

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.

Boiler Scale.—Parties having fine specimens for sale or loan, address Jas. F. Hotchkiss, 84 John Street, N. Y.

Storage Electricity, \$1; Dictionary Electricity, \$2. All inventions described. Best out. School Electricity, N. Y.

For Sale.—Complete set of Patent Office Reports from 1847 to 1882. Address J. G., Box 1977, New York city.

Wanted.—A Hydraulic Press for hand power. Must be in good order and cheap for cash. Address with full particulars to P. O. Box 3489, New York city.

Building with power for sale, rent, or partner wanted for manufacturing. W. J. Humphreys, Elmwood, Ill.

Farley's Directories of the Metal Workers, Hardware Trade, and Miners of the United States. Price \$3.00 each. Farley, Paul & Baker, 530 Market Street, Phila.

Wanted.—Some energetic reliable business man, specially to travel and sell on commission. State Rights under improvement in Tellurian, patented August 22, 1882, No. 263,236. Illustrated in SCIENTIFIC AMERICAN of January 27, 1883. Apply to J. Spicer, Taylor's Island, Md.

American Fruit Drier. Free Pamphlet. See ad., p. 222.

Am. Twist Drill Co., Meredith, N. H., make Pat. Chuck Jaws, Emery Wheels, Grinders, automatic Knife Grinders. Brass & Copper in sheets, wire & blanks. See ad. p. 222.

The Chester Steel Castings Co., office 407 Library St., Philadelphia, Pa., can prove by 20,000 Crank Shafts and 15,000 Gear Wheels, now in use, the superiority of their Castings over all others. Circular and price list free.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Diamond Planers. J. Dickinson, 64 Nassau St., N. Y.

Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 221.

Gear Wheels for Models (list free); Experimental Work, etc. D. Gilbert & Son, 212 Chester St., Phila., Pa.

Upright Self-feeding Hand Drilling Machine. Excellent construction. Pratt & Whitney Co., Hartford, Conn. Woodwork'g Mach'y. Rollstone Mach. Co. Adv., p. 221.

20,000 Duc Spherical Elevator Buckets, sizes 3 1/2 to 17 inches, constantly on hand. Telegraphic orders filled. T. F. Rowland, sole manufacturer, Brooklyn, N. Y.

First Class Engine Lathes, 20 inch swing, 8 foot bed, now ready. F. C. & A. E. Rowland, New Haven, Conn.

Common Sense Dry Kiln. Adapted to drying of all material where kiln, etc., drying houses are used. See p. 222.

Lightning Screw Plates, Labor-saving Tools, p. 222.

The Best.—The Deuber Watch Case.

Curtis Pressure Regulator and Steam Trap. See p. 206.

The Sweetland Chuck. See illus. adv., p. 206.

Knives for Woodworking Machinery. Bookbinders, and Paper Mills. Taylor, Stiles & Co., Riegelsville, N. J.

The Celebrated Wooton Desk. See adv., page 206.

Comfort Dinner Pails.—Most convenient in use. For sale everywhere. Reardon, Ennis & Co., Troy, N. Y.

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 190.

Scientific Books. See page 188. 100 page Catalogue free. E. & F. N. Spon, 44 Murray Street, N. Y.

Permanent Exposition.—Inventors' Institute, Cooper Union, N. Y. City. Every facility for exhibition of machinery, merchandise, and inventions. The expense is small—the advantages great. Send for particulars.

Contracts taken to manuf. small goods in sheet or cast brass, steel, or iron. Estimates given on receipt of model. H. C. Goodrich, 66 to 72 Ogden Place, Chicago.

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, polishing compositions, etc. Complete outfit for plating, etc. Hanson & Van Winkle, Newark, N. J., and 92 and 94 Liberty St., New York.

Guild & Garrison's Steam Pump Works, Brooklyn, N. Y. Steam Pumping Machinery of every description.

Lists 29, 30 & 31, describing 4,000 new and 2d-hand Machines, ready for distribution. State just what machines wanted. Forsaith & Co., Manchester, N. H., & N. Y. city.

