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Preliminary Geomorphological Studies of the Lime Creek Area & Preliminary Report on the Lime Creek Sites: New Evidence of Early Man in Southwestern Nebraska

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CONTRIBUTION OF THE DIVISION OF PALEONTOLOGY

NOVEMBER 1948

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BULLETIN OF THE UNIVERSITY OF NEBRASKA
STATE MUSEUM

VOLUME 3 LINCOLN, NEBRASKA, NOVEMBER 1948 NO. 4, PT. 1

Preliminary Geomorphological Studies of the Lime Creek Area[1]

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W. D. FRANKFORTER

PALEONTOLOGICAL and archaeological discoveries were made near Cambridge, Nebraska, by the University of Nebraska State Museum field party in the spring of 1947 (Schultz and Frankforter, 1948, pp. 279–280). Fossils and artifacts were found *in situ* at the base of a fifty-foot terrace on Lime Creek (University of Nebraska State Museum Localities Ft–41 and Ft–42) and on Medicine Creek just below the mouth of Lime Creek (Ft–50). Lime Creek is located (Fig. 1) in southwestern Nebraska in the southeastern part of Frontier County. It is a tributary of Medicine Creek which in turn is a tributary to the Republican River.

The locations of the three Lime Creek sites are: Ft–41, slightly E of center of NW ¼ of SE ¼, sec. 15, T. 5 N., R. 26 W.; Ft–42, center of NW ¼ of NW ¼ of SE ¼, sec. 15, T. 5 N., R. 26 W.; Ft–50, center of E ½ of NE ¼ of NE ¼, sec. 23, T. 5 N., R. 26 W. These positions are shown in an aerial photograph of the area (Fig. 2). The positions of Ft–41 and Ft–42 are also shown graphically (see Fig. 4). Ft–40 is of importance mainly to the paleontologist because the faunal assemblage represents a very late Pliocene fauna, including many new kinds of extinct animals.

[1] Contribution No. 2 to the Paleontological Salvage Program of the University of Nebraska State Museum in the Federal Reservoir areas in Nebraska. The geomorphological studies have been supported in part by a grant from the University of Nebraska Research Council.

* Professor of Geology, Midland College.

The paleontological material from this site reveals new information on the Pliocene-Pleistocene boundary line problem—a fundamental problem in the over-all Pleistocene history of the region.

A series of five topographic benches or terraces is developed (see Figs. 4 and 5) along the Republican River and its tributaries. Field studies indicate that these represent cycles of alluviation interrupted by erosional periods. A similarly developed series of terrace-fills in a contiguous region has been provisionally correlated with the sub-stages of the Wisconsin stage of Pleistocene continental glaciation (Lueninghoener, 1946).

The regional continuity of these terraces is in process of being demonstrated. It is the result of the cooperative work of several institutions. An extensive program for the study of the Pleistocene of the Great Plains has been in progress for the past

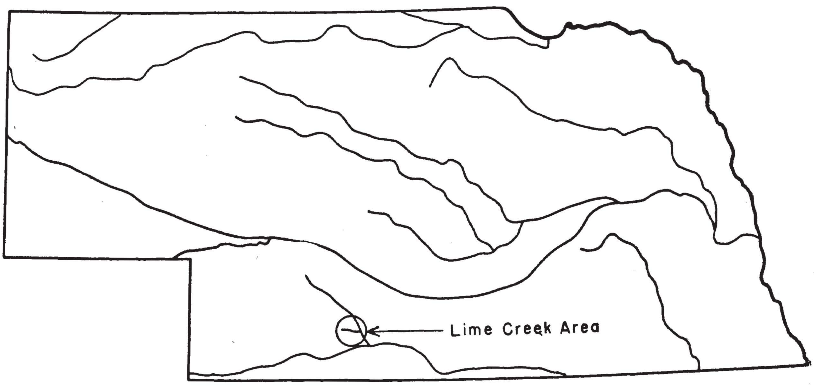


FIG. 1—Index map of Nebraska showing general location of the Lime Creek Sites.

fifteen years by the Nebraska Geological Survey, the University of Nebraska State Museum and the Department of Geology, the United States Geological Survey, the Kansas State Geological Survey, and the Iowa State Geological Survey. Initially a program of terrace study in connection with paleontological work was instigated during 1935 and 1936 when Dr. Paul MacClintock, physiographer of Princeton University, was financed by the Carnegie Institution of Washington to work with the University of Nebraska State Museum in the White and Chey-

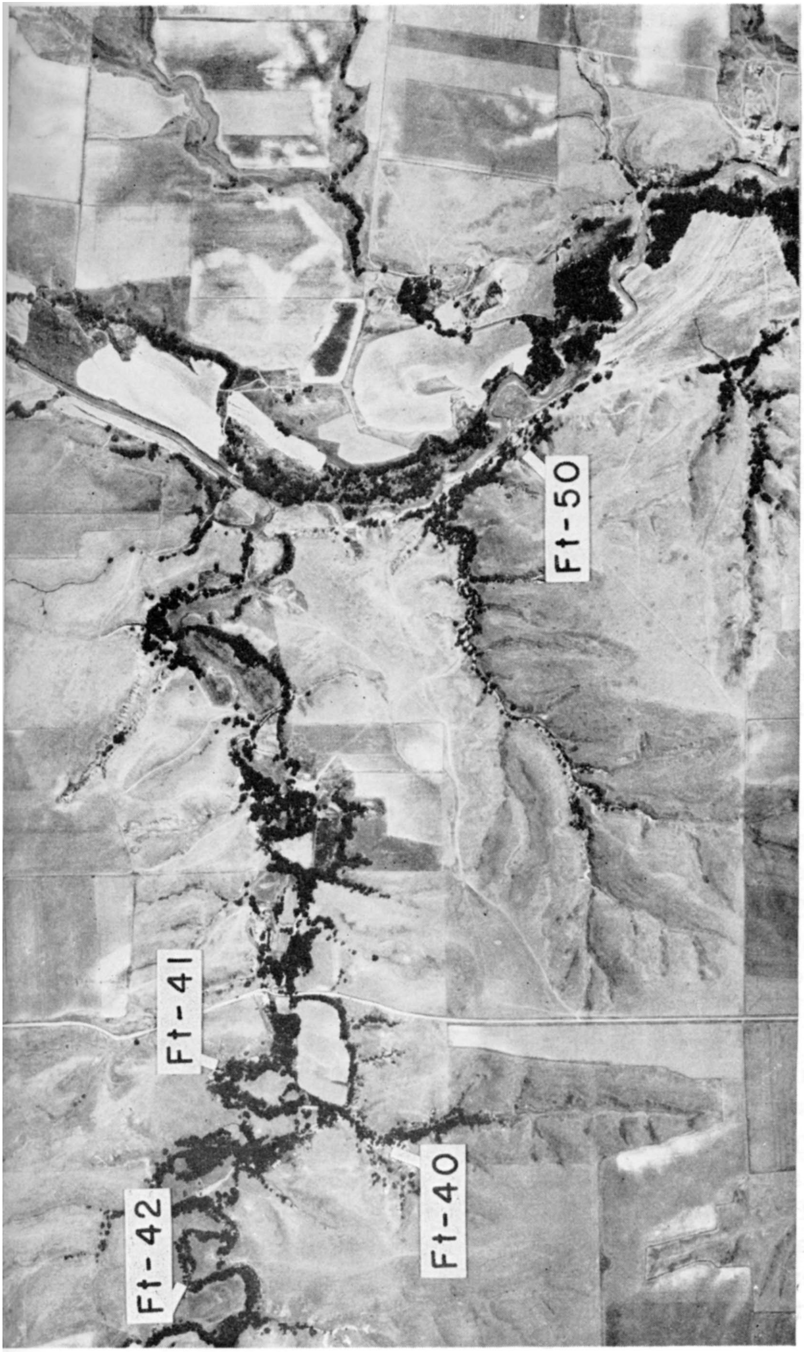


FIG. 2—Aerial photograph showing locations of archaeological and paleontological sites on Lime and Medicine creeks. Photograph by permission of Soil Conservation Service.

enne river areas in Nebraska and South Dakota. In 1936 Dr. Helmut DeTerra, also representing the Carnegie Institution, joined in the work. By 1937 a sequence of erosional and sedimentational events could be demonstrated locally. This sequence now can be applied regionally to the central Great Plains. Recent studies along the Republican River as well as the Platte and Missouri rivers have made this regional application possible. Dr. G. E. Condra and Prof. E. C. Reed of the Nebraska Geological Survey and Prof. James Thorp, Principal Soil Correlator of the Great Plains States for the Division of Soil Survey, United States Department of Agriculture, are aiding in the interpretation and dating of the soils and terraces involved in the study. Papers based upon their observations will be published at a later date. For the past year the University of Nebraska State Museum has been following a program of detailed regional photogrammetric terrace study of the Republican River and strategic tributaries such as the Medicine and Lime creeks. Agricultural Adjustment Administration and Soil Conservation Service contact aerial photographs (scale of approximately three inches per mile) have been used and a composite map traced from these photographs has been completed. This map is now being checked in the field and it is planned to present this information in a subsequent report. Inasmuch as it is beyond the scope of this preliminary paper to give complete evidence for conclusions, the above statements should indicate that the decisions reached, even though tentative, are the result of a systematic program of research.

The criteria used in the correlation of terrace-fills are: (1) physiographic continuity of the terrace, (2) height of the terrace above the normal stream level, (3) sedimentational characteristics and lithology of the terrace-fill, (4) stratigraphic relations of the terrace-fill to sediments of known Pleistocene age, (5) number of buried soils in the terrace, (6) fossil content (vertebrate and invertebrate) of the terrace-fill.

The provisional terrace sequence designation for the Republican River and tributaries is denoted by the abbreviations RT–0, RT–1, RT–2, RT–3, and RT–4 respectively for the fills from the youngest to the oldest (R = Republican River, T = Terrace, and the number of the terrace is indicated by starting with 0 for the Recent flood plain terrace).

