third edition, revised and enlarged. It is well illustrated by diagrams and there are many tables.

ENAMELS AND ENAMELING. By Paul Randau. London: Scott Greenwood & Company. New York: D. Van Nostrand Company. 1900. 8vo. Pp. 188. Price $4.

The book is intended as an introduction to the preparation and application of all kinds of enamels for technical and artistic purposes for enamel makers, workers in gold and silver and manufacturers of objects of art. Until recently the literature on enameling was neglected, but with this book and the one by Cunynghame the field seems to be adequately covered. The directions are straight-forward and the formulas appear to be excellent. It is a book which can be safely recommended.

STUDIES FROM THE YALE PSYCHOLOGICAL LABORATORY. Edited by Edward W. Scripture, Ph.D. Researches in Experimental Phonetics. Observations on Rhythmic Action. By E. W. Scripture. Vol. VII. 1899. Octavo. Price $1.

Dr. Scripture has opened up an entirely new field in psychological research. He has critically studied talking machine records of English poetry, and has shown us that if our concepts of the elementary sounds of language are not altogether wrong, they certainly need revision. It is the opinion of Dr. Scripture that "the correct concept of the English poetical line seems to be that of a certain quantity of speech-sound distributed so as to produce an effect equivalent to that of a certain number of points of emphasis at definite intervals." Our very limited space prohibits an extensive review of Dr. Scripture's work.

DYNAMO-ELECTRIC MACHINERY. Its Construction, Design and Operation. Direct Current Machines. By Samuel Sheldon, A.M., Ph.D., assisted by Hobart Mason, B.S. New York: D Van Nostrand Company. 1900. 12mo. Pp. 281. Price $2 50 net.

The book is intended to be used primarily in connection with instruction in electrical engineering institutions for technical education. It is intended equally as much for the general reader who is looking for information concerning dynamo-electric machinery, of types discussed, as well as a book of reference for engineers. The author is Professor of Physics and Electrical Engineering in the Polytechnic Institute in Brooklyn, and has been very successful as a teacher and a lecturer. He has produced a most excellent book.

IRON CORROSION. ANTI-FOULING AND ANTI-CORROSIVE PAINTS. By Lewis Edgar Andes. London: Scott Greenwood & Company. New York: D Van Nostrand & Company. 1900. 8vo. Pp. 275. Price $4.

There is no more important subject with which the civil and mechanical engineer has to deal than corrosion of iron and steel and the methods of preventing it. The author has done a signal service in preparing such a comprehensive work upon the subject. It is a unique contribution to technical literature, and is a work which we can heartily commend to all who are in any way engaged in building iron and steel structures.

THE TESTING AND VALUATION OF RAW MATERIALS USED IN PAINT AND COLOR MANUFACTURE. By W. W. Jones, F.C.S. London: Scott Greenwood & Company. New York: D. Van Nostrand Company. 1900. 16mo. Pp. 88. Price $2 net.

This little text-book is intended to supplement the larger and more comprehensive works on the subject, says the Preface, but at the same time it is filled with most valuable matter, which interests all who are in any way connected with the paint manufacturing industry. The various processes given have been selected from numbers of others after many years of experience.

PREPARING FOR INDICATION. Practical Hints. By Robert Grimshaw. Second edition. New York: Practical Publishing Company. 1900. 18mo. Pp. 56. Price $1.

Nothing is more annoying than for a mechanical engineer to reach a plant, possibly far out in the country, and find that the engine has to be drilled and the pipe attached. The author prepared the little book before us in order to obviate difficulties of this kind, and to show how necessary connections should be made.

INTELLIGENCE IN PLANTS AND ANIMALS. By Thomas G. Gentry, Sc.D. New York: Doubleday, Page & Company. 1900. 8vo. Pp. 489. Price $2 net.

The present volume is a new edition of the author's privately printed "Soul and Immortality" and is filled with most interesting animal stories. It is unusually impressive, being a collection of strange and curious facts from the life of animals and plants which seem to bear out Mr. Gentry's claim for them of a much higher order of intelligence than is generally allowed them.

TEXT BOOK OF IMPORTANT MINERALS AND ROCKS. WITH TABLES FOR THE DETERMINATION OF MINERALS. By S. E. Tillman. New York: John Wiley & Sons. 1900. 8vo. Pp. 176. Price $2.

This book is a slow outgrowth of efforts to meet the necessities of the United States Military Academy for a convenient text-book of important minerals and rocks. The author has performed a difficult task in a very acceptable manner. The tables are excellent, and tend to afford a ready determination of rocks.

Business and Personal.

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.

(8012) C. H. H. asks: 1. Could you give me a receipt for transferring newspaper or other pictures in which printer's ink is used, the same as letter copying is done? A. Dissolve a stick of caustic potash in 20 fluid ounces of water. Wet the printed matter with it, blot off the excess of water, apply plain uncalendered paper and rub with a hard object. 2. Can I use copper-plated sheet iron in an acetylene gas holder? Would there be any chemical action caused by the gas? A. We do not recommend copper in an acetylene generator. Under certain conditions it may cause an explosive compound to be generated. 3. Is there only one factory in the United States for the manufacture of carbide for making acetylene? A. We believe there is only one. 4. Is there any way of obtaining a fair quality of lubricating oil from petroleum, having an asphaltum basis, without distillation? A. Petroleum and asphalt may make a good tar lubricant for axles or other heavy machinery. We cannot suggest a method of manufacture.

