EARLY MAN IN WASHINGTON

RICHARD D. DAUGHERTY

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By
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The original scientific report on the excavations at the Lind Coulee Site was published in the Proceedings of the American Philosophical Society, Volume 100, Number 3, June 1956. The American Philosophical Society has generously given its permission to publish parts of the original text in this booklet.

ABOUT THE AUTHOR

Richard D. Daugherty, a native of Washington, received his B. A. and Ph. D. degrees from the University of Washington. Since 1947 he has conducted the archaeological excavation of many prehistoric sites throughout the State. He has been a member of the State College of Washington faculty since 1950.

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INTRODUCTION

One of the most fascinating areas of American archaeological research is the discovery, and the studying, of evidence of the early inhabitants of the New World. The archaeologist refers to this small population of nomadic hunters by such terms as "Early Man" or "Paleo-Indians." These terms are not very precise, but common usage places in this category all the cultural remains that date from periods earlier than 5,000 or 6,000 years ago.

The problem of learning all we can about these early Americans is indeed a broad one. We are concerned with such things as the time and conditions under which man first moved into northwestern America from northeast Asia, what the physical type of the population was, and what kind of culture they had. Also involved is man's relationship with his environment; the problem of economic influences of the changing flora and fauna associated with the very marked climatic changes that accompanied the advance and retreat of great continental ice sheets. As we will see later on in this study, how man lived, what he ate, how he dressed, what tools and weapons he used, are closely related to the climate and the types of food available to him.

More than in any other area of archaeological research, the specialist in Early Man studies must have some understanding of geology, paleontology, pollen analysis, soils, and paleo-climatology (the study of past climates and climatic changes). It is through knowledge provided by these fields that the archaeologist is able to date his discoveries and learn something of the nature of the environment in which Early Man lived.

Before we explore the evidence of Early Man's activities in the New World, and particularly in Washington, a little background information is necessary.

GEOLOGIC BACKGROUND

The last half a million years of geologic history is known as the Pleistocene epoch. Sometimes this epoch is referred to as the "ice age" or "glacial period" because of the fact that during this time there were four major stages of continental glaciation, known as the Nebraskan, Kansan, Illinoian, and Wisconsin glacial stages. These stages of glaciation were separated by even longer warm, or interglacial, intervals during which the ice sheets retreated or disappeared. In Europe, Africa, and Asia we find evidence of man's early cultural developments from early Pleistocene times right up to the present, and even find human skeletal remains that show the changes

in man's appearance that have taken place during the last half a million years. Having developed in the Old World, it was not until late Pleistocene times, during the last, or Wisconsin, glacial stage, that man found his way across Bering Strait and into North America. No evidence has been found that man ever penetrated the northern latitudes of Europe and Asia until late in the Pleistocene, and until he began living in northeastern Asia, it would have been impossible for him to enter the New World.

The Wisconsin glacial stage was actually a multiphase affair. That is, this period of glaciation was made up of a number of minor advances of ice called glacial substages, and these were separated by periods of warming called interstadial periods. Man's entry into the New World must be visualized, then, against this background of pronounced climatic change related to successive advances and retreats of the continental ice sheets.

Table 1 outlines the glacial substages and interstadial periods of the Wisconsin glacial stage and their approximate durations in time. It also indicates the major climatic periods of the postglacial period (Griffin, 1956, p. 19).