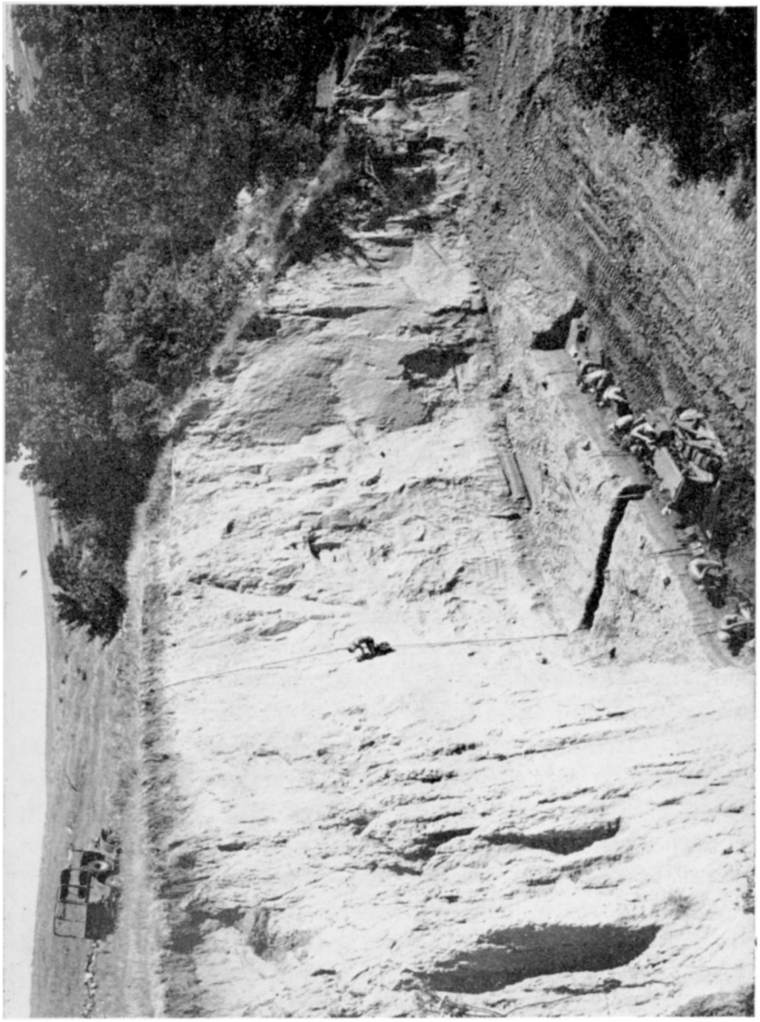


FIG. 3—Photograph of site Ft–41 as excavated in 1947. Bulldozer in foreground was used to remove overburden covering test strip at the base of which were found Scottsbluff type artifacts associated with the remains of Pleistocene mammals.

Remnants of early Pleistocene gravel-fills are exposed locally in the dissected upland areas above RT–4 in the hills north of the Republican River. These gravels are considered by the writers to be equivalent to the upper part of the Broadwater formation, which is exposed in a contiguous drainage system (Schultz and Stout, 1945, p. 232). A typical exposure of these early Pleistocene gravels is found two miles west and one mile north of Red Cloud in the SE ¼, sec. 28, T. 2 N., R. 11 W., Webster County, Nebraska. The fauna at this locality includes *Stegomastodon* (mastodont), *Plesippus* (horse), and *Titanotylopus* (giant camel). See Fig. 6, Part 2 for stratigraphic distribution of these genera.

Republican River Terrace-3 has only recently been recognized in the Medicine Creek area because its surface has been confused with both RT–2 and RT–4, particularly with the former. In places it has been mistaken for the lower terrace, RT–2, because the difference in elevation between the two surfaces is only slight, while in other localities the RT–3 surface has been interpreted to represent the eroded lip of RT–4. The relationships of these terraces has definitely been demonstrated in the area immediately north of the junction of Lime Creek with Medicine Creek (see Fig. 5). At this locality a series of five terraces is developed with complementary equivalents on both sides of the stream, which affords morphological proof for differentiation. This evidence is also supplemented by different sedimentational and lithological characteristics in the various terrace-fills. Provisionally it is believed by the writers that these terrace-fills represent times of alluviation which can be correlated with the substages of the Wisconsin. The RT–4 fill is a complex, the lower portion representing an alluviation equivalent to the post-Kansan and pre-Wisconsin stages of glaciation. The main loess resting on the Loveland in RT–4 appears to be Iowan in age. The terrace-fills of RT–3, RT–2, and RT–1 respectively are provisionally correlated with the Tazwell-Cary, Mankato, and Cochrane. The RT–0 fill is very recent, *i.e.* it was deposited during the past one thousand years or so.

The stratigraphic distribution of Pleistocene mammals in Nebraska is illustrated (Fig. 6), in order to show how far research has progressed in this direction. This work is based on an extensive program of paleontological research combined with geomorphological studies of Pleistocene terrace-fills. The stratigraphic position of a large number of specimens has been determined in relation to terrace deposits. It is expected that further excavation at the Lime Creek sites will augment the list of late Pleistocene forms considerably and throw light on evolutionary trends of various lines of development. Heretofore there has been a scarcity of information pertaining to the late Pleistocene fauna of the Great Plains.

In the base of RT–2 along Medicine and Lime creeks artifacts were found associated with a late Pleistocene fauna (see Schultz and Frankforter, Pt. 2 of this paper) at localities Ft–41, Ft–42, and Ft–50. Stratigraphic relationships of these sites to the terrace are best demonstrated at Ft–41 (see Figs. 3 and 4). At this place recent flood waters have exposed a perpendicular bank 51.5 feet above the normal water level of Lime Creek.

The following section is exposed at this locality:

1. Soil (probably a complex)	3.2 ft.
2. Loess, silty, massive, buff-colored (lighter color than material in No. 4)	2.0 ft.
3. Soil (faintly carbonaceous)	3.0 ft.
4. Loess, silty, massive buff-colored, with limy concretions	14.3 ft.
5. Silt with faint horizontal carbonaceous layers, tan-buff (basal 10.5 ft. contains flint chips, charcoal, hearths but no identifiable artifacts except in chief occupational zone in basal 1 ft. layer—bones extend through the lower 2 ft.)	25.0 ft.
6. Clay, carbonaceous, plastic, dark gray, with silty lenses (occasional bones and flint chips)	4.0 ft.
Normal water level at base of No. 6	
7. Clay, dark buff-gray	3.7 ft.
8. Clay, silty, sandy, dark blue-gray, with many limy concretions	3.1 ft.
9. Silt, sandy, gray, grading into sandy gravel (water bearing)	2.7 ft.
The base of the section rests on Cretaceous bed rock (Niobrara chalk).	

The relationships of the various deposits in the section are graphically shown in the insert circle of Fig. 4.

Part No. 6 of the section is a humic soil which was formed in the flood plain of Lime Creek prior to the deposition of the material which lies stratigraphically above it. This local area may have been an old beaver meadow. Additional evidence for this suggestion, other than the thick carbonaceous soil, is found in the abundance of fossil beaver material located in the occupational layer. Although occasional pieces of flint, charcoal,

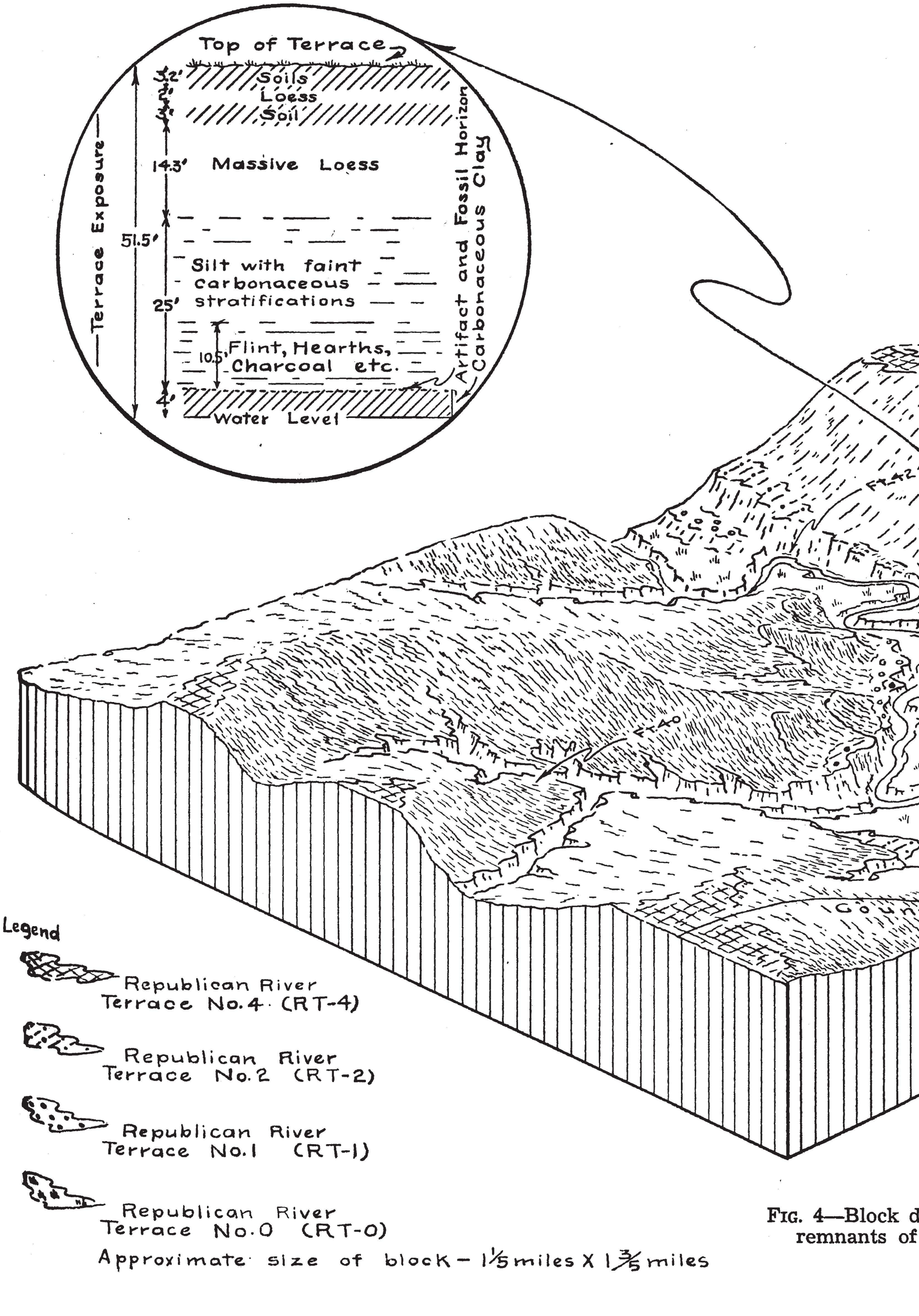
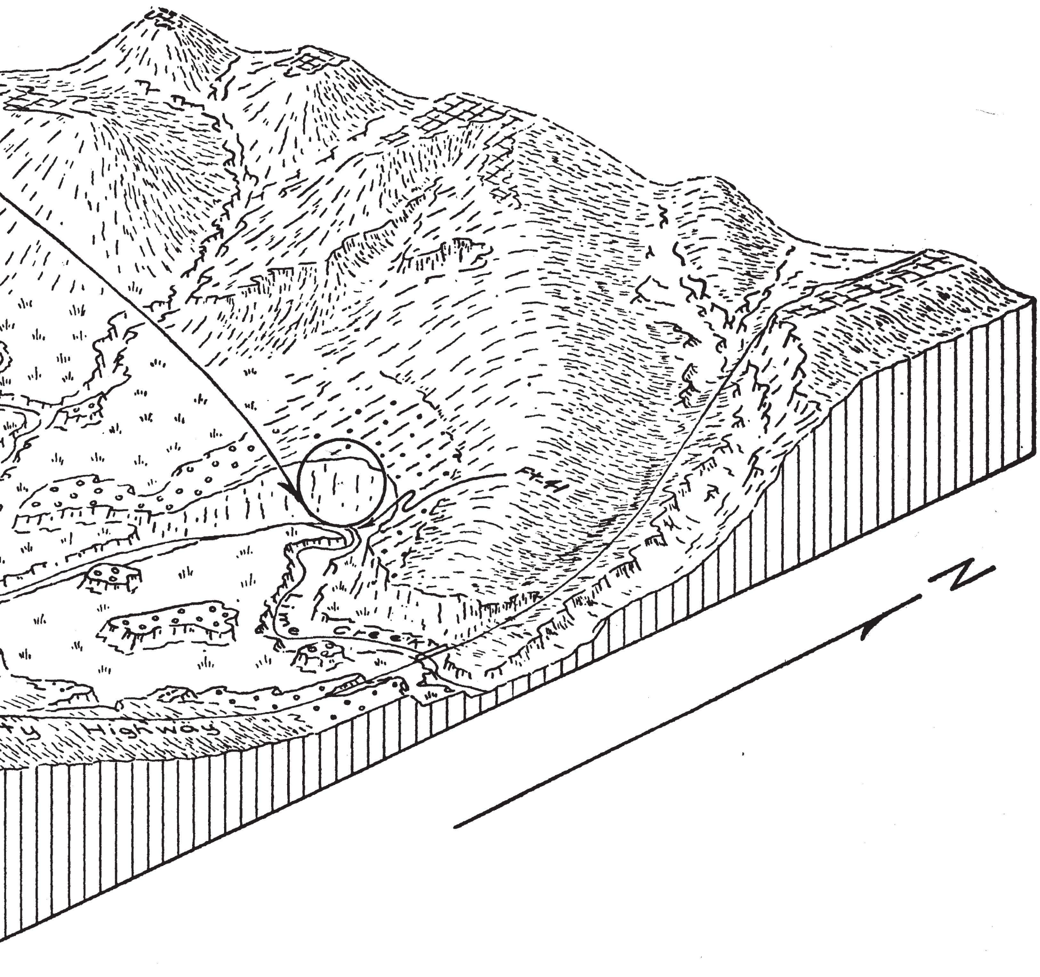


