

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.

Chard's Extra Heavy Machinery Oil.
Chard's Anti-Corrosive Cylinder Oil.
Chard's Patent Lubricene and Gear Grease.

R. J. Chard, Sole Proprietor, 6 Burling Slip, New York.

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.

OFFICE CITY WATER WORKS, CINC., O., April 16, 1880.
I take pleasure in stating that of all the coverings now in use at City Water Works, embracing 5,000 square feet of various kinds, the H. W. Johns Asbestos Air Chamber Covering is by far the best, not only in efficiency, but also in durability and lightness.

(Signed) THOM. H. RYON, Assist.-Engineer in charge.
H. W. Johns Mfg Co., 87 Maiden Lane, New York, sole manufacturers.

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

Money to Invest in Manufacture; Box 1084, Batavia, N. Y.

Wanted—A man competent to take charge of the Metal Working Department of a large Manufactory. He must be energetic, quick, and inventive, as well as practically familiar with the best methods of press and die work, particularly in brass. Answer, stating qualifications in detail, as well as name and references, which will be received in confidence. R. S. & Co., Box 73, N. Y.

Wanted.—A few good Wood Turners wanted to work on Gauge and waymth Lathes. One competent to superintend shop. Good wages and steady employment. Winter & Ball, cor. Grove and 13th Sts., Jersey City, N. J.

Wanted—Metal Pattern Makers accustomed to small work. Ad. St. Louis Malleable Iron Co., St. Louis, Mo. Engines. Geo. F. Sheild, Waltham, 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.

Wiley & Russell Mfg Co. See adv., p. 333.

Among the numerous Mowing Machines now in use, none ranks so high as the Eureka. It does perfect work and gives universal satisfaction. Farmers in want of a mowing machine will consult their best interests by sending for illustrated circular, to Eureka Mower Company, Towanda, Pa.

Brass & Copper in sheets, wire & blanks. See ad. p. 364.

Wanted—A Man as Superintendent and Foreman of Machine and Foundry (N. Y. State). Manufacturing a specialty. Good business and mechanical ability required. Giving antecedents, references, and salary desired. Address Iron, P. O. Box 255, New York City.

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

The Inventors Institute, Cooper Union Building, New York. Sales of patent rights negotiated and inventions exhibited for subscribers. Send for circular.

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 E. Stebbins Manuf'g Co. (Brightwood, P. O.), Springfield, Mass., are prepared to furnish all kinds of Brass and Composition Castings at short notice; also Babbitt Metal. The quality of the work is what has given this foundry its high reputation. All work guaranteed.

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.

Eagle Anvils, 10 cents per pound. Fully warranted.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 349.

Packing once tried always used. Phoenix Packing from 1-16 up in spools or on coils. Phoenix Packing Company, 108 Liberty St., 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., Pittsburg, Pa.

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

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

Power, Foot, and Hand Presses for Metal Workers. Lowest prices. Peerless Punch & Shear Co., 53 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 Hoghead Machinery, address H. A. Crossley, Cleveland, Ohio.

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

For Mill Mach'y & Mill Furnishing, see illus. adv. p. 349.

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.

Light and Fine Machinery to order. Foot Lathe catalogue for stamp. Chase & Woodman, Newark, N. J.

For Separators, Farm & Vertical Engines, see adv. p. 349.

For Patent Shapers and Planers, see illus. adv. p. 349.

Best Oak Tanned Leather Belting. Wm. F. Forepaugh, Jr. & Bros., 581 Jefferson St., Philadelphia, Pa.

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

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

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 348.

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.

Peck's Patent Drop Press. See adv., page 333.

Reed's Sectional Covering for steam surfaces; any one can apply it; can be removed and replaced without injury. J. A. Locke, Agt., 32 Cortlandt St., N. Y.

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 sent C. O. D. for \$8. A. H. Downer, 17 Peck Slip, New York.

Blake "Lion and Eagle" Imp'd Crusher. See p. 333.

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

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 349.

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.

Sheet Metal Presses, Ferracute Co., Bridgeport, N. J.

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

Saw-Mill Machinery. Stearns Mfg. Co. See p. 333.

Portable Railroads. Sugar Mills. Horizontal & Beam Steam Engines. Atlantic Steam Engine Works, B'klyn, N. Y.

