CLASSICS OF SCIENCE:

Mastodons in North America

Paleontology

The age of rock formations and the dating of fossils, especially of the large extinct quadrupeds, were matters of lively controversy when Lyell, almost a generation before "The Origin of Species" was published, made his important trip to North America, making notes as he went of the geology, flora, fauna, customs of the inhabitants, and everything else of interest that came his way. (For his description of Niagara Falls, see the SCIENCE NEWS-LETTER, July 13, 1929.)

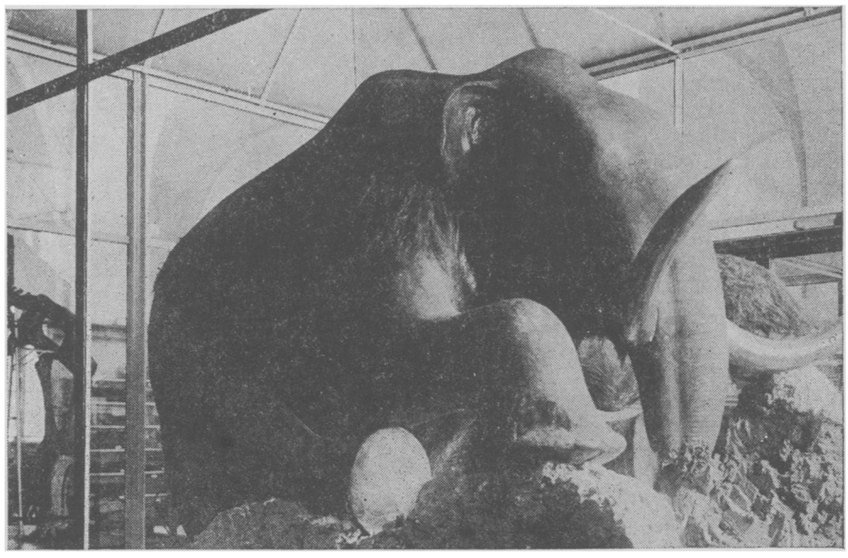
TRAVELS IN NORTH AMERICA; with Geological Observations on the United States, Canada, and Nova Scotia. By Charles Lyell. In two volumes. London: 1845.

Terraces at Cincinnati

The Ohio river at Cincinnati, and immediately above and below it, is bounded on its right bank by two terraces, on which the city is built; the streets in the upper and lower part of it standing on different levels. These terraces are composed of sand, gravel, and loam, such as the river, if blocked up by some barrier, might now be supposed to sweep down in its current, and deposit in a lake. The upper terrace, is bounded by steep hills of ancient fossiliferous rocks, the blue, Lower Silurian limestone, mentioned in the last chapter, in horizontal stratification. The higher terrace is about 60 feet above the lower, and this again about 60 feet above low water in the Ohio. The geologists here are convinced that the inferior terrace is of newer origin as shown in the section and proved by excavations, not exposed at the time of my visit.

In sinking a well at the distance of 300 yards from the Ohio, and at the depth of 50 feet from the surface, they found pieces of wood and many walnuts in a bed of silt.

Near the edge of the higher terrace, in digging a gravel-pit, which I saw open at the end of Sixth street, they discovered lately the teeth of the *Elephas primigenius,* the same extinct species which is met with in very analogous situations on the banks of the Thames, and the same which was found preserved entire with its flesh in the ice of Siberia. Above the stratum from which the tooth was obtained, I observed about six feet of gravel covered by ten feet of fine yellow loam, and below it were alternations of gravel, loam, and sand, for 20 feet. But I searched in vain for any accompanying fossil shells. These, however, have been found in a similar situation at Mill Creek, near Cincinnati; a place where several teeth of mastodons have been met with. They belong to the genera



A STUFFED MAMMOTH is a unique exhibit of which the Leningrad museum can boast. This famous animal was found frozen in the perpetual ice in Siberia, its hide still fit for the purposes of taxidermy and its flesh still edible

Melania, Lymnæa, Amnicola, Succinea, Physa, Planorbis, Paludina, Cyclas, Helix, and *Pupa,* all of recent species, and nearly all known to inhabit the immediate neighborhood. I was also informed that, near Wheeling, a bed of freshwater shells, one foot thick, of the genus *Unio,* is exposed at the height of 120 feet above the mean level of the Ohio. The remains of the common American mastodon (*M. giganteus*) have also been found at several points in the strata in the upper terrace, both above and below Cincinnati.

