Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion. If the Notice exceeds four lines, One Dollar and a Half per line will be charged.

How to make Violins—Write J. Ranger, Syracuse, N.Y.

State and County Rights for Sale.—Wilkinson's Liquid Measure. See illustration on page 374 last volume of the SCIENTIFIC AMERICAN. Patented in the United States and Canada. Address J. W. Wilkinson, P. O. box 1301, Meadville, Pa.

Walrus Leather and fine Wool Polishing Wheels; all sizes. Greene, Tweed & Co., 18 Park place, N. Y.

Bookbinder's Stock Cutting Machine. Send for Circular. Frank Thomas & Co., Home St., Cincinnati, O.

A rare opportunity for a good practical man.—On accomodating terms a onehalf or whole interest in Machine and Repair Shop. J. A. Campbell, Farmington, Iowa.

Manufacturers of friction clutches, please send cuts and prices to Wiles, Adams & Co., 13 and 15 Union street, Troy, N. Y.

A Good Chance.—$2,500 will buy right of Talley's Liquid Vent and Automatic Bung Vent. J. Talley, Kansas City, Mo.

Three plain Cylinder Boilers, 34 in. by 35 ft.; Domes, 24 x 24 inches; in good condition; very cheap. Wilson & Roake, 261 Front street, New York.

New and Improved Butt Machinery. Patterns and Fixtures for sale for making Cast Iron Butts. Will be sold at a great bargain. Address, Box 123, Phillipsburg, N. J.

34″ x 17 ft. Lathe, $400; 16″ do., $175; 15″ do., $150. 4 ft. Planer, $275. 18″ Drill, $150. At Shearman's, 132 N. 3d St., Philadelphia, Pa.

For Engine Lathes and Iron Planers, send for Illustrated Catalogue and Price List to Ames Manfg. Co., Chicopee, Mass.

Small Fine Gray Iron Castings a specialty. Soft and true to patterns. A. Winterburn, 16 De Witt St., Albany, N. Y.

Linen Safety Hose, all sizes, at lowest rates. Greene, Tweed & Co., 18 Park place, N. Y.

Wanted—Second-hand 12 in. Lathe. Address, 101 Laramie City, Wyoming Territory.

Wanted—A complete machine to make Wire Hair Pins. Reply to T. J. Goff, West Oakland P. O., Cal.

For Sale Cheap.—Two Patents. Combined Tea Kettle and Steamer, and combined Foot Scraper and Wiper. Address J. A. Worley, Cleveland, O.

West's New Yankee Tire Setter. Sets them cold on the wheel. Shrinks all around alike. J. B. West, Rochester, N. Y.

For Sale.—One Spinning Lathe. Good as new. Address White Sewing Machine Co., Cleveland, O.

Reliable Oak Leather and Rubber Belting. A specialty of Belting for high speed and hard work. Charles W. Arny, Manufacturer, Phila., Pa. Send for price lists.

Shaw's Noise-Quieting Nozzles for Escape Pipes of Locomotives, Steamboats, etc. Quiets all the noise of high pressure escaping steam without any detriment whatever. T. Shaw, 915 Ridge Ave., Philadelphia, Pa.

For 13, 15, 16, and 18 in. Swing Screw-Cutting Engine Lathes, address Star Tool Company, Providence, R. I.

For Sale.—Second-hand 4 Sided-Moulder, with about 300 knives; good as new; price $500. T. R. Bailey, Agt., Lockport, N. Y.

John T. Noye & Son, Buffalo, N. Y., are Manufacturers of Burr Mill Stones and Flour Mill Machinery of all kinds, and dealers in Dufour & Co.'s Bolting Cloth. Send for large illustrated catalogue.

Electric Gas Lighting Apparatus, applied to public and private buildings. The latest improvements. A. L. Bogart's patent. Address 702 Broadway, N. Y.

