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.

NEW BOOKS AND PUBLICATIONS.

THE RAILWAY BUILDER. A handbook for estimating the probable cost of American railway construction and equipment. By William J. Nicolls, C.E. Henry C. Baird & Co., Publishers, 810 Walnut st., Philadelphia. Price, postpaid, $2.

A handy little work in pocket book form, containing information of a practical character derived from the author's experience and from various standard authorities. Clearly and concisely written, well illustrated, and in general a useful guide to the railway engineer.

Notes & Queries

(1) D. writes: In these times of base ball matches, will you please give your readers the rationale of the "curved ball," about which we hear so much? A. See SCIENTIFIC AMERICAN, No. 20, vol. 37, November 17, 1877.

(2) W. Y. asks: If I were to take two amalgamated zinc plates, each 6 inches square, and two copper plates, each 6 inches square, and place each pair in a separate earthen vessel containing diluted sulphuric acid, and connect the zinc of one pair with the copper of the other, would the battery thus made be strong enough to plate metals and make electrotypes? A. Yes.

(3) M. H. W. wishes to know if there is anything to keep animal liquid from stinking. A. Carbolic or salicylic acid.

(4) W. F. asks: Can you tell me what will dissolve zinc without evolution of gas? A. You may try a strong aqueous solution of ferric chloride or solution of potassium bichromate or permanganate mixed with strong solution of ammonium chloride (preferably hot) acidified with a few drops of nitric acid. Cupric chloride solution deposits copper in place of a portion of the zinc dissolved. Also by making the zinc plate (first superficially amalgamated with mercury) the anode of a couple in dilute sulphuric acid or strong aqueous solution of ammonium chloride, using a moderately active electric current from a separate battery, or by exposing the plate (in either of the liquids mentioned) as one of the positive plates of such a battery.

(5) S. E. asks: Can a fresh egg be preserved by coating it with any substance which will exclude the air? A. Yes, for a time. Gum arabic, shellac, and paraffin are used. The Germans apply linseed oil. See SCIENTIFIC AMERICAN, p. 75 (24), vol. 37, and SUPPLEMENT No. 65, p. 1030.

(6) O. W. S. asks: 1. What are the properties of the metal aluminum? Is it a rigid or stiff metal? Will it resist strain tending to bend it? A. Yes. It has, when pure, about the hardness of silver and tensile strength of copper. 2. Is it brittle? A. It is not brittle. 3. Will it run freely when melted? A. It melts at about 1,300° Fah., rather slowly when pure, but flows easily and may be cast. 4. Is it solid, not porous, when cast? A. See pp. 798, 1213, 1337, and 1635, SCIENTIFIC AMERICAN SUPPLEMENT.

(7) C. T. R. asks: Is the carbon in the carbon telephone graphite, or some other form of carbon? A. It is lampblack collected from burning kerosene or other light hydrocarbon. It is compressed into a button under great pressure.

(8) J. H. asks (1) for a recipe for making birdlime. A. Boil the middle bark of the holly 7 or 8 hours in water, drain it, and lay it in heaps in the ground, covered with stones, for 2 or 3 weeks, till reduced to a mucilage. Beat this in a mortar, wash it in rain water, and knead it till free from extraneous matters. Put it into earthen pots, and in 4 or 5 days it will be fit for use. An inferior kind is made by boiling linseed oil for some hours until it becomes a viscid paste. 2. Give length of time it will remain fit for use when exposed to heat of sun. A. We do not know.

(9) R. C. B. asks for a recipe for exterminating red ants. A. Dissolve some camphor in a small quantity of methylic alcohol, precipitate it by addition of water, and project a little of the suspended camphor into their haunts. A very small quantity of carbolic acid used in a similar manner will answer as well or better—especially if the solution contains glycerin. Tobaccowater and powdered borax are also said to be effectual.

(10) W. D. H. writes: I unfortunately spilt a solution of iodine (in alcohol) over the page of a valuable book. The paper composing the book is not glazed, but rather coarse. How am I to remove the iodine without injury to the book? A. Apply solution of pure sodium hyposulphite, and then strong ammonia water, by means of blotting paper; remove excess by pressing between sheets of bibulous paper moistened with water, and dry between clean warm (dry) blotting pads.

(11) D. F. writes: In drying white shirts in the drying room of a laundry we use the waste heat from the furnaces on which the ironers heat their smoothing irons, the furnaces being located on the floor below the dry room, and the hot air passes constantly from the furnaces through heat flues to the floor above. But there go up with the hot air minute particles of dust and ashes which oil the shirts. Can you suggest any way to overcome this difficulty? A. Place on your furnaces heating drums having a great number of air flues which are in communication with the external air and also with the drying room. Allow the products of combustion to pass around the air flues.

