Notes & Queries

H. F. is informed that the metal manganese is mixed with copper to make manganese bronze.—S. O. K. should stuff his saddles with well cleaned wool.—T. J. L. will find directions for ridding his house of water bugs on p. 315, vol. 32.—F. W. S. is referred to our advertising columns for a good system of short hand.—L. N. will find a recipe for aquarium cement on p. 80, vol. 31.—J. T. M.'s questions as to the first year, etc., are absurd.—B. B. will find directions for cultivating mushrooms on p. 129, vol. 34.—W. R. K. can waterproof paper by the process described on p. 17, vol. 33.—E. T. C. will find directions for polishing brass instruments on p. 57, vol. 34.—H. H. is informed that the only import duties in England are on tea, tobacco, and alcohol in all its forms. A few duties are put on silver plate, playing cards, etc., to compensate for the internal taxation on these articles.—D. H. can get rid of ants by applying the remedy given on p. 172, vol. 33.—W. A. W. will find the formula for the friction of water in pipes on p. 250, vol. 34.—H. F. L. will find a description of a pantagraph on p. 179, vol. 28.—H. W. will find some notes on boiler furnaces and bridge walls on p. 339, vol. 33.—J. S. will find a description of M. Jamin's magnet on p. 383, vol. 29.—A. J. D, is informed that the process of type founding is too complicated for description in these columns.—B. F. K. will find directions for making vulcanized rubber stamps on p. 155, vol. 31.—W. B. H.'s specimen of paper board is too hard to be penetrable by oil. It could be softened by soaking in hot water.—A. B. will find directions for preparing lime for oxy-hydrogen light on p. 315, vol. 33.—W. J. B. will find directions for preserving eggs on p. 306, vol. 34.—C. B. R. will find a recipe for cement for cracks in stoves on p. 183, vol. 34. For bronzing iron castings, see p. 243, vol. 34.—D. B. T. will find formulæ for the pressure and temperature of gases on p. 123, vol. 33.—S. H. G. will find a good recipe for indelible ink on p. 129, vol. 28.—F. F. T. will find an answer to his query as to dynamometer brake on p. 273, vol. 31.—E. D. R. can fasten mother-of-pearl to glass with the cement described on p. 46, vol. 33.—E. O. T. will find several good recipes for bronzing on pp. 38, 243, 312, vol. 34.—S. S. D. will probably find that the oxyhydrogen light will answer his purpose.—G. H. F. will find directions for making gas for domestic use on p. 131, vol. 30. For gilding wood, see p. 90, vol. 30. A compound of pounded ice and salt makes an excellent freezing mixture.—R. can obtain a copy of a print in facsimile by the photo-engraving process advertised in our columns.—A. O. F. will find directions for making concrete pavements on p. 185, vol. 33.—C. F. S., H. S. U., G. W. S., J. L. B., 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) W. U. L. asks: 1. Is it possible to run a band saw by foot power? A. Yes, for light work. 2. What speed does it require? A. The saw should run by foot power at about 4,000 feet per minute.—J. E. E., of Pa.

(2) N. F. C. asks: What is the matter with a telescope which "looks smoky," and does not give a sharp definition? A. Either the spherical aberration is not corrected or the glass is not homogeneous. The probabilities are that the center and edge are not of the same focal length. Take a piece of paper the size of the lens, cut a circular piece from the center one half its diameter, cover the marginal portion of the lens with the outer part of the paper, allowing the light to pass through only the central portion of the lens; focus on some well defined object, then put the central piece of the paper over the center of the lens and remove the other, and focus with the light passing only through the margin: thus, by using diaphragms of different sizes over different parts of the glass it can be seen whether all parts of the glass have the same focus; if not, the glass must be corrected accordingly.

(3) P. F. asks: Can I successfully transmit motion from one friction pulley, 6 inches in diameter, going at 4,000 revolutions per minute, to another pulley 4 feet in diameter, by bringing the large one in contact with the small one, by a hand lever? A. Yes, if the faces of the pulleys are grooved. See diagram No. 60, "Mechanical Movements," in SCIENTIFIC AMERICAN REFERENCE BOOK.

