

## UNIVERSITY AND EDUCATIONAL NEWS.

MRS. E. B. COXE has given Lehigh University \$20,000 as a fund in memory of her husband, Eckley B. Coxe, the income of which is to be used for the support of poor and deserving students.

COLORADO COLLEGE has been given \$10,000 by an anonymous donor to be used for a building for women students.

THE Massachusetts Institute of Technology receives, by the will of the late William Tappen, Jr., Milton, Mass., \$10,000 to be used for deserving students, and is further made the residuary legatee of the estate.

THE will of the late Rev. Caleb Bradley, of Dedham, Mass., gives \$2,000 to Tufts College and \$2,000 to Gales College.

DR. E. FISCHER has been promoted to a full professorship of botany in the University at Berne, and has been made Director of the Botanical Gardens. Dr. Gustav Jäger, docent in the University of Vienna, has been appointed to an assistant professorship of theoretical physics, and Dr. Friedrich Gräfe, docent in the Polytechnic Institute at Darmstadt, to an assistant professorship of mathematics.

MR. A. FRANCIS DIXON has been appointed professor of anatomy in the University College of South Wales. It appears that the method of election was for three selected candidates to appear before the Council, one to be chosen by that body.

## DISCUSSION AND CORRESPONDENCE.

## ON SUPPOSED EFFECTS OF STRAIN IN TELESCOPIC OBJECTIVES.

TO THE EDITOR OF SCIENCE: In your issue of April 23d (page 656) I notice a criticism by Professor E. S. Holden, Director of the Lick Observatory, which seems to me to call for a word of comment. Professor Holden is inclined to discredit the observations of Mercury and Venus made by Mr. Percival Lowell and his assistants at Flagstaff, principally for the reason that they have not as yet been 'fully confirmed by other observers with other telescopes.' The markings seen by Mr. Lowell he attributes to

a supposed strain on the glass, induced by an overtight condition of the adjusting screws or of the objective in the cell.

Now it happens that I personally superintended the adjustment of the Lowell objective in the cell at Flagstaff before the observations in question were made, and I am satisfied that the screws holding the glass in place were *barely turned home with the fingers*. I desire to express it as my belief, founded on long experience as a practical optician, that strain in the glass is incapable of producing the effect of markings on a planetary disc. It is obvious that the same class of strain which exists in the Lowell must be present also in the Lick objective, since both are mounted precisely alike in their cells on triangular bearings; and if such effects were produced in the 24-inch glass as Professor Holden imagines they would be much more apparent in the 36-inch.

Having worked both of these objectives myself, and expended as much artistic ability on the one as on the other, there can be no impropriety in my saying that the performance of the Lowell glass is equal to that of the Lick or any of our large telescopes.

ALVAN G. CLARK.

CAMBRIDGEPORT, MASS.,  
May 1, 1897.

## THE LOESS FORMATION OF THE MISSISSIPPI REGION.

TO THE EDITOR OF SCIENCE: In reply to Professor J. E. Todd's letter in your issue of April 30th I wish to offer the following remarks:

A complete and satisfactory answer of the questions presented by Professor Todd would require a thorough discussion of the Loess formation; but the necessarily limited nature of this communication, and my own imperfect knowledge of the formation in its entirety, will admit only of my touching briefly upon a few points.

There is, in portions of the upper Mississippi region, particularly in that part of it with which I am best acquainted—northwestern Illinois, a silt deposit which is spread out over the very uneven uplands as an originally nearly uniform sheet, and whose relation to belts of comparatively thick typical loess along the

main streams is similar to that between the gray loamy clay and the 'loess' of Missouri. The upland deposit is similar in composition to the typical loess of the valleys, except that it contains a large constituent of fine clay particles which partially bind the rounded silt grains. This deposit of unusually argillaceous loess, besides mantling the upland ridges, descends the slopes of the valleys and is present over the thick terrace-like deposits of true loess. They are separated by a smoothly undulating but quite sharp line. This line is present throughout northwestern Illinois and in Iowa at Dubuque. Without discussing the significance of this line, I will call attention to the fact that Chamberlin and Salisbury, in making the study of the loess of the 'Driftless Area,' recognized the distinction between the silt deposits along the main streams and on the uplands remote from the main water-courses, particularly on the east side of the Mississippi river; and in reference to their origin they say, on pages 306-7 of the 6th Annual Report of the U. S. Geological Survey, "the loess-depositing waters were neither true lakes nor true rivers, but assumed an intermediate fluvio-lacustrine character, possessing sufficient onward flow to prevent the deposition of a large proportion of the clayey constituents of the silt they bore. \* \* \*

The loess probably represents the debatable ground between the two" (a lake and a river). "The coarser stratified portion along the immediate valleys of the great streams seems clearly on the fluvial side of the line, while the broad, loam-like mantle apparently lies on the other side." It is this comparatively thin but uniform mantle of argillaceous loess or loam, on the uplands and in the valleys, for whose origin I claim a purely lacustrine or possible semi-marine character, largely because, while clearly water-laid, it passes within one-half mile and less from the top to the base of hills 100 and even 200 or more feet in height. It mantles a region having a range in altitude of 600 or more feet.

