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.

Wanted—Superintendent for six thousand spindle cotton yarn mill. State salary and references Rosalie Yarn Mills Natchez. Miss.

Astronomical Telescopes, first quality & low prices, Eye Pieces, Micrometers, etc. W. T. Gregg, 75 Fulton St., N. Y.

Hotchkiss' Mechanical Boiler Cleaner, 84 John St., N. Y. will keep your boiler free from all sediment or mud · prevents scale; no cost save first. Engineers make 10 per cent selling other parties than employers. Circular on application.

Notice.—Alden Crushers & Pulverizers manufactured & sold only by patentee. Farrelly Alden, Pittsburg, Pa

Use Vacuum Oil Co.'s Cylinder Oil, Rochester, N. Y.

Samples of Asbestos Liquid Paints, Roofing, Roof Paints, Steam Pipe and Boiler Coverings, Steam Packing, etc., will be sent free on application to the H. W. Johns M'f'g Co., 87 Maiden Lane, New York, sole manufacturers of genuine Asbestos materials.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

A perfect Mowing Machine is an absolute necessity to a farmer. The best made is the Eureka. It has the lightest draught, and will cut at least one-third more grass per hour than any other mower. Simple in construction and durable. Prices reasonable Send for illustrated catalogue to Eureka Mower Co., Towanda, Pa

Wren's Patent Grate Bar. See adv. page 397.

Exporters of Machinery for Plantations. Sugar Machinery. Coffee Huller and Cleaners Information and estimates on all classes of American machinery and patented devices. Agricultural Implements and Hardware Jos. H. Adams & Son., 283 Pearl St., New York.

Stereopticon for Sale. See adv. last page.

Steam Cylinders bored from 3 to 110 inches. L. B. Flanders Machine Works, Philadelphia, Pa.

For Sale.—A Berryman Patent Heater, very little used · cost $200; will sell for $50, f. o. b. Davis & Watts, Baltimore, Md.

Every Machinist and Manufacturer in the country should send to G. B. Grant, Boston, for his list of gears.

Wanted—To hear from an Engine and Mach'y Manuf. Co. to whom the services of an energetic young man, with experience and some capital, would be an object. J. B. R., Box 773, New York.

Improved Speed Indicator. Accurate, reliable, and of a convenient size Sent by mail on receipt of $1.50 E. H. Gilman, 21 Doane St., Boston, Mass.

The Mackinnon Pen or Fluid Pencil. The commercial pen of the age The only successful reservoir pen in the market. The only pen in the world with a diamond circle around the point. The only reservoir pen supplied with a gravitating valve; others substitute a spring, which soon gets out of order. The only pen accompanied by a written guarantee from the manufacturers. The only pen that will stand the test of time. A history of the Mackinnon Pen; its uses, prices, etc., free. Mackinnon Pen Co 200 Broadway, New York.

Fragrant Vanity Fair Tobacco and Cigarettes. 7 First Prize Medals—Vienna, 1873 · Philadelphia, 1876; Paris, 1878 · Sydney, 1879—awarded Wm S. Kimball & Co., Rochester, N. Y.

Superior Malleable Castings at moderate rates of Richard P Pim Wilmington, Del.

Wood Working Machinery of Improved Design and Workmanship. Cordesman, Egan & Co., Cincinnati, O.

The "1880" Lace Cutter by mail for 50 cts.; discount to the trade. Sterling Elliott, 262 Dover St., Boston, Mass.

The Tools, Fixtures, and Patterns of the Taunton Foundry and Machine Company for sale, by the George Place Machinery Agency, 121 Chambers St., New York.

Improved Rock Drills and Air Compressors. Illustrated catalogues and information gladly furnished. Address Ingersoll Rock Drill Co., 1½ Park Place, N. Y.

Experts in Patent Causes and Mechanical Counsel. Park Benjamin & Bro., 50 Astor House, New York.

Corrugated Wrought Iron for Tires on Traction Engines etc. Sole mfrs., H. Lloyd, Son & Co., Pittsb'g, Pa.