(4) J. B. L. says: My telescope is constructed according to a description given some three years ago in the SCIENTIFIC AMERICAN. The eye leys is plano-convex, and gives an inverted image. I wish to know if, by using a double concave eye lens which does not invert the image, I can get the same field. A. No, only about one third as much, with a lens of the same focal length.

(5) S. B. & Co. ask: What will remove grease from emery wheels without injury to the wheel? A, Bisulphide of carbon is the best known solvent for oil or grease. Naphtha and benzine are also good solvents.

(6) F. R. says: In p. 6, vol. 35 of the SCIENTIFIC AMERICAN, in giving the composition of sulphate of potassa, you use KO as the symbol of potassa and H O as the symbol of water, while according to Youman's "New Chemistry" K_2O is used as the symbol of potassa and H_2O is used as the symbol of water. These compounds (KO and HO) could not exist according to Youman's "Chemistry," as there would be an odd bond in the molecule, thus: K—O—, H—O—. Please explain. A. The symbols were given according to the old system of nomenclature, but the new system is for many reasons preferable. Whether the old or new system, however, be employed in calculating the percentage composition of compounds such as you mention, provided the systems are not confused with each other the final result will be the same. For instance: According to the old system, sulphate of potassa would be written KO,SO_3, while according to our present theory of chemistry is written K_2SO_4. While in the present system the atomic weight of potassium remains the same as in the old, those of oxygen and sulphur have been doubled:

	Old Theory.	New Theory.
Potassium (kalium).....	39·2	39·2
Sulphur.....	16·0	32·0
Oxygen	8·0	16·0

As there enters into the composition of the above salt, according to the old formula, one atom of potassium, one of sulphur, and four of oxygen, and according to the new theory, two of potassium, one of sulphur, and four of oxygen, the composition by weight will be as follows:

Old.		New.	
K	39·2×1=39·2	K	39·2×2=78·4
S	16·0×1=16·0	S	32·0×1=32·0
O	8·0×4=32·0	O	16·0×4=64·0
	87·2		174·4

87·2 : 39·2 :: 100 : x, or 174·4 : 78·4 :: 100 : x. In these two proportions, x, or the amount of potassium as calculated from either of the above systems = $44{\cdot}9541\frac{31}{109}$. And as determined by like methods the proportions of the constituents of the salt in 100 parts by weight are S $18{\cdot}3486\ \frac{26}{100}$, O $36{\cdot}6972\frac{52}{100}$.

(7) A. R. asks: Is there to be an occultation of Saturn by the moon on August 6? A. Yes, between 10·30 and 14.0 P. M., duration about 20 minutes. There will be another on September 3, commencing about 2.30 A. M. with a duration of 1 hour.

(8) W. G. F asks: What is the cause of mildew and blotches appearing on the fresco painting in a church? A. The roof may leak and wet the ceiling and walls slightly, or dampness may be generated under the floor, and the church may not be sufficiently ventilated during the week. A warm day and a cool night would occasion a precipitation of moisture on the interior of the walls, unless there were means of ventilation.

(9) M. W. asks: What is the weight of a cubic foot of solid ice? A. About $57\frac{1}{5}$ lbs.

(10) R. S. asks: 1. Is there any substance that will prevent the oxidation of galvanized iron when used for water coolers, and the consequent taste thereby imparted to the water? A. Try the application of melted paraffin. The surfaces may be uniformly covered by means of a brush. Pure paraffin is both tasteless and inodorous, insoluble in water, and not attacked by either acid or alkaline solutions. 2. Is there any substitute for muriatic acid in soldering the same that will not discolor the iron or affect the water? A. Pulverized rosin is sometimes preferred for this purpose.

(11) C. B. Q. asks: Why is it that the sun, shining through small apertures of any irregular form, produces circular bright spots instead of spots of the shape of the aperture? A. The light from a bright object passing through a small aperture forms an image of that object. It is therefore an image of the sun and not of the aperture which is seen; and as the aperture is increased the image of the sun is less, and that of the aperture more, defined. Eclipses of the sun are sometimes observed by this means.