TABLE 1.—*Subdivisions of Wisconsin glacial stage*

Glacial stage	Glacial substages and interstadial periods	Years ago	Postglacial climatic periods	Years ago
				2,500
			Medithermal	4,500
			Altithermal	7,000
	Cochrane glacial		Anathermal	9,000
		9,000		
	Mankato glacial	11,000		
	Two Creeks interstadial	12,000		
	Cary glacial	14,000		
	Brady interstadial	17,000		
Wisconsin	Tazewell glacial	20,000		
	Iowan glacial	22,000		
	Farmdale glacial	30,000		
	?	55,000		
	?	75,000		

The appearance of man and certain other forms of animal life in the New World is intimately linked with the glacial substages. Many theories have been advanced in an effort to explain how these

early hunters managed to cross Bering Strait. Watercraft, ice crossings, and the rising of the bottom of the sea to form a land bridge between Siberia and Alaska are among the more common theories. As frequently happens, the most reasonable explanation is also the simplest. During glacial substages when a tremendous amount of water was locked up in vast continental ice sheets, which in places reached a thickness of as much as 5,000 feet, and in greatly enlarged mountain glaciers, sea level was lowered between 150 and 300 feet, depending upon the severity of the subglacial period. The lowering of sea level even 150 feet would be sufficient to provide a dry land crossing of what is now Bering Strait. The late Pleistocene occurrence in both hemispheres of certain types of large animals, such as horses and elephants, points to the fact that there must have been some dry-land connection between Asia and North America.

The vast ice sheets, expanding from centers in Canada, spread north, south, east, and west, but geological studies of Alaska indicate that the interior of this large northern area was never glaciated. It is true that there was an expansion of mountain glaciers in the Brooks Range, the Alaska Range, and other mountainous areas, but the central lowlands of Alaska remained free of ice throughout these glacial advances. In fact, judging from the numerous remains of the horse, elephant, bison, and other large animals found frozen in the muck deposits of central Alaska, it appears that this region was a refuge area for great numbers of game animals during the glacial substages. It appears, then, that man and other forms of animal life could move freely between northeastern Asia and northwestern America during a glacial advance.

Once in Alaska, however, man was not free to move into the more southerly latitudes until the melting of the continental ice sheets during an interstadial period provided an ice-free corridor. It must be remembered that these early migrants to the New World were not on an exploring mission. They were engaged in their everyday activities of hunting big game animals; as these animals moved, so did man.

Which, then, of these glacial substages provided the proper conditions and saw the first population of man in America? We can arrive at a likely answer to this question through the process of elimination. Archaeological discoveries in Colorado, New Mexico, Arizona, and elsewhere have provided us with evidence that man was already living in these areas during the Brady interstadial period. This leaves only the Tazewell, Iowan, and Farmdale substages as possibilities. It is not clear, as yet, just which of these times saw the first crossing of Bering Strait by man, but the distinctiveness exhibited by the earliest cultural remains thus far discovered in America, when they are compared with implements from a similar period of time in northeast Asia, might well lead us to select the