Malleable and Gray Iron Castings, all descriptions, by Erie Malleable Iron Company, limited, Erie, Pa.

Power, Foot, and Hand Presses for Metal Workers. Lowest prices. Peerless Punch & Shear Co., 52 Dey St., N. Y.

Recipes and Information on all Industrial Processes. Park Benjamin's Expert Office, 50 Astor House, N. Y.

For the best Stave, Barrel, Keg, and Hogshead Machinery, address H. A. Crossley, Cleveland, Ohio.

National Steel Tube Cleaner for boiler tubes. Adjustable, durable. Chalmers-Spence Co., 40 John St., N. Y.

The Brown Automatic Cut-off Engine; unexcelled for workmanship, economy, and durability. Write for information. C. H. Brown & Co., Fitchburg Mass.

Gun Powder Pile Drivers. Thos. Shaw, 915 Ridge Avenue, Philadelphia, Pa.

Best Oak Tanned Leather Belting. Wm. F. Forepaugh, Jr., & Bros., 531 Jefferson St., Philadelphia, Pa.

Stave, Barrel, Keg, and Hogshead Machinery a specialty, by E & B Holmes, Buffalo, N. Y.

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

National Institute of Steam and Mechanical Engineering, Bridgeport, Conn. Blast Furnace Construction and Management The metallurgy of iron and steel. Practical Instruction in Steam Engineering, and a good situation when competent. Send for pamphlet.

Clark Rubber Wheels adv. See page 381.

Downer's Cleaning and Polishing Oil for bright metals, is the oldest and best in the market. Highly recommended by the New York, Boston, and other Fire Departments throughout the country. For quickness of cleaning and luster produced it has no equal Sample five gallon can by sent C. O. D. for $8. A. H. Downer, 17 Peck Slip, New York.

The "Fitchburg" Automatic Cut-off Horizontal Engines The "Haskins" Engines and Boilers. Send for pamphlet. Fitchburg Steam Engine Co., Fitchb'g, Mass.

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

Presses, Dies, and Tools for working Sheet Metal, etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y.

Eclipse Portable Engine. See illustrated adv., p. 382.

The Student's Illustrated Guide to Practical Draughting. By T. P. Pemberton Sent on receipt of price, $1. Address T. P. Pemberton, 5 Dey St., Room 13, New York.

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, importers Vienna lime, crocus etc Condit, Hanson & Van Winkle, Newark, N. J., and 92 and 94 Liberty St., New York.

For Yale Mills and Engines, see page 381.

Wright's Patent Steam Engine, with automatic cut off. The best engine made. For prices, address William Wright Manufacturer, Newburgh, N. Y.

Machine Knives for Wood-working Machinery, Book Binders, and Paper Mills. Also manufacturers of Soloman's Parallel Vise. Taylor Stiles & Co., Riegelsville, N. J.

Rollstone Mac. Co.'s Wood Working Mach'y ad. p. 366.

Steam Engines, Boilers, Portable Railroads, Sugar Mills Atlantic Steam Engine Works, Brooklyn, N. Y.

Blake "Lion and Eagle" Imp'd Crusher. See p. 397.

Apply to J. H. Blaisdell for all kinds of Wood and Iron Working Machinery. 107 Liberty St., New York. Send for illustrated catalogue.

4 to 40 H. P. Steam Engines. See adv. p. 381.

The Chester Steel Castings Co., office 407 Library St., Philadelphia, Pa., can prove by 15,000 Crank Shafts, and 10,000 Gear Wheels, now in use, the superiority of their Castings over all others. Circular and price list free.

Brass & Copper in sheets, wire & blanks. See ad. p. 397.

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

For best Indirect Radiators, see adv., page 397.

Eagle Anvils, 10 cents per pound. Fully warranted.

Gear Wheels for Models (list free); experimental and model work, dies and punches, metal-cutting, manufacturing, etc. D. Gilbert & Son, 212 Chester St., Phila., Pa.

The best Truss ever used: Send for descriptive circular to N. Y. Elastic Truss Co., 683 Broadway, New York.