"Abbe" Bolt Forging Machines and "Palmer" Power Hammers a specialty. Forsaith & Co., Manchester, N. H.

Magic lanterns, stereopticons, cond. lenses, etc., on hand and made to order. C. Beseler, 218 Centre St., N. Y.

Railway and Machine Shop Equipment. Send for Monthly Machinery List to the George Place Machinery Company, 121 Chambers and 108 Reade Streets, New York.

Improved Skinner Portable Engines. Erie, Pa.

25' Lathes of the best design. G. A. Ohl & Co., East Newark, N. J.

For Power & Economy, Alcott's Turbine, Mt. Holly, N. J.

"How to Keep Boilers Clean." Book sent free by James F. Hotchkiss, 84 John St., New York.

Engines, 10 to 50 horse power, complete, with governor, \$250 to \$550. Satisfaction guaranteed. More than seven hundred in use. For circular address Heald & Morris (Drawer 127), Baldwinville, N. Y.

Wanted.—Patented articles or machinery to make and introduce. Gaynor & Fitzgeraid, New Haven, Conn.

Latest Improved Diamond Drills. Send for circular to M. C. Bullock Mfg. Co., 80 to 88 Market St., Chicago, Ill.

Water purified for all purposes, from household supplies to those of largest cities, by the improved filters manufactured by the Newark Filtering Co., 177 Commerce St., Newark, N. J.

Ice Making Machines and Machines for Cooling Breweries, etc. Pictet Artificial Ice Co. (Limited), 142 Greenwich Street. P. O. Box 3083, New York city.

Split Pulleys at low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

Machinery for Light Manufacturing, on hand and built to order. E. E. Garvin & Co., 139 Center St., N. Y.

Presses & Dies, Ferracite Mach. Co., Bridgeton, N. J. Supplement Catalogue.—Persons in pursuit of information on any special engineering, mechanical, or scientific subject, can have catalogue of contents of the SCIENTIFIC AMERICAN SUPPLEMENT sent to them free. The SUPPLEMENT contains lengthy articles embracing the whole range of engineering, mechanics, and physical science. Address Munn & Co., Publishers, New York.

NEW BOOKS AND PUBLICATIONS.

THE IMPERIAL DICTIONARY OF THE ENGLISH LANGUAGE. By John Ogilvie, LL.D. New edition, edited by Charles Annandale, M.A. Four vols., 4to. New York: The Century Company.

This important work, which has been accepted in Great Britain for more than a quarter of a century as a standard lexicon of the English language, and as one of the most useful works of the kind existing for general reference, is not merely an ordinary dictionary intended to supply philological information, but is, in addition, an encyclopaedia, which gives brief, clear, and well summarized descriptions of things to which words are applied.

This encyclopedic feature adds greatly to the real usefulness of the work as a book of reference, and, along with the numerous quotations that it contains, makes it attractive reading. The scientific and technological features of the dictionary are closely allied with its encyclopedic character. While it does not contain, nor profess to, all the terms found in each art and science, yet it does contain far more than the reader will be likely to meet with in general literature. It is especially strong in the departments of botany, zoology, geology, anatomy, medicine, surgery, physics, mathematics, chemistry, mineralogy, astronomy, archaeology, architecture, engineering, machinery, manufactures, agriculture, and commerce. In the treatment of subjects relating to science, the articles belonging to this department have, in order to secure accuracy, been submitted for revision to men eminent for their scientific attainments. Wherever an engraving can help to set the meaning of a word more clearly before the reader, it has been introduced; and these engravings, which number nearly three thousand, have been executed with remarkable care and finish, and are splendid specimens of the wood engraver's art.

This new edition of the Imperial Dictionary, which is here offered to the public by the American publishers, without change or revision, has been in preparation for over ten years, and so greatly has the vocabulary been increased, and so important and extensive have been the changes due to the revision, that it may now be considered a new work.

