Letters to the Editor

Pleistocene Fossil Excavations at Blue Licks Spring, Kentucky

Fearful that the proposed U. S. Flood Control dam near Falmouth might permanently impound water to a considerable depth over the well-known Pleistocene vertebrate fossil site at Lower Blue Licks Spring on the Licking River in the northeastern bluegrass region of Kentucky, Major Victor K. Dodge, a distinguished amateur naturalist of Lexington, recently sponsored at his own expense an experimental excavation to prove that a wealth of unrecovered fossil bones of Glacial animals was still to be had for the digging at this famous locality. The writer was requested by Major Dodge and Mr. William J. Curtis, curator of the adjoining Blue Licks State Park Museum, to be present and to aid in the direction of the exploration.

About two wagonloads of "big bones," principally *Mastodon americanus,* but with some representatives of *Elephas primigenius, Magalonyx jeffersonii, Symbos cavifrons,* and *Bison bison,* if not *latifrons* and/or *antiquus,* had already been taken from this site by Thomas W. Hunter (deceased) from hand-dug trenches surrounding the old saline-sulphur spring during the period 1897–1900. These "big bones" are now in the museum at Blue Licks State Park.

The Dodge exploration was begun with a bulldozer on the morning of 14 October 1945 along a selected strip 8 to 10 feet wide and about 20 feet removed to the southwest from the old salt spring. Three feet of brown silt-loam, sand, clay, gravel, and loose limestone slabs and rubble were removed. This bed of unconsolidated river deposits gave much evidence of having been previously turned over, probably by Mr. Hunter. Beneath it, an additional 1½ feet of alluvial deposit was found to contain scattered brownish fragmental bones of the deer, the elk, and the buffalo. This upper 4 to 4½ feet is of Recent and sub-Recent (post-Glacial) age.

Immediately below the river deposits described above, there appeared in the excavation a black, coarse, firmly-cemented gravel, the pebbles or cobbles of which, when broken, revealed usually chert, occasionally fine sandstone or dense crystalline limestone. These pebbles were set in a matrix of countless small Pottsville quartz pebbles and fine quartz sand, the entire bed ranging from 3½ to 4 feet in thickness. This bed was of a very dark or gray-black to jet-black color, due to thorough impregnation of sulphur and iron, the latter forming the cement of the bed. This semiconsolidated gravel is definitely of fluvial origin and of late Pleistocene age. It rests directly on water-cut and grooved, Cynthiana (upper Ordovician) limestone, bedded and in place. The entire fluvial section, opened down to the bedded limestone at Blue Licks Spring, ranges in thickness from 8 to 9 feet, depending upon the level encountered in the underlying limestone.

When the black gravel was encountered in the excavation, the writer recommended disuse of the bulldozer and began careful removal of the pebbles from the gravel by hand pick. Almost immediately a shoulder blade, vertebrae, and short limb-bones of the Bison were revealed on the southwest side of the cut and were carefully removed. Turning then to a lower exposure of gravel in the northeast side of the trench, discriminate digging soon exposed a very large limb bone which, when completely uncovered and removed, proved to be about half of the humerus of the Mastodon. Later, two fractional vertebrae and about 7 feet of the tusk of a Mastodon were uncovered. Of this tusk some 3 feet crumbled, the balance of nearly 4 feet being removed. During the slow hand-digging necessary to find and lift these frail Pleistocene vertebrate fossils, an inconspicuous fragment of bone was removed which, now that it is cleaned, appears to be about half of the lower mandible of *Castoroides ohioensis,* the giant Glacial beaver, and the first to be recognized at this locality.

All of the "big bones" recovered in this exploration were found to occur exclusively in the hard, basal, black gravel. Several of them, including the Mastodon tusk, give evidence of stream wear or planation; all were separately imbedded in disorder in the gravel when it was a soft and unconsolidated river-deposited bed surrounding the salt spring, prior to the accumulation of any of the overlying brown, silty, sandy loam.

The Pleistocene fossil bones recovered in this exploration were immediately removed by Major Dodge to the University of Kentucky Archaeological Laboratories in Lexington, where they have been cleaned and placed upon exhibition by Professor W. G. Haag.

After the removal of the Mastodon tusk late in the afternoon, the bulldozer was re-employed, the trench, then about 8 or 10 feet wide and exposing 15 or 20 feet of the black gravel bone-bed, was quickly refilled, and the surface leveled to approximately its original appearance before the end of the day. Approximately 75 people—many of them active amateur naturalists, others scientifically trained in archaeology, including Dr. Charles E. Snow, anthropologist of the University of Kentucky—were present from northern central Kentucky, southwestern Ohio, and southeastern Indiana.

