cries, not merely of books. A beautiful photogravure of Professor Schorlemmer is used as frontispiece. While chemistry is, in many ways, a disappointment, the present work will be found a most valuable contribution to chemistry from an almost new aspect.

THE TELEPHONE HANDBOOK. By Herbert Laws Webb. Chicago, Ill.: Electrician Publishing Company. 1894. Pp. 146. Price $1.

This little book is quite clearly described by its title. It is compactly printed, adequately illustrated and contains an index. The subject is not very deeply gone into, and we believe its descriptions of telephone practice, with the accompanying diagrams, will be of interest and value to many.

MANUAL OF PHYSICO CHEMICAL MEASUREMENTS. By Wilhelm Ostwald. Translated by James Walker. London and New York: Macmillan & Co. 1894. Pp. xii, 255. Price $2.25.

This admirable work on measurements derives interest from being, in a great measure, a description of experiments. It is an excellent illustration of what we are growing to recognize as German thoroughness, all the minor points of the work being as closely considered as the other portions. It differs from recent works on the same subject that we have had to review in precisely this thoroughness and in the utilization of the best methods rather than the simplest methods, the latter attaining, to our minds, often an almost vicious importance in the American treatment of inductive work in science. In this work the author designs to tell how work can be well done, not merely how the mere forms of work can gone through most readily.

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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 This is for our information and not for publication.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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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.

(6317) W. S. asks: 1. What is the horse power of a cylinder of steel 3 inches long, 3½ inches wide, revolving at the speed of 15,000 revolutions a minute on a ⅜ inch shaft? What must the speed of the cylinder be to generate 1 horse power? Is it true that the higher the speed, the less power you get? If it is true, how is it that the De Laval steam turbine generates 20 horse power at 30,000 revolutions a minute? A. The solid cylinder while revolving at the high velocity stated would have 2¼ horse power by its momentum alone, which would diminish to 0 in a few moments by the giving out of its unsustained power. A little less than one-half the speed will be equal to one horse power under the same conditions. The power derived from momentum of a mass or weighty body increases with velocity, and when the velocity is sustained by a power, as in an electric motor, [steam turbine, or impact water wheel, the power is also sustained in terms of the factors of momentum and velocity.

(6318) M. H. J. writes: Will you please inform me what will be the effect of loose steam turned in one of the patent drying kilns in case of a fire? I refer to drying kilns such as are built by the Sturtevant Dry Kiln Company, the Reliance Patent Dry Kiln Company, and the Standard Dry Kiln Company. A. Steam is an extinguisher of flame, and if turned into a drying kiln on fire, will extinguish the flame, and finally extinguish the ignited wood, if kept on long enough, and the kiln thoroughly saturated with wet steam. The only difficulty that might arise will be in turning off steam before the ignited wood is cooled, when the admission of air may again start the flame.

(6319) E. R. asks: Why is it that brick chimneys always lean toward the north after they have been several years built? Also, how to find the length of the outside line of a segment of a circle when the length of the chord and rise of arc are known. A. Mortar in walls and chimneys is subject to change of constituents by the presence of moisture and carbonic acid gas in the atmosphere. The mortar, which at first is a hydrate of lime and sand, gradually changes to a carbonate in its lime element; thereby increasing its bulk to a small extent. On the storm-wet sides of chimneys subject to repeated changes of temperature by sunshine, the process of the elemental change probably goes on somewhat faster than on the shady side; which, with the additional change due to a slight disintegration of the mortar by the continual change of temperature on the sunny side, gradually lifts one side faster than the other, producing the observed cant in chimneys and columns. The internal heat of a chimney cannot be assigned as a cause of unequal expansion of the sides, because it is of equal effect on all sides. For length of arc, multiply square root of sum of square of chord and four times square of versed sine by ten times square of versed sine; divide this product by sum of fifteen times square of chord and thirty-three times square of versed sine; then add this quotient to twice chord of half arc, and sum will give length of arc very nearly. This rule is worked out with an example in Haswell's "Engineer's Pocket Book," chapter on mensuration, $4 by mail.

(6320) G. W. asks: How long would a tank containing ten cubic feet of compressed air, at a pressure of two hundred pounds, run a one-half horse power motor? What would be the most suitable motor to use in this connection? What power would a twelve foot windmill develop at 50 revolutions per minute? A. At 200 lb. pressure the cylinder will contain 14⅓ volumes or 143 cubic feet of free air. It requires 12 to 14 cubic feet of free air per horse power in small engines, so that the time could not exceed a 10 minute run, unless the air can be heated before entering the engine to about 300° Fah., when the time could be extended to 15 minutes. The most economical form of steam engine is the best air motor. A well designed windmill of the size and at the speed named should develop ¼ horse power.

(6321) G. W. P. writes: My line wire terminates at each end in a tensional diaphragm of raw hide for signaling purposes, the wire being suspended from loops of hemp cord, instead of using the usual insulators, the insulation being secured by the perfect dryness of everything in this climate for most of the year. 1. Would such an arrangement hinder the working of the telephone over the same wire? A. Your line will answer, we think, for electric telephoning. 2. Does an iron pump stock furnish an efficient grounding medium, the supply pipe of course ending in water? A. Yes.

(6322) F. C. W. asks: How can I change the shape of a piece of aluminum? Can it be melted and cast in moulds the same as lead, or will it have to be worked the same as wrought iron? A. Aluminum can be hammered, rolled, and drawn the same as brass, only requiring more frequent annealing, which should be at low temperatures, 400° Fah. makes it soft enough for ordinary working. It can be easily cast in iron moulds for ingots, and in sand moulds with patterns; an ordinary plumbago crucible is used; flux is not needed, but common salt only is used when scrap metal is to be melted.

(6323) I. S. asks: I have four storage cells, each having 72 square inches positive plate. What is the best kind of battery, and how many would it take to charge them? I have used gravity battery and found it very unsatisfactory. A. You will require a current of 3 amperes to charge your battery. You may use a bichromate battery for the purpose. It is better to use a mechanically generated current for economical reasons. The gravity battery is cheaper than the bichromate, but is much slower.

(6324) G. A. W. F. asks: How many and what gases enter into the composition of air? Is there any truth in the alleged discovery of a third gas as a component part of air, in addition to those now recognized, viz., oxygen and nitrogen? A. We refer you to our SUPPLEMENT, No. 977, "Chemistry at the British Association," for some notes on the new gas, one of the most interesting discoveries of the year.

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