The separate words or entries contained in the four volumes before us number about 130,000, the definitions in all the cases that we have examined being specially full, clear, accurate, and concise. The etymology in this new edition has been altogether remodeled and brought up to the present state of knowledge on the subject, and special care has been taken to state in a concise form such facts regarding the derivation of each word as might suffice to meet the wants of the general reader, without entering into an extended treatment that could be appreciated only by the philologist.

Altogether, this work forms a wonderful monument of wide research and erudition, and should find a place on the book shelves of all classes of readers.

REPORT OF THE ENTOMOLOGIST OF THE DEPARTMENT OF AGRICULTURE, Charles V. Riley, M.A., Ph.D., for 1882. Author's edition. Washington: Government Print.

Contains a partial summary of the year's correspondence and labor of the entomological division in the promotion of silk culture; a report on pyrethrum, its use as an insecticide, its cultivation in the United States, and experiments made in its use; study of the chinch bug, the army worm, the scale insects of the orange, rice insects, corn and clover pests, the cotton worm, the apple maggot, new lac and wax insects, etc. The report is well indexed and illustrated. In view of the circumstance that the aggregate annual loss to the nation from insect depredation amounts to many million dollars—Prof. Riley says hundreds of millions—it is a pity that means are not provided for the fuller reporting of the work of the entomological department. The work is so well done and so useful that it should not be stinted in its publication.

COTTON AND WOOLEN MILLS OF EUROPE. Reports of U. S. Consuls in answer to a circular from the Department of State. Washington: Government Print. Sept., 1882. 8vo., paper, pp. 400.

Comprises about forty reports upon the cotton and woollen industries of the principal European trade centers, each report describing minutely the mechanical, financial, commercial, and labor conditions under which the manufacture is carried on, with all kindred information obtainable. It is needless to add that the information given is of great value to manufacturers and dealers, as well as to legislators and all interested in the real and relative welfare of American operatives.

TEXT BOOK OF GEOLOGY. By Archibald Geikie, LL.D., F.R.S., Director General of the British Geological Surveys. London: Macmillan & Company.

This admirable textbook is an expansion of the article "Geology" in the revised edition of the Encyclopedia Britannica. Dr. Geikie is a charming writer, a master teacher of his favorite science, and also one of its most successful prosecutors. He has been a close and appreciative student of American geology, in the field as well as in the reports of our working geologists, and in his breadth of view and grasp of his subject he shows a marked advance upon the views of the rigid uniformitarian school which has so long dominated English geology. To American students his work possesses peculiar value from the fact that, unlike our popular American text books, which dwell most upon historical geology, it is particularly full in its treatment of the cosmical aspects of geology, rock structure, and dynamical geology. The seven divisions of the work are: Book I. Cosmical Aspects of Geology, 24 pages. II. Geognosy, an investigation of the materials of the earth's substance, 162 pages. III. Dynamical geology, a study of the agencies of geological changes, their operations and effects, 276 pages. IV. Structural geology, 125 pages. V. Paleontological geology, 304 pages. VI. Physiographical geology, 19 pages. The illustrations are carefully selected and include a large number from De La Beche's classical "Geological Observer." The work has a copious index.

THE BREWER, DISTILLER, AND WINE MANUFACTURER. Philadelphia: P. Blakiston, Son & Company. \$1.75.

This is the first of a series of English technological handbooks to be edited by Mr. John Gardner. It gives directions for the manufacture of beers, spirits, wines, liquors, etc., as carried on in England. Its value for this market would be materially enhanced by the addition of chapters on the treatment of American wines, and the brewing of larger beer.

THE SLIDE RULE SIMPLIFIED, EXPLAINED, AND ILLUSTRATED. By Robert Riddell. Philadelphia: J. B. Lippincott & Company.

The author's aim is to demonstrate the practical scope and utility of the slide rule as a means of mechanical calculation, and to illustrate its capabilities and use in connection with the work of the carpenter and joiner. Skillfully handled the slide rule is a wonderful saver of time and labor, a pocket calculating machine, which every mechanic should know how to take advantage of. Mr. Riddell's illustrations are abundant and well chosen. The preliminary explanations might be clearer, but any intelligent boy or man can master their meaning with proper study, rule in hand, and will be sure to find the lesson a useful one.

