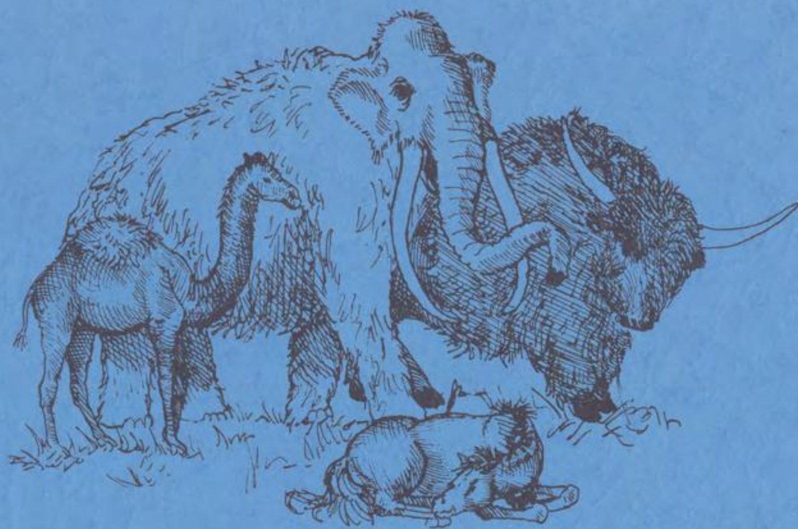


A Guide to Understanding Idaho Archaeology

(THIRD EDITION):

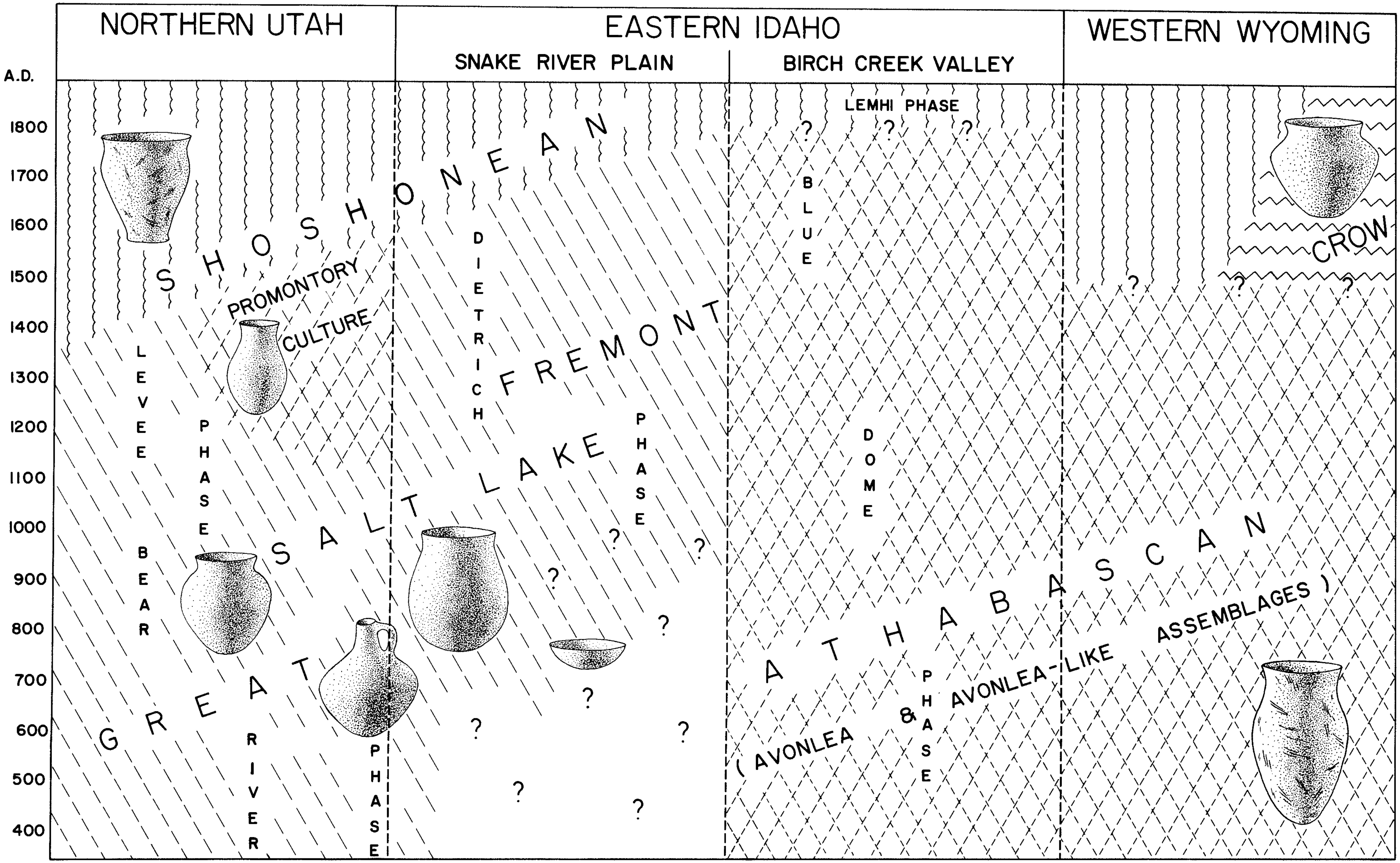
The Upper Snake and Salmon River Country

By B. Robert Butler

A Special Publication of

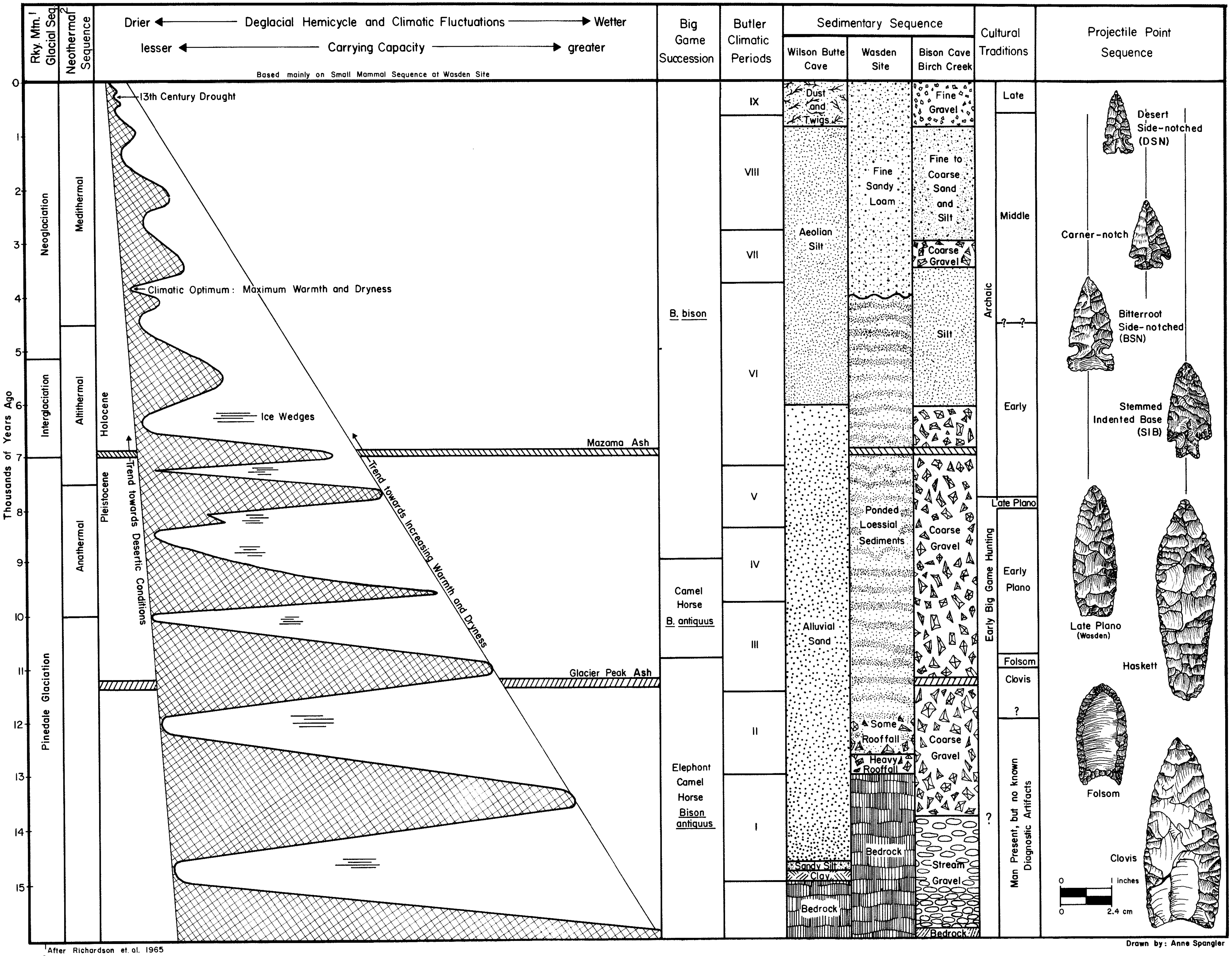
THE IDAHO MUSEUM OF NATURAL HISTORY
Pocatello

CULTURAL SEQUENCES IN THE NORTHEASTERN GREAT BASIN SUBCULTURE AREA DURING THE LATE PERIOD[1]



[1] A Supplement to the 3rd. edition of A Guide to Understanding Idaho Archaeology by B.R. Butler Prepared April, 1981

Ecological and Cultural Succession in the Upper Snake and Salmon River Country†



[1]After Richardson et. al. 1965

[2]After Antevs 1948, 53, 55

†from the 3rd Edition of A Guide to Understanding Idaho Archaeology by B. Robert Butler, Idaho Museum of Natural History, Pocatello, 1978.

A GUIDE
TO UNDERSTANDING IDAHO ARCHAEOLOGY (THIRD EDITION):
THE UPPER SNAKE AND SALMON RIVER COUNTRY

by B. Robert Butler
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and
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A SPECIAL PUBLICATION OF THE
IDAHO MUSEUM OF NATURAL HISTORY
POCATELLO, IDAHO

1978

This edition of the *Guide* was published originally by the Idaho State Historic Preservation Office, Boise, with the assistance of a survey and planning grant provided by the National Heritage Conservation and Recreation Service, Department of the Interior, Washington, D.C. It is dedicated to my late friend and colleague, Earl H. Swanson, Jr., who did so much in so short a time to put the Upper Snake and Salmon River Country on the archaeological map of North America.

Foreword and Acknowledgements

This third edition of the *Guide* is a direct outgrowth of an article I wrote in 1973 for the Smithsonian Institution's *Handbook of North American Indians*. The article focused on the archaeology of the Upper Snake and Salmon River Country. It was written in non-technical language for a broad audience and emphasized what was *unknown* about the prehistory of the region as well as what was known. I have followed essentially the same guidelines here.

Although the article (Butler 1973) has not yet been published, much of what was said there is already dated, the result of a continuing rapid growth in knowledge about the prehistoric environments and cultures of this region. Part of this growth in knowledge was stimulated by federal legislation enacted in the past decade, especially the *National Historic Preservation Act of 1966* (80 Stat.915) and the *National Environmental Policy Act of 1969* (83 Stat.852), which were followed by *Executive Order 11593* (36 FR 8921;36 CFR 800) signed by President Nixon on May 13, 1971.

The National Historic Preservation Act of 1966 declared a national policy of historic preservation, which was defined as "the protection, rehabilitation, restoration and reconstruction of districts, sites, buildings, structures and objects significant in American history, architecture, archaeology or culture." It also directed the expansion of the *National Register of Historic Places* (first established in the *Historic Sites Act of 1935* [49 Stat.666]) to include archaeological and historical resources of state and local significance as well as of national significance, established a *National Advisory Council on Historic Preservation*, and provided procedures in Section 106 for federal agencies to follow in the event one of their programs might affect a National Register property.

The National Environmental Policy Act of 1969 (NEPA) recognized the value of cultural resources--defined as resources of historical, archaeological or architectural significance--noted that these are fragile, limited and non-renewable aspects of the human environment, and directed that these resources were to be identified and evaluated in environmental statements.

Executive Order 11593, "Protection and Enhancement of the Cultural Environment," was in furtherance of the purposes and policies of NEPA, the National Historic Preservation Act of 1966, the Historic Sites Act of 1935 and the *Antiquities Act of 1906* (34 Stat.225). The Antiquities Act of 1906 was the first official act passed by the Congress of the United States intended to protect antiquities on public lands in the U.S. Executive Order 11593 asserted that "the Federal Government shall provide leadership in preserving, restoring and maintaining the historical and cultural environment of the Nation." The Order directed federal agencies to assure the preservation of cultural resources under their ownership, ordered these agencies to nominate to the National Register all properties under their jurisdiction that meet the criteria for such nomination and directed them to take such steps as necessary to ensure the protection and preservation of the cultural resources under their control.

To implement these actions at the state level, federal matching funds were made available to the *State Historic Preservation Officer* (SHPO) of each state. The SHPO for the state of Idaho is Dr. Merle Wells, an historian with the Idaho Historical Society. Until the early 1970s, the Idaho

State University Museum was the leader in conducting surveys in Idaho and was responsible for the establishment and maintenance of the systematic index of archaeological sites in the state. Because of a substantial increase in archaeological activity beginning in the early 1970s, it became increasingly difficult for the ISU Museum to maintain such functions for the entire state. A cooperative arrangement had to be worked out between the increasing number of professional archaeologists employed in the state of Idaho, the institutions involved in training archaeologists and in archaeological research, and the State Historic Preservation Officer.

With the assistance of Dr. Wells and the approval of the Board of Trustees of the Idaho Historical Society, an *Idaho Advisory Council of Professional Archaeologists* was formed in 1974 and a State Archaeologist hired to carry out policies recommended by the Council and approved by the SHPO and the Board of Trustees of the Idaho Historical Society. The Council meets twice a year to discuss problems and formulate policies relating to the identification, evaluation and preservation of archaeological resources in the state of Idaho. Membership on the Council is open to all professional archaeologists employed in the state.

In addition to the Council, three archaeological centers, each located to serve a particular area of the state, were established. The first of these centers, located on the campus of Idaho State University at Pocatello, operates as part of the Division of Archaeology, Idaho Museum of Natural History (formerly ISU Museum; name change approved by State Board of Education May, 1977). This regional center maintains archaeological survey records for the following counties:

Bannock	Camas	Fremont	Madison
Bear Lake	Caribou	Gooding	Minidoka
Bingham	Cassia	Jefferson	Oneida
Blaine	Clark	Jerome	Power
Bonneville	Custer	Lemhi	Teton
Butte	Franklin	Lincoln	Twin Falls

The second regional center is located on the campus of the University of Idaho at Moscow, and maintains archaeological survey records for the following counties:

Benewah	Kootenai
Bonner	Latah
Boundary	Lewis
Clearwater	Nez Perce
Idaho	Shoshone

The third regional center is located in Boise, and operates as part of the Office of the State Archaeologist, Idaho Historical Society. This center maintains archaeological survey records for the following counties:

Ada	Gem
Adams	Owyhee
Boise	Payette
Canyon	Valley
Elmore	Washington

The regional centers are not intended to delineate specific geographic areas of archaeological research within the state. Nevertheless, it may be desirable to develop an overview of the geographic areas served by each center. That is my main objective in this third edition of *A Guide to Understanding Idaho Archaeology*: to provide an overview of the archaeology of the Upper Snake and Salmon River Country.

There are many who have contributed their labors to this third edition of the *Guide*, and I should like to acknowledge their efforts here: for the many hours of editing and re-editing, Beatrice Condit, Lucille Harten, Jo Parris, Barbara Santos and Cris Torp; for the drawings, Randy Engle, Erica Hansen, Frankie McNealy and Anne Spangler; and for typing and re-typing as well as editing work on the numerous drafts, Linda Rohner. A special note of thanks is also due Drs. David Wright, Jr., Director of the Museum, Merle Wells, State Historic Preservation Officer, and Thomas Green, State Archaeologist, for their encouragement and assistance in getting this edition of the *Guide* into print. Dr. Karl Holte of the ISU Department of Biology was kind enough to review the list of native edible plants in Table 2 and to add to it. None of the aforementioned individuals is responsible, however, for the shortcomings of this volume.

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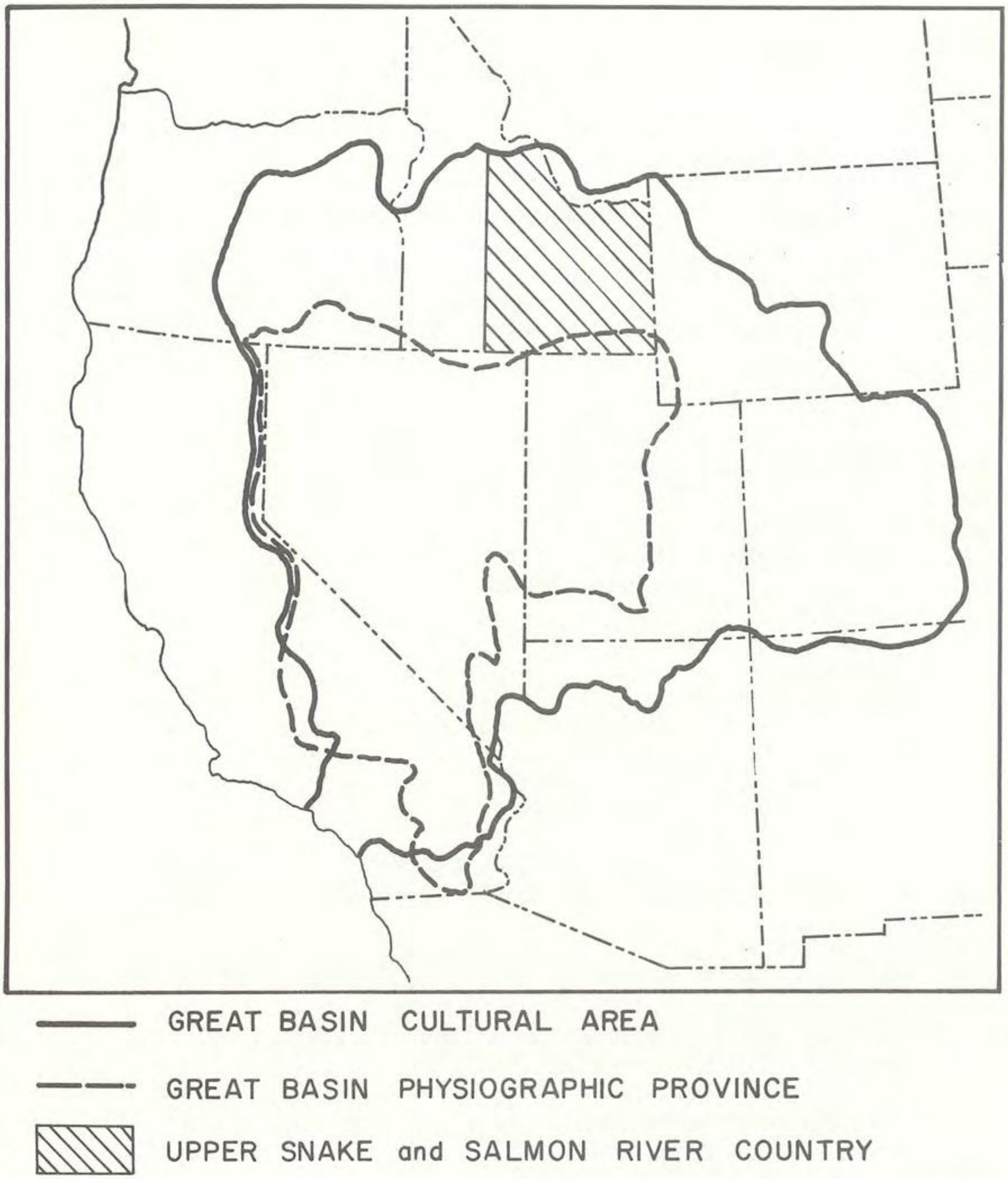


Fig. 1. The Upper Snake and Salmon River Country in relation to the Great Basin culture area and physiographic province.

I. INTRODUCTION

A. An Approach to the Archaeology of the Upper Snake and Salmon River Country

My approach to the archaeology of this region (Fig.1) is by way of the natural setting in which the prehistoric peoples lived. By natural setting, I mean that whole combination of plants, animals, soils, landforms, climate and their interrelationships that comprised the changing ecology of the region throughout prehistoric human occupation. This approach tends to emphasize those aspects of the natural setting that probably had the greatest influence on the lifeways (cultures) of the prehistoric peoples inhabiting the area as evidenced in the surviving remains of their material equipment, facilities and food.

The value of such an approach has long been recognized by both archaeologists and ethnologists. J.D. Clark (1960:308) stated it well from the point of view of archaeology when he said, in another context, "It is essential that the *environment and ecological setting* of [prehistoric] cultures...be established as accurately as possible, for without this knowledge, we can hardly begin to interpret the cultural evidence." Julian Steward made use of this approach in his authoritative study of the native peoples of the Great Basin culture area, published in 1938. The Great Basin culture area embraces the historic native inhabitants of the Upper Snake and Salmon River Country, the Bannock and Northern Shoshoni. As Steward pointed out in his study (1938:2):

> Most of the [Great Basin] people lived at a bare subsistence level. Their culture was meager in content and simple in structure. Pursuits concerned with problems of daily existence dominated their activities to an extraordinary degree and limited and conditioned their institutions. It was inevitable, therefore, that considerable study should be given to subsistence activities in the different natural areas.

He then went on to say,

> This, however, must not be construed as "environmental determinism," which is generally understood to postulate some kind of automatic and inevitable effect of environment upon culture. It is *human ecology or the modes of behavior by which human beings adapt themselves to their environment. Any adaptation necessarily involves an inter-action of two elements: the natural environment and the particular cultural devices, invented and borrowed, by which the environment is exploited. The kinds of activities entailed in this exploitation affect the different phases of the culture to varying degrees....* (Steward 1938:2; emphasis mine)

According to Steward (1938:2), "analysis of human ecology in the [Great Basin culture] area requires consideration first of certain features of the natural landscape; second, of cultural devices by which the environment was exploited; and third, of resulting adaptations of human behavior and institutions." The same considerations also hold for analysis of prehistoric human lifeways in this area. However, we know too little as yet about the prehistoric environments of the Upper Snake and Salmon River Country and of the cultural devices utilized by its prehistoric human inhabitants to proceed to the third consideration listed by Steward. Therefore, for the purposes at hand, I propose rephrasing Steward's considerations as follows:

1) We must begin by attempting to understand as fully as possible the environment of the Upper Snake and Salmon River Country from the time of earliest possible human habitation down to the historic period. This requires constructing models of the changing environments of the region that can be correlated with existing cultural data.

2) We must examine the existing cultural data so as to reveal what is lacking in our knowledge of the prehistoric cultures of the region as well as to elucidate what is known about these cultures.

3) Finally, we must develop an overview of the cultural materials found in the region that will permit a greater appreciation of these materials and of the lifeways that once existed here.

These, then, are among the objectives of this third edition of *A Guide to Understanding Idaho Archaeology.*

B. The Desert Culture Concept

In the mid-1950s, just before systematic archaeological study of the Upper Snake and Salmon River Country got underway, an important overview of Great Basin prehistory emerged in the form of the Desert Culture Concept. The term "Desert Culture" was coined by Jesse Jennings of the University of Utah in connection with his analysis of materials recovered from Danger Cave near Wendover, Utah (Jennings 1953,1957). He defined the desert lifeway as follows (Jennings 1957:7):

> ...It is certain, first of all, that the population was sparse. The effective social unit was small. An extended family--man, wife or wives, children and children-in-law, some infants--numbering no more than 25 or 30 in all, would constitute a normal, year-round grouping. The

quest for food required most of the energy of the group.

The pattern of life was a cyclic wandering, but it was not a truly nomadic one. The small groups moved regularly from place to place, from valley to upland, in search of the seasonal animal or plant resources which centuries of experience had taught them were to be had. The wandering was not aimless; it was based on intimate and annually renewed knowledge of a relatively well-defined territory. Under such conditions, the material possessions were few, utilitarian and durable or easily manufactured at need. It is also apparent that a culture of such low intensity, and with so little material wealth, would develop no skill or strength in warfare. Indeed there were never any great concentrations of people except when pine-nut harvests or animal drives brought several groups temporarily together, perhaps by prearrangement.

The twin hallmarks of the Desert Culture were the basket and the flat milling stone. The orientation of the culture toward small seeds was well established by 7000 B.C., as these utensils testify. Supplementing vegetable foods, or perhaps of equal importance, was the hunt--virtually every animal of the desert fell prey to trap, snare and weapon...The sparse population favored cave and overhang situations for shelter, although many open camps would have been necessary...The non sedentary gatherers exploited the whole environment, not specializing in any one resource as a primary subsistence base. Particularly they understood small seed harvesting and cookery...

The desert dwellers were expert in the use of plant fibers. A variety of cordage--some as fine as today's machine twisted sewing thread--was made for use in nets, bags, and ropes....

With minor modifications, such as substituting camas bulb harvests for the pine-nut harvests in the second paragraph above, the foregoing could easily be a description of prehistoric lifeways in the Upper Snake and Salmon River Country. However, the Desert Culture Concept entailed other ideas, ideas that are now in the process of being refuted in the Upper Snake and Salmon River Country. I have reference to the conclusions reached about the Desert Culture prior to publication of the 1957 Danger Cave report, summarized in Wauchope, 1956:71:

1. The Desert culture is distinguishable in its culture pattern from the Big-Game Hunting tradition exemplified by Folsom and similar finds...The technology of

the Desert culture is sufficiently distinct from that of the Paleo-Indian big-game hunters to testify not only to a quite different environmental adaptation but to a different cultural outlook as well. At this level of simplicity, even very simple technological devices may be of tremendous importance in opening up an environment to human exploitation...The abundant seed-grinding and plant-preparing tools of the Desert culture form archaeological evidence for [such] technological difference...It is our contention that the Desert culture was better adapted to its distinctive environment than any group of contemporary big-game hunters could have been. The distinction is of more than academic importance, for we perceive a ready and easy transition from the Desert culture to the Southwestern cultures, whereas it would seem to require a much greater cultural shift to make such a transition from a mammoth-hunting life way...

2. The Desert culture is apparently of an antiquity equal to the Plains big-game hunters (Folsom and comparable cultures). The older view, that the seed-using cultures...were later developments out of a big-game hunting base, no longer seems tenable...If the Desert culture actually developed from a big-game hunting base, the time of divergence must be further back than previously considered since a common base has not been found in the Basin or elsewhere. Such a postulated divergence may well have taken place before human occupation of the Southwest, before human entry into the New World...

3. There is geographic separation between the Desert culture and Paleo-Indian hunters, the former being the primary western culture while the latter is more characteristically eastern and northern. There are exceptions, such as the [Clovis] discovery in southern Arizona, but these finds are relatively rare in comparison with the abundance of such material in the High Plains, and, according to recent work, in the East. As noted previously, the makers of fluted-blades in the Eastern Woodlands might well have had a somewhat different subsistence base since they do not seem to have been hunting the now extinct late Pleistocene forms. In the Southwest, the fluted-blade discoveries are seen as evidence of occasional penetrations into a region which was already occupied by Desert culture peoples.

4. Recognition of the Desert culture provides a definition of considerable functional significance. The lumping of the Desert culture with the big-game hunting tradition under the stage "Early Lithic" (as done by Willey

> and Phillips, 1955) seems to us to obscure configurational differences of great importance, and for reasons previously given we feel that the separation must be made. It follows that if there is a continent-wide "Early Lithic" stage out of which these two traditions developed, the stage must be older than 10,000 years ago, by which time two traditions seem to be well-established.

In keeping with these conclusions about the Desert Culture, Jennings (1974:64) believes that "in archaeological interpretations much--perhaps too much--has been made of assumed variability of Late Pleistocene and Recent climates," especially in the Great Basin. He (Jennings 1974:66-67) goes on to describe the ecology of the Basin from this point of view:

> Presumably, prior to 14,000 B.P. [years before the present] the Basin vegetation was ranker and possibly slightly different during the wetter pluvials than today; but after 12,000 B.P. the Basin climate and dependent vegetation and animal resources were not markedly different from now. It can be shown that the effect of the late minor ice advances on the Western climate has been overemphasized, if not exaggerated...Jennings (various) argues that the climate differences, if any, would be small, skewed only a trifle in earliest time toward increased moisture. Slightly more precipitation would result only in ranker growth of steppe plants; it would *not* lead to a widely different ecosystem or a significant change in species proportion....(emphasis mine)

As the data gathered at archaeological sites in the Upper Snake and Salmon River Country will show, all of the foregoing conclusions about the Desert Culture and the environment of the Great Basin culture area over the past 12,000 years are doubtful and a different view of Basin prehistory and environment must be considered. It is in this light that the value of the prehistoric materials from the Upper Snake and Salmon River Country can be readily appreciated.

C. A Brief History of Systematic Archaeological Investigation in the Upper Snake and Salmon River Country

Beginnings

As indicated above, systematic archaeological study of the Upper Snake and Salmon River Country began only recently. However, a serious effort was made in this direction many years earlier on the campus of the Southern Branch of the University of Idaho, the forerunner of Idaho State University. Towards the close of 1934, the Executive Dean of the

Southern Branch of the University of Idaho, Dr. John R. Nichols, appointed an Historical Museum Committee made up entirely of faculty members of the Pocatello campus. According to the report of its chairman, Dr. Charlton Laird of the English Department, the Committee met in December of that year and outlined certain objectives, among them the collection and preservation of materials suitable for a general museum. In connection with the latter,

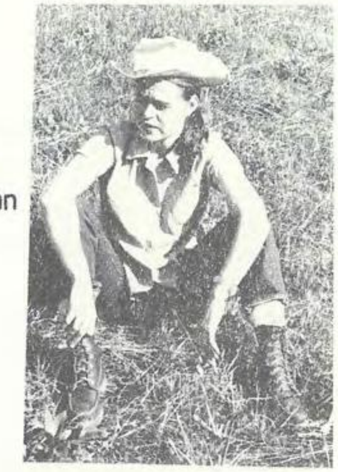
> ...the Committee recognized that a museum here would have a number of natural advantages. It would be one of the few museums in the northern Intermountain area associated with an educational institution, where experts in various fields would be available for consultation. It would be situated at one of the historically important points in the Northwest, where much early material could be saved. It would be located in an area offering unusual opportunities for the study of wild life and natural phenomena. *It would be near the center of an area archaeologically rich, but almost unknown to scientists; and it would be within a few miles of an ethnographic group highly important for our understanding of the aboriginal American, but as yet only inadequately studied.* Thus the Committee felt that it should endeavor to build a general museum, but should give special attention to the collection of materials for which the University of Idaho, Southern Branch, was peculiarly situated. (Laird 1940:1; italics mine)

Although there were no trained archaeologists on the faculty, members of the Historical Museum Committee carried out excavations at several cave sites in the region during the late 1930s. Among these were Pence-Duerig Cave overlooking the Snake River in south-central Idaho and Jackknife Cave at the southern end of the Lemhi Range. Both were written up many years later (Gruhn 1961a; Swanson and Sneed 1971). As a result of its endeavors, the Committee made a number of specific recommendations, among them that an archaeologist should be added to the staff of the Southern Branch to direct mapping and excavation of the more important sites in the region (Laird 1940). None of the Committee's recommendations were to be realized, however, until the late 1950s. World War II intervened and the growing campus had other priorities.

Many of the recommendations contained in the 1940 report of the Historical Museum Committee were directly owed to Dr. Sven Liljeblad (Fig.2), a Swedish ethnographer and linguist who had come to Idaho just before World War II for the purpose of studying the language and culture of the Bannock and Shoshoni. These recommendations reflected his scholarly knowledge of the value of the archaeological and ethnographical resources of the region. Dr. Liljeblad received the title of "Museum Field Representative" in 1942, but there was no salary connected with this position. He subsisted on his own limited funds while studying the language and culture of the native peoples of this area. By 1951 these funds were nearly depleted, and he was planning to join the crew of a Portuguese fishing boat. In the meanwhile,

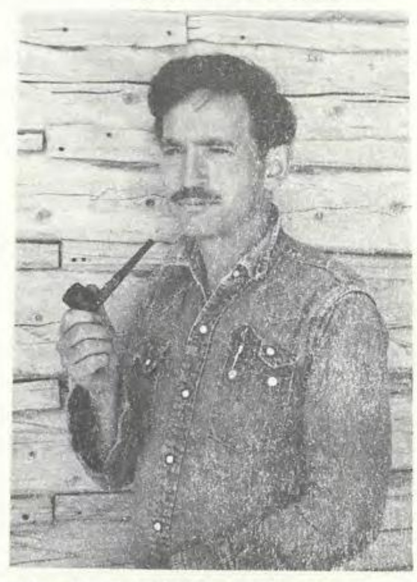
Sven Liljeblad

Ruth Gruhn



Earl H. Swanson Jr.

B. Robert Butler



Alan Bryan

Fig. 2. Some of the people involved in the Idaho State College Museum and the Birch Creek Project in the early 1960s: Dr. Sven Liljeblad, a leading scholar on Bannock and Shoshoni languages and culture; Ms. (now Dr.) Ruth Gruhn, who was in charge of the excavations at Wilson Butte Cave; Dr. Earl H. Swanson, Jr., Director of the Museum and chief architect of the Birch Creek Project; Dr. Alan Lyle Bryan, one of the principal archaeological field surveyors; and B. Robert Butler, Research Associate and later Curator of Archaeology in the Museum and Associate Professor of Anthropology.

the Southern Branch of the University of Idaho had become Idaho State College. Dr. Carl McIntosh, President of the College, learned of Dr. Liljeblad's plan and suggested to the current Chairman of the Historical Museum Committee, Dr. Edson Fichter, a zoologist, that Dr. Liljeblad might be employed to reorganize the Museum collections, which were then in a terrible state of disarray. For the next three years, Dr. Liljeblad labored many long hours at this grueling task.

Meanwhile, construction of a new campus library building began. Dr. McIntosh decided that an unexcavated portion of the basement of this new building would serve admirably for museum space, and effected changes in the construction plans to that end. Subsequently, with neither windows nor adequate ventilation and light, the late Prof. William Kitaj of the Foreign Language Department, Prof. Merrill Beal of the History Department and Dr. Fichter scraped heavy accumulations of dried mud from the 10,000 square feet of newly created floor space to make a place for the Museum collections and exhibits. Two weeks before the doors of the building were opened in November, 1956, Dr. Fichter and Dr. Liljeblad hurriedly prepared exhibits in six old candy counter display cases representing the proposed divisions of the Museum. The exhibits proved to be a success. Shortly thereafter the search began for a Museum director trained in archaeology. With the help of Dr. Jesse Jennings, the search quickly narrowed to a young man who had just completed his graduate studies in archaeology at the University of Washington--Dr. Earl H. Swanson, Jr. (Fig.2).

Immediately following his arrival on campus in the fall of 1957, Dr. Swanson instituted two programs that were to have a very far-reaching effect on the archaeology of the Upper Snake and Salmon River Country. The first program involved establishing two Museum publications: a quarterly called *Museum Notes and News* and a monograph series, the *Occasional Papers of the Idaho State College Museum*. Volume 1, Number 1 of *Museum Notes and News* was issued in October, 1957. Number 2 followed a month later, and Numbers 3 and 4 were issued during the first half of 1958. Commencing with Volume 2, *Museum Notes and News* became *Tebiwa, Journal of the Idaho State College Museum*. The total number of pages per volume was greatly increased, but the number of issues per year was reduced to two. *Tebiwa* is an anglicized form of a Bannock word meaning "homeland" or "native land" (Vol.2, No.1, the Editor's page).

Number 1 of the *Occasional Papers*, "The Archaeological Survey System of the Museum" (Swanson 1958a), was published in February of 1958, six months after Swanson arrived at the college. This paper outlined an archaeological survey system that would readily apply to the entire state, cited laws pertaining to the conservation and preservation of archaeological resources within the state and illustrated the method of recording information on an archaeological survey form prepared by the Museum for this purpose. The next *Occasional Paper*, issued the following year (1959), was a direct consequence of the second program instituted by Dr. Swanson during his first year as director of the Museum.

The second program involved a systematic survey and appraisal of the region's archaeological resources. A program of this kind usually requires the services of several competent archaeologists as well as adequate financial support. Neither was available at the time on the Idaho State College campus. Nevertheless, thanks to the procurement of a National Park Service contract for extensive archaeological survey work in central and southern

Idaho during the summer of 1958, the second program was soon under way. This contract enabled Dr. Swanson to bring two highly experienced survey archaeologists to Pocatello, Donald R. Tuohy and Alan Lyle Bryan (Fig.2), former classmates of Swanson's and mine at the University of Washington. Early in the summer of 1958 these three, each with an assistant, set out to explore the different sections of the Salmon and Snake River drainages stipulated in the National Park Service contract.

By the end of the summer, Swanson, Tuohy and Bryan had located 650 archaeological sites and had collected more than 8,000 artifacts. Through the following autumn and winter months they catalogued, sorted and studied the artifacts and prepared a report. The report covered the occurrence and distribution of such things as pictographs, petroglyphs, tipi rings and housepits that they had observed the previous summer, as well as types and distributions of the stone artifacts they had collected at the same time. It was published as *Occasional Papers of the Idaho State College Museum*, Number 2, "Archaeological Explorations in Central and South Idaho--1958" (Swanson, Tuohy and Bryan 1959). The Museum survey program did not end with the publication of this paper, nor was this paper the only consequence of the 1958 survey.

Wilson Butte Cave

During the course of the 1958 survey, certain of the sites and localities found were believed to be of primary importance in understanding the prehistory of the Upper Snake and Salmon River Country. The National Park Service contract did not provide for intensive investigation of these sites and localities. Support for such investigations would have to come from other sources, but this was not long in coming.

That very autumn (1958), Ruth Gruhn (Fig.2), working out of the Peabody Museum of Harvard University, came to Pocatello in search of a pioneering problem in environmental archaeology suitable for a doctoral dissertation. In the company of Swanson and Bryan, Gruhn inspected a number of the more promising sites that these men had found, and chose to excavate Wilson Butte Cave on the Snake River Plain in south-central Idaho. Funds for the Wilson Butte Cave project were raised by Dr. J.O. Brew, Director of the Peabody Museum of Harvard University; logistical support and guidance were provided by the Idaho State College Museum. Work began at Wilson Butte Cave during the summer of 1959 and was completed the following summer. A year later the largest, most thorough and comprehensive report ever written on a single archaeological site in Idaho, "The Archaeology of Wilson Butte Cave, South-Central Idaho," was published as an *Occasional Paper of the Idaho State College Museum* (Gruhn 1961b). Because of its importance in understanding the prehistoric environments and cultural sequences in the region, the results of the Wilson Butte Cave excavations are described at length here.

This cave is a lava blister situated on a broad basaltic ridge which rises approximately 300 feet above the Plain and is some 4,300 feet above sea level (a.s.l.). It is located approximately 15 miles north of the Snake River in the south-central part of the state (Fig.3). The immediate environment of the cave is typical of the more arid parts of the Snake River Plain; rainfall averages less than 10 inches per year and sagebrush dominates the landscape.

The entrance to the cave is at ground level. The interior of the cave, however, is largely below the ground level and one must descend from the mouth to the surface of the deposits inside. The uppermost of these deposits is quite dry. Consequently, many perishable items left by the last human inhabitants of the shelter are to be found in this deposit. Altogether, there are five major deposits within the cave. From the surface to bedrock, they are as follows: Stratum A, dust and dry vegetal material; Stratum B, silt; Stratum C, sand; Stratum D, sandy silt; and Stratum E, the lowest deposit, clay. A generalized drawing of the stratigraphy at Wilson Butte Cave is shown in Fig.3. The "man" standing at the entrance to the cave has been drawn to scale.

The lower three strata, E, D and C, were water-deposited, while the upper two, B and A, were definitely wind-deposited. The water-laid deposits clearly indicate more moist conditions outside the cave than is presently the case, a conclusion supported by the types of small mammals and birds represented in the deposits. The change from the former moist conditions to the present dry conditions in the vicinity of the cave was not abrupt. Stratum C, by far the thickest deposit at the site, yielded enormous quantities of small mammal bones, and the relative proportions of the various species represented in these bones indicate a gradual trend towards dry conditions outside the cave.

Also of interest is the succession of big-game animal forms represented in the deposits at Wilson Butte Cave. The lowest and oldest deposit, Stratum E, yielded the bones of two extinct forms of camel and one of horse. No identifiable big-game animal bones were recovered from Stratum D. The massive Stratum C deposit, which can be divided into an upper, middle and lower unit, yielded evidence of the following big-game animals: in the lower unit, two extinct forms of camel, one of horse and possibly one of sloth; in the middle unit, an extinct form of camel and the modern (?) form of bison; and in the upper unit, the modern form of bison only (the modern form of bison is frequently called buffalo in North America). The uppermost deposits at the site, Strata B and A, yielded bones of the modern form of bison along with a few bones of deer or antelope.

On the basis of a careful study of the physical properties of the deposits and the types of animals associated with them, Gruhn (1961b: 41-42) offered the following tentative reconstruction of the changing environment in the vicinity of Wilson Butte Cave:

> During the period of deposition of Stratum E, the yellow brown clay, the climate was moist and probably cooler than at present. There is some evidence that forest cover may have been present on the butte at this time. The plains around Wilson Butte were probably moist grassland or parkland, where camel and horse grazed. A body of water supporting ducks and shorebirds was evidently nearby...
>
> An amelioration in climate is indicated by the break between Stratum E and the overlying strata, suggesting there was a dry interval when no water flowed through the cave. Later, deposits of silt and sand (Stratum D) accumulated near the front of the cave, indicating a resumption of moist

> conditions. An interval of severe cold is suggested by the frost trails in the Stratum D deposits.
>
> The break between Stratum D and Stratum C may represent another dry interval followed by water erosion. Moist conditions were again present during the period of deposition of the grey brown sand, Stratum C. At this time grassland was probably dominant on the plains around Wilson Butte, and heavy vegetation apparently disappeared from its summit after the early part of the period. Early in this period horse and ground sloth (?) apparently disappeared from the scene, but camel continued until the middle part of the period, at which time modern bison were also present on the plains, later becoming the major herbivore in the region.
>
> The end of deposition of the waterlaid grey/brown sand was evidently brought about by a period of severe aridity, and aeolian [i.e., wind-laid] deposits began to accumulate in the cave. The [small mammal] remains in Stratum B suggest a semi-arid climatic period, and xerophytic [desert type] plants probably became dominant on the plains around Wilson Butte. Grass, however, was probably abundant, as bison were apparently still numerous...
>
> The environment of Wilson Butte Cave during the period of deposition of Stratum A was evidently much like the present. The [assemblage of small mammals] is desert or prairie in character. Sagebrush was abundant, but there was also evidently sufficient grass for bison, the principal hunt animal for the occupants of Wilson Butte Cave at this time.

