

interest all students of technology as well as manufacturers. The author has devoted a chapter to the methods used in making the many analyses of raw and finished products.

DICTIONARY OF CHEMICALS AND RAW PRODUCTS USED IN THE MANUFACTURE OF PAINTS, COLORS, VARNISHES AND ALLIED PREPARATIONS. By George H. Hurst, F.C.S. London: Scott, Greenwood & Co. 1901. 8vo. Pp. 382. Price \$3 net.

The need of a dictionary of this kind is emphasized by the loose nomenclature of raw materials used in the paint and varnish business. Mr. Hurst's compilation is a most valuable one. It is thorough and accurate, and the matter is well presented. It is a valuable book.

A B C OF THE TELEPHONE. By James E. Homans, A. M. New York: Theodore Audel & Co. 1901. 12mo. Pp. 335. 268 figures. Price \$1.

It is surprising what an excellent book can be produced at such a low price. Some of the illustrations are very poor, but many of them are excellent and the diagrams are exceedingly clear. The theory of the subject is described and the practical details are given. Many special types of instruments are shown. Typographically the book is a satisfactory one, and the binding, black and yellow with yellow type, is very effective.

THE INDUCTION MOTOR. A Short Treatise on Its Theory and Design. With Numerous Experimental Data and Diagrams. By R. A. Behrends. New York: American Electrician Company. 1901. 8vo. Pp. 105. Price \$1.50.

The induction motor has received comparatively little attention from competent engineers. The few whose experience and knowledge would entitle them to speak with authority on this subject are deterred from publishing by commercial reasons. The author has made the induction motor the subject of early and special study. The subject is treated mathematically, and will certainly prove of value to electricians and those who are engaged in practical work.

EXPERIMENTAL CHEMISTRY. By Lyman C. Newell, Ph.D. Boston: D. C. Heath & Co. 1900. 12mo. Pp. 435. Price \$1.10.

There seems to be no end in the making of textbooks, and the one before us is one of the best we ever remember to have seen. We are glad to note the omission of many illustrations which have been handed down from time immemorial. The way in which the matter is arranged and presented is excellent, and the glossary of chemical terms is an excellent one. The problems are also numerous. It is a thoroughly modern and valuable textbook. A teacher's supplement is also issued.

A SHORT MANUAL OF INORGANIC CHEMISTRY. By A. Dupré, Ph.D., and H. Wilson Hake, Ph.D. London: Charles Griffin & Co., Ltd. Philadelphia: J. B. Lippincott Co. 8vo. Pp. 391. Price \$3.

The third edition of this excellent manual retains the main features of the preceding edition, but has nevertheless undergone some very material alterations. The introductory portion deals with general principles and is an excellent exposition of general chemistry. Then follows a description of the properties of the various elements and their compounds. The scheme of properties of any element or compound is an excellent feature.

ATOMS AND ENERGIES. By D. A. Murray, A. M. New York: A. S. Barnes & Co. 1901. 16mo. Pp. 202. Price \$1.25.

This essay aims to give not a theory, but a discussion. In dealing with the movements of atoms the author has endeavored to not postulate any new force or factors of any kind, but simply to take the energies and laws which we now know, and to compute their effects in the atomic distances. The field entered is new and certainly large, and all students of chemistry and physics will be glad to read such a carefully considered discussion.

THE ELEMENTS OF ASTRONOMY. By Sir Robert Ball, LL.D., F.R.S. New York: The Macmillan Company. 1900. 16mo. Pp. 183. Price 80 cents.

What has long been needed is an elementary treatise on astronomy which would present the subject in an interesting manner. There is no one today more qualified to do this than Sir Robert Ball, and he has produced a most admirable little book which is well illustrated. The work, while it contains some mathematics, can be understood by those who have no special knowledge of mathematical science.

Whittaker's Revolving Planisphere, showing the principal stars visible for every hour in the year, consists of a circular disk on which the principal stars are seen and from our latitude are clearly indicated. By means of an exceedingly simple arrangement the disk may be made to revolve in such a way as to show only those stars visible in any given time. In addition to this may be shown the varying time of sunrise and sunset during the whole year. The price of the Planisphere by mail is 65 cents.

In "Six Months Abroad on Three Hundred Dollars," reviewed in our issue of July 13, the accommodations on the ocean voyages were second-class, and not steerage as stated.

Business and Personal Wants.

READ THIS COLUMN CAREFULLY.—You will find inquiries for certain classes of articles numbered in consecutive order. If you manufacture these goods write us at once and we will send you the name and address of the party desiring the information. In every case it is necessary to give the number of the inquiry. MUNN & CO.

