

for numerous mistakes occur in the spelling both of the common as well as of the scientific names; thus we have Spury for Spurry, Cormwell for Gromwell, Torn-apple for Thorn-apple, *Hordeum murianum* for *H. murinum*, *Anthoxanthum oderatum* for *A. odoratum*, &c.

IN four bone-caves of Upper Franconia different proportions of mammalian remains are met with ("Some Franconian Cave Faunas," by A. Nehring, in Report of Proceed. of the Imperial Geolog. Instit. Vienna, August 31, 1879). The bones of the older layers are darker in colour, and belong to the collared lemming and other decidedly arctic species. Bats are absent. This fauna probably existed at the end of the glacial period, when there were as yet few forests, or none, in the surrounding region. The bones belonging to a later period are lighter in colour, and indicate a post-glacial forest-fauna, mingled with a few arctic species. Bats requiring a temperate climate are abundant. These more delicate remains may have been brought to the caves by owls. This later cave-fauna of Upper Franconia agrees with that of Balve in Westphalia.

IN the United States a series of experiments has been made by the Ordnance Department in the use of the telephone to assist in determining the time of flight of small-arm projectiles, which has hitherto been a matter of great difficulty at long ranges, owing to the impossibility of seeing them strike. One telephone was placed within a few feet of the gun, and the other (both being provided with Blake's transmitters) in the shelter, about thirty feet in front of the target. The telephone being placed to the ear, a stop-watch, beating fourths of a second, was started at the moment of firing, and stopped on the bullet striking. The observations founded on a large number of experiments never differed more than a quarter or half of a second from each other, the slight delay in starting the watch being neutralised by the delay in stopping it. It was found that the time of transit was affected by the wind, being shortened by a rear and lengthened by a head wind.

FROM the Canaries we continue to receive the *Revista de Canarias*, which we are pleased to see has reached its twenty-third number, and still continues to devote a fair amount of its space to science.

A SECOND edition of Mr. W. H. Penning's "Text-Book of Field Geology" has been published by Baillièrè, Tindall, and Cox, with several additions and improvements.

IT is stated that a seam of exceedingly good coal has been opened up on the Irwin River in Western Australia. Its existence appears to have been known, though no attempt had been previously made to work it.

M. COCHERY, Minister of Postal Telegraphy, has asked from the French Parliament a credit of 320,000*l.* for establishing a subterranean telegraphic communication between the principal French cities and Paris. This resolution has been taken in consequence of the number of interruptions experienced in the aerial service during the present winter. For days the communication with Marseilles was conducted by a single line.

THE number of the *Transactions* of the Asiatic Society of Japan which has just come to hand, contains several papers of interest from different points of view. Among these may be mentioned "Analyses of Surface Waters in Tokiyo [Yedo]" by Mr. R. W. Atkinson; "The Chemical Industries of Japan," by the same; "A History of Japanese Art," by W. Anderson; and notes by the Rev. J. Summers on Osaka, usually known to the outer world as the commercial capital of Japan.

THE additions to the Zoological Society's Gardens during the past week include a Brown Bear (*Ursus arctos*), three — Snakes (*Tropidonotus tigrinus*) from Japan, presented by Messrs. James Veitch and Sons and Mr. Chas. Maries; an Arabian Gazelle (*Gazella arabica*) from Arabia, presented by Miss M.

Murray; two Korean Pigs (*Sus sp. inc.*) from the Island of Quelpart, Corea, presented by Dr. Sydney Ringer; a Japanese Hawk Eagle (*Spizaetus orientalis*) from Japan, presented by Mr. Harry Pryor, C.M.Z.S.; two Common Gulls (*Larus canus*), British, presented by Mr. George Weaver; a Robben Island Snake (*Coronella phocarum*), four Rufescent Snakes (*Leptodira rufescens*) from South Africa, presented by the Rev. G. H. R. Fisk, C.M.Z.S.; a Rhomb-marked Snake (*Psammophylax rombeatus*) from South Africa, presented by Mr. Eustace Pillans; three Oyster-catchers (*Hamatopus ostralegus*), three Brant Geese (*Bernicla brenta*), British, purchased; a Yellow Conure (*Conurus solstitialis*) from Guiana, received in exchange.

OUR ASTRONOMICAL COLUMN

WINNECKE'S COMET.—The only known comet of short period due at perihelion within the present year is that discovered by Winnecke in March, 1858, which was soon found to be identical with the third comet of 1819, detected by Pons at Marseilles on June 12, having completed seven revolutions in the interval. Encke had shown that the observations in 1819, extending over thirty-six days, were best represented by an ellipse, with a period of 2052 days, or 5^h 618 years, but it is not upon record, so far as we know, that any serious attempt was made to recover the comet when with Encke's period it might be expected to be near perihelion, and thus it remained for Winnecke to find it again after a lapse of nearly forty years. The perturbations by Jupiter and Saturn during this period have been calculated by Clausen, with the view to fix the precise value of the mean motion at the perihelion passage in 1858. Another revolution would be completed in November, 1863, but the comet's track in the heavens under that condition is so unfavourable, that no observations were secured. At the next return in 1868, however, it was well observed, and again in 1875. The calculations for this comet are understood to be in the hands of Oppölzer, of Vienna. With his elements for 1875, the next perihelion passage, without having regard to perturbations which must be small in the present revolution, would fall at the beginning of December next, in which case, the comet's apparent track must be again an unfavourable one; indeed it seems questionable if it will be possible to obtain observations. The most likely time will perhaps be late in January, but the intensity of light will then be very small.