FIG. 4—Block d
remnants of



iagram showing geomorphological relationships of terraces on lower Lime Creek. All
Republican River Terrace No. 3 appear to have been removed by erosion in this area.

and bones are found in the clay of No. 6, the chief occupational zone is on top of this carbonaceous soil. This initial time of occupation is provisionally interpreted to be the interval immediately prior to or at the beginning of the Mankato substage of the Wisconsin stage of the Pleistocene continental glaciation.

Part No. 5 of the section is a stratified silt. It represents a continued time of alluviation and it is believed to be contemporaneous with the advancing of the Mankato glaciation. In this periglacial region streams appear to have been incompetent to carry their load and consequently a progressive alluviation or filling of Lime Creek Valley took place. Field evidence indicates that during the progressive sedimentation, which took place to form this terrace-fill, conditions of alluviation gradually gave way to conditions of eolation. The climate, therefore, appears to have become increasingly more inhospitable for human habitation. The lower 10.5 feet of No. 5 contains evidence of human habitation while artifacts are lacking in the top 14.5 feet and in all of No. 4 or in equivalent horizons in other localities, thus supporting sedimentational evidence for this premise.

Part No. 4 of the section appears to be mainly an aeolian deposit. This provisionally is interpreted sedimentationally to have been deposited during a time of a waning glaciation (Mankato).

Part No. 3 of the section is an old buried soil believed to represent an interglacial time. No. 2, a loess, is correlated to represent a glacial time, namely the Cochrane substage of the Wisconsin. No. 1 represents a complex of recent soils.

Sites Ft–42 and Ft–50 indicate by their physiographic characteristics that they are also a part of RT–2, however, these exposures are less complete and their stratigraphic relationships are therefore not as clearly shown as at Ft–41. At the time of completion of this report, heavy earth-moving equipment is removing the overburden on site Ft–50. It is expected that this site will yield new information pertinent to this research problem.

Grateful acknowledgments are due to the following individuals: Dr. B. H. Burma, Dr. A. L. Lugn, Prof. E. F. Schramm, and Prof. T. M. Stout of the Department of Geology, University of Nebraska; Dr. G. E. Condra and Prof. E. C. Reed, Nebraska

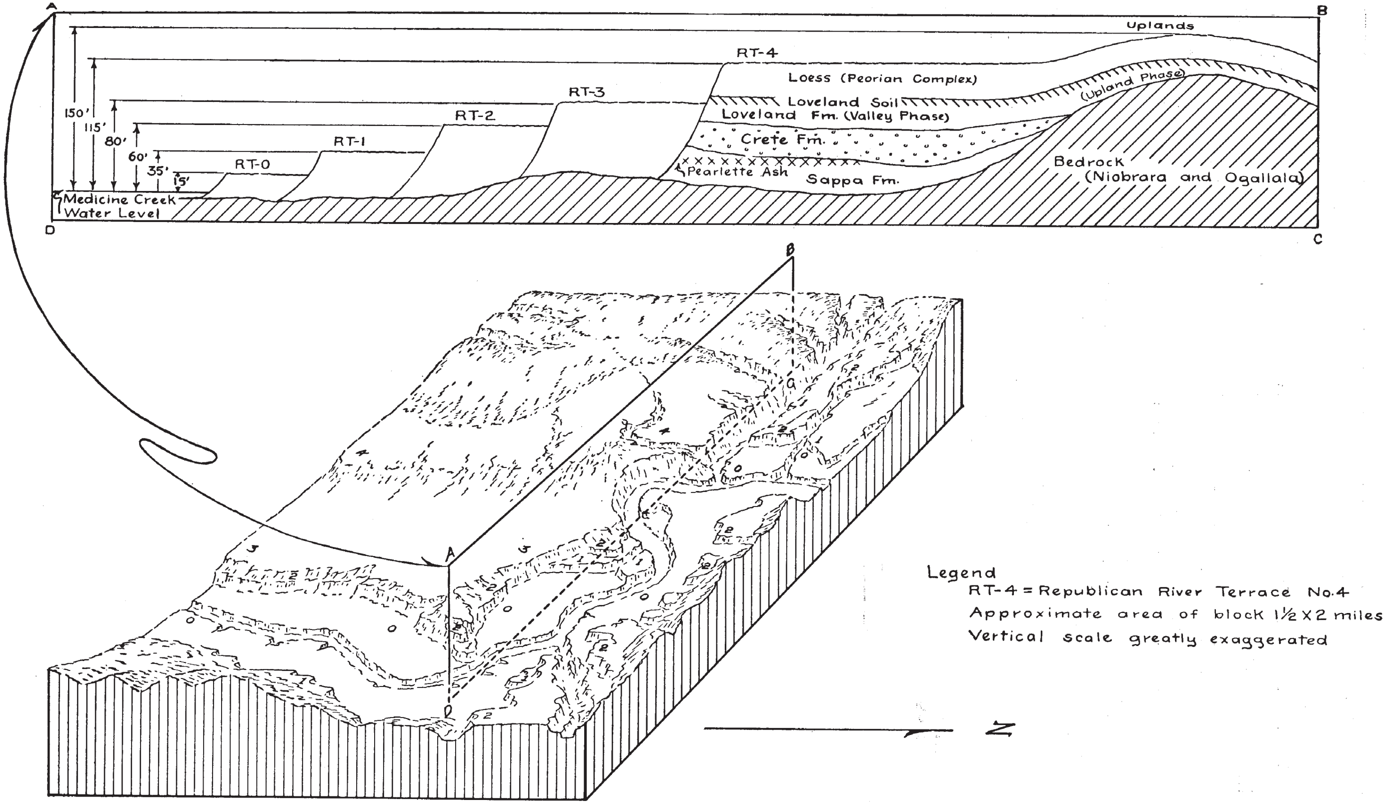


Fig. 5—Block diagram showing terrace distribution on Medicine Creek north of junction with Lime Creek. Enlarged rectangle shows terrace relationships (composite). The term Sappa was recently proposed by the Nebraska Geological Survey to replace the term "Upland."

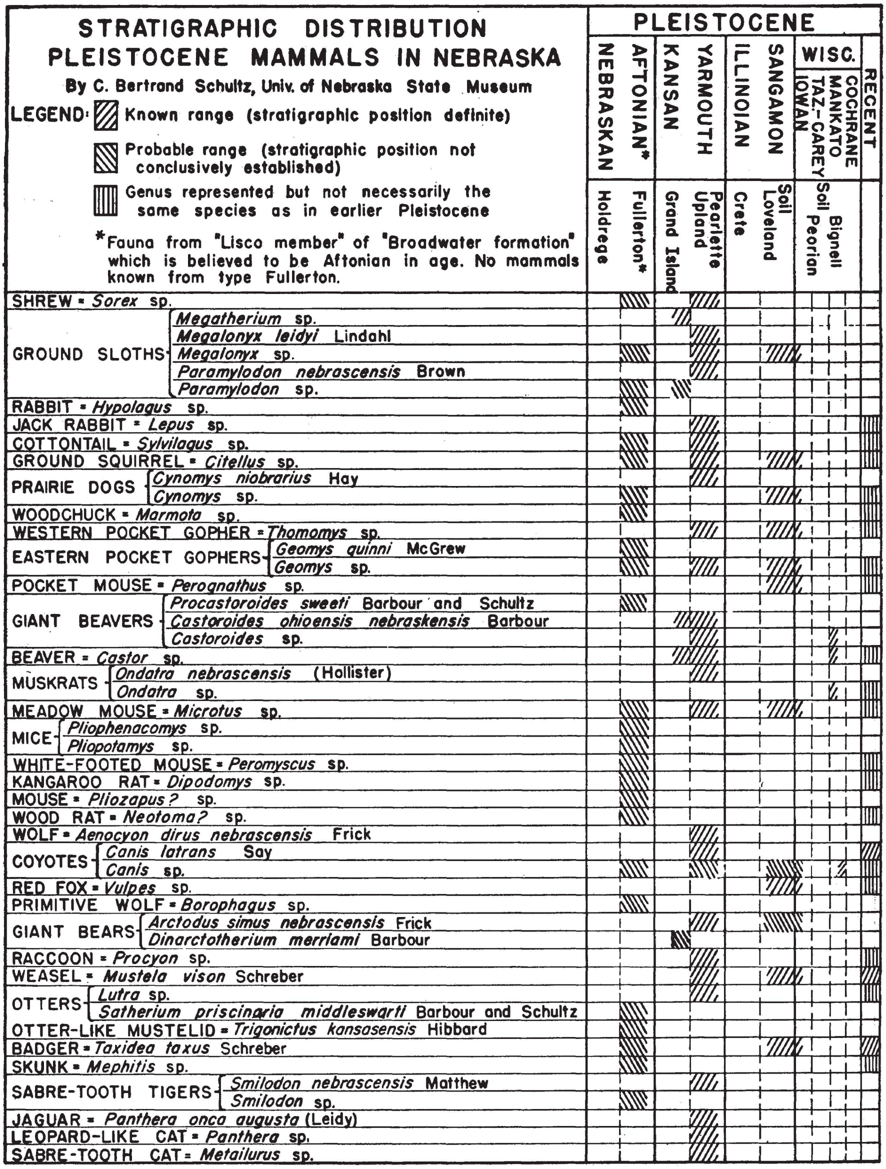


FIG. 6, PART 1—The stratigraphic range of the Pleistocene mammals in Nebraska (reprinted from Condra, Reed, and Gordon, 1947, pp. 67–68). Prepared by C. Bertrand Schultz with the cooperation of A. L. Lugn and Thompson M. Stout of the Department of Geology, University of Nebraska; G. E. Condra and E. C. Reed of the Nebraska Geological Survey; Gilbert C. Lueninghoener of Midland College; and W. D. Frankforter of the Museum staff.

