

AN ABSTRACT OF THE THESIS OF

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The dramatic upsurge of contract-supported archaeological activity, generated by legislative action, has precipitated an increase in information about Oregon's prehistoric peoples. This information, however, has not been presented in a format which can be easily understood by the general public.

This study presents an account of early peoples in Oregon, based on recent archaeological research. It focuses on early human populations in the state and their interaction with the environment. The information is presented in layman's terms and is supported by illustrations.

Oregon's Early Peoples and Their Relation to  
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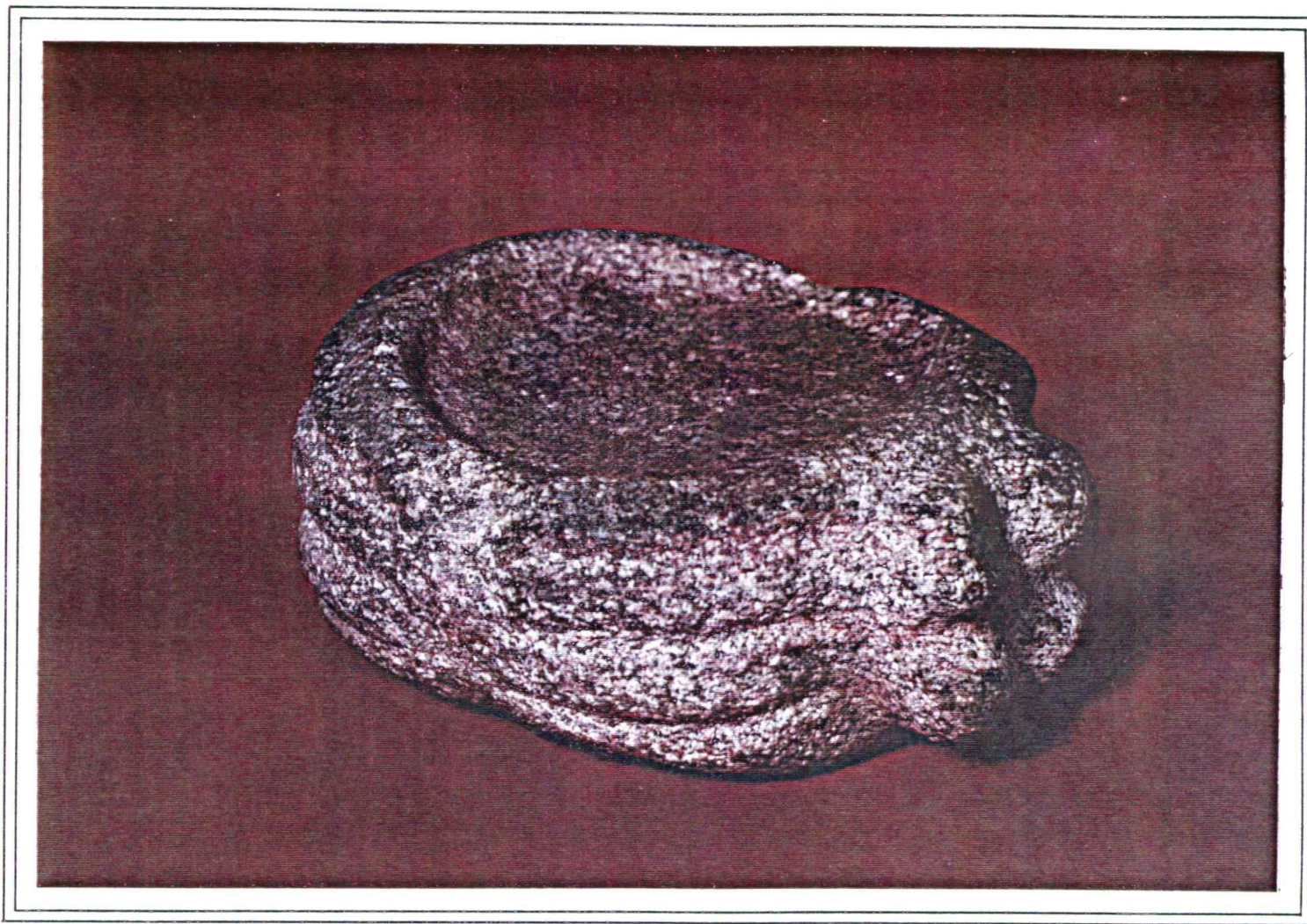
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Frontispiece. A mortar excavated from The Dalles in northeastern Oregon. Approximately 6,000 years ago a rejuvenation of culture took place at The Dalles, this period is characterized by the development of stone sculpture.



Oregon's Early Peoples and Their Relation to  
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CHAPTER I

INTERPRETING ARCHAEOLOGY VIA PUBLICATION

Archaeology has expanded considerably within the last decade. Conservation archaeology, contract archaeology, cultural resource management, emergency, and salvage archaeology are terms which designate the branches of archaeology that have become necessary because of increased construction activity. Modification of the earth's surface by these activities threatens the record of prehistoric peoples.

Archaeology can provoke a sense of awareness and appreciation for environmental and cultural resources in an age when this is increasingly important; it can be an adventure, a recreational resource, and an educational resource. Archaeology can be many things to many people, but it can not if they do not know about it. Interpretation is a way to get the message to the public. Proper management of cultural resources depends on an aware, concerned, and responsible public.

There is great potential within government for meaningful involvement of the archaeologist in interpretation, potential for the preservation of cultural resources and for communication with the public. This potential can be realized only when the benefits are understood.

Interpretation is a service which is important to resource managers. The definition proposed at the Second World Conference on National Parks by Don Aldridge (1972) is:

...the art of explaining the place of man in his environment, to increase visitor or public awareness of the importance of this relationship, and to awaken a desire to contribute to environmental conservation (emphasis added).

"Explaining the place of man in his environment" are the key words in this definition, with the ultimate aims being public awareness and conservation of the resource. Aldridge's definition requires a minor amendment, however, to include as a goal cultural resource conservation.

Archaeology, as defined by David Hurst Thomas in his book Archaeology (1979), is:

The study of the human past. Archaeology's initial objective is the construction of cultural chronology; its intermediate objective is the reconstruction of past lifeways; and its ultimate objective is the discovery of the processes which underlie and condition human behavior (1979:456).

Modern archaeology is an exciting field because so much can be learned about ourselves, our humanity, and our past. We learn these things only by studying the objects of the past from a variety of perspectives (Thomas 1979:2).

Narrative interpretation in historic and prehistoric areas has unlimited scope as outlined in Thomas's definition. Interpretive stories may also highlight modern man's dilemma, or they may demonstrate the value systems and operating techniques of other men who were more at home with the earth than we are (Brown 1971:96). In

other words they may contain environmental messages.

Interpretation need not be limited to activities such as guided walks. The basic information also can be presented in the written word. The public can be reached on-site, as well as off-site, by presenting the results of archaeological work in a wide variety of publications; books, newspaper articles, magazines, and brochures. Through this medium, interpreters have the opportunity and challenge of relating the evidence of history and prehistory to the public.

Archaeology is a relevant topic today. Archaeological information in the United States is expanding at a rapid rate. This is due to enabling legislation and an increase in funding. Along with this growth, the gap widens between the professional, the amateur, and the public at large. Fortunately, within recent years some professionals and amateurs have made valid attempts at bridging that gap through amateur organizations and the use of volunteers in research. These two groups, with similar interests, are beginning to work together to further advance our knowledge of prehistory. The general public, however, is generally unaware of studies in the field of archaeology. This is unfortunate because public understanding is essential to progress in archaeological research.

Archaeologists depend heavily on public funds. In fact, it has been estimated that in a few years ninety percent of all archaeological research in the United States will be contract related (Kelley 1977). Most of these contracts will be awarded through government agencies. Public understanding, thus, is an important

source of support for future advances in archaeology. As the public comes to understand it's heritage, it will show a keener interest in the professional development of the science of archaeology.

### Why Interpret Archaeology Via Publication

The initial question should be: is the interpretation relevant? Does it tell a story, and illustrate relationships, and will it reach the public? Publications may not be needed in your area. Interpretation must meet the readers in their present frame of mind. Therefore, it should always be current. The message, Cantu suggests, must be "dynamic and different, yet at the same time retaining some essential qualities and ideas." (Cantu 1973:21)

If a decision is made to interpret via publication, the next step would be to gather a good data base. The work of the archaeologist is fundamental to good interpretation. Yet, there exists a belief among some archaeologists that the public does not show sufficient interest in their assemblage of information. This may not be true. As Freeman Tilden (1974) states, "It is a sign of native intelligence on the part of any person not to clutter his mind with indigestibles." It is essential to render the experiences of early man intelligible if the public is going to show interest.

Archaeologists often conclude their fieldwork and laboratory analysis by publishing the facts in professional journals or reports to the funding agency. These reports and publications are sometimes available to the public through libraries, but because they were not

written for public consumption, they may not attract the interest of the general reader. McGimsey (1971) warns:

We have long heard the professional battle cry of "publish or perish." I suggest that if this professional society and its members continue their near total emphasis on research and publication (and academic teaching), to the virtual exclusion of all else, then "publish and perish" will be more appropriate. What will happen is that our basic resource materials will disappear, and archaeology's final contribution to mankind will be to provide future generations with an excellent example of suicide by an entire profession (McGimsey 1971:125).

It is the interpreter's role to take the archaeologists facts and apply appropriate interpretive skills and methods to bring past culture to life.

It is logical for an interpreter to utilize publications as one facet of the entire interpretive effort. The following are a number of advantages and disadvantages of publications prepared by William Dunmire (1976) of the National Park Service:

#### Disadvantages

1. Publications are a "cold" medium, lacking the warmth of a personal contact.
2. Dynamic concepts, such as geological forces over a period of time, are difficult to convey through this static medium.
3. Publications are a one-way form of communication.
4. Publications too often become an overused panacea.

#### Advantages

1. Publications have a potential for offering the greatest interpretive depth and detail.
2. Publications have a take home value; they can be read and reread at leisure.
3. Through publications your interpretive message can be distributed widely beyond the park or forest by taking advantage of commercial outlets or local information centers.

4. Manuscripts can be reviewed by outside experts before committed to print...
5. Publications sometimes are the cheapest tool in the interpreter's mixed bag.
6. Compared to signs, outdoor exhibits, and visitor centers, publications have virtually no adverse impact on the environment.
7. Valuable staff time is saved at the information desk whenever publications are available that provide answers to regularly asked questions.

The advantages generally outweigh the disadvantages, and most of the disadvantages can be overcome through judicious interpretive planning. Publications do not have to be a "cold" medium if the writer is aware of the experiences and needs of the reader. This is difficult to do at times but, when done properly, can add much to the understanding of scientific concepts. Graphics and color photographs can be used wherever they are appropriate to add an important dimension to reading. These are only a few suggestions. The actual success or failure lies with the talent of the author.

Readability is essential. In general, short sentences with non-technical words are easier to understand than long sentences with technical words (Wagar 1974:102). Interpreters are communicators, yet Hunt and Brown have found much of the interpretive material they sampled to be very difficult reading (Hunt and Brown 1971). One of the paramount skills of interpretation should be concise, clear, non-technical writing.

Readability depends on both the subject and its presentation. In a study of interpretive exhibits, Washburne and Wagar (1972) found that the reader was most interested in violence and violent events. It is easy to find numerous examples of violent events in prehistoric life.

An example is the eruption of Mt. Mazama in Oregon. The story of this major catastrophe and the evidence of its role in human history can easily be related to the reader. Another example would be the Lake Missoula flood; the ice that impounded Lake Missoula gave way at least three times, releasing catastrophic floods of enormous magnitude, which swept through the Spokane area and southwestward across the Columbia Plateau (Butler 1968:34).

There are two points to remember. First, illustrate dynamic concepts whenever feasible because the written word alone may not convey your message. Second, the reader deserves to know, as early on as possible, what the message is. Write so that your reader may get the message quickly - on the very first reading (Bates 1978:89).

#### When To Interpret Through Publications

Publications should not be used as an end in themselves, but rather as a supplement to normal interpretive operations. They certainly cannot rival the warmth and immediate feedback of a personal contact. They can, however, become an effective management tool in areas where cultural resources are of special significance. They can be used when:

1. Archaeological sites are too hazardous to allow visitation.
2. Archaeological sites are fragile and cannot stand the impact of visitation.
3. Archaeological sites are inaccessible to visitors because of their location.
4. Archaeological sites are located on private land.
5. Archaeological sites will be destroyed by construction or flooded by a dam.
6. Archaeological sites are not attractive to visitors,

- but important in contributing to our knowledge of prehistory.
7. Artifacts cannot be left for general viewing due to dangers of deterioration or vandalism.
  8. Resource managers need to protect the location of the site.
  9. The agency or private organization wants to offer something which the visitor can take home to read in their spare time; to further understand the site or story.
  10. The agency policy requires cost effective interpretation and public information.

### Research and Interpretation

Research is the basis of good interpretation. Research results indicate that field techniques are rapidly changing. Prior to Libby's discovery of radiocarbon dating in 1949, archaeologists had no reason to save charcoal. Now carbon-14 is one of the most widely accepted dating techniques used for establishing chronological controls. Pollen samples were not considered prior to the 1930's; no one had thought of reconstructing past environments through pollen analysis. Bones were discarded by many early archaeologists; now, through faunal analysis, they are divulging strong evidence of past lifeways.

Archaeology has developed from a pastime of relic collecting to a professional scientific discipline. The injection of science into archaeology is increasing our knowledge of prehistoric man. By gathering more specific data about varied aspects of an archaeological site, the archaeologist can step back and view the whole picture of past lifeways at a site or within a region. This is where the interpreter takes over.

### Goals Of Interpreting Archaeological Sites



There are five goals in interpreting archaeological sites for the general public:

1. To provide the public with an awareness, appreciation, and understanding of the resource.
2. To provide a link between the resource, the managing agency, and the public.
3. To inform the public that government funds are being used to recover, protect, and preserve man's heritage.
4. To accomplish the goals of managing the resource to prevent or minimize site vandalizing.
5. To assist management in implementation of goals and objectives.

The goals and objectives of interpretation have been summarized most succinctly by Freeman Tilden, whose book Interpreting Our Heritage (1974) has been the mainstay of interpretive literature in its early development during the 1950's and 60's:

Through awareness, appreciation; through appreciation, understanding; through understanding, protection.

### A Critical Review of Selected Archaeological Publications

The earliest publication written for the public concerning Oregon's archaeology is Emory Strong's (1960) Stone Age on the Columbia River. This is an account of historic and prehistoric life on the Columbia River. Strong, an amateur archaeologist, has actively recorded and excavated sites. He has provided a fairly comprehensive coverage of the history and prehistory of the Lower Columbia. The book's weakness is that a good portion of the information is derived from historical information and artifacts out of context.

Strong begins with a lengthy chapter on the setting. The major focus is on the location of individual sites and their historical sur-

roundings. The environmental setting is discussed, but the study lacks valid information about the post-glacial environment. Dynamic forces are not discussed, such as the Lake Missoula flood or the eruption of Mt. Mazama.

A detailed map and descriptions of site locations are supplied by the author, which may have led to further desecration of important archaeological sites. Maps presented in an archaeological publication should not indicate the exact location of archaeological sites. This information may be of importance to the story, but can be presented less specifically.

Another chapter deals with archaeological methods. Included is the code of ethics of the Washington Archaeological Society. This sets some standards for what an amateur archaeologist should be doing. The problem is that it encourages amateur archaeologists to continue their hobby, incorporating "controlled digging." Site destruction should be deterred, not encouraged. If amateur archaeologists wish to dig, they should do so under the direction of a professional.

In summary, Strong's book is primarily a record of relic collectors' excavations and their artifactual findings. This should not be frowned upon, but accepted as a contribution to our knowledge of early man on the Columbia. The damage is done; any information we can obtain about the sites is valuable.

The most comprehensive work in Oregon to date is Luther Cressman's Prehistory of the Far West, which has been the only synthesis of Oregon archaeology. The purpose of this publication was to "present the pre-

history of human occupation in the far-western part of North America" (Cressman 1977:1). It was written as a text for college students, and lacks the appeal of a more general overview. The text is understandable, but at times technical, because of the background of the author and the audience he was writing for.

Cressman's book is primarily based upon information supplied by professional archaeologists in the West, although he does not exclude significant amateur findings. The foundation of this synthesis is Cressman's good research design. Most of the information presented is based on scientific evidence.

The author used devices such as headings, subheadings, and paragraph indentations to advantage in his book. The illustrations are interwoven with the text. This method is much better than having the illustrations grouped together in the middle or at the end of the text. When illustrations are grouped the reader will either skip them entirely or look at them all at once without reference to the text (Bates 1978:150).

The use of the American Antiquities style of footnoting by Cressman is also beneficial. In this style footnotes are incorporated into the text and the reader is able to determine immediately the source of the information. When footnotes are placed at the bottom of the page, or at the end of the chapter or book, the readers have to break their concentration, if interested in consulting the footnotes. The effectiveness of communication diminishes accordingly. Quotations are used extensively in Cressman's writing. Quotations are important

when:

1. The point is important.
2. The statement is to be refuted.
3. The author's statement is ambiguous.
4. The citation may be questioned.
5. The point is stated so well that the style will strengthen your message. (Bates 1978:153)

Quotations, thus, are a valuable communication tool.

Cressman's other book written for public consumption is The Sandal and the Cave (1964). This book, like Ruth Kirk's Oldest Man in America (1970), is a site-specific interpretive effort, addressing only one archaeological site. Both Cressman's and Kirk's books address the importance of prehistoric archaeological sites. These publications are valuable in that their purpose is to increase the public's awareness and knowledge of prehistory. These site-specific stories are of interest because of their age and their role in the chronology of human development in the Northwest. A more general overview, however, would be more appropriate for the general public. The availability of site-specific information is necessary for people who have an interest in expanding their knowledge of archaeology.

B. Robert Butler's A Guide to Understanding Idaho Archaeology (1968) is an excellent synthesis of Idaho's archaeological discoveries. However, the book tends to get bogged down with technicalities at times. Butler begins with recommended readings. By providing these he is suggesting that one's understanding of this material will increase if one first gains a background in archaeology. It appears that this book was written primarily for college students.

Butler uses the American Antiquities style of footnoting, which

improves the readability. There is plenty of "white space" throughout the text. Headings, subheadings, and indented paragraphs are used to clearly define and separate information.

One weakness is the lack of illustrations within the text. The very few illustrations provided are grouped at the back of the book and are easily skipped. Maps and drawings are supplied but very few photographs are included.

The strength of this book is Butler's expertise on Idaho's archaeology. Certainly no one is more qualified to write a statewide synthesis.

The last book I reviewed was Ruth Kirk's and Richard Daugherty's Exploring Washington Archaeology (1978). This is an outstanding synthesis of Washington archaeological work, with an emphasis on archaeological undertakings by Washington State University with which Daugherty is associated.

Kirk and Daugherty have put together the best publication on regional archaeology I have seen. The book is lavishly illustrated with a variety of drawing, maps and black and white and color photographs.

Kirk's background as a journalist combined with Daugherty's archaeological experience proved to be an effective combination. Daugherty is the dean of Washington archaeology and has been quite active in attempting to make information available to the public.

Although the book is good, it does have some drawbacks. Kirk at times is overly journalistic. The reader has to go through the entire story from beginning to end to discover the writer's message. There

are 107 pages of copy without subheadings. If readers were looking for specific information, they would have difficulty finding it.

There is also a noticeable absence of direct quotations, footnotes, and bibliographic references. All of these features and strength and structure to text (Bates 1978).

### Summary

Archaeological information in the United States is expanding at a rapid rate. However, this growth is accompanied by a widening gulf between the professional, the amateur, and the public at large. The public is generally unaware of recent studies in the field of archaeology. This is unfortunate since public understanding is a base of support for future advances in archaeology.

Interpretation can be used to provide the public with an awareness, appreciation, and understanding of cultural resources; the ultimate outcome being protection of the resource.

Publications as an interpretive medium offer many advantages. If done properly they can be an effective management tool in areas where cultural resources are of special significance.

In the Northwest there are several good examples of archaeological texts written for the general public. The best example is Kirk's and Daugherty's Exploring Washington Archaeology. Only one synthesis has been done on Oregon archaeology and it was written for use as a college textbook.

## INTRODUCTION

The purpose of this study is to present an introduction to Oregon's archaeology for the public. Oregon's climate, geography, and resources are unique features of the state, for they set the conditions for survival and play a determining role in human life. Environments are not static: changes in climate effect the distribution of resources and necessitates a distinctive mode of life (Murdock 1965: 133).

Man reacts to the web of life as a cultural animal. Perhaps the best definition of culture, as it is used in anthropology, is still the one proposed by Edward B. Tylor (1981) in his book Primitive Culture:

...that complex whole which includes knowledge, belief, art, morals, law, customs, and any other capabilities and habits acquired by man as a member of society (Tylor 1871).

The development of culture depends largely on the interaction of environmental factors. As Luther Cressman (1977) wrote,

The environment provides the resource and the opportunity for cultural response, which has to be made in terms of the problem to be solved (Cressman 1977:3).

To illustrate the effect of environmental factors on culture we need only look at the location of modern-day population centers in the state. The combination of favorable climate, fertile soils and gentle terrain have made the Willamette Valley the most attractive area for white settlement. Information from the 1970 U.S. Census reveals that

70 percent of the population in the state was concentrated in the Willamette Valley. Surely the environment played an equally important role in the life of prehistoric peoples.

Oregon has changed considerably since humans arrived. The climate, vegetation, and distribution of wildlife has changed, and in some areas the physical features of the land have noticeably altered. Particularly in the last 5,000 years flora and fauna have undergone major adjustments in their ranges (Smith 1965:633). The dynamic concept which links all environmental factors is change. The key to human survival has not been resistance to change, but meeting change with change (Kroeber 1939:372-374).

Richard Wagner in his book Environment and Man (1974) commented most precisely on change. He suggested:

If you were to view the evolution of life on earth as a thirty-minute film, you would see wave after wave of new species evolving, filling the environment with a diversity of life forms, and then receding - sometimes totally,...It is humbling to note that man's existence would flash by in the last 3.5 seconds of that film! (Wagner 1974:7)

The story of early peoples in Oregon would not be noticeable, occurring within the last eighth of a second of that film. Present evidence suggests that humans have been in Oregon for approximately 13,000 years.

What follows is a discussion of Oregon's climate, resources, and geography. This chapter will be limited to a description of the actual physical features of Oregon. The role that these features played in the life of early peoples in the region will be discussed in the fourth



and fifth chapters.

## CHAPTER II

### THE ENVIRONMENTAL SETTING

#### The Land

Oregon has a varied landscape, ranging from broad flat valleys to 3,500m (10,000ft) Cascade summits (figure 1). The Pacific Ocean forms the western boundary of the state and has greatly influenced the coastal features. Present land forms are a result of forces long preceding the arrival of humans.

Although development of land forms usually occurs slowly, there were several catastrophies which helped to shape the land. The eruption of Mt. Mazama, and the Lake Missoula flood had rapid and dramatic effects on the landscape.

Glaciers have left indelible and sometimes datable scars in certain regions of the state. In a glacial period the annual volume of snow that falls in polar and high mountain regions is greater than the amount of annual summer melt. As the snow accumulates, it solidifies into large masses of ice, termed glaciers. During an interglacial stage there is more melting than accumulation so that the areas covered by ice become smaller. Our present period, the Holocene, represents an interglacial period (Spencer 1969:27).

In the study of prehistoric people archaeologists are most interested in the post-glacial period. Estimated by Heusser (1960:68) to



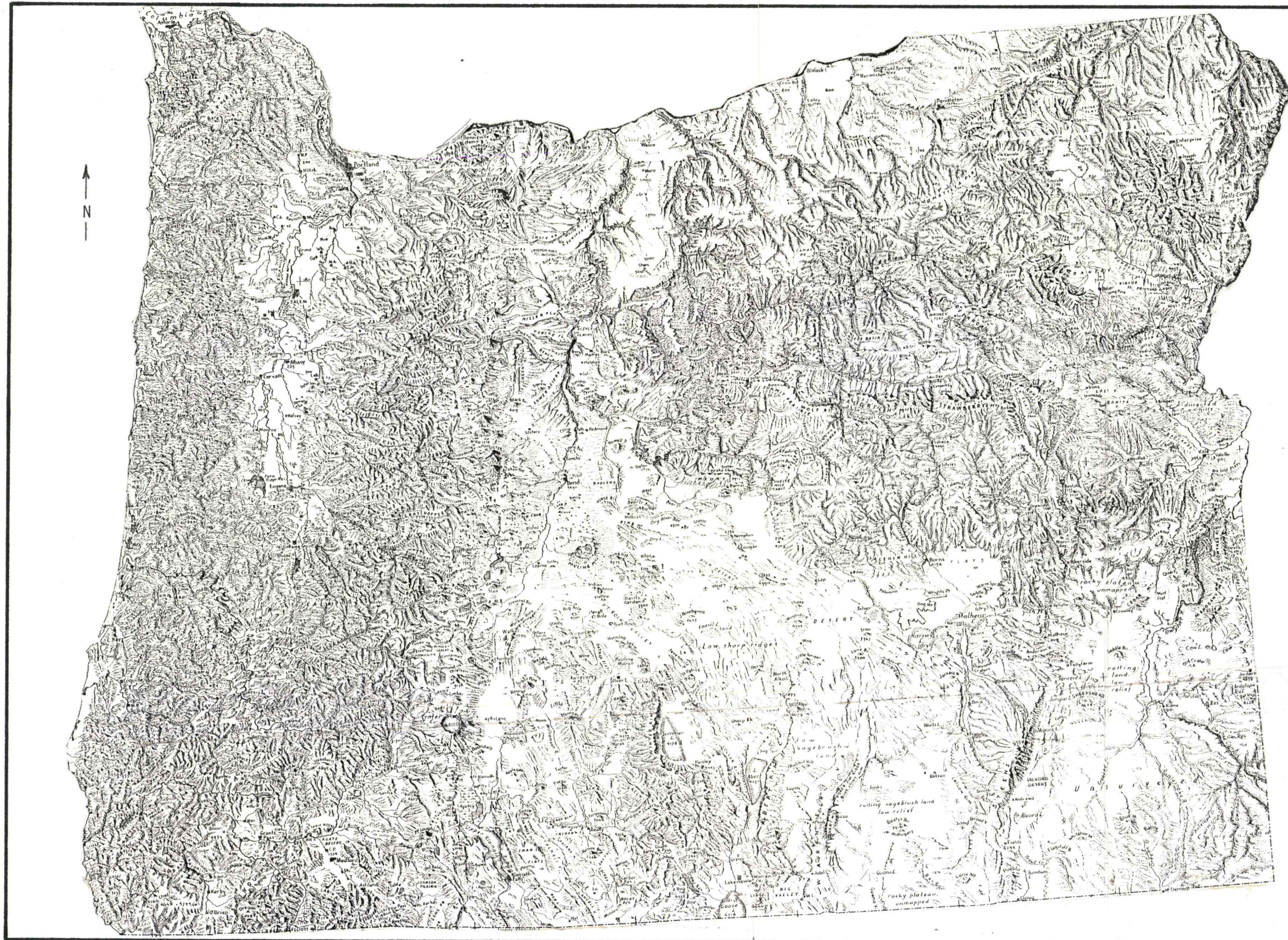


Figure 1. Landforms of Oregon (by Erwin Raisz).



have begun approximately 10,500 years ago, this period is the time in which the climatic trend was towards a warmer and drier cycle (Antevs 1948), causing widespread deglaciation and rising of the sea level worldwide. A stage of increased rainfall and lowered temperatures followed the deglaciation (Spencer 1969:26).

The climatic regions in the state are closely associated with its physical features. Generally the state can be divided into the eastern dry lands and the western wetlands. Western Oregon's winters are mild and its summers are moderate. Eastern Oregon is distinctly continental with cold winters and hot summers. Table 1 lists climatic information from selected areas of the state.

Climate and the concomitant temperatures play a most significant role in the distribution of plant communities. Temperature and rainfall are extremely significant in plant distribution when one considers that 70 percent of a plant's weight is water (Kormandy 1976:137). Oregon's mountains, coast, valleys, and basins provide a diversity of vegetation found in few other states. Plants and plant communities may be subdivided into habitats, or places where the animals that feed on these plants actually live. Wildlife habitats are defined by the type of soil, slope, water, wind, sunshine, and other local features (Whittaker 1975:77). The Northwest was a place of incredible wealth for the hunter-gatherer. The wildlife which occupied the state during post-glacial times can be best described as abundant.

The state can be separated most clearly into six geographic regions. Each area has its own unique character and will be discussed separately.

TABLE I. CLIMATIC DATA FROM SELECTED AREAS IN OREGON

<u>Town</u>	<u>Elevation</u>	<u>Average Annual Temperature in Celsius</u>	<u>Average Annual Precipitation in Millimeters</u>
Astoria	66	10.6	1,967
Bend	1,097	8.0	318
Lakeview	1,455	7.8	364
Medford	400	11.4	502
Portland	9	12.6	1,076
Port Orford	96	11.3	1,780
Salem	60	11.4	1,038

### The Coast Range

The long, narrow mountainous belt lying between the ocean on the west and the Willamette Valley on the east is known as the Coast Range. The Range is bordered by the Columbia River on the north and the Klamath Mountains on the south. The average crestline altitude is 457m (1,500ft) with Mary's Peak reaching 1249m (4,097ft) (Fenneman 1931;459).

Fluctuations in sea level are demonstrated by physical alterations in the Coast Range. During the last glacial advance, ending 10,500 years ago, surface water was frozen or trapped in closed basins. Because normal runoff of surface water back to the sea was reduced, the level of the sea was conspicuously lowered, resulting in worldwide exposure of the continental shelves (Spencer 1969:27).

The change in sea level had two effects on river valleys in the Coast Range: as the sea level lowered, rivers flowed faster and eroded valleys; later, as sea level and streams rose, streams dropped their loads of sediment into embayed river mouths. During the glacial period large land areas were added, coastlines shifted and former islands were connected to the mainland (Spencer 1969:29). The present coastal landforms are a result of fluctuations in sea level and the relentless erosional force of the sea upon the land (Figure 2).

Although most of the research dealing with the post-glacial climate in the Northwest has been centered around the Great Basin and the lower Snake River, Henry Hansen (1947) studied the distribution of ancient plant remains in peat bogs on the Oregon coast. Hansen was able to reconstruct the climatic trends and conditions that pre-



Figure 2. The Pacific Ocean constantly alters Oregon's Coastal features.

vailed on the coast during post-glacial times. The high proportion of spruce pollen in a coastal peat bog suggests an initial wet climate as the ice was receding from regions farther to the north. Shortly thereafter, during the warmer and drier period which prevailed in the entire region, there was a decrease in precipitation. The coastal area was probably not as dry as inland regions (Hansen 1947:26).

The Coast Range is one of the most densely forested regions in the United States. At the time of the first settlers conifers covered most of the land from the ocean to the Cascades' timberline. The Coast Range vegetation is dominated by Sitka spruce (*Picea sitchensis*), western hemlock (*Tsuga heterophylla*), and western-red cedar (*Thuja plicata*), but Douglas fir (*Pseudotsuga menziesii*) and grand fir (*Abies grandis*) are also plentiful (Franklin 1969:46).

The coast's lush environment harbors large populations of game mammals. Black-tailed deer (*Odocoileus hemionus columbianus*) and Roosevelt elk (*Cervus wapiti*) are the most important, especially prior to white settlement. At the time elk were locally abundant; indeed, during their winter stay at Fort Clatsop, Lewis and Clark reported killing 128 elk (Burroughs 1961:134).

Other forms of wildlife exploited by man in the Coast Range include waterfowl, salmon, sturgeon, eulachon, trout, harbor seals, stellar and California sea-lions, whales (usually when washed ashore), clams, crab, and mussels. The latter three are a rich coastal resource. The abundance of life on the Oregon coast is still unspoiled owing to the cold, clear water of the Pacific and the diverse Coast



Range vegetation.

### The Willamette Valley

The Willamette Valley lies between the Coast Range and the Cascade mountains (Figure 3). The Valley is the heart of Oregon - the only stable, humid lowland in the state (Patton 1976:108). The Willamette River is the dominant feature and provides major drainage for the Valley. The Willamette River, dominated by winter rains and early spring snow melt, is the principal tributary to the Columbia River. The prominence of the Columbia River, which borders the Valley on the north, is striking. The Columbia's mean annual flow of 7,083 cubic meters per second (513,163 cubic feet per second) makes it the third largest river in the U.S. (Figure 4) (Patton 1976:142).

In detail the Valley's surface takes many forms. In some areas, the Eugene-Albany region, for example, the terrain is very smooth with almost an imperceptible slope. In other parts near Salem and Portland the Valley floor is hilly. The range in elevation is from a few meters above sea level at Portland, to approximately 152m (500ft) on the edges of the upper Valley (Dickens 1959:95).

The Willamette Valley is warmer, drier and less heavily forested than the Coast Range. Although taken over by agriculture today, the area was formerly dominated by oak savanna and prairies (Smith 1949). Dense forests were confined primarily to the mountain foothills and flood plains. Indians were responsible for most of the fires which created and maintained these open conditions (Kirkwood 1902; Morris 1934).

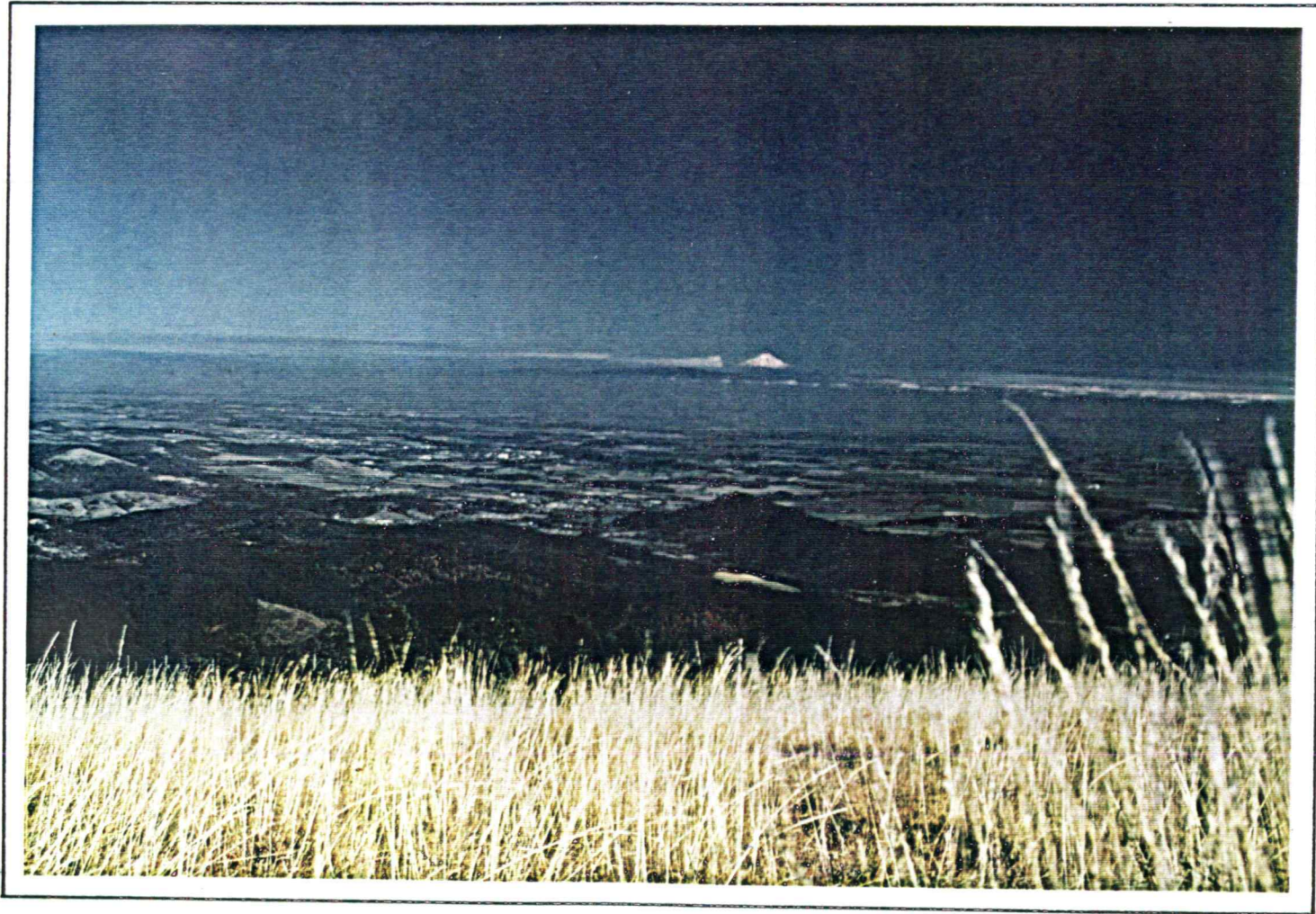


Figure 3. The Willamette Valley, from Mary's Peak. View is northeast with Mt. Jefferson in the background.