She was able to secure dates on six radiocarbon samples from the Wilson Butte Cave deposits. The dates and the provenience of the samples from which the dates were derived are listed below in Table 1.

TABLE 1
The Wilson Butte Cave
Radiocarbon Dates and Their Provenience

Date in Years B.P.	Stratum
15,000 ± 800 (13,050 B.C.)	E
14,500 ± 500 (12,550 B.C.)	C, lower zone
6,850 ± 300 (4,900 B.C.)	C, upper zone
2,940 ± 200 (990 B.C.)	B, middle zone
940 ± 200 (A.D. 1010)	B, upper zone
425 ± 150 (A.D. 1525)	A, middle zone

The radiocarbon dates from Wilson Butte Cave permit the establishment of a broad chronological framework within which the various events at the site can be placed. So far as environmental events are concerned, the climate in the vicinity of Wilson Butte Cave was generally more moist during the entire period between 15,000 years ago and 6,850 years ago than it is at the present time. At the beginning of this period, the climate was cooler and moister than at any time since then. Thereafter the climate gradually became warmer and drier. This was followed by a period of relative aridity, which began approximately 6,850 years ago and which appears to have prevailed down to the present day.

In describing the cultural materials from Wilson Butte Cave, Gruhn (1961b:116) used the term "assemblage" to "designate groups of artifacts which appeared to be in physical association, occurring together in limited areas or at approximately the same relative depth in the same stratum." There are six such artifact assemblages, labeled Roman numerals I-VI; each is "characterized by different artifact types, in particular, projectile points; and appear to represent occupations of the cave by distinctive cultural groups." Some of the characteristic artifacts (mainly projectile points) are illustrated in Fig.4.

Wilson Butte I. This assemblage consists of five artifacts, three of stone and two of bone, recovered from near the base of Stratum C. The stone artifacts include: (1) a small, slightly utilized ignimbrite flake; (2) a thick, triangular, percussion-flaked basalt point; and (3) a thick, parallel-sided chalcedony flake that has been partially retouched along the edges (i.e., modified by having flakes pressed off the edges). Gruhn (1961b:116) refers to the second and third artifacts (Fig.4) as "knives." The bone artifacts include a long bone splinter that might have been employed as a pressure-flaking tool and a small fragment of mammal bone with a series of short parallel scratches that were probably made by a stone knife. Similar scratches were also observed on two bone fragments from Stratum E. However, there were no definite tools associated with this stratum. Presumably, man was present at Wilson Butte Cave during the time Stratum E was accumulating there, but the evidence of his presence is uncertain. The Wilson Butte I assemblage, therefore, represents the earliest unequivocal evidence of man at Wilson Butte Cave. The radiocarbon date for the lower zone of Stratum C, from which the Wilson Butte I assemblage was recovered, is 14,500 $\pm$ 500 B.P. This places the Wilson Butte I artifacts among the oldest definitely dated artifacts in the New World. Unfortunately, they are not distinctive enough to relate them to any particular cultural tradition in the New World.

Wilson Butte II. This assemblage consists of 22 stone artifacts recovered from the middle zone of Stratum C. The majority of these, which include such things as a hammerstone and some utilized flakes, scrapers, and "knives," are of little interest since they are generally non-diagnostic. Of primary interest are two categories of implements found in this assemblage: (a) food grinding implements and (b) projectile points. The first category is represented by a fragment of a vesicular lava mano (handstone) that exhibits definite signs of having been used. The second category is represented by basal fragments of five points, four of which (Gruhn 1961b: 127) "clearly indicate close relationship with the culture of the specialized bison hunters of the large, lanceolate, parallel-flaked point tradition on the Great Plains (cf. Wormington 1957:103-147)." The manifestations of this tradition at Wilson Butte Cave are coincident with the first appearance of bison remains at the site.

The presence of a mano (handstone) in the context of the Wilson Butte II assemblage suggests that this type of implement, which is often regarded as one of the hallmarks of the Desert Culture pattern, either may not have originated with the Desert Culture or was not unique to that way of life. There is little reason for believing that the diet of the Early Big-Game Hunters on the Plains was restricted to meat alone. Like most hunters the world over, they probably rounded out their diet with plant foods, including some edible seeds. Compared with the amount of meat represented by the big-game animal remains associated with the Wilson Butte II assemblage, the single mano in this assemblage would not seem to indicate any great dependence on seeds or other plant foods. The only other manos and milling stones recovered from Wilson Butte Cave came from the upper part of Stratum B and from Statum A and form parts of assemblages V and VI, both of which have the remains of big-game animals (viz., bison) associated with them. In short, big-game hunting appears to have been the primary occupation of the various inhabitants of Wilson Butte Cave while they were at this site.

Wilson Butte III. The most distinctive artifacts in this small assemblage, which dates from approximately 5000 B.C. and is associated with the upper zone of Stratum C, are some stemmed, indented-base projectile points (Fig.4). These, according to Gruhn (1961b:119), "mark the first appearance of early Great Basin culture at Wilson Butte Cave." Her statement stems from the fact that similar projectile points occur in the Great Basin approximately 2,000 years earlier than at Wilson Butte Cave. Projectile points of this general type also occur on the Great Plains, but at a somewhat later date than at Wilson Butte Cave. She (1961b:119) also notes that the distribution of stemmed, indented-base points in Idaho "appears to coincide largely with that of the Great Basin area in Idaho." On the basis of these considerations, she (ibid.:149) concludes that the occurrence of these points at Wilson Butte Cave at this time (ca. 5000 B.C.) "may indicate an expansion of the Desert Culture north out of the Great Basin as conditions on the Snake River Plain became more arid with the approach of the Altithermal period." The Altithermal period (interval) is the postulated phase of maximum warmth and dryness marking the beginning of the postglacial climatic conditions in North America, which I shall discuss in the chapter treating the environment of the Upper Snake and Salmon River Country through time.

Wilson Butte IV. This assemblage, which appears to be only 500 years younger than Wilson Butte III, and is also associated with the upper zone of Stratum C, is characterized by stemmed, shouldered points and large side-notched points. These were among the many types of points found in the long sequence at Danger Cave, and are presumably indicative of archaic cultures.

Wilson Butte V. During the hypothesized Altithermal interval (ca. 4500 B.C. to 1500 B.C.), which followed Wilson Butte IV in time, Wilson Butte Cave does not appear to have been occupied. Presumably, the Snake River Plain was not fit for either man or beast (i.e., bison) at this time. As soon as this supposed phase of maximum warmth and dryness passed, however, both man and beast are once more in evidence at Wilson Butte Cave. Wilson Butte V, the first of the post-Altithermal assemblages, probably dates between 2000 B.C. and 500 B.C. (Gruhn 1961b:149). In general, this assemblage (1961b:131) "shows affiliations with sites of the Early and Late Middle Prehistoric Period in the northwestern Plains. Traits characteristic of this period on the northwestern Plains found in the Wilson Butte V assemblage include medium-sized lanceolate points, large to medium-sized corner-notched points, large side-notched points, gravers, spokeshaves, and milling stones." The first of the projectile points mentioned here are of the "McKean" Lanceolate type, an example of which is illustrated in Fig.4. This type, which is widespread on the northwestern Plains at around 2500-1500 B.C., was named after the McKean site in northeastern Wyoming, where a large series of these points was recovered. In Idaho, this type of point appears to be largely restricted in distribution to the Snake River Plain and the foothills to the south (Gruhn 1961b:131). It also occurs in the northern Great Basin, but at a much earlier time than either on the northwestern Plains or in Idaho (cf. form W-6 at Danger Cave near Wendover, Utah; Jennings 1957).

This is also true of certain other traits that the Great Basin and northwestern Plains share in common. The temporal priority of these traits in the northern Great Basin has led some archaeologists (Jennings among them) to speculate that the Middle Prehistoric Period on the northwestern Plains may represent a movement of population out of the Great Basin into the adjacent margins of the Plains. Because of the estimated age of the Wilson Butte V assemblage, which includes some of these traits, Gruhn (1961b:150) suggests that this assemblage "could be related to such a cultural expansion, and the Snake River Plain was evidently an intermediate area between the northern Great Basin and the Great Plains at this time."

Wilson Butte VI. This late prehistoric assemblage, which dates from after A.D. 1300, is the only one at Wilson Butte Cave containing perishable materials. Among these are: sagebrush bark cordage; one-piece wooden arrowshafts; composite arrowshafts with cane mainshafts and wooden foreshafts; composite fire drills; and a leather moccasin. The durable goods in this assemblage consist of such things as bone gaming pieces, small side-notched and corner-notched arrowpoints (Fig.4), and a type of coarse pottery that Gruhn calls Wilson Butte Plain Ware.

Primarily on the basis of the associated pottery, which is "clearly related to pottery definitely identified as Shoshonean in Western Utah and further southeast in the Great Basin," Gruhn (1961b:143) is fairly certain that the late prehistoric inhabitants of Wilson Butte Cave were Shoshoneans. Other material culture traits in the Wilson Butte Cave assemblage are similar to those found among the ethnographic Shoshoni-speaking peoples of the Great Basin, and this lends further support to her conclusion regarding the identity of the late prehistoric inhabitants of Wilson Butte Cave. Granting the fact that these people were Shoshoneans, when did the Shoshoni enter Idaho?

According to Gruhn (1961b:148), "the evidence from Wilson Butte Cave indicates that Shoshonean peoples from the Great Basin had entered southern

Idaho by A.D. 1300-1400." In addition to the distinctive type of pottery, another possible archaeological marker considered by her for the spread of Shoshoneans north and east out of the Great Basin at this time are the small side-notched points associated with the Wilson Butte VI assemblage. Points of this type have long been referred to as "Shoshone" points. Baumhoff and Byrne (1959), in a study of the temporal and geographic distribution of points of this type in eastern California, called them "Desert Side-notched" points. This is the name by which points of this type are now identified in the regional literature. Baumhoff and Byrne found that Desert Side-notched points first appeared in the southern Sierra Nevadas at approximately A.D. 1350 and in northeastern California at approximately A.D. 1500, indicating that this type of point spread from the southern to the northern part of the Sierra Nevada Range in roughly 150 years. Presumably, a similar time slope is also indicated for the spread of Desert Side-notched points northward out of the Great Basin into southern Idaho. That this may not be entirely true, I shall demonstrate further along.

In addition to the above-mentioned archaeological evidence, Gruhn (1961b:144-145) also cited certain linguistic studies that indicate a late prehistoric dispersion of Numic-speaking peoples, the Shoshoni among them, out of the southwest corner of the Great Basin. These studies are in agreement with the supposed archaeological evidence pointing to a very recent arrival of Shoshoni in Idaho. According to this line of evidence, the ancestors of the ***tú̈kudeka***, a group of Northern Shoshoni inhabiting the mountains of central Idaho during the early historic period, would not have arrived in their new homeland until the late 15th or early 16th century.

The Birch Creek Project

This project, like the Wilson Butte Cave excavations, was another consequence of the 1958 survey. It was also environmentally oriented, but in a much different way than the Wilson Butte Cave excavations. A grant for purposes of conducting an archaeological study in the Birch Creek Valley of eastern Idaho (Fig.3) was awarded to Dr. Swanson by the National Science Foundation in 1959. It was the first of a long series awarded to Swanson by the Foundation for this work. The final report on the project was not completed and published until 1972 (Swanson 1972). It was to be the capstone of Swanson's career, for he died at the age of 47 in March, 1975, a consequence of his long-standing diabetic condition, which also contributed to his near total blindness as early as the summer of 1960, the first season of the Birch Creek Project.

As he made clear in the final report on the Birch Creek Project, Swanson (1972:5-6) rejected the idea that the Northern Shoshoni were relatively recent arrivals in the Upper Snake and Salmon River Country:

> Birch Creek was an experiment. I went there with the possibility in mind that the Northern Shoshoni belonged to the mountains. A generation of scholars thought that these peoples were late arrivals in the land now known as Idaho. The succession of scholarly works in which this thesis has been

> maintained is impressive and has its own strength. The beginning point of modern scholarly judgement on this matter rests with Julian Steward. Steward's classic Basin-Plateau Aboriginal Sociopolitical Groups (1938) sets the foundations for the interpretation of Northern Shoshoni as late migrants out of the Great Basin who were converted to horse-mounted bands by the spread of Plains influence. Others have followed without ever questioning the assumption that the Northern Shoshoni and their eastern neighbors came into their historic setting no more than 7 to 10 centuries ago...The assumption was reinforced by the tendency among anthropologists to treat a mountain area as a marginal refuge. This is reflected in Steward's initial statements about the Northern Shoshoni (Steward 1938:186). The results of this generation of thought were about as follows: the Northern Shoshoni and the linguistic group to which they belong, Shoshoni-Comanche, were supposed to have split away from other of the Numian-speaking peoples of the Great Basin perhaps seven centuries ago (i.e., circa A.D. 1300). They spread north and east from the Basin taking with them the desert culture of that area. This type of culture was slowly modified by the westward spread of Classic Plains Culture through people known today as the Crow and Blackfeet. The Northern Shoshoni band known as the Mountain or Mountain Sheepeater Shoshoni was driven into the great complex of mountains and valleys and meadows north of the Snake River Plain. In this marginal position, unfit for most human habitation, they survived as renegades while their more easterly relations borrowed the horse and some of Plains Culture and advanced their cultural standing, if not their geographic position.

Swanson (1972:6) believed that it would make equally good sense to assume that the Northern Shoshoni had occupied the Northern Rocky Mountain setting for a long, long time and that their linguistic relatives to the south and west had spread out of the Rocky Mountains to the Great Basin around a thousand years ago. Although these assumptions may appear rather facetious, he took them seriously. For purposes of the Birch Creek Project, Swanson went on to assume that Northern Shoshoni culture was so intertwined with the Northern Rocky Mountain setting that the boundaries of the former were essentially the same as the latter. Thus, all that was needed to test his idea concerning the antiquity of Northern Shoshoni culture was a "geographic unit which illustrated the range of conditions found throughout Northern Shoshoni territory" (Swanson 1972:6). He felt that a single mountain valley, such as the valley of Birch Creek, would be suitable "because changes in altitude, precipitation and drainage might approximate the variations in environment over much of the Northern Rocky Mountain region occupied by these people." Birch Creek Valley was selected because the 1958 survey "had shown there was occupation in a range of topographic positions and because there were at least two sites with apparent substantial stratigraphic depth" (Swanson 1972:6), the Bison and Veratic rockshelters.

These rockshelters were initially formed at the time Birch Creek flowed against a limestone cliff at the foot of the mountains along the eastern side of the valley (Fig.5). To the north and south of the sites are steep, narrow canyons. An alluvial fan has formed at the mouth of each of these canyons. Such fans are built by streams issuing from mountains upon low-lying land. They are usually low, cone-shaped heaps of rock and finer debris, steepest near the mouths of the canyons from which they debouch, and sloping outward from there in an ever-decreasing gradient. The Veratic rockshelter is situated at the low point between the two aforementioned fans and has been partially filled by materials from both. The Bison rockshelter is situated at a higher point relative to Veratic rockshelter. This site contains a greater depth of deposits than Veratic rockshelter, but these deposits are of the same antiquity as those in the latter site. At present, the "streams" in the vicinity of the two sites are not active except for brief moments during wet years.

The depositional sequence at these sites is easiest to describe in terms of the Bison rockshelter accumulations. These can be grouped into seven natural depositional units, as follows (this summary is mine):

> *Unit 1:* Water-rounded gravel and flood loam, probably deposited by Birch Creek when that stream was flowing against the face of the cliff at the back of the site and when the climate was much moister than at present. If the date for Glacier Peak ash, a layer of which is enclosed in the lower part of the next unit, is correct--ca. 11,300 years ago as determined by Mehringer, et al. (1977; see below)--then Birch Creek ceased flowing against the face of the cliff shortly before 11,300 years ago.
>
> *Unit 2:* A thick accumulation of coarse angular fan gravel and/or rockfall, called Fan Gravel I in the field, which probably formed under peri-glacial conditions associated with a glacial episode in the Lemhi Range. Enclosed in this accumulation of coarse gravel are a layer of Glacier Peak ash and a layer of Mount Mazama ash (Fig.5). Glacier Peak and Mount Mazama are two of the many volcanic vents in the Cascade Range that produced volcanic ash deposits found widely spread over the Pacific Northwest. There were several eruptions of Glacier Peak and one large eruption of Mount Mazama; the last resulted in the formation of Crater Lake, Oregon. The Glacier Peak ash in Unit 2 of the Bison cave deposits I believe to be referable to the Glacier Peak ash deposits enclosed in the Lost Trail Pass bog on the Continental Divide due north of Salmon, Idaho, which have been radiocarbon dated between 11,200 $\pm$ 100 and 11,300 $\pm$ 230 years ago (Mehringer, et al. 1977). Because the Glacier Peak deposit occurs near the bottom of Unit 2, I estimate the beginning date for this sedimentary unit as between 11,300 and 12,000 years ago. The Mazama ash enclosed in the Lost Trail Pass bog dated

between 6,700 ± 100 and 6,720 ± 120 years ago (Mehringer, et al. 1977), which is consistent with other dates for this ash deposit in the Pacific Northwest, but slightly younger than the date previously established for this ash deposit at Bison cave (Swanson 1972:51). Because Unit 2 continued to accumulate for some time after this ash fall, I estimate a terminal date of ca. 6,100 years ago.

Unit 3: A series of layers of fine sediments, composed mostly of wind-blown silt. The beginning date for the accumulation of these sediments is approximately 6,100 B.P. and the terminal date is approximately 3,500 B.P.

Unit 4: Another accumulation of coarse angular gravel or rockfall similar to Unit 2. The upper part of this unit has been radiocarbon dated at 3,400 B.P.

Unit 5: A series of fine to coarse sand and silt layers, probably deposited under climatic conditions similar to the present. Radiocarbon dates indicate that this unit began to accumulate approximately 3,000 years ago and was still accumulating as late as 900 years ago.

Unit 6: Four or five layers of fine angular gravel or "scale." The upper two layers of this unit contained blue "seed" beads of European origin. Estimated terminal date for this unit is A.D. 1800.

Unit 7: Several thin layers of decomposed organic matter, capped by a thick accumulation of cattle (?) dung. One of the thin layers contained, in addition to many objects of native manufacture, several European trade beads and a gunflint. This latest occupation at the site probably dates from between A.D. 1840 and A.D. 1860.

Based mainly on considerations of these and similar accumulations of geologic sediments at the Veratic rockshelter, Swanson (1972:35ff) inferred a sequence of environmental conditions which he believed to be representative of those found in the Rocky Mountains throughout the time of human occupation. He divided this sequence into seven periods, each characterized as follows (Swanson 1972:61-62, with dates inserted by me):

I (ending ca. 11,300 B.P.)--wet, turning drier at the end;

II (11,300-7,200 B.P.)--primarily cold and moist, but drier at the beginning and at the end of the period;

III (7,200-5,850 B.P.)--primarily arid, especially at the start, but alternating with semi-arid conditions toward the latter part of the period;

IV (5,850-3,450 B.P.)--cool, moist;

V (3,450 B.P.-A.D. 1250)--arid, then briefly cool and moist, turning semi-arid, but not uniformly so;

VI (A.D. 1250-1850)--briefly dry, then cool and moist but less so than periods II and IV; and

VII (A.D. 1850 to present)--semi-arid

Enclosed in the geological sediments at the Bison and Veratic rockshelters was a long sequence of artifacts which had, according to Swanson (1972:65), "a chronology and set of associations of their own." This cultural sequence was divided into five periods or phases: "(I) Birch Creek, 9000-5200 B.C.; (II) Bitterroot, 5200-1450 B.C.; (III) Beaverhead, 1450-950 B.C.; (IV) Blue Dome, 950 B.C.-A.D. 1250; and (V) Lemhi, A.D. 1250-1850." The last phase correlates directly in time with Northern Shoshoni culture, but this phase is not the first manifestation of Northern Shoshoni culture at the two rockshelters, at least in Swanson's view (1972:187):

> The evidence at hand indicates that the ancestors of the Northern Shoshoni were in the region by 8,500-8,000 years ago and that they were from the beginning hunters of diverse big game. The pattern of this evidence in a series of archaeological sites has led to the use of the term *Bitterroot Culture* as the archaeological expression of the Northern Shoshoni. The pattern of the Bitterroot Culture represents part of the prehistory of the Northern Shoshoni. It is that part of their life which was associated with big game hunting and food collecting in the environment of high mountain valleys. Since all of the Northern Shoshoni lived in historic times in the open valleys and canyons of the Northern and Central Rocky Mountains, the geography of the Bitterroot pattern reflects accurately the prehistory of this culture....

Swanson had a great deal more to say about the Bitterroot Culture than mentioned here; however, the foregoing serves to point up the direction and character of his thinking. There are many problems inherent in this approach to and interpretation of the Birch Creek data. First, as I shall demonstrate later, Birch Creek Valley is not representative of the whole of Northern Shoshoni territory by any means; it is representative only of the Lost River drainages, which form a distinctive subprovince in the region. Second, the materials found in the Birch Creek rockshelters relate only to hunting, and probably only to small male hunting parties. Third, his interpretations of environmental change were based almost exclusively on the geological sediments at these sites and sweeping, unsupported comparisons with geologic deposits at other sites. As Jennings (1974:187) has noted, "Swanson's interesting work is rendered less convincing by somewhat dogmatic statements about past geologic events and their correlation with culture change in Birch Creek history." Finally, anthropologists demonstrated long ago the enormous difficulty of correlating a specific historic language with a specific set of prehistoric cultural remains. Race, language and culture are independent variables; one cannot simply assume that there is a direct relationship between the language of the historic inhabitants of a region and the prehistoric cultural remains found there.

Even if one disagrees with Swanson's conclusions, however, one must still agree that the Birch Creek project was an important element in the development of systematic archaeological studies in the Upper Snake and Salmon River Country. The project involved a number of those who had worked in the region previously, such as Ruth Gruhn, Alan Lyle Bryan and Don Tuohy, and others new to the region, such as myself. I came to assist Swanson on the project in June of 1960 and remained to become Curator of Archaeology in the Museum and Associate Professor of Anthropology. Prior to coming to the Upper Snake and Salmon River Country, I had been conducting field research in the Southern Plateau region of Washington, which led to the formulation of the now well known, but controversial, Old Cordilleran Culture Concept (Butler 1961a). It was my interest in testing aspects of this concept that led to a four-year-long program of excavation in the Clearwater Plateau region of north-central Idaho (Butler 1962) and, finally, to "Studies in the Prehistory of the Central Section of the Eastern Snake River Plain" and the Wasden Site excavations (Butler 1968a).

Studies in the Prehistory of the Central Section of the Eastern Snake River Plain and Beyond

These studies were initially shaped by two unrelated events. The first involved the Old Cordilleran Culture Concept and my archaeological studies in the Clearwater Plateau. I believed that Early Big-Game Hunters from the Great Plains shared the Intermontane region of Western North America with Old Cordilleran and Desert Culture peoples. At that time (1958), almost nothing was known about the archaeology of the Eastern Snake River Plain, and only a few Early Big-Game Hunter points had been described in the regional literature (Campbell 1956; Osborne 1956). Subsequently, at the Weis rockshelter in the Clearwater Plateau, I found examples of Plains Lanceolate (Plano) points associated with typical Old Cordilleran Culture remains dating from 6,300 years ago (Butler 1962). With reference to the Plains Lanceolate points, I said, "One has the impression that the [Clearwater Plateau] region may have become a refuge area at this time for some of the Early Bison Hunters who may have wandered into the Plateau from the east during early post-glacial times" (Butler 1962:79). As Swanson and Gruhn were beginning to demonstrate, the best place to search for evidence pertaining to these Early Bison Hunters in the Intermontane region was on the Eastern Snake River Plain. Addressing myself to the problem in the spring of 1965, I said (Butler 1965a:41):

> That these Early Big Game Hunters did, in fact, make their way on to the [Eastern Snake River Plain] from the Great Plains seems fairly certain as indicated by the growing number of Early Man point finds in southern Idaho (Campbell 1956; Swanson 1961; Gruhn 1961b; Bowers and Savage 1962; Butler 1963a,1964; Swanson and Bryan 1964). The question is which of the Early Big Game Hunters or Early Big Game Hunting traditions came first, when, under what conditions, and how long did they persist on the [Eastern Snake River Plain]?

By coincidence, the previous autumn, I was designated Museum liaison and advisory archaeologist to the newly formed Upper Snake River Prehistoric Society, Inc., a group of amateur archaeologists working mainly at the National Reactor Testing Station and residing in Idaho Falls. Their first project under my direction was excavation of the Haskett Site, an open site on the Snake River Plain just below the American Falls Reservoir (Figs.3,6) which yielded distinctive types of Early Man points, Haskett types 1 and 2 (Fig.6).

By July of 1965, several of these points had been found in place at the site (Butler 1965c), but there was no way of dating them in their present context. "What was needed was a finely stratified cave site with cultural deposits dating between 6,500 and 8,500 years ago somewhere on the Eastern Snake River Plain" (Butler 1968a:5). In October of that same year, Helen and Richard Gildersleeve, members of the Society, came upon a series of three collapsed lava blisters near the foot of Kettle Butte on the Snake River Plain 18 miles west of Idaho Falls (Figs.3,7). Collectively, the three collapsed blisters were called the Wasden Site; the one I chose to excavate with the help of the Society members was called Owl Cave. It is described at length in the next chapter.

Owl Cave was productive of data beyond my fondest dreams. First, it had a very deep accumulation of finely stratified geological sediments extending from the present back beyond 10,000 years ago; second, a very abundant quantity of small animal remains was enclosed in these finely stratified sediments; and third, the skeletal remains of more than 60 individual bison, dating from 8,000 years ago, were also enclosed in the accumulation of sediments, along with a fine collection of projectile points and other tools. All of this enabled me to initiate a series of interdisciplinary studies that resulted in a more comprehensive view of the past environments of the Upper Snake and Salmon River Country and the evolution and extinction of big-game animal forms in this region than had been possible previously (e.g., Butler 1972a,1975).

This more comprehensive view is the subject of the next chapter, but I must enter a caveat here. There is much debate going on informally about the nature and meaning of the sedimentary record at Owl Cave. After 1971, excavations at the Wasden Site continued under the direction of Ms. Suzanne Miller, a former student of mine and a member of the Upper Snake River Prehistoric Society, Inc. She has chosen to pursue her own line of inquiry, which has, inevitably, given rise to differences in interpretation of the data. Meanwhile my own research utilizing data from Owl Cave is still in progress; this third edition of the *Guide* reflects my current thinking and observations about that site.

II. THE ENVIRONMENT OF THE UPPER SNAKE AND SALMON RIVER COUNTRY THROUGH TIME

Our objective here is to gain an understanding of the environment of the region from the time of first human occupation to the arrival of Lewis and Clark in 1805. As to when the area was first occupied, we cannot be certain. Evidence mentioned in the previous chapter indicates that human occupation may have begun more than 13,000 years ago. Therefore, we need to have an understanding of the environment that prevailed in this region for that length of time, if not longer. Because there are no written descriptions or records of the prehistoric environments, it is necessary for me to attempt a reconstruction of these past environments on the basis of a limited body of evidence obtained from caves, rockshelters and lake deposits in the area. Much of this evidence came from detailed studies of sediments and small animal remains recovered from Owl Cave; hence, that site will figure largely in this chapter. Before examining this evidence, we must look at the contemporary or historic natural setting in the Upper Snake and Salmon River Country.

A. The Contemporary (Historic) Setting

Landforms and Drainage Patterns

The landforms of the Upper Snake and Salmon River Country reflect a great variety of geological processes, volcanism and mountain building among them (e.g., McKee 1972). American physical geographers have divided these landforms into four major units or physiographic provinces: the Northern Rocky Mountain; the Columbia Intermontane; the Middle Rocky Mountain; and the Basin and Range (Fig.8), each of which has certain distinctive characteristics.

The Northern Rocky Mountain province overshadows much of the Upper Snake and Salmon River Country. Here are found some of the highest and most rugged mountains in the state, with a few peaks exceeding 11,000 feet a.s.l. The greater part of the province is over 7,500 feet a.s.l. There are, however, a series of broad valleys in the province which descend to approximately 5,000 to 5,500 feet a.s.l. As can be seen in Figure 9, these valleys extend from the Salmon River southeastward towards the Eastern Snake River Plain. Each is separated from the next by a high mountain range, and each is drained by a pair of streams, one flowing towards the Salmon River and the other towards the Snake River Plain.

The heads of these streams are separated by a low divide across the midpoint of each of the valleys. Two of the streams flowing northwestward, the Lemhi and Pahsimeroi Rivers, are major tributaries of the Salmon. The third and most western of these streams, Warm Creek, is quite small in comparison with the other two. The streams flowing towards the Snake River Plain form three of the five "Lost Rivers," so named because they disappear in a series of sinks along the northern edge of the Eastern Snake River Plain (Fig.8).

The Plain itself is the largest area of low relief in the Upper

Snake and Salmon River Country. It is everywhere underlain by basalt, and the surface is dotted with hundreds of extinct volcanic craters and cones and collapsed lava blisters and tubes. There are also large areas of fresh-appearing lava fields, such as the Craters of the Moon just west of the big bend of the Big Lost River. The elevation of the Plain ranges from just over 3,000 feet a.s.l. at the extreme western end to over 6,000 feet a.s.l. at the eastern end. The slope of the Plain is not uniform from northeast to southwest, however; there is an elevated volcanic ridge along its central, east-west axis which lies just to the south of the big bend of the Big Lost River.

This central axis is marked by a series of prominent volcanic features aligned along a secondary volcanic ridge extending northeastward from Craters of the Moon. In addition to Craters of the Moon, these features include 7,550-foot-high Big Southern Butte, the lower (6,400 feet a.s.l.) and smaller Middle and East Buttes, and the still lower (5,571 feet a.s.l.) and smaller Kettle Butte, which is towards the eastern end of the ridge (Fig.9).

Immediately north of these volcanic features is a broad depression into which the "Lost Rivers" disappear and from which there is no exterior outlet. This depression is called Pioneer Basin, following the informal designation by Nace and his associates (1956). Also in this depression is Mud Lake, a "perched" body of water into which Medicine Lodge and Camas Creeks, the easternmost of the five "Lost Rivers," drain. This body of water and the Lost River sinks are at the lowest points in Pioneer Basin. They lie within the bottom of an extinct lake, ancient Lake Terreton, the shoreline of which was approximately 4,800 feet a.s.l. (Nace et al. 1956). Entrenched in the bottom of this extinct lake are the braided and abandoned channels of the Big Lost River and Birch Creek. The waters from these streams and from the overflow of Mud Lake disappear beneath the bottom of the extinct lake and flow southwestward through layers of gravel caught between the basalt flows underlying the Eastern Snake River Plain and emerge as the "Thousand Springs" in the Snake River Canyon just opposite the mouth of Salmon Falls Creek at the western end of the Plain.

The Snake River itself was probably diverted to its present course along the southern edge of the Plain by the volcanic processes that formed the elevated central axis of the Plain. Volcanism on the Plain also led to the damming of the Snake River at the downstream end of the American Falls Reservoir from time to time, which created a large slack-water pool in which thick deposits containing the fossilized remains of a great variety of animals accumulated during Mid-to-Late Pleistocene time (Trimble 1976). More will be said about these fossil animals further along in this chapter.

To the south of the Snake River are the Basin and Range and Middle Rocky Mountain provinces. The Basin and Range province consists mainly of low, eroded mountain ranges separated by broad valleys drained by generally small streams, such as the Portneuf and Raft Rivers. At the western end, the Basin and Range province grades into the lava uplands of the Columbia Intermontane province. On the east, it grades almost imperceptibly into the higher, more rugged Middle Rocky Mountains. In effect, the Basin and Range and Middle Rocky Mountains, together with the Northern Rocky Mountains, form a high rim around the northern, eastern and southern borders of the Eastern Snake River Plain, a cross-section of which can be seen in Fig. 9. To a large extent, this mountainous topography controls the climate in the region.

Climate

The mountains of the Upper Snake and Salmon River Country form a barrier to the free flow of air in nearly all directions, but they are not the only barrier to the free flow of air. During winter months, for example, high pressure systems over the Pacific Ocean and the Great Basin often deflect the eastward-moving, moisture-bearing low pressure systems from the Pacific Ocean northward across the panhandle of Idaho. These maritime storm systems are the principal source of moisture for the region. Another source of moisture, especially in the summer, are the occasional low pressure systems that move into the area from the Gulf of California and Pacific Ocean along the western flanks of the Rocky Mountains. Because of these latter systems, much of the Upper Snake and Salmon River Country receives 50% or more of its annual precipitation in the April to September period (62% in the Upper Salmon River Valleys; 50% in the eastern half of the Eastern Snake River Plain and in the mountains and valleys to the south). Other parts of the state, including the western end of the Eastern Snake River Plain, receive only a third or less of their annual precipitation during the same period (Rice 1971).

All of the lower valleys and most of the Eastern Snake River Plain receive under 10 inches of moisture per year. One of the driest locations, however, is in the valley of the Salmon River near Challis, where the weather station reports less than 7 inches of precipitation per year. The mountainous areas, on the other hand, receive a much higher amount, mainly in the form of snowfall which gradually melts and provides a significant source of water for the streams in the lower valleys during the warmer months of the year. Some of the snowfall is probably incorporated in the permanent snowfields and glaciers in the higher mountains.

Temperature, of course, varies with elevation. "In general, it can be said that monthly means are 32°F or lower at stations above 5,000 feet from November through March; between 4,000 and 5,000 feet, November through February; [and] 3,000 to 4,000 feet, December through February" (Rice 1971:2). Since a large part of the Upper Snake and Salmon River Country is over 5,000 feet in elevation, it is apparent that freezing temperatures prevail over much of the region for nearly half of the year. For this reason, the lower valleys and Eastern Snake River Plain can be referred to as cold desert or steppe, but such a classification can be deceptive, as we shall see below.

Vegetation

Because of the relatively high elevation of the region as a whole and the more than 9,000 feet of topographic relief, the vegetation of the Upper Snake and Salmon River Country exhibits a stronger relationship to altitude than to latitude. However, the altitudinal variation in vegetation is clearly related to the local climate, itself a function of altitude. Because the various plant species differ considerably in their environmental requirements, some of these species flourish at lower elevations and some at higher elevations. "So complete is the climatic change in going from the lowest to highest altitudes that none of the plants native to Idaho is known to range all the way from the basal plains to the highest mountain summits" (Daubenmire in Davis 1952:2). A few plants, however, such as the common big sagebrush (*Artemisia tridentata*) are adapted to a wide range of environments and are found from the basal plains high into the mountains. At least three sub-species of big sagebrush occur in the region: Mountain big sagebrush (*A. tridentata* subspecies *vaseyana*), which is found at the higher elevations, and Basin big sagebrush (*A. tridentata* subsp. *tridentata*) and Wyoming big sagebrush (*A. tridentata* subsp. *wyomingensis*), which are found at lower elevations (Tisdale et al. 1969).

These subspecies are not always readily distinguishable from one another and often have many of the same plants associated with them, such as the ubiquitous bluebunch wheatgrass (*Agropyron spicatum*). Thus, there sometimes appears to be a great overlap in vegetation zones in the Upper Snake and Salmon River Country. This apparent overlap of vegetation zones is also the result of other factors, as Daubenmire points out (in Davis 1952:11):

> Although each zone reaches its best development within certain fairly definite limits of altitude, it characteristically sends long, pennant-shaped, and discontinuous extensions down to considerably lower elevations along valleys, and on the other hand, except for the uppermost forest zones each attains its greatest elevation along summits of dry ridges and the upper parts of south-facing slopes. Owing to the resultant interfingering of the zones, their general altitudinal relationships are usually actually reversed along the sides of ravines. For example, in the main body of the Douglas fir zone may be found the lowermost tips of extensions of the spruce-fir or arborvitae-hemlock zones following down the bottom of ravines, whereas on the summits of adjacent ridges occur strips of the ponderosa pine type which are approaching the upward limits of the distribution of this type.

According to Daubenmire (1943), there are ten distinct vegetation zones occurring in the Rocky Mountain area. From highest to lowest, they are:

1. Alpine
2. Spruce-fir
3. Arborvitae-hemlock
4. Douglas fir
5. Ponderosa
6. Juniper-piñon
7. Oak-mountain mahogany

8. Fescue-wheatgrass
9. Wheatgrass-bluegrass
10. Sagebrush-grass

Of these, the ponderosa pine, fescue-wheatgrass and wheatgrass-bluegrass zones are virtually absent from the Upper Snake and Salmon River Country. All three zones are well represented north of the Salmon River and the ponderosa pine zone also extends well to the south of the Salmon in western Idaho (Daubenmire in Davis 1952). Of the remaining zones, the juniper-piñon and oak-mountain mahogany zones are more fully developed further south in Utah and Nevada. They thrive in environmental conditions that are more typical of the Southern Rocky Mountain and Basin and Range provinces than of the Upper Snake and Salmon River Country as a whole. The juniper-piñon zone is most frequently seen south of the Snake River on low mountains and rocky hills, usually where the oak-mountain mahogany zone is not well developed or absent (Figs.8,17). Trees producing edible nuts, most notably *Pinus monophylla*, occur mainly in a small area near the Nevada-Utah border. The juniper, however, is more widely spread, occurring in the foothills of the mountains on the north side of the Snake River Plain as well as to the south of the Snake River. Historically, the most extensive stands of mountain mahogany (*Cercocarpus ledifolius*) were found south of the Snake River and east of the longitude of the downstream end of the American Falls Reservoir (Daubenmire in Davis 1952:2). However, the mountain mahogany in this area was extensively utilized for firewood by early settlers and is now relatively scarce. Mountain mahogany occurs along some of the higher valleys of the Salmon River drainage, though not as a distinct zone. None of the oaks extend into Idaho, but occur well up into the northern part of Utah.

The most characteristic vegetation zones in the Upper Snake and Salmon River Country are the alpine, spruce-fir, Douglas fir, and sagebrush-grass zones. The first three are shown together as the coniferous forest zone in Fig.8. Of these zones, the spruce-fir and the Douglas fir are the most important archaeologically. It is in these zones that archaeological sites associated with the hunting of mountain (bighorn) sheep (*Ovis canadensis*) are most commonly found. The spruce-fir zone is the uppermost of the forest zones and is usually characterized by subalpine fir (*Abies lasiocarpa*) and Engelmann spruce (*Picea engelmanni*). In southern Idaho, however, lodgepole pine (*Pinus contorta*) and Douglas fir (*Pseudotsuga menziesii*) are the most common trees in this zone (Daubenmire in Davis 1952:10). Also occurring here in this zone are the wind-distorted whitebark pine (*Pinus albicaulis*) and limber pine (*Pinus flexilis*). Natural parks, island-like areas of grassland or desert-like vegetation (Daubenmire in Davis 1952:4,footnote), are common in this zone as well as in the Douglas fir zone. The latter zone is marked by extensive stands of Douglas fir and in the Upper Snake and Salmon River Country abuts directly upon the sagebrush-grass zone.

The sagebrush-grass zone is the most widespread in the Upper Snake and Salmon River Country. This zone completely flanks the Northern Rocky Mountains and extends well out onto the Great Plains (see Fig.10). As will be shown later, the distribution of the American bison or buffalo (*Bison bison*) west of the Continental Divide coincides remarkably closely with this zone. The sagebrush-grass zone is not a uniform mixture of sagebrush and grass, but is made up of complex mosaics of shrubs, grasses and forbs (non grass-like herbaceous plants) (Fig.11). Sagebrush (*Artemisia tridentata*) is clearly the dominant shrub everywhere in the zone, but there are also considerable amounts of other shrubs such as bitterbrush (*Tetradymia* spp.). Grasses are second only to sagebrush in importance, and among the native grasses, bluebunch wheatgrass (*Agropyron spicatum*) is the most important, followed by Sandberg bluegrass (*Poa secunda*), prairie junegrass (*Koeleria cristata*), needlegrass (*Stipa* spp.), and Indian ricegrass (*Oryzopsis hymenoides*). Second only to the shrubs and grasses are the desert buckwheats (*Eriogonum* spp.) and arrowleaf balsamroot (*Balsamorhiza sagittata*).

In the poorly drained meadows along the northern edge of the Plain (Camas Prairie west of the Big Wood River being the largest of these) and in many of the higher mountain valleys both to the north and south of the Plain, the vegetation is distinctly different from the surrounding zone, be it the sagebrush-grass or coniferous forest zone. It includes many species of sedge (*Carex*), rushes (*Juncus*), and willows (*Salix*), the wild iris (*Iris missouriensis*) and the important native food plant, camas (*Camassia quamash*).

No systematic studies have been made of the plants utilized by the native historic inhabitants of this region, the Northern Shoshoni and Bannock. There are, however, many plants in the region that might have been utilized by the Northern Shoshoni and their prehistoric predecessors. A sample of these potential food plants is listed below in Table 2, a few of which are also illustrated in Fig.12.

