STARS HAVING PECULIAR SPECTRA.—Circular No. 124 of the Harvard College Observatory contains the particulars of a number of variable stars and other objects which the Henry Draper memorial photographs, examined by Mrs. Fleming, show to have peculiar spectra.

The chief peculiarities are bright or multiple hydrogen lines, as, for example, in the spectrum of B.D.+47°·939, a 4·5 magnitude star in Perseus, in which Hβ is bright and the lines Hγ and Hδ appear to be double, probably because fine bright lines are superposed on them. A star in Scorpio, of magnitude 7·1, is found to have a spectrum similar to that of ζ Puppis. Several of the variable stars mentioned show a range of about five magnitudes.

SIMULTANEOUS DISPARITION OF JUPITER'S FOUR SATELLITES.—From a study of the phenomena of Jupiter's satellites, Signor Enzo Mora finds that on October 3, 1907, all four of the larger moons will be invisible, for several minutes, at the same time, and, as this is a rare occurrence, he directs attention to the matter in No. 4148 of the *Astronomische Nachrichten*. From 7h. 48m. to 7h. 54m. (Greenwich Civil Time) No. 1 will be eclipsed and occulted, No. 2 will be in transit, No. 3 will be eclipsed, and No. 4 occulted. The satellites will again be invisible at 9 p.m. on the same evening. The last time this phenomenon occurred was October 21, 1895, and, after October next, it will not occur again until October 22, 1913.

PHOTOGRAPHS OF FAINT STARS.—In Circular No. 123 of the Harvard College Observatory Prof. E. C. Pickering outlines a plan by which the information to be gathered from photographs of stellar regions, taken by numerous observers in various countries, may become readily available to anyone in search of such information. For stars of the thirteenth magnitude and brighter, the Harvard collection of photographs largely supplies the necessary data. For example, for each of the stars of magnitude 5·0 and brighter, some 2000 in number, the collection contains about one thousand photographic images taken during the last twenty years; similarly, for the thirteenth magnitude stars, about five million in number, there are about 200 images of each.

Prof. Pickering now suggests that anyone having in the possession photographs which might furnish useful information, such as the earlier appearance of Novæ, variable stars, &c., should publish particulars of the same, or should forward to him the necessary information in order that it may be included in a publication which the Harvard authorities are preparing, and so become available generally.

MODEL TO ILLUSTRATE EFFECTS OF THE EARTH'S ROTATION.—In No. 7 (February, 1907) of the *Comptes rendus* M. G. Blum describes a simple apparatus for reproducing the phenomena observed in the Foucault-pendulum experiment for showing the earth's rotation. Briefly, the apparatus consists of a sphere, representing the earth, and a small pendulum which may be made to oscillate on its surface in any latitude. The sphere rotates on an axis, and is slotted along a meridian so that the gallows carrying the pendulum may be clamped on to it at different points representing different latitudes. The oscillation of the pendulum—which consists of a thin wooden rod with a small wooden bob—is produced by a coiled spring, and always takes place in a plane normal to the sphere. With this apparatus the rotation of the plane of oscillation with regard to that of the sphere may be shown to be equal in period and opposite in sense at the poles, and to have a slower period as it approaches the equator, the change being so marked that it can be readily seen and its nature recognised.

PROMINENCE OBSERVATIONS (1906).—No. 1, vol. xxxvi. (1907), of the *Memorie della Società degli Spettroscopisti Italiani* contains a posthumous note of Prof. Mascari giving the results of the solar-prominence observations made at Catania during the first half of 1906. Three hundred and forty prominences were observed on eighty-seven days, giving a daily frequency of 3·91. In the northern hemisphere the daily frequency was 2·32 and the mean heliographic latitude 31°·6, the corresponding figures for the southern hemisphere being 1·59 and 29°·2 respectively.

METEOROLOGICAL OBSERVATIONS.

