

NEW BOOKS AND PUBLICATIONS.

A LABORATORY MANUAL OF PHYSICS AND APPLIED ELECTRICITY. Arranged and edited by Edward L. Nichols. In two volumes. Vol. II. Senior Courses and Outlines of Advanced Work. By George S. Moler, Frederick Bedell, Homer J. Hotchkiss, Charles P. Matthews and the Editor. New York: Macmillan & Co. 1894. Pp. 444. Price \$3.25.

We have before now reviewed the author's course of physics for the lower classes. In the present book one finds more advanced researches, with the use of satisfactory apparatus given in full detail, with especial reference to electrical work. As arranged, it makes excellent reading, being far more than a mere laboratory guide, and in it the author no longer appears to avoid proper apparatus, something which, to our minds, has been a defect in some manuals used for the lower classes in practical physics; so it may be recommended to readers not only as an exponent of college teaching and methods, but also as an actual manual of physics. Its make-up is of the most advanced description, as indicated by the capitalization of as few words as possible, although italics are used in considerable number.

THE RELIGION OF SCIENCE LIBRARY. Fundamental Problems. The Method of Philosophy as a Systematic Arrangement of Knowledge. By Dr. Paul Carus. Second edition, enlarged and revised. Chicago: The Open Court Publishing Company. 1894. Pp. xii, 373. Price, cloth, \$1.50; paper, 50 cents.

SCIENTIFIC AMERICAN

BUILDING EDITION.

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2. Plate in colors showing the residence of John Cottier, Esq., at Bensonhurst, L. I. Three perspective elevations and floor plans. Cost \$6,750 complete. A good example of Colonial architecture. Messrs. Parfitt Bros., architects, Brooklyn, N. Y.
3. A dwelling at Edison Park, Ill. Cost \$1,700. Architect, Mr. F. W. Langworthy, Chicago, Ill. A model design for its class and cost. Two perspective elevations and floor plans.
4. A very attractive residence recently erected for A. C. Garsia, Esq., at Flatbush, L. I. Two perspective elevations and floor plans. Mr. John E. Baker, architect, Newark, N. J. A modern design.
5. An \$800 summer cottage built for A. R. Doten, Esq., at Casco Bay, near Portland, Me. Perspective elevation and floor plans. Mr. Antoine Dorticos, architect, Portland, Me.
6. Perspective elevations and floor plans of a handsome residence recently completed for George W. Catt, Esq., at Bensonhurst, L. I. A very picturesque design. Cost \$8,100 complete. Mr. S. S. Covert, architect, New York.
7. A church at Short Hills, N. J., built entirely of rubble stone. Estimated cost \$6,000. Perspective elevation and floor plan. Messrs. Lamb & Rich, architects, New York City.
8. The house of Francis I. at Abbeville, France.
9. A stable and conservatory attached to the residence of John Cottier, Esq., at Bensonhurst, L. I. Perspective elevation and ground plan. Messrs. Parfitt Bros., architects, Brooklyn, N. Y.
10. A residence at Ardmore, Pa., in the Queen Anne style. Perspective elevation and floor plans. Cost complete \$6,750. Architects and builders, Messrs. J. B. Cornell & Sons, Philadelphia, Pa.
11. A cottage at Edgewater, Ill., erected for Edgar Smith, Esq. A unique design in the Colonial style. Cost \$7,800 complete. Two perspective elevations and floor plans. Mr. G. W. Maher, architect, Chicago, Ill.
12. An attractive cottage at Bath Beach, Long Island, N. Y., recently erected for G. W. Snook, Esq. Two perspective elevations and floor plans. Mr. Percy Emmett, architect, Bath Beach, Long Island.
13. Miscellaneous contents.—Wood pavement in London.—Preservation of wood.—Methods of constructing chimney flues and pipes at Paris, illustrated.—The passing of red brick.—Long distance house moving.—Carved and fancy mouldings, illustrated.—A new sash lock.—Automatic heat regulation in houses, etc., illustrated.—Woodwork vs. flame.—Curiosities about wood.—Cement water tanks.—An improved hot water heater, illustrated.—How to cool a cellar.—A new woodworking machine, illustrated.—An improved stage bracket iron, illustrated.—Party walls.—Architectural metal ornaments, illustrated.