Marine Iron Works, Chicago. Catalogue free.

Inquiry No. 1062.—For manufacturers of miniature magnifying photographs.

For logging engines. J. S. Mundy, Newark, N. J.

Inquiry No. 1063.—For hand and power core-cutting machines.

TURBINES.—Lefel & Co. Springfield, Ohio, U. S. A.

Inquiry No. 1064.—For automatic machinery to make a machine for flange trimming, knurling and curling thimbles.

"U. S." Metal Polish. Indianapolis. Samples free.

Inquiry No. 1065.—For manufacturers of iron try molds for making small aluminum castings; also mills to grind scrap aluminum.

WATER WHEELS. Alcott & Co., Mt. Holly, N. J.

Inquiry No. 1066.—For advertising novelties of the Buffalo Exposition.

Yankee Notions. Waterbury Button Co., Waterbury, Ct.

Inquiry No. 1067.—For makers of chilled iron rolls. (New York City, if possible.)

Machine chain of all kinds. A. H. Bliss & Co. North Attleboro, Mass.

Inquiry No. 1068.—For fans for cooling purposes, run by spring motor.

Handle & Spoke Mchy. Ober Mfg. Co., 10 Bell St., Chagrin Falls, O.

Inquiry No. 1069.—For small motor to run a fan or cream freezer to one-quarter horse power.

FOR SALE.—Old numbers SCIENTIFIC AMERICAN. E. Rowe, Indiana, Pa.

Inquiry No. 1070.—For manufacturers of an asbestos hood to cover ice water pitchers in hotels, etc.

Sawmill machinery and outfits manufactured by the Lane Mfg. Co. Box 13, Montpelier, Vt.

Inquiry No. 1071.—For manufacturers of the new change-making machines.

For Sheet Brass Stamping and small Castings, write Badger Brass Mfg. Co., Kenosha, Wis.

Inquiry No. 1072.—For fountain pens for delicate recording instruments.

Rigs that Run. Hydrocarbon system. Write St. Louis Motor Carriage Co., St. Louis, Mo.

Inquiry No. 1073.—For dish-washing machines.

FOR SALE OR ON ROYALTY.—Self-feeding hammer patent. C. T. H., 377 So. Grant Ave., Denver, Col.

Inquiry No. 1074.—For the manufacturer of the "Victor" self-buttoning collar button.

Ten days' trial given on Daus' Tip Top Duplicator. Felix Daus Duplicator Co., 5 Hanover St., N. Y. city.

Inquiry No. 1075.—For umbrellas to open and close by pressing a button or spring.

SAWMILLS.—With variable friction feed. Send for Catalogue B. Geo. S. Comstock, Mechanicsburg, Pa.

Inquiry No. 1076.—For manufacturers of novelties.

Gear Cutting of every description accurately done. The Garvin Machine Co., 149 Varick, cor. Spring Sts., N. Y.

Inquiry No. 1077.—For tubes or boxes for mailing liquids; also glass vials and labels for same.

See our Collective Exhibit—Section "S," Electricity Building, Pan-American Exposition. Standard Welding Company, Cleveland, Ohio.

Inquiry No. 1078.—For a small, second-hand electric plant capable of running one hundred 16 c. p. Edison lamps, with or without steam engine.

FOR SALE.—New process for making oil with fish and fish offal is offered for sale or licenses in United States of America. Address Foreign, Box 773, New York.

Inquiry No. 1079.—For manufacturers of large wooden wheels, 7 feet in diameter, capable of carrying load of three tons.

The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Refrigerating Machine Company. Foot of East 135th Street, New York.

Inquiry No. 1080.—For a drill capable of drilling hard metal.

NOVELTIES.—Manufacturers and firms trading in novelties of every description and wishing to place their goods on the South African market should communicate with the undersigned, enclosing catalogs and lists. H. E. James, Agent and General Importer, P. O. Box 746, Pretoria, Transvaal, S. A.

Inquiry No. 1081.—For an apparatus for collecting gas from blast furnaces and using same for operating gas engines.

FOR EXCHANGE.—Unincumbered real estate at cash valuation of three thousand dollars to exchange for patent: entire patent or state rights. Give full description of patent. For particulars address C. E. Newton, 57 Ruggery, Columbus, O.

Inquiry No. 1082.—For apparatus for condensing milk and fruit juices.

WANTED.—A thoroughly competent engineer to push in United States of America a new, efficient and economical process, for dealing with large benefit towns' sewage and refuse waters from industry. Address France, Box 773, New York.

Inquiry No. 1083.—For apparatus to utilize wind power to compress air.

