NEW BOOKS AND PUBLICATIONS.

SCIENCE LECTURES AT SOUTH KENSINGTON. Vol. I. Macmillan & Co., Publishers: New York city. Price $1.75.

This is a collection of excellent short monographs on scientific subjects which have already separately appeared in pamphlet form. It includes "Photography," by Captain Abney, "Fluorescence and the Absorption of Light," by Professor Stokes, Professor Kennedy on the "Kinematics of Machinery," Mr. Bramwell on the "Steam Engine," Professor Foster on "Electrical Measurements," Mr. Sorby on "Microscopes," etc., all being concise and well written essays on the several subjects.

A PHILOLOGICAL AND HISTORICAL CHART. By A. E. de Rupert. A. E. Barnes & Co., New York. Price $5.00.

This illustrates in a simple and comprehensive way the division of languages as classified by modern philologists. It shows the origin, development, progress or decline of the literatures of the world, gives a list of prominent authors and their best works, and many important historical facts. The chart is apparently the result of much careful study, and should prove valuable to educational institutions.

HOUSE DRAINAGE AND WATER SERVICE. By James C. Bayles. Published by David C. Williams, 83 Reade St., New York city.

The author in his preface states that this work is the outgrowth of the discussion of practical questions pertaining to plumbing and sewage in the *Metal Worker*, of which he is the editor. Its scope will be seen from the following subjects treated: "Hygiene in its practical relation to Health," "Sewer Gas," "Waste and Soil Pipes," "Traps, Seals, and Vents," "Water Service in City Houses," "Drainage of Country Houses," "Chemistry and Hydraulics of Plumbing," etc. The book is excellently well written, is replete with valuable information selected with good judgment, and will prove, we do not doubt, a standard guide to the trade to which it is more particularly addressed, as well as a useful work of reference for all interested in the very vital questions involved in the science of sanitary engineering.

Parts 26 to 30 of the New Encyclopedia of Chemistry, lately issued, carry the work forward from "Leather" to "Manure." The articles are remarkably voluminous, far more so than is usually possible in extended publications of this description, and they are well up to late advances in the science. The Encyclopedia will be completed in 40 parts, price 50 cents each. Published by J. B. Lippincott & Co., 715 and 717 Market street, Philadelphia.

Almanague de la Gaceta Industrial for 1878. This almanac, issued by the above named journal, an excellent scientific periodical published in Madrid, Spain, contains in full the law relative to public works in that country, tables of Spanish exports, and a list of Spanish patents for the past year, besides the usual calendar.

Notes & Queries

(1) E. B. L. asks: What is the best material to fasten lithographs on paper to the ends of barrels, so as to stand outdoor exposure, the lithographs being varnished over after being put on? A. Try a strong solution of shellac in a saturated aqueous solution of borax; concentrate by evaporation.

(2) R. T. asks: 1. Can any part of the work on woodcuts done by machine? A. Yes; plain and circular ruling and shading, and also the removal of wood from the widest blank spaces, technically called "routing." 2. What are the wages of a good mechanical engraver in New York? A. From $3 to $5 per day, on salary; sometimes more by the piece. 3. Is there an American work on wood engraving? A. "Practical Instruction in the Art of Wood Engraving," by W. A. Emerson; and Watson's "Manual of Instructions in the Art of Wood Engraving."

What is a dollar in English money? A. The gold dollar is equal to £0·2056, or 4·11*s.* or 49*d.*

(3) Y. M. C. A. asks: Is there anything which may be taken to dispel stage fright? A. It is said that a few whiffs of ether may act as a relief.

(4) J. J. D. asks: What will cement leather and metal together? A. Melt together equal parts of asphaltum and gutta percha; apply hot under a press.