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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. Special Written Information on matter 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.

(6285) W. A. S. E. asks how or in what way the canvas is prepared which is sold at art store and whether the pores are filled with some composition or sized. A. 1 part white lead, 2 parts whiting; a small portion of litharge and sulphate of zinc for driers; mix with equal parts of boiled linseed oil and raw linseed, tinted with either brown umber or lampblack, for a neutral ground. The canvas is tacked upon a stretching frame, and sized with weak glue size, to which a small portion of zinc sulphate is added. When dry it is stippled over with some driers and linseed oil, as thin as possible, not saturated. When very nearly dry the white lead, whiting, etc., is mixed up very smooth, and put upon it very thin and smooth with a large palette knife, and hatched over with a large sash tool, drawing it across one way and then at right angles, until the face presents a face like a piece of fine linen or cartridge paper, when it is left to dry.

(6286) W. H. S. and A. K. W. ask for a cement for lining oak tanks. A. An oak tank will last from twelve to fifteen years if coated with Burgundy pitch 1,500 grammes, old gutta percha in shreds 250 grammes, pounded pumice 750 grammes. Melt the gutta percha, mix with the pumice, and add the pitch. A hot iron passed over the surface smooths it, and assists adhesion. The box resists sulphate of copper baths, but not cyanides.

(6287) H. F. asks: Does not the attraction of the field (in a motor) of the armature, at all points directly opposite the poles, tend to stop the revolution of the armature? In other words, are not the lateral attraction of the outer edge of the field, of the pole of the armature, and the equal repulsive force of the opposite outer edge of the field, the only propelling forces that cause the armature to revolve? A. Your query is not very clear. The simplest general statement is that the armature is kept so polarized that the line connecting the poles of the field is constantly at an angle with the line connecting the poles of the armature, and the latter are constantly shifting in the direction opposed to the rotation.

(6288) L. P. says: Given a 30 inch turbine water wheel to work under 7 or 7 1/2 feet fall, what should be the width and depth of race to convey water to the wheel? What would be the minimum space that could be allowed between bottom of wheel and bottom of wheel pit to give good results? About what horse power could be expected from a wheel of a good make

of size named, working under 7 feet of fall, having all the water it could use? A. A 30 inch turbine using 750 cubic feet of water per minute under 7 feet head will equal 9 horse power and will need a race 3 feet deep 4 feet wide to maintain an approximate full head at the flume. There should be at least 2 1/4 feet clearance under the bottom of the wheel. Wheels are made of various sizes up to 114 inches, with proportional increase in quantity of water used and size of raceway. The 114 inch wheel under 7 feet head will use 10,000 cubic feet of water per minute and produce 120 horse power.

(6289) W. L. B. says: In a double cylinder gasoline engine with cylinder 4 1/2 x 6 inches, making 250 revolutions per minute, giving 6 horse power, what is the pressure per inch at time of explosion and at what point of stroke should exhaust be located to give best results? A. There is considerable difference shown in pressure and expansion lines in gasoline engines, owing to the various mixtures of gasoline vapor and air, its most powerful effect being for a mixture 1 part vapor to 10 parts air. Under the various conditions in ordinary use, the explosive pressure may vary from 50 to 100 pounds per square inch. The exhaust should take place at the end of the stroke. See a valuable work on "Gas, Gasoline and Petroleum Engines."

(6290) J. B. D. asks: Does it make any difference in the working of a bicycle if the large sprocket wheel is set higher than the small sprocket wheel? A. There is a little difference. The chain grips best when nearly horizontal. A slight departure from horizontal will do no harm.

(6291) F. M. M. writes: I wish to know how large an air pump running at say 200 feet piston speed should hold a pressure of 30 pounds per square inch, with 1/4 inch nozzle outlet, open wide. Roper says steam has a velocity of 1,601 feet per second at 30 pounds pressure. Now, figured on this basis, how much air will be delivered from 1/4 inch orifice, or does the velocity of air differ from that of steam? Knowing the velocity at point of discharge, at what pressure is the cubical contents of discharge represented, I mean, at free air pressure, tank pressure or an intermediate? By answering the above you will confer a great favor. Can you furnish me a book with data by which air capacities can be figured? A. The velocity of air from a nozzle of good form at 30 pounds pressure is 640 feet per second. Hence the flow from a quarter inch nozzle will be

