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 the following week's issue.

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Patent Dealers. Street & Fishburn, Dallas, Texas.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

For best hoisting engine. J. S. Mundy, Newark, N. J.

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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 This is for our information and not for publication.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.

(3435) M. O. B. asks: After a fire stream of water has reached its natural height, how much higher can it be forced by steam fire engine, or in case the nozzle of bose be brought 100 feet higher than the water's level, will that be any advantage in forcing water higher than when hose is connected with steam fire engine at base of building? Give the difference between the nozzle being 100 feet high and nozzle placed at base of building A. With 70 lb. fire pump pressure, you can throw a three-quarter stream a little over 100 feet high, while the hydrostatic height due to the above pressure is 161 feet, so that you could with the hose extended to that height still throw a stream 30 or 40 feet higher, the friction of the hose making the difference between the hydrostatic height and the jet height.

(3436) L. W. B. asks: What process to use to bronze a gun, and bring out the colors on a Damascus barrel, without rusting. And for polishing, which is the best, beeswax or a lacquer; if lacquer what kind? A. The browning of gun barrels cannot be done without rusting. You can blue stain by first cleaning and polishing, and wipe with a solution of one part protochloride of antimony, one part nitric acid, two parts hydrochloric acid, then rub the surface with a piece of green young oak wood until the desired blue color is produced. Then warm and rub the barrel with paraffine or beeswax, or if a varnish is desired, wipe with a little copal on a rag.

(3437) F. H. V. asks: 1. Does the density of the atmosphere have any effect on the focus of a lens? I should think as the atmosphere gets denser it would approach more nearly the density of the lens and lessen the refractive power of it, thereby increasing the focal distance of the lens. Is this correct? A. The density of the atmosphere does affect the focal distance of a lens, but ordinary changes are not appreciable. 2. I have an instantaneous shutter, which has its slide made of vulcanized rubber. Sometimes the slide warps so badly that it prevents the shutter from working. What can I do to prevent the slide from warping? A. Dress the slide a little thinner, so that it will run loose, and varnish with shellac,

(3438) L. F. S. says: On a plantation for sugar that I have charge of as engineer they are using water from a bayou in which there is a quantity of grass and leaves that produce a fermentation in the boilers. It forms a foam that prevents us from knowing the level of water. Can you give me any receipt to stop the fermentation in the boilers? A. You can only lessen the amount of vegetable matter in the boilers by excessive blowing off. Otherwise filtration will be in order, by the construction of an artificial filter bed of sand; or if the soil is sandy at reasonable depths, a system of driven wells attached to the pump would give you cleaner water than the open stream.

(3439) J. D. L. asks how to find the required voltage and amperage for a motor of a certain horse power. A. 746 watts constitute an electrical horse power. A volt multiplied into an ampere is a one horse power watt, so that, for example, 1 ampere multiplied into 746 volts will give you a H. P.; or 1 volt multiplied into 746 amperes would give you a H. P.; or 2 volts multiplied into 373 amperes = 1 H. P; or 373 amperes multiplied into 2 volts = 1 H. P. and so on. Any other given number of volts which multiplied into a given number of amperes will produce 746 = 1 electrical horse power. For such calculations, we refer you to the "Arithmetic of Electricity," $1 by mail.

(3440) R. writes: Please give the component parts of concrete, *e. g.*, how much cement, sand and gravel? A. Best Portland cement, 1 part; clean sharp sand, 1 part; broken stone, egg size, 1 part.

(3441) H. D. P. asks how the face and head are prepared for making a plaster cast of the face and head with nose and ears attached. A. Casting from life is very unpleasant for the person operated upon, and especially when the face is moulded, the pain is considerable. The face is first greased well with vaseline. the eyelashes and eyebrows being well buried in pomade or clay and the small hairs well smoothed down. Whiskers, etc., should be well coated with clay. Quills are inserted in the nostrils for respiration. Then when the patient is lying in a recumbent position, the plaster is laid on. The patient must not move or laugh or speak until the plaster is set. The plaster is mixed with warm water, as the plaster sets better than with cold water. When the cast is sufficiently set, it is removed. This is the painful part of the operation. A hand can be done by thrusting it in a basin of plaster, then placing it on a towel in desired position. As the plaster sets, lay a strong thread on the wet plaster along the hand down the middle finger. A second thread may be laid from the wrist to the thumb. The object of these threads is to make division in the mould, and thus enable the hand to be withdrawn. Now lay on the plaster over the whole to a sufficient thickness. When it is nearly set (still soft and wet), take the ends of the threads, and by jerking them sharply through the plaster, sections are made in the mould. In a few minutes the plaster is hard and the mould may be burst asunder at the divisions cut by the thread and the hand released. Fractures which will probably occur in thin parts of the mould must be cemented carefully in their places after they are dry by a solution of shellac in alcohol. Limbs and even the entire figure can be moulded in this manner. Professional moulders should be employed in taking casts of deceased persons.—From "Scientific American Cyclopedia of Receipts and Notes and Queries."