PATENT FOR SALE.—American "Patent" right of a new machine for cutting edges of books, etc. European patent has just been sold. Millions of dollars in it. Price, \$40,000. Only principals please apply to A. R., 100, Box 773, N. Y.

Inquiry No. 1084.—For manufacturers of toys and children's novelties.

Inquiry No. 1085.—For small air compressor operated by sprocket and chain, or otherwise from axle of automobile, to compress two-thirds of a cubic foot of air at normal pressure per minute, up to 250 pounds per square inch.

Inquiry No. 1086.—For manufacturers of porcelain shutter knobs.

Inquiry No. 1087.—For manufacturers of ice-making machinery.

Inquiry No. 1088.—For machinery of latest type for manufacture of sandpaper.

Inquiry No. 1089.—For machinery for crushing and screening flint and garnet.

Inquiry No. 1090.—For scientific, chemical and microscopic apparatus for college laboratory.

Inquiry No. 1091.—For a stern paddle wheel steamer capable of navigating in 16 inches of water.

Inquiry No. 1092.—For parties to make a folding pocket dinner basket of pasteboard or imitation leather.

Inquiry No. 1093.—For manufacturers of Paris skirt and shirt waist supporters; also for general mail order goods.

Inquiry No. 1094.—For manufacturers of rudder and motor combined for propelling row boats.

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.

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.

(8278) F. A. G. asks: Can you recommend to me a satisfactory advanced textbook in electricity? Should like one containing an account of phenomena, both old and new, together with a clear mathematical exposition of the facts. Nipher's "Electricity and Magnetism" is sometimes used as a textbook, but its clearness is somewhat compromised by the author's frequent introduction of conversion factors, and he seems to have a fear of employing such generalities as Green's theorem, Poisson's equation, etc. Maxwell's work rather represents the opposite extreme, being too general for my purposes. An ideal book would be Thompson's "Elementary Lessons in Electricity and Magnetism for Advanced Students." A. The familiarity with the subject of electricity which your letter exhibits would indicate to us that you can hardly find what you require in any single textbook. You seem to have reached the stage where your reading of necessity would branch out into the special treatises and papers read before the learned societies. At any rate, we do not know any single, comprehensive treatise to recommend to the man who has passed beyond the use of Nipher and Maxwell. We would name certain works of a special character which may meet your need: Cummings' "Theory of Electricity," \$2.25; Gerard's "Lessons in Electricity," \$2.50; Gray's "Absolute Measurements," Vol. I, \$3.25; Vol. II, in two parts, \$6.25; Gray's "Treatise on Electricity," Vol. I, \$4.50; Fleming's "Alternating Current Transformer in Theory and Practice," Vol. I, \$5; Vol. II, \$5; Jackson's "Textbook on Electromagnetism," \$2.25; Steinmetz's "Theory and Calculation of Alternating Current Phenomena," \$2.25; Sir William Thomson's "Mathematical and Physical Papers," Vol. III, "Electricity and Magnetism," \$5.50; Sir William Thomson's "Papers on Electrostatics and Magnetism," \$5; Whetnam's "Solution and Electrolysis," \$1.00; Luptke's "Electro-Chemistry," \$2.50. We could follow these with a long list of treatises upon the various sections of electrical engineering, but we do not understand that your wishes go out in that direction.

(8279) G. M. M. writes: I would like to have you explain Query 8252 to L. H. E. in your valuable paper. "To find the horse power of an electric motor, measure the amperes it is taking and the voltage of the current," etc. This may be very plain and simple to some, but to amateurs it is a problem difficult to understand. How are we to measure the amperes and volts, except perhaps by getting costly instruments? A short and simple rule for the measurements (if there is any) of electrical units would be of greater assistance to students than what to do with the product when obtained. A reply through Notes and Queries would help several of us and perhaps L. H. E. as well. A. If one wishes to measure the weight of a bar of iron, he will provide himself with standard weights and a balance; if he would obtain its length, he must have a standard rule. So it would seem apparent that if one would know the amperes and voltage of the current an electric motor is using, he must have the proper instruments for measuring these factors of the current. This was not involved in query 8252. The request there was simply for the rule for finding the horse power of an electric motor. That question was properly and plainly answered. The query above goes further and asks a rule for finding the volts and amperes of a current. There are a number of methods of measuring these which are used in the laboratory, but they would not be intelligible to those not already practised in measuring electrical quantities, and such have them in their laboratory manuals. The only practical way is to obtain the proper measuring instruments and measure them just as any other measurement is made. When the quantities are measured you may be able to see through the rule for their use.