Removal.—Fitch & Meserole, Manufacturers of Electrical Apparatus, and Bradley's Patent Naked Wire Helices, have removed to 40 Cortlandt St., N. Y. Experimental work.

Power & Foot Presses, Ferracute Co., Bridgeton, N. J.

For Best Presses, Dies, and Fruit Can Tools, Bliss & Williams, cor. of Plymouth and Jay Sts., Brooklyn, N.Y.

Lead Pipe, Sheet Lead, Bar Lead, and Gas Pipe. Send for prices. Bailey, Farrell & Co., Pittsburgh, Pa.

Hydraulic Presses and Jacks, new and second hand. Lathes and Machinery for Polishing and Buffing metals. E. Lyon & Co., 470 Grand St., N. Y.

Solid Emery Vulcanite Wheels—The Solid Original Emery Wheel—other kinds imitations and inferior. Caution.—Our name is stamped in full on all our best Standard Belting, Packing, and Hose. Buy that only. The best is the cheapest. New York Belting and Packing Company, 37 and 38 Park Row, N. Y.

Steel Castings from one lb. to five thousand lbs. Invaluable for strength and durability. Circulars free. Pittsburgh Steel Casting Co., Pittsburgh, Pa.

For Solid Wrought iron Beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

Split-Pulleys and Split-Collars of same price, strength and appearance as Whole-Pulleys and Whole-Collars. Yocum & Son, Drinker st., below 147 North Second st., Philadelphia, Pa.

Skinner Portable Engine Improved, 2 1-2 to 10 H. P. Skinner & Wood, Erie, Pa.

All nervous, exhausting, and painful diseases speedily yield to the curative influences of Pulvermacher's Electric Belts and Bands. They are safe and effective. Book, with full particulars, mailed free. Address Pulvermacher Galvanic Co., 292 Vine St., Cincinnati, Ohio.

To Clean Boiler Tubes—Use National Steel Tube Cleaner, tempered and strong. Chalmers Spence Co., N.Y.

Territory, on a Useful Household Article, given away free. Address Ezra F. Landis, Lancaster, Pa.

More than twelve thousand crank shafts made by Chester Steel Castings Co. now running; 8 years' constant use prove them stronger and more durable than wrought iron. See advertisement, page 14.

Emery Grinders, Emery Wheels, Best and Cheapest, Hardened surfaces planed or turned to order. Awarded Medal and Diploma by Centennial Commission. Address American Twist Drill Co., Woonsocket, R. I.

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

Reliable information given on all subjects relating to Mechanics, Hydraulics, Pneumatics, Steam Engines, and Boilers, by A. F. Nagle, M.E., Providence, R. I.

