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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 This is for our information and not for publication.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.

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

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(7689) J. W. B. asks for the composition of the materials used in making the electro-polishing cloth; it is a cloth filled with something, and is used to polish all kinds of metal, silverware and glass. Also the composition of the magical sponge used for the same purpose. A. Dissolve in 20 ounces of water 4 ounces of soap and gradually add 2 ounces of pumice stone or finely powdered emery. Work this well into coarse cloth with the aid of a sponge. For silverware and glass use jeweler's rouge instead of pumice stone and emery. We are unable to give you any information regarding polishing sponges.

(7690) L. E. T. asks: Why is lightning always visible around the horizon, never being seen directly overhead? A. In answering this question, we should, in the first place, express a doubt of the statement that lightning is never seen directly overhead. It is true that people very rarely look directly overhead; but if they did, we think they would sometimes see the lightning flash across the zenith from one part of a cloud to another part. By far the greater number of lightning flashes are from one cloud to another, and but few from the cloud to the earth. Now to answer the question: It is a fact that most of the lightning flashes are toward the horizon. This is due in general to the fact that the earth around us seems to be a plane and the sky seems to be a dome. A storm cloud moves over the surface of the earth at the same distance above it, disregarding inequalities. When first seen, it is perhaps twenty miles away from the observer in a straight line. It is then seen on the horizon. When the cloud has moved twenty miles, it is directly overhead. It has seemed to rise from the horizon to the zenith, but its actual motion has been along the earth's surface. Its apparent rising is optical, only, and not real. The lightning which plays over the face of the cloud during this time shares the same optical change, and many of the flashes seem to go toward the ground. This appearance of downward motion of the lightning is also an illusion. The passage of a lightning flash is instantaneous, and we in our minds assign a direction to it. It is possible to train one's self to see the flash go up from the earth to the cloud. Prof. Snell, of Amherst, used to say to his students that he always saw the lightning flash up from the earth to the cloud. Another effect of projecting the motion of the cloud, which is nearly horizontal, against the concave dome of the sky is to cause the apparent velocity of the storm to increase very rapidly as it comes near us. The cloud seems to rise very slowly at first and to move much more rapidly as it comes over our heads. A gathering storm may increase its velocity of progression, but a thunderstorm which may travel several hundred miles before it uses up its force, is visible above any one horizon for a small portion of its course. Its actual motion, therefore, is quite uniform. Its acceleration is due to the fact that it is much nearer to the observer when it is nearly, or quite, over his head.

(7691) W. S. L. writes: 1. Have read your description of the Jeanty battery. 1, What voltage will each cell give and what amperage on short circuit? How many cells will be required to charge storage battery? A. We have no knowledge of the Jeanty cell beyond what is contained in the SUPPLEMENT, No. 1225, translated from the French journal Cosmos. It is however a gravity cell, and will give an E. M. F. of a little over one volt. Its amperes will vary with the total area of the zinc and copper plates used and the distance between them. This cell can be used for any purpose for which the gravity cell can be used. In charging storage cells, five of these cells will be required for each two storage cells. We do not know whether these cells have been introduced into the United States or not. 2. How many cells of storage battery and what size for one, two, and three ten candle power lamps? A. Ten candle power lamps are made for a great many different voltages. To light any lamp by a storage battery, take half as many cells as the voltage of the lamp. The size of the cell determines the ampere hours it will give, that is, the length of time it will light the lamps. Without knowing what current the lamps use, we cannot tell the number of cells required.

(7692) F. A. W. writes: I would like to ask a few questions in regard to the primary battery Jeanty that you illustrate in issue of June 24, 1899. What is the E. M. F. of battery? Are they made in different sizes? If so, what is the size and weight of cells of different capacity? I am looking for a primary that I can operate a lamp for a stereopticon outfit. Can this cell be used successfully to charge storage battery? A. See answer to last query. You will require about fifty of these cells to light an arc lamp for a stereopticon. It is of course possible to use a battery for a stereopticon, but it is an expensive mode of getting light, both in labor and materials. Where the current for incandescent lighting cannot be had, there is no better light for a stereopticon than the calcium light. Many prefer it for its softness, even when the electric light can be had.