THE MATERIALS OF ENGINEERING. In three parts. Part I. Non-metallic materials. By Robert H. Thurston, C.E. New York: John Wiley & Sons.

Prof. Thurston has here brought together a considerable amount of practical information with respect to stones and cements, timber, fuels, lubricants, and minor non-metallic materials used by engineers, such as leather, paper, rubber, cordage, etc. The adaptation of different materials to special uses, their varying strength and durability, modes of testing and of preservation, their uses, economical characteristics, and behavior under ordinary conditions are discussed at some length. An appendix embraces a large number of handy conversion tables, a report on the centimeter, gramme, second system of units, with conversion tables, and a table of four figure logarithms.

REPORT UPON THE PRIMARY TRIANGULATION OF THE UNITED STATES LAKE SURVEY. By Lieut. Col. C. B. Comstock. Washington: Government Print.

Contains nothing of popular interest. There are elaborate discussions of standards of length, basis, and base apparatus; of the testing and use of such standards and apparatus; illustrations of the methods of conducting triangulations; and descriptions of the methods and instruments of astronomical work, and kindred matters, which will be appreciated by those engaged in work of this nature, and possibly by students of geographical surveying.

ANNUAL REPORT OF THE CHIEF SIGNAL OFFICER FOR 1880. Washington: Government Print.

A volume of portentous size, in which the useful information given—which is considerable—is buried out of sight and almost past finding. Brief digests and summaries of the results of observation and experience would cost less and would be much more serviceable to the public.

SAW FILING. By Robert Grimshaw. New York: John Wiley & Sons.

In addition to saw filing the little book treats of the structure of saw teeth, the choice of saws, gumming, spring setting, and swaging. It is amply illustrated and seems likely to be of use to practical sawyers.

THE COLORS OF FLOWERS AS ILLUSTRATED IN THE BRITISH FLORA. By Grant Allen. London: Macmillan & Co. \$1.

Mr. Grant Allen needs no introduction to the readers of this paper. He has a rare faculty both for original investigation and for describing his observations entertainingly without sacrifice of scientific quality. This, the latest addition to the "Nature Series," comprises five essays treating of the origin of petals in flowers, the law of progressive coloration, variegation, temporary or permanent reversion of color, degeneration, and other phenomena illustrating the natural variations of flowers, and the bearing of such variations upon the theory of evolution.

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.

Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their identification.

(1) C. M. S. asks: 1. In electric telephoning, is the voice or sound actually transmitted, or is it reproduced? A. It is reproduced. 2. In electric telegraphing, does the electricity pass from one point to another—say, from Boston to New York—and do its

work, or is it an electric disturbance (if that is the way to put it), not unlike the disturbance of the air in a room, when on opening one door another is closed, not from the air at the opened door rushing over and closing it, but by the movement of the whole body of air in the room? A. For the sake of convenience, dynamic electricity is usually spoken of as flowing in a current along its conductor. No one knows the nature of the action of electricity.

(2) H. W.: For soldering flux use borax glass; pulverize, and then add water to proper consistency.

(3) A. M. F. asks: 1. Can absolute alcohol be frozen, and if so, at what temperature? A. Alcohol has never been solidified. 2. Can the spirit used in thermometers freeze, and if so, at about what temperature; and what is used to measure a very low temperature? A. Alcohol thermometers are used for low temperatures. 3. What kind of thermometers does the United States Signal Service use for low temperatures, below the freezing point of mercury, and are there any better made? A. See SUPPLEMENT, No. 59, for the general subject of thermometers. We presume the United States Signal Service uses alcohol thermometers for very low temperatures. SUPPLEMENT, No. 309, describes the instruments used at the New York Meteorological Observatory.