Upon the whole it appears, that the strata of loam, clay, and gravel forming the elevated terraces on both sides of the Ohio and its tributaries, and which we know to have remained unaltered from the era of the Indian mounds and earthworks, originated subsequently to the period of the existing mollusca, but when several quadrupeds now extinct inhabited this continent. The lower parts both of the larger and smaller valleys appear to have been filled up with a fluviatile deposit, through which the streams have subsequently cut broad and deep channels. These phenomena very closely resemble those presented by the *loess,* or ancient river-silt of the Rhine and its tributaries, and the theory which I formerly suggested to account for the position of the Rhenish loess (also charged with recent land and freshwater shells, and occasionally with the remains of the extinct elephant) may be applied to the American deposits.

I imagine first a gradual movement of depression, like that now in progress on the west coast of Greenland, to lessen the fall of the waters, or the height of the land relatively to the ocean. In consequence of the land being thus lowered, the bottoms of the main and lateral valleys become filled up with fluviatile sediment, containing terrestrial and freshwater shells, in the same manner as deltas are formed where rivers meet the sea, the salt-water being excluded, in spite of continued subsidence, by the accumulation of alluvial matter, brought down incessantly from the land above. Afterwards, I suppose an upward movement gradually to restore the country to its former level, and, during this upheaval, the rivers remove a large part of the accumulated mud, sand, and gravel. I have already shown that on the coast of Georgia and South Carolina in the United States, we have positive proofs of modern oscillations of level, similar to those here assumed.

Big Bone Lick

Two days after I reached Cincinnati, I set out, in company with two naturalists of that city, Mr. Buchanan and Mr. J. G. Anthony, who kindly offered to (*Turn to next page*)

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be my guides, in an excursion to a place of great geological celebrity in the neighbouring state of Kentucky, called Big Bone Lick, where the bones of mastodons and many other extinct quadrupeds had been dug up in extraordinary abundance. Having crossed the river from Cincinnati, we passed through a forest far more magnificent for the size and variety of its trees than any we had before seen. The tulip-tree (*Liliodendron tulipferum*), the buckeye, a kind of horse-chestnut, the shagbark hickory, the beech, the oak, the elm, the chestnut, the locust-tree, the sugar-maple, and the willow, were in perfection, but no coniferous trees,—none of the long-leaved pines of the Southern Atlantic border, nor the cypress, cedar, and hemlock of other States. These forests, where there is no undergrowth, are called "wood pastures." Originally the cane covered the ground, but when it was eaten down by the cattle, no new crop could get up, and it was replaced by grass alone.

Big Bone Lick is distant from Cincinnati about twenty-three miles in a S. W. direction. The intervening country is composed of the blue argillaceous limestone and marl before mentioned, the beds of which are nearly horizontal, and form flat table-lands intersected by valleys of moderate depth. In one of these, watered by the Big Bone Creek, occur the boggy grounds and springs called Licks. The term Lick is applied throughout North America to those marshy swamps where saline springs break out, and which are frequented by deer, buffalo, and other wild animals for the sake of the salt, whether dissolved in the water, or thrown down by evaporation in in the summer season, so as to encrust the surface of the marsh. Cattle and wild beasts devour this incrustation greedily, and burrow into the clay impregnated with salt, in order to lick the mud. Bartram, the botanist, tells us, that in his time (1790) he visited Buffalo Lick in Georgia, forming part of a cane swamp, in which the head branches of the Ogeechee river take their rise. The lick consisted of "white-coloured tenacious fattish clay, which all kinds of cattle lick into great hollows, pursuing the delicious vein." "I could discover nothing saline in its taste, but an insipid sweetness. Horned cattle, horses, and deer are immoderately fond of it, insomuch that their excrement, which almost totally covers the earth to some distance round this place, appears to be perfect clay, which, when dried by the sun and air, is almost as hard as brick." (Travels in N. and S. Carolina, &c. p. 39.)

