

PREHISTORY AND THE MISSOURI VALLEY DEVELOPMENT PROGRAM

SUMMARY REPORT ON THE MISSOURI RIVER BASIN ARCHEOLOGICAL SURVEY IN 1948

By WALDO R. WEDEL

INTRODUCTION

The Missouri River Basin Survey of the Smithsonian Institution, organized in 1946, continued during calendar year 1948 its archeological and paleontological investigations at Federal water-control projects throughout the watershed of the Missouri. The present report, third in a continuing series, briefly reviews the year's activities in field and laboratory. Although primarily concerned with the work of the River Basin Surveys, it includes also summary statements on the researches of various State agencies cooperating in recovery of scientific materials that might otherwise be lost because of the water-control program. As in previous yearly summaries, this one makes no pretense at complete and final coverage of accomplishments during the period involved. Neither should it be regarded as necessarily representing the opinions and judgments of the staff members and others on whose findings in field and laboratory it is very largely based. It is, in short, a statement of progress during calendar year 1948, at the end of 2½ years of sustained work. To that statement have been added certain preliminary generalizations regarding the significance of the findings in the over-all picture of native human history in the Great Plains and nearby regions.

It is unnecessary to discuss in detail here the general background, organization, and purposes of the Missouri River Basin Survey, since these matters have been adequately set forth elsewhere.¹ Briefly, the project is one phase of a Nation-wide archeological and paleontological salvage program administered by the Smithsonian Institution and actively directed by Dr. F. H. H. Roberts, Jr., Bureau of American Ethnology. This program is based on a memorandum of understand-

¹ See Smithsonian Misc. Coll., vol. 107, No. 6, Apr. 23, 1947; and Amer. Antiq., vol. 12, No. 4, pp. 209-225, April 1947.

ing, dated 1945, between the Smithsonian Institution and the National Park Service, and on a series of interbureau agreements between the National Park Service, the Bureau of Reclamation, and the Corps of Engineers. Its purpose is to locate, record, and evaluate the archeological and paleontological materials that will be affected by each of more than 100 Federal water-control projects proposed or under construction by the Bureau of Reclamation and the Corps of Engineers; to transmit this information to the National Park Service, along with such recommendations for further action as seem necessary to recover a representative sample of the scientific data which are about to be lost; and to direct the Federal phases of any subsequent recovery work undertaken, including limited or comprehensive excavation at key sites. Financial support is provided by the Bureau of Reclamation through the National Park Service.

In carrying forward the enormous task set for it, the Missouri River Basin Survey has been materially aided by various organizations, agencies, and individuals. Only a few of these can be singled out at this time for special mention. In the Missouri River Basin Recreation Survey office, Region 2, National Park Service, Chief Recreation Planner Guy D. Edwards and Archeologist J. D. Jennings continued their helpful and stimulating interest in all phases of the archeological recovery program. The Bureau of Reclamation, besides providing funds to support the work, has freely supplied maps, engineering data, construction programs and schedules, and other materials on request. Furthermore, as is noted elsewhere in this report, the Bureau took the initiative in setting up the highly successful cooperative excavation program at Medicine Creek, Nebr.—a pattern of operation that for efficiency and productiveness might well be followed at other projects where archeological and paleontological materials are directly threatened by dam construction. The Corps of Engineers has continued to provide maps and other project data; and in the Omaha district office, T. E. Huddleston has remained an unofficial but extremely helpful consultant in interpretation of aerial photographs and in other problems pertaining to pre-excavation archeological work on the Missouri River in North and South Dakota. Local, district, and regional officials and personnel of these and other agencies, project engineers, representatives of construction companies, and many private individuals have extended innumerable courtesies to River Basin Surveys field parties and to the local Survey office in Lincoln. The same is true of State and other non-Federal agencies with whom contacts were made. Especially to be noted in this regard is the generous cooperation of the University of Nebraska in continuing to provide, in its Laboratory of Anthropology, working space for the Survey. The active support and direct interest of the Committee for Recovery of Archeological Remains, representing the

archeological profession and various learned societies, must also be acknowledged.

The general procedure by which the investigative work of the River Basin Surveys is programmed consists of three phases. The first is reconnaissance, in which the primary objective is to get a working familiarity with proposed or potential reservoir areas and their archeological or paleontological possibilities. The second is intensive survey, wherein there is complete coverage of the reservoir area and limited testing, if possible, of the more promising sites located. The third is comprehensive excavation which, depending upon various factors, may mean either the complete working out of certain sites or else the large-scale but not complete clearing of a series of key sites. These three phases, of course, are not mutually exclusive; and as the backlog of proposed reservoirs awaiting examination dwindles and adequate funds become available, it may be possible to intensify the initial survey and then move directly into such excavation as seems warranted.

From its inception in 1946 until the end of 1947, the field activities of the Missouri River Basin Survey were restricted mainly to preliminary reconnaissance and some follow-up surveys. No funds were available for extended excavations, although a small allotment in fiscal year 1948 made possible limited excavations late in 1947 at Boysen, Wyo., and in 1948 at Angostura, S. Dak., and Heart Butte, N. Dak. Early in 1948, at the suggestion of officials of the Bureau of Reclamation, a major excavation program was set in motion at Medicine Creek, Nebr. Because this work was of an emergency character, funds originally programmed by the Missouri River Basin Survey for other projects were reallocated for supervisory and other costs in connection with the operations at Medicine Creek. This unexpected drain on already inadequate funds was followed in July 1948 by a reduced allotment for fiscal year 1949 and then by a pay increase for classified staff personnel. Thus, the Missouri River Basin Survey went through calendar year 1948 with operating costs substantially increased and funds available materially reduced in amount. As a result, field work went forward on a smaller scale than originally planned and a portion of the professional staff could not be sent into the field. Except at Medicine Creek, no comprehensive excavation was possible in 1948.

It may be appropriate to note at this point one of the major obstacles to effective programming of field work on this project. For various reasons, including seasonal climatic, labor, and other factors, the most satisfactory period for archeological work is between, approximately, April and October. This period begins in the last quarter of an expiring fiscal year and runs into or through the first quarter of the next.

It represents an interval during much of which there is uncertainty regarding the amount of funds to be allotted for the new fiscal year

beginning on July 1, and also as to the date on which those funds will be available. If enough carry-over funds are held back to insure completion of field-work begun not long before the close of one fiscal year, there is an excellent prospect that the amount of the carry-over will be deducted from the next year's allotment. All of this means that annually at the very time when an all-out summer field program should be in the making, dwindling funds and the uncertainty regarding their replenishment exert a strong restraining influence on the planning and carrying out of field work.

During calendar year 1948, eight reservoir areas were visited by River Basin Surveys field parties in search of archeological remains, and 194 sites were added to the preceding year's total in the Surveys files. The University of Nebraska Laboratory of Anthropology investigated five other proposed reservoir areas and located 34 sites. Information on the archeological resources of Davis Creek Reservoir area was provided by the Nebraska State Historical Society from its files, making unnecessary for the present any field surveys in that locality. By year's end, the River Basin Surveys and cooperating agencies had visited, partially or completely surveyed, and appraised as to archeological materials 57 Bureau of Reclamation and 9 Corps of Engineers projects, and had on record a total of 877 sites of archeological interest. Projects visited were distributed throughout the Missouri Basin as follows: Colorado, 4; Kansas, 6; Missouri, 1; Montana, 4; Nebraska, 23; North Dakota, 11; South Dakota, 9; Wyoming, 8.

Paleontological investigations by the River Basin Surveys during 1948 consisted of re-examination and collecting at four reservoir sites previously examined; no new localities were visited. The University of Nebraska State Museum, a cooperating institution, re-examined two localities previously worked. By the end of 1948, a paleontological reconnaissance and collecting had been done by the River Basin Surveys at 97 reservoir sites, including 93 Bureau of Reclamation and 4 Corps of Engineers projects. These were distributed as follows, by States: Colorado, 3; Kansas, 7; Montana, 25; Nebraska, 23; North Dakota, 10; South Dakota, 6; Wyoming, 23.

In table 1 below are summarized the reservoir projects investigated by archeological and paleontological field parties of the Missouri River Basin Survey and by cooperating agencies up to December 31, 1948. In the pages that follow are briefly described the field operations and some of the findings during calendar year 1948; additional details concerning some of these explorations may be found in *American Antiquity*, volume 14, No. 4, part 1, April 1949. Reviews of scientific salvage operations in preceding years will be found in the summary reports of the Missouri Basin Survey for 1946 and 1947, published by the Smithsonian Institution.



This map shows the course of the river and its tributaries, with various points marked for reference. The points are labeled with letters and numbers, and rectangular markers are placed at specific locations along the river. The map is oriented vertically, with the river flowing from top to bottom.

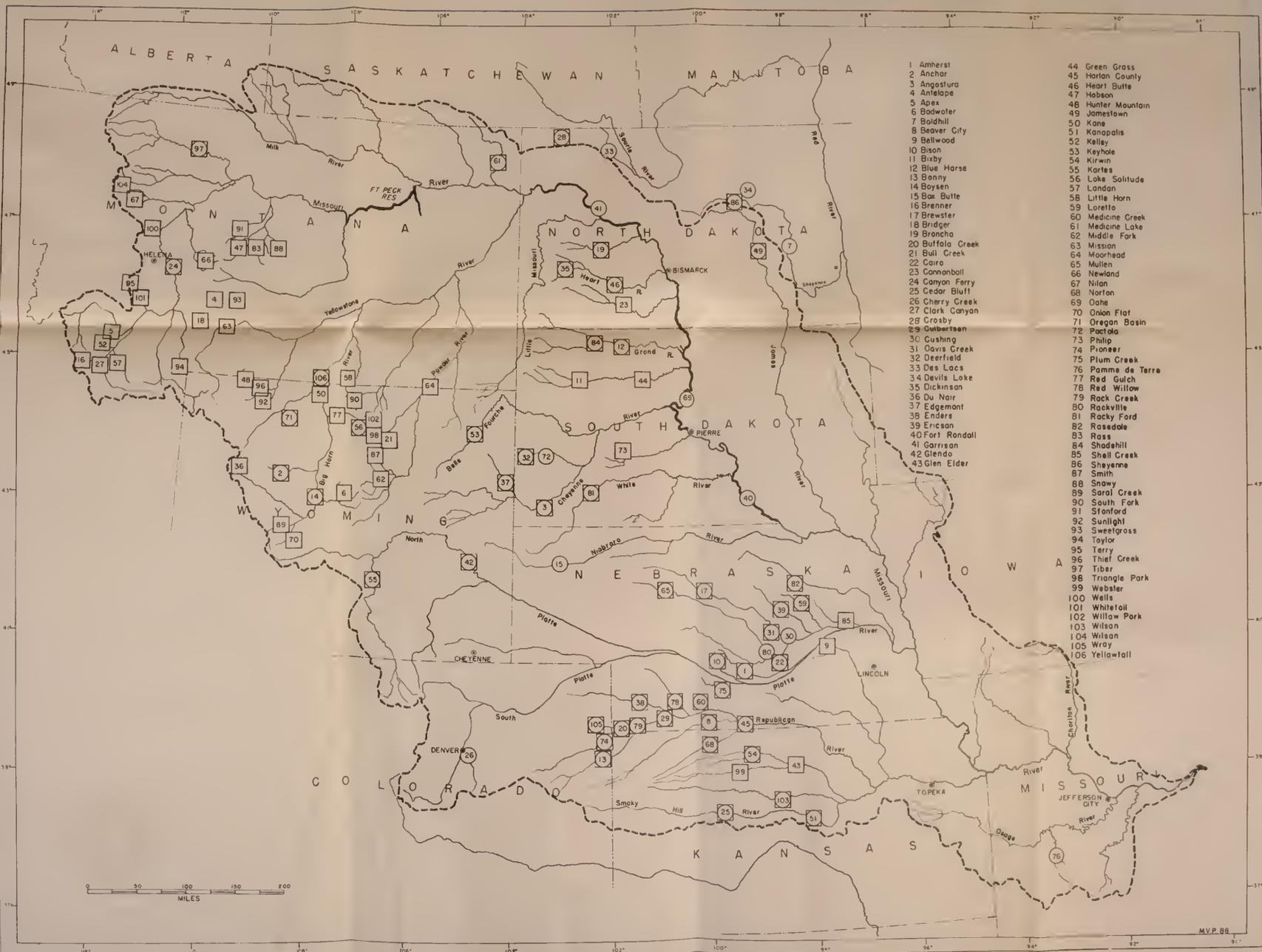


FIGURE 1.—Map of Missouri River Basin (heavy broken line), showing reservoir projects investigated by the Missouri River Basin Survey and cooperating agencies as of December 31, 1948. Numbers designating projects correspond to those in column 1 of table 1. Circles indicate archeological investigation; boxes indicate paleontological examination; boxed circles indicate archeological and paleontological investigations.

TABLE 1.—Missouri Basin reservoir sites investigated by the Smithsonian Institution River Basin Surveys and cooperating agencies through first half of fiscal year 1949 (to end of calendar year 1948). Numbers in first column correspond to numbers on location map (fig. 1). Sixth column indicates whether investigations were archeological (A), paleontological (P), or both (A, P)

No.	Project	Stream	County	State	Surveys	Archeological sites recorded			
						FY 47	FY 48	FY 49	Total
1	Amherst	Wood River	Buffalo	Nebr.		5			5
2	Anchor	South Fork Owl Creek	Hot Springs	A, P		3			3
3	Angostura	Cheyenne River	Fall River	A, P		5	66		71
4	Anselope	Shields River, offstream	Park	P					
5	Apex	Birch Creek	Beaverhead	Mont.					
6	Badwater	Badwater Creek	Fremont	Wyo.					
7	Baldhill	Shoeyenne River	Barnes, Griggs	N. Dak.		10			10
8	Beaver City	Beaver Creek	Furnas	Nebr.		4			4
9	Bellwood	Clear Creek	Polk	A, P		0			0
10	Bison (formerly Buffalo Creek)	Buffalo Creek	Dawson	Nebr.		1			1
11	Bixby	Moreau River	Porkins	S. Dak.					
12	Blue Horse	Grand River	Corson	S. Dak.		0			0
13	Bonny	South Fork Republican River	Yuma	A, P		3			3
14	Boysen	Big Horn River	Fremont	A, P		15	60		75
15	Box Butte	Niobrara River	Dawes	Nebr.		1			1
16	Brenner	Horse Prairie Creek	Beaverhead	P					
17	Brewster	North Loup River	Blaine	Nebr.		1			1
18	Bridger	Bridger Creek	Gallatin	A, P					
19	Broncho	Knife River	Dunn, Mercer	Nebr.		9			9
20	Buffalo Creek	Buffalo Creek	Dundy	A, P		1			1
21	Bull Creek	Clear Creek	Johnson	Nebr.		1			1
22	Cairo	Dry Creek	Hall	Wyo.		0			0
23	Cannonball	Cannonball River	Grant	A, P					
24	Canyon Ferry	Missouri River	Broadwater, Lewis and Clark	A, P		7	26		33
25	Cedar Bluff	Smoky Hill River	Trego	A, P		4			4
26	Cherry Creek	Cherry Creek	Arapahoe	A		6			6
27	Clark Canyon	Beaverhead River	Beaverhead	Mont.					
28	Crosby	Missouri River, offstream	Divide	P		1			1
29	Culbertson	Republican River	Hitchcock	A, P		1			1
30	Cushing	Spring Creek	Greeley, Howard	Nebr.		1			1
31	Davis Creek	Rapid Creek	Greeley, Howard, Sherman, Valley	A, P			7		7
32	Deerfield	Rapid Creek	Pennington	Nebr.		0			0
33	Des Lacs	Des Lacs River	Ward	S. Dak.		0			0
34	Devils Lake	Devils Lake	Ramsey	N. Dak.		5			5
35	Dickinson	Heart River	Stark	N. Dak.		3			3
36	Du Noir	Wind River	Fremont	Wyo.			0		0

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No.	Project	Stream	County	State	Surveys	Archeological sites recorded			
						FY 47	FY 48	FY 49	Total
37.	Edgemont.	Beaver Creek	Weston	Wyo.					28
38.	Enders.	Frenchman Creek	Chase	Nebr.	A, P			28	4
39.	Ericson.	Cedar River	Greeley, Wheeler	Nebr.	A, P				5
40.	Fort Randall.	Missouri River	Brule, Buffalo, Charles Mix, Gregory, Hughes, Hyde, Lyman.	S. Dak.	A	93			93
41.	Garrison.	Missouri River	Dunn, McKezale, McLean, Mercer, Monrtrall, Williams.	N. Dak.	A	70			70
42.	Glendo.	North Platte River	Platte	Wyo.	A, P	43			43
43.	Glen Elder.	Solomon River	Mitchell	Kans.	P				
44.	Green Grass.	Moreau River	Dewey	N. Dak.	P				
45.	Harlan County	Republican River	Harlan	N. Dak.	A, P	23			23
46.	Heart Butte.	Heart River	Grant	N. Dak.	A, P	4		9	13
47.	Hobson.	Judith River	Judith Basin	Mont.	P				
48.	Hunter Mountain.	Clark Fork	Park	Wyo.	P				7
49.	Jamestown.	James River	Stutsman	N. Dak.	A, P	7			0
	Johnson Siding (see Pac-tola).	Rapid Creek	Pennington	S. Dak.				0	0
50.	Kane.	Big Horn River	Big Horn	Wyo.	P				18
51.	Kanopolis.	Smoky Hill River	Ellsworth	Kans.	A, P	18			18
52.	Kelley.	Rattlesnake Creek	Beaverhead	Mont.	P				
53.	Keyhole.	Belle Fourche River	Crook	Wyo.	A, P			29	29
54.	Kirwin.	North Fork, Solomon River	Phillips	Kans.	A, P	1			1
55.	Kortes.	North Platte River	Carbon	Wyo.	A, P	0			0
56.	Lake Solitude.	Paintrock Creek	Big Horn	Mont.	A, P				
57.	London.	Blacktail Creek	Beaverhead	Mont.	P				
58.	Little Horn.	Little Horn River	Big Horn	Mont.	P				
59.	Loreto.	Beaver Creek	Boone	Nebr.	A, P			7	7
60.	Medicine Creek.	Medicine Creek	Frontier	N. Dak.	A, P				29
61.	Medicine Lake.	Big Muddy Creek	Roosevelt, Sheridan	Mont.	A, P	18	11		8
62.	Middle Fork.	Middle Fork, Powder River	Johnson	Wyo.	A, P	8			
63.	Mission.	Yellowstone River	Park	Mont.	P				
64.	Moorhead.	Powder River	Powder River, Campbell	Mont., Wyo.	P				
65.	Mullen.	Middle Loup River	Hooker	N. Dak.	A, P	8			8
66.	Newland.	Newland Creek	Meagher	Mont.	P				
67.	Nlian.	South Fork, Sun River	Lewis and Clark	Mont.	A, P				
68.	Norton.	Prairie Dog Creek	Norton	Kans.	A, P	3			3

PERSONNEL

No changes were made in the professional staff of the Missouri River Basin Survey during 1948, but owing to shortage of funds and increased operating costs, steps were being taken at year's end for a staff reduction. On active duty throughout the year were six archeologists: Paul L. Cooper, temporarily in charge of the field office during the writer's absences in Washington; Robert B. Cumming, Jr., laboratory supervisor; Wesley L. Bliss; Marvin F. Kivett; J. J. Bauxar; and Jack T. Hughes. As in the preceding year, Dr. T. E. White, on leave of absence from the Museum of Comparative Zoology, Harvard University, carried on the paleontological phases of the Missouri River Basin Survey salvage work. He was in Lincoln, or on field assignment out of Lincoln, from May 18 until November 5.

Full-time office and laboratory personnel included Mrs. Ina May Reagan, clerk-stenographer; Dean Clark and A. E. Nixon, laboratory assistants; J. M. Shippee, expert laborer; and George Metcalf, field and laboratory assistant. One full-time and one part-time temporary office assistant were added to the clerical force during the year. Drafting of maps and diagrams, some of the routine processing of specimens, and the maintenance of certain office and laboratory files were carried on with part-time student and other assistance.

Student assistants were again employed wherever possible as members of the field parties. Robert L. Hall and Warren Wittry, University of Wisconsin, joined Mr. Cooper at Heart Butte on June 22, and remained with the party until early September. Gordon F. McKenzie, University of Nebraska, was with this unit from August 1 to September 3. Dr. White was assisted in Wyoming and Montana by Ernest Lundelius, University of Texas, from June 1 to September 3, and by John C. Donohoe, Montana State College, from June 14 to August 1. Miss Dorothy E. Fraser participated as special consultant in field investigations in the Fort Bennett, S. Dak., locality with the Cooper party during the month of August.