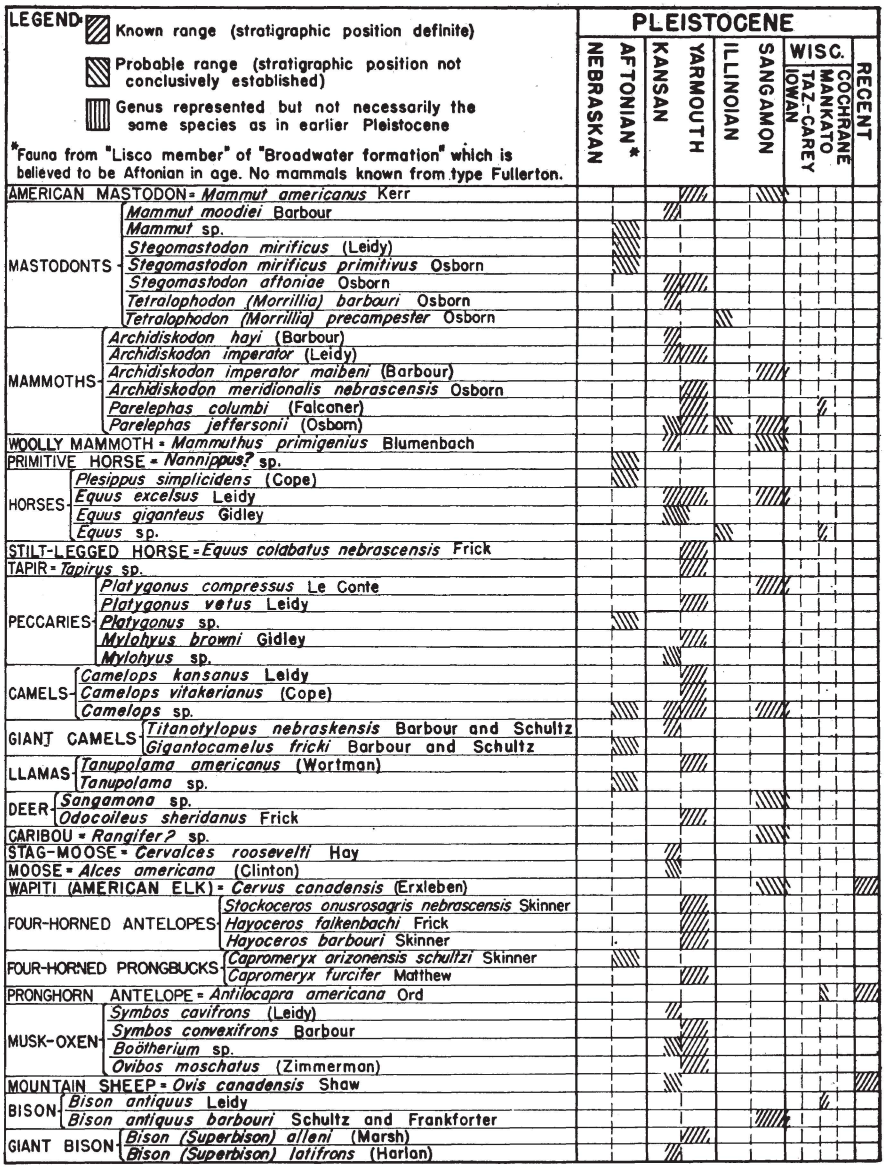


FIG. 6, PART 2—The stratigraphic range of the Pleistocene mammals in Nebraska. See legend for Fig. 6, Part 1.

State Geological Survey; Dr. Kirk Bryan, Harvard University; Mr. A. T. Lobdell and Mr. O. L. Polk, Nebraska State Department of Roads and Irrigation; Mr. J. D. Bishop, Dr. Stafford Happ, Mr. B. V. Reany and Mr. C. H. Wagner, Corps of Army Engineers; Mr. H. E. Robinson, Bureau of Reclamation; and Mr. Allen Graffham and Mr. Loren M. Toohey of the Museum staff.

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BULLETIN OF THE UNIVERSITY OF NEBRASKA STATE MUSEUM

VOLUME 3 LINCOLN, NEBRASKA, NOVEMBER 1948 NO. 4, PT. 2

Preliminary Report on the Lime Creek Sites: New Evidence of Early Man in Southwestern Nebraska[1]

C. BERTRAND SCHULTZ AND W. D. FRANKFORTER

IN THE natural course of paleontological and geological explorations in Pleistocene deposits the fossil hunter often discovers evidence of man's early occupation of North America. Artifacts and other cultural evidence are frequently found in direct association with the fossilized bones of various species of animals. Some of these remains represent extinct species while others can be referred to those found in North America today. Much is yet to be learned concerning the stratigraphic distribution of vertebrate life of the Pleistocene and the time of extinction of certain forms, but new evidence (see Schultz, Lueninghoener, and Frankforter, Part 1, Fig. 6 of this report) is constantly being accumulated which aids in clarifying the picture. In 1932 the University of Nebraska State Museum commenced a research program (Lugn, 1934, pp. 319–356; Schultz, 1934, pp. 357–393) in the field and laboratory relating to the stratigraphic distribution of the Pleistocene mammals and the study of extinction in the Great Plains. Since that time the major portion of the Museum's field work has been directed to problems relating to the Pleistocene. The significance of terraces to the problems has been pointed out in Part 1 of this report (also in Schultz and Stout, 1945; 1948).

[1] Contribution No. 3 to the Paleontological Salvage Program of the University of Nebraska State Museum in the Federal Reservoir Areas in Nebraska. This paper (in part) was presented by the writers at a "Symposium on Early Man in America" on December 28, 1947, at the 46th Annual Meeting of the American Anthropological Association at Albuquerque, New Mexico.

During June and July 1946 an exploration program in the proposed Medicine Creek reservoir area in southeastern Frontier County, Nebraska, was commenced by the University of Nebraska State Museum. Although the Museum had conducted paleontological explorations and excavations along Medicine Creek, a tributary of the Republican River, on numerous occasions since 1927, the work was intensified in 1946 because of the recent decision of the Bureau of Reclamation to place a reservoir on the Creek. Work is now well underway in the actual construction of the Medicine Creek dam. As a result of the explorations in the area in 1946 and 1947 many new paleontological sites have been discovered and old ones re-examined. The Museum has a cooperative agreement with the Smithsonian Institution and the National Park Service for the salvage of paleontological specimens in the reservoir areas in the Republican River Valley. The conclusions set forth in the following preliminary report are naturally tentative since only a small portion of each site has been excavated. Two faunal assemblages heretofore almost unknown in the Great Plains have been discovered in the vicinity of Lime Creek.

One is not of special interest to the anthropologist since it was not associated with man, but it is of importance to the paleontologist because it represents a very late Pliocene fauna, including many new kinds of extinct animals. The main quarry (Ft–40) [2] was first worked in 1927 (Barbour, 1927) when the holotype of *Amebelodon fricki* was discovered and described. The paleontological material recovered from this quarry during the past two seasons is contributing considerably to the solution of the Pliocene-Pleistocene boundary line problem.

The second faunal assemblage is from the base of a late Pleistocene terrace (Republican River Terrace–2).[3] The paleontological material obtained in this terrace at sites Ft–41, Ft–42, and Ft–50 is of especial interest in the Great Plains region because for the first time an extensive fauna has been discovered in deposits of this age, and directly associated with the fossil remains were numerous artifacts of Early Man. Site Ft–42 (Fig. 1) was discovered in April 1947 and sites Ft–41 (Figs. 2–3)

[2] See aerial photograph in Part 1, Fig. 2 of this report for exact location of the sites referred to in this paper.

[3] For terrace terminology see Part 1 of this report.

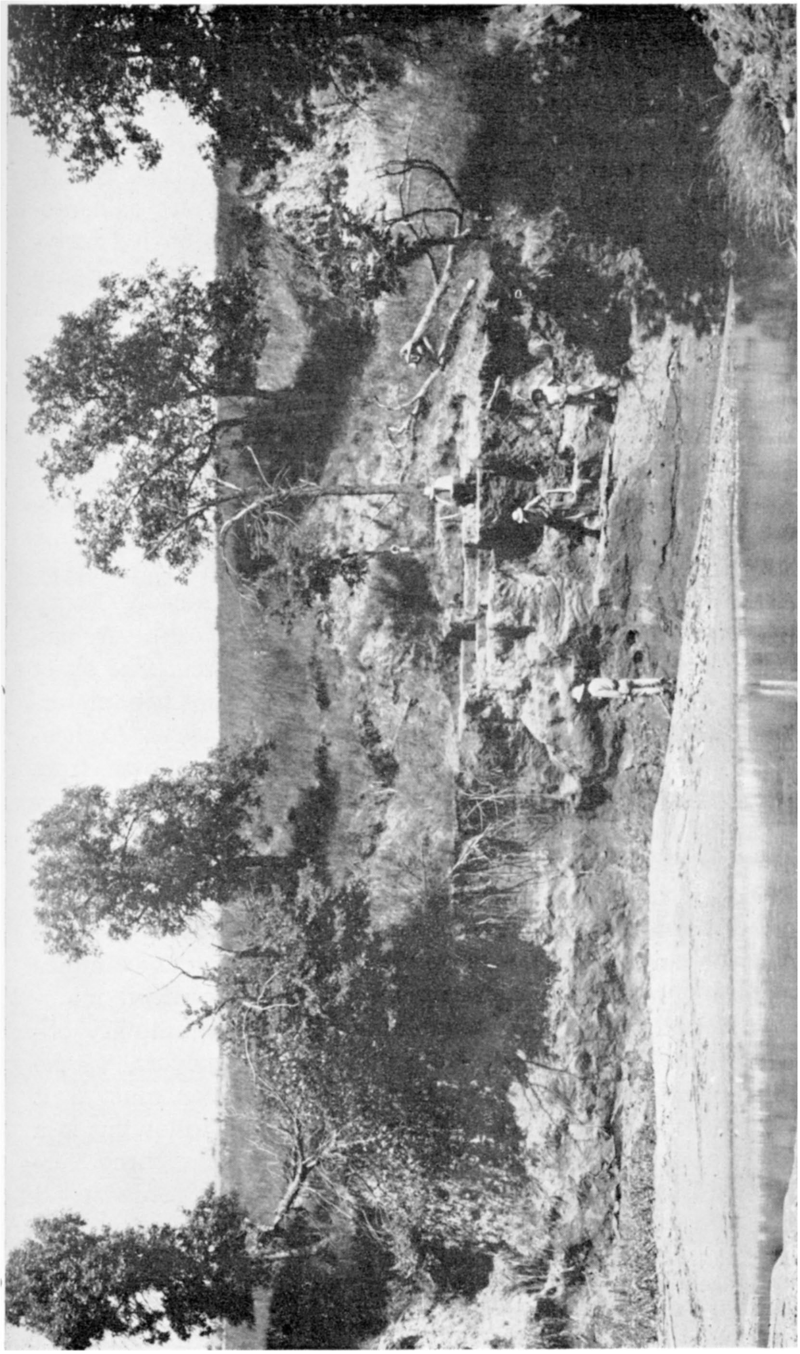

FIG. 1.—The discovery site, Ft–42, located in the base of RT–2 on Lime Creek, Frontier County, Nebraska.

and Ft–50 were found during re-exploration of the terrace following the disastrous Medicine Creek flood of June 22, 1947. The flood waters exposed the base of Terrace–2 in numerous places along Lime and Medicine creeks.