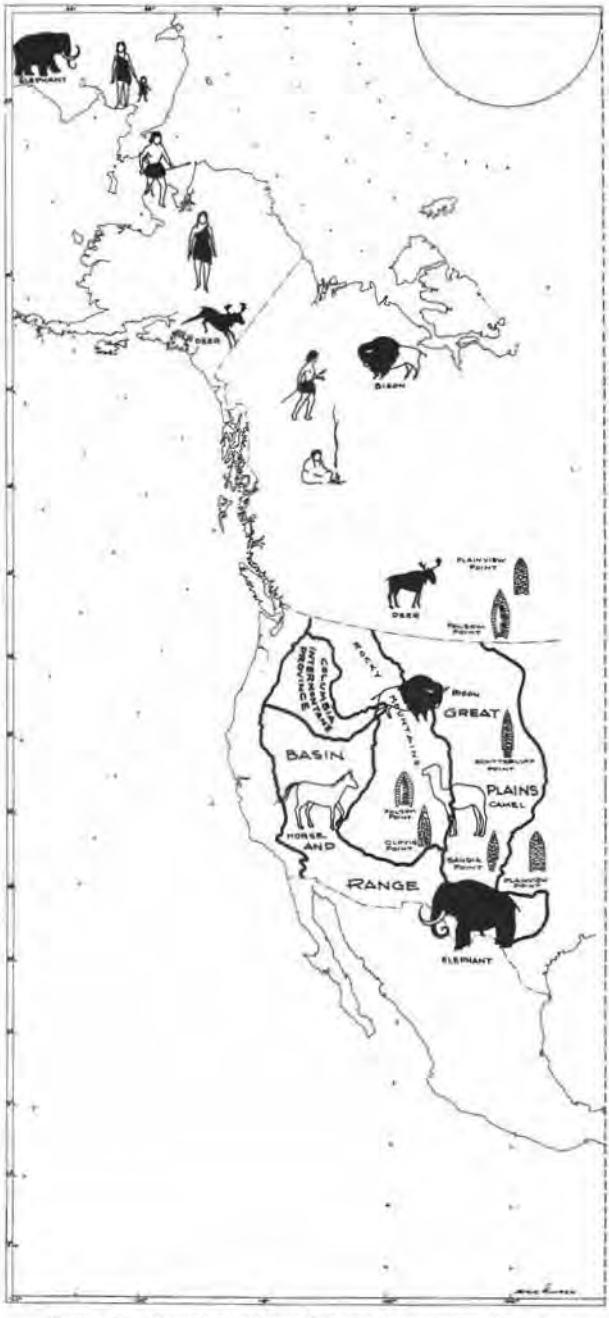

FIGURE 1.—Migrations from Siberia to western America.

earliest glacial time, for it must have taken some considerable time for this distinctiveness to develop. At any rate, we can be fairly certain that between 20,000 and 30,000 years ago man first reached this continent.

In appearance, these earliest arrivals probably were little different from modern Indian populations. By this time man had already developed essentially modern physical characteristics. As the last 30,000 years has probably seen the crystalization of the distinctive physical traits of the modern races of man in the various areas of the world, it is likely that the earliest populations in America were not as mongoloid in appearance as the modern American Indian. But as time passed and the characteristic mongoloid traits developed in Asia, and subsequent population movements between Asia and North America took place, these later arrivals were becoming more typically mongoloid in appearance. The latest large-scale population introduction, the Eskimo, is the most distinctively mongoloid in appearance.

One might well ask whether 20,000 or 30,000 years is sufficient time to permit man to spread over all of North and South America. Someone has pointed out that if, after man entered Alaska, he expanded his geographic knowledge and territorial occupation in a generally southerly direction at the rate of only 2 miles per year, he would reach the southern tip of South America within 5,000 years. This is probably a conservative estimate for a nomadic hunting population.

Although various lines of evidence lead us to infer that man has been in the New World for as long as 30,000 years, the earliest authenticated archaeological remains date from about 23,000 years ago. This is not an unexpected situation, for the farther back in time we go, the smaller the population and the less evidence there is to find. When one thinks of a handful of early nomadic hunters scattered over an area the size of North America or even Alaska, he begins to see the scope of the problem. But, fortunately, as time passed the population increased, and, as this increase continued, more and more evidence of man's activities was left for the archaeologist to discover; evidence in the form of isolated implements that had become lost, or kill sites of big game animals, or even camp sites, village sites, and burial sites. Generally speaking, the closer we get to the present, the more evidence there is to find.

A BRIEF OUTLINE OF THE CULTURE-HISTORY OF WESTERN NORTH AMERICA

The earliest dated evidence of man in America comes from southern Nevada. At Tule Springs a campsite has been located at which the cracked and charred bones of mammoth, camel, bison, deer, and horse were found along with two crudely made artifacts.

By means of radiocarbon dating of the charcoal from the fires, it was determined that man had been hunting and eating these animals at least 23,800 years ago.

In the process of excavating the skeleton of a Columbian mammoth near Naco, Arizona, archaeologists from the University of Arizona discovered that the animal had been killed by man. Eight spear points were found associated with the bones, one imbedded in a vertebra. The spear points are of the distinctive Clovis Fluted type which have been found with mammoth remains in New Mexico, Texas, Colorado, and elsewhere. The date of this kill and the antiquity of the Clovis hunters may be estimated at between 12,000 and 17,000 years ago.

