Victoria, Sir Graham Berry, has addressed a letter to Sir Erasmus Ommanney, informing him that, in accordance with instructions, he has asked Her Majesty's Government if they would contribute the sum of £5000 towards an Antarctic exploring expedition, provided the Australian colonies contributed a similar sum. Sir Graham has received (September 2) a letter from the Colonial Office, stating that the subject is now under the consideration of Her Majesty's Government. Not only for the sake of promoting science, but also the good feeling and bond of union which should exist between mother-country and colonies; let us hope the answer will be favourable. Here at least is a common work, for the benefit and honour of both. If the reply is favourable, the Agent-General is instructed to communicate with Sir Allen Young, with the view of ascertaining on what terms he would take the command of such an Expedition. If there is any obstacle in the way of a money grant, why should not a suitable vessel be placed at the disposal of Australia?

LIEUTENANT VAN GELE has started for Bangala Station, under instructions from the head-quarters of the Congo Free State at Brussels, for the purpose of solving the problem as to the connexion, if any, which exists between the Wellé and the Mobangi. It is clear that Mr. Stanley does not mean to face this problem, as it was hoped he would do.

METEOROLOGICAL NOTES.

THE new Chief Signal Officer of the United States is making some sweeping changes in the meteorological service. We regret that the series of simultaneous meteorological observations taken at noon, Greenwich time, which began in 1875, at the instigation of the Vienna Meteorological Congress, is to be given up at the close of the present year, from lack of funds. This service has developed from a comparatively limited work to one of great magnitude, covering almost the whole of the northern, and part of the southern, hemisphere. For some time the observations were reduced, and published in the form of daily bulletins and maps, but the continued reduction of the amount at the disposal of the Chief Signal Officer rendered it necessary to give up this great and useful publication, and to limit the work to the issue of a monthly "Summary and Review of International Meteorological Observations," containing the monthly means of all the observations, with explanatory text and maps of the average isobars, isotherms, winds, and tracks of areas of low pressure. This valuable publication will be continued up to December 1887, to complete the data for ten consecutive years in a shape convenient for further research. General Greely states that it is further intended to publish charts of the average monthly pressure and temperature for each month of the year, based on ten years' international observations.

FOR some years Prof. Cleveland Abbe has been engaged, under the superintendence of the Chief Signal Officer of the United States, in the preparation of a general bibliography of meteorology, which has been very largely contributed to by Mr. Symons, by Dr. Hellmann of Berlin, and others; the number of books and pamphlets now catalogued amounts to about 52,000. Prof. Abbe stated, at the recent meeting of the British Association, that the work is now practically complete, and ready for publication. The General Committee of the Association fully recognized the high importance of the work, and expressed a hope that its publication by the Signal Office would speedily render it accessible to all nations.

THE last number of the *Annuaire de la Société Météorologique de France* for April and May contains two interesting papers. (1) On the distance of the arc of the aurora borealis from the ground, deduced from the variation of its angular velocity, or from its breadth, by M. Carlheim-Gyllenskjöld. The author states that the observations made during the Swedish expedition to Cape Thorsden prove that the angular velocity of the movement of the arc increases according to a regular law as the arc rises from the horizon towards the zenith, and that its more or less rapid change depends chiefly on the vertical elevation of the arc above the ground. The formula employed in the calculation is fully explained, and the result arrived at is that the mean height of the aurora borealis is from 30 to 45 miles above the earth, which agrees very closely with the results obtained at Ice Fjord by the Swedish Expedition. (2) A paper by M. G. Guilbert on the prediction of clouds and their succession throughout the day. The author finds that the first arrival of clouds, their movement over us, and their disappearance below the horizon are not left to chance, but on the contrary follow a regular order which renders prediction possible. Several examples are given of the connexion between the succession of the clouds and barometric depressions. The same journal also contains a communication by M. G. Tissandier on an extraordinary decrease of temperature observed in a captive balloon, on January 15 last, near the Champ-de-Mars. The wind was very strong from north-east, and the temperature at the ground was 24°·8 F. at 1h. 30m. p.m., while at about 330 feet it fell to 20°·3. At 1h. 50m. a second ascent of nearly 600 feet was made, where the temperature was 19°·1, showing an unusual diminution in the upper regions, especially as the weather at the time was very cloudy.

THE *Annuaire de l'Observatoire de Montsouris*, near Paris, for the year 1887, has been somewhat late in publication, apparently owing to recent changes in the management of the Observatory. M. Marié-Davy, who had charge of it since 1873, has retired, and from January 1 last the Observatory has ceased to be a Government establishment, and has been taken over by the Municipal Council of Paris. The work of the Observatory is, as before, divided under three heads: (1) Meteorology properly so called, and its application to agriculture and hygiene, together with magnetism and electricity; (2) chemical analysis of the air and of the rain-water collected at Montsouris; (3) microscopic study of the organic dust held in suspension in the air and water, each of these services being intrusted to a separate scientific man under the supervision of a special Commission. The *Annuaire* contains elaborate discussions under each of these heads; the temperature ob ervations date from 1699, and rainfall observations extend from 1689 to 1886; those prior to 1873 were taken at the Paris Observatory. The highest shade temperature last year was 91°·0 on July 21, and the lowest 18°·1 on January 24; the mean for the year was 52°·0. The thermometer screen is an open stand sheltered at top and sides, unlike those used in this country, and the year dates from October or December, being what is called the agricultural or meteorological year; this want of uniformity renders it difficult to compare the observations with others. The greatest monthly rainfall was in June, being 4·57 inches, and the least in February, 0·71 inches. The apparatus used in the different investigations is clearly illustrated.