(4) F. E. W. asks: 1. What is the chemical composition of ordinary "laughing gas" as used by dentists? Can it be described as "ordinary air with an excess of oxygen"? A. Laughing gas is nitrogen monoxide (N₂O). The name you apply would be incorrect. 2. What is the composition of prussic acid, and what is its action upon the system, by reason of which it causes almost instant death? A. Prussic acid is chemically hydrocyanic acid (HCN), one atom of hydrogen combined with one atom of cyanogen. It produces coma by acting on the nerves of motion or sensation. A very full description of its symptoms may be found in Taylor's "Medical Jurisprudence."

(5) E. B. asks: What is the exact analysis of sulphate of potash, and where and how is it produced? Also, what crops are designated as field crops, and what as garden crops? A. Potassium sulphate is a by-product from several chemical industries. It is also made directly as a fertilizer by several large dealers. Frequently it is sold commercially as pure as 85 per cent of potassium sulphate. The field crops are wheat and such products, while vegetables, etc., are called garden crops. The following are analyses of potassium sulphate as manufactured by one of our large fertilizer companies:

	1.	2.
	Per cent.	Per cent.
Potassium oxide.....	36.11	32.34
Sodium oxide.....	8.50	7.31
Sulphuric acid.....	49.82	44.78
Moisture list at 100° C.....	0.86	0.25
Insoluble matter.....	1.06	0.74

(6) H. T. Co. ask: What is the best preparation or lubricant for wooden cogs in heavy gearing? A. Black lead and tallow.

(7) J. W. S. asks: 1. Is the light of a lamp affected by the color of a ceiling? A. A room having white walls and ceiling will be better illuminated by a lamp than a room with colored walls and ceilings. White walls reflect a great proportion of the light, while dark walls absorb it more or less, according to the depth of color. Of course the amount of light produced by the lamp is unaffected by its surroundings. 2. What can I use to remove mildew from a cement wall? A. Mildew on walls may be partially removed by scrubbing with soda water, and when dry whitewash or paint. A solution of oxalic acid may be used as a wash to bleach out the stains after the scrubbing. 3. Will a live fish add anything to the weight of a bucket of water? A. The fish will add its own weight to the bucket of water.

(8) E. F. F.: A locomotive cannot get on a dead center unless the engine of one side is broken down, and it is running with only one engine.

(9) J. S. asks how to calculate the change-gears for a screw cutting foot lathe to cut any number of threads per inch; the lead screw has ten threads per inch. Please give full instructions. Also, when cutting threads on a foot lathe, when you have gone over the thread once and want to go over it again, do you have to back the tool out of the cut and reverse the foot wheel and run it backward until the tool is where it began, and then begin another cut? A. The gearing and management for cutting threads are the same in principle upon all lathes. In SCIENTIFIC AMERICAN, "Notes and Queries," vol. xlvii, query 31, page 323, you will find formulas for two styles of gear. If your lathe has a clamp grip upon the leading screw, you can unclamp and slide back for any number of threads that will divide by 10 without a remainder, or that is a divisor of 10 without a remainder, thus in your case you can slide back for 2 1/2, 5, 10, 20, 30 threads to the inch only, and will have to run back for all others.

(10) R. W. S.: The charge of powder for a 100 ton gun is 452 to 450 lb., pebble powder.

(11) W. J. R. asks how to transfer a print (common printing) to a piece of polished steel. A. To transfer prints to polished steel, or to glass, make a varnish as follows: Gum sandarac, 4 ounces; mastic, 1 ounce; Venice turpentine, 1 ounce; alcohol, 15 ounces; or any smaller quantity in proportion. Digest in a bottle, with frequent shaking. Moisten the print slightly upon the back by laying a wet cloth upon it; then varnish the steel plate or glass with a thin even coat; lay the print with the face next to the varnish, commencing on one side so as not to inclose air bubbles, pressing it down close with the fingers if the print is small, or a soft roller if the print is large. Be careful that all parts of the print are in contact with the varnish. Lay aside to dry. After it is dry, wet the back with water and cautiously rub the paper off with the fingers; rub lightly toward the last with plenty of water, and the surface of the varnish will come up smooth with the ink of the print solidly embedded. Then a thin coat of mastic varnish will give it a finish.