Figure 4. The Columbia River borders the Willamette Valley on the north and is one of the largest rivers in the United States.

Some of the large mammals of the valley are white-tailed deer (*Odocoileus virginianus*)(limited to the northwestern portion of the valley), black-tailed deer, mountain beaver (*Aplodontia rufa*), Northwest coast bobcat (*Lynx rufus*), and the Oregon cougar (*Felis concolor*) (Bailey 1936:335).

### The Cascade Range

The crest of the Cascade Range divides the western wetlands from the eastern dry lands (Figure 5). Located in the Cascades are glacier-carved volcanic peaks that rise more than 2,500m (8,202ft)(Patton 1976:108). The crestline of the Range averages a little more than 1,524m (11,360ft)(Baldwin 1976:53).

The Cascades are divided into the Western Cascades, which are older, more eroded and have summits more uniform in height than the High Cascades, which consist of more recent lava flows and lofty peaks.

The most famous Cascade feature is Crater Lake. Crater Lake is one of the clearest fresh-water lakes in the world. The Lake's blue water is situated in a "caldera", a depression formed by the collapse of a mountaintop - Mt. Mazama, in this instance (Figure 6). Howell Williams (1942) described Mt. Mazama as a peak rivaling Mt. Hood in size. Mt. Mazama erupted about 7,000 years ago and spewed forth 17.7 cubic kilometers (11 cubic miles) of pumice and ash, which was carried by winds in a northeasterly direction as far as Washington, British Columbia, and Montana (Cressman 1977:52).

Prior to the advent of glacial recession, there were extensive





Figure 5. The Three - Sisters in the High Cascades are part of the chain of mountains which form a climatic barrier between the east and west.



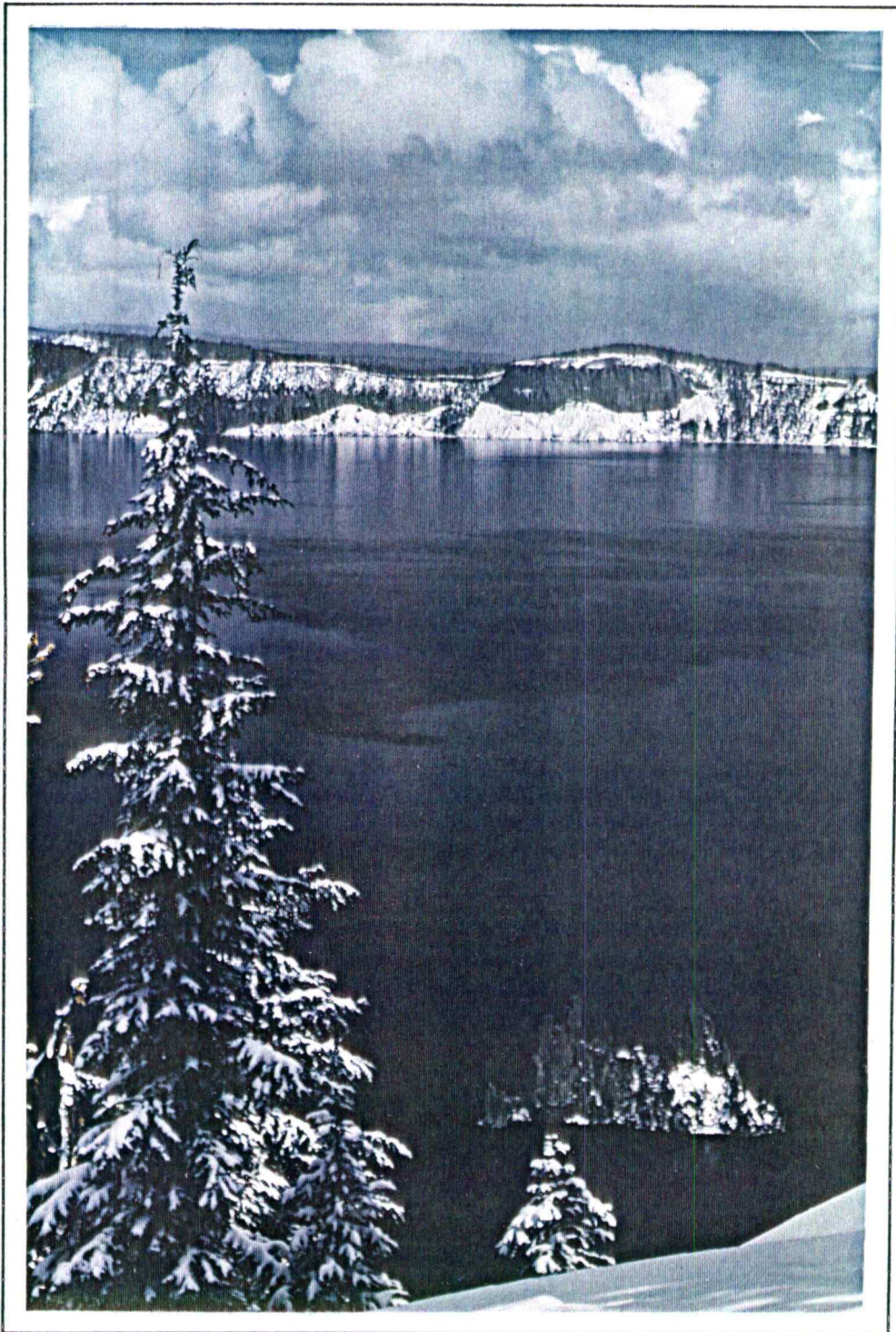


Figure 6. Crater Lake is situated in the depression formed by the collapse of Mt. Mazama.

glaciers in the High Cascades. At least once glacial ice spread from near Olallie Butte continuously southward to Mt. McLaughlin.

According to Thayer (1939), ice was 150-300m (492-984ft) thick on the summit near Olallie Butte. Large areas near Crater Lake (Mt. Mazama) were completely mantled by ice, and long glacial tongues extended down valleys to the east and west. Much of this ice came from the slopes of the ancient Mt. Mazama volcano (Williams 1942).

The Cascades act as a physical and climatic barrier. When westerly winds hit the Cascades the rising air expands and the air mass must drop its water. Since most of the air's moisture is released on the west side of the mountains, eastern Oregon is said to be in the rain shadow of the Cascade mountains (Figure 7). The moisture's effect in terms of vegetation, soils, and wildlife is substantial (Strahler 1976:328).

The natural vegetation of the Cascades includes Douglas fir, western hemlock, western-red cedar, big-leaf maple, incense cedar, sugar pine, Pacific madrone, and western yew. Ocean spray, Oregon grape, sword fern, and vine maple are the most common members of the understory. At moderate elevations are found Pacific silver fir (*Abies amabilis*) and in the higher elevations, mountain hemlock (*Tsuga mertensiana*)(between 1700-2000m)(Franklin 1969:71-73).

Two species of elk inhabit the Cascade forests. The Roosevelt elk (*Cervus canadensis roosevelti*) resides in the Western Cascades, while the Rocky Mountain elk (*Cervus canadensis nelsoni*) lives in the forests mostly east of the Cascades' crest. Another member of the

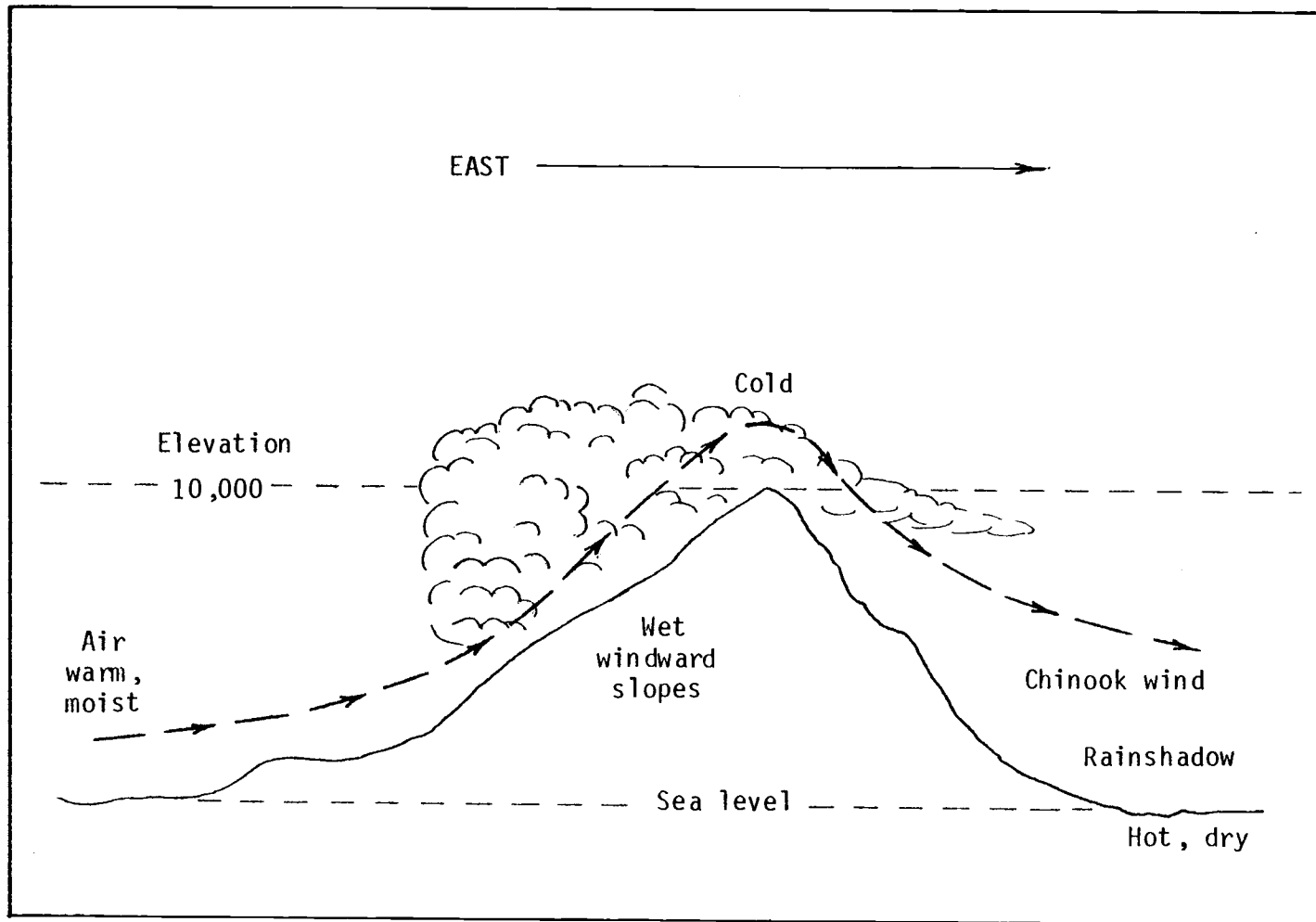


Figure 7. Cooling, condensation, and precipitation occur within a mass of air forced to ascend a mountain barrier.



cervid family, the mule deer (*Odocoileus hemionus*) is split into subspecies by the Cascade Range. The black-tailed deer (*Odocoileus hemionus columbianus*) inhabits western Oregon; the mule deer resides east of the Cascades. Both deer and elk have maintained large populations in the Cascades for many years (Ingles 1976:425,426).

Rabbits, squirrels, and grouse may also have been important to early man in the Cascades (Murray 1966:35). Bobcats, mountain lions, and coyotes are also present in the Cascades although the first two have decreased in numbers since prehistoric times.

### Southwestern Oregon

This region consists of rugged peaks much higher than those in the Coast Range (Figure 8). Local differences in elevation range from 600-1500m (1,969-4,921ft), with Mt. Ashland being the tallest peak at 2295m (7,530ft)(Patton 1976:108). To the west these mountains decrease in height until they meet the Pacific Ocean (Baldwin 1976:71).

The Rogue River Valley is the dominant feature and the River, whose waters are supplied by winter rains and early spring snow melt, provides the main drainage. The width of the basin reaches nearly 16.09km (10 miles) in the broadest northern part and narrows to about 3.22km (2 miles) near Ashland. The most striking character of this Valley is its contrast with the surrounding mountains (Dickens 1959:44).

The southwest region is extremely complex in terms of vegetation - combining elements of Californian, North Coast, and eastern floras, with a large number of species found only in the Klamath Mountains

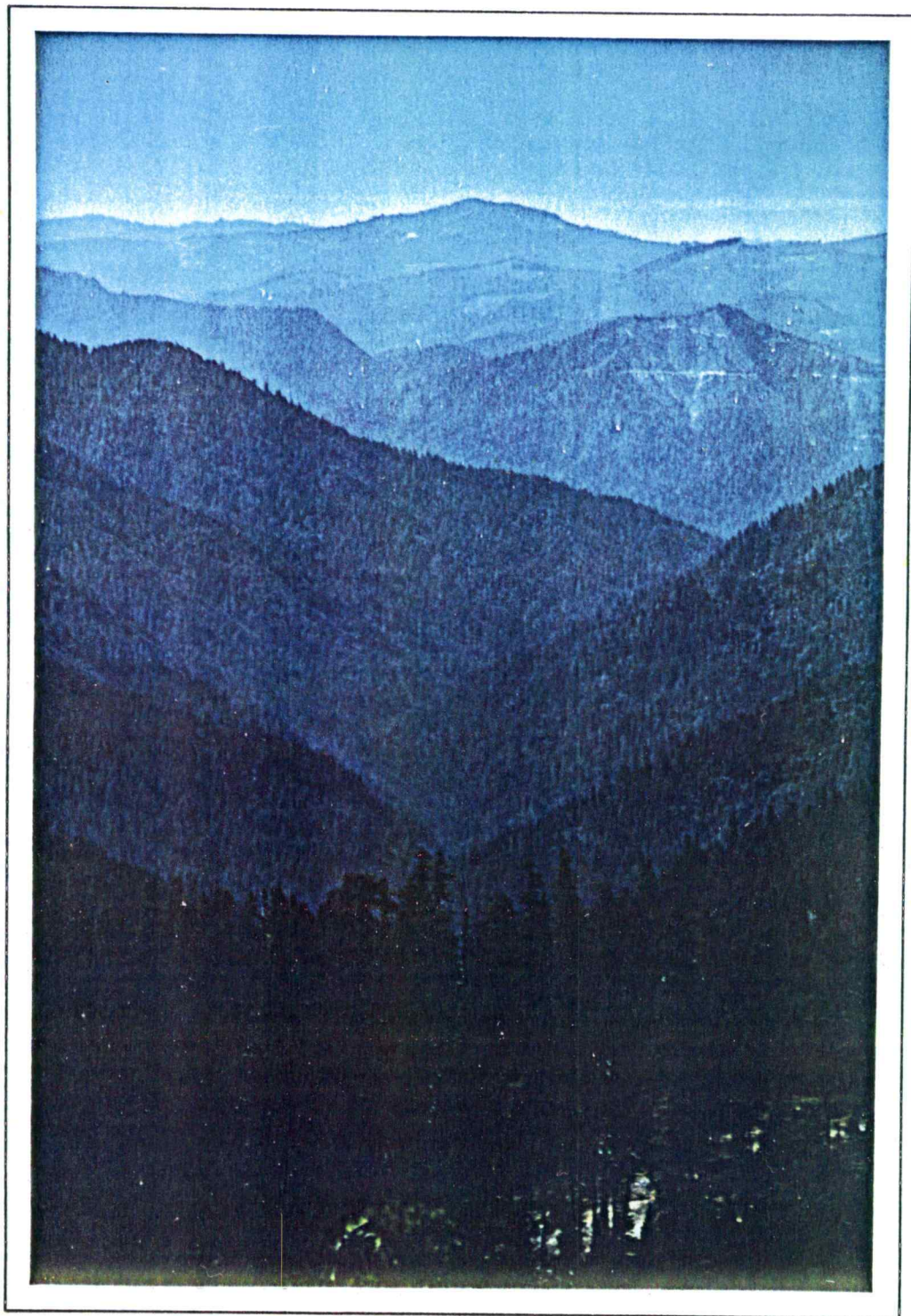


Figure 8. A series of ridges in the Klamath Mountains provide a glimpse of southwestern Oregon's rugged terrain.

(Whittaker 1960:61). This environment and floristic diversity combines with a long history of prehistoric and historic disturbances, primarily by fire, to produce an extremely varied array of communities (Franklin 1969:78).

Because of the complexity of vegetation, this area has been divided into three major forest zones by Franklin (1969):

- 1) Interior Valley Zone (Pines-Oak-Douglas Fir)
- 2) Mixed Evergreen Zone (Douglas Fir/cedar-Pines)
- 3) Mixed Conifer Zone (Douglas Fir-Pines-Incense Cedar-Firs)
  - a. White Fir Zone
  - b. California Red Zone (Franklin 1969:79)

Deer are abundant in the southwest. The many streams are inhabited by trout and other fresh waterfish, and were probably important in the diet of southwest Oregon's prehistoric peoples.

### The Columbia Plateau

The Columbia Plateau is the most diverse region in Oregon. Characterized by broad plateaus sloping gently toward the Columbia River, the Plateau includes all of the hilly and mountainous terrains of the northeast; elevations range from less than 100m (329ft) in the Umatilla area to about 3000m (9,843ft) in the Wallowas (Patton 1976:108). The Deschutes, John Day, and Umatilla Rivers, as well as others, have been entrenched into the lava plateau to form steep-walled canyons (Figure 9)(Baldwin 1976:83).

The Columbia Plateau, which lies in the northeast corner of the state, is often referred to as the Deschutes-Umatilla Plateau. It is a true lava plateau. In the west near the Ochoco and Umatilla Moun-



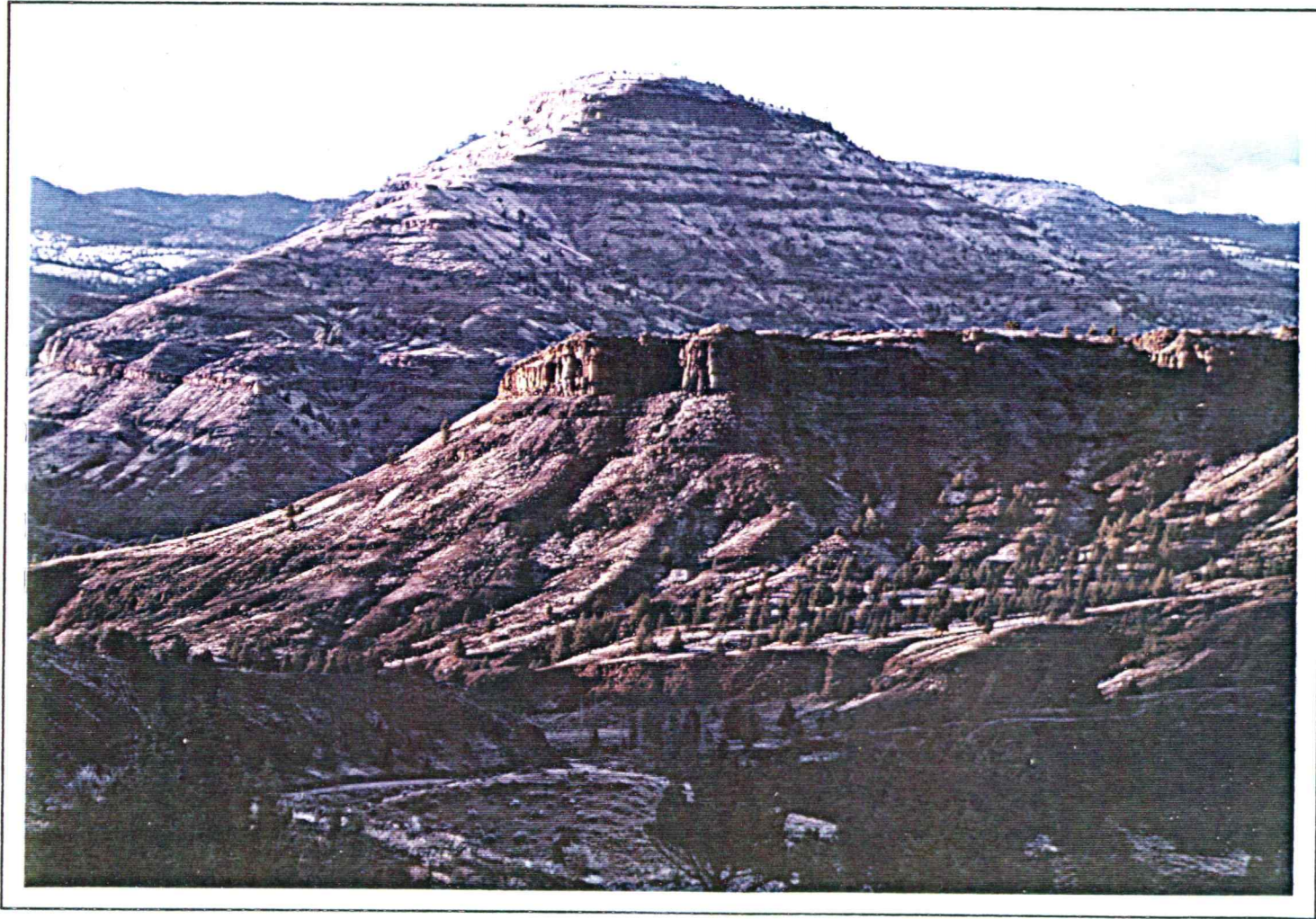


Figure 9. The John Day River has cut through resistant stone to form steep-walled canyons which are common on the Columbia plateau.

tains the surface is part of an old plateau which has been uplifted, folded and faulted. To the east lie the Aldrich and Strawberry Mountains; beyond are the rugged Greenhorn and Elkhorn Mountains, the latter showing signs of glaciation. The Wallowas in the northeastern corner were mantled with the most extensive glaciers in Oregon outside of the Cascade Range (Crandell 1965:349).

The Columbia Plateau region is characterized by bunchgrass and sagebrushes (Figure 10). Because the vegetation in most of this area is known as desert, high desert, or northern desert shrub (Franklin 1973:51), the region is broadly characterized as a steppe.

The steppe region can be divided into the forest steppe, characterized by western juniper (*Juniperus occidentalis*), and three other zones: the steppe without big sagebrush (*Artemisia tridentata*) as a component, the shrub steppe, occupying the center of the Columbia Basin, in which big sagebrush and perennial grass dominate, and desert shrub (Franklin 1973:51).

The grasses of the plateau steppe provide excellent browse for the abundant mule deer. The pronghorn antelope, which feeds mainly on sagebrush, various grasses and desert plants, was an important resource for prehistoric peoples. Although the antelopes' range is limited to the southern plateau (Ingles 1974:437), mountain sheep (*Ovis canadensis*) and mountain goats (*Oreamnos americanus*) are found in the mountainous regions of the Columbia Plateau.

### The Great Basin





Figure 10. Most of the Columbia Plateau's steppe vegetation consists of bunchgrass and sagebrush.

The Great Basin is characterized by its internal drainage pattern. The basic features are long narrow ridges or mountain ranges, separated by low basins and include the high lava plains extending from the Deschutes River near Bend to the upper Malheur River and from the Blue Mountains to the Basin and Range region. The Basin and Range region is east of the southern Cascades and south of the High Lava Plains. The average elevation of the basins is 1200m (3,937ft) and the crests average 1367m (4,511ft)(Fennemen 1931:330).

Many ranges are steep on the east side and gently sloping on the west side as a result of block faulting and tilting. The highest and easternmost range is Steens Mountain 2,967m (9,734ft) above sea level (Figure 11)(Baldwin 1976:113).

The most interesting aspect of the region is the fluctuation in water level, from dry flats to extensive lakes. There is evidence of past shorelines formed during the last glacial advance when lake levels were as much as 107m (350ft) higher than the present ones (Antevs 1925: 70). Presently, Klamath Lake is the largest body of water in the region and Summer Lake is the next largest (Baldwin 1976:113).

The eastern margin of Catlow Valley (near Blitzen and Roaring Springs) is covered by lake beds which lap against a low fault scarp that forms the western margin of Steens Mountain. Prominent shorelines are present along this scarp, where waves from the wide expanse of Catlow Lake carved numerous benches in the resistant stone (Figure 12). The lake in Catlow Valley was one of the largest expanses of water in southeastern Oregon during glacial times (Baldwin 1976:125).



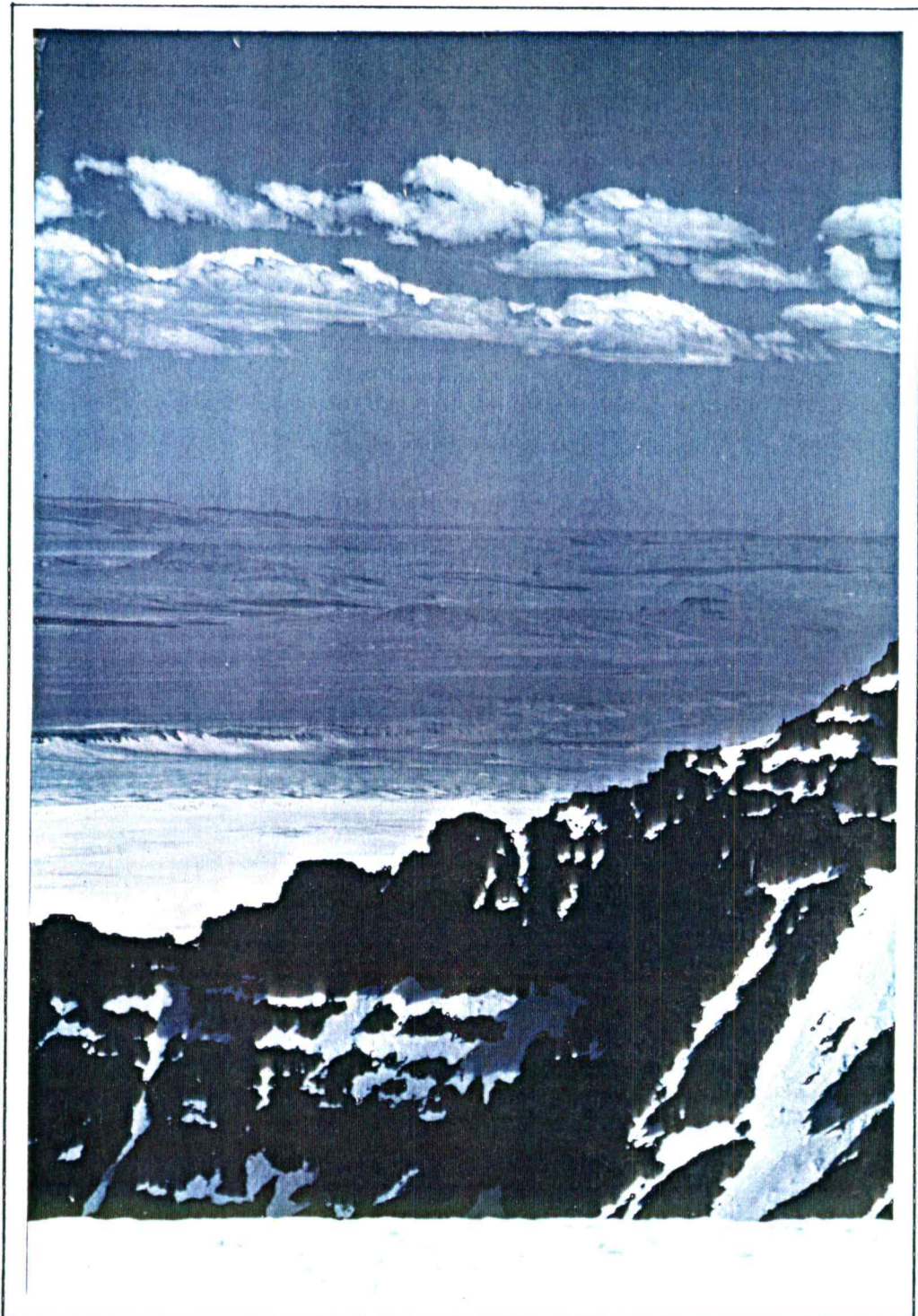


Figure 11. Overlooking the Alvord Desert from Steens Mountain in the Great Basin.





Figure 12. Looking across Catlow Valley from Catlow Cave archaeological site. The Valley was once a vast lake during glacial times.



The Owyhee Uplands region is included in the Great Basin and is characterized by an uneven plateau that is older than the Basin and Range region. The rock is mainly old lava flows which were uplifted and warped. The highest point is Mahogany Mountain at 1989m (6,526 ft); the lowest point is 640m (2,100ft) on the Snake River (Patton 1976:108).

In the Great Basin the later stages of the last glacial advance were characterized by increased rainfall and lowered temperatures. These decreases reduced the evaporation rate; as a result, surface runoff created many large freshwater lakes in previously dry basins. Such temporary cooler and wetter (pluvial) conditions are evident in southeastern Oregon. Pluvial stages are considered to coincide with glacial advances, whereas dry interpluvial conditions occurred during interglacial stages (Spencer 1969:29).

The majority of the state's lakes are located in the Great Basin region. These lakes are only remnants of the once vast lakes of the Basin and Range regions. There is reason to believe that the basin's waters once produced a much richer resource of freshwater fish than today; for example salmon were found in the Klamath Lake area during recent times but are no longer present (Miller 1965:571).

Oregon is situated in the Pacific Flyway, one of four waterfowl routes out of Alaska and Canada. The Great Basin's lakes attract tremendous numbers of waterfowl and other avian species. It is believed that most North American birds occupy the same areas today as they did during post-glacial times; however, the fossil record pro-

vides evidence of a southward shift of habitat ranges during the glacial period (Selander 1965:531).

The pronghorn and mule deer, as well as the jack-rabbit, are found in considerable numbers in this area because they feed on desert plants. There is reason to believe that all three of these mammals were important to the early human populations in the Great Basin. The elimination of bison occurred prior to white settlement but skulls are still occasionally found in the area. Indian hunting pressure, disease, or environmental changes may have eliminated the bison (Patton 1976:154).

The vegetation areas of the Great Basin are similar to those of the Columbia Plateau. The main categories are steppe and shrub steppe. Sagebrushes, which are ubiquitous in southeastern Oregon, and grasses dominate the region. In high elevations on Steens Mountain quaking aspen (*Populus tremuloides*) occurs. In these communities the understory is generally lush, which is unusual for the Basin and Range region (Franklin 1969:161).

### CHAPTER III

#### EARLY MAN IN OREGON

In this chapter archaeological sites from the various regions of Oregon will be examined. It is difficult, if not impossible, to tell the prehistory of a region from one site; yet, individual archaeological sites provide specific sets of information about the development of local cultures. The intent is to present a sampling of data gathered in each region; for more in-depth information the reader should review site reports. Reports on archaeological work are filed with the funding agency, but many are available at public libraries. A federal repository is the best place to find information on archaeological projects funded with federal government monies. A list of federal repositories in Oregon is listed in Table 2.

The sites discussed have made important contributions to our understanding of the prehistory of the state, and have shed light on the total picture of early humans in the New World. The areas discussed are the same as those covered in the chapter on the environment, with the addition of the Lower Columbia, which is a unique culture area. A list of sites discussed is presented in Table 3, and the location of these archaeological sites is shown in Figure 13.

#### The Coast

The coast is relatively unknown territory in Oregon's prehistory.

TABLE II. LIST OF FEDERAL GOVERNMENT LIBRARY REPOSITORIES

Ashland	Portland
Southern Oregon State College Library, 1250 Siskiyou Boulevard (97520) (503)482-6445	Lewis and Clark College, Aubrey R. Watzek Library, 0615 SW Palatine Hill Road (97219) (503)244-6161, ext. 406
Corvallis	Library Association of Portland, Social Science and Science Dept., 801 SW 10th Ave. (97205) (503)223-7201
Oregon State University Library, Documents Division (97331) (503)754-2761	Portland State Univ. Library P.O. Box 1151 (97207) REGIONAL DEPOSITORY (503)229-3673
Eugene	Reed College Library, 3203 SE Woodstock (97202) (503)771-1112, ext. 260
University of Oregon Library Documents Section (97403) (503)686-3070	U.S. Dept. of Energy, Bonneville Power Adm. Library, P.O. Box 3621 (97208) (503)234-3361
Forest Grove	Salem
Pacific University Library (97116) (503)357-6151, ext.305	Oregon State Library, State Library Building (97310) (503)378-4368
La Grande	Oregon Supreme Court Library (97310) (503)378-6030
Eastern Oregon College, Walter M. Pierce Library (97850) (503)963-2171, ext. 240	Willamette Univ., College of Law Library, Ferry & Winter Sts. (97301) (503)370-6387
McMinnville	Willamette Univ., Main Library 900 State St. (97301) (503)370-6312
Linfield College, Northup Library (97128) (503)472-4121, ext. 261	
Monmouth	
Oregon College of Education Library (97361) (503)838-1220, ext. 418	

TABLE III. LIST OF SITES DISCUSSED IN CHAPTER III.

