Notes & Queries

J. B. F. asks: What is the best process of cleaning and tinning old copper saucepans?

J. W. S. asks: Is there any substance which, when enclosed in a glass tube or bottle, willgive a continuous light, brighter than phosphorus?

T. E. asks: How can I prepare gelatin for heliotype printing? What are the materials and proportions for making the inking rollers?

A. M. asks: How is the solution used in electroplating with tin, described on page 71 of the present volume, prepared?

W. A. B. asks: How can I restore ivory to its natural color? What is the composition of the cement with which knives are fastened in the handles?

H. R. E. asks: Can articles be coated with steel by an electrotype battery, and how?

P. L. B. asks: What will keep cherry boards from warping?

G. P. asks: 1. How can I make oiled silk? 2. How can I make a waterproof varnish for muslin bags, which will not crack when the bags are folded up?

B. I. L. asks: 1. Of what substance are Mr. Rogers' groups of statuary composed? 2. Is there a book which describes the tools and *modus operandi* used in making such statuary?

E. says: I have several hundred horse power running to waste three miles distant from a manufactory where I require thirty or forty horse power. Can you advise me how it is practicable to transmit the waterpower over that three miles to drive the manufactory?

E. asks: Is there any value in a miner's compass? "I bought one, and when new, the north pole was readily influenced by the presence of metallic iron. It was sent 300 miles by rail, and lost its attraction for metallic iron; but when carried into a shaft of limonite ore, the south end points down and the north end up, at an angle of about 70°. Outside the mine, the south pole dips about 10°, and at other places 20°. Why does the south pole dip instead of the north pole? Is the needle of any practical value in prospecting? What are the difficulties in using it, and how are they to be guarded against?"

Answers to Correspondents

A. F. A. says: Please give a rule for calculating the power of a tube boiler. The fire is under the boiler and comes through the tubes. Answer: Calculating the heating surface in square feet, and dividing by 15, will give you the horse power, approximately.

J. W. asks: What are the component parts of nitro-glycerin, and the relative amounts by weight of each ingredient? Answer: Into a mixture of four and two thirds pounds of concentrated sulphuric acid and two and one third pounds of concentrated nitric acid, pour one pound of glycerin and you have the terrible explosive agent, nitro-glycerin.

Z. M. P. K. asks: What cheap chemical preparation will dissolve and clean earthen pipe sewers from a tough sediment adhering thereto, supposed to be caused by grease and soap suds from washing dishes, etc.? Answer: Try washing with milk of lime, or strong lime water.

W. K. M. asks if apple pomace distributed round a well of water would cause an engine which uses the water to rust or cut. The engine is sometimes found to be quite rusty in the morning. Answer: We do not think the result you speak of is produced by apple pomace, but more probably by dampness in the atmosphere.

W. P. B. asks: What is the comparative efficiency, for draft, of brick and iron chimneys, also how much difference will the form, square or round, make? What is the rule for size and hight of chimneys, computed from the boiler? Can you mention any cheap work giving reliable information on kindred subjects? Answer: A round chimney of brick is probably the best. No. 1 of Van Nostrand's "Scientific Series" will probably give you the desired information.

G. T. L. asks: In working steam expansively in the ordinary reciprocating engine, does it make any difference whether the port is left wide open during the first part of the stroke and entirely closed during the remainder, or whether the port is but partially open during the entire stroke, the width of the opening, in the latter case, being of course regulated by the desired degree of expansion? Answer: It is much more economical to work the engine as mentioned in the first case.

J. B. M. says: I have an engine that requires 40 lbs. pressure, but sometimes I have extra heavy work and have to run it at 60 lbs. Will it take any more fuel to keep the pressure at 60 lbs. all the time, provided that there is no escape of steam through the safety valve? Answer: Theoretically, it takes scarcely any more fuel to make steam of 60 lbs. pressure than it does of 40 lbs.; but in practice, there is a noticeable difference in the amount of consumption in the two cases. It will be ordinarily more economical, however, to carry steam at the higher of the two pressures.

J. S. M. asks for an easy rule for setting a slide valve with a link motion? How would you set a cut-off, made of two plates sliding on the back of the slide valve, with a right and a left hand double thread on the stem, they being drawn together by a wheel on the top of the stem? How can I set out the rings of the steam piston? How shall I key up the connections with the crank pin and cross heads? How can I set the boxes to the other bearings, especially the thrust bearing? What is the best thing to prevent foaming or to prevent the water from being drawn over from the boiler into the engine? Is it a good plan to give a boiler plenty of steam room, so that the steam may clear itself of the water that is apt to rise with it? Answer: We are glad to receive a letter containing such intelligent questions; but our correspondent, without perhaps being aware of it, has made inquiries that could only be answered by a lengthy treatise on marine engines. He must study such things for himself; and while he will find many valuable hints in our paper, he can only master the subject by diligently reading the best textbooks, and carefully investigating the best practice.

T. T. says: We have a well about 40 feet from a pond, and want to lay a one inch iron pipe under ground, from pond to well: how can we do this without draining the pond? We want to lay it about 4 or 5 feet below the surface of the water. Answer: Perhaps you had better lay the pipe in another manner. If the well is below the pond, a siphon will answer very well, and can be easily applied.