Oppölzer has suggested that the comet imperfectly observed by Pons in February, 1808, in the constellation Ophiuchus, may have been identical with Winnecke's, if it were in perihelion on or about April 12. The following particulars relating to the comet of 1808 appear to have been obtained from Pons's papers, and were communicated to Schumacher by Inghirami:—"La comète du 6 février 1808, est une des comètes qui ont échappé aux astronomes sans pouvoir en calculer les elemens à cause que l'on n'en a pu avoir que quelques positions très-douteuses par méprise avec d'autres nébuleuses. Elle était très faible et difficile à voir. La nébulosité était ronde, elle s'étendait à peu près un degré et on y soupçonnait par intervalle un très faible noyau en deux parties. Son mouvement était assez rapide vers le sud et l'on n'a pu l'apercevoir que 3 jours parceque la clair de lune était très-fort, de sorte que malgré de recherches très-opiniâtres, on ne pouvait pas même la soupçonner le 10." There is then given a "Configuration renvercée du 3 février vers les 5*h*. du matin dans le grand chercheur qui à peu près a 3 degrés de champ;" and it is added: "Les deux nébuleuses marquées dans la figure sont sur le ventre d'Ophiuchus un peu au-dessous de l'Equateur." Oppölzer identifies the nebulae as Nos. 9 and 10 of Messier. In Zach's *Correspondenz* the comet is called a very small one, and nothing is said as to its rapid motion. It is evident that if the statement forwarded to Schumacher is the correct one, the comet moving quickly and with an apparent diameter of nearly a degree must have been in near proximity to the earth. Winnecke's comet in perihelion, on April 12, would have had about the following positions:—

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|------------------|-----------------|-----------------|------------|
| Feb. 5 at 16 ... | R.A. 237 56 ... | Decl. - 7 0 ... | Dist. 1'04 |
| " 8 at 17 ... | " 241 39 ... | " - 7 31 ... | " 1'01 |

So that the motion, though southerly, would be but small. The identity of the comet of 1808 with Winnecke's comet is therefore at least doubtful.

In 1833 Clausen made what appears a more likely suggestion, that the comet of July, 1819, was identical with the second comet of 1766, which was observed for a short time only by Messier at Paris, before perihelion passage, and after perihelion by La Nux in the Isle of Bourbon, though but roughly. Burckhardt found, in 1817, that the whole of the observations could be represented within their probable limits of error by an ellipse with a period of revolution little over five years. The planet Jupiter must have acted powerfully upon Winnecke's comet towards the end of the last century, and, so far as we can see, it appears possible that the perturbations occasioned at that time may account for the differences in the orbits of 1766 and 1819. If Burckhardt's elements for the comet of 1766 are approximately correct, as seems probable, it may have been detected at its first visit to perihelion in the actual form of orbit, perhaps at its first visit after being fixed in the system through the agency of Jupiter. We know that Brorsen's comet of short period was discovered under similar conditions.

METEOROLOGICAL NOTES

SIX years ago we remarked (NATURE, vol. ix. p. 164) that what was required in order to describe and classify many forms of clouds, were accurate delineations of these forms in their different aspects, and systematic inquiries as to the relations of clouds to the mode of their formation, to the states of the aqueous vapour composing them, and to the varying elasticity, temperature, and electricity of the atmosphere. Since then but slow progress has been made, the great desideratum being the contribution of data in a form on which science can lay its hands. A contribution of data of this sort has just been made by Dr. Hildebrandsson, the director of the meteorological observatory of Upsala, in a memoir on the "Classification of Clouds employed at the Observatory," illustrated with sixteen photographs of clouds. The photographs, which are about nine by seven inches, are very fine ones, and well chosen out of a large number taken under the direction of Dr. Hildebrandsson, to illustrate the different forms of cloud and their more important modifications and transitional states. The series representing the more marked changes from the delicately-pencilled cirri of the flimsiest texture to the nimbus of a rain-cloud is a most instructive one; as is also the series showing the strato-cumulus as commonly observed during the winter season in Scandinavia. The relations of the varying forms of clouds to cyclones and anticyclones which pass over Sweden is just touched on, but this important phase of the inquiry we hope Dr. Hildebrandsson will again return to, seeing he can so readily refer to the observations of his observatory, which give so complete and satisfactory a record of the various fugitive phenomena of the weather changes of that part of Sweden. Dr. Hildebrandsson's photographs of clouds may be studied with equal interest and professional advantage by artists as well as by meteorologists, it being scarcely possible to point to any department of art standing more in need of a thorough reformation than the cloudscapes of our landscape painters.