(12) T. D.: To cut glass water gauge tubes, file a nick in one side and break as you would a stick. In some cases it is necessary to scratch the tube on the inside. You can do this with the sharp end of a broken file.

(13) A. F. S. asks how to prepare a good blacking for the interior of telescope tubes. I am about to construct one, and would be very much obliged to you for this information. A. For dead black for inside of telescope tubes use alcoholic shellac varnish and lampblack, equal parts by weight, and thin with enough alcohol to make it flow freely with the brush.

(14) J. L. B.: The method of preparing paraffine paper is as follows: Dissolve paraffine in benzine, and into the warm solution dip the paper, sheet by sheet; let drip off and dry. On the large scale it may be done by letting paper from a continuous roll pass through such a solution, and then between flannel to absorb the surplus. Wax is best dissolved in carbon disulphide, and paper can thus be made ready for use in five minutes. Quite a good plan is to apply the benzine solution of paraffine by means of a sponge.

(15) S. L. asks if there is any chemical or mechanical means for repolishing glass after being scratched? A. Slight scratches may be partially polished out by rubbing the part with rouge wet with water upon a piece of soft leather. If it is a deep scratch, it will have to be ground out with the finest flour emery, such as is used by opticians, and the spot polished with rouge and water upon a piece of soft leather. If you have much of this kind of work to do, it will save time to set up a buff wheel made of wood, and grind out the scratches with fine pumice stone and water. Then polish with a felt buff and rouge with water.

(16) A. S. M. asks: Do locomotives ever work up to 100,000 horse power on the road? A. No. What is the highest power ever developed by locomotives? A. About 800 horse power.

(17) J. E. asks: 1. For a test for determining the presence of sulphuric acid in a liquid? A. Barium chloride gives a white precipitate with sulphuric acid. 2. Is there any other chemical that will change starch into sugar? A. Any dilute acid.

(18) F. asks: The best cement for small pieces of ore on wood or metallic substances; have tried glue and whitening mixed.

- A. Starch 2 drachms.
White sugar 1 ounce.
Gum arabic 2 drachms.
Water q. s.
Dissolve the gum, add the sugar, and boil until the starch is cooked.

(19) A. L. H. asks what the composition used in common friction matches is.

- A. Fine glue 2 parts.
Water 4 "
Phosphorus 1/4 to 2 "
Potassium chlorate 4 to 5 "
Powdered glass 3 to 4 "
Red or white lead or snail sufficient to color.
For complete information consult Dussauce, Practical Treatise on the Fabrication of Matches, etc. SUPPLEMENT No. 31 contains a good account.

(20) G. A. B. asks: Is there not a method of hardening and tempering shears and scissors (both solid steel and steel laid blades) in water without their water cracking or becoming too hard to work, which is preferable to hardening and tempering in oil? If so, please give directions for doing same. If, in your judgment, oil is best, please give the best mode of using it. Is there anything better than oil or water for the purpose? If so, what and how used? A. Shears, if made of low steel, such as shear or double shear or even of American spring steel, should not water crack if properly treated. We fear that you heat them too hot and throw them into the water in any way most convenient. There is probably no better way than, first, to test the hardening quality of the steel by a few trials of the lowest heat that it will harden in water at 70°, or shop temperature. Be careful not to overheat the points, and dip vertically. Oil is preferred by some because it does not chill the steel so quickly as water. If you would like to try the oil hardening, the process is the same as with water, with the same precautions. Use only the best lard oil. If you are making shears and scissors from fine steel, you will probably find all the difficulty in overheating, as fine steel will not stand high heat hardening.

(21) J. H. F. asks: 1. Does the steam pressure on a piston head keep up to a given pressure as the piston recedes, or does it diminish gradually? A. The pressure remains the same if the opening to the cylinder be large enough; but if too small, the pressure will fall. 2. State the differences in a large cylinder and a short crank and a small cylinder and a long crank—that is, as to the comparative power obtained. A. Theoretically there is no difference; practically, the friction would probably be most with large cylinder and short crank.