SUNSHINE and Snowfall in 1906.—In *Symons's Meteorological Magazine* for January, Mr. R. H. Curtis gives an interesting summary, with map, of the bright sunshine over the British Isles, registered by the Campbell-Stokes (burning) recorder. The year was one of the sunniest on record; the most favoured region was the English Channel, all stations from Torquay to Lowestoft recording approximately 2000 hours of sunshine. At inland stations the amount became less, yet, broadly speaking, all the region south of a line drawn from the Humber to the Bristol Channel received 200 hours more than the yearly average. In north-west Scotland the amount was below 1200 hours, which was not far from the average of that district. The most brilliant months (relatively to their possible amounts) were February, April, June, July, and September; the most sunless months were May and November, in both of which the amounts recorded were generally below the average.

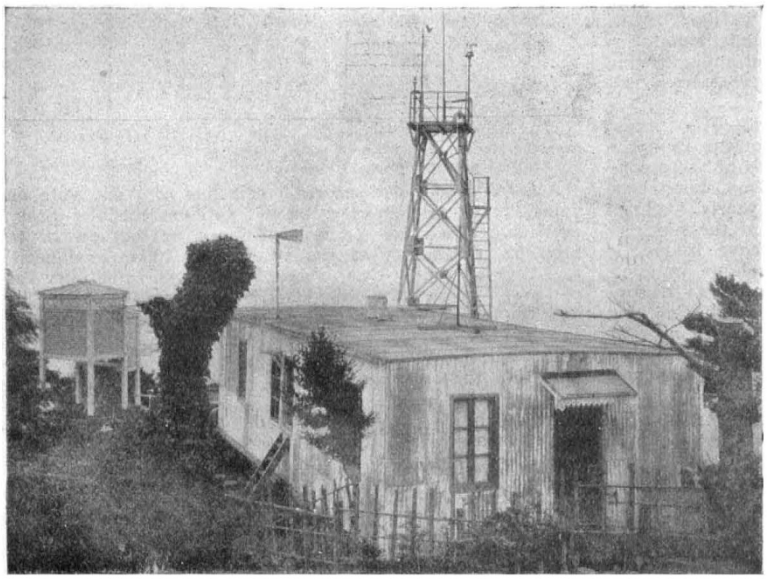
The snowfall is preliminarily dealt with by the editor, with especial reference to the storms between December 25–30, which occurred over nearly the whole of the British Isles. Considerably more than half the kingdom received above 5 inches, and some districts, especially north-east England and the southern uplands of Scotland, from 1 foot to 2 feet in depth. In the south of Scotland trains were blocked; Aberdeen was isolated for several days, and a most serious railway collision occurred near Arbroath. Although the greatest amounts recorded were in Scotland, Dr. Mill points out that the severity of the storm in Ireland, where more than a foot was recorded in the north and west, was noteworthy, owing to its usual immunity from heavy snowfalls, an amount of 5 inches over wide districts being very unusual there.

Rainfall of Scotland in May, 1906.—In discussing this subject in the Journal of the Scottish Meteorological Society, Mr. A. Watt shows that the rainfall of Scotland in that month was of a very exceptional character; in the eastern districts, generally, the fall was much the heaviest in May during the last fifty years. The rainfall on the east coast was heavier than that on the west; only a few scattered stations towards the north-west did not receive as much as 3 inches, about nine-tenths of the mainland received at least 4 inches, while a large area in the south and south-east and other isolated parts received 6 inches and upwards, or about thrice their normal amount. A note by Mr. R. C. Mossman on the conditions experienced by himself in the Greenland Sea during the month in question shows that the weather there was unusually inclement; the characteristic features were high barometric pressure, accompanied by strong north-west and north winds and gales, very low mean temperature, and densely overcast skies. Mr. Mossman states that there can be little doubt that the Arctic anticyclone was the dominating factor in the production of the abnormal rainfall in Scotland, and also of the unusually high temperatures observed in Russia at the same time, referred to in Mr. Watt's paper.