- |                      |                       |
|----------------------|-----------------------|
| a) The Dalles        | b) Fort Rock Cave     |
| c) Catlow Cave       | d) The Lower Columbia |
| e) Tillamook         | f) Umpqua-Eden        |
| g) Columbia/Portland | h) Applegate          |
| i) Cascadia Cave     | j) Odell Lake         |
| k) Mill Creek        |                       |

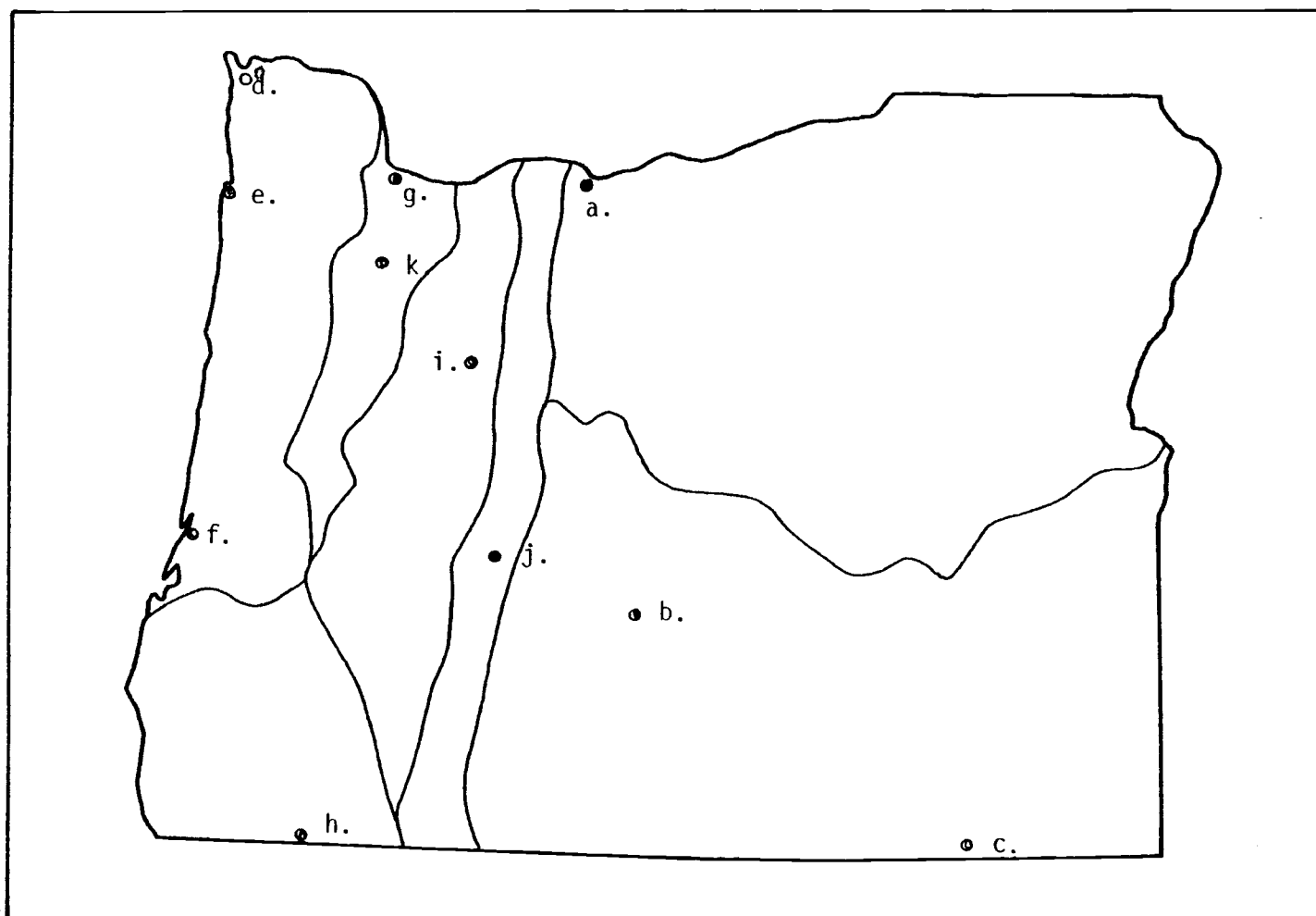


Figure 13. Location of archaeological sites discussed in Chapter III. Key to map on page 46.

Although coastal resources had surely provided all the necessities for cultural development for thousands of years, the evidence of coastal habitation goes back only 3,000 years. There have been a good number of archaeological sites excavated on the coast, but only two, the Tillamook and Umpqua-Eden sites, provide helpful insights into the earliest known period of occupation. Luther Cressman and a small crew from the University of Oregon excavated the Tillamook sites. Included in the party was Thomas Newman, who later published a report of the findings. The Umpqua-Eden site is still being excavated by Richard Ross and a small crew of Oregon State University field school students.

#### Umpqua-Eden

Archaeology began at this site in 1974, with limited excavations by Peter Stenhouse, an amateur archaeologist. When Stenhouse uncovered a house floor, he contacted Dr. Ross. In 1978 the Anthropology Department at OSU decided to hold an archaeology field school at the site with Richard Ross in charge. Since one house floor was already discovered, Ross hoped to uncover and accurately date other house floors (Richard Ross, Personal Interview, August 1979).

Artifacts suggest that the residents of Umpqua-Eden were very well adapted to the area and its resources. The location, on an estuary in a coniferous forest (Figure 14), provided the peoples with unlimited access to a variety of food sources. A high percentage of artifacts reflect a hunting culture with only a minor dependence on plant foods. Faunal remains indicate that animals were hunted on a regular basis. Young harbor seal bones are abundant. Ross believes that during April



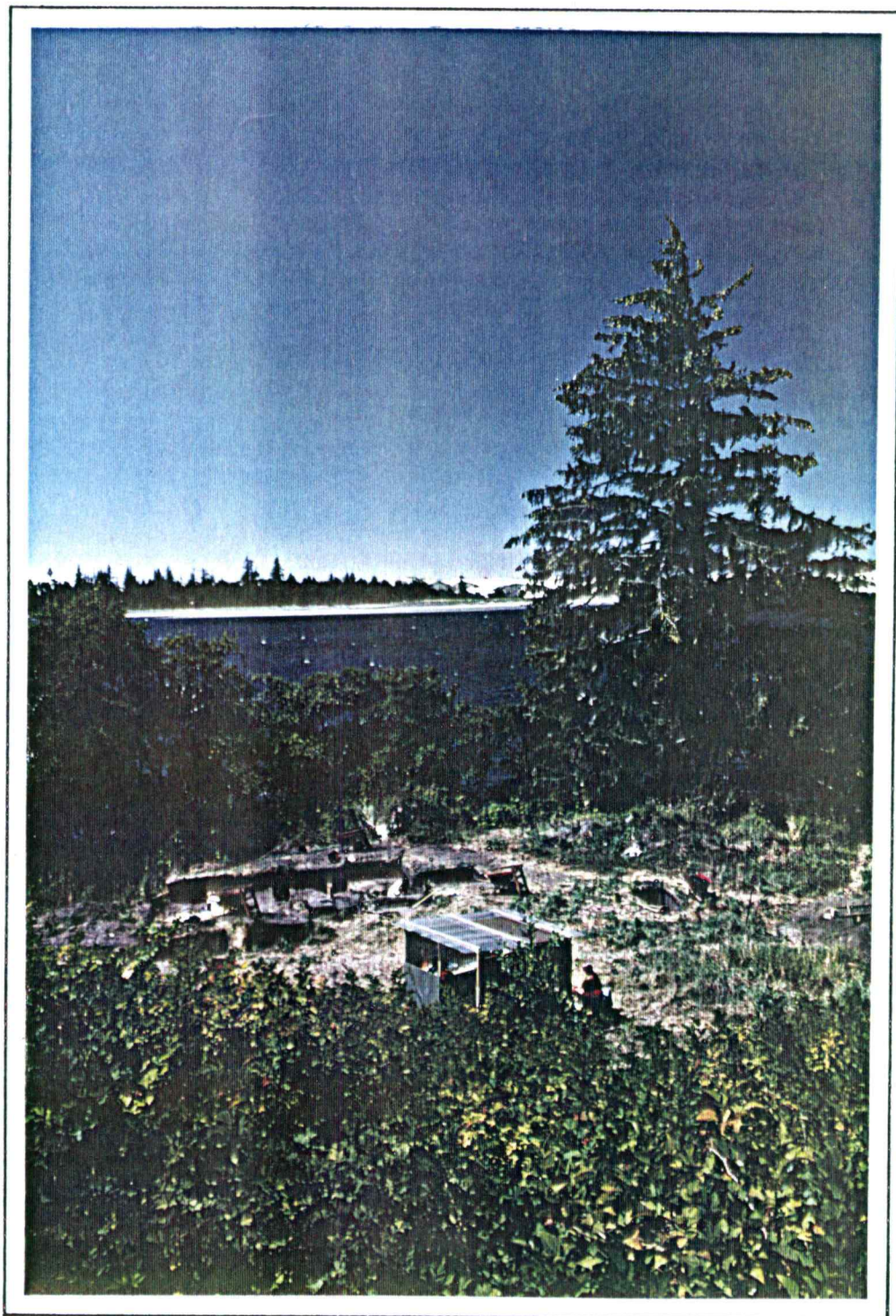


Figure 14. The Umpqua-Eden archaeological site is located on the Umpqua River adjacent to an estuarian environment.

and May, when harbor seals give birth to their single pups, people were living at the site and exploiting an easily accessible resource (Richard Ross, Personal Interview, August 1979). The fact that the people at the mouth of the Umpqua were returning year after year to exploit this resource indicates a sizable seal population. Clams, crab, and mussels supplemented the diet of these peoples.

Their disposal of shells has worked to the advantage for the archaeologists in that shells change the acidity of the soil and aid in the preservation of bone. The river, mudflats, sandbars, ocean, and upland woods were all within a few miles of this site; therefore, any or all of these resources could be easily exploited. The rich maritime resources of the Oregon coast were exploited so fully during this seasonal occupation, that the hunting of land mammals occupied a minimum of the subsistence activities (Richard Ross, Personal Interview, August 1979).

The majority of uncovered artifacts are worked bone, such as harpoon heads, projectile points, needles, fish hooks, figurines, wedges and pendants (Figure 15). Stone tools, made mostly of local materials, were present to a lesser degree. Some tools made of obsidian found east of the Cascades are present, however, and indicate a trade mechanism extending from eastern Oregon (Richard Ross, Personal Interview, August 1979).

### Tillamook Prehistory

On Netarts Sand Spit in a meadow enclosed by conifers and brush





Figure 15. Bone artifacts such as this pendant formed the major portion of the human occupational record at Umpqua-Eden.

lies an archaeological site which had been occupied for the last 550 years. Several house pits were either tested or excavated by Luther Cressman. Radio-carbon dates indicate a series of occupations at the site.

The earliest living area, dating back to 1400 A.D., is situated under extensive "middens" (refuse piles), as on the Umpqua the presence of shells provided good bone preservation. Thomas Newman (1959:11) writes that the large bones of deer and elk were utilized almost exclusively in the manufacture of artifacts; in fact, only two stone projectile points were found at the site.

The faunal remains show a generally greater dependence upon both large land and sea mammals. Other mammals utilized to a lesser extent were bear, wildcat, cougar, and waterfowl, of which Dusky Canadian Geese were the most actively hunted (Newman 1959:33).

In all, five house pits were tested, ranging in date from 550 to 175 years ago. The most recent occupation was by the historic Tillamook Indians. Although this is a fairly recent site, it is the oldest to date on the northern Oregon coast.

### The Willamette Valley

Halfway up the Willamette Valley near the I-5 interchange to Salem lies an archaeological site which has provided valuable information about early human occupation of the northern Willamette Valley. The site was found in what is now called Hager's Grove, adjacent to Mill Creek, and is one of the few excavations to date in the northern Will-

amette Valley. Two sites were discovered at this location and later excavated by Richard Pettigrew, Oregon State Highway Archaeologist (Richard Pettigrew, Personal Interview, April 1980).

Mill Creek has been a meandering stream for thousands of years. The sites were found along side of where the creek once flowed; apparently, the site was used over and over again in phases, beginning 4,000 years ago and ending 400 years ago. Because a living floor was uncovered but structures have not been found, Pettigrew suggests that this was a warm-season camp (Richard Pettigrew, Personal Interview, April 1980).

The site is similar in some respects to southern Valley sites, but in the southern Valley mounds are present and there is a build-up of soil (alluvial material). In the northern Valley the streams have down-cut through layers of earth and are well entrenched. One trait found in the southern Valley which was not present at the Mill Creek site is the abundance of deeply serrated projectile points (Richard Pettigrew, Personal Interview, April 1980).

An interesting aspect of the excavation of Mill Creek sites is the documentation of early exploitation of plant foods. Charred camas bulbs, hazelnuts, acorns, and choke-cherry pits were uncovered. Also found was a 3,000 year-old oven feature of the type used by Indians of the Pacific Northwest in preparation of camas (*Camassia quamish*). Although this discovery is no surprise to archaeologists, the oven and a mortar (Figure 16) excavated at the site provide proof that plant foods were an important item in the subsistence of early Willamette Valley



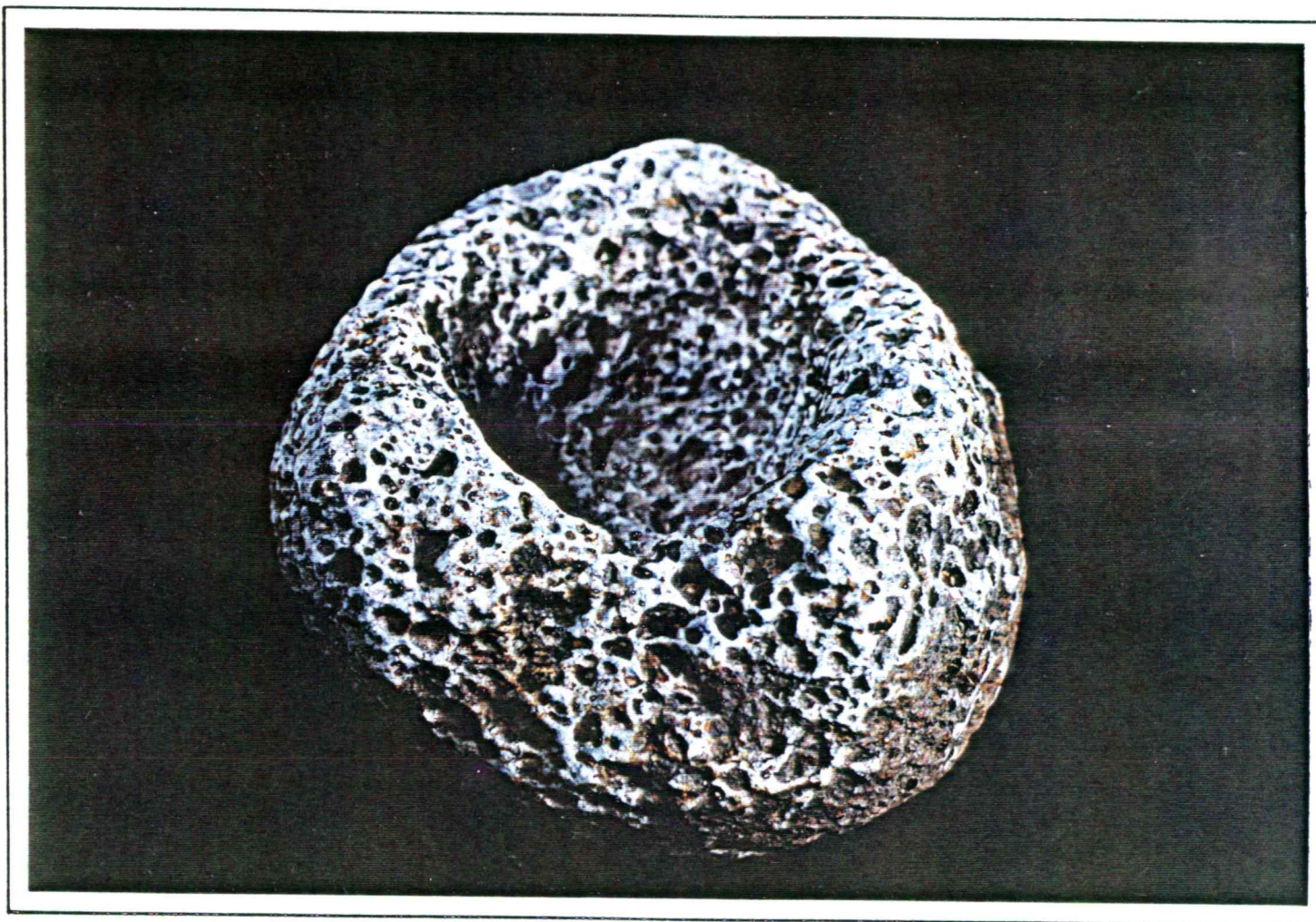


Figure 16. This mortar provides the earliest evidence of food processing in the Willamette Valley, approximately 3,000 years ago.

Indians (Richard Pettigrew, Personal Interview, April 1980).

One cache of projectile points was discovered. Projectile points and scrapers were the most abundant stone tools, made of both cryptocrystalline and obsidian. These local materials were probably stream-rolled pebbles from the McKensie River (Richard Pettigrew, Personal Interview, April 1980).

### The Cascade Range

Limited archaeology has been done in the Cascade region of Oregon. The most significant site, Cascadia Cave, dates back 8,000 years and was excavated in 1964 by Thomas Newman of the University of Oregon Anthropology Department. Another important site in the Cascades is Odell Lake, where Luther Cressman did limited excavation in 1937 (Newman 1966, Cressman 1948).

### Cascadia Cave

Cascadia Cave is a rockshelter located on the south Santiam River in the western Cascades. The presence of Cascade-type projectile points (Figure 17)(Butler 1961), an association with petroglyphs (Figure 18), and the evidence of a hunter-gatherer society earn this cave a unique place in Oregon's prehistory (Newman 1966).

The people who lived at Cascadia Cave were hunters and gatherers in a forest environment. Deer were by far the most utilized mammals, accounting for almost 98 percent of the mammals hunted (Newman 1966:38). Other mammals may have been used, but Peter Murray (1966) believes,

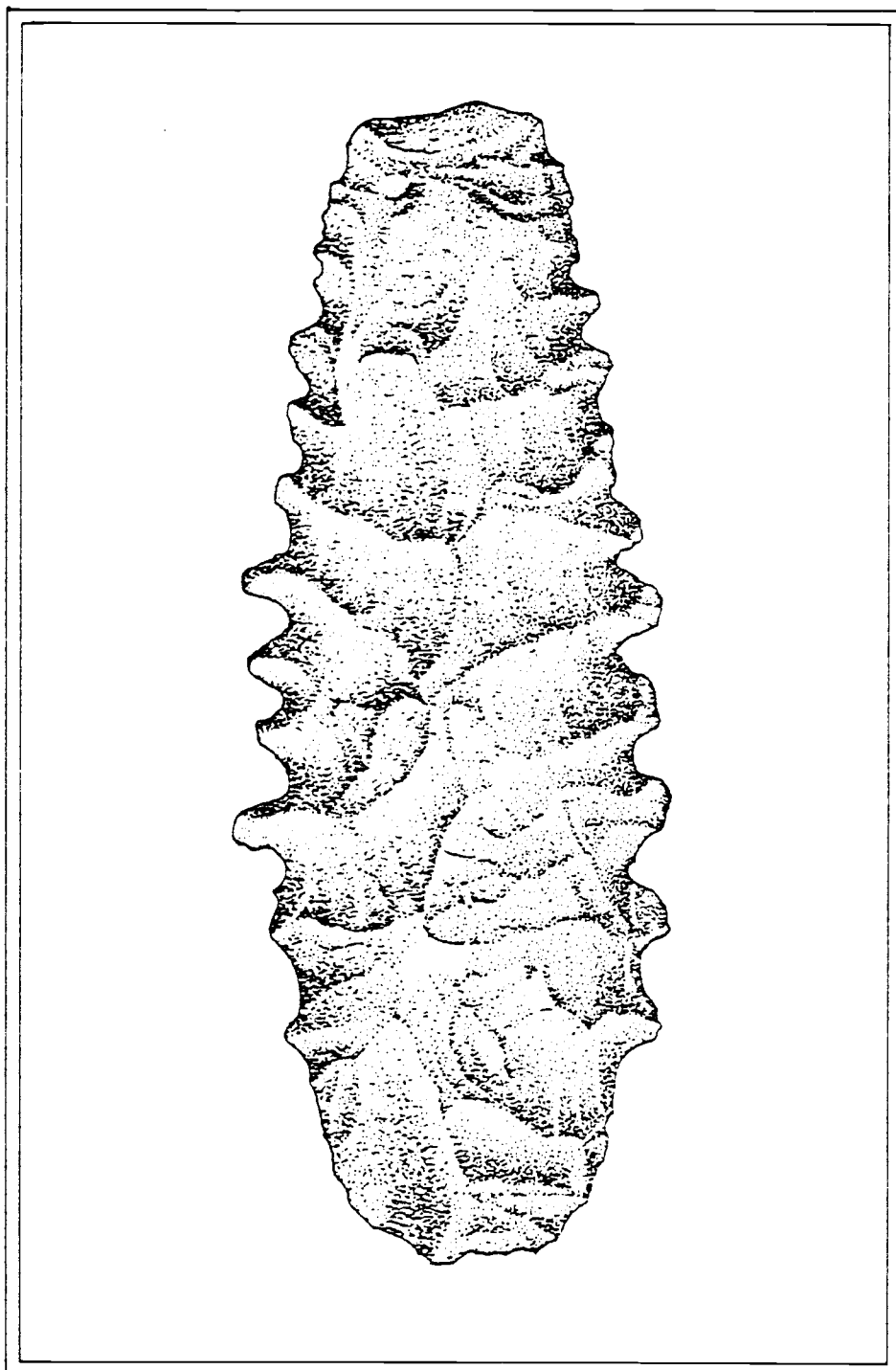


Figure 17. The Cascade projectile point is thought to be diagnostic of a cultural tradition which extended from the Columbia Valley to South America; this tradition dates back 8-12,000 years.



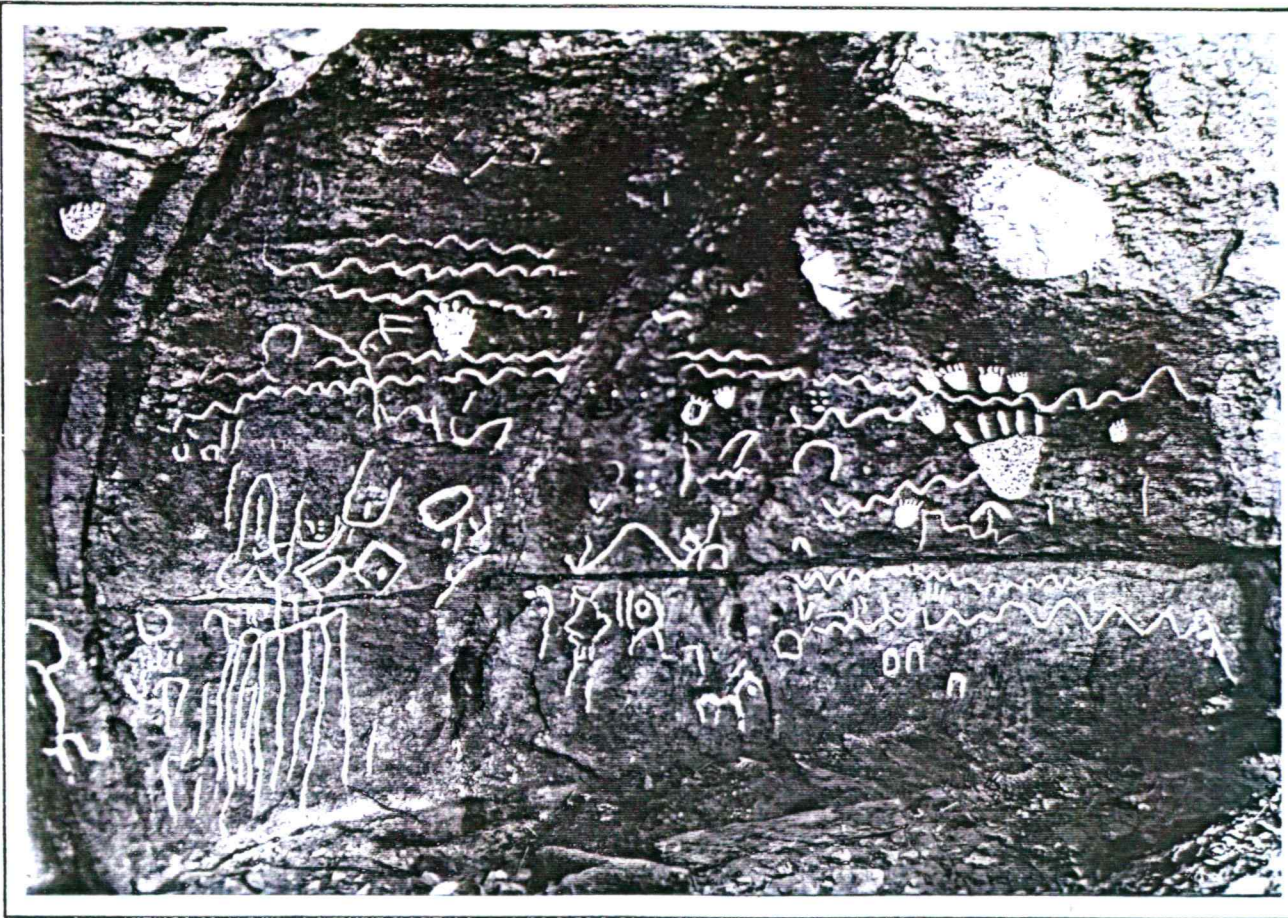


Figure 18. Petroglyphs, such as these found at Cascadia Cave puzzle many archaeologists, but may have been early peoples first attempts at leaving a written history.

"It is probable that bones of more delicate species decomposed in the damp fill" (Murray 1966:40).

The most unusual aspect of this site is the absence of fish remains, for trout, salmon, and steelhead runs occur on this section of the river. Newman (1966) presents two hypotheses for this absence:

- 1) That the Willamette Falls blocked fish runs until more recent times.
- 2) That the site was seasonally occupied during the spring and summer; these fish were more abundant in the winter (Newman 1966:29).

Butchering practices and Murray's (1966:40) theory of delicate bone decomposition may also account for this oddity.

Newman is certain that this was not a permanently occupied site; faunal remains and the presence of hazelnuts indicate a spring and summer occupation. As a variety of plant foods, such as blackberry, salmonberry, wild rose, wild strawberry, skunk cabbage, salal and hazelnut are abundant in the area during the spring and summer, it can be assumed that these plants supplemented the people's diets (Newman 1966:10,28).

Although bones were present, they were not used as tools. Stone was preferred; drills, scrapers, ground stones, hammerstones, projectile points, and knives were among the stone tools excavated. The preference for making stone tools probably led these peoples to travel east to known sources of desirable materials (Newman 1966:15,18).

#### Odell Lake Site

This site was discovered by the landowner during construction of

a lakeside lodge in 1937. The managing editor of the Bend Bulletin later brought the site to Luther Cressman's attention (Cressman 1948).

Not much is known about the site other than the fact that artifacts were located below Mt. Mazama ash. The ash has been dated at about 7,000 years ago (Cressman 1977:52). Dr. Ira Allison, an Oregon State University geologist, inspected the site and confirmed that the ash layer was the original, undisturbed ash fall from the eruption of Mt. Mazama (Cressman 1948:58).

The Odell Lake site was believed to be a camp site. It is probable that humans utilized the Cascade resources only seasonally during the spring, summer or autumn and travelled to other areas in the winter months, when the people subsisted by hunting and gathering, with a strong dependence on wildlife resources (Cressman 1948:58).

### Southwestern Oregon

Adjacent to the Applegate River in southwestern Oregon lie the remains of peoples who have continuously occupied the banks of the River for some 8-10,000 years. The story of this occupation begins with a seasonal camp on a terrace which once met the Applegate River prior to down-cutting of the River through layers of earth to its present level. Several sites were discovered while Oregon State University archaeologists led by Dr. David Brauner were surveying the pool area of the proposed Applegate Dam. The oldest Paleoindian site was tested and later excavated on the basis of one surface flake thinned from a stone tool (David Brauner, Personal Interview, April 1980).

The earliest occupation of the Applegate was probably by provincial peoples who came to the area, liked what they found, and decided to stay and exploit the resources of the area. Although they fashioned crude stone tools from native materials (Figure 19), a high frequency of projectile points and a low frequency of edge ground cobbles (Figure 20) suggest that they were gatherers as well as hunters. Hunting and fishing probably still provided their major food supply. This site indicates the beginning of a food processing technology on the Applegate (David Brauner, Personal Interview, April 1980).

The only identifiable faunal remains were three bone fragments from deer. Although it is not certain because of poor bone preservation and vegetation changes, it is probable that humans were hunting a variety of land mammals, fishing, and gathering plant foods. Possible plant foods found in the area are acorns, camas, seeds, and pine nuts (Sapir 1907:257).

Early humans on the Applegate probably found a very attractive environment in which to settle (Figure 21). Archaeological sites are located on terraces today because of the steady down-cutting and shifting of the River, which left behind terraces underlain by resistant stone. The three sites provided good locations for habitation, with their protection from the wind, exposure to sunlight, and easy access to the river. Laboratory analysis of these sites is still underway and should reveal much about past lifeways on the Applegate (David Brauner, Personal Interview, April 1980).





Figure 19. The earliest inhabitants along the Applegate River utilized native materials in manufacturing stone tools, such as quartz, which was used to make this knife.



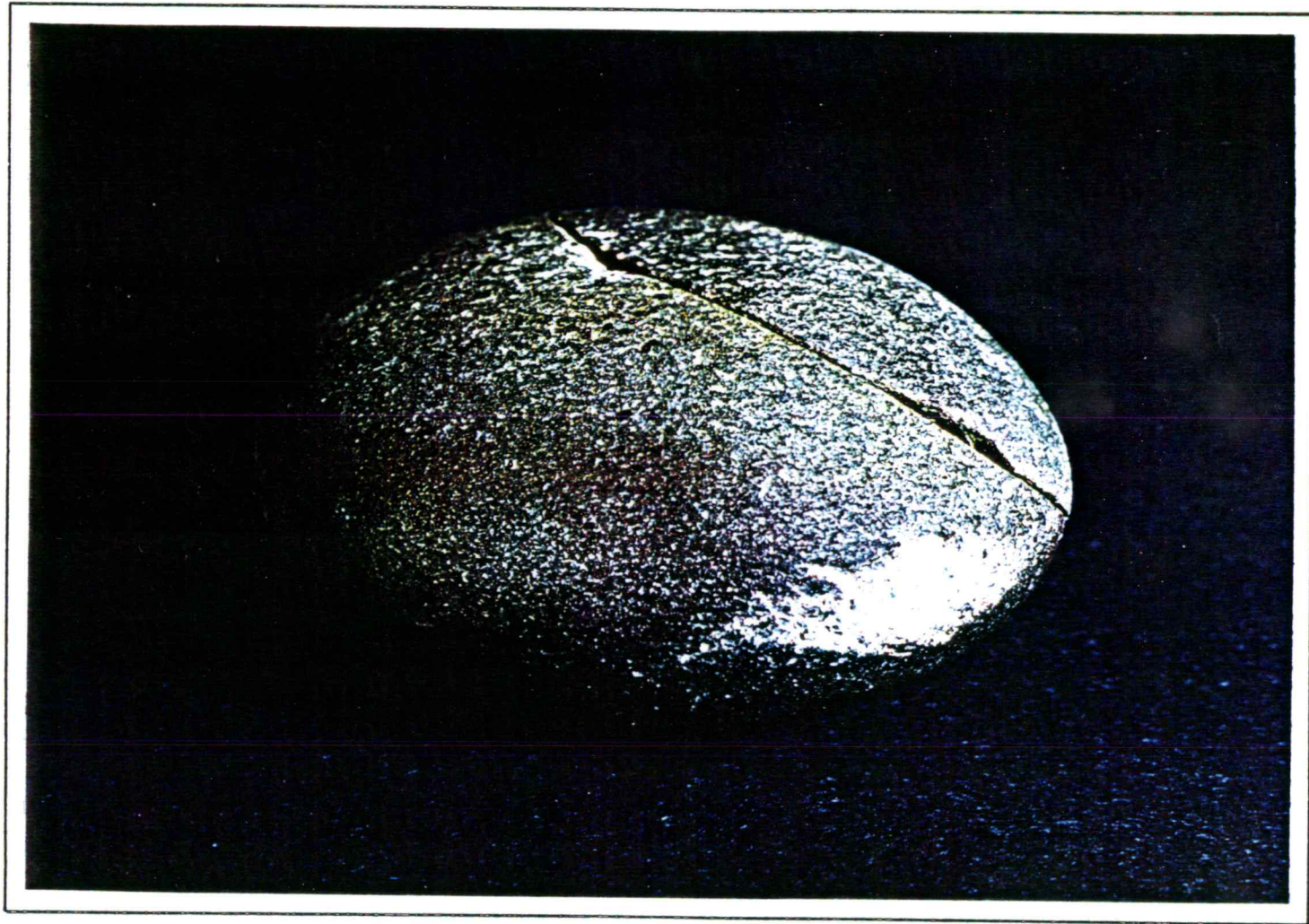


Figure 20. The edge-ground cobble was an early food processing tool and may have preceded the use of the more refined pestle.



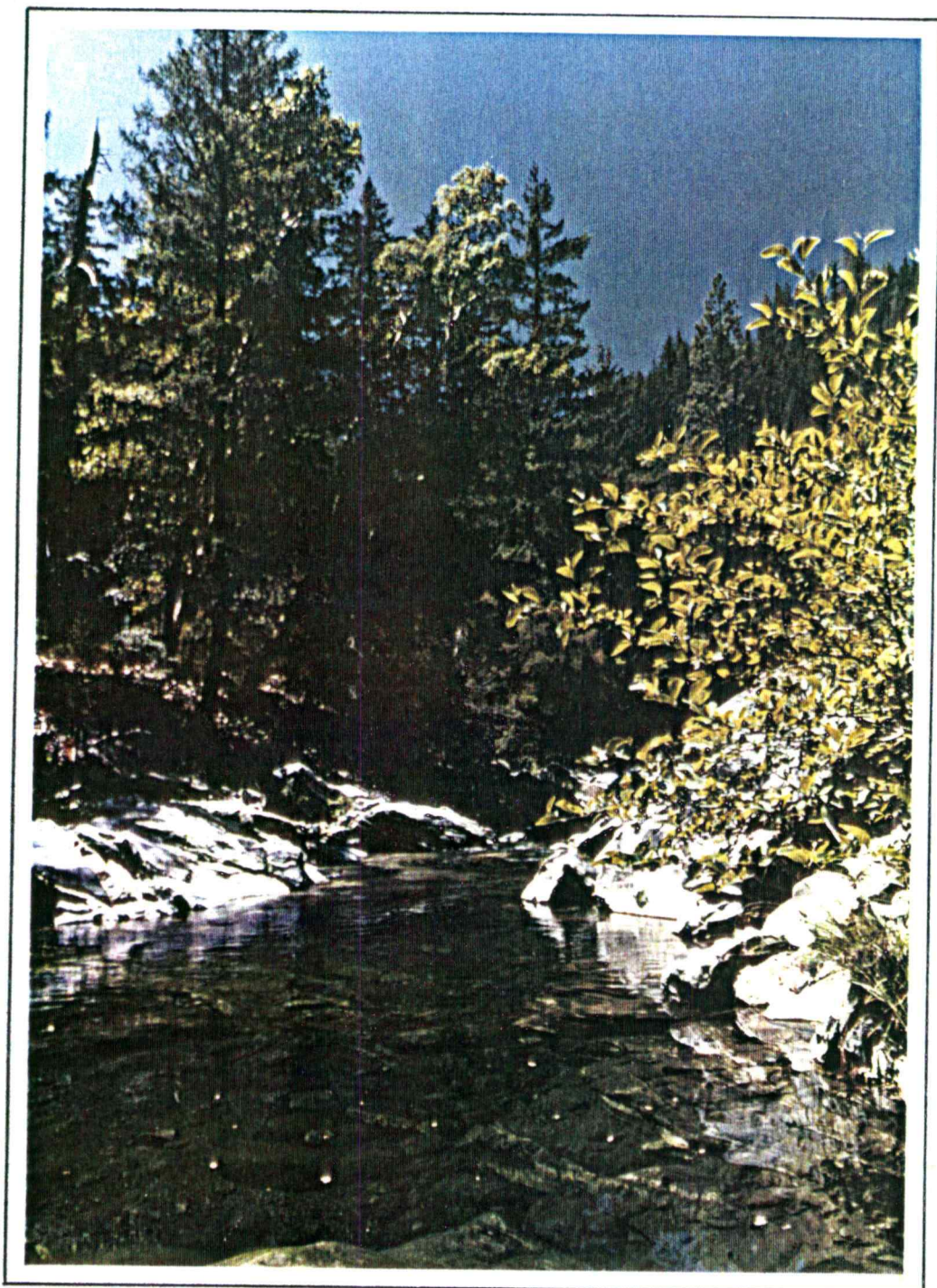


Figure 21. The Applegate River offered an attractive setting for its early occupants.

In 1953 Luther Cressman and a field party from the University of Oregon began a salvage archaeology program on the Columbia in the area where The Dalles Dam was to be constructed. This research effort proved very fruitful and established a firm chronology of occupation of the Lower Columbia in The Dalles region. It is clear that riverine adaptation in The Dalles area was developed between 11 and 10,000 years ago (Cressman 1960:66).

