elaborate (probably on account of post-war conditions), but they are sufficient. The whole subject is one of great interest. Stereoscopic instruments have now got well beyond the curious toy stage, and have many applications of precision, not the least of which is to range-finders, of which the Germans appear to have made considerable use.

The value of such a historical monograph, especially with the excellent index of names and references at the end, is very great. To anyone desirous of acquiring rapidly knowledge of a subject for research purposes, it means an incredible saving of time and labour. It is also an aid to research in another way, by unearthing a number of results long forgotten, from which many a valuable hint can be gleaned. For the lack of work of this kind far too much of the time of men of science nowadays is spent on rediscovery. L. N. G. F.

Kite Balloons.

The Design and Stability of Streamline Kite Balloons, with Useful Tables, Aeronautical and Mechanical Formulae. By Capt. P. H. Sumner. Pp. viii + 146. (London: Crosby Lockwood and Son, 1920.) 10*s.* 6*d.* net.

WHILE a vast literature has grown around aeroplanes since the outbreak of the war gave an unprecedented stimulus to aeronautical theory and practice, and a certain amount has been written about airships, very little indeed has seen the light of publication in connection with balloons. Popular interest was attracted to the more spectacular phases of flight; the Zeppelin raids dominated the minds of millions of non-combatants in the early part of the war, and the aeroplane raids captured their minds later on. To the active service man who was inclined to join the Air Force the aeroplane gave promise of excitement and distinction; to the scientific investigators at home the aeroplane and airship presented many problems of baffling difficulty and interest. The kite balloon, on the other hand, never reached such heights of popularity. Its work was more useful than spectacular; ever shrouded in secrecy, it scarcely ever attracted the attention of any who were not immediately engaged in its construction or its use.

A certain amount concerning the kite balloon is to be found in such a book as Bairstow's "Applied Aerodynamics," but it seems that Capt. Sumner's is the first separate book on the subject, at least in English. The author takes as model a balloon of capacity 670 cubic metres, which can rise to a height of 2500 ft. with one observer, and a suitable amount of ballast. By means of proportional rules other sizes can be readily calculated.

First the functions of the various parts of the kite balloon are explained, and then the aerodynamics are dealt with, leading up to the equilibrium problem. Longitudinal stability comes next, but the stability considered is statical, not dynamical; this ensures great simplification, of course, but something might have been said about the justification for using it. Chapters follow on the effect of the wind, tension in the material of the balloon, the valve, the envelope and rigging. There is, finally, a short account of meteorological balloons.

Much useful information is contained in the appendix, which is, however, rather miscellaneous in character. One wonders whether a man capable of following the reasoning in such a book needs an appendix containing the formula for the area of a circle or the definitions of the trigonometrical ratios. S. BRODETSKY.

Our Bookshelf.

Airman's International Dictionary: Including the Most Important Technical Terms of Aircraft Construction, English, French, Italian, German. By Mario Mele Dander. Pp. vii + 227. (London: Charles Griffin and Co., Ltd., n.d.) 6*s.*

AVIATION for commercial purposes has failed to develop in the manner that was anticipated, yet several regular air services have come into existence, and if the evolution of civil aeronautics is slow, we can have no reason to doubt the ultimate emergence of the aeroplane and airship as standard means of locomotion. There is therefore complete justification for the assertion in the publishers' note that ". . . there is urgent need for a handy dictionary which will enable a flying man to make his needs and desires known in whatever country he may land." The dictionary was printed in Italy, and Messrs. Griffin have secured copies for issue in this country. It forms an eminently useful handbook, not only for the pilot, but also for the student and researcher, who often have to consult literature in foreign languages and deal with terms which are too recent for the standard dictionaries.

The dictionary gives the important technical terms in connection with aeroplanes and airships, as well as with aeroplane and airship construction. There is a "one alphabet" index for all four languages, thus saving much time in the search for the meaning of any term.

In a book of this kind mistakes and misprints are to be expected, and it is to be hoped that in a future edition experts in the various languages will be called in to revise the terms. Thus any