Notes & Queries

J. H. T. and J. E. F. can calculate the sizes of change pulleys by the rule given on p. 138, vol. 34.—C. P. H. can fasten emery to steel by first painting the steel with white lead in linseed oil, letting it dry, and then coating with a thick solution of best glue.—S. W. will find directions for transferring engravings to wood on p. 138, vol. 30.—G. N. M. will find particulars of the screw threads on iron gas pipe on p. 378, vol. 32. As to galvanizing iron, see p. 315, vol. 36.—R. M.'s question as to well water for drinking and cooking purposes was answered on p. 268, vol. 36.—G. H. will find some information as to raising fish artificially on p. 17, vol. 29. He should address Mr. Seth Green, Rochester, N. Y., as to spawn, etc.—C. L. R. will find directions for making rubber stamps on p. 156, vol. 31.—J. T. L. should know the laws of his State better than we do.—A. F. will find advice as to chicken cholera on p. 395, vol. 30. —G. S. will find directions for making glue on p. 8, vol. 32.—A. K. will find an answer to his query as to drawing a circle touching three other circles on p. 377, vol. 34.—J. P. M. J. will find directions for making a storm glass on p. 75, vol. 30.—I. can cement rubber to brass by painting the brass with oil paint, letting it dry, and then gluing on the rubber.—W. M. M. will find a good recipe for harness blacking on p. 299, vol. 33.—H. H. R. can galvanize iron ferrules by the process described on p. 315, vol. 33.—M. S. F. and many others will find directions for constructing refrigerators on p. 251, vol. 31.—Will J. Y. B., who inquires as to practical locomotive engineering, send his name and address?—F. T. C. should read our articles on granite ironware on pp. 325, 340, vol. 36.—O. H. B. will find directions for skeletonizing leaves on p. 155, vol. 31.—E. will find advice as to corns on the feet on p. 202, vol. 34.—F. M. will find an article on staining wood on p. 323, vol. 36.—A. R. T. will find directions for constructing a filter on p. 251, vol. 31.—D. B. K. will find particulars of the Wisconsin reward, offered for a road engine, on p. 64, vol. 34.—H. S. will find a description of the motion of the wheels of a railroad car on a curve on p. 362, vol. 35.—J. R. G., J. F., H. L., C. H. F., S. W., A. K., J. P. L., N. F., J. R. B., S. S., J. B. O., N. W. K., J. C. B., C. G., J. G., O. M., and others, who ask us to recommend books on industrial and scientific subjects, should address the booksellers who advertise in our columns, all of whom are trustworthy firms, for catalogues.

(1) J. B. says: For the benefit of J. K. W. (No. 21, June 9, 1877), I would say that water cannot be sucked through a pipe faster than the head (in this case the atmospheric pressure) will drive it; to attempt more will part the water rope, if we may so call it; and when the parting reaches the pump, the latter being relieved of its load, the whole working force of the steam will be expended upon the engine alone; hence the high velocity attained when the break has been effected. J. K. W. may find, either by calculation or experiment, the velocity with which the water will travel through his suction pipe by the head which he now has; if that rate of travel does not supply him with sufficient water, the remedy lies in increasing the diameter of his suction pipe, and not in increased velocity. Cocks or valves will avail him nothing.

(2) J. B. says: The problem involved in No. 21, June 16, 1877, is fully covered by known physical laws. A stream of water acquires its velocity, be it more or less, in obedience to gravity, according to the sharpness of descent and the amount of resistance by friction on its bed. But the surface of a stream of water always has a pitch proportioned to the pitch of its bed. It would therefore be impossible for a log (or anything) to lie on its surface without being impelled by gravity from the higher to the lower part of its surface, just as a ball would travel from the higher to the lower end of a railroad car let loose and traveling down a steep grade. The headway such log will make over the stream must depend upon its fall and the amount of water it displaces in its travel. As there is the least amount of water displaced by the travel of the log when lying lengthways of the stream, and most when lying across the stream. The former position will give its quickest and the latter its slowest rate of travel, which correspond to the raftmen's assertion.

(3) H. W. P. says, in answer to A.'s query as to the speed of rafts in streams: It is because the friction on side and bottom of streams is so great that the center runs one third faster; and the deeper and heavier the raft, if it does not touch bottom, the faster it runs. In ordinary streams there are bayous to be filled by back water, which takes time; a raft also cuts across all bends in rivers, gaining time; and as soon as it strikes the center current again, it takes headway immediately. We used to run out lumber, etc., down a creek by holding the water in large dams, letting it off in a body. A boat starting ¾ of an hour after the dam was cut would overtake the first water in going 9 or 10 miles, that is, it would run ahead of the water so that it would stop in the middle of the stream and wait for water.