(12) S. R. S. asks: How long does it take benzine to be saturated with fat, and must it be heated to become so? Must it be distilled to be separated from the fat, or must the mixture be pressed? I have tried distillation, which resulted in the cork being expelled from the bottle, and as I had the bottle in a water bath no harm resulted. I am anxious to make the experiment, yet have no desire to risk an explosion with such a dangerous substance as benzine. A. Heat your heavy oil over a water or sand bath for some time, and you will doubtless recover the fatty matters. We would not advise you to risk the "distillation" of benzine in a corked bottle. For information respecting the construction of apparatus for distilling, etc., consult any elementary work on chemistry. Your druggist will perhaps loan you books. A strong solution of the dry fatty matters in benzine may be made at ordinary temperatures in ten minutes, if properly agitated together.

(13) J. H. M. asks: What kind of oil is used to thin printer's ink, so as to work on the stencils made by the electric pen? A. A little nut oil or a "varnish" prepared by igniting the boiling oil, and allowing it to blaze, while constantly stirred for a short time.

(14) H. S. T. asks: 1. Are anodes now made of pure nickel? A. The nickel plates sold as pure nickel contain small quantities of carbon, presumably as carbide of the metal. 2. In forming sulphate of nickel, will it do to use metal instead of oxide of nickel? A. Yes, but not very well; it would require the application of heat; the oxide is much cheaper. 3. How is an oxide of nickel formed? A. There are two oxides of nickel. The monoxide (NiO) is prepared by heating the nitrate to redness or by precipitating a soluble nickel salt with caustic alkali, and washing, drying, and igniting the apple green hydrated oxide. The sesquioxide (Ni_2O_3) is prepared by passing chlorine through water holding the hydrated monoxide in suspension. It is also produced by mixing a soluble salt of nickel with solution of bleaching powder (calcium hypochlorite). The former oxide is of most importance.

(15) D. R. writes: Will you please tell me of any compound that could be moulded to make an imitation of rubber (hard) or coral? A. Vulcanized fiber or celluloid has been used successfully. See p. 10, vol. 38, and pp. 147 and 204 (73), vol. 37, SCIENTIFIC AMERICAN.

(16) J. W. McM.—Telescopic specula are parabolic and not elliptical. We do not know that disks of speculum metal are in market. The constituents of speculum metal are copper 66·6 parts, tin 33·4 parts. For optical works, write to an industrial publisher.

(17) C. W. writes: Will you inform me as to the proportions of bisulphuret of carbon and chloride of sulphur used in vulcanizing rubber, by what is known as the cold process, and the manner of applying and time required? A. The caoutchouc is simply immersed for a short time in a mixture of 40 parts of carbon disulphide and one of sulphur chloride; then transferred to a room heated to 70° Fah. until the sulphide has evaporated, when it is boiled in a solution of 1 lb. of caustic soda and 2 gallons of water, and then thoroughly washed. Benzolene, the lighter product of the distillation of petroleum, has been used in place of carbon sulphide.

(18) C. H. M. writes: 1. We are taught in our works on physics that when an electrical current passes through a direct or right hand helix, which incloses a magnet, if the current flows from right to left it determines the poles of the magnet in a fixed direction relative to the flow of the current. If the current be reversed the poles will also be reversed. If a permanent magnet be surrounded by an insulated wire, and a current of electricity be passed through the wire in a direction contrary to the harmony of magnetic polarity and electrical currents, the effect is first to demagnetize the bar and then reverse its poles by remagnetizing it by induction, in a contrary direction to that which it possessed before the current began to flow. How can these facts be reconciled with the use of permanent magnets in the Bell telephone? A. The current induced in the helices is so slight that it is doubtful if this alone would affect the power of the magnet. The Bell telephone as now constructed has a soft iron core projecting from the end of a compound bar magnet for receiving the helix. This core serves as an armature to the magnet, and as a preventive of demagnetization. 2. How is gas carbon prepared to mould into different shapes, or made into pencils or sticks for use in galvanic batteries? A. They are made by calcining in an iron mould an intimate mixture of coke and bituminous coal, finely powdered and strongly compressed.

(19) E. M. B. asks for the name of any work in which he can find "spontaneous combustion" specifically treated. A. See article on the subject by Joseph Williams, SCIENTIFIC AMERICAN SUPPLEMENT, No. 32.

(20) W. A. writes: I am running 18 inch saws, and do what I will the boxes will heat. Until recently I ran them at a speed of 2,400 revolutions per minute. I slowed them down to 2,050, and still they seem to heat just as bad. I was using a poor class of Babbitt and thought that was it. I bought some of the best I could buy, and still they heat. A. Either your boxes are out of line or the mandrel is sprung or out of round, or the boxes are too short. We would recommend truing the mandrel in a lathe, and the use of longer boxes, which must be rigidly mounted.

(21) F. S. asks: Can you tell me how the liquid bronze is made that is sold in shoe stores for bronzing shoes? A. It is made by dissolving aniline red in thin alcoholic shellac varnish. Add the aniline until you get the bronze effect.