TABLE 2

SOME OF THE COMMON NATIVE EDIBLE PLANTS
OF THE UPPER SNAKE AND SALMON RIVER COUNTRY*

(1) Roots and Underground Parts

Scientific Name	Common Name	Where Found
Allium cernum	Wild onion	Widely distributed
Balsamorhiza sagittata	Balsamroot	Widespread
Brodiaea douglasii	Wild hyacinth	Plains and hills; moist areas
Calochortus nuttallii	Sego lily	Widespread
Camassia quamash	Blue camas	Moist, open meadows
Cirsium spp.	Thistle	Widespread
Claytonia lanceolata	Western spring beauty	Widespread
Cymopterus spp.	Biscuit root, wild celery	Open plains, hills
Cyperus esculentus	Nutgrass	Moist ground, only locally abundant
Erythronium grandiflorum	Dogtooth violet	Widespread
Fritillaria atropurpurea	Leopard lily	Open hillsides

Scientific Name	Common Name	Where Found
Fritillaria pudica	Yellow bells	Hillsides and mountains
Glycyrrhiza lepidota	Licorice	Patches in moist valleys and meadows
*Heracleum lanatum***	Cow parsnip	Moist ground, streambanks
Lewisia rediviva	Bitterroot	Stony hills, ridges
Ligusticum filicinum	Loveroot	Moist, mountainous ground
Lomatium spp.	Desert parsley	Dry slopes
Nuphar polysepalum	Pond lily, cow lily	Lakes, ponds, slow streams
*Orobanche fasciculata***	Broom rape, ghost plant	Plains, hills, slopes; widely distributed
Orogenia linearifolia	Indian potato, snowdrops	Open mountainsides, ridges, sandy or gravelly soil
Perideridia gairdneri	Yampa, wild caraway	Open meadows or partial shade; locally abundant
Polygonum bistortoides	American bistort	Moist or wet meadows at high elevations in mountains
Potamogeton spp.	Pondweed	In water
Potentilla anserina	Silverweed	Moist or wet, open ground
Sagittaria latifolia	Swamp potato, common arrowhead, wappato	Shallow water of streams, margins of lakes
Scirpus acutus	Common tule	In wet ground or shallow water
Stellaria jamesiana	Chickweed	Moist, loamy sites
Typha latifolia	Common cattail	In marshes, shallow lakes, stream borders
Valeriana edulis	Tobacco root	Dry meadows, moist, open areas

**Also used as pot herbs or salad greens

(2) Fleshy Fruits and Seeds

Scientific Name	Common Name	Where Found
Agoseris aurantiaca	False dandelion	Mountain meadows and woodlands
Amelanchier alnifolia	Serviceberry	Moist hillsides, woods
Arctostaphylos uva-ursi	Kinnikinnick, bearberry	Dry woods
Artemisia tridentata	Big sagebrush	Widespread
Berberis repens	Oregon grape	Dry woods and hills

Scientific Name	Common Name	Where Found
*Chenopodium capitatum***	Blite goosefoot	Rocky soil, moist valleys
Crataegus spp.	Hawthorn	Widespread
Descurainia spp.	Tansy-mustard	Widespread
Fragaria vesca	Strawberry	Moist plains and hills
Fragaria virginiana	Strawberry	Meadows and woods
Gaultheria humifusa	Western wintergreen	Mountain slopes, valleys, moist areas
Helianthus annuus	Sunflower	Open plains, valleys
Juniperus spp.	Juniper	Plains and hillsides
Lonicera spp.	Honeysuckle, twinberry	Woodlands
Oenothera spp.	Evening primrose	Dry, open areas
Oryzopsis hymenoides	Indian ricegrass	Widespread
Physalis subglabrata	Ground cherry	Open ground
*Pinus flexilis****	Limber pine	High, dry ridges and slopes
Prunus virginiana	Chokecherry	Hills, valleys, river banks
Ribes spp.	Currant, gooseberry	Plains, streams and hills
Rosa spp.	Rose	Plains, woods and hills
Rubus spp.	Raspberry, thimbleberry	Moist, shaded areas
Sambucus cerulea	Elderberry	Mountain slopes, woodlands, streams
Vaccinium spp.	Whortleberry, blueberry, bilberry, grouseberry, huckleberry	Mountain slopes

**Also used as pot herbs or salad greens
***Used in same way as piñon nuts (*Pinus monophylla*)

(3) Pot Herbs or Salad Greens

Scientific Name	Common Name	Where Found
Amaranthus retroflexus	Pigweed, redroot	Moist to dry ground
Claytonia perfoliata	Miner's lettuce	Moist, shaded areas
Dodecatheon spp.	Shooting star	Moist soil
Epilobium angustifolium	Fireweed	Moist, open areas and hillsides
Opuntia polyacantha	Cactus, prickly pear	Dry plains and hills
Oxyria digyna	Mountain sorrel	Wet soil in mountains
Pteridium aquilinum	Bracken fern, brake fern	Woods, canyons and fields
Rorippa nasturtium-aquaticum	Water cress	Springs and fresh streams

Scientific Name	Common Name	Where Found
Rumex acetosella	Sheep sorrel, sour dock	Wet soil
Sedum spp.	Stonecrop	Dry, open areas and rocky slopes
Urtica dioica	Stinging nettle	Streambanks
Viola spp.	Violet	Dry or moist soil

*Does not include all plants in the categories specifically mentioned. Sources: Davis 1952; Harrington and Matsumura 1967; Kirk 1975: Holte 1978 personal communication.

To summarize, the vegetation distribution in the Upper Snake and Salmon River Country is essentially twofold in character: that which is found mainly in the drier, lower valleys and on the Eastern Snake River Plain and that which is found mainly in the higher mountains. This dichotomy is clearly reflected in the distribution of many of the warm-blooded animals found in the region.

Animals

There is a great diversity of animal life in the Upper Snake and Salmon River Country, but only two large groups will be considered here: the anadromous fishes (i.e., fishes that ascend the rivers from the sea for purposes of breeding) and the mammals.

Three species of anadromous fishes ascend the Snake and Salmon Rivers from the Pacific Ocean to spawn in the headwaters of these streams: the chinook salmon (*Oncorhyncus tshawytscha*), the sockeye salmon (*Oncorhyncus nerka*) and the steelhead trout (*Salmo gairdneri*) Fig.13). Of these the chinook salmon was probably the most important. There were three runs of chinook: fall, spring and summer, each designated by the time the run began at the mouth of the Columbia River. The fall run spawned primarily in the main stem of the Columbia and its lower tributaries during September through December; the spring run in the Upper Salmon and its tributaries, and the Snake River and its tributaries as far upstream as the 212-foot-high Shoshone (Fishing) Falls at the western end of the Eastern Snake River Plain (Fig.24) from August through September; and the summer run in the Salmon River and the streams of eastern Washington in September only (Netboy 1974:266). The sockeye salmon spawned almost entirely in small streams which were tributary to a lake or in the shoals of lakes (Fulton 1970:23). The only known sockeye spawning grounds in the Upper Snake and Salmon River Country are at a series of lakes in the Sawtooth Valley where the main Salmon begins. The sockeye runs in this area were totally destroyed between 1913 and 1934 by the construction of a dam across the Salmon River near Sunbeam, Idaho (Fulton 1970:27); little is known about their former abundance. However, they spawned in the winter months and were firm of flesh. Like the sockeye salmon, the steelhead trout also spawned in the winter months (December-March) in the Salmon and Snake Rivers (Netboy 1974:266). Other edible species of fishes also occur in the waters of the Upper Snake and Salmon River Country, but these were probably not as abundant as the anadromous fishes and, thus, of much less consequence in the lives of the prehistoric human inhabitants of the region.

In his pioneering work, *The Recent Mammals of Idaho*, Davis (1939:27) noted that of the 141 kinds of mammals found in the state, "56 kinds appear to be limited in their distribution primarily by climatic factors, largely temperature, while [another] 70 kinds may be assignable to three, possibly five, areas, the limits of which are not determined by climate alone, but by the interaction of climatic, geographic, edaphic and biotic factors, each of which, alone, may affect each of the kinds of mammals differently."

Two of the three main biotic areas recognized by Davis, the *Northern Great Basin* and the *Central Rocky Mountain*, occur in the Upper Snake and Salmon River Country (Fig.8) but also extend beyond it. The Northern Great Basin biotic area is coextensive with the Eastern Snake River Plain, the adjoining valleys of the Northern Rocky Mountains and the arid plateaus of southwestern Idaho, northwestern Utah, northern Nevada, eastern Oregon and northeastern California, which is also approximately the main part of the sagebrush-grass steppe area west of the Continental Divide (Fig.10). The Central Rocky Mountain biotic area, on the other hand, embraces mainly the mountainous areas of central and eastern Idaho south of the Salmon River, areas which are covered mostly by coniferous forests, principally of the Douglas fir and spruce-fir types. Certain of the big-game animals found in Idaho appear to have been associated primarily with one or another of these two biotic areas.

For the Central Rocky Mountain biotic area, Davis (1939) lists moose (*Alces alces*), mountain goat (*Oreamnos americanus*), grizzly bear (*Ursus arctos horribilis*) and black bear (*Ursus americanus*). Also common in the Central Rocky Mountain biotic area but not restricted to it are: mountain sheep (*Ovis canadensis*), mule deer (*Hemionus odocoileus*), whitetail deer (*Odocoileus virginianus*) and elk (*Cervus canadensis*). Davis (1939) does not list any big-game animals associated primarily with the Northern Great Basin biotic area; however, he could have listed two: antelope and bison. (Some of the aforementioned big-game animals are illustrated in Fig.13.) Herds of antelope (*Antilocapra americana*) are commonly observed today in the broad valleys connecting the Salmon River Valley with the northern edge of the Eastern Snake River Plain and, historically, tens of thousands of bison roamed these valleys and the Eastern Snake River Plain. However, many writers, beginning with Captain John C. Fremont, regarded the bison as a recent invader of the region. Remarking on the rapid disappearance of bison from the Intermountain region, Fremont (1845:144-145) suggested that it would

> be interesting to throw a glance backward through the last twenty years and give some account of their former distribution through the country, and the limit of their western range.
>
> The information is derived from Mr. Fitzpatrick, supported by my own personal knowledge and acquaintance with the country. Our knowledge does not go further back than

> the spring of 1824, at which time the buffalo were spread in immense numbers over the Green river of the gulf of California and Lewis's fork of the Columbia river [the main Snake River]; the meridian of Fort Hall [on the Snake in eastern Idaho] then forming the western limit of their range. The buffalo then remained for many years in that country, and frequently moved down the valley of the Columbia [i.e., the Snake], on both sides of the river as far as the *Fishing Falls* [Shoshone Falls on modern maps, which is near Twin Falls, Idaho, at the western end of the Eastern Snake River Plain].
>
> * * * * * *
>
> ...In travelling through the country west of the Rocky mountains, observation readily led me to the impression that the buffalo had, for the first time, crossed that range to the waters of the Pacific only a few years prior to the period we are considering; and in this opinion I am sustained by Mr. Fitzpatrick, and the older trappers in that country.

The idea which follows from Fremont's remarks, that the American bison (buffalo) was a recent intruder into the Upper Snake and Salmon River Country, has been challenged by me on both archaeological and paleontological grounds (Butler 1971b; 1977a). As I shall demonstrate below, not only were bison native to the Upper Snake and Salmon River Country but so were certain other forms of now extinct big-game animals.

B. Past Environments

When man first entered the Upper Snake and Salmon River Country, the region was still in the grips of the last Ice Age, or the Pleistocene, which was followed by the Holocene, or Recent, geologic epoch. The Pleistocene and Holocene together constitute the last major division in the earth's geologic history, the Quaternary. It was during the Quaternary that man and the big-game animals of the world evolved into their present forms.

Among the hallmarks of the Pleistocene epoch are: (1) a series of extremely cool episodes in the Earth's climate resulting in the formation of extensive glaciers, especially in the northern hemisphere where enormous ice sheets covered much of northern Europe, Asia and North America (Fig.14); (2) the formation of huge, fresh-water lakes, such as Lake Bonneville and Lake Lahontan in the Great Basin (Fig.15) and Lake Terreton on the Snake River Plain, where there are now only salty remains (e.g., the Great Salt Lake) or deserts; and (3) a world-wide lowering of sea levels concomitant with the glacial episodes which resulted in the direct connection of certain continents, such as Asia and North America by way of the Bering Land Bridge (Fig.14). It was the existence of the Bering Land Bridge during the last great glacial episode of the Pleistocene that permitted the ancestors of the modern-day American Indians to migrate from Asia into North America. The Holocene, of course, refers to modern-day climatic and ecological conditions.

Depending on the particular set of climatic and ecologic conditions one chooses, the Pleistocene ended and the Holocene began at some point between 14,000 and 6,500 years ago (Neustadt 1967). I prefer the date of 6,500 years ago (4500 B.C.) because (a) that is when all of the glacial ice had melted from the continents and the seas were at their highest level (Bloom 1971) and (b) that appears to have been the time when Pinedale Glaciation came to an end in the Rocky Mountains and the modern-day ecological conditions in the Upper Snake and Salmon River Country became established (Butler 1977a).

Glaciation in the Rocky Mountains

During the Pleistocene, valley glaciers were widespread throughout the Rocky Mountains and local icecaps existed in a number of ranges (Richmond 1965:217). In addition to these, a gigantic sheet of ice formed in the mountains north of the common border between Canada and the United States and flowed into the northern parts of Montana, Idaho and Washington (Fig.15). This glacial formation is called the Cordilleran Ice Sheet. Near the maximum of each advance of this glacial formation, ice blocked the Clark Fork River at Lake Pend Oreille in northern Idaho to form Glacial Lake Missoula and also blocked the Columbia River at Grand Coulee to form Glacial Lake Columbia. The last time the Cordilleran Ice Sheet blocked these rivers was during the Pinedale glacial substage in the Rocky Mountains (Blackwelder 1915), probably between 18,000 and 14,500 years ago (Crandall 1965; Frye, William and Black 1965). Geological deposits in a small canyon opening onto the Snake River below Lewiston, Idaho indicate that the ice sheet began to retreat shortly after that time, leading to a catastrophic flood in the Columbia Basin between 13,000 and 10,000 years ago (Foley 1976). However, neither the Cordilleran Ice Sheet nor the valley glaciers in the Rocky Mountains completely disappeared at the time of this flood.

The process of shrinkage of the Cordilleran Ice Sheet and the valley glaciers during the ensuing deglacial hemicycle, "that time between the initial withdrawal of ice from the outermost moraines to the time of the complete disappearance of continental ice sheets" (Bloom 1971:357), was probably halted many times by intervals of extremely cold weather in an otherwise long-term warming trend. These halts are called stillstands or stadials. Evidence obtained from a recently completed, very detailed examination of a series of glaciated valleys in the Lemhi mountain range separating the Little Lost River and Birch Creek north of the Snake River Plain indicates that there were at least 9-11 distinct stillstands in the glaciers occupying these valleys during Pinedale time (Fig.15; Knoll 1977).

Each of the stillstands probably reflected a brief cold pulse in a climatic trend that was becoming increasingly antiglacial (i.e., warmer) in character. These cold pulses may have been responsible for the frozen ground features observed by Malde (1964) on the Western Snake River Plain, the frost trails noted by Gruhn (1961b:21) in Stratum D at Wilson Butte Cave near the western end of the Eastern Snake River Plain, and the sequence of ice wedges and convoluted deposits described by Dort (1968) at the Wasden Site in the central section of the Eastern Snake River Plain (Fig.16). If there is a direct relationship between these frozen ground features and the 9-11 glacial stillstands of Pinedale time occurring in the mountains north of the Snake River Plain, it may be possible to date some of the stillstands, especially the later ones, for there are radiocarbon dates bracketing the frozen ground features at Wilson Butte Cave and at the Wasden Site. Stratum D at Wilson Butte Cave dates between 14,500 and 15,000 years ago (Gruhn 1965), while the sequence of frost wedges and convoluted deposits at the Wasden Site date between 12,850 and 6,500 years ago (Butler 1972b).

The glacial stillstands of Pinedale time were not, however, the last of the glacial events in the northern Rocky Mountains. During the Holocene or Recent geologic epoch, there was another episode of glaciation in these mountains, generally referred to as Neoglaciation (Richmond 1965). This new glaciation, which began between 5,300 and 4,000 years ago, was not as extensive as Pinedale glaciation, though it does indicate a momentary return to cooler conditions during an otherwise strong warming trend. According to Knoll (1977), there were five glacial stillstands during Neoglacial time, three before 340 years ago, one between 340 and 70 years ago, and another between 70 and 25 years ago. To my knowledge there are no frozen ground features on the Snake River Plain that correspond in time to these Neoglacial stillstands. However, it seems obvious that these, as well as the earlier Pinedale stillstands, reflect environmental conditions that would also have had an effect on vegetation and, indirectly, on the wildlife subsisting on this vegetation.

Changes in Vegetation

Plant geographers are in general agreement that the species of plants found in the Intermountain region today are essentially the same as those found in the region at the beginning of the Pleistocene (Cronquist et al. 1972). The main difference between then and now, especially in the past 30,000 years, was in the distribution of the vegetation zones. During cool episodes, these zones were probably as much as 5,000 feet lower in elevation than today and extended several hundred miles or more further to the south in the Great Basin (e.g., Mehringer 1965).

The only evidence we have of such changes in the vegetation zones of the Upper Snake and Salmon River Country was obtained by Bright (1966) from a pollen and seed core at Swan Lake, a small body of water that formed in Marsh Creek when this former outlet of Pleistocene Lake Bonneville became choked with gravel and other materials around 13,000 years ago. The Bonneville Flood (Malde 1968) had swept through this outlet much earlier, between 35,000 and 29,700 years ago (Trimble 1976:57,59,61), on its way into the Portneuf River Valley and on down the Snake River. Apparently, enough water continued to flow through the outlet channel after the flood to keep it open until around 13,000 years ago (Fig.15).

Swan Lake is slightly over 4,765 feet above sea level. Except for marshes and wet meadowlands, the locality in the immediate vicinity of the lake has a typical sagebrush-grass cover. The nearest coniferous forest, of the lodgepole pine type, is at least 2,200 feet higher in elevation and is several miles or more away. Between 12,000 and 10,800 years ago, however, according to data obtained from pollen and seeds found in the Swan Lake deposits, there was a forest of this general type containing both lodgepole pine and limber pine in great abundance dominating the vegetation in the immediate vicinity of the lake (this type of forest is shown in Fig.17). The sagebrush-grass vegetation was present but did not become the dominant vegetation until around 10,000 years ago (Fig.17). In the time since 10,000 years ago, there were other fluctuations in the composition of the vegetation around Swan Lake, but these fluctuations are not as remarkable as the change that occurred then.

In addition to the noticeable altitudinal shifts in the vegetation zones as the climate began to become increasingly warmer towards the close of the Pleistocene, there were shifts in the proportions of the main types of plants found in each zone. Both kinds of shifts had a marked effect on the kinds and distribution of animals occurring in the Upper Snake and Salmon River Country. The effect was distinctly different for the large as opposed to the small animals.

Changes in the Small Animals

As illustrated by materials recovered from geological deposits at Wilson Butte Cave and the Wasden Site, the remains of small animals such as gophers, rabbits and ground squirrels can be very useful indicators of both long and short-term changes in vegetation and climate.

Wilson Butte Cave (as described in the first chapter) is a lava blister located on a high ridge near the western end of the Eastern Snake River Plain (Fig.3). Partly as a result of the physical situation of the floor of the cave and partly as a result of the climatic conditions at the time, the earliest deposits inside Wilson Butte Cave are water-laid (Fig.4). By radiocarbon count (see Table 1), these water-laid deposits accumulated in the cave over a period extending from 15,000 years ago to approximately 6,500 years ago, the period of the final deglacial hemicycle of the Pleistocene. The deposits accumulating in the cave after that time are entirely wind-laid up until 1,000 years ago, a possible indication of a drier, warmer climate following the end of the deglacial hemicycle. After 1,000 years ago, the deposits consist of dust and dry bits of vegetation brought into the cave by small animals and man, materials which have also been observed at other cave sites in the Pacific Northwest in the same stratigraphic position (Fryxell and Daugherty 1963).

Enclosed in the 15,000-year-long accumulation of deposits at Wilson Butte Cave are the bones of various animals, large and small. Among the more abundant of the small animals represented are the northern pocket gopher (*Thomomys talpoides*), small rabbits (*Sylvilagus* spp.), and ground squirrels (*Citellus* spp.). In the deposits that accumulated during the deglacial hemicycle (from 15,000 to 6,500 years ago), the single most abundant species was the northern pocket gopher, whose natural habitat is grassy prairies, alpine meadows, bushy areas and open pine forests (Burt and Grossenheider 1976:127). This species was completely absent in the deposits that accumulated after 6,500 years ago, as was one of the more common ground squirrels, *Citellus richardsoni*, whose habitat is sagebrush-grassland, usually near water (Burt and Grossenheider

1976:99). The most common ground squirrel, *C. townsendi*, on the other hand, which is at home in dry soil (Burt and Grossenheider 1976:98), shows a definite increase in proportion to all of the other small animals towards the end of the deglacial hemicycle and through most of the Holocene. In the last 1,000 years, however, the small rabbits, which were always present in small proportions, became the most common of the small animals found at Wilson Butte Cave. The small rabbits are at home in sagebrush, loose rocks and cliffs (Burt and Grossenheider 1976: 209,212).

These shifts through time in the composition of the small animal species found at Wilson Butte Cave are clearly indicative of a change in the environment of the Upper Snake and Salmon River Country (Guilday 1969). However, the relatively small numbers of individual small animals found and the enormous time spans involved in the deposition of their remains at Wilson Butte Cave did not permit a detailed analysis of this change. Such was not the case, however, at Owl Cave.

Owl Cave is one of three large, collapsed lava blisters, collectively referred to as the Wasden Site. These blisters occur next to each other on a sagebrush-covered lava pressure ridge extending out from the foot of Kettle Butte (Fig.7), 120 miles northeast of and 900 feet higher in elevation than Wilson Butte Cave. Because such ridges usually form at right angles to the direction of flow (Easterbrook 1969:392), the ridge in which the Wasden Site blisters occur probably did not originate from a flow stemming from Kettle Butte itself, but from a fissure farther to the west. The ridge was produced by movement of the congealing lava flow while the interior of the flow remained in a molten state. This molten interior probably broke out somewhere and left the top crust and solidified sides of the ridge in place, producing a typical lava tunnel. Subsequently, portions of the crust over this tunnel collapsed, resulting in the large cavities we now call the Wasden Site.

Apparently, the collapse of the tunnel roof did not take place all at once, for the bottoms of the three blisters are not filled in to the same degree nor with the same materials. One cavity, for example, has only roof collapse debris in it, while another is partially filled with wind-blown sediments that cover the rooffall but leave open a long section of uncollapsed lava tube. Owl Cave, on the other hand, has more than 15 vertical feet of wind-carried fine sand and silt covering the bottom and the original rooffall (Fig.18).

These wind-carried sediments probably did not begin to accumulate in the cave until around 12-11,000 years ago. The fine stratification of these sediments seen in Figs. 16 and 18 was apparently due to local ponding in the cave from 13,000 to approximately 4,000 years ago as the result of snow melt. The cave is a natural trap for snow and wind-blown sediments. Ponding is indicated by the fact that (a) the laminated deposits, although locally distorted, are level with the world overall and (b) they occur in alternately dark and light pairs, an indication of both mechanical and organic origin. Such pairs are called couplets, rhythmites, or varves; under some circumstances, they can be used as a measure of absolute time (Flint 1971:400).

Another aspect of the sediments that can be seen in Figs. 16 and 18 is the fact that they are cryoturbated, disturbed by frost wedging. Such frost wedging and concomitant cryoturbation of the adjacent deposits was probably the result of permafrost conditions associated with the glacial stillstands of Pinedale time observed by Knoll (1977) in the Lemhi Range northwest of the Wasden Site (Fig.15).

Interestingly, the finely laminated deposits that accumulated in Owl Cave prior to 5,000 years ago consist of very fine sediments called glacial flour or loess, while those sediments that accumulated in the cave after that time consist of somewhat coarser sediments best described as sandy loam (Fosberg, Lewis and McDole 1968). The deposition of the glacial flour or loess at the cave site probably took place during the summers as the glaciers in the mountains surrounding the Snake River Plain were melting. The glaciologist Flint (1971:255), for example, notes that "in analogy with conditions in Alaska today, we can suggest that loess accumulated chiefly during the summer, the season of ablation of glaciers, when sedimentation of outwash was at a maximum, and when the ground surface was neither frozen nor blanketed with snow." The sandy loam also was probably deposited chiefly during the summer, following the annual crests of local streams which left flood loam deposits along the banks after the water level had fallen, deposits that the wind picked up and blew over the surrounding landscape. In short, the post-volcanic sediments found in Owl Cave also appear to reflect a changing environment in the Upper Snake and Salmon River Country. The nature of this changing environment becomes very evident in the small animal remains enclosed in the accumulation of loess and sandy loam deposits at Owl Cave.

An extraordinarily large quantity of these remains was recovered from the deep accumulation of deposits beneath an owl roost in the ceiling of the cave (Guilday 1969). These remains are the skulls, jaws and other skeletal parts of the small animals consumed by the many generations of owls that roosted in Owl Cave between 12,000-11,000 years ago and the historic present. There is a wide range of small animal species represented in these remains, but three species predominate at all levels: those of the northern pocket gopher (*Thomomys talpoides*), the pygmy rabbit (*Sylvilagus idahoensis*) and the Townsend ground squirrel (*Citellus townsendi*). These were also among the most common of the small animals found at Wilson Butte Cave.

The total numbers and distribution through time of each of the three principal species of small animals recovered from the deposits below the roost at Owl Cave are shown in Fig. 19. The left-hand graphs in this figure (A, B and C) show the numbers and distribution of each of the three species, while the right-hand graphs (D, E and F) show the proportion of each of these species relative to the sum total of all three species at each moment in time. Because the total numbers of each species recovered were extremely small for the periods between 1,500 years ago and the present, and before 10,000 years ago, the numbers for these time periods were eliminated from the computer-drawn graphs.

Given the known habitats of the northern pocket gopher, the pygmy rabbit and the Townsend ground squirrel mentioned earlier in connection with the small animal remains at Wilson Butte Cave, a number of inferences can be made about environmental conditions in the general vicinity of Owl Cave, based on the graphs in Fig. 19. Obviously, something was happening that affected each of these species in particular ways over a long period of time. The pygmy rabbits, for example, which are most abundant where sagebrush is most abundant, exhibit a number of interesting and distinctive changes. First, there is a long series of oscillations in numbers, with the maximum number occurring (on the graph) between 9,500 and 9,000 years ago (Fig.19,B). Thereafter, the maximum of each successive oscillation is usually less than the one before. The minimum point in each successive oscillation, although variable, tends to be lower after 6,000 years ago than before, with the lowest minimum falling between 4,000 and 3,500 years ago. The minimums before 6,000 years ago are all associated with the presence of permafrost features (ice wedges and cryoturbated deposits) at Owl Cave. These features are believed to indicate freeze/thaw conditions coincident with the glacial stillstands of Pinedale time observed by Knoll (1977) in the Lemhi Range northwest of Owl Cave. These conditions affected all three species of small animals in the same way, but to differing degrees. The pygmy rabbit appears to have been the most sensitive of the three species to these conditions.

The long-term trend indicated by the pygmy rabbit is one of an increasingly warm, dry climate beginning before 10,000 years ago and continuing down to the present, interspersed with brief episodes of very cold, dry conditions or very warm, dry conditions, with the warmest and driest episode falling between 4,000 and 3,500 years ago. The same trend is also evident in the Townsend ground squirrel and the northern pocket gopher. The ground squirrel, which is adapted to warm, dry conditions and is scarce before 8,000 years ago, becomes prominent after 8,000 years ago. The pocket gopher, on the other hand, which is at home in relatively cool, moist conditions, exhibits a very abrupt decline around 7,200 years ago. After that time, the pocket gopher continues to decline, but at a much slower rate.

If we examine the graphs showing the proportions of these species before and after 7,200 years ago (Fig.19,D,E and F), it is quite evident that there has been a substantial change in the structure of the small animal community as represented in the remains at Owl Cave. Before 7,200 years ago, the cool, moist-loving, grass-associated northern pocket gopher was the dominant form; after 7,200 years ago, the dry-tolerant, sagebrush-associated pygmy rabbit became the dominant form along with the dry-adapted ground squirrel. Evidently, there was a quantitative change in the plant cover, with all of the plants becoming sparser, but with the grasses and forbs diminishing to a greater extent and more rapidly than the sagebrush. Such changes in the vegetation cover would have had an enormous impact on the large grazing and browsing animals inhabiting the Upper Snake and Salmon River Country. They also imply a significant change in the climate of the region.

Changes in the Large Animals

When the waters of ancient Lake Bonneville began flowing into the Snake River around 33,000 years ago, first as a horrendous flood and then as a series of overflows, probably for thousands of years thereafter, numerous gravel deposits were laid down along the Snake River. These contain the partially fossilized remains of many of the animals that lived in the Upper Snake and Salmon River Country between 33,000 and 15-13,000 years ago. The latter date is when the outlet channel of Lake Bonneville became choked with debris and Swan Lake formed near the town of that name (Bright

1966). Among the larger animals represented in these deposits are two species of ground sloth, Jefferson's and Harlan's (*Megalonyx jeffersoni* and *Glossotherium harlani*), at least one species each of wolf (*Canis dirus*), bear (*Arctodus simus*), sabertooth cat (*Smilodon* sp.), elephant (*Mammuthus* sp.), horse (*Equus* sp.), camel (*Camelops* cf. *hesternus*), caribou (*Rangifer tarandus*), deer (?*Odocoileus* sp.), antelope (?*Antilocapra* sp.) and two species of bison, an older, larger form, the giant *Bison latifrons*, and a smaller, more modern form, *Bison antiquus* (McDonald and Anderson 1975; Anderson and White 1975). This assemblage of animals is generally referred to as a Rancholabrean fauna, after the Rancho La Brea tar pits in the heart of Los Angeles, California, where the remains of many of these animals have been found (e.g., Downs 1968). It is an assemblage of animals typical of the Late Pleistocene in North America. The remains of many of the same animals have also been found in caves occupied by prehistoric man in the Upper Snake and Salmon River Country.

Three caves are of particular interest here: Wilson Butte, Owl and Jaguar Caves. The last is a cave in the upper reaches of Birch Creek Valley. The lower levels of Wilson Butte Cave, those dating between 15,000 and 6,800 years ago, yielded the remains of a sloth (*Nothrotherium* sp.?), two different kinds of camel (*Camelops* sp. and a smaller, unidentified species), horse (*Equus* sp.) and bison (*Bison* sp.). Of these, only bison continued to be represented in the later deposits, probably in an evolved form (Butler 1971b). The evolution of this animal through the late Pleistocene and into the Holocene is discussed below. The lowest levels of Owl Cave, those dating before 10,000 years ago, yielded the remains of camel (*Camelops* cf. *hesternus*), elephant (*Mammuthus* sp.) and bison (*Bison*, probably *antiquus*). Of these, only the bison continued to be represented in the later deposits, *Bison antiquus* at least as late as 8,000 years ago and the modern form, *Bison bison*, after that (see below). Neither sloth, nor elephant, nor bison is represented in the Jaguar Cave deposits. However, these deposits, which probably date between 20,000-15,000 years and 9,000 years ago (Dort 1975), contained the remains of a wide variety of animals, including those of an extinct lion (*Panthera atrox*), possibly the dire wolf (*Canis* cf. *dirus*), a camel (*Camelops* cf. *hesternus*), two species of horse (the American Kiang, *Equus conversideus*, and a large horse, *Equus* sp.), the modern form of caribou (*Rangifer tarandus*) and mountain (bighorn) sheep (*Ovis* cf. *canadensis*), plus many modern carnivores, such as the grey wolf (*Canis lupus*), red fox (*Vulpes vulpes*), coyote (*Canis latrans*), bear (*Ursus arctos*) and wolverine (*Gulo gulo*) (Kurtén and Anderson 1972). There were also remains of domestic dog (*Canis familiaris*) in the Jaguar Cave deposits (Lawrence 1968).

From the large animal remains found in the above-mentioned cave deposits, it is clear that there were profound changes occurring in the environment of the Upper Snake and Salmon River Country between 15,000 and 7,000-6,800 years ago. For example, there are no elephant remains dating after 10,000 years ago and no camel or horse remains dating after 9,000 years ago. The bison survives into later times, but not in its original form.

There is considerable debate concerning the evolutionary development of bison (Butler 1971b:3). Some authorities hold that the modern form, *Bison bison*, can be traced to a large-horned invader from the Old World, *Bison latifrons*, which gave rise to a smaller-horned form, *Bison antiquus*, the immediate ancestor of the modern form, *Bison bison*. Others see two or more waves of bison coming into the New World from the Old, each of which gave rise to a series of forms intermediate to the modern form. My own view (Butler 1971b) is in line with the first group of authorities, those who see the modern form evolving out of *Bison antiquus* which, in turn, evolved out of *Bison latifrons* (Fig.20). The data from geological deposits in the Upper Snake and Salmon River Country seem to fit this proposed genealogy very readily. There appears to be temporal continuity between *Bison latifrons* and *Bison antiquus* in the post-Bonneville Flood deposits along the Snake River in southern Idaho and between *Bison antiquus* and *Bison bison* at Owl Cave on the Eastern Snake River Plain. There is also additional evidence of the continuity of bison in the Upper Snake and Salmon River Country from ca. 10,500 years ago well into the historic period at rockshelters in the Birch Creek Valley immediately north of Owl Cave (Swanson 1972). This evidence clearly indicates that the bison was not a recent invader from the Plains as had been suggested by Captain John Fremont and others.

The great reduction in size between *Bison latifrons* and *Bison bison* appears to be related to the changing environmental conditions following the last maximum of glaciation in North America. The climate was becoming warmer overall, and the plants on which these animals subsisted were becoming scarcer. Eventually, many of the larger herbivores, such as elephant, camel, and horse, became extinct in North America along with such carnivores as the sabertooth cat (*Smilodon* sp.) that preyed on them. Some writers believe that humans played a major part in causing the extinction of these animals. Martin (1967), for example, has stated that "man and man alone was responsible for the unique wave of late Pleistocene extinctions in North America." This is called the "Pleistocene overkill" hypothesis, an hypothesis which Grayson (1977) has rebutted on the basis of wholesale extinction of birds in North America during and at the end of the Late Pleistocene. To understand what was happening at this time, one must have an appreciation for the magnitude of the climatic changes that were occurring.

Changes in Climate

The "model" of postglacial climatic change most often cited by archaeologists working in the Desert West is the Neothermal climatic sequence proposed by Ernst Antevs (1948,1953,1955), a European-trained paleoclimatologist. Using the postglacial temperature curve calculated on the basis of pollen zones and annual sediment chronologies for northern Europe and assuming a direct correspondence in time between the postglacial temperatures of Europe and North America, Antevs (1948) proposed a three-phase postglacial climatic sequence for the Great Basin. The first of the three phases, when the climate of the Great Basin was cooler and more moist than now but becoming warmer, was called the *Anathermal*. The second phase, when the climate of the Great Basin was presumably much warmer and drier than now, was called the *Altithermal*. The third and final phase, when the climate of the Great Basin became as it is at present, was called the *Medithermal*. Each of these three phases was dated in accordance with the postglacial climatic events of northern Europe, the *Anathermal* at 10,000 to 7,500 years ago, the

Altithermal at 7,500 to 4,500 years ago, and the *Medithermal* at 4,500 years ago to the present. Although dated in accordance with postglacial climatic events in northern Europe, studies of deposits at certain archaeological sites in the Great Basin seemed to support the suggested chronology and nature of the postglacial climatic sequence proposed by Antevs. The problem was that archaeologists began using the suggested chronology indiscriminately as a means of dating their sites and became dogmatic in interpreting archaeological deposits in relation to the proposed temperature sequence. Some writers, such as Bryan and Gruhn (1964), cautioned against uncritical use of the Neothermal climatic sequence, but appear to have accepted the idea of an unusually warm, dry phase, the Altithermal, following the end of the deglacial hemicycle. There is no question that Antev's pioneering work was extremely valuable and very percipient; however, there is need for a model that can overcome some of the problems inherent in his proposed Neothermal climatic sequence. I wish to propose such a model here, employing some recently published findings of the *CLIMAP* project (Hayes et al. 1976) and data from the Upper Snake and Salmon River Country. *CLIMAP* is an acronym for *Climate: Long-Range Investigation and Mapping*, a study which is part of the National Science Foundation's International Decade of Ocean Exploration program.

There are as many different ideas about the cause(s) of climatic change as there are persons involved in climatology. Among these different ideas, however, only one has been formulated in such a way as to predict the frequency of major glacial fluctuations during the Pleistocene (Hays et al. 1976). This idea is called the orbital hypothesis, of which there are a number of versions (e.g., Broecker 1965). All versions of this hypothesis "predict that the obliquity of the earth's axis (with a period of about 41,000 years) and the precession of the equinoxes (period of about 21,000 years) are the underlying, controlling variables that influence climate through their impact on planetary insolation" (Hays et al. 1976:1121). A test of existing geologic data by the *CLIMAP* group has confirmed the general hypothesis that the fundamental causes of the Pleistocene glacial succession were changes in the earth's orbital geometry. This test also revealed that variance in the climatic records of the past 500,000 years "is concentrated in three discrete spectral peaks at periods of 23,000, 42,000 and approximately 100,000 years (Fig.21, lower graph). These peaks correspond to the dominant periods of the earth's solar orbit, and contain respectively about 10, 25 and 50 percent of the climatic variance" (Hays et al. 1976:1131).

Suspecting that there might be a similar regularity in the fluctuations of the numbers of small animal remains recovered from Owl Cave at the Wasden Site, I submitted the data to the Idaho State University Computer Center and had the graphs in Fig. 19 drawn. The computer program used is generally called the IBM 113Ø Data Presentation System, Version 2. The curve produced was composed of line segments plotted between all given data coordinates. The fill points that comprise the line segments between all of the actual data points (see Fig.19) were calculated on weighted second-order polynomial segments (Jim Mather, ISU ADP Programmer, personal communication June 6, 1974). The object was to produce a continuous line between the actual data points without undue distortion of the trends indicated by the data points for each successive period of time. I then had a graph made of an oscillating line that dampened down at regular intervals at a regular rate. This graph was drawn to the same scale as the computer-drawn graphs; the oscillation interval selected was 2,000 years. This graph was then superimposed on the computer graph for the pygmy rabbit, mainly because this species seemed to be the most sensitive to cold pulses. The results are shown in Fig.21. The fit between the two graphs is by no means perfect, yet both graphs exhibit a similar pattern of oscillation dampening down at nearly regular intervals from more than 10,000 years ago to at least 1,500 years ago. The results of this crude test lead me to propose the following model of climatic change for the Intermountain region:

1. For the past 12-14,000 years, the climate of the Intermountain region has been getting progressively warmer and drier.

2. However, this trend is not continuous but cyclical; there are cool, moist episodes separated by either extremely cold or warm, dry intervals.

3. These cycles are approximately 2,000 years in length; there are probably other cycles of lesser length that are also of importance.

4. The maximum carrying capacity of the region declined with each successive cycle, except during the initial phase of Neoglaciation, when the trend was briefly reversed.

5. Neoglaciation was merely a transitory departure from the overall climatic trend of the past 12,000 years.

6. The shift from Pleistocene to Holocene conditions began around 12,000 years ago and continued down to around 7,200-6,500 years ago; there is a definite boundary between the Pleistocene and Holocene marked by a significant shift in the structure of the small mammal communities of the region and the final extinction or evolution of certain Pleistocene animal forms.

7. There was not an unusually long, dry period following the end of the Pleistocene; rather, there was a continuing trend towards increasing warmth and dryness, during which there was a relatively cool, moist interval, ca. 6,000-5,000 years ago, followed by a short interval of extremely warm temperatures or reduced moisture ca. 4,000-3,800 years ago. This, in turn, was followed by a brief return to glacial conditions.

8. These Neoglacial conditions gave way to a long-term

> trend towards increasing warmth and dryness, interrupted by cool, moist intervals, that has lasted down to the present time.

The effects that this proposed pattern of climatic change is believed to have had on the biota of the Upper Snake and Salmon River Country are outlined below as a succession of nine "climatic-ecologic" periods. Each period is characterized by distinctive changes in the biota of the Upper Snake and Salmon River Country. The dates chosen for the beginning and ending of these periods are approximate only; they are based mainly on the events dated at Wilson Butte Cave (Gruhn 1961), the Wasden Site (Butler, various) and at Swan Lake (Bright 1966).

Period I. Ca. 15,000-13,000 B.P.

Cool to cold; extensive alpine glaciers in mountains north of Snake River Plain; probably tundra conditions in the valleys north of the Snake River Plain; coniferous forest probably covers many of the valleys south of the Snake River Plain, encroaches on the Plain itself, covering higher prominences and ridges on the Plain; lodgepole and limber pine dominant in much of this coniferous forest; spruce also in abundance, but Douglas fir scarce or absent; sagebrush-grass vegetation presend in parklands and on the Plain, but marshes and wet meadows also present; typical Late Pleistocene (Rancholabrean) fauna present.

Period II. Ca. 13,000-11,400 B.P.

Still cool, but warming trend (deglacial hemicycle) has begun; this trend will be interrupted by intervals of very cold temperatures resulting in glacial stillstands in the mountains and permafrost conditions on the Snake River Plain at intervals of approximately 1,800-2,000 years; glacial melt increasing, resulting in high run-offs in the major rivers and the construction of high terraces along these rivers; tundra conditions still present in the valleys north of the Snake River Plain, but ameliorating; coniferous forest still present at lower elevations and on the Plain; however, changes in biota are beginning to occur; by end of this period, elephants, which were never very numerous in this region, are becoming extinct along with certain specialized carnivores such as the sabertooth cat.

Period III. Ca. 11,400-10,800 B.P.

Still cool, but definitely warmer than before; marked decrease in spruce at lower elevations; distribution of lodgepole and limber pine beginning to change; sagebrush-grass vegetation may be becoming more abundant; by the end of the period, camel and horse may have become scarce and elephant extinct.

Period IV. Ca. 10,800-8,400 B.P.

Warming trend, interrupted by cold pulses, continues; coniferous forest retreating from lower elevations; lodgepole and limber pine becoming less important, Douglas fir more important; sagebrush-grass vegetation expanding with grasses equal in importance to sagebrush; among the small animals associated with the sagebrush-grass biome, the northern pocket gopher is dominant (see earlier discussion); among the large game animals, *Bison antiquus* is probably at a maximum in the lower valleys and on the Plains, while mountain sheep are expanding in the mountains.

Period V. Ca. 8,400-7,200 B.P.

The long-term warming trend has reached a point where temperature and moisture conditions are becoming acute for survival of Late Pleistocene ecosystems; although there are still remnants of Pleistocene alpine glaciers in the mountains and cyclical cold pulses capable of producing periglacial conditions on the Snake River Plain, there is a very substantial rise in the numbers of the dry-adapted Townsend pocket gopher; however, the northern pocket gopher and pygmy rabbit, although evidencing some decline in maximum numbers, are still dominant among these small animals; *Bison antiquus* is clearly present early in the period but evolving towards the modern form of bison (*Bison bison*); both camel and horse are extinct by the end of this period.