(12) L. C. M. asks. Will a vertical steam boiler 30 inches high by 16 inches diameter, with 12 upright flues, 1¾ inches in diameter, running the length of boiler, set on the lower half of a common coal stove, be of sufficient capacity to warm a house by hot water, the house containing 4 rooms, each 16 feet square by 9 feet high? A. If you have a strong draft, and a good arrangement of heating pipes, we think your boiler might answer.

(13) N. P. M. says: We desire to heat and ventilate a schoolhouse in the most efficient manner and at the least possible cost. The size is 25 feet by 38 feet, and 12 feet from floor to ceiling, with four windows on each side, and two doors in front end. The floor is about 1 foot from the ground. It is a frame building. A. If there is no cellar under the building, excavate a small one at the windward end and provide a good warm air furnace; supply air to the air chamber of the furnace from the exterior of the building by means of a long wooden box or shaft extending to the point where the most prevalent winds strike the house, and insert in said shaft a sliding board valve, to close it or limit its capacity at pleasure. Supply the warm air to the room by means of two large floor registers, one upon each side thereof, conveniently arranged for drying the feet. For the ventilation, place three vertical pipes of tin or wood, about 6 by 12 inches, on on either side, one between each two windows, and extending from the floor to the ceiling and discharging into the space above the ceiling, and provide two ventilating registers in each pipe, one near the floor and one near the ceiling; in cold weather, the lower one alone may remain open, in warm weather both. If your building has gables, place a window in each gable, filled in with blind slats so set as to effectually protect the interior from storms, and these will give the proper ventilation to the space between the ceiling and roof. If, however, you have a high roof, ventilate by a small cupola provided with windows of like description. As a matter of economy, your present stoves enclosed within brick walls may give you a very effective furnace. Be careful to see that the fire chambers are tight, so that no smoke or gas can escape to contaminate the air.

(14) G. D. S. asks: How can I destroy grass, weeds, etc., in gravel walks? A. Dig them up by the roots. Cutting off the tops does no good.

(15) E. T. C. asks: How can I prepare calf and sheep skins for drumheads? A. Remove the hair or wool from the skins by steeping in a solution of lime; then shave all the fleshy matter from the inside, wash, and stretch the skins tight on frames; rub well with pumicestone, polish with powdered chalk, and dry. Finish with a coating of white of egg.

(16) E. & D. ask: 1. How can we make colored printing ink? A. To make printing ink, old linseed oil, boiled and ignited, must be taken, and good black rosin selected. Soap is another important ingredient, yellow rosin soap being used for black ink, and white curd soap for the various colored inks. Vegetable lampblack is the best for making black ink. Boil 6 quarts linseed oil till the smoke begins to rise, and ignite the vapor with a bit of lighted paper in a cleft stick; let it burn till the oil, now transformed into a varnish, will draw out into strings half an inch long. Then 6 lbs. rosin should be gradually added, and then 1¾ lbs. soap in slices, which must be put in cautiously, as the water contained in it causes a commotion. Set the pot on the fire and stir well with a spatula. Put 8 lbs. of the pigment into an earthen pan, and add the varnish by slow degrees, and stir carefully till the whole is incorporated. Then grind in a mill or on a slab with a muller. The pigments commonly in use are carmine, the lakes, vermilion, red lead, Indian red, Venetian red, red, yellow, and orange chromes, burnt sienna, Prussian and Antwerp blues, etc.

(17) M. B. asks: How are potatoes desiccated and preserved? A. They can be cut in small cubes, or powdered on a grater, and dried in an oven.

(18) R. R. asks: 1. What is the composition used in rockets composed of? A. Mix together 12 parts (by weight) saltpeter, 6 parts charcoal, and 4 parts sulphur. The ingredients should be powdered separately. 2. How is golden fire made? A. If you mean golden rain for rockets, take meal powder 6 parts, saltpeter 1 part, charcoal 2 parts. Powder separately and mix.

(19) O. A. J. asks: In balancing a crank shaft for a steam engine running at high speed, should I put the combined weight of connecting rod, crosshead, and piston opposite the crank pin on the balance crank, or should any allowance be made for the lower end of the connecting rod resting on the crosshead? A. For a vertical engine, the first method is necessary. For an horizontal engine, balance the crank and two thirds the weight of the connecting rod.

