

the details of construction of the kites and of the meteorographs. The second chapter concerns the *Results from the Kite Meteorographs and Simultaneous Records at the Ground*, and includes complete tables containing data as to the altitudes of the kites; the temperature of the air at the kite, on Blue Hill and in the valley at the base; humidity and wind velocity at the kite and on the hill, etc. The third chapter is by Mr. Clayton and is a discussion of the records. If anyone has had any doubts as to the scientific quality and as to the value of the kite work done at Blue Hill, a glance at this chapter will amply suffice to dispel his doubts. A laborious collection of data and a careful study of these data have clearly preceded the final writing of this discussion.

It would detain us too long were we to call attention to the many noteworthy points which Mr. Clayton has brought out. Only a few can be mentioned. The anemometer records show that between the average heights of 100 and 400 meters the rate of increase of velocity for each 100 meters of greater altitude is 0.6 mile per hour, this being a slower increase than has been found to obtain in the cloud levels higher up above the top of Blue Hill. The change in direction of the currents aloft, shown by the shifting of the kites during their ascents, is interesting. The prevailing tendency is for the kites to indicate currents from the west aloft, no matter with what surface direction of wind they left the ground. The temperature results are naturally the most important. It appears that the diurnal range of temperature diminishes rapidly with increasing altitude in the free air, and almost disappears, on the average, at 1,000 meters.

The variations in change of temperature with altitude are classified into six types, all of which are striking. To mention only three, type 4, which Mr. Clayton calls the *warm wave* type, is produced when a warmer current overflows colder air, and in a majority of cases, when found below 2,000 meters, is caused by the approach of a warm wave, which, moving faster in its upper strata than in the lower, overflows the colder air aloft before it is itself felt as a warm wave on the earth's surface. Such a type, when its existence is known,

makes possible the forecast of a warm wave with a high degree of certainty. The *cold wave* type (type 5) shows a fall of temperature with increase of altitude at the adiabatic rate of unsaturated air, above 300 metres, while the night curve shows a rapid decrease of temperature with increase of altitude from the ground upward, these conditions making it possible for showers to occur if the lower air is damp enough. The connection of tornadoes and thunderstorms with falls in temperature is well known, and these results throw much light on the vertical temperature gradients at times of such disturbances. The sixth type is, perhaps, the most interesting of all. It shows the same or nearly the same temperature from 400 to 1,400 metres or more, and is found prevailing in anticyclones. This is of special importance because of its bearing on the Hann, or driven, theory of anticyclones; for if, as generally stated, the warm and dry air at considerable altitudes in anticyclones is the result of warming by descent and compression, the vertical temperature gradient in anticyclones should be at the adiabatic rate, or nearly at that rate. No adequate explanation of these apparent contradictions appears as yet, and further temperature data from the free air in anticyclones will be awaited with interest.

The above are only a few of the many noteworthy points which are brought out in this valuable monograph. Meteorologists are under a debt of gratitude to Mr. Rotch for his liberality in conducting the experiments, and to Mr. Clayton for the masterly way in which he has dealt with the data under discussion.

R. DEC. WARD.

HARVARD UNIVERSITY.

Outlines of Descriptive Psychology. By GEORGE TRUMBULL LADD. New York, Charles Scribner's Sons. 1898. Pp. xi+428.

The present volume covers substantially the same field as the author's 'Psychology, Descriptive and Explanatory,' but is intended rather as a text-book than as a treatise for advanced students. It is not a mere abridgment of the former; every point has been reviewed and the expression revised, so that few sentences read exactly alike in the two works.

The arrangement of chapters and the development of the subject is practically the same in both, as might be expected, in view of their common authorship. But further than this, whole phrases and sentences are to be found everywhere which furnish parallel readings with but slight verbal alterations. A frank acknowledgment of this parallelism, though not a matter of primary importance, might have been of considerable assistance to some readers. On the whole, the verbal changes referred to are in the interest of conciseness and smoothness of diction, and the limiting of discussion in the 'Outline' to a few salient points makes the presentation clearer and more acceptable to the ordinary student. Assuming the general identity of standpoint of the two works, we need do no more than point out their most striking differences. In the earlier work the chapter on Impulse, Instinct and Desire is placed after the treatment of perception, reasoning and the emotions, and just before the will. In the 'Outline' it is advanced to the first place in the part devoted to the Development of Mental Life, so that it precedes even the discussion of Perception. This is a notable indication of the larger prominence which the 'motor consciousness' is obtaining in psychology.

A chapter is added in the 'Outline' on the relation between mind and body. The author eliminates the metaphysical side of the topic, which he has discussed in his *Philosophy of Mind*, while the treatment of the scientific aspect may be considered an advance on the position taken in his two works on physiological psychology.

The genetic standpoint is emphasized more than in any of Professor Ladd's previous works, while laboratory psychology is given more space and greater importance, relatively, than in the larger descriptive psychology. Diagrams occur frequently to illustrate both particular experiments and curves of general results. In connection with the latter, it should be noted that the diagrams on pages 84 and 85, which are given for the purpose of exhibiting the difference between Weber's and Fechner's statements of the psycho-physical law, are rather misleading; the axes of sensation and stimulus are reversed in the two drawings, making the

curves difficult of comparison, and, moreover, the interpretation of the horizontal distances (sensation increments) in the first diagram is somewhat open to question. The psycho-physical law itself is stated (in italics) as follows: "For any given class of sensation the least noticeable difference is a constant fraction of the sensation" (p. 83). A slip of this character is unusual in so careful a writer as Professor Ladd.

It is scarcely in place here either to approve or to criticise Professor Ladd's general positions, which are too well known to call for any special review. The distinction between processes and development of mental life forms the basis for a two-fold division of the work. The author reminds us in his preface that experiment has been most frequently and successfully applied to the elementary phases of mental life, and that it has accomplished but little in the higher types of psychical process. The same position is maintained in the body of the work, where references to experimental results are largely confined to the first part.

As indicated by the title, the 'Outline' is a 'descriptive' treatment of psychology. The omission of detailed 'explanatory' portions, which appear in the larger work, make it available for general class-room work, and in this sphere it will doubtless prove of extreme value. Page references to well-known authorities are given at the end of each chapter, supplying a more detailed treatment for those who wish it.

H. C. WARREN.

SCIENTIFIC JOURNALS.

American Chemical Journal, April. 'An Investigation of some Derivatives of Orthosulphobenzoic Anhydride:' By M. D. SOHON. The author studied the action of alcohol, phenols, ammonia and amines on the anhydride and obtained esters, phthaleins and other derivatives which were well characterized. A series of sulphonic acids isomeric with the sulphaminebenzoic acids was obtained. 'Iodometric Estimation of Tellurium:' By J. F. NORRIS and H. FAY. The authors oxidize the tellurous acid with potassium permanganate, estimate the excess of the latter with potassium iodine and sul-