Another group of early hunters of mammoth, bison, and horse left evidence of their culture in a cave near Sandia, New Mexico.

FIGURE 2.—Clovis point.

FIGURE 3.—Sandia point.

FIGURE 4.—Folsom point.

Projectile points, scrapers, and chipped flakes of stone were found in the lowermost cultural deposit of the cave. The age of the Sandia material appears to be about the same as that of the Clovis hunters.

Overlying the layer of Sandia material was a cultural stratum of characteristic Folsom material. The well-made and distinctive Folsom Fluted points are known all the way from sites in Alberta and Saskatchewan in Canada, southward along the High Plains, and into the Southwest. The Folsom hunters appear to have concentrated their hunting activities mainly on a very large form of bison that ultimately became extinct about 9,000 years ago. The Folsom culture can be dated from 9,000 to 12,000 years ago.

The evidence is quite clear that the earliest New World populations were economically oriented toward the hunting of large game animals. But at the end of the Pleistocene a new economic orienta-

tion and way of life was beginning to emerge in the intermontane region between the Rockies and the Sierra Nevada-Cascade ranges. This is referred to as the "Desert Culture," and is characterized by a basic economic emphasis on the gathering of wild plant foods rather than the hunting of big game animals. The intermontane west never seems to have supported the vast herds of game animals that existed on the Plains to the east of the Rockies.

The Desert Culture which had its beginnings at the close of the Pleistocene had great persistence and stability, and in the nuclear area of Utah, Nevada, eastern California, and southern Oregon—often called the Great Basin—it lasted with relatively little change into the historic period. Archaeological work in a number of Great Basin caves enables us to sketch in the broad outlines of this way of life.

We can imagine small bands of people, probably averaging no more than thirty persons to a band, wandering from place to place in search of food. The food resources were numerous but probably never abundant. Large and small mammals, ducks, geese, and a few fish were eagerly sought. But of even greater importance were the seeds of wild grasses, nuts, roots, berries, and other vegetable foods.

Being nomadic, their material possessions were few. Hunting weapons, gathering baskets and other containers, digging sticks, grinding stones for processing seeds and nuts, and a few simple ornaments constituted the bulk of their material goods. Undoubtedly the political organization and social and ceremonial life were equally simple. With an intimate knowledge of his environment and its resources, man was able to maintain a continuous, if precarious, existence in this intermontane desert region of western North America.

About 5,000 years ago an important change began to take place in the economy of some of the southern Desert Culture groups. It was at about this time that man first began planting maize, or corn, in the Southwest. Gradually the planting and harvesting of maize, and later other crops as well, supplanted the earlier Desert Culture economic base of gathering wild plant foods and hunting, and provided the basis for the development of the relatively stable sedentary and rich Anasazi, Mogollon, Hohokam, and Patayan cultures of the past 2,000 years. The construction of multistoried pueblos, housing several hundred people, testifies not only to the strong economic base provided by agriculture, but also to the great elaboration of political and social organization so necessary for this type of communal living.

We have seen that the Desert Culture of the intermontane west ran its uninterrupted course in the nuclear region of Utah, Nevada,