(5) E. W. W. asks: 1. To make an electro-magnet capable of holding 1,000 lbs., what should be the gauge and length of wire? A. About 50 lbs. of No. 12 copper wire, cotton insulation. 2. What diameter and length of arms of horseshoe core? A. 2½ inches in diameter and 15 inches long. 3. How many coils deep should the helix be? A. About 16. 4. What power Grove battery to work it up to its full strength? A. 12 or 15 cups.

(6) B. E. writes: I have an electrical apparatus which at one moment has a strong current, and the next moment the action will almost cease. I use an induction coil with a Grove battery. What is the difficulty? A. Probably the trouble is with your battery. Clean the zinc and connections thoroughly, then charge the porous cup with strong nitric acid, and use in the jar a solution of 1 part of sulphuric acid in 12 parts of water. The zinc should be thoroughly amalgamated.

(7) H. McK. writes: I received some gold from the bank lately, and have found several pieces partially covered with a dark and hard scum. How can I get the scum off without injury to the coins? A. Boil them in a little strong lye, wash, and dip in warm dilute nitric acid for a few minutes; wash again.

(8) J. L. C. asks: 1. Would a bar magnet 9 inches long and 1 inch thick and wide act as a compass needle? A. Yes. 2. Would it still act as such if surrounded on all sides by iron? A. The attraction of the surrounding iron would destroy its accuracy of direction. 3. What power would be necessary to cause it to deviate from north and south? A. The smallest weight that could be imagined would cause a deviation. 4. Would the power necessary be increased by enlarging the magnet? A. To a certain extent.

(9) H. R. asks for a recipe for making gelatine for moulding plaster ornaments. A. Soak glue with 10 parts of cold water over night; then add 1 part of glycerin, heat to 190° with stirring, and run it into the well oiled pattern.

How is composition amber made? A. Dissolve shellac in an alkaline lye, then pass chlorine through the solution until all the lac is precipitated. After washing this must be melted and kept over the fire until it runs clear, taking care that it does not burn; it should then be run into moulds of the size of the pieces required.

(10) A. H. writes: We have a well the water of which is clear and uncolored, but at different times during the season tastes and smells very bad, especially when being heated. If nothing is done to it, it becomes good again after a time. Can you give any probable reason for its bad smell and taste? Will a filter of sharp sand and wood charcoal pounded fine purify it enough for drinking purposes? A. The water may be contaminated by inflow from the surrounding soil or from decaying organic matter of vegetable or animal origin at the source of the spring. In either case, if the impurities are sufficient to discharge the pink color imparted to a sample of rain water by a trace of dissolved potassium permanganate, the water is unfit for drinking purposes. Fine grained wood charcoal, well burned, and reduced to a coarse powder, will deodorize a quantity of water containing 90 times its volume of ammonia, but the disinfection of some waters by it is not complete. It should be renewed at least once a week.

(11) O. M. asks: How is modeling wax made? A. Melt the wax with a little water in a capacious earthen or porcelain-lined iron vessel over a salt water bath; agitate and add cautiously about 2 per cent strong solution of potassium bichromate, acidified with one tenth its volume of sulphuric acid; cover, keep at a moderate temperature for several hours, and skim with a hot ladle into hot water; draw off the residue of wax at the bottom, disturbing the foreign matter as little as possible, strain it through a fine uncolored cloth, add it to the portion skimmed, and draw off into warm moulds.

How can I construct a small galvanic battery? A. Provide a small glass or earthen jar, a plate or strip of zinc, well rubbed with a little mercury and dilute sulphuric acid, a piece of clean copper about the size of the zinc, a few pieces copper wire, and some sulphuric acid diluted with 20 volumes of water. Join a wire to each plate, and suspend them facing each other, but not touching, in the acid solution contained in the battery jar. Electrical currents will then pass through any metallic circuit joining the connecting wires of the plates. See back numbers of the SCIENTIFIC AMERICAN for other forms of battery.

(12) H. S. asks: How can petrified wood be cut and polished? A. Use a strip or ribbon of soft iron supplied with water and sharp sand as a saw. Polish with moist emery grading towards the finest, and finish with tripoli.