Period VI. Ca. 7,200-3,800 B.P.

At ca. 7,200 years ago, the trend towards increasing warmth and dryness reaches a point where the grasses begin to fail and there is an abrupt shift in the composition of the small animal community in favor of the dry-adapted forms; some cold pulses early in period, but alpine glaciers completely gone by ca. 6,500 years ago; forests greatly reduced in total area; carrying capacity of sagebrush-grass ecosystem steadily declines; warming trend culminates in episode of maximum warmth and dryness ca. 3,800 years ago; this period is the first phase of the Holocene epoch.

Period VII. Ca. 3,800-2,800 B.P.

Return to cooler, moister conditions, glaciation in the mountains, and increased carrying capacity of regional ecosystems; a grassland maximum.

Period VIII. 2,800-650 B.P. (300 B.C.-A.D. 1300)

Trend to increasing warmth and dryness again; bison appear to begin to increase in numbers; climatic cycles of less than

1,000 years in length become increasingly important.

Period IX. 650 B.P.-Historic (A.D. 1300-1805)

> Episodes of glaciation in mountains, though not as great as in Period VII, and also episodes of drought; short climatic cycles important; modern bison continues to increase in number.

The shorter climatic cycles referred to in Periods VII and IX are not detectable in most archaeological deposits, but they are conspicuous in the annual growth rings of certain species of trees, such as Douglas fir (*Pseudotsuga menziesii*). With the cooperation of the Bureau of Land Management and the Challis, Salmon, and Caribou National Forests and the able assistance of Mr. Robert Pearson, a graduate student in biology at Idaho State University, I initiated a large-scale Douglas fir tree-ring study in the summer of 1976. The first phase of this study involving intensive sampling of Douglas fir trees at four different locations on dry mountain slopes north of the Snake River Plain is nearing completion. This study forms the basis of Mr. Pearson's M.S. thesis at Idaho State University. A computer print-out of the growth pattern of Douglas fir trees associated with the East Fork Lookout site described towards the end of the next chapter is shown in Fig. 22. The 1934-36 drought is identified on the print-out as is the prolonged 13th century drought which has been recognized in tree-ring growth patterns elsewhere in the western United States (e.g., Schulman 1956). The latter is coincident with the beginning of the Late Archaic period in the Upper Snake and Salmon River Country.

Undoubtedly, the climato-ecological sequence outlined here (and visually depicted in Fig. 23) will be modified as more information accumulates on the prehistoric environments of the Upper Snake and Salmon River Country. Yet, I believe that the concept upon which this proposed sequence is based, viz., a deglacial hemicycle of more than 10,000 years in duration in which there is a succession of climatic cycles of generally decreasing magnitude, is basically sound and will withstand the test of time. The question now is, what sequence of prehistoric lifeways and material culture remains do I believe developed or occurred in response to the changing environment of the Upper Snake and Salmon River Country? An answer to this question is proposed in the next chapter.

III. THE LIFEWAYS AND MATERIAL EQUIPMENT OF THE NATIVE PEOPLES OF THE UPPER SNAKE AND SALMON RIVER COUNTRY THROUGH TIME

A. Introduction

There are various ways of organizing and presenting information on prehistoric lifeways and material culture remains. Here I have chosen to follow in part Willey's concept of major cultural traditions. By major cultural traditions, Willey (1966:4) meant

> the principal native cultures or major cultural groupings as these can be discerned in geographical space and chronological time....Each major cultural tradition is characterized by a definite patterning of subsistence practices, technology, and ecological adaptation....

Two such major prehistoric cultural traditions can be discerned in the Upper Snake and Salmon River Country, an *Early Big-Game Hunting tradition* which was succeeded by an *Archaic tradition*, the living representatives of which were the historic Northern Shoshoni speakers of the region. Each of these traditions will be discussed chronologically by periods within the geographic framework of the region. Before doing so, however, it will be worthwhile to take a look at what is known about the historic native inhabitants of the area.

According to Murphy and Murphy (1960), who spent time between 1954 and 1957 working on Northern Shoshoni history and ethnography in connection with Indian lands claim cases, the recent history of these peoples can be divided into six periods:

(1) A pre-horse period in which everyone was on foot and which extended well into the 1600s;

(2) An early equestrian period, ca. A.D. 1700-1750, which saw horse-mounted Shoshonean-speaking peoples expand well out onto the High Plains; however, many Shoshoni remained on foot in their home territory;

(3) The period of an hypothesized general retreat of horse-mounted Shoshoni from the northern Plains and back across the Continental Divide, ca. 1750-1810, due to pressure from Northern Plains tribes, such as the Blackfoot, who had now acquired both horses and firearms;

(4) The period of fur trade, 1810-1840, which saw Shoshoni history "become inextricably connected with that of the American frontier" (Murphy and Murphy 1960:296);

(5) The period of the Oregon Trail and beginning of permanent white settlements in the region, 1840-1868; and finally

(6) The reservation period, 1868 and on, when the native Shoshoni were forced to accept reservation life.

Published descriptions of the lifeways and material culture of the native Shoshoni prior to the reservation period are few and far between. The first serious effort at recording their former lifeways was made by Robert H. Lowie on the Lemhi Reservation in 1906, shortly before that reservation was closed and the residents moved to the Fort Hall Reservation. At the time, Lowie was an inexperienced research assistant in the anthropology department of the American Museum of Natural History on his first major field trip. He did not know the native language and was not in the field long enough to learn it. As a result, the information he gathered on the Lemhi Reservation about former lifeways in the region (Lowie 1909) was very fragmentary and of limited value.

The next effort to record the former lifeways of the native peoples in southern Idaho was made by Dr. Julian Steward in 1935 and 1936. Steward was an employee of the Smithsonian Institution's Bureau of American Ethnology at the time and an experienced field worker. He made extended visits to various Shoshoni communities in Nevada and Idaho, including the Fort Hall Reservation, and published one of the most authoritative studies ever made of the former lifeways of these peoples (Steward 1938). Even that study had serious shortcomings, however, for Steward tended to view all of the native peoples he studied from the point of view of life in the Great Basin proper, which revolved to a large extent around seed gathering.

Most useful for our purposes, though still largely unpublished, are the studies made of the native peoples of southern Idaho by Dr. Sven Liljeblad, which began shortly after Steward had published the results of his studies and which continue to this date. A brief history of Liljeblad's work was presented in the first chapter of this volume. My own perception of Northern Shoshoni socioeconomic organization is greatly colored by my association with Dr. Liljeblad.

Both Liljeblad and Steward appear to agree that the socioeconomic organization of the Northern Shoshoni in pre-horse times was essentially the same as that of the Western Shoshoni; each family was a self-sufficient economic unit, and within this unit, the division of labor was along sexual lines. This division of labor covered all essential pursuits, including the manufacture of the tools used by each sex. Women, for example, were responsible for collecting plant foods, cooking and housekeeping, and they made the pots in which the foods were cooked. Men were responsible for hunting big-game animals and the manufacture of the bows, arrowshafts and chipped stone projectile points used in the hunt.

Although several individual families might camp together for a period of time, these encampments were not of a permanent nature. The individual families went wherever and whenever they pleased. Winter encampments were only somewhat more permanent than the spring-to-fall encampments. As Liljeblad (1957:35-36) notes, "these aggregates [sic] have often been called 'villages' in the literature, but it must be understood that these villages were not organized communities with perennial endurance and permanent membership. The village did not look quite the same from year to year; the location was not necessarily the same."

Despite the impermanency of the local populations, early travelers as well as later researchers assigned names to them as if they were enduring groups. Such names are misleading, as Liljeblad (1957:54-56) explains:

> [The Northern Shoshoni] made it a point of geographic, or rather ethnographic, order to refer to the prevailing food habits within a sub-area when naming the indigenous population collectively. There is hardly a native term for any principal food throughout the common area which does not occur in these names. People who camped near the salmon streams much of the year were called *agáideka* which means 'salmon eater,' whereas groups who frequented the Bear River country were *péngwideka*, that is, 'fish eaters.' The great value attached to the marmot as a food animal caused the term *yáhandeka*, 'groundhog eaters,' to be applied to various groups both in the east and the west. The mountain dwellers in the north were called *túkudeka*, a word which in the literature frequently occurs in the corrupt form 'Tukuarika.' The general meaning of *tuku* in both Shoshoni and Bannock is 'flesh' or 'meat'; but since to the northernmost Shoshoni meat was, for all practical purposes, that of the mountain sheep, they applied the word *tuku* to their most important game in the same sense that English-speaking peoples use the word 'veal' for calf meat. Consequently, *túkudeka* means 'mountain sheep eaters.' At the opposite extremes of the common areas, groups roaming between the Snake River and the Great Salt Lake--besides being referred to by a variety of other food-names--were called *híkandeka* or *húkandeka*. The former term can best be translated with 'seed eaters.' In slightly varied form, the first part of the word in several Shoshoni dialects denotes one or the other of various grasses with edible seed (wheat grass, spear grass, wild rye, and probably others), all of which likewise occur under the other names. *Huka*, on the other hand, means 'dirt' or 'dust.' The term *húkandeka*, among contemporary reservation Indians the commonly used appellation for the descendants of said groups, apparently originated as a pun; ingenuity in playing on words is much admired in Shoshoni lore. Mounted groups of migratory hunters to the Plains were called *kútsundeka*, 'buffalo eaters.' The same people, when hunting in the Teton country of northwestern Wyoming, appropriated the less presumptive title *padehiyadeka*, 'elk hunters,' which was applied to hunting people on the upper courses of the Beaverhead and Yellowstone Rivers; but at other times these same peoples would be called *túkudeka*. The

> 'Buffalo Eaters,' when traveling up the Portneuf to dig roots, were called *kuyedeka* (eaters of *Valeriana obovata* or 'tobacco root')....
>
> Nowhere among the Northern Shoshoni did these or other names relating to special foods denote specially defined local groups or individual bands. Rather, they referred to regional resources utilized by people who might travel widely. An individual, a family, or an entire band could be named differently at different times according to temporary whereabouts or to the seasons and the corresponding foods....

To further complicate the problem of identifying the particular groups in the Upper Snake and Salmon River Country, there were Northern Paiute-speaking peoples who commingled with the Shoshoni inhabiting the Snake River Plain. Many writers have treated these Northern Paiute speakers, whom they call the Bannock, as if they were a distinct ethnic group. However, according to Liljeblad (1957:57), the "Bannock" were culturally indistinguishable from the Snake River Shoshoni and freely intermarried, hunted, fished, and camped with them. Therefore, it would be more accurate to treat them as members of local bilingual "bands." The distribution of the various dialect groups in the Upper Snake and Salmon River Country is shown in Fig. 24.

How and by what means were the various food resources harvested by the Northern Shoshoni? On the basis of present information, this is a difficult question to answer. As indicated earlier, Steward saw the native peoples of the Upper Snake and Salmon River Country as no better off than their relatives in the Great Basin proper. This is probably most apparent in his perception of the importance of bison (buffalo) hunting in the Upper Snake and Salmon River Country prior to the introduction of the horse in the seventeenth century (Steward 1938:200);

> ...Buffalo occurred in the eastern part of the area, and there had been many near Fort Hall in 1834....But buffalo were extinct...in Idaho by about 1840....No doubt the sage-covered plains were not their optimum environment, so that the arrival of trappers and the acquisition of firearms and horses by the Indians was sufficient to exterminate them. *It is improbable that in pre-horse days the buffalo was sufficiently numerous or means of taking it sufficiently developed to have made it an important feature of the economy*....(Emphasis mine)

In another place, he says (Steward 1938:189):

> Throughout the mountains, subsistence was principally on seeds, roots, mountain sheep, deer, and salmon. Antelope

> were scarce; there were no buffalo. The fertile and lower Lemhi Valley had some antelope. Moreover, the Lemhi Shoshoni could keep horses with which to make expeditions to the south and east for buffalo and to the west for seeds and roots, especially camass. In fact, many seeds utilized by the Lemhi grew along the Snake River but not in the Salmon district or were more abundant near the Snake River, so that possession of horses was a great advantage.
>
> At best, however, foods were not plentiful. Grass [writing in 1811] described the Lemhi as the "poorest and most miserable nation I ever beheld; having scarcely anything to subsist on except berries and a few fish."

The last comment is difficult to believe, although similar comments were also made by travelers in other parts of the Upper Snake and Salmon River Country. The Lemhi River along with other tributaries of the Salmon formed a major spawning ground for salmon (Fig.24). The seasonal runs of salmon were harvested mainly by means of weirs, dams, and nets. Usually, several or more families cooperated in the construction of these facilities; as many as 20 families were involved in the construction of weirs across the major tributary streams of the Salmon River (Steward 1938:191). Similar facilities were also built at the "fishing falls" on the Snake and on Salmon Falls Creek and other tributaries of the Snake below the 210-foot-high Shoshone Falls. Horse-mounted families traveled from all over the Snake Country to the fishing grounds during the main runs. To what extent non-horse-owning families traveled to these fishing grounds is unknown. After the spring and early summer fish runs, many families from the Salmon River locale as well as from elsewhere in southern Idaho journeyed to Big Camas Prairie (Fig.24) to trade and socialize. While there, they subsisted on a great variety of plants and animals and also harvested camas bulbs. These were "gathered in great quantities and preserved for winter either by boiling in clay pots, grinding on a metate, spreading in the sun to dry and winnowing to remove skins, or by merely drying without cooking" (Steward 1938:167).

The fisheries and camas grounds aside, there are abundant indications that bison roamed nearly everywhere in the Upper Salmon River locale from the Lemhi River as far west as the East Fork of the Salmon. For example, John Work, leader of the Hudson's Bay Company's 1830-1831 Snake Brigade, who was in the Upper Salmon River Valley towards the end of October, 1830, made the following entries in his diary (Work 1971:36-41):

> Oct. 20 At our encampment [in the headwaters of the Big Lost River] there is not a bit of wood, so that Wormwood is used for fuel. The men had a fine hunt in the afternoon after a herd of buffalo several of whom they killed. Some time back these animals have been exceedingly numerous here, but the Bannack [Bannock] Snakes having passed but very short [time] ago have driven most of them off.

> Oct. 21 Raw cold weather. Marched 12 Miles W. by N. over a height of land [Willow Creek Summit] to another swamp or Fountain [Antelope Pass] where a branch of Salmon river has its rise [Warm Spring Creek]....The men drove down a small herd of buffalo from the Mountains and killed several of them but they were so lean that they were not worth the trouble. Immense herds have been seen in this valley very recently but at present few are to be seen.
>
> Oct. 22 Marched 18 Miles N.W. to Salmon river....Here is also a hot spring [Beardsley Hot Spring]. The river has a good deal of poplar and willows on its banks, but the plains are exceedingly barren and scarcely a blade of grass left by the buffalo. Some of the men set their traps, there is the appearance of beaver. Some buffalo were killed. Salmon ascend this branch to past this place. The Bannack Snakes have been lately encamped here, but have taken another direction and cut across the hills to the N.E.

In 1971, I excavated a bison jump on the north side of the Salmon River a few miles southeast of Challis, opposite the outlet of Warm Springs Creek (Figs.3,25). A small cave associated with the jump site yielded remains of bison dating between 1,200-1,300 years old (Butler 1971a), but the jump itself probably dated from historic time (ca. A.D. 1840-1860). The existence of this historic jump came as a surprise. Steward (1938:191) had reported that the local peoples "did not surround, impound, or drive [bison] over cliffs" in historic time. Liljeblad, however, obtained a more complete account of bison hunting, which included chasing bison over cliffs, from one of his informants, AJ, who was born about 1860 in the Upper Salmon River locale. This account is quoted here in part as published in 1971 (Butler 1971a:10):

> The oldest method of buffalo hunting that is remembered is buffalo chasing in winter in deep snow. The hunting party consisted of a group of about four of five men on snowshoes. They chased the animals toward deeper snow where they killed them with bow and arrows. A participating hunter could kill one or two animals on a single hunt. The slow fellows would go along just for packing the meat--for having a share of the meat. In those early days, the buffaloes went as far to the south and west as Camas Prairie.
>
> They used to ambush the buffaloes when they were grazing, usually on places where they were going for water, and shot them with arrows. Or they ambushed them along a trail going near a steep grade and drove them over the edge.
>
> During the winter they chased the buffaloes on snowshoes driving them over the cliffs. Later, when they hunted

> from horseback, they also drove the buffaloes over the cliffs. When a buffalo was running, and just when he was about to jump off from the edge of the grade, he lifted his tail. This was a good sign for the pursuer to stop when hunting on horseback.

The historic Challis Bison Jump was identical in nearly every respect to the classic bison jumps found along the eastern flank of the Rocky Mountains from north-central Wyoming to central Alberta. These jumps involved the following elements: (1) a grazing area where the bison collected in sufficient numbers to warrant organizing a drive; (2) a drive lane area leading to (3) a cliff with a talus slope at the foot. The drive lane, which might be a few hundred yards to several miles or more in length, was usually marked out by two lines of rock piles that converged toward the cliff (examples from the Challis jump are shown in Fig.26). The rock piles were from 5-10 yards apart in each line and rarely exceeded a foot in height. They served merely as interval markers. The hunters would crouch behind these markers with their robes outstretched before them in their hands. As the bison herd galloped by, each hunter in turn would twitch his robe slightly, a move which was usually sufficient to keep the bison within the drive lane and moving toward the cliff. The cliff needed to be of sufficient height that the bison could not easily escape death or injury. A height of 50 feet or more was ideal. A talus slope below the cliff served to entrap the animals, making them easier to kill. The historic Challis Bison Jump contained all of the aforementioned features. At the foot of the cliff, trapped among the talus rock were the remains of an estimated 20-30 individual bison and more than 100 chipped stone projectile points, some of which are illustrated in Fig.25. At the edge of the talus, where butchering and skinning occurred, there were also examples of a certain type of tool found at many open sites in the Upper Salmon River locale, a type of tool first described by the paleontologist, Joseph Leidy. While in the Bridger Basin of southern Wyoming in the early 1870s, Leidy saw Shoshoni women using a tool

> of so simple character that had I not observed it in actual use and had noticed it among the material of the buttes, I would have viewed it as an accidental spawl. It consists of a thin segment of a quartzite boulder, made by striking the stone with a smart blow. The implement...is circular or oval, with a sharp edge, convex on one side and flat on the other. It is called a "teshoa," and is employed as a scraper in dressing buffalo-skins (Leidy 1872:653).

"Teshoa" is an English rendering of the Shoshoni *toshawi* or *tosawihi*. The latter is a compound of *tosa*, which means "to be white" as in flint or chalcedony, and *wihi*, which is the generic term for any unhafted, hand-held, sharp-edged cutting tool (Liljeblad, personal communication).

Thus, *toshawi* or *tosawihi* means literally a sharp-edged, hand-held cutting tool of white chalcedony or similar material, but is usually translated as "white knife." Experiments conducted by students in one of my graduate classes proved that this simple tool was very effective in dismembering and skinning large game such as deer. A typical teshoa is illustrated in Fig.27.

At best, however, the local, non-horse-mounted residents of the Upper Salmon River locale could not count on bison as a reliable food resource. These animals roamed over very large areas, and were easily disturbed, except possibly during the rutting season. According to McHugh (1958), there are two basic social units among bison, cow groups and bull groups. Cow groups average about 20 individuals in number, but may range up to 70 individuals and consist of cows, yearlings, calves, two-year-old bulls, some three-year-old bulls, and rarely of bulls four or more years in age. Bull groups, on the other hand, are generally smaller in number, usually consisting of from one to five mature males, mostly four-year-olds, and an infrequent old barren cow. Both groups tend to be widely dispersed for the greater part of the year, but during the rutting season (early June to late September), a number of these groups may come together to form a large herd. Such herds were commonly reported by early travelers on the Eastern Snake River Plain, especially in the vicinity of the Lost River Sinks at the foot of the Northern Rockies. Those bison observed and hunted in the Upper Salmon River locale probably belonged to individual cow and bull groups casually wandering through the area in search of feed.

Other big-game animals, such as mountain sheep, deer, and elk, were probably a far more dependable source of hides and meat than the bison. Although each of these species occupied a different habitat and had distinctly different seasonal ranges, they bore an outward semblance to each other in social behavior, sex and age segregation, and seasonal patterns of behavior. Unlike bison, the home ranges of these species are relatively small, salt licks and trails are well established, and the herd composition is stable. In short, the behavior of these species within a given terrain at a particular time of year is highly predictable. They could be successfully hunted by a small group of men, as Steward (1938:33) noted:

> Deer and Mountain Sheep, occurring alone or in small bands, were taken through the wiles and perseverance of single hunters or small groups of men whenever they happened to be in a locality favorable for hunting. Only bison, limited to the [Upper Snake and Salmon River Country], and antelope, occurring throughout the [Great Basin culture] area were objects of important [i.e., large-scale communal] hunts. Antelope, forming small herds, lent themselves to communal hunts, but such slaughter so reduced their number that years might be required to restore the herd....

The preferred method of hunting mountain sheep according to Liljeblad's informants was with dogs and poisoned sticks, as follows:

> Mountain sheep [are] best hunted by a group of men, usually three in number. They moved on until they got near. When the dog "feels it" he will run before and chase the sheep to a rock or to the side of a canyon. The sheep would stay there. The mountain sheep, when coming up there, will jump down the cliff and kill themselves, or the dog will kill them. A stick with poison was placed at a place where the sheep was expected to jump down from a higher point. Such a stick was of "the grey willow" which is harder than the common willow. There was grass tied on to the stick so that it looked like a large grass. It was a little larger than the front legs of the animal for giving a chance to hit it. The poisoned sticks were put at places where the sheep usually had their way and where they had to jump. Often there was a stick placed on each side of the obstacle, always in an angle so that the stick pointed in the direction from where the animal had to jump off. These sticks were about as thick as an ordinary arrow shaft. They could easily break. There was a poisoned black stone point fixed to it like an arrowhead. (From field notes provided by Dr. Liljeblad and used with his kind permission.)

Another method, mentioned by Steward (1938:37), was used during the rutting season when the rams were duelling. That method involved knocking two logs together in imitation of the impact of the rams' horns during the duel; concealed hunters were then able to kill individuals attracted by the noise. Concealment was often behind circular roofless enclosures.

It should be apparent from the preceding discussion as well as from the first chapter that the historic native food resources of the Upper Snake and Salmon River Country were not uniformly distributed. There were significant geographical differences from north to south and east to west in kinds as well as abundance of these resources. On this basis alone, one could argue that no single locality can be considered representative of the Upper Snake and Salmon River Country as a whole. Thus, Swanson's belief that Birch Creek Valley was a microcosm of the Northern Shoshoni territory is surely mistaken. Nevertheless, as we shall see further along, the excavations at the Birch Creek sites have contributed greatly to what we know today about the prehistory of the Upper Snake and Salmon River Country.

B. The Types and Distribution of Archaeological Sites in the Upper Snake and Salmon River Country

Raw data on prehistoric human life in an area are gained basically by two means, either by excavation of known archaeological sites or by searching for undiscovered sites. The latter is usually referred to as "archaeological survey." The most common type of archaeological survey, especially before the mid-1970s, was one aimed at securing a catalog of sites and a collection of artifacts. This was the type of survey carried out when systematic archaeological studies were just getting under way in the Upper Snake and Salmon River Country (e.g., Swanson et al. 1959). Valuable as this approach was at the time, it failed to provide us with reliable knowledge of the full range and geographic distribution of the various types of archaeological sites and materials to be found in the region.

Attempts to secure a representative sample of all of the different kinds of archaeological resources to be found on the surface in particular parts of the Upper Snake and Salmon River Country began under my direction in 1974 with surveys of a series of Bureau of Land Management Planning Units. Four such units have been partially or completely sampled to date: Mount Bennett Hills; Challis; Little Lost-Birch Creek; and Camas-Little Grassy (Cinadr 1976; Epperson 1977; Kingsbury 1977; Roberts 1976). The approximate locations of these planning units are shown in Fig. 28. Note that none of these is located south of the Snake River. There have been surveys made south of the Snake River, but not of the kind made of the aforementioned BLM planning units. The question is: what did we learn about the types and distribution of archaeological sites in the region based mainly on the BLM planning unit surveys?

Six general site categories were recognized in the course of these surveys:

(1) surface lithic scatters;
(2) caves and rockshelters;
(3) quarry/workshops;
(4) pictographs and petroglyphs (so-called "Indian Rock Writing");
(5) rock structures (hunting blinds; houses; and "tipi rings") and house pits; and
(6) bison jumps.

As we learn more about the region and about individual sites, these categories will undoubtedly be refined and increased in number.

The most common category of site by far, based on the surveys mentioned above, is the surface lithic scatter. Unquestionably, this category embraces open sites of many different uses: temporary encampments, chipped stone tool manufacturing, food processing, etc. Because of prior surface collecting at these sites by relic hunters and casual visitors, it is difficult to determine on the basis of surface examination the specific functions these sites served or the periods of time in which they might have been utilized. They occur everywhere in the region; only a very small number have been systematically excavated.

Caves and rockshelters are also common in the region. They exist wherever rock formations favor their occurrence. Most of what we have learned about material culture sequences in the region has been gleaned from excavations of caves and rockshelters, but these have yielded evidence pertaining primarily to big-game hunting and not to the full round of prehistoric life. Hence, as will become evident in the sections to follow, our knowledge of former lifeways in the region is limited mainly to big-game hunting activities.

Quarry/workshop sites also existed wherever geologic formations and processes favored their existence. Quarries are important sources of information on prehistoric stone tool manufacturing processes, but only one, in the foothills of the Northern Rockies east of Birch Creek, has been systematically investigated in the Upper Snake and Salmon River Country (Kimball 1976). The materials sought at quarry sites were usually those particularly suitable for chipped stone tool manufacture, volcanic and silicic minerals. The volcanic minerals included: fine-grained or glassy basalt; rhyolite; ignimbrite (a welded tuff common in this region); and obsidian. These are typically found in the volcanic regions of the Upper Snake and Salmon River Country, especially from the foothills of the Northern Rockies southward to the Basin and Range province south of the Snake River Plain. The silicic minerals, such as quartzite, chalcedony, jasper, agate, chert and opalized wood, occur both north and south of the Snake River Plain, but the greatest variety by far is in the mountains bordering the Salmon River and its tributaries. Most minerals appear to have been used within the general area in which they occurred; some, such as glassy basalt and obsidian, appear to have been transported far from their sources, probably in the form of "blanks" from which finished tools were made when needed.

Petroglyphs and pictographs have long attracted the interest of white residents in the region (e.g., Erwin 1930), and there have been a number of attempts made to study them systematically. None has been very satisfactory. We do know that there is a very distinct geographic difference in the distribution of these two forms of prehistoric rock "art" in the Upper Snake and Salmon River Country (Boreson 1976). The pecked and incised form (petroglyphs; Fig.29) occurs almost entirely from the Snake River Plain south. Only one has been reported from the Upper Salmon River Valley (Swanson et al. 1959). The painted form (pictographs) is confined mainly to the area north of the Snake River Plain, but some examples occur on the Plain itself. Just what this north-south geographic division in the distribution of these two rock art forms signifies is unknown at this time.

Probably the most common rock structures are those collectively referred to as "hunting blinds," an example of which is illustrated in Fig. 30. These exhibit patterns of location and distribution that appear to be related to the hunting of specific species of animals. For example, John Spears, a New York *Sun* reporter, described structures of this kind and the method of hunting mountain sheep from them among the Paiute of the Great Basin proper (Spears 1892:73):

> These sheep find their feed on the benches and gulches of the mountain side, and while eating, it is said, they never look upward. But when they are alarmed they fly to the top, and if there is a ridge there, follow it to the highest peak. Having observed this peculiarity, the Piutes [sic] build blinds on the ridgetop runways. They started in during the fall of 1891 to build a number of such blinds on crests overlooking several Death Valley trails...The Blinds were in all cases low semicircular walls of stone...When all preparations were complete, [the Indians] posted their best marksmen in the blinds while the others chased the sheep up to slaughter.

I have observed many blinds of this kind high up on talus slopes within mountain sheep winter ranges along the Salmon River; they were rarely at the tops of ridges, however. In the Basin and Range province south of the Snake River, similar blinds are located on ridge tops, which may simply reflect local topographic conditions. Slopes along the Salmon River are generally more precipitous than those in the Basin and Range province.

Only a few stone house structures have been observed thus far in the Upper Snake and Salmon River Country, all in the valleys drained by the Salmon River. One, which will be treated in greater detail in a later section, is illustrated here (Fig.30). Such structures are easily destroyed. Every effort should be made to preserve and protect them when they are found, which is also true of the other rock structures mentioned.

Large numbers of tipi rings, circular rows of stones used to weight down tipi coverings (Fig.29), have been reported along the Middle Fork of the Salmon (Swanson et al. 1959), at the lower ends of the Little Lost River and Birch Creek Valleys (Kingsbury 1977), and in the upper part of the Eastern Snake River Plain (Roberts 1976). A smaller number occur in the Lemhi River Valley and in the valley of the Snake River upstream from its confluence with the Henry's Fork (Swanson et al. 1959). Only one small group near the Continental Divide has been excavated (Fig.29) (Ranere et al. 1969). All of the known tipi ring sites probably date from the equestrian period, A.D. 1650 and later. However, there may be older precursors to be found in the region (e.g., Fig.30).

Housepits, circular depressions excavated in the earth over which a conical roof was constructed, have been found mainly along the Salmon River and its principal tributaries, especially the Middle Fork of the Salmon. None of these have been excavated in detail; they represent an aspect of life in the Upper Snake and Salmon River Country which is totally unknown.

Only one bison jump, the one near Challis already described (Fig.25), is known for certain. There are almost certainly others, however, perhaps dating from an earlier period. No one has made a systematic effort to identify earlier jump sites as yet.

This very brief and general treatment of the types and distribution of archaeological sites in the Upper Snake and Salmon River Country has emphasized the fact that our knowledge of prehistoric lifeways in this region is still very limited. Nevertheless, on the basis of this limited knowledge, it is still possible to outline a sequence of cultural traditions and change in the region. This sequence is described in the following sections.

C. The Earliest Cultural Manifestations in the Region

We are not certain when the ancestors of the American Indians first entered North America or when they arrived in the Upper Snake and Salmon River Country. There is some evidence that they had crossed the Bering Land Bridge into Alaska by approximately 30,000-28,000 years ago; however, the oldest possible cultural material known to date from the Upper Snake and Salmon River Country is only about 15,000 years old. This material consists of two animal bone fragments recovered from Stratum E at Wilson Butte Cave bearing cut marks suggestive of deliberate butchering by people using stone tools.

The earliest definite cultural material found in the region came from the lower zone of Stratum C at Wilson Butte Cave. This stratum yielded a radiocarbon sample that dated at 14,500 ± 500 years B.P. (Gruhn 1965). The material consists of: a small, slightly utilized ignimbrite flake; a thick, percussion-flaked basalt "point" or knife; a thick, parallel-sided chalcedony flake partially retouched along the edges; a bone splinter that might have been employed as a flaking tool; and a bone fragment with cut marks on it. The stone tools are illustrated in Fig. 4. Found in the same zone as these tools were a few remains of extinct forms of camel, horse and sloth. These same forms were hunted by later occupants of the cave and, thus, may have been hunted by the occupants of the lower zone of Stratum C as well. The tools made and left at the cave by these early occupants were not diagnostic, however, of the Early Big-Game Hunting tradition.

D. The Early Big-Game Hunting Tradition

Following Willey (1966:38), the phrase "Early Big-Game Hunting tradition" is used here in connection with those "early cultural complexes which are characterized by distinctive lanceolate point types and other associated lithic, or stone remains." The point types in question are the fluted Clovis and Folsom and the broad range of types collectively referred to as "Plano."

On the High Plains, these types comprise an historically related series. "All were integral parts of complexes which reflected a way of life primarily dependent on killing large game animals, many of the species now extinct" (Willey 1966:38). Of the three types, the Clovis is the oldest, dating from around 11,500 years ago, and is usually found with elephant kills. The name comes from a locality on the Llano Estacado, or "Staked Plain," of western New Mexico, between the towns of Clovis and Portales, where many points of the Clovis type have been found in place. Also named after a town in New Mexico are Folsom points, which are slightly younger in age than Clovis points, generally dating between 11,000-10,000 years ago, and which are usually found with kills of extinct bison, notably *Bison antiquus*. These points are smaller than Clovis points, finely retouched along the edges, with a channel flake scar or flute running the length of the point. A typical specimen is illustrated in Fig. 33a. Folsom points are followed immediately in time by a variety of long, well made, finely flaked lanceolate point forms, among which are the Agate Basin and Scottsbluff types. Both of the latter types are found in Wyoming, and Scottsbluff points occur in some quantity in the headwaters of the Snake River at Jackson Hole, Wyoming (Wright 1976).

Presumably, it was on the High Plains that the Big-Game Hunting tradition developed. According to Willey (1966:37):

> The Big-Game Hunting tradition was primarily adapted to, and developed in, a grasslands environment of the late

> Pleistocene. Such an environment once existed on the North American High Plains, and it is on the Plains that the principal discoveries relating to this tradition have been made....

This emphasis on a grasslands environment is probably misleading. All of the Pleistocene big-game animals hunted on the High Plains also occurred in the intermountain west, where there was also a greater range of local environments; the chances are equally good that the Big-Game Hunting tradition could have developed here and expanded onto the High Plains (e.g., Davis 1975). The sequence of cultural materials from the Upper Snake and Salmon River Country supports this latter possibility.

This sequence exactly parallels that found on the High Plains: Clovis, Folsom and Plano, in that order, associated for the most part with extinct forms of big-game animals. Of the three point types, only the Clovis has not been found in place and dated in this region.

The best single collection of Clovis points in the Upper Snake and Salmon River Country came from the Simon Site in Camas Prairie near Fairfield, Idaho (Butler 1963a). It was a cache of completed Clovis points, Clovis point "blanks" and preforms, smoky quartz bifaces and a huge, carefully prepared flake (this collection is partially illustrated in Fig. 31), which Mr. W.D. Simon of Fairfield uncovered while scraping a roadway along the edge of one of his fields (Fig.31). The cache had been buried near the edge of a former tributary of Camas Creek which had subsequently filled in with a bog deposit in which camas grew in historic times. There was no way to date the cache except typologically; there were no radiocarbon datable materials in the cache, and geologically the site could only be assigned to the Late Pleistocene. Two years after the discovery of this cache, a Clovis point was observed on the beach in front of a wave-eroded site near the mouth of the Portneuf River. Nearby were teeth from an immature elephant. Test excavations made at the site yielded a backbone fragment from an immature elephant, but there were no cultural materials associated with it (Butler 1968b:38).

The association of cultural materials with elephant remains was not established with certainty until 1971 when excavation was resumed at the Wasden Site by members of the Upper Snake River Prehistoric Society, Inc. (Butler 1971b). The few cultural materials first found with the elephant remains (Fig.32) could not be attributed to a particular cultural tradition or complex, but later excavations under the direction of Ms. Suzanne Miller yielded fragments of three Folsom fluted points in association with these remains. Also recovered from the same level at the Wasden Site were the remains of bison (*B. antiquus*), camel (cf. *Camelops* sp.) and pronghorn (*Antilocapra* cf. *americana*) (Dort and Miller 1977:F-3). Folsom points have been found nearly everywhere in the region (Butler 1965b,1969b,1973a; Campbell 1956; Swanson 1961a), but the Wasden Site specimens were the first to be found in place and in a radiocarbon-datable context. There is, however, a problem with the radiocarbon dates that have been obtained for the earliest culture-bearing deposits at the Wasden Site.

I submitted two elephant bone samples from these deposits to the radiocarbon laboratory at Washington State University for dating. One came from between 4.8 and 5.1 meters below datum; the other from 5.2

meters below datum. The upper sample yielded a date of 12,250 ± 200 B.P. (WSU-1259); the lower sample a date of 12,850 ± 150 B.P. (WSU-1281). A third sample of elephant bone from between 5.09 and 5.14 meters below datum and collected and submitted by Ms. Miller five years later yielded a date of 10,920 ± 150 B.P. (WSU-1786). This raised a question in my mind as to the validity and reliability of all the previous radiocarbon dates that I had obtained through the WSU radiocarbon laboratory for the Wasden Site. At my request, the present director of the WSU radiocarbon laboratory, Dr. John C. Sheppard, offered the following evaluation of the dates in question (letter to me dated 12-16-77):

> A series of six radiocarbon dates have been determined for the Wasden site. The table below summarizes these dates:

WSU-560	8160 ± 260	yrs. B.P.,	charcoal
WSU-561	3340 ± 575	"	"
WSU-641	7750 ± 210	"	"
WSU-1259	12,250 ± 200		bone
WSU-1281	12,850 ± 150		"
WSU-1786	10,920 ± 150		bone

> WSU-560 to WSU-641 were determined by Lars Engstrand. Control of the dating system was excellent since the modern (oxalic acid) reference sample was essentially constant. WSU-561 was diluted and this is reflected in the higher standard deviation. The evaluation of these dates is that there should be little question concerning them.
>
> WSU-1259 and WSU-1281 were dated several years later. The modern reference standard was obviously out of control since it varied by about 3.8% from the average, thus an uncertainty of about 600 years is introduced into these determinations. These bone samples were not given a NaOH treatment so any humic acid present was not removed. This makes 1259 and 1281 more suspect by some unknown amount. Since humic acid usually has a radiocarbon age which doesn't differ by more than ± 1000 years of the sample and the amount of humic acid present is probably less than 10 to 20% of the sample, the effect on the [radiocarbon] age of the bone should not be drastic. It is not going to change the apparent age of the sample 5000 years. The change may be 500 to 1000 years at the most and probably less than 500 years. Thus we conclude that the [radiocarbon] age of 1259 and 1281 are approximately the value reported but with a larger uncertainty, approaching 600 years.
>
> With reference to WSU-1786, this bone sample was pretreated with NaOH to remove humic acid. The sample was counted twice and compared to NBS oxalic acid and modern wood standards. Agreement between counts was excellent. WSU-1786 is not in statistical agreement with WSU-1259 and

> WSU-1281 if reported standard deviations are used. If a 600-year uncertainty is used for WSU-1259 and WSU-1281, Z values of 1.94 and 3.12 are obtained when compared to WSU-1786, thus WSU-1786 is definitely statistically different from 1281 and probably different from 1259. Consequently, we are left with two sets of dates at approximately 12,000 years that appear to be statistically different. The only way to resolve this discrepancy is more [radiocarbon] dating of bones from the Wasden site....

I certainly agree with Dr. Sheppard that more radiocarbon dating of bones from the early levels of the Wasden site is desirable. Meanwhile, the existing dates can be used if we do two things: (1) increase the standard deviation of the radiocarbon age of the first elephant bone samples dated to $\pm$ 600 years as recommended above by Dr. Sheppard and (2) use the 95 percent confidence limits in comparing the ages of all samples involved, which means doubling their standard deviation values as follows:

Sample #	Age plus 1 Standard deviation	Age range at 2 Standard deviations
WSU-1786	10,920 $\pm$ 150	11,220-10,620
WSU-1259	12,250 $\pm$ 600	13,450-11,050
WSU-1281	12,850 $\pm$ 600	14,050-11,650

This "exercise" in juggling figures is of more than passing interest and value, for it points to the very real possibility that the earliest levels at the Wasden Site were contemporaneous with part or all of those at Jaguar Cave, where a particularly interesting array of big-game animal bones was recovered.

Jaguar Cave is a frost-plucked cavity in the wall of a canyon dissecting the western flank of the Beaverhead Mountains in the upper reach of Birch Creek Valley some 7,450 feet above sea level (Fig.3). According to Dort (1975), this cavity formed and began filling in perhaps as early as 20,000 years ago; by 9,000 years ago, it was completely sealed off from the outside. The earliest material from the cave consists of black, almost fossilized, bones recovered from cracks that extended below the floor level of the cave. The black bones were the remains of a camel (*Camelops* sp. cf. *hesternus*), a large horse (*Equus* sp.), grizzly bear (*Ursus arctos*), dire wolf (*Canis* sp. cf. *dirus*), the Pleistocene marten (*Martes nobilis*), coyote (*Canis latrans*), badger (*Taxidea taxus*), red fox (*Vulpes vulpes*) and cottontail rabbit (*Sylvilagus nuttalli*) (Kurten and Anderson 1972). The camel, horse, dire wolf and marten are, of course, extinct forms.

As the cave began filling in, more bones accumulated in it. An 11,580 $\pm$ 250 year old fireplace near the rear of the cave yielded a flaked antler tine bearing cut marks, the only "tool" found in this early accumulation of bone, and the bones of camel (*Camelops* sp. cf. *hesternus*), Pleistocene marten (*Martes nobilis*) and collared lemming (*Dicrostonyx* sp. cf. *torquatus*), a species now found only in the arctic region of North America.

Subsequently, more rooffall and great quantities of bone accumulated in the cave. A shallow depression on top of this fill contained charcoal that yielded a date of 10,370 ± 350 radiocarbon years before the present. Among the accumulation of bones were those of the extinct Pleistocene marten (*Martes nobilis*), two species of horse (*Equus conversideus* and a larger *Equus* sp.) and a Pleistocene lion (*Panthera atrox*). There were also two varieties of domestic dog represented in this accumulation of bones, a larger variety nearly as big as a small wolf and a smaller variety about the size of the small Basketmaker dogs of the Southwest (Lawrence 1968). Chief among this accumulation of bones, however, were those of the mountain sheep (*Ovis canadensis*), a species which occurs in the region today. Historically, this species was a favorite game animal among the Mountain Shoshoni and was hunted by them using dogs (e.g., Steward 1938:37). The prehistoric occupants of Jaguar Cave also may have hunted the mountain sheep using dogs, perhaps the larger variety found at the cave. Unfortunately, nothing in the way of the material equipment they used in the hunting of sheep or other animals was recovered from cave deposits. However, if these earlier deposits at Jaguar Cave are contemporaneous with the earliest levels at the Wasden Site, then this is a heretofore unknown and unrecognized aspect of the Folsom Horizon and Early Big-Game Hunting tradition in North America, an aspect which continued throughout the prehistory of the Upper Snake and Salmon River Country and probably also in the Great Basin proper as well.