H. A. Le's Moulding Machines, Worcester, Mass.

Pays well on small investments.—Magic Lanterns and Stereopticons of all kinds and prices. Views illustrating every subject for public exhibitions and parlor entertainments. Send stamp for 116 page catalogue to McAllister, M'f'g Optician, 49 Nassau St., New York.

New Economizer Portable Engine. See illus. adv. p. 397.

For Shafts, Pulleys, or Hangers, call and see stock kept at 79 Liberty St., N. Y. Wm. Sellers & Co.

Wm. Sellers & Co., Phila., have introduced a new injector, worked by a single motion of a lever.

Saw Mill Machinery. Stearns Mfg. Co. See p. 397.

Skinner & Wood, Erie, Pa., Portable and Stationary Engines, are full of orders, and withdraw their illustrated advertisement. Send for their new circulars.

Ore Breaker, Crusher, and Pulverizer. Smaller sizes run by horse power. See p. 397. Totten & Co., Pittsburg.

Bracket Woods.—Wm. E. Uptegrove, Saw Mills, 463 East 10th St., New York, offers to the trade a choice stock of these woods. Send for price list.

Houston's Sash Dovetailing Machine. See ad., p. 397.

NEW BOOKS AND PUBLICATIONS.

LEARNING TO DRAW; OR, THE STORY OF A YOUNG DESIGNER. By Viollet-Le-Duc. Translated from the French by Virginia Champlin. New York: G. P. Putnam's Sons. $2.

A story with a purpose, the purpose being primarily to contrast the conventional method of teaching the art of drawing and incidentally everything else with a method that may fairly be called rational. A secondary purpose of the book is evidently to enforce the important truths that industrial art is worthy of high honor, and that its advancement is not likely to be much helped by would-be cultivators of "high" art, or art for its own sake.

SUNLIGHT AND SHADOW; OR, GLEANINGS FROM MY LIFE WORK. By John B. Gough. Hartford: A. D. Worthington & Co. 8vo, cl., pp. 542. Price (by subscription) $3.25.

Probably no man living has been seen and heard by so many as John B. Gough; and it would be safe to say that no other man living could find ready made so comprehensive and eager a market for the printed story of his life's work. The book is eminently characteristic of the man.

THE UNITED STATES BLUE BOOK; COMPILED FROM OFFICIAL SOURCES. By J. H. Soulé. 75 cents. Washington, D. C.: J. H. Soulé.

A register of Federal officers and employments in each and every State and Territory in the United States, with their salaries and emoluments, with much other information relative to public officers and employments.

THE HOME WORLD. A MONTHLY MAGAZINE FOR THE HOME. Edited and published by Rev. Elijah C. Baldwin. New Haven, Conn. $2 per annum. 8vo, pp. 64. Vol. 1. No. 1.

This new venture proposes to make a specialty of home affairs, cultivating the whole field of home interests, social life, health, domestic comfort and thrift, moral and mental advancement, and the like. It comes with a tidy make up and a wholesome table of contents.

DIAGRAM FOR FINDING DISTANCES AND HEIGHTS. By H. von Bayer, C. E. Washington, D. C. Price 40 cents.

The object of this diagram is to enable seamen to readily and easily make use of the heigbts of prominent coast marks, as commonly set down on sailing charts, in determining their ship's position. It has been approved by the Navy Department and adopted for use on all United States Government vessels. Its simplicity and handiness would seem to make it especially serviceable to our merchant marine.

LYRA BICYCLIA: FORTY POETS ON THE WHEEL. By J. G. Dalton. Boston. Published for the author. Sold by Hall & Whiting, 32 Bloomfield street. 6c cents.

A book of verses anent the bicycle, mostly parodies. Enthusiastic riders of the machine may possibly find some of them amusing.

DIPHTHERIA: ITS CAUSE, NATURE, AND TREATMENT. By Rollin R. Gregg, M. D. Buffalo, N. Y.: Matthews Bros., and Bryant.

