

those just given that the reader will obtain a glimpse, faint and imperfect though it may be, of a single day's doings at Penikese."

The description of the Physalia is unique and especially good: "As we have no specimen before us, let us try, through the medium of the 'dead languages,' a little induction *a posteriori*, and discover, if we can, *what* our specimen is really like."

"At first sight, the Portugese man-of-war would put one in mind, as the name suggests, of an immense bubble of air." * * "It stings us with an electric stroke." * * "The true home of this living, floating island is in the Gulf of Mexico," etc. The author says he found a specimen, which 'threw off' a whole tankful of young, which went paddling around everywhere of their own free will, as happy as clams at high water.'

Aside from a few errors in spelling and the misstatement of a few well-known historical facts, we offer no further adverse criticism, though in closing we cannot refrain from quoting from page 64, where the author says: "Well do I remember how often Professor Agassiz urged us to read only the best of books." * * * "He cordially detested the ordinary books upon scientific subjects. At one time, in a paroxysm of rage at these 'would-be scientists,' he exclaimed: 'They are mere compilations of persons unfamiliar with science, who mix the false and the true.' Alas, shall we ever again meet with his equal, as teacher and pupil and brother combined!"

H. C. B.

NOTE: Since writing the above review we have examined an advertising circular which announces 'A Memorial Volume of Penikese,' the same as the above mentioned work. We quote from this circular as follows: "About two years ago I completed a contract for the printing of my 'Penikese Island;' unfortunately, before the pages were finished, the parties with whom I contracted became bankrupt. I have just succeeded in rescuing the sheets from the wreck at an expense of something over \$100. The work is in signatures, is on tinted paper, hand-made expressly for the purpose, comprises about 100 pages, and only 100

copies were printed. These will be sent to the old teachers and scholars and their friends only if they can be found. Price, postpaid, \$3.00. Send check or postal order to W. A. Stearns, Atlanta, Ga."

Exploration of the Air by Means of Kites. I. *Kites and Instruments*, by S. P. FERGUSON. II. *Results from the Kite Meteorographs and Simultaneous Records at the Ground.* III. *Discussion of the Observations*, by H. HELM CLAYTON. Reprinted from the *Annals of the Astronomical Observatory of Harvard College*, Vol. XLII., Part I. Cambridge, 1897. 4to. Pp. 43-128. Pls. VII.

Ten years ago no one would have thought that a serious piece of scientific work could have for its subject the exploration of the air by means of kites. Yet, as has been frequently pointed out in this JOURNAL during the last two years, the records obtained from the free air, at altitudes up to two miles above the earth's surface, by means of meteorological instruments attached to kite lines, have given extremely valuable results. So much so, indeed, has this been the case that *kite meteorology*, if we may so term it, has come to be recognized as an increasingly important branch of the general science of meteorology. Occasional reference has been made in these columns to the kite work done at Blue Hill Observatory, under the direction of Mr. A. Lawrence Rotch, by Messrs. Clayton, Fergusson and Sweetland. This work is now well known, but until the present time there has been no complete report upon it.

The publication, in the *Annals of the Harvard College Observatory*, of a monograph on *The Exploration of the Air by Means of Kites*, marks an epoch in the history of modern meteorology. The Weather Bureau issued, in 1896, a valuable Bulletin (by Professor Marvin) entitled *Kite Experiments at the Weather Bureau*, but this was concerned chiefly with the construction of kites and the forces acting on them, and did not include a discussion of the instrumental records obtained by means of the kites.

It is impossible, in a brief notice, to do the Blue Hill kite report justice. There are three chapters in all. The first, on *Kites and Instruments*, is by Mr. S. P. Fergusson, and deals with

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.