B. M. asks: How can I mix chalk or other precipitate with either alcohol or water, so that there will be no sediment at the bottom? By what process can it be brought to a creamy appearance? Answer: The nature of a precipitate is insolubility. Chalk is insoluble in water or alcohol, and therefore precipitates or falls to the bottom as a sediment. You cannot change the chemical properties of chalk in this respect. You can only keep up a creamy appearance of a mixture of chalk and water by frequent stirring.

H. M. B. asks: What is the best mode of extracting, from linen or clothing, the stains produced by the tincture of muriate of iron, after they have been washed? Answer: Soak in solution of oxalic acid, and wash thoroughly. Oxalic acid is poisonous when swallowed.

H. J. B. Jr. asks our opinion of a system of hydraulic rams for propelling water for extinguishing fires. Answer: Probably when steam is not used in a building, this would be a good arrangement. But when steam is available, a steam pump could be made more effective and quicker in its operation.

D. A. I. asks: Can you inform me of the best method of coating paper with a coloring matter, such as an aniline dye, the object being to have the coating as thick as possible without scaling off readily? The color at the same time should be soluble in water. I have tried common gum arabic, but, while it prevents scaling off, it is insoluble in water, and is very difficult to work. Answer: Try a very weak solution of gum arabic. This has very slight consistency, and, while preventing scaling, cannot be difficult to work.

A. M. R. asks for information concerning the most recent process of making malleable iron castings, on a large and small scale. Answer: A process of making malleable iron castings is to heat the castings to redness while imbedded in powdered chalk or charcoal, or oxide of iron (hematite, for instance), so as to protect from the action of the air, and decarbonize the cast iron. See Osborn's "Metallurgy of Iron and Steel," and "The Manufacture of Steel," by Grüner.

J. T. B. says: A friend and I have a question *sub judice*. He contends that, in the construction of an ear trumpet, it is of great importance that the material be such that it will increase the sound which it transmits, such as light metal or other material capable of sonorous vibrations while I, on the contrary, maintain that the whole design of the ear trumpet is for the purpose of collecting and transmitting or conducting the sound already produced, and that it should be constructed in bell form merely to collect the sound waves and thus make a direct impression on the *membrana tympani* with greater force. I contend that the form has more to do, with its effectiveness as an aid to hearing, than the material of which it is constructed, and that it being sonorous or capable of vibration does not increase the sound or make it more easily heard. Which is right? Answer: It is generally considered that it makes very little difference of what material the instrument is constructed, or what is its form, provided only that the outer opening is greater than that which enters the ear. The effect of this is to transmit the sound vibrations to portions of air continually growing smaller, thus increasing the intensity, as the vibrations approach the ear.

R. H. asks: 1. In which case has a vessel the greatest buoyancy, when filled with atmospheric air, with compressed air, or when exhausted of air altogether? 2. What is the relative buoyancy? 3. Give a rule for finding the weight which a given quantity of air will support in sea or fresh water. 4. What is the best shape for buoys? 5. What amount of horse power would be required to move a horizontal column of water 3 feet diameter and 30 feet long at the rate of 20 miles an hour, the column discharging horizontally against an open body of water 3 feet below the surface? 6. What resistance would be offered by the open body of water? Answers: 1. When exhausted. 2. Common atmospheric air weighs about ·0765 pounds per cubic foot, compressed air at a pressure of two atmospheres weighs twice as much, and so on. 3. Weight which can be supported by a floating body is equal to the weight of the displaced water. 4. They are usually made can shaped. 5 and 6. We cannot answer these questions without some further particulars being given. If, as we suppose, the questions are asked in reference to propulsion by a water jet, we must refer you to some good treatise on the subject.

T. R. B. asks how to get the exact radius for a link for an engine? Answer: We think you will find full and correct information on this subject in "Link and Valve Motions," by W. S. Auchincloss.

M. H. asks: Will linseed oil mixed with slaked lime do to paint old buildings with? Answer: Linseed oil and slaked lime when mixed together will form a soapy compound, not suitable, we should imagine, for a paint. You want for a body some substance that will not chemically combine with the oil, such as red oxide of iron or red ocher, a favorite color in some localities. You can shade down with whiting or fine chalk.

C. P. asks for the best method of restoring the colors of faded carpets, and removing grease spots. Answer: You can remove grease spots from a carpet by soaking it with benzine or naphtha, by means of a rag. We know of no way to restore the faded colors in a carpet.

W. B. J. asks: What material must I use to make a tough elastic mold for casting center flowers in plaster of Paris? Answer: Use a mold of gelatin, and a cold setting plaster.

C. R. C. asks: How can I make powdered soapstone perfectly white? Answer: The coloring matter of soapstone is due to some metallic oxide in its composition. You might try the action of dilute oil of vitriol upon it in a very finely powdered condition.

G. B. asks: What salts and gums are the most affected by the weather? Answer: The most deliquescent salt, or one that attracts moisture the most, is the chloride of calcium. The gums, on the contrary, have generally the property of parting with their combined water, and drying when exposed to the air.