(7693) C. B. M. writes: In experimenting with electric detonators for blasting, etc., I wish to procure some data regarding same, such as resistance of platinum wire, heat generated, amount of current required, etc. A. The construction of an exploder with which to set gunpowder on fire is not difficult. Take two pieces of rather coarse copper wire, No. 14 or 16 will answer, and join the ends with a piece of rather fine platinum wire, No. 26 or 28 will answer. The platinum and copper wires should be joined by twisting rather than by soldering, and not more than a quarter of an inch of free platinum wire is needed between the copper wires. The other ends of the copper wires are to be joined to the battery. The platinum wire is buried in the powder to be ignited. When the circuit is closed, the electric current heats the platinum wire to redness, and this sets the powder on fire. A couple of cells of dry battery should be sufficient. The resistance of platinum, is nearly 5¾ times that of copper, size for size.

(7694) W. F. D. asks: 1. Is there any known substance (or substances) through which electricity cannot pass? If so, please name them? A. Any insulator fulfills the requirement of this question. There are many of these. Those in common use are glass, mica, porcelain, slate, India rubber, gutta percha, vulcanized fiber, paraffine, paraffine oil, and various other oils, both of animal and vegetable origin. These are all high insulators. 2. What is the most economical method of producing it for experimental purposes? A. There is no single substance of the character referred to. Each of the substances we have named above has its own process of manufacture. 3. What is the latest theory concerning the above? A. A substance which offers so high a resistance to the passage of an electric current that practically no electricity can pass through it, is called a non-conductor, and may be used for insulation.

(7695) W. P. C. asks: What length of spark must an induction coil give to successfully operate an X-ray tube? A. Coils giving a spark of an inch or even less in length have been used to produce X-ray pictures. This is due to the fact that the effect of the rays upon the plate is cumulative, and by prolonging the exposure a picture can be made with a small tube and small coil. A small coil will not operate a large tube to advantage. For successful work in penetrating the thicker portions of the body, a coil giving a spark of even fourteen inches is used.

(7696) J. T. M. asks: Will you oblige me by giving me the address of some house which can furnish all necessary material for making the electric motor which is described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 641? How can this machine be made to produce an electric light, if at all? A. The machine described in SUPPLEMENT, No. 641, was designed for a motor. If power is applied to it and it is turned at full speed, it may produce current as a dynamo, and it may not. Many little machines will not excite their own fields. You can use a battery to excite the field. It then will generate a current and will probably light a miniature lamp. For dealers in materials see our advertising columns.

(7697) G. B. O. asks: Will two equal waves of light or sound, coming from opposite directions and meeting each other, cause darkness, or stillness, respectively? A. If two waves of any sort meet each other in opposite phases, as, for instance, the crest of one falling into the trough of the other, these waves will destroy each other. This is called the interference of waves. It may be observed in water, and produced in sound, light, and electric waves. See any text book of physics.

(7698) M. R. M. asks: The way to find the magnifying power of a telescope, field and opera glass, and, so doing, your kindness will be thoroughly appreciated. A. For the magnifying power of telescopes, divide the focal length of the object glass in inches by the focal length of the eye piece in inches, if a single lens. With Huygenian, Ramsden, or terrestrial eye pieces, the method of obtaining the magnifying power is illustrated, with the forms and combination of the lenses, with the rules, in SCIENTIFIC AMERICAN SUPPLEMENT, No. 399, 10 cents mailed. The magnifying power of an opera glass is best obtained by comparison of one of the pairs of glasses by direct vision of the other eye on a well defined object.

(7699) G. M. asks: Will you kindly inform me whether the armature can be wrapped with eleven coils instead of twelve in the simple electric motor described in SUPPLEMENT, 641? A. You need not rewind your armature because you have room for but eleven coils instead of twelve as designed. Make a commutator with eleven bars, the same as the number of coils, and proceed in other respects according to the directions in SUPPLEMENT, No. 641.

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