

niun sulphate is added. As the article itself cannot be heated, it will be well to heat the solution of potassium sulphide.

(8790) H. J. K. says: I desire to deposit nickel directly on a wax mold, and to do this it is of course necessary to first make the wax mold conductive. The molds are blacklead first. What I would like to know is, what kind of a conductive coating is best to apply. Some use a solution of nitrate of silver and phosphorus. (Can you tell me how to proceed with this? It is for use in making nickel-faced electrotypes. A. The blacklead (graphite) is applied to act as the conducting surface upon which the metal is deposited. You are evidently misinformed as to the nitrate of silver and phosphorus; these are not used. A good account, with formulae, for the process of blackleading and nickel plating, will be found in the "SCIENTIFIC AMERICAN Cyclopaedia" articles, "Electrotyping" and "Electro-metallurgy."

(8791) E. O. H. asks: Will you kindly inform me what composition pulp or fiber water pails, tubs and trays are made of? Also kindly explain how they are formed or pressed. A. Old paper stock is boiled to a pulp with water. It is then pressed to remove the excess of water and mixed with glue, gum, dextrine, starch paste or rosin size and pressed into oiled molds under heavy pressure. Dry. Then soak with linseed oil and dry with heat. It is usual to add some mineral weighting material to the pulp, such as clay, chalk, barytes, etc.

(8792) F. R. J. asks: How should paper be treated (manila or wood pulp or straw paper) to prevent mold when placed on damp or moist surface? A. Any antiseptic chemical can be used: as these are all poisonous, paper so treated must not come in contact with edibles. Bichloride of mercury, sodium fluoride, carbolic acid, salicylic acid, or benzoic acid are a few of such chemicals. The essential oils are also very good, and would not be poisonous to any extent: dissolve in alcohol and flow it over the paper to be treated. Oil of sassafras is one of the cheapest that can be so used. Oiling or paraffining the paper will also serve.

(8793) P. M. C. says: We desire some cheap adhesive substance that can be used in manufacture of briquettes to contain charcoal and sawdust. A. Coal tar and molasses are the substances used for briquetting, and are both quite cheap.

(8794) H. B. says: In looking over the SCIENTIFIC AMERICAN of October 25, 1902, I notice reference made to the water pail forge. In your reply to 8722, K. T., will you kindly let me know the construction and use of the water pail forge, as we desire to use in shop if it is practicable. A. The "water pail forge" may be easily constructed by placing a sheet of lead in the bottom of a common water pail. It would better be large enough to cover the bottom and have a strip up one side of the pail to the top, to which the positive wire is attached. Fill the pail about half full of a liquid composed of washing soda 10 parts, borax 1 part, and water to a specific gravity of 1.15. Make a couple of notches in the edge of the pail and lay an iron bar across the top of the pail to which the negative wire is attached. Take the article to be heated in a pair of tongs, place the tongs against the iron rod and thrust the article to the desired depth in the water. A pressure of 220 volts is necessary for rapid heating. A rod of iron one quarter inch through will be red hot in a second or two. A large soldering iron is hot in a few seconds. It works too fiercely to be easily controlled, and for this reason it has not come into use in shops. The metal is soon melted and falls in drops.

(8795) E. E. S. desires a method of identifying the element rhodium, also its chemical reactions, which would enable one to test ores for the presence of the above-named substance. A. The separation and detection of rhodium is difficult and requires expert chemical work: it would be impossible to give any simple method of detection, as it is always associated with other metals of the platinum group. There is no book published devoted to the analysis and separation of the rare earths. The information must be obtained by consulting the various standard works on chemical analysis and by looking through the journal literature. Fresenius' "Qualitative Analysis" gives considerable information as to rhodium, as well as on the other rare metals.

(8796) J. W. W. wishes to know what is best for a mold to burn a substance that is red heat that will not crack or give? Have tried wrought iron. Cast sometimes gives or bends. How would fire clay or the same composition as Berlin crucible do? (Can you give me a formula for it? A. Fire clay, mixed with some molder's sand, or kaolin, can be used for making such molds. If mixed with stale beer or ale, it gives a firmer mold than if mixed with water. Phosphate of lime, also mixed with stale beer, gives a very clean, white mold, but is not strong. Thoroughly dry and bake before using.

