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.

Notes & Queries

S. J. S. will find good recipes for laundry soaps on pp. 331, 379, vol. 31. For toilet soaps, see p. 289, vol. 28.—**B. F. T.** will find directions for putting a black finish on brass on p. 362, vol. 25.—**J. C. S.** will find directions for coloring a meerschaum pipe on p. 90, vol. 36.—**A. B.** will find a good recipe for Babbitt metal on p. 122, vol. 28.—**G. A. D.** will find directions for coloring butter with annatto on p. 187, vol. 31.—**L. O. J.** will find something on iceboats sailing faster than the wind on p. 107, vol. 36.—**J. M. L.** will find directions for clarifying cotton seed oil on p. 91, vol. 36.—**D. V.** will find a good recipe for shoe polish on p. 107, vol. 36.—**A. B.** will find directions for japanning on metal on p. 408, vol. 30.—**T. S. D.** will find recipes for all kinds of colored fires on p. 203, vol. 34.—**G. S. C.** can fasten his paper labels to wood with flour paste.—**W. R. B.** will find directions for dyeing billiard balls on p. 88, vol. 34.—**G. W. M.** will find directions for making raisins on p. 59, vol. 34.—**T. F. T.** will find something on burning petroleum in steam boilers on p. 165, vol. 30.—**S. B. U.** will find some illustrations of lathes for turning spokes, tool handles, etc., on p. 88, vol. 36.—**W. E. P.** will find a formula for safety valves on p. 330, vol. 32.—**A. O.** will find directions for removing mildew on p. 138, vol. 27. For mending rubber boots, etc., see p. 203, vol. 30.—**W. C. L.** will find directions for preserving eggs on p. 306, vol. 34.—**R. M. G.** will find a recipe for root beer on p. 138, vol. 31.—**W. F. H.**'s plan for a refrigerator might answer. See p. 251, vol. 31.—**J. C.** can remove the wool from pelts by steeping the skins in water, and hanging them up till the wool putrifies. Then scrape with a blunt knife. For cleansing wool, see p. 6, vol. 32.—**W. H. J.** will find a recipe for a cement for marble on p. 344, vol. 32.—**T. B.** can gild his steel scabbard by following the directions given on p. 106, vol. 34.—**A. H. B., J. A. C., W. H. H., J. F. P., D. S., J. N. H., J. P., F. F., M. N., M. C., R. C., K. S. W., T. J.**, 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) R. H. C. says: We have a slate roof which leaks very much. I have not discovered any defect in the way in which it was put on; it appears to be perfect. The pitch may be too low, and the rain may be driven through by the wind on this account. Is there any wash, paint, or cement that might be used for the purpose of remedying this defect? A. There is an india rubber paint which is used to make leaky roofs tight, but we have not learned of its being applied to slate roofs.

(2) C. C. B. says: I am making a small steam engine. The cylinder has, inside diameter, about 1 inch with 2½ inches stroke. What would be the most suitable material and dimensions for the boiler? A. Make one 10 or 12 inches in diameter and 18 inches high, of ⅛ inch iron. You can carry 60 lbs. steam pressure.

(3) M. C. says: I have had charge of some greenhouses that were erected about four years ago; they are thoroughly heated, and all the pipes have a thick coat of black paint. The houses never gave any satisfaction, no matter how healthy the plants were in the fall. Soon after the fires were lighted both leaves and flowers began to drop, and some plants died. My predecessors attributed it to gas getting into the houses. Upon inquiry I found no gas was there except when the pipes were hot, and that the hotter they were the worse it was. In my opinion, the cause of the trouble was a strong smell of paint from the pipes. Since then I only keep heat enough to save the plants from freezing. A. From your statement there is no doubt that the paint used on the pipes was an imperfectly purified coal tar. Such tar contains a great number of hydrocarbons—naphtha, naphthalen, anthracen, phenol, several organic alkaloids, hydrosulphuric and hydrocyanic acids, etc., all of which are more or less volatile at the temperature to which they must have been subjected. These exhalations have proved fatal to plant life when in sufficient quantity. We do not know of a better remedy than that of removing the cause. Painting the pipes with a strong solution of washing soda and lime would, in a measure, prevent the escape of the most objectionable constituents into the air, by forming with them compounds non-volatile at any temperature to which they are likely to be subjected in contact with the pipes; but the former would be the surest plan.

