Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notices exceed Four Lines, One Dollar and a Half per Line will be charged.

Notes & Queries

N. G.'s directions for placing an engine on the center originally appeared in the SCIENTIFIC AMERICAN.—P. T. will find an article on glue on p. 8, vol. 32, which will probably answer his purpose.—T. S. can copper his malleable iron castings by following the instructions on p. 90, vol. 31.—D. J. W. and others are informed that we have so frequently recommended courses of study to young engineers that we cannot repeat them.—F. B. L. can make a waterproof varnish for cloth by following the instructions on p. 74, vol. 31.—G. M can can solder brass to iron by following the directions on p. 251, vol. 28.—F. D. will find directions for drying raisins on p. 409, vol. 31.—S. C. D. will find directions for making fulminate of silver on p. 90, vol. 31.—S. E. S. can produce a dead black on brass work by the process given on p. 362, vol. 25.—W. H. L. can transfer pictures to glass by using the process detailed on p. 123, vol. 30.—C. E. F. will find an answer to the question as to the ball falling through the earth on pp. 158, 250, vol. 31.—C. J. will find directions for obtaining albumen from blood on p. 344, vol. 31.—C. R. can use up his coal dust by following the directions given on p. 371, vol. 24.—G. can temper turning and boring tools by following the process described on p. 21, vol. 31. As to horse power of an engine, see p. 33, vol. 33.—S. H. D. will find a recipe for an alloy for making models, etc., on p. 91, vol. 30.—W. S. will find directions for making matches on p. 75, vol. 29.—L. E. O. will find that the gyroscope is lucidly described on p. 91, vol. 31.—W. B. T. can preserve leaves and flowers by the process given on p. 246, vol. 31.—F. S. will find a description of a wooden railroad on p. 358, vol. 31.—J. M. McC. can detect cotton in linen goods by the method described on p. 102, vol. 28.—T. K. G. will find a recipe for a composition for explosive bullets on p. 300, vol. 33.—L. J. F. will find directions for refining cotton seed oil on p. 19, vol. 30.—C. S. can glue his rubber rollers to the wooden spindles. For a recipe for utilizing old rubber, see p. 33, vol. 27.—D. A. R. can clean ivory by the process described on p. 10, vol. 32.—M. R. W. will find rules for calculating the proper cut-off of an engine on pp. 37, 69, vol. 32.

(1) C. R. M says: I am going to cover a boiler with staves one inch thick, tongued and grooved; the staves do not fit close to the surface on account of rivet heads. Would charcoal dust mixed with clay be a good thing to put between the boiler and the staves? A. Clay alone will probably answer as well.

(2) G. C. H. and others desirous of entering government service as engineers should apply to the Secretary of the Treasury; and if there are any vacancies in the engineer corps, they will receive full information.

(3) T. B. J. asks: 1. What power should be obtained from steam issuing from a quarter inch round pipe at 80 lbs. pressure by a good non-condensing engine? A. We would like some further particulars. 2. Has any rotary engine hitherto constructed given as much power from the same steam as a plain reciprocating engine? A. There is not much information in print about the performance of rotary engines; but as far as the records go, the advantage is with the reciprocating engines.

(4) A. H. asks: If the smoke stack on a locomotive be cut off about one foot above the boiler, will that reduce the power? If so, in what proportion may grate area and heating surface be increased to remedy the loss? A. If the blast continues effective, there would be little difference.

(5) B. L. G. says: 1. I have a vertical stationary 4x8 engine, with a vertical boiler 6 feet high, 30 inches outside diameter, with 40 two inch tubes 4 feet long in it. How much power will I get with 50 lbs. steam? A. Probably between 3 and 4 horse power. 2. The heat as now arranged passes through the tubes and up the chimney. To economize fuel, I propose to put a sheet iron jacket over the boiler, to within 6 or 8 inches of the bottom, with another outside of that, reaching from the bottom and made tight, the pipe to the chimney leading from near the top of this. The heat would then pass up the tubes, down between the shell of the boiler and the inner jacket, and up between the jackets to the chimney. Would this be advisable? If so, how much space would be necessary between boiler and jacket? The draft is good. 2. It might be better to leave off the second jacket. Make space about the same as the cross section of tubes. 3. I would like to use the exhaust for heating; would it be advisable to run it through 150 feet of pipe with 8 elbows? Should I use a back pressure valve? A. It would be advisable to have a back pressure valve in this case. 4. What size of pipe would be best? A. The larger the pipe you use, the better.