LABORATORY ACTIVITIES

The field headquarters and laboratory for the Missouri River Basin Survey were located throughout the year in the Laboratory of Anthropology at the University of Nebraska. Until the end of September, space was provided for these facilities in the basement of Love Memorial Library. Thereafter, more spacious and better-lighted quarters designed primarily for anthropological research and training were made available in the basement of the newly completed Burnett Hall. As in the preceding year, storage space at the Lincoln Municipal Airport was utilized for housing the Survey's 11 vehicles, field equipment

and supplies, and certain specimens. As previously, also, additional laboratory and study space was generously provided for Survey personnel by the Nebraska State Historical Society.

The basic project files were maintained and expanded throughout the year. At year's end, the basic site file included 635 site folders, each containing a site survey sheet prepared in the field, a catalog of artifacts collected and photographs made, and other data relevant to the particular location. This represents an increase of 192 over the total at the end of 1947. All of the material in the basic site file has also been duplicated in reserve files.

The map file, which includes topographic, geologic, land survey, ownership, and other maps needed for reference and planning purposes, was augmented by 101 additional sheets during the year. It now includes approximately 667 maps. Many of these were furnished by the construction agencies and by other State and Federal offices, as requested from time to time; others were purchased as needed. There are also 295 aerial photographs, most of them on a scale of 1:12000. They cover much of the main-stem area along the Missouri River between Pierre, S. Dak., and the North Dakota State line, as well as smaller areas on Medicine Creek, about Angostura, and elsewhere.

Drafting and map-making have been pushed steadily, but almost wholly with part-time student assistance. Archeological site maps, reservoir site location charts, archeological and geological profiles, and house plans to the number of 24 had been prepared by the end of December.

The addition of a full-time laboratory assistant in the darkroom in June has vastly facilitated the preparation of specimen photographs, the processing of field and laboratory negatives, and the photographic duplication of office and laboratory records. Darkroom work during calendar 1948 includes the processing of 1,087 negatives of field and laboratory photographs; preparation of 1,562 black and white prints for reference files and illustrative purposes; preparation of 121 2 x 2 black-and-white slides; cataloging and filing of 373 color transparencies, most of them in 35-mm. size; and the preparation of 262 photographic enlargements in 8 x 10-inch size for publicity and reference uses.

An ethnohistorical reference file begun late in 1947 was continued through 1948. At year's end this included 5,202 cards carrying classified information on the early documentary sources for the Missouri Basin Indians. Emphasis was on the native tribes residing formerly along the main stem and the references to them by European and American explorers up to the beginning of the nineteenth century.

With the beginning of comprehensive excavation, the handling and storage of specimens has become a major activity. By the end of 1948, nearly 100,000 specimens had been cleaned, cataloged, and stored.

Slightly more than half of these were accumulated during the calendar year. The restoration of outstanding or representative pieces and their preparation for eventual study and exhibit has gone forward on a small scale. It should be noted that the great bulk of specimens now on hand are primarily of study interest; they include much broken and fragmentary material which will be discarded when no longer needed for analysis and report writing. Under present laboratory procedures, all materials sent in from the field by archeological parties are processed and cataloged, so as to facilitate their study. Only a relatively small fraction of the collections now on hand will eventually find their way into National, State, and local institutions.

As in the previous year, the Missouri River Basin Survey furnished to the National Park Service preliminary mimeographed appraisals of the archeological and paleontological resources of reservoirs investigated. For those reservoir areas where intensive survey was subsequently made, supplementary appraisals have been furnished. These appraisals consist of site location maps, summary descriptions of materials seen, and an evaluation of the probable scientific importance of the remains located. Where further investigation is believed to be needed, an estimate of the nature and extent of such additional work is also included. These reports are distributed by the National Park Service to the construction agencies, to district and regional offices of the various Federal agencies concerned, and on a selective basis to cooperating State and other institutions and organizations where their particular fields of interest are concerned.

During calendar year 1948, preliminary appraisals on archeological resources of 11 reservoir sites were prepared and distributed. These include Baldhill and Garrison in North Dakota; Beaver City, Bonny, Buffalo Creek, Culbertson, Norton, Pioneer, Red Willow, and Rock Creek in the Republican River Basin of Colorado, Kansas, and Nebraska; and Wilson Reservoir site in the Smoky Hill Basin of northern Kansas. Supplementary appraisals were distributed for Boysen, Glendo, and Oregon Basin, in Wyoming; and for Canyon Ferry and Tiber, in Montana. In addition, a memorandum on Cheyenne River Basin archeology, including Angostura, Edgemont, Johnson Siding, Keyhole, and Pactola Reservoir sites in southwestern South Dakota and northeastern Wyoming, was furnished the National Park Service.

In preparation was a preliminary appraisal of the Davis Creek Reservoir site, Nebraska, based on archeological work by the Nebraska State Historical Society and Works Project Administration in 1939; and several longer reports of more technical nature. These latter included a report on certain discoveries in the fall of 1946 at Harlan County Reservoir site; and one on Birdshhead Cave in the Boysen Reservoir site, Wyoming. Late in the year, members of the field staff

were beginning to turn their attention to the preparation of technical summaries on the 1948 field work at Medicine Creek, Angostura, and lower Oahe Reservoir sites. These summaries were published in the April 1949 issue of *American Antiquity*, which is devoted entirely to papers dealing with the Missouri Basin work of the River Basin Surveys and cooperating State agencies.

In addition to the various archeological reports noted above, a 71-page appraisal of the paleontological resources of certain river basins and reservoir sites in the Missouri watershed was also distributed. This covers 70 reservoir sites, potential, proposed, and under construction, in Nebraska, North and South Dakota, Montana, and Wyoming. Not distributed were reports prepared by the paleontologist on Boysen, Canyon Ferry, and Cedar Bluff Reservoir sites, and a preliminary statement on the physiographic history of Horsehead Creek in the vicinity of Site 39FA65, in Angostura Reservoir, South Dakota.

In November, the Smithsonian Institution published a summary report prepared by the field director on the activities of the Missouri River Basin Survey during calendar year 1947.

As in preceding years, the Lincoln office of the River Basin Surveys furnished information, as requested, to the daily press, to technical and semipopular periodicals, and to various other agencies and individuals. In the field, archeologists at various times addressed local civic and other groups interested in the prehistory of their particular localities. Especially gratifying in this connection was the sustained public interest shown in the excavations at Medicine Creek, where illustrated talks by the archeologist in charge became a semi-weekly part of his duties.

Several staff members participated in various ways in the sessions of the Sixth Plains Archeological Conference, held at the University of Nebraska, in Lincoln, November 25-27, 1948.

FIELD WORK AND EXPLORATIONS

During calendar year 1948, field work was carried on by five units representing the River Basin Surveys. Four of these were concerned with archeological researches, the fifth with paleontology. Archeological projects included the following: comprehensive archeological excavations for 4½ months at Medicine Creek Reservoir site, under the direction of M. F. Kivett; 3½ months of reconnaissance and intensive survey at five reservoir sites in the Cheyenne River Basin in northeastern Wyoming and southwestern South Dakota, under Jack T. Hughes; 6 weeks of test excavations at Heart Butte, N. Dak., and a like period in the lower Oahe Reservoir site, South Dakota,

under Paul L. Cooper; and 2 weeks of mound excavation in the vicinity of Fort Randall Dam, South Dakota, also by Mr. Cooper. The paleontological unit, under Dr. T. E. White, divided 4 months of field activities among Boysen (Wyo.), Canyon Ferry (Mont.), Angostura (S. Dak.), and Cedar Bluff, (Kans.) Reservoir sites. Further details regarding these various projects are given below.

Another staff archeologist, J. J. Bauxar, was detailed at request of the Regional Director, Region 2, to the National Park Service from April 5 to June 26 for archeological researches at Homestead National Monument, Gage County, Nebr. W. L. Bliss spent approximately one week in August assisting in archeological excavations by the University of Nebraska State Museum in Medicine Creek Reservoir, Nebraska.

NEBRASKA

Medicine Creek Reservoir site.—Of outstanding interest in the year's program were the comprehensive archeological excavations conducted during the summer at Medicine Creek Reservoir site in southern Nebraska. A preliminary reconnaissance here by M. F. Kivett and J. M. Shippee during the summer of 1946 had disclosed the location of 15 archeological sites within the future pool area. In 1947, following the disastrous flood of June 21–22 on Medicine Creek, Bureau of Reclamation plans for construction of the dam and reservoir were speeded up. Accordingly, the River Basin Surveys assigned Mr. Kivett, with George Metcalf as assistant, to approximately 2 months of further survey and limited excavations at and near the dam site, at points that seemed likely to be affected soon by construction activities. This work, a continuation of investigations begun some time previously by the Nebraska State Historical Society, disclosed the presence of at least 20 additional localities of archeological interest here and strongly indicated the advisability of more extended excavation. Findings by the field parties working here in 1947 have been briefly summarized in a previous report.

In early spring of 1948, a conference was arranged in Denver, Colo., in which representatives of the Bureau of Reclamation, the National Park Service, and the Missouri River Basin Survey participated. The Bureau of Reclamation generously offered to furnish power machinery and hand labor for the salvage of materials to be affected by reservoir construction, provided the River Basin Surveys would assume responsibility for the technical supervision of the work. The offer was promptly accepted, and the arrangements were embodied in a memorandum from the Regional Director, Region 7, Bureau of Reclamation, dated February 6, 1948. Under this arrangement, archeological excavations were carried on from March 29 until August

20, 1948. The Bureau of Reclamation made available the services of 15 to 20 laborers, a road patrol, and, for part of the time, a bulldozer, besides providing surveyors as their services were requested from time to time. From the Lincoln office of the River Basin Surveys, M. F. Kivett was detailed to supervise the operations and to insure that the work would be carried on in accord with recognized archeological procedures and standards. George Metcalf again was assigned as field assistant.

The Medicine Creek project has been outstandingly successful in every particular. Uniformly cordial and pleasant relationships existed at all times between River Basin Surveys personnel and the various representatives of the project, district, and regional offices of the Bureau of Reclamation. No better cooperation could have been asked than that extended by the latter agency in this matter.² The division of responsibility under which the work was conducted by the Federal agencies permitted the archeologists to devote their full time to the scientific and technical aspects of the operation. The applicability of power machinery under close and constant control to the excavation of village and camp sites, not previously attempted on a comparable scale in the Missouri Basin, was convincingly demonstrated.

Medicine Creek Dam, now well along in construction, is located 8½ miles north of Cambridge, Nebr., in the southeast corner of Frontier County. It is to be an earth-fill structure with a crest length of approximately 5,665 feet and a maximum height of about 115 feet above stream bed. Provision will be made for a maximum high-water level of 2,408.9 feet. At normal pool (elevation 2,366 feet), the reservoir will be 8½ miles long, with a shoreline of about 31 miles. It will control a drainage area of some 656 square miles. Purposes of the dam, a unit of the Frenchman-Cambridge project, are flood control and irrigation.

Between March 29 and August 20, comprehensive excavations were made in five sites, with more limited investigations in three others. With the mechanical aids available, entire sites were stripped of their sod and overlying soil cover, so that the complete village layout could be determined and mapped (pls. 1, 2). The actual clearing of house floors and storage pits, and the closer investigation of remains uncovered by the preliminary stripping, was done, of course, with hand tools. This technique, which made possible the accurate determination of native settlement patterns and the discovery of numerous small features not readily determinable by the usual hand-tool methods, is one of the great advantages of mechanized archeology. Remains

² Special acknowledgment should be made of the helpfulness of C. L. Mutch, project engineer; H. E. Robinson, District Manager, McCook County; and A. A. Batson, regional director.

uncovered include 28 prehistoric lodge sites, 75 storage pits, 22 refuse deposits, several burials, and more than 31,000 cataloged objects of pottery, stone, bone, shell, and other materials.

Work began on March 29 at site 25FT17, atop a high ridge (pl. 1) that will be incorporated into the west half of the dam structure. Here the major part of one site was excavated, including 8 subrectangular house floors (pl. 3 *a, b*), 21 storage pits beneath house floors, 4 outside storage pits, and 5 midden or refuse areas. From April 26 to May 5, the work was extended to 25FT16, a short distance to the west and close to the western terminus of the future dam. Here the Nebraska State Historical Society had previously excavated two house floors in 1947. A third lodge floor was cleared in 1948 by the River Basin Surveys, as were eight storage pits and three refuse areas. Practically all of these materials are assignable to the Upper Republican culture, although several pits and a few sherds suggest that an older Woodland occupation preceded the Upper Republican at 25FT17.

From May 6 until June 14, excavations were carried on at two Upper Republican sites located in the borrow area on the left (east) bank of Medicine Creek, a short distance above the dam site. At site 25FT13, 8 rectangular house floors were cleared and 17 storage pits were opened, 12 of them lying within the house units. Five refuse deposits, each lying near the entrance of one of the houses, were also excavated. Despite the stripping of large sections of the nearby village area, some of which had undergone considerable erosion, no other archeological features were noted. Extensive tests for burials on the bluff overlooking the village site from the east disclosed the remains of but a single extended adult male Indian; a few accompanying sherds, projectile points, and other objects suggest that this individual may have been an inhabitant of this or another nearby village.

Site 25FT14, a small Upper Republican village situated some 250 yards northwest of the preceding, was also worked partially during this period. A single house floor was cleared, and extensive test trenches were opened. Unfortunately, the larger part of the site had been destroyed by local collectors prior to the present salvage program.

On the right bank of Medicine Creek, approximately one-fourth mile above the dam site, was one of the larger village sites excavated in the reservoir area. This, 25FT70, lay only partially within the future pool area, and therefore was not completely cleared. Between June 15 and July 16, nine rectangular house floors were opened here (pl. 4, *a, b*); several of them were marked prior to excavation by slight elevations in the unbroken sod. Among the numerous specimens recovered from this site, particular interest attaches to the quantities of charred corn, mostly shelled, and the lesser amounts of beans, sun-

flower seeds, and squash seeds taken from storage pits. Several sizable sections of house timbers in an excellent state of preservation will be useful in determining something of the type of vegetation characteristic of the locality in aboriginal days and may also supply information toward an absolute dating for the site and for a part of the Upper Republican culture, which it mainly represents.

One small low-lying area within the limits of 25FT70 yielded calcite-tempered cord-roughened pottery, small pits, scattered post molds, and other artifacts perceptibly different from those in the surrounding Upper Republican houses. These, along with the burials of two children, are attributed to an earlier Woodland group.

At the edge of the bluff near 25FT70, stepped trenches were cut down the hillside to check the seeming occurrence of cultural debris in the lower portion of the terrace fill. These cuts, made in some instances to a depth of 6 feet, revealed evidence of extensive washing and scattering of cultural refuse from the bluff-top site. Below the surface refuse mantle and apparently in situ in the fill at the valley edge, were found scattered bones of a Pleistocene camel and of other unidentified animal forms. There was no evidence of anything that might be construed as Early Man. This area, worked between July 17 and 20, was designated Site 25FT29.

Several hundred yards upstream and also on the right bank of Medicine Creek, one subrectangular Upper Republican house site was opened at Site 25FT36. A second house floor lying above future pool level was located but not worked. Two midden areas slated for flooding were also worked out.

Site 25FT18, a Woodland site situated on a low terrace on the left bank of Lime Creek near its confluence with the Medicine, was completely excavated between August 3 and 20 (pl. 5, *b*; 6). Unlike the other and probably later village sites investigated, this one had no earth-lodge floors. Cultural materials and camp refuse occurred in a dark, stained layer varying in thickness from 6 to 30 inches and buried beneath 6 to 15 inches of lighter-colored wind-blown deposits. The entire cultural layer and all overlying sterile deposits, involving approximately 12,000 cubic feet of soil, were removed. Several fireplaces, numerous scattered post molds, and a few small pits or basinlike structures were cleared, all lying at the bottom and just below the dark culture-bearing stratum from which came most of the artifacts and specimens (pl. 6, *b*). The disarticulated remains of two adult burials were also recovered from the lower portion of the culture stratum. Artifacts from site 25FT18 include calcite-tempered cord-roughened potsherds, tubular bone beads, bone awls, small corner-notched projectile points, end scrapers, disk beads and rectangular to oval pendants of shell, and other materials.

The River Basin Surveys excavations at Medicine Creek in 1948 were concerned entirely with remains of pottery-making peoples, some of them, at least, depending partly on maize horticulture. Two cultural horizons appear to be represented—the Upper Republican and the Woodland. No clear-cut instances of stratification were found, and there is no direct evidence from the Medicine Creek Reservoir area itself as to the temporal relationships between these two complexes locally. From the broad similarity of the remains here to other culturally related materials found in stratigraphic relationship elsewhere, however, there seems no good reason to doubt that the Woodland remains represented sparingly at 25FT70, possibly at 25FT17, and more fully at 25FT18 were laid down some time before the more abundant Upper Republican remains. Kivett has tentatively designated the Woodland variant here represented as the Keith Focus.

Pending completion of the detailed analyses now under way on the 1948 Medicine Creek collections, only a few of the salient findings or trends of evidence can be noted here. Current views are that the Upper Republican in this locality probably flourished somewhere between the late thirteenth and late fifteenth centuries. As already indicated, there are timber specimens from some of the Upper Republican sites that may yield to dendrochronological analysis and from which the local complex may be datable in terms of the Christian calendar. Even if that hope fails, it should be possible to determine the relative building dates of individual houses within a single village unit, or between groups of houses in different parts of the several villages. There are already evident rather definite variations in detail in sherd types from the various sites, as well as in sherd samples from different house units of the same village. These variations seem to correlate with other minor but consistent differences in the material culture inventory, and possibly are due to something more than mere family or individual tastes.

The present excavations have confirmed and greatly amplified earlier views regarding the nature of the prehistoric Upper Republican occupancy. Subsistence was basically by corn-bean-squash-sunflower horticulture, with the bison scapula hoe as the characteristic gardening tool. Quantities of mammal and bird bones indicate that hunting was also important, the nearby bison having been heavily drawn upon. Bone fishhooks and, in some sites, great quantities of freshwater-mussel shells, indicate other sources of food. Underground storage pits were a regular adjunct of the dwelling complex, occurring inside as well as outside the houses. They are both smaller and less numerous in relation to the number of house units than the storage pits of the later Pawnee and other historic horticultural vil-

lage tribes of the eastern plains, which suggests to me a somewhat less intensive or less productive food-raising complex. The loose, scattered nature of the villages, characterized by rectangular earth-covered dwellings arranged in groups of two to four or more units and separated by a few rods from another similar cluster, all of them unfortified (pl. 1), is in striking contrast to the great, compact, often ditched and palisaded, earth-lodge villages seen among the Pawnee and their neighbors in eastern Nebraska during the sixteenth, seventeenth, and eighteenth centuries.

Judged by the findings at 25FT18 and 25FT70, the Woodland occupancy of the locality was appreciably different from the Upper Republican. No evidence of domestic crops came to light, and the bone hoe was absent, as it has been so far at other Woodland sites excavated or tested in the Nebraska-Kansas region. The bones of birds and animals were moderately abundant throughout the culture strata involved. There is some indication that deer and smaller animals were hunted to a much greater extent than the bison, which, in later prehistoric and historic times, apparently became the principal meat source. Pottery was present in much smaller amounts than in the Upper Republican horizon, and the number of vessels owned per family was certainly very considerably lower. Small, well-made, stemmed projectile points suggest use of bow and arrow. There was no recognizable evidence of fishing. In contrast to the substantial earth lodges of later times, small structures of perishable materials seem to have been used for habitation. These, presumably, were erected in or over some of the small basinlike features revealed in the excavations, and around or near the ash-filled fireplace depressions. Unfortunately, no post-mold configurations recognizable as possible house patterns could be worked out.

One of the few disappointments of the season at Medicine Creek was in the fact that no Upper Republican burial grounds could be located and worked out. The single extended skeleton on the hill east of 25FT13 is very likely from the Upper Republican period, but of course is inadequate to show convincingly the physical type and somatological relationships of the natives who left the great majority of village sites so far located in and about the future reservoir area. Unless interment was in single isolated or remote graves, or was not a regular method for disposing of the dead among these villagers, it may be presumed that among the still-unfound antiquities of the locality there must be a number of burial grounds.

For the Woodland horizon, the available evidence is not much more satisfactory. The two burials at 25FT70 were those of children, and there is but a single measurable skull from the grave at 25FT18. Since these sites seem to have been generally rather small, associated

burial grounds of any size are perhaps not to be expected. One is tempted to wonder, incidentally, whether the placing of a grave, with single or compound burial, in the camp area by the Woodland peoples may have been a factor in their abandonment of the sites.