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

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.

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

For Superior Steam Heat. Appar., see adv., page 364.

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.

Houston's Four-Sided Moulder. See adv., page 366.

A profitable business for a person with a small capital. Buy a Stereopticon or Magic Lantern, and an interesting assortment of views. Travel and give public exhibitions. For particulars, send stamp for 116 page catalogue, to McAllister, Mfg Optician, 49 Nassau St., N. Y.

New Economizer Portable Engine. See illus. adv. p. 366.

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

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.

Ore Breaker, Crusher, and Pulverizer. Smaller sizes run by horse power. See p. 365. Totten & Co., Pittsburg.

Vacuum Cylinder Oils. See adv., page 365.

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

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

Comb'd Punch & Shears; Universal Lathe Chucks. Lambertville Iron Works, Lambertville, N. J. See ad. p. 285.

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) A. R. writes: I wish to make an electro-magnet capable of sustaining from 100 pounds to 125 pounds weight. A. To form the core bend a piece of soft, round iron, one inch in diameter and two feet long, into the form of the letter U; on each of its arms slip a spool or coil of insulated wire, three inches in diameter and about eight inches long, formed by winding No. 16 copper wire, cotton insulation, on a mandrel or shaft of round iron, one inch in diameter and one foot long, wrapped with four layers of foolscap paper. As each layer of insulated wire is wound on the mandrel it should be brushed over with hot glue, and when the spool is thus wound, and the glue between each layer of wire is thoroughly dry, then the mandrel is knocked out of the spool. Wind each spool in the same direction, and when the spools are slipped on the

core, connect the inside end of one spool of wire with the inside end of the other spool of wire; this will leave two ends of wire, which are to be connected with the poles of a battery of six Bunsen cells.

(2) H. asks: How can nickel be stripped from a piece of Britannia ware without injuring the surface of the latter? A. Nickel cannot readily be stripped from such an alloy cleanly. You may try a bath composed of a strong hot solution of an alkaline nitrate acidified with oil of vitriol. Dip, and rinse well in water; repeat if necessary.

(3) M. C. asks: What is the best steel for magnets? A. That will depend somewhat on the style of magnet that is to be made. For permanent horse-shoe magnets, the German spring steel is generally preferred. 2. To what degree should it be tempered? A. Leave it hard, especially at the ends.

(4) E. B. S. asks: How can I put up a sand battery? A. Make a water-tight box of about 1 cubic foot capacity, out of sheet lead one-sixteenth of an inch thick, and nearly fill it with clean white sand moistened with a solution of sulphate of copper. The lead box forms the positive pole of the battery, and a plate of zinc buried in the sand forms the negative pole.

(5) C. B. W. asks: 1. What should be the focal length of a 2½ inch objective for an astronomical telescope? A. From 36 to 44 inches. 2. How can I construct an astronomical eyepiece? A. See SUPPLEMENT, No. 252, for full instructions for constructing small telescopes.

(6) W. R. A. asks: How can I refill the porous cells of a Leclanche battery? A. Hold the top of the porous cup in a gas flame until the pitch with which it is sealed is softened, then draw out the carbon plate, and refill the cup with granulated black oxide of manganese and coarsely powdered gas coke, in about the proportion of five parts of the oxide of manganese to one of gas coke.

(7) McK. & Co. ask (1) how to make a waterproof paste to stick silk on silk. A. Macerate virgin rubber (caoutchouc) cut into finest shavings with about ten times its weight of pure benzole in an open-mouthed bottle set in hot water (away from fire); shake occasionally and add more benzole, if necessary, until a perfect soft union is obtained. The cement should not be used in excess—in such quantity as to delay its drying. 2. Where can I buy diamond cutting tools and machinery? Where can I get a young man as jeweler and diamond cutter and setter? A. An advertisement in Business and Personal column would no doubt procure the information you require.