The relationship of the bone-artifact horizon to the terrace is best shown at Ft–41 (see Figs. 2–3, also Part 1 of this report, Figs. 3–4). Although the chief zone containing the paleontological and archaeological specimens at Ft–41 is buried forty-seven and one-half feet below the top of the terrace, evidence of human habitation in the form of flint chips, charcoal, and hearths occurs at several levels up to nine and one-half feet above the main horizon. The occupational zones are in a silt but are restricted to carbonaceous layers which represent old vegetation-covered surfaces or soils. See Part 1 of this report for further discussion concerning the geological description of this site. At Ft–42 stratigraphic evidence suggests that a portion of the site represents a slightly younger geological time than the main occupational zone in Ft–41, but it must be pointed out that both sites are in the base of Terrace–2. Every effort was made to establish the true relationship of the archaeological and paleontological material to the terrace. The exact relationship of Ft–50 to the other two sites has not been determined, but it also is definitely in the base of Terrace–2. Archaeological and paleontological specimens now are known from basal Terrace–2 sites not only in the Republican River Valley but also in the drainages of the Loup, North Platte, Niobrara, White, and Cheyenne rivers.

Although time has permitted only partial preparation and study of the fossils found associated with the artifacts at Lime Creek, the material at hand reveals that in addition to examples of reptiles, amphibians, and birds, at least seventeen mammalian forms are represented in the fauna. Preliminary observations suggest distinct differences between several of the fossil and modern forms but positive identification must wait for further preparation and comparisons. The following is a tentative list [4] of the mammals represented in the three Terrace–2 sites in the Lime Creek area: (1) *Blarina* (Shrew); (2) *Lepus* (Jack Rabbit); (3) *Sylvilagus* (Cottontail); (4) *Cynomys*

[4] Only generic determination is given. A complete report will be made after the 1948 collection from Ft–50 is prepared.

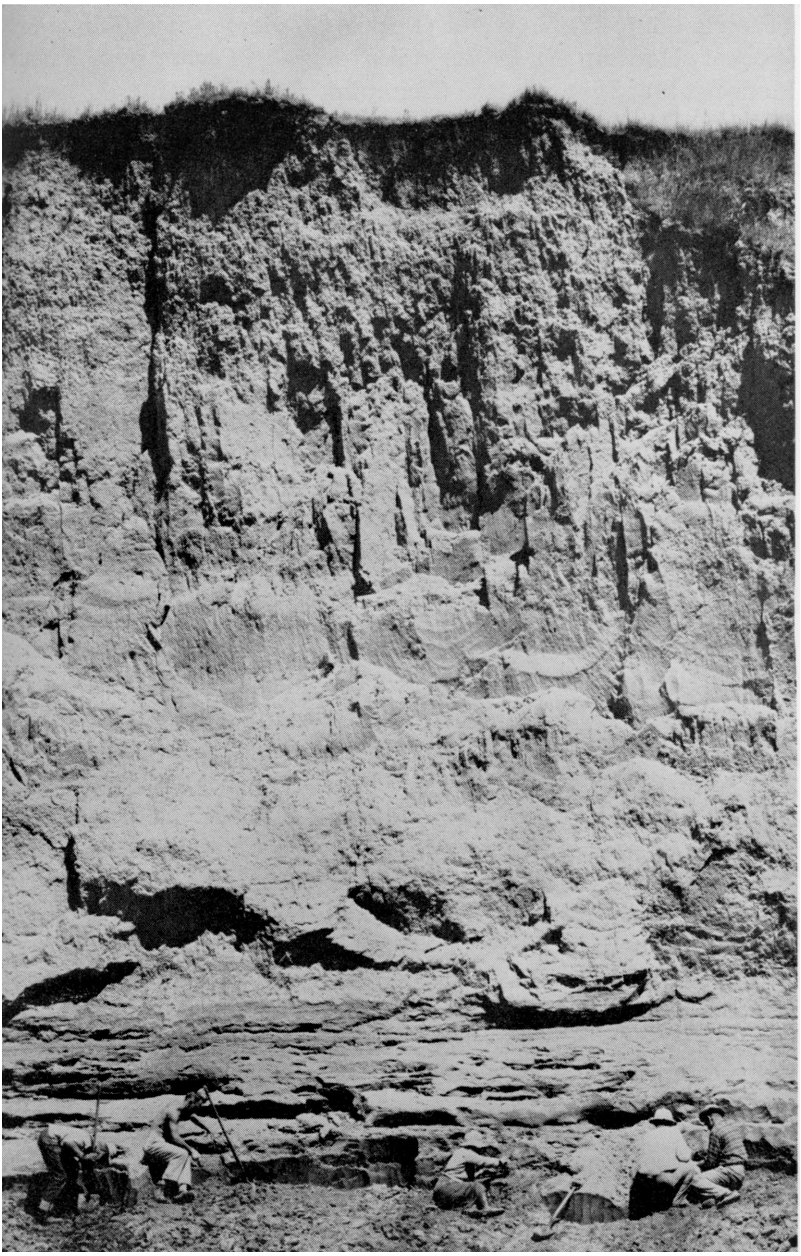

FIG. 2—Perpendicular exposure at site Ft–41 on Lime Creek, at time of discovery in June 1947. Artifacts of Scottsbluff type and fossil bones were found *in situ* in base of cliff.

(Prairie-dog); (5) Geomyid (Pocket Gopher); (6) *Perognathus* (Pocket Mouse); (7) *Castor* (Beaver); (8) *Peromyscus* (Deer Mouse); (9) *Synaptomys* (Lemming Mouse); (10) *Microtus* (Meadow Mouse); (11) *Canis* (Coyote); (12) *Procyon* (Raccoon); (13) *Taxidea* (Badger); (14) *Odocoileus* (Deer); (15) Cervid, large form (Deer); (16) *Antilocapra* (Antelope); (17) *Bison* (Bison).

The sites in the base of Terrace–2 on Lime and Medicine creeks were only tested during the 1947 field season but extensive excavation is now (July–August 1948) in progress at Ft–50. Site Ft–41 was selected last year as the best location for determining the relationship of the occupational zone to the terrace. Here the slump material, which normally covers the terrace face, had been removed by flood action and a perpendicular exposure of the fill had been produced (see Fig. 3; also Fig. 4 for extent of test excavation at Ft–41). After the overburden was removed [5] at Ft–41 a north-south base line was established on magnetic north running approximately parallel to and about four feet east of the original face of the quarry. Toward the south end of the exposure an arbitrary point was located on the base line and was considered the datum point. The east-west line was established at right angles to the base line at this point and 120 feet west on this line a cedar stake was set with a spike in the top to be used as a check on the grid system. A grid of 5-foot squares was laid out using the base line and the east-west line through the datum point as the axis. The first tier of plots east and west of the base line were designated as 1E and 1W respectively with the intention of extending this system as needed. The north-south measurements originally were in feet, for example 50–55N designating the first plots north of the east-west axis. Later it was thought advisable to make the system uniform and plots north of the

[5] The task of removing 47½ feet of overburden was tremendous. It was not a new problem for the Museum, however, because frequently it has been necessary to remove similar amounts from other fossil quarries. Power machinery has been used by the Museum for this purpose for over fifteen years. At Ft–41 dynamite was used to loosen up the loess and soils in the upper 35 feet of the section and a seven and one-half ton bulldozer made available by the Bureau of Reclamation was used to push the loose material away. The overburden was removed to about four feet above the bone-artifact zone. This latter amount was removed by hand when each five-foot square was excavated.

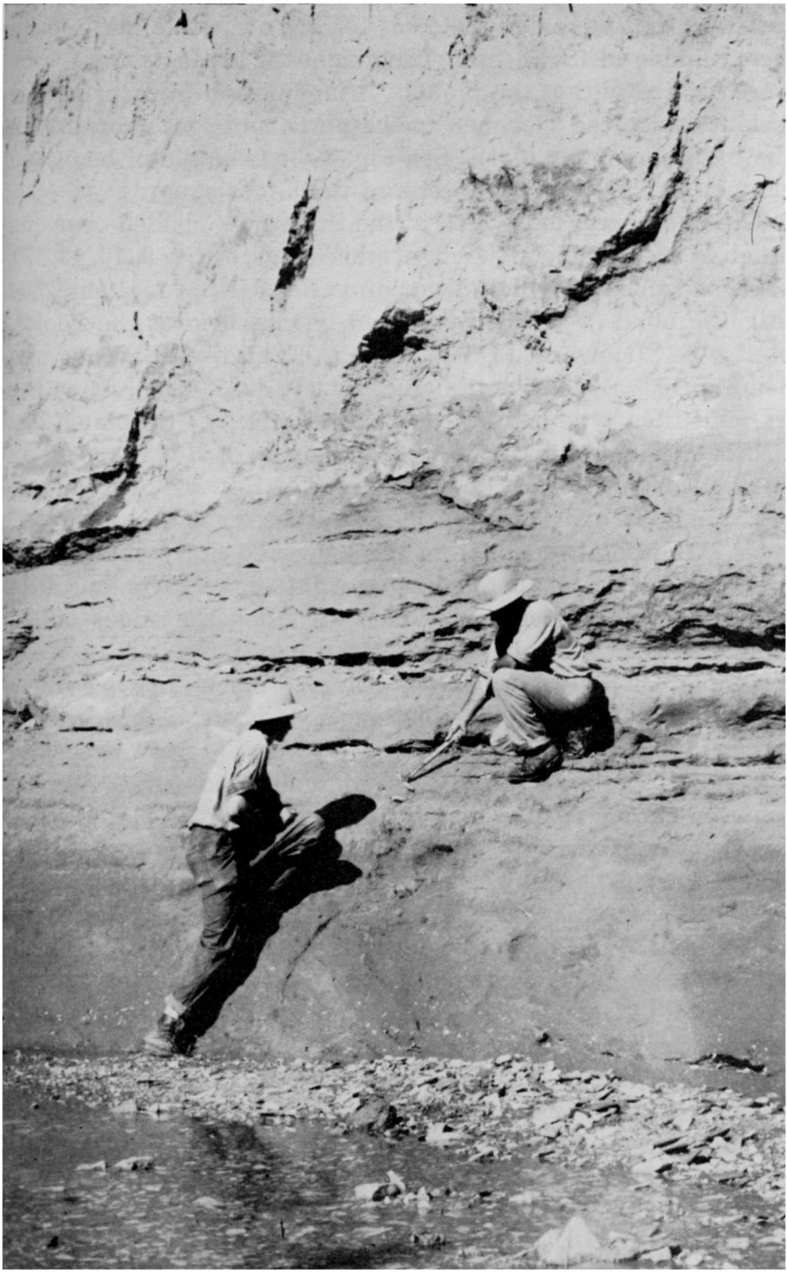

FIG. 3—Close-up of base of site Ft–41 at time of discovery, June 25, 1947. Bones and flint in cultural horizon at end of pick.

east-west axis were designated as 1N, 2N, etc. while those south were numbered 1S, 2S, etc. The diagnostic artifacts and fossils were located within the plots by triangulation (measuring the distance from the specimen to the north and south corners on the base line of the plot). See Fig. 5 for example of bone and artifact distribution within one of the 5-foot squares.