The Dalles, situated on the Columbia Plateau, has unique environmental features. The Columbia Gorge acts as a funnel through which the moist, cool, Pacific air passes and the winds can at times become extremely strong and disagreeable. The Dalles actually lies on the border between the western wetlands and the eastern dry lands. The true Columbia Plateau is characterized by less precipitation than that which The Dalles receives (Cressman 1960:13).

Two main sites were excavated, referred to as WS 1 and WS 4 because of their close proximity. Cressman (1960) presents the archaeological record of The Dalles in a sequence of three major periods: Early (11,000-7,500 years ago), Transitional (7,500-5,000 years ago), and Late (6,000 - Historic contact)(Cressman 1960:59-61). The hallmarks of the early period are the girdled bola (a hunting weapon), the raptorial birds (hawks, eagles, etc.), the burin (used to engrave stone and bone), and bone and antler tools. These hallmarks disappear approximately 7,500 years ago. The change in artifact types is gradual from early to middle. The middle period is characterized by choppers, cutting tools, projectile points and knives. The late period is marked

by development of stone sculpture (Figure 22), of carving and incising bone, and of a variety of projectile point styles (Cressman 1960:59-62).

Harbor seals once were found on the Columbia as far as The Dalles. Harpoon heads found at The Dalles site leads Cressman to conclude that the peoples were hunting this marine mammal. It appears that fishing was the major economic activity of the inhabitants of The Dalles area. Dip-nets (Figure 23) and seine nets were used most, but spearing also was practiced (will be discussed in more detail in Chapter VI). Salmon, sturgeon, lamprey, and smelt were taken. To the staple fish diet were added berries, roots, and game (Cressman 1960:35).

A most interesting aspect to which Cressman can offer no hypothesis is the absence of bones after the early period. It has been suggested that this absence may coincide with the ceremonial disposal of bones in the river, but as Cressman states, "No Perry Mason among the anthropologists available has come up with an explanation" (Cressman 1960:69).

The Dalles has played an important function in establishing a definite, long-term occupation on the Columbia Plateau in Oregon. This area developed into a very important trade area during both prehistoric and historic times. The obstacle presented to travel on the Columbia by the five-mile rapids no doubt played a considerable part in the cultural development of this area. The rapids not only were an obstacle to man but also presented an obstacle to fish and harbor seals. When these resources became concentrated at the rapids, so did human beings.

### The Great Basin





Figure 22. The appearance of stone sculpture represents the beginning of non-functional art forms along the Columbia River.





Figure 23. This photograph, taken at The Dalles in 1899, demonstrates the use of dip-nets for salmon fishing.

The Northern Great Basin, which extends into Oregon, has provided the most interesting and complete record of early peoples in the state. The earliest work was done by Luther Cressman and field parties from the University of Oregon (beginning in 1932 archaeology in the Northern Great Basin has been dominated by the University of Oregon). Although early work preceded the advent of radio-carbon dating, Cressman writes that early work demonstrates that

The Northern Great Basin has been occupied by man at the same time as Equus (horse), the camel, and a variety of bison; that occupation had been continuous to the time of the white man's arrival, but that the intensity of occupation varied...(Cressman 1942:135).

The early archaeology in the Northern Great Basin has provided a foundation for continuing work in the area and through artifactual evidence of early people in the Great Basin, including beautiful specimens of basketry and sandals (Figures 24 and 25), which have come to be the hallmark of the Great Basin culture (Cressman 1942)

It appears that early man in the Northern Great Basin preferred to live in caves and rockshelters (Figure 26); at least, that is where most of the cultural material left by them has been preserved. All the caves show a gradual enrichment of artifacts and culture from the earliest to the later occupations. Several of these caves are adjacent to freshwater springs, which would have supplied water when the lakes were dry (Cressman 1942:138).

The Catlow Valley was once the largest expanse of water in southeastern Oregon (Baldwin 1976:125). It is probably not mere chance that the caves with the richest remains are those in Catlow Valley adjacent to this vast resource. Included among the finds are bones, projectile



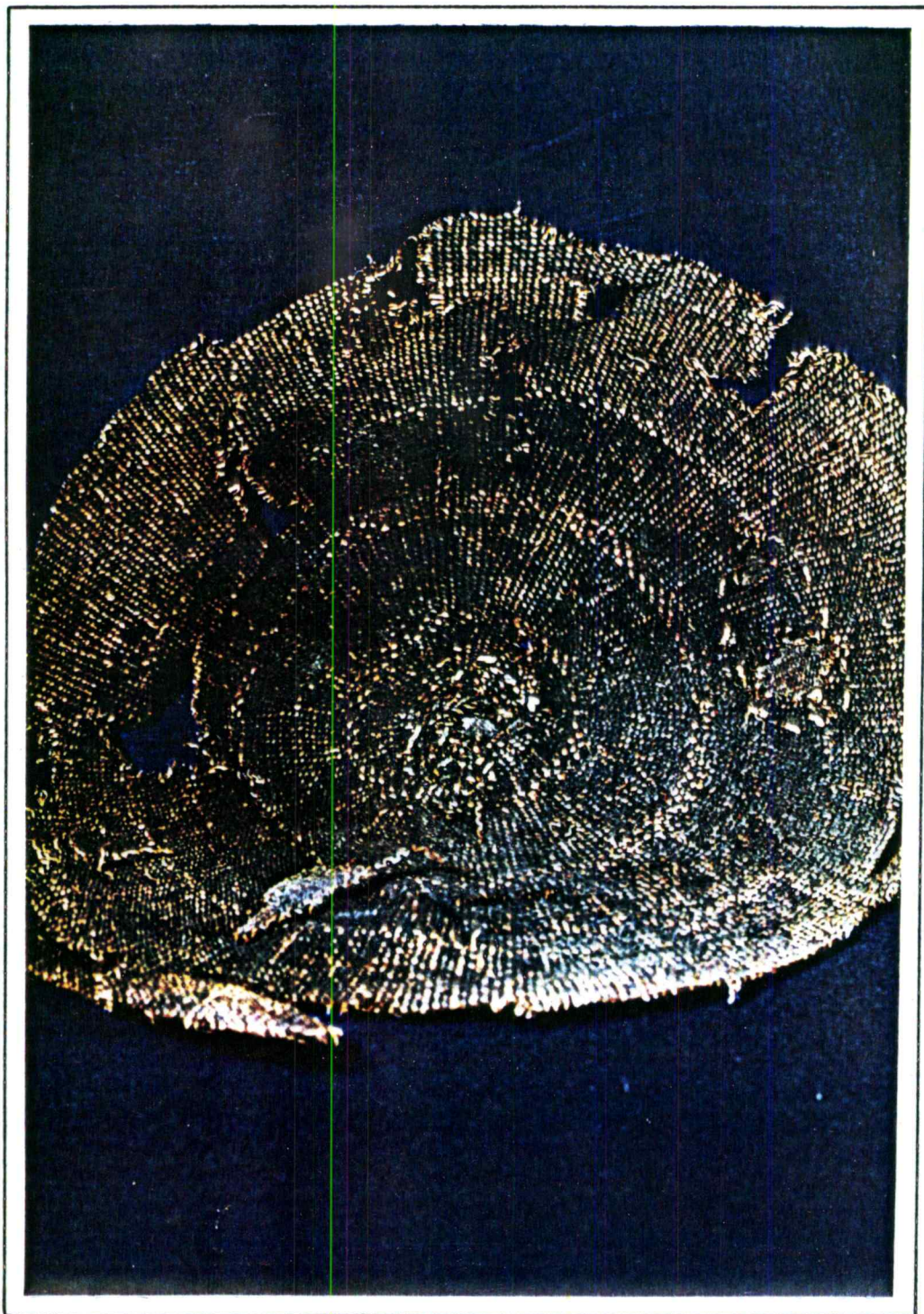


Figure 24. Basketry requires great skill and is considered to be the hallmark of Great Basin culture. This basket was recovered from Catlow Cave.





Figure 25. Finely twined sagebrush sandals show the extended use of basketry dating back over 9,000 years in the Northern Great Basin.





Figure 26. Catlow Cave was one of the richest archaeological sites in terms of cultural material ever excavated in the Northern Great Basin.



points, scrapers, knives, basketry, matting, twine, ground stone, leather items, and sandals. There were two distinct layers of cultural material, the more recent one with basketry, and the lower level without. This difference may be explained by soil dampness and its effect on preservation of organic material (Cressman 1942:24).

When Luther Cressman excavated Catlow Cave in the early 1940's there were no accurate dating methods available to archaeologists. The initial occupation definitely occurred before Mt. Mazama erupted some 7,000 years ago, but little else is known. In the summer of 1979 the University of Oregon combined forces with the University of Washington to re-examine the remains of Catlow Cave. Mel Aikens, of the University of Oregon, and Donald Grayson, of the University of Washington were in charge of the project, Jim Wilde was the field foreman. The season began on a bad note, for between April and June, "pot-hunters" had looted one of the only areas in the cave believed to be undisturbed. Mel Aikens decided to continue the work planned at the site, but as the archaeologists dug below the potted section, they found the soil too disturbed by burrowing rodents for the contents to have any meaning. Emphasis was then shifted to another local human occupation, Sentinel Cave, dated at 10,000 years ago. A report by Wilde of the findings is forthcoming (Jim Wilde, Telephone Conversation, April 1980).

Fork Rock Cave, a rock shelter in the Northern Great Basin, provides the earliest evidence of human occupation in Oregon. A radio-carbon date of 13,200 years ago was derived from a hearth charcoal sample found in association with several stone tools. The intensity of

occupation at Fort Rock Cave varied considerably. Cressman (1977:149-150) feels that occupation of the cave was definitely a function of the quality of habitat for human life. The tools used at the beginning of occupation of this site show sophisticated methods of fabrication of stone tools. One of the oldest dated specimens of twine is associated with a sandal from Fort Rock Cave, dated at 9,053 years ago.

Cressman (1977:150) suggests that Great Basin peoples were innovators of culture and were amazingly efficient at exploiting resources in a harsh environment even though survival was often close to the subsistence level.

### The Lower Columbia

In the summer of 1978 Rick Minor and a small field crew from the University of Oregon did limited excavations on six sites along the Lower Columbia. All of the sites were located within the last 64 kilometers (40 miles) of the River. The goal of the project was to develop an understanding of early settlement patterns in the region (Rick Minor, Personal Interview, August 1979).

Minor found that at least one of the sites contained projectile points described as Windust Phase (Figure 27). Harvey Rice (1972) describes Windust points as having

relatively short blades, shoulders of varying prominence, principally straight or slightly concave bases (Rice 1972:4).

This type of point is believed to be between 7,500 and 10,500 years old (Rice 1972:4).

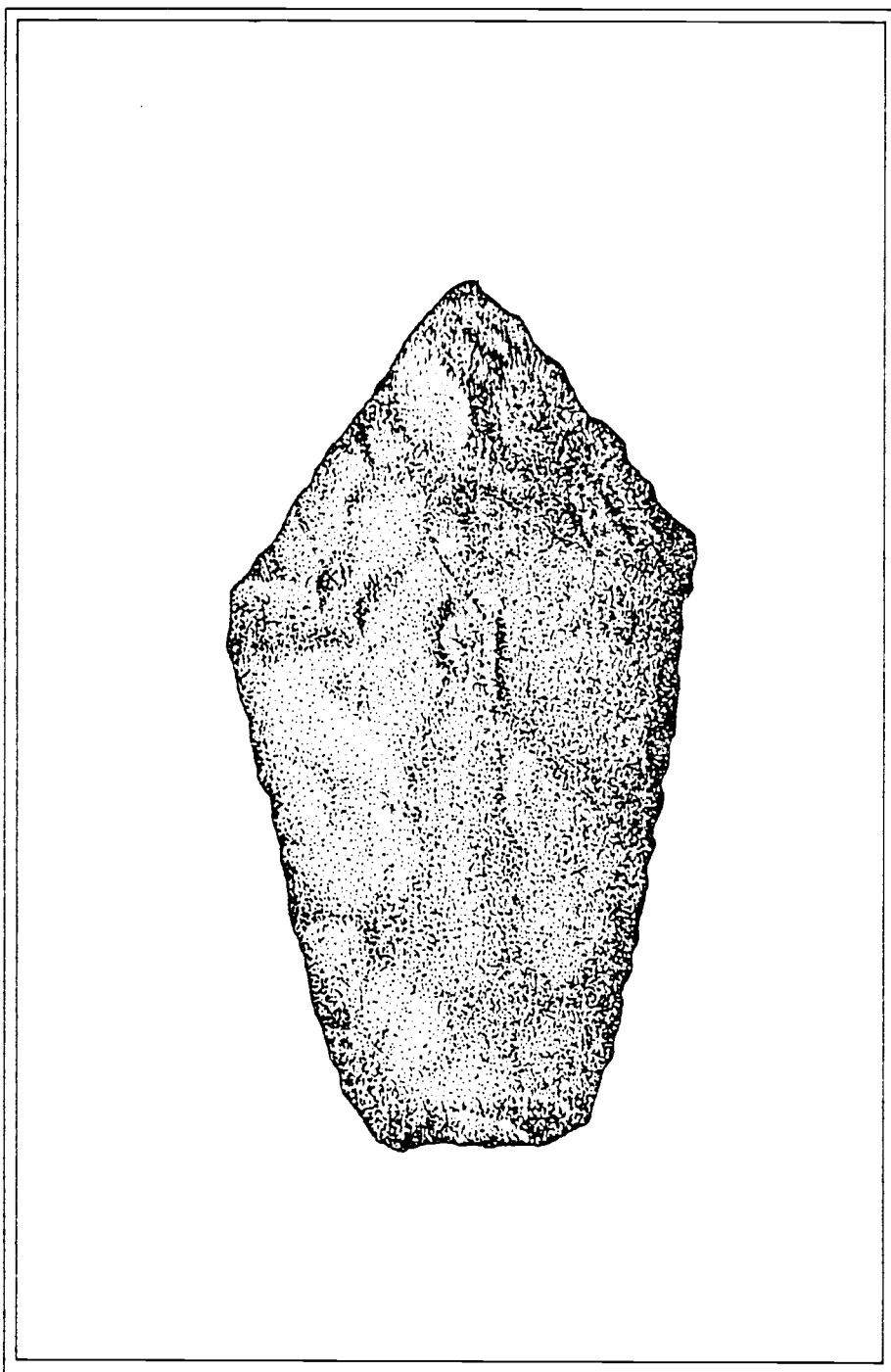


Figure 27. The Windust projectile point is part of a cultural phase dating back 8-10,500 years ago and is found in several cultural areas in Oregon.

The sites also contained enormous elk antlers, projectile points of various styles, scrapers, and numerous choppers, which may have been used to process elk. It appears that large mammals were utilized almost as much as river resources (Rick Minor, Personal Interview, August 1979).

It is difficult to get substantial time depth from sites next to rivers because the environment is very dynamic. Although Minor's finds are not coastal sites, the artifacts provide evidence that man was utilizing river resources on the Lower Columbia for some time. The question is, if humans were within 64 kilometers (40 miles) of the coast at that time, why would they not also have been exploiting marine resources?

#### Portland Area

Rick Pettigrew (1977) did archaeology in the Portland area dealing with the cultural history of the Lower Columbia. Ten sites were excavated, and from three others surface material was collected. The project also included a comparative analysis of artifacts, collected by amateurs, to provide a larger sample of cultural material (Pettigrew 1977:2,3).

The complete cultural sequence described by Pettigrew was from 2,600-145 years ago. Even though information was obtained to document occupation for at least 8,000 years, it was impossible to estimate a cultural sequence that far back. Pettigrew believes that humans have inhabited the Columbia for at least the last 11,000 years - probably as



long as any other area in North America outside of Alaska (Pettigrew 1977:25).

A phase which is believed to have begun 2,600 years ago is characterized by such artifacts as stemmed drills, stone crescents, broad-necked projectile points, pendants, and atlatl (spear-thrower) weights. More recent material includes clay figurines, knives, scrapers, incised clay tablets, net-sinkers, and historic trade items (Figure 28). These phases provide documentation of definite "stylistic" changes through time (Pettigrew 1977:321-332).

Subsistence resources, including mammals, fish, waterfowl, and plant foods, were incredibly abundant on the Lower Columbia, and so permitted a high population density in large, permanent settlements. One settlement near present-day Scappoose Oregon is reported to have had a population of 1,200 in 1805 (Thwaites 1905:6). Kroeber (1939:136-155) states that the Lower Columbia surpassed all other regions of the Northwest Coast in terms of population density: at the time of contact, the population was estimated at 64 persons per square kilometer. As Pettigrew suggests, there is much work yet to be done on the Lower Columbia, and his research sets a foundation for future work (Pettigrew 1977:13).

### Summary

The earliest Paleoindian site yet found in Oregon dates back 13,200 years to a time when North America was experiencing widespread climatic and environmental changes (Cressman 1977). This radio-carbon



Figure 28. Historic trade items, such as this bottle, are found in the upper levels of archaeological sites on the Columbia River and indicate white contact.

date is almost 1,200 years earlier than the first well-known archaeological complex in North America, the Clovis fluted point horizon.

A review of the information on extinct megafauna (large animals) and associated radio-carbon dates led Martin (1967) to conclude that approximately 11,000 years ago most Ice Age megafauna in North America became extinct. There is evidence (Cressman 1942, Cressman and Laughlin 1941) that humans were living in what is now Oregon while some of these now extinct species still roamed the land. Most evidence suggests that the development of culture in the state was concentrated east of the Cascade Mountains. It could be that western Oregon Paleo-indian sites have been disturbed by the activities of white men in the area. Sites are also very difficult to find west of the Cascades due to dense vegetation patterns. The oldest archaeological site in western Oregon is from the Klamath Mountain region, next to the Applegate River, where humans are believed to have hunted for the last 8-10,000 years.

Archaeology in Oregon outside of the Great Basin has just begun to gain momentum; federal legislation has assisted in providing funds for proper archaeological analysis, and archaeological techniques have improved vastly in recent years. In the future it will no doubt become possible to provide a more complete and accurate picture of the pre-history of the region.

## CHAPTER IV

### ADAPTATION TO ENVIRONMENTAL CHANGE

My aim in this chapter is to examine early peoples, their migration and relationship to the environment. This relationship is not a simple matter; it is complicated by a variety of factors. Culture plays an important part in the way humans react to their environment. In general, climate, landforms, vegetation and wildlife are crucial, but some features are more important than others. Two examples would be: the spacing of water holes in the Great Basin, which may have been vital to nomadic seed-gathering people and the habits of desert wildlife on which they depended (Steward 1955:38); also, the areas where rivers were funneled through narrow canyons provided the best fishing on the Columbia Plateau (Figure 29)(Ray 1938).

As will be shown, the story of early human occupation in Oregon is a story of peoples well adapted to their environment. Cultural and natural areas have generally the same boundaries because the culture represents an adjustment to the particular environment. Oregon's culture areas can be broadly divided into the Plateau, the Great Basin, the Northwest Coast and the Willamette Valley; Southwest Oregon is considered a part of the Northern California culture area (Figure 30).

Climatic changes have provided migration avenues and in some ways may have forced people to migrate to more favorable environments. The evidence of human occupation in the New World has sparked some inter-



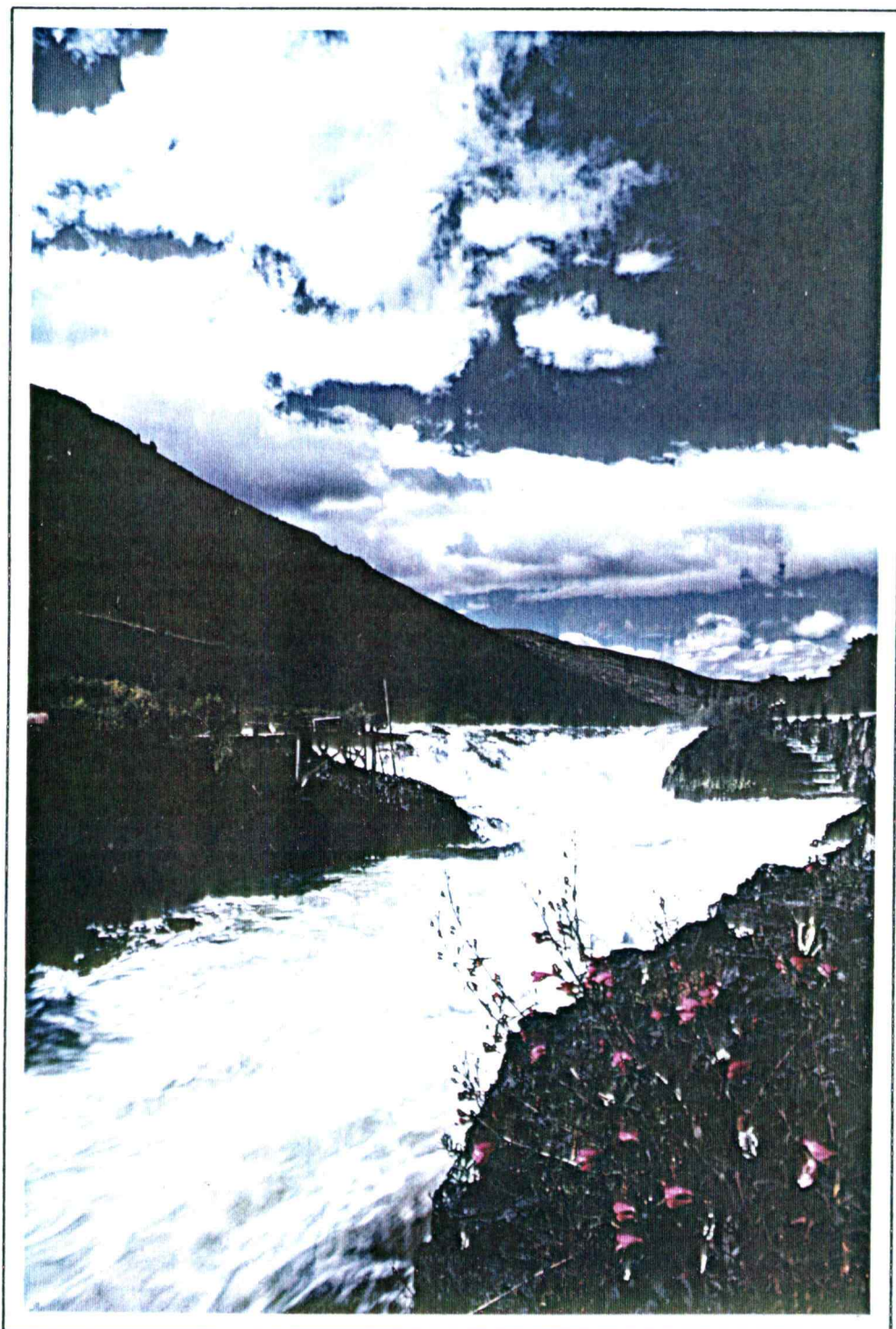


Figure 29. Shear's Falls on the Deschutes River was an excellent fishing site, because its narrow canyon walls funneled the fish through a small opening, allowing for easier capture.

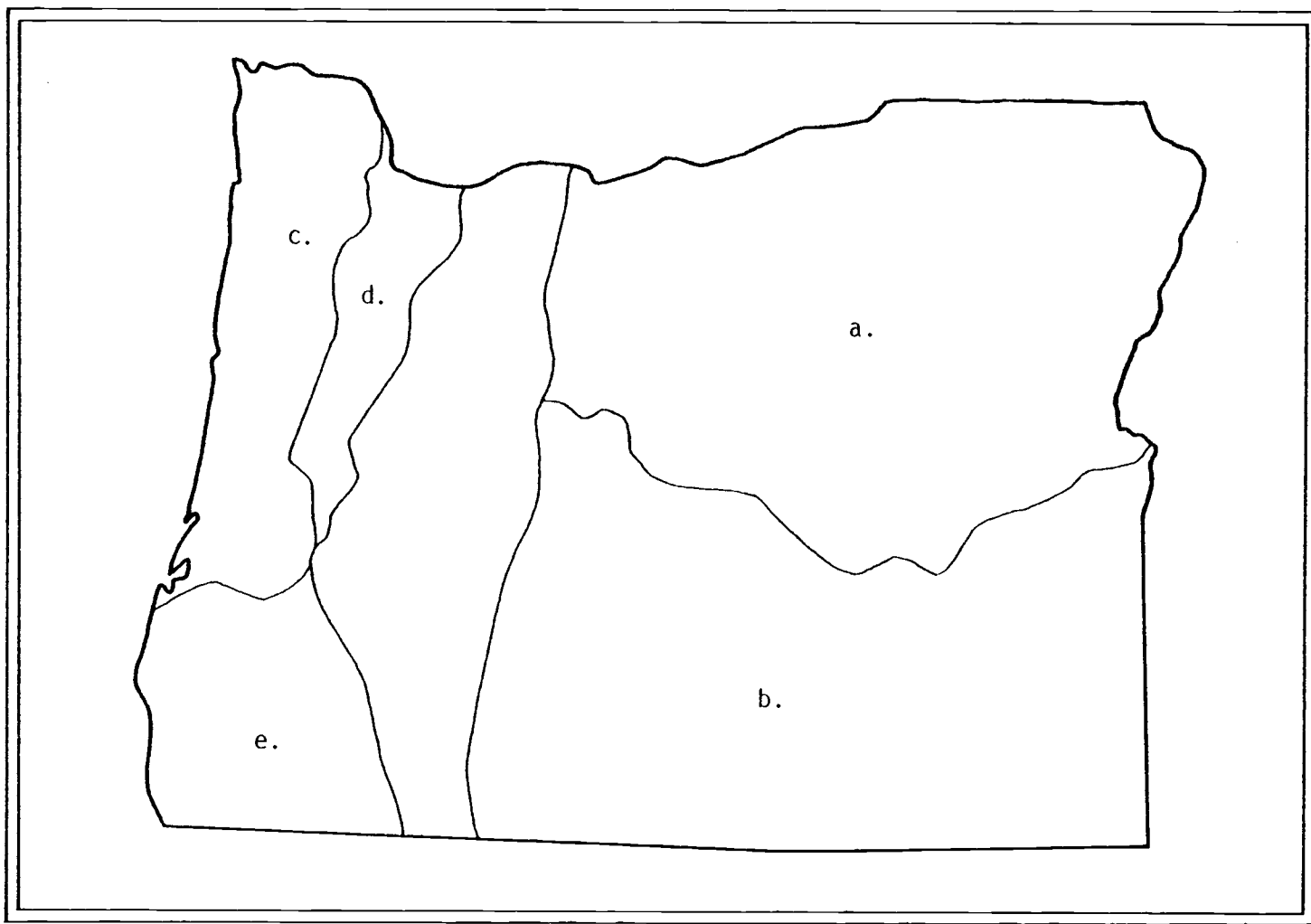


Figure 30. Oregon's culture areas are broadly divided into: a) Plateau, b) Great Basin, c) Northwest Coast, d) Willamette Valley, and e) Southwest Oregon.

esting and controversial theories regarding migration and diffusion.

### Climate

Practically every action of life is directly affected by climate. Food, clothing and shelter are all dominated by the climate of a culture area. The efficiency of any group of people is closely linked to the climatic conditions under which it lives. Climate differs from weather in that weather changes from day-to-day, while climate is the long period assembly of weather conditions. Day-to-day activities are affected by weather, but the general patterns of culture are governed, rather, by climate. Kroeber (1939) states that:

The strongest case for relation of climate and culture could expectably be made with a classification taking into consideration all or several important elements of climate, temperature, precipitation and sea level changes (Kroeber 1939:13).

### Migration

Sea levels were lowered drastically by glacial advances which ended approximately 11,000 years ago (Bright 1966:26). Many archaeologists hold the view that the American Indian originated somewhere in Northern Asia and came to North America from Siberia when the sea was lowered exposing a land connection at the Bering Straits in Alaska, referred to as Beringia (Figure 31). This view is primarily held because no other route appears possible.

If human migration to the New World did take place by way of a land connection, it would have to have occurred when the connection existed between 70-35,000 years ago, or between 25-10,000 years ago

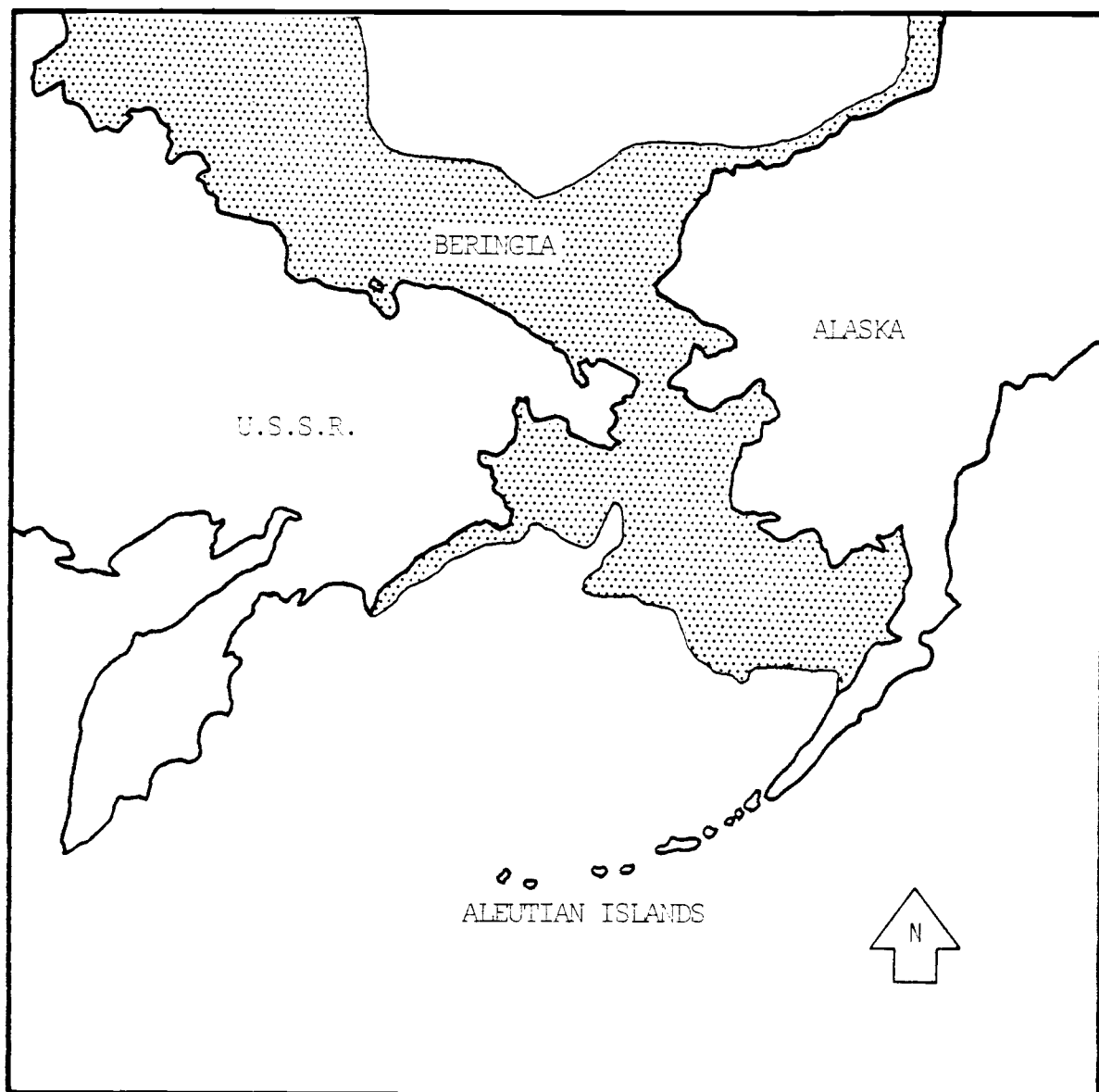


Figure 31. A land connection called "Beringia" may have been the migration route for the first Americans from Asia to North America. The connection was exposed by lowered sea levels, caused by glacial advances and existed between 70-35,000 years ago and between 25-10,000 years ago.



(Hopkins 1967:467). There is a considerable difference of opinion as to when migration may have occurred. Some (Krieger 1964; Bryan 1965; and others) contend that there is ample evidence for humans in the New World to indicate at least an initial influx of people between 70-35,000 years ago, while others (Haynes 1967; and others) believe that little or no evidence exists for the peopling of the New World prior to 12,000 years ago.

The matter of a land connection is further complicated by questions of when humans could have travelled south if their way was blocked by ice. Fred Wendorf (1966) feels that an ice-free corridor existed between two major ice sheets. The great glaciers spreading eastward from the Pacific coastal ranges comprise the Cordilleran ice sheet and those spreading westward from the Laurentians, the Laurentide ice sheet (Figure 32). Wendorf writes:

The presence of trees, peat, and other organic materials dating between 18,000 and 28,000 B.C., and often found below till or other features of the last glacial maximum, is conclusive evidence that, at least in the areas where these samples were obtained, vegetation was growing, and thus glacial ice was not present, at this time. In short, the ice probably did not form a continuous barrier until approximately 18,000 B.C. (Wendorf 1966:258).

Wendorf's research suggests that the way was blocked south between 20-12,000 years ago.

While most archaeologists believe that people would have had to travel south by way of a mid-continent ice-free corridor, Knut Fladmark (1978:119) believes that another ice-free zone existed along the northwest coast. William Irving (1971) states that we are doing these

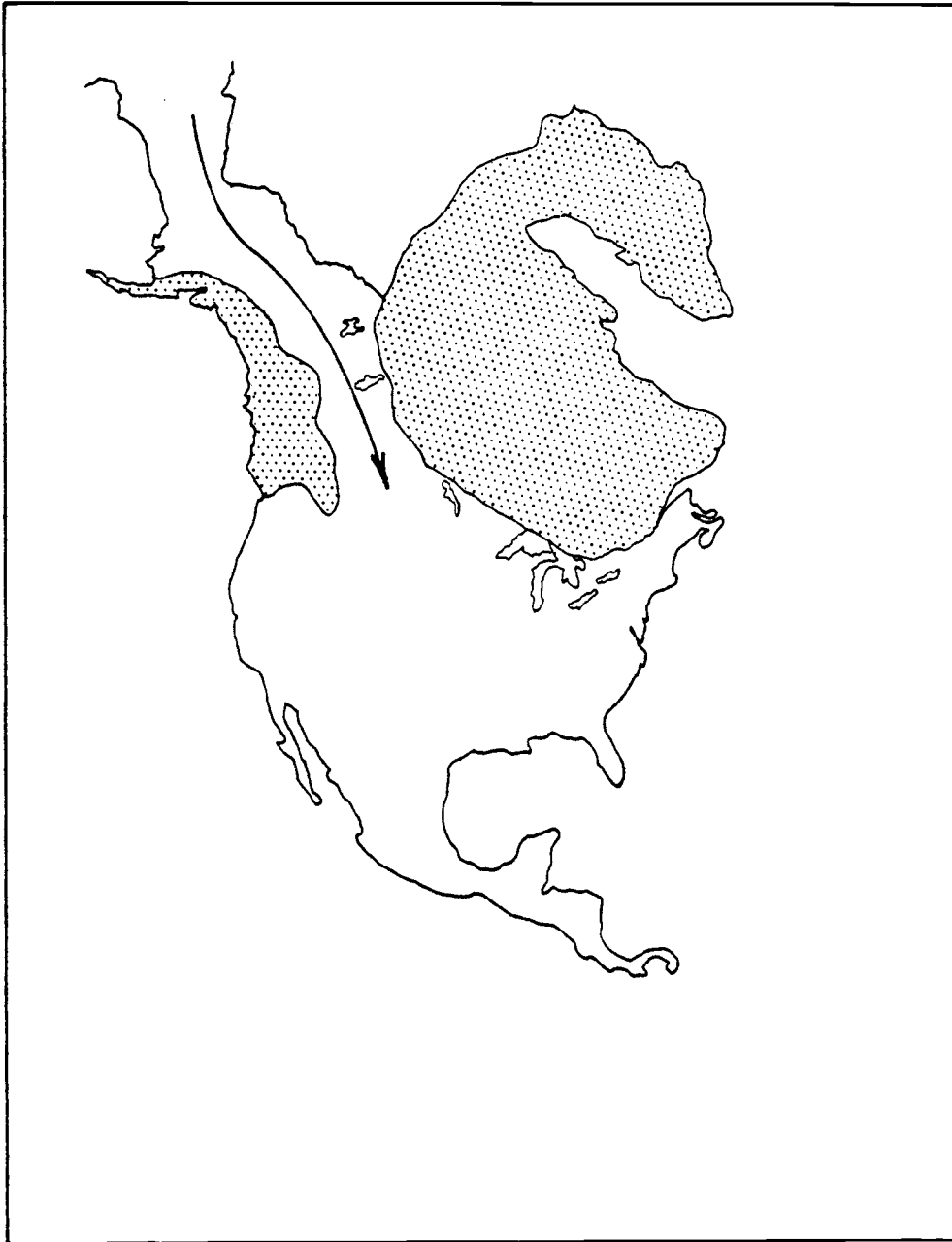


Figure 32. Humans may have first entered North America by way of the Bering Land connection and migrated south through an ice-free corridor.

people an injustice by assuming their inability to cope successfully with a wide range of environmental conditions. He suggests that "barrier oriented" thinking perpetuates this injustice and that people may have been able to cross the great ice fields in glacial times.