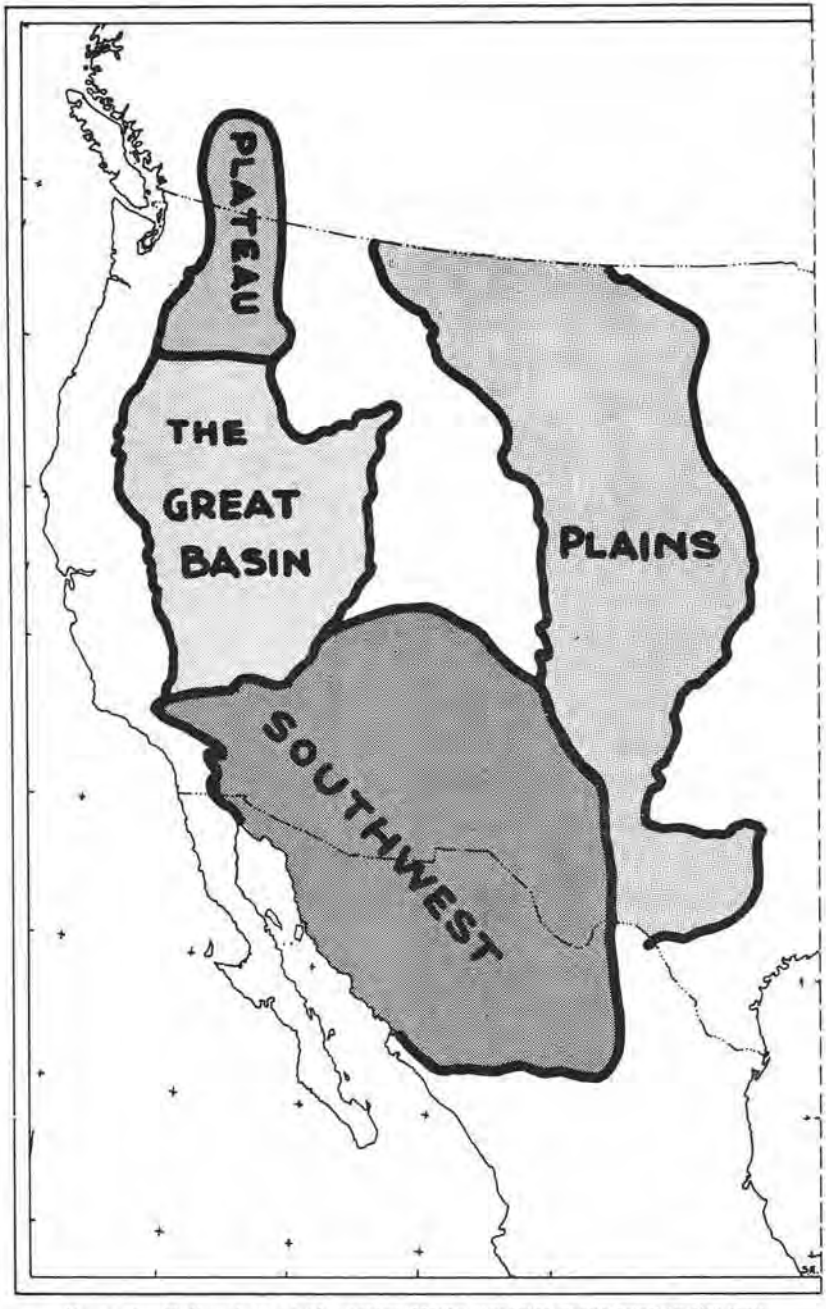

FIGURE 5.—Cultural areas of western North America mentioned in the text.

eastern California, and southern Oregon, but gradually gave way to agriculture in the southern part of the region, the area known as the Southwest.

In the north, the area of greatest concern to this study, a somewhat different cultural situation developed. In part related to the big-game hunting economic tradition, in part related to the Desert Culture base, and in part due to a local and unique economic orientation toward fishing, a rather distinctive early culture emerged in our area.

In the next section we will concentrate our attention on the best known Paleo-Indian site in Washington and later fill in the picture from scattered and fragmentary evidence provided by a number of other sites and discoveries in eastern Washington.

LIND COULEE SITE

GENERAL STATEMENT

In this section we deal with excavation conducted at an early site in central Washington known as the Lind Coulee Site. There are several reasons for concentrating on this site. First, since this is the only site in Washington for which we have substantial knowledge about the Paleo-Indian residents of the area, we can learn a great deal from a detailed account of what was discovered. Second, in addition to presenting information about the early cultures of the area, it is interesting to see how the archaeologist works in the field and laboratory. We will see how archaeological sites are located, how they are excavated, how the findings are recorded, and, finally, how the stone and bone implements and other types of evidence recovered during the excavations can furnish us with a picture of life in this region many thousands of years ago.

