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BOOK REVIEWS:

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The Gas, Petrol and Oil Engine. Volume 2. By Dugald Clerk, D.Sc., F.R.S., M.Inst.C.E., and G. A. Burls, M.Inst.C.E. Longmans, Green & Company, 39 Paternoster Row, London, Eng. 8 Vo., VII., 838 pages; 478 figures. Price, $7.50.

The name of Dugald Clerk is too intimately associated with the literature of the gas engine to require any comment, and Volume 2 of the Gas, Petrol and Oil Engine, produced in co-operation with Mr. G. A. Burls, M. Inst. C.E., is a fitting sequence to what he has previously produced. This book as a whole, will form a welcome addition to the library of anyone concerned with the development of internal combustion engines, while chapter three, dealing with igniting arrangements; seven, petrol engines; eight, some petrol engines described, and nine, on carburettors, will prove specially instructive to those interested in automobiles or motor boats.

As the authors state, Volume 1, "On the Thermodynamics of the Gas, Petrol and Oil Engine, Together with Historical Sketch" was published in 1909. The sequel to this, Volume 2, deals with practical problems of design, construction, and operation of these engines. Commencing with chapter one, the reader is shown the development of the four-stroke engine, and given the results of tests made on various types, while in chapter two a similar method is adopted with regard to two cycle engines.

Igniting arrangements are discussed under the following groups: (1) Flame method. (2) Incandescent method. (3) Methods depending on Catalytic, or chemical action. (4) Electrical methods.

Section two of this chapter treats on ignition in small, high-speed petrol motors suitable for motor cars and boats, and section three of sparking plugs.

Speed regulation, governors and governing methods are fully described.

Chapters five and six, on the various fuels used in internal engines, are more than ordinarily valuable. The various fuels are described and compared and the whole matter covered in a concise and thorough manner.

The remainder of the book deals with petrol engines, carburettors, heavy oil engines, marine gas and oil engines with an appendix on the acceleration of the reciprocating parts. The book as a whole forms a distinct addition to the literature of internal combustive engines, their fuels and accessories. The entire subject is thoroughly covered, the matter lucidly arranged, and the many tables and illustrations add much to an interesting and useful work.

The Practical Railway Spiral. With short working formulas and full tables of deflection angles, together with examples by L. C. Jordan, B.S., C.E., Principal of the Civil Engineering Department, Heffley Institute, Brooklyn, New York. Publishers, D. VanNostrand Company, New York. Illustrated; 155 pp.; 4 ins. x 6½ ins. Price, $1.50 net.

The author adopts as the rule for the close approach to the ideal in curves: Divide the spiral length into six equal parts; lay out 5 per cent. of the desired degree of curvature in the first part; in each of the next four equal parts of the spiral length attain 20 per cent. of the desired degree; and in the remaining portion of the length accomplish the remaining 15 per cent. This rule is given because of the objection to the ordinary spiral on the grounds that the grade of each rail due to run-off is curved at the ends where it joins the track grade, and that due to the play in gauge the outer wheel flange in leaving the tangent for the curve strikes a blow against the rail as it is brought against it for curvature. Whether the rail will improve the riding qualities of the track can only be determined by trial.

The tables in the book are all for the six-cord spiral for lengths of 150, 225, 300 and 450 feet. A spiral length of 150 feet for ordinary curves and 300 feet for high-speed is advocated regardless of the degree of curvature, but the method of using other chord lengths and degrees of curvature is explained on the basis of constant angles and deflections for a constant ratio of length to radius and varying angles or deflections in the ratio of length to radius when the ratio is not constant.

The author brings out in the book the present inconsistencies in the use of spiral curves on American railways, and recommends a carefully worked-out and practical spiral, as described above. It is designed on the principle of limiting the rate of tipping or run-off of elevation at the end of the circular curve to two inches per second of time, elevating the outer rail for centrifugal force to a maximum of 6 inches, and limiting the speed for the sharper curves to correspond with the length.

Apparently the author would like to standardize in practice and get away from the inconsistencies in practice of the railways, some of whom vary the length of spiral with the degree of curvature, some with the amount of super-elevation, some with the speed of the fastest trains, and some design the length of the spiral from a bending of two of the above causes.

The book, in its tendency to standardize practice in spirals is deserving of all success. We believe it will prove of interest and value to all railway engineers.