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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 This is for our information and not for publication.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.

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Minerals sent for examination should be distinctly marked or labeled.

(5404) Constant Reader writes: Will you kindly inform me through your valuable paper the component parts of concrete? I saw in your paper a long time ago (I did not need to use it then) an article respecting a buildi g, I think, in England, where they had used saccharine in some form, which had a hardening effect upon it, which is very important. If so, please state how much may be used in a given quantity. Please give all the information you can, as I want to build a large building with that material, if I can be persuaded it will be sufficiently strong. A. The proportions for concrete vary somewhat, depending upon the nature of the work and required strength. With the best American hydraulic cements, 1 part by measure to 2 parts sand, with an equal bulk of broken stone, makes a good strong concrete for pressure in the foundations of buildings and for walls. This may be varied to 1 part cement, 3 parts sand, 4 parts broken stone, for ordinary subwork. The use of sugar in mortar has been proved highly beneficial to its strength and hardness, and also enables brick laying to be carried on in frosty weather, as such mortar does not freeze at several degrees below the freezing point. The proportion of 2 pounds of common brown sugar to 1 bushel of lime and 2 bushels of sand makes a mortar that sets as hard as cement and much quicker than ordinary mortar. As the sugar is supposed to be a solvent of lime, it should be added to mortar in a thin sirup, the previous mixed mortar being as thick as it is possible to work it. The affinity of the sugar for the lime seems to partially dehydrate it and set free some water that thins the mortar. One pound of sugar to 16 gallons of water with the necessary lime makes a very hard and durable whitewash.

(5405) F. I. says: I noticed on an almanac that the sun's declination reaches 23° 27′ in June and December. Is this correct? If not, please give it correct. At what angle is the moon's path inclined to the earth's equator? What is the distance from earth to moon at apogee and perigee? What is the distance from earth to sun at aphelion and perihelion? A. 23° 27′ 6″ is the declination for this year. The moon's orbit is inclined 5° 8″ from the ecliptic, which gives the moon a variable inclination to the equator of 28° 35′ to 18° 19′ during the course of the regression of its nodes. Its mean distance is 238,840 miles. Its distance at apogee is 252,975 miles and at perigee 221,614 miles. The distance of the sun from the earth at aphelion and perihelion is about 3,000,000 miles over and under the mean distance, which is assumed at 92,897,000 miles.

(5406) G. F. W., New Jersey, asks whether a person can get a stationary engineer's license that lives in New Jersey, and has a position in New Jersey, as I have had the offer of a position as engineer, but I will require a license to secure same. Also inform me what part of New York City I can obtain them. A. Engineer's licenses are given by authorities acting under local laws for use in the district in which they are to be used. You should apply to inspectors in your State, if there are laws requiring license. The license department for engineers for New York City does not issue licenses or certificates to any engineer until he has secured a position in the city. The license department is at police headquarters.

(5407) E. J. P. says: Around the circumference of a circle whose radius is 200 feet, and making four revolutions per minute, a bird is flying. In the center of the circle, and moving his gun with the bird, stands a rifleman. If we suppose the bullet and bird to be each a mathematical point only, and the bullet to encounter no resistance from the atmosphere, where must he aim in order to hit the bird, no allowance being made for gravitation? A. The bird by computation will be flying 83·4 feet per second faster than the muzzle of the gun in the circuit, presuming the bullet to fly at the rate of 1,500 feet per second; $\frac{83{\cdot}4}{1500}$ then is 0·062 of a foot, or ¾ of an inch, that the bullet would strike behind the point aimed at.

(5408) R. R. J. asks: Please answer through your paper the following: How long can a storage battery stand in the acid without injury from sulphate, discharged? What is the remedy for a sulphated battery? Can it be fully restored? A. Sulphating, if bad, is cured by long overcharging with current about 30 p. c. below the maximum. Not the smallest speck of sulphatemust be allowed to remain on the plates. Too great a charging current will cause sulphated plates to buckle. To prevent sulphating give a good charge once a month. The time required for bad sulphating cannot be stated. It varies under different circumstances.

(5409) S. G. S. writes: In your answer to J. W. S. (5318) I fully agree with you about putting the pump chamber in the water when it can be done. I don't fully understand what you mean by saying the only drawback in putting the cylinder 30 feet out of the water is that it is constantly liberating air from the water. A. All water in the natural state contains air in solution, which is entirely liberated under a vacuum; 30 feet above the water is very near the vacuum line. Under its action most of the air is disengaged by expansion and interferes with the economical action of the pump.

(5410) J. B. R. asks: What would be the difference in price between coal at $2.64 per ton and petroleum at about 3 cents per gallon, for an equal number of horse power? Also the name and address of crude petroleum burners on the market. A. Coal at the price named is $\frac{118}{1000}$ of a cent per pound, and if of good quality is equal to 14,000 heat units per pound. Petroleum at price named is four-tenths of a cent per pound and equal to 20,000 heat units per pound. The proportion figures that coal at the price stated is two and three-eighths times cheaper than petroleum for fuel. W. J. Gordon, 235 Broad Street, Philadelphia; Meyers & Osborn, Cleveland, Ohio; Schutte & Goehring, Philadelphia; Aerated Fuel Co., Springfield, Mass., are manufacturers of petroleum burners for boilers. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 623, 624, 673, for illustrated descriptions of petroleum burners.

(5411) C. S. W. asks for a receipt for bleaching or removing the oil from calfskins. A. The removal of oil from oil-dressed leather is practiced as specialties by concerns in the Eastern States, by the naphtha process, by immersing the leather in naphtha in closed vessels for a suitable time, to extract the whole or a part of the oilas desired, when it is subjected to pressure for removing the naphtha and then dried. Bleaching is further promoted by a bath of oxalic acid and acetate of lead dissolved in water. The details of these processes are kept as much as possible a trade secret. We have no literature on this subject.

(5412) W. C. C. writes: When an ordinary charged storage battery is left untouched for about 200 days, no longer can any current be gotten from it. Is this due simply to the oxidation of the spongy lead plate, or does the peroxide on the other plate also undergo change? A. A spontaneous discharge is due to leakage. The material of the cell or surface moisture on the cell may act as a conductor and passes a slight current, which slowly exhausts the charge. Sulphating also takes place. A wet surface under the cells also tends to discharge them by acting as a conductor.

(5413) G. B. C. asks: What is the best thing to clean nickel plating, bicycles for instance, and to prevent their rusting? A. Polish the nickel plating with a paste made of vaseline and rouge and wipe the polished surface with a cloth moistened with vaseline.

(5414) C. H. McD. asks what to mix red lead with in order to make it stick to storage battery plate instead of using flannel. A. An excellent plan is to mix the red lead with 10 per cent sulphuric acid, to apply it as a paste to the roughened plate and holding it in position with parchment paper or other material to form the plate. After forming, remove the paper. There is no available cement for the purpose.

(5415) M. D. asks for proportions of bicarbonate of sodium, tartaric acid and flour to make baking powder. A. Mix two parts tartaric acid, three parts sodium bicarbonate, and three parts powdered starch, all parts by weight.

(5416) J. W. L. says: Can you inform me how pearl is colored to become smoked pearl? A. The smoked pearl is dyed after finishing, with aniline and other colors, and then polished.

(5417) R. B. S. says: I have a circular glass plate 18 inches in diameter and I wish to drill a ½ inch hole through the center. A. The hole can be cut with emery and water fed into a copper or brass tube revolved in a guide of wood or metal fastened to the glass with wax. The tube may be revolved between the hands or by a bow string; in the latter case a center should be fixed to the top of the tube by which to hold it in position when the bow string is turning it.

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