To summarize, Folsom man in Idaho hunted a wide variety of big game--elephant, camel, horse, bison and probably mountain sheep--using spears tipped with the characteristic Folsom fluted point. The elephants he hunted were apparently juveniles or immature specimens. Similar selection of young or immature specimens is also evident at elephant kill sites uncovered in Wyoming (Frison, personal communication). Probably, younger elephants were easier to harvest than older ones. This age selection is not as evident in the other species of big game hunted by Folsom man in Idaho. The methods or tactics used in hunting these animals are unknown, but dogs may have been employed in the hunting of the mountain sheep. Other than the type of projectile point, almost nothing is known about the tool kit of Folsom man in Idaho at this time. Some retouched stone flakes and chips of elephant bone comprise the only tools found thus far with Folsom points in this region.

Considerably more is known about the material equipment and lifeways of the local inhabitants during the Plano period. By this time, many of the caves and rockshelters in the valleys north of the Snake River Plain began to be utilized sufficiently often that continual, albeit thin, layers of occupational debris began to accumulate in them. Typical are the Bison and Veratic rockshelters in Birch Creek Valley described in the first chapter.

These rockshelters formed when Birch Creek flowed against the escarpment more than 12,000 years ago and began eroding portions of it. Subsequently, angular gravel and other sediments from the steep arroyos dissecting the escarpment began accumulating at its base, pushing Birch Creek away from the escarpment and permitting the first human use of the rockshelters.

This last event probably took place around 11,500-11,000 years ago. From that time until well into the historic period, prehistoric hunters camped at the two rockshelters, apparently only for a few days at a time and at widely spaced intervals. On each occasion, however, some cultural debris was left behind and eventually buried beneath a layer of gravel or sand and silts that washed or blew into the rockshelters. This debris, whatever remained of it, usually consisted of bones of the animals hunted and eaten while in the vicinity of the rockshelters, broken and discarded stone projectile points, knives, scrapers, drills and the detritus from the manufacture, repair and/or sharpening of these stone tools. Occasionally, bone awls and beads, shell ornaments and food remains also survived, but the more perishable items such as basketry, leather, sinew and arrow shafts probably quickly decayed in these open rockshelters.

Bones of big-game animals were found in all but the earliest deposits at the two rockshelters. The most common big game in each period were bison (*Bison* sp.) and mountain sheep (*Ovis canadensis*); however, there were rarely more than a few individuals of each species represented in any one layer. Also widely, but thinly, distributed through the layers were the remains of deer (*Odocoileus* sp.) and antelope (*Antilocapra americana*). Remains of elk (*Cervus* sp.) were extremely scarce, occurring only in a few layers. Except for the form of buffalo represented in Periods II, III and IV, no evidence of an extinct species of big-game animal was found at either Bison or Veratic rockshelter. Bones of domestic dog (*Canis familiaris*) were also found in the later deposits (Periods II-VII) at these sites.

Based on the long continuity in and low numbers of big-game species found, the two rockshelters would appear to have served primarily as temporary encampment sites for small hunting parties. If so, one would not expect to find any great variation through time in the material equipment found there, and this is apparently the case. Of the 1,644 artifacts recovered from the two rockshelters, 1,007 (61%) are projectile points or fragments thereof, 270 (16%) are choppers, scrapers and fleshers, and 131 (8%) are cores, flakes and blades (data extracted from Swanson 1972, Tables 2-5). These three categories account for 85% of all the artifacts recovered from the two sites. Although the distribution of these categories and of the particular types of artifacts comprising them varied through time, Swanson (1972:65) chose to distinguish the sequence of cultural phases at the two sites mainly on the basis of "changes in the proportions of recurring point types." The phases are as follows (Swanson 1972:65-66):

Ia early Birch Creek Phase, 11,000-8,200 years ago;
Ib late Birch Creek Phase, 8,200-7,200 years ago;
II, Bitterroot Phase, 7,200-3,450 years ago;
III, Beaverhead Phase, 3,450-2,950 years ago;
IV, Blue Dome Phase, 2,950 years ago to A.D. 1250;
V, Lemhi Phase, A.D. 1250-1850

For the moment, we are concerned only with the earliest of these Phases, the Birch Creek Phase, and the chipped stone points that characterize this phase, the so-called Birch Creek A and B lanceolate points. A total of ten examples of the A type, all basal fragments, were recovered from the earliest culture-bearing deposits at the Bison and Veratic rockshelters (Swanson 1972, Tables 2-3; Fig.48a-p). According to Swanson, both types of points are characterized by a certain distinctive pattern of flake scars; these "are broad collateral pressure flaking scars which feather at the midline on both faces so that the point has a smooth lenticular cross section lacking a median ridge altogether" (Swanson 1972: 90). This pattern of flake scars is very evident on the only known complete Birch Creek Type A point from the Upper Snake and Salmon River Country, which is shown in Fig. 33g. This specimen came from the Sampson site near the mouth of the Portneuf River, the same site mentioned earlier that yielded bones and teeth of an immature elephant and also a Clovis point. It was found in place in a deposit overlying the elephant material. The form of this specimen appears typical of the type: a short tip section and a long, parallel-edged basal section, the edges of which are heavily ground, and a broad, flat, slightly oblique base. The Birch Creek Type B points share none of these characteristics, least of all the pattern of flake scars, yet Swanson (1972:91) states that "the B variety with its narrow base corresponds...the Haskett points (Butler 1965c, 1967a)...." This comparison is in error.

There were two types of lanceolate points found at the Haskett site. Both share the same pattern of flaking evident on the Birch Creek "A" points, but differ distinctly in form from one another and from the Birch Creek "A" points. Like the Birch Creek "A" points, Type 1 Haskett points (Fig.33d-f,h-i) are broadest and thickest near the tip end, and this end accounts for only one-third the length of the point. Unlike the Birch Creek "A" points, the stem portion of the Type 1 Haskett points tapers in and down to a thin, somewhat rounded end. The edges of the stem portion are either ground smooth or dulled, probably to facilitate socketing the point in a hand-held spear shaft. The Type 2 Haskett points (Fig.33c) are considerably longer and heavier than the Type 1 Haskett points. The edges are uniformly excurvate from the tip to the base, with the broadest and thickest part of the point midway between the two ends. The edges are ground or dulled near the basal end, possibly indicating that most of the point was exposed. Complete examples of both types of Haskett points occurred at the Haskett site, but the Type 1 points were, by far, the most common.

The Haskett site was located in an ancient sand dune field on the Snake River Plain eight miles southwest of the American Falls Reservoir. Collectors have found many early types of points in this field, including both Clovis and Folsom points. The Folsom point described by Campbell (1956) came from the same general vicinity. The site in question was discovered by the late Mr. Parley Haskett of Pocatello, Idaho, after whom it was named. He found several points weathering out of a former sand borrow area (Fig.6). Subsequently, with the help of members of the newly formed Upper Snake River Prehistoric Society of Idaho Falls, Idaho, and members of the geology faculty at Idaho State University, the sand borrow area was studied in detail and additional specimens of Haskett points recovered in place (Butler 1965c; Strawn 1965; Davis, Fenske and Ore 1965). Along with the points, several flake knives and many pieces of bison tooth enamel were also recovered. The bison tooth enamel was the last remaining evidence of the big-game animals that the Haskett point makers had hunted here. Apparently, they had successfully ambushed or surrounded several or more bison at this spot, then killed and butchered them, leaving a number of their projectile points and knives behind in the process.

Because of the lack of suitable materials, it was not possible to establish the age of the Haskett site with any degree of certainty, nor to reconstruct the climate of the time. Therefore, a search was made for a large cave site that might yield further evidence of Haskett points and the climate of that period. This search led to the discovery and excavation of the Wasden Site (Butler 1968a). However, although the Wasden Site yielded a great deal of evidence bearing on the climate of the time, it did not yield any Haskett points. Not until the summer of 1972 were other Haskett points uncovered at an archaeological site in Idaho.

They were found enclosed in a sequence of geological deposits that had accumulated in a rockshelter near the outlet of lower Redfish Lake, which drains into the uppermost reach of the Salmon River high in the mountains of central Idaho (Fig.3). No evidence of animal bones or other food remains were recovered from these deposits, but there was sufficient charcoal to date them. Charcoal from a rocklined hearth near a cache of Type 1 Haskett point blanks yielded a radiocarbon date of 9,860 $\pm$ 300 years ago, while charcoal from an earlier layer overlying one containing a mid-section of a Haskett point yielded a radiocarbon date of 10,000 $\pm$ 300 years ago (Sargeant 1973). By 8,000 years ago, Haskett points were no longer found at this site, which was also true at a series of cave sites in central Oregon (Bedwell 1970).

Direct comparison of the Haskett points from the Upper Snake and Salmon River Country with points of the same age found at the central Oregon sites indicates that they are almost certainly manifestations of the same cultural tradition (Sargeant 1973). Projectile points of similar form and age are also found on the High Plains east of the Continental Divide (Sargeant 1973), sometimes in association with mass kills of bison. On the High Plains, they are collectively referred to as "Plano" points (Willey 1966:44ff), which is why I have referred to this as the Plano period in the Upper Snake and Salmon River Country.

As on the High Plains, there are many different types of Plano points to be found in the Upper Snake and Salmon River Country. Gruhn (1961b:127) noted that "classic parallel-flaked points like Scottsbluff, Eden, Angostura, Plainview, and Milnesand, along with a wide range of variant large lanceolate parallel-flaked points, are fairly numerous as far west as Owyhee and Twin Falls counties...and are also fairly frequent finds in the desert blowouts west and north of American Falls, in Power, Blaine, and Bingham counties." Her Wilson Butte II assemblage is characterized by some of these point types. Also found in this assemblage is a mano (handstone) fragment (Gruhn 1961b:118). A mano is used in grinding certain foodstuffs, usually seeds, and is considered one of the hallmarks of the Desert Culture. Associated with the Wilson Butte II assemblage, however, are the bones of bison and camel, indicating big-game hunting as well as plant food gathering. The two are not mutually exclusive, as indicated previously.

Late in the Plano period, there appears to be a decline in the quality of workmanship exhibited in the production of points; they are not as finely made as in the past and more coarsely textured minerals, such as basalt and rhyolite, are used. There are probably many sites in the Upper Snake and Salmon River Country, including the Bison and Veratic rockshelters in Birch Creek Valley and Wilson Butte Cave on the Snake River Plain, that contain manifestations of the late Plano period. However, one manifestation in particular is deserving of special attention, the mass bison (*Bison antiquus*) kills at the Wasden Site 8,000 years ago.

There were two kills, each involving the slaughter of probably more than 30 individual bison. They took place very close together in time, resulting in what initially appeared to be a single layer of bones at the site (Fig.18). More than 70 bison were represented in this layer, including bulls, cows, and calves of different ages (Butler, Gildersleeve and Sommers 1971). Analysis of the lower jaws of the younger bison by Dr. George Frison at the University of Wyoming in the spring of 1976 confirmed that there were, in fact, two kills. One occurred just before the beginning of the calving season and the other at the beginning of the calving season (Frison, personal communication). Among modern bison (*Bison bison*), the main calving season ranges from the beginning of March until the end of June, but usually peaks in April and May (Allen 1876;56-57; Garretson 1938:38). The same seasonal pattern is also evident in the 8,000-10,000 year old mass bison kills on the High Plains (Frison, personal communication). The question is, what methods were used in hunting the large numbers of bison found at the Wasden Site?

The least complicated methods of hunting bison in use among the historic Indians of the Plains and the Upper Snake and Salmon River Country involved relatively few hunters. These methods included stalking bison on foot, ambushing them along trails or near watering holes, or, in the winter, stranding them in deep snow. In these instances, only a few bison were killed at any one time (Arthur 1974; Butler 1971a). Much more complicated was the "surround," which might involve an entire community. A pre-horse surround among the Blackfoot has been described thus (Ewers 1960:45-46):

> After swift-running men located a herd of buffalo, the chief told all the women to get their dog travois. Men and women went out together, approaching the herd from downwind so that the animals would not get their scent and run off. The women were told to place their travois upright in the earth, small (front) ends up. The travois were spaced so that they could be tied together, forming a semi-circular fence. Women and dogs hid behind them while two fast-running men circled the herd, approached them from up-wind and drove them towards the travois fence. Other men took up their position along the sides of the route and closed in as the buffalo neared the travois enclosure. Barking dogs and shouting women kept the buffalo back. The men rushed in and killed the buffalo with arrows and lances.
>
> After the buffalo were killed the chief went into the centre of the enclosure, counted the dead animals, and divided the meat equally among the participating families. He also distributed the hides to the families for making

lodge covers. The women hauled the meat to camp on their dog travois. This was called "surround of the buffalo."

Bison could also be induced to "follow" a lead cow into a surround or be enticed into the surround by other means. Pounds or corrals were also constructed as a means of entrapping bison. Usually, they were placed so as not to be visible to the bison until it was too late for them to turn away. Blind canyons, hollows, and the like were ideal places for a pound. The bison were then driven towards the pound location by the hunting party. Details of the drive varied considerably from group to group (Arthur 1974).

I believe that the Wasden Site (Owl Cave) served as a natural pound into which small herds of bison were induced or driven by a band of big-game hunters 8,000 years ago, employing techniques similar to those reported in use among the Plains Indians in pre-horse days. Once trapped in the cave pound, the bison were killed and butchered there. Based on observations made at the time the 8,000-year-old bone bed was uncovered, it appears that virtually every animal had been systematically cut apart. Limb bones were stacked to the left and right. The heads had been detached and the tongues and lower jaws removed. Sometimes a hole was carefully chopped in the base of a skull for removal of the brain. Meat was cut from the parts of the carcasses using stone knives. Minute flakes from these knives were found lying against the bones, but no knives or other butchering tools were found among the bony remains of the bison. A single flesher made from a bison nasal bone was found along with more than 30 projectile points (Fig.34a-r). The latter were scattered throughout the bone bed. One was found in the rib cage of a bison. Tip ends of several others were embedded in ribs or in a shoulder blade. Apparently, hand-held spears were thrust into the chest cavities of the bison as they milled about in the pound. Two of the projectile points recovered from the bone bed appear to be reworked basal fragments of Birch Creek points (Fig.34c,f); the others are called "Late Plano" points for want of a better descriptive term.

E. The Archaic Tradition

Ideally, the Late Plano points mark the final phase of the Early Big-Game Hunting tradition in the Upper Snake and Salmon River Country. Camel and horse had completely disappeared by this time, and *Bison antiquus* was evolving into the modern *Bison bison*, the historic American buffalo. Elephants, of course, had become extinct by the beginning of the Early Plano period. However, in addition to bison, other big game, such as deer, elk, antelope and mountain sheep, continued to flourish in the region and were hunted into the Historic period. Thus, there is not a clear break between the Early Big-Game Hunting and Archaic traditions in this region.

Theoretically, the transition from Big-Game Hunting to Archaic cultures should be marked by a noticeable change in the kinds of food resources being exploited and by the occurrence of more sophisticated material equipment. Because of the nature and location of the sites excavated up to now--mainly caves and rockshelters in hunting localities--no evidence of a change in the kinds of exploited food resources has been found. There is, however, clear evidence of a change in weaponry at these sites during the time in question.

This evidence is in the form of side-notched (SN) and stemmed, indented base (SIB) projectile points. These may signal the spread of the spear-thrower (atlatl) and dart into the region (see Fig.35 for illustrations of the main forms of weaponry in North America). The oldest example of these point forms to be found at the Wasden Site came from the deposits immediately above the 8,000-year-old mass bison kills. This example was the base of an SIB point such as illustrated in Fig.4. These same deposits also yielded the base of a parallel-flaked Plano point (Butler 1968a:Fig.11g) and a radiocarbon sample that dated at 7,750 + 210 B.P. (WSU-641). That date appears to agree closely with Swanson's (1972: 110) estimate for the first occurrence of SN points at the Birch Creek rockshelters (i.e., between 8,200 and 7,200 years ago), which overlapped in time with the Birch Creek Plano points at these sites.

Swanson called the new point form at the Birch Creek sites the Bitterroot side-notched type. Examples of this type are shown in Fig.35. It is a type found widely throughout the intermountain area and also on the High Plains. As a result, it has been given many different names (e.g., Northern side-notched, Madeline Dune side-notched, Large side-notched, Cold Springs side-notched). Points of this type were found in Assemblage IV at Wilson Butte Cave. Gruhn (1961b:64-66) simply called them "large side-notched" points. Assemblage IV occurred immediately above Assemblage III, which was radiocarbon dated at 6,890 ± 300 years ago (Gruhn 1961b:119). Assemblage III contained several SIB points, but neither side-notched nor Plano points. This assemblage could be considered an Archaic stage manifestation, but as Gruhn noted (1961b:119), "there is no direct evidence for any other method of subsistence at this site" than big-game hunting. No large side-notched points were recovered from the Wasden Site, but fragments of SIB points continued to be found in very small numbers until around 3,500 years ago. The deposits containing the SIB fragments also yielded occasional remains of bison, either *Bison antiquus* or *Bison bison*.

South of the Snake River Plain, at the Weston Canyon Rockshelter in the Bannock Range (Fig.3), a similar succession of projectile point forms occurs. This highly stratified site was first occupied approximately 8,000 years ago and continued to be reoccupied at frequent intervals until the time of Christ (Delisio 1970; Miller 1972). Hunting of big game was the principal objective of the occupants of this site at all times. The remains of at least 300 individual mountain sheep (*Ovis canadensis*) were recovered, along with those of 16 elk (*Cervus canadensis*), 9 bison (*Bison* cf. *bison*), and 8 deer (*Odocoileus* cf. *hemionus*). Mountain sheep were the predominant big game hunted in every occupational layer. As Miller (1972: 126) noted, the assemblage of stone tools accompanying the big-game animal remains exhibited a number of interesting features:

> The composition of the tool kit is remarkably uniform throughout the site as are the food animals and butchering techniques. The non-projectile flake tools are dominated by flake scrapers. These scrapers, regardless of material, are relatively lightweight, modified by unifacial edge flaking, and often present

> a multi-purpose aspect. On the same hand, large, heavy fleshers are absent and highly fashioned scrapers are scanty in number [the opposite of the Bison and Veratic rockshelters]. Each occupation has projectiles and flake scrapers accompanied by an assortment of modified obsidian flakes and obsidian flake cutting tools, a few bifaces, and even fewer bifacial knives. In all layers, the number of flake tools, particularly scrapers, remains proportionately high, in some cases dominating the projectile point category [again, just the opposite of the Bison and Veratic rockshelters].

Of equal interest is the succession of projectile point forms from the early layers at this site. The earliest layer, 17, and the lower part of the next layer, 16, yielded only SIB points. The remainder of layer 16 yielded a large series (83) of SN points along with Elko Eared and Elko Corner-notched points (Fig.35), all of which are characteristic of Swanson's Bitterroot phase, 7,200-3,500 B.P. The predominance of SN points is also characteristic of the occupations at Mummy Cave in northwestern Wyoming between 7,600 and 7,200 years ago (Wedel et al. 1968) and at Hogup Cave in northern Utah from approximately 8,400 to 3,250 years ago (Aikens 1971). Farther west and north, in the Southern Plateau region of Washington and northern Oregon, SN points are the sole characteristic points of the Cold Springs Horizon which dates from approximately 7,000-4,500 years ago (Butler 1961a).

The temporal, geographical and cultural differences in the initial occurrences of SIB and SN points in the northern Intermontane region may indicate that two distinct, but functionally similar, weaponry systems were involved. One, characterized by SIB points, was spreading northward out of the Great Basin around 8,000-7,200 years ago; the other, characterized by SN points, was spreading westward across the northern Intermontane region at about the same time, probably from the northern Plains. What the separate origin of these weaponry systems portends with respect to other aspects of lifeways in the Upper Snake and Salmon River Country is not entirely clear. However, it is clear that after 7,200 years ago, despite the differences in kinds and relative abundance of food resources, the material culture remains found in the region are more like that of the Great Basin proper than of any other area. This similarity in material culture remains is most evident in what I shall call the Late Archaic period.

F. The Late Archaic Period

The Late Archaic period extends from the 13th century through the middle of the 19th century and embraces Swanson's (1972) Lemhi Phase in Birch Creek Valley and Gruhn's (1961b) Dietrich Phase on the Snake River Plain in south-central Idaho. Also included is the Equestrian period, A.D. 1650 and on, because, at present, the manifestations of this period are indistinguishable from those immediately preceding it in time.

The most widely and easily recognized of the Late Archaic material culture traits are: (1) small, triangular, side-notched arrow points of the kind illustrated in Fig. 25, which are collectively referred to as Desert side-notched points (DSN) (Baumhoff and Byrne 1959); and (2) pottery of a kind commonly called "Shoshoni" ware (e.g., Tuohy 1956; Coale 1963). DSN points are found nearly everywhere in the Desert West after A.D. 1100-1200 (Hester 1973). Shoshoni ware is also widespread, but is treated by some archaeologists as an *archaeological* hallmark of an hypothesized expansion of *Numic (Paiute and Shoshonean) speaking* peoples out of the southwestern corner of the Great Basin around 1,000 years ago. The hypothesized movement of peoples out of the southwestern corner of the Great Basin is based on a reconstruction of the historical relationships and geographical origins of the languages spoken by the native inhabitants of the Basin in early historic time. As Miller (1966:92-93) has pointed out,

> The three Numic sub-branches [Western or Paiute, Central or Shoshoni, and Southern or Ute] show a continual dialect gradation with the dialect differences closely spaced in the southwest homeland, and more and more distantly spaced on out into the Basin. If the Numic moved down from the North they would have had to be gathered in a wide arc from southern Idaho to central Colorado. Then they would have moved simultaneously in the direction of Death Valley as though they were taking part in a gigantic rabbit surround, carefully dropping off small groups on the way, appropriately spaced. As they funneled into the southwest corner, it would have taken careful planning in placing the dialects so as to avoid a pile-up. It is unlikely that the Basin saw such carefully planned migrations until the days of Brigham Young.

This hypothesis is supported by the obvious geographical origin of certain words used by Northern Shoshoni. For example (from Jacobsen 1968:47):

> The pinon nut occurs throughout the Great Basin as an important food and is named in Numic languages by words cognate with Northern Paiute ɨiba. The pinon tree (*Pinus monophylla*, or in northeastern Ute territory *Pinus edulis*) is named by a derivative of the same stem, such as Northern Paiute ɨibabi. But in northern Shoshoni spoken in mountain districts of central Idaho..., outside of the range of growth of the pinon, the word ɨiba is applied primarily to the seed of the limber pine (*Pinus flexilis*), which is used for food there. The limber pine itself, however, is called by an entirely different word, wongobi, cognate with Northern Paiute wogopi "pine." Both these stems were certainly present in Proto-Numic....

Madsen (1975), among others, believes that the hypothesized spread of Numic speaking peoples from the southwestern corner of the Great Basin can be verified archaeologically on the basis of the spatio-temporal distribution of Paiute-Shoshoni type pottery, which he assumes to be a material culture hallmark of Numic speaking peoples. This type of pottery is found throughout the Great Basin and northward. The oldest examples are reportedly found in the Death Valley area, just north of the hypothesized homeland of the Numic speaking peoples of the Basin (Fig.36). "Hunt (1960) and Wallace (1962) *suggest* a basal date of about A.D. 1000" for the Death Valley area pottery (Madsen 1975:83; emphasis mine). Pottery of the same kind but only slightly younger in age was recovered from sites in southeastern Nevada and southwestern Utah (Madsen 1975: Table 1). The same kind of pottery has also been recovered from sites in southeastern Idaho dating as early as A.D. 1222 $\pm$ 70 years B.P. (Neudorfer 1976). Thus, for the southwestern Great Basin homeland hypothesis to be true, the Numic speaking peoples would have had to spread throughout most of the Basin area and into its northeastern periphery, displacing everyone in their path in less than 250 years, a remarkable feat, indeed, for non-warlike peoples. One can only ask what happened to those peoples who were there prior to these latecomers. Perhaps they never left and simply acquired a new language and some new material culture traits. I think that this is what happened in the Upper Snake and Salmon River Country.

For example, the early 13th century pottery found in southeastern Idaho came from an earth oven at a site at the northeastern end of the Blackfoot Reservoir. In addition to seven fragments of the characteristic Shoshoni ware and some bone fragments, this earth oven also yielded 177 pieces of chipping detritus and 18 finished artifacts. Among the diagnostic finished artifacts were: a Desert side-notched (DSN) point; a Cottonwood triangular point (Fig.25a), a type of small point often found associated with Desert side-notched points (Hester 1973:37); and three Elko corner-notched points (Fig.35). Examples of the same three point types were recovered from the upper layers of Hogup Cave in northern Utah, also along with Shoshoni ware pottery predating the 13th century (Aikens 1971). However, Elko corner-notched points go back as early as 8,000 years ago at Hogup Cave (Aikens 1971) and 7,200 years ago at the Weston Canyon rockshelter (Miller 1972) and at the Birch Creek rockshelter (Swanson 1972). A study of the neck widths of these and other types of projectile points through time in the Northern Great Basin culture area revealed that the neck widths of projectile points were distinct but constant within each sub-area for more than 7,000 years (Corliss 1972). The only change that occurred was the addition of a second distinct standard neck width of projectile points in each sub-area after the introduction of the bow and arrow around 2,000-2,500 years ago (Corliss 1972). Thus, on the basis of this evidence, it would appear that although projectile point styles changed through time, certain cultural constraints in their manufacture remained unchanged.

Continuity through time in non-projectile point artifacts is also evident at the Birch Creek sites (Swanson 1972). The same applies to the form and use of earth ovens at these and later sites in the region. A typical earth oven in use by natives historically was described by Father DeSmet (Chittendon and Richardson 1905:488):

> [The natives] make an excavation in the earth from 12 to 14 inches deep, and of proportional diameter to contain the roots [i.e., plant foods; but animal foods could also be cooked the same way]. They cover the bottom with closely-cemented pavement [of rounded cobbles or other suitable rocks], which they make red-hot by means of fire. After having carefully withdrawn the coals they cover the stones with grass or wet hay, then place a layer of roots, another of wet hay, a third with bark overlaid with mold, whereon is kept a glowing fire for 50, 60, or sometimes seventy hours.

The oldest earth oven of this form found at the Birch Creek sites was 4,500 ± 170 years B.P. by radiocarbon count (Swanson 1972:51,76). I have wondered whether the first appearance of earth ovens of this form might mark the beginning of the Middle Archaic in the region, but other indications are needed to define this period.

Many other material culture traits of the Late Archaic are difficult to trace back in time, either because they are of a highly perishable nature or are extremely difficult to date in any direct way. Examples of the former, which are characteristic of the Dietrich phase at Wilson Butte Cave, include artifacts of wood, cane, cordage and hide, such as composite and single shaft arrows, composite fire drills, sagebrush bark cordage and moccasins (Gruhn 1961b:90ff). Also characteristic of this phase are cylindrical wooden game counters and small, polished, ovoid-to-rectangular dice, of which a great number were recovered from the cave (Gruhn 1961b:92). These may have been used in a women's basket-dice game (e.g., Lowie 1924:258). The presence of pottery, which was apparently made and used only by women, reinforces this interpretation of the dice game implements. Men, however, also might have participated in the playing of the game.

Pottery was completely absent at the Bison and Veratic rockshelters in Birch Creek Valley, but has been found in quantity around the Birch Creek sinks and elsewhere in the Upper Snake and Salmon River Country. This, plus the fact that the predominant artifacts at the Birch Creek sites are projectile points, leads me to believe that these sites, and the Lemhi Phase in particular, are representative only of male-oriented hunting activities. The principal difference through time at these sites is in the variety and proportions of projectile point types and in the addition of earth ovens around 4,500 years ago as previously mentioned. If there were changes in hunting techniques, in the method by which large numbers of big-game animals were harvested at one time, this is not evident at the Birch Creek sites. For such evidence, we must look elsewhere in the region and at a different type of site.

Large-scale hunting facilities, such as the historic Challis Bison Jump described earlier in this volume, are difficult to date unless they contain wood, bone or other carbonaceous materials that can be radiocarbon dated or artifacts of a distinctive type that can be cross-correlated with those found in a previously dated deposit. The kill area at the foot of the Challis Bison Jump yielded more than a hundred Desert side-notched points, which placed this site clearly in the Late

Archaic period, but it contained a small number of glass beads of a type most probably traded into the Upper Snake and Salmon River Country between A.D. 1860 and 1880 (Butler 1971a:13). Only one such bison jump is known for certain, yet I am confident that there are others, some dating from early in the Late Archaic period and possibly also from the late Middle Archaic period as well (i.e., from ca. 500 B.C.-A.D. 1200).

By far the most common type of big-game hunting facility in the region is the hunting blind. As I indicated earlier, wherever there is a convergence of big-game animal trails, water, and suitable talus rock, especially in the Salmon River mountains, there are hunting blinds. Blinds made of brush were probably constructed where suitable talus rock was unavailable, but these blinds would not have survived intact for long. Most of the hunting blinds cannot be dated either directly, through radiocarbon dating or organic materials associated with them, or indirectly, through comparison of chipped stone points found in them with similar points of known age from other sites. Hunting blinds rarely contain either organic materials or chipped stone points. There are exceptions, of course. We have discovered in the past few years hunting blinds and associated stone structures with wood remains in them (Fig.30); the wood can be radiocarbon dated if it predates the Industrial age. One of these exceptions, which I have called the East Fork Lookout and which dates from early in the Late Archaic period, is described below.

The East Fork Lookout is located within a known mountain sheep wintering range on a high, extensive rhyolite talus slope overlooking the East Fork of the Salmon. Between this slope and the river are steep, sagebrush-covered hills. On the slope and above it are scattered Douglas fir (*Pseudotsuga menziesii*) trees. At the foot of the slope is a spring hidden by a dense growth of willows and marsh plants. Just above the spring are several hunting blinds; more occur further up the slope and on the ridges above the site. All over the lower part of the rhyolite slope there is abundant and clear evidence of prehistoric tool manufacturing, but no diagnostic artifacts are to be found. There is also a structure here best described as a house. It was built by prying rocks up from the surface of the rhyolite slope and piling them up around the pit thus created. The final shape of the structure is like that of an old-fashioned beehive with an open top, except that there is a definite rampway on the west side of the structure and indications that there was a covered roof (Fig.30). The structure is approximately 9.5 feet in diameter and 4.5 feet deep. The indications of a covered roof are in the form of thick tree limb sections incorporated in the inner walls of the house and also lying on the ground immediately outside the house. The limb sections are all of Douglas fir. One of those incorporated in the house itself yielded a radiocarbon date of A.D. 1340 ± 70 years (WSU-1587); another lying on the ground outside the house yielded a date of A.D. 1510 ± 70 years (WSU-1705). Wood from another set of hunting blinds only a few miles away in a similar setting (Fig.30) yielded a date of A.D. 1290 ± 70 years (WSU-1704). Thus, there appears to be a fairly strong indication that these large hunting blind complexes in mountain sheep wintering ranges were well established at the beginning of the Late Archaic period.

Curiously, 70-80 year old Bannock-Shoshoni informants born in nearby Herd Creek and interviewed at Fort Hall in 1976 were completely surprised to learn of the existence of these sites. One informant said, "My grandfather never told me about those places" when he and his grandfather rode past them. The first suggestion made by these informants was that the structures "were built by white soldiers." Apparently, they had no first-hand knowledge of the hunting blinds or houses even though the former are found nearly everywhere in the Salmon River area and were used to hunt a wide variety of big-game animals, including bison. Perhaps their lack of knowledge simply reflected changes in local lifeways that occurred after the introduction of the horse in the late 16th or early 17th century. Steward (1938) may have been right when he said that the horse revolutionized Shoshoni economy and lifeways, but we have yet to discover all of the places, kinds of facilities, and material culture remains that distinguish the Late Archaic and Equestrian periods from one another.

G. Summary and Conclusions

The sequence of major cultural traditions and periods outlined here for the Upper Snake and Salmon River Country is very different from that envisaged by Jennings and others for the Great Basin. This sequence consists of an Early Big-Game Hunting tradition followed by an Archaic tradition, at the end of which an Equestrian tradition also appears.

The former two traditions persisted through several periods or more, each characterized by distinctive types of material culture remains. The Early Big-Game Hunting periods closely parallel those found on the High Plains east of the Continental Divide. The sequence of projectile point types--Clovis, Folsom, and Plano--and big-game animals--elephant, horse, camel, and bison--are the same (see chart,Fig.37). The most important difference may lie in the age of the Clovis and Folsom materials: this material may have existed slightly earlier in the Upper Snake and Salmon River Country than on the High Plains. The Archaic periods are at least three in number--Early, Middle, and Late--but the Middle Archaic period is not yet clearly defined. All periods of the Archaic appear to have a close relationship with Archaic manifestations in the Great Basin, but present indications are that the hunting of big game, especially bison and mountain sheep, continued to be of importance in the Upper Snake and Salmon River Country.

The material culture of the Late Archaic in this region is identical to that of the Basin proper, which has been taken by some archaeologists as an indication of a recent expansion of Numic speaking peoples into the Upper Snake and Salmon River Country from the Basin. However, there is so much continuity through time in the occupation of the region that such a recent immigration of these peoples seems unlikely.

This continuity of occupation also raises another set of questions. Is the Big-Game Hunting tradition ancestral to later cultural developments throughout the Desert West, such as some researchers have long suspected? If so, is the Old Cordilleran Culture in the Pacific Northwest simply a regional variant of the Early Big-Game Hunting tradition coextensive in time with the Early and Late Plano periods in the Upper Snake and Salmon River Country and on the High Plains? Commonplace though it may be, the answer to these questions is likely to come only through vigorous and detailed study of all of the archaeological resources to be found in these regions. We have not yet discovered the full range of activities and material culture goods characteristic of the former lifeways in the Desert West. Nor have we determined the precise effect of climatic changes on these activities and on the number and distribution of peoples in the Desert West through time. When we do, we may find that there are far more fascinating questions to be answered than any of those posed here.

IV. RECOMMENDATIONS FOR FURTHER WORK

Obviously there is a great deal of work that will have to be done before the questions raised in the preceding chapter can be answered. By necessity, much of this work is of a very practical nature. Let me outline some specific examples:

1) Because of a lack of suitable maps and information-gathering instructions, records of sites made before 1973 are frequently inaccurate and incomplete. A systematic effort should be made to relocate the sites in question and upgrade the information on them. Specific information-gathering instructions should be drawn up and circulated among all field workers, including federal employees engaged in archaeological survey and evaluation work.

2) Sample-oriented archaeological inventories should be made of all previously non-sampled localities in the region, beginning with these: (a) the Pahsimeroi Valley; (b) the Salmon River Valley from Challis to North Fork; (c) the Big Lost River Valley; (d) the Medicine Lodge-Beaver Creek locality; (e) the Idaho National Engineering Laboratory (formerly the National Reactor Testing Station); (f) the Lemhi Valley; (g) the Fort Hall Indian Reservation; and (h) the Curlew Valley and Deep Creek-Blue Spring Hills locality. Based on previous experience, a minimum of approximately 16 percent of the acreage in each locality should be systematically surveyed.

3) Because lithic (mainly chipped stone) scatters form the most common type of surface site in the region, detailed studies should be made of representative examples of this general type of site from each locality surveyed as in 2) above. The purpose of such studies would be to determine whether or not there are significant differences between such sites within any given locality and between such sites in the different localities. I have suggested in the preceding pages that some sites, such as the Bison and Veratic rockshelters, were occupied by men only. Material remains indicative of the presence of women, mainly pottery and teshoas, are absent at these sites. Perhaps there were localities utilized primarily by women in which the converse is true. In any event, detailed studies of lithic scatters should lead to a considerable refinement in their classification and to a greater appreciation of their value than is now the case.

4) There are substantial collections of prehistoric artifacts from this region housed in the Idaho Museum of Natural History's Division of Archaeology; many of these are unstudied and uncatalogued. All of these collections should be systematically studied, and where needed, catalogued and classified. The objectives of this study would be twofold: (1) to determine geographic and temporal differences in the materials and technology employed in the manufacture of artifacts from the region and (2) to work out reliable and useful criteria for classifying artifacts found or observed in the course of field surveys. Perhaps a handbook of prehistoric artifact types and technologies would be among the tangible results of

these studies.

5) The potential occurrence and distribution of major native food sources in the region need to be mapped in detail. This includes the seasonal ranges of such big game as the native mountain (bighorn) sheep, the probable locations of native vegetable food crops and their time of ripening and probable yields, and the probable locations of all fisheries in the region. This information could then be collated with known site locations, yielding data on seasonal rounds and settlement systems in the area.

6) In keeping with 5) above, studies of climatic changes through time and their cumulative as well as immediate effects on particular species of plants and animals and on biotic communities in the region are needed. For example, what were the effects of glaciation in central Idaho on the salmon species spawning in the Salmon River and its principal tributaries and on the fresh water mussels in these streams? When and under what circumstances did the large camas (*Camassia quamash*) meadows found historically at such places as Big Camas Prairie come into existence?

7) All known big-game hunting facilities should be revisited, mapped, and photographed, and wherever possible, radiocarbon and tree ring samples should be collected for purposes of dating these facilities and placing them in a specific climatic regime. Additional examples of these facilities should be sought in those areas identified in 5) above. There is a high probability that locational information alone will make it possible to ascertain the particular species of game hunted at these facilities.

8) Excavation of selected sites associated with major native plant food locations, fisheries, and prehistoric quarries should be initiated as soon as possible, for those are aspects of the prehistoric cultural systems in the region about which we are almost totally ignorant.

Undoubtedly, chance factors will continue to play a large role in the archaeology of the Upper Snake and Salmon River Country, and every archaeologist wants to do "his own thing." Some of us are primarily interested in reconstructing specific cultures or lifeways; others, such as myself, have the long-range goal of attempting to explain the development of culture and cultural systems generally through time and space. Increasingly, there are also those who are mainly interested in protecting and preserving archaeological sites and material culture remains for the future. The work that I have outlined above should contribute directly to all of these goals.

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FIGURES 3-37

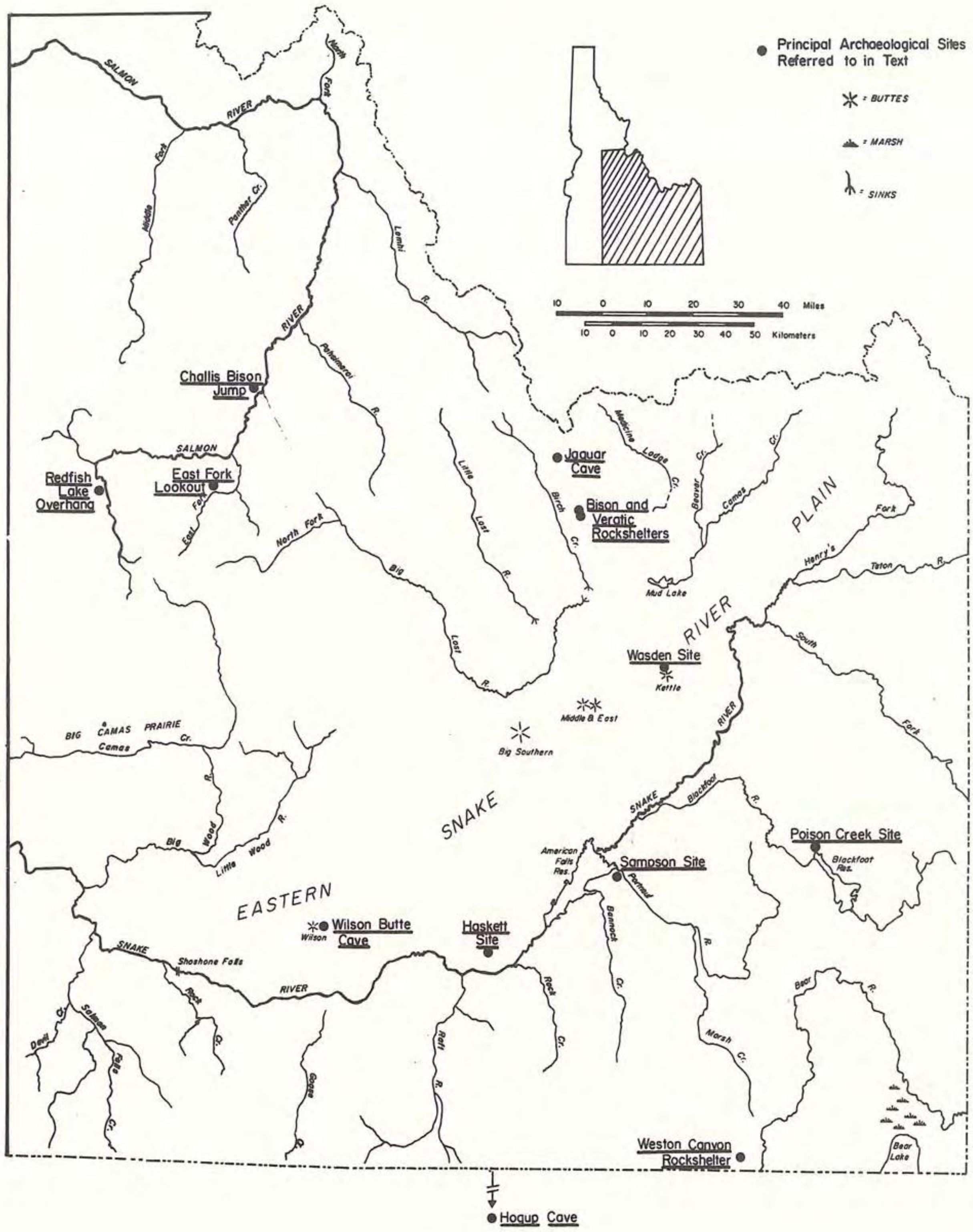


Fig. 3. Map showing location of the major sites mentioned in the text.