Concerning the external relationships of these early Medicine Creek peoples and their contacts with contemporary groups, little information came to light. At none of the sites worked was there any recognizable evidence of puebloan pottery or other Southwestern trade materials. Absent, too, were obsidian, steatite, and other exotic minerals from the regions to the west, as well as finished products or raw materials certainly attributable to peoples of other culture to the southeast or east. The general impression is thus one of closely self-centered small communities too busy with their own local affairs to engage extensively in long-distance trading or other ventures.

As has been noted, where the sites examined this summer lay in unbroken ground or had not been subjected to long-continued and deep erosion, they were overlain by varying depths of light wind-blown soil. This overlying mantle, capped with sod, generally obscured the village horizon, so that potsherds, chipped stone and rejectage, and refuse animal bone could be detected only along the eroded margins. With removal of the overburden, the old occupational level showed up as a dark-stained zone varying in thickness and in the amount of cultural admixture. The house sites had been dug to varying depths into this old village level; some houses had been but slightly below the contemporary surface, others had been in pits up to 15 or 18 inches deep. The implication would seem to be that at the time the Upper Republican peoples inhabited the locality, the terrace and bluff surfaces were at a somewhat lower level and that moisture was adequate to maintain a relatively stable vegetation cover. Subsequent to abandonment of the village sites, there has been increased soil movement, with no indication that a stable humus level was again reached until the present sod developed and a new soil-forming period set in.

This apparent correlation of prehistoric corn-growing peoples with former soil surfaces now buried by aeolian deposits has been noted at other places in the Republican drainage and elsewhere in the Nebraska-Kansas region. Some of the sites at Medicine Creek have been inspected very briefly by soils experts, but more detailed studies will be necessary before the true significance of this seeming correlation can be set forth. The prospects seem excellent, however, for eventual dating, through the associated archeological materials, of some of the climatic fluctuations that have characterized the region for many centuries past, but within the time of men who attempted to make their living through the cultivation of maize and other crops.

NORTH DAKOTA

The only archeological field work programmed for North Dakota by the River Basin Surveys during 1948 was limited excavation at the Heart Butte Reservoir site. Previous investigations here include a brief reconnaissance by Paul L. Cooper and J. J. Bauxar on August 15 and 16, 1946, at which time a small part of the proposed reservoir was examined and local residents were consulted. During the 1947 season, a party from the University of North Dakota and the North Dakota Historical Society, under leadership of Dr. Gordon W. Hewes, spent approximately 1 week in the locality. The 1948 operations here by the River Basin Surveys were designed to make a final test of the archeological possibilities of the locality. The party was in charge of Paul L. Cooper. From June 12 to June 20, he was assisted by Thad C. Hecker, of the North Dakota Historical Society, and the work consisted mainly of further survey, chiefly on the south side of the river. From June 21 to August 1, the party consisted of Cooper and two student helpers, Warren Wittry and Robert Hall. One local laborer was employed from July 6 to July 30.

Heart Butte Reservoir site.—Heart Butte Dam is under construction on Heart River, in northern Grant County approximately 15 miles south of Glen Ullin. It is an earth-fill structure, with a height of 123 feet and a crest length of 1,850 feet. At full pool (elevation 2,084.5 feet), the reservoir will be about 14 miles long, with a maximum width nowhere much exceeding 1 mile. The Heart here follows a general easterly course through a steep-walled, flat-floored valley lined with well-developed terraces. Timber is sparse, consisting of some juniper on the slopes and deciduous trees—mostly cottonwood, ash, and chokecherry—on the bottoms. Most of the ground, except where under cultivation, is heavily grassed.

Following a check of previously unvisited portions of the area, most of the activity between June 21 and August 1, 1948, consisted of excavation at site 32GT1, a pottery-bearing site (pl. 12, *c*) on the north bank of the Heart River about 3 miles above the dam site. The excavations totaled some 380 feet of trenches cut into undisturbed portions of the site. Cultural materials were found chiefly at depths varying from 6 to 24 inches beneath the present surface. There were large quantities of bison bone, most of it badly split and broken; bones of the domestic dog also occurred. Artifacts were not plentiful. Pottery showed simple stamping, with cord-impressed designs, and appeared to be related to late Mandan or Hidatsa wares. House remains or other structures were not observed, but small fireplaces occurred in some numbers. These were simple affairs—small burned areas, sometimes basin-shaped, and capped by ashes.

During the last week in the area, tests were made at a rock shelter, 32GT5. This produced some evidences of late, brief, and casual occupancy; tests on the slope below were mostly negative. Other sites examined include two bison kills or hunting camps, five small sites yielding scattered bits of pottery and other debris, and two small flint-littered areas that may have been workshops.

On the basis of the several examinations made between 1946 and 1948, it may be concluded that the known antiquities threatened with destruction by Heart Butte Dam are not likely to constitute a serious loss to archeology. Temporary hunting camps, some of them probably belonging to the village tribes resident on the Missouri 50 or 60 miles to the east, seem to be the chief remains. The bison kill, 32GT6, on the north bank of the river some 4 miles above the dam site, may be of some antiquity and would possibly repay partial excavation. The considerable overburden would make this a costly and difficult task, however, and it seems not improbable that the information to be derived therefrom could be duplicated from other similar sites lying outside of areas that will be affected by reservoir construction. Unless remains not now known are turned up in course of construction, Heart Butte Reservoir site can probably be written off as no great loss to archeology or paleontology.

SOUTH DAKOTA

Archeological investigations by the River Basin Surveys were carried on at three Federal water-control projects in South Dakota during 1948. One party under Jack T. Hughes, with J. M. Shippee as field assistant, and with local labor from time to time, was in the Angostura Reservoir near Hot Springs, S. Dak., from June 2 until September 15. On September 27, Hughes and Shippee made a brief reconnaissance of Pactola and Johnson Siding Reservoir sites, on Rapid Creek a few miles west of Rapid City, locating one small site at the latter locality. Another party, led by Paul L. Cooper and including Robert Hall, Warren Wittry, and, during the month of August, Gordon F. McKenzie and Miss Dorothy E. Fraser, worked from August 1 until September 10 along both banks of the Missouri between Pierre and the Cheyenne River. This section, with an abundance of native village sites, will be flooded by the proposed Oahe Dam to be built a few miles upstream from Pierre. During the last 2 weeks in November, Cooper and Shippee excavated a burial mound situated on the spillway line of Fort Randall Dam, now under construction a few miles north of the Nebraska-South Dakota line. Excepting this latter work, which was done in conjunction with the Corps of Engineers, most of the South Dakota field operations consisted of survey and test excavations.

Angostura Reservoir site.—Angostura Dam is now under construction (pl. 7, a) on the Cheyenne River, in Fall River County about 9 miles south of Hot Springs. Here a concrete dam and earth-fill dikes rising some 130 feet above stream bed and having a crest length of about 1,775 feet, will impound a pool 11 miles long by 1½ miles wide. At maximum pool (elevation 3,200 feet) an area of about 4,995 acres will be under water; at minimum pool (elevation 3,162.5 feet) the pool area will be about 2,690 acres. Purpose of the project is irrigation.

The future reservoir will lie in a narrow sheltered belt curving around the south and east flank of the Black Hills. To the west and north, the terrain is hilly and rough, with coniferous forests on the higher portions. To the east and south are gently rolling grass-covered hills and plains. Within the reservoir area, the Cheyenne has only two tributaries of note. Sheps Canyon enters from the left a few hundred yards above the dam site; it contains springs but the channel is badly clogged. Less than 3 miles above the dam, Horsehead Creek joins the Cheyenne from the right; it has a valley with broad bottoms, well-developed terraces, and an intermittent flow of water. Most of the reservoir area is a wide valley, with a strongly developed series of terraces along the river. Cottonwood formerly stood along the stream banks, with stands of yellow pine in the ridges; the greater part was grass-covered.

Including the findings during a brief reconnaissance in 1946, a total of 71 archeological sites is now on record for the locality in and near Angostura Reservoir. The great majority of these are sites that will be destroyed by the construction of the reservoir and associated works. None show evidence of any single long-time occupancy; frequent and repeated use of the locality by various peoples over a long period of time seems rather to be indicated.

Three sites from which small sherd samples were collected suggest relationships on at least two time levels with pottery-making cultures to the east. One of these sites, lying on Horsehead Creek, shows cord-roughened ware with simple unthickened vessel lips bearing diagonal impressions. These sherds were found in thin, shallow, layered refuse deposits, along with quantities of broken bison and other large bones. A hunting camp may be indicated, possibly one used periodically by small groups of Indians residing normally farther to the east or south. Some relationships may be suspected with a late prehistoric pottery-making group, such as the Upper Republican peoples of the Loup-Platte-Republican region.

At two other sites pottery of a different sort was found. This ware was thin and well made; the surfaces commonly bore simple stamping or, in several instances, incised decoration. It is reminiscent of pottery previously found at sites in Ericson, Mullen, and Harlan County Reser-

voir areas in Nebraska, in northeastern Nebraska, and on Sundance Creek in Crook County, Wyo. It is associated at Angostura with small triangular arrow points, planoconvex scrapers, chipped knives, etc.; no habitation sites have yet been identified, although there is some tendency for the material to occur in spots suggesting midden or former lodge sites. No white trade goods were found in association, though the horizon represented is generally supposed to be very late prehistoric or protohistoric.

Among the far more numerous nonpottery sites, there seem to be several variant complexes. Owing to the extremely limited excavations to date, however, they cannot as yet be satisfactorily defined. They include numerous camp sites situated on the ridges, terraces, and bluffs along the river. Some are covered by a few inches to several feet of wind-blown sand or fluvial silts. Chipped stone, flakes, rejectage, bone fragments, and similar refuse occurs in varying amounts. Some sites have rock-bordered fireplaces; at others there are rock-lined fire basins (pl. 8, *a*); still others show rock-filled pits. In a number of instances, grinding implements have been found about these hearths. Projectile points, like the hearths and some other remains, show appreciable variation from site to site, and may have real diagnostic value for the establishment of cultural units.

Tipi rings were recorded at only five locations within the reservoir area, but are said to be very common elsewhere in the locality. As elsewhere, so here there were few artifacts in association. At one site (39FA13), a tipi ring directly overlies a stone-filled hearth from which it was separated vertically by several inches of soils (pl. 9, *a*). It is believed that most of these rings are probably among the more recent remains of the region.

Of more than passing interest are several sites in the lower part of the reservoir area where roasting pits occur (pl. 8, *b*). These are about 2½ feet in diameter by 3 feet deep, narrowing somewhat in the upper portions. Charcoal and fire-cracked stones occur in the bottom, above which is dark, sooty soil. The pit walls are usually hardened and fire-reddened. Thin layers of clean sand in the lower part of the fill suggest periodic reuse. Associated with these pits are small side-notched points, planoconvex scrapers, mealing slabs and handstones, and other items. In one or two instances, the pits are locally reported to have been used for burial purposes, with bone awls, large and small tubular bone beads, and other objects accompanying the dead. No pottery was found on these sites, although in southern Nebraska and western Kansas somewhat similar pits occur in sites of the pottery-using semihorticultural Dismal River peoples (Plains Apache) of the late seventeenth and early eighteenth centuries.

Noteworthy, too, is a camp site (39FA65) lying some 3 miles up Horsehead Creek, on its right bank. This site, portions of which will

certainly be inundated by the reservoir pool, lies at the edge of a small "badlands" area (pl. 10, *a*). From the eroded margin of the site came a large Plainview type projectile point and several basal fragments of lanceolate points with narrowed straight to concave bases, fine flaking, and ground proximal edges. Lanceolate point fragments were also recovered in excavations (pl. 10, *b*), which further disclosed small circular fireplaces without stones, and considerable amounts of minute, paper-thin flakes from the manufacture of chipped artifacts. Strangely enough, in the work done here to date, virtually no animal bones were encountered. Other artifacts include chalcedony plate knives, medium to large bifacial blades, end and side scrapers, a gougelike fragment somewhat reminiscent of the Clear Fork, Tex., gouges, and a subrectangular mano. Some of the blades suggest affinities with the finely made implements recovered by Roberts at the Agate Basin bison kill in Wyoming a few miles to the west, and with specimens found by the University of Nebraska State Museum on Hat Creek and White River, in Nebraska, a few miles to the south. It is believed that the site may have considerable antiquity, at any rate as compared with most of the others recorded in the district, but much more work and more intensive geological studies will be needed.

Much of the chipped stone and rejectage found at sites in Angostura evidently was gathered by the natives at aboriginal quarries in the region. None of these occurs within the future pool area, but one of the largest lies about 6 miles airline northwest of the head of the future reservoir. Shown on the United States Geological Survey's Edgemont quadrangle sheet as "Flint Hill," this is at or near the head of Hell Canyon. Scores of large craterlike pits and piles of rough workshop debris (pl. 9, *b*) litter nearly a half section of high tableland. Gray, purple, brown, red, and yellow quartzite were obtained here from the Cretaceous Dakota formation. Numerous artifacts in great variety of size and form have been collected in and about these pits during many years by their owner, Mr. Neal Conboy, who generously showed members of the Survey party over the ancient diggings. On lower benches and slopes nearby are to be seen many tipi rings; others to the number of many hundreds are said to be scattered for some miles northward from the quarries. Additional aboriginal diggings occur in the area, notably at Battle Mountain near Hot Springs. The general appearance of those observed was very similar to the better-known and more extensive Spanish Diggings some 70 miles to the southwest in Wyoming.

Within historic times—that is, after about the first quarter of the nineteenth century—the Black Hills were dominated by the Teton Dakota. Before that, during the latter eighteenth and early nineteenth centuries, they were part of the Cheyenne range, with such other tribes as the Kiowa, Comanche, and Arapaho also utilizing the

game, fuel, and other resources of the region. It is possible that at a still earlier period Shoshoneans from the Wyoming basin occasionally wandered into the district. There is neither documentary nor archeological evidence that corn-growing peoples ever established themselves here in any strength or over any long period, although it is possible that some planting of a perfunctory sort may have been practiced occasionally, as by the Cheyenne, even as late as the nineteenth century. What is evident, however, from the still incomplete archeological record is that throughout a long period of time, migratory nomads seasonally or otherwise availed themselves of the natural advantages the region offered over the barren, sun-baked, and wind-swept surrounding plains. Moreover, since pottery-making peoples from the east and south evidently did venture into the locality from time to time, the prospects seem good for injecting time perspective into the local archeological picture. Additional study is needed to determine the cultural allocation of the pottery horizons represented here, and these will have to be fitted stratigraphically or otherwise into their proper position in the apparent succession of nonpottery horizons from the west.

Angostura is one of several reservoirs proposed for the upper Cheyenne River Basin and the Black Hills region. Lying between the area of semihorticultural, pottery-making peoples to the east, and the nonpottery-making hunters and gatherers to the west, it offers an unusual opportunity to study the interrelationships and to work out the chronological relationships of representatives of these two widely divergent subsistence economies. In the midst of an otherwise dry uninviting region, the Black Hills offer, within a comparatively limited geographical area, the advantages of mountain, valley, and plains environments. Here could be found water, wood, shelter, useful minerals, an abundance of large and small game, and a rather surprising variety of native flora. Small wonder that the historic hunters, as their predecessors long before, returned season after season to the Hills.

Fort Randall Reservoir site.—Archeological work at Fort Randall Reservoir site, a Corps of Engineers project on the Missouri just above the Nebraska line, consisted of the excavation of a burial mound lying on the left bank just below the dam site. This mound, 39CH9, lay in the path of construction activities for the spillway, and so was slated for complete removal. Through the cooperation of the Omaha district engineer and the area engineer at Pickstown, S. Dak., the construction agency provided a bulldozer, and the River Basin Surveys furnished a limited amount of hand labor and the technical supervision. Mr. John Trantina, geologist for the engineers at Pickstown, kindly surveyed the mound before its removal. Paul Cooper was in

charge of the excavation, and was assisted by J. M. Shippee. This work was carried on between November 9 and 24.

The mound lay at the edge of the bluffs some 200 feet above the Missouri River bottoms, its summit marked by the Corps of Engineers monument L-15 (elevation 1,454 feet). Before excavation, it rose to a height of about 4 feet, with a diameter of approximately 60 feet. Its surface was cut up by various small excavations, wherein occasional bits of bone could be seen. Otherwise, the only remains of aboriginal activity in the immediate vicinity were a few flint chips from the surface of a cultivated field lying nearby to the north.

Upon excavation, it was found that the mound covered a subrectangular pit, with which timbers had been associated. There were no burials in this pit. Several secondary burials occurred in the mound fill and at its base. These included at one point a sort of platform of long bones laid side by side, on top of which were placed four skulls (pl. 11, *a*). It is presumed that all the interments had been secondary, although two were apparently partially articulated. No certain association could be determined between any of the burials and the artifacts, several of which came from the mound fill and out of animal burrows.

Artifacts included two small vertically elongate pottery vessels, with subconical base; both were apparently grit-tempered, and one bears a fabric marking on the surface. There were also two chipped projectile points, one large and corner-notched, the other small with side notches. Fragments of washerlike shell objects, and a few disk and tubular shell beads came to light. There were also numerous perforated canine teeth, the holes through the roots distinguished by cutting rather than by drilling, and with mesial and lateral surfaces flattened.

There are several specific trait similarities between this material and that obtained in 1947 from burial mounds (39CH4) on Wheeler Bottom some 13 miles upstream. At neither of these sites, however, does the burial complex as a whole correspond to any other now known burial mound of the Dakota region. The associated village complex, too, remains at present unknown. Studies now under way on the cultural and skeletal materials may throw further light on the prehistoric mound builders whose vestiges occur but sparingly west to the upper Missouri Valley.

Oahe Reservoir site.—The Oahe Reservoir is one of five major water-control projects planned by the Corps of Engineers for the Missouri River in South and North Dakota. The proposed dam site (pl. 12, *a*) is in Hughes and Stanley Counties, South Dakota, about 6 miles northwest of Pierre, S. Dak., and 1,123 miles above the mouth of the Missouri. Here, across the lower half of Wood Island, will be erected

an earth-fill structure, with a maximum height of 242 feet, and a crest length of 9,800 feet. At full pool (elevation 1,620 feet), an area of some 298,000 acres will be flooded, and the waters will back up the Missouri to the vicinity of Bismarck, N. Dak. Purposes of the project, on which actual construction has not yet begun, are given as flood and silt control, power, irrigation, and navigation.

In the portion of the Missouri Valley that will be flooded by Oahe Reservoir, the river winds through a flat-floored, alluvium-filled trench from 1 to 4 miles wide, bordered by bluffs from 200 to 400 feet high. Above the flood plains, which are often as much as 1 or 2 miles wide, benchlike terrace remnants rise at various elevations from 20 to 100 feet or more. Frequently, the river swings against the base of the bluffs on one side, leaving on the opposite bank a broad terrace or "bottom" with a gentle ascent to the bordering uplands. Thus, as a result of the meandering habit of the stream, the banks are characteristically a series of bottoms or flats alternating with rugged, hilly sections. The larger tributaries, all entering from the west and including from south to north, the Cheyenne, Moreau, Grand, and Cannonball, have all cut their valleys 100 to 400 feet below the uplands, have well-developed flood plains a mile or more wide, and are bordered by well-defined terraces of varying age. Groves of deciduous trees, including especially cottonwood, ash, elm, and oak, stud the valley bottoms and line the stream banks, often growing also in the narrow ravines that descend from the bluffs.

Remains of aboriginal village sites are extraordinarily plentiful on this section of the Missouri. They include some of the largest, best preserved, and most impressive sites in the Missouri watershed and Great Plains region. In historic times, after *circa* 1800, various bands of the Dakota Sioux ranged across this territory, but without establishing any fixed towns. Along the main stem, the South Dakota section of the future reservoir was the habitat of the village-dwelling Caddoan-speaking Arikara, who dwelt at various times in a series of fortified and unfortified towns from approximately Pierre northward. Farther upstream, above the Grand, were the towns of the Mandan, historically in the vicinity of the Heart River and above, but previously probably located in part farther downstream. Earlier settlements of this people possibly underlie some of the Arikara town-sites below the Grand. The Cheyenne on their historic (late eighteenth century) movement westward from the Red River drainage to the Black Hills, are thought to have tarried for a time on the Missouri. It is quite likely, too, that still other semisedentary groups, of whom there is little or no known record at present, at one time made this region their home.