Some archaeologists believe that an early, pre-projectile society existed, which provides evidence for early human entry and occupation of North America. Archaeological work by Charles Borden (1968) suggests that this may be true. At the Yale site in British Columbia Borden excavated an early human occupation which contained no projectile points. The site contained crude tools made from well rounded river cobbles, which are hand tools not meant for hafting (attaching to a handle or shaft). These "cobble choppers" were given a date between 12,500 and 11,000 years ago. This "pebble tool," or "chopper scraper," tool site raises intriguing questions regarding the tool's origins and possible relationship with early chopper tool cultures of Eastern Asia (Borden 1968:68).

The earliest acceptable artifact radiocarbon date in North America is 27,000 years ago. This artifact found in the Canadian Yukon, is a scraper made from the shinbone of a caribou. This date is near enough to the period of the last appearance of a land connection to suggest that the person who made it was part of the first surge of humans to cross over (Morlan 1978:81,87). Some archaeologists question this date, for they feel the tool may have been made in more recent times with an old bone.

Near the city of Puebla, Mexico, an archaeological site was exca-

vated which is dated at 22,000 years ago. This date is supported by strong field evidence (Irwin-Williams 1967). Another Mexican site, the Tlapacoya site, is dated at 24,000 years ago (Haynes 1967). While many archaeologists feel that this evidence is the best yet for a site of this antiquity, the archaeologist who analyzed the radiocarbon dates from the Tlapacoya site, Vance Haynes (1967:49), feels that any evidence to date of people in the New World preceding 12,000 years is "...not so conclusive that it precluded other interpretations." In many cases the evidence is too good to reject but too questionable to accept.

Even if the first Americans, or "Paleoindians" as archaeologists call them, arrived in the New World only 15,000 years ago - a most conservative estimate - there would have been enough time for these people to multiply beyond the actual populations of North and South America by 1,500 A.D. The concept that many people, including archaeologists, find hard to believe is that even with conservative estimates people have been in the New World for only one or two percent of the total span of their existence (Snow 1976:19).

### Adaptation

Climate was not only a major factor in the migration of people to Oregon, for climate continued to affect human seasonal migration patterns within the region and the selection of living areas as well. When one considers the environmental changes that have taken place in the last 15,000 years, it is safe to say that adaptive processes took



place under conditions quite different than those of today.

Lowered sea levels during the last glacial advance formed a much different riverine environment than that which presently exists. Waning glaciers provided a tremendous runoff and also increased river levels considerably. At The Dalles on the Columbia River, the pre-dam river level was 15.25m (50ft) above sea level, post-glacial waters reached 46m (150ft) above sea level. This 46 meter water level posed an obstacle which was no doubt challenging for early humans (Cressman 1977:122). The sediment content of this glacial outwash may also have effected fish populations and prevented salmon from entering or at least spawning on the Columbia (Cressman et al. 1960).

The Oregon coast was a much different habitat during glacial times also. If humans were present they would have found a sea level 100m (300ft) below its present level. The exposure of the continental shelf provided a broad plain on which man may have been exploiting marine resources. Evidence from southern California suggests that humans were present on the continental shelf as recently as 5,000 years ago, as the sea level was rising. Thousands of mortars have been collected by scuba divers in the area. Moriarty, Shumway, and Warren (1959:15) report that shells found buried within the ancient middens in the La Jolla area of California come from embayments such as would have existed in the heads of local canyons during a period of lower sea levels.

The initial occupation of the Fort Rock Basin probably occurred during the period when glacial ice was 915m (3,000ft) thick to the north near Seattle and vast lakes spread across the low basins of south-

eastern Oregon, in what is called the "Pluvial Period" (Figure 33) (Cressman 1977:38).

Obviously, the growth of valley glaciers and the massive Cordilleran ice sheet to the north were associated with a cooler, moister climate than presently prevails in Oregon. Presumably, glacial ice would have affected both the composition and the distribution of vegetation in the state. This assumption is supported by pollen samples taken from an 8,500 year old Northern Great Basin sandal by Luther Cressman, who wrote that the sample was "...composed primarily of pine, sagebrush,...grains of hemlock, birch, and alder" (Cressman 1977:46). Precipitation at the time was nine to ten inches per year heavier than found in the area now (Cressman 1977:46). Since these trees take years to mature and seed, one can assume that this cooler, moister trend must have been in effect for sometime to allow these species to exist in the area. Pollen studies by Hansen (1947) support this climatic trend.

Through an analysis of the distribution of pollen types in Northwest peat bogs, Henry Hansen was able to reconstruct climatic trends that prevailed in late glacial and post-glacial times. The late glacial cool and moist period was followed by a period of increasing warmth and dryness. The next climatic phase was of maximum warmth and dryness; by this time the Rocky Mountains were completely deglaciated, and the trend was again toward a cooler, moister climate (Figure 34) (Hansen 1947:114-115).

The post-glacial period is estimated to begin at 10,800 years ago, when the warming trend caused widespread deglaciation and altered

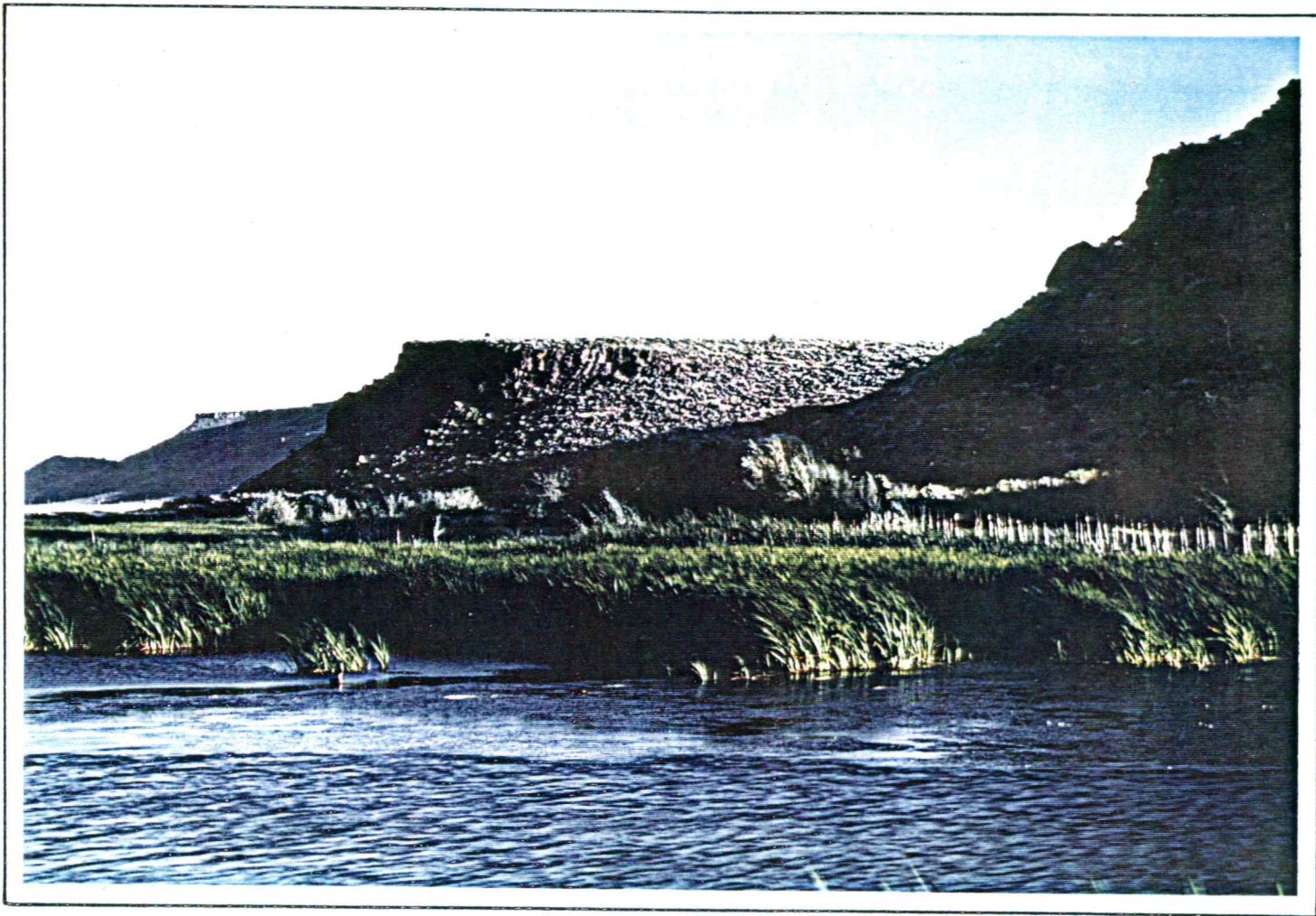


Figure 33. This scene in Malheur County, Oregon depicts what the Great Basin probably looked like in the Pluvial Period.

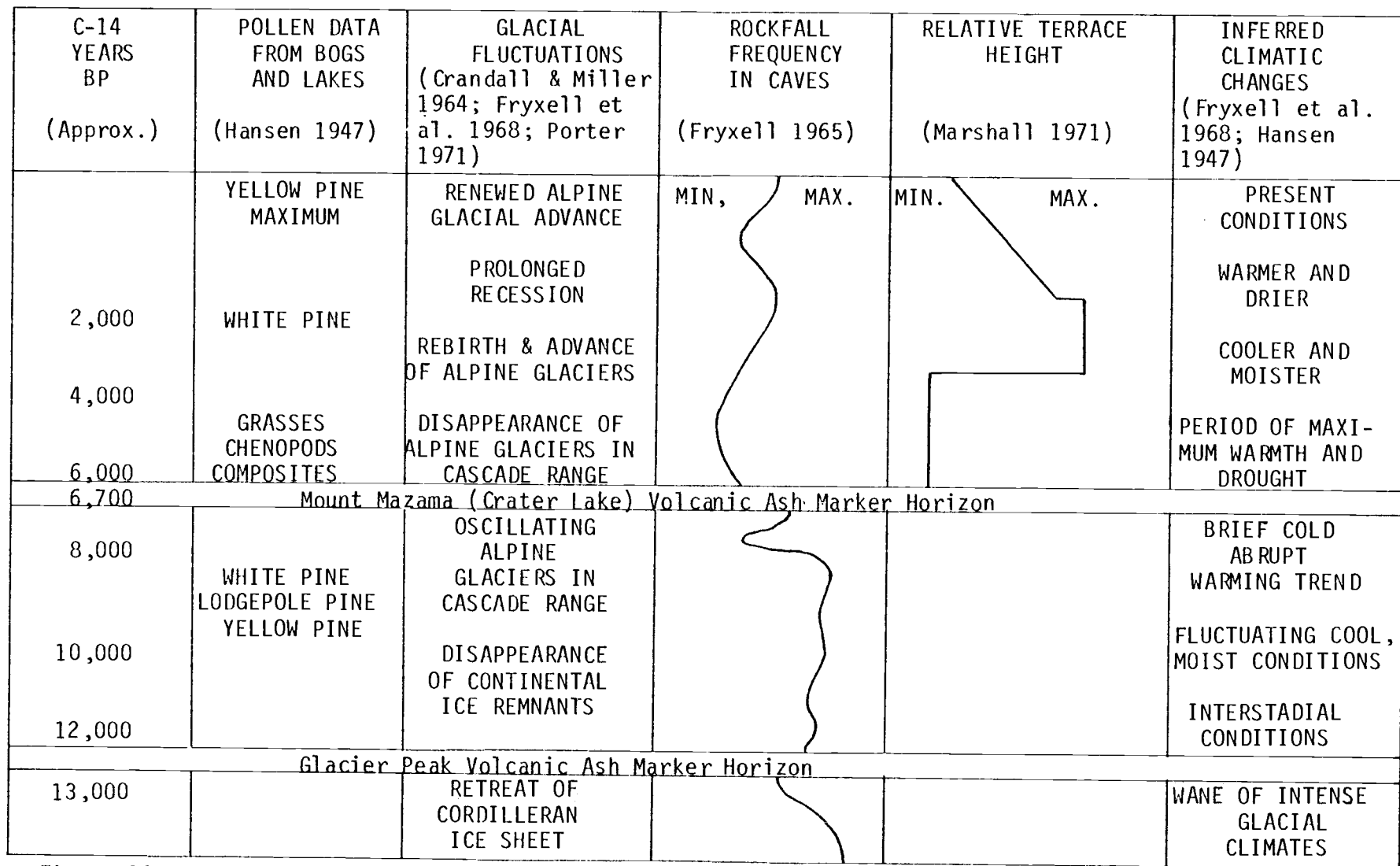


Figure 34. A postglacial climatic curve for the Pacific Northwest (after Carl Gustafson, 1972, Faunal Remains from the Marmes Rockshelter and Related archaeological sites in the Columbia Basin, Unpublished PhD thesis).



regional vegetation (Bright 1966:26). The effect that these climatic changes had on humans cannot be overstated. B. Robert Butler (1968) writes,

Perhaps the most important point is that at no time after 10,800 years ago was the climate as cold and moist as it had been previously. Certain species of animals that were adapted to generally cold, moist climate of the late glacial period would not survive through the increasingly warmer and drier post-glacial period. They disappeared from the scene and their place was taken by the animals of today (Butler 1968: 37).

Since wildlife and vegetation changes were taking place, human populations must have been forced to alter their subsistence patterns and adapt to new environments and resources.

### Catastrophes

A discussion of early peoples would not be complete without mentioning several catastrophes which had to affect the peoples inhabiting Oregon at the time of their occurrence. The Lake Missoula flood and the eruption of Mt. Mazama are the two most important, for in a relatively short period of time they caused widespread environmental changes and surely affected human populations.

#### The Lake Missoula Flood

During the last Ice Age a large glacial ice sheet flowed south in the United States, where it incorporated glaciers of local origin (Richmond 1965). This glacial formation is known as the Cordilleran ice sheet. B. R. Butler (1968) described the ice blocking glacial Lake

## Missoula:

Near the maximum of each advance of this ice sheet ice dammed the Clark Fork River at Lake Pend Oreille to form Glacial Lake Missoula, and blocked the Columbia River at Grand Coulee to form Glacial Lake Columbia. At times it also blocked the Spokane River east and west of Spokane.

The ice that impounded Lake Missoula collapsed at least three times, releasing catastrophic floods of enormous magnitude, which swept through the Spokane area and southwestward across the Columbia Plateau. The last of these floods followed the early maximum of the last or Pinedale Glaciation. (Butler 1968:33-34)

A radiocarbon date of 32,700 years ago was derived from wood and peat collected by Fryxell (1962:9) in Lake Missoula gravels. Had humans lived in the area before the flood, clearly all evidence would have been destroyed or transported downstream (Cressman 1977:50). It would have taken a considerable amount of time for life to recover from the scouring of the land caused by this flood.

In 1953 Luther Cressman found a basalt knife imbedded in the gravels of the Missoula flood near the John Day River. The object was verified as an artifact independently by four professional archaeologists, three of whom were unaware of the source and its significance (Cressman et al. 1960). Cressman (1977:71) feels that the knife had been picked up by the flood waters and eventually deposited downstream. Cressman's evidence for man in the Northwest prior to the Missoula flood has been questioned by some archaeologists. Since the knife was found by itself, without other cultural material, it can only suggest pre-Missoula peoples in Oregon and cannot be considered firm evidence.

### Mt. Mazama's Eruption

As the recent eruption of Mt. St. Helens in Washington has displayed, the Cascades contain several active volcanoes. Their activity, however, is unpredictable. The most important eruption to archaeologists is that of Mt. Mazama, which formed the caldera in which Crater Lake now lies (Figure 35). Mt. Mazama was once a glacier covered mountain. A long period of quiet preceded the culminating eruptions. When the pressure built up in an underground chamber and the roof of the chamber was no longer able to withstand it, the volcano entered the most explosive stage of its long history (Williams 1963:29). The eruption occurred approximately 7,000 years ago and spewed forth some 11 cubic miles of pumice and ash, which was carried by prevailing winds and the force of the explosion in primarily a northeastern direction (Cressman 1977:52).

Of the actual eruption of Mt. Mazama, Williams (1963) writes:

Day after day, night after night, the eruptions continued. There were brief intervals of comparative calm, but each was brought to a close by an outburst more violent than the one preceding. It was now increasingly difficult to see what was happening on the mountain. Fine dust and the smoke of forest fires permeated the air. The hot, acid fumes were suffocating. As the activity grew in strength, the winds veered towards the northeast, in the direction of what is now the town of Bend. The falling fragments, which at first had scarcely been larger than peas, were now as large as a man's fist. Over thousands of square miles the air was so charged with dust that the days were darker than the blackest night. Close to the mountain, it was impossible to see one's outstretched hand. Far off, on the plateau to the east, small bands of Indians gathered in dumb horror about their campfires, too bewildered to flee for safety. They had often seen the mountain burst into flame before, but this cataclysm, this ashy

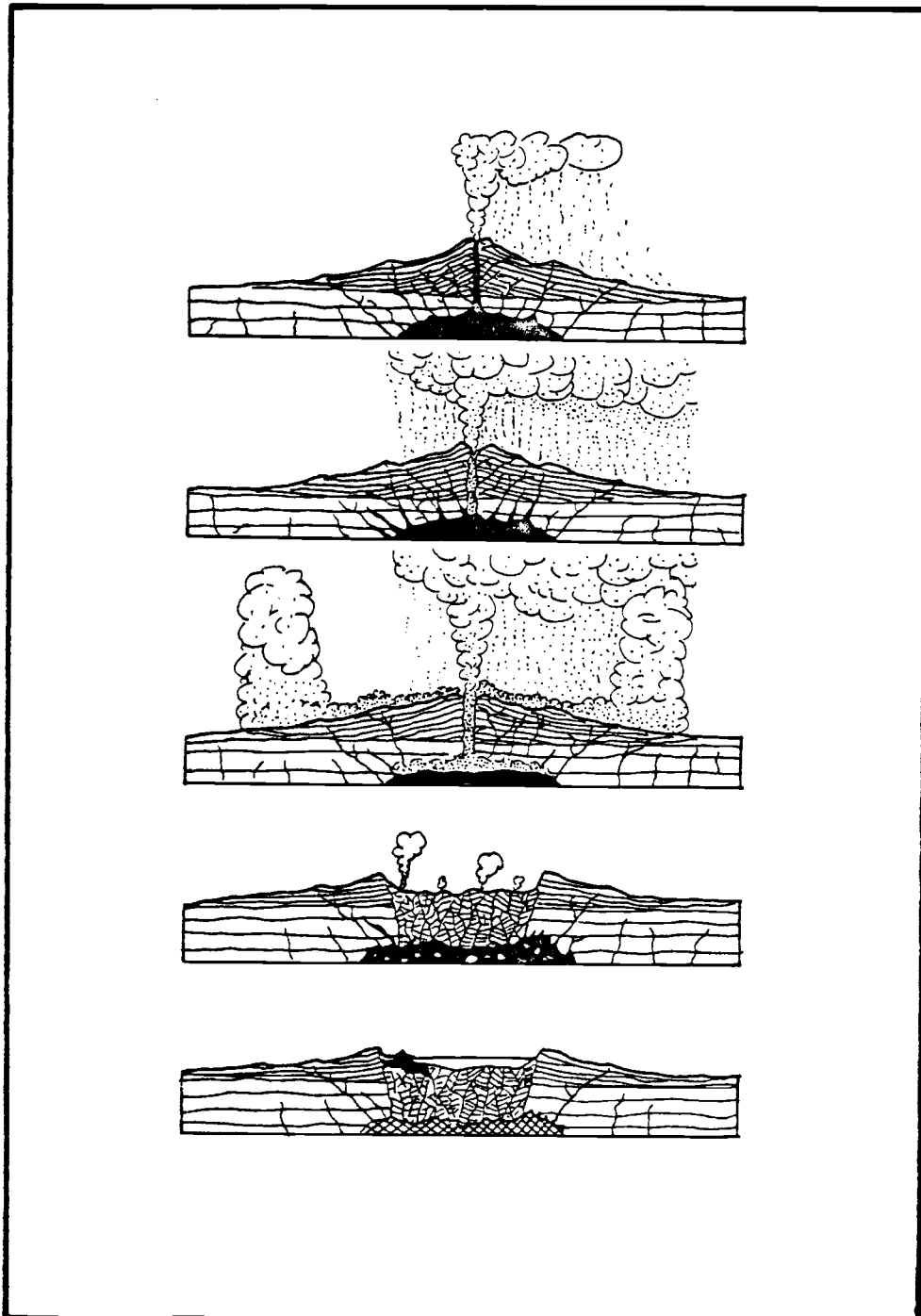


Figure 35. The evolution of Mt. Mazama, from the beginning of the great eruptions (top) to Crater Lake today (bottom)(after Williams 1963).



darkness, seemed to be the end of everything. (Williams 1963:30)

The effect on native populations may have been great. Although we cannot know what effects there were on the flora and fauna, especially of eastern Oregon, as a result of the Mazama eruption, it is believed that the entire life chain may have been effected. To quote Malde (1964);

Although actual thickness of the ash fall beyond 20 miles from Mount Mazama was less than a foot...its ecological effect must have been felt many miles further downwind. Besides damaging plants and foraging animals, the ash that washed into rivers and lakes probably exterminated most of the fish. The major rivers would have been roily with ash year after year, as the ash was progressively washed from the uplands. With food supplies dwindling, the Indians probably had to move elsewhere. Future archaeological discoveries can be expected to shed light on the importance of volcanism in Indian life. (Malde 1964:11 quoted in Bedwell 1973)

Malde's theory that Indians probably had to relocate after the eruption of Mt. Mazama is supported by archaeological evidence at Fork Rock Cave, which indicates a decline in human use of the area (Cressman 1977:53).

### Summary

The relationship and adaptation of humans to their environment is a complex affair. Climate is most significant, for it not only affected migration of people to Oregon, it also affected seasonal migration patterns within the state. Glacial sheets lowered the sea level, caused rivers to rise, and generally altered the landscape. These environmental alterations must have forced people to react differently to

the environment. Catastrophes may have had not only a physical, but also psychological impact on local populations of Indians. The cultural and natural history of Oregon has been marked by change which is imperceptible in the short span of one human life, or even a generation, but over thousands of years this change and its effect on humans is quite evident.

## CHAPTER V

### SUBSISTENCE

With regard to subsistence, the archaeologist generally focuses on the business of how people went about feeding themselves. The natural resources of any particular culture area dictated technologies, which may have been used differently and have entailed different social arrangements in each environment. The environment is not only permissive or prohibitive with respect to technologies, but special local features may require specific adaptations that have far reaching consequences. Julian Steward (1955) writes,

Societies equipped with bows, spears, surrounds, chutes, brushburning,... and other hunting devices may differ among themselves because of the nature of the terrain and fauna (Steward 1955:38).

Although archaeological material may indicate the use of and/or preference for a particular set of cultural equipment (this preference may be widespread), such preference does not indicate similar methods of use.

Oregon's prehistory is the record of hunters and gatherers. The development of hunting and gathering technologies is a dynamic process. The changes that took place in the environment and the related cultural adjustments greatly affect the type of artifacts archaeologists dig up; i.e., the style and function of such tools and their relationships in space and time.

Even though artifacts in good context can present a fairly accurate record of the technologies and techniques used in subsistence, information recorded by early white explorers and ethnographers, who described the various cultures in the area, helps to give meaning to archaeological evidence. In describing subsistence patterns, the author will use both archaeological and historical information.

In each region of Oregon there was a predominant economic activity made possible by the natural environment and its resources. In speaking of hunters or gatherers, the author will discuss the area where the economic activity was the predominant but not the only subsistence activity.

### Hunting Weapons

When people first entered the New World they were following a vast wildlife resource. Beringia may have reached 2080km (1,300 miles) in width (Haag 1974:263). which suggests that early humans were not crossing a narrow land bridge and purposefully migrating across it but were following the natural migration of mastodon, mammoth, musk oxen, bison, moose, elk, camel, fox, bear, wolf and the horse (the horse flourished and then died out in North America; it later appeared in the New World through introduction of the species by the Spanish conquistadors). People in search of stable food resources crossed this connection carrying with them cultural baggage which is the foundation of later, more developed New World technologies.

The progression of weapons in the New World has probably paral-

leled the pattern in Europe, from thrusting and throwing a spear to spear-thrower, and then to bow and arrow. The earliest archaeological record in Oregon of the spear-thrower, or atlatl (Figures 36 and 37), is from Fork Rock Cave, the thrower probably dating from approximately 8,500 years ago (Cressman et al. 1940 in Cressman 1977:105). A similar date is estimated for two atlatl spurs from The Dalles (Cressman et al. 1960). The spear thrower is distributed throughout the Arctic, along the Pacific Northwest Coast, into southwestern Washington through Oregon east of the Cascades, and into north-central California (Riddell 1960).

The spear-thrower was eventually replaced by the bow and arrow, but the transition took some time. The archaeological record in the Great Basin shows that there was a considerable period during which both weapons were used (Cressman 1956 in Cressman 1977:106). Cressman (1977:106) suggests that archaeological records indicate a 750 year period of synchronous use of both weapons, possibly because of the advantages of each in different hunting situations.

This long period of overlap indicates that the knowledge required to produce and use a bow and arrow was learned slowly by trial and error (Cressman 1977:108). The material used in the construction of a bow, upon which a great deal depended, was, of course, dictated by circumstances and environment. One problem that Great Basin people may have encountered with the bow and arrow is the wooden bow's becoming flacid in extremely hot weather (Pope 1923:331).

It is possible that during the period of transition the spear-



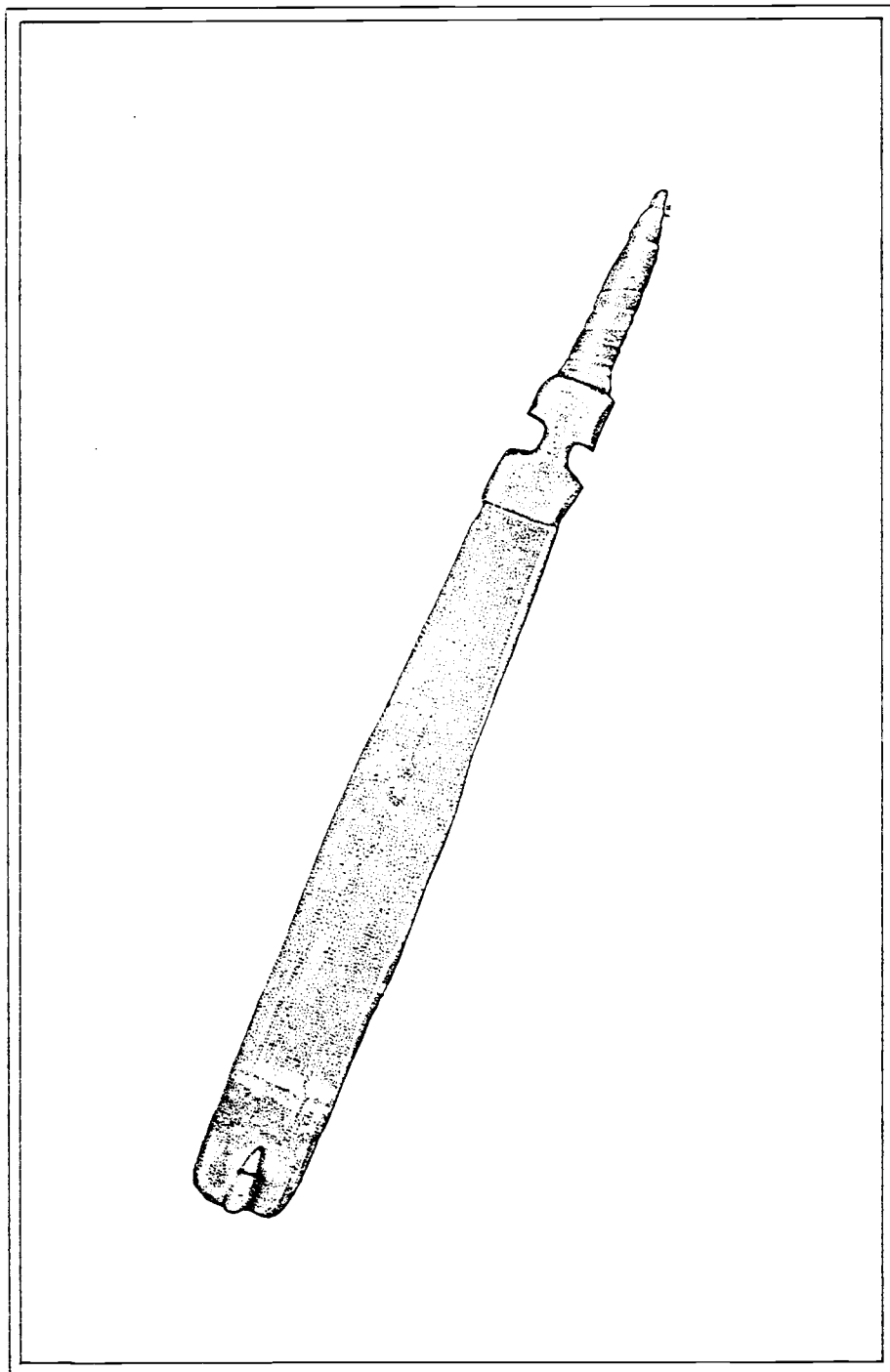


Figure 36. The atlatl was used as an extension of the arm to hurl a spear; its use preceded the bow and arrow.

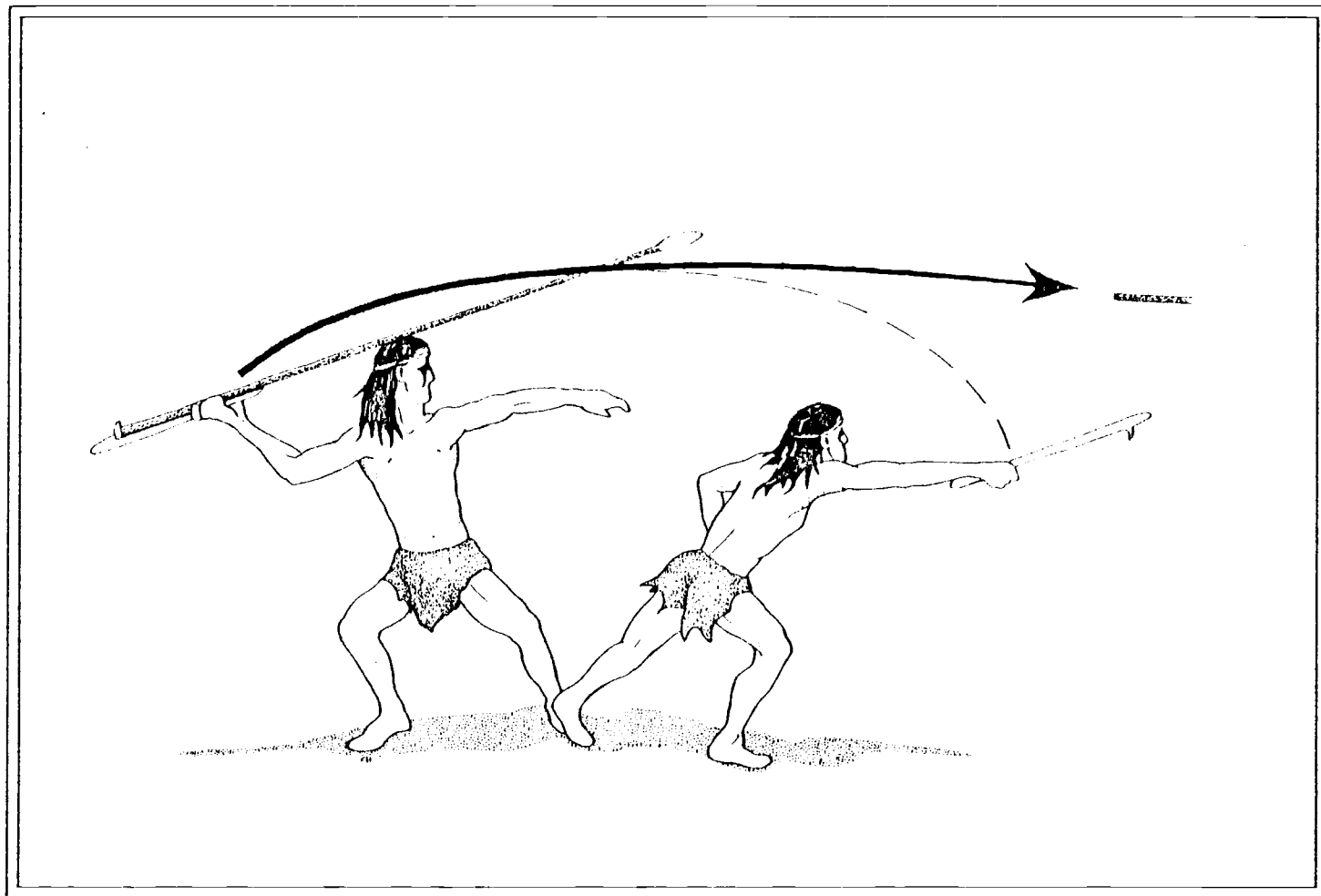


Figure 37. The spear-thrower, or atlatl, was an effective weapon and the transition to use of the bow and arrow took some time.

thrower was used for larger game and the bow and arrow for smaller game. The average native arrow is crude and unfeathered, which would render it inaccurate for anything but long distance shooting (Pope 1923:332). It also took some time to develop proper projectile points for tipping the arrow. The early projectile points were much too large for accurate shooting of an arrow. The characteristics of the point would also affect penetration (Figure 38).

Aside from these major hunting implements, snares, deadfalls, and other traps were probably long used in prehistoric times. Although no archaeological evidence exists, early explorers and ethnographers often refer to the use of these methods for hunting. Game trails provided excellent locations for early man to utilize these methods of food procurement. It is probable that these methods were used largely to supplement food supply.

Harpoons, leisters, and bolas are also important hunting tools which will be discussed later.

### Mammals

A possible association of humans and extinct animals, such as the camel and bison (antiquus), is reported in the Willamette Valley and the Great Basin (Cressman and Laughlin 1941; Cressman 1940). There is also evidence of bison use in the later occupations of Catlow Cave (Figure 39), but these bison are of the more common species (Bison bison).