(22) C. C. writes: In your paper of the 13th ultimo, answering query 41, a receipt is given for waterproofing linen garments. Would the same ingredients and application thereof do for worsted and woolen garments without damaging the texture and color? Or in case you know of a superior receipt, would you oblige by placing it in your columns? Would you please answer: 1. After boiling for a quarter of an hour, you say rinse out. 2. After being in the solution for 6 hours, wring out and wash. Should the rinsing and washing process take place in cold or hot water? A. The following may be tried. Two solutions are prepared. The first, composed of 1 part dry gelatine dissolved in 4 parts of oil, contains a little sulphuric acid. The substances are mingled by the aid of heat, after which about 5 parts of an alkaline solution, 26° B. strong, is added and stirred till cold. To prepare the second solution, dissolve alum, zinc sulphate, and lead acetate in three separate vessels, making each solution of the same degree of density. Mix these in the proportions of 5 parts alum solution, 1 1/2 parts zinc solution, 5 1/2 parts lead solution. After settling, the supernatant liquid is diluted to 1° to 2° B. Textile fabrics are first treated in a bath containing 1/2 fluid ounce of the first solution in 9 quarts of hot water; after draining and drying they are left 8 to 12 hours in the second solution, and gradually dried, which finishes the process. See also SUPPLEMENT, No. 317.

(23) T. A. C. asks: 1. Is the tendency of the time to use high speed engines for increase of power? A. Yes. 2. Will an engine with a driving wheel 3 feet in diameter, running at 300 revolutions per minute, exert more power on the line shaft than an engine of driving wheel of 6 feet diameter making 150 revolutions per minute? A. Yes, because the pressure on the piston is expended on an arm or radius of 1 1/2 feet in the first case and 3 feet in the last. Assuming the pressure on the piston to be the same, the power given out is in proportion to the speed.

(24) J. C. G. asks: What process may be used to the best advantage in coloring meerschaum pipes? If a meerschaum pipe is once burnt, can it be remedied so as to continue coloring afterward? A. When once burnt the pipe cannot be satisfactorily colored, unless the burnt portion is removed and the surface again treated by the process by which meerschaum is prepared. The coloring is produced by action of the smoke upon the oils and wax which are superficially on the exterior of the pipe, and are applied in the process of manufacture.

(25) W. H. W. asks: 1. Where can I get selenium, what it costs, and if it would make a good electric conductor? A. Selenium can be purchased in New York of almost any of the dealers in pure chemicals. Its cost is about \$4.00 per ounce. Its conductivity varies according to the degree of light or heat to which it is exposed, and it conducts electricity better at a higher temperature than at a low temperature. 2. Can white cast iron be magnetized, and how? A. White cast iron can be magnetized if chilled or hardened. It may be charged with an electro-magnet.

(26) C. F. P. asks for a recipe for making shellac varnish that will be a good insulator of electricity. A. Dissolve the best orange shellac in 95 per cent alcohol.

(27) D. S. asks: What can I put on canvas to make it airtight and flexible? A. Boiled linseed oil is generally used for the purpose indicated. In time the oil will take up oxygen from the air, and in that condition it has a rotting effect upon the fabric.

(28) E. M. G. writes: I would like to have some information on "spongy iron," and how made, if you can give any. A. Pure iron may be obtained by heating pure ferric oxide in a current of hydrogen gas. At a strong red heat the metal is obtained in a spongy state. Spongy iron, such as is used for filtering purposes, is simply metallic iron.

(29) A. B. writes: 1. "To lime whitewash add sulphate of zinc." Is this of any value, and if so, how much zinc must I add? A. Zinc sulphate is added to the lime whitewash to prevent it from souring. It acts as an antiseptic. Less than one per cent should be added. 2. Can ice cream be prepared without eggs and without heating? If so, how? A. Ice cream can be made without eggs by using gelatine, but not without heat, as we know of.