The small areas excavated at the three sites yielded over one hundred identifiable artifacts of stone (Figs. 6, 7, 8, 9, 10, 12, 13), bone, and antler (Fig. 11). Two points Nos. UNSM 7551 and 7554 (Fig. 7), found *in situ* at Ft–41, can be classified as the Scottsbluff type [6] (Howard, 1943, p. 232, Pl. 11; also see Barbour and Schultz, 1932, 1936; Schultz and Eiseley, 1935, 1936), or as the ND and NDa type (Strong, 1935, p. 88, Fig. 7). Specimen No. UNSM 7554, found in plot 1N; 1W (see map of site, Fig. 4) is an example of the typical Scottsbluff type of Howard or NDa type of Strong. It has a slightly indented base which has parallel sides. The point, made from red and gray flinty chalcedony, displays excellent ribbon flaking at right angles to its long axis. Very delicate retouching is noted all along the edges of the point. The two parallel sides of the base have been ground. Point No. UNSM 7551, made of gray and black flint, is a modified Scottsbluff type (ND of Strong). It is straight sided and has chipping similar to specimen No. UNSM 7554 described above, but probably represents an unfinished point. It was found in two pieces, the base (*in situ,* Fig. 6) in plot 1S; 1W and the portion of shaft in 1S; 1E. A base of a third point No. UNSM 7552 (Fig. 7) made from brown jasper, also appears to represent a modified Scottsbluff type similar to specimen No. UNSM 7551. It was found in plot 6N; 1W. One point No. UNSM 7555 (Fig. 12) made of greenish gray, mottled, flinty agate, was found at Ft–42, and the base of another No. UNSM 7553 (Fig. 12), made of red, gray, and white, flinty chalcedony, was uncovered at Ft–50. These two could be classified as NAb3 (Strong) type of points. The most distinctive and abundant type of blade found at Ft–41 is shown in Fig. 8. Approximately twenty per cent of the artifacts obtained from this site are of this type.

[6] The Scottsbluff Bison Quarry, where the original Scottsbluff type artifact was found in definite association with extinct bison (Barbour and Schultz, 1932, 1936; Schultz and Eiseley, 1935, 1936; Skinner and Kaisen, 1947, p. 173), was in the base of Terrace–2 in the North Platte River drainage.

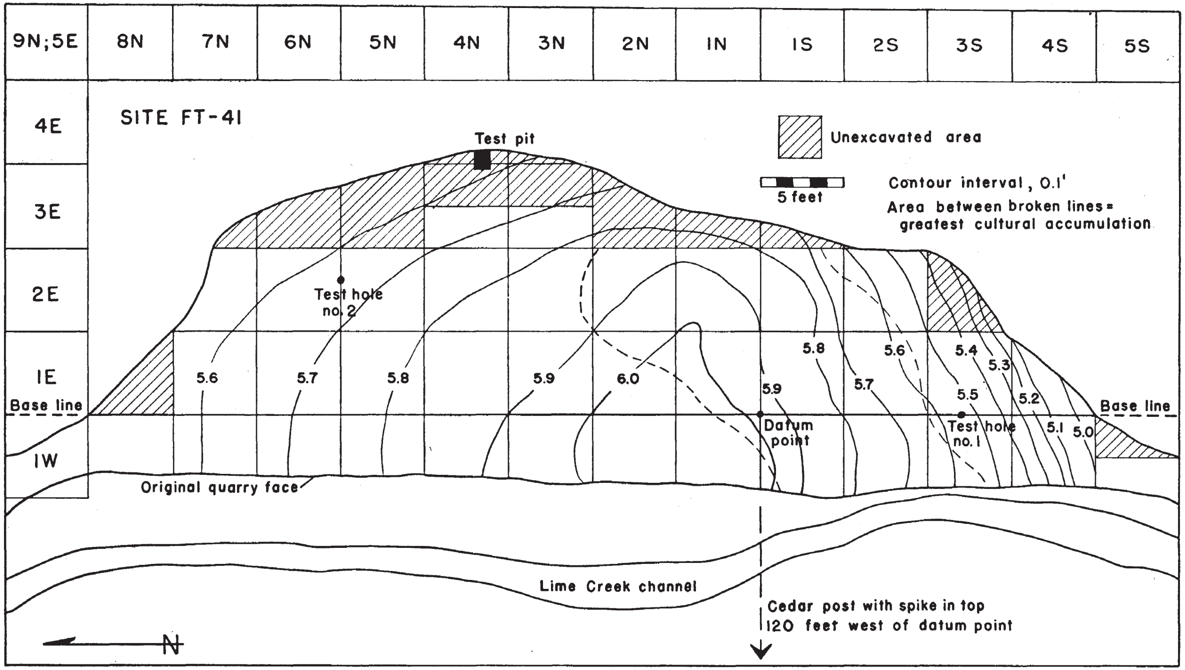

FIG. 4—Map of site Ft–41 showing area excavated, June 25–September 5, 1947. Test pit at 4N; 3–4E was made to secure stratigraphic data. Flint and bones were encountered in the test pit, thus revealing the horizontal continuation of the cultural material in the unexcavated area under Terrace–2 fill. Test holes Nos. 1 and 2 were made to extend stratigraphic section. The contour lines represent the surface upon which the cultural material and associated bones were found.

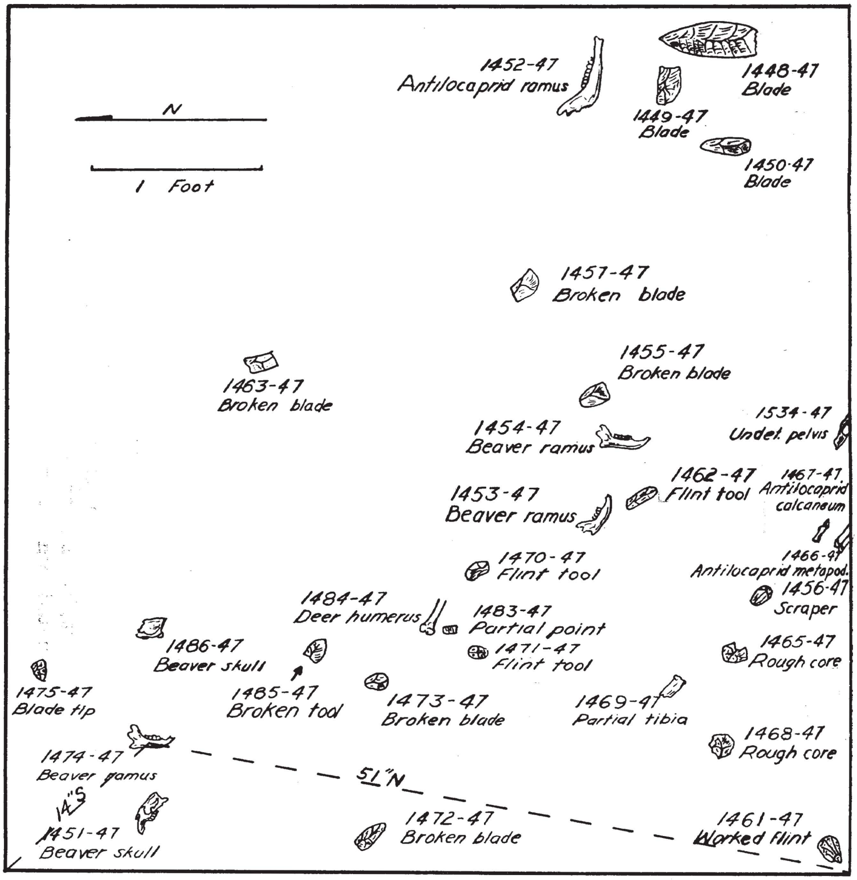

FIG. 5—Diagram of plot 1S; 1E showing method employed at Ft–41 for plotting bones and artifacts. UNSM field numbers are used to identify significant features.

These blades vary in size from the largest (No. UNSM 7556), which is 179.7 mm. (approximately 7 inches) long and 52.7 mm. (slightly more than 2 inches) wide at the base, to the smallest (No. UNSM 7598) which is 96.8 mm. (approximately 3⅞ inches) long and 29.0 mm. (slightly more than 1⅛ inches) wide at the base. The workmanship on the blades is not extraordinary.

Numerous other blades, knives, and scrapers (Fig. 9) were also encountered at Ft–41 along with a tremendous amount of fortuitous flakes. Local jasper similar to that in nearby Niobrara (Cretaceous) exposures was used for the majority of worked pieces. Some of the finely worked specimens, however, were chipped from material apparently not locally derived. Many broken artifacts found at widely scattered places in the site fit together although found at slightly different elevations

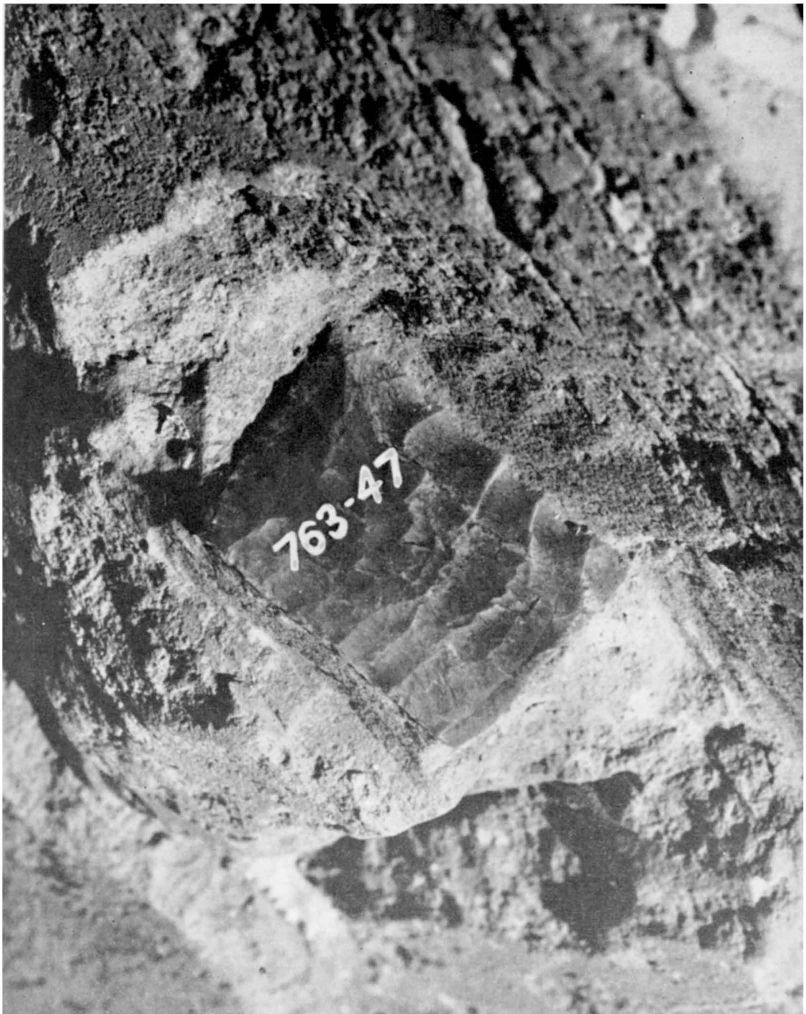

FIG. 6—Base of modified Scottsbluff type point UNSM 7551 *in situ*, Ft–41. Number 763–47 is the field designation. x approximately 1½.