Of the mammals known to prehistoric peoples, deer were the most widely utilized (Figure 40). The hunting of deer was practiced in

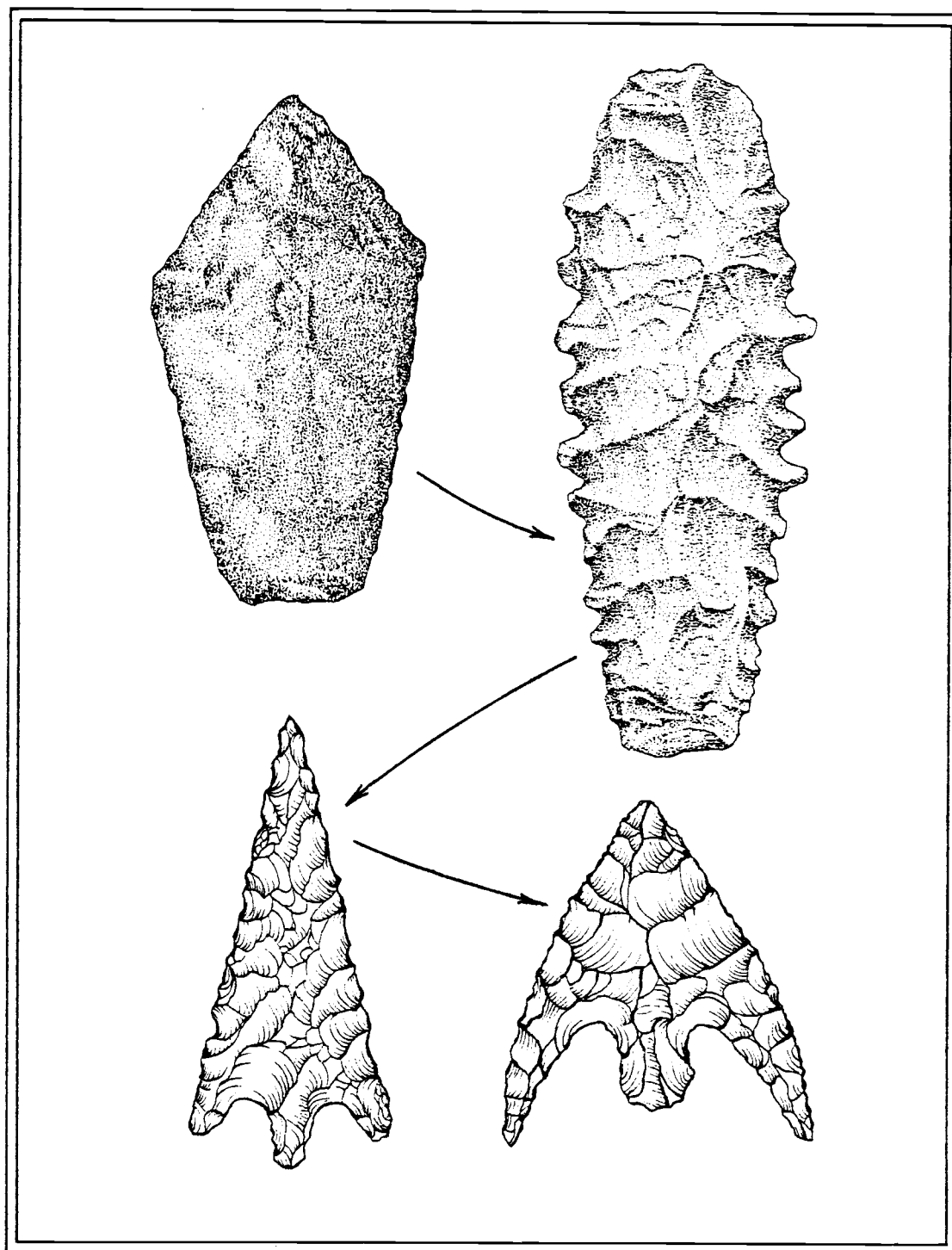


Figure 38. A projectile point sequence for western Oregon shows the gradual refinement of stone working techniques.

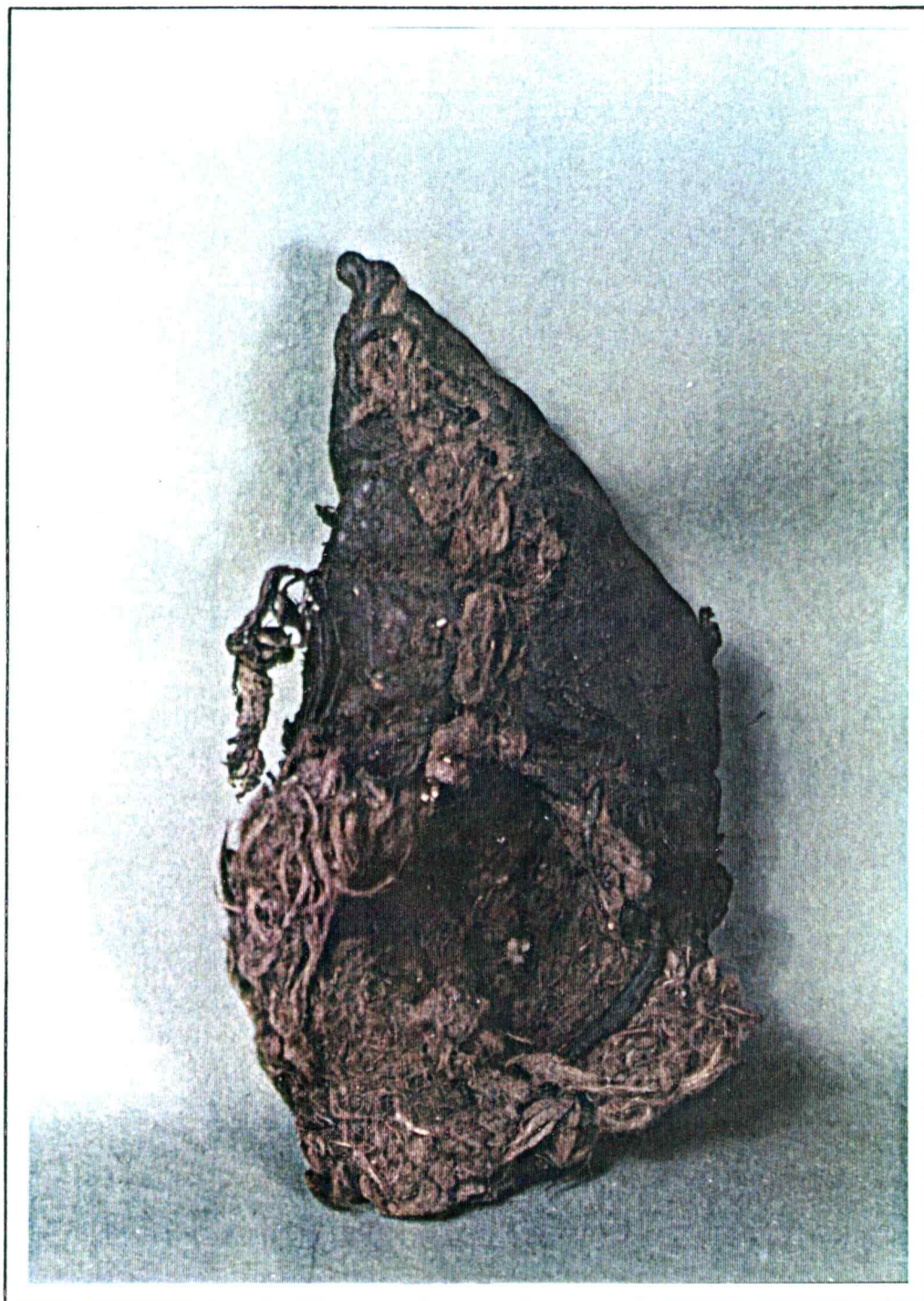


Figure 39. This moccasin is evidence of the utilization of Bison (bison) in the Northern Great Basin.





Figure 40. Black-tailed deer was one of the most commonly exploited mammals by Oregon's early peoples.

every culture area of the state. Spear-throwers, bow and arrows, and traps were used. William Hartless (1923), a Kalapuya Indian, describes the method used by his people:

Trap consisted of rope placed where deer would jump over log or hill. One end of rope tied to a bent pole which was left bent by means of another rope. As soon as deer was caught, the rope holding the pole broke, the tree shot up and tied the deer's neck fast (Hartless 1923:14-15).

Verne Ray (1938:116) reports that pitfalls were also used by Oregon natives in hunting both deer and elk.

Elk were locally abundant in Oregon (Figure 41), and elk bones have been found in sites on the Columbia Plateau, in northwestern Oregon, and along the coast. Elk were probably prized equally for their meat, skin and antlers. That antlers of elk were a favored tool-making material on the Lower Columbia and on the coast is probably due to their abundance in the area and the lack of good stone for tool making (Figures 42 and 43).

Antelope were also abundant in eastern Oregon during prehistoric times and probably were one of the chief game resources. Although there is little doubt that antelope were hunted, Luther Cressman (1977: 104) does not recall a single antelope bone ever having been found in archaeological work in the Northern Great Basin. Jesse Jennings (1957: 224) reports for Danger Cave in the Eastern Great Basin that "the chief game resource appears to have been ungulates." An antelope horn handle for a knife found in Catlow Cave indicates that antelope were probably used in southeastern Oregon (Cressman 1942).

In the early white contact period the Great Basin antelope hunt





Figure 41. Oregon's early peoples used the meat, fur, bones, and antlers of elk, which demonstrates their efficient utilization of resources.



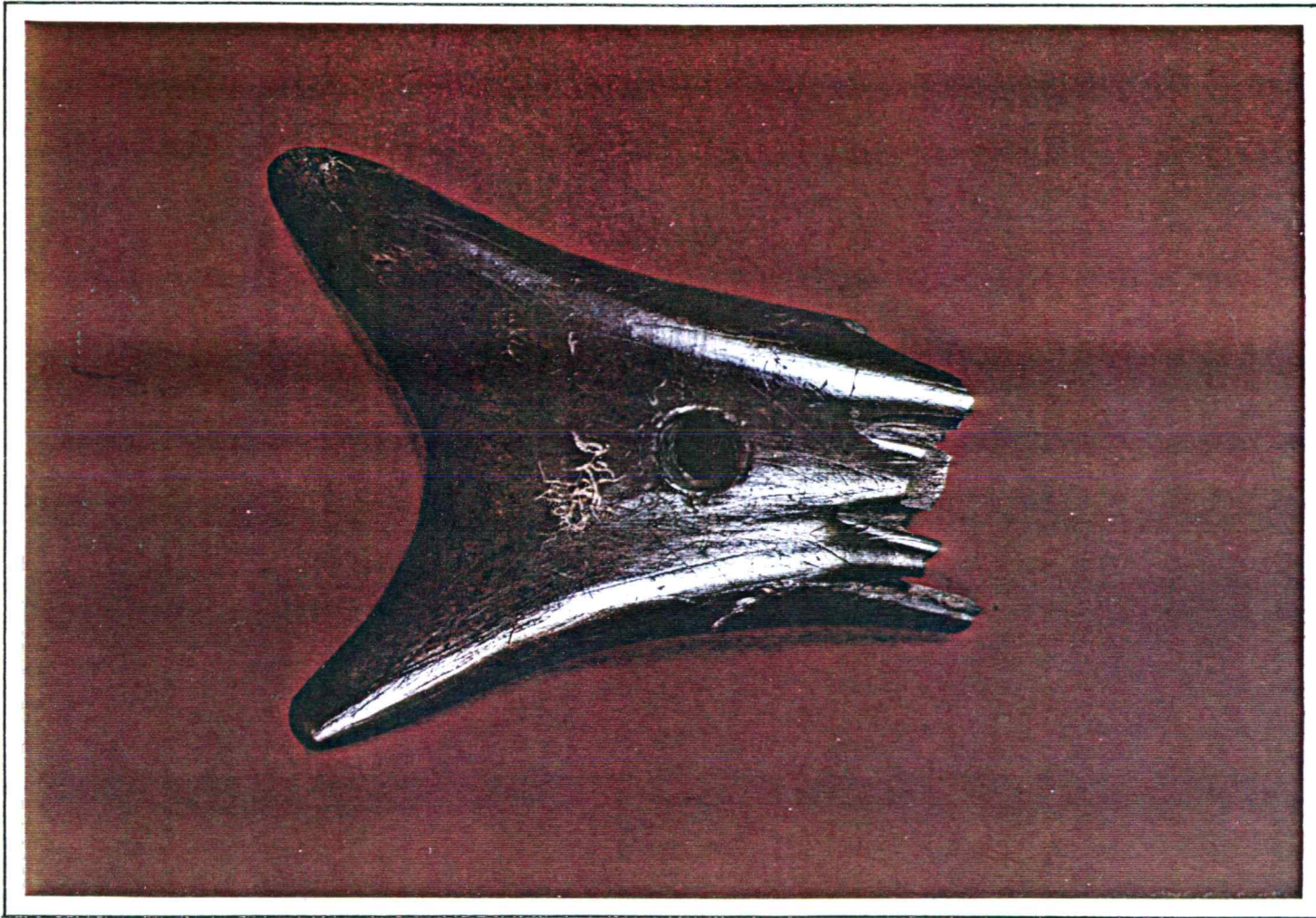


Figure 42. This antler artifact, possibly used as a comb, was discovered at The Dalles (see page 110 for view of the other side).



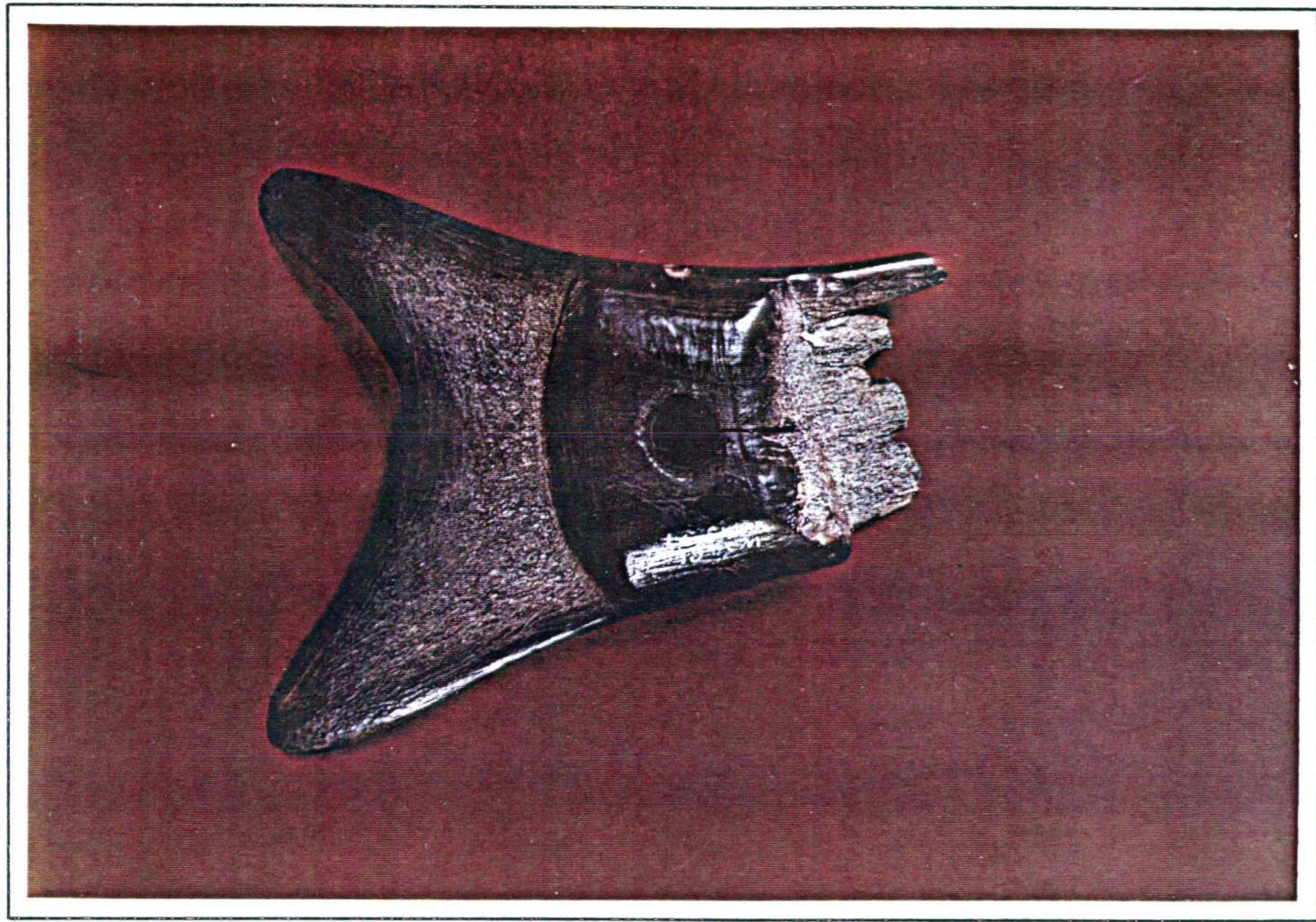


Figure 43. Opposite view of antler artifact from previous page.



had communal significance. The hunt was held in a given locality at intervals of several years under the leadership of a medicine man, or "shaman," as he is called. Julian Steward (1955) describes the process:

The people built a brush corral from which wings, consisting of piles of brush or stones, extended outward a half a mile or so. Drivers spread out several miles from the corral, formed a line across the valley, and slowly closed in, urging the antelope between the wings and into the corral (Steward 1955:110-111).

It is obvious that some antelope hunting was taking place in Oregon during prehistoric times, so the lack of archaeological evidence can probably be attributed to butchering practices or refuse disposal outside of living areas.

Rabbits were another important resource in the Great Basin (Figure 44). Nets believed to have been used in rabbit drives have been found in prehistoric archaeological sites in the area (Cressman 1942). During the early historic period the rabbit drive was the principal collective hunt. The only distinctive feature of these drives was the use of a net about the height and mesh of a modern tennis net and several hundred feet long. Steward (1955) describes their communal use:

A number of these nets were placed end to end to form a huge semicircle. Men, women, children, and dogs beat the bush over a wide area, gradually closing in so that rabbits which were not clubbed or shot by drivers became entangled in the nets, where they were killed (Steward 1955:109).

Other mammalian species of lesser economic importance were squirrel, chipmunk, muskrat, beaver, mice, gopher, mountain lion, bobcat, wolf, fox, marten, otter, raccoon, and bear. It is also possible that in certain seasons of scarcity these minor game species were utilized



Figure 44 . The jack rabbit was an important food source and was hunted collectively in the Great Basin.

greatly to get through rough times.

### Birds

Oregon is situated in the Pacific Flyway, one of four waterfowl routes out of Alaska and Canada (Figure 45). This geographic position provided early people with a plentiful supply of birds; in fact, over 400 species have been recorded in the state (Patton 1976:169). Bird hunting was widely practiced by aboriginal peoples. Bones from many species have been found on the coast, along the Columbia River, in the Willamette Valley and in the Great Basin.

Because of Oregon's location on the Pacific Flyway, every spring and fall large numbers of waterfowl could be expected to migrate through the area. Waterfowl were most probably hunted with the aid of fine nets, which were strung between poles sometimes thirty to forty feet above the ground near water holes. Low flying birds would fly into these nets in the light of dawn or dusk, and the waiting people - usually men - would wring their necks (Underhill 1944:47). Early residents of Oregon no doubt closely observed the habits of waterfowl and placed their nets strategically.

In the excavation of Fort Rock Cave a surprising feature was uncovered. Bones of wild turkeys, never before reported from this region, were found in large quantities below the Mazama ash dated at approximately 7,000 years ago. The turkey is native to many parts of North America, but this discovery unexpectedly extends the known range of the species. At this site a large number of waterfowl bones were also





Figure 45. Dusky Canada Geese and other waterfowl were seasonally abundant and provided a valuable food resource.

unearthed. It is believed that these peoples' exploitation of resources was truly diversified (Bedwell 1973:59,158).

In The Dalles region there is strong evidence of early use of raptorial and scavenger species (hawks, eagles, and vultures). Of over 1,000 bird bones analyzed by Loye Miller (1957) of the University of California, 92.5 percent of these belonged to the raptorial and scavenging kinds; each of the remaining kinds accounted for less than two percent. Included in this analysis were bones of the California Condor (17 percent), now absent in Oregon (Miller 1957:59-62; Cressman 1960).

These raptors and scavengers were probably attracted to the area by the cast-up carcasses of post-breeding salmon or by human refuse (Miller 1957:60). One characteristic of these birds which make them relatively easy prey is their tendency to run a few steps to get airborne. Since a number of birds may be focusing on the eating of a single carcass, an entangling bola would have been a very effective weapon with a good chance of securing a number of birds with a single throw. The bola is a weapon consisting of a cord with weighted balls fastened at the ends. There is evidence for use of the bola 9,000 years ago at The Dalles. Cressman (1977) states that the archaeological record indicates a local invention of this weapon (Cressman 1977:110-111). Raptors and scavengers are also attested to by archaeological records from various sites along the coast and in the Great Basin (Richard Ross, Personal Interview, August 1979; Cressman 1942).

#### Marine Resources



Marine mammals, such as the seal and sea lion, were exploited on the rocky coast of Oregon by native peoples. Sea lions were difficult to catch, for they are wary animals despite their awkwardness out of water. The results of such hunting, however, were worth the effort. The stomach of a sea lion was ideal for a large bottle; the intestines, twisted and dried, made tough, elastic bow strings, and its meat could feed a village (Underhill 1944:43).

Harbor seals were also hunted along the Oregon coast and up into the mouths of many rivers. Prior to dam construction harbor seals would migrate up the Columbia as far as The Dalles. Various weapons, including harpoons, were in use at The Dalles well before 9,000 years ago, the earliest indication of harpoon use in the New World (Cressman 1960:47,87).

The sea otter furnished coastal natives with many fine robes and blankets. These highly gregarious and formerly very abundant sea mammals were easily caught because of their timidity. The population of sea otters was drastically reduced when early explorers began to trade for these valuable pelts.

Whales were abundant along the Oregon coast, but unlike Washington coast tribes, it is believed that the whale was not hunted at sea off the coast of Oregon. The presence of whale bones in Oregon coastal middens documents their utilization, but the numbers are relatively few. It is possible that use of the whale was limited to those washed ashore or stranded by violent Pacific storms (Drucker 1943:84). Franz Boas (1894) records a number of customs and taboos associated with the

whale:

When the Clatsop found a whale its discoverers indicated their claim by tying straps of kelp to the animal; then others were called, but they did not cut where the straps had been placed. Those who came last received the lower side of the animal. Portions were not recut (immediately?) (Boas 1894:262).

Many species of dolphin and porpoise occur along the coast, and those that migrated up river as far as brackish water reached were hunted by the natives (Ray 1938:115). Lewis and Clark wrote that, "the Indians gig (spear) them and always eat the flesh of this fish when they can procure it..."(Thwaites 1905:163).

Saltwater fish that were of economic importance include flounder, herring, smelt, perch, eel and sturgeon, the latter being favored for its size and flavor (Swan 1969:245). Practically all other flora and fauna of the sea were utilized as food or as an aid in getting food. Seaweed was eaten for salt, barnacles were collected and cooked in ashes, crabs were caught with a pointed pole, and lamprey eels were taken with gaff hooks; mussels, razor-clams, oysters, and sea urchins were also important items in the subsistence of coastal peoples. Clams were a chief resource, as attested to by the huge shell mounds along the Oregon coast (Figure 46)(Drucker 1943; Barnett 1937). It is in these shell mounds that many artifacts are discovered today because of the excellent preservation within.

### Fishing

Fish have provided an important food source in the diets of Northwest peoples for thousands of years, for a variety of species are avail-



Figure 46 . Shell middens, like this one at Yachats, were the Coastal Indian's refuse piles and were once found all along the Oregon Coast.

able during different seasons of the year. Early humans, when they reached Oregon, probably found a much richer resource in terms of freshwater fish; their numbers and the diversity of species exceeded the tremendous quantity known in the historic pre-dam era in Oregon (Miller 1965:571). It is safe to say that it would not have taken humans long to develop methods of collecting this abundant resource.

Much of what we know about prehistoric people in Oregon comes from sites excavated along rivers. Present knowledge suggests an aboriginal population well adapted to exploiting riverine resources. The Great Basin and Willamette Valley provide exceptions to this generalization; in the former, for example, only specimens of a few chubs were found in the archaeological record going back 10-9,000 years ago (Bedwell 1973:55). The Willamette Valley residents subsisted mainly on roots and bulbs of numerous plants, but their diet was supplemented with crayfish, fish, and meat. Salmon, trout, and eel were preserved for the winter (Jacobs 1945:188-189). Salmon was the favored fish and the salmon spirit was respected with a special fish-eating ritual (Townsend 1839:182). Faunal remains from The Dalles and Fort Rock Cave provide the earliest evidence for fishing in Oregon approximately 9,000 years ago (Cressman 1960; Bedwell 1973:197). However, it cannot be said that this evidence suggests the beginning of fishing in the area, for it is possible that early people brought a fishing technology with them into the region.

At the time of white contact a variety of methods for collecting fish had been well developed. The following is a list of methods used

in various localities (Rostlund 1952):

- 1) Line with hook or hooks.
- 2) Fish spears, leisters, harpoon, and bow and arrow.
- 3) Weirs and traps.
- 4) Net
  - a. Seine; pulled by two canoes.
  - b. Dip; from river bank, platform, or canoe.
  - c. Gill; set between posts or canoes.
  - d. Funnel shaped; for eulachon or herring.
- 5) Herring rake.
- 6) Fish club.
- 7) Poisoning (Rostlund 1952:81-136).

Although Rostlund's list summarizes developed fishing methods, it is not yet possible to arrange these methods according to their age.

Possibly as early as 7,500 years ago the gorge (a primitive fish hook) was used in the Klamath Basin, for several were found in the Kawumkan Midden (refuse pile)(Cressman 1956). They do not, however, occur at The Dalles, a heavily used fishing site. Cressman (1977:113) feels that the Klamath Lake area was favorable to the use of the gorge and line (Figure 47), but the Columbia with its swift current was not.

Projectiles used for fishing included the bow and arrow, the spear, the leister, and the harpoon. The bow and arrow was taboo along the Oregon coast but is reported in most other areas of Oregon (Barnett 1937:164; Rostlund 1952:134). The bow and arrow would be most effective in shallow pools, as the water would alter the course of a projectile. This method also presents problems in retrieving the fish. Archaeological evidence of projectile use for fishing is difficult to ascertain due to their many uses (Cressman 1977:108).

One projectile which solves the retrieval problem is the leister (Figure 48), an ingenious device used from the Columbia - north during



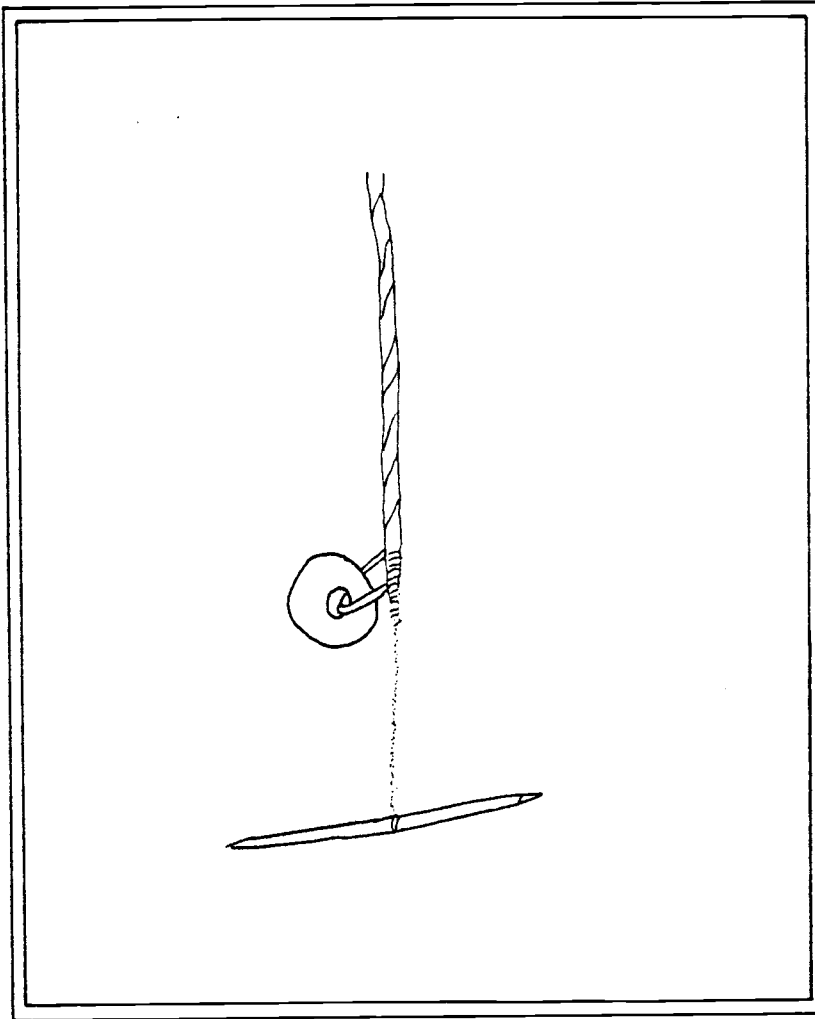


Figure 47. The gorge and line is thought to be the most primitive of all hook and line devices and possibly the oldest. The off-centered barb angled and stuck in the throat of the fish.

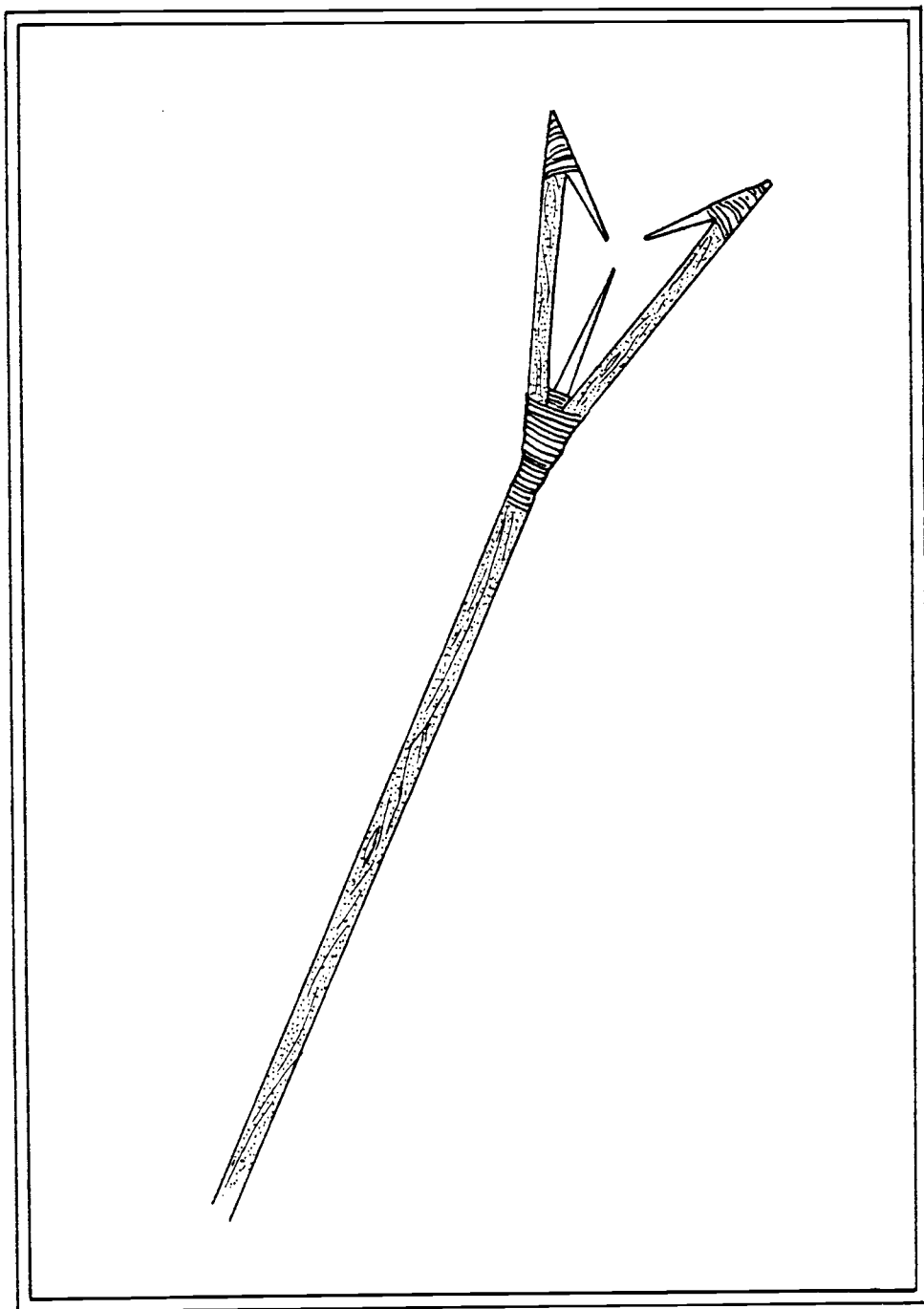


Figure 48. The leister is a thrusting fishing spear primarily used in shallow water.

contact times. Cressman (1977:115) writes that the most frequent occurrence, archaeologically speaking, of the leister is in the region between the Columbia and Fraser Rivers. Because the leister is a thrusting instrument and cannot effectively be used in deep water, this distribution is to be expected.

The harpoon also provided a solution to the retrieval of fish (Figure 49). The harpoon differs from the simple spear in that the harpoon's head detaches from its shaft and a retrieval line can be attached. A later modification of the harpoon was the toggling head and composite head. The toggling head was one that toggled, or pulled sideways, to lodge itself in the animal's flesh; the composite toggling harpoon head was composed of multiple components (Figure 50). It is not certain whether the harpoon was first developed for hunting on land or in water, but the more advanced types were primarily employed in hunting sea mammals (Barnett 1937:169; Rostlund 1952:106-108). The three-piece toggle point is found on the Middle Columbia and Snake Rivers in contexts that indicate its use 1,000 years ago (Cressman 1977:116).