The Atmosphere in the Tropics.—In the Proceedings of the American Academy of Arts and Sciences for December, 1906, Mr. A. L. Rotch gives the results of the Franco-American expeditions undertaken at the expense of M. Teisserenc de Bort and himself to prove, by means of kites and unmanned balloons, the direction of the upper return currents above the trade-wind region of the North Atlantic. For this purpose M. Teisserenc de Bort purchased and equipped the steam yacht *Otaria*, of 350 tons, and expeditions were made in the summer of 1905 and in the winter (February) of 1906. With regard to the results of the first expedition, Mr. Rotch states:—(1) north of Madeira and near the Azores the upper winds are chiefly from west and north-west; (2) winds blowing towards the equator are from north-east to east in the lower region, and generally from north-west to north-east above 1000 metres; (3) the return currents from the equator, or anti-trades, are formed by winds having a southerly component, being generally south-west in the latitude of the Canaries, and south-east near the Cape Verdes. As most of the observations of direction of the upper currents found by Prof. Hergesell during the cruises of the *Princesse Alice*

in 1904–5 differ radically in showing no southerly component, the *Otaria* was sent again to the south and west of the region which had been explored in the preceding summer. Mr. Rotch states that the upper anti-trade is shown both by the balloons and the drift of the clouds between 3000 metres and 4000 metres, and that the classic observations of the return trade on the Peak of Teneriffe indicate a general phenomenon, and agree with those obtained over the open ocean by the recent expedition. Prof. Hergesell's remarks upon this subject were referred to in NATURE of December 27, 1906 (p. 211).

Meteorological Observations on the Summit of the Tsukubasan, Japan.—The establishment of this first-order observatory, and the determination of the force of gravity and exact geographical position, are due to the interest taken in physical science by H.I.H. Prince Yamashina. The observatory is situated on the most westerly peak of the mountain, in lat. 36° 13′ 21″ N., long. 140° 5′ 47″ E., about forty miles north-east of Tokio, at an altitude of 2852 feet; it commands the view of the surrounding district for many miles to the north and west, while to the south and east it has an open view of the wide expanse of the Pacific Ocean. Its position is therefore extremely favourable for studying the conditions of the atmosphere at that height. As connecting links, intermediate stations have been established near the little village of Tsukuba, at an altitude of 787 feet, and at the base of the south-west of the mountain, 98 feet above sea-level. The illustration represents the peak observatory, which is constructed of wood and zinc, the main objects being durability and usefulness, without any attempt at ornamentation. On the roof are seen the rain-gauges, lightning conductor, and wind-vane; close to the main building, on the north-east, stands a steel tower carrying another lightning conductor, anemometers for recording both horizontal and vertical movements of the wind, and a sunshine recorder, while the thermometer screen is seen to the south-west of the building. It goes without saying that the instruments are of the best make, although the sunshine recorder is of the photographic (Jordan) type, not the burning (Campbell-Stokes) pattern. The latter instrument alone is now used at the stations of the British Meteorological Office, as giving strictly comparable results. The observing staff consists of a director and five assistants; at the time of the publication of the first report, for the year 1902, the observatory and subsidiary stations were under the supervision of Mr. Okada, adjunct of the Central Meteorological Office at Tokio, the control of the observers and other details being undertaken by Mr. J. Sato, chief observer at the peak station. The computation of the mean and extreme values for 1902 from hourly readings for all three stations, and tables showing the ranges and wind frequency and velocity, are carefully prepared, but no general textual summary of results is given. At the base station only the rainfall observations are complete for the year; the total fall was 63·72 inches, and at the peak station 62·82 inches. The absolute ranges of the barometer at the summit and intermediate stations were practically the same, being 1·87 inches and 1·78 inches respectively. The mean annual temperatures at these two stations were 48°·2 F. and 55°·2 F., and the absolute ranges 39°·2 and 37°·4 respectively. The resulting wind direction at the summit, computed from the records of a Robinson's anemometer, was N. 82° E., resultant velocity 0·39 metre per second (0·87 mile per hour); the mean hourly velocity, irrespective of direction, was approximately 17·2 miles.



The Mete rological Observatory on the Tsukuba an.

Meteorology of India.—The Meteorological Department of India has issued a memorandum on the weather conditions during October and November, 1906, with a forecast of the rainfall in northern India and of the snowfall on the neighbouring mountain areas during the cold weather of 1906–7. Dr. Walker states that on the average of the whole country there was a defect of 22 per cent. in the rainfall of October and of 20 per cent. in November. The temperature conditions were determined by the distribution of rainfall; in the latter month the weather was unusually warm over practically the whole of the country, and especially in the North-Western Provinces. From information available, the snowfall also appears to have been less than usual. Among other factors affecting the cold-weather season, the director points out (1) that the active state of the sun during the past year is an element that should be taken into account; the number of sun-spots observed in 1906 is in moderate excess, which fact, if taken alone, suggests that a severe winter is rather more likely than a mild one. (2) That the mean of the departures of November rainfall at Zanzibar and Seychelles is −1·8 inches, which, taken by itself, suggests that the approaching cold-weather precipitation may be somewhat lighter than usual. All things considered, the final conclusion is that there is no reason for expecting any large departure from normal conditions.