(4) R. C. W. asks: Will you please inform me how long cold can be kept up to freezing point by any chemical process without renewing the chemicals, and what chemicals are best for the purpose? A. Your question is somewhat indefinite. It should be borne in mind that cold, as we understand it, is occasioned simply by loss of heat. A body may be kept at a low temperature for an indefinite length of time, provided it be constantly surrounded with a body colder, or at least not warmer, than itself, or provided that it be protected from the possibility of acquiring heat from any source —either by radiation, conduction, or convection. The former is a comparatively easy matter to accomplish, but the latter is rendered difficult, if not impossible, by reason of the difficulty of realizing a perfect non-conductor of heat, and other essentials. In the change of matter from the solid to the liquid or gaseous condition, a definite quantity of heat disappears; and the more rapid this change, the more noticeable the loss of heat. In changing to a liquid, the solid ice may reduce the temperature of immediately surrounding bodies to nearly its own temperature (32° Fah.). If it be mixed in a fine powder with salt, the liquefaction is more rapid and the temperature may sink to 40° below the freezing point of water (8° below zero). Powdered ammonium nitrate, when mixed with just sufficient water at 40° Fah. to dissolve it, sinks the temperature to zero. Four ounces each of potassium nitrate (saltpeter) and ammonium chloride (sal ammoniac), when mixed with 8 ozs. water, will do the same. Finely powdered sodium sulphate (Glauber salt) drenched with strong hydrochloric acid will reduce the temperature 50° Fah., while a mixture of two parts dry snow or fine ice with three parts of powdered calcium chloride will freeze the mercury in the thermometer (mercury solidifies at 40° Fah.). The most intense cold is produced by the volatilization of liquefied gases, such as sulphurous acid, ammonia, nitrous oxide, and carbonic acid. By means of the latter a temperature of − 200° Fah. may be reached. As soon as the change is completed, the cooling action ceases, and of course the body will soon recover its normal temperature by acquisition of heat from the surrounding bodies, unless insulated by means capable of intercepting the heat—conditions which, at best, can be only imperfectly attained. Animal fibers, feathers, charcoal, asbestos, etc., are among the best non-conductors of heat, while polished metals and the like are the poorest radiators. Carré's method of refrigerating water by the promotion of its own evaporation (see p. 82, vol. 33) is perhaps the cheapest and most practical method—not excepting natural ice—for maintaining low temperatures for lengthened periods. On the quantity of material employed and the rate at which the liquefaction is permitted to proceed will depend on the length of time the low temperature may be maintained. This answer applies to several other queries.

(5) P. F. McC. asks: 1. How can sealing-wax be made so that it will set immediately on application, and not adhere to papers coming in contact with it soon after being applied to the matter to be sealed? A. Wax which contains a larger proportion of shellac and less of Venice turpentine hardens more quickly. Try incorporating with it a little more powdered shellac by fusion. 2. Can I use anything else that will adhere as tenaciously as sealing-wax? A. Perhaps a stick of shellac alone would answer the purpose.

(6) S. R. says: 1. I have had used on cuts, scratches, sores, etc., on dumb beasts, zinc variously prepared from chloride, oxide, iodide, phosphate, etc., but I fail to get it prepared so as to be lasting. A solution is soon gone, an ointment lasts but a little longer. A. Do you mean metallic zinc, its oxide, or the salts? Zinc and its inorganic preparations are all lasting. Perhaps we do not get your idea. If you mean that when applied they soon rub or wash off, perhaps forming them into an emulsion with pure gelatin and a little glycerin would obviate the difficulty. 2. In what way can I put a foil or coating, or some other preparation of zinc, on leather so as to have it remain permanent, and so that the leather will remain soft and pliable? A. You can use a thin solution of caoutchouc in coal tar naphtha as a cement.

(7) S. W. asks: How can I make a flexible spirit varnish with such tenacity and pliability as not to be influenced by atmospheric changes? It is intended for finishing leather. A. What is known as spirit copal varnish will best serve your purpose. You will find it described on pp. 59 and 91, vol. 36. We do not know of another spirit varnish that will answer.

