nitric acid to "eat out" the letters? A. The etching ground commonly used is prepared by melting together equal parts of asphaltum, Burgundy pitch, and beeswax, stir to incorporate. If the ground is brittle, use more beeswax; if it drags, more asphaltum.

(18) D. C. M.—Consult Blodgett's "Climatology," Buchan's "Handbook of Meteorology," Dove's "Law of Storms," Espy's "Philosophy of Storms," Herschel's "Meteorology," Karentz's "Meteorology," Lardner's "Meteorology," Morris' "Meteorology," Jenkens' "Use of Barometers," etc.

(19) B. S. writes: I made a copying pad according to directions in your paper, and find it works well, except that the material wastes away very rapidly in the cleaning after use. How could I obviate this difficulty? A. Use a very little warm water instead of cold. The gradual wasting is unavoidable.

(20) J. C. L. asks: How shall I proceed to polish copallite to properly show the insects therein? A. Cut it with a fine saw, and polish with tripoli and a little oil, applied on kid or chamois skin.

(21) R. W. H. asks for a receipt for dyeing billiard balls? A. Black.—Boil in a strong aqueous solution of logwood extract, and then immerse in acetate of iron solution; repeat if necessary. Blue.—Immerse for some time in a dilute aqueous solution of sulphate of indigo partially saturated with potash. Green.—Dip the blued ivory in tin liquor for a few minutes, then in a hot saturated aqueous solution of fustic; or boil the iron in a solution of verdigris in vinegar. Yellow.—Use the tin mordant and a hot strained decoction of fustic. Red.—Use tin mordant, and steep in a decoction of Brazil wood or cochineal or both. Lac, under similar circumstances, produces scarlet.

(22) S. G. writes: 1. I am about making an engine to run a scroll saw. It requires about the same power to run the saw as a sewing machine. What would be the proper dimensions for the engine? A. About as small as you can make, say 1 inch cylinder by 2 or 3 inch stroke. 2. Would Babbitt metal be hard enough to make the cylinder? If not, is there any metal softer than iron that would do? A. Yes, but it would wear fast. Use a piece of mandrel drawn brass tubing.

(23) G. A. C. asks: 1. If a steam fire engine will throw a stream a distance of 160 feet through 100 feet of hose, the engine running at 150 revolutions a minute, will it throw as far through 1,000 feet of hose, the engine still making 150 revolutions per minute? A. Yes, but it will require much more engine power to overcome the friction of the water in the 900 additional feet of hose. 2. Please name a good work on the steam engine for one who is not a professional engineer. A. Bowne's "Catechism of the Steam Engine."

(24) W. H. asks: What is the best self-feeder for low pressure steam boiler (up to 10 lb.)? A. The old Watt water column and float.

(25) P. V. H. writes: I think that the trouble complained of by your correspondent W. H., 6 query, page 123, in your number of February 2 (received to-day), will be corrected, if he brings his return pipe for condensed water from radiators into the boiler below the level of the water. The noises made are due to the struggles between the steam and water, when this pipe is open sometimes to steam, making varying pressure as the quantity of condensed water varies. Having suffered myself from this trouble, I completely corrected it in this way. There is never the least noise now.

(26) S. G. M. asks: 1. Can you give me a description of the Blake transmitter? A. See p. 274, Vol. 40, SCIENTIFIC AMERICAN. 2. Will the Lyons transmitter (described in SUPPLEMENT No. 163) work without an induction coil? A. No.