PROF. HUGO MEYER discusses, in the *Nachrichten der k. Gesellschaft d. Wissenschaften* of Göttingen (No. 9, 1887), the thunder-storms at that place during the years 1857-80. The discussions of thunder-storms have hitherto mostly been for large areas, hence the results of a long series of observations referring to a single place have a special interest. The observations now in question were carefully made by M. Listing, and are preserved in the Physical Institute at Göttingen. They show, with regard to the yearly period, two principal maxima: the first occurring about the beginning of July, being later than at many other places—for instance at Prague and Munich, which have their second maximum about that time; the second maximum at Göttingen being about the middle of August. These observations also show two secondary maxima of thunder-storm frequency, one in the spring (April 1-10) and another in the autumn (September 28 to October 7): the first being a period of unusually rapid increase of temperature; and the second, one of a relatively slight fall of temperature; such a late autumn maximum being of rare occurrence. With regard to the daily period, two maxima occur in all months, one at the warmest part of the day, and one at midnight. In the winter half-year both the maxima occur some hours earlier than in the summer half-year, and the afternoon maximum in winter is divided into two parts. The occurrence of these double maxima, both in the yearly and daily periods, has been previously pointed out by Prof. von Bezold with regard to the thunder-storms in Bavaria. The tables show that thunder-storms at Göttingen only come from between N.W., through N., and round to S.E. in the warm daily and yearly periods, which tends to prove that they are heat thunder-storms. The cyclonic thunder-storms come almost exclusively from a westerly and south-westerly direction. The yearly march of thunder storm frequency at Göttingen and various other places for the eight principal points of the compass is clearly shown by graphical representations, in the form of wind-roses; the mean direction of motion of all the storms at Göttingen is nearly from S. 68° W.

THE *American Meteorological Journal* for August contains an important article by Prof. W. Ferrel on the relation of the

pressure to the velocity of the wind. He points out that the formula generally used by English and American engineers and meteorologists, and which seems to have come down from a preceding century, is undoubtedly very erroneous. The formula, viz. $p = 0{\cdot}005\ v^2$, is used at all altitudes and for all temperatures, without regard to the varying densities of the air. The true theoretical formula—that is, one that would hold good in case of no viscosity of the air—is given at p. 302 of his "Recent Advances in Meteorology" (NATURE, July 14, p. 255). For an average temperature of, say, 15° C., and air of the standard pressure of 760 millimetres, this formula becomes $p = 0{\cdot}00255\ v^2$, which gives the ratio 1 : 1·96 between the two constants, from which it follows that the velocities usually deduced from pressures should be very considerably increased. The author also objects to the use of the constant 3 which is employed in the reductions of wind velocities obtained from a Robinson's anemometer of the Kew pattern, and which is about one-fourth too large, except for low velocities, as is shown by recent experiments by Stokes and Whipple in this country, and by others abroad. The same journal also contains interesting articles on the comparison of rain-gauges, by F. Pike, and on tornadoes, by H. Allen. The latter recommends the adoption of the term "low area," or "helicone," instead of cyclone, which he thinks should be applied to West Indian storms only.

THE results of rain and river observations made in New South Wales and part of Queensland during 1886, published by the Government Astronomer for New South Wales, contain a large quantity of valuable statistics on the distribution of rain, the heights of rivers, and evaporation. The number of stations in New South Wales has increased from 641 in 1885 to 772 in 1886, yet there are many parts of the colony still unrepresented. The Report is accompanied by a map, showing very plainly by means of black spots of various sizes the increase in the amount of rainfall as we go northwards into tropical regions, until Innishowen, in Queensland, caps the list with 176 inches. The greatest average rainfall in New South Wales is only 64 inches, at Antony, just under a very high mountain range, and next to this Port Macquarie, 60 inches. The mean rainfall for the whole colony amounted to 26·04 inches in 1886, being 11 per cent. more than the average for the past twelve years.