(8) W. E. H. asks: Can you describe a simple inexpensive way to prepare oxygen for inhalation? Also plan for inhaling instrument such as may be made by any handy workman? If so, you may enable many rural physicians to test the efficacy of oxygen in catarrh and in pulmonary affections. A. Mix pure crystallized potassium chlorate with about one-quarter its weight of pure black oxide of manganese, and heat the mixture in a copper retort, with large delivery tube, until the gas begins to come over. Conduct the gas through a large empty bottle (to avoid accident by back pressure), then through a strong solution of iron sulphate (copperas), and then through an iron tube several feet in length, filled loosely with fresh quicklime in granular lumps (free from dust). Collect in a rubber bag. An ordinary mouth piece answers well enough if the air from the lungs is expelled through the nostrils, or so as not to contaminate the contents of the bag. The heat should be continued under the retort with caution to avoid too rapid a disengagement of the oxygen until no more gas comes over.

(9) C. H. C. asks: Does the area of the base or bottom of a cistern have anything to do with the pressure of the contents on the sides of the same, or, in other words, does not the pressure on the sides of a cistern depend entirely on the depth of the contents and not on the cubical contents of the same? A. The pressure per square foot depends entirely on the depth of the water.

(10) C. W. Y. writes: We have a quantity of silver and of gold solution, made the usual way with cyanide of potassium. 1. Is there a cheap way of precipitating the metals so that we can use them? A. Precipitate the silver solution with excess of caustic soda or carbonate of soda; wash, dry, and heat the silver cyanide mixed with borax glass nearly to whiteness in a small blacklead crucible. Make the gold bath distinctly acid by adding sulphuric acid (out of doors to avoid inhaling the poisonous gas given off), then add an excess of sulphate of iron in strong aqueous solution to precipitate the gold. Collect the precipitate gold on a filter, wash with hot water, and fuse in a small crucible with borax glass as in the case of silver. 2. Is there some way that we can prepare the solution to apply with a sponge like the ordinary washes for cheap plating? A. We know of no way of using the bath as suggested. 3. How can we make a cheap battery so as to use our solution, provided it cannot be precipitated without too much expense? The solution is so rich that any bright clean metal will be plated over in a few minutes. A. See Nos. 157, 158, and 159. SCIENTIFIC AMERICAN SUPPLEMENT, for descriptions of batteries.

(11) C. U. F. asks for the best preparation of whitewash that will stand the storms and time (for outside of buildings). A. For brickwork exposed to damp take one half peck well burned quicklime, fresh from the kiln, slake with hot water, enough to reduce it to a paste, and pass it through a fine sieve; add a gallon of clean white salt which has been dissolved in a small quantity of boiling water, and a thin smooth paste, also hot, made from 1 lb. fine rice flour; also ¼ lb. best white glue, made in the water bath. Mix together, stir well, add ¼ lb. best Spanish whiting in 5 quarts boiling water, stir, cover over to retain heat and exclude dust, and let it stand a week. Heat to boiling, stir, and apply hot. The above proportions will cover 40 square yards. 2. Also the best way to refine older for family use? A. See pp. 394 (7) and (15), Vol. 39, and 209 (24) and 28 (46), Vol. 38, SCIENTIFIC AMERICAN.

(12) J. W. McF. asks: 1. Of what is the wax composed that is used by electro-platers for building

up card stands, etc., when the top has an uneven edge, so that when gold plating (the inside, the solution will cover the whole surface? A. Resin, 3 oz.; beeswax, 2 oz.; sweet oil, q. s. to soften. Heat together in a small dish, stir with a stick, pour into cold water, and work it well with the hands. Should it get brittle more oil must be incorporated. 2. I have a scarf pin that is made of oxidized silver. Can you inform me how it is done? A. Dip the clean silver into aqueous solution of an alkaline sulphide, or expose it while moist to the action of sulphureted hydrogen.

(13) G. A. L. asks: How can the mottled coating seen on new gun barrels be reproduced, or what ingredients are required to make a preparation suitable for browning them, and which will be harmless to the iron? A. 1. Mix powdered chloride of antimony into a thin creamy paste with olive oil, adding a few drops of nitric acid. Warm the metal, cover its surface uniformly with this paste, and let it stand until properly browned. 2. Nitric acid, ½ oz.; spirit of niter, ¼ oz.; spirit of wine, 1 oz.; sulphate of copper, 2 oz.; tincture chloride of iron, 1 oz.; water, 40 oz. 3. Sulphate of copper, 1 oz.; water, 20 oz.; spirit of niter, 1 oz. The blue vitriol is dissolved in the hot water, and the solution cooled before the other ingredients are added. The browning and marking is effected with the burnisher and scratch brush, the polishing with a piece of smooth hard wood. Lacquer with thin alcoholic shellac and use the wood polisher again. The metal in the first place must be chemically clean.

