the theory, once granted, than to grant it and its retinue of corollary assumptions. But the mere novelty and unfamiliarity of the conception, not to say the strange difficulty that the reader experiences at first in orienting himself in a pendulating world, need hardly of itself invite to indifference or contempt. A hypothesis, however unproven or unprovable, which puts into such new and clear light so many obscure phenomena seems to me to deserve, at least at the hands of students of distribution, a modicum more of attention than has recently been accorded it by a British reviewer. As for the ultimate disposition of such theories as those of Reibisch and Kreichgaur, that is clearly more likely to fall within the province of astrophysics than of faunistic biology.

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MOREHOUSE'S COMET

A COMET was discovered photographically at the Yerkes Observatory on the evening of September 1, by Professor D. W. Morehouse, of Drake University, Des Moines, Ia., who has been engaged in graduate work during the summer under the direction of Professor Barnard.

The comet's position on the three plates simultaneously exposed on that night was approximately: R. A. $3^h\ 20^m$; Dec. North $+66°$.

Several photographs were also obtained by Professors Barnard and Morehouse on September 2 and 3, from which quite accurate positions will be determined. The tail is shown on the plates for a length of about six degrees, and exhibits some interesting structure. Although the comet made a strong impression on the discovery plates, it was faint visually when seen on the following night, and was without any definite nucleus. The coma was not large, but was uniformly diffuse.

A micrometric position was obtained with the 12-inch refractor by Mr. Fox, as follows: Sept. 2, G. M. T., $17^h\ 45^m$, R. A. $= 3^h\ 21^m\ 55^s$; Dec. $= +66°\ 52'\ 24''$.

The motion is thus seen to be toward the north, with a slight westerly component. The comet is of course above the horizon in northern latitudes through the whole night.

EDWIN B. FROST
YERKES OBSERVATORY,
September 4, 1908

SPECIAL ARTICLES

NOTE UPON THE STRUCTURE OF THE SANTA CATALINA GNEISS, ARIZONA

THE extensively-developed pre-Cambrian gneiss of the South side of the Santa Catalina Mountains near Tucson, Arizona, is remarkable for its tabular form; its regular stratification; its altitude at low angles; its broad flat surfaces and in places, for its extreme foliation, passing from coarse grained tabular granitic-gneiss into micaceous, sericitic and hornblende schists. Seen from a distance, especially from the locality known as Gibbon's Ranche, the croppings appear like ordinary stratified sandstones and shales. Close inspection reveals an elongated drawn out and flattened structure, which it is the special object of this paper to note.

The whole series appears to have been elongated under great pressure, resulting in flattening and spreading out into thin layers with a consequent reduction of thickness and an increased lamination.

I purposely refrain from describing this modification of form as a "flow" or as "flow-structure" for these terms convey the impression of a much more mobile condition than existed and of superficial movement rather than of the interior elongation by stretching under great pressure of a deeply seated mass of comparatively solid rock.

The compression and extension are shown in several ways, but specially by the elongation of nodules of feldspar; by sheets of quartz which seem to have been rolled out like dough and impressed by nodular masses of feldspar above and below.

The phenomena remind the observer of the curiously elongated rocks in California; the "grave-stone slates" and sandstones of the middle gold region, which are there uplifted at high angles, while in the Catalina gneiss the dip is gentle, approaching horizontality.

The sections of the Catalina rocks show a great variety of mineral composition ranging from quartzite to muscovite-schist and biotite-schist. There can be little doubt of their elastic origin, though they are now penetrated by layers of pegmatitic granite, which partake of the deformation.

These gneissic and schistose rocks are members of the series of pre-Cambrian schists for which I proposed the name "Arizonian." They are widely distributed in middle and southern Arizona and offer an inviting field for investigation.

Wm. P. Blake

Tucson, Arizona

Physiographic Sketch of Lewis County, N. Y.

The county of Lewis, bounded on the northeast by St. Lawrence, on the west by Herkimer, on the south by Oneida and on the east by Oswego and Jefferson counties, extends from the 43° 25′ of northern latitude for fifty-four miles northward and from the 75° 50′ western longitude for nearly thirty-four miles to the east, and is naturally divided by Black River into two heterogeneous sections from a genetic point of view, an eastern section, made up to the greatest extent of igneous and metamorphic rocks, and a western one that chiefly comprises a sedimentary series.

Successive manifestations of dynamical forces upon the igneous rocks in the east, as the crushing of the granites into gneisses and the intrusions of syenites, as well as gabbros, into the gneissic series and into the crystalline limestone series, have affected also to some extent the sedimentary rocks in the west in such a manner as to slightly bend during post-Ordovician time Cambrian, Ordovician and (Lower) Silurian strata into a flat synclinal fold that plunges at a very small angle to the north-northeast, while subsequent erosion nearly completed one of its cycles by reducing post-Ordovician topography to a peneplain, remnants of which can still be traced in the most elevated portions of the western section.

During another cycle of erosion that was never completed, but only brought about the partial destruction of the peneplain and exposed in succession the different members of the Ordovician, *i. e.*, the Black River and Trenton limestone, as well as the Utica-Frankfort slates and the Pulaski sandstone shales, at least one member of the Silurian, namely the Oswego sandstone, and, bordering the Ordovician in the east, the Potsdam sandstone of the Cambrian, a strike fault west of Black River, extending through the entire length of the county and possibly beyond, caused the disappearance of the Potsdam sandstone along the fault line, thus bringing the pre-Cambrian igneous and metamorphic series into contact with the Ordovician.

Succeeding the faulting of the region and the invasion of ice sheets of local character from the Adirondack, as well as from the Lake Ontario region, which led to the formation of two distinct sets of ground and terminal moraines, a second flood plain was established, adjacent to the former, but on a much lower level, which we might consider a base-leveled plain, as its uniformity of level is admirable for its entire extension from the utmost northwestern points of the county for over forty miles, as far as Forestport, beyond the southern boundary line of Lewis County.

Into this flood plain post-glacial erosion has sunk in several successions, of which two are more prominently marked by river-terraces, the channel that is now occupied by Black River, and has modified the topography of the regions east and west of Black River to such an extent as to impart to them the physiognomy of uplands and highlands, respectively.

At present the area under discussion is passing through a cycle of erosion that has started recently, speaking geologically, and conditions have been established that apparently favor the rejuvenation of the entire drainage system of the region and the carving into the sedimentary strata in the west along joint planes and into the igneous and metamorphic rocks in the east without special regard to basal structure, of those deep gulfs