

### THE EXPLORATION OF THE ATMOSPHERE AT SEA BY MEANS OF KITES.

FOR some years past, kites have been persistently and successfully employed by Mr. A. L. Rotch at his observatory at Blue Hill, U.S.A., for obtaining a knowledge of the movements,

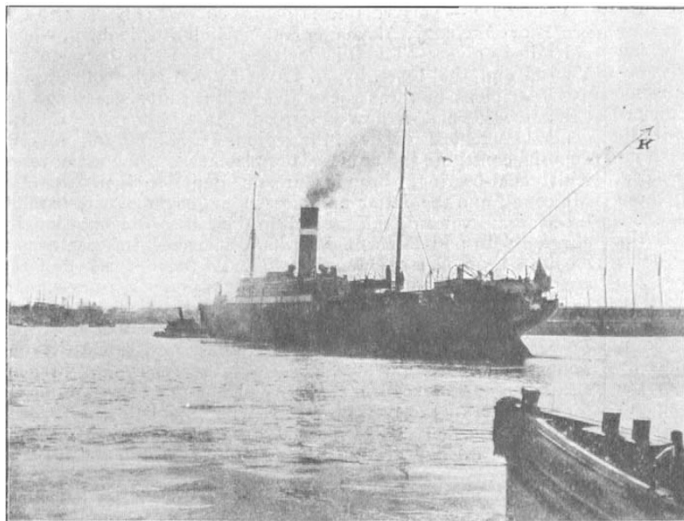


FIG. 1.—S.S. *Commonwealth* leaving Boston (kites were flown from κ).

temperature and humidity of the upper air, and heights of three miles have been reached; their use was also systematically begun about the same time on the continent of Europe, especially at M. Teisserenc de Bort's observatory at Trappes, near Paris, where altitudes exceeding those at Blue Hill have been attained. We have also frequently referred to similar experiments both with kites and balloons made at the request of the International Aeronautical Committee. Valuable results have been obtained and published, so far as the land is concerned, and experiments will, we believe, be undertaken in this country under the superintendence of the Royal Meteorological Society. But in order to raise the kites to any considerable height, a wind of certain velocity is necessary. Mr. Rotch's flights were made when the wind velocity on the ground was between twelve and thirty-five miles per hour, and he points out that certain types of weather, such as anti-cyclonic conditions, with very light winds, or stormy conditions, can rarely be studied by that means.

The prediction of weather for a day or so in advance has been brought to considerable perfection by the combined efforts of various meteorological services and the publication and study of synoptic weather charts; but further progress is necessary, and we believe that it is to the investigation of the upper air, especially if, as has been suggested, observations could be carried out in equatorial and trade-wind regions, where the changeable conditions of our latitudes do not exist, that further advance in weather knowledge may be confidently expected.

The plan proposed in a paper recently communicated to the Royal Meteorological Society by Mr. Rotch, and published in its *Quarterly Journal* for January last, with reference to the extension of kite observations to the sea, will doubtless lead to important results, and such observations will show whether the conditions prevailing over the ocean differ materially from those existing over the land. We give illustrations of Mr. Rotch's endeavour to obtain data with kites sent up from the s.s. *Commonwealth* while crossing the Atlantic, through the courtesy of Captain J. McAuley. Fig. 1 shows the vessel leaving Boston on August 28, 1901, and the position from which the kites were flown, while Fig. 2 shows the installation of the kite-reel on the after-deck of the vessel.

The kites can be used on ships to better advantage than on

land. For example, even when the air is calm, by steaming through it at a speed of ten or twelve knots the kites can be raised to the height they would reach in the most favourable natural wind, and attain the altitude of the upper air-currents. During the passage of the *Commonwealth*, anticyclonic conditions mostly prevailed, and the wind blew only four to twelve miles an hour; but as the vessel steamed about fifteen knots, it was possible to use the kites on five days out of eight occupied in crossing the Atlantic. In one of the flights it was found that the air was 5°·6 warmer at a height of 130 metres than it was at the sea-level, and remained so during the afternoon (August 31). Another advantage gained by flying kites from a steamship is that wherever the observations in the upper air may be made there is always the observing station on the ship at sea-level, and not far distant, horizontally, with which to compare them.