(13) C. J. B. B. asks: How can old lard be clarified? A. Melt and agitate the material for 20 minutes with a quantity of granular charcoal free from dust. Strain off while hot into a small quantity of hot water; agitate briskly for a few minutes with the addition of about 2 per cent of a strong solution of alum, and let stand in a warm place to settle. Draw off the fatty matters into clean hot water, agitate, settle, cool, and press.

(14) S. T. W. asks how a bleaching preparation may be made. A. Dissolve 2 lbs. of sal soda in a gallon of hot water, and add 1 lb. of good lime; stir the mixture for a few minutes, allow to stand for half an hour, and then carefully pour off and bottle the clear liquid. Half a pint of this may be added to each tub of water.

(15) J. S. C. asks: What will prevent steel tools, particularly hand saws, which are in constant use, from rusting? A. Apply a little pure tallow occasionally.

What is the most convenient way of cleaning wood rasps that are clogged with wood and pitch? A. Use a file card, or a very thin and narrow piece of sheet copper.

(16) G. W. G. asks: Is there such a thing as sulphate of carbon, and if so, what is it like? A. No. You probably refer to bisulphide of carbon (carbonic bisulphide); this is a volatile limpid liquid, having a strong unpleasant odor. It refracts light powerfully, and is one of the best solvents for oil, caoutchouc, sulphur, etc.

(17) W. B. B. asks: 1. How can I make a cheap marking fluid for bar iron, steel, etc.? A. Common barytes (barium sulphate) ground with linseed oil to a paste and thinned with turpentine has given satisfaction. 2. Also one for use on boxes, kegs, etc.? A. Ground charcoal, 20 parts; ground manganese (black oxide), 1 part; rub into a paste with a small quantity of linseed oil, and thin with a solution of 1 part asphaltum dissolved in 10 parts of benzine.

(18) S. S. asks: What acid will eat into wood? A. Woody fiber is strongly acted upon by moderately concentrated nitric, sulphuric, and chromic acids, or mixtures of these.

(19) G. M. M. writes: I wish to make a new jaw for a broken cast iron bench vise, but have failed to make the steel weld to the cast iron, after several trials with borax, etc. How should it be done? A. If you make the iron sufficiently hot and let it run through the mould long enough, the weld will be perfect.

(20) C. S. R. asks: How can I obtain a small quantity of ozone, without expensive apparatus? A. 1. Suspend a stick of wet phosphorus in a bottle containing moist air or oxygen; after half an hour the odor of ozone can readily be detected in the atmosphere confined. 2. Place in the bottom of a clean, dry bottle a small quantity of potassium permanganate; pour over this enough sulphuric acid to cover it, and stopper the bottle. At the expiration of a few minutes ozone may be detected in the air within the bottle. Organic or readily inflammable matter coming into contact with the permanganate mixture will be quickly inflamed if the acid used be concentrated. For ozonizing air it is better to dilute the acid somewhat.

(21) C. L. asks: Is there any process by which iron rust may be removed from marble? A. It cannot be readily removed without somewhat defacing the polished surface of the stone. Attrition with moistened pumice powder will generally efface the stain, and the polish may be restored by rubbing first with rouge and finally with putty powder (tin oxide) under a piece of moistened woolen cloth disposed over a smooth block of wood.

(22) W. & D. ask: What should be the dimensions of a lighter to carry 2,000 bushels of green sand marl—about 100 lbs. to a bushel? A. You can readily make the calculation, estimating each cubic foot of displacement to require a weight of 62·5 lbs.

(23) C. H. B., F. C., L. G. W., and others who request information on the subject of electric engines, should consult the "Student's Text Book of Electricity," by Noad; on p. 279 they will find an account of some experiments, and also references to other good works on the subject; all of the latest steps in this direction appear in our columns. See SUPPLEMENTS 33, 38, 41, 43, 77, and 78.