Dr. Gregg combats the fungus theory of diphtheria, holding that the supposed bacteria found in diphtheritic exudation are non-living particles of fibrin in various stages of coagulation and disintegration. The fibrin so thrown off is not a cause of the disease, but the result of an effort of the system to expel the excess of fibrin in the blood, an excess brought on by a waste of albumen, the real cause of the physiological disturbance. According to Dr. Gregg, diphtheria is a form of albuminuria, allied to Bright's disease and also to consumption of the lungs, the waste of albumen throwing the constituents of the blood into disproportion, the resulting excess of fibrin, salt, etc., acting poisonously like any other foreign matter in the blood. Where the disease seems to be sudden and violent its malignancy is attributed to the circumstances that the system has previously been subjected to a serious loss of albumen through colds or other causes pr ducing an excessive excretion from mucous surfaces. Local treatment is deprecated, particularly harsh measures likely to irritate the mucous membrane of the fauces. The positive treatment advised is as amazing as the reported results of such treatment. For a virulent "constitutional disease" to yield invariably to single doses of lycopodium, 6,000th potency, or lachesis, 2,000th, is quite miraculous. Yet by following the practice indicated, avoiding all local treatment, young practitioners are assured by Dr. Gregg that they can save all their cases of this terrible disease.

PARACENTESIS OF THE PERICARDIUM. A CONSIDERATION OF THE SURGICAL TREATMENT OF PERICARDIAL EFFUSIONS. By John B. Roberts, A.M., M.D. Philadelphia: J. B. Lippincott & Co.

A valuable monograph on an operation rarely performed and on which very little has been written. A very careful search discovers sixty recorded cases in Europe and America, the table collated by Dr. Roberts giving the name of the operator in each, the date, sex, and age of patient, mode and site of operation, results, etc. The record, Dr. Roberts concludes, fully justifies the adoption of the operation into the family of accepted surgical procedures.

THE SCIENTIFIC ENGLISH READER. By Dr. F. J. Wershoven. Leipsic: F. A. Brockhaus.

In this work Dr. Wershoven has carried out an idea which we should like to see adopted by some intelligent maker of German readers for English students. He has brought together some forty or more selections from standard scientific English writers in the departments of physics, chemistry, and chemical technology, giving in footnotes the German equivalents for all the technical terms and expressions used, and for a large number of related terms. The book thus furnishes a valuable technical vocabulary for English readers of German works of science.

SURGERY IN THE PENNSYLVANIA HOSPITAL. By Thos. G. Morton, M.D., and William Hunt, M.D., with papers by Drs. John B. Roberts and Frank Woodbury. Philadelphia: J. B. Lippincott & Co.

Since the foundation of the Pennsylvania Hospital in 1752, its medical officers have recorded more or less fully nearly all the operations performed, with notes of the more interesting cases received. Since 1873 full clinical notes of all cases have been kept. The vast amount of valuable material thus accumulated has now been digested by the surgeons and physicians of the hospital, and published in handsome style by direction of the liberal managers of the institution. The cases are classified according to their nature; and in many instances the progress made in surgical means and methods, during the period covered by the hospital records, has been critically reviewed. The work is illustrated by nearly a hundred engravings and phototypes. It is a positive addition to the literature of surgery, and is in every way a credit to the institution, the results of whose benevolent work and professional experience it summarizes.

A PRACTICAL TREATISE ON NERVOUS EXHAUSTION (NEURASTHENIA), ITS SYMPTOMS, NATURE, SEQUENCES, TREATMENT. By George M. Beard. Second Edition. New York: William Wood & Co.

The value and timeliness of Dr. Beard's essay are well attested by the call for a second edition within a month after the publication of the first edition. The only novel feature of the new issue is a cleverly written preface giving the author's answer to the question; "What Constitutes a Discovery in Science?"

WAS MAN CREATED? By Henry J. Mott, Jr. New York: Griswold & Co. 8vo, cl., pp. 151.

In this expanded lecture Dr. Mott has endeavored to set forth briefly yet broadly the lines of observation and deduction by which science has arrived at the idea of man as a natural growth. Its title should rather be "How Man was Created," creation being regarded as a slow evolution by natural processes, not as a spasmodic or miraculous exhibition of supernatural power. The publisher's work is well done, and the numerous illustrations have been judiciously chosen.