(4) C. D. W. asks: The roof of the new Illinois State House, as well as the stylobate cornices and upper portion of the dome, are covered with zinc. It has been on about three years, and I am told is materially affected by oxidation. The theory is that zinc, though subject to oxidization, has the peculiarity that the oxide does not scale off as from iron, but forms a permanent coating impervious to the action of the atmosphere. Some mechanics, however, assert that neither zinc, copper, nor lead will withstand the action of our atmosphere, as bituminous coal strongly impregnated with sulphur is almost the only fuel used. It is claimed by some that the sulphurous acid in the atmosphere tends to corrode zinc so as to make it worthless for roofs or gutter linings. A. Are you sure that the roof and gutters in question are not of galvanized iron, iron coated with zinc? This is the material most commonly used for that purpose at the present time. Zinc has been found to be too brittle for the strain to which it is subjected, in such cases, by the expansion and contraction induced by changes of temperature. A slight oxidation will adhere to the surface, but an acid deposit from the atmosphere will penetrate the coating in points and deteriorate the metal.

(5) N. J. S. says: I have a floor of ash and black walnut which has been oiled with raw linseed oil once. How can I finish it so as to get a hard, smooth finish that will not be scratched by boot heels nor be sticky or retain the dirt as a waxed floor does? A. Oil raises the fiber of black walnut and gives it a rougher surface than when free from it. To polish any wood, it is only necessary to fill the pores well, and then rub it down to a smooth surface. Thus painters prefer to put on a coat of shellac varnish first, before oiling walnut and other hard woods. For fine floors, a thin coat of liquid wax is applied as a finish.

(6) A. J. S. asks: What is the best plan for putting up a cheap dry house of lumber, for drying (by steam) white oak, hickory, and other lumber used in wagon and buggy making? A. Make as tight a house as possible with tongued and grooved siding-boards, floors, roof, etc., and provide a stack of steam pipe containing 1 foot of heating surface to every 50 cubic feet of air contained in the building. Set the steam pipe in compact shape and enclose it with a casing of galvanized sheet iron open at the top; supply cold air from outside of the building by a boxed conduit to the bottom of this stack. The air when heated will rise and diffuse itself into the room, and as it cools will fall to the floor; provide registers in the floor, through which it may escape into other boxed tubes under the floor leading to an upright chimney discharging above the roof. Let a smoke pipe from the boiler enter the chimney and extend up inside the flue far enough to heat the same. The change of air is necessary to dry the lumber. The size of the house of course will depend upon the quantity of material required to be stacked up into it at any one time.

(7) G. asks: 1. How do you calculate the amount of pipe of a given size to warm a room of a given size? A. One square foot of plate or pipe surface is generally taken as sufficient to heat about 70 cubic feet of air in dwellings. 2. What allowance should be made for doors and windows? A. The said foot of surface will heat, in accordance with varying conditions, from 40 to 100 cubic feet of air, and allowance should be made for extra exposures, to correspond with that scale. A steam pressure of 5 lbs. is sufficient for heating purposes. 3. What is meant by the terms direct and indirect radiation, in giving capacity of steam generators for heating houses? A. Direct radiation is used when the pipes are located in the room, and indirect when they are located in a chamber in the cellar, to warm air which is conducted to the room by air pipes.

(8) D. M. says: After reading L. S. W.'s reply to J. B. C., p. 75 (6), vol. 36, I think the following demonstration will be more acceptable to J. B. C.: Imagine three spheres of which the given circles are great circles, and a plane tangent to the three spheres. Any two of the spheres may be conceived to have been generated by the revolution of two of the circles about the line joining their centers. During such revolution, the lines tangent to the two circles describe a conical surface. We have, therefore, three spheres and three conical surfaces. Now the plane, which is tangent to the three spheres, is also evidently tangent to the three conical surfaces; and therefore the vertices of those conical surfaces are all in the tangent plane. Now those vertices are the points (1), (2), (3). But the same points are also in the plane passing through the centers of the three spheres, which is the same with the plane of the paper on which the figure is drawn. Those points, being in two planes at the same time, must therefore be in the intersection of those planes, that is to say, in a straight line.