(27) R. H. J. writes: I have a new steam kettle, cast iron, porcelain lined, which is supplied with steam by a ½ inch pipe; it is 10 feet from the boiler, and yet I can scarcely make water boil in it with 30 lb. of steam; what is the matter? A. You send insufficient data, but a few general remarks may throw some light on the trouble. To raise water from mean temperature (39° Fah) to boiling, it requires about one fifth its weight in steam to do it, making no allowance for loss of heat by radiation. To evaporate all the water from a steam kettle it will require at least its own (the water's) weight of steam. The waste or return water from a steam kettle should not be taken to the same steam trap as the water from the heating apparatus, for the great shrinkage, that is, rapid condensation, due to the steam coming in contact with a large body of water through the sides of the kettle, will cause the condensed water to back up and fill the steam space. Theoretically it will take about 2⅛ minutes to boil a cubic foot of water, assuming all the steam that can pass through a ½ inch pipe at 30 lb pressure can be utilized in the same time. Thus, if you have a 75 gallon kettle it will take 25 minutes to heat all the water to 212° Fah. with steam through a ½ inch pipe, making no allowance for transmission through the iron, the slowness of convection of the water, and loss by radiation, and this under the most favorable circumstances of piping and trapping. When ebullition begins all the water in a kettle has not yet reached 212°. The baking of about ⅛ of an inch of mush on the bottom of a kettle, for the want of stirring when the meal was first put in, prevented the proper cooking of the food for 10 hours, and eventually it had to be removed to another and clean kettle.

(28) R. D. G. asks: 1. Do you know of any gear cutters which can be attached to a lathe? A. There are gear cutters made to be attached to a lathe for cutting small wheels. 2. I would like to know the easiest method for getting the diameter of a wheel when the pitch and number of cogs are given. A. Multiply the pitch by the number of teeth; the product is the circumference of the wheel at the pitch line.

(29) H. H. & Co., referring to our reply to F. A. S. on p. 124, current volume of SCIENTIFIC AMERICAN, write: The Bessemer steel from which railway rails are made contains from 35 100 to 45-100 of one per cent of carbon, and if mould boards and scraper bottoms are made of such steel, they can be hardened. These articles are made every day by all steel works from such material when asked for. Of course the degree of hardness will not be equal to the special plow steels made by the crucible method. Sheet steel for shovels, spring steel for carriage springs, etc., are rolled from Bessemer ingots when buyers require a cheap article.

(30) J. R. asks for a work on steam fitting similar to Mr. Baldwin's "Hints to a young Steam Fitter." A. We do not know of a work exclusively devoted to the subject. 2. What is the best length for a tubular boiler to burn hard coal, 12 or 14 feet; and the best size tube, 3½ or 4 inch; draught is good. A. If you use 3½ inch tubes you can make the boiler 12 feet, but with 4 inch tubes it should not be less than 14 feet. In either case it may be made 2 feet longer with advantage.

(31) R. C. M. asks (1) for a rule for finding the horse power of engines. A. Square the diameter of the cylinder, multiply the product by 0·7854. Multiply this product by the average pressure of steam per square inch on the piston, and this result by the number of feet the piston travels per minute, and divide by 33,000, the quotient is the horse power. 2. What is the rule for finding the horse power of a tubular boiler? A. For a tubular boiler allow 15 to 17 feet heating surface for each horse power. 3. What is the name of the newest and best book on the blast furnace? A. Schinz on "The Action of the Blast Furnace."

(32) J. L. writes: 1. In your issue of February 7, 1880, question No. 1, you advise hydraulic cement properly mixed to stop leaks in legs of locomotive boiler corroded by salt or lye. How is it to be mixed? Are you not advising the party to get up a first class explosion; one that will make that boiler throw a somersault similar to a locomotive boiler which exploded inside of Rogers' Works in Paterson, N. J., in 1852? A. Mixed like ordinary hydraulic lime mortar, small pieces of broken bricks put on to fill up space, there is no danger if the top is kept properly below the fire line. It has been used successfully in a number of cases. 2. What do you consider the best packing or joint for use between cast iron steam dome and top of portable boiler? A rust joint or soft cement composed of lead, oil, and borings, asper "Wrinkles and Recipes," pages 135 and 136? A. If the surfaces are true and faced, use the soft cement; if rough and untrue, make a rust joint.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

E. F. B.—It is pyrolusite—binoxide of manganese. The powdered mineral is commercially known as manganese, also as black oxide of manganese. It is largely used in the manufacture of bleaching powder or chloride of lime (calcium hypochlorite) and in glass making.—S. D.—We cannot judge fairly of the value of your water from so small a sample. The cost of a full quantitative analysis of a mineral water would be about $100.—M M.—The ore is undoubtedly rich in silver; it is free milling.—J. F. S.—The sample of boiler incrustation consists chiefly of sulphate and carbonate of lime, oxide of iron, silica, alumina, and organic (carbonaceous) matter. The use of small quantities of tannate of soda has been found efficacious in preventing the formation of hard incrustations. Filter the water and use the blowout frequently.—W. S. B.—Crystals of rose and amethystine quartz, sometime used in jewelry. They are of little value. No. 2. It is chlorite in quartz, possibly auriferous.—L. M. C—They consist chiefly of carbonate of lime with small quantities of clay, quartz, sulphide of iron, and lime phosphate.