FIELD ENGINEERING. A HAND BOOK OF THE THEORY AND PRACTICE OF RAILWAY SURVEYING AND CONSTRUCTION. By William H. Searles. New York: John Wiley & Sons.

The author's aim has been: To present the general subject of railway field work in a progressive and logical order; to classify the problems of railway engineering so that they may be easily referred to; to discuss all the main practical questions of railway engineering, avoiding matters non-essential, etc., employing throughout a uniform and systematic notation easily understood and remembered; to express the resulting formula of every problem in a shape best adapted to convenient numerical computation, and to furnish a larger variety of tables especially adapted to the wants of field engineers than has heretofore been published. The manner in which these purposes have been carried out is in keeping with the author's high professional reputation. Many of the thirty odd tables are original, and most of the others have been recalculated or enlarged.

A HISTORY OF THE JETTIES AT THE MOUTH OF THE MISSISSIPPI RIVER. By E. L. Corthell, C.E., Chief Assistant and Resident Engineer during the construction. New York: John Wiley & Sons.

Our high opinion of the purpose and character of the great undertaking which Captain Eads and his associates have brought to successful issue at the mouth of the Mississippi has been repeatedly expressed during the progress of the work. It is gratifying, now that the victory over physical, financial, and professional obstacles has been grandly won, to have the history of the complex struggle so worthily recorded as it is in this volume by Mr. Corthell. Though it appeals directly and professionally to engineers, the work has a wider range of interest and should find a place in the library of every man who cares for the development of the resources of his native land or admires American boldness, energy, pluck, and endurance in the prosecution of works of utility. These attributes of American manhood never had a more commendable object, nor were ever exhibited on a more heroic scale, than in the opening of the Mississippi to commerce.

N. W. AYER & SON'S AMERICAN NEWSPAPER ANNUAL FOR 1880. Philadelphia: N. W. Ayer & Son, Newspaper Advertising Agents. 8vo, pp. 616.

A remarkably well-made catalogue of American newspapers, giving their names, frequency of issue, politics, or other distinguishing features, date of establishment, (approximate) circulation and advertising rates, together with statistics of population, political majorities, etc., of the State, county, and town of publication of each. Special lists are also given of class journals. The catalogue includes 10,674 periodicals, of which the new England States have 818, New York 1,241, other Middle States 1,267, Southern States 1,730, Western States 4,855, Territories 190, Canadian provinces 574.

THE COMPEND OF ANATOMY. FOR USE IN THE DISSECTING ROOM AND IN PREPARING FOR EXAMINATIONS. By John B Roberts, A.M., M.D. Philadelphia: C. C. Roberts & Co.

A concise statement of the more important facts of human anatomy. The descriptions are clear, though necessarily brief, and the matter is well arranged, Gray being followed for the most part.

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) T. W. F. writes: After cutting down a large pine tree I counted 124 rings. How old does this make the tree? Some claim that one, and others say that two rings are made each year, and some that none are made the first ten years in the growth of the tree. A. One ring is formed each year. The tree is 124 years old.

(2) W. H. C. asks: What will dissolve rubber and evaporate readily so that it can be used in mending rubber boots? A. Cut the rubbber, gum rubber (common vulcanized rubber cannot be used), into thin shreds, digest it in a corked bottle with eight or ten times its weigbt of warm benzole. Shake the bottle occasionally, and after several hours add more of the solvent if necessary.

(3) C. D. A. asks how to remove the bone from the inside of a buffalo's horn. A. The bone may be loosened by soaking the horn in soft water for some time.

(4) C. G. H. asks: What will remove the stain of nitro-muriatic acid from dark woolen goods. A. Nothing—aqua regia destroys the coloring matter.

(5) G. L. K. asks: In what way can wood be prepared to prevent worms from working in it in salt or sea water? A. Impregnate with creosote water or the "heavy oil" from coal tar distillation.