(9) C. W. H. asks: Can dyeing or coloring be done in cold water? A. Many of the coal tar colors may be used in this way: For animal fibers—wool, silk, etc.—the affinity of these colors is so great that, in most instances, no mordants are necessary. The baths are usually made slightly acid. With vegetable fibers, however, a fast dye is not assured without mordanting. Some of the finer goods are prepared by treating with steam coagulated albumen (animalizing), gelatin, various tannates, tin salt, alum, and other metallic salts. The following is the usual method of treatment, except with goods intended for very light shades: Pass the goods though a strong decoction of sumac or other tannin solution for an hour, and afterwards for an hour or two through a weak solution of stannate of soda; wring out, dip into a dilute solution of sulphuric acid, and rinse well in water. The goods are then ready to be passed through the color bath, slightly acidulated. For different tints, these baths are worked at different temperatures.

(10) F. W. says: I wish to lay the face tier of a brick wall in black mortar. How can I make the coloring material and mix it? A. Some prefer to use red mortar and afterwards pencil the joints with black. Color the ordinary white mortar with Spanish brown for red mortar, and with ivory black for black, by mixing in enough of the color in a powdered state to give a good deep tone.

(11) H. A. S. asks: 1. How many prisms are required in a spectroscope to detect mineral elements in presence of all the ash ingredients of organic bodies? A. If we understand you, one 60° prism will answer. 2. What is the best and cheapest form of apparatus to heat such compounds for examination? A. Mix the substance with a little pure hydrochloric acid and glycerin, and introduce into the flame on a coil of platinum wire.

1. Has soup prepared by dissolving meat bones in a Papin's digester ever been known to produce ossification of any of the soft tissues? A. We have never heard of such a result. 2. Has it ever been known to produce a new crop of teeth in toothless persons? A. We have no data as to such a fact.

I have seen a statement that May 19, 1780, was so dark a day that candles were necessary everywhere; and I have heard that another occurred about the year 1820. Has any scientific explanation ever been given of this phenomenon? A. The darkness on the days you mention were the result of solar eclipses. They occurred on days of unusual cloudiness. Perhaps the darkest day in modern history was that caused by the total solar eclipse in the year 1806.

(12) A. B. says: 1. I have built a boat 15 feet long and 4 feet 6 inches wide. How large a boiler and engine do I require to work her to best advantage? She is 22 inches deep from top of rail to top of keel. A. Cylinder, 2½ x 3 inches; boiler, 20 inches in diameter and 3 feet high. Propeller, 18 to 20 inches in diameter, and of 3 feet pitch. 2. How fast ought she to run? A. Probable speed, 5 miles an hour in smooth water.

(13) L. L. asks: 1. Does it make any difference in what position a watch is in when running? A. For watches adjusted to temperature and position, it does not make much difference. 2. When not being carried, what position should it be left in? A. In the case of ordinary watches, we imagine that the wear will be rather more uniform when they are in a vertical position. 3. If a person sleeps in a cold room, would a watch be better under his pillow than on a table or hung up in the same room? A. It is best not to subject them to great changes of temperature.

(14) W. G. says, in reply to C. W. W., who has an engine, of 2½ inches bore and 4 inches stroke, which runs slower with increase of pressure: Having had much experience with small engines and boilers, I will state that I have had the same difficulty when using an upright tubular boiler, and discovered the following to be the cause: The upper portions of the tube superheat the steam to such a degree as to prevent lubrication on the valve and piston surface by condensation, and thereby reduce the speed of engine. Even with increased pressure, this effect will be more appreciable when the area and travel of slide valve are in excess.

(15) J. M. T. asks: Is there friction between two bodies while at rest, or only when one or both are in motion? A. Both when at rest and in motion.

Why does a balloon rise in the air? A. See p. 64, vol. 32.

(16) S. J. S. asks: 1. How are augers twisted? A. By special machinery. 2. How are twist drills made, and are they single or double grooved? A. They are double grooved or double twisted, and are cut out in a milling machine.

Can weights, springs, or water from a tank be used to any advantage to run a lathe? A. No.

How much do iron and brass, in rods or bands, expand in length when heated to red heat? A. Iron about ⅛ inch per foot, brass $\frac{1}{75}$ inch.

Is the pressure of the air to be added to the weight of water in the bottom of a vessel in estimating the pressure on the bottom? A. No.

Does a watch or clock run faster when just wound up? A. No.

Is it not moisture in the air that makes it heavier, and so affects the barometer? A. Yes.

Is the pressure in a siphon equal throughout, or is it greater in the upper end? A. Equal throughout.

Will it take more power to run two millstones in opposite directions than it will to run one at the same speed, the other being stationary? A. Yes, it will take double the power.

