as regards the errors of the instruments employed and the heights above the sea, so far as known. The heights of places not yet determined trigonometrically are approximated to barometrically by a comparison with other stations whose heights are known. From these data the monthly and annual isobars for each millimetre (0·039 inch) are drawn on thirteen maps. It is to be regretted that so much work, characterised not only by general accuracy, but also by an attention to minute accuracy of detail in certain directions, can only be regarded as to a great extent thrown away, at least in so far as regards the inquiry in hand, viz., the representation of the facts of atmospheric pressure in Russia, as that pressure varies by latitude and season, in their relation to configuration of surface and the relative distribution of land and water. The author has failed to see that, in order to give a satisfactory solution of this problem, one of the first requisites is that the observations at the different stations be for the same terms of years, or be reduced to the same terms of years, by the process of differentiation. As regards the thirty Russian stations, the averages are for periods varying from seven to fifty years, and excepting Lugan and Catherinenburg, no two places are for the same terms of years. As regards the months the result of this method of discussion is great unsatisfactoriness. Thus at several places where the averages are only for a few years, they not unfrequently are very different from the isobars which have been drawn for the districts where they are situated. Still further, the anomalous directions of several of the isobars, such as the isobar of 759 millimetres for March, cannot be accounted for by the physical peculiarities of the region traversed by the anomalous portion of the curve; but an examination of the facts suggests that the anomaly is probably due to the simple circumstance that exceptionally high or low monthly means of particular years are included in the averages of some stations, whilst at other neighbouring stations observations were not made during these exceptional months. The annual isobars are necessarily more satisfactory. It may, however, be noted that if allowance be made for the correction for gravity, according to latitude, which has been employed, a correction which for several reasons is objectionable, the annual isobars for Russia are substantially the same as those published by Mr. Buchan, even though these were confessedly a first approximation, giving only the broad features of the distribution of atmospheric pressure over the globe. Much more is now required than this, seeing that the data since acquired would enable us to draw the isobars with a precision sufficient to show not merely their general change of position with season and latitude, but also the exact forms impressed on the curves by their position with reference to large masses of land and water. In solving this problem, what is required from Russia are tables of the monthly means of each year during which observations have been made at each station, corrected for instrumental errors now ascertained—tables, in short, similar to those published by Dr. Buys Ballot for many places in Europe, in the *Annals* of the Dutch Meteorological Institute for 1870.

METEOROLOGY OF MAURITIUS—The *Mauritius Meteorological Results* and *Meteorological Reports* for 1874 and 1875, have been received, which are deserving of special notice from the increased vigour and efficiency with which they show meteorological research to be prosecuted in that part of the globe. In addition to the usual elaborate summaries, the *Results* for 1875 contain a noteworthy addition in the form of two Tables, one giving the hourly means of the atmospheric pressure of the months during 1875 deduced from the barograph curves, and the other the same means from the term-day observations made at the observatory from 1853 to 1871. Tables showing the hourly readings for each day were prepared but are not printed in the *Results*. If this be due to want of funds to meet the expense of publication it is to be hoped that the difficulty will be got over in next publication, on account of the great value of such hourly readings in many meteorological inquiries, but more particularly in connection with the gales and hurricanes of the Indian Ocean, which are so carefully detailed by Dr. Meldrum in the *Results*. The examination of these readings and the hourly observations of the wind could not fail to suggest conclusions of the utmost value in their bearings on systems of storm warnings for tropical countries such as we recently sketched in NATURE (vol. xv. p. 261) for the Bay of Bengal. In the *Annual Report* for 1875, it is stated in the course of a discussion on sunspots and rainfall, that since the photoheliograph has been in use at the Observatory the sunspots have been compared with the daily weather, and that, so far as the observations have gone, the results are in conformity with those for longer periods, both the rainfall and the velocity of the wind having been greater when the spots were most numerous. This increase of the velocity of the wind with an increase of sunspots is a point of first importance when viewed in connection with Mr. Lockyer's suggestion that increased sunspot area implies increased solar radiation, with Mr. Blanford's confirmation of this idea from an examination of the results of the solar radiation thermometers in India, and with the result arrived at by Mr. Clement Ley, showing that with like conditions of pressure the wind's velocity is greatest during those months of the year when temperature is highest.

