

lar, in which shape the cigars are held by a practically rigid frame or band, which holds them in this position whether in or out of the box. The latter is triangular in form and has a base plate and one fixed end piece, the other end piece and two side pieces being hinged. A clasp holds the box closed, and by releasing it, one of the end pieces and the two side pieces may be let down and the cigars well exhibited.

DESIGN FOR A COLUMN. — Amos A. Fenn, Leavenworth, Kansas. This column is angular in form, with plane ends, intermediate of which the several faces have a special style of ornamental configuration.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

NEW BOOKS AND PUBLICATIONS.

ALLEN'S NATURALIST'S LIBRARY. Edited by R. Bowdler Sharpe. (A) A HANDBOOK TO THE MARSUPIALIA AND MONOTREMATA. By Richard Lydekker. (B) A HANDBOOK TO THE BIRDS OF GREAT BRITAIN. By R. Bowdler Sharpe. London: W. H. Allen & Co., Limited. 1894. Pp xvii, 302, and pp. xix, 342. Price \$2.40 each.

These beautiful volumes, the illustrations all being in colors and exceedingly numerous, cannot be adequately reviewed by us. The one on birds contains over thirty beautiful plates relating to ornithology and oology. The one on marsupials and monotremes, treating of the curious animals of Australia and their relatives in other parts of the world, has thirty-eight plates of the same description. The illustrations of the kangaroo and the wallaby alone will be found of especial interest. There are other volumes to follow, and a most valuable series will be the result. The volumes remind us of the old time and widely popular "Naturalist's Library," to which it is a worthy successor.

WATER OR HYDRAULIC MOTORS. By Philip R. Bjarling. London: E. & F. N. Spon. New York: Spon & Chamberlain. 1894. Pp. xii, 287. With 208 illustrations. Price \$3.50.

The different types of hydraulic motors, from the old fashioned water wheel to the modern turbine, reciprocating and oscillating engines and hydraulic rams, are the subject of this work, which not only describes these different classes of machines with adequate illustrations, but treats of measurement of water and of general hydraulics. It has an excellent table of contents, both of the matter and the illustrations, and an index.

MECHANICAL DRAWING. Projection Drawing; Isometric and Oblique Drawing. Working Drawings. A condensed text for class room use. By Walter K. Palmer. Columbus, Ohio: Charles B. Palmer. Price 80 cents.

When a young man finds that he can draw, he is apt to consider himself a draughtsman, while he may be ignorant of the manipulation of instruments and appliances. There are definite mathematics in drawing, and this little work, designed for the use of teachers, develops the fundamental points which should be understood by a draughtsman, some of which are, doubtless, comparatively little studied.

TAN PILE JIM; OR, A YANKEE WAIF AMONG THE BLUENOSES. By B. Freeman Ashley. Chicago: Laird & Lee. Pp. 259. Illustrated. Price cloth, \$1; boards, 50 cents.

This prettily printed and illustrated book gives a picture of life in the British provinces. The author evidently is of a humorous bent, and by means of numerous illustrations the text is fully illustrated.

THE WORK OF HERTZ AND SOME OF HIS SUCCESSORS. Being the Substance of a Lecture delivered at the Royal Institution. By Professor Oliver Lodge. London: The Electrician Printing and Publishing Company, Limited. Pp. 58. No contents, no index. Price \$1.

We are glad to find the classical researches of Hertz put into book form. The matter is largely experimental, and is elaborately illustrated, so that it will be of more popular interest than the dry statement of the work otherwise would be. Unfortunately, it lacks both index and contents, either of which would add materially to its value.

ALTERNATING CURRENT WIRING AND DISTRIBUTION. By William Le Roy Emmet. New York: The Electrical Engineer. 1894. Pp. 76. No index. Price \$1.

We are very glad to see this little work. It will help electricians to recognize the fact that there is more concerned in the distribution of alternating currents of electricity than Ohm's law. The short table of contents of the book gives an excellent idea of its range of topics. The omission of an index is, of course, something to be regretted.

ELECTROMAGNETIC THEORY. By Oliver Heaviside. Vol. I. London: The Electrician Printing and Publishing Company, Limited. 1893. Pp. xxi, 466. Price \$5.

Mr. Heaviside has won a fine reputation by his mathematical work on the theory and application of electricity. The title of this book states that it is on the electromagnetic theory. The preface indicates that the author has a pretty good knowledge of human nature and appreciates, to say the least, his own value. His plea for the recognition and correct statement of electrical units is excellently put and makes really amusing reading. The esprit of the author may be deduced from the title of one of the sections on "the nature of antimathematicians."

the introduction being divided into sections. His plea for mathematics is most amusingly and graphically put. We strongly recommend the book to aspiring electricians, and hope that it will induce many to take up the mathematics of the subject who otherwise would be content with its general treatment.