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

THE Technical Instruction Committee of the City of Liverpool is the recognised local authority through which the Board of Education deals with all the science and art classes in the city with only two exceptions. The Committee carries on its work through many agencies in an organised plan, and every year several important developments are recorded. From the Report for the year 1901 we learn that the committee again renewed the grant of 200*l.* in aid of the scientific work carried on by the Lancashire Sea Fisheries Joint Committee. A permanent sea fisheries laboratory in the zoological department of University College, under the direction of Prof. Herdman, is partly supported by this grant; and trained assistants are constantly at work in this laboratory, investigating fisheries' questions that may arise in connection with the local industries. One of the rooms of the zoological museum at University College is devoted to a permanent fisheries collection, illustrating the local fishing industries, but no part of the grant made by the Technical Instruction Committee is expended on this museum. In connection with courses of lectures to gardeners on plant diseases, given by Prof. Harvey Gibson, a

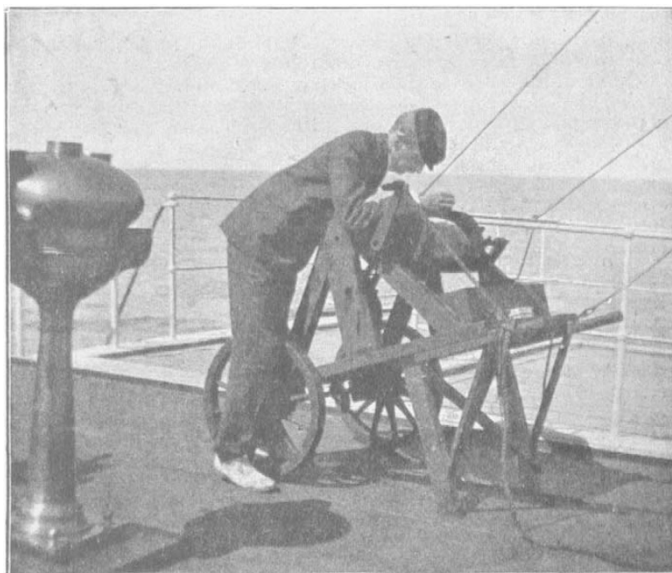


FIG. 2.—Kite-reel on after-deck of s.s. *Commonwealth*.

course of special lectures, followed by practical work in the botanical laboratory, has been arranged in the new Hartley Botanical Laboratory at University College. This attempt to show practical working gardeners the scientific methods of

observation and investigation into such problems as those of plant disease is likely to be of the greatest value.

THE Report of the Technical Education Committee of the Derbyshire County Council states that the Technical School at Glossop, erected by Lord Howard of Glossop, has during the past year been furnished and equipped by the Glossop Town Council, aided by a grant of 600*l.* (in addition to the loan of chemical and physical apparatus) from the County Council. There are now nine schools of science in the administrative county, of which seven are co-educational schools for boys and girls. It is sometimes complained that the "school of science" curriculum is not sufficiently commercial, but early specialisation in purely commercial subjects, such as bookkeeping, commercial geography and business letter writing, should certainly not be encouraged. The Committee quotes in this connection Mr. Sydney Webb's remarks that "English business is not being driven to the wall because of a dearth of qualified clerks and trained office boys. . . . What we have to do is to train our business men, be they clerks or partners, not merely or even chiefly to discharge their office routine, but to let their intellects play round their business, to put into their work, not only brains, but brains of the highest or inventive kind. This is where they seem at present to fall behind the German and the American. Now we may take it for granted that we cannot get business men of wider minds by narrowing their education, nor produce that heightening of the imagination which makes discoveries by carefully shutting out all knowledge of the world that is not business. The most efficient business man, in this highest sense of the word efficient, will, we may be sure, not be an uncultivated man nor a man of narrow range."

#### SCIENTIFIC SERIALS.

*Bulletin of the American Mathematical Society*, February.—Prof. F. N. Cole is the chronicler of the proceedings at the eighth annual meeting, in New York City, of the Society on December 27, 28, 1901. Though now two days are devoted to the conference, owing to the large number of papers sent in (twenty-seven), this time is hardly adequate, and it is becoming a serious question whether it will not be necessary to adopt a practice of selection, permitting the presentation, even then in condensed form, of more important papers only. The meeting was largely attended, the number of members present amounting to fifty-nine. A social feature was the dinner on the Friday evening. The officers and members of council were elected. Sir Robert Ball was present, and amongst the abstracts of the papers communicated is that of his recent researches in the theory of screws. Miss Scott's paper on a recent method for treating the intersections of plane curves investigates the nature of the set of equations discussed in Dr. F. S. Macaulay's paper in the London Mathematical Society's *Proceedings*, vol. xxxi., giving different and simpler proofs of the theorems obtained by Dr. Macaulay.—Prof. Holgate gives an account of the proceedings at the January meeting of the Chicago section, held at Evanston, Illinois, January 2, 3, 1902. Here also the attendance was unusually large. Nineteen papers were presented, and abstracts of them are here given. "The Vector Analysis" of Dr. E. B. Wilson is reviewed by Prof. A. Ziwet. Prof. Gibbs's "Elements of Vector Analysis" (1881-4) attracted wide attention, though it was only a pamphlet (83 pp.) printed for the use of his students. This Mr. O. Heaviside adopted, with slight modifications, and expounded fully in his "Electromagnetic Theory" (1893). Dr. Wilson's work is founded upon Prof. Gibbs's course of lectures delivered in 1899-1900, and gives the first generally accessible authentic record of Prof. Gibbs's system. The additions to the theory of the (1881-4) pamphlet are not extensive, though Dr. Wilson's book runs into 436 pp. This bulkiness is due to the lavishly open print and partly to the author's effort to make the subject easily intelligible by supplying numerous illustrations and applications. A good index is a desideratum, and the printing details lack the advantage of external aids now so common in carefully printed mathematical text-books.—Mr. J. L. Coolidge gives an interesting notice of Dr. Max Simon's "Euclid und die sechs planimetrischen Bücher" and of Prof. M. J. M. Hill's "The Contents of the Fifth and Sixth Books of Euclid."—The notes and new publications give the usual interesting information.