With special reference to the question of the mode of formation of the gray loamy clay of Missouri, which I regard as a portion of the Loess formation, as also does Professor Todd, I wish to make the following statements, which,

I believe, can easily be demonstrated to be facts:

The drift sheet of northern Missouri was not laid down on a perfectly level plain, but on an undulating upland, dissected by valleys of which the Missouri and Mississippi were examples. The Missouri valley, at least from Boonville onward, is preglacial in age, and it is hardly necessary for me to add that the Mississippi valley along the entire east border of the State is so also. These valleys do not now have much drift because it has been removed from them by subsequent erosion.

The line of Professor Todd's supposed 'barrier' or ridge from the Osage-Gasconade divide to Pike county, Illinois, being traversed by two important preglacial valleys—the Mississippi and Missouri—loses its effectiveness to account for the difference in altitude of the loess plains of northern Missouri and southern Illinois.

The gray loamy clay or 'upland loess' of northern Missouri was laid down on an undulating plain, some portions of which have a decided slope. The 'fluvial' theory of its origin, which supposes that the area upon which it was being formed was dry during a large part of the year, and, therefore, that it was deposited somewhat like the alluvial silts of the Mississippi delta at the highest flood stages, is opposed by the inequalities, when considered over broad areas, of the surface of the sheet of loess or loam. Rivers do not wander about except on plains which have an even and very slight slope. In order to uniformly sheet with water-laid silt even a very slightly hilly region, a lake-like body of water is required. That which covered northern Missouri at the time the 'upland loess' was deposited may not have exceeded 50 or 100 feet in average depth, and may not have covered the entire loess region at one time, but its nature was decidedly different than that of a river.

The failure to find beach ridges is far from being positive evidence of the absence at any former time of the shore line of a great lake, or even of the sea. For instance, the ocean waters in advancing over Florida to form the Columbia sands which mantle the northern portion of the peninsula, and later in withdrawing

from the same area, formed no distinct beach ridges; at least none have been observed by the writer. In Citrus and neighboring counties the marine Columbia sands seem to be composed of three members—a lower or red member (formed while the shore line was advancing inland), a middle or yellow member (formed mainly during the culminating period of the submergence), and an upper or white member (formed while the shore line was retreating). These rest upon an undulating land surface, rising in a distance of about eight miles, from sea level at Crystal River, to an altitude of about 180 feet A. T., near Lecanto, and again descending to nearly sea level in the Withlacoochee valley. No prominent beach ridges were formed *because the shore line did not remain at one level on the slope of the land a sufficient length of time*. This is only one of a number of similar cases which might be mentioned where the sea advanced upon and retreated from a sloping land surface without forming beach ridges.

In regard to the other objections against the lacustrine origin of the Missouri 'upland loess,' presented by Professor Todd, namely, that it is absent from certain areas in the eastern part of the State near the junction of the Mississippi and Missouri rivers and at a low level, I wish to suggest that it may have been there present originally as a very thin sheet which has since almost disappeared because of erosion. Past experience has taught me that when the loamy deposit which constitutes the 'upland loess' is very thin and patchy and approaches closely in composition and appearance to the residuary clays it is, by many geologists, scarcely recognized as a portion of the Loess formation. This suggestion is justified by the fact that I have observed in the region traversed by the St. L. and S. F. railroad, between Cuba and Pacific City, a loamy clay, usually free from pebbles, apparently separated from the residuary clay by a sharp line, and overspreading the surface of a hilly country like the 'upland loess' in northwestern Illinois. If this is a portion of the Loess formation it indicates that the lake or sea waters rose against the northeastern corner of the Ozark uplift to an altitude of 1,000 or more feet, or rather I should say that the land went down to that amount below these

waters. The superficial silts of this region ought to be investigated. O. H. HERSHEY.

FREEPORT, ILL.

#### SCIENTIFIC LITERATURE.

*Birds of the Galapagos Archipelago.* By ROBERT RIDGWAY. Proc. U. S. National Museum, Vol. XIX., pp. 459-670, 2 pls. Cover title-page dated 1896, but not published till March, 1897.

It was in the Galapagos Islands that Darwin, during the memorable 'Voyage of the Beagle' in 1835, made the original observations which led him to discover and formulate the great principle of evolution—to the elucidation of which the remainder of his life was so successfully devoted—and it was the birds of these islands which first drew his attention to the derivative origin of species. Hence to naturalists, and particularly ornithologists, the Galapagos Islands will ever be classic ground.

Unhappily, the advent of man, with his retinue of goats, pigs, cats and rats, has already resulted in the extermination of at least one of the indigenous birds; others are threatened with the same fate. The extinction of an animal is always a matter of regret, and in the present case is a serious loss to science because of certain unsolved problems respecting the extraordinary and unique interrelations of many of the species. For instance, certain genera contain a large number of forms, alike in color and markings, but differing in proportions, particularly the size and shape of the bill. In one genus (*Geospiza*) the bill presents a series of types which at first would hardly be supposed to fall within the limits of a single family,—much less a single genus. This remarkable series comprises bills that in form and size resemble those of tanagers, small-billed sparrows and huge-billed grosbeaks. But for the existence of intermediate forms no one would think of placing such diverse kinds in a single genus. In one or two of the genera almost every conceivable stage and step of intergradation exists, so that it becomes extremely difficult—if not in some cases impossible—to draw the line between specific and individual variations.

Owing to the absence of information concerning the adaptations and limits of specific varia-