(8013) I. H. M. asks: 1. Wish to build a small dynamo about ¼ horse power (4-pole type preferred). Can you give me dimensions? Have you a SUPPLEMENT describing such a machine? A. See SCIENTIFIC AMERICAN, vol. 77, No. 11, price ten cents. 2. Is the current of an induction coil direct or alternating? A. An induction coil gives an interrupted current. By the construction of the coil the current in the secondary which would be produced by the closing of the primary circuit is suppressed, that is, it does not produce any spark. The spark is produced only when the primary circuit is broken, hence the sparks are all in the same direction. 3. Have you a SUPPLEMENT giving description of an alternating current motor? A No, except the one referred to in answer above. 4. Can the small alternating dynamos used in telephones be changed to direct by changing armature connections? A. Yes, by putting a commutator upon the armature in place of the rings which take off the current. 5. Would it be practicable to build a small 4-pole dynamo with changeable connections, making it both direct and alternating, for experimental work? A. It would be better to build it with a commutator at one end of the armature shaft and the rings at the other, or else with both side by side at the same end. Then connect the wires to either pair of brushes as you please.

(8014) I. C. T. asks: Is permanent magnetism limited? A. No; magnetism is not limited, but the capacity of steel to receive it is limited. 2. What weight in soft iron would a permanent magnet weighing 100 pounds, magnetized as strong as possible, sustain? A. We do not know. Heavy magnets do not support so large loads relatively as lighter ones do. A 1 pound Haarlem magnet has, it is said, supported 28 pounds. A 3½ pound Haarlem magnet has held up 62 pounds. These are extraordinary results, which have not been equaled elsewhere. See Thompson's "Electromagnet," $6 by mail. A 100 pound laminated magnet might hold up 100 to 150 pounds. 3. With 550 volts how many amperes would it require to run a 1,000 horse power motor? A. About 1,500 amperes. 4. Can electric currents of different voltage and different amperage be mixed together? A. Yes; but it would not be a nice thing to do if there was any great variety in the voltages. 5. What is the least voltage and least number of amperes required to run a ⅛ horse power motor? A. With allowance for losses ⅛ horse power is about 100 watts. You can divide this up as you please. If your current pressure is 10 volts, 10 amperes are required; if 100 volts, 1 ampere is required.

(8015) G. K. D. writes: I wish to make a so-called solar microscope for exhibition purposes. If you can aid me in this matter, I shall feel very thankful to you. A. The solar microscope is a very simple piece of apparatus. It consists of a mirror outside the window of a darkened room, usually fastened to the shutter through a hole in which the beam of light is reflected by the mirror. The light then passes through a condensing lens of 4 or 5 inches in diameter and with a focal length of 9 inches. The objective of the microscope is placed near the focus of this condenser. The object to be projected is supported in the proper position in front of the objective, and the image is focused on the screen beyond. The stand of the microscope is not usually employed, since its tube is too long. It would cut off a part or the image from the screen. No eyepiece is used. You would better call upon the teacher of science in your high school, who would show you the whole apparatus, for there is probably one in the high school of your town. The best description of the instrument is to be found in Dolbear's "Art of Projecting," price $2 by mail. Your sketch would not answer the purpose. You could not make one of the size shown. A beam of light so large when condensed on an object would melt it. Nothing could stand it.

(8016) F. L. S. asks how a small Wimshurst machine is connected to a Holtz machine when used to excite the Holtz machine? A. Connect the discharging rods of the Wimshurst to the exciting brushes or the armatures of the Holtz machine. When the Holtz machine is charged, disconnect. A switch can be used for connecting and disconnecting the Wimshurst exciting machine.

(8017) W. O. M. asks: Will you please inform me if the armature of the motor described in SUPPLEMENT 641 will do for a dynamo, provided it has properly designed fields? If so, about what would the current be in volts and amperes if fields were excited from another source? A. The motor of SUPPLEMENT 641 is a dynamo if power be applied to it to drive the armature. It will give more current if the fields are excited from an external source; probably about the same, or nearly the same, current as is required to drive it as a motor.

(8018) W. G. asks: 1. Are better results obtained by including Leyden jars in the circuit of a Roentgen ray tube? A. No Leyden jars are required with an induction coil in operating an X-ray tube. With a static machine the Leyden jars are required and are a part of the machine, always in place when the strong spark discharge is produced. 2. Is thin copper better for the sectors of a Wimshurst than tin-foil and does it decrease the output if air bubbles are under them? A. Any metallic foil will answer for the sectors of a static machine. One metal is as good as another for this use. Aluminium would be preferable because of its lightness and its retention of its polish. 3. Mention SUPPLEMENT fully describing the new Wimshurst; one giving directions to build a machine of suitable size for amateur investigations. A. We have a number of SUPPLEMENTS upon the Wimshurst machine—Nos. 548, 584, 647, 914, 948, and 1131. Price ten cents each.

(8019) W. G. W. asks: Can a fundamental, when sounding, produce undertones as well as overtones under any conditions? If so, what are the laws governing the same? Can you tell me where I can obtain a book which illustrates and describes in detail Chladni's figures? A. Fundamental tone alone cannot produce any other tone except a body capable of sounding in sympathy with its tone is near. Then the same tone is produced by that body. The lower tones to which you refer are probably combination tones, "difference tones," they have been called. You will find them treated in Tyndall's Lectures on Sound, price $2 by mail. Also in Helmholtz's Sensations of Tone, price $9.50. Chladni's figures are given in Tyndall's book, mentioned above.

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