In contrast to the valley below Pierre and above Knife River, a considerable amount of archeological work has been carried on at various localities in the future Oahe Reservoir area. Before the war, surveys were conducted from time to time by the University of South Dakota Museum in South Dakota, by the North Dakota Historical Society in North Dakota, and by Logan Museum of Beloit College in both States (1929-31). In 1932, the Bureau of American Ethnology worked in the vicinity of Mobridge, S. Dak.; in 1938, Columbia University and the North Dakota Historical Society operated a joint expedition in the vicinity of Bismarck; and in 1939, a Columbia University-University of South Dakota-WPA expedition excavated in a number of sites between Pierre and the Cheyenne River. In 1947, a joint expedition representing the University of North Dakota and the North Dakota Historical Society excavated a prehistoric site below Fort Yates, N. Dak. So far, only summary reports, fortunately of high quality, are available on these latter operations. Several reports on the archeology of the Missouri in North Dakota have also appeared, but the reconstructions of prehistory so far published for the main stem below the Heart River rest largely on survey work rather than on the badly needed excavations that alone will give the larger picture. Thus, despite the apparently extensive nature of work to date in this general locality, by comparison with what remains to be done in the way of detailed examination of key sites, only a beginning has been made.

In the 6 weeks allotted to reconnaissance in the future Oahe Reservoir, it was manifestly impossible to cover the entire area. Priority was given, therefore, to that section lying between the proposed dam site near Pierre and the mouth of Cheyenne River some 40 miles upstream. Coverage included mainly the west bank, with some reconnaissance at several sites reported along the east bank; not all parts of the entire section were walked out. Some test trenching was carried out in the vicinity of Fort Bennett. Prior to the River Basin Surveys work, a list of some 30 sites known for this locality had been provided by the South Dakota Archeological Commission. Most of these were revisited by the 1948 Surveys party. Additional sites were also located, so that there is now on record a total of 46 recorded sites on the west bank of the Missouri between Fort Pierre and the Cheyenne River and about 15 sites on the east bank.

Of the 61 sites visited by, or reported to, the 1948 Surveys party, the majority appear to be remains of earth-lodge villages. Fortifications consisting of ditches (pl. 12, *b*), low ridges of earth, and occasionally including traces of bastions, were noted at a number of sites. Hut rings, circular or oblong depressions, storage pits, refuse deposits, and

other features characterize many of these sites, particularly where the surface has not been broken by cultivation. In size, they range from small communities of perhaps a dozen or less houses to great settlements like the Fort Sully site, where hundreds of house pits and quantities of refuse cover an area nearly a half mile long by 200 yards wide. At some, there is evidence of occupation by Indians into the time of the White conquest; but it is a safe guess that many were inhabited at an earlier period.

As Strong observed in 1936, ". . . the Upper Missouri area is exceeded in the size and number of sites as well as in cultural importance only by the pueblo region of the southwest, the lower Mississippi area, and the mound region centering in Ohio. . . . Yet this highly important archeological area is at present represented by a single major monograph and that only partially based on actual excavation." In terms of our present salvage problem, it may be noted further that the extent of probable flooding of archeological sites in this region is not generally appreciated. With a dam 200 feet or more high just above Pierre, most of the terrace sites, at least as far upstream as Fort Yates, N. Dak., will be under water at full pool. Among the better known sites that face destruction will be: Buffalo Pasture (39ST6), on a 70-foot bench just above the upstream toe of Oahe Dam (pl. 12, *b*); Lower Cheyenne Village (39ST1) on a 60-foot bench at the mouth of Cheyenne River; Fort Sully village site (39 SL4), on Telegraph Flat 150 feet above the present river; and the Rygh (39CA4) and Leavenworth (39CO9) sites on opposite banks some 13 miles north of Moberg, S. Dak. Even those sites not under water the year around will be subject to slumping and eventual slippage into the reservoir when the Pierre shale which underlies many of them becomes waterlogged. This is already taking place at the Lower Cheyenne Village site, much of which has been destroyed in the last half century by slumping; and it is quite likely that additional sites will be similarly affected.

Of immediate concern is the area surrounding the proposed dam site. Here no less than four archeological sites face destruction when dam building gets under way. Two of these, 39ST15 and 39ST16, lie on and beside the access railroad and classification yard, approximately 2 miles below the dam site on the right bank. A third, 39ST14 (Scotty Phillips Ranch site), lies about half a mile below the downstream toe of the proposed dam, in the work area. It is also situated on the right bank, and is a fortified site measuring approximately 175 by 275 yards, with perhaps 18 or 20 house pits within the enclosure. It has apparently never been excavated or tested, but offers an exceptionally good opportunity for extensive and relatively inexpensive excavation by the controlled use of power machinery and hand labor. Across

the river, directly in line with the proposed intake structure and lying beneath the dam fill, is a small cluster of house pits, designated 39HU22. The fourth site lies approximately 1,100 yards above the upstream toe of the proposed dam, on the right bank of the stream and well within the future pool area. This is the fortified Buffalo Pasture site, 39ST6, where limited excavations have been made within the ditched portion. Excepting this latter, all of the sites here noted will undoubtedly be destroyed or very extensively damaged as soon as construction begins. It is imperative, therefore, that systematic sampling be done at the earliest possible moment at all of the sites, and that at least one, preferably 39ST14, be comprehensively investigated.

Because of the great size of this reservoir, it seems certain that many hundreds of sites will be forever obliterated when it fills. That similar remains can be found outside the area to be flooded is improbable. It is particularly important, therefore, that salvage operations here be pushed as rapidly as possible. Further reconnaissance in the as yet unsurveyed remainder of the pool area should be completed as promptly as possible, so that key sites can be chosen. Excavation is a time-consuming task at best; and if the initiation of a program of systematic excavation be too long deferred after dam construction begins, archeologists will be confronted at the last moment with an impossibly huge piece of work.

WYOMING

Archeological field work in Wyoming during 1948 was limited to preliminary reconnaissance at two proposed Bureau of Reclamation projects in the northeastern part of the State. These were: Edgemont Reservoir site, in Weston County, and Keyhole Reservoir site, in Crook County. The field work was done by J. T. Hughes and J. M. Shippee from September 16 to 20 at Edgemont, and from September 21 to 25 at Keyhole. Both localities are in the headwater drainage of the Cheyenne River, on the flanks of the Black Hills uplift.

Edgemont Reservoir site.—The locale involved here lies on Beaver Creek, a tributary of the Cheyenne, some 35 miles northwest of Angostura and about 18 miles south of Newcastle, Wyo. The Beaver is a small meandering stream in a barren plains country. Its valley is lined with numerous terrace remnants and abandoned channels. The Black Hills are a few miles to the northeast. No figures on dam specifications are at hand, but the pool area is to be approximately 5 miles long by 1 mile in maximum width. Purpose of the project is irrigation, and flood and silt control.

The 4-day reconnaissance of the proposed pool area disclosed a total of 28 sites. These occur almost continuously on and in the terraces along both banks of the stream. Generally they are fairly superficial,

but overburden in some cases ranges up to several feet in depth. Commonly the sites are marked by clusters of fire-cracked stones and quantities of flakes. Hearths of surface, basin, and pit types are apparently represented, and there appears to be a considerable variety in stone artifact types. At one place, a cut bank shows near the surface a roasting pit, which is underlain at successive lower levels by basin-like fireplaces. Here, and elsewhere in the locality, there would seem to be good prospects for correlating a succession of human occupations with a sequence of geological events reflected in the formation of minor stream terraces.

No pottery-bearing sites were recorded during the present survey, although farmers living upstream from the proposed reservoir area report the occasional finding of pottery vessels along the Beaver. Most of the sites seen were littered with greater or lesser quantities of chipped stone and rejectage, projectile points, blades, scrapers, knives, blanks, chert cores, etc. A few sites yielded manos. Obsidian flakes were found at Site 48WE29. That a long range in time is probably involved may be inferred from the fact that specimens recovered range from stone points of early types to glass trade beads of the historic period.

Keyhole Reservoir site.—The Keyhole Reservoir site is on the upper Belle Fourche River, at the west edge of the Black Hills some 65 miles northwest of the Edgemont Reservoir site. A dam 105 feet high and, with dike, about 1,100 feet long, will be located some 11 miles airline northeast of Moorcroft, Wyo. At full pool, the reservoir will be about 10 miles long and will have a maximum width of 6 miles. The reservoir is intended for flood and silt control, and for storage of irrigation waters for the Belle Fourche project in western South Dakota.

In the western or upper part of the reservoir site, relief is comparatively low. The river meanders through a wide, shallow valley, treeless except along the immediate banks of the watercourses and flanked by rolling short-grass upland prairies. The eastern portions, on the other hand, have rather abrupt valley edges and some canyon topography, and are surrounded by pine-covered hills. Vegetation characteristically varies from sagebrush and short grass in the west to a fairly heavy yellow pine cover on the east.

In the 5 days available for reconnaissance here, it was not possible to search the entire pool area, but a check of the most likely portions disclosed 29 sites of archeological interest. A thorough reconnaissance would probably reveal many more. With two or three exceptions, all of those found will be largely or entirely destroyed when the reservoir fills.

Judged by the results of the reconnaissance, sites seem to be especially plentiful in the lower portions of the future pool area, around

the confluence of Deer, Mule, and Cottonwood Creeks with the Belle Fourche. They are situated in a variety of topographic positions. Rock hearths seem to be rather less plentiful than at Edgemont or Angostura. No pottery-bearing sites or evidence of white trade contacts were seen. A number of the occupational areas are of some size and quite productive; where protected as they are in some instances by overburden, they should well repay excavation. Camp-site debris consists of chipped stone, a few projectile points, blades, scraping and cutting tools, and abundant flakes and spalls. Fragments of bone and shell occur at some sites, and some obsidian was found. Noteworthy is the fact that a number of heavy lanceolate, "fish-tailed," and notched projectile point forms were recovered, closely resembling forms which have been found elsewhere under conditions suggesting considerable antiquity. There is thus a likelihood that hunting horizons earlier than most of those represented at other reservoir sites around the Black Hills here await further exploration.

In the opinion of the archeologist making this reconnaissance, Keyhole offers more promise than does Edgemont and would probably prove relatively as productive and important as Angostura.

FIELD WORK IN PALEONTOLOGY

Paleontological field investigations in the Missouri River watershed were carried on by the River Basin Surveys from June to October, 1948. Three reservoir sites, all of which had been partially investigated during 1947, were revisited in further search for vertebrate fossils. No new reservoir localities were examined. The work was under the supervision of Dr. T. E. White, who was assisted throughout much of the season by two student helpers—Ernest L. Lundelius, University of Texas, and John C. Donohoe, Montana State College. From August 2 to 5, White and Lundelius participated in a field conference of the Society for Vertebrate Paleontology and in a tour of certain paleontological localities in Wyoming, under sponsorship of the University of Wyoming. During the latter part of August, they spent approximately 2 weeks making physiographic studies on Horsehead Creek, in Angostura Reservoir, South Dakota, in connection with the archeological investigations at Site 39FA65, as elsewhere described in this report.

From June 4 to July 12, Dr. White's party operated in the Boysen Reservoir area on Big Horn River north of Shoshoni, Fremont County, Wyo. This work was materially expedited through information supplied by Mr. Harry A. Tourtelot, of the United States Geological Survey. Although fossil material was fragmentary and scarce, a sufficient variety of specimens was collected to establish definitely the age of geologic formations heretofore only tentatively correlated.

From 6 localities, most of them on the lower course of Cottonwood Creek, in the Lost Cabin faunal zone of the Lower Eocene, remains of 23 species of fossil mammals were collected. These were mainly of small forms; they include insectivores, primates, rodents, carnivores, condylarths, perissodactyls, and artiodactyls. One of the insectivores represented is a species new to science. Also included in the material is the most nearly complete skull yet found of the primitive insectivore, *Didelphodus*, and the skull and jaws of a small carnivore, *Didymictus*, previously represented only by upper and lower dentitions. These and other specimens promise to contribute important information to knowledge of the morphology of Eocene mammals. Reptilian remains collected will clarify a number of details concerning the cranial morphology of one genus. A technical report on the paleontological findings in this area is being prepared for publication.

From July 14 to August 19, work was carried on in the Oligocene and Miocene deposits of Canyon Ferry Reservoir site, on the Missouri River north of Townsend, Broadwater County, Mont. Here the party was aided through information supplied by J. Leroy Kay of the Carnegie Museum, Pittsburgh, Pa. Nearly 125 specimens representing 14 genera were obtained from 3 localities in the Oligocene and 2 localities in the Miocene. The remains of rodents, insectivores, and small artiodactyls were most abundant. The small Oligocene mammals of this montane area, when compared to those of the same age on the plains, interestingly illustrate the principles of geographical variation as well as do the living species.

The period from August 21 to September 3 was spent in Angostura Reservoir, on the Cheyenne River south of Hot Springs, S. Dak., assisting with geological studies the archeological work being carried on by Hughes for the River Basin Surveys at site 39FA65. Borings were made with a hand auger to determine the depth and character of the valley fill on Horsehead Creek in the immediate vicinity of the site, and geologic profiles were compiled. On the basis of these preliminary studies, it appears that the physiographic history of Horsehead Creek will have to be worked out in conjunction with that of the Cheyenne River, and that the key to a geological dating of the terrace in which 39FA65 is situated probably lies in correlation of the terrace with the receding falls of the Cheyenne. The falls now lie a short distance above the canyon in which the dam is located, but in the canyon the maximum height of the waterfall member corresponds to the height of the oldest terrace on Horsehead Creek, in which site 39FA65 is located. It seems possible, therefore, that the gorge of the Cheyenne at the dam site was cut, for the most part, after the occupation of site 39FA65. A report has been prepared on these preliminary findings for inclusion with a detailed report on

the archeology of the site; and it is hoped that additional observations will be possible before the archeological and geological features involved are covered by the reservoir waters.

Following completion of the physiographic studies at Angostura and drafting of a report on them, Dr. White again went into the field. From September 23 to October 1, the Upper Cretaceous Carlile Shale in the Cedar Bluff Reservoir site on the Smoky Hill River southeast of Wakeeney, Trego County, Kans., was prospected for fossils. A number of fossil fish were found, but crystallization of gypsum and weathering of marcasite in the matrix had reduced the remains to the point where they were not worth collecting. It is believed that no further paleontological salvage work is needed at this reservoir site.

The fossils collected during 1948 include no material of outstanding exhibit value. Despite their often fragmentary nature, however, they have considerable usefulness and importance for study purposes. Since much is still to be learned about the paleontologic horizons represented at Boysen and Canyon Ferry, it is highly desirable that further work be done prior to filling of the pool areas. Owing to the small size, marked rarity, and scattered occurrence of most of the fossils on these time levels, it has been found most economical and profitable to revisit the localities briefly in successive seasons and to collect the materials newly weathered from the clay beds. The grain-by-grain removal of matrix through normal agencies of erosion operating over considerable areas of fossiliferous deposits uncovers more material than would sustained or large-scale excavation, either by hand methods or with power equipment. In this respect, the fossil-collecting throughout many of the reservoir sites in Wyoming and Montana present problems quite unlike those confronting archeologists, or those faced by paleontologists preoccupied with large faunal forms and later geological horizons.

FIELD WORK BY COOPERATING AGENCIES

As in the preceding year, several State-supported agencies participated actively in the 1948 investigations at Federal water-control projects. There were three of these cooperating agencies in Nebraska, two in North Dakota, and one in Kansas. Five were engaged wholly in archeological investigations; the sixth conducted both archeological and paleontological work. The operations of these agencies were entirely on a voluntary basis, and involved no distribution of Federal funds. Where the cooperative work was done through a formal agreement between the River Basin Surveys and a particular agency, the latter has provided reports from time to time on its activities, and summaries of these reports have been included in the periodic and

other statements of progress furnished the National Park Service by the Lincoln office of the River Basin Surveys.

This section of the present report is based largely on data supplied from time to time by the agencies concerned, either through statements of progress, through preliminary reports prepared for publication, or through discussions with field personnel. Some of the sites noted were visited by River Basin Surveys personnel while the field investigations by State agencies were under way. The courtesy of these agencies and their representatives in making available advance information on their findings is hereby gratefully acknowledged.

KANSAS

Archeological salvage operations in Kansas during 1948 were conducted by the University of Kansas Museum of Natural History. A party under the supervision of Carlyle S. Smith worked from June 19 to August 20 in the Kanopolis Reservoir area on Smoky Hill River and also outside the reservoir area along the Little Arkansas River in Rice County. The Kanopolis locality had been examined between August 4 and 10, 1946, by M. F. Kivett and J. M. Shippee for the Missouri River Basin Survey. Through the cooperation of interested individuals, including especially William O. Leuty, Corps of Engineers, and G. L. Whiteford, of Salina, a total of 18 sites was recorded in the 1946 survey. The advisability of a more intensive investigation and the probable need for systematic excavation at certain sites was pointed out in the preliminary report of that work. With virtual completion of the dam early in 1948 and the imminent flooding of many of these archeological locations, it became imperative that any salvage activity be undertaken immediately. The Missouri River Basin Survey was committed to the limit of its resources elsewhere, and so the University of Kansas undertook what proved to be the final salvage effort on this reservoir site. Most of the sites in the pool area were submerged beneath the rising reservoir waters by the time the 1948 field work ended.

Kanopolis Dam, constructed by the Corps of Engineers, is on the Smoky Hill River about 12 miles southeast of the town of Kanopolis, in Ellsworth County. It has a height of 131 feet above stream bed, and a crest length of some 15,400 feet. At full pool (elevation 1,508 feet), slightly more than 13,000 acres of land will be under water, and the lake will extend upstream about 20 miles by river to a point just west of Kanopolis and within 3 or 4 miles southeast of Ellsworth.

In this section of its course, the Smoky Hill pursues a direction south of east. It flows in a flat-floored valley lined with rather abrupt bluffs capped here and there by outcropping ledges of Dakota sand-

stone. Lower portions of the valleys of several formerly permanent tributaries and canyons have now been flooded by the reservoir. These include Elm and Clear Creeks on the south, Bluff and Thompson Creeks on the north, and several short canyons near the dam. Native vegetation consisted of hardwood timber along the stream banks—chiefly cottonwood along the river, with elm and hackberry on the tributary creeks and in the canyons. The uplands, where not under cultivation, are covered with grass.

Archeological remains in the locality are of several kinds. They include petroglyphs, burial cairns, and occupational sites. Though these cannot in all cases be allocated to recognized cultural horizons or time periods, it is clear that a span of some centuries and the presence of several different native groups can be inferred.

In the immediate vicinity of the reservoir, there are at least three known petroglyph localities. The principal one, 14EW1, is a prominent sandstone cliff known locally as Indian Hill on the north side of the valley between Horse Thief and Red Rock Canyons, about 2½ miles northwest of the dam. Here human, animal, geometric, and other figures cover some 50 feet of the sandstone face. Horses and mounted figures, boatlike characters, and other items suggest that part of the gallery may be post-White contact; other portions may be considerably older. The underside of several large blocks that have rolled down the slope bear figures that were probably once included in the cliff front. Smith's party found at the base of the bluff a diamond-shaped flint knife, several end scrapers, and chert chips, perhaps left by the Indians who cut the figures into the sandstone face. There has been considerable disfigurement of the locality by picnickers; it lies above full-pool level and thus will not be flooded, but the likelihood is strong that further vandalism will eventually destroy most of the characters in what is probably one of the most extensive and interesting petroglyph sites in Kansas. The other known petroglyph localities hereabouts are 14EW7, known locally as Three Cave Farm, on the north side of the valley about 3 miles east of Kanopolis; and 14EW14, on Elm Creek about 2 miles north of its confluence with the Smoky Hill. Both these are relatively small and contain only a few characters.

Burial cairns at one time apparently occurred in some numbers on the bluffs along Smoky Hill River. Most of them, however, have been destroyed by removal of the stones for use in construction of fences. The University of Kansas party opened two of these structures at site 14EW13, at the extreme end of a ridge between Red Rock Canyon and Elm Creek overlooking the Smoky Hill Valley. Both contained small rectangular cists covered with sandstone slabs, but

the burials that they presumably at one time held had disintegrated or been removed long ago. A flint chip and scraper fragment were the only included cultural materials.

A few miles outside the reservoir to the south, on top of a grassy butte overlooking a branch of Thompson Creek, four other cairns in a group of seven were opened. One, approximately 12 feet in diameter and 15 inches high, consisted of a rectangular cist measuring 30 by 66 inches surrounded by small, irregularly shaped stones and covered with slabs whose weight had crushed a flexed skeleton within. Most of the skull had disintegrated, and there were no artifacts present. The other three cairns contained no recognizable cists or burials, and were devoid of cultural materials. This site, located on the Hudson farm, has been designated 14EW24.

The occupational sites seen in 1946 and re-examined more carefully in 1948 suggest that at least three, and possibly four, pottery-making peoples were present at one time or another within the present reservoir limits. No large or impressive sites were noted at any time; areally limited sites with rather thin deposits suggest short-lived occupancies or perhaps transient residence by hunting parties from more permanent and larger communities situated elsewhere.