(14) A. C. L. asks: Will you please inform me what kind of cement is used in cementing rubber rolls as used in clothes wringers, and how applied? A. See answer to McK & Co. on this page.

(15) A. F. B. asks: Can you give me a formula for a composition that will serve as a substitute for vulcanized rubber? I wish to make some dishes for photographic purposes. A. You can use wooden or papier mache vessels coated with a film of gutta percha dissolved in warm benzole. We know of no satisfactory substitute for rubber.

(16) J. H. T. writes: It is claimed that fruit or vegetables of any kind if heated and put into air tight jars or cans will keep without working or spoiling, but I find that green corn is an exception; if there be other exceptions I do not know of them. Can you tell me why green corn is an exception? Also how it is that it ferments when sealed up in airtight cans? I am told that if I put two ounces tartaric acid to every sixteen quarts of corn while cooking and then seal it up it will keep and not ferment. Why is it so? A. The secret lies in thoroughly curing the corn—it requires much longer heating than most vegetables. The natural milk is not removed and tartaric acid is not used. Pack each can as full as possible, seal, and place at once in the boiling water; after it has boiled long enough tap a low hole, and as soon as the air and steam are out seal again with a drop of solder.

(17) "Cavalry Man" asks: Can you give in your paper a receipt for putting a dark blue color to steel? The arms we use are of a dark blue color when we first receive them, but this soon wears off, and I would like to know some method of restoring it. It is only a surface coat, and muriatic acid washes it off so that if you try to impart a blue with muriatic acid it first washes off the color already on and thus necessitates bluing the whole barrel instead of only the spot devoid of color. A. The original color is due to the film of oxide formed on tempering the metal. It cannot well be repaired when injured without reheating the whole piece. A good, though easily injured imitation, for cloaking a worn spot is a very thin alcoholic solution of shellac, colored to suit with a trace of aniline blue—purple.

(18) W. E. J. asks: 1. Will two currents, one positive and one negative, traveling over the same wire and in the same direction, neutralize each other? A. Yes. 2. Is there any way by which two magnets may be arranged so as to be acted on independently over one wire? A. Yes. See Duplex and Quadruplex Telegraphy in "Prescott's Electricity and the Electric Telegraph."

(19) S. B. M. asks (1) how to make impression paper different colors. A. We refer you to SCIENTIFIC AMERICAN, Vol. 40, page 187 (23). 2. How to ebonize wood. A. See SCIENTIFIC AMERICAN, Vol. 40, page 91 (18). 3. The proper position of eccentric for the crank pin on an engine. A. It should be set ahead of the crank pin; but how much will depend upon the valve and valve gear; it should be sufficient to give one-sixteenth to three-sixteenth inch opening of valve when the crank pin is on the center, depending upon the rise and velocity of the piston.

(20) G. H. E. asks: 1. Do polarized armatures lose their magnetism soon? A. With fair usage, no. 2. Is their use to be commended as to practical efficiency? A. Yes; they are largely used in telegraphy and in telephone calls.

(21) C. W. B. asks: 1. Which is better for the drive wheel of a foot power scroll saw, an iron or wooden wheel? A. Iron is best, but wood answers a good purpose. 2. Is it better to have a tight balance wheel on the shaft that drives the saw? A. Yes.

(22) A. L. E. asks how to find the circumference of a circle, the diameter being given. A. Multiply the diameter by 3.1416.

(23) G. B. C. asks (1) for an amateur telegraph line, one-half mile in length, five stations: what size of wire? A. No. 2 galvanized iron wire will answer. 2. How many Leclanche cells? A. Five to each station. 3. How much and what size of insulated wire on each pair of spools of sounders. A. Use 8 or 10 layers of No. 24 silk covered copper wire, taking care to have nearly the same amount of wire in each magnet.

(24) G. H. asks how to blue wire such as used in manufacturing hair pins, also fish hooks, etc. A. Dip them in a lacquer composed of a good quality of alcoholic shellac varnish to which has been added a little aniline blue.

(25) J. W. H. asks: Will a saw that is run by water power run any stronger at night than in the day? A. No. 2. Will pure steam from the upper part of a steam boiler when let out scald, if no water comes with the steam? A. If of sufficiently high pressure it will not scald near the outlet.