PHYSICAL LABORATORY MANUAL FOR USE IN SCHOOLS AND COLLEGES. By H. N. Chute. Boston, U. S. A.: D. C. Heath & Co. 1894. Pp. xvii, 213. Price 80 cents.

Harvard University has led the way in requiring of its applicants for admission the execution of a course of practical physics as one of its alternatives. This excellent little book describes such a course. Numerous illustrations are given, and the different topics in physics are excellently treated.

PRACTICAL WORK IN GENERAL PHYSICS. For use in schools and colleges. By W. G. Woolcombe. Oxford: At the Clarendon Press. 1894. Pp. xii, 83. Price 75 cents.

We have in this volume another of the works on physical experiment, in which is covered the elementary or initial portions of physics. The book takes the form of a description of experiments, and some fifty different examples are given and elucidated as to their performance.

TWO OF A TRADE. By Martha McCullough Williams. New York: J. Selwyn Tait & Sons. 1894. Pp. 206. Price, cloth, \$1.

Any of the above books may be purchased through this office. Send for new book catalogue just published. MUNN & Co., 361 Broadway, New York.

SCIENTIFIC AMERICAN BUILDING EDITION. OCTOBER, 1894.—(No. 108.)

TABLE OF CONTENTS.

- 1. Elegant plate in colors showing a Colonial residence at Plainfield, N. J., recently erected for B. A. Hegeman, Jr. Two perspective elevations and floor plans, also an interior view. Cost \$6,000. A picturesque design. Mr. Frank W. Beall, architect, New York City.
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12. Roman remains at Bath, England.
13. The Temple of Neptune at Paestum.

Miscellaneous Contents: Mahogany pavement.—Proportion in architecture.—The architect who never exceeded estimates.—Some difference between the English and American plumbers.—Decay of stone.—Wood water main.—Artificial marble.—Art mouldings, illustrated.—Snowguards for roofs, etc., illustrated.—Double tenoning by machinery.—Transparent bricks for hothouses.—The Capital heater, illustrated.—The Poppert patent improved weight sliding blinds, illustrated.—The new decoration in the apse of St. Paul's.—Preparing walls for papering.—An improved carpenter's clamp, illustrated.—An improved sanitary appliance, illustrated.—Hughes' improved drawing table, illustrated.—Helping the deaf to hear, illustrated.

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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.

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(6266) J. H. J., Shanghai, China, writes: Will you please tell me through the columns of the Scientific American how the rule for ascertaining the fall of the earth's surface for any given distance is obtained? The rule I believe is as follows: For the first mile a fall of eight inches; for other distances, multiply by the square of the distance in miles. A. The rule as stated by our correspondent is an approximate one only, and is derived from the formula of the United States engineers, viz., square of the distance in feet divided by the earth's equatorial diameter in feet equals the amount of curvature in feet. This being for curvature alone, a correction for refraction must be made, making the formula (1-2m) D^2 in which D=distance in feet, 2R=twice the earth's radius in feet, and m=0.075 in feet.

(6267) F. M., Kansas, writes: I am desirous of digging a well. I have already made three attempts and failed in each case. The circumstances are these. At the depth of about 17 feet there is a 6 foot layer of sand and gravel, the first two feet of which appears to be quicksand, the remaining 4 feet coarse sand and gravel, after which comes blue clay. We attempted to drive a wooden curb as we dug, but as fast as we removed the sand inside the curb it would fill in from underneath. The water also bothered considerably; we tried pumping it out, but after an hour's pumping, the sand would wear the leathers in the pump, so that it would cease to act, and as before stated, we had to abandon the attempt. Some parties advise me to have a brick and cement wall built on a circular wooden frame, the same to be sunk as sand is removed, but I cannot see why this should prevent sand coming in underneath any better than the wooden curb. Also how can the water be kept out of the way while removing the sand? Advice on the above matter will be greatly appreciated. A. An oak cage curb is the proper guard for protecting the operation of laying the foundation of your stone curb. This may be made of a ring of oak plank cut in segments and lapped to complete two layers for stiffness, also a narrow ring of pine for the top, to be removed when the stone curb reaches it in building. On the outside nail 1 1/2 inch oak strips 5 or 6 feet long, according to depth it is desired to sink the curb below the water line, the strips nearly touching each other to make a strong but not tight curb. Place the wooden curb at the bottom on the water line and build up the stone curb, resting upon the bottom wooden ring as tight as possible without cement and so that the stone work will form a resisting arch circularly against the earth pressure, care being taken to protect the well from an earth cave from the water line to the top by braced sheeting of boards. When the stone curb is finished to the top ring, the work of excavating may be done by shovel as far as the water will allow without pumping. A large sand auger should then be used to continue the taking out of the sand evenly all around the inner edge of the curb to allow it to settle level. Any disposition to tilt may be counteracted by excavating at the high side only. No water should be taken out other than contained in the sand in the auger. A sand auger may be made by any sheet iron worker, from No. 16 iron, by