(6) H. M. says: 1. Please give me the dimensions of a boat for an engine 3x3 inches. A. Make a boat 20 feet long by 5 feet wide. 2. How large a wheel should I use? A. Use a propeller from 20 to 24 inches in diameter, and 2½ to 2¾ feet pitch. 3. The boiler is 23 inches long and 14 inches in diameter, and has nineteen 1¾ inch flues, with firebox 13 inches high and 14 inches in diameter. It is make of ¼ inch plates. Heads are $\frac{5}{16}$ inch thick. How much steam can I carry? A. About 130 lbs. per square inch, if your boiler is well made.

(7) N. Y. says: 1. I wish to supply 90 gallons of water per hour at 160° Fah. through a 1 inch pipe. The temperature of the space about the pipe is 325°, and the incoming water 36°; what must be the length of pipe? A. You will have to determine the matter by experiment. 2. As it would take a different length to raise the temperature to 200°, or a different length still of 2 inch pipe to raise the same to 160° or 200°, by what formula can a solution be obtained? A. Possibly some of our readers may have information on the subject. If so, we would be glad to hear from them, as the subject is one of great interest. We could give you approximate formulas, but they would not be very safe guides.

(8) E. H. K. asks: I have an upright boiler, 12 inches in diameter by 2 feet high, with nineteen 1½ inch tubes, 6 inches water space above tube sheet, and 8 inches space below crown sheet. She lifts her water a great deal, and I think of carrying the water 6 inches above crown sheet. Is there any danger in having water below the tube sheet? Will the dampness of steam keep the tubes not surrounded with water or above the water safe from burning? A. It is very common to run vertical boilers with the water a few inches below the upper tube sheet.

(9) C. and B. say: We are building a boat, 18 feet in length by 4 feet beam and 6 inches draft forward and 8 inches aft, to run on very still water. What size of screw propeller will it require to run it at ten miles an hour? A. The boat will not carry the machinery necessary for that speed.

(10) W. H. asks: How can I make a compound of metal, such as is used for plugs in low water whistles for steam boilers? A. Mix bismuth, lead, and tin, changing the relative proportions of the different metals for different melting points.

(11) M. M. says: I have an upright tubular boiler, 6½ feet high by 34 inches diameter. The tubes are 4½ feet by 2¼ inches. The steam pressure never exceeds 70 lbs. Is it dangerous to use steam at that degree of heat? A. From your account, we do not think that you are carrying a dangerous pressure. 2. An ½ inch pipe, from near top of boiler, leading to a steam box, had a crack about 2 feet from boiler soldered over with common solder, and the steam melted the solder off. A. The solder was probably too soft, or had too low a melting point.

(12) A. B. C asks: In finishing my house, can the plaster be made to resemble porcelain? A. An extra hard surface and superior polish is given to plastering by the use of Keene's cement or the Parian cement, which is furnished by dealers in this city, being imported from Europe. These cements are used, either of them, in place of plaster of Paris, and probably will give the surface you require.

(13) R. S. N.—Much obliged to you for calling our attention to that curious exhibit.

(14) F. B. M. asks: 1. How can I solder silver with a blowpipe? A. Make silver solder as follows Hard solder: Silver 4 parts, copper 1 part. Soft solder: Silver 2 parts, brass wire 1 part. 2. How can I make a good solution for cleaning silver? A. Clean silver with hot water, followed by a mixture of equal parts of spirits of ammonia and turpentine; after this, if necessary, use prepared chalk, whiting, maguesia, or rouge. 3. How can I test gold with acid? A. See p. 283, vol. 33.

(15) E. T. M. asks: What solvents are more powerful than muriatic acid? A. This depends upon the nature of the substance. Some substances insoluble in muriatic acid dissolve readily in nitricacid. And again bodies, such as gold and platinum, insoluble in nitric or hydrochloric acid alone, are dissolved by a mixture of the two. Mineral substances, containing silicates, are dissolved by hydrofluoric acid, or in a mixture of hydrofluoric and sulphuric acids.

(16) A. H. asks: 1. Has the United States government offered any reward for an indelible ink or liquid for obliterating stamps with? A. We do not know. 2. Will a preparation answer which no chemical can remove? A. The ink must, to be effective, be irremovable by chemicals or any other means.

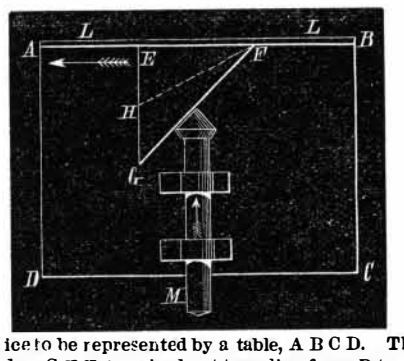
(17) J. G. asks: What is lucern, and how is it prepared for fodder for cattle? A. Lucern is a forage plant, one of the *leguminosæ*; it is known in Spain, and in California and elsewhere, as *alfalfa*. Hay can be made from it, as is done with clover; but eaten green, it is an excellent food for cows. It is in full bearing in the third year, and may afterwards yield from three to five crops per season.