(20) E. L. says: My house stands on level land. At the present time the water in my cellar is 30 inches deep, caused by the heavy rains. I have thought I would pump the water out when drier weather comes on, and then with a sledge hammer drive stones in the soft bottom, and cover the stones and sides of the wall with water lime cement, hoping thereby to have a good dry cellar. Do you think my method a good one, or will the upward pressure of the water burst up the cement? A. The upward pressure of the water will be equal to the weight of the water, according to the hight it would rise above the floor. At 30 inches deep, the upward pressure would be a little more than 1 lb. per square inch, or 156¼ lbs. per square foot. To sustain this, you require a stone bottom about 10 inches thick, more or less, according to the weight of the stone. This should be laid in and grouted in cement, when the cellar is dry. For the sides, build up on the inside of your present cellar wall another lining wall as high as the water rises, and 12 inches thick, carefully laid up in the cement. If you wish to retain the present hight in the clear in the cellar, you must excavate to the depth required by the stone bottom. Use the best hydraulic cement, and grout it well into the joints of the stonework.

(21) H. L. C. says: Would a dam, 300 feet long and 15 feet in the middle, running out to nothing at the ends, and 2 feet thick at the top and 4 or 5 at the bottom, filled in with loose rocks and dirt (on the water side), be sufficiently strong to hold the water to make a pond for cutting ice? A. The weight of wall and backing would be sufficient to resist the pressure of the water; but the permaneney of a dam depends mainly upon its capacity to retain the water without leakage. The wall should have a proper foundation deeply laid, and the interior slope made watertight with a clay puddling extended over the bottom of the pond for some distance in from the dam. The least discharge of water through or under the dam washes the earth away, and continually increases the size of the aperture, until it threatens the stability of the whole work.

(22) J. L. W. asks: 1. In building a heavy brick wall, which of the two makes the best and most secure job of brickwork, making every third or every sixth course of brick headers? A. Every third course is the stronger, although they are seldom laid so frequent as that. 2. In turning arches in a cell building for a prison, where one cell will be above the other for four stories high, should the centers that the arches are turned over remain in the first stories until the entire upper stories are completed? Will it damage the work to strike the centers when the first story is complete, so as to use the same in the next stories? A. The centers should be struck as soon as the mortar is well set, in order that the arch may come to its proper bearing, it being understood that the exterior walls of the building, where the last arches are received, are sufficiently thick and high to resist the thrust of the arches. 3. The cells are 5 by 8 feet, the arches are semi-circular, turned the 5 foot way. Should the ends of the arch, where they come in contact with the main walls, be built in solid, so as to tie them together, or should the arch be turned separately, merely finishing against the main wall? A. It is not necessary; the stability of the arches will depend upon the sufficiency of the final abutment at the termination of the series against the exterior wall at the two ends.

(23) E. O. K. says: 1. I am building a house, and wish to supply a range and bath tub by means of a tank in the attic over the kitchen. Is there any better way to make the tank than to build an outside frame of pine plank, and set inside it a watertight tank of zinc? A. The best kind of tank for your purpose is one formed of castiron plates, 18 by 18 inches, and 9 by 18 inches, with exterior flanges at the joints through which the plates are bolted together. A tank 6 feet by 4½ feet and 2 feet 3 inches high would be a suitable size and could be made from these plates. The next best kind would be one made of 2 inch plank, tongued and grooved together, rectangular, the ends tongued into the sides, held together with frames of light timber, and lined with sheet lead. As for zinc it is too brittle, and is injured by the contraction and expansion which it has to undergo. 2. I wish to construct in my outdoor cistern such a filter as will render the water drinkable. How shall I best accomplish it? A. Make the crosswall of brick with openings at bottom, enclosing one third of cistern; fill in this space with a layer of sand, a layer of charcoal, and a top layer of sand, and the clear water will rise through it.

(24) J. M. B. asks: What is the compound used for penciling or tucking brick walls? A. White lime mortar, consisting of pure lime paste and a little white sand.

(25) J. A. G. asks: Which is the best for grinding a turning or planer tool on, an emery wheel or a grindstone? A. A grindstone is the best.