A single stratified site, 14EW6, was briefly worked in 1948. This lay on Thompson Creek, near its confluence with the Smoky Hill. From the two uppermost of four culture-bearing strata came sherds of *Geneseo Plain* and *Geneseo Simple Stamped* types, a triangular projectile point, end scrapers, a mano fragment, and numerous fragments of animal bone refuse. These occurred in thin, dark soil strata, along with charcoal, ash lenses, and basin-shaped hearths underlain by fire-reddened earth. Judged by the cultural materials, these two levels belong to the Great Bend aspect, thought to be a Wichita manifestation flourishing in central Kansas between *circa* 1475 and 1675. A third and lower stained soil level also contained a few hearths, and yielded two small plainware sherds apparently of prehistoric pottery and identifiable as of either Upper Republican or Woodland type. The fourth and lowermost level had a few hearths and broken animal bones, but no artifacts from which cultural affiliations could be determined. These four culture-bearing strata evidently represent intermittent camp sites; the sterile intervening layers of sedimentary materials presumably were laid down by prehistoric flood waters from the converging creek and river.

The prehistoric Upper Republican culture is represented in collections from several small sites throughout the reservoir area. One of these localities, 14EW19, is on a terrace on Thompson Creek above the stratified site 14EW6. Others were noted in the vicinity of Clear Creek and on Elm Creek, where bits of burnt clay daub suggest the

remains of earth lodges. None of these, however, could be excavated in the time and with the very limited manpower available.

Woodland materials were also noted at a number of small sites in the locality. One of these, 14EW12, at the mouth of Elm Creek, showed a thin deposit of Woodland pottery in one portion, whereas Upper Republican materials occurred in other parts. With respect to tempering, the Woodland pottery suggests two variants, one characterized by angular calcite fragments, the other by rounded sand grains or crushed quartz. Small-stemmed or corner-notched projectile points with barbed blades also occurred here, as well as planoconvex end scrapers, a chipped celt, and numerous side scrapers. At 14EW13, on the ridge overlooking 14EW12 from the east, and near the two disturbed cairns briefly noted above, were additional calcite-, shale-, and grit-tempered pottery fragments of apparent Woodland origin. Associated projectile points were small, mostly under three-quarters of an inch long, with sharp barbs and expanding stems; one had serrate blade edges. Other artifacts included planoconvex scrapers, a flat sandstone grinding slab, a perforated shell hoe, a small biperforate shell pendant, a T-shaped drill, and several side scrapers.

Some 10 miles south of Ellsworth, on a branch of Ash Creek, the University of Kansas party excavated an as yet unidentified subsurface feature with which were associated rocker-marked, dentate-stamped, zone-decorated, and other potsherds of evident Hopewell affinities. Corner-notched and expanded-base projectile points, chipped disks, flake knives, planoconvex scrapers, splinter awls, chipped celt fragments, sandstone abraders, and other items were also associated. Although no Hopewellian sites are on record for the Kanopolis Reservoir area itself, one or two sherds found on the surface by local collectors suggest that this horizon may have been represented by peoples who at times utilized or lived in the locality.

In summary, it appears from the salvage operations of 1946 and 1948 at Kanopolis Reservoir that the locality has been intermittently occupied on successive time levels by various native peoples. These demonstrably included representatives of: the Great Bend aspect, dated *circa* 1475-1675; the Upper Republican culture, preceding 1450; and one or more Woodland variants, which perhaps antedated A. D. 1200. It is possible that there were also Hopewellian peoples here, either coeval with the Woodland or somewhat later, but in any case preceding the Upper Republican. No trace has been found of any prepottery cultures here, nor is there any archeological evidence, unless it be in the petroglyphs showing horsemen, of the Cheyenne, Arapaho, and other late hunting peoples who are known to have roamed the area in the nineteenth century.

NEBRASKA

As in the preceding year, three State agencies engaged in cooperative scientific salvage work in Federal water-control projects in Nebraska during 1948. The Nebraska State Historical Society carried on archeological excavations at Medicine Creek Reservoir from early June until August 19, under the leadership of A. T. Hill, Director of the Museum. This work was a continuation of researches begun in the preceding summer. A summer field session of the University of Nebraska Laboratory of Anthropology, under Dr. J. L. Champe, excavated sites in Harlan County Reservoir during June and July; and subsequently this agency carried on limited reconnaissance at several proposed reservoir sites in the Lower Platte Basin in central Nebraska. The University of Nebraska State Museum had a paleontological party at work in the Medicine Creek Reservoir, and another at Harlan County Reservoir. From mid-July until August 25, archeological work was carried on by the Museum at a deeply buried prepottery site on Medicine Creek a short distance below the mouth of Lime Creek. The Museum researches were under the general supervision of Dr. C. B. Schultz and W. D. Frankforter; Mr. and Mrs. Preston Holder were in direct charge of the archeological studies at Medicine Creek.

A brief résumé of investigations and findings by these agencies at each reservoir project follows.

Harlan County Reservoir site.—The Harlan County Dam, now under construction by the Corps of Engineers, is on the Republican River 3 miles east of Republican City, Nebr., 13 miles west of Franklin, Nebr., and approximately 235 miles above the confluence of the Republican with the Smoky Hill River. Project plans call for an earth-fill structure with a height of about 106 feet above stream bed and a crest length of 11,950 feet. At full pool, elevation 1,973.5 feet, an area of about 53,500 acres will be under water, and the reservoir waters will extend northwest up the Republican Valley for approximately 14 miles, to a point above Orleans, Nebr. Another arm of the reservoir will reach southwest up the valley of Prairie Dog Creek to a point near the Kansas-Nebraska State line just north of Woodruff, Kans. Purposes of the dam are flood control and irrigation.

In the vicinity of the reservoir, the Republican flows through a flat-floored valley from 1 to 2 miles wide, bordered by extensive bottoms and enclosed by loess bluffs. Terrace remnants occur at varying heights above the channel of the main stream as well as along its larger tributaries. Gently rolling loess hills lie to the north of the river valley, while the region on the south tends to be somewhat more dissected and broken. Cottonwood, willow, box elder, elm, and ash fringe the watercourses and the base of the bluffs, especially along the

south side of the valley, and small game and fur bearers still exist in some numbers. The bottoms and much of the uplands are in cultivation, but extensive areas are still used for hay and pasture.

It has been known for some years that aboriginal village and burial sites exist in considerable numbers along the Republican and its smaller perennial tributaries. Systematic investigations on a modest scale have been made from time to time at various localities along its course. At the beginning of the nineteenth century, the Pawnee had at least two villages of earth lodges near the point where the stream leaves Nebraska to enter Kansas—one near Guide Rock, in Webster County, Nebr., and another near Republic, Kans. Evidences of several earlier peoples also are present; some of these were clearly horticultural, at least in part, but others seem to have relied largely or entirely on hunting and gathering for their subsistence economy. The accumulating evidence suggests that these different peoples probably did not originate in the same locality or from the same basic culture complex, but that they were of diverse origins and antecedents. For most of the complexes indicated, however, the available information has been rather meager, resting on the scattered sampling of many sites rather than on the intensive and comprehensive examination of a few key sites.

The Harlan County Reservoir site was first examined by a River Basin Surveys field party, consisting of M. F. Kivett and J. M. Shippee, during the summer of 1946. Their operations, carried on from August 20–25, consisted of surface collecting, some small-scale test-pitting, and interviews with local and other persons familiar with the locality and its antiquities. Earlier investigations by the Nebraska State Historical Society and the University of Nebraska Laboratory of Anthropology also supplied helpful leads in this survey. In November, several of the more promising locations were rechecked, and one burial site, 14PH4, was excavated.

From these investigations, it was determined that of 23 known sites in the vicinity of the reservoir, including 16 native occupational and 7 burial areas, 14 apparently lay below the 1,973-foot contour level and would be inundated at flood stage. Six others lay below the 2,000-foot level where it seemed likely that erosion by wave action or otherwise might affect them adversely; and three occurred under conditions that suggested they would very likely be damaged by construction work. Moreover, it was apparent that not less than four archeological complexes, probably involving a time span of as much as a thousand years, were represented within the limits of the future pool area. Included among these are Woodland variants, Upper Republican and Dismal River sites, and at least one apparently assignable to an unnamed but probably late pottery horizon also represented elsewhere in eastern Nebraska and northern Kansas.

Since the nature of certain of these complexes, as well as their interrelationships, remain obscure, it seemed highly desirable that systematic excavations be carried out before the sites were destroyed by the rising reservoir waters. Because of inadequate funds and prior commitments elsewhere, the River Basin Surveys were unable to undertake the needed investigations here. The University of Nebraska Laboratory of Anthropology was accordingly invited to make such investigations as seemed desirable and feasible, especially in the lower portion of the future pool area. That agency accepted, and took over the work of exploring certain especially promising sites on the banks of Prairie Dog Creek.

The principal site worked, 25HN37, is located on the left bank of Prairie Dog Creek about 3 miles above its confluence with the Republican, and some 6 miles southeast of Alma, Nebr. Occupational remains here are scattered over an area at least 1,000 feet long and 250 feet wide, along the rim of a terrace which forms a bluff perhaps 30 feet high on the north bank of the creek. With the aid of machinery, a trench nearly 800 feet long was opened along the edge of the site terrace overlooking the creek. A fire-pit uncovered near one end of the trench led to widening of the cut over what was subsequently identified as a house site. Similar features were worked out in association with each of three fireplaces located in tests made by Kivett and Shippee in November 1946. Not far from the house sites, a roasting pit was also opened.

The house sites, as defined, each consisted of five post holes arranged symmetrically around an ash-filled fireplace, to form a pentagon from 12 to 15 feet in diameter. Within this pentagon, charcoal and debris were mixed throughout the earth to a depth of 5 or 6 inches below the level of the top of the fireplace. No evidence of an outer ring of post-holes could be found. In three cases, a pair of smaller postholes was found 12 or 13 feet from the pentagon on the east side, possibly representing the outer end of a doorway. There were no traces of wattle clay, such as often occurs in the more familiar earth lodge sites of the Central Plains. Details of construction for the habitations here represented are uncertain, but it seems clear that the lodges must have differed rather widely from the earth lodges of the Pawnee and other semisedentary village tribes. There were no cache pits within the house sites.

The roasting pit lay not far from the three houses. In cross section, it was bell-shaped, with walls and bottom burned a bright red. It measured 25 inches in depth, with a diameter at the orifice of 40 inches and at the floor of 52 inches. Ash, clay, earth, and charcoal strata, along with animal bone and some artifacts, filled the pit.

Artifacts were not abundant in the excavations, but the limited sample so obtained and the rather extensive series of materials col-

lected from the cultivated site surface leave little doubt regarding the cultural affiliations of the site. Potsherds are thin, hard, and fine-textured, usually dark in color, with fine sand or mica tempering; exterior surfaces are plain or simple-stamped; and rims are moderately high, slightly flared, and have rounded or flattened and everted lips. No recognizable puebloan sherds or other trade artifacts are reported. Other artifacts include numerous end scrapers; scraper-graver combination tools; drills of several forms; triangular projectile points with or without side notches; sandstone abraders; bison scapula hoes and choppers; fleshers without serrate blades; bison-rib shaft wrenches; broken awls; long tubular bone beads. Bison, deer, beaver, turtle, and other bone refuse occurs. No evidence of white trade contact was found in situ, though some of the surface iron and brass may have belonged to the Indian occupants.

A report on the 1948 findings at 25HN37, prepared by Champe, has been published in the April 1949, issue of *American Antiquity*.

The University of Nebraska State Museum was represented at Harlan County Dam by two students. In the early part of the summer, while construction work was suspended because of a labor strike, these men spent their time prospecting for fossils in the vicinity of the reservoir. Several promising Pliocene quarries were located, all outside the future pool area. Upon resumption of construction activities, the Museum representatives devoted their time to watching the excavations for paleontological remains and to tests at some of the newly discovered localities nearby. During the winter, a new fossil quarry at the south end of the dam axis was reported to the Museum by Corps of Engineers personnel, but adverse weather prevented investigations during the remainder of the calendar year.

Medicine Creek Reservoir site.—The 1948 investigations of the Nebraska State Historical Society here involved the excavation of house units and refuse areas at six village sites, and test excavations at a seventh. The sites selected lay on the right (west) bank of the creek, outside the then federally owned lands and mostly upstream from those under study by the River Basin Surveys. Two of the sites, 25FT19 and 25FT20, lay just south of Lime Creek; the others were all within a distance of approximately 2 miles to the north. At none were the remains present completely worked out.

Sites investigated, with the principal features opened in each, include 25FT19, two house floors and one midden; 25FT20, one house floor; 25FT22, two house floors and two middens; 25FT28, one house floor and one midden; 25FT30, five house floors and one midden; 25FT39, two house floors and two middens; 25FT23, tests only. All the house floors uncovered were subrectangular in form and lay a few inches to approximately 2 feet underground; characteristically, they showed four primary or central postholes. These structural

evidences, the pottery remains, and the work in chipped and ground stone, in bone, shell, and other materials all conform closely to the larger series obtained in the River Basin Surveys excavations nearby. By extending the foundation of controlled data on which laboratory analysis and interpretation are based, these remains constitute an important supplement to the data gathered at various times by other agencies, Federal and non-Federal, in the Medicine Creek locality. There are, to be sure, some variations from site to site; but the materials collected by the Historical Society in 1948 can undoubtedly be safely ascribed to the Upper Republican horizon. It is not possible at the moment to assess the site variations in terms of possible time or other significant differences.

Archeological work at Medicine Creek by the University of Nebraska State Museum consisted of excavations at a deeply buried prepottery site designated 25FT50. This is located in the right (west) bank of Medicine Creek a few hundred yards downstream from the mouth of Lime Creek, on which two other early prepottery sites, 25FT41 and 25FT42, had previously been worked. At site 25FT50, the cultural materials occurred in a zone about 2½ to 3 feet thick in the lower part of a terrace fill provisionally identified by Museum paleontologists as Republican River Terrace 2. There were two levels of concentrated debris and stained soil separated by a lighter colored intermediate zone in which much less cultural material was found. Most of the artifacts and about half the hearths uncovered were in the lower level, designated Occupational Level 1. Scattered about through the occupational refuse were numerous animal bones, including bison, antelope, deer, coyote, rabbit, and smaller forms, as well as occasional reptiles, amphibians, and birds. Most of the larger bones had been cut, broken, or otherwise modified by human industry; there were no large mammal skulls. Artifacts included leaf-shaped projectile points with concave base; trapezoidal scrapers, some with gougelike bits; ovoid and lanceolate blades; drills; abrading or grinding stones; a flattened stone spheroid with equatorial groove; eye-letted bone needles; crude bone awls; a bipointed bone object; and miscellaneous cut and worked bone fragments. Some of the specimens show a general resemblance to artifacts from the later pottery horizons of the locality; but others, such as the projectile points, gougelike scrapers, and perhaps the grooved stone are reminiscent of earlier horizons. Also the depth of overburden argues strongly for an age considerably greater than that of the Woodland and Upper Republican pottery sites found in the immediate vicinity but under different physiographic conditions.

A preliminary statement by Mr. and Mrs. Holder regarding the findings at 25FT50 has been published in the April 1949, issue of *American Antiquity*.

Paleontological researches by the Museum at Medicine Creek included work at two Pliocene fossil deposits, 25FT40 and 25FT47, which were endangered by construction of an access road. From 25FT40 were gathered the remains of some 25 species of insectivores, rodents, carnivores, perissodactyls, artiodactyls, fish, birds, and other vertebrates, some of them reportedly representing new species. These forms are said to "represent the latest Pliocene assemblage so far discovered in the Great Plains region and therefore will be of utmost importance in establishing the Pliocene-Pleistocene boundary . . . Several specimens are the largest recorded from the Pliocene of the Great Plains and probably represent the latest survivors of their times."

At 25FT47, the faunal list is much shorter; the quarry has been tentatively identified as Ash Hollow (Middle Pliocene) in age.

ARCHEOLOGICAL RECONNAISSANCE IN THE LOWER PLATTE BASIN

The Lower Platte Basin includes that portion of the Platte River watershed lying east of Lake McConaughy, near Ogallala in Keith County, Nebr. The Platte itself courses generally eastward near the southern boundary of the basin. In eastern Nebraska, it is joined from the north by two major tributaries—the Loup near Columbus, and the Elkhorn near Ashland. These two tributaries drain much of the Sandhill and Loess Plains areas of central and eastern Nebraska.

Water development plans of the Bureau of Reclamation for the lower Platte Basin include construction of about 16 major reservoirs. Most of these will be distributed in a belt some 50 miles wide extending from northern Gosper County northeastward to Antelope County; others lie outside this belt to the north on the upper reaches of the Loup system, or else to the eastward about the confluence of the Loup and Platte Rivers.

Preliminary examinations of several of the proposed reservoir sites in this region were made in May 1947, by a party from the River Basin Surveys. Projects visited at that time include Amherst, Buffalo Creek (renamed Bison), Cairo, Ericson, Mullen, and Rockville. Also traversed at the time was Brewster, where, however, no actual survey was attempted. Preliminary reports of the findings at the several projects here listed have been issued, although in no case was complete coverage of the future reservoir area possible.

In 1948, the University of Nebraska Laboratory of Anthropology undertook reconnaissance at several additional projects proposed for the Lower Platte Basin. This work was carried on over a period of 3 weeks, from August 15 to September 2, following termination of the Laboratory's excavation program at Harlan County Reservoir. Two university students in anthropology, J. H. and D. Gunnerson, made

the actual field investigations, under the general supervision of Dr. J. L. Champe. Units visited include Cushing, in Howard and Greeley Counties; Loretto, in Boone County; Plum Creek, in Gosper County; and Rosedale (formerly Clearwater) in Antelope County. Cushing, Loretto, and Rosedale are located north of the Platte River; Plum Creek lies just south of that stream in south-central Nebraska.

The observations of the Laboratory field party at the four reservoir sites visited would seem to indicate that the water-control projects will directly affect a number of aboriginal sites representing various time levels and several cultural complexes. These include remains apparently assignable to the certainly prehistoric Woodland and Upper Republican horizons; and also the traces of one or more later prehistoric, or possibly protohistoric, peoples whose identity has not yet been established. Further surveys at all four reservoir sites, and probably some excavation, are believed to be warranted by the new evidence now at hand.

Cushing Reservoir site.—The site of the proposed Cushing Reservoir is on Spring Creek in Howard and Greeley Counties, Nebr. Spring Creek enters the Loup River from the north just below the junction of its North and South Forks. The proposed dam site is a short distance northwest of the town of Cushing, from which point the reservoir will extend upstream to the vicinity of Wolbach, in Greeley County. The maximum water surface area will be about 1,700 acres.

Seven archeological sites, all lying below the 1,850-foot contour, were recorded in the future pool area by the University of Nebraska Laboratory of Anthropology field party. Five of these yielded pottery remains as well as other occupational debris; on the other two, only bone fragments, stoneworking refuse, chips, and similar materials were found. Of the pottery sites, three yielded sherds of Upper Republican type and one had sherds suggestive of Woodland wares. From one site came a rather curious assemblage of pottery fragments including several grit-tempered sherds apparently in the Upper Republican-Nebraska culture tradition; others of different type with broad shallow grooves and trailed horizontal lines occasionally cut by diagonals; and one fragment with horizontal single-cord impressions on the rim exterior and cord-impressed diagonals on the outer edge of the vessel lip. From the limited observations made, it is not clear whether a stratification of archeological complexes is here indicated, or whether some other interpretation will be called for.

The occurrence of grass-impressed wattling clay on several sites suggests the former presence of earth-covered habitations of fairly substantial character. These, in turn, would imply a fairly sedentary

mode of life on the part of the erstwhile inhabitants, and possibly a semihorticultural subsistence economy.

Loretto Reservoir site.—The proposed Loretto Reservoir is to be located on Beaver Creek in Boone County, Nebr. Beaver Creek joins the Loup River from the north near Genoa, some 25 or 30 miles southeast of Loretto. The dam site is not far above Loretto, whence the pool will extend about 8 miles northwest along the Beaver. At maximum proposed pool elevation of 1,849 feet, an area of about 2,360 acres will be under water.

Seven sites of archeological interest, all situated below the 1,900-foot contour, have been recorded for the Loretto Reservoir site. Since a heavy growth of weeds covered much of the ground surface, it is quite probable that additional sites remain undiscovered. Pottery remains were found at four sites; and, while the samples collected were not large, they suggest the former presence of at least three different pottery-making peoples. Small Woodlandlike pottery fragments occurred at two sites; another yielded a sherd of apparent Upper Republican type; and still another had "hole-tempered" sherds, one of which bore deep trailed parallel lines as surface decoration. These are pottery types not generally expected to occur on the same time level; and they suggest that the locality may have been occupied or visited at different times by representatives of successive widespread aboriginal cultures.