This modern, quickly executed fossil hunt has confirmed the previously expressed opinion of Major Dodge, the writer, and others that the Lower Blue Licks Spring is still a locality rich in Pleistocene vertebrate fossils. The success of the undertaking points dramatically to the immediate importance of formulating some systematic, adequately financed plan which will make it possible to prospect thoroughly the two-acre, old bog between the former salt spring and the Licking River channel, and to recover for the use of science the undoubtedly large

amount of vertebrate paleontological material still entombed there. Possibly as the result of such promptly and properly executed excavations many bones, if not complete skeletons, of those missing members of the American Pleistocene fauna, *Equus complicatus, Tapirus haysii, Mylodon harlani, Ursus americanus,* and some representatives of the exceedingly rare *Canidae* and *Felidae,* neither of which are now known in Kentucky, may be recovered, with consequent enrichment of our knowledge of the mammalian scene immediately south of the continental ice sheet during the last stages of the Glacial age.

WILLARD ROUSE JILLSON

Frankfort, Kentucky

Why Not?

Settlement of the atomic bomb question is the most urgent of all Government problems. While our statesmen play Pearl Harbor politics in the house of state the conflagration of a Third World War is already smoldering in the basement. The public is fast asleep or unaware of its implications. I suggest that the AAAS take the lead in getting all state academies and science clubs to present the facts in terms of destruction by the atomic bomb to the public, labor organizations, American Legion, etc., furnishing them with a plan of action.

LYELL J. THOMAS

University of Illinois

An Appeal

We the undersigned, wives of American scientists, have read with interest and concern the "News from Abroad" in recent issues of *Science.* We want to help these scientists, victims of the Axis, and we suggest the desirability of supplementing the work of the established relief agencies by sending gift packages of clothing and food directly to individual scientists and their families. Some of us have already sent packages to friends whose present addresses are known, and the acknowledgments we have received leave no doubt of the urgent need which these packages are helping to meet. Used clothing and shoes are genuinely appreciated.

American scientists who would like to send packages to colleagues of the occupied countries may obtain names and present addresses from the Secretary of this group. It is suggested that you indicate the country of your greatest interest and the ages of the children for whom you can supply clothing. We have just received from the Netherlands the names of some forty families with suggestions as to what clothing, etc., would best help them. Warm clothing and shoes seem to constitute their greatest need.

A package sent *now* is worth six sent next spring.

LANGHORNE H. BRICKWEDDE, LOUISE MCD. BROWNE, EMILIE H. CONDON, LOLA S. DEMING, EDITH O. HENDRICKS, MILDRED R. MASI, GRACE H. RUARK, GRACE H. SMITH, *Secretary.*

National Bureau of Standards

Ch'ang Shan, a Chinese Antimalarial Herb

Ch'ang Shan, the roots of *Dichroa febrifuga* Lour., has long been used in China for malaria, but as far as we are aware, no scientific studies had ever been made on its antimalarial action until 1942, when a solid extract of this herb was tried on 13 clinical cases of tertian malaria. A dose of 0.03–0.06 gram of the extract (equivalent to about 7.5–15.0 grams of the crude drug) was administered by mouth twice or three times daily for an average of 5 days. In comparison with the results of 152 quinine-treated cases, Ch'ang Shan appeared to be as prompt as quinine in controlling the fever, but its antiparasitic effect was a bit slower, requiring one more day than quinine in converting positive smears into negative.

Both the antipyretic and antiparasitic effects of Ch'ang Shan were demonstrable in experimental animals. A simple decoction of the crude drug was able to reduce the febrile temperature of rabbits inoculated with *B. coli* vaccine. Chicks infected with *Plasmodium gallinaceum* run a course of malaria which is almost invariably fatal if not treated. Ch'ang Shan (1 gram/kgm.), given by stomach tube twice a day for 1 to 7 days, controlled the infection in all cases, as shown by the conversion of positive smears into negative and the prolongation of the survival periods. Such treatment did not, however, prevent relapses, which usually occurred sooner or later. In doses of only about one-fifth that of Ch'ang Shan, the leaves of the same herb (Shuu Chi) were found equally effective.

In the Chinese Book of Herbs (*Pen Ts'ao Kang Mu*), Ch'ang Shan belongs to the category of poisonous herbs. Nausea and vomiting were, however, the only toxic reactions observed in our clinical cases. Acute toxicity tests were made on 5 dogs, 37 ducklings, and 56 chicks, L.D. 50 being 20 grams/kgm. (approximate), 22 grams/kgm., and 14 grams/kgm., respectively. Fatal doses of Ch'ang Shan produced in dogs intense congestion with numerous hemorrhagic patches throughout the whole gastrointestinal tract. Aside from some congestion, no specific lesions were found histologically in the liver, spleen, and kidneys.

With a view to isolating the active principle or principles, our chemical studies were checked at every step by testing on chicken malaria. Up to the present time we have succeeded in isolating from both Ch'ang Shan and Shuu Chi four crystalline substances. Two of these are neutral principles: Dichrin A (m.p. 228–230° C.) and Dichrin B (m.p. 179–181° C.); the other two are alkaloids: Dichroine A (melting at 230° C. with decomposition) and Dichroine B (melting at 237–238° C. with decomposition). In the doses tried, only Dichroine B was found to be effective for chicken malaria, while the other three were all inactive.

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