(24) J. B. asks: Can you give me the recipe for making the soap used for "permanent" bubbles, rings, etc., in illustrating the interference of light? I have tried several recipes, but with poor success. A. 1. Take olive oil soap (genuine white castile), cut it into thin shavings, and dry thoroughly. Dissolve these shavings in alcohol until the alcohol is saturated. The solution should show a specific gravity of 0·88. 2. Mix glycerin with water until it shows a density of 17·1° Baumé. To 6·102 cubic inches of solution 2, add 1·52 cubic inch of solution 1, and boil until the alcohol is all expelled—until the temperature rises above 212° Fah. Cool and turn into a graduated flask, and add water to make the volume 6·102 cubic inches. Filter, if necessary, to remove oleate of lime.

(25) J. R. S. asks: To what extent is the value of a piece of silver or gold enhanced by the government stamp being placed thereon? A. The government stamp simply shows that the piece is of the standard weight and fineness required by law for its particular denomination. Its value is regulated like that of any other product, chiefly on conditions of demand and supply.

(26) L. T. writes: My attic is infested with bats. How can I destroy or drive them away? A. If you can securely stop all the cracks and outlets of the attic, a small quantity of sulphur burned in the rooms, on an earthenware dish, will doubtless accomplish all that is desired. If the room is large at least half a pound of sulphur should be used. It is well to remember that sulphurous oxide, the product of the combustion of the sulphur, forms with the moisture in the air a powerful bleaching agent; nothing of value should therefore be left in the sulphured atmosphere. Be careful not to breathe the irritating gas.

(27) W. C. Y. asks: How can petroleum be removed from carpets? A. Place that portion of the carpet that is spotted with the oil in front of a hot fire. The oil will thus evaporate.

(28) D. F. H. writes: We have a steam boiler of 5 horse power which is used 3 or 4 times a week. Will it do any harm to allow water to stand in it, if it is blown out once a week? A. No.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

J. R.—The two larger pieces are orthoclase; the smaller one is argillyte.—I. L. M.—No. 1 is hornblende schist. No. 2 is ferruginous limestone. No. 3 is shale and limestone. No. 4. The earth contains a little copper as well as iron sulphide. No. 5 is dolomite and chlorite.—A. M.—It is a variety of chrysocolla—silicate of copper—sometimes used in jewelry and inlaid work.—J. E. H. No. 1 is clay slate or indurated clay containing iron sulphide. No. 2 is an impure limestone—also containing pyrites.—W. U. S.—The stove blacking contains a large per cent of iron oxide and sulphate, and sulphur or sulphides, besides organic carbon.—A. S.—No. 1 is bornite with impure chrysocolla—a valuable ore of copper. No. 2 contains limonite, bornite, cuprite, chalcopyrite, chrysocolla, and malachite; possibly auriferous. No. 3 is impure aluminum silicate. No. 4 is chalcopyrite and limonite. No. 5 is bornite, malachite, and chrysocolla. No. 9 is quartz with seams of ferropyrite and chalcopyrite (iron copper sulphide). No. 10 is a weathered calcspar containing chalcopyrite and ferropyrite.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges with much pleasure the receipt of original papers and contributions on the following subjects:

Malaria and Light. By G. P.
Protection against Potato Bug, etc. By G. H. W.
Planetary Layer Formation. By G. R. C.
The Scientific Turkey. By F. H. J.
Preventing Flour Mill Explosions. By J. C. C.
What is Life? By A. W.
Lasting Bricks. By D.
Dividing the Circle into Odd Parts. By A. B.
Describing Polygons of Unequal Number of Sides. By H. G.
Preventing Collisions at Sea. By C. A. G.
Perturbing Compensations in Planetary Arrangement. By G. R. C.
Sewage Management. By C. S.
The Star Feed. By T. J. B.
The Torpedo Balloon. By. F. P.
Creation and Life. By J. H.
Dredging Machinery. By F. A. G.
Cinders in the Eye. By H. E. R. and J. L.