making a cylinder about 9 inches in diameter and no higher than 9 inches, as that is about the depth of sand that can be taken in at one operation. The bottom of the cylinder to be fitted with lips like an auger, but extending around and just overlapping, with an opening from the center to a depth of one inch at the outer part. A strong forked iron stem about 6 feet long with an eye at the top for a wooden handle will complete the auger. Then by screwing the auger into the sand, with a little manipulation like handling a post auger, which by the way will make a good sand auger with a sheet iron guard pipe to keep the sand from washing off. In this way of excavating without removing the water the curb may be settled down to the desired depth. After arriving at the layer of coarse sand, if the curb sticks by the packing of the sand, a pole or rod of iron may be thrust under the lower edge of the curb ring to loosen it, or by removing the upper cage ring the stone curb may be carried up to increase the weight. In this manner by careful management substantial well curbs may be sunk to considerable depth in water-bearing quicksands and gravel.

(6268) N. C. F. asks: Will you kindly give me the true explanation of the reason why a sheet iron heater placed over a kerosene lamp will heat a room better than the lamp will without the heater over it, and why the same flame inside of a sheet iron drum in the form of a gas stove will give more heat than the same flame without a stove over it? A. There is no absolute increase of heat or of heat units by the use of the iron drums as stated; but there is something in the susceptibility of the nerves to the effect of low radiant heat from enlarged metal surfaces, nor is the phenomenon confined to metal alone, as attested in our boyhood, when we enjoyed the low radiant heat from the sunny side of a barn in the cool autumn weather. The radiant heat from the lamp diverges in all directions, and only the area of the body intercepts it, while the extended surface of a sheet iron drum intercepts and converts the entire divergent radiant heat into convergent radiant heat from a large surface, and its effect upon the nerves is to make us feel warm without an actual increase of heat energy from the lamp.

(6269) A. P. H. S. asks for a formula for treating wood patterns to give them the smooth black appearance. I have tried a number of paints and pigments, but thus far have been unable to find anything that will answer. A. Stir refined lampblack into brown shellac varnish until it contains enough of the pigment to cover well. Strain through cotton cloth. Apply two coats. After the first coat is dry rub down with fine sand paper or with emery paper. After the second coat is dry rub with hair cloth or a bunch of horse hair, and finally apply a thin coat of brown shellac with a camel's hair brush.

(6270) L. H. E., Kansas, says: On September 20, at 6:30 o'clock in the morning, the sun shines in a tunnel, or if you were to stand at one end and look through you could see the sun at the day and hour mentioned. What is the per cent of the grade of the tunnel and how do you get it? A. On September 20 the sun is on or near the equatorial plane, and for the assumed latitude of 40° north the sun's path is inclined 50° from the plane of the horizon at sunrise. At that date it rises about 14 minutes before 6, which added to the time of observation, makes it 44 minutes on its course from the horizon. Then 44' x by the cosine of the latitude=33'7", the vertical altitude. As 4 time minutes are equal to 1 degree 33'7"=8'42 degrees, to which should be added 0-11' 4 for refraction at that altitude, making 8'53 or 8° 31', the sine of which is 0.148, or nearly 15 per cent as the grade of the tunnel.

Communications Received.

- "The Bronze Age in Europe." By W. H. K.
"On Flying." By D. G. E.
"On the Moon." By H. W. E.
"On Bird's Eye Maple." By W. J. B.
"Astronomy as It Is." By H. C.
"A Submerged Atmosphere." By A. E. R.
"On a Remedy for Red Ants." By J. E. B.
"On Phenomena of Regeneration." By E. K.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

October 9, 1894,

AND EACH BEARING THAT DATE.

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

- Agricultural machine, convertible, S. J. Conkright. 527,263
Air brake systems, locking stop cock for train pipes of, J. T. Eldridge. 527,327
Air compressor, pedal, J. North. 527,248
Album, C. Jaeger. 527,304
Amalgamating apparatus, electric ore, J. C. Ludwig. 527,150
Amalgamator and separator for recovering precious metals from ores, Reading & Rigby. 527,076
Anchor, H. A. & H. A. House, Jr. 527,061
Anchors, means for raising, H. A. & H. A. House, Jr. 527,060
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Axle box, pedestal, car, S. J. Van Stavoren. 527,087 to 527,091
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Basting and roasting pan, J. Stroud. 527,262
Bathing apparatus, S. S. Goldman. 527,077
Battery. See Electric battery.