The reclamation and electric power developments in eastern Washington have resulted in an intensive program of archaeological research in those areas to be flooded by the reservoir waters behind the various dams. Each summer since 1946 has witnessed archaeological surveys of reservoir areas conducted for the purpose of locating sites, and the excavation of important sites located by the surveys. It was during the survey of the O'Sullivan Reservoir and the interconnected system of canals and wasteways of the Columbia Basin irrigation project that the Lind Coulee Site was located.

Archaeologists are often asked, "Just how do you go about locating an archaeological site?" The actual locating of sites is not too difficult a task. It is simply a matter of knowing what kind of evidence to look for and training oneself to be able to recognize the evidence when it occurs. The more experienced person can usually recognize the evidence for the existence of a camp site, village site,

or burial site more readily than an inexperienced person. This is especially true of the person who has had a great deal of experience in a particular area, because he has learned what types of localities are most likely to have been selected for situating the village or the burial site, what evidence to look for, and other unique local factors, as well.

In 1947 Mr. F. A. Riddell, now (1959) curator of the Sacramento State Indian Museum, and the author were employed in the River Basin Archaeological Surveys Program of the Smithsonian Institution to survey and evaluate the archaeological and paleontological resources of 14 reservoirs in Washington, Idaho, and Montana. Such surveys are made by walking back and forth within the maximum pool level of the reservoir, looking for such things as scattered flint chips, fire-broken rock, charcoal-blackened soil, bone fragments, river mussel shells—in short, the kind of cultural debris that would mark a camp or village site. Some of this material is buried beneath

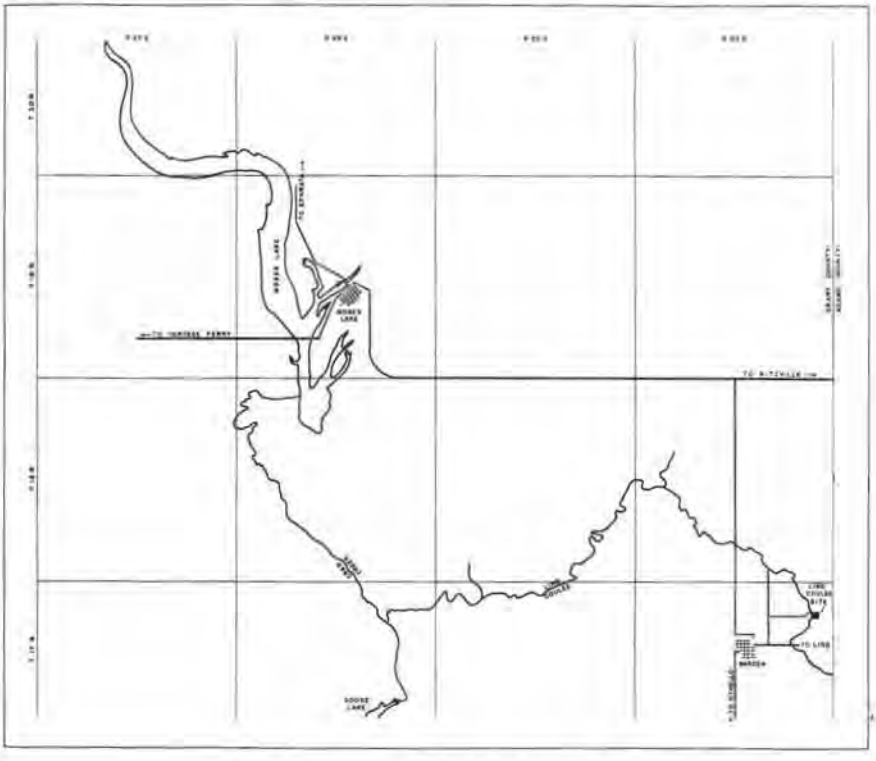

FIGURE 6.—Location of the Lind Coulee Site.

the surface, so the exposed faces of eroded stream banks or gullies must also be examined. Occasionally "buried" sites will be exposed in sand blowouts. If the vegetation cover is so heavy that the usual surface evidence cannot be seen, test trenches must be dug at likely spots.