(8) F. B. N., and others who ask for a good walnut stain: Boil 1 quart water and add first 1½ ozs. washing soda, and then, a little at a time, 2½ ozs. of Vandyke brown. When the foaming has nearly ceased, add ¼ oz. bichromate of potassa dissolved in a little boiling water; stir well and filter through a cloth. The color may be deepened with a drop or two of Brunswick black, or made of a warmer tone by increasing the amount of water and adding more bichromate of potassa. It should be applied with a brush quickly, and without much lapping; and when dry it takes a good coat of varnish.

(9) E. E. W. asks: How can I make torpedoes such as the boys use on July 4? A. A little fulminate of mercury is the material commonly used, also powdered chlorate of potassa and sulphur. To prepare the fulminate, 1 oz. mercury is dissolved, with the aid of a gentle heat, in 8½ ozs. by measure of nitric acid of specific gravity 1·4, and the solution is poured into 10 measured ozs. alcohol, specific gravity 0·83; action soon ensues, with the evolution of copious white fumes, and the fulminate is deposited in white crystalline grains, which are washed with very cold water and dried at a very gentle heat. The greatest care should be observed in preparing this material, as it explodes with extreme violence when overheated as well as by slight percussion or friction.

(10) A. P. asks: Why is a fillet left in the corner of an axle bearing? A friend claims that the fillet is left on bearing to prevent wear of brasses. I claim that it is left to strengthen axle. A. The fillet is left to strengthen the axle.

(11) S. H. W. asks: 1. How can I make a kaleidoscope? Should the reflecting strips of glass be of uniform width throughout their length, or should they be wider at one end than at the other? A. With ordinary illumination the reflectors may be parallel; but it is better to set them at an angle. The longer the tube the smaller the angle. In a tube 9 inches long, this should be about 8°, allowing ¾ inch diameter for the eye aperture. 2. Is it necessary that the glass should be silvered? A. No; use a black backing, so as to leave only one reflecting surface. 3. How and where should the bits of colored glass be arranged to get the prettiest effect? A. Use a few small, brightly colored, angular, and prismatic pieces of glass, a few small glass tubes containing several drops of colored liquids, and, if the figure is desired to contain curve lines, a few pieces of curved tubing (with or without liquid), and some colored beads. Place these loosely between two pieces of clear glass in a suitable cap, somewhat larger than the opening between the reflectors, and adjust the cap on the large end of the tube so that the light will pass through it. Too much shifting material in the cap will cause the figure to change sluggishly and imperfectly. The space between the glasses in the cap depends somewhat on the size of the glass tubing used, but should not much exceed half an inch.

(12) W. E. B. asks: 1. How can an inexperienced person finish a cane made from cabbage palmetto wood? A. Fill the pores with common oil rosin varnish, and when dry, rub down with fine sandpaper or pumicestone. Then apply a flowing coat of spirit copal or French varnish. 2. Is this finish applicable to orange canes, with the bark on? A. The orange sticks should be smooth and dry. Use a filling of alcoholic shellac, and finish as above.

(13) J. W. S. asks: Can you give me directions for making cupro-ammonium? A. Cupro-ammonium or ammonio-cupric oxide is perhaps most readily obtained by precipitating a strong aqueous solution of sulphate of copper by the addition of ammonia water, filtering off the liquid and dissolving the precipitate in a slight excess of strong ammonia water. If an excess of the ammonia be used in precipitating the copper oxide it will redissolve the precipitate. To be used as a reagent, the cupro-ammonium solution must be concentrated by evaporation.

Is there any substance that will dissolve, not decompose, silk or wool? A. No.

(14) A. A. W. says: Desiring to make a waterproof cloth more reliable for rough usage than rubber, I saturated some cotton goods with linseed oil boiling hot, but failed to make a good waterproof. Can you give me a recipe for making such goods? A. Dissolve in the oil about five per cent of beeswax, and pass through this the cloth previously saturated with a strong solution of acetate of lead and dried perfectly. Instead of dipping the cloth, the oil is often applied with a brush. Alum solution is sometimes used instead of the lead salt.

