

to the transmission of daily weather reports by telegraph; the use of wireless telegraphy 'in providing advance news of weather on the Atlantic'; an increase of the office staff, and the provision of new quarters for the central office.

#### ANTARCTIC WINDS.

DR. ERICH VON DRYGALSKI, in a paper read before the Royal Geographical Society on April 25 last, on the German South Polar Expedition, calls special attention to the winds noted during the *Gauss* voyage to the far south. The zone of prevailing westerlies was left behind and a trough of low pressure was crossed, the ship remaining on the southern slope of this trough, where the pressure rises again to a maximum over the continent. Here the winds were found to be prevailing easterly, 'which sweep down from the south over the vast uniform and but slightly inclined surfaces of the inland ice, and appear on the sea-board as easterly, foehn-like gales.' These gales, according to Dr. von Drygalski, give this south polar region its distinctive character, and also its limits, and by their frequency and uniformity 'they reveal the immensity and the homogeneous nature of those Antarctic lands.'

#### NOTES.

A. B. MACDOWALL (*Met. Zeitschr.*, XXI., 1904, 77-78) believes that during the last sixty years sunspot maxima have been accompanied in England by higher temperatures. He thus takes a view directly opposed to that of Köppen and Nordmann, who believe that the temperatures are higher (in the tropics) during sunspot minima. MacDowall also publishes curves of pressure at Ben Nevis Observatory and of the moon's phases, in which he considers the coincidence sufficiently marked to lead to a belief of cause and effect, and curves of relative humidity at Greenwich and of the moon's phases, which seem to him similarly related.

THE Deutsche Seewarte (Hamburg) has begun the publication of a pilot chart, to be issued quarterly, of the North and Baltic Seas. The same institution has also lately begun to

issue charts showing for 8 A.M. each day the distribution of pressure over the North Atlantic between Europe and North America, and also the force and direction of the wind. These charts are published as soon as possible after date.

SIR JOHN ELIOT, lately at the head of the Indian Meteorological Department, gives it as his opinion, as quoted in *Nature*, Vol. 69, 538, that 'the next development of weather study will almost certainly be in the direction of international or world meteorology, and its relation to the phenomena of sunspots and terrestrial magnetism.'

Two recent studies on the vertical distribution of temperature in the free air are the following: R. Assmann, 'The Temperature of the Air above Berlin,' translated in *Monthly Weather Review*, XXXII., 1904, 177-180; L. T. de Bort, 'Décroissance de la Température avec la Hauteur dans la Région de Paris,' *Ciel et Terre*, XXIV., 1904, 579-583.

THE Prussian Meteorological Institute has issued a new (second) revised edition of its 'Anleitung zur Anstellung und Berechnung meteorologischer Beobachtungen.' The first part deals with observations at second and third order stations. R. DEC. WARD.

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#### STOMACH STONES AND FOOD OF PLESIOSAURS.

IN a recent paper\* on North American Plesiosaurs, Dr. S. W. Williston, in discussing the probable significance of the pebbles so often found associated with plesiosaur remains, says: "What the use of these pebbles was I will not venture to say. They may have served as a sort of weight to regulate the specific gravity of the animals or they may have been swallowed accidentally. If, as I believe probable, the plesiosaurs were in the habit of feeding upon invertebrate animals, seeking such in the shallow muddy bottoms, the pebbles may have been taken with the food unintentionally. I doubt this, however. I may add that all specimens do not reveal similar pebbles."

\* Field Columbian Museum Publication number 73, page 75.

During the summer of 1903 the writer collected fossils in the Niobrara shales in South Dakota, finding the remains of many plesiosaurs. In nearly every instance a large number of siliceous stones were found associated with the bones, often embedded in the matrix en masse. In one specimen in which the largest dorsal vertebræ were four inches in diameter, there was at least half a bushel of these stomach stones, ranging from the size of a walnut to four inches across.

Considering the weight of these stones, the wonder is that so many specimens contain them. One would expect that when the flesh began to decompose, the weight of these stones would be too great to be contained by the weakened tissues and that they would be lost before the animal reached its final resting place. This may well explain the absence of stones in some cases.

Throughout the Niobrara formation in Dakota baculites are very abundant while scaphites are rare, especially in the shales. I could not be certain that any of the baculites associated with the plesiosaur remains had been eaten by these animals but in plesiosaur specimen number 5803 of the American Museum collection I found a variety of fossils representing this animal's last meal. Great numbers of fish vertebræ were scattered among the bones, while there were several pterodactyl bones, broken in small sections. But of chief interest were seven scaphites, more or less broken, which had without question been eaten by this animal. One other specimen had scaphites associated with it. The conclusion seems evident that invertebrate animals formed a large part of the food of plesiosaurs and that, in default of crushing teeth, the breaking up of the food was effected by the aid of these stomach stones, the presence of which further implies a thick-walled, gizzard-like arrangement in the alimentary canal.

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THE striking diversity of conditions and of vegetation in high mountain ranges makes

them ideal places for field experiment. Their value is greatly increased, moreover, when their slopes arise directly from the plain, as in frontal ranges. This is the case at Pikes Peak in the Rampart range of the Rocky Mountains, where the distance from the plains at an altitude of 1,800 meters to the alpine summit at 4,200 meters is less than ten miles. The significance of this is evident when one reflects that these ten miles contain in miniature the habitats and formations found between latitude 40° and the arctic circle: in less than a half-day, one may pass from the temperate zone through the boreal-subalpine to the arctic-alpine zone. The opportunity for the study of the development and structure of vegetation is unique. The major zones are in evidence as nowhere else, and their ecotones are clear-cut. Weathering and erosion are at a maximum, making new habitats and destroying old ones, and the developmental history of formations may be read from hundreds of stages. Experimental methods in vegetation and in the evolution of new forms may be applied with an ease and a certainty of freedom from accidents and interference which can be obtained only with difficulty in other regions. The dream of the physiologist (ecologist) to have his laboratory out-of-doors may be realized here, and it is merely a matter of time until methods will be found by which research will deal primarily with the experiments of nature, and the walled laboratory will be relegated to a purely secondary place.

The reconnoissance work done by different members of the botanical seminar of the University of Nebraska in various parts of the Rocky Mountains from 1893 to 1898 showed that the Pikes Peak region possesses the combined advantages of accessibility and diversity to a degree found nowhere else. This country was worked over more in detail in the summer of 1899, and Minnehaha, at an altitude of 2,500 m. on the Cog railway, was selected as a base. Minnehaha is within an hour's walk of the plains, and an easy climb of two hours brings one to timber line on Mount Baldy. It is in the midst of the coniferous and aspen forests of the subalpine zone, in a locality