(22) C. B. T. writes: Can you say anything about potato flour in your "Notes and Queries"? A. The potato flour used by confectioners and Hebrews is simply fine potato starch reduced to flour in a mill similar to that used for flouring wheat.

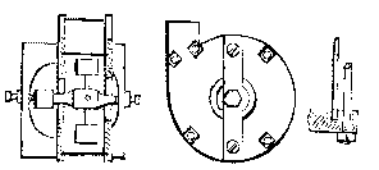
(23) "Nails" asks how to copper iron articles, such as nails, etc. A. Clean the iron by pickling it in dilute oil of vitriol and tumbling in a barrel, with sand if necessary; then bring them into contact with a strong aqueous solution of copper sulphate.

(24) A. M. H. asks: Do you know any good recipe for making fly paper that fastens them to the paper? Boiled linseed oil and sugar are the materials used, we believe.

(25) Y. O. asks: What kinds of paper and what process are used to manufacture changeable paper flowers, which change their color according to the atmosphere? A. Saturate the paper with a moderately concentrated solution of cobalt chloride in rain water.

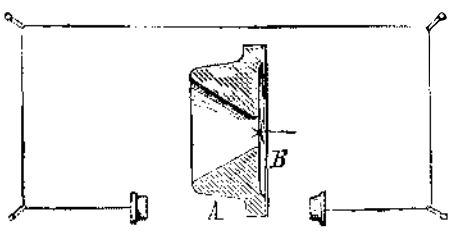
(26) M. A. D. writes: I am troubled with superfluous hair and I want to get rid of it. How can I do it? A. Böttger recommends the following: 1 part, by weight, pure crystallized sodium sulphydrate, and 3 parts of fine purified chalk; rub well together, moisten with water, and apply a layer the thickness of a knife blade. It should be allowed to remain in contact with the flesh not more than two or three minutes to avoid injury to the skin. Depilatories of this kind destroy the vitality of the hair. We do not recommend their use. If the materials are impure the skin may be stained.

(27) C. M. B. asks: How can I construct a small pressure blower, suitable for a sand blast? A. Make two wooden side pieces of the form shown in the side elevation. Cut a groove in each to receive the sheet iron strip which forms the curved sides. Turn a wooden shaft. Insert metal bearing pieces in its ends. Bore four holes in the hub and insert four arms with fans attached. Support the shaft on pointed screws inserted in the cross pieces attached to the side pieces. Clamp the side pieces to the edges of the sheet iron by means of small bolts. We give dimensions below: Di-



ameter of case, 6 inches; thickness of case inside, 2½ inches; size of opening in sides, 2½ inches; size of fans, 1½ x 2 inches; discharge opening, 1½ x 2½. The size and proportions may be varied. A fan of this sort will answer for the sand blast or for a small forge, but if it is to be used continuously the shaft should be iron or steel and it should be run in well made boxes.

(28) P. B., W. B. P., and others.—A cheap and effective acoustic or thread telephone may be made by turning from wood a mouthpiece, A, and attaching to it a disk, B, of ferrotype plate. The mouthpiece should be 2¼ inches in its largest diameter, and should have an annular surface ¼ inch wide for receiving the disk, B, which is attached by means of sealing wax. The wax is first applied to the wood, and the disk is warmed and pressed against the mouthpiece. The disk is 2¼



inches in diameter. The portion left free to vibrate is 1¾ inch in diameter. The larger internal diameter of the mouthpiece is 1¾ inch, the smaller ½ inch. There is a small hole in the center of the diaphragm for receiving the thread, which also passes through a small piece of soft rubber and is knotted. The telephone thread must be supported on small elastic bands which must be put under tension. The string must also be taut. By means of this arrangement sound may be conducted at any desired angle, the elastic rubber supports being arranged as shown at the corners of the engraving. Whispers and even breathing may be distinctly heard over a long distance. When talking loud the receiving instrument should be removed 2 inches from the ear.

(29) H. W. A. writes: In your issue of July 6, Mr. Edison describes the arrangement of a "free lever resting on the receiving diaphragm, which answers very well for calling purposes at telephone stations where there is comparatively but little noise." Can anything of the kind be applied to the Bell telephone? A. Something similar has been applied to the Bell telephone.

(30) E. I. asks: 1. What metal is used as a positive electrode in coating copper with iron? A. Iron. 2. What composition is used in making a mould from steel plate engravings for electrotyping? A. Gutta percha, wax, fusible metal, or plaster of Paris. Gutta percha is probably the best.

COMMUNICATIONS RECEIVED.

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

Motors. By D. E. P.
Steam Yacht. By G. F. S.
Potato Disease, etc. By T. C.
An Invention Wanted. By W. G. S.
The Use of Mechanism. By J. B. and T. B. McC.
Quantitative Psychology. By J. M. M.
What is the Sun composed of? By T. B. McC.