The three nonpottery sites were characterized by bone fragments, chips, and other village-site refuse; there is no way of determining at the moment the relationships of these remains to those of the pottery-using natives of the locality.

Plum Creek Reservoir site.—The site of the proposed Plum Creek Reservoir is on Plum Creek in northern Gosper County, Nebr., a few miles south of the Platte River. No data on size and operation of the proposed project are available at this time, other than a map prepared by the Tri-County Project, P. W. A., in 1941. This shows two different reservoir sites; both are in Gosper County, but the upper extends a short distance into Frontier County. Both locations were examined by the Laboratory party, but torrential rains and the resulting impassible roads cut short the survey of the upper site.

Ten archeological sites were recorded in this locality during the 1948 survey. With a single exception, these were marked only by occasional bone refuse, and by flint chips, cores, and other nonceramic remains. The one exception is a hilltop site, 25GO20, where potsherds, chips, cores, burned and unburned bone scrap, and other materials were picked up. Much material is reported to have been found at this spot in past years by local collectors; and of the sites seen by the 1948 survey party, this one seemed the most promising and prolific.

Judged from the potsherds seen, the site appears to be attributable to the Upper Republican horizon.

Information from local collectors indicates that pottery-bearing village sites assignable to Upper Republican peoples occur on Turkey Creek, tributary of the Republican River, in southern Gosper County, but that only a single site of this complex—25GO20, noted above—has been recognized to date in the Plum Creek Reservoir area.

Rosedale Reservoir site.—Location of this proposed project, formerly called the Clearwater Reservoir, is on Clearwater Creek in Antelope County, Nebr. Clearwater Creek is a permanent stream emptying into the Elkhorn River from the southwest a few miles below the proposed reservoir and east of the town of Clearwater. The dam site is to be approximately 2 miles south of the town of Clearwater and 9 or 10 miles west of Neligh. The reservoir pool will extend about 6 miles up the creek, to or slightly beyond the Holt County line. At maximum level, 2,850 acres will be under water. The surrounding terrain is gently rolling to hilly, with extensive sandy areas; the creek valley has low terraces rising 8 to 10 feet above the flood plain and a fringe of hardwood timber along the stream banks.

Despite the comparatively small area involved here, archeological sites appear to be fairly plentiful and of varied character. Eleven sites were recorded in the 1948 survey by the Laboratory of Anthropology; it is very probable that others remain undiscovered. Six of the sites yielded no pottery whatsoever; their age and cultural affiliations cannot even be guessed at with the meager evidence now at hand.

Potsherds strongly suggestive of Upper Republican wares were found on two sites; in one instance, they occurred at a depth of 24–30 inches in a road cut. In another site they seemed to be coming out of a shallow buried stratum, along with other debris and sherds of possible Dismal River affiliations. The suggested association, and in any case the exact stratigraphic relationships here, deserve further investigation. Three other sites yielded sherds with shell and/or grit tempering, simple stamped exterior surfaces, and parallel horizontal trailed lines which had evidently encircled the rims of the vessels. This material is somewhat reminiscent of ceramic remains found previously at Ericson, Harlan County, and other reservoir sites, as well as elsewhere in north-central Nebraska. In general, this material gives the impression of being relatively late in time, but since none of the sites in which it occurs has yet been comprehensively excavated and described in print, the complex represented remains pretty largely unknown and is still unclassified.

NORTH DAKOTA

In North Dakota, cooperative archeological salvage work was carried on by a field party from the University of North Dakota, work-

ing in conjunction with the North Dakota Historical Society. Under the active supervision of Dr. Gordon W. Hewes, a party of six was in the field at the Baldhill Reservoir from June 25 to August 1, 1948. During this period, two burial mounds were opened and several village sites nearby were briefly test-pitted. Unfavorable weather and a consequent delayed crop season, which prevented access to several promising bottomland village sites, hampered the operations. This work, it should be noted, followed a reconnaissance for the River Basin Surveys during 1947 by a party of four, under M. F. Kivett, at which time three mound groups and seven occupational sites were recorded. Kivett's party also partially excavated a burial mound in Griggs County to salvage exposed skeletal material, and recommended further work in the region.

Baldhill Reservoir site.—Baldhill Dam, a Corps of Engineers project, is under construction on the Sheyenne River, 16 miles upstream from Valley City, N. Dak., and about 271 miles above the mouth of the stream. It is to be an earth-fill structure having a height of approximately 61 feet above stream bed and a length of 1,650 feet. Purposes of the project are flood control, water supply for industrial and municipal use, and pollution abatement.

For the 1948 investigations by the University of North Dakota-North Dakota Historical Society party, two mounds in Barnes County were selected. These were designated as site 32BA1 by the River Basin Surveys. They lay about 90 yards apart on the left bluff of the Sheyenne River nearly one mile below its junction with Baldhill Creek, and some 60 or 70 feet above the river. Both mounds were approximately circular in outline, perhaps 100 feet in diameter, and between 6 and 7 feet in height. They appeared to have been built wholly of topsoil gathered up nearby, without any preliminary clearing away of the topsoil on the spot over which they were erected. Beneath one of the mounds, the original soil surface was marked by a fine layer of carbonized grass stems and ash, suggesting that the grass had been burned off before the tumulus was built. Glacial boulders, of which many occurred on the field surface about the mounds, had been freely incorporated in the mound fill. No humus layers or other significant stratigraphic features were noted in the mound sections; both appear to have been constructed within a relatively short span of time rather than by gradual long-term accretion.

Upon excavation, both mounds were found to have a central underlying burial pit whose fill contained fragmentary and disarticulated human skeletal remains of all ages and both sexes. The central pit in Mound B measured 11 by 5 feet, with a depth of 3 feet or more beneath the original ground surface. These pits had evidently been roofed over with transversely laid oak timbers which, in the case of

Mound B, rested on rows of glacial boulders set along the sides of the pit. It is presumed that the space below the timbers was left open when the mound was built, and became filled with soil and rocks when the timbers finally decayed. Mound A contained a second shallower pit without roof, just east of the principal chamber. In this were found four partially articulated and moderately well-preserved adult skeletons, apparently buried together side by side and alternately oriented.

Artifacts were not plentiful in either mound, nor were they of such nature as to be very helpful in determining the cultural affiliations and chronological level of the associated skeletal materials. From Mound A came a medium heavy stemmed projectile point; a heavy bone punchlike object; a human molar with ground-off root; an end-perforated freshwater mussel-shell ornament; a painted bird-bone tube fragment; four partly worked or ground carnivore teeth; a complete human upper dental arch and palate carefully cut and ground down along with its included teeth; and miscellaneous scrapers, flakes, etc. Mound B yielded a small cylindrical copper bead, a clay bead (?), a crudely chipped-stone digging (?) tool, and one complete and one fragmentary bison-rib beaming or smoothing tool. The disintegrated skull, ribs, and vertebrae of a bison, possibly stained or painted, lay just above the fill near one end of the central grave pit in Mound B.

A preliminary report on the 1948 findings at Baldhill has been published by Hewes in the April 1949 issue of *American Antiquity*. As pointed out there, it is hoped that further study of the physical anthropology of the intact and restorable human remains from these two mounds, plus dendrochronological analysis of the log fragments from the burial chamber will throw further light on the difficult problem of dating and identifying culturally the eastern Dakota burial mounds. In certain particulars the Baldhill mounds opened by Hewes are reminiscent of findings by Montgomery, Strong, Meleen, and Cooper at other burial mounds in eastern North and South Dakota; but, unfortunately, the complex as such cannot yet be specifically and directly related to that at any other reported mound sites of this general region or of the Minnesota woodlands to the east.

RÉSUMÉ AND CONCLUSIONS

In the foregoing pages, we have briefly reviewed the archeological and paleontological field work carried on in the Missouri River Basin during calendar year 1948 by the River Basin Surveys and cooperating agencies, in conjunction with the Federal water-control program. Archeological investigations by River Basin Surveys parties included extended excavations at Medicine Creek, Nebr., and at Fort

Randall, S. Dak.; surveys and test excavations at Angostura, S. Dak., at Heart Butte, N. Dak., and in the lower Oahe Reservoir site, S. Dak.; and reconnaissance at Oahe, Pactola, and Johnson Siding, in South Dakota, and at Edgemont and Keyhole, in Wyoming. Paleontological work by the River Basin Surveys included re-examination and collecting at Boysen Reservoir site, Wyo.; at Canyon Ferry, Mont.; and at Cedar Bluff, Kans.

Cooperating agencies, and the localities investigated by each, included the following: University of Kansas Museum of Natural History, at Kanopolis, Kans.; University of Nebraska Laboratory of Anthropology, at the Harlan County, Cushing, Loretto, Plum Creek, and Rosedale Reservoir sites, Nebr.; University of Nebraska State Museum, at Harlan County (paleontology) and Medicine Creek (archeology and paleontology), Nebr.; Nebraska State Historical Society, at Medicine Creek, Nebr.; University of North Dakota—North Dakota Historical Society, at Baldhill, N. Dak.

These investigations represent a widely scattered sampling—spatially, temporally, and culturally—of the aboriginal remains of the Missouri Basin region. From Kansas to North Dakota, in a variety of ecological settings, the traces of native pre-White and early contact peoples came under observation and detailed study. In some instances, important new data were added to previous records of the prehistory of the localities involved, and the place of these findings in the over-all picture of native life in the Great Plains was made appreciably clearer. Elsewhere, the findings are represented by data inadequate as yet to permit exact placement of the remains in the present scheme of things. Despite the uncertainties and differences of opinion attached to some of the discoveries and their interpretation, it is clear that our knowledge of human prehistory in the Basin has advanced materially over the past year as a result of these researches. It is also clear that many of the problems now puzzling the archeologist here cannot be solved without the assistance of qualified students from other disciplines. With the archeological manifestations often are linked various phenomena having to do with past climatic variations, depositional and erosional problems, stream changes, and other matters of much importance to the student of human prehistory but for the most part beyond his particular abilities of interpretation.

Included in the 1948 archeological field work are several sites whose age almost certainly is to be measured in terms of millennia rather than of centuries. These are the Allen site, 25FT50, in Medicine Creek Reservoir, Nebraska, and the Long site, 39FA65, in Angostura Reservoir, South Dakota. At Medicine Creek, site 25FT50 is one of a group of three that have been under study since 1947. Sites 25FT50 and 25 FT41, the only ones so far comprehensively investigated, have

been assigned by University of Nebraska paleontologists to the basal portions of Republican River Terrace 2, which is provisionally equated with the beginning of the Mankato substage of the Wisconsin glaciation. If this correlation is correct, the sites in question would antedate Eden Valley Yuma and also the Lindenmeier Folsom horizon, as these have been dated by other geologists. Presumably, they would also equate in time with the native horse, the Columbian mammoth, and *Bison antiquus*, as the stratigraphic range of these mammals has been reported for Nebraska. Despite the fact that the Lime Creek sites, especially 25FT41 and 25FT50, have produced a considerable amount of refuse animal bone, there is as yet no published proof that any of this material represents extinct forms, or that the bison remains found are other than those of the modern plains species. That the sites involved are in or near the base of one of the older terrace fills of the local drainage system is clear; but until the faunal and geological evidence bearing on the sites has been fully detailed and verified, the estimates of antiquity suggested by the paleontologists concerned must be viewed with reserve.

So far as the archeological complex, or complexes, at Lime Creek are concerned, there is little at the present writing to substantiate the placing of the material chronologically anywhere near or previous to the Lindenmeier Folsom horizon, where the association with extinct bison, *B. taylori*, seems well documented and is generally accepted. With exception of certain projectile points, most of the stone and bone artifacts so far reported from Lime Creek can be duplicated in any large collection of materials from Upper Republican and other archeological complexes in southern Nebraska, even though the latter have no historical connection and are without question from a much later time level. As a complex, it seems to me that the materials from the Allen site are rather more reminiscent of the remains from Signal Butte 1 than of any defined Folsom complex; whether further excavation would heighten or lessen this general similarity I have, of course, no way of knowing. More detailed and extended analyses and comparisons than have yet been made are needed before this problem and the true relationships of the Lime Creek materials can be settled.

At Angostura, site 39FA65 is an occupational zone of considerable extent but with as yet very limited material culture inventory. Simple fireplaces are present; as in the Lime Creek sites, no stone seems to have been used in connection with these features. Occupation appears to have been intermittent and of short duration, apparently along the edge of a creek valley whose contours were unlike those of the present valley. Several "early" point types have been found on the eroded edge of the site; in similar position, as well as in the cul-

ture stratum, have been found several fragments of lanceolate points characterized by narrow straight to concave bases, fine flaking, and ground basal edges. These have some similarity to certain specimens from the Allen site, and also to a series of well-made blades collected by Roberts in 1942 from a bison kill in the Agate Basin between Lusk and Newcastle in eastern Wyoming. It is presumed that the inhabitants of site 39FA65 subsisted mainly on large game, but to date bone fragments have been strangely absent. It is not clear whether this is attributable to local soil conditions or to other factors. Further work at this promising and important site is planned for 1949.

Presumably later in time than the occupation of the Long site at Angostura were a series of poorly defined and meagerly represented complexes found along the upper reaches of the Cheyenne and its tributaries in southwestern South Dakota. In the vicinity of the Angostura Dam there are several sites exhibiting physical stratification in the form of dark soil horizons of varying thickness, separated by noncultural deposits. Archeological remains occur in the darker soil formations, chiefly as fireplaces of various kinds with which are associated very limited quantities of other cultural materials. There is some stratigraphic evidence that simple hearths built on a layer, or within a circle, of stone may be a rather early form; that this type was superseded by a shallow basin partly filled with stones; and that this in turn was followed by pits whose diameter and depth were approximately equal, whose sides and bottoms were hardened and reddened by prolonged heating, and which usually contain fire-cracked stones and sooty soil. The last type is reminiscent of the somewhat similarly shaped but usually larger roasting pit of the protohistoric Dismal River horizon in the upper Kansas-Republican drainage. There are some slight indications that the projectile points and other artifacts found sparingly in association with each of the hearth types may be distinctive, but the available samples are too small to be conclusive. At some sites, manos, metates, and fragments are rather plentiful; elsewhere they are scarcer or wholly absent. Seasonal shifts of emphasis in food-getting, rather than distinct culture complexes, may be indicated by such differences. It is noteworthy, too, that few of these sites show any great quantity of animal bone refuse such as one would expect if the occupants had relied largely on hunting for their subsistence. This may mean that most of the slaughtering was done outside the living area, and only the edible portions of the game brought into camp; but somehow this is not a very satisfying explanation.

The findings at Medicine Creek and at Angostura, insofar as they involve the remains of nonpottery-making peoples, are of interest for several reasons. In the first place, they help to fill in some of the

long and little-known intervals of time during which the Great Plains were certainly inhabited, if sparsely, before the arrival of pottery-making semihorticultural peoples in the western plains. They indicate, or strongly suggest, recurrent short-term occupancies in many localities throughout a wide area that today impresses one as rather uninviting and inhospitable. At the same time, the very meager material culture assemblage from nearly all sites so far found probably indicates a plane of living but little above a bare subsistence level and far below that characteristic of the historic horse nomads or the semihorticultural Indians of late prehistoric, protohistoric, and historic times.

No less important to Plains prehistory than the foregoing are the additional data gathered during 1948 concerning the pottery-making Indian inhabitants of the region. These, in general, are probably from a later period than the materials considered above; but it must be emphasized that not all of the potteryless horizons at Angostura, for example, can be proved to be earlier than some of the ceramic complexes in and east of the Black Hills. It is possible that Woodland and Upper Republicanlike penetrations here will be found to interdigitate with some of the later lithic horizons of the upper Cheyenne drainage. At the moment, direct stratigraphic evidence bearing on this question is not at hand.

Nothing in the 1948 findings in the Missouri Basin controverts the long-held view that, among pottery-bearing complexes, those designated as Woodland are the earliest in the region. It is perhaps more nearly correct to speak of a Woodland series, since there is growing evidence of more than one trait assemblage within what has been called the Woodland horizon. Kivett has proposed the term "Keith focus" for a group of sites in southern Nebraska and western Kansas which are partially characterized by calcite-tempered, cord-roughened pottery; small stemmed or corner-notched projectile points, sometimes with serrate blades; small chipped celts; tubular bone beads, either plain or with encircling incisions; and secondary burials in communal ossuaries which also contain great numbers of shell disk beads, triangular corner-perforated shell pendants, and certain other traits. The two Woodland habitation sites—25FT18 and a small area in 25FT70—excavated at Medicine Creek Reservoir area in 1948, may be assigned to the Keith focus, and it seems probable that the same or a similar complex is represented at Kanopolis Reservoir in Kansas. At both Medicine Creek and Kanopolis, the Woodland sites are small, the artifact yield is low, and evidence of maize-growing is nonexistent. In general, one gets the impression that small population groups and a rather simple hunting and gathering subsistence economy, albeit one with a well-established pottery tradition, are to be inferred.

Probably also assignable to a Woodland horizon are the mounds excavated in the Fort Randall Reservoir area—39CH4 and 39CH9. As already noted, some of the individual traits at these burial sites occur in widely separated localities from northern Kansas to Minnesota. Presumably the structures, whose associated village complex remains unknown, represent a western extension or variant of one of the Minnesota Woodland cultures. The mounds opened by Hewes at Baldhill lack many of the material traits found scatteringly in other burial structures around Devils Lake and elsewhere in eastern North and South Dakota, but in all probability likewise have a basic relationship to some Woodland manifestation of the Minnesota region. Neither the Fort Randall mounds nor those at Baldhill show a very close similarity as complexes to anything called Woodland in the central Plains.

Woodland potsherds from several occupational sites in Fort Randall Reservoir, though few in number, suggest at least two other variants with counterparts to the south in Nebraska. Sherds decorated with single-cord impressions are reminiscent of pottery from sites on Eagle Creek, in Holt County, and from Loseke Creek, in Colfax County. Others have punched rim bosses and exterior cord-roughening. To what extent these and other slight but seemingly consistent pottery variations are paralleled by differences in other material traits remains to be determined. Such a definition of the several variants now lumped together as Woodland, and determination of their relative temporal position, would be a long step ahead in the understanding of plains prehistory.

It has been noted above that evidence of maize-growing by the Woodland peoples on Central Plains sites is very scanty or else is altogether wanting. For the northern plains, in the Dakotas on both sides of the Missouri River, there is virtually no published information from which the nature of the local Woodland subsistence economies may be judged. It may be surmised that the westerly manifestations represent largely nonhorticultural peoples, whereas the easterly ones in which burial mounds occur may prove to be semihorticultural; but this is sheer conjecture and needs verification or correction.

In the Central Plains region of Kansas and Nebraska, the post-Woodland archeological complexes for the most part represent peoples whose subsistence economies were based to greater or lesser degree on maize-bean-squash horticulture. Long before introduction of the horse by European invaders, small unfortified villages composed of rectangular semisubterranean earth-covered lodges were scattered along the smaller stream valleys from the Smoky Hill drainage northward through Nebraska and apparently into the Dakotas. The

extensive excavations at Medicine Creek in a series of Upper Republican village sites afford a good insight into the nature of this early semihorticultural occupation of the Great Plains. It is noteworthy that neither the comprehensive work by the River Basin Surveys at Medicine Creek nor the widely scattered earlier investigations by other agencies in and about the Kansas River Basin have disclosed any satisfactory evidence of trade or other contacts between these prehistoric Plains communities and their contemporaries in the Pueblo region of New Mexico.

Materials probably assignable to the Upper Republican horizon were found during 1948 at Kanopolis, at Harlan County, at several of the small proposed reservoir sites surveyed in the Lower Platte Basin by the University of Nebraska Laboratory of Anthropology, and on one or two sites at Angostura Reservoir. With exception of the last-named occurrence, all of the localities listed are within the previously known range of the Upper Republican culture. Several variants apparently exist, and these may have temporal significance. It seems likely that the large mass of data obtained at Medicine Creek, under carefully controlled conditions and in a relatively limited locality, will make possible a beginning toward separation into more or less distinct site or horizon complexes. It will be interesting to see, when more intensive work has been done, whether the sites tentatively assigned to the Upper Republican at Angostura will continue to be so classified; and also whether they show any evidences of horticulture or, alternatively, are to be interpreted as seasonal hunting camps for peoples normally resident farther to the east or south. The relationships of the central plains Upper Republican materials to certain sites along the Missouri in the Fort Randall Reservoir area, where cord-roughened body sherds and incised rims of collared form bring to mind the pottery remains at Medicine Creek, are still to be worked out.