EXPLORING BALLOONS FOR METEOROLOGICAL PURPOSES.—Since the beginning of February, M. Secretan, the optician of the Pont-neuf, in Paris, has been sending up regularly every day at noon small exploring balloons for the purpose of ascertaining the direction of the several streams of air and the height of clouds. The results are daily published in the *Petit Moniteur*. The balloons are given gratuitously by the *Grand Magazin du Louvre*, and are of india-rubber filled with pure hydrogen. The diameter is ninety centimetres. M. de Fonvielle finds by calculation and by several experiments, that the mean velocity of elevation is about four metres per second. Hence to obtain the altitude of the clouds it is sufficient to observe the balloon with an opera-glass, to count the number of seconds necessary to lose sight of it owing to the opacity of the clouds, and to multiply the number of seconds by four. It was found that the altitude of clouds varies from 400 to 800 metres, and prospects of fair weather are increased in proportion to the elevation of clouds. The clouds follow the direction of an aërial stream in which they are wholly immersed, and are not placed, as has been repeatedly stated, at the surface of separation. The direction of the air for the first 100 metres is almost always very uncertain and varies according to unknown causes. This shows that anemometers give a very poor idea not only of the velocity but also of the direction of prevailing winds, and that no real progress is to be expected in the knowledge of atmospheric calculation as long as meteorologists confine themselves to taking into account anemometrical observations. Very often two different streams of air are observed, the lower one extending from 100 to 200 or 300 metres; under these circumstances the weather seems to be particularly uncertain and unsettled. Meteorologists, we think, might make use of this method of observation with great advantage.

BIOLOGICAL NOTES

A CHYTRIDIUM WITH TRUE REPRODUCTION.—Botanists are indebted to Dr. L. Nowakowski for a memoir on *Polyphagus euglenæ*, in which they will find recorded for the first time the whole life-history of one of the most interesting of the group of vegetable parasites known as Chytridia. First described in 1855 by Bail, who was a pupil at Breslau of the illustrious F. Cohn, this species has now had all the mysteries of its life cleared up by the researches of Nowakowski, studying at the same university and under the same master. The Euglenæ on

which it is parasitic will be well known to microscopists as a group of flagellate Infusoria, at one time found as freely-swimming forms, and at another passing into a resting stage. It is at this period of their existence that the Polyphagus attacks them. The minute spores are furnished with four or more delicate filaments, which project from the body of the spores like rays. One or more of these soon comes into contact with a Euglena, bores through its integument, and penetrates into its protoplasmic contents; it now becomes a haustorium, increases in size, often sends off other filaments, which go on the search for other specimens of Euglenæ; in the meanwhile the body of the spore grows apace, and, if its haustoria be only fairly successful in catching Euglenæ, soon increases to considerable (microscopical) dimensions, and in course develops into a pro-sporangium. Next a little bladder-like projection is seen slowly forcing its way out from this latter, and at last becomes developed into a zoosporangium, from which in time issue the cloud of zoospores, and so after a well-known fashion the vegetative development of this parasite is carried on. The presence of a true reproduction is, however, the great fact in the memoir. Among the individuals of Polyphagus developing in the interspaces of the dead Euglenæ will be found *two* forms; one larger than the other, and generally spherical in shape, is the female plant; the other, small and more or less club-shaped, is the male plant. From the former there is a tube-like prolongation which passes into a haustorium; from the latter there are several haustoria; these remain thread-like if they encounter no Euglenæ, or enlarge when they do. These two unicellular plants then conjugate, but after a somewhat strange and novel manner. The protoplasmic contents of the female plant project through an opening in the cell wall, forming slowly an oval mass (gonosphere), with the which a haustorium from a neighbouring male plant, coming into contact, there is a co-mingling of the contents of the two plants, and thereby a zygospore is produced; sometimes these have a quite smooth covering, at other times they are rough, with minute prickles. After a little rest the zygospore develops a zoosporangium, from which issue swarm-spores, and the cycle is complete. As the result of these investigations, the author would place the Chytridia forms in the group of the Siphomycetes. It will be observed that though the whole contents of two cells go to form the zygospore, yet that the difference in the size of these cells is very marked, and that the behaviour of the gynœciel cell reminds one of what takes place in an oospore. (Cohn's *Beiträge zur Biol. der Pflanzen*, Bd. ii. Heft 2, 1876.)