(6) J. M. asks how rosin oil and spirits of rosin are made. A. Heat the rosin in a metal retort provided with a large condenser. The rosin yields about 74 per cent of liquid distillates. The first portions are yellow, strong smelling, and mobile, called essence of rosin or rosin spirit. Later in the distillation a viscid fluorescent oil (pinolin) passes over. This is called rosin oil.

(7) J. F. asks how steam gauge dials are plated, and what kind of black cement is used in filling the figures. A. Electroplate with silver and immerse for a few moments in a mixture of equal measures of water and nitric acid, to frost; rinse in running water, dry in hot sawdust, when thoroughly dry use a soft brush to clean and burnish the parts required to be bright. For filling the figure mix fine oil asphaltum with a sufficient quantity of ivory black in impalpable powder,

(8) S. W. P. asks (1) how to toughen a lithogram so that the surface will not peel or rub off. A. Use less water and more glycerine, or expel the excess of water by heating for some time over the water bath. 2. Is there auy chemical which will aid in removing the writing? A. No chemical aid. Try the addition of a small quantity of soap to the composition.

(9) S. F. S. asks how to treat sails so that they will not mildew. A. Impregnate with strong hot soap suds, press out the excess, and immerse in strong alum water or in weak lead acetate solution, rinse and repeat the soap, if necessary.

(10) E. S. F. asks for a receipt for making a green ink. A. Dissolve one of the soluble coal tar (aniline) greens in hot water to proper shade and add a few drops of clove oil.

(11) E. E. C. writes: We are running a saw mill composed of one 72-inch circular saw, one muley saw, one gang carrying 42 saws, besides edgers, butting saws, lathe mill, etc. We have seven two-flue boilers, 42 inches by 22 feet; engine, 24x28, running 95 revolutions with 80 to 90 lb. of steam; main driving pulley is eleven feet in diameter. When the saws are all in the cut the mill lags and the motion of the engine drops down as low as sixty. Now, what I want to know is this: can we increase our power by running the engine to 120 revolutions, reducing the diameter of the driving pulley in proportion to offset the increase motion? Can we do it without increasing our boiler surface? How much would the power be increased if such a change were made? A. Your power would be increased in proportion to the increased speed of the engine, provided you have boiler sufficient to maintain the pressure. The demand for steam will also be increased in proportion to the increased speed of the engine.

(12) J. C. writes: Take a given quantity of the atmosphere at its normal pressure, say at 40° Fah., then raise the heat 300°; what would be its volume? or if confined in an air-tight vessel, what pressure would it show on pressure gauge? A. The increase of volume or pressure would be about 1-480 part for each degree of increase of temperature.

(13) M. M. M. asks: 1. Are engineers required to have a license to run an engine in a factory isolated from other buildings, in Iowa? A. It depends upon the law of the State, or municipal regulations, if in a city. 2. If so, is the law requiring it a State or United States law? A. State or municipal. 3. Where and to whom in Iowa must application for a license be made? A. The law should give you this information.

(14) W. H. L. asks: What is the material and how prepared and used, that anatomists use for injecting the veins and arteries of the cadaver to make them stand out bold and clear and appear as if they were full of blood as in life? A. Chloride of zinc, arsenious acid, and mercuric chloride in aqueous solution have been used most successfully.

(15) E. H. B. writes: Some time since the SCIENTIFIC AMERICAN referred to the danger of lead poisoning from the use of improperly prepared "granite ware," and in the manufacture of citric acid. 1. How can I apply some simple test to detect the presence of lead in the juice of acid fruit or vinegar pickles cooked in such ware? A. Mix a small sample of the suspected liquid with some freshly prepared sulphureted hydrogen water (strong). A black precipitate or coloration indicates lead. 2. I have used citric acid in place of lemons very much this summer, but fear it was harmful. In what way would the lead affect the system if present? A. When taken in any considerable quantity it produces violent spasmodic colic.

