DISCUSSION AND CORRESPONDENCE

USE OF THE TERMS "EROSION," "DENUDATION," "CORRASION" AND "CORROSION"

I AM interested in Mr. Bissell's plea for a more precise term, in geological literature, of the terms, "erosion," "denudation," "corrosion" and "corrasion." Without entering into a discussion of the merits of various past definitions of these words, may I presume to express my own views on this subject?

"Erosion" means "gnawing away," and is properly used to include all natural processes which have their origin at the earth's surface and which involve the destruction of rocks at or near the earth's surface. This is the broadest term referring to surficial rock destruction. It embraces work performed by passive or motionless agents (weathering) and work performed by moving agents, such as running water, glacial ice, waves, and wind. It may be used correctly for rock destruction on the land or on the sea floor. Thus, we may speak of erosion of the sea floor by waves or by submarine currents, and of the erosion of rocks, exposed on land, by moving ice or by alternate contraction and expansion due to heating and cooling, etc., etc. While it must connote transportation and may connote deposition, it should not be used to include these dependent processes.

"Denudation," by derivation, refers specifically to *stripping* or *laying bare*. It is often used in the sense of natural removal of soil or mantle rock from underlying solid rock, or removal of one rock formation from one lying below. It refers to erosional processes which are destructional, and like erosion should not be used to denote transportation or deposition. Almost, if not quite, without exception, "denudation" refers to stripping (erosion) only on land, whether it is on a small scale or on a large scale.

"Corrasion" is mechanical erosion performed by moving agents such as wear by glacial ice, by wind, by running water, etc.

"Corrosion" is most commonly used for chemical erosion, whether accomplished by motionless or moving agents.

I have suggested the foregoing definitions always having in mind that the "rock" eroded may be consolidated or unconsolidated and that corrasion is accomplished largely by virtue of sand, silt, or other rock debris carried by the moving agent of erosion.

FREDERIC H. LAHEE

DALLAS, TEXAS,
May 11, 1921

THE BREEDING HABITS OF AMBYSTOMA TIGRINUM

THE eggs of *Ambystoma tigrinum* are usually described as occurring in small clumps. This is typical of the species in the eastern part of its range. While collecting in Colorado at an altitude between 6,000 and 7,000 feet, I found eggs of *tigrinum* laid singly. When first laid the egg resembles that of *Diemictylus*. As development continues the outer envelope becomes swollen until at the time of hatching its diameter is one half to three quarters of an inch. The eggs are attached to vegetation or debris. The depth varies from a few inches to two feet. On one occasion adults brought into the laboratory laid freely.

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A PHENOMENAL SHOOT

AN extraordinary water-shoot, discovered by Mrs. B. W. Wells, near the city of Raleigh, N. C., on March 21, 1920, is of such unusual size as to deserve recording. The shoot sprang from the side of the trunk of a beheaded tree of *Paulawnia tomentosa* (Thunb.) Steud. and grew in one season (1919) to the length of 19 feet, 5 inches. Twenty internodes were formed, the longest of which, located a little below the middle of the shoot, measures 19 inches in length. The base of the shoot is 7.75 inches in circumference and 2.5 inches in diameter. Braunton in Bailey's Encyclopedia of Horticulture gives 14 feet as a maximum length of *Paulownia* shoots growing from the root after winter killing. The shoot recently discovered, exceeding this by 5 feet, 5 inches, is believed to be a record for

the tree type of woody plant in the temperate zone.

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THE AURORA OF MAY 14, 1921

To the Editor of Science: A very fine display of northern lights was observed here on Saturday night May 14th to daylight Sunday morning. It was first observed at 8:30 P.M. and was most conspicuous in extremely bright patches here and there in the sky, lasting usually not over a minute, with long arcs crossing the northern horizon. It was slightly cloudy, especially overhead and toward the northeast, but bright patches of aurora could be seen through the clouds. The sky was clear in the west and here and there groups of fine lines were visible, having always a slant of 60 degrees from the horizontal, corresponding to the dip of the compass at Tucson.

The colors were a dull white changing to a greenish tint in the northerly glows, a brilliant pearly luster in the patches and an occasional strong red color over large indefinite areas.

The display appeared to become somewhat less intense at 10:30 but shortly afterward showed renewed activity especially in long lines extending over large parts of the sky, which was now nearly clear, and all pointing toward a vanishing point of perspective situated about 30 degrees south of the zenith and a little to the west of the meridian, which is the direction of our lines of magnetic force extending toward the south pole. This vanishing point was very beautiful and was observed by many people. By one o'clock the display had somewhat diminished, but a later view at 3:30 showed a perfectly clear sky and the ordinary arcs crossing the northerly horizon with occasional nearly vertical streamers extending upward.

This was observed in many other parts of Arizona and far exceeds the recollection of anything of the sort seen here in forty years. I have notes upon four previous occurrences. One was seen from Flagstaff, Arizona, in the winter of 1894 and 1895. One was reported to me on November 5, 1916, and faint displays were seen here on October 9 and December 13, 1920. This was the first display of northern lights for most of the people of this part of the country.

A. E. Douglass
Steward Observatory,
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THE AURORA SEEN FROM SINALOA, MEXICO IN LATITUDE 27° N.

The Northern Light display of May 14 was very plainly visible from the mesa here—only a few miles from the tropics. The Indians have been firing the forests to hasten the advent of the summer rains, and, when I first observed the glow along the sky-line formed by the Sierra Madre I thought they were indulging in their propitiation of the gods on a rather larger scale than usual. The glow began about eight o'clock and the rays were first visible about fifteen minutes later. They were white to pale yellow in color, ever changing in form, location, and brightness. Many of them appeared to reach an east-and-west great circle through the zenith, those low down in the eastern sky appearing longer. The apparent focus was several degrees east of north.

I had never before witnessed such a display and never expected that my first observation of the aurora would be from the semi-tropics.

J. Gary Lindley

QUOTATIONS

THE MOUNT EVEREST EXPEDITION

The organization of the expedition is now complete, and all the members proceeding from England have left for India. The leader of the mountain party, Mr. Harold Raeburn, sailed from Birkenhead direct for Calcutta on March 18. Colonel Howard Bury, chief of the expedition, left Marseilles for Bombay on April 9, and Mr. G. H. Leigh Mallory, one of the young climbers, sailed from London direct for Calcutta on the preceding day. Mr. A. F. R. Wollaston, surgeon and naturalist, left Marseilles for Bombay on April 16, and by the same boat Mr. G. H. Bullock, who had been selected at the last moment to replace Mr. George Finch, who was unfortunately, owing to ill-health, unable to take part in the ex-