S. C. A. says: In Colorado the atmosphere is clear and dry. Persons on their arrival there find it very difficult to perform any active labor on account of the difficulty in breathing, until they become acclimated. This is more noticeable in sickly persons, or persons with weak lungs. Is it to be accounted for by there being a less per centage of oxygen in this pure, dry atmosphere? 2. Must the lungs expand to allow one to inhale sufficient air to obtain the required amount of substance to sustain life? Answer: You are right in saying that oxygen is essential to the lives of animals, and that the lungs are provided for the purpose of absorbing it, thus oxydizing the blood and keeping up the standard of animal heat necessary to life. On the mountain hights of Colorado, the air is less dense than that at the sea level, and consequently, bulk for bulk, contains less oxygen. It follows from this fact that, where you live, the lungs must inhale more air in a given time, in order to obtain the required amount of oxygen, and consequently one must breathe faster. It would naturally take some time for the lungs of persons who are accustomed to breathe dense air to become accustomed to a comparatively rarified atmosphere, and this change of air would affect sickly persons or those with weak lungs more than those with sound ones.

J. W. R. asks: By what process can I obtain the greatest amount of carbon? Answer: That depends upon the kind of carbon wanted. Charcoal is one kind, and a very compact variety forms sometimes in gas retorts. Lampblack is nearly pure carbon.

J. F. W. asks: What metal is the best conductor of electricity? Answer: Silver is the best conductor of heat and electricity known.

S. T. B. asks: What battery power will it require to heat red hot a platinum sheet, 5 inches square and the thickness of a sheet of writing paper? Answer: Supposing the platinum to be the one hundredth of an inch thick, about seventy five cups of the largest size of Bunsen's battery, all well connected and in active operation, will be needed.

G. A. asks for a simple method, suitable for class illustration, of producing a current of electricity by light, to show the relations of heat, light, electricity, and chemical force. Answer: Adjust a prism so as to get a well defined polar spectrum, bring the violet rays to a focus on the eye of a fine cambric needle made so hard that it will scratch glass; this will magnetize the needle, proving that light will produce magnetism, by which a current of electricity may be induced in a small coil of very fine wire connected with the binding posts of a sensitive galvanometer; a slight movement of the galvanometer needle each time the magnetized cambric needle is caused to enter the coil, and a movement in the opposite direction when it is withdrawn, delicately prove the correlation of light to magnetism and electricity.

H. W. S. Jr.—In the compound engine, the use of the steam by a second cylinder is secured in a manner better than that which you propose.

F. J. S. says: 1. Is the "Science Record" an illustrated work? 2. What is the approved theory of the magnetic force which controls the needle of a compass? 3. What is the variation of the compass at New York? 4. What is the cause of the variation which the magnetic needle makes with the true meridian? 5. How is lodestone obtained? Answers: 1. Yes. 2. It is quite reasonable to regard the earth as an immense magnet, whose south pole is at its north geographical pole, and consequently attracts the north pole of the needle. 3. About two degrees west of north; the variation is not fixed, and is more or less every day in the year, and frequently several times in a day. 4. It is supposed to be caused by local electric action. 5. It is a valuable lower oxide of iron, and is found in the ground as an ore.

D. M. B.—The machine you describe in your communication does not seem to us to embody any novel features. The fact that a heavy body, when put in motion, requires considerable force to stop it is by no means new. The announcement that you get rid of the resistance is scarcely worthy of comment, as it amounts to saying that you have created power. You must excuse us for not being willing to give up what you are pleased to call the old theory of the lever. If your machine really destroyed resistance, it would accomplish this equally well whether running fast or slow; and in such an impossible machine, a pound weight, hung on a point where the power is applied, would, in falling a foot, raise something more than a pound (suspended there to represent the resistance) through the same space.

E. T. asks: Does the burning of coke affect the iron of a boiler more than coal? Answer: We think not.

D. K. S. asks: Will corn meal put into a steam boiler injure the iron? I find after 6 months use of it (put in to stop a leak) that my boiler is as clean and free from scale as when new. Answer: We think not.

W. H. F. asks: Are any oscillating engines made in this country with cut-off valves? As far as I can learn, they are all made to open and close their ports by the oscillation of the cylinder, and are therefore invariable in their action. I wish to procure, if possible, two oscillators wherein I can regulate the steam as with a link motion. Answer: We have seen such engines as you describe, but it would probably be necessary for you to have them built to order, as we do not think they are regularly in the market.

J. J. R. asks: For a small steam yacht, say 20 or 30 feet long and 5 or 6 feet beam, which is the steadier, fastest and cheaper, as far as machinery is concerned, a side wheel or propeller? Where space is not so much an object as speed and steadiness, which is preferable, an upright or horizontal engine and boiler? Answer: The side wheel will be the steadier, and the screw propeller the faster and cheaper. For such a small boat, a horizontal boiler is hardly practicable, and the upright boiler can be made of large diameter and low, so as not to affect the steadiness of the little steamer.