The celebrated bog of Kentucky is situated in a nearly level plain, in a valley bounded by gentle slopes, which lead up to the table-lands before mentioned. The general course of the meandering stream which flows through the plain, is from east to west. There are two springs on the southern or left bank, rising from marshes, and two on the opposite bank, the most western of which, called the Gum Lick, is at the point where a small tributary joins the principal stream. The quaking bogs on this side are now more than fifteen acres in extent, but all the marshes were formerly larger before the surrounding forest was partially cleared away. The removal of tall trees has allowed the sun's rays to penetrate freely to the soil, and dry up part of the morass.

Within the memory of persons now living, the wild bisons or buffaloes crowded to these springs, but they have retreated for many years, and are now as unknown to the inhabitants as the mastodon itself. Mr. Phinnel, the proprietor of the land, called our attention to two buffalo paths or trails still extant in the woods here, both leading directly to the springs. One of these in particular, which first strikes off in a northerly direction from the Gum Lick, is afterwards traced eastward through the forest for several miles. It was three or four yards wide, only partially overgrown with grass, and, sixty years ago, was as bare, hard, and well trodden as a high road.

The bog in the spots where the salt springs rise is so soft, that a man may force a pole down into it many yards perpendicularly. It may readily be supposed, therefore, that horses, cows, and other quadrupeds, are now occasionally lost here; and that a much greater number of wild animals were mired formerly. It is well known that, during great droughts in the Pampas of South America, the horses, cattle, and deer throng to the rivers in such numbers, that the foremost of the crowd are pushed into the stream by the pressure of others behind, and are sometimes carried away by thousands and drowned. In their eagerness to drink the saline waters and lick the salt, the heavy mastodons and elephants seem in like manner to have pressed upon each other, and sunk in these soft quagmires of Kentucky.

The greater proportion both of the entire skeletons of extinct animals, and the separate bones, have been taken up from black mud, about twelve feet below the level of the creek. It is supposed that the bones of mastodons found here could not have belonged to less than one hundred distinct individuals, those of the fossil elephant (*E. primigenius*), to twenty, besides which, a few bones of a stag, horse, megalonyx, and bison, are stated to have been obtained. Whether the common bison, the remains of which I saw in great numbers in a superficial stratum recently cut open in the river's bank, has ever been seen in such a situation as to prove it to have been contemporaneous with the extinct mastodon, I was unable to ascertain. In regard to the horse, it may probably have differed from our *Equus caballus* as much as the zebra or wild ass, in the same manner as that found at Newberne in North Carolina appears to have done. The greatest depth of the black mud has not been ascertained; it is composed chiefly of clay, with a mixture of calcareous matter and sand, and contains 5 parts in 100 of sulphate of lime, with some animal matter. Layers of gravel occur in the midst of it at various depths. In some places it rests upon the blue limestone. The only teeth which I myself procured from collectors on the spot, besides those of the buffalo were recognized by Mr. Owen as belonging to extremely young mastodons. From the place where they were found, and the rolled state of some of the accompanying bones, I suspect that they had been washed out of the soil of the bogs above by the river, which often changes its course after floods.

Mr. Cooper of New York, who has given the fullest account of the fossils of this place, says, that the remains of reeds and freshwater mollusca accompany the bones; but he names no species of shells. Mr. Anthony and I were therefore diligent in our search for shells in pits which happened to have been recently laid open by col- (*Turn to next page*)

Negro Children Vary

Psychology

Negro children who live in different sections of America vary markedly in mental ability, judging by results of psychological tests which have been given to children in Nashville, Chicago, and New York City. Two hundred white children and three hundred negro children, all twelve years of age, have been examined by Prof. Lyle H. Lanier, of Vanderbilt University, who described the investigation before the International Congress of Psychology.

The children were asked to learn to associate certain numbers with certain letters of the alphabet. In Nashville, the white children excelled the negroes in time required to learn the series, in the errors made, and in the speed of responding. The negroes were practically equal to the whites in the number of repetitions required. In Chicago smaller differences were found, though the white children made a better rating on the test. In New York the negro children were superior in the number of repetitions required and in the total number of errors made, and in the number of logical errors made. The white children excelled in speed and in the number of repeated errors, and they were markedly faster in responding, Prof. Lanier stated.

Science News-Letter, September 7, 1929

Brown Spider is Sleepers' Friend

Entomology

Bedbugs, which have given tourists many a bad night in Athens and which added to the discomforts of the already wretched refugees in Greek camps during the troubles with Turkey a few years ago, have met their Nemesis in a spider. So reports Dr. N. T. Lorando, chief physician to the Evangelismos Hospital and Near East Relief, Athens.