Weirs and traps were constructed to obstruct the passage of fish in order to facilitate their capture, and the purpose of the trap was to impound the fish so it could not get away. Weirs and traps were often used separately, but the most effective system employed the two ideas of obstruction and impoundment (Rostlund 1952:101). A weir must be placed in the moving water of a stream in order to be effective. With the vast runs of anadromous fish (those which travel upstream from

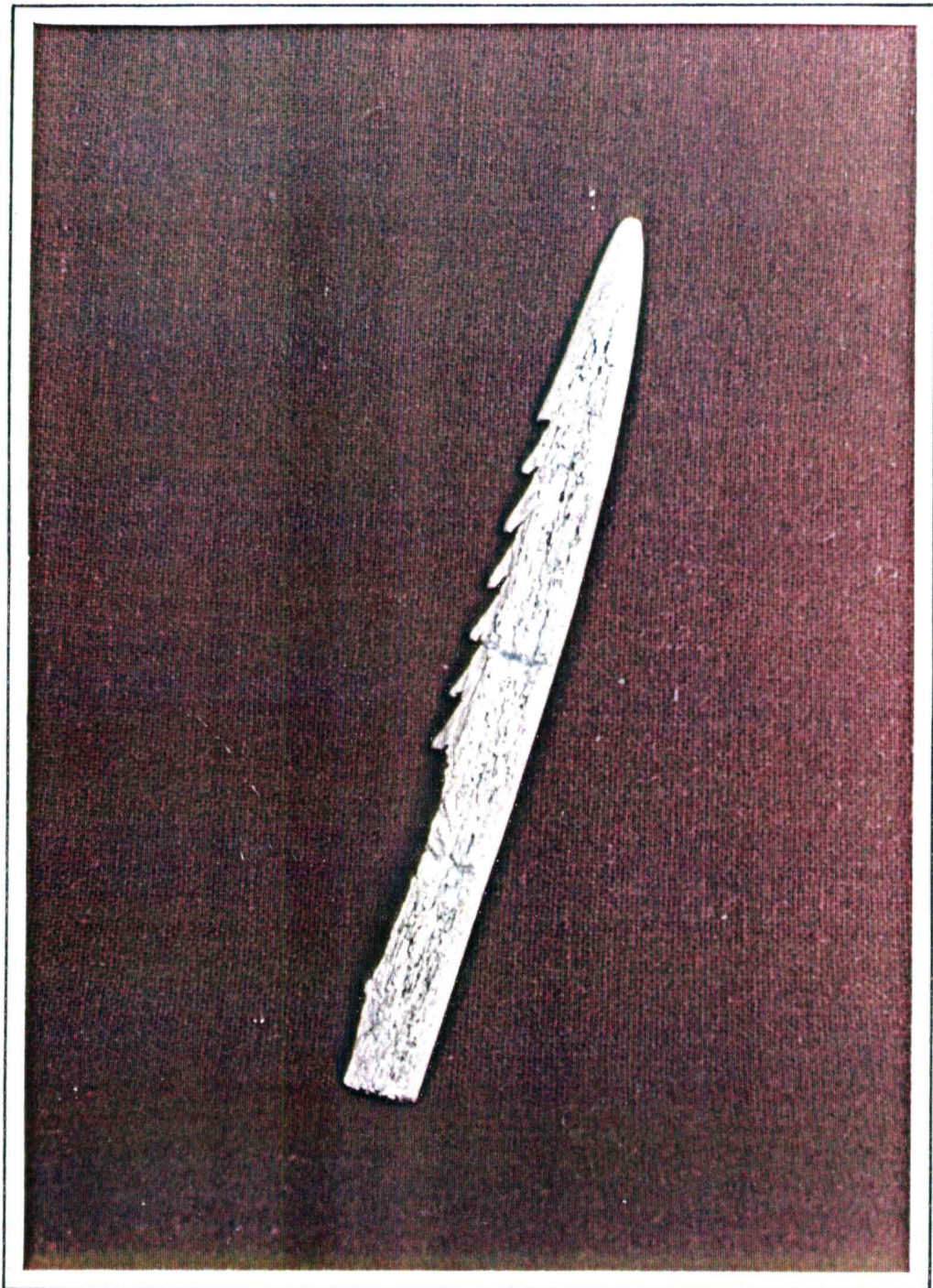


Figure 49. This unilaterally barbed harpoon point was found at the Umpqua-Eden site. The harpoon had an advantage over the spear, since it was retrievable.

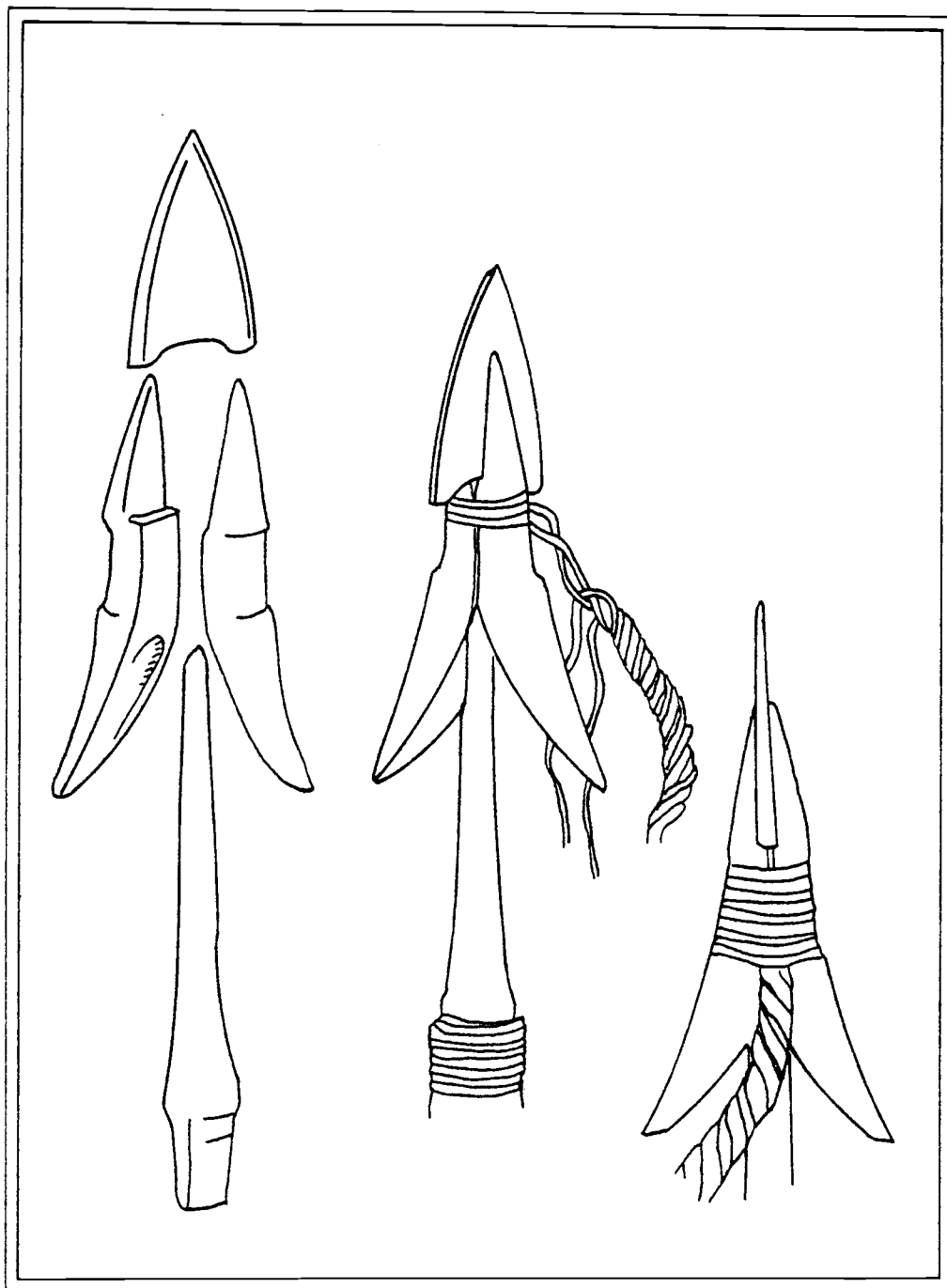


Figure 50. The composite harpoon head is composed of multiple components and was used in hunting marine mammals.



the sea into freshwater to spawn) up coastal rivers the weir proved quite effective and was commonly used in white contact times (Ray 1938). Rostlund (1952:102) suggests that the most primitive weirs may be one of the most ancient and economically important techniques used in fishing.

The seine net and gill net were, in Rostlund's (1952:81-82) opinion, "the most advanced and efficient fishing implements known to the American Indians." A highly developed net fishery is a distinctive mark of peoples seriously engaged in fishing. The Columbia provides a good example of a region whose residents depended heavily upon fish for subsistence. The presence of the grooved, notched, or perforated net sinkers (Figure 51) marks the beginning phases of net use at The Dalles approximately 8,000 years ago. Net systems not using weights such as dip nets (Figure 52) were possibly used earlier on the Columbia, but no evidence has been found. A large seine net towed by two canoes has been reported from certain tribes along the Oregon coast and on the Columbia River (Figure 53)(Ray 1938:108).

The noose, poisoning, and decoy methods of fishing are techniques for which there is no archaeological record, though early explorers and ethnographers write that these were at least in use. The fish club and herring rake appear in archaeological excavations rather late.

One of the most important aspects of subsistence fishing is preparation. The theory of abundance of this resource is true for some localities, but even this abundance was seasonal. In order for people to become heavily dependent upon one particular resource, i.e. fish,

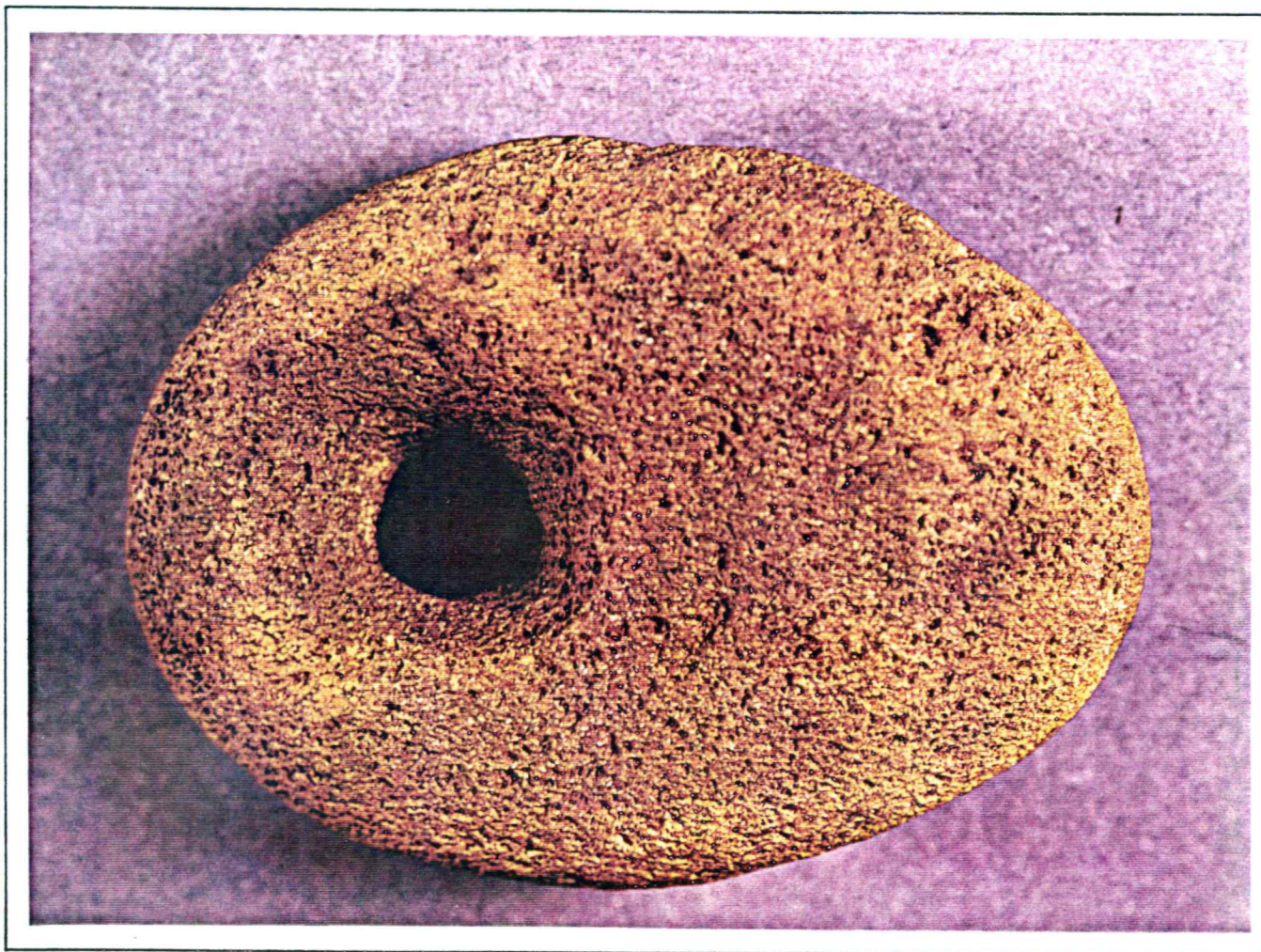


Figure 51. The beginning of fishing net use on the Columbia River is marked by the net-sinkers in the archaeological record.

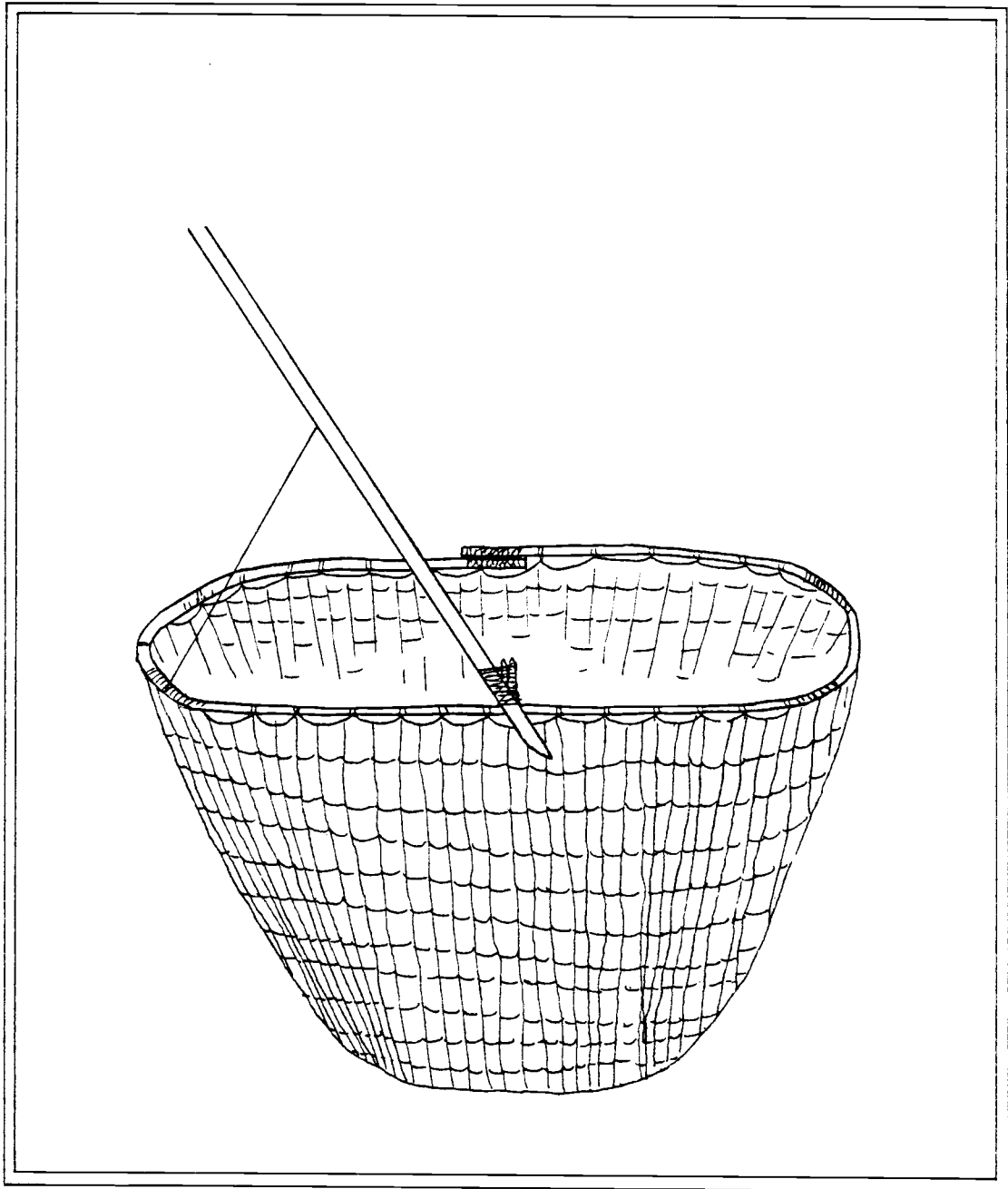


Figure 52. During heavy fish runs on the Cokumbia River a dip-net was used from the shore or a platform. The handle is twenty feet long, which the fisherman thrusts upstream as far as he can reach.





Figure 53. During the white contact period, Indians on the Columbia River fished with seine nets, which varied in size from one hundred to six hundred feet long and from seven to sixteen feet deep.

they had to first have enough individuals to process a large quantity, and second develop good storage systems (Figure 54). The people of the Columbia had both. Lewis and Clark estimated the quantity of fish in storage on the Lower Columbia: one stack of fish contained about 10,000 fishes. It was said that about 30,000 pounds of dried and pounded fish were annually prepared for trade by The Dalles Indians (Twaits 1905:343). Drucker (1939) says that dried salmon was a "mainstay which permitted the Alsea (on the coast) to pass a winter of leisure" (1939:82).

The preservation of fish is economically significant in that Indians could not have taken the best advantage of the resource without this process. The amount of fish that could be processed by the local labor force actually may have limited the harvest of some fish species. Rostlund (1952:140) writes, "The preservation process was economically the most critical bottleneck in the whole aboriginal fishery of North America."

#### Species of Fish Exploited

Pacific salmon and steelhead were by far the most important fishes in prehistoric times in that they provide more food than all other species combined. Because prime food fishes are abundant during the annual run, the availability varying with the seasons, this resource ranks high in both quantity and quality. As far as fish were concerned, in Oregon it was either feast or famine. Other less abundant anadromous species are sturgeon, sea lamprey, and in certain locations smelt



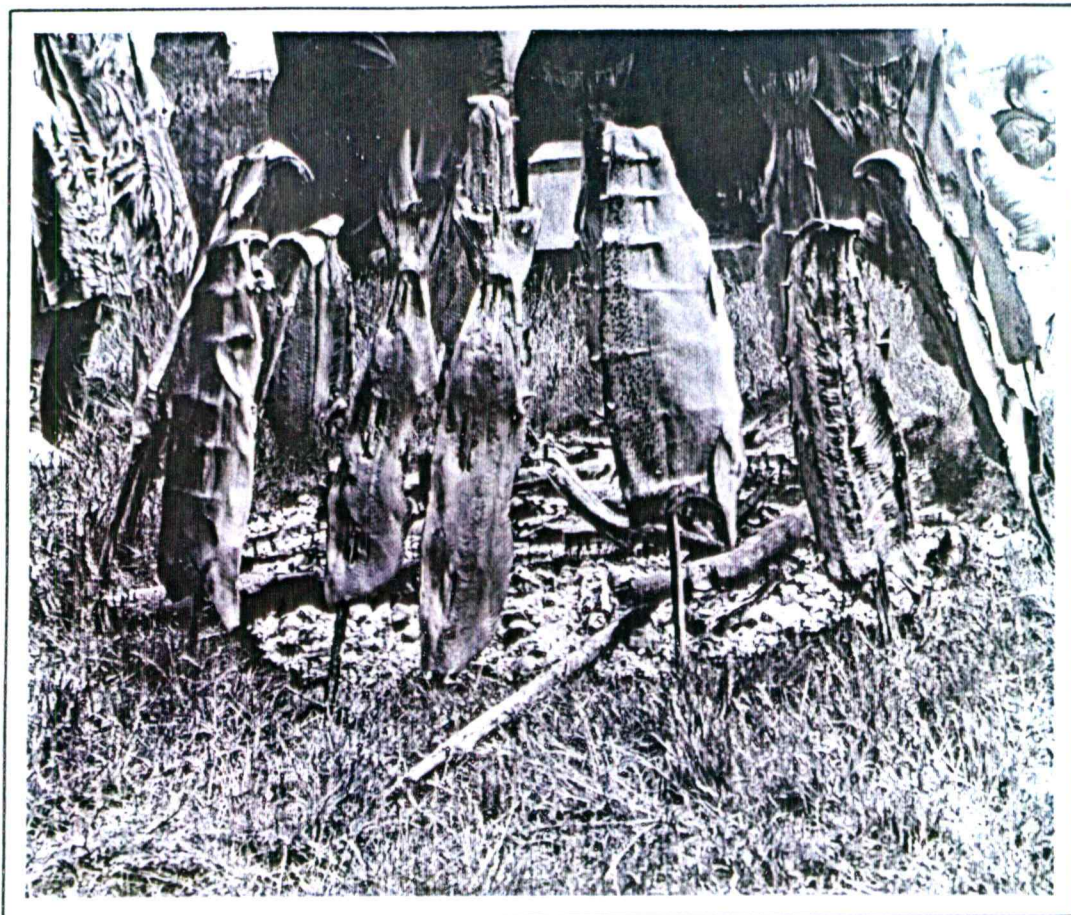


Figure 54. Although much of the seasonal salmon catch was stored for the winter, or for trade, the natives on the Columbia River favored fresh salmon. They were prepared by pushing sharp pointed sticks through the fish and roasting over an open fire

and candlefish. Except for trout, freshwater fishes were not abundant. The Oregon coastal streams freshwater fauna was quite meager; it includes, besides trouts, one species of sucker, minnows, and, on the Umpqua River system, a species of squawfish. Some lake chubs, minnows, and killfish exist and existed in the Great Basin. Cutthroat trout occurred in some of the lakes in southeastern Oregon. Rostlund (1952), in writing about Pacific fishes, claims that, with a few local exceptions, fish were nowhere abundant enough to be a staple food and, at best, served only to supplement other food resources (Rostlund 1952: 74-75).

### Gathering

Plant gathering provided the mainstay in the diet of many prehistoric populations in Oregon. Especially in western Oregon plant foods played a critical role in survival, for they were a very stable and dependable resource. Cressman (1977:119) suggests that "gathering did not begin with the appearance in the archaeological record of stone food processing implements," (for example, mortars and pestles)(Figure 55). He continues, "These stones indicate the appearance of a new method of food preparation, nothing more." (Cressman 1977:120)

Throughout Oregon food processing was being practiced at a very early time. Archaeological work in eastern Oregon provides the earliest physical evidence of early food processing. At The Dalles and in the Klamath Basin area manos and metates (a mano is a smooth stone tool held in the hand and used to crush grain or seed on a metate) (Figure



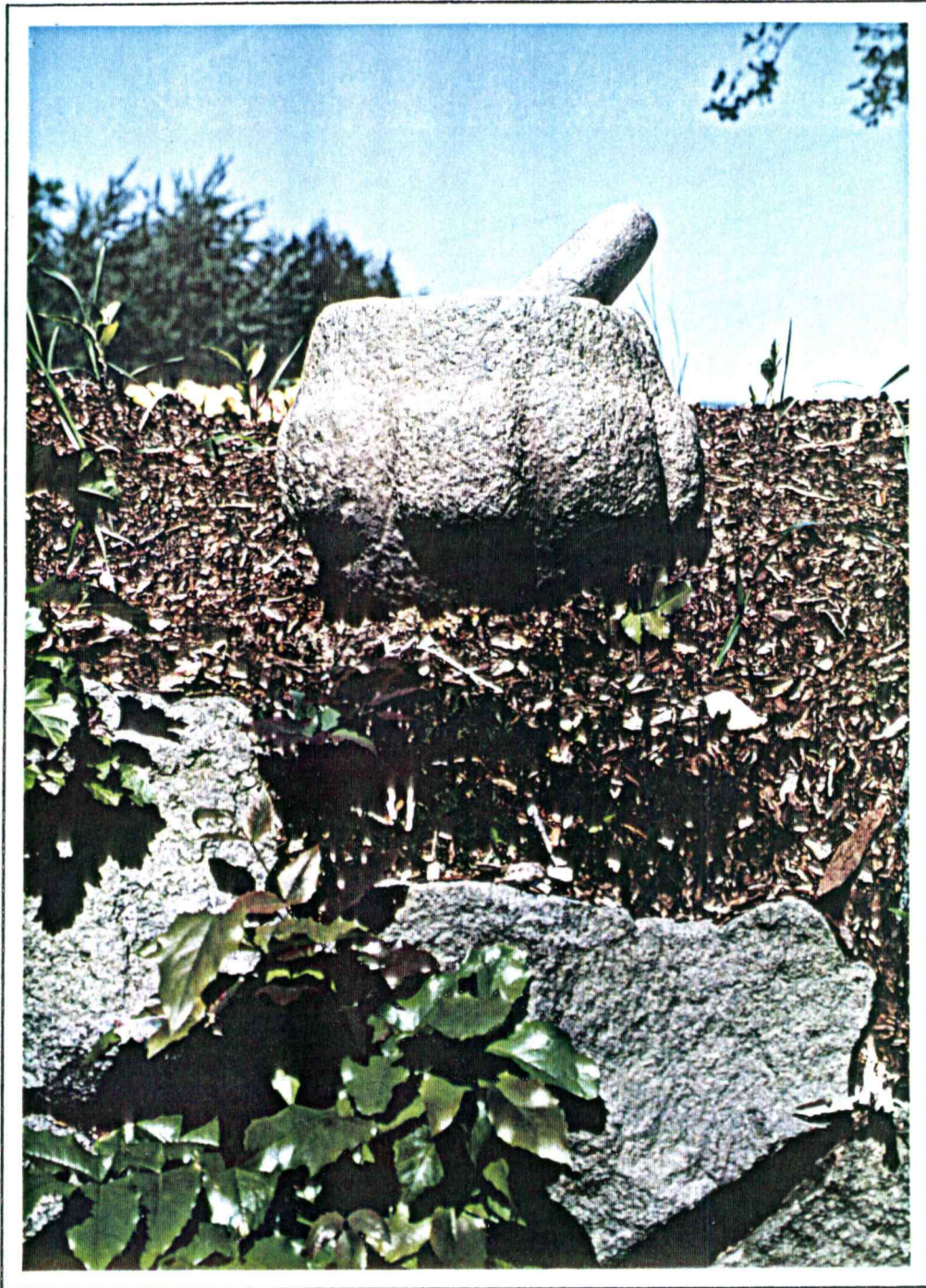


Figure 55. Mortars and pestles were used in processing plant foods and provided a medium for sculpture along the middle Columbia in the later period, beginning approximately 6,000 years ago.

56) dating back 9,000 years ago were found (Cressman et al. 1960; Cressman 1956). A mano found at Fort Rock Cave is dated at 13,200 years ago (Bedwell 1973:152). The mano and metate preceded the mortar and pestle, which were found later at The Dalles, only 7,000 years ago (Cressman et al. 1960). Specimens found thus far in the Willamette Valley go back only 4,000 years ago (Richard Pettigrew, Personal Interview, March 1980). In southwestern Oregon a mano and metate date back 5-6,000 years ago (David Brauner, Personal Interview, April 1980).

Hopper-mortars were used with a bottomless basketry hopper to hold the material to be pounded and ground (Figure 57). The hopper-mortar was much easier to make than a stone mortar and was equally useful. Hopper-mortars were common on the Columbia Plateau and were also used during white contact times by the Takelma of southwestern Oregon. One dating back approximately 5,000 years ago was excavated on the Apple-gate River (David Brauner, Personal Interview, April 1980).

In Oregon three plant foods are striking examples of important subsistence resources: the wokus of the Klamath Indians; acorns of the southwestern Oregon Indians, and camas, exploited wherever it grew in western Oregon. Distinct patterns of gathering and preparation evolved around each, which is reflected in the processing tools found in the archaeological record.

The woka (*Nuphar Polysepalum*), or pond lily, was mostly available in the late summer when lily pods were ready to drop their seeds. The Klamath Basin provided the best area for growth of this species. Wokas were harvested exclusively by women in dugout boats made of *Ponderosa*



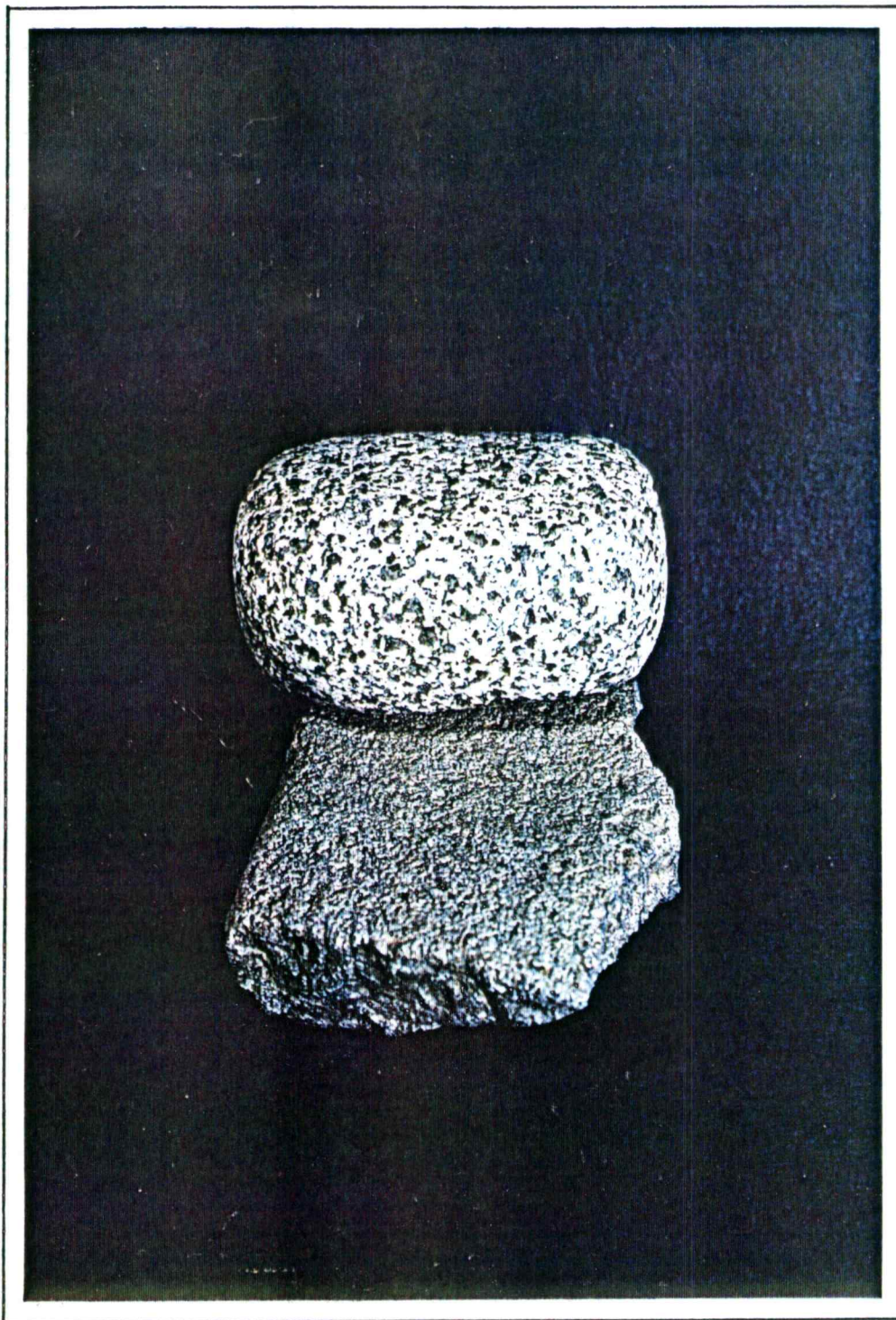


Figure 56. The mano and metate were used in grinding seeds. The motion was back and forth, rather than an up and down motion used with the mortar and pestle.



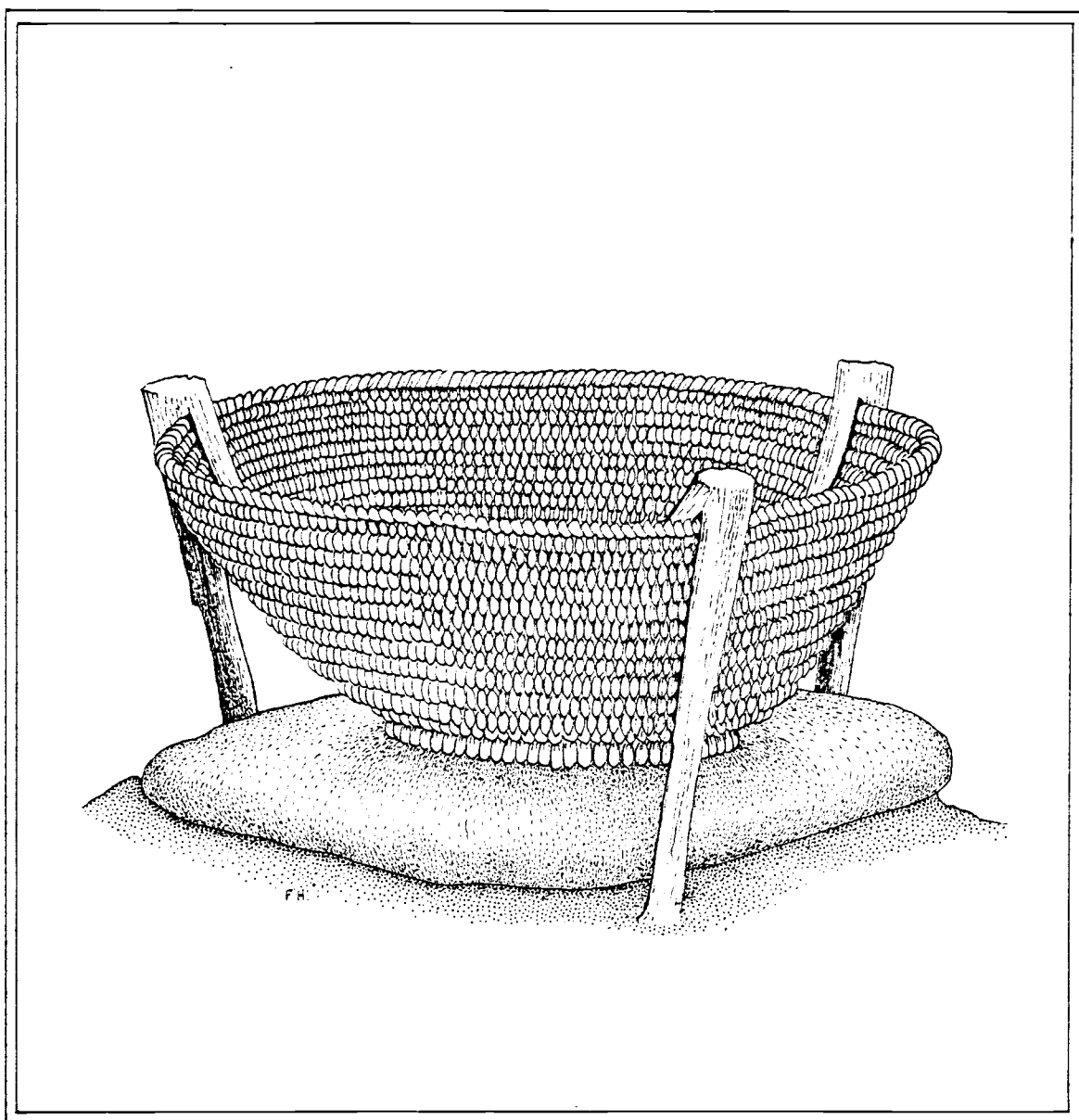


Figure 57. The hopper mortar was used in food processing by Oregon's early peoples. The hopper, or basket, is bottomless and is held in place over a mortar stone by wooden pegs driven into the ground.

pine, which were propelled by poling rather than paddling. The pods of the woka were lifted from the water with a large wicker spoon. In early times seeds were placed in a wicker tray with live coals to dry them for mealing. The pods were processed in a variety of ways depending on their level of maturity (Coville 1902:731-735).

The woka resource was considerable. A day's harvest, actually measured by Coville (1902), ordinarily consisted of four to six bushels of hard pods and a half bushel of disintegrating pods per person (Coville 1902:730). Since the gathering took place for one to five weeks a good stockpile of meal could be expected.

The staple food of the Takelma of southwestern Oregon is considered to be the acorn collected from various species of oak (*Quercus*). The first acorns appeared in the early spring, at which time women gathered and prepared them. After being mashed in a hopper-mortar basket, the meal was then sifted and placed on carefully washed sand and seething water was applied to remove the bitter tasting tannin. The acorn dough was then boiled in a basket-bucket constructed of hazel shoots and roots, and hot stones were added to the basket. The final result was a mush which formed the most typical food item for these peoples (Sapir 1907:257-258).

