

flora from the heretofore most southern known Dakota outcrop containing plants, namely, the Woodbine formation of Texas, contains two species which are identical with Argentine forms. Four identical forms are found in the Magothy and three in the Raritan of the Atlantic coastal plain, two occur in the Atane beds of the west coast of Greenland, which are usually classed as Cenomanian, and one occurs in the Patoot beds (Senonian) of the same region. Two forms are common to the Cenomanian of Bohemia and one is found in the Senonian of Prussia and Bulgaria. The only possible lower Cretaceous form contained in this flora is one which Kurtz identifies as *Asplenium Dicksonianum*, which, as currently understood, ranges from the Kootanie and Kome beds into the upper Cretaceous. This view is probably erroneous, as I have a number of facts in support of the view that the lower Cretaceous forms which have been referred to this species are distinct from those which occur in the upper Cretaceous. Kurtz identifies one species with a basal Eocene form of North America and another with a basal Eocene species of Belgium.

The flora as a whole has an entirely Cenomanian facies and its remarkable similarity to that developed in the central west during the mid-Cretaceous certainly points very strongly to a community of origin. Were the evidence less convincing in its array of forms it would be an easy matter to infer that Kurtz's *Liriodendron Meekii* was a leguminous leaflet, and that his species of *Cinnamomum*, *Litsæa* and *Sassafras* were simply the Cretaceous precursors of the abundant Lauraceous forms which occur in the modern flora of South America, but such a view is entirely untenable in the light of the disclosed species of *Liquidambar*, *Cissites*, *Persea*, *Menispermities*, *Platanus*, *Populus*, *Betulites*, *Quercus*, etc.

These facts will suggest to some the possibilities of a southern origin of our upper Cretaceous floras quite the opposite of the usually accepted view that they had their origin in the far north. However this may be, the evidence, it seems to me, conclusively points to a geographical connection between North and

South America during the mid-Cretaceous, at which time the mid-Cretaceous North American flora extended southward, reaching Argentina and displaying a Cenomanian flora at a somewhat later time than that assigned to it by the Argentine geologists. In other words, that while these South American beds are homotaxial they are not synchronous with the North American Cenomanian, the time interval between them being that which was necessary for the northern flora to spread from about the latitude of Texas to that of Patagonia.

Further than this, such facts go a long way toward discrediting Von Ihering's theory, approvingly quoted by Ortmann in the Princeton Expedition Reports, that northern and southern South America are to be regarded as genetically different and separated, at least until well into Tertiary times, by a sea connecting the Atlantic and Pacific.

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AGE OF PETROLEUM DEPOSITS, SARATOGA, TEXAS.

WHILE careful watch has been kept on the drilling of a number of wells in this district, it is only within the present month that fossils have been found in such condition as permitted their accurate determination and the recognition of their geological horizon.

A bed of shells was noticed in one or two wells drilled by the Rio Bravo Oil Co. at a depth of approximately 1,100 feet, but the specimens were so fragmentary that nothing could be made of them. Mr. Robinson, who is drilling a well west of the proven field, found this same bed at 1,158 feet and was fortunate enough to get a number of fair specimens. He turned these over to the writer, who sent them to the United States National Museum for identification.

Dr. W. H. Dall, under date of January 18, makes the following report on them:

In regard to the small lot of fossils from 1,158 feet, Robinson well, Saratoga, Texas, referred to by Dr. Dumble in the letter of January 12, herewith returned, I have to report as follows: it contains—

Donax (sp. nov.?).

Corbula inaequalis Say.

Divaricella dentata Wood.

Mangilia sp. (cf. *cerina* K. & S.).

Natica sp. fragm.

Terebra (*Oxymoris*) var. *indenta* Dall—fragm.

Anachis sp. fragm.

Pecten sp. fragm.

Spine of *Cidaris*? fragm.

These are almost certainly upper Miocene shells of the same age as those of the Galveston well, reported on by Professor Harris.

As the bed from which these shells were gotten is between the upper and lower oil sands, and as there is no appreciable difference in the character of the sediments above and below, including the lower oil horizon, it would seem most probable that the age of this oil pool is the Upper or Deep Well Miocene of Harris.

It is interesting to note that this is the first locality in Texas outside Galveston Island at which these fossils have been found.

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CURRENT NOTES ON METEOROLOGY.

TEMPERATURE IN CYCLONES AND ANTICYCLONES.

It is known to readers of these 'Current Notes on Meteorology' that the temperatures obtained by means of kites in cyclones and anticyclones at Blue Hill Observatory do not agree with the results obtained by Hann, Teisserenc de Bort and others in Europe. In the November number of the *Meteorologische Zeitschrift*, Hann discusses a recent paper by H. H. Clayton, which appeared in the *Beiträge zur Physik der freien Atmosphäre*, No. 3, and was recently briefly summarized in these columns. Hann points out the difference in the method of treatment adopted by Clayton on the one hand, and by Teisserenc de Bort and himself on the other, and notes that in general in dynamic meteorology barometric maxima and minima do not mean the crests and troughs of pressure waves at a given place, but the regions from which the pressure (at least as a whole) decreases in all directions (maxima) or increases (minima). Hann and Teisserenc de Bort, in their studies, used the daily weather maps as the basis, and

not the barogram at a single station, for they are of opinion that the vertical distribution of temperature above a single station at those times when the trough or the crest of a pressure wave passes over it has no clearly defined physical significance. "This method has led to the conclusion (observations on mountains and those obtained in the free air by means of balloons are in agreement on this point) that, at least in winter, the mass of air in cyclones averages colder than that in anticyclones (as Hann first pointed out in April, 1890). This does not imply that there may not also be smaller cyclonic whirls, especially in summer, which are relatively warm. The thermal conditions of tropical cyclones are still uncertain, and it would be a mistake to attempt to refer all atmospheric whirls back to the same cause."

LIFTING POWER OF ASCENDING AIR CURRENTS.

In the *Monthly Weather Review* for September, 1905 (issued November 29), H. H. Clayton cites some cases of the lifting power of ascending air currents in quiet summer weather. On August 6, 1894, at Blue Hill Observatory, a kite was caught in an ascending current about fifty feet above the top of the hill, and rose rapidly toward the zenith, circling as it rose. A large cumulus cloud was passing at the time, and the kite followed this cloud toward the east, until, being drawn out of the ascending current, the kite fell rapidly to the ground. On September 8 last, as reported by John Ritchie, Jr., a piece of paraffine paper was carried nearly vertically upward from the top of Mt. Chocorua, N. H., reaching a height of at least 1,000 feet. There was very little wind stirring at the time, and the paper rose steadily upward, not as if blown by a gust of wind. Both kite and paper were probably lifted by ordinary ascending currents of air such as commonly exist on summer days.

CLOUDS AND HEALTH.

MAJOR CHAS. E. WOODRUFF, U. S. A., who has recently written a book on the effects of tropical light on the white race, setting forth the view that the sunlight is a very important factor in the problem of acclimatization in