Meteorological Observations in Cape Colony.—The report of the Meteorological Commission for the year 1905 shows that a large amount of useful work is being carried out in rather adverse circumstances. The sum received from the Parliamentary Grant for the year did not exceed 862*l.*; the supply of instruments and reduction of anemometrical and other observations have consequently been curtailed, while no general inspection of stations has been made since 1901. The results are published for a large number of ordinary meteorological and rainfall stations, some of which belong to adjacent territories outside the boundaries of Cape Colony; the report also contains a useful monthly chronicle of the weather by Mr. C. M. Stewart (secretary), and special tables of the maximum daily rainfall at various stations. The mean rainfall for the year, deduced from all the stations, was 23·77 inches, occurring on sixty-five days; the amount was only about 0·1 per cent. below the average for 1885–1894, and was an increase of 2·61 inches above the mean for 1904. The four largest records in one day were 11·33 inches at Evelyn Valley, on October 10; 10·70 inches at Durban, on June 1; 10·37 inches at Vogel Vlei, on April 9; and 10·18 inches at Forestbourne, on October 10. Thunderstorms were unusually frequent in December, and practically absent in July. The highest temperature recorded was 119°·5 at Main, on November 19, and the lowest

17°·0 at Moyeni, Basutoland, on August 23. The mean yearly value of the absolute maxima was 86°·9, and of the corresponding minima 41°·6. The mean temperature for the year was 0°·9 below the average. The stormiest month was October, and the calmest was April.

We have also received the official meteorological year-books for South Australia (1904) and Mysore (1905). Both of these works contain valuable means for previous years.

Forty Years of Southern New Mexico Climate.—Bulletin No. 59 of the New Mexico College of Agriculture contains the meteorological data recorded at the experimental station from 1892 to 1905 inclusive, together with results of temperature and rainfall observations at other stations in the Mesilla Valley for most of the years between 1851 and 1890, published some years ago by General Greely in a "Report on the Climate of New Mexico." The station is situated in lat. 32° 15′ N., long. 106° 45′ W., and is 3868 feet above sea-level. The data have a general application to those portions of southern New Mexico with an altitude less than 4000 feet. The mean annual temperature for the whole period was 61°·6, mean maximum (fourteen years) 76°·8, mean minimum 41°·4, absolute maximum 106° (which occurred several times), absolute minimum 1° (December, 1895). The mean annual rainfall was 8·8 inches; the smallest yearly amount was 3·5 inches, in 1873, the largest 17·1 inches, in 1905. Most of the rain falls during July, August, and September. The relative humidity is low, the mean annual amount being about 51 per cent. The bulletin was prepared by J. D. Tinsley, vice-director of the station.

Meteorological Observations in Germany.—The results of the observations made under the system of the Deutsche Seewarte, Hamburg, for 1905, at ten stations of the second order, and at fifty-six storm-warning stations, have been received. This is the twenty-eighth yearly volume published by the Seewarte, and forms part of the series of German meteorological year-books. We have frequently referred to this excellent series, and the volume in question is similar in all respects to its predecessors; it contains most valuable data relating to the North Sea and Baltic coasts. We note that the sunshine at Hamburg was only 29 per cent. of the possible annual amount, and that there were 103 sunless days; the rainfall was 25·9 inches, the rainy days being 172 in number.

VOX POPULI.

IN these democratic days, any investigation into the trustworthiness and peculiarities of popular judgments is of interest. The material about to be discussed refers to a small matter, but is much to the point.