640 x .049 x 3 vol x 60 sec. = 99 +

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or say 40 cubic feet of free air per minute, and

40' = 0.29' area,

200 ft. pr. m.

or 298 square inches, but owing to the loss in the pump by clearance, leakage and imperfect piston packing, not less than a cylinder 8 inches in diameter will do the work at the feet per minute speed as stated. The stated flow of steam as above is the theoretical velocity of steam flowing into a vacuum, but practically it is but 900 feet from 100 pounds pressure into the atmosphere. The flow of air, which is much heavier than steam, is but 952 feet per second into a vacuum, and varying in nozzle velocity from 632 to 658 feet per second, between 15 pounds and 75 pounds pressure and flowing into free air. Computations are made on the basis of free air volume plus pressure. We have no complete works on air compression, but much can be gained from back numbers of SCIENTIFIC AMERICAN SUPPLEMENT, on air compression and its uses. A few useful formulas and tables are published in Haswell's "Engineer's Pocket Book," \$4 by mail.

(6292) D. P. B. says: Please answer through the columns of your valuable paper, when and where the first electric car in the world was operated, also when and where the first cable car? A. The electric railway system was invented and model railways exhibited with cars driven by electricity in 1839, in New York. A practical trial was made on the Edinburgh and Glasgow Railway in 1842. See SCIENTIFIC AMERICAN, November 3, 1894, for an interesting account of the first trials. The first cable car was operated in San Francisco by A. S. Halliday, in 1871.

(6293) E. S.—The bird's skin sent is that of a female golden crowned kinglet (Regulus satrapa), a common winter bird from the Northern States southward.—F. M. C.

(6294) W. A. V. asks how to make stencil paint. A. Take shellac, 2 oz.; borax, 2 oz.; water, 25 oz.; gum arabic, 2 oz.; lampblack, a sufficiency. Boil the borax and shellac in water till they are dissolved, and withdraw from the fire. When the solution has become cold, complete 25 oz. with water, and add lampblack enough to bring the preparation to a suitable consistency. When it is to be used with a stencil, it must be made thicker than when it is to be applied with a marking brush. The above gives a black ink; for red, substitute Venetian red for lampblack; for blue, ultramarine; and for green, a mixture of ultramarine and chrome yellow.

(6295) M. J. W. asks for a formula for economical fuel. A. Mix coal, charcoal or sawdust, 1 part; sand of any kind, 2 parts; marl or clay, 1 part; in quantity as thought proper. Make the mass up wet into balls of a convenient size, and when the fire is sufficiently strong place these balls, according to their size, a little above the bar, and they will produce a heat considerably more intense than common fuel, and insure a saving of one-half the quantity of coals. A fire thus made up will require no stirring nor fresh fuel for ten hours.

(6296) G. de B. asks for a formula for French mustard. A. The following is M. Lenormand's receipt: Flour of mustard, 2 lb.; fresh parsley, chervil, celery and tarragon, of each 1/2 oz.; garlic, 1 clove (or head); 12 salt anchovies (all well chopped); grind well together, add salt, 1 oz.; grape juice or sugar to sweeten, and sufficient water to form the mass into a thin paste by trituration in a mortar. When put into pots a red hot iron is momentarily thrust into the contents of each, and a little wine vinegar added.

TO INVENTORS.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

October 30, 1894,

AND EACH BEARING THAT DATE.

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

Table listing inventions with patent numbers and names of inventors. Includes items like Advertising device, Alarm, Alkaline salts, Alloy, Aluminum, Armature, Axle, Ballot box, Basket, Bed, Beer, Bell, Belt, Beverage, Bicycle, Boiler, Brake, Brush, Bucket, Burglar alarm, Burner, Button, Cable, Camera, Can, Car, Carriage, Case, Caster, Churn, Clothes, Coffee, Comb, Combination, Collar, Collier, Colours, Cooler, Cotton, Counterbalancing, Coupling, Crane, Crystallization, Culinary vessel, Cultivator, Cutter, Dental mirror, Dice box, Digesting, Direct-acting, Disinfecting, Door, Door check, Door, Door handle, Door stop, Dredging, Drier, Drying articles, Drilling machine.