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.

Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(2976) A. C. asks: 1. Is an iron casting containing from 40 to 60 per cent of steel (or *vice versa*) of any commercial value as scrap? A. Yes. 2. Is it possible to decarbonize foundry irons by the Bessemer or any other process? If not, why? A. Yes; but they may not be well adapted for it, as not being pure enough, etc. 3. Why will steel scrap produce slag in a cupola and not in a covered crucible? A. In the cupola it is mixed with the ashes of the coal, which have to be slagged off, and it also needs slag to protect it from oxidation. In a covered crucible there is no impurity to be disposed of, and the steel is protected from oxidation. 4. In the manufacture of steel car wheels are the wheels cast from new steel, made in a converter? A. Casting direct from a converter has had very little success hitherto, on account of blowholes in the metal. 5. Is not the presence of blowholes in steel castings due more to the lack of pressure on the castings rather than to impurities in the metal? A. Blowholes are due to the low degree of fluidity of melted steel, and only to a limited extent to impurities. 6. What work is there on the manufacture of steel castings that you could recommend as being thoroughly up to the times? A. We highly recommend our SUPPLEMENT, No. 692, as well as many others to be found indexed in our new catalogue of SUPPLEMENTS. Also Howe's "Metallurgy of Steel," $10 by mail.

(2977) J. N. H. asks: 1. In what ratio is the time in which no current is passing to the time in which a current is passing in an alternating current? A. The time when no current is passing is almost zero. As the current rises and falls, and changing in direction rises again, the zero phase is indefinitely short in duration. The full discussion is quite complicated. 2. How can the lines of force about a certain magnet be calculated? A. By determining the adhesion of an armature, or by determining the E. M. F. produced by cutting the lines with a coil of given size, or by producing the lines and determining the E. M. F. produced in a coil of known size. 3. What is meant by the "torque" of an armature? A. The turning moment or couple, the product of the pull upon the armature by its effective radius tending to produce rotation. 4. What is a "cushion tire" on a bicycle? A. A hollow tire, giving greater extent of cushioning than the ordinary solid rubber tire.

(2978) C. H. asks: 1. What kind of battery would be most satisfactory and economical to run a motor to furnish ¼ horse power? A. Probably a Bunsen battery is the best for your purpose. You will find it a troublesome and expensive power. 2. How many cells would be required A. Enough to give 373 watts through zero external resistance, say 24 one quart cells. 3. How long would they furnish the required current at one charging? A. With ordinary use they will work for 50 or 60 hours with one full charge and an additional renewal of the bichromate solution. 4. What makes the bones of canned salmon so soft and brittle? A. The canning process, and action of the ingredients.

(2979) N. E. C. asks: What is the difference between air pressure at sea level and one, two, three, four and five thousand feet elevation respectively? And, what the difference in the volume of air at sea level and the above elevations? A. Taking the height at sea level as 30 inches, at 5,000 feet it is 24·773: at 10,000 feet, 20·459; at 15,000 feet, 16·896: at 3 miles, 16·361; at 6 miles, 8·923; at 9 miles, 4·866; at 15 miles, 1·448. As a rough approximation, allow one inch to one thousand feet. The volume of the air is in inverse ratio to the height of the barometer.

(2980) A. F. asks (1) if there is anything he can put on boots and shoes to make them waterproof? A. Beef tallow 4 ounces, resin 1 ounce, beeswax 1 ounce, melt together and add an equal quantity of neat's foot oil. Rub in while warming the shoe at a fire. 2. How can I take spots out of clothes, black worsted. It is a lightish spot, and I think it is grease. A. Use benzine, applying in a ring around the spot and finally to the spot itself. 3. How can I make cloth waterproof? A. Melt in paraffin wax with a hot iron. 4. I have a scar on my chin; how can I take it off? A. It is probably impossible to remove completely; consult a physician.

(2981) H. A. S. asks what the boiling point is for oils of spruce (*Abies nigra*) and tamarack (*Larix Americana*). A. The specific gravity of these oils varies from 0·850 to 0·880; they boil from 300° to 320° Fah., are very slightly soluble in water, sparingly in alcohol, readily in ether.

(2982) M. F. asks how to transfer lithographs to glass. A. Varnish the glass with dammar varnish or Canada balsam. When dry, soak the picture in water for some hours. When the glass is nearly dry, smoothly press the wet picture upon it, being careful to exclude all air bubbles. When all is dry, rub off the paper with the wet finger, dry, and revarnish.

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AND EACH BEARING THAT DATE.

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Steam trap, Leith & Hampton 450,415
Stilts, L. C. Johnson 450,357
Stopper. See Bottle stopper.
Stove, gas, W. S. Wright 450,278
Stove or lamp, oil, W. H. Wilder 450,547
Strap. See Corner strap.
Stuffing box, C. G. Mayer 450,518
Surgical instrument, C. H. Truax 450,206
Swinging gate, C. Z. Husel 450,233
Switch. See Electric switch. Railway switch.
Tack blank, staple, W. L. Ludlow 450,246
Telegraph, printing, P. H. Fisk 450,228
Telegraph relay, R. C. Wicks 450,278