A weight-judging competition was carried on at the annual show of the West of England Fat Stock and Poultry Exhibition recently held at Plymouth. A fat ox having been selected, competitors bought stamped and numbered cards, for 6*d.* each, on which to inscribe their respective names, addresses, and estimates of what the ox would weigh after it had been slaughtered and "dressed." Those who guessed most successfully received prizes. About 800 tickets were issued, which were kindly lent me for examination after they had fulfilled their immediate purpose. These afforded excellent material. The judgments were unbiassed by passion and uninfluenced by oratory and the like. The sixpenny fee deterred practical joking, and the hope of a prize and the joy of competition prompted each competitor to do his best. The competitors included butchers and farmers, some of whom were highly expert in judging the weight of cattle; others were probably guided by such information as they might pick up, and by their own fancies. The average competitor was probably as well fitted for making a just estimate of the dressed weight of the ox, as an average voter is of judging the merits of most political issues on which he votes, and the variety among the voters to judge justly was probably much the same in either case.

After weeding thirteen cards out of the collection, as being defective or illegible, there remained 787 for discussion. I arrayed them in order of the magnitudes of the estimates, and converted the *cwt.*, *quarters*, and *lbs.* in which they were made, into lbs., under which form they will be treated.

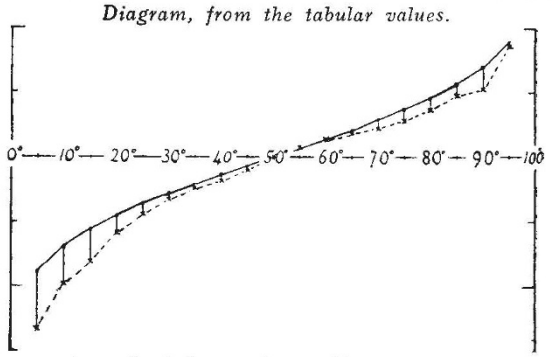
Distribution of the estimates of the dressed weight of a particular living ox, made by 787 different persons.

Degrees of the length of Array 0°—100°	Estimates in lbs.	Centiles: Observed deviates from 1207 lbs.	Centiles: Normal p.e. =37	Excess of Observed over Normal
°				
5	1074	−133	−90	+43
10	1109	− 98	−70	+28
15	1126	− 81	−57	+24
20	1148	− 59	−46	+13
q_1 25	1162	− 45	−37	+ 8
30	1174	− 33	−29	+ 4
35	1181	− 26	−21	+ 5
40	1188	− 19	−14	+ 5
45	1197	− 10	− 7	+ 3
m 50	1207	0	0	0
55	1214	+ 7	+ 7	0
60	1219	+ 12	+14	− 2
65	1225	+ 18	+21	− 3
70	1230	+ 23	+29	− 6
q_3 75	1236	+ 29	+37	− 8
80	1243	+ 36	+46	−10
85	1254	+ 47	+57	−10
90	1267	+ 52	+70	−18
95	1293	+ 86	+90	− 4

q_1, q_3, the first and third quartiles, stand at 25° and 75° respectively.
m, the median or middlemost value, stands at 50°.
The dressed weight proved to be 1198 lbs.

According to the democratic principle of "one vote one value," the middlemost estimate expresses the *vox populi*, every other estimate being condemned as too low or too high by a majority of the voters (for fuller explanation see "One Vote, One Value," NATURE, February 28, p. 414). Now the middlemost estimate is 1207 lb., and the weight of the dressed ox proved to be 1198 lb.; so the *vox populi* was in this case 9 lb., or 0·8 per cent. of the whole weight too high. The distribution of the estimates about their middlemost value was of the usual type, so far that they clustered closely in its neighbourhood and became rapidly more sparse as the distance from it increased.

Diagram, from the tabular values.



The continuous line is the normal curve with p.e.=37.
The broken line is drawn from the observations.
The lines connecting them show the differences between the observed and the normal.

But they were not scattered symmetrically. One quarter of them deviated more than 45 lb. above the middlemost (3·7 per cent.), and another quarter deviated more than 29 lb. below it (2·4 per cent.), therefore the range of the two middle quarters, that is, of the middlemost half, lay within those limits. It would be an equal chance that the estimate written on any card picked at random out of the collection lay within or without those limits. In other words, the "probable error" of a single observation may be reckoned as ½(45+29), or 37 lb. (3·1 per cent.). Taking this for the p.e. of the normal curve that is best adapted for comparison with the observed values, the results are obtained which appear in above table, and graphically in the diagram.