(8797) B. D. wishes a receipt for a glue which will satisfactorily glue celluloid to wood, such as is used in making draughtsman's tie squares of celluloid and wood. A. A very simple formula recommended for this purpose is to heat glue to boiling, and stir in gradually wood ashes until the consistency is similar to a thick varnish. Use hot.

NEW BOOKS, ETC. ANNALS OF THE ASTRONOMICAL OBSERVATORY OF HARVARD COLLEGE. Vol. XLIV. Part II. Reduction of Observations made with the Meridian Photometer During the Years 1892-98. By Edward C. Pickering, Director of the Observatory. Cambridge: Published by the Observatory. 1902. Pp. 115-216.

How to ATTRACT THE BIRDS. And Other Talks About Bird Neighbors. By Neltje Blanchan. New York: Doubleday, Page & Co. 1902. 8vo. Pp. 224. Price \$1.35.

The author has presented us with a book which tells much of birds that is probably not contained in any of the animal books now so widely read. The title of the work is somewhat misleading, for a goodly portion of the volume is devoted to a popular exposition of the principles of ornithology. The manner in which this book is written is extremely personal. For that reason it is far more readable than a cold description of bird habits. The publishers have seen to it that the work appears in a handsome dress.

THE JOURNAL OF THE DEPARTMENT OF AGRICULTURE OF VICTORIA. April, May, June, July. Published for and on behalf of the Government by Direction of the Hon. John Morrissey, M. L. A. Edited by H. W. Potts, F. C. S., F. L. S. Melbourne. 1902. Pp. 457-535.

THE PAINTER'S LABORATORY GUIDE. A Handbook of Paints, Colors, and Varnishes for Students. By George H. Hurst, F. C. S. London: Charles Griffin & Co., Ltd. Philadelphia: J. B. Lippincott Company. 1902. 12mo. Pp. ix, 248.

In writing this laboratory manual, the requirements of students who can attend practical courses in the subject of painting at some technical school or college, as well as those students who, although unable to attend such courses, desire the benefits obtained from a course of experimental work, have been kept in view. In his sections on pigment making, the author enters into some description of the chemical principles on which the preparation of pigments is based, as well as of the chemical properties of pigments. Short notes on pigment manufacture on a large scale are likewise introduced. In the section on lakes special attention to the preparation of lakes and coal-tar dyes is given. Experiments are described which can be carried out by students whose time is limited.

A TEXTBOOK OF PHYSICS. By J. H. Poynting, Sc.D., F.R.S., and J. J. Thomson, M.A., F.R.S., Hon. Sc.D. Dublin. Properties of Matter. London: Charles Griffin & Co., Ltd. Philadelphia: J. B. Lippincott Company. 1902. 8vo. Pp. vi, 228.

With this volume on the Properties of Matter, Profs. Poynting and Thomson open a series comprising a textbook on Physics. The second volume, that on Sound, has already been issued, and the remaining volumes, dealing with Heat, Magnetism, Electricity and Light, will be published as soon as possible. Like its predecessor on Sound, the present volume is intended chiefly for the use of students who lay most stress on the study of the experimental part of physics, and who have not yet reached the stage at which the reading of advanced treatises on special subjects is desirable. To bring the subject within the compass thus described, an account is given only of phenomena which are of special importance, or which appear to throw light on other branches of physics. The mathematical methods adopted are very elementary. In the present volume the authors deal with weight, mass, gravitation, and those properties of matter which relate chiefly to change of form, such as elasticity, fluid viscosity, surface tension, diffusion and solution.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending January 6, 1903, AND EACH BEARING THAT DATE. [See note at end of list about copies of these patents.]

Table listing inventions with names and patent numbers. Includes items like 'Account register and desk, Paul & Hankey 717,909', 'Alarm register and desk, Paul & Hankey 717,909', 'Alarm-giving mechanism, E. H. Juhlin 717,867', etc.

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Table listing various machinery and tools with prices. Includes items like 'Bicycle brake, F. P. McElfresh 717,900', 'Bicycle gearing, C. Holst 717,576', 'Billiard or pool table cushion, D. W. Delaney 717,737', etc.