1. How are common screws made? A. In lathes, with tools and dies. 2. How can I make wooden screws perfectly smooth? A. By using keen tools.

What is the simplest way of cutting a square hole in a bar of iron? A. Drill a round hole and square it out.

(17) G. E. C. asks: Could I have a brick range 2 x 3 feet, built on a platform about 1 foot from floor, with two compartments, to be heated with petroleum, the lower one to be used as an oven, the upper one to have a stove top to set cooking utensils on, and have a ventilating pipe run from each compartment of the oil receptacles into the place in the chimney where the stove pipe usually goes, to carry away any gas or smoke? I want the oil receptacles to be arranged to be drawn out, to be filled and trimmed, and I would like four burners to heat an oven 22 inches square, as hot as the same oven could be heated with wood. A. We doubt the propriety or the economy of substituting oil for wood, but something may be done to make the atmosphere of kitchens more endurable in summer, and permanently so in warm climates. A double faced range could be made and set in the center of the thickness of the chimney, with the space above the top of it open to the exterior of the house; a very slight structure, simply having a good floor and roof and open around the sides, and built against the chimney as an extension to the house, would answer for a summer kitchen, while the ordinary kitchen inside the house could be used in winter. The transposition could be made by a pair of iron sliding doors shutting off the kitchen not in use; and these doors could be transferred from one side of the chimney to the other when the change of season required it.

(18) A. X. A. says: In your issue of December 2 is a recipe in which "insoluble acid chromate of lime," and gelatin are to be used; and in a succeeding number of your paper the modes of preparing the insoluble acid are given. I have made the acid according to your directions, but the result of my manipulation of the recipe is a failure. You say: "Take of insoluble acid chromate of lime one part, and of gelatin five parts; but you do not say what further is to be done. Will the acid dissolve the gelatin, or must warm water be added? In my experiment the acid would not dissolve the gelatin, and I had to add considerable warm water before it would do so. A. Dissolve the bichromate of lime in the smallest possible quantity of warm water, and filter; then add the gelatin, previously softened by immersion in cold water. Heat the mixture over a water bath until the gelatin is completely dissolved, stir well, and use while hot. The recipe should have stated that this cement was best suited for glassware. The bichromate of potash or of ammonia will answer nearly as well as the lime salt.

(19) E. C. N. asks: How must a stove be constructed to burn pea coal, for heating outbuildings? Is there any way of constructing a draught below the grate of any common heating stove, sufficiently strong to do without an extra long chimney? A. Use a broad grate to spread the coal out well, so as to avoid the necessity of heaping it up much; make the opening for the draft some distance below the grate, and regulate by the usual slide dampers in the lower and upper doors.

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

F. R. R. S.—The substance you send is carbonate of iron. It is held in solution in the water by the large excess of carbonic acid which the water contains. On boiling the water the carbonic acid gas is expelled and the iron salt is precipitated from solution. The removal of this and some other objectionable salts which the water very probably contains, may be removed by the addition of the proper quantity of clear lime water to it—the lime in this instance will combine with the excess of carbonic acid and fall to the bottom together with the carbonate of iron. To determine the precise quantity of lime water requisite, add the reagent (saturated solution) to a small portion (of known volume) of the freshly drawn water, in small quantities at a time, and with constant stirring until no further precipitate forms. Then by a simple operation in proportion the quantity of the reagent necessary for the purification of a given quantity of the well water may be easily determined. An excess of the reagent must be avoided. This impurity would probably prevent the successful working of an injector.

W. S. W. asks: How is the best rosin, used on violin bows, prepared?—**W. F.** asks: What is a simple method for washing clay for brick and tile making?—**E. S. D.** asks: What is the best kind of wood to construct a guitar?

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:

On Rheumatism. By A. R. E.
On Postage Stamps. By E. B.
On Boiler Explosions. By G. B. B.
On Reaching the North Pole. By J. H. S.
On Heating Street Cars. By P. T.
On a Hybrid Fruit. By R. S. B.
On an Air Vessel. By J. T. R.

Also inquiries and answers from the following:

E. B. M.—**F. F. F.**—**N. B. H.**—**B. B.**—**O. F.**—**R. V. J.**—**F. M.**—**N. B. C.**—**C. F. E.**—**W. T.**—**C. W. C.**—**T. F.**—**C. A. S.**—**S. N. M.**—**J. R. D.**—**P. J. D. S.**