On a later time level than the Upper Republican culture are several sites tested or more intensively worked at Kanopolis, Harlan County, Angostura, and other proposed or potential reservoir areas. At Kanopolis, near the junction of Thompson Creek and Smoky Hill River, two levels of a stratified site (14EW6) yielded pottery and other remains attributable to the protohistoric Great Bend aspect. This complex, which appears to represent a sixteenth and early seventeenth century Wichita (?) occupation, occurs at several large village sites, marked by middens, cache pits, and other evidences of a fairly sedentary semihorticultural mode of life, on the southern tributaries of the Smoky Hill in McPherson County, Kans., and on tributaries of the Arkansas River in central and southern Kansas. Site 14EW6, lying somewhat north and west of the previously known

range of the complex, may be presumed to mark a periodic camp site, perhaps utilized by hunting or trading parties.

In Harlan County additional information on the nature of the Dismal River culture complex has been accumulated. Dismal River sites have been found so far mainly in the Sandhills and High Plains of western Nebraska, between the 99th and 104th meridians and southward from the Niobrara to the Smoky Hill Valley in Kansas. At Harlan County, as in previous work on Stinking Water Creek in Chase County, Nebr., house patterns differing rather widely from those of the earlier Upper Republican peoples, and suggesting a less substantial type of dwelling, were uncovered. To date, in this locality, no satisfactory evidence of horticulture, of contact with Whites, or of trade relations with southwestern peoples, has been found. Most of the artifacts correspond nicely to those found previously at other Dismal River sites in southern Nebraska and in western Kansas, and there can be no question as to the cultural relationships of the materials here. Ethnohistorical considerations leave little room for doubt that the Dismal River remains, which elsewhere have been found in such context as to indicate a late seventeenth and early eighteenth century dating, are the remains of Plains Apache who were displaced southward about the middle of the eighteenth century by arrival of the Comanche from the west.

Because the year 1948 witnessed no extended excavations in any of the numerous village sites along the Missouri River in the Dakotas, there seems little point to adding further conjectures and guesses to the literature on the area. The surveys carried on have merely confirmed the extraordinary abundance and richness of aboriginal remains here; and preliminary sherd analyses have verified the views that regional and temporal differences occur. Unfortunately, it is not yet possible to translate the site-to-site or locality-to-locality differences now apparent into a clear story of cultural growth. It would not be surprising if something similar to the Woodland-Upper Republican-Lower Loup-Pawnee sequence in the Nebraska region were eventually demonstrated for the main stem in the Mandan and Arikara areas, but much more thoroughgoing studies and more comprehensive excavations than have been made in the past will be necessary to test this possibility. And, linked with this much-needed main-stem work, additional data must be gotten from the westerly tributaries of the Missouri before it becomes possible to tie in satisfactorily the pottery-bearing manifestations scattered westward to or beyond the Black Hills and the valleys of the Little Missouri and the Yellowstone.

From such widely scattered, often sketchy, and very uneven data as are now available concerning the archeological remains of the Missouri Basin, no detailed synthesis of culture growth and human development

can yet be made. The broad outlines of human history in the region, however, are becoming increasingly clear. It seems evident that throughout a span of time very likely to be measured in terms of millennia, simple hunting and gathering peoples dominated much or most of the area. This occupation began at a time when large game animals of species that have since become extinct still roamed the western plains; and there is geological, paleontological, and other evidence that climatic and physiographic changes of appreciable magnitude have taken place during the period that has elapsed since. It may be assumed that the population groups during this stage were small and scattered, and that most of the energies of the peoples were devoted to the getting of food, shelter, and clothing. Since most known sites are situated in or on stream terraces and in otherwise unprotected places, little is left of the material culture of the original occupants save items made of relatively durable materials. The extent and nature of work in skin, basketry, wood, and other perishable media is mostly unknown, as is the physical appearance of the people themselves. No positive evidence of the domestic dog has been found in association with the Folsom, the so-called Yuma, or the later prehistoric hunting and gathering complexes of the Missouri Basin region.

In the semiarid sagebrush plains of central Wyoming, there is reason to believe that a late prehistoric occupation by a small-game hunting and gathering people, who were possibly Shoshonean, took place. Further work at such reservoir localities as Edgemont, Keyhole, Moorehead, and Angostura ought to show how far eastward this incursion of Great Basin peoples and economies extended. Elsewhere in the short-grass plains of Montana, Wyoming, and adjacent areas, a basic economy probably consisting of big-game hunting combined with gathering lasted into the historic period, when the mode of life was considerably altered and greatly enriched by acquisition of the horse in the late seventeenth and early eighteenth centuries.

In the eastern portion of the Missouri Basin, along the Missouri itself and in the valleys of its major tributaries as far upstream as the Yellowstone, primarily hunting and gathering economies gave way in prehistoric times to peoples who practiced food growing as well as food gathering. It is not yet certain at what time period or cultural level the use of domestic plants here began. A few kernels of maize have been reported from a Woodland site in central Nebraska; but the few Woodland sites where comprehensive excavations have been carried on have yielded no evidence of horticulture, except possibly in the case of the Sterns Creek complex in eastern Nebraska. It is possible that thoroughgoing investigations at other sites attributed to the Woodland period, particularly in eastern Nebraska and in the Dakotas, will

produce evidence of tillage or of domestic crops. Settlements of the Woodland peoples were small and unfortified; habitations were of perishable materials and apparently of light construction; and except for the presence of limited amounts of pottery in the western Woodland sites, there is little or nothing to suggest that the mode of life followed differed very markedly from that of the late preceramic hunters of the plains. At best, it would seem that incipient horticulture may be suspected for the Woodland peoples whose remains have so far been studied in the Missouri Basin west of the main stem.

Following the widespread and as yet ill-defined Woodland occupancy of the trans-Missouri plains, with its doubtful or incipient horticulture, came another of markedly dissimilar character. This one, provisionally dated to the thirteenth, fourteenth, and fifteenth centuries, is represented by numerous village sites assigned to the Upper Republican and related complexes. Maize, beans, squash, and sunflowers were cultivated; hunting and the gathering of wild plant foods were secondary subsistence sources; and fishing, including in some localities the extensive collecting of freshwater mussels, was also practiced. The people resided in small, relatively permanent, unfortified communities of rectangular earth-covered lodges; and the clustered arrangement of habitations in at least some instances suggests that kin groups may have been the basis of society. No satisfactory evidence of community ceremonial centers has yet been adduced for these settlements. Pottery was much more abundant and better made than that of the preceding Woodland peoples; and there were fairly well-developed and varied industries in stone, bone, horn, and shell. This prehistoric small-town stage is abundantly represented in the drainage basins of the Kansas-Smoky Hill-Republican and the Platte-Loup systems. There are some suggestions of a counterpart along the Missouri in the Dakotas; but its existence there, and its contemporaneity, if it exists, with the Central plains materials, remain to be demonstrated.

In central Kansas and in east-central Nebraska, the small-town Upper Republican communities were apparently superseded in the late fifteenth and sixteenth centuries by larger aggregations of semi-sedentary peoples who practised an intensive maize-bean-squash horticulture, together with some hunting and gathering, and dwelt in villages of circular grass houses or, north of the Kansas River drainage, of circular earth lodges. Considerable crop surpluses are suggested by great numbers of large storage pits in the village sites; and it may be presumed that these horticulturists traded some of their surplus to contemporary hunting peoples ranging the plains to the west. Somewhat later in time were the archeological manifestations termed Dismal River, and several vaguely defined and unnamed pottery-mak-

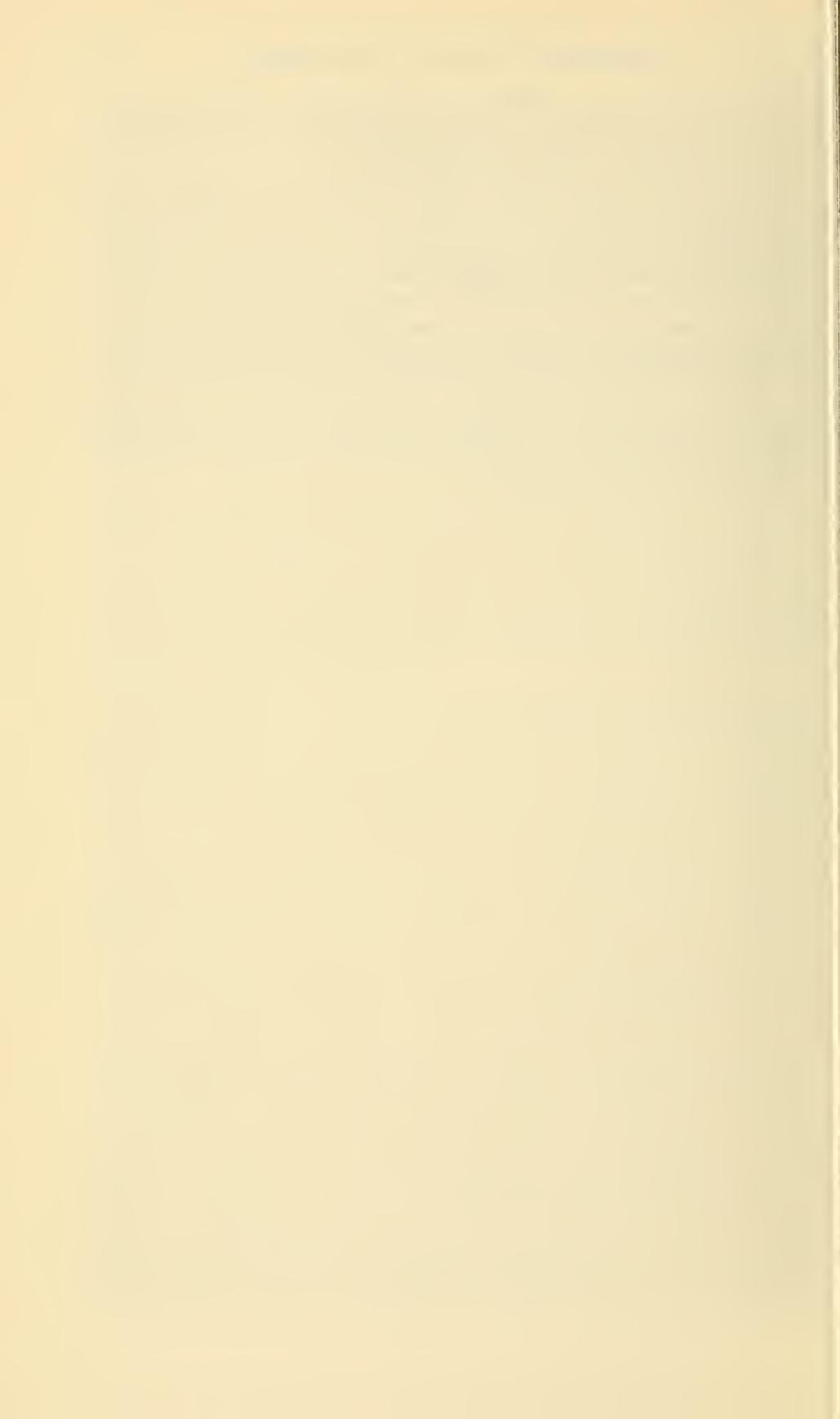
ing complexes found from the Kansas River to the Niobrara and probably beyond. Regionally distinctive complexes, of which there is evidence in the preceding small-town stage, are increasingly apparent; and there is also indication of more extensive trade contacts than can be demonstrated for the prehistoric period. These various archeological complexes, moreover, were late enough in point of time so that in several instances more or less satisfactory correlations can be made with historic tribes of the region, such as the Wichita, Pawnee, and Plains Apache.

In the Central Plains, compactly built and fortified towns seem to have developed after the close of the small-town period and after the gathering of people into larger communities was well under way. A similar tendency toward defensive measures is indicated on the upper Missouri. Among the longer established and more strongly horticultural village tribes of the eastern Missouri Basin, such as the Pawnee, Arikara, and Mandan, this period immediately before, during, and after the first contacts between the Indians and Europeans seems to have been the high-water mark of native cultural achievement in the Missouri Valley. Following it, as historical and archeological data clearly show, came the swift rise to ascendancy of the horse-using bison hunters of the western plains and the parallel decline in influence of the older village cultures.

In the broad view, it is obvious that hunters and primitive horticulturists flourished for a long time in the Missouri River Basin, before as well as after the coming of the white man. It is also clear that the archeological complexes representing these aboriginal occupancies, though relatively simple, varied considerably from locality to locality and from one time period to another. Here and there the various complexes have been aligned in what are very probably correct chronological and developmental sequences. There still exist, however, enormous gaps in our information. In the western portions of the Basin, including Montana, Wyoming, and adjacent areas, numerous sites have been located but very few have been systematically and comprehensively excavated. Along the Missouri River in the Dakotas, hundreds of village sites representing several centuries of residence by various tribes, likewise remain very inadequately known. Throughout the whole Basin, there are growing indications that man's successive occupancies may correlate with climatic fluctuations whose records can be studied in stream terraces, buried soil horizons, wind and water deposits, and other physiographic and geologic phenomena. There are excellent prospects, I think, that as archeologists expand and bring into sharper focus the story of native man's residence in the Basin they will be able to contribute information of importance to students of the various earth sciences. This, of course, is not the pri-

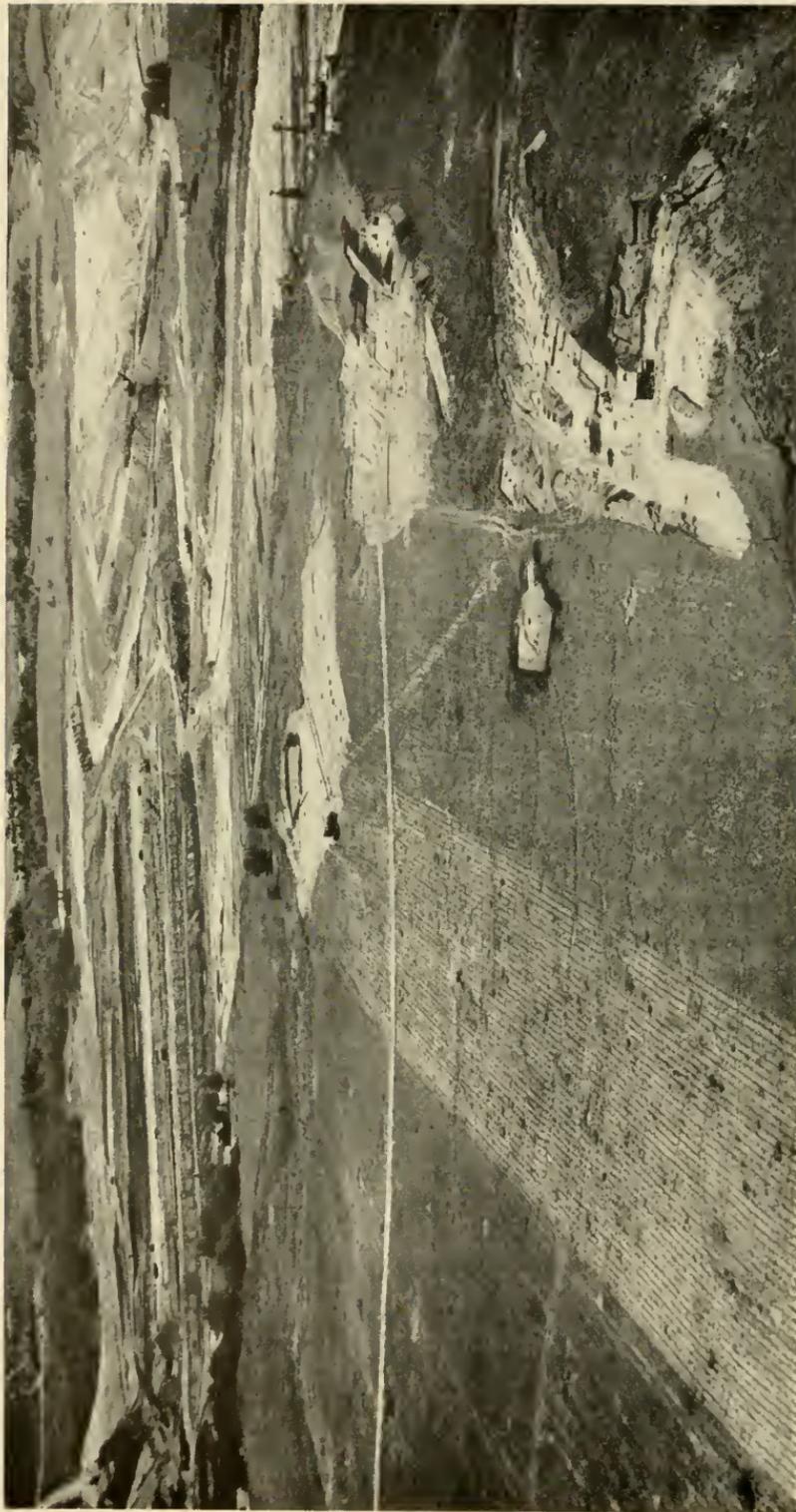
mary goal of archeological research, any more than is the mere accumulation of great numbers of specimens; but it promises to be an important byproduct of our investigations.

As the Federal water-control program in the Missouri Basin speeds up and expands, the need for an equally accelerated scientific recovery program is also accentuated. As dam after dam reaches completion, increasing numbers of archeological sites will disappear beneath the rising reservoir waters. In many instances, as particularly along the Missouri River in the Dakotas, the remains that will be destroyed cannot be duplicated outside the reservoir areas. Unless these unique and irreplaceable segments of native American history are to be irretrievably lost, funds for their study and partial salvage must be made available promptly and in adequate amount. The time remaining for this task is fast running out.

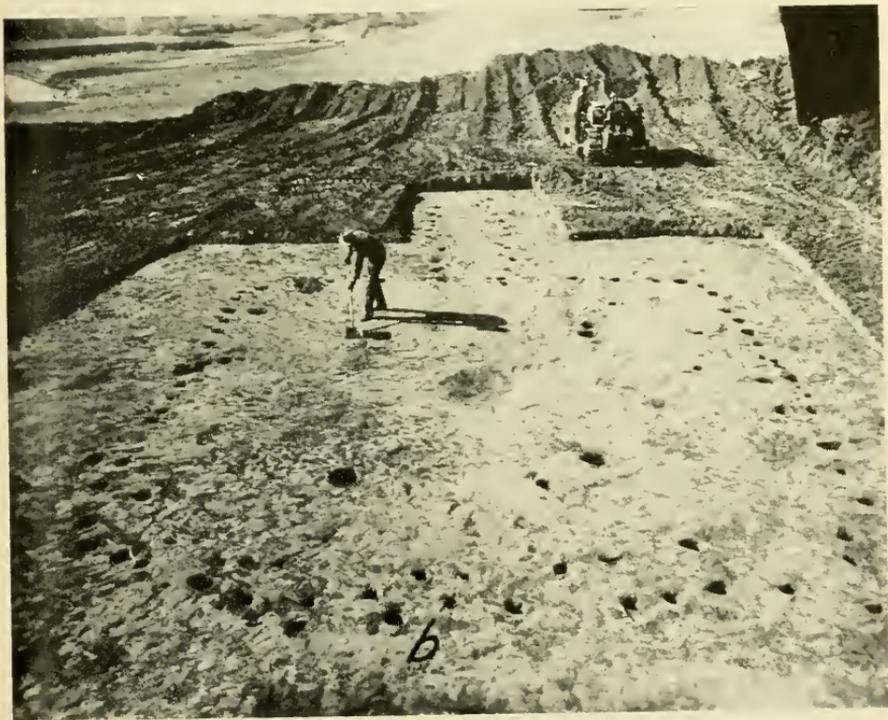
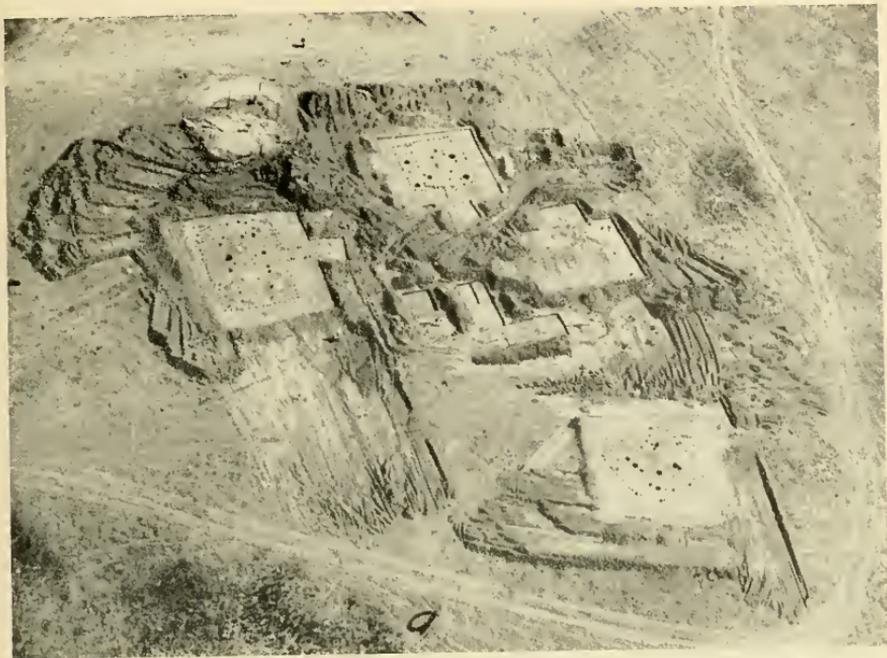




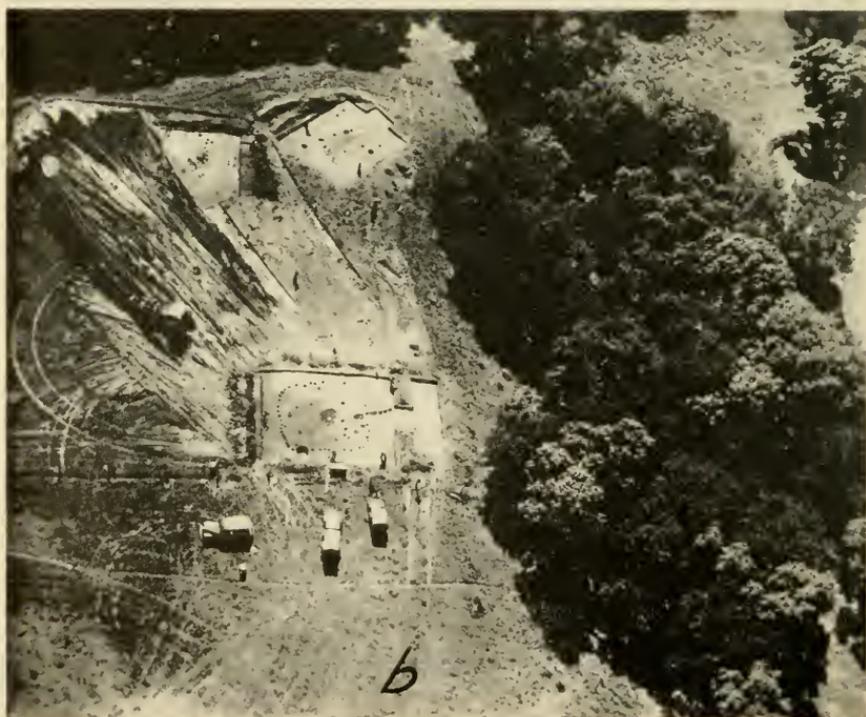
Aerial view of Medicine Creek Dam site, looking upstream; River Basin Surveys excavations shown are at Sites 25FT16 and 25FT17, now covered by the dam fill. (Bureau of Reclamation Neg. 404-1010G.)