demonstrating that the main occupational zone is of one age.[7] In addition to the chipped stone implements one complete and two partial sandstone abraders (Fig. 10) were encountered. Worked pieces of antler and bone including two bone awls are represented in the inventory from the three sites (see Fig. 11). Perhaps the most interesting bone tool is a highly polished needle (No. UNSM 7590) from Ft–50 which measures 84 mm. long and 4 mm. wide, with a small eye 5 mm. from the end. A detailed report will be published upon this archaeological material by the Division of Anthropology of the Museum.[8]

It was decided to excavate extensively at Ft–50 during the 1948 season because this site will be the first of the three to be inundated. It also appeared to be the most prolific as far as bones and artifacts were concerned. A small test trench, approximately 6′ x 20′ paralleling the face of the exposure, had been excavated during 1947 in order to determine whether the exposed bones and flint were in slump material or actually in the Terrace–2 fill. The specimens encountered proved to be *in situ* in the base of the terrace-fill. Professor Preston Holder, archaeologist from the University of Buffalo, has been engaged by the Museum for the 1948 season as a representative from

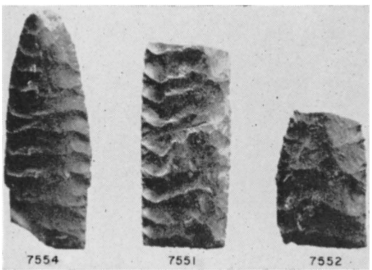

FIG. 7—Projectile points, Scottsbluff type, from Ft–41. UNSM numbers. x ½.

[7] The contour map (Fig. 4) shows that the surface upon which the early Lime Creek hunters lived was comparatively level.

[8] E. Mott Davis, newly appointed Curator of Anthropology in the Museum and Instructor in the Department of Sociology and Anthropology, University of Nebraska, will be responsible for this work as well as for future archaeological excavations in the Lime Creek area.

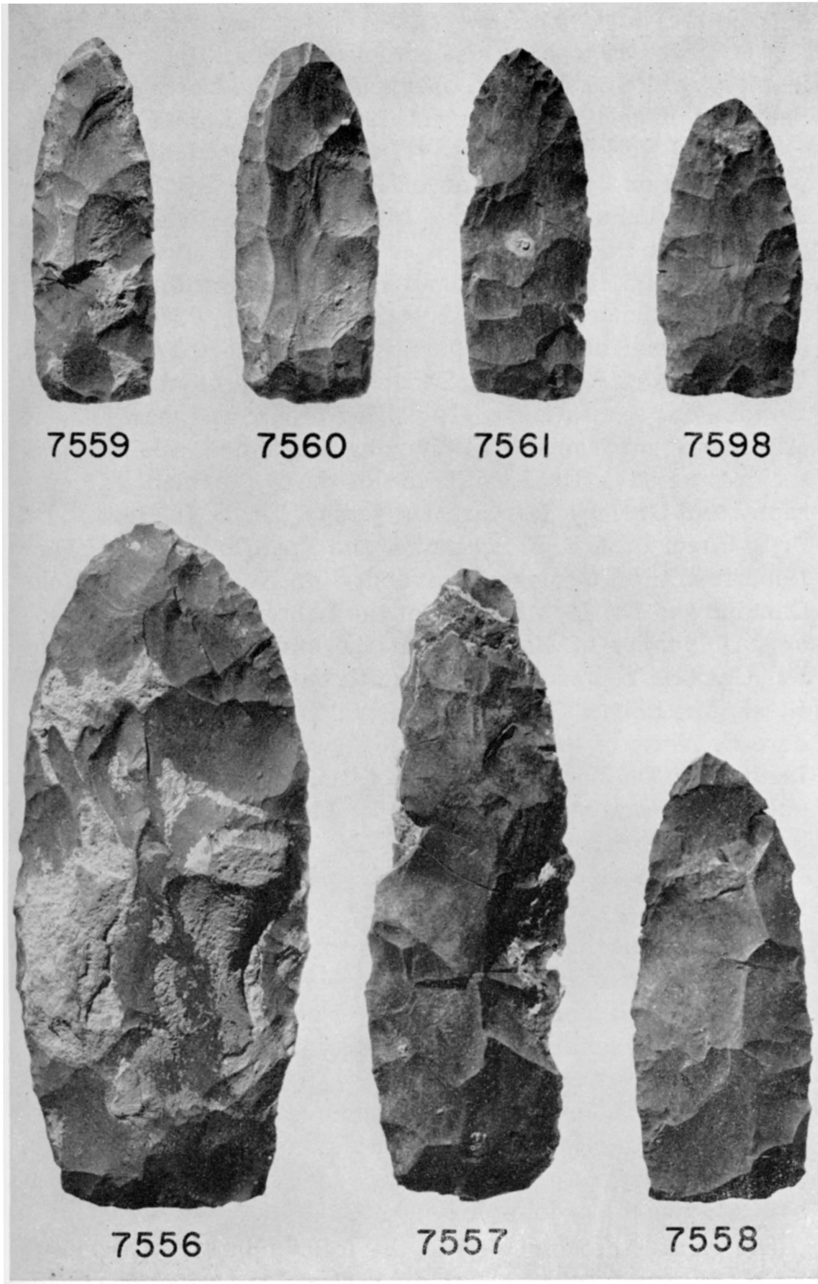

FIG. 8—The most distinctive and abundant type of blade found at Ft–41. UNSM numbers. x ½.

the Department of Sociology and Anthropology of the University of Nebraska to supervise and publish upon the archaeological work at Ft–50. Loren Toohey, paleontologist of the Museum field staff, is party leader during 1948 for the Lime Creek area.

The field work during the 1947 season along Medicine Creek was carried on by a party of ten led by Allen Graffham under the supervision of the writers. Members of the field party who assisted with the excavations at Lime Creek include James Allen, William H. Berninghausen, Kenneth Harding, J. Knox Jones, Jr., Richard Loomis, Richard Lugn, Neal McClymonds, Maurice Mendenhall, George Scheffert, Robert Truxell, Olin Webb, and Mrs. Florence E. Sunderland. Representatives from a number of institutions were invited to visit the localities and on various occasions the following interested scientists examined the sites: Dr. Kirk Bryan of the Department of Geography and Geology, Harvard University; Dr. B. H. Burma, Dr. A. L. Lugn, Prof. E. F. Schramm, and Prof. T. M. Stout of the Department of Geology, University of Nebraska; Dr. John Champe and Dr. Jack Roberts of the Laboratory of Anthropology, University of Nebraska (at the end of the field season Dr. Champe represented the Smithsonian Institution at the sites); Mr. Robert Cumming, Dr. Waldo Wedel, and Dr. Theodore E. White of the River Basin Surveys of the Smithsonian Institution; Dr. Loren C. Eiseley of the Department of Anthropology, University or Pennsylvania; Mr. A. T. Hill of the Nebraska State Historical Society; Dr. J. D. Jennings of the National Park Service; and Mr. H. P. Zuidema of the Department of Geology, University of Michigan.

It is obvious that workers in various scientific fields must combine forces and cooperate with each other if the problem of the antiquity of man in America is to be solved. At the Lime Creek sites in addition to specialists in archaeology, geomorphology, and vertebrate paleontology, the problem will be attacked in the following fields: (1) sedimentation (quantitative), (2) invertebrate paleontology (pulmonate gastropods), (3) paleobotany (wood and pollen), (4) radioactivity (isotope carbon 14), and (5) pedology (soils).

The writers are indebted to the following: Mr. Alex Keith for the discovery of site Ft–40 in 1927 and for assistance to the Museum field parties during the past twenty years; Mr. Herb

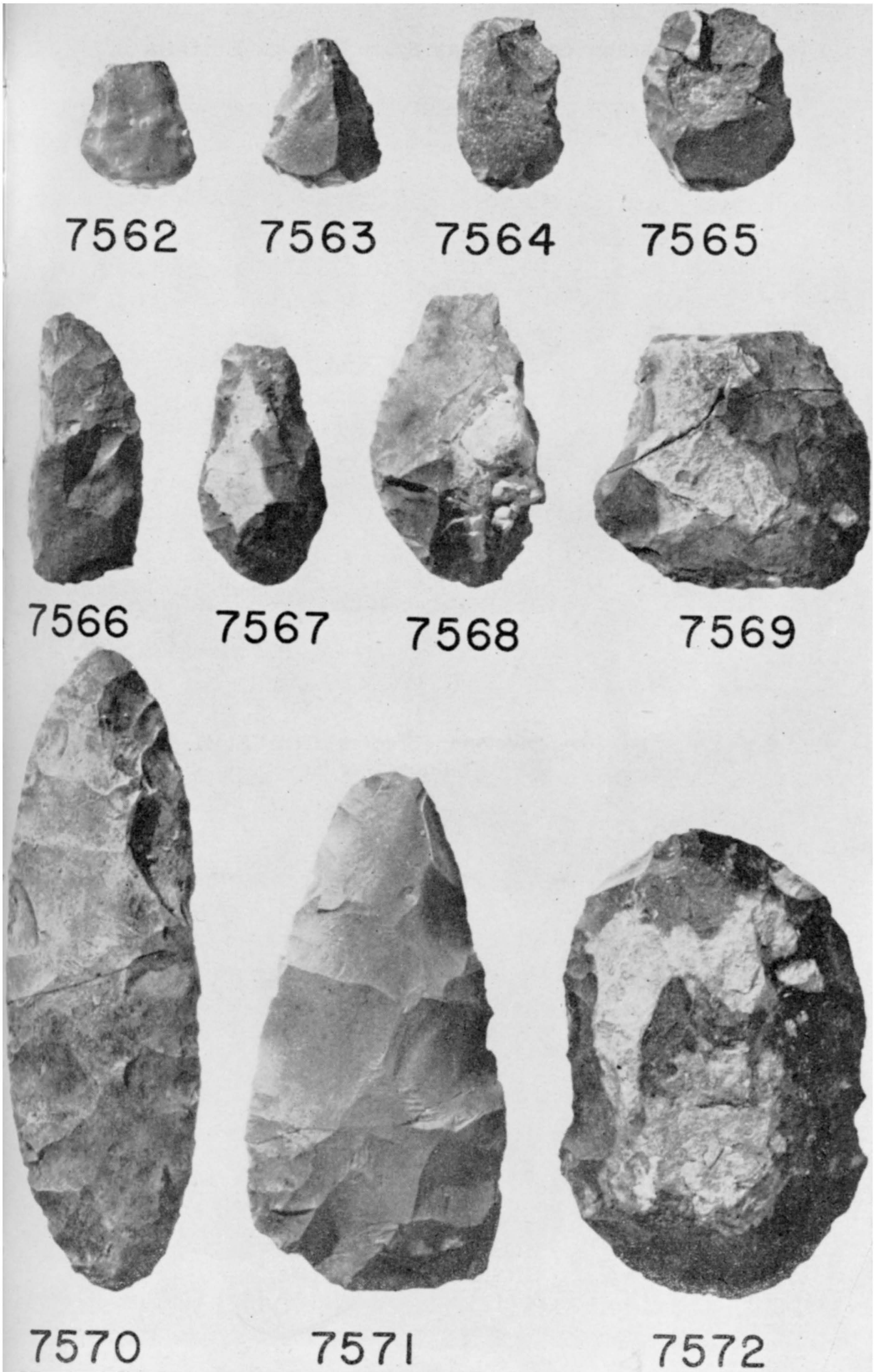

FIG. 9—Scrapers and knives from Ft–41. UNSM numbers. x ½.