THE Meteorological Council have issued a new edition of their "Fishery Barometer Manual." The first edition of this work was published by Admiral FitzRoy about thirty years ago, and was freely distributed by the Board of Trade to small ports and fishing-stations supplied with public barometers. This useful practice of supplying barometers to fishing-stations has been continued to the present time, nearly 170 barometers having been erected, in addition to those issued by the Royal National Lifeboat Institution. The present Manual contains much additional elementary information likely to be of use to the fishermen, and refers briefly to the recent advances in the development of weather prediction, especially by means of daily charts. Reference is also made to the telegrams now received daily from America, and to the warnings issued by the *New York Herald* Service. The Manual also contains a table showing the distribution of gales on our coasts during fifteen years, from which it appears that November is generally more stormy than December, and that the maximum storminess in March, which is especially marked in North-East England, entirely disappears in South-West Ireland and South-West England.

WE had occasion recently (NATURE, June 23, p. 184) to refer to the active steps taken by Mr. Clement L. Wragge in promoting the meteorological service in Queensland, and we have now to record a further development by the publication of daily weather charts for Australasia. The charts are drawn for 8 a.m. daily, giving isobars, wind direction and force, and the temperature and humidity of the air. Rainfall is represented by dots of various sizes, while other phenomena, such as dust-storms, fog, hail, &c., are shown by appropriate symbols, and there is also a synopsis of the existing weather. The charts will be of great utility in the study of the weather of the Australian colonies.

WE are pleased to notify the publication of a Monthly Weather Record for the Mauritius, the first issue of which, for January last, has been received. The Record, which is after the style of the United States Weather Review, but without plates, contains the results of observations taken at the Royal Alfred Observatory, together with the means and extremes of temperature at four other stations, rainfall observations taken at fifty-five stations, observations taken at Rodrigues and the Seychelles, and observations taken on board ships in the Indian Ocean. The Observatory of Mauritius stands on a plain near Port Louis, three miles from the west coast, 179 feet above the sea-level. From west-south-west through west to north there is an uninterrupted view of the sea, and from north through east to south-east the ground generally slopes to the summit of the Piton, four miles distant, and 917 feet above the sea. Between south-east and south-west there is a chain of mountains, the highest peak of which bears nearly six miles due south, and has an altitude of 2874 feet above the sea. Among the miscellaneous observations it is noted that the tail of a comet (supposed at first to be Barnard's comet) was seen on January 20, and three subsequent evenings from various parts of the island.

THE BRITISH ASSOCIATION.

SECTION A—MATHEMATICAL AND PHYSICAL SCIENCE.

On the Magnetization of Iron in Strong Fields, by Prof. Ewing, F.R.S., and Mr. W. Low. Read by Prof. Ewing.—In the experiments described iron was subjected to very intense magnetization by placing a narrow neck between two massive pole-pieces. In this way values of magnetic induction higher than those previously reached had been attained. Through the kindness of Prof. Tait the large electro-magnet of the Edinburgh University had been transferred to University College, Dundee, and by its means the induction was pushed up to the value of 38,000 C.G.S. units. There seemed, indeed, to be no limit to the value attainable, and so the neck was then turned down to about one-sixth of its previous diameter, and the induction was forced up to 45,000. By turning the neck still further and annealing it, the highest value of 45,350 was reached. An attempt was made to determine the strength of the magnetic field in the immediate neighbourhood of the neck. The quantity $\frac{B - \text{field}}{4\pi}$, where B was the magnetic induction, was found to change from 1680 in an experiment where B was 24,700, to 1420 in the case of the highest value of B attained. This would favour the idea that the intensity of magnetization has a limit. But it is difficult to be quite sure that the field in the immediate neighbourhood of the neck is the same as in the neck itself.

In order to overcome this difficulty the field in the air round the neck was explored by means of three or four coils wound one on top of the other. This will show if the field is varying fast near the iron. If not, it would be natural to assume that the field is much the same as in the iron, because in the median plane there is no surface magnetism.

On Some Points in Electrolysis and Electric Conduction, by Prof. G. Wiedemann.—Before proceeding to the discussion of electrolysis the author wished to congratulate the Association on the appointment of a Committee to investigate this important subject, and further to congratulate the Committee on having Prof. Lodge to direct their labours. He had read with great interest the able report on electrolysis which had been some time ago presented to them by Prof. Armstrong. His own communication would contain much that was old, and something that was new. There was a difficulty in the definition of an electrolyte. Some people say an electrolyte is a salt. Some say it is a binary compound. But what is a binary compound? It is something which can be decomposed into two parts. But water-free hydrochloric acid does not conduct. Nevertheless it can be decomposed into two parts. Whether the water plays a part in decomposition is still an open question, although Kohlrausch thinks he has shown that in very dilute solutions the water does take part. The resistance of an electrolyte is measured by the work done in the wandering of the ions. It had been said that his view was that the viscosity is proportional to the resistance. This is not quite correctly stated. There are to be considered (1) friction of the ions in the liquid, (2) friction of the salt in the liquid, (3) friction of the whole liquid on the walls of the vessel. (3) may be avoided, and therefore we can omit it. The main thing considered has been the friction of the ions in the liquid. Kohlrausch has lately taken very dilute solutions, and can only find the friction of the salts and not that of the ions present here, which agrees with his theory. A difficulty in this connexion is, that in very dilute solutions the impurities of the