plane, and should make a good preliminary textbook for a degree in aeronautics.

(2) In his preface Mr. Park says that his aim has been to consider problems of airscrew design and construction from the point of view of the designer. In so doing he explains methods developed for the Lang Propeller Co., Ltd. A very considerable degree of success has been attained, and the book is not difficult to follow. The items of calculation are given in great detail, but are connected with the main outlines of airscrew theory so closely that the book may be used by later workers even when they are more up-to-date in their theories.

It is very noticeable that the two latest books dealing with the subject of airscrew design adopt the attitude that the oldest theory agrees better with practice than a new and presumably sounder one. Empiricism has to this extent rather retarded the development of the subject. The theory adopted in the early days of aeronautics ignored the influence of previous passages of the airscrew blade and its companions, and the effect was found in a disagreement between prediction and observation. An examination of the theory by Lanchester, De Bothezat, and others indicated a loss of efficiency and of torque which was great for the stationary airscrew or helicopter, and of less importance at the highest speeds of flight of an aeroplane. The most difficult part of design being the production of an airscrew which allows the engine to develop full power at a given speed, it was found that the introduction of an inflow factor indicated by a modified theory was advantageous. In the later periods of development the magnitude of the inflow factor required has been found to decrease to the point at which it may be ignored. It is highly probable that this is an incorrect view of the phenomena, and that it would be much more sound to attribute the change to an opposing change due to the compressibility of the air. The importance of this latter factor depends on the tip speed of the airscrew, a quantity which has been steadily increasing. No one has yet propounded a working theory which is based on the best established theoretical data.

The greater part of the treatise by Mr. Park is independent of the refinements mentioned above, and gives a good analysis of the possibilities of airscrew design. In commending the book to readers, one may suggest that it will cover the immediate needs both of a designer and of a scientific student of sufficient ability. A thesis of considerable value might be produced as a result of the data of the book and the critical faculties of the student.

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Our Bookshelf.

Practical Biological Chemistry. By Prof. G. Bertrand and P. Thomas. Translated from the third edition by Hector A. Colwell. Pp. xxxii+348. (London: G. Bell and Sons, Ltd., 1920.) 10s. 6d. net.

THIS work will be found of great value by students and, perhaps more particularly, by teachers of biochemistry. The object of the authors has evidently been to provide a series of laboratory exercises illustrating the properties of the chief substances of biochemical interest, and at the same time affording examples of the methods used in the various branches of biochemical investigation. A large number of tests, interesting preparations and estimations are described in the first part (Statics), whilst in the second part (Dynamics) the subjects of enzymes, micro-biology, and fermentations are treated experimentally.

Although the whole range of biochemistry is dealt with, and the exercises are chosen quite impartially from the chemistry of animal and vegetable life, the treatment is nevertheless very unequal as regards both the selection of methods and the degree of detail given. For example, as all readers would desire, a very full account of the admirable Bertrand method for the estimation of sugars is given, and, similarly, Duclaux's ingenious distillation method for the estimation of volatile acids is fully described. On the other hand, although several pages are devoted to the amino-acids, and Sørensen's formaldehyde titration method is described, there is no mention of van Slyke's method for the estimation of amino-nitrogen, and, indeed, the name of van Slyke does not occur in the index. Again, the conception of hydrogen-ion concentration is mentioned, but no practical use of it is made in the book. It is on account of this arbitrary element in the treatment that we consider the book as likely to be of greater value for teachers than for students; but whoever uses it will find in it many interesting and unusual experiments, described in a clear and suggestive manner, without too great a load of detail. The translator has done his work well, and has added a few notes, including a detailed description of the use of the Maquenne block for the determination of melting points.

A. HARDEN.

Wireless Telegraphy: With Special Reference to the Quenched-Spark System. By B. Leggett. (The Directly-Useful Technical Series.) Pp. xv+485. (London: Chapman and Hall, Ltd., 1921.) 30s. net.

WE welcome this volume, which gives full practical details of the "Telefunken" or quenched-spark system of radiotelegraphy. (We use this word, for we think it will shortly receive international sanction.) Practically all the treatises on this subject published in English concern themselves mainly with the Marconi system, and dis-