Letters to the Editor

On the Etiology of Clubbing of the Fingers

A common genesis for the development of clubbed fingers has long been sought. Its frequent occurrence in anoxic states, such as congenital heart disease with cyanosis, severe emphysema, chronic mountain sickness, etc., seemed to indicate anoxia as a basic cause. However, the development of clubbing in various chronic infections and in certain neoplastic states appeared to make the anoxia theory untenable, and as a result many theories have been proposed, the most recent based on increased peripheral flow (M. Mendlowitz. *Medicine,* 1942, 21, 269).

On the basis of readily observed clinical data, it is possible to postulate an anoxic factor in the infectious and neoplastic states, thereby offering a unified theory of pathogenesis. In these conditions the sedimentation rate of the blood is increased, which in turn is dependent on the formation of rouleaux. Intravascular rouleaux having been observed, it is apparent that the diffusion surface per unit of hemoglobin is reduced. The vasodilation incident to chronic anoxic states and the a–v anastamoses probably serve to facilitate the circulation of the rouleaux. With rapid rates of blood flow, tissue anoxia may exist in infections and neoplasms though the arterial saturation is normal. This provides the same mechanism (tissue anoxia) for clubbing in these states as in the classical cases of arterial anoxia.

An extension of these remarks will appear elsewhere.

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Exploration for "Big Bones" at Lower Blue Licks Spring, Kentucky

Proposing to continue the exploration for Pleistocene vertebrate fossils begun last year (*Science,* 1946, **103,** 58), a party from central northern Kentucky, southwestern Ohio, and southeastern Indiana led by Maj. Victor K. Dodge, gathered at the former old salt spring in the Licking River valley at Lower Blue Licks in Nicholas County, Kentucky, early on the morning of 15 September 1946. As on the previous occasion Maj. Dodge sponsored the project, paying all costs personally. The writer was present upon invitation of Maj. Dodge; other assisting personnel present were Charles E. Snow, anthropologist, and William G. Hagg, archeologist, both of the University of Kentucky, Lexington, Kentucky.

At 9:00 A.M. a bulldozer with a 12-foot blade, engaged especially for the project, began the removal of the soft river bottom alluvium over a 40-foot strip about 18 feet N. 70° E. of the walled enclosure of the famous old salt spring, the flow of which ceased about 1897. At varying depths ranging from 18 to 26 inches in the first cut made by the bulldozer, a soft, yellowish, sandy, pebbly loam containing small limestone slabs, and rotten wood, all probably of early Recent age, gave up quite a number of scattered, disconnected, frequently fragmental buffalo, deer, elk, and other contemporary fossil bones. Beneath this a sharply defined bed of dark gray or blackish river sand containing small, occasional pebbles of chert and limestone and Pottsville quartz pebbles, produced a number of buffalo, deer, and perhaps other bones. This bed of loose sand was very evidently water deposited and of fluvial origin. Its dark color was evidently derived from a former, age-long impregnation of the sulphur-saline waters of the nearby old salt spring together with some amount of iron in solution.

Beneath this bed of sand and clearly separated stratigraphically from it was found 20–21 inches of a hard, blackish, sandy, fluvial gravel containing numerous rounded quartz and chert pebbles of small size and many small, smooth, and somewhat flattened limestone slabs of cobble size or slightly larger. This bed rests directly upon the smooth, somewhat broadly water-grooved, bedded and in-place lower Cynthiana limestone. It was this hard, black, coarse semiconsolidated gravel, lying just above the limestone, that produced the proboscidian bones found in Cuts No. 1 and No. 2 on the southwest side of the salt spring in the fall of 1945. In this first cut of 1946 this heavy black gravel bed produced only a scattering of bison, elk, and deer bones; the much desired osseous relics of the *Mastodon* and the *Mammoth* were not found. Cut No. 1 was 52 inches deep, as measured from the surface to the solid bedded limestone.

In the course of the day's exploration five separate cuts were made by the bulldozer. Each of these was 12 feet wide and from 30 to 50 or 60 feet long. Cut No. 2 was made 6 feet northeast of No. 1. It produced only the usual assortment of buffalo, deer, and elk bones. Cut No. 3, set 15 feet S. 35° E. of the walled spring, was similarly unproductive, turning up only one well-preserved but broken *Mastodon* molar. During the process of excavating Cut No. 3, which was abandoned at a depth of 57 inches, it became increasingly evident that it had been previously opened in part, probably by Thomas W. Hunter (deceased), by means of hand-dug trenches during the period 1897–1900. He procured many excellent bones and tusks of *Mastodon americanus* and *Elephas primigenius* as well as skeletal relics of the buffalo, deer, elk, and other animals, most of which are now on display in the nearby Blue Licks State Park Museum.

In midafternoon, Cut No. 4, located about 28 feet S. 35° W. from the walled curb of the old salt well, was opened in a narrow undisturbed area between Cuts No. 1 and No. 2 of 1945. This cut, 56 inches deep, turned out to be very productive of proboscidian fossils in the hard, black, coarse gravel bed overlying the bedded lower Cynthiana (Ordovician) limestone. Besides the usual assortment of buffalo, deer, and elk bones at upper levels, there were found in the bottom of the cut three large