CRYPTOGAMIC FLORA OF RUSSIA.—We notice the appearance of the first fasciculus of an important Russian work, by M. Sredinsky, being a Catalogue of Russian Cryptogams. The work will be divided into five parts: Vascular Cryptogams, Musci, Lichens, Fungi, Characeæ, and Algæ, each part to appear in several separate fascicules. The first fasciculus is a description of the Vascular Cryptogams of Southern Russia, Transcaucasia, and the neighbourhood of St. Petersburg. Much valuable material, collected by Russian botanists, is already in the hands of the author, and many members of the St. Petersburg Society of Naturalists have promised to supply him with much additional material for his valuable work.

ALGÆ OF THE GULF OF FINLAND.—At the last meeting, February 28, of the St. Petersburg Society of Naturalists, M. Gobi made an interesting communication on the Algæ of the Gulf of Finland. They are not numerous and have migrated from the Atlantic Ocean. Towards the east the red Algæ become rare, and all diminish in number and size. It must be observed also that the red Algæ of the Gulf of Finland have almost nothing in common with those of the White Sea, which circumstance is an argument against the existence of a former communication between the Baltic and the White Sea advocated by some geologists, but more and more discountenanced by the latest explorations. Describing in detail the most important forms of red Algæ of the Gulf of Finland, M. Gobi exhibited a complete collection of them, together with a series of drawings and of microscopical plates from the same.

BOTANICAL GEOGRAPHY OF RUSSIA.—The seventh volume of the *Memoirs* of the St. Petersburg Society of Naturalists contains a most valuable contribution to the botanical geography of Russia, by M. Gobi, "On the Influence of the Valdai-plateau on the Geographical Distribution of Plants, with a Sketch of the Flora of the Western Part of Novgorod Government." The author begins with a detailed description of the orography of the region, of its geological structure, its soil and subsoil, its marshes, lakes, &c., and deals at length with the climate of the country. Further, after a review of former botanical works dealing with the same region, he gives a list of plants growing on the plateau (615 Phanerogams). The fourth chapter is devoted to a delineation of the main topographico-botanical subdivisions of the flora; and the fifth is a detailed discussion of the relations existing between the flora of the plateau and those of neighbouring tracts. After some general remarks the author traces here the boundaries of the regions occupied by about fifty plants, which boundary-lines run either across the plateau or along its slopes. The intrusion of these plants from the north, north-east, and south is graphically shown on three maps accompanying the paper.

NOTES

WE understand that the Council of the new University College, Bristol, intend shortly to appoint a Principal of the College. We presume that the claims of science will be well considered in the appointment, as the movement to which the college owes its origin took its rise in the desire to found a school of science for the West of England and South Wales. In the interests of the higher scientific and literary education, we hope that the Council may be successful in securing the services of an eminent man for so important a post.

AT the monthly meeting of the Council of the University College of Wales, one of the governors present expressed his intention to give 200*l.* a year for three years, to be applied in such form as the Council may deem best in connection with the college for the encouragement of scientific agriculture.

THE President and Fellows of the Chemical Society dined together at Willis's Rooms on Tuesday evening, the company numbering about 200, and including some of the most distinguished names in science. Prof. Huxley, in responding to the toast of the Learned Societies, pointed out that most of the younger London scientific societies are offshoots, or "buds," of the Royal Society; the latter, he maintained, now more than at any other time, needed sympathy and support. Prof. Huxley alluded with some humour to the extraordinary claims put in by some applicants for a share of the government grant, one gentleman alone having asked for 3,000*l.* out of the 4,000*l.* Some of the applicants reminded him of the Irishman who requested government to give him an appointment in any capacity in Church, Army, Navy, or Civil Service, his sole qualifications, the applicant confessed, being an inexhaustible fund of animal spirits and a keen sense of humour.

AN influential meeting was held at the Mansion House on Tuesday in support of the erection of an Imperial Museum for India and the Colonies, to which scheme we have already referred in detail. The proposal met with the warm approval of the meeting, and it was resolved that steps should be taken to move in the matter, and have a building erected on the Thames Embankment, on the site of the now demolished Fife House.

THE *Morning Post* of March 15 contains an article on the present state of the Loan Collection of Scientific Apparatus, and