(18) S. C. asks: How can I dissolve india rubber, to saturate thin linen cloth with, to make it waterproof? A. Make a solution of the gum rubber in bisulphide of carbon, steep the material in this for a short time, and allow to dry in the air.

(19) W. M. B. asks: 1. Is there such an article as linoleum, made from flax seed? A. Yes it is now largely manufactured in this country, and used as a substitute for oilcloth. 2. Can it be used as a substitute for india rubber? A. We do not know that it has yet been used for this purpose.

(20) Referring to query No. 23 in our paper for October 30, an asbestos cement, recommended for verandah roofs, is manufactured by the inventor and patentee, H. W. Johns, 87 Maiden Lane, N. Y.

(21) W. F. C. says, in reply to S. P. and others who doubted the superior velocity of iceboats to the wind that drives them: It is clear that L. P. is no sailor, or he would know that a boat's best point of sailing is very often not before the wind, that is to say that some boats can sail faster with the wind abeam than with it behind them. Carrying this principle to iceboats, and assuming (not taking friction of ice and wind into account) that before the wind an iceboat can sail as fast as that wind, with the latter abeam it can sail much faster. Example: Suppose a field



of ice to be represented by a table, A B C D. The wedge, G E F, is an ice boat traveling from B to A. The sliding rod, M, represents the force and direction of the wind, and the raised ledge, L L, will answer for the grooves or edges of the runners that keep the boat on her course. We will further suppose all these parts to be lubricated so as to create a minimum of friction. The G F side of the wedge represents the sail of the boat, fixed at an angle of 45° to the line of direction. If the bolt is pressed forward one inch upon the side, G F, of the wedge, the latter will be moved forward in the direction from B to A just one inch, and at equal speed. Therefore, if this one inch of motion of the boat represents the wind at 30 miles an hour, the corresponding motion of the wedge, E F G, will also be 30 miles per hour. If, however, the sail of the boat or the side of the wedge be not at an angle of 45° to the line of its direction, as at G F, but only at an angle of 22½°, as at H F, one inch of forward motion of the boat, M N, will produce two inches of motion on the wedge, H E F, so that, if the inch of motion of M N represents, as before, the wind at 30 miles an hour, the resultant motion of the wedge will represent progress of the boat at the rate of 60 miles an hour, being, of course, two to one. These figures are necessarily purely theoretical, as friction is not at all taken into account. They will, nevertheless, serve to demonstrate that which is apparently impossible—a boat traveling faster than the wind which drives it.

(22) H. A. says, in reply to L. P. S.'s query as to the running of fans: An old foundery foreman was in charge of a foundery, the proprietors of which had just put up a new fan, with wooden trough connection with the cupola. The fan was so geared that the blast could not be varied by varying the speed of the fan, as had been the practice. So our foreman proceeded to make a long slot in the side of the air trough, and over the slot he carefully fitted a sliding cover. "Now," said he, "go ahead with your blast. I'm ready for you!" Finding very soon that the blast was too strong, he slightly opened the slide in the trough to let the blast escape outwardly. But, to use his own language, "the more he opened the more she blew," and his expedient was a total failure. The next day he put in a gate as the only means of reducing the blast.

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

E. W. P.—It is decomposed mica, and consists of silex, alumina, magnesia, lime, potash, and soda.—W. K.—We found no gold in your specimen.—D. T. M.—We cannot say how they were made. They do not contain injurious substances.—H. M.—It is an artificial stone, and has been made apparently by cementing clay, of which it is mostly composed, together with graphite, by means of some lime cement.—H. N. P.—It is composed of zinc and tin.—R. J. B.—Your specimen did not come to hand.—W. J.—It is hydrated oxide of iron, but the percentage of iron is too small to permit of its being worked profitably.

D A. R. says: I have a bar of iron 10½ x½x4 inches, supported at one end. I wish to know how to calculate the weight which, applied to the end, will break it?—J. D. asks: How can I best weigh flax before it is fed through the cards for manufacturing into bagging?—W. L. T. asks: How can I make papes with a black surface, to be drawn on so that the lines will show the white ground through the surfacing composition?—J. A. R. asks: How do you calculate the number of gallons of oil in an oil car tank of cylindrical form with hemispherical ends, at different depths?—M. asks: How can I prepare autumn leaves for preservation?