English Patents Issued to Americans.

From February 13 to February 17, inclusive.

Anæsthetic compound, T. A. Edison, Menlo Park, N. J.
Bookstand, F. G. Johnson, Brooklyn, N. Y.
Dyeing, G. G. Smith, St. Albans, Vt
Electric lamp, T. A. Edison, Menlo Park, N. J.
Electric light, T. A. Edison, Menlo Park, N. J.
Flue cleaner, R. Atherten *et al.*, Paterson, N. J.
Gas, manufacture of, H. Y. Attrill *et al.*, New York city.
Oil still, E. Watson, Buffalo, N. Y.
Printing calico, F. Baylies *et al.*, New York city.
Railroad rails, A. J. Gustin, Boston, Mass.
Refrigerating apparatus, S. B. Hunt *et al.*, N. Y. city.
Telegraph, electric, B. Thompson *et al.*, Toledo, Ohio.
Wood-cutting tool, F. Hanson, Hollis, Me.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were Granted in the Week Ending

February 17, 1880,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list, including both the specifications and drawings, or any patent issued since 1867, will be furnished from this office for one dollar. In ordering please state the number and date of the patent desired, and remit to Munn & Co., 37 Park Row, New York city.

Aerial navigation, vessel and machinery for, A. L. Blackman ... 224,510
Axle box, car, T. V. Le Roy (r) ... 9,084
Axle box, car, I. P. Wendell ... 224,751
Bale tie buckle, J. H. Mitchell ... 224,708
Baling press, M. F. Connett ... 224,655
Banjo, C. F. Burrowes ... 224,512
Barber's chair, F. Peters ... 224,604
Barrel machine, G. Farnsworth ... 224,587
Barrels, handling, J. A. Griswold ... 224,527
Barrels, lye conductor for, F. Jones ... 224,698
Bed lounge, T. Soden ... 224,739
Bedstead fastening, G. G. Musser ... 224,714
Beehive, J. T. Fife ... 224,589
Belt, galvanic, C Norwood ... 224,717
Bluing package, H. Sawyer ... 224,731
Boat knee, dory, E. G. Matthews (r) ... 9,089
Boiler furnace grate, C. Hill ... 224,688
Bolt mechanism for locking ranges of cells, G. F. Kindt ... 224,546
Book, copying, S. Hano ... 224,529
Boot and shoe tree, J. A. Ambler ... 224,506
Boot and shoe uppers, lasting, G.W. Copeland *et al.* 224,516
Boot tree, A. W. Cox ... 224,517
Bottle box, J. Matthews (r) ... 9,090
Bottle, nursing, J. E. Potter ... 224,557
Box fastener, J. Casey ... 224,647
Box smoothing iron, J. M. Lomasney ... 224,552
Bracelets, manufacture of, E. W. Webbon ... 224,620
Bricks and tiles, machine for cutting off, J.S.Smith 224,616
Bridge, truss, R. W. Gorrill ... 224,677
Bridle bit attachment, N. J. Blatherwick ... 224,633
Buckle, harness, I. L. Landis (r) ... 9,088
Bulletin board, L. O. Harris ... 224,684
Buttons to sale cards, machine for attaching, F. W. Clough ... 224,583
Can nozzle, G. Browne ... 224,577
Cane cutter, sugar, P. Seitz ... 224,733
Cane shaving machines, attachment for, G. S. Colburn ... 224,585
Cannon, breech-loading, Brannon & Bunting ... 224,637
Cant hook, H., C. A., & J. H. Peavey ... 224,605
Car coupling, J. H. Meredith ... 224,599
Car coupling, A. S. Peck ... 224,721
Car coupling, H. N. Wickes ... 224,754
Car for common roads, T. T. Prosser ... 224,727