Camas was probably the single most important vegetable food for early peoples of western Oregon (Figure 58). Although its use dates back 4,000 years in the Willamette Valley (Richard Pettigrew, Personal Interview, April 1980), it is uncertain when the beginning of camas exploitation occurred. The camas bulbs were dug up with a stick in late



Figure 58. Camas is common in the wet meadows of western Oregon and its starchy bulb formed a staple food item of Indians of this region.

summer or early fall and then baked in earth ovens (see Downy and Furniss 1968). After baking, the bulbs were either eaten immediately or dried to grind into meal and make camas cakes for eating during the winter (Peterson 1975:4).

A variety of other vegetable foods that supplemented the diet of Oregon's early human populations included pinenuts, native sunflower seeds, wild carrots, wappato or wild potato, wild onion, various berries, and probably anything else that was experimented with and found edible.

### Summary

Archaeologists rely heavily on ethnographic information. The observable data, such as site locations, tool design, and subsistence activities may be used to give meaning to artifacts found in archaeology. Of the scholarly fields that investigate the human species, archaeology more than most places people clearly in relation to their environment (Chang 1966:57). A number of environmental factors are interrelated including climate, soil, fauna (humans included) and flora, and topography.

Michael Coe and Kent Flannery (1964) in a provocative article state that humans:

must exploit a wide variety of small ecological niches in a seasonal pattern - niches which are usually scattered over a wide range of territory...  
(Coe and Flannery 1964:651).

As we have seen this may not always be true, for on the Columbia River fish provided the major source of food and several large, stable set-



tlements developed along the banks of the river. For the most part, however, archaeology supports this statement, for the majority of archaeological sites excavated within Oregon have been described as seasonal camps, stops on the seasonal pattern of subsistence activities.

In general the patterns of prehistoric subsistence and habitation in Oregon bespeaks a highly specialized technology that took maximum advantage of available resources. Archaeological evidence suggests that some early peoples were innovators, while others were not. Cressman (1977) believes that the Great Basin provided a stimulating atmosphere for innovation, one in which the individual was constantly pressured by the nature of life to attempt to devise more effective ways of adaptation.

For the earliest occupants of Oregon subsistence activities dominated everyday life, but survival may not have been as difficult as previously believed. Subsistence activities were certainly not all that early peoples were engaged in. Cressman (1977) wrote, "In most cases people do not have to exploit all the opportunities of the natural environment to survive, but the more fully they exploit them, the higher the standard of living within the limits imposed by the environment" (Cressman 1977:2).

Prehistoric peoples were closely in tune to the environment and acted as functional units of ecology - something modern people seem to have forgotten. Early people were not only affected by environmental change, such as vegetation zones and wildlife distribution, but they also affected these elements by their actions. Archaeology has sup-

ported the belief that culture is a direct result of this interaction between people and their environment.

## CHAPTER VI

### ARCHAEOLOGY

Archaeology is the study of cultures of the past through their remains. The term refers to the entire process from search and discovery of archaeological sites, to reporting the results (Chang 1968). Archaeology is a subdiscipline of anthropology, which is an unusual discipline because anthropologists go in many directions in their study of man. The common link which all anthropologists share is a perspective. This perspective holds that the science of mankind can arise only from a holistic, all-encompassing, and interdisciplinary approach (Thomas 1979:96).

Much has been written about the "new archaeology"; some archaeologists praise it, while others reject it. K. C. Chang (1968) wrote:

I am not impressed by the phrase "new archaeology" that one sometimes finds in current literature. What is old today was new in its own time, and what is now new will become old tomorrow. To say archaeology is new is to alienate it from the old, whereas one could more profitably absorb and reorganize the old. Rethinking is a constant and routine mental process that brings about renewal at every turn (Chang 1968:3).

It can be said that a lot of thinking has been going on in the field of archaeology, the result being significant advances in the reconstruction of past lifeways.

This chapter will first address the various phases of archaeological work, from the field to the final report. Second, it will review

some of the scientific and legislative advances that have greatly affected the direction of modern archaeology.

### Field Work

David Hurst Thomas in his book Archaeology (1979) states that,

Archaeology's initial objective is to construct cultural chronologies, to order the past material culture into meaningful cultural segments. The intermediate objective is to breathe life into these chronologies by reconstructing past lifeways. The ultimate objective is to determine the cultural processes that underlie human behavior, past and present (Thomas 1979:137-138).

Before an archaeologist can go about constructing chronologies and reconstructing past lifeways in any given location, they must locate the remains of past cultures. Many archaeological sites are discovered when a private land owner undertakes a construction project and uncovers artifacts in the process. Archaeology, however, is not always a matter of chance. With the development of contract, salvage and emergency archaeology, spawned by government construction projects, there has been an associated improvement in systematic methods of locating, testing, and excavating archaeological sites.

When an archaeologist receives a contract, the first step they will take is to the library to review literature pertinent to their study. They might also communicate with informants, such as outside specialists, amateurs, and other archaeologists. This is done in order to develop a foundation of knowledge for future field work.

Background research may be followed with an intensive field survey, depending on the needs of the funding agency. The systematic



field survey is done by trained archaeologists who walk a given area scanning for surface evidence of past habitation. This involves not only searching for artifacts, but carefully observing the landscape for noticeable changes in topography or vegetation, for they also are indicators of past human activity. This information, obtained from either intensive or sample surveys, is then applied toward answering specific questions about the archaeological record, or questions about human behavior.

Use of a research design to evaluate research testing priorities is an important, time-saving method preceding the actual testing of a presumed archaeological site. In areas where surface indicators point towards human occupation the archaeologist will dig a test pit (Figure 59), usually 1x2 meters wide, and as deep as cultural material is found. These pits give a good sample of what lies beneath the surface. If the material excavated is deemed to be significant based on criteria established by the funding agency or the archaeologists, further testing is done. Expanded test operations allow archaeologists to determine the vertical and horizontal extent of the cultural material, thereby giving a good idea of the importance of the find. Based on this information recommendations are made for future work, perhaps large scale excavation of the site (Figures 60 and 61).

With the increase in contract archaeology, mitigation has become an essential part of a systematic study. Mitigation is the process in which the decision on methods of alleviating impacts on archaeological sites is undertaken. The nature of the recommendations depends on the

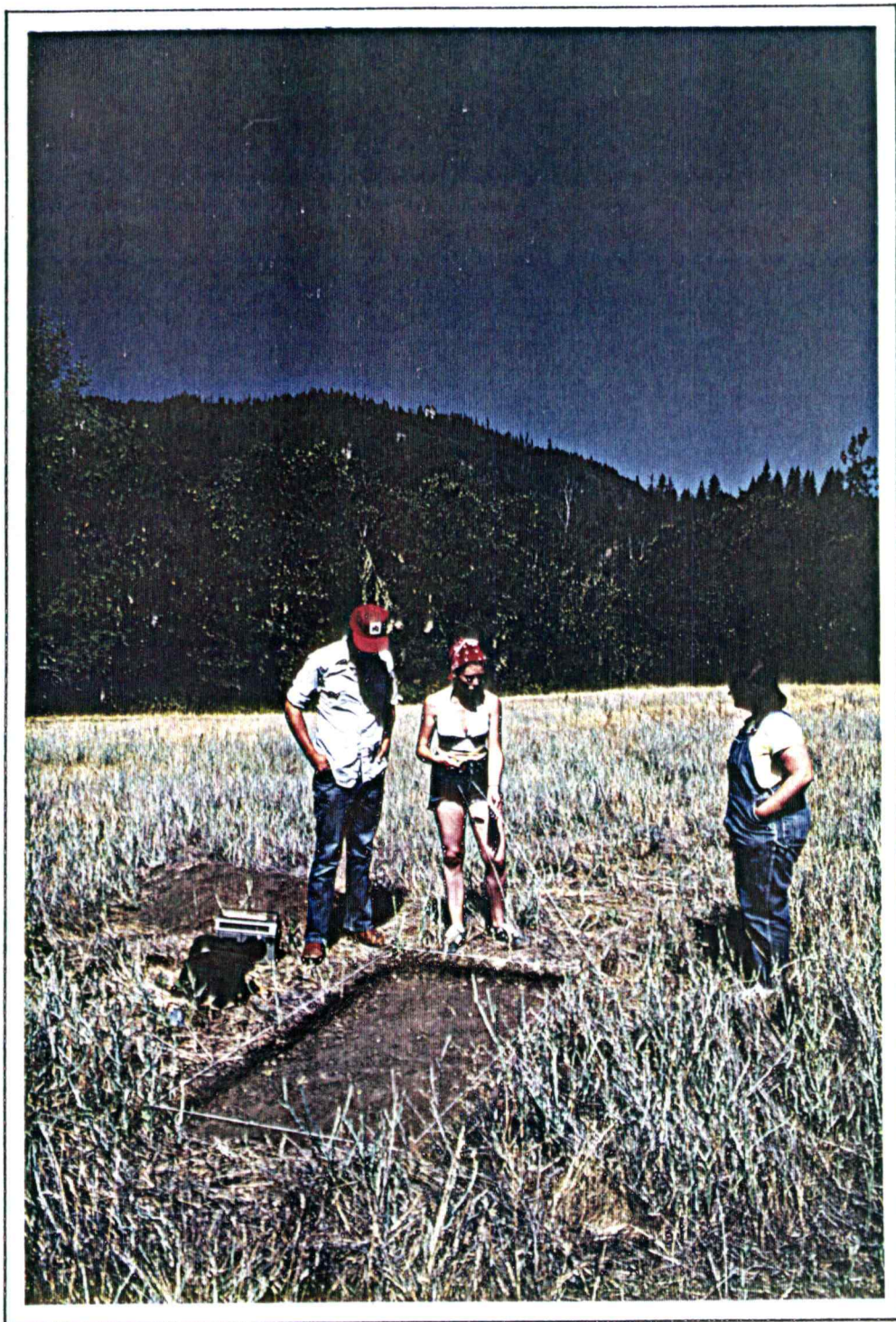


Figure 59. Archaeologists begin excavation of a test pit in order to determine the presence of subsurface cultural material.



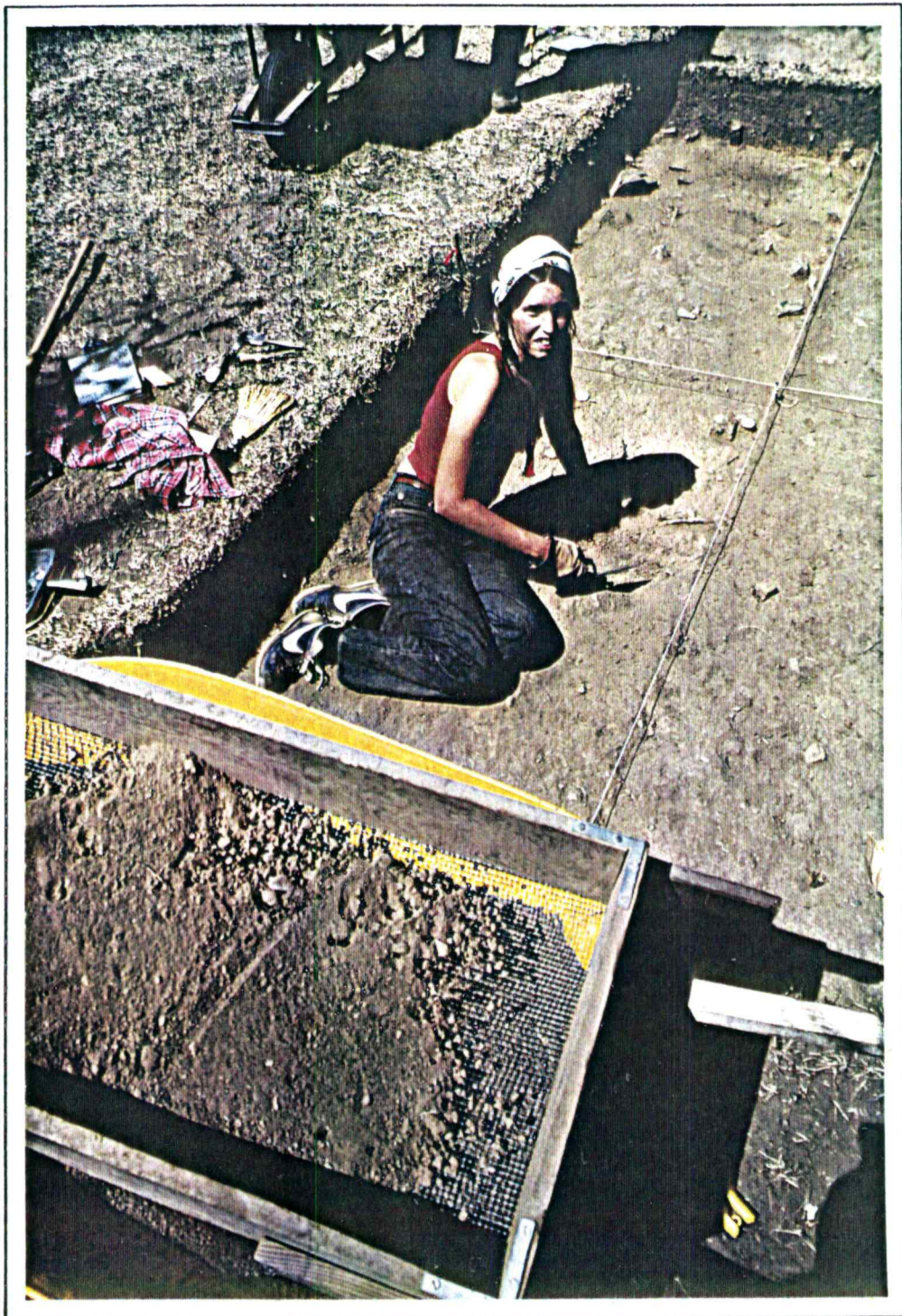


Figure 60. The "digging in the dirt" aspect of archaeology is exacting work, where thin layers of soil are removed with the aid of a trowel.





Figure 61. On the Applegate project, archaeologists excavated in ten centimeter levels, which were then mapped and photographed to accurately plot the location of artifacts and their relationship to other aspects of the site.



scope of the proposed project, significance of the resources, and the predicted impacts. If there is no way to protect or conserve the cultural resource, scientific investigation - usually involving excavation - is the alternative that is frequently turned to. In reality, when archaeologists make recommendations, they usually suggest a flexible plan that combines avoidance, preservation, and excavation (Schiffer and Gumerman 1977:325,330).

A large volume could be written and still not cover all aspects of archaeological excavation. A cursory view will be presented here. Fred Plog, Margaret Weide, and Marilyn Stewart (1977) write about the selection of sites for excavation:

If one is interested in reconstructing prehistoric settlement-subsistence systems, sites cannot be selected for excavation solely on the basis of their size or the cultural tradition or time period that they are believed to represent. Equal attention must be paid to smaller sites that, because of the initial artifactual material collected from them or because of their location, seem to represent functionally different site types (Plog, Weide, and Stewart 1977:117).

A concern with the reconstruction of settlement-subsistence systems may affect the method of excavation. Four major strategies for revealing settlement information are presented by Thomas (1979):

- 1) The ecological determinants approach - stresses the underlying environmental and technological factors that condition the placement of archaeological sites.
- 2) The locational analysis approach - concerned with the regional centers relation to outlying secondary sites.
- 3) The site catchment approach - focuses on the mode of procurement of subsistence items, but emphasizes the strategic placement of major habitation areas.
- 4) The biocultural approach - represents an important synthesis between strictly archaeological and

physical anthropological research; this relatively new subdiscipline focuses on mortuary patterns and attempts to explore ways in which biological factors (such as rates of mortality, disease, and genetic distance) are related to sociocultural phenomena such as site placement (Thomas 1979:315-316).

The principle methods of obtaining subsistence information are also outlined by Thomas (1979):

- 1) Faunal analysis - the study of animal remains in archaeological sites, can be directed toward a number of relevant objectives (such as butchering methods, animals utilized, and methods of capture).
- 2) Plant remain analysis - plant remains have been important in reconstructing past environments, species of plants utilized, and the distribution of prehistoric plant communities (Thomas 1979:269).

In reconstructing subsistence systems, a sampling of sites is necessary in order to insure an understanding of the distribution of activities within individual sites (Plog, Weides, and Stewart 1977:118).

Interpreting the evidence of culture during excavation is a matter for the well trained archaeologist. Subtle changes in soil type, color or consistency are observed. Identification of artifacts and artifact locational patterns are often difficult for the untrained eye. Patterns of rocks, soil changes, and the distribution of artifacts within the site can be recorded on film or in drawings, but are best interpreted by the archaeologist at the site (Figure 62).

The laboratory analysis of the cultural and ecological material occupies a major portion of the time spent on a project (Figure 63). Donald MacCleod (1977) writes:

Even sophisticated educators are surprised to learn that about 75 percent of archaeology is done indoors - with the mind, the emotions, the eyes, and the hands -

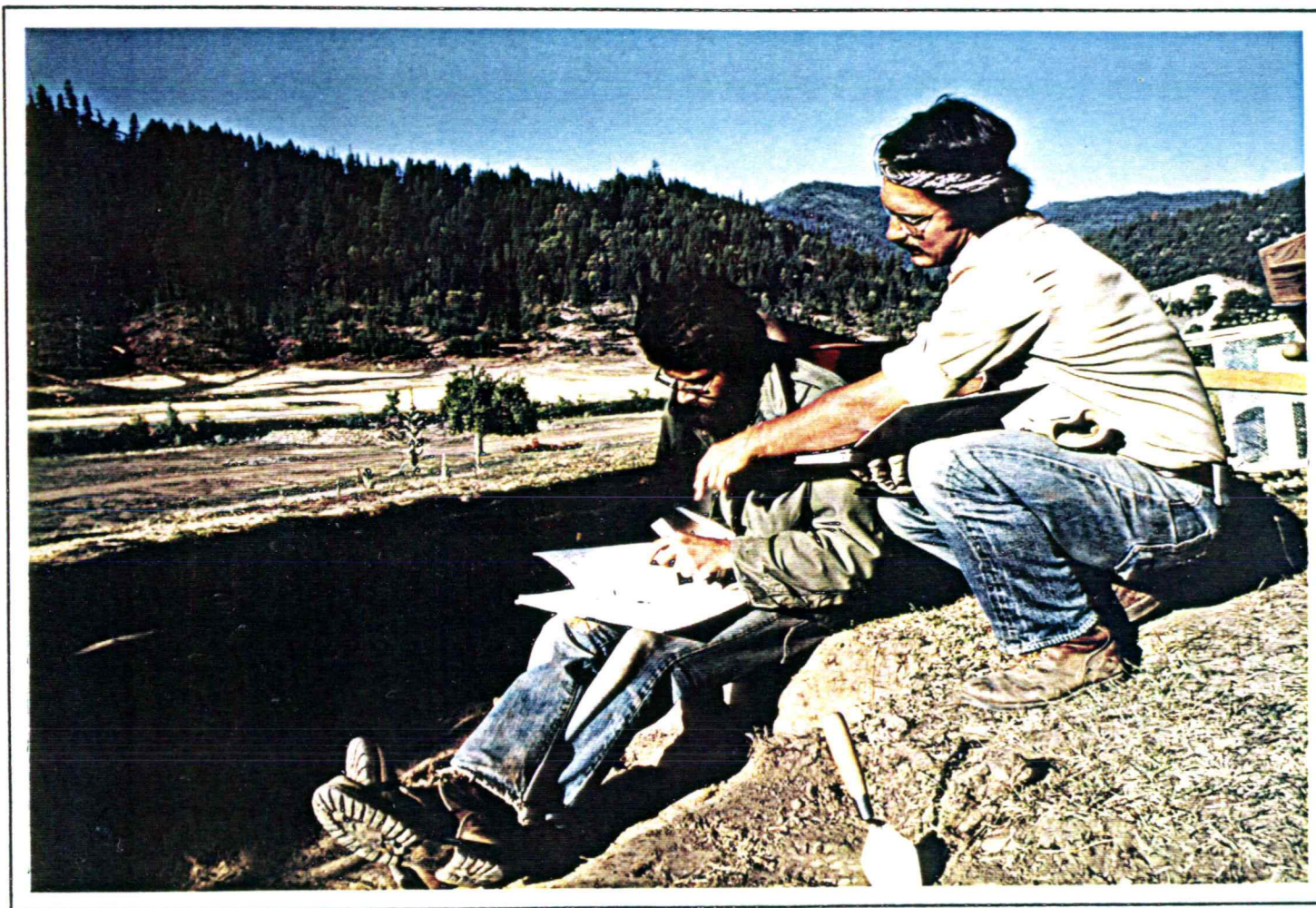


Figure 62. On-site archaeology requires careful analysis of each phase of excavation.



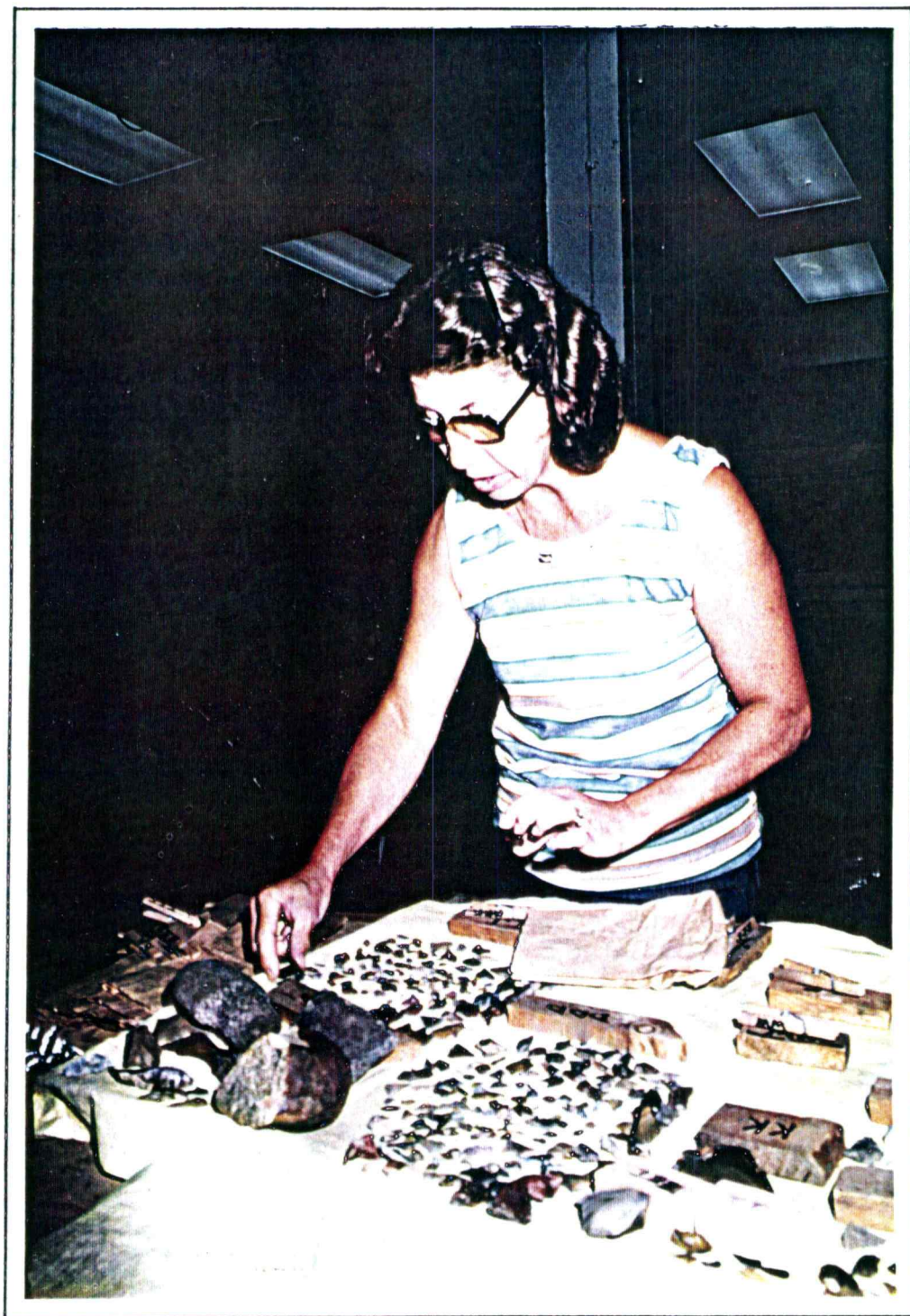


Figure 63. Laboratory analysis occupies as much as seventy-five percent of the archaeologist's time.



while digging is only a small part of the total process (MacCleod 1977:71).

The analysis can be quite tedious, such as analyzing flakes on projectile points to determine the makers tool processing technology and how it differs from others. Photographs, drawings, and computer printouts are carefully reviewed and relationships are assessed. This is the most important aspect of any archaeological work and the analysis eventually boils down to theories based on facts.

The final phase is compiling a report of the findings; without this step the excavation would be worthless. The archaeological report adds to our knowledge of prehistoric peoples, gives other archaeologists information to compare with data from their projects, and fulfills the needs of the funding agency.

### Science and Archaeology

Archaeologists in many ways are like detectives who seek to recover the activities of past cultures from clues buried beneath layers of soil. Most of this evidence is necessarily circumstantial - revelation comes from applying the resources of natural sciences.

Science is advancing at an accelerating pace; so also does the application of science to answering some of our questions about prehistoric peoples. David Hurst Thomas (1979) writes that scientists in archaeology are trying to render the human experience intelligible, "but scientists approach the goal from the opposite direction. To a scientist, particulars are important only for what they can tell about the universal" (Thomas 1979:63). The scientist uses the scientific

method to extract universals from a world of particulars.

The emphasis in archaeology has shifted from the artifacts as an end in themselves, to what the artifacts mean. Like all other forms of life, man exists in a physical environment and archaeologists have to take full account of this to understand how early peoples lived. There are a variety of approaches to determining the meaning of artifacts and how they tell the story of man's relation to the physical environment. These approaches have required an interdisciplinary study of archaeological evidence.

Archaeological field techniques have been greatly refined in recent times. In the early 1900's, archaeologists threw away too much. Before Libby perfected radiocarbon dating in 1949, charcoal was discarded. Prior to the 1930's pollen samples were not taken because no one had thought of using pollen to reconstruct past environments. Animal bones, which were once discarded, are now studied carefully to reveal subsistence activities and butchering techniques. Soil is now known to contain a gold mine of information, for it contains plant seeds, and soil structure indicates the nature of deposition (Figure 64)(Thomas 1979:18). The ultimate aim of scientific study is to reveal overall patterns of past culture.

### Law and Archaeology

Management of cultural resources, which includes archaeological resources, had its formal beginnings in the United States with the passage of the Antiquities Act of 1906. This act protects any "historic



Figure 64. The deposition of soil is indicated by the stratigraphy. Above center in this photograph is a charred layer, where the occupants once burned their refuse pile.

or prehistoric ruin or monument, or any object of antiquity situated on lands owned or controlled by the Government" (McGimsey 1972:235). It provided penalties for violation and established the illegality of damaging or removing federally-owned antiquities. The greatest impact of this law, however, was not in the punishment of relic collectors, but in the establishment of a precedent for a national policy of conserving cultural resources (Schiffer and Gumerman 1977:3-4).

The Interagency Archaeological Salvage Program was developed in response to the large scale, federal water-control programs that followed World War II. This was the beginning of federal involvement in specific archaeological investigations. In effect, the Federal Government had acknowledged that its own destructive actions were not exempt from the provisions of the Antiquities Act of 1906 (Reaves 1976:19).

The Reservoir Salvage Act of 1960 was intended to resolve the underfunding of river basin salvage. Unfortunately, sufficient money to carry out the intent of the law was never appropriated (Reaves 1976:19).

Two important laws were passed in 1966. The Historic Sites Preservation Act and the Department of Transportation Act. The former placed additional leadership and coordinating responsibility with the Secretary of the Interior and directed that he expand and maintain a National Register of Historic Places. It created the President's Advisory Council on Historic Preservation and granted it a commentary and review function whenever properties on the National Register were to be affected by Federal actions (Reaves 1976:19-20). The Department of



Transportation Act explicitly embodied the concept of considering cultural resources during the planning stages of a project to insure that site destruction was minimized (Schiffer and Gumerman 1977:5).

The National Environmental Policy Act of 1969 is the most important piece of legislation effecting cultural resources (McGimsey 1976). It requires that environmental, historical, and cultural values be weighed against economic and technological benefits when proposed federal actions are assessed. It specifies that archaeological resources must be considered.

In 1971 the White House issued Executive Order 11593 for the purpose of tying together the diverse pieces of legislation affecting cultural resources. It issued three broad cultural resource mandates and required that all federal government lands be inventoried for their cultural resources in order to determine which are eligible for the National Register by July 1, 1973. Needless to say, this deadline was impossible to meet (Schiffer and Gumerman 1977:6).

The Archaeological and Historical Conservation Act of 1974 was intended to solve the funding problems in cultural resource management. It provided funds for preservation or recovery of significant scientific, historical, prehistorical, or archaeological information when these resources were endangered by Federal actions. The act specifically mentions that money may be spent on analysis of materials and publication of results. The impacts of this law, now just beginning to be felt, are likely to be far reaching as large-scale investigations are undertaken to mitigate the unavoidable adverse effects of many

federal projects, especially the construction of dams (Schiffer and Gumerman 1977:7)

In 1977 the Oregon Legislative Assembly sponsored House Bill 2625. This Bill was important, for the state government recognized the need to protect its cultural resources. The Bill related to state lands and prohibited excavation or removal of archaeological, historical, prehistorical or anthropological material, making this action a misdemeanor. Excavation could be undertaken for scientific research if it was approved by the director of the Oregon Museum of Anthropology, and the approval of the president of the institution of higher learning carrying out the research. The Oregon State Museum of Anthropology was established as a state wide repository for cultural materials.

The state legislature acted again on cultural resources in 1979. Senate Bill 631 was passed, which prohibits unauthorized possession, exhibition or sale of human remains or artifacts from native Indian graves. Furthermore, it required the discoverer of Indian remains to reinter the remains after reporting the discovery to the local Indian organization. Specifications were also established for archaeologists seeking to excavate Indian graves. The punishment for violation of this law is one year in jail, a \$1,000 fine, or both.

The most recent federal act providing for protection of archaeological resources is Public Law 96-95. This Act is referred to as the Archaeological Resource Protection Act of 1979. This act put "teeth" into protecting archaeological resources on federal land from relic collectors. The penalty for violation is determined by, a) the

archaeological or commercial value of the resource involved, and b) the cost of restoration and repair of the resource and the archaeological site involved, not to exceed \$10,000. Second offenders receive a stiffer penalty, not to exceed \$100,000, or imprisonment for five years, or both. The Act also addresses cooperation with private collectors of archaeological resources which were obtained before the date of the Act, in order to improve communication, cooperation, and exchange of information.

### The Crisis in Modern Archaeology

Since the development of the Interagency Archaeological Salvage Program archaeologists have combed thousands of miles of the North American watershed, searching for traces of prehistoric inhabitants and have discovered hundreds of archaeological sites requiring excavation. They are so pressed for time that in some places they are digging with bulldozers instead of the customary trowel (Figure 65). The object is to save North America's prehistoric remains before it is too late. Archaeologists are working against the deadline of a series of impending floods that soon will bury the remains of past cultures.

Archaeologists in the United States have been presented with a problem of tremendous dimension. The construction of dams is going ahead so rapidly that they have only a few short years to carry out exploration which would ordinarily take generations. One of the critical problems is lack of funds, another is the lack of properly trained archaeologists. Many seasonal archaeological positions are being

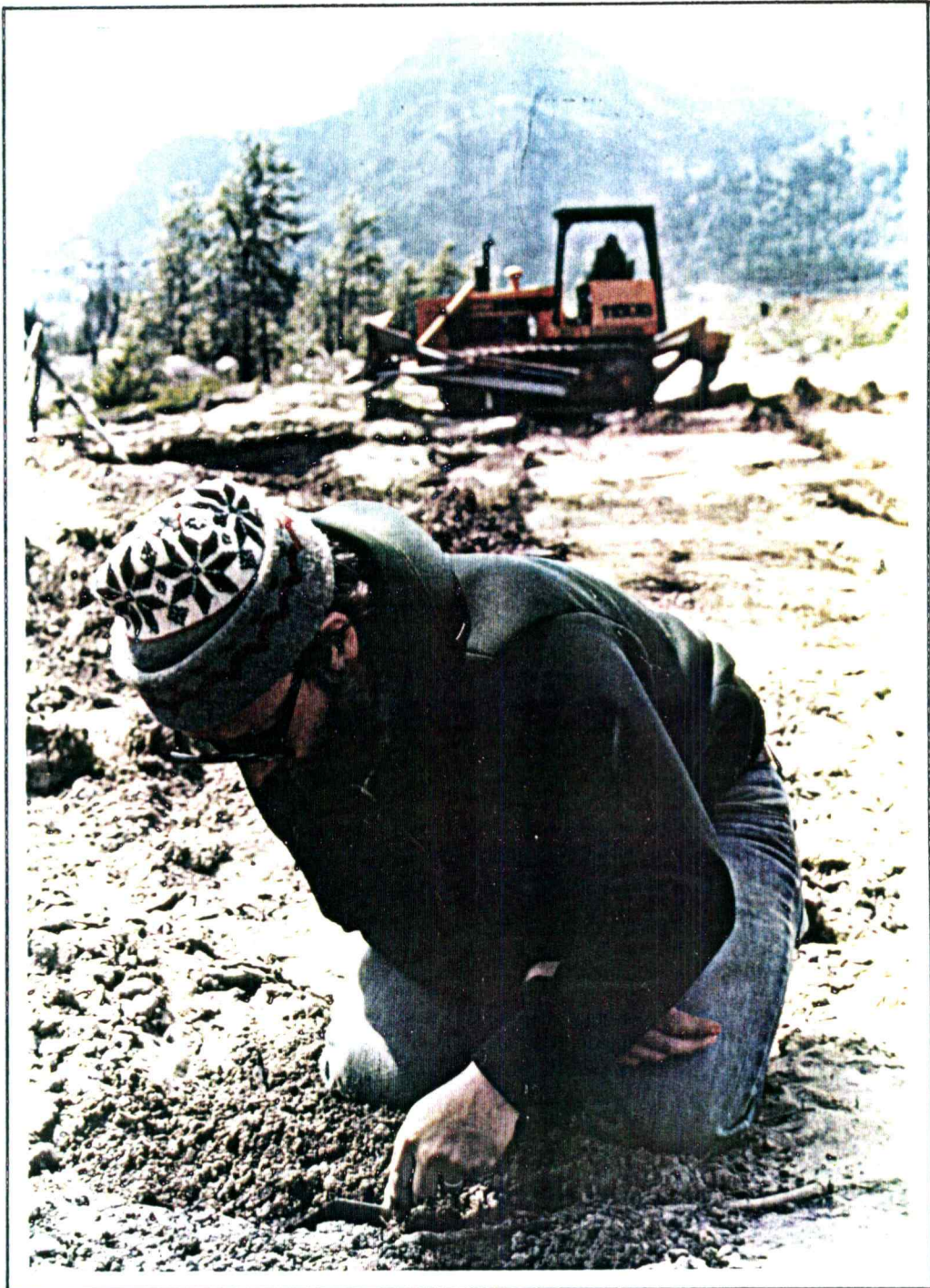


Figure 65. An archaeologist hastily excavates a prehistoric village with the aid of the trowel and bulldozer, in preparation for the new power unit at Bonneville Dam.



filled with inexperienced people who are expected to go out in the field and identify cultural resources when many do not even know what they are looking for. Proper training and increased financial support are two necessary prerequisites for preserving our cultural resources. It will take a combined effort by federal, state, and local institutions, and public support to achieve even a fair sampling of the nation's archaeological resources and to save a minimum of its prehistoric record.

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