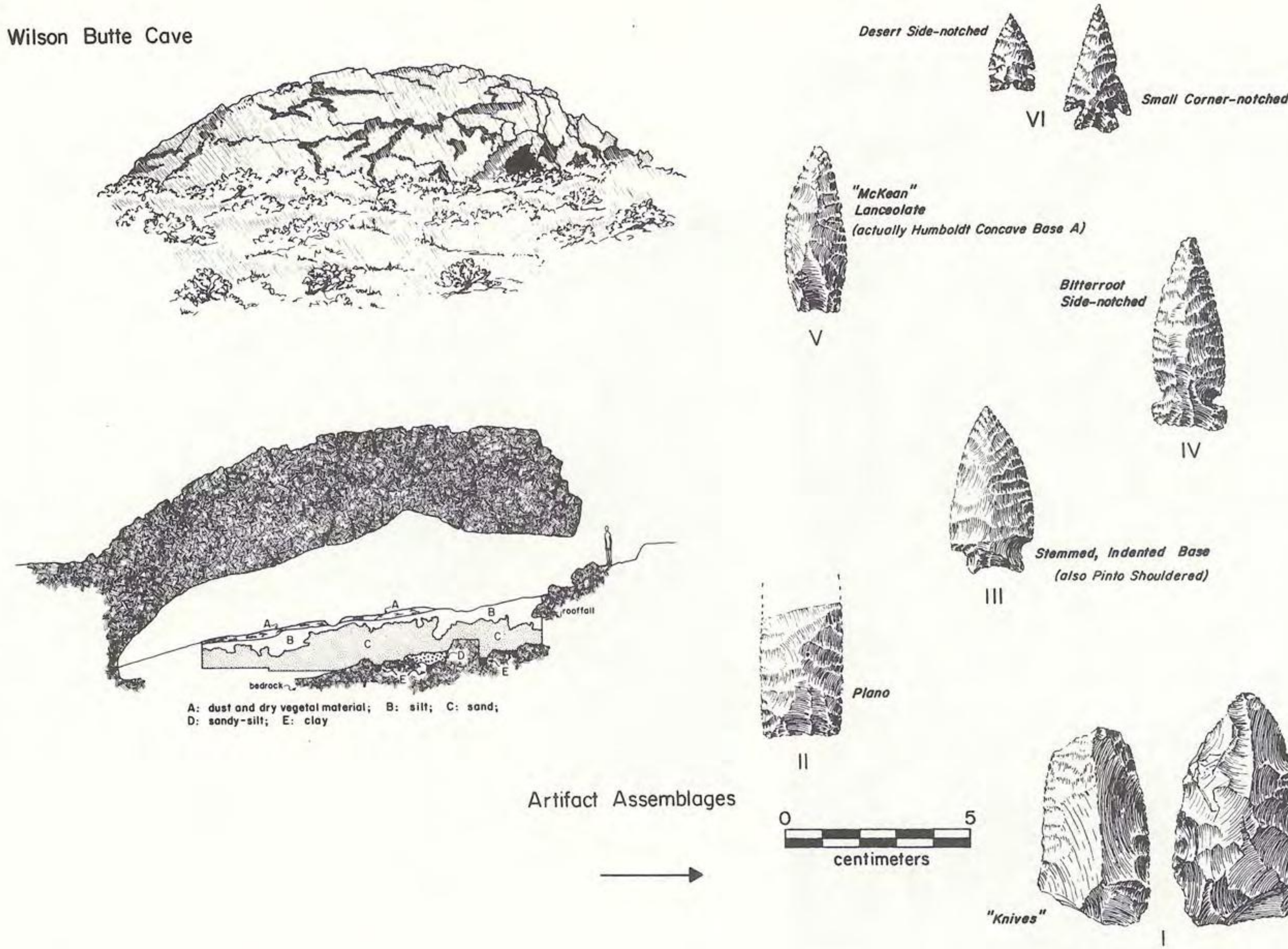
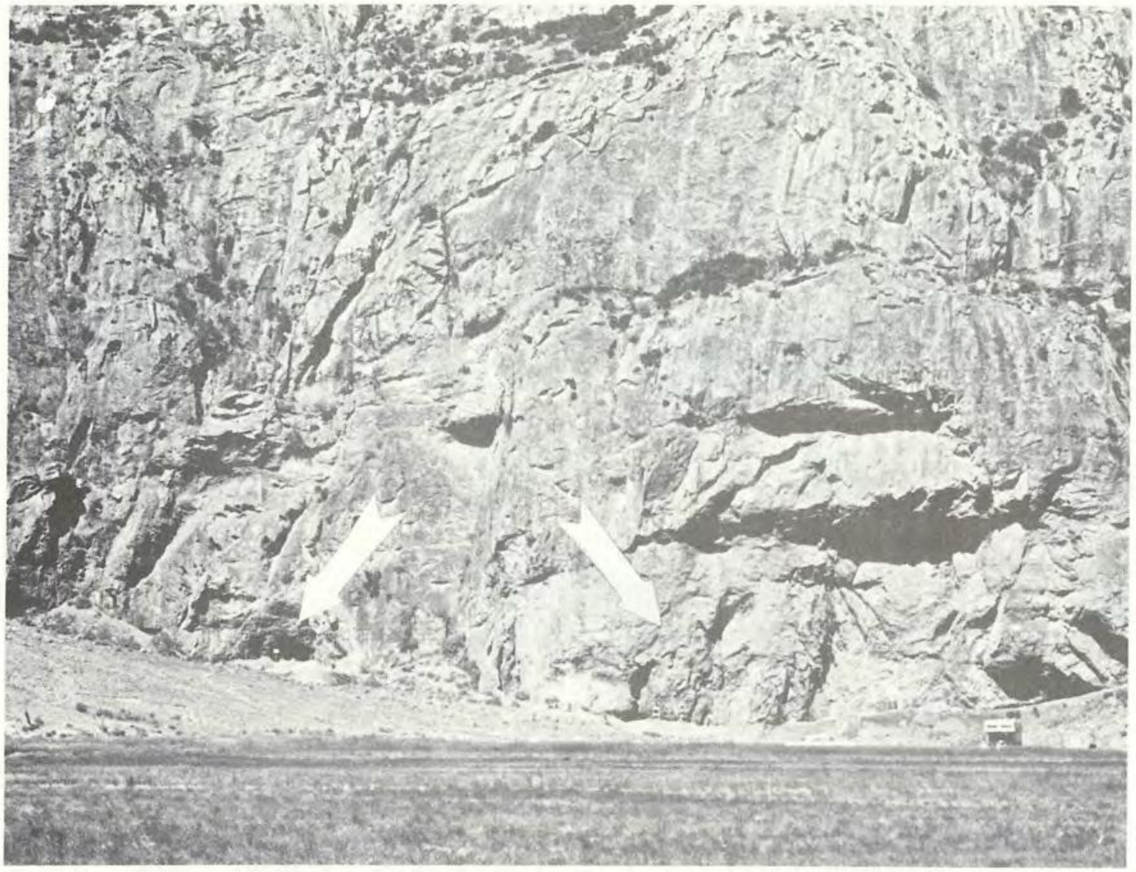


Fig. 4. Sketch of Wilson Butte Cave, cross-section of the deposits there, and the sequence of artifact assemblages and characteristic projectile points.



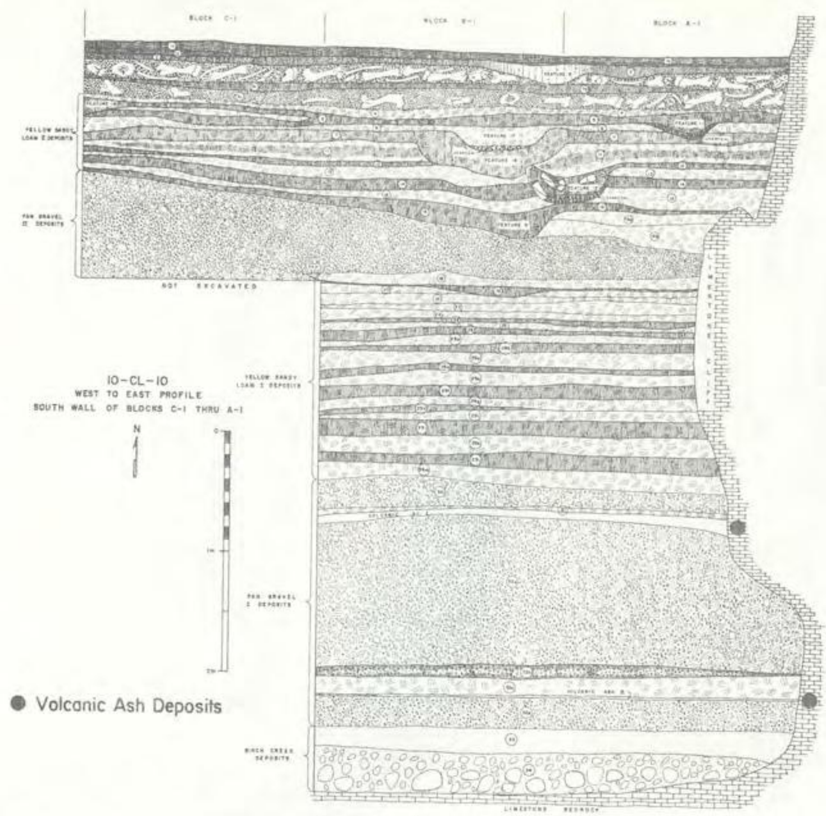


Fig. 5. Upper, the Birch Creek rockshelters; Bison is on the left (left pointing arrow) and Veratic is on the right. Lower, cross-section of deposits at the Bison rockshelter; solid black dots mark the Mazama (upper dot) and Glacier Peak (lower dot) volcanic ash deposits there.

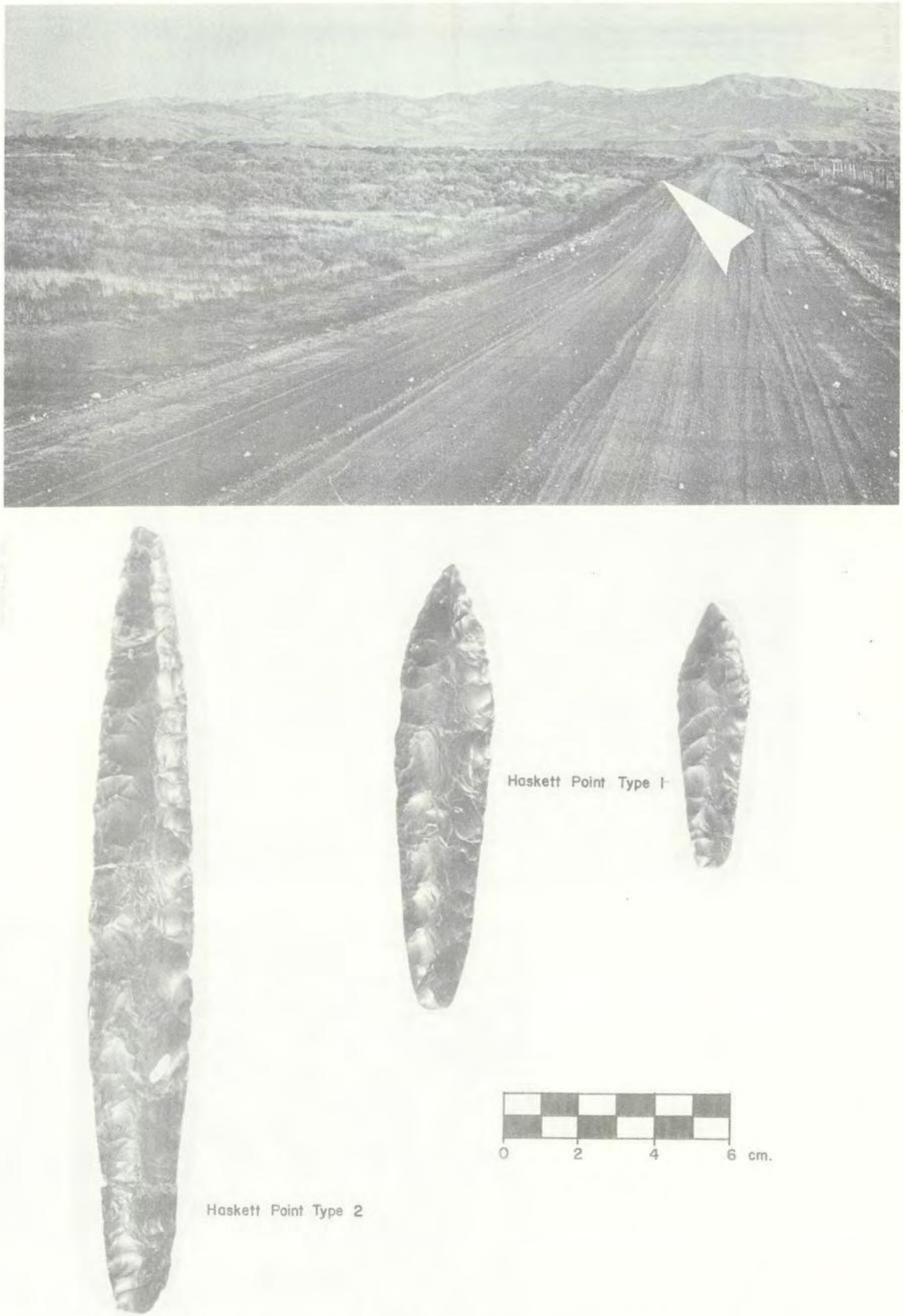


Fig. 6. The Haskett Site locality (white arrow on road points to the site itself) as seen from the north looking towards the Snake River and the Basin and Range province south of the river, and typical Types 1 and 2 Haskett points. These and other Haskett points are also illustrated in Fig. 33.

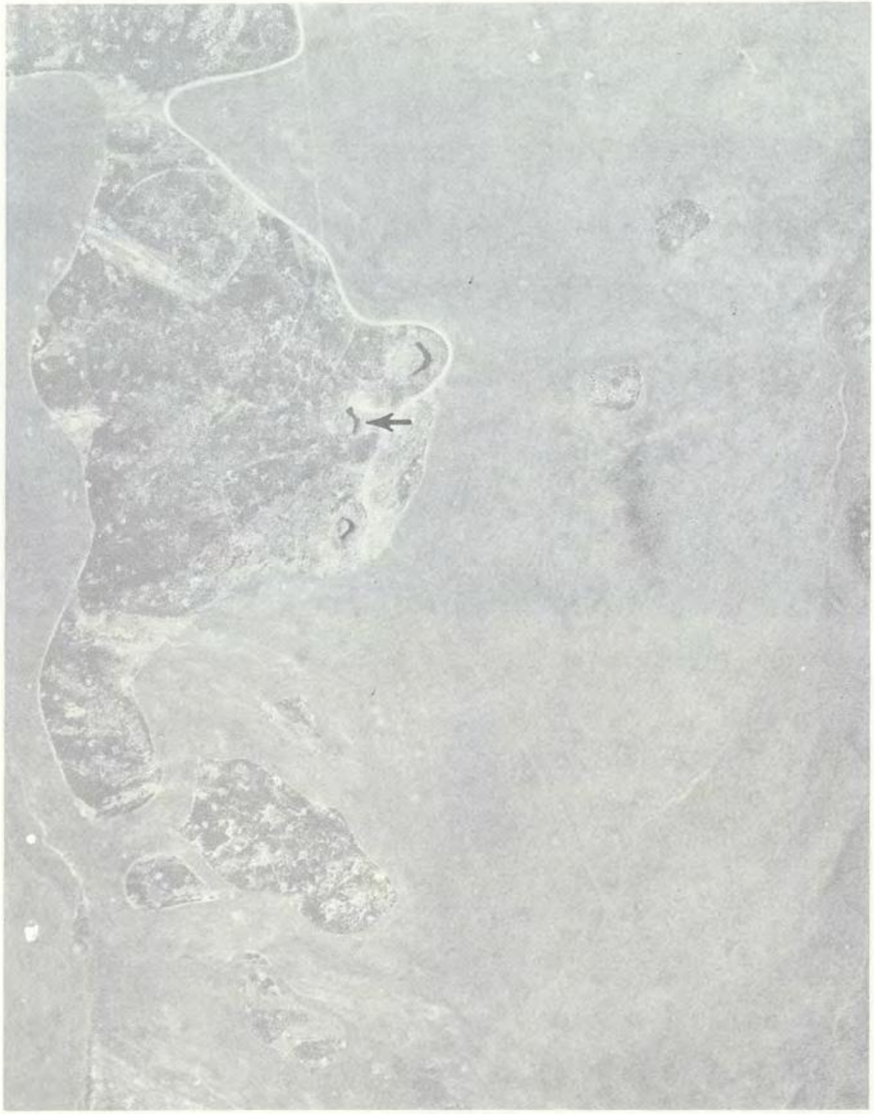


Fig. 7. Upper, aerial view of the Wasden Site (Department of Agriculture photo); arrow points to the Owl Cave blister. Lower, Owl Cave at the beginning of excavations there in 1965.

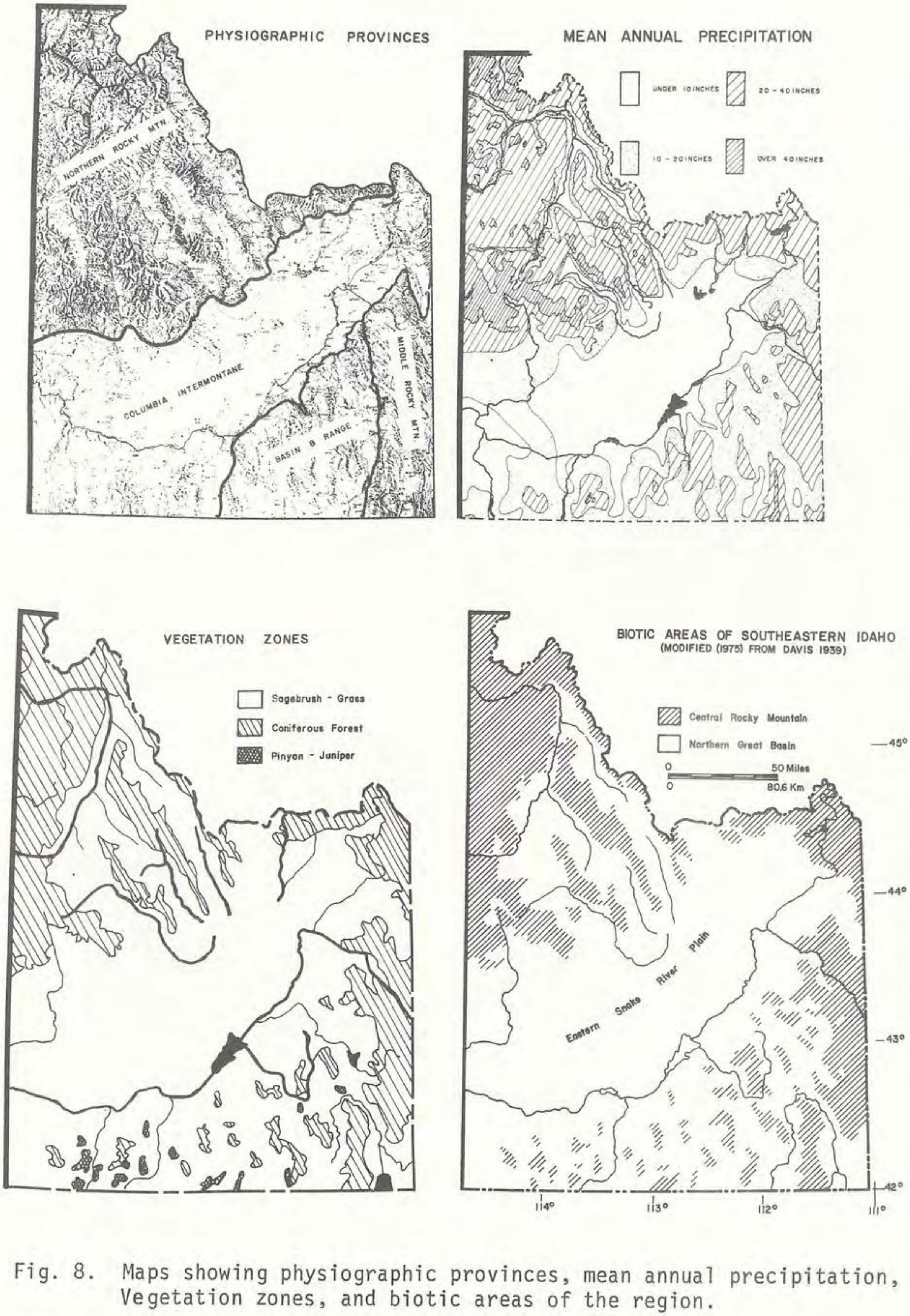


Fig. 8. Maps showing physiographic provinces, mean annual precipitation, Vegetation zones, and biotic areas of the region.

LANDFORMS

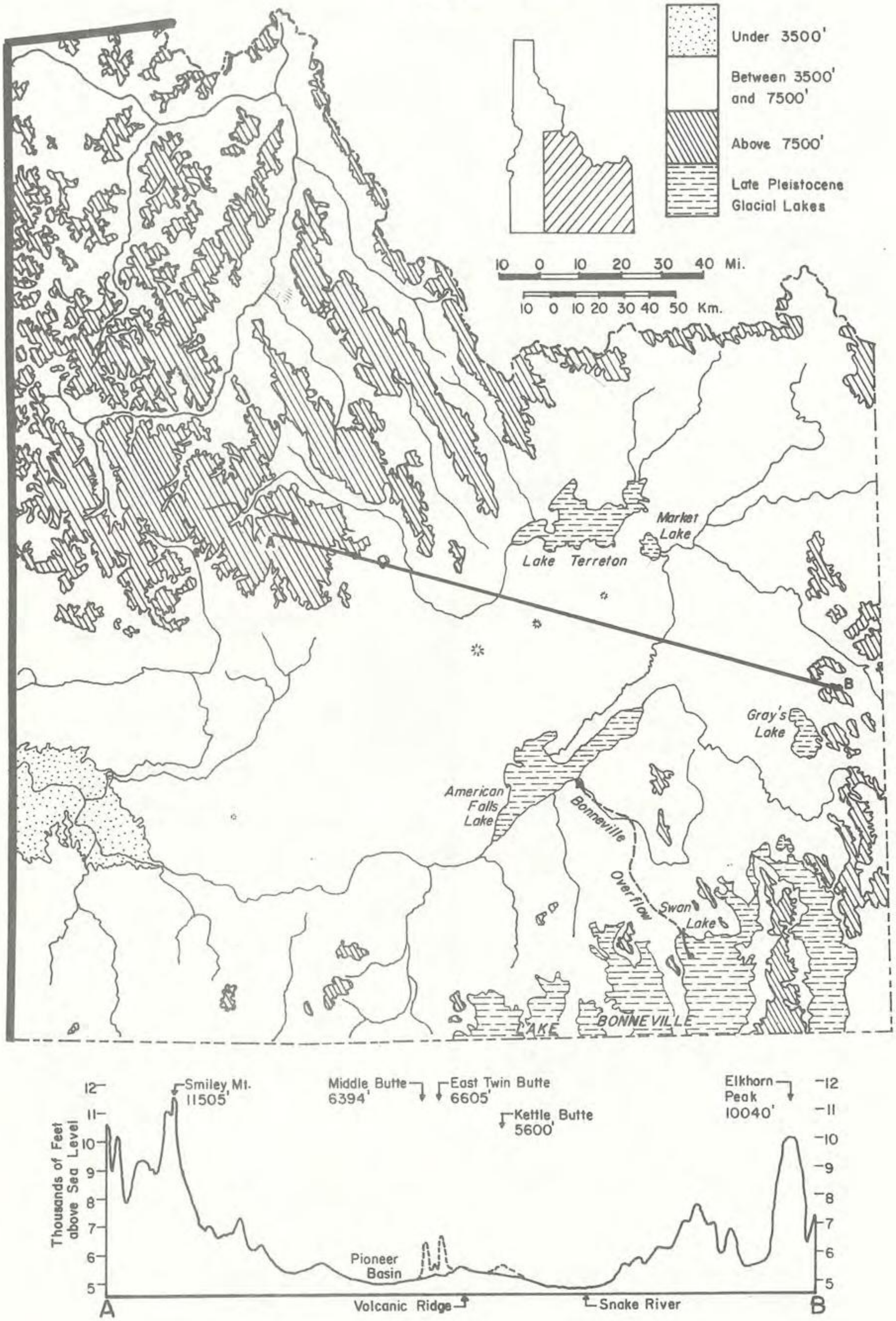


Fig. 9. Some of the principal landforms and elevations of the region. A-B line on upper drawing shows location of cross-section below.

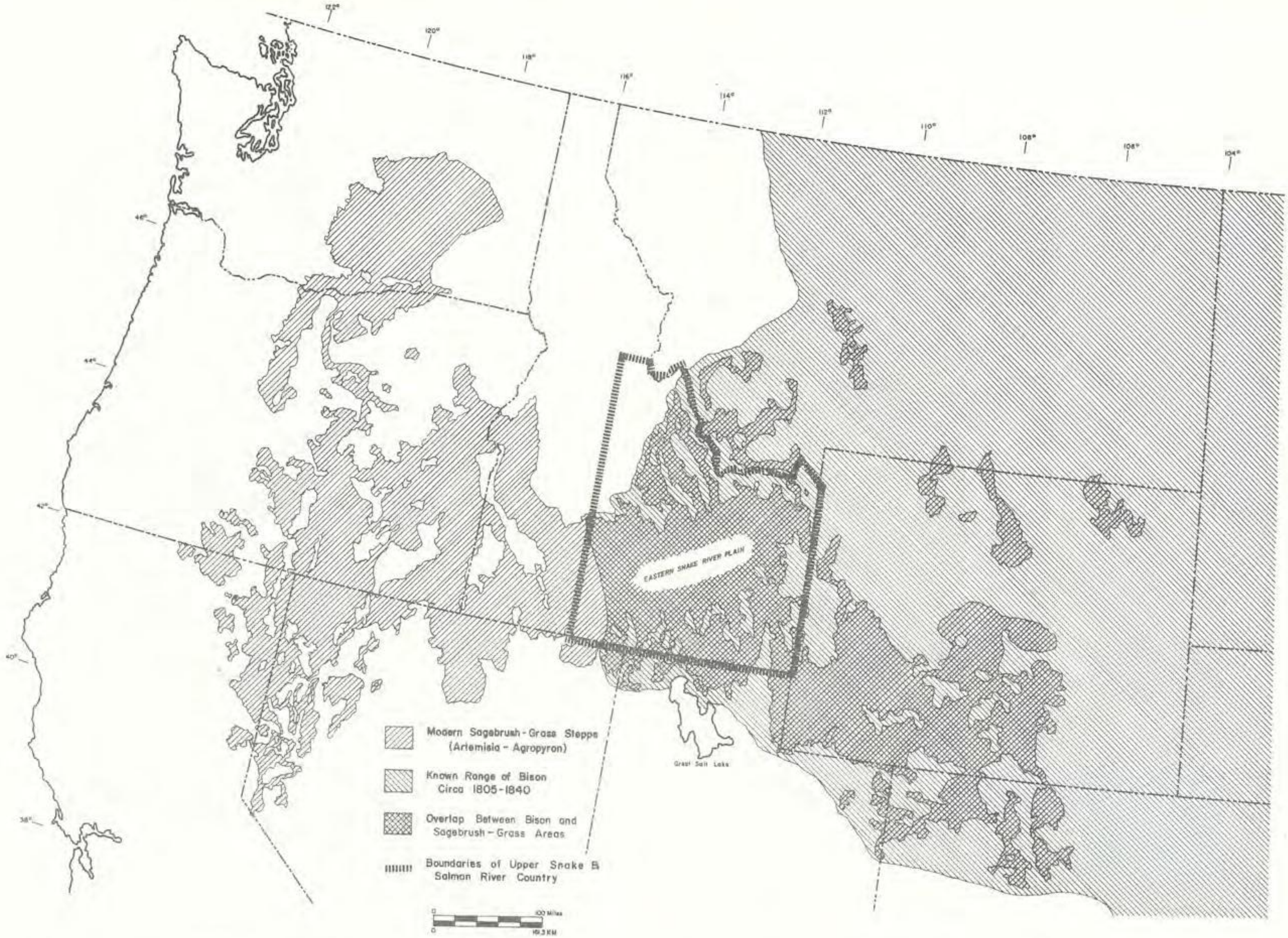


Fig. 10. Distribution of the Modern (Holocene) sagebrush-grass steppe in the western United States and the western limit of bison, ca. A.D. 1805-1840. Note the overlap of these within the boundaries of the Upper Snake and Salmon River Country.

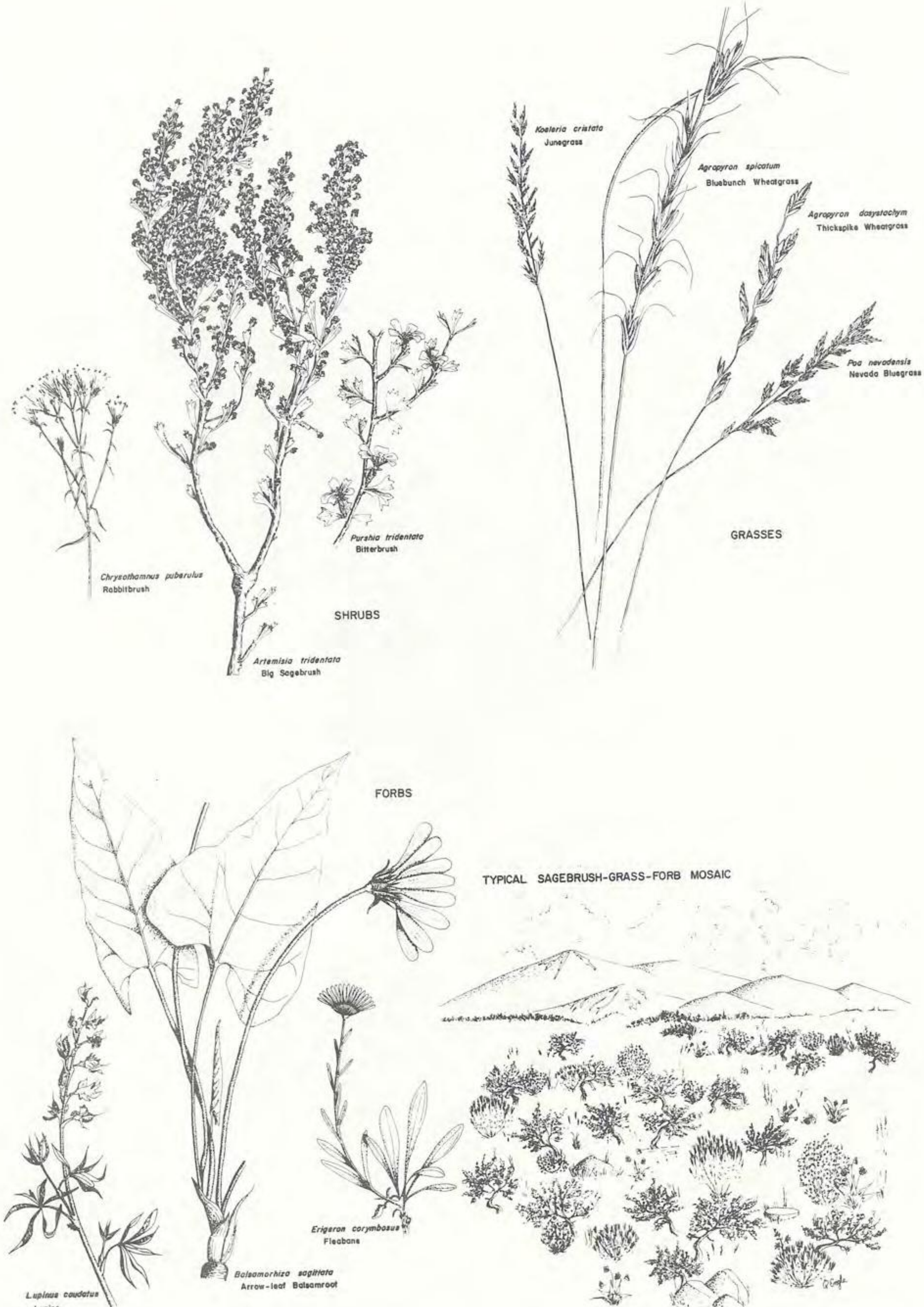


Fig. 11. Some of the principal native plants forming the sagebrush-grass cover in the Upper Snake and Salmon River Country (based on Blaisdell 1958).

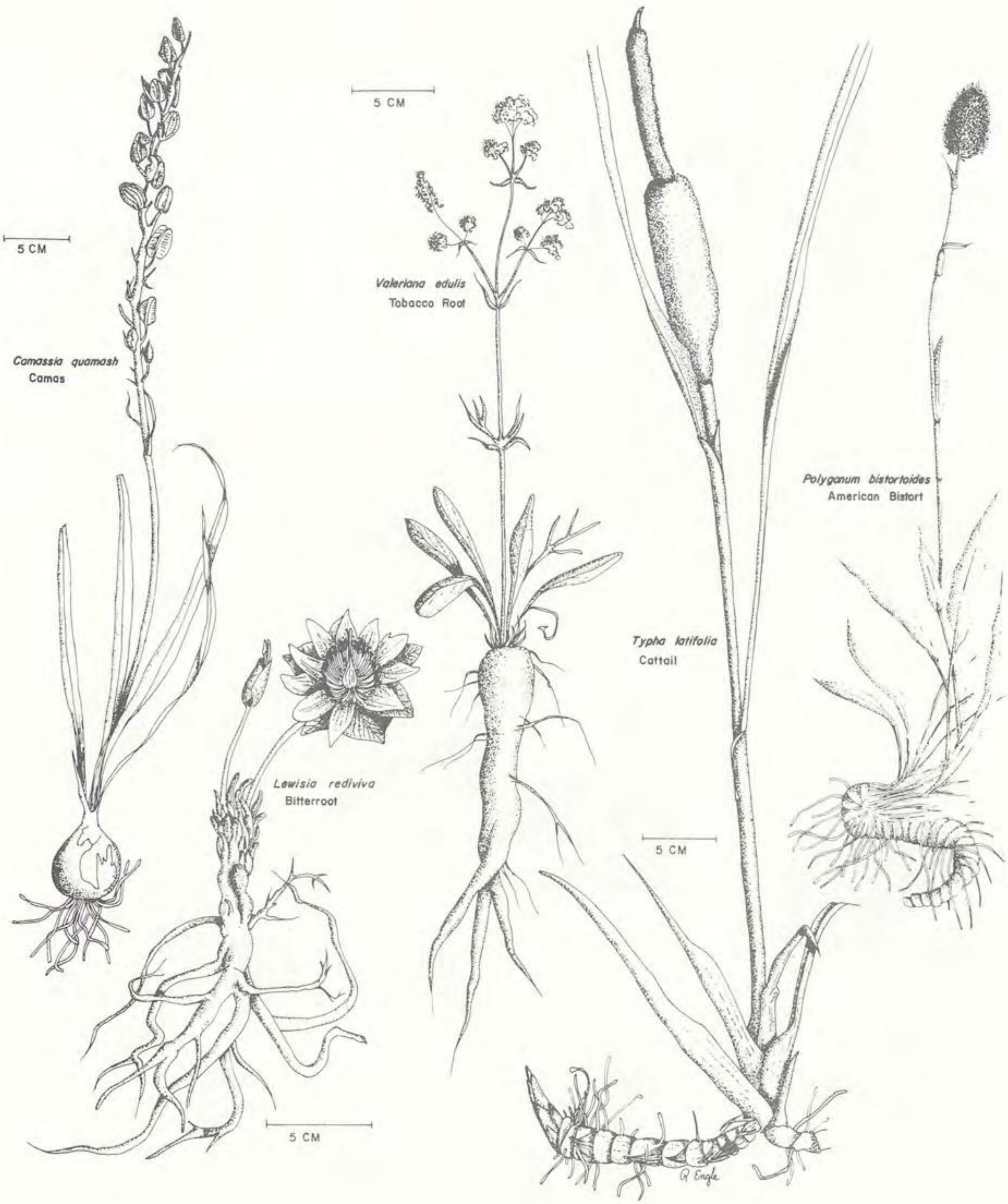


Fig. 12. Some of the more common native food plants found in the region.

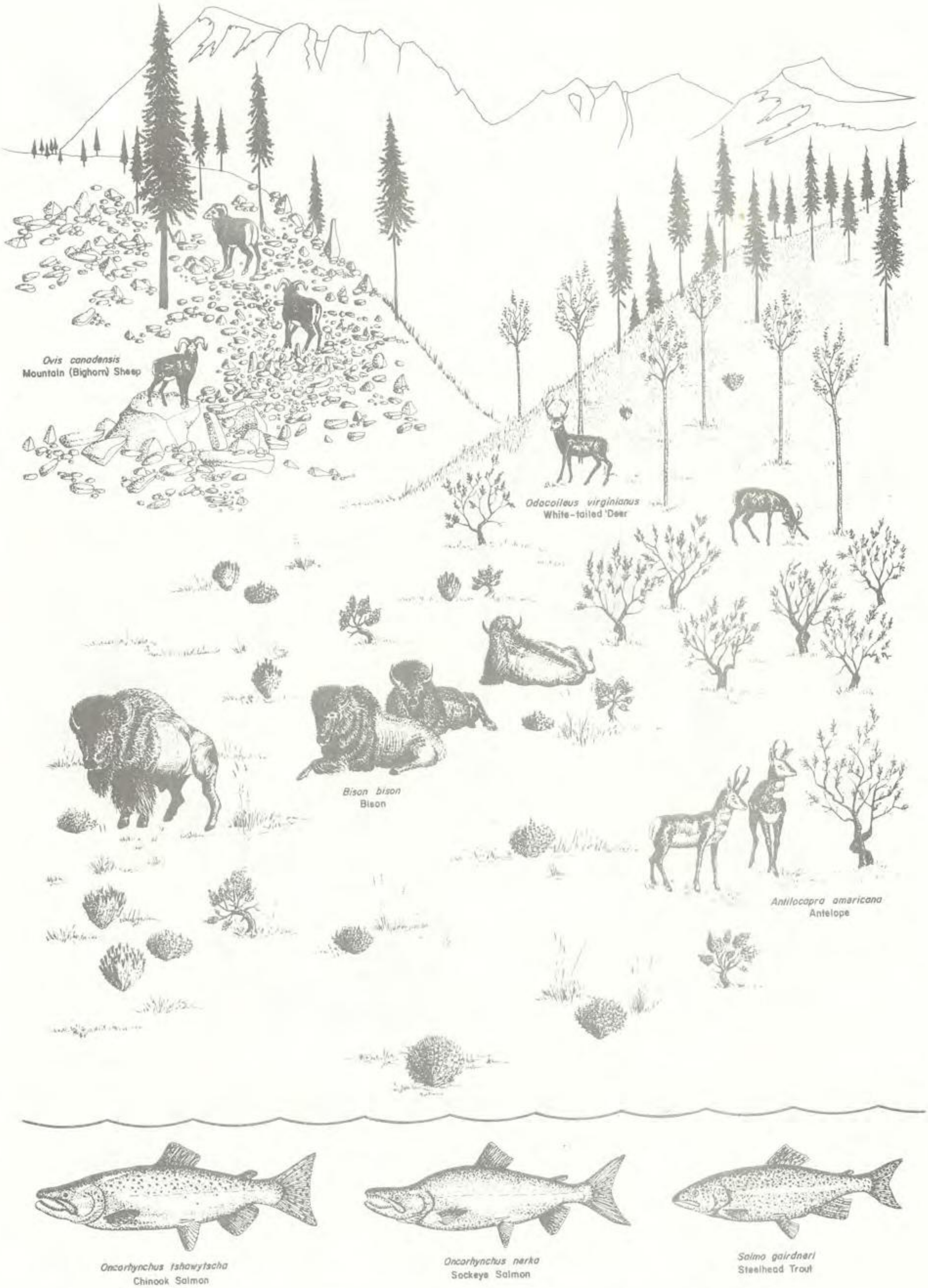


Fig. 13. Some of the principal big-game animals and fishes found in the region.

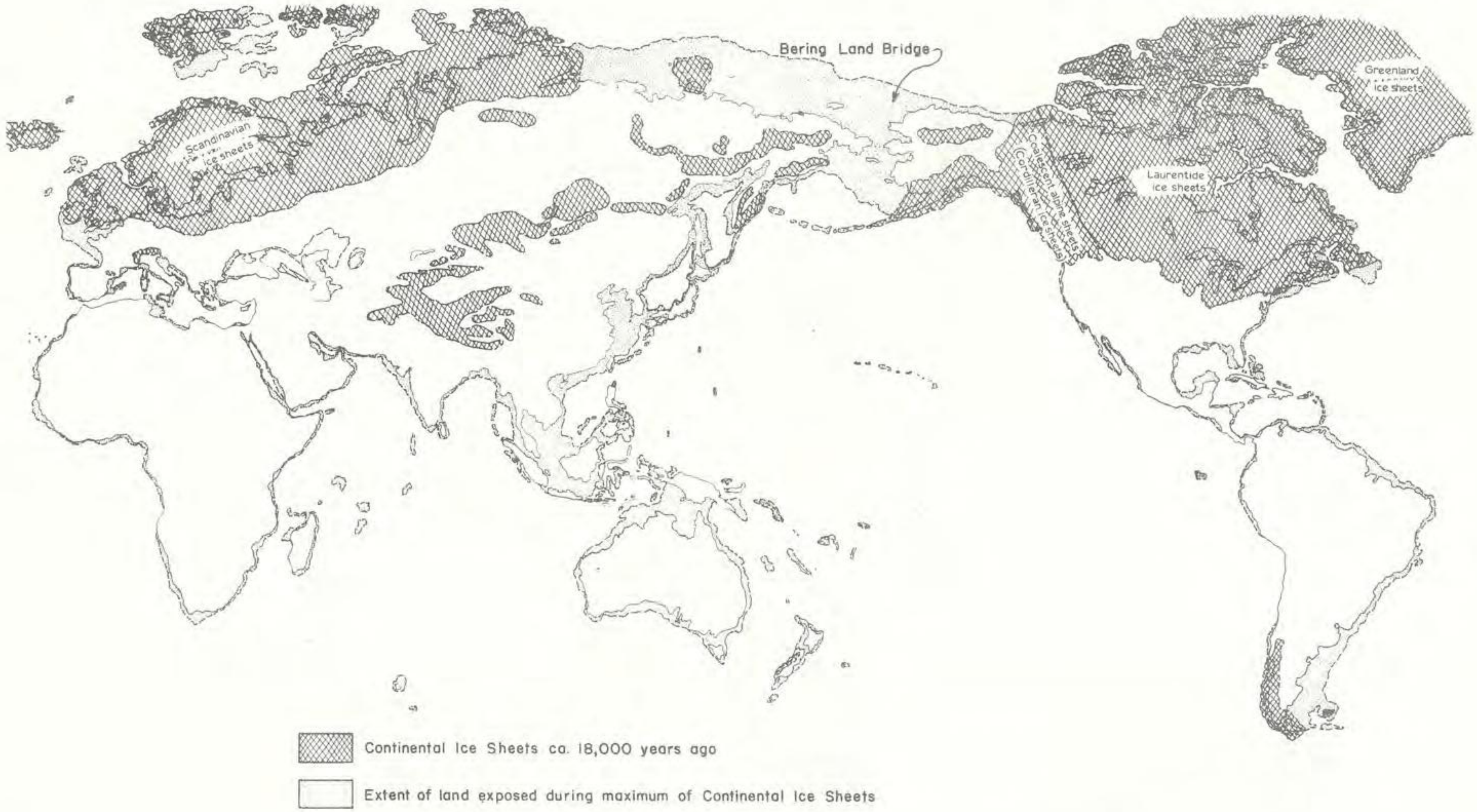


Fig. 14. Glaciated parts of the world ca. 18,000 years ago and land exposed at that time as a result of this extensive glaciation.