During 1923 and 1924, Dr. Lorando says, conditions in the large refugee camp near Athens were deplorable. In spite of the efforts of the people to keep the premises cleaned and disinfected the bloodsucking insects bred in hordes, sometimes driving them out of the barracks to sleep in the streets. Then, suddenly, the bedbugs disappeared altogether.

At first it was thought that the disinfectants had at last prevailed, but on investigation it was discovered that a medium-sized brown spider was the real benefactor. This eight-legged friend of man would walk up to an unsuspecting bedbug, bite it through the back, and drain it of its blood. It also seemed to have the power of making the insects suspend movement by touching them with one leg, if it saw a fresh victim while it was still busy with a recent catch. Its appetite was large, laboratory specimens devouring thirty or forty bedbugs a day.

Each female spider laid two or three batches of eggs during a summer, standing guard over the nest until the young spiderlings hatched. These were precocious hunters, starting off on the business of bedbug eradication the day they first saw the light, in spite of the fact that they were then much smaller than their prey.

The generic name of this spider is suggestive: *Thanatos,* which is the Greek word meaning death. The spider is death only to vermin, however, for it is not poisonous to human beings. Another species of the same genus has been observed hunting horseflies in Sicily, which may account for the Sicilian folk-belief that horses can not be healthy unless there are cobwebs in the stable.

Dr. Lorando cites several other instances on record, where bedbugs have found enemies in the ranks of their own insect kin. Among these are the assassin bugs, better known a generation ago as "kissing bugs," and also cockroaches and the tiny red house-ants. But all of these are themselves rated as vermin, so that the remedy is almost as bad as the ill. Dr. Lorando recommends the artificial encouragement of his spider, because *Thanatos* is not herself offensive and because she has made a very good record as a pest-destroyer.

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Mastodons in North America—*Continued*

lectors of fossil bones; and we soon obtained a small *Ancylus* and *Cylas.* Afterwards, in the most eastern marsh, in the middle of which a powerful spring throws up beech nuts and shells from the mud below, we found two species of *Melania* known as recent, *Physa heterostropha, Cyclas similis, C. dubia?* (and another species, not known to naturalists here,) *Pisidium* (supposed to agree with one from Lake Erie), *Ancylus* (not known), and fragments of *Unio;* also the following land shells—*Helix solitaria* (with bands of colour not effaced). *H. alternata, H. clausa, H. fraterna,* and *Pupa armifera.* As new terrestrial and freshwater shells are occasionally added to the recent American fauna, I think it very probable that all the fourteen species which we met with, and which, I believe, co-existed with the mastodon, are still living, though perhaps not all of them in the immediate neighbourhood.

The Ohio River

It is impossible to view this plain, without at once concluding that it has remained unchanged in all its principal features from the period when the extinct quadrupeds inhabited the banks of the Ohio and its tributaries. But one phenomenon perplexed us much, and for a time seemed quite unintelligible. On parts of the boggy grounds, a superficial covering of yellow loam was incumbent on the dark-coloured mud, containing the fossil bones. This partial covering of yellow sandy clay, was at some points no less than fifteen or twenty feet thick. Mr. Bullock passed through it when he dug for fossil remains on the left bank of the creek, and he came down to the boggy ground with bones below. We first resorted to the hypothesis that the valley might have been dammed up by a temporary barrier, and converted into a lake; but we afterwards learnt, that although the Ohio is seven miles distant by the windings of the creek, there being a slight descent the whole way, yet that great river has been known to rise so high as to flow up the valley of Big Bone Creek, and, so late as 1824, to enter the second story of a house built near the springs. The level of the Licks above the Ohio, is about fifty feet, the distance in a straight line being only three miles. At Cincinnati the river has been known to rise sixty feet above its summer level, and in the course of ages it may occasionally have risen higher. It may be unnecessary, therefore, to refer to the general subsidence before alluded to (probably an event of a much older date), in order to account for the patches of superficial silt last described.

After spending the day in exploring the Licks, we were hospitably received at the house of a Kentucky proprietor a few miles distant, whose zeal for farming and introducing cattle of the "true Durham breed," had not prevented him from cultivating a beautiful flower-garden.

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