(16) R. T. asks how to clean the wool on a sheep's skin and how to cure the skin? A. Nail on a board stretched, wool out, and scour with good soap suds and fuller's earth until properly cleansed. Then rinse thoroughly in hot water, and comb. Nail, wool down, stretched taut on a board, rub in plenty of salt, stand in warm place, and finally scrape off the softened inner membrane with a blunt knife. Then rub in plenty of moist alum powder, and let it stand several days or a week in a dry place. Soften, if desired, by rubbing with hot flour paste and the yolks of a few eggs, or with plenty of oil.

(17) J. A. C. writes: I have a piece of ordinary steel, one and a half inches in length, half inch wide, and one-sixteenth inch in thickness. Now, I wish to temper half of its length and not temper the other half. How am I to proceed? A. Harden throughout, then place half of its length in a vise having smooth jaws, or between two heavy blocks of iron, which must touch both sides of the steel. Now temper the protruding end by applying a gas or alcohol flame, or by means of blacksmith's tongs made hot.

(18) J. W. G. writes: 1. I have a battery of two flue boilers set in the usual manner, the furnace walls extending up to the water line. Would it be any advantage to extend the furnace walls higher and let the hot air and gases extend nearly or quite around the boilers before returning through the flues? Wouldn't it to some extent superheat the steam? A. It would tend to superheat the steam, but would be likely to damage the boilers in a short time. 2. My engine is 16x24 cylinder, slide valve cutting off at one-third of the stroke, making 75 revolutions; the exhaust port is cut out what is called line and line. Would it be any advantage to give the exhaust a little lap, and if so, how much? A. You cannot cut off with an ordinary slide valve so short as one-third with advantage. As a rule exhaust lap is not advantageous in a quick running engine.

(19) J. H. C. writes: We have two batteries of boilers, 42 inches diameter, 22 feet long; one battery is covered over the top, the other is not covered; and we have had considerable trouble with this set of boilers cracking the sheets through the seams of the underside or belly of the boilers. I claim it is due to the difference of expansion between the top and bottom of the boilers on account of the top of the boilers being exposed to the air. What are your views? A. We do not think your trouble arises from the difference of expansion, as there are hundreds, if not thousands, so set that are not covered. It is probably due to poor iron, or careless firing when the boilers are cold. Still it is a good plan to cover the boilers

(20) G. W. D. writes: I have an excellent water power with 30 feet head, located 4 miles from a railroad. I propose to utilize it for manufacturing purposes, but find some difficulty in deciding whether to build the factories at the dam, or on the railroad; the latter plan would save the labor and expense of hauling the raw materials—grain and wool—and manufactured goods to and from the depot and mills. I am considering the question of transmitting the power from the dam to the railroad, either by wire rope, compressed air, or electricity, and shall thank you for such light as you can throw upon the subject, whether it would be advantageous, and, if so, which system would be most effective and economical? The ground is perfectly level. A. Of the modes named, wire rope would probably be the cheapest and easiest maintained; although, if you have a surplus of power at the dam, electricity might be used to advantage.

(21) G. E. T. writes: Please state formula for mixing the alloy used in bronze butts, door knobs, and other similar articles of hardware. A. Copper, 89; tin, 8; zinc, 3.

(22) A. A. asks how to remove nitric acid stains from dark clothes. A. Nitric acid, if strong, or if permitted to remain long in contact with the fabric, destroys the coloring matter. Ammonia water, if used immediately after the contact, will prevent this action and restore the color.

(23) L. P. asks (1) how to make a solution to plunge small brass articles in to give them a light red color. A. You might try a bath of thin alcoholic shellac suitably colored with aniline red. We know of nothing that will give the metal itself a bright red color. 2. What is the best lacquer for polished brass and how is it applied? A. 1. Seed lac, dragon's blood, annato, and gamboge, each 4 oz.; saffron, 1 oz.; spirit of wine, 10 pints. 2. Alcohol 1 pint; turmeric, 1 oz. (powder); annatto 2 drs.; saffron, 2 drs.; agitate occasionally for a week, filter and add seed lac 3 oz., and let stand for two weeks with occasional agitation. Keep well stoppered. 3. Is there a cheap way to gild small articles; if so, how? A. If the work is small coat with the lacquer properly thinned, and dry in an oven at about 250° F.