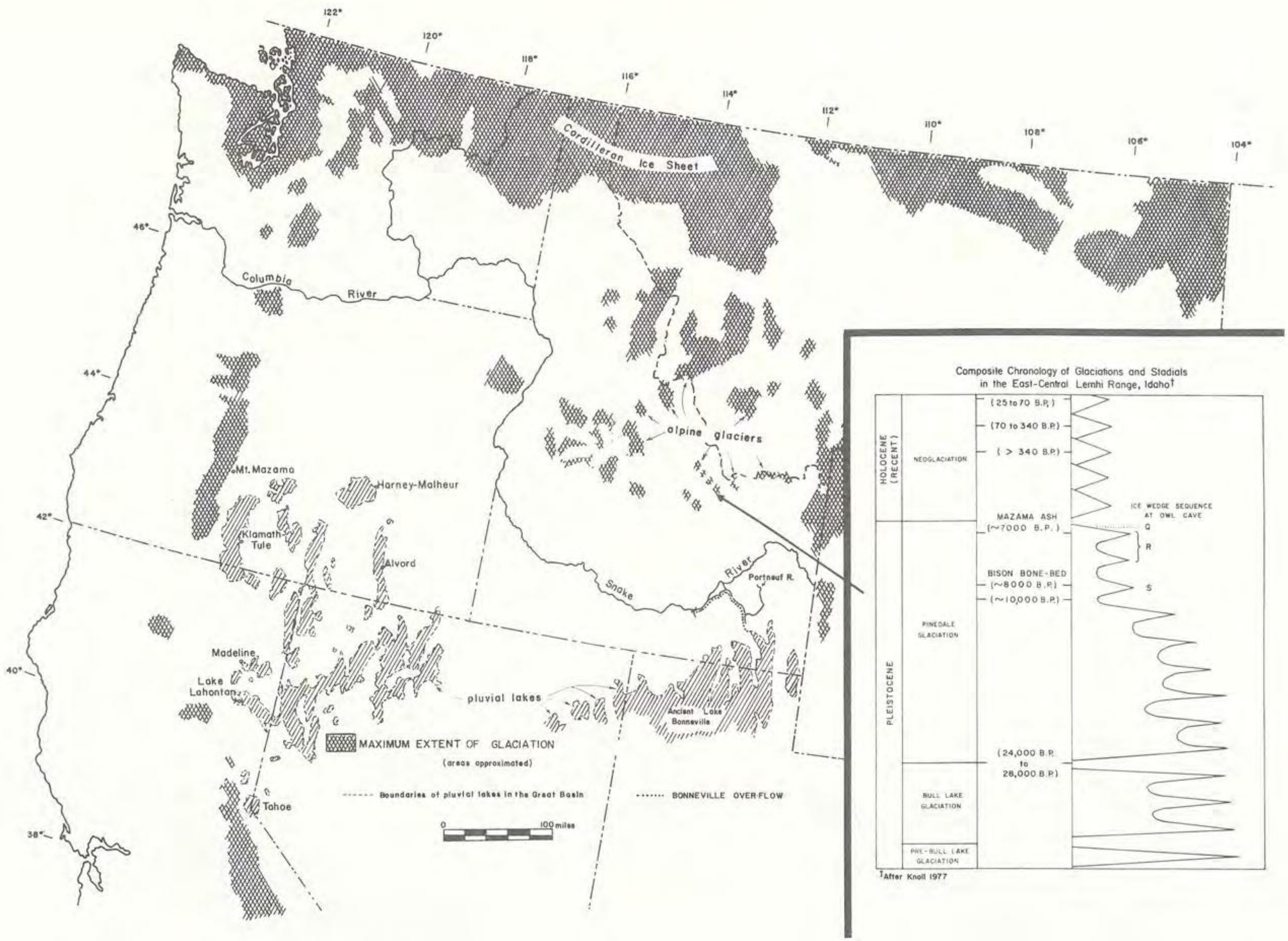


Fig. 15. Areas of the northwestern states covered by glaciers during the Pleistocene and the major lakes that formed at that time. The path of the overflow from Lake Bonneville to the Snake River is also shown. Inset shows glacial chronology in the central Lemhi Range worked out by Knoll and possible related events at the Wasden Site.

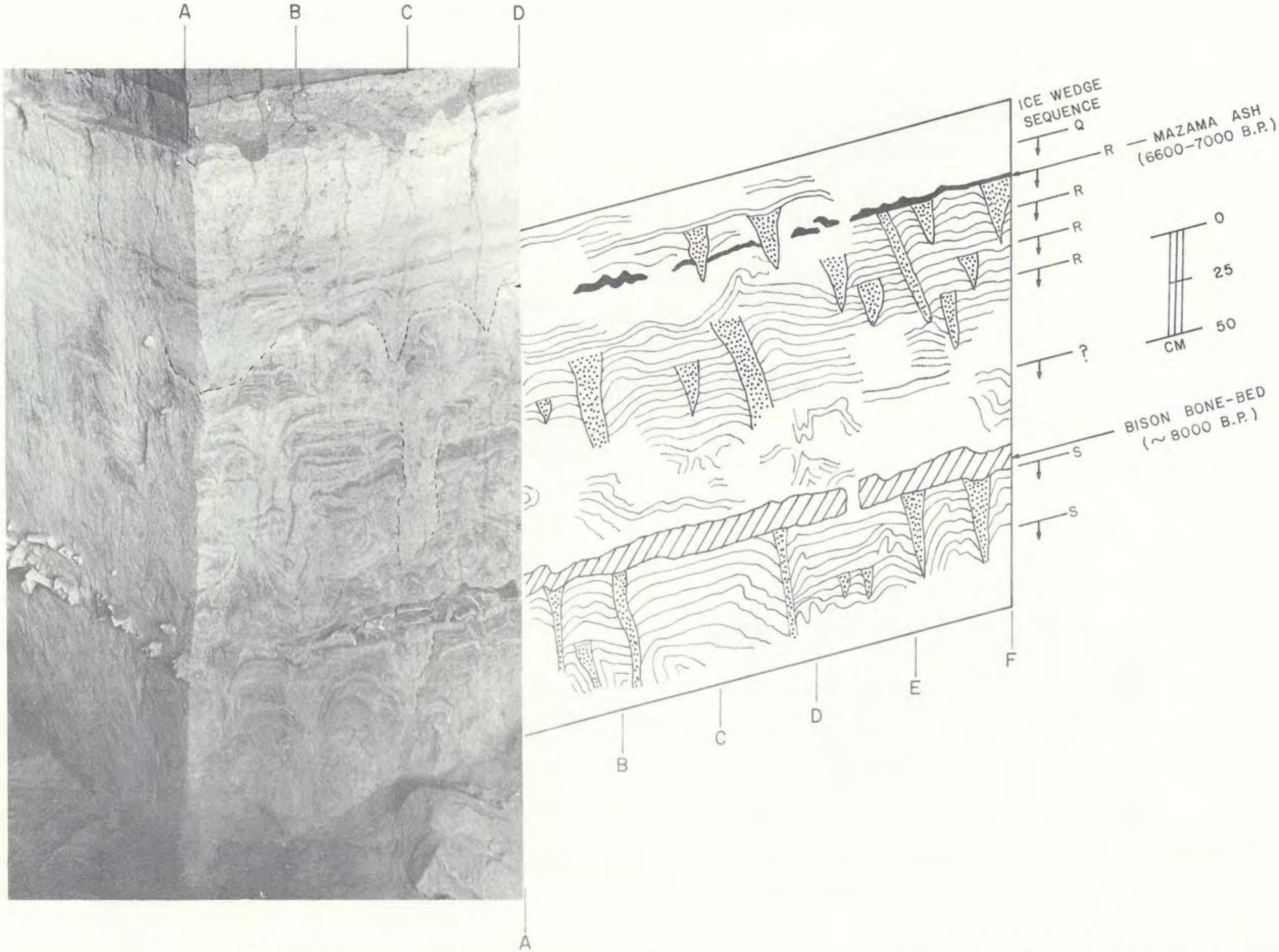


Fig. 16. Ice-wedge sequence at the Wasden Site as recorded by Dr. Wakefield Dort, Jr. (drawing on right) and photograph of the same section; letters provide points of reference between the photo and the drawing. Additional photos of these deposits are shown in Fig. 18.

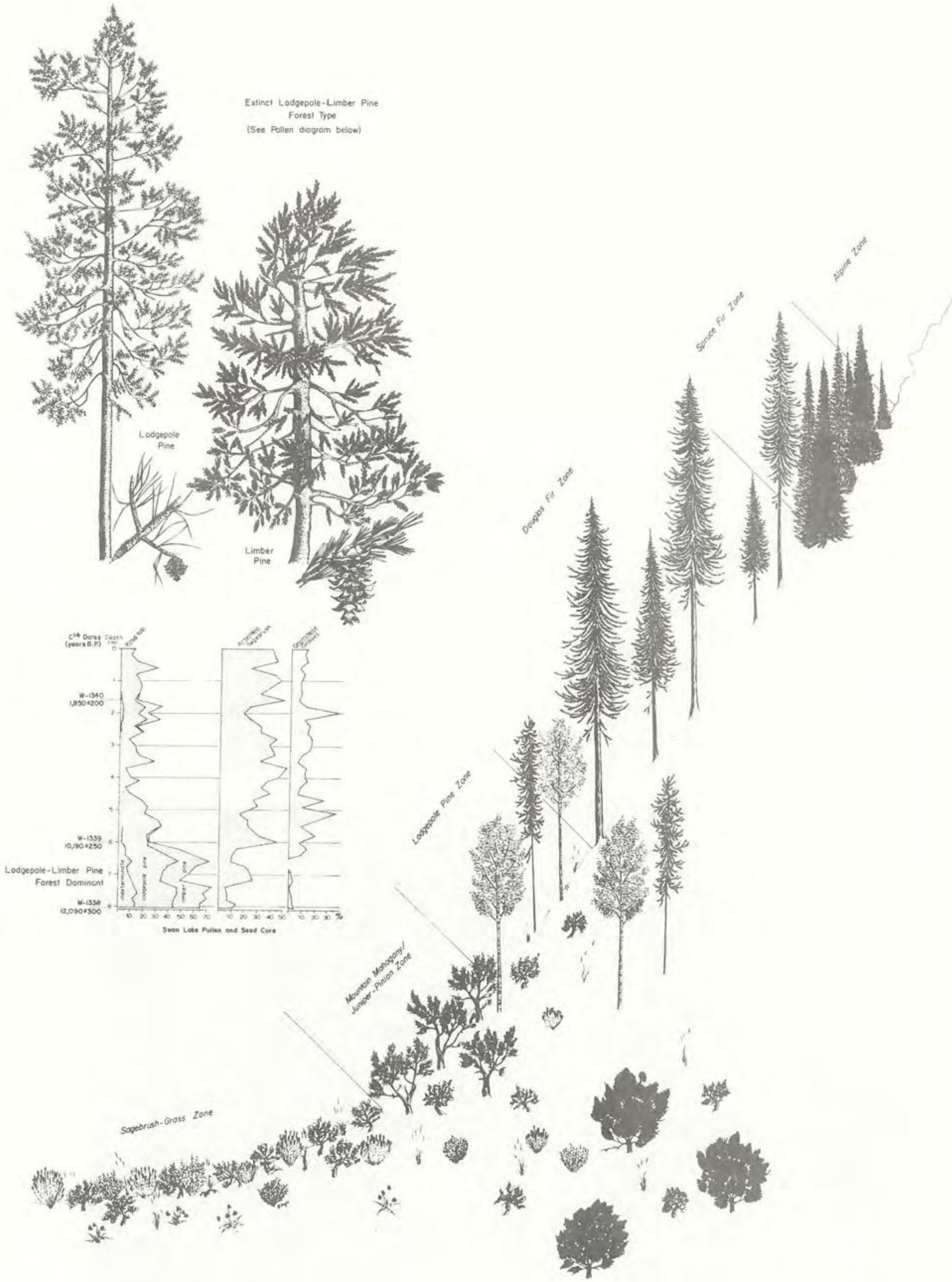


Fig. 17. Typical cross-section of vegetation zones in the Upper Snake and Salmon River Country and pollen profile (left center) obtained from a small lake in the former outlet channel of Lake Bonneville. Trees shown above the pollen profile formed a now extinct forest type at this location between 13,000 and 10,800 years ago as revealed in the lower part of the pollen profile.

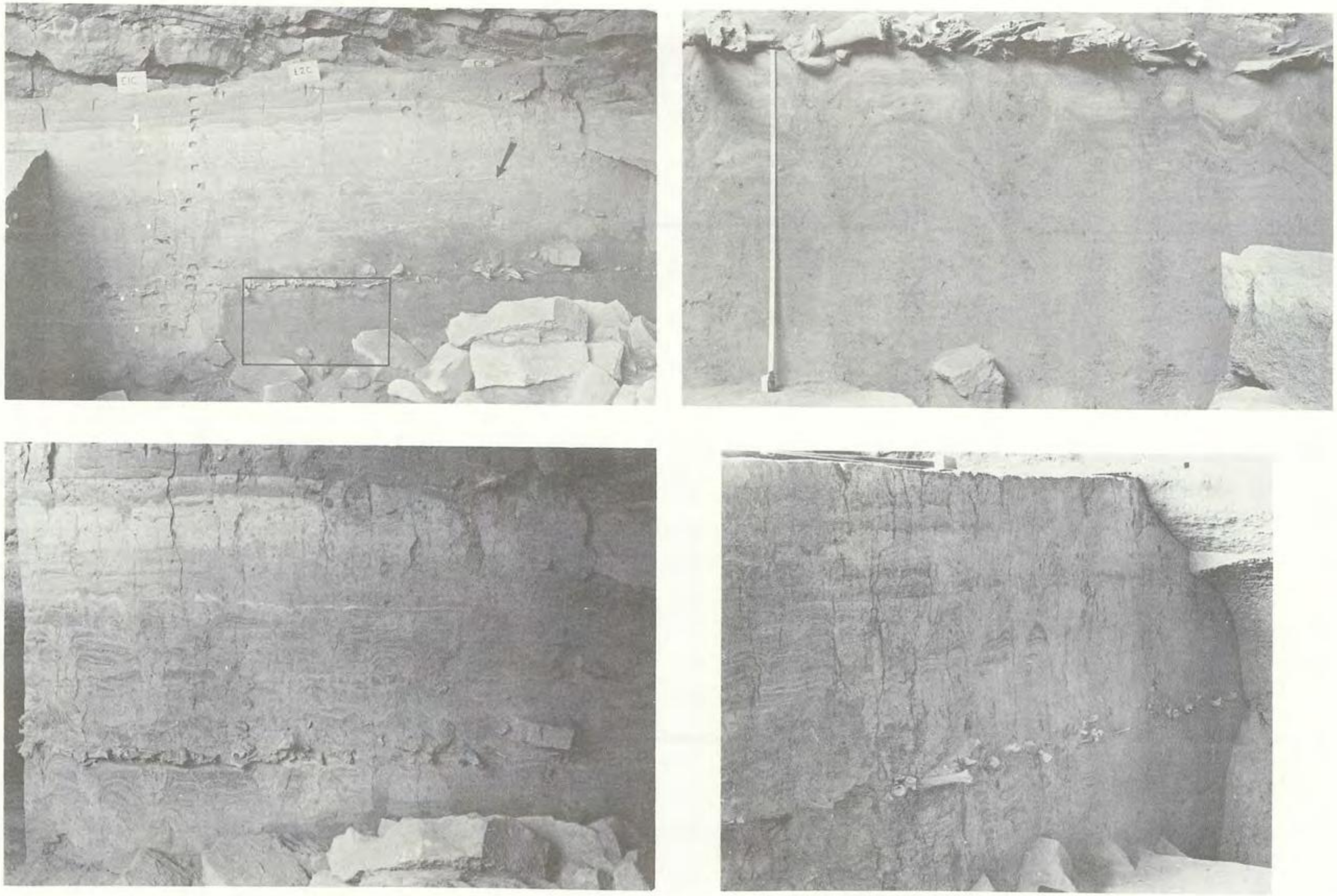


Fig. 18. Four views of the deposits at Owl Cave exposed between 1964 and 1968. Upper left, the main cross-section of the deposits; rock pile in lower right corner is rooffall left in place as found; black arrow above points to layer of Mazama ash dating between 7,000 and 6,600 years ago. Another view of this section is shown in Fig. 16. Upper right, close-up of deposits outlined in black rectangle, left-hand photo, showing ice wedge formation below 8,000-year-old Bison antiquus bone bed. Lower left, close-up of deposits shown in upper left photo. Lower right, cross-section of deposits perpendicular to those shown in upper left photo; this extends to the back wall of the cave at the left-hand side of the section shown above. Note the ice-wedge features and 8,000-year-old bison bone bed as before. These sections all reveal the alternating dark and light bands resulting from local ponding of the deposits prior to ca. 4,000 years ago.

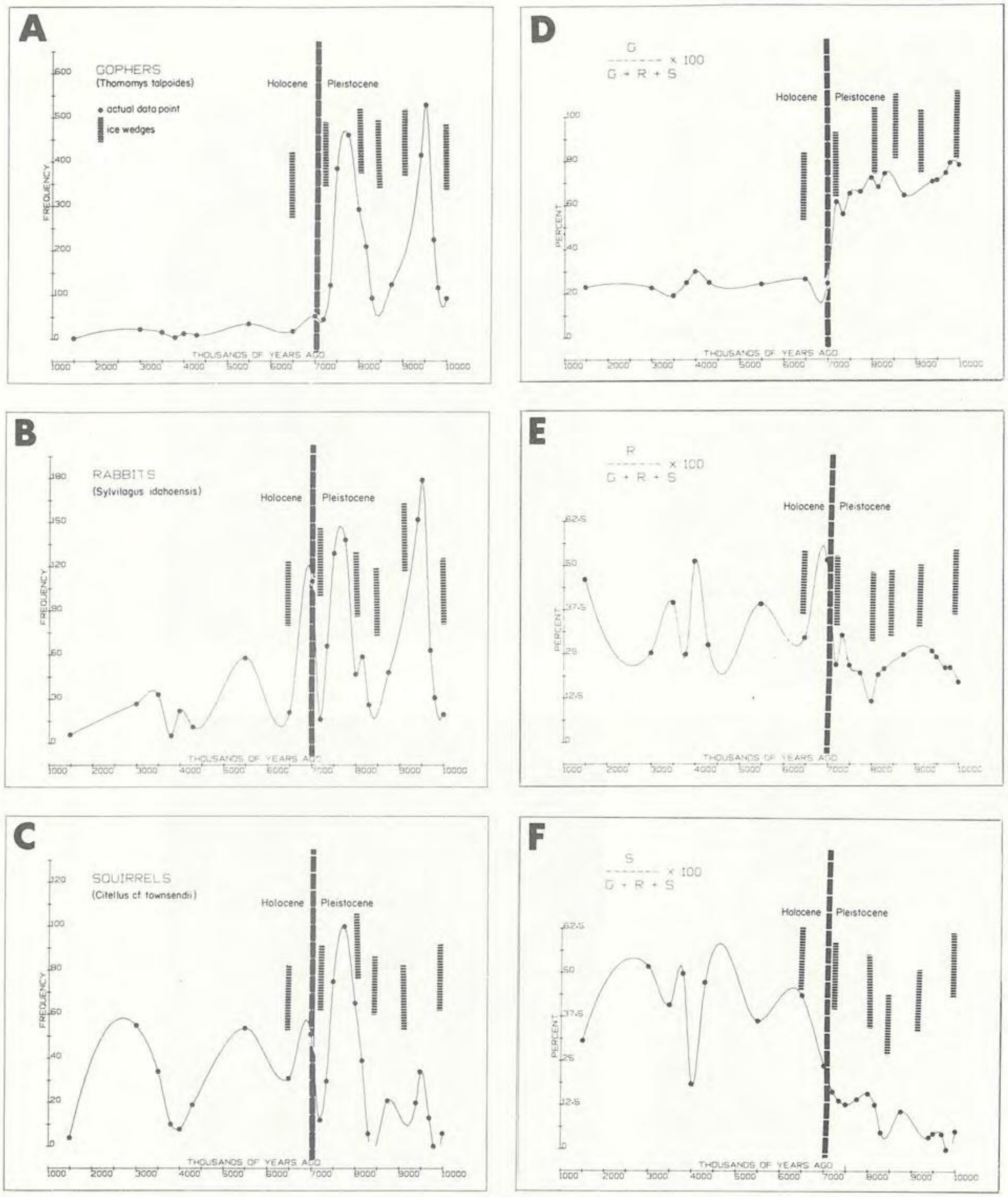


Fig. 19. Computer-drawn graphs of trends in number of principal small animal species found under an owl roost at the Wasden Site (Owl Cave). Left-hand graphs show trends in individual species or types of small animals; right-hand graphs show changes in proportions of these through time. The latter may indicate a shift in the structure of the small animal community in favor of dry adapted species at about 7,000-6,600 years ago, marking the beginning of the Holocene or Modern epoch in the Upper Snake and Salmon River Country.

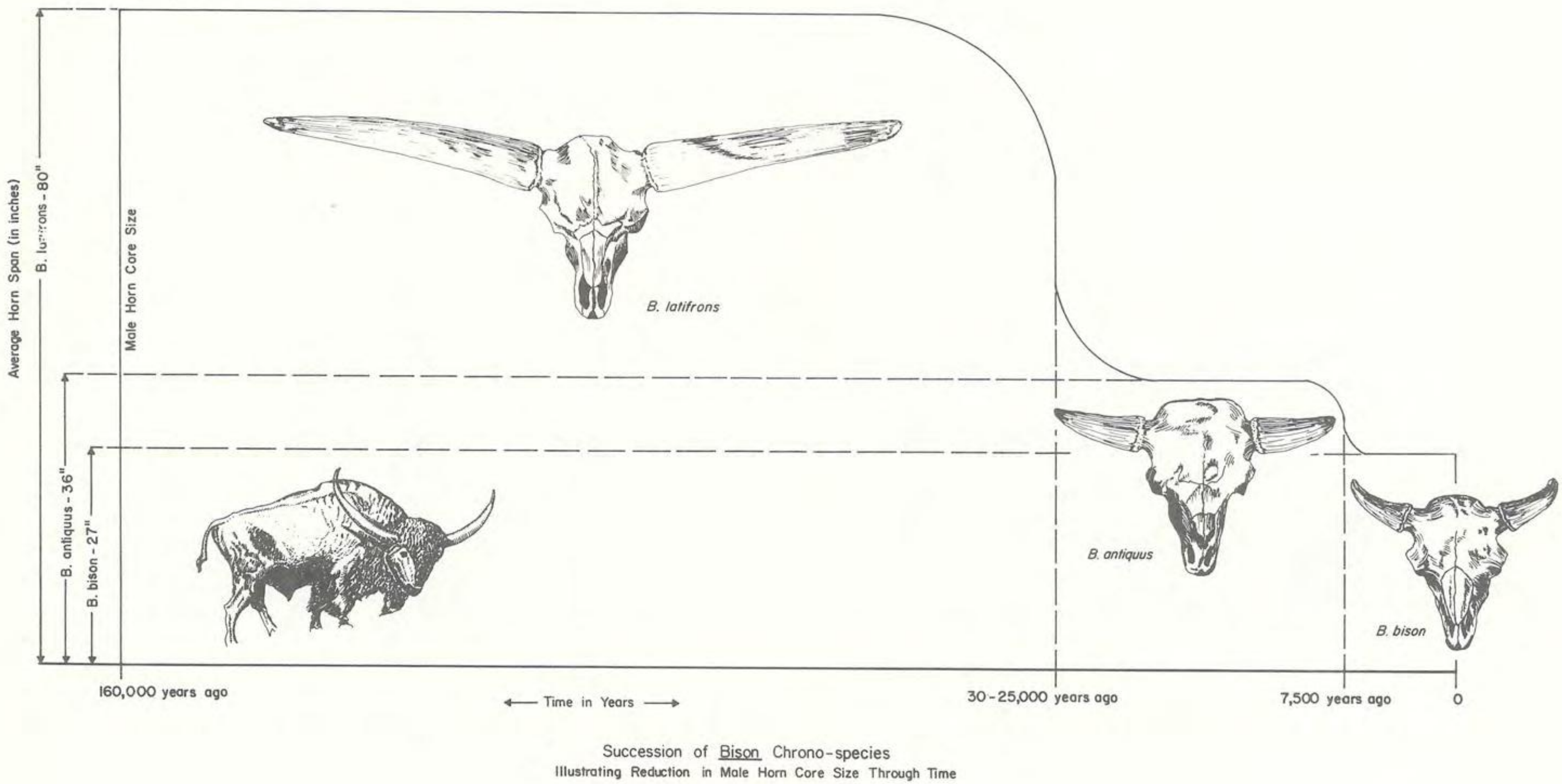


Fig. 20. Changes in Bison species through time in the Upper Snake and Salmon River Country.

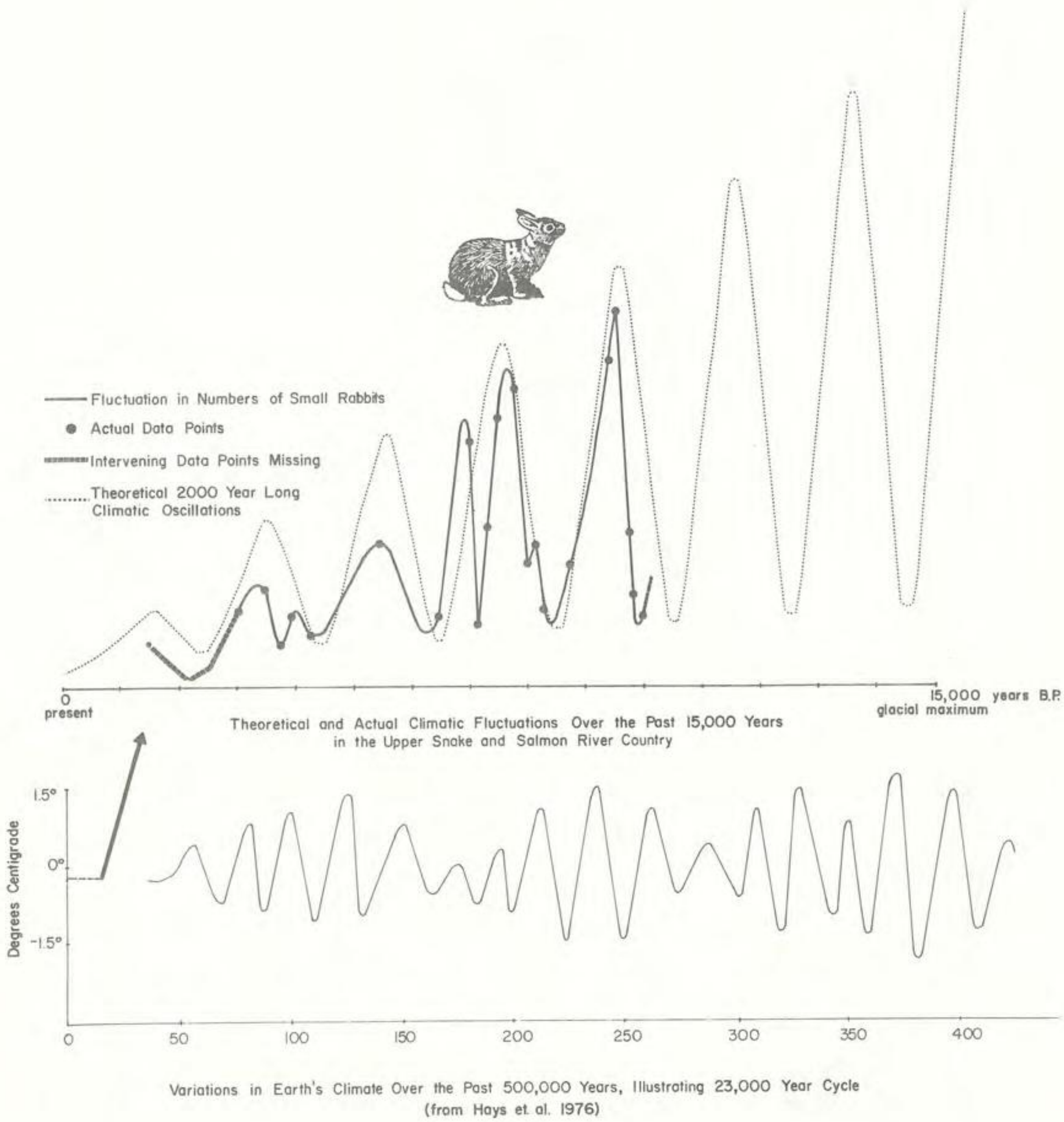


Fig. 21. Cyclical variations in the regional climate over the past 15,000 years and in the earth's over the past 500,000 years.

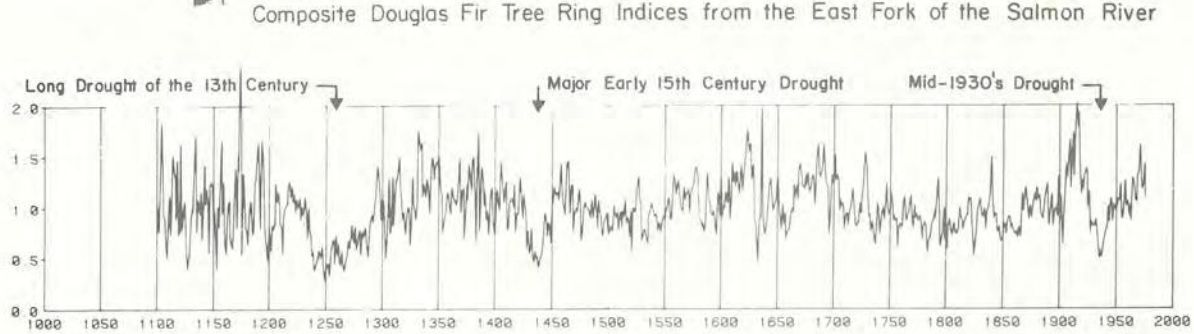


Fig. 22. Douglas fir tree-ring indices for the East Fork of the Salmon since A.D. 1100 with major droughts pointed out. A typical Douglas fir tree and cone are shown above left.

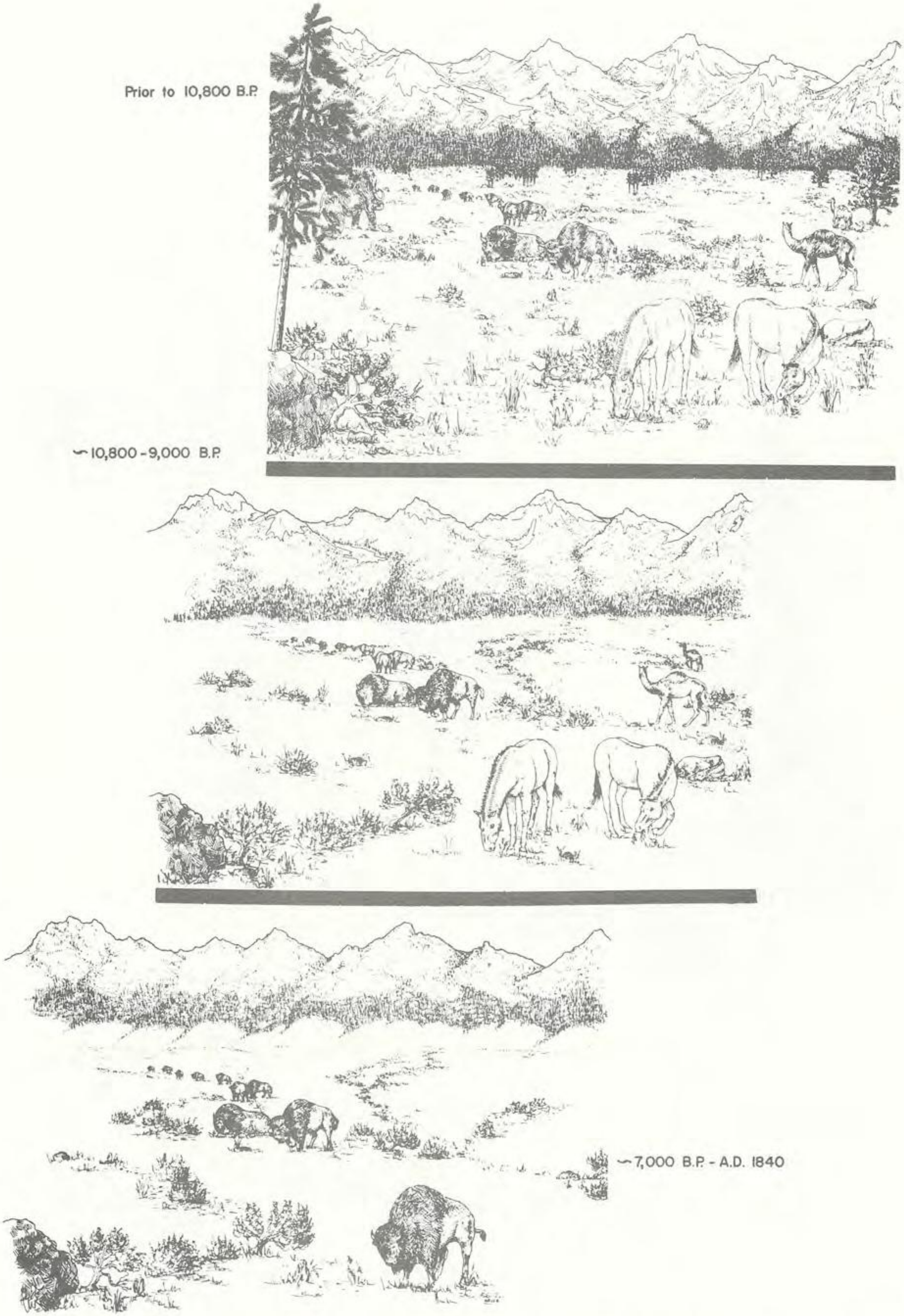


Fig. 23. Artistic reconstruction of cumulative effects of climatic change near the margins of the Snake River Plain at various periods of time beginning with the initial period of occupation by man.

Northern Shoshoni Dialect Groups and Villages in the Upper Snake and Salmon River Country

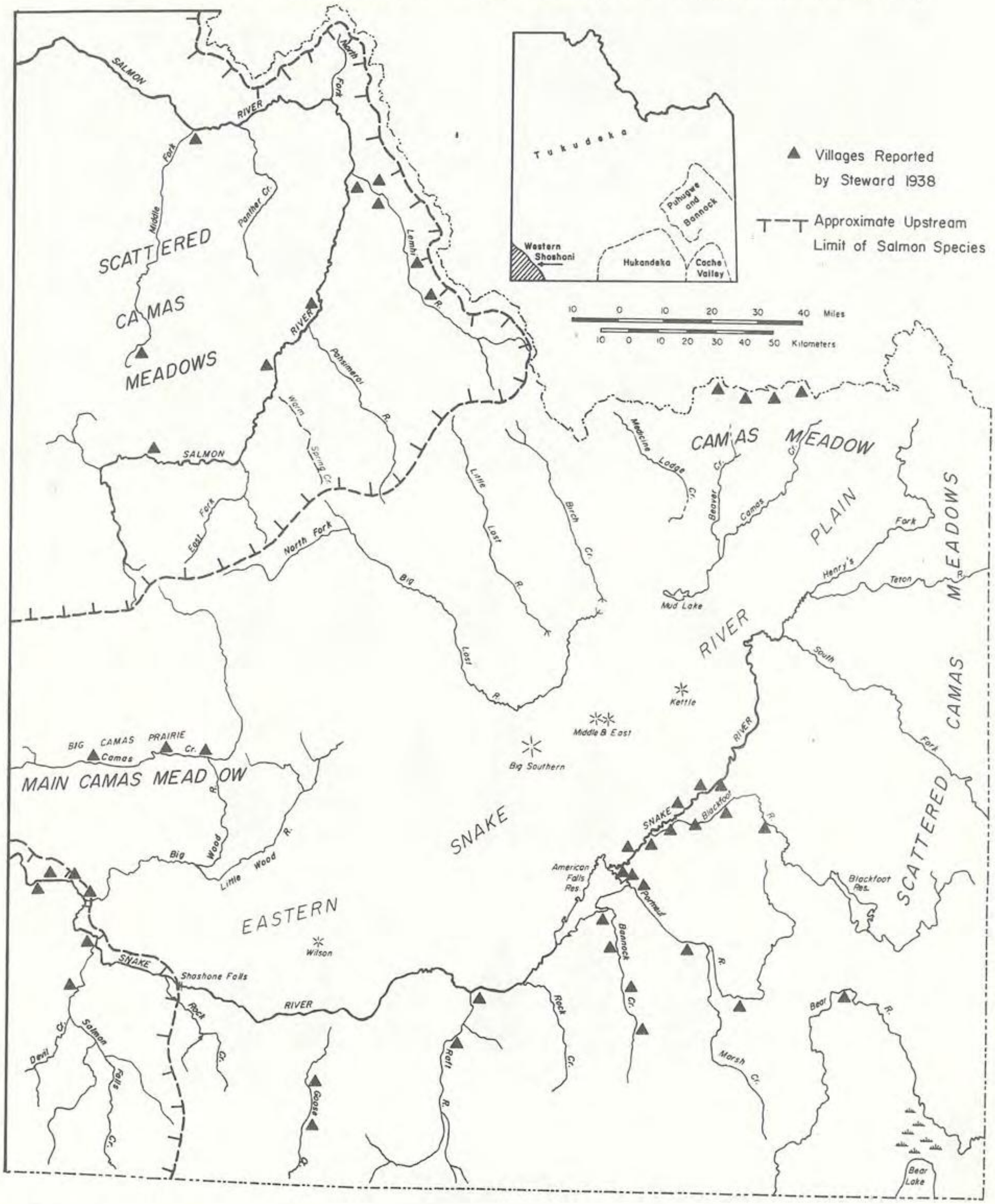
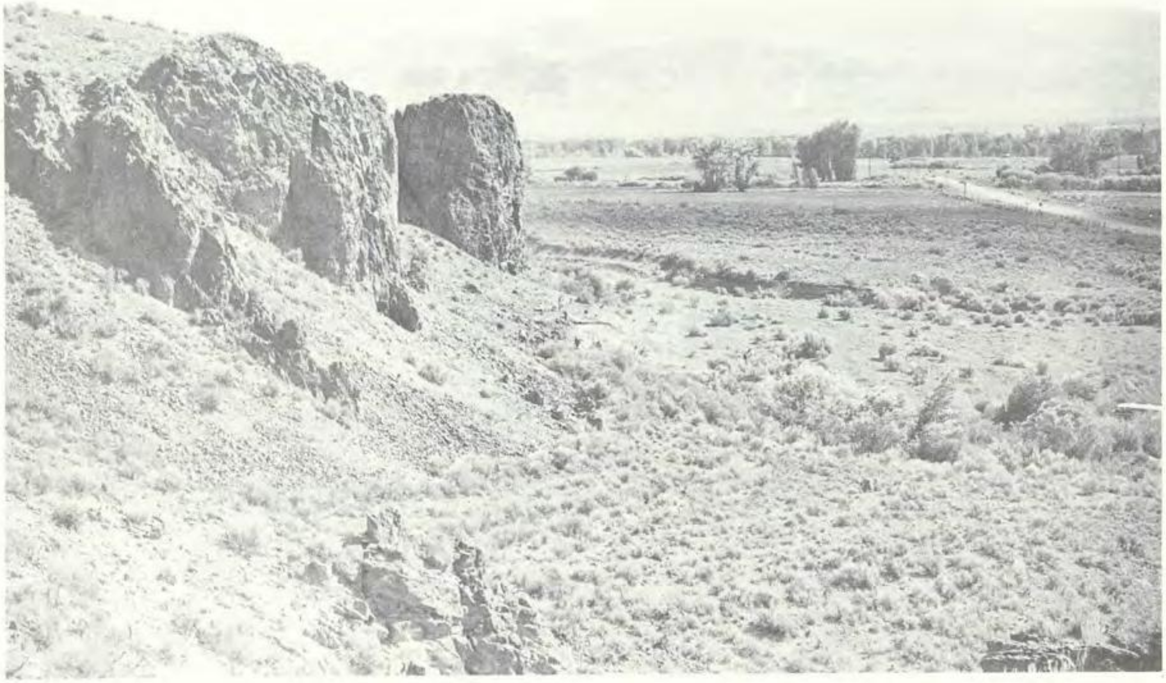


Fig. 24. Northern Shoshoni dialect groups and "villages" in relation to salmon streams and camas meadows in the Upper Snake and Salmon River Country. Note that no "villages" are known from either the Lost River Valleys or the Snake River Plain.