(15) J. B. H. asks: What is the best method of treating quicksilver, used for amalgamating purposes, in a quartz crushing mill? The base metals in connection with the gold are metallic arsenic, manganese, sulphur, iron pyrites, and white and yellow mundic. A. If we understand you, the best way would be to drive off the sulphur, arsenic, etc., by roasting the crushed ore before introducing it to the amalgamating tubs. The mercury is recovered by distillation from the amalgam in an iron retort, and condensing the mercury vapor in cold water. If the mercury is contaminated with sulphur and arsenic compounds, it may be freed from these by mixing it with a quantity of lime and heating in a close iron retort to about 400° Fah., which drives off the arsenic, and then transferring to a clean retort and distilling off the mercury at a much higher temperature (662° Fah.).

(16) T. says: Some tarletan which I carefully put away last year I find to be full of holes, as though eaten by moths. What insect do you think would eat tarletan? A. Tarletan, which is often dyed with colors requiring an animalization of the fibers (that is, a treatment with gelatin, etc.) in mordanting, is much subject to the depredations of the moth. 2. Of what is tarletan made? It does not appear to be cotton. A. Tarletan is a cotton fabric.

(17) F. W. M. asks: 1. Is a zincograph printed from a perfectly flat surface, as a lithograph is, or is etching necessary in preparing the plate? A. The plate is slightly etched with dilute nitric acid after the drawing is made. 2. If printed from a flat surface, how is the design put upon the plate, and how is it made to adhere? A. In photo-zincography, a flat surface is used. The image on chromate of gelatin paper is washed, inked by passing the ink roller over it, and the lines in fatty ink transferred to the plate by carefully pressing the paper on it. The ink lines adhere to the metal as they do to the stone. 3. Do you know of any substance which will render soluble the bichromate of potash and gelatin waterproofing on paper, without injuring the fiber of the paper? A. This is accomplished, although imperfectly, by alkaline washes.

(18) W. A. V. N. asks: Is there any formula by which I can determine the pressure of steam per square inch in a vessel used to generate steam, but which we regulate by a thermometer, there being no steam gauge attached? A. If your thermometer is so arranged that it gives you the temperature of the steam, you can determine the pressure by reference to a table, or you can calculate it from the formula given on p. 81, vol. 29.

(19) W. B. B. asks: Which will run more easily up hill, a small wheel or a large wheel, on a smooth surface? A. A large one.

(20) B. J. T. says: Some of the ball players say they can throw a ball on a curve to deceive the striker. Some say they can throw the ball in almost a direct line; and as it nears the striker it will diverge, taking a short curve. Is it possible to throw a ball in this manner? A. We have often watched skillful pitchers, but never have seen the action spoken of, and would require something more than mere assertion to make us believe it.

(21) E. J. W. asks: What is the cracking which is frequently heard in steam radiators? A. It is generally due to imperfect circulation, and the presence of air in the pipes.

(22) J. M. says: A party here claims that a boat will draw or sink deeper where the water is shallow than in deep water. Also that it will draw less in the night than in the daytime. I deny the above assertions. A. We think you can do so safely.

(23) G. G. asks: Is the trisection of an angle impossible? If so, why? A. Brande states "that the indefinite trisection of an angle cannot be effected by plane geometry, that is, by means of the straight line and circle, inasmuch as the analytical equation on which it depends rises to the third degree."

(24) W. H. C. says: I wish to build an hydraulic engine, with a cylinder 10 inches in diameter by 12 inches stroke, using a pressure averaging 20 lbs. How many foot pounds would it raise, provided the engine attained a velocity of 100 revolutions per minute? A. Horse power = (pressure per square inch on piston × area of piston in square inches × speed of piston in feet per minute) ÷ 33,000. From this you will see that the power varies directly as the pressure.

(25) H. F. says: I have in one solution sulphate of quinia, sulphate of iron, and phosphoric acid.