THE Hydrographic Committee of the French Marine has at a recent sitting sanctioned the publication of the last four of the series of sixteen wind charts prepared by M. L. Brault. In these four charts the winds of the Pacific are dealt with, the winds of the North Atlantic, the South Atlantic, and the Indian Ocean being discussed in the twelve charts previously prepared. In preparing these sixteen charts M. Brault has made use of upwards of 3,000,000 observations made over the oceans and continents of the globe. The chief results referring to the circulation of the atmosphere show as regards the South Pacific, which presents the largest expanse of ocean least influenced by land, a belt of calm or light winds near the equator; then the well-known south trades; to these succeeds a belt of winds variable as regards direction, but blowing with a force at least as great as the trades; and lastly, westerly winds, varying little, though more than the trades, in direction, and incurring upon the South Pole the nearer they approach it, and blowing much stronger than the trades and variables. As regards the other oceans, the disturbing influence of the land is felt in proportion to the extent of the continents which surround them, the disturbing influence reaching its maximum in August and January, in other words in those months when atmospheric pressure of the continents is in greatest excess or defect compared with that of the ocean as shown by the isobaric charts of the globe.

M. L. TEISSERENC DE BORT has prepared isabnormal charts of the temperature and pressure of the atmosphere, with the view of comparing, with some exactness, these two all-important factors of atmospheric circulation. He finds that when any region presents an excess of temperature, either absolute or relative to that of places in the same latitudes, a barometric minimum tends to be formed, and that the coincidence between the minimum of pressure and the maximum of temperature is almost complete. The tendency results in either a well-defined area of low pressure, or in the less pronounced form of a simple distortion of the isobaric lines as they cross the region of relatively high temperature. On the other hand, barometric maxima tend to establish themselves over regions whose temperature is either absolutely high or relatively so to the latitude, and the tendency to an increased pressure is the more decided when the region in question is surrounded by regions of low pressure.

At a meeting of the Botanical Society of Edinburgh, held on Thursday, the 8th inst., Sir Robert Christison read a paper of very considerable importance on the relative growth of the trunks of trees during 1879 as compared with 1878. Upwards of two years ago Sir Robert set on foot a system of measurement of the girths of a large number of well-grown trees in Edinburgh and neighbourhood, the measurements being made by himself with the same measuring-line, and the same circumference to be measured secured by marking it at the time of the first measurement with paint. The inclement character of the summer months of 1879 as compared with 1878 was described by a reference to the daily maximum temperatures noted at the Edinburgh station of the Scottish Meteorological Society, from which it appeared that for the six months ending with September the mean for 1879 was fully 5° less than for 1878, and the deficiency of day temperature amounting to nearly 10°. Of 11 deciduous trees, exclusive of oaks, the deficiency of growth during 1879 as compared with 1878 was 41 per cent.; of 17 evergreens of the pine tribe, the deficiency was 20 per cent.; and of 7 oaks the deficiency was 10 per cent. The 7 oaks were of different species, but they all gave results closely agreeing with each other. We shall look forward with the greatest interest to the annual reports of this investigation, which may be expected to reveal novel and valuable results illustrative of the bearings of meteorology on the growth of our forest trees.

AN interesting account of waterspouts observed on November 10, 1879, off Cape Spada, west of Canea, by Herr Miksche, has been communicated by him to the Vienna Academy. About 9 A.M. some heavy thunder-clouds rose in the west in a clear sky, reaching the zenith only after noon. One in advance, very black, and low-hanging, gave, about ten minutes to one o'clock, the phenomenon of the waterspout, a thick descending column, of milk-white appearance, being formed from it. The amount of downward gyrating force may be approximately estimated from the fact that at the distance of some eighteen miles one could distinctly see with the naked eye, a high round pedestal, formed by the foaming sea-water, like the socle of a monument. After ten minutes' duration, the column lost its conical form and began to assume a rectangular one; while, at the extreme eastern point of the cloud, a second waterspout was formed, conical in shape and of the same hue and intensity as the first. To this column also the sea presented a pedestal visible to the eye. For fully five minutes the water discharge continued with like intensity in both trombes. Precisely at five minutes after 1 P.M., *i.e.*, about a quarter of an hour after formation of the first trombe, an angular discharge of lightning (without audible thunder) took place from the clouds at that part into the sea; then the trombe suddenly ceased, only the pedestal continuing some time to show where it had been. The second trombe remained unaffected five minutes longer, then was extinguished without lightning discharge, and without reverting to the original conical form (as the first did). This fine display of natural forces was quite finished at 1.16 P.M., the clouds then uniting and pursuing their course eastwards.

GEOGRAPHICAL NOTES

At the meeting of the Geographical Society on Monday last, a letter was read from Mr. Thomson which had that day been received *via* Mozambique, announcing the arrival of the East African expedition at Mbungu, at the north end of Lake Nyassa, on September 22. Mr. Thomson was unable to discover the Urunga country and river, described by the late Capt. Elton as lying near Merere's town, but he believes the river to be the