(30) G. L. asks: 1. What article contains the largest amount of butyric acid? A. Butyric acid is found in butter and in various animal and vegetable fats. 2. Can you give me a recipe for preserving eggs for five or six months—a cheap and effective one? A. Consult SCIENTIFIC AMERICAN SUPPLEMENT, No. 317.

(31) G. H. B. asks: 1. What is the process of the manufacture of vaseline? A. Vaseline is obtained by distilling off the lighter and more volatile portions from American petroleum, and purifying and decolorizing the residue by treatment with sulphuric acid and potassium bichromate and subsequent digestion with animal charcoal. 2. The process of deodorizing alcohol. A. To deodorize alcohol the following is recommended: To each gallon add an aqueous solution of four to eight grains potassium permanganate, shake well, and add, after five minutes, as much calcium chloride, previously rubbed with a little water. Filter the liquor after several hours, and set it aside for a few days. The alcohol will then have lost its chlorine smell and acquired a peculiar flavor, which, however, depends on the proportions of the permanganate and calcium chloride used. If then distilled, the alcohol may be used as the finest cologne spirit.

(32) C. E. H. writes: I wish to do some brazing, and for this purpose I constructed a fire-pot 8 inches in diameter and lined with fire-brick. This is filled with charcoal and attached to a small blower, in imitation of those used with a portable forge. The parts to be soldered are filed clean and placed in position. The solder is then applied, and borax is used as a flux. The fire is raised to its highest temperature we can obtain before the soldering is attempted; but the difficulty encountered is that the copper pipe which we wish to unite will become red hot and all the flux apparently burnt off without melting the solder, or, at least, melt it very imperfectly. What is wrong, and how can I overcome the difficulty? A. You cannot braze copper pipe with the seam side up without difficulty. The proper way is to clean the edges and wire the pipe with small iron wire at small intervals to keep the edges together. Then brush a borax solution made by rubbing a piece of borax upon a stone with water, upon the outside along the seam, and also upon the inside if the tube is not long. Then place a few pieces of low or common yellow brass upon the inside along the seam, dipping the pieces into the borax solution before putting them in place. Put one piece close to the end that you begin to heat first. Arrange the fire (which should be charcoal) so that you can incline the tube about twenty degrees. Lay the tube into the fire, seam down so as to melt the brass at the upper end first. As soon as the brass begins to flow, gradually draw the tube toward you, looking at the progress of the flow upon the inside, until the brass has flown through the whole length of the seam. If upon examination it is found perfect, take off the wires and boil the tube in a pickle made of one part sulphuric acid to ten parts water, in a copper dish; or, if not convenient, heat the tube nearly red and plunge in the pickle. If places are found not perfect, push a piece of brass and borax solution to the proper place inside and heat as before. Spelter solder that is granulated is made for such uses, and is furnished by most houses that deal in sheet brass and copper, or can be procured at a copper-smith's. A piece of sheet brass, cleaned and clipped with shears, should make good work.

- COMMUNICATIONS RECEIVED.
A Challenge for Scientific Men. By H. C.
Electricity in Gold Mining. By O. H. T.
On Sewage. By S. G. J.
On Storms. By A. W.
On the Protecting Qualities of Snow. By E. G. A.
On Cleopatra's Needle. By T. H. H.
On the Siemens Dynamo. By M.
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On Aerial Navigation. By F. B.
On the Hydrostatic Paradox. By F. S. H.
On the Vienna Electric Exhibition. By A. P. De R.

(OFFICIAL.)
INDEX OF INVENTIONS
FOR WHICH
Letters Patent of the United States were
Granted in the Week Ending
March 27, 1883,
AND EACH HEARING THAT DATE.

[Those marked (r) are reissued patents.]
A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1836, will be furnished from this office for 25 cents. In ordering please state the number and date of the patent desired and remit to Munn & Co., 261 Broadway, corner of Warren Street, New York city. We also furnish copies of patents granted prior to 1866; but at increased cost, as the specifications, not being printed, must be copied by hand.

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