

from the alternating current side, in a Wonder Alternator? The direct current side is wound for 10 volts, 1 1/2 amperes; both sides using the same winding. A. There is a drop of ten per cent. or more in a rotary converter. We have no figures for the special one about which you ask. You should refer the question to the makers of the machine. 3. State some good books on elementary chemistry and price of same. A. We recommend and can supply Smith's "Inorganic Chemistry," price \$2.25, or Remsen's "College Chemistry," price \$2.50. Both are authorities. 4. What is the address of Massachusetts Institute of Technology? A. The Massachusetts Institute of Technology is located in Boston, Mass.

(10836) R. R. B. writes: A friend claims that if a live fish is put into a vessel partially full of water and swims around without touching the bottom or sides, although not a drop of water is spilled, the fish and the receptacle and the water will weigh no more than merely the receptacle and water. He attempts to explain it by arguing that the fish is in equilibrium and is therefore not a dead weight; I consider that, as the specific gravity of the fish must necessarily equal that of the water to maintain the equilibrium, the downward force exerted on the water by the fish must equal that of an equal volume of water, which would of course increase the weight of the outfit. Which is correct? A. If a fish is put into a tub of water, it displaces water; if the fish is in equilibrium under the surface of the water, it is displacing its own weight of water, and the water in the tub is made deeper by the displacement due to the fish. It is just the same then as if the same weight of water were poured into the tub. If a fish be put into a tub the tub is made just as much heavier as if the same weight of water were poured into the tub. 2. I have heard that a buzzard, after flying up into the air, sometimes rests on his wings, and without moving them or any other part of his body, goes to sleep and does not change his position relative to the earth at all, neither approaching nor receding from it. Is this so? A. We are not familiar with the actions of a turkey buzzard, but we can say that we do not believe that any bird can float in air without moving a wing, and neither rise nor sink in the air. It could if its weight were the same as that of the air it displaces; but all birds we know are heavier than air.

(10837) R. E. S. C. says: Will you kindly inform me the relative position of the magnetic north to the true north for this longitude, how many degrees apart they are and which is east or west of the other, and if the norths are represented by distinct symbols on the compass dial such as an arrow for magnetic north and N. for true north. A. The magnetic needle at your place points about 12 deg. to the west of true north, that is, the magnetic declination is 12 deg. west. Nearer than that we are not able to give it since your place is not given in the government tables which we have. Should you wish the exact figures you can doubtless obtain them by addressing the director of the United States Coast and Geodetic Survey, Washington, D. C., who has in charge this work, and whose force is making determinations in various parts of the country year by year. The words East and West in connection with magnetic declination tell on which side of the true north and south line the magnetic needle points. It is not desirable to indicate declination upon a compass dial, since the declination changes year by year. In the eastern part of the United States the declination is west and increasing each year. Nor does this change correspond to the longitude.

(10838) R. P. C. says: We have two car wheels cast on an axle and a straight level track. A third rail is placed between the two rails in an elevated position so it comes in contact with axle and parallel to the other rails. Will the axle travel the same distance on the third rail without slipping as the two wheels do on the track in the same number of revolutions? A. Anything rolling on a track moves along in one revolution a distance equal to its circumference. If your car wheels are 24 inches in diameter, the circumference will be a trifle more than 75 inches, and the wheels without slipping will move that distance in each revolution. If the axle is 4 inches in diameter it would roll a little more than 12 1/2 inches in each revolution. It must keep up with its wheels and so must slip on the third rail the rest of the 75 inches every time the wheels revolve once.

(10839) W. H. R. says: In the course of an argument I stated the fact, or at least what I considered a fact, that waves have no power of force but are merely a motion which would not carry anything forward. Am I right in this assertion? A. Any wave which is a mere vertical motion of the water would have no mechanical value or power, but the waves as they beat against the shore have great force, which is sometimes utilized for doing work. The ocean waves which beat against a vessel often break strong iron rods and twist them into shapeless masses. It would be useless to deny force to such waves. There are few waves which are merely tossings of the water. The force of waves combing upon the shore is largely due to the momentum of the water as it rushes up a sloping shore. At the most, your statement is a half truth—true only for one form of wave.