(3442) G. E. H. asks how to preserve plants, flowers, etc., for a botanical cabinet. A. The following answer is from the new "Scientific American Cyclopedia of Receipts, Notes and Queries." A method of preserving the natural colors of flowers, recommended by R. Hegler in the *Deutsche Botanische Monatshefte*, consists in dusting salicylic acid on the plants as they lie in the press, and removing it again with a brush when the flowers are dry. Red colors in particular are well preserved by this agent. Another method of applying the same preservative is to use a solution of 1 part of salicylic acid in 14 of alcohol by means of blotting paper or cotton wool soaked in it and placed above and below the flowers. Powdered boracic acid yields nearly as good results. Dr. Shouland, in the *Gardeners' Chronicle*, recommends as an improvement in the method of using sulphurous acid for preserving the color, that in the case of delicate flowers they might be placed loosely between sheets of vegetable parchment before immersion in the liquid, so as to preserve their natural form.

(3443) H. G. A. asks: What is the correct atomic weight of oxygen? Is it 8 or 16 when given in a table in which hydrogen is 1? Is atomic weight not based upon hydrogen as the standard unit 1, and as water is 1 hydrogen to 8 oxygen, should oxygen not be represented as 8? I find some tables give hydrogen 1, oxygen 8, while others give hydrogen 1, oxygen 16. Where oxygen is given as 16, should hydrogen not be 2? A. Water contains 2 volumes of hydrogen to 1 volume of oxygen. By Avogadro's law the molecules and their constituent atoms are supposed to occupy the same volume when in the gaseous state. Hence a molecule of water is supposed to contain 2 atoms of hydrogen and 1 atom of oxygen. This gives the basis for hydrogen 1 to oxygen 16 by weight. The relative weights differ, as you indicate, in old and new system tables, but this is compensated for by a corresponding difference in the old and new system formulas.

(3444) J. J. H. writes: Having many calls for covering wood, iron, or steel pulleys and band wheels with a tough manila paper, I can find no cement powerful enough to cause paper to properly adhere to the face of the wheel, when subjected to the proper load and speed. I want something that will cause the paper to keep its place on face of pulley or wheel under all circumstances and conditions of weather, something I could feel safe in recommending to my customers. Do you know of any reliable cement and the process for making it, or could you in any way inform me where I could get it? Should feel very thankful for any information leading to the discovery of the cement I want. A. See Notes and Queries, No. 3213, August 8, 1891, papering a pulley.

(3445) F. G. H. asks how to etch silver. A. The following answer is from the new "Scientific American Cyclopedia of Receipts, Notes and Queries." In press. Silver is etched in a similar manner to brass or copper. Prepare a ground (Callot's) composed of linseed oil varnish and mastic, heat until the wax is melted, filter, and apply with a brush and heat until varnish stops smoking. Cover every portion of the silver carefully with the ground, scratch the design with an etching needle, then etch with the following solution: 16 parts nitric acid (sp. gr. 1·40) is added to 160 parts water. Dissolve 6 parts potassium chlorate in 100 parts of water. Mix the two solutions and etch. Examine the piece frequently, and when sufficiently etched, remove the ground with alcohol.

(3446) W. E. V. asks: How can I straighten pieces of bent or crooked lancewood, out of which I wish to make a fishing rod? Also I have some paraffine wax which has grease in it; how can I take it out? A. Steam the wood and slightly bend in opposite direction from the natural bend and dry. It is cheaper to buy fresh paraffine than to free what you have from grease. Or you can try boiling in solution of caustic soda.

TO INVENTORS.

An experience of forty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequaled facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices, which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., office SCIENTIFIC AMERICAN, 361 Broadway, New York.

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