(26) H. R. asks: How are Bourdon springs for pressure gauges manufactured? A. The tube is, we believe, first drawn with a cylindrical section, like other drawn brass tubes, then given the proper section by either rollers or drawing through another die.

(27) W. S. asks: 1. How can I melt copper, brass, and zinc, and what kind of furnace and heat will I need if I melt copper and zinc together to make brass? How many parts must I have and what kind of flux, or is there any need of flux? For melting, will I have to take an iron ladle or crucible? A. You can melt the metals referred to in a common coal fire. You will require a crucible for copper and brass, but zinc may be melted in an iron ladle. Common brass is composed of copper 3 parts, zinc 1 part. Fine yellow brass, copper 2 parts, zinc 1 part. Melt the copper, then add the zinc. Stir the alloy with a dry wooden rod. A little borax may be used as a flux. 2. On making moulds, what kind of mixture must I take to work nicely and cast well? A. Fine moulding sand is the best for general use.

(28) W. T. K. asks (1) how to connect three steam whistles so that they will all go off at once? A. Have one common steam valve to the 3 whistles. 2. What power is in a cylinder 1 1/4 inch bore and 1 3/4 stroke, at 600 revolutions a minute? A. For rules for calculating horse power of engines, see SUPPLEMENT, No. 253.

(29) J. K. asks: 1. What will prevent a grindstone wearing off in one place more than in another? I have one about 30 inches in diameter, and there is one place that is soft in it and I can't keep it round. A. It is an inherent defect in the stone. We know of no remedy. 2. What power am I using. The pulley I get my power from is 14 inches in diameter, and it makes 250 revolutions per minute with a 2-inch belt. A. About 2 1/4 horse power; possibly 2 1/2, if the belt is run very tight.

(30) D. C. M. asks: 1. How can I measure the power of a telescope or field glass? A. The magnifying power of a telescope is found by dividing the focal length of the objective by the focal length of the eyepiece. 2. How should I proceed to make a sun-glass for a telescope? A. Place a piece of very dark glass over the eyepiece. See SUPPLEMENT 252 for directions for making telescopes. 3. Which is the best for an observatory, a mercurial or an aneroid barometer? A. Mercurial. 4. Where can I procure dynamite cartridges for extracting stumps, and what will be the probable cost? A. Address manufacturers who advertise in our columns. 5. Where can I get a copy of the "Nautical Almanac?" A. From industrial publishers whose advertisements may be found in another column. 6. Who shall I apply to to become a volunteer observer for the U. S. Signal Service? A. Apply to the chief of the Signal Service Bureau at Washington, D. C.

(31) K. E. B. asks: 1. Could I obtain power enough from a 1/2 inch hydrant to run an electric machine five times the size of the cut on first page of SUPPLEMENT, No. 161? Water has good pressure from Worthington engines. A. It depends entirely on the pressure and the size of the pipe leading to the half inch aperture. With a pressure of 40 pounds per square inch you could do it. If you intend making a machine of the size named you should follow Siemens' latest machine, or imitate some of the more recent machines of prominent makers. 2. How does electricity pass from the cores of the magnets to the wire, the wire being insulated on an electric machine? A. It does not pass from the cores of the magnets to the wires. It is evident you do not understand the principle upon which the dynamo-electric machine operates. You should consult some elementary work on physics. 3. Why must the machine given in No. 161 SUPPLEMENT be set on a brass plate? I see other machines rest on iron or wood. A. Any non-magnetic material will do. Iron cannot be used, as it would close the poles of the magnet. 4. Suppose an electric machine will run ten lamps, and I only use one, will my light be any larger from the one than it would when all ten were in use? A. Yes. 5. I understand that electricity does not burn passing through the carbons of a lamp. If so, why should the number of lamps to a machine have a limit? A. Every lamp adds to the resistance of the circuit, and there is a limit to the resistance the machine is capable of overcoming.

(32) J. N. W. asks: Do any of the stars twinkle except the fixed stars? A. All stars twinkle. This phenomenon is due to the constantly varying density of the atmosphere.

(33) R. M. asks how steel watch chains and other small steel articles are polished. A. By tumbling in a wooden cylinder containing leatherscraps and crocus.