NEW BOOKS, ETC.

BALDWIN ON HEATING. Sixteenth Edition, Revised and Enlarged. By William J. Baldwin. New York: John Wiley & Sons, 1908. 12mo.; pp. 404; 143 figures and 15 plates. Price, \$2.50.

In 1879 the first edition of this work appeared. It could be called nothing more than a collection of suggestions or hints, as stated in the preface of the earlier editions. These earlier editions were the publisher's editions, being reprints with slight corrections, but without revision. So far as the work related to the principles of steam heating, where the water of condensation is returned by gravitation to the boiler, there could be little change in the book. To bring it down to modern practice in the use of steam by other methods, a general revision was necessary. Therefore, the whole former book is superseded by one whose data and practice harmonize. The author, therefore, endeavors to give some facts relating to the principles of modern steam fitting, which, since the writing of the first book, has risen to the dignity of a branch of engineering science that may be known as domestic engineering, and which includes substantially all that goes to make up the engineering plant of a modern city building, excepting electric light and elevator systems, which do not properly belong to the subject.

LIFE AND LETTERS OF HERBERT SPENCER. By David Duncan, LL.D. New York: D. Appleton & Co., 1908. 2 vols. 12mo.; cloth; 414-444 pages; 21 illustrations. Price, \$5.

The last twenty-one years of Herbert Spencer's life, following after the close of his autobiography, appears in this important publication. For this period, it is the only authoritative record. The value is significant when it is known that a part includes material that Spencer at the time thought best not to use himself. By this plan, the Life and Letters gains the insertion of the "Filiation of Ideas," written by him in 1899. It is the philosopher's final contribution to the theory of evolution and furnishes a concise elucidation of the Synthetic Philosophy. The space devoted to the letters shows an able selection of correspondence with representative literary and scientific persons; and the high narrative level attained in the portion given to the life in no respect falls short in the work of nicely and strongly carrying the portrayal through the difficulties of a long biography. Five portraits are presented of Spencer between 19 and 78 years of age. The index is very comprehensive.

MANUAL OF ROAD CONSTRUCTION AND MAINTENANCE. By Major E. M. Paul, R.E., Chatham, England; Published by the Royal Engineers' Institute, 1908.

This work was compiled at the School of Military Engineering by Major Paul, R.E., of the instructional staff of the School of Military Engineering at Chatham. It is a valuable contribution to civil as well as military engineering, although it was intended primarily for the military engineer.

DYNAMO-ELECTRIC MACHINERY. By Francis B. Crocker, E.M., Ph.D. Chicago: American School of Correspondence, 1908. 8vo.; pp. 235. Price, \$1.50.

The title page tells that this is an authoritative treatise on the theory of constructive details, calculations, characteristic curves and design of dynamo-electric machinery. The author is the head of the department of electrical engineering of Columbia University, past president of the American Institute of Electrical Engineers, and is the author of a number of books on electricity. He is a recognized leader in his profession. The present work will prove of special value to the student as a textbook. We are particularly impressed with the clarity of the writing. The book is profusely illustrated with half-tones, line cuts, and drawings made to scale.

CURVES FOR CALCULATIONS. A Manual for Engineers, Architects, Designers, Draftsmen, Builders, and Contractors. By Sidney Diamant, E.E., Structural Engineer. New York: McGraw Publishing Company, 1908. Small 4to.; pp. 13; 25 plates. Price, \$2.

This subject is a most important one to the engineer who has to deal with beams and channels for constructional work. With the aid of this book the work of the engineer will be greatly lightened.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending August 18, 1908,

AND EACH BEARING THAT DATE

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

Table with 2 columns: Invention name and Patent number. Includes items like Abdominal supporter, Air regenerating and purifying apparatus, Amalgamator, etc.

Main table of inventions with 2 columns: Invention name and Patent number. Includes items like Amusement apparatus of the gravity railway type, Amusement apparatus, public, Anchor, stockless, Animal trap, etc.

Continuation of the main table of inventions with 2 columns: Invention name and Patent number. Includes items like Electric circuit breaker terminal piece, Aalborg, Electric currents, means for regulating the supply of, C. M. P. Montbarbon, etc.