THEORY OF THE TOP.

Advisory Committee for Aeronautics. Reports and Memoranda, No. 146. Report on Gyroscopic Theory. By SIR G. GREENHILL. Darling and Son, and T. Fisher Unwin, London, 1914. Folio. iii+277 pp.+49 figs. Boards. Price 10s.

The British Advisory Committee for Aeronautics has printed, or rather, until the war, had printed annual reports which are the prime sources for information regarding the development of the theory and practice of aeroplane design. Unfortunately they no longer divulge their findings. The Committee has also published other reports bearing less directly upon aeronautical problems, but yet advantageous in the more recondite parts of the theory. Of these supplementary publications, Greenhill's report on gyroscopic theory deserves particular attention of the student of mathematics and mechanics, and cannot forever be neglected by the practical engineer, so important are many instances of gyroscopic action becoming.

We are indeed fortunate that the Committee got Greenhill to prepare the report. His long-continued investigations on the top have made him a world-recognized authority on the subject. The fact that we have available for study the great work of Klein and Sommerfeld on the same subject does not in the slightest detract from the value of the present work. The merest glance will convince any reader that the two treatises are conceived in very different ways and that they rather supplement than overlap one another. Besides Greenhill's is decidedly shorter and more concerned with apparatus. It will be of more interest to the student of mechanics and engineering, though of less to the student of the theory of functions of a complex variable. And here we might remark that a beautiful theory and a practical analysis susceptible to ready calculation are unfortunately not always to be combined. The theta function is a thing of beauty, but I have always found the solution of the problem of the motion of the top by theta functions with complex arguments anything but satisfactory from the point of view of calculation. Perhaps after all Legendre knew what he was about when he introduced his third elliptic integral,—at any rate we judge that Greenhill thinks so.