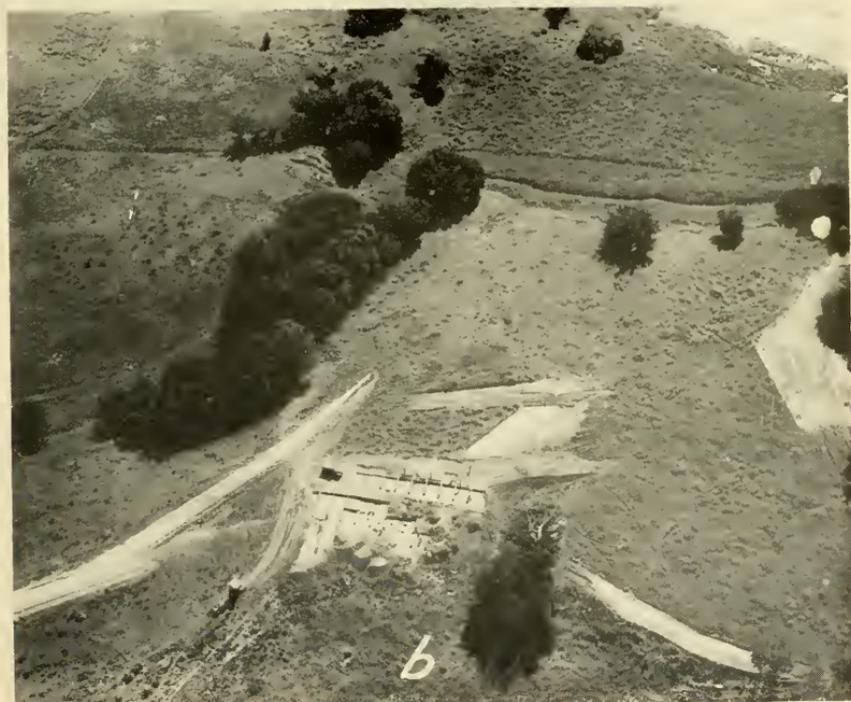
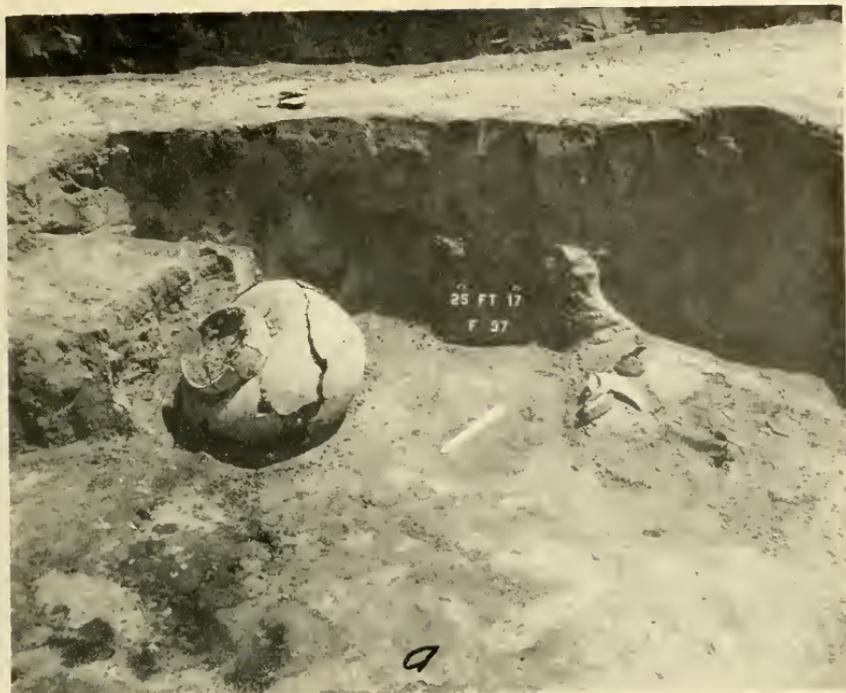
Aerial view of Medicine Creek Dam site (construction area at top), looking downstream. The River Basin Surveys excavations shown at Site 25FT13 (right and top center) have since been destroyed by earth borrowing for the dam fill. (Bureau of Reclamation Neg. 404-1010H.)



a, Aerial view of excavations at 25FT17, Medicine Creek, Nebr. Three prehistoric house sites and associated refuse areas shown here are now covered by the Medicine Creek Dam. (Neg. 25FT17-124.) *b*, Excavating a prehistoric house site at 25FT17, Medicine Creek, Nebr. Note central fireplace basin surrounded by four large primary and numerous smaller secondary post molds, with vestibule entryway opening to south. (Neg. 25FT17-111.)



a, View southeast across excavations at 25F170, Medicine Creek, Nebr. Square excavations at center have exposed four house sites; dam under construction at top and left center. (Neg. 25F100-45.) *b*, Prehistoric house sites and other features uncovered at 25F170, Medicine Creek, Nebr. (Neg. 25F170-11.)



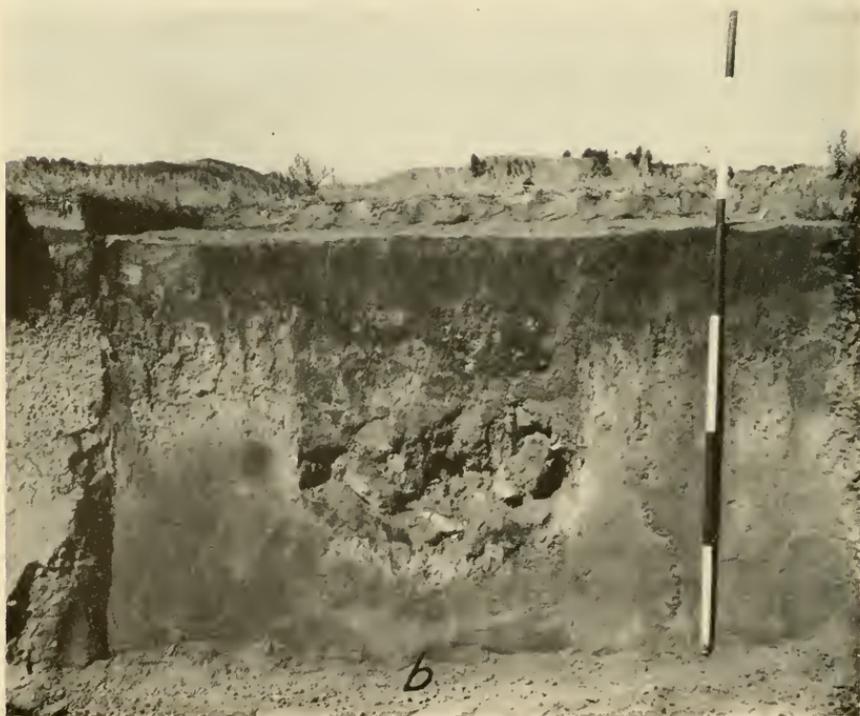
a, Pottery vessels as uncovered on floor of prehistoric earth-lodge site at 25FT17, Medicine Creek, Nebr. Upright charred timbers at rear mark approximate wall of house pit. (Neg. 25FT17-147.) *b*, Excavations at Woodland site 25FT18, at junction of Lime and Medicine Creeks, Nebr. (Neg. 25FT18-48.)



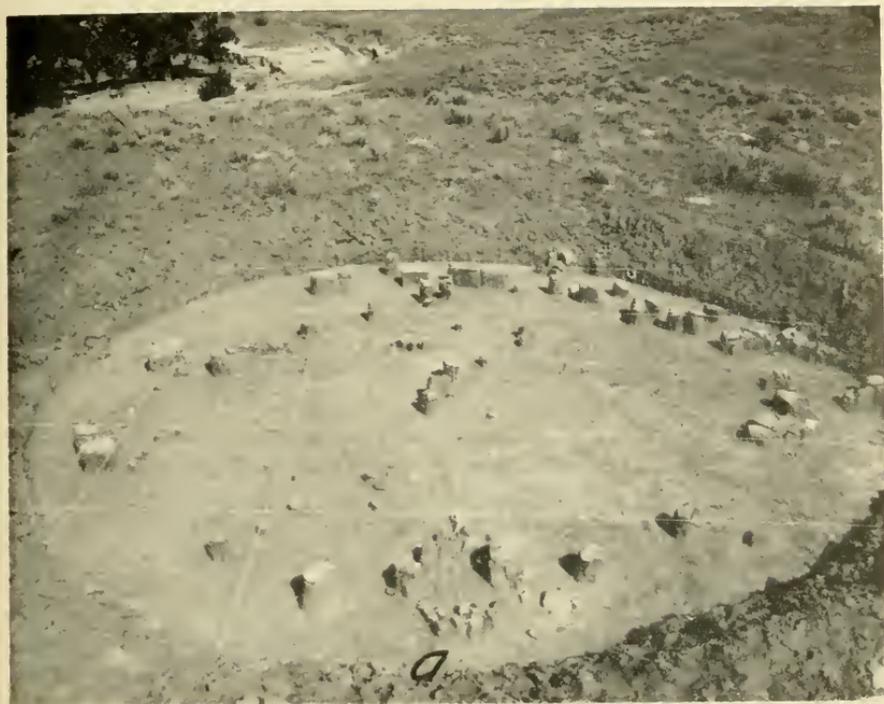
a, View south across excavations at 25FT18, Medicine Creek, Nebr. Control strips or blocks have been left standing at 10-foot intervals to show nature of culture zone and overlying deposits. (Neg. 25FT18-22.) *b*, Fireplaces, post molds, and miscellaneous small pits at base of Woodland occupation zone, Medicine Creek, Nebr. (Neg. 25FT18-16.)



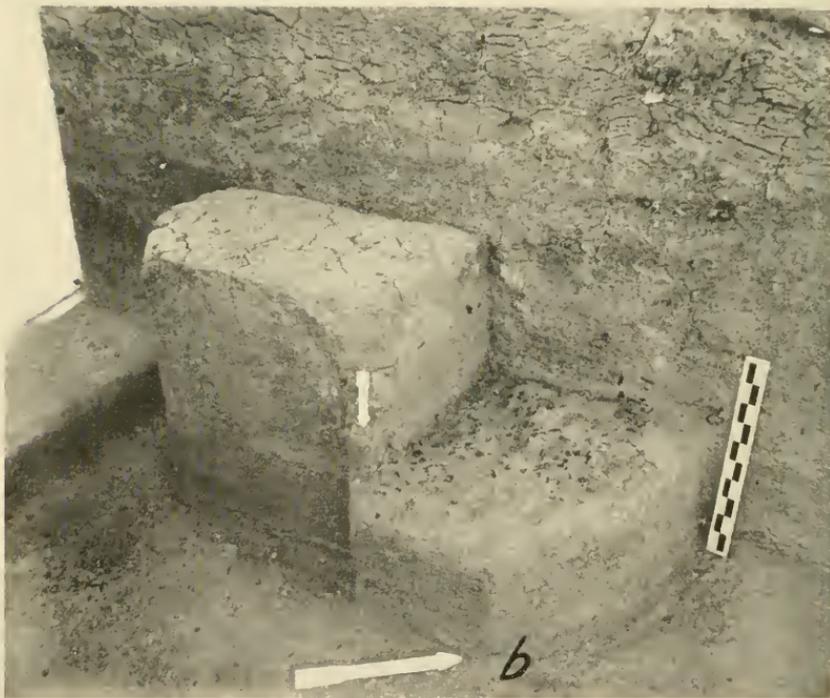
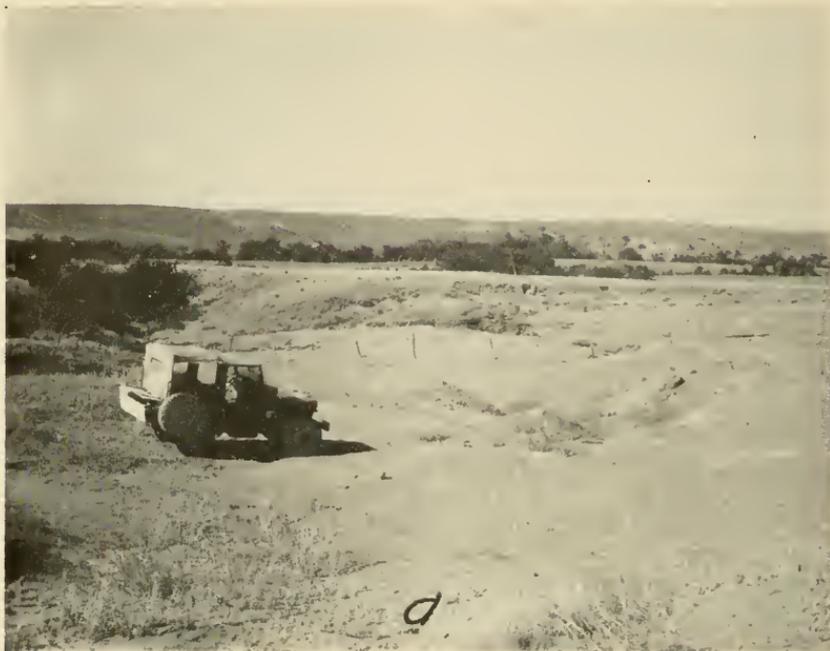
a, Aerial view of Angostura Dam (center foreground) and part of reservoir area beyond, Angostura Reservoir, S. Dak. Circles indicate some of the archeological sites within the future pool area. (Neg. 39FA00-20.) *b*, Bulldozer of Utah Construction Company removing sod at start of archeological tests at 39FA10, Angostura Reservoir, S. Dak. Part of construction area visible in background. (Neg. 39FA10-2.)



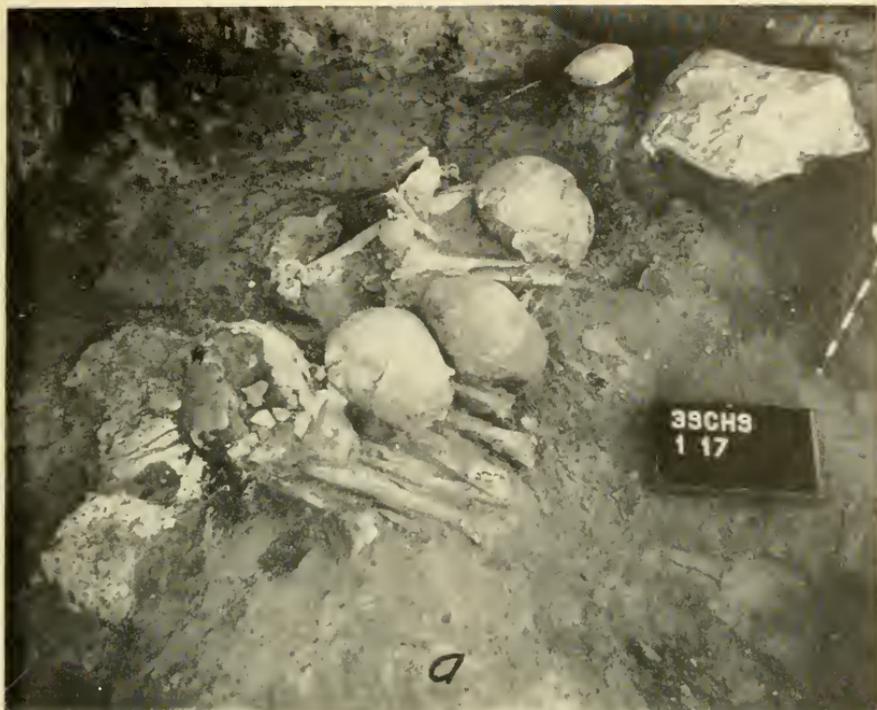
a, Workmen excavating stone-lined fireplace basin at 39FA9, Angostura Reservoir, S. Dak. (Neg. 39FA9-15.) *b*, Deep hearth or roasting pit containing burnt stones and sooty soil, exposed during road construction; Angostura Reservoir, S. Dak. (Neg. 39FA68-2.)



a, Excavated tipi ring at 39FA13, Angostura Reservoir, S. Dak. Stones marking tipi ring are underlain in center foreground by an older rock-filled hearth consisting in part of broken manos and grinding slabs. (Neg. 39A13-3.) *b*, Refuse beside aboriginal quartzite quarry pits on Flint Hill, 39FA49, near head of Angostura Reservoir, S. Dak. (Neg. 39FA49-12.)



a, View west across Area A at the Long site, 39FA65, Angostura Reservoir, S. Dak. Test cuts are visible to right of center; Horsehead Creek in background. (Neg. 39FA65-10.)
b, Excavations at Long site, 39FA65, Area A, Angostura Reservoir, S. Dak. Beside and just above the charcoal-laden zone was found the basal fragment of an obliquely flaked point, here shown in situ (small arrow). (Neg. 39FA65-11.)



a, Grouped secondary burials as found in Mound 39CH9, formerly situated in spillway line of Fort Randall Dam, Charles Mix County, S. Dak. (Neg. 39CH9-32.) *b*, Buried archeological zone (line of white stones and bone) exposed in wall of ravine cutting into Missouri River terrace at 39ST23, about 3 miles below Cheyenne River, Oahe Reservoir area, Stanley County, S. Dak. (Neg. 39ST23-1.)



a



b



c

a, Panorama of Oahe Dam site, about 6 miles above Pierre, S. Dak., looking northwest up the Missouri River. Site 39HU22, on the east bank at 1, lies directly on the axis of the proposed dam; 39ST14 (Scotty Phillips Ranch site) at 2, and 39ST6 (Buffalo Pasture) at 3, will be respectively downstream and upstream from the dam. (Neg. 39HU00-6 and 7.) b, Buffalo Pasture site, 39ST6, showing fortification ditch (arrows); Oahe Reservoir site, S. Dak. c, Site 32GT1, on Heart River, showing exploratory trenches; Heart Butte