(34) C. A. C. asks: 1. How many feet of No. 16 and No. 36 copper wire are required to produce one ohm resistance? A. Of No. 16, American gauge, about 232 feet. Of No. 36, about 2 1/2 feet. 2. What weight ought an electro-magnet to lift if composed of two spools with cores 1 x 3 inches, wrapped with twelve layers of No. 16 cotton-covered copper wire, with ten cells of gravity battery? A. It ought to lift 50 pounds or more. You would get a better effect by making the cores much longer, say 8 inches, and winding the same amount of wire so as to form a coil 5 inches long on the outer end of each core.

(35) J. A. asks: 1. Will you please answer in your next issue of the SCIENTIFIC AMERICAN how can water backs which are full of lime be cleared out? A. There is no practical means, except mechanical means, chipping or the like, that can be of any service. 2. Is any essential part of the locomotive patented? A. Many of the modern appliances to locomotives are patented, but the main parts of the locomotive are old, and may be made without infringing patents.

(36) P. C. N., C. G., W. V., C. W. T., and others ask: 1. For a plain description of how to proceed in order to charge a straight bar of steel with sufficient magnetism to give it the power of lifting four times its own weight. Also, how to proceed with horse-shoe and other forms. 2. The name of the best brand of steel to use (Jessup's, chrome, or black diamond), and why it is the best. How to temper. 3. Is there any gain in allowing the bar to remain under the influence of the current for a long time, or does it receive the full charge instantaneously? In fact, we would like some information on this subject that we can rely upon. A. 1. The quickest and best way to magnetize steel bars is to place them centrally in a suitable coil, and then connect the helix with the wires from a dynamo-electric machine or powerful battery for a few seconds, remembering to break the current before removing the magnet from the coil. If the source of the current is a dynamo machine, the coil should be about 2 1/2 inches long and should consist of 10 or 12 layers of No. 12 magnet wire. If a battery is used, a coil 1 1/2 inches long, composed of 14 or 16 layers of No. 16 magnet wire, will be the best. The internal diameter of the coil should be only large enough to admit the bars easily. A battery of six Grenet elements, each having an effective zinc surface of 30 square inches connected in series, will do the work very well on small magnets; such, for instance, as are used in telephones. Where a number of magnets are to be made at one time the bars may be passed in a continuous line through the coil, always keeping three bars in contact end to end, adding one above the coil before taking one off below. In this manner sixty bar magnets have been strongly charged in ten minutes. Horse-shoe magnets cannot be charged so readily. There are two or three ways of charging them. One way is to place them in contact with the poles of a very strong electro-magnet, removing them after breaking the current; another method is to place each limb of the magnet in a coil adapted to the current to be used, and still another method is to employ a single coil, inserting one pole of the magnet into the coil in one direction, thus breaking the current, and inserting the other pole into the coil from the opposite direction. It is well to remember that the magnet will be very much impaired if the current is not broken before removing it from the coil. The secret of success in charging magnets is to have a strong current. It is impossible to make magnets satisfactorily without this all-important requisite. 2. As to the quality of steel best adapted to this purpose, machinery steel hardened and not tempered answers admirably. For horse-shoe magnets German spring steel is the best. Tool steel answers well if hardened and drawn to a straw color. 3. The steel receives its maximum charge almost instantly. It is useless to allow it to remain under the influence of the magnetizing current more than a few seconds.

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

- A. D. L.—A fair variety of potter's clay.—P. M. C.—An argillaceous lime carbonate.—W. T.—The clay contains a large percentage of alkalis and a little lime phosphate.—C. McG.—It is tourmaline.—H. S.—Zinc sulphide.—G. C. R.—A fair quality of potter's clay.—J. T. C.—Carbonate of lime. Some of the stone would probably make a fair cement.—F. D. H.—Tourmaline.—G. N. J. Titaniferous iron oxide.

COMMUNICATIONS RECEIVED. On Swift's Comet. By W. R. B. Features of No. 9. By W. B. W. On Scientific Discussion. By C. R.

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INDEX OF INVENTIONS FOR WHICH Letters Patent of the United States were Granted in the Week Ending November 9, 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.

Table listing various inventions and their patent numbers, including items like Kettle handle, Lamp, Lasting device, Letter box alarm, and many others.