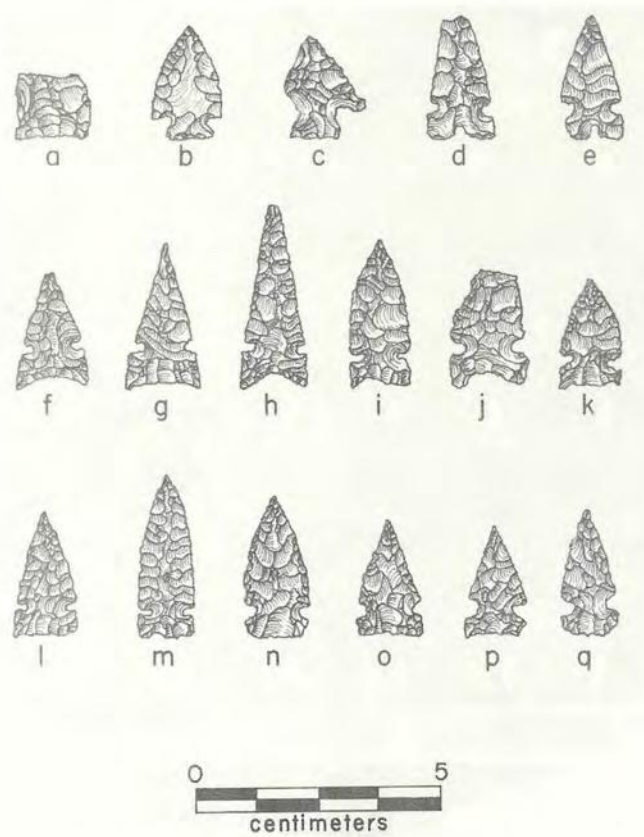


Fig. 25. Upper, view of Challis Bison Jump from the west. The talus slope in which the bison remains were found lies between the vertical basalt pillars in upper left center of photo. Lower, some of the typical projectile points (arrowheads) recovered from among the bison bones noted above: a, base of Cottonwood triangular point, a type frequently found; d-q, Desert side-notched points, and b-c, small corner-notched points, and dating from the 14th through the 19th centuries.

Fig. 26. Challis Bison Jump drive lane markers. Upper left and right, the small stone piles serving as drive lane markers. Lower left, the alignment and spacing of the stone piles above just before the cliff shown in lower right photo (arrow marks approximate location of one of the stone piles; at right of arrow is the jump itself.

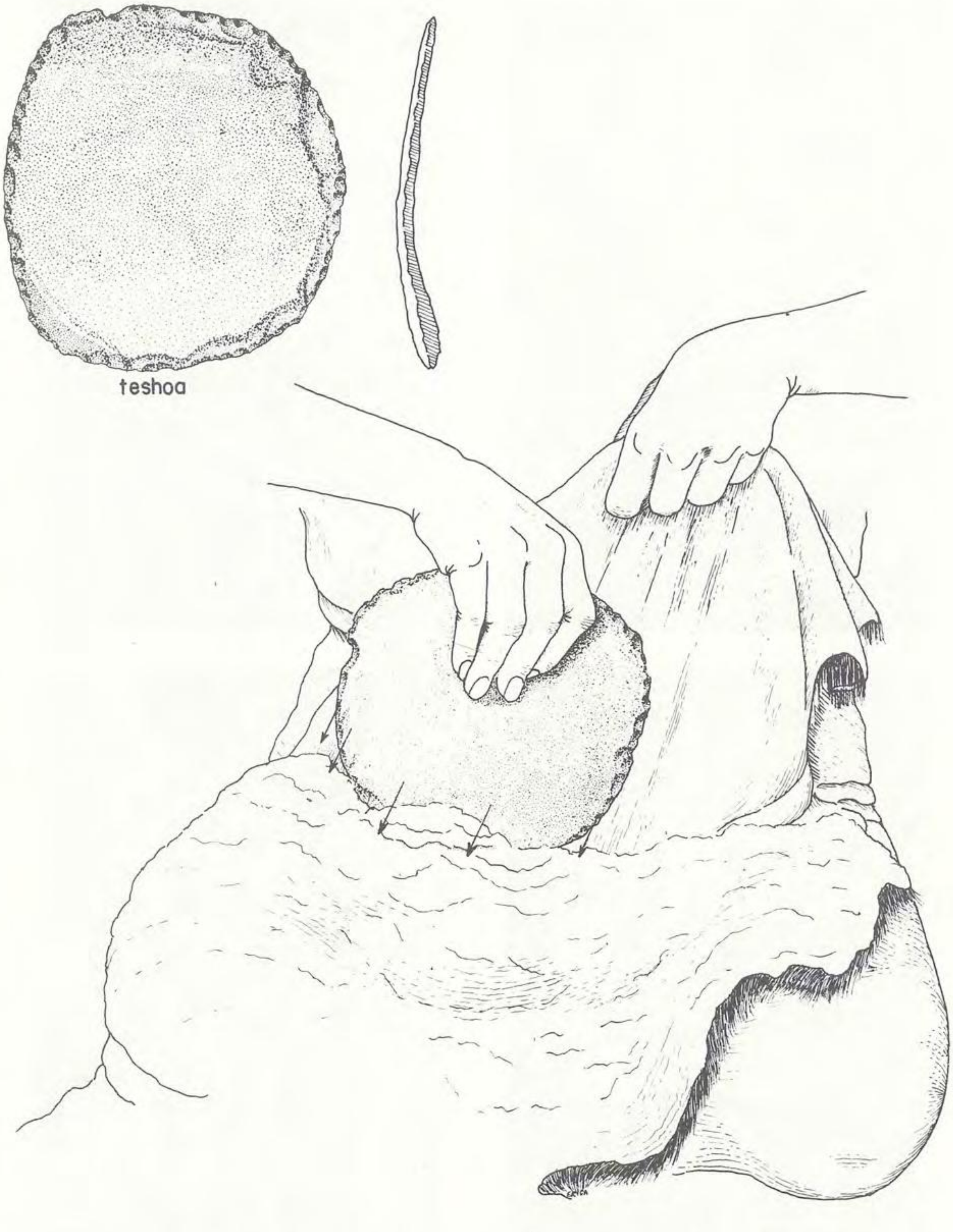


Fig. 27. A typical teshoa (unhafted Shoshoni woman's knife) and artistic reconstruction of the same in use as a flesher.

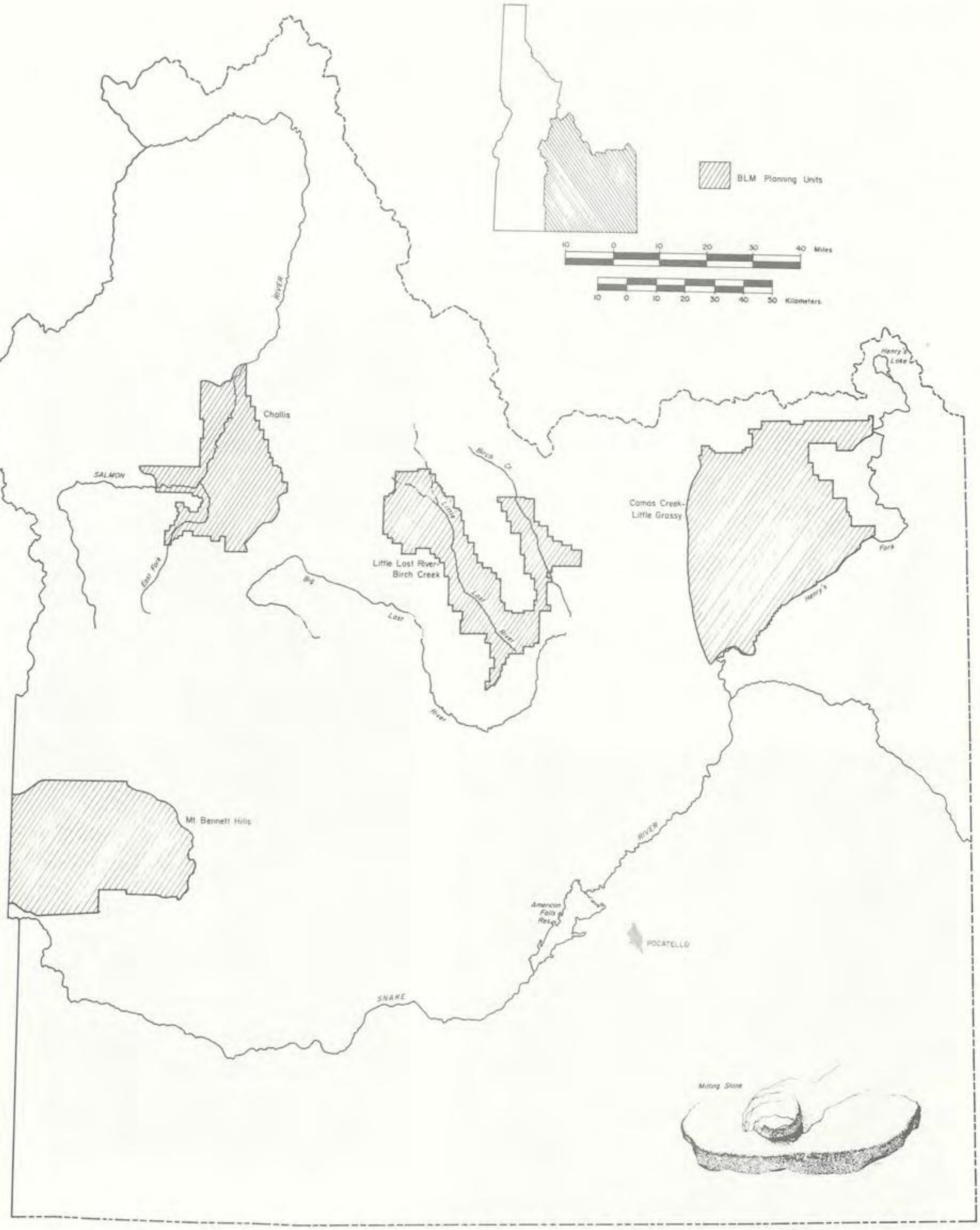


Fig. 28. Approximate areas covered by the BLM planning units referred to in the text. These units were the first parts of the region to be inventoried by stratified, non-aligned, random sampling methods as well as by other, more traditional, methods. As a result, we have fairly reliable knowledge of the types and distribution of prehistoric sites to be found in these areas. These areas were inventoried between 1974 and 1976.

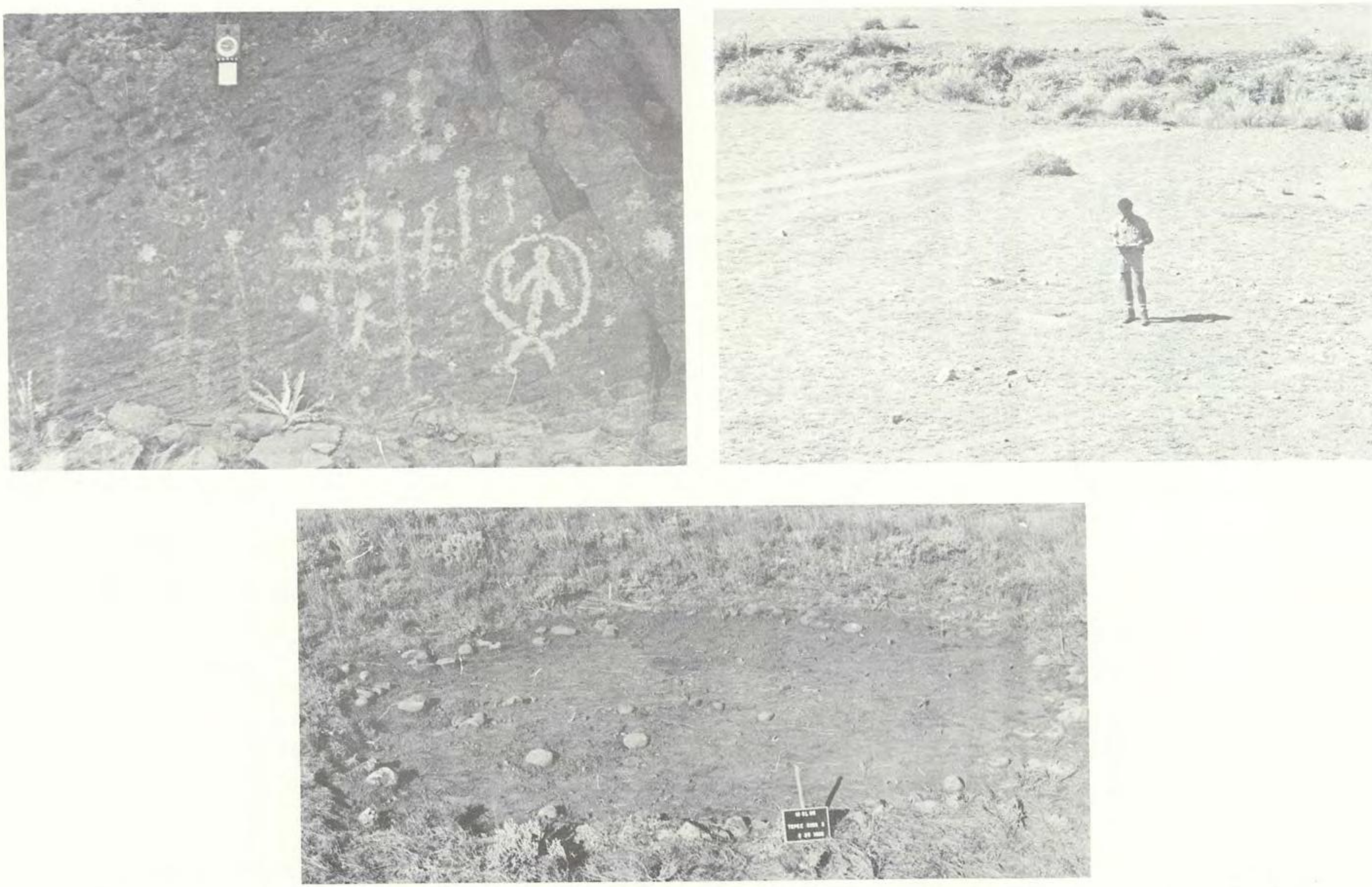


Fig. 29. Petroglyphs and tipi rings. Upper left, petroglyph from Mt. Bennett Hills planning unit (see Fig. 28). Upper right, typical tipi ring from Little Lost-Birch Creek planning unit. Man is standing at center of ring. Lower, partially excavated tipi ring near Monida Pass on Interstate 15.

Fig. 30. Other rock structures. Upper left, stone house with ramp entranceway dating from the 14th century. Upper right, Douglas fir limb incorporated in upper wall of house, probably a roof support of some kind. A similar limb fragment was recovered from the same position in the wall beneath the outstretched arm of the man in the left photo. The latter fragment yielded a radiocarbon date of A.D. 1340 ± 70 years (WSU-1587). Lower left, a wall of dry-laid masonry (basalt slabs), either for a large brush-covered structure (a wickiup or conical lodge) or skin-covered tipi, at the western edge of the Camas-Little Grassy planning unit shown in Fig. 28. Man stands at entranceway to the structure. Lower right, mountain sheep hunting blind near Jimmy Smith Lake, which drains into the East Fork of the Salmon. Wood from this blind yielded a radiocarbon date of A.D. 1290 ± 70 years (WSU-1704).

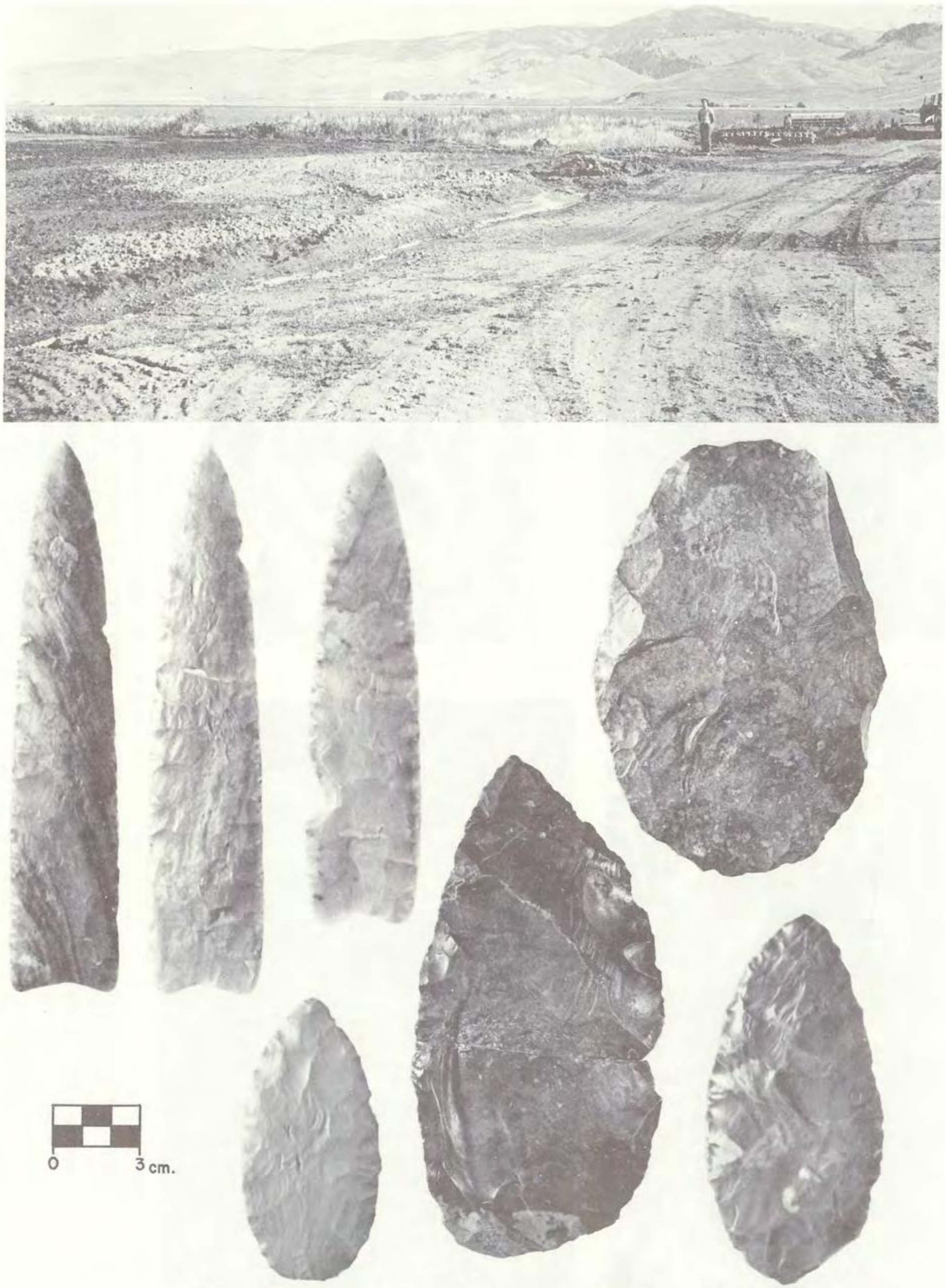


Fig. 31. The Simon Site Clovis cache near Fairfield, Idaho. Upper, man stands where cache of Clovis points and bifaces were uncovered by Mr. Simon in the autumn of 1961. Lower, some of the Clovis points (left three specimens) and bifaces recovered from the cache.

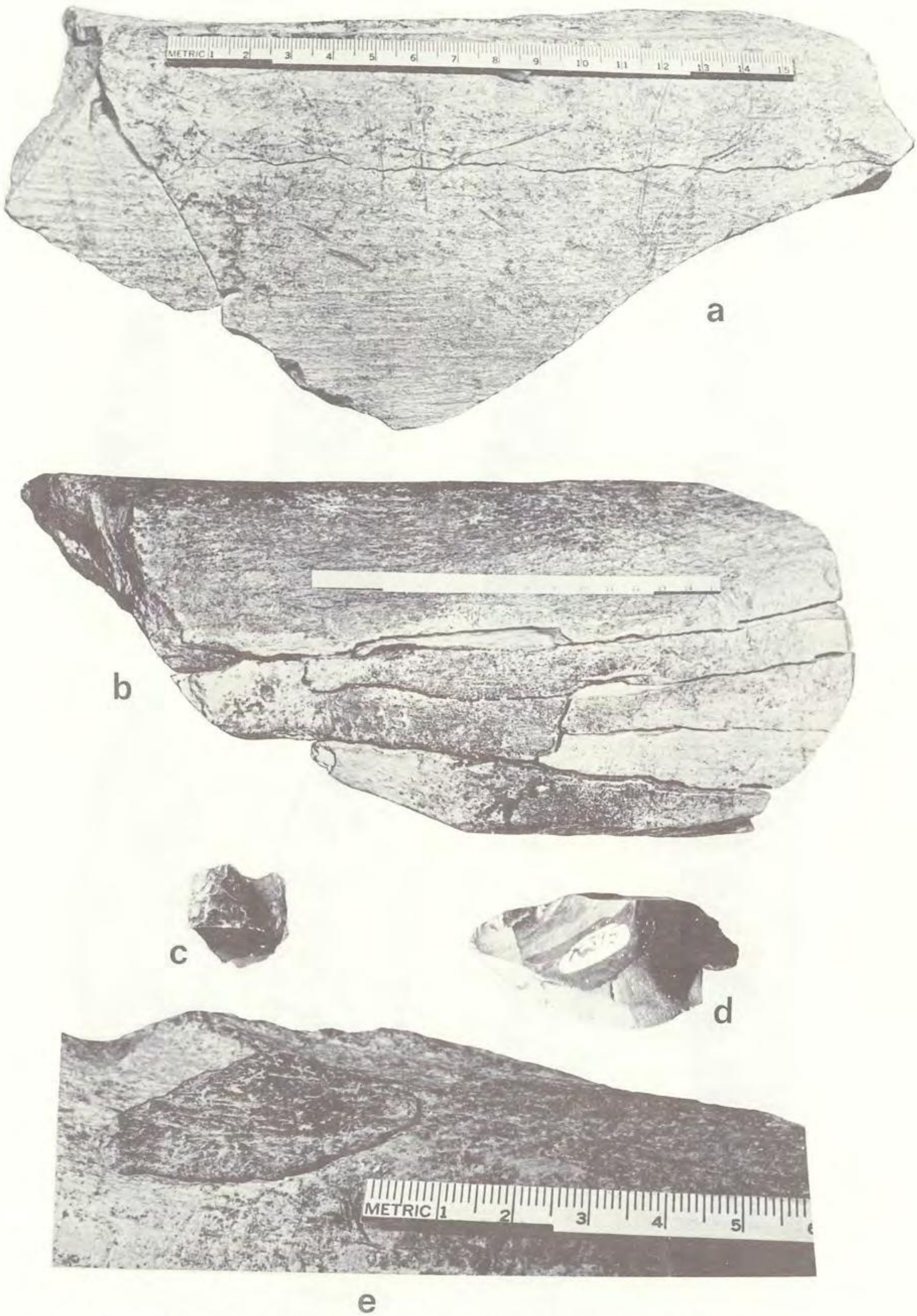


Fig. 32. Some of the elephant foreleg bone fragments recovered from the Wasden Site and two chipped stone items associated with the bone fragments. a-b, leg bone fragments showing butchering marks; e, close-up of leg bone fragment showing a piece of bone deliberately chipped from it, perhaps for purposes of creating a cutting or scraping tool; c-d, chipped stone fragments; c, appears to be an edge of a Folsom point; d, is an unretouched flake.

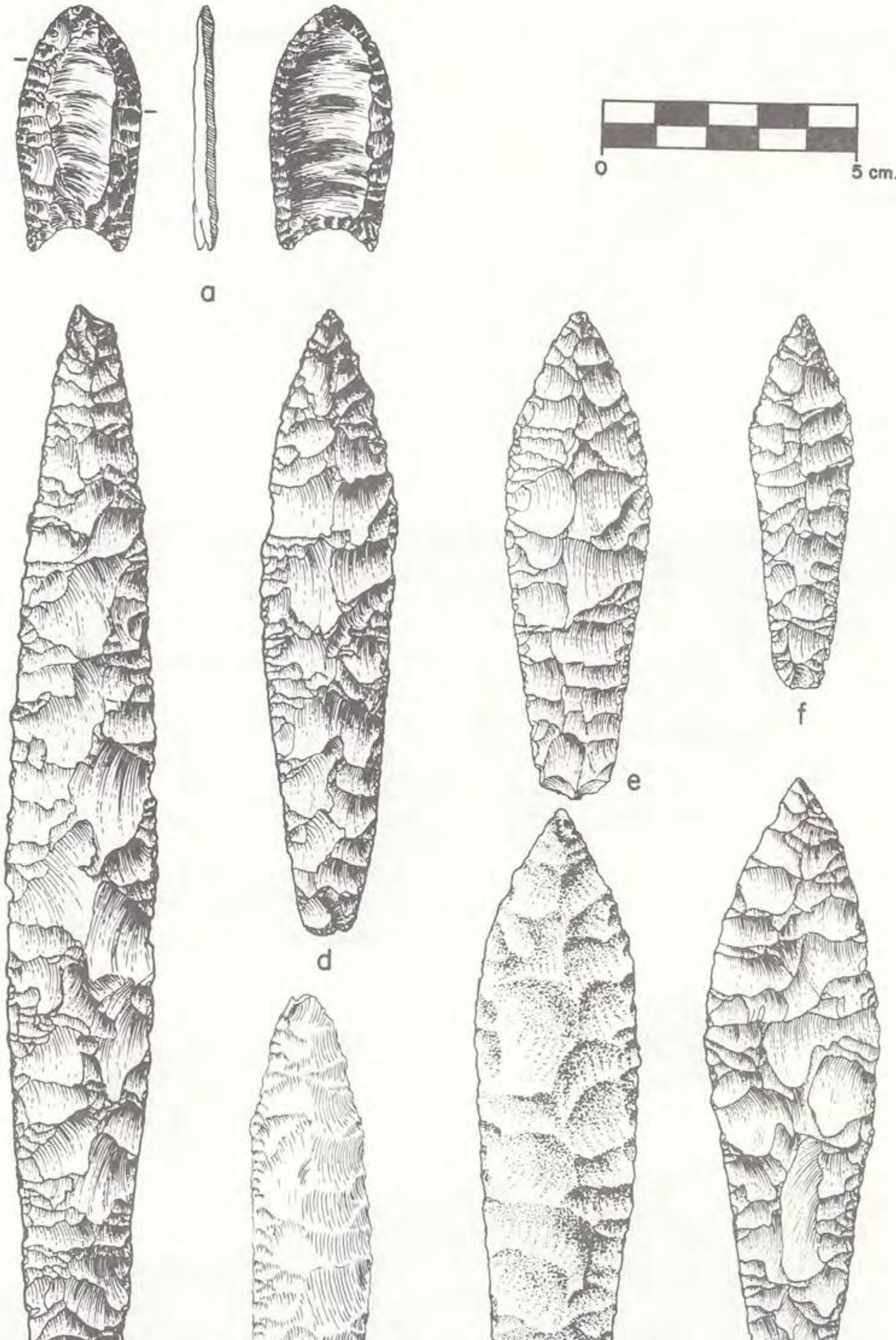


Fig. 33. Folsom (a) and Plano (c-i) points from the Upper Snake and Salmon River Country. a, from Curlew Valley on Utah-Idaho border; c-f, h-i, from the Haskett site (c, Type 2 and d-f, h-i, Type 1 Haskett points); g, Birch Creek point from site on the American Falls Reservoir.

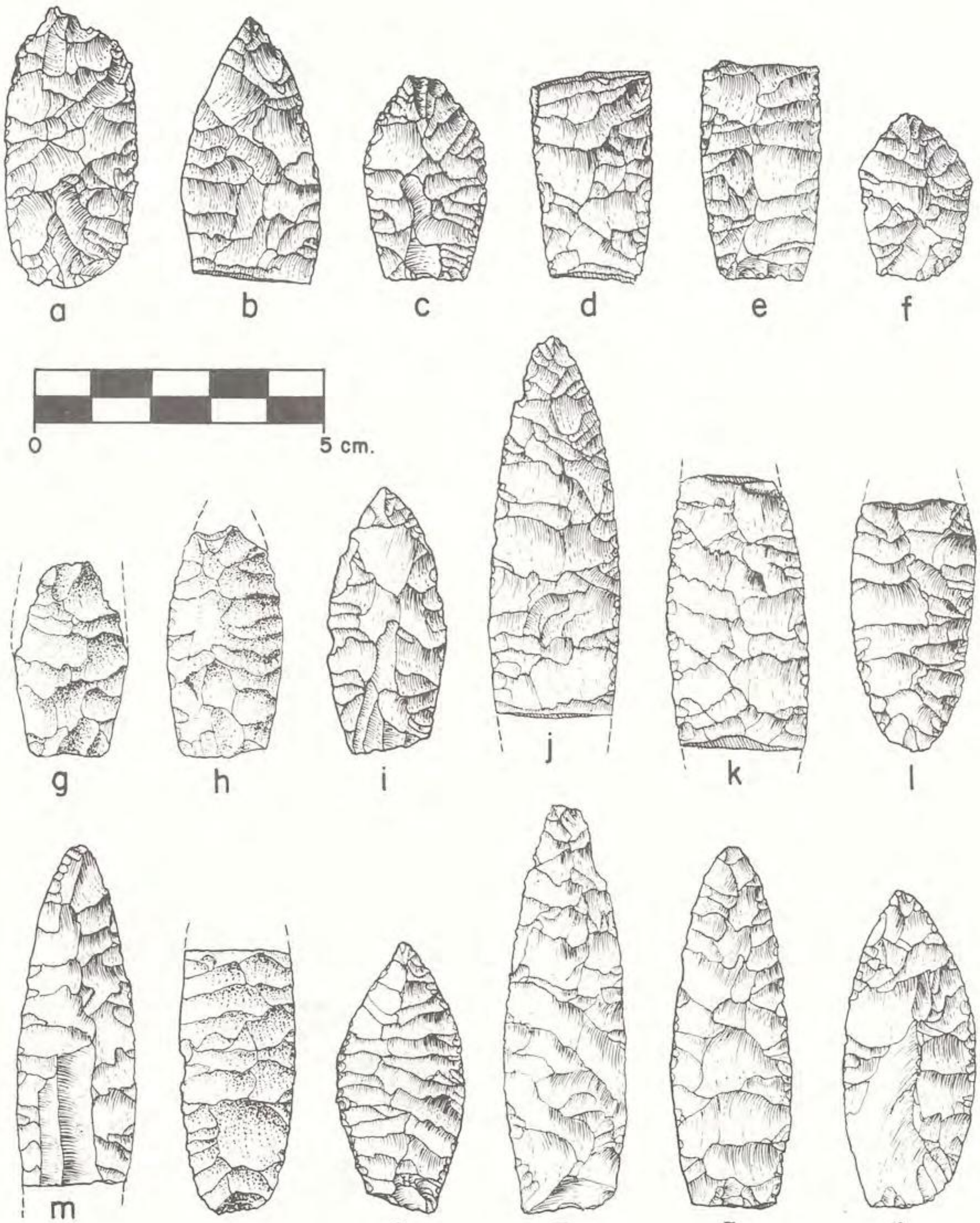


Fig. 34. Late Plano points associated with the 8,000-year-old *Bison antiquus* kills at the Wasden Site. *c* and *f* may be reworked Birch Creek type basal fragments.

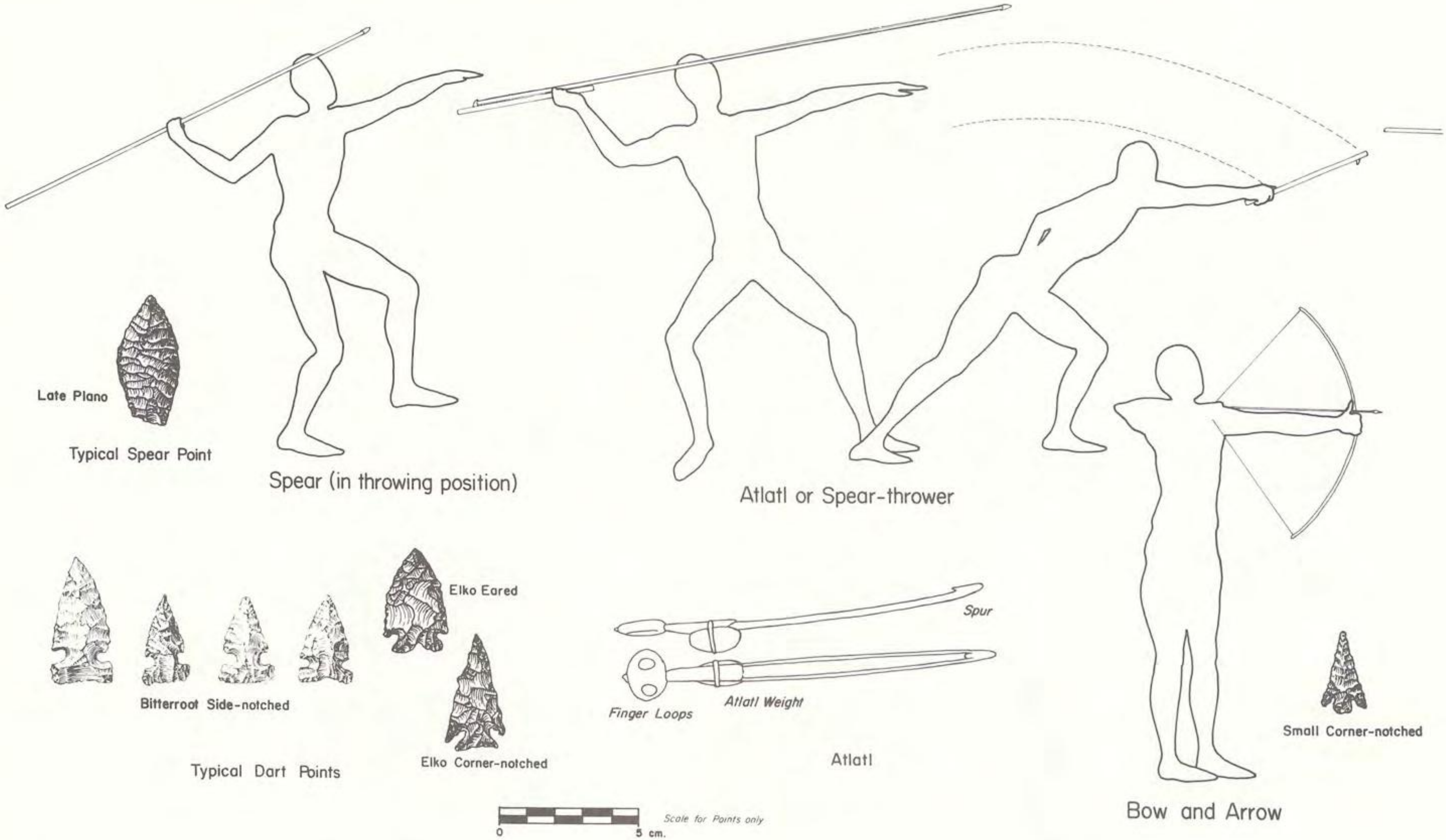
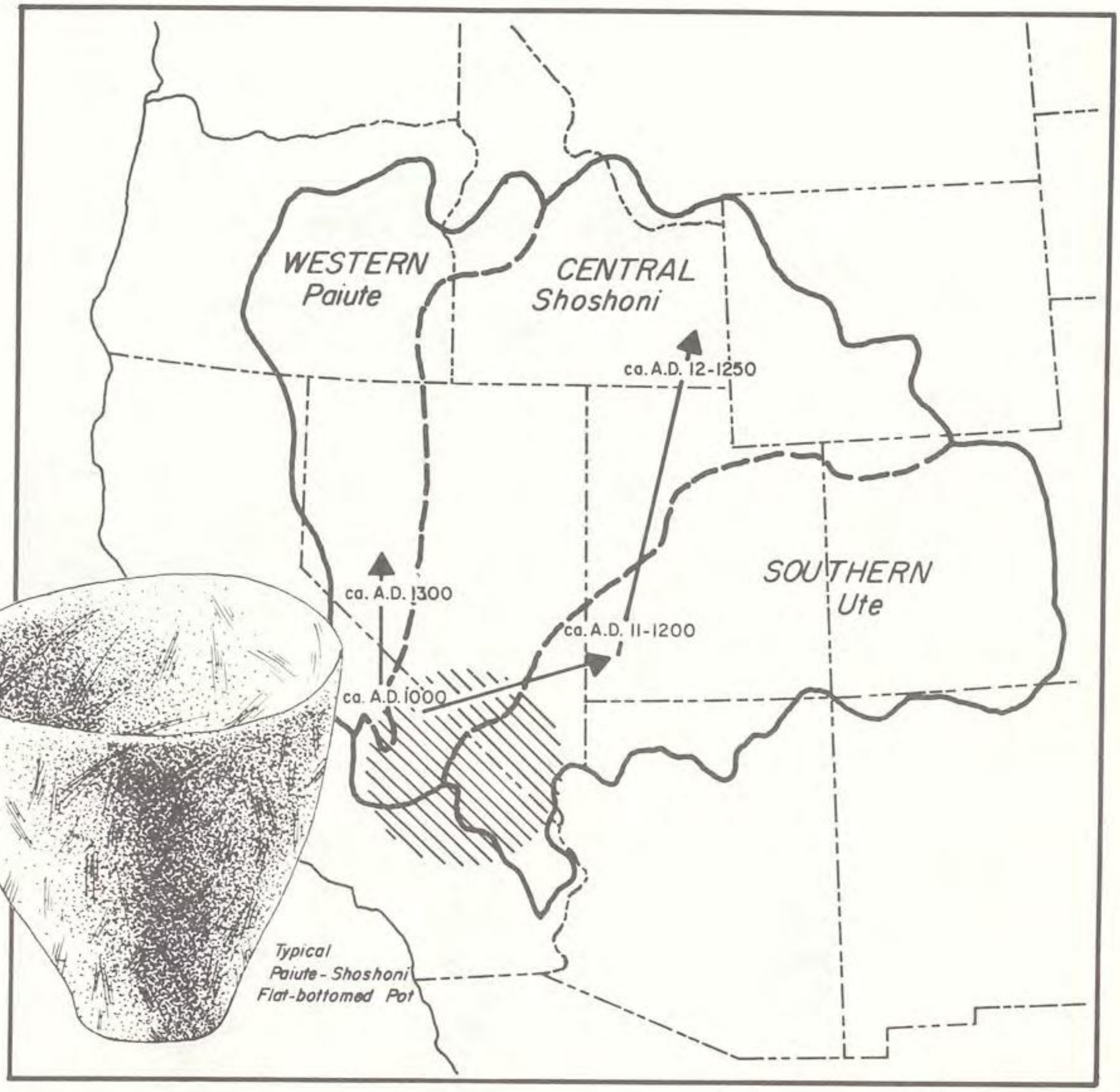


Fig. 35. Successive forms of prehistoric weaponry in North America and examples of the projectile point forms probably associated with each in the Upper Snake and Salmon River Country.



Distribution of Numic speaking Peoples in the Great Basin

Hypothesized Homeland of Numic speaking Peoples

Reported Spatio - temporal Placement of Paiute - Shoshoni Pottery in the Great Basin

Fig. 36. Hypothesized spread of Numic (Paiute and Shoshoni) speaking peoples out of the southwestern corner of the Great Basin and presently known earliest occurrences of Paiute-Shoshoni pottery in selected parts of the Great Basin Culture area.

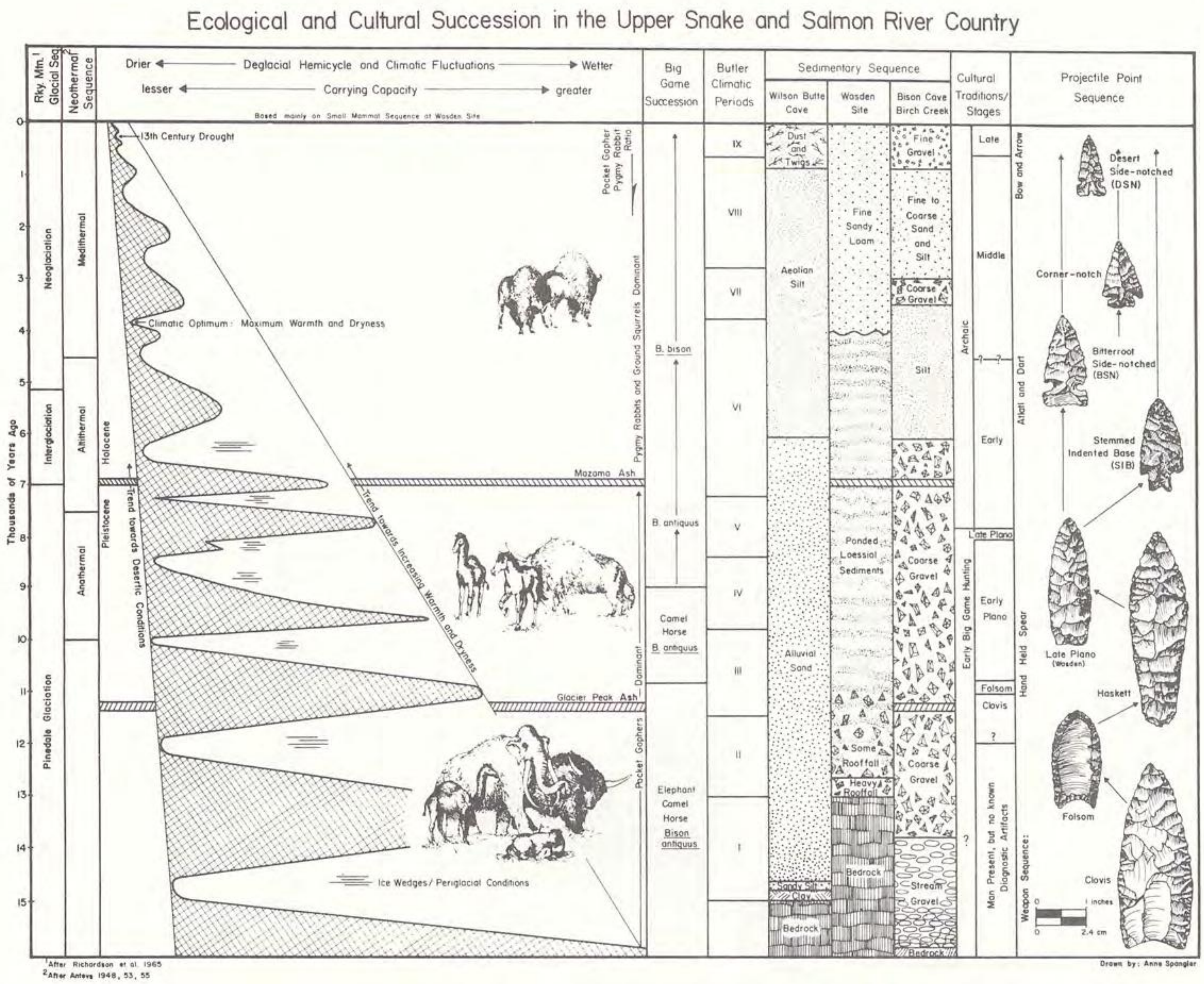


Fig. 37. Chart summarizing principal climatic, ecological, geological, and cultural changes through time in the Upper Snake and Salmon River Country.

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