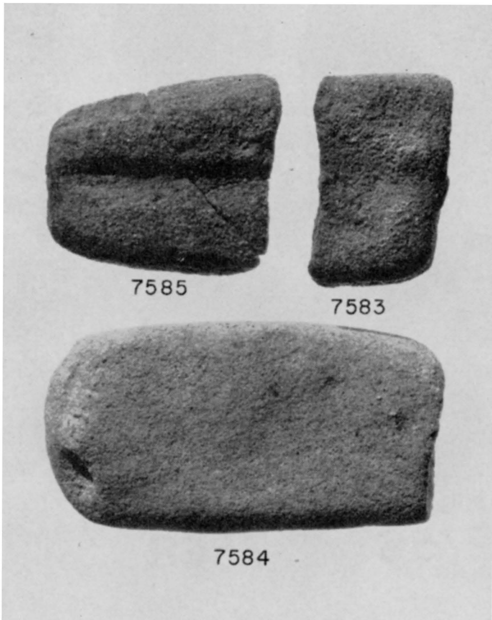

FIG. 10—Sandstone abraders from Ft–41. UNSM numbers. x ½.

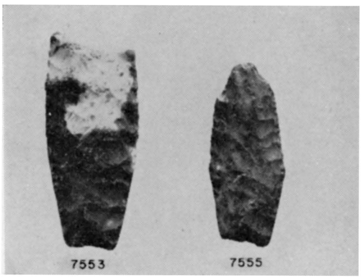

FIG. 12—Projectile points. UNSM 7553 from Ft–50. UNSM 7555 from Ft–42. x ½.

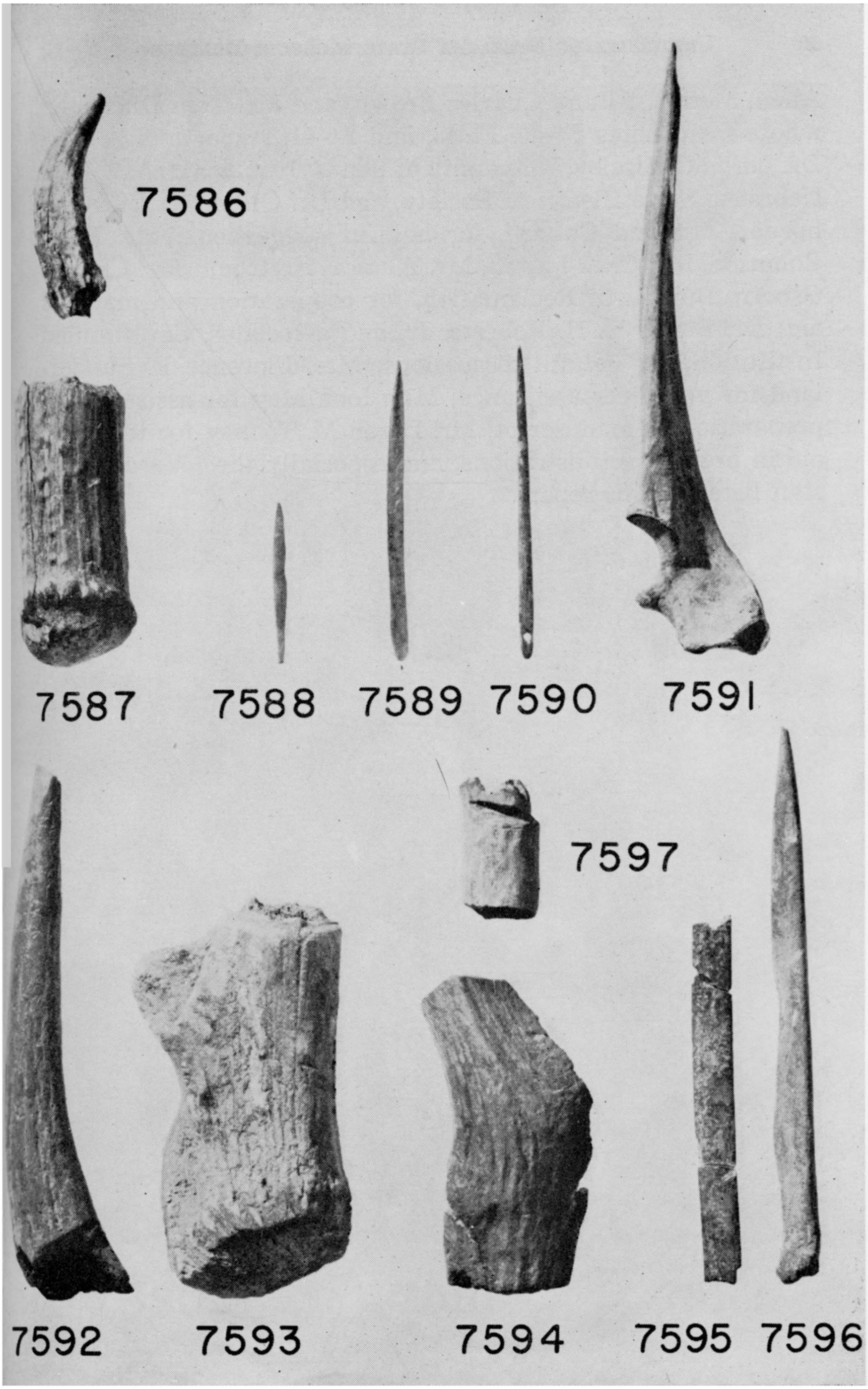

FIG. 11—Worked bone and antler from Lime Creek sites. Nos. UNSM 7586, 7587, 7588, 7589, 7590, 7591 from Ft–~~41~~50. Nos. UNSM 7595 and 7596 from Ft–42. Nos. UNSM 7592, 7593, 7594, 7597 from Ft–~~50~~41. x ½.

Allen, Messrs. Al and Charles Brown, and Mr. Tom Dixson on whose farms sites Ft–50, Ft–42, and Ft–41, respectively occur; Dr. Loren C. Eiseley, University of Pennsylvania, Mr. A. T. Hill, Nebraska State Historical Society, and Dr. Gilbert C. Lueninghoener, Midland College, for helpful suggestions; Mr. H. E. Robinson, Mr. C. L. Mutch, Mr. Allan Nesbitt and Mr. Charles Osborn, Bureau of Reclamation, for cooperation and material aid; Dr. Frank H. H. Roberts, Jr. and associates, Smithsonian Institution, for helpful discussions; Mrs. Florence E. Sunderland for volunteer assistance; Miss Iona May for assistance in preparation of manuscript; Mr. Loren M. Toohey for technical aid in preparing illustrations; and especially the Museum field staff listed in this report.

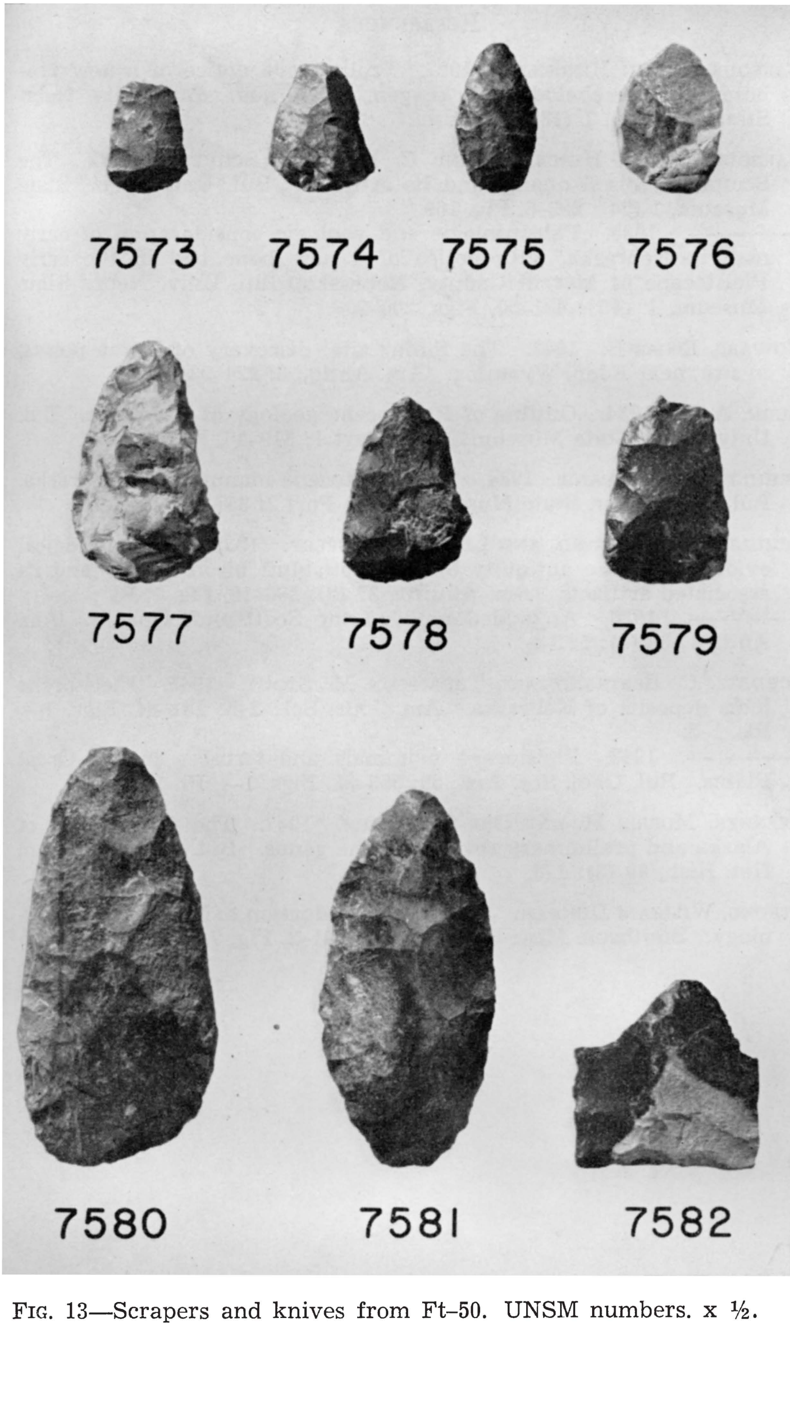

FIG. 13—Scrapers and knives from Ft–50. UNSM numbers. x ½.

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