(24) J. D. H. writes: I am engaged in the business of preparing and gilding wooden mouldings, and my preparer is very much troubled with pin holes caused by the formation of small bubbles of gas immediately after the application of each coat of the preparation. I have been told that the addition of a little oil to the mixture (of whiting, china clay, glue, and water) would cure the evil, but this remedy does not seem to be reliable. Any information tending to give relief in this respect will be gratefully received. A. The imperfections are probably due to the sizing used in the first coating. Add to it a few drops of ammonia before using. You will find a good article on the subject, on pp. 301 *et seq.*, Spon's "Workshop Receipts."

(25) J. E. M. asks how to make an analysis of phosphate to find the percentage of ammonia, soluble and precipitated phosphoric acid, insoluble phosphoric acid and potash. A. Consult Fresenius' "Quantitative Chemical Analysis."

(26) W. M. B. asks how to clean and whiten engravings which have become dirty by hanging in a smoky room. A. Moisten with a strong clear solution of chloride of lime until white, then soak in running water. Steep for half an hour in water containing a very little hyposulphite of soda to neutralize any trace of adhering, bleach and dry between bibulous paper under pressure.

(27) C. W. H. asks: How is commercial French mustard prepared? A. The following is M. Lenormand's recipe: Flour of mustard, 2 lb.; fresh parsley, chervil, celery, and tarragon, of each ½ oz.; garlic, 1 clove (or head); 12 salt anchovies (all well chopped); grind well together, add salt 1 oz., grape juice or sugar to sweeten, and sufficient water to form the mass into a thin paste by trituration in a mortar. When put into pots a red hot iron is momentarily thrust into the contents of each, and a little wine vinegar poured upon the surface. 2. Also how is chow-chow made? A. Chow-chow, as usually prepared, is a mixture of various pickles, cucumbers, cauliflower, onions, etc., chopped and mixed with mustard and a small quantity of vinegar.

(28) C. K. L. asks: What is the best and cheapest way to store up or accumulate power? A. Depends upon the purpose; the hydraulic accumulator is the best for many purposes. 2. How can the stickiness be taken from adobe or clay soil so as to make it loamy and easy to plow? A. The addition of sand alone can accomplish this.

(29) G. L. L. asks how to plug leaky boiler tubes. A. If the leak is near the head, fit and drive in a short ferrule; if the leak is in the body of the tube where you cannot bolt a band around it, take it out and put in a new tube.

(30) D. D. asks: 1. How far will a siphon draw water perpendicularly, when there is no limit to the discharge? A. If the pipe is perfectly tight it will draw 20 to 22 feet. 2. How much lower should the discharge end be than the other to get the siphon started after it is filled with water? A. A very small difference in height of the two ends will discharge water, but the greater the difference the greater the quantity discharged in a given time.

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

G. D. M.—1. An impure clay—some of this would probably make good brick. 2. Kaolin containing much silica and some lime carbonate—useful in the manufacture of pottery. They are of sedimentary origin, not suitable for building purposes. Consult Dana's Geology.—A. C. R.—It is composed chiefly of infusorial silica—not derived from any mill waste.—A. F. McC.—The rock contains no precious metals.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

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

November 23, 1880,

AND EACH BEARING 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 1866, 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. 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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From November 16 to November 19, 1880, inclusive.

File holder for letters, W. Downie, Chicago, Ill.
Firearms, D. Kirkwood, Boston, Mass.
Generators for hydrocarbon engines, I. R. Blumenberg, Washington D. C.
Glaziers' tacks, G. W. Hubbard, Windsor, Vt.
Heat, generating, B. N. Huestis, Phelpstown, N. Y.
Lamps, W. B. Robins, Cincinnati, Ohio.
Lamps, W. B. Robins, Cincinnati, Ohio.
Paper folding machinery, L. C. Crowell, New York city.
Ships, H. K. Carter *et al.*, Camden, N. J.
Wagons, apparatus for dressing arms of, R. R. Miller, Plantsville, Conn.