(8280) C. O. P. asks: 1. Will you please tell me how many cells of sal ammoniac porous cup batteries it will take to excite the field of the alternating current dynamo described in SCIENTIFIC AMERICAN, September 11, 1897? A. The sal ammoniac battery is not adapted to use for the purpose you mention. It cannot furnish a steady current for any length of time. It is only fitted for such places and uses as call upon it for action a moment and then allow it to rest longer than it has worked. In this respect it is like some people. To understand this feature

of batteries look up polarization of batteries in some textbook. Batteries which polarize easily are only adapted to use upon open-circuit work. The potassium bichromate cell may be used for exciting the fields, or the Edison-Lalande cell. A battery in which polarization is prevented is the sort to use upon a closed circuit, since it can give a constant current without diminution till its materials are used up. 2. Will you explain how I can rewind to make it direct current, and about how many volts and amperes will it develop, both as an alternating current and direct current? A. No change is required in the winding to adapt the machine to the direct current. A commutator must be put in place of the collector rings, and the windings of the armature must be connected to the segments of the commutator. We cannot give the volts and amperes which the machine will give. 3. Where can I procure data for making a fan motor that will run with batteries and using an 8 to 10-inch fan? A. You can find the full directions for making the motor and also a good form of battery with which to run it in Parkhurst's "Motor Building for Amateurs," price \$1 by mail.

(8281) G. T. T. asks: I would like to know something about the action of zinc on iron. That is, we are told (could not say how true) that zinc in a water pail will keep same from rusting, and I believe that this is proved. Could you explain why this is so? A. We have heard the statement made many times that zinc will protect iron from rusting. We have not taken the trouble to verify it. If the fact is as stated, the result is not due to any action of the zinc upon the iron. Zinc has no direct chemical action upon iron. Whatever action there may be is due to an electric current set up in the water between the zinc and the iron. The result is a decomposition of the water. A small electric battery is thus formed in the water pail. The zinc is positive and the iron is negative. When the water is separated into its oxygen and hydrogen, the oxygen being electro-negative goes to the positive zinc, and the positive hydrogen goes in a similar way to the negative iron. In this way the oxygen which would rust the iron (since iron rust is iron oxide, a compound of iron and oxygen) is kept away from the iron and the iron does not rust. The zinc is oxidized and disappears.

(8282) E. N. F. asks: 1. Would not 17 cells, each of 2 1/2 volts, 0.4 ampere, connected as per diagram, give the same results as though there were 12 of 2 1/2 volts and 2 1/2 amperes each and all connected in series? A. No. You show twelve coils in series connected to a multiple arrangement of four single cells on one side and to the line on the other side of the series. Now the E. M. F. of the twelve in series will be twelve times that of the single cells at their side. The line is in shunt with the single cells. The E. M. F. of the twelve cells will send a current which divides between the line and the multiplied cells in the inverse ratio of the resistances of the two. The cells in series will therefore send current back through the cells in multiple, and most of the current will be lost in this way; since the resistance of the four cells in multiple is very small. 2. What reason is there why primary cells should not be overcharged? A. We presume you mean by "overcharge" the use of too strong a solution. If so, the answer is that the solution will act too fiercely upon the positive plate and much of the energy will be wasted as heat in the liquid of the cell. 3. Is it not possible for a motor taking 100 watts to develop more than 100-746 of a horse power? A. We do not see how a power can produce more effect than it has in itself. A horse power can do so much work and no more. 4. Could a 1-6 H. P. motor run a small automobile large enough to hold a 125-pound boy? If so, how many times should it be geared down, driven wheel being 2 feet diameter and driving pulley 2 inches? A. Yes; on a good road, at a moderate speed. The gearing must be made so as to rotate the wheels of the carriage as many times as are necessary to drive it at the number of miles per hour desired. 5. Will you please tell me how to make the luminous substance that is put on clock dials to make them visible at night? A. This question was answered in the Query column of SCIENTIFIC AMERICAN Vol. 85, No. 1, under Query No. 8249.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending

July 16, 1901,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Table listing inventions and their patent numbers: Advertising device, C. H. Keyser... 678,669; Air compressor, E. Hill... 678,487; Air compressor, C. B. Little... 678,839; Alarm, See Low-water alarm; Apparel, safe-keeping device for wearing, W. Schaller... 678,694; Automobile, L. C. Savale... 678,520; Bag machine, Millhiser & Doeppe... 678,728; Bale band fastening, D. Mullane... 678,761; Baling press, cotton, W. M. Thomas... 678,630; Ballot box, J. A. Linn... 678,786; Band cutter and feeder governor, M. Lafever... 678,838; Bank, coin registering, J. F. Healy... 678,543; Barrel carrier, Metcalf & Bell... 678,416

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