Car, freight, T. T. Prosser ... 224,724, 224,726, 224,728, 224,729
Car, stock, J. L. Copp ... 224,652
Car, stock, S. H. McGibeny ... 224,707
Cars, illumination of railway, R. Boeklen ... 224,576
Carbureting apparatus, Heywood & Boeklen ... 224,592
Carriage prop block washer, A. S. Parker ... 224,603
Carriage spring, J. R. Locke ... 224,597
Cart, grain, T. T. Prosser ... 224,725
Caster, B F. Culver ... 224,518
Chain, drive, J. Simpson ... 224,737
Chains, manufacture of weldless, A. O. David ... 224,659
Christmas tree holder, H. Albrecht ... 224,624
Churn power, Z. T. Parker ... 224,602
Clocks and watches, second hand attachment for, A. Bonzon ... 224,635
Cloth folding and cutting machine, G. W. Baker. 224,571
Cloth pressing machine, E. Gessner (r) ... 9,076, 9,077
Clothes line fastener, J. T. Cronk ... 224,657
Clothes pounder, J. W. Tullis ... 224,747
Coal, etc., composition for aiding the ignition of, J. M. Child ... 224,649
Collar, horse, Fisher & Watson ... 224,671
Cooking apparatus, steam, E. Fox ... 224,672
Corn dropper, rotary, J. Selby ... 224,613
Corn husker, W. B. Farwell ... 224,588
Corn sheller, W. S. Reeder ... 224,609
Cornice, adjustable window, S. R. Scottron ... 224,732
Cotton chopper, J. B. Carson ... 224,645
Crane for loading vessels, J. W. Alexander ... 224,505
Creasing and embossing tool, comb'd, R. Young ... 224,759
Cultivator, A. H. Allison (r) ... 9,085
Cultivator, D. Guptail (r) ... 9,087
Damper regulator, automatic, F. A. Jones ... 224,514
Deflection stand, Jackson & Guerber ... 224,540
Dental mouth glasses, support for, R.B.Donaldson 224,663
Dental plugger, H. D. Justi ... 224,595
Disinfecting apparatus for water closets, etc., E J. Mallett, Jr. ... 224,553
Door spring, M. R. Davis ... 224,584
Door spring, T. Rowe ... 224,730
Drill hole cleaner, pneumatic, J. L. Prentiss ... 224,558
Drop handle, J. Kintz ... 224,702
Electric apparatus, dynamo, C. F Brush ... 224,511
Electric conductor, C. E. Chinnock ... 224,579
Electric lights, apparatus for treating carbon pencils for, W. Sawyer ... 224,612
Electric machine, dynamo, W. Hochhausen ... 224,593
Electrical conductors, induced current guard for, C. E. Chinnock ... 224,580
Elevator, Bevins & Phillips ... 224,574
Elevator, G. H. Pleasance ... 224,723
End gate, wagon, G. Jontz ... 224,697
Extinguisher, W. H. Hovey ... 224,539
Fabric striping machine, J. Craig ... 224,656
Faucet, drain, A. G. Class ... 224,582
Feather notching machine, A. Wemple ... 224,561
Felly bending machine, C. Wright ... 224,758
Fence, W. R. White ... 224,621
Fence post driver, J. Carpenter ... 224,578
Filter, I. T. Green ... 224,680
Firearm, magazine, W. H. Elliot ... 224,522
Firearm, revolving, A. Swingle ... 224,742
Firearm sight, R. F. Cook ... 224,651
Fire engine, steam, H. F. Shaw ... 224,735
Fire extinguisher, A. M. Granger ... 224,678
Fluids, apparatus for effecting interchange of temperatures of, S. H. Rouart ... 224,611
Flush bolt, P. Bradford ... 224,638
Fruit gatherer, S. Rice ... 224,610
Furnace fire door, Babcock & Wilcox ... 224,626
Garbage receptacle, V. Borst ... 224,636