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*Memoirs (Trudy) of the Kazan Society of Naturalists*, vol. xxxiii., 5 and 6.—Researches into the soils and flora of the Penza and Gorodische districts, by J. Sprigin.—On the Erinaceæ of Russia, by K. Satunin (with one plate). The following five species, found in European Russia, Caucasia and Transcaspien territory, are described:—*Erinaceus europæus*, *E. auritus*, *E. albulus*, *E. macracanthus* and *E. hypomelas*.

Vol. xxxiv.—This volume is dedicated by the Society to the professor of geology, Alexander Antonovitch Stuckenber, whose portrait is given.—The Plagioclase-augite rocks between the Yenisei and the Lena, by A. Laversky. A large collection of 350 specimens of these rocks was made thirty years ago by Czekanowski and is now described, the author giving also a general geological review of the region. Cambrian and Silurian deposits constitute the frame of the plateaus. They are covered with coal-bearing, brown Jurassic deposits (perhaps also Miocene), and the latter are pierced and covered with basalts, breccias and volcanic tuffs, which in their turn are occasionally covered with post-Pliocene deposits. The sheets of basalt seem to have been ejected immediately after the deposition of the coal-bearing sandstones, and cover an immense space—larger than anywhere else on the globe—and are similar to the basalt sheets of Novaya Zemlya, Franz Josef Land, Greenland, Jan Mayen, Iceland and the north-western portion of Great Britain. A map and several plates, as also a summary in French, accompany this excellent and very elaborate work.—Materials for the fauna of the Devonian deposits of the Urals, by P. Kazansky, with one plate (summed up in German).—Materials for the knowledge of the soils and the vegetation of Western Siberia, by A. Gordyaghin, part i. Under this modest name the author gives, as an introductory chapter, an excellent description, geographical, geological and botanical, of the region in the basin of the Irtys (from 49° to 61° N. lat.), where we see the gradual transition from the black-earth steppes to the forest region. Some very interesting discussions about desiccation and the periodical changes in the precipitation in Western Siberia are incorporated in this chapter.—On the Turbellariæ of the Solovetsk Islands, by I. P. Zabusoff. Descriptions of the thirty-nine species, some of which are new, which were found in this part of the White Sea, and anatomical descriptions of four especially interesting forms (long summary in German, and three large plates).—The fauna of the Carboniferous limestone on Shartymka River, on the eastern slope of the Urals, by M. Ianishevsky (seven plates and one map). No less than 328 different species, some of which are new, are described, and the conclusion is that these limestones (described already by Verneuil and Murchison) seem to belong to the Lower Carboniferous age.—First addition to the "Fauna of the Permian Deposits of Eastern European Russia," by A. Netchayeff, with three plates. Eighteen species, of which nine are new, are described in Russian and in German.

*Bulletin de l'Académie des Sciences de St. Pétersbourg*, 5<sup>e</sup> série, tome xi., 1-5.—Observations of minor planets, made at Pulkova with the 15-inch refractor in 1898 and 1899, by W. Séraphimoff. The positions of thirty-five minor planets are given.—Observations of terrestrial magnetism at Obdorsk and Samarovo (North Siberia), by H. Abels.—On the products of oxidation of the new alkaloid cotarnine, by G. Wulff.—On the determination of the form of the solar disc, by W. Ceraski.—Actinometric measurements at Ekaterinburg, by P. Müller.—Determination of the velocity and direction of motion of clouds, by V. Kouznetsov (according to Pomortseff's method), with a plate.—Researches into the coefficient of refraction of ethyl ether in the vicinity of the critical point, by Prince B. Galitzin and J. Willip (in German). The chief results of this elaborate work are: the critical temperature is 193°·61 C.; critical pressure, 36·28 atm.; critical volume, 3·84 c.c. The formula of Lorentz represents very well the relations between the refraction-coefficient and the volume, and covers a wide range of temperatures (10° to 100°), both for the liquid and the gaseous states. The Lorentz constant is  $C = 0·3025$ . "It must also be admitted that in certain circumstances the liquid state may persist above the critical point—a phenomenon which is quite analogous to the retardation of evaporation."—Contributions for explaining various information from oriental sources about Eastern Europe, by F. Westberg. A learned and very interesting series of researches about the information found in these sources about different nations—the Rûs, the Madjars, the Vyes, and so on.—On the classification of the Chrysomonades, by L. Iwanoff (in German). Certain peculiarities of structure