In addition to cultural debris or refuse, other types of evidence exist. A large circular depression in the ground is likely to be all that remains of a semisubterranean house. The builders of the house had dug a circular hole in the ground 15 to 40 feet in diameter and from 3 to 5 feet deep. A conical roof of poles covered with grass, matting, and finally soil, served to make a snug and warm winter dwelling. When the house was abandoned, the roof was removed to save the poles or else it rotted and fell in. Blowing sands and silts partially fill such holes, so that all that remains is the circular, usually shallow, depression.

While surveying the O'Sullivan Reservoir and the interconnected system of canals and waterways of the Columbia Basin irrigation project, a campsite nearly 9,000 years old was discovered along Lind Coulee.

Lind Coulee is one of the westernmost of the scabland channels which were carved by meltwaters of late-Pleistocene glaciers. A complex system of stream, lake, and windblown deposits is exposed in the profile of the eroded coulee walls. A large share of the credit for the discovery of this important site properly belongs to Professor George F. Beck of the Central Washington College of Education, and to a number of the townspeople of Warden, Washington, who long have been familiar with the exposed walls of Lind Coulee as a productive source locality for the collecting of bones of extinct Pleistocene animals, and who, on numerous occasions, have picked up stone implements and flint chips from the coulee floor.

When Mr. Riddell and the author first visited the locality, an area was discovered along the east wall where flint chips and small bone fragments were being eroded out of the deposits at a level many feet below the surface. In the report of this survey a recommendation was made that the locality should be thoroughly tested to determine the extent of the deposits and whether full-scale excavations should be conducted.

It wasn't until the summer of 1950 that the testing of the site was undertaken. At this time the author had a crew working on the excavation of an Indian village site located on the shore of Moses Lake. During the final 2 weeks of the season the crew was moved to the Lind Coulee locality and two trenches were dug into the deposits. Numerous flint chips, fragments of burned bone, areas blackened with charcoal from campfires, and several stone hide-scrapers were discovered in the test trenches. There was then little doubt that a campsite of considerable antiquity had been located in the deep sedimentary deposits bordering Lind Coulee.

FIGURE 7.—Beginning testing operations at the Lind Coulee Site (1950). The top of the cultural horizon occurs approximately 1 foot above the floor of the test trenches. View facing east-southeast.

The following summer the author was back at Lind Coulee with a crew of 12 students to begin the excavation of this important site. Excavations were conducted here during the summers of 1951 and 1952, but before discussing the digging and what was found, it will be well to examine the geography, geology, and ethnic background of the area so that what was discovered here may be better understood.

THE SETTING

Located in the southwest quarter of section 1, Township 17 North, Range 31 East, in Grant County, the Lind Coulee Site physiographically falls within the Central Plains section of the Columbia Basin, which is one of the four subprovinces of the Columbia Intermontane province.

The Central Plains section is drained by the Columbia River and several of its tributaries. Like most of the Columbia Intermontane province, this section has an underlying base of thousands of feet of superimposed Miocene basalt flows. Capping the basalts are surface deposits of stream, lake, and windblown materials of varying thickness. These deposits date from late Miocene to Recent times.

When one views the present semidesert environment of the Columbia Basin it is not easy to remember that the area was not always as we see it today. In fact, since late glacial times, when man first entered the area, very pronounced climatic changes have taken place, and accompanying the climatic changes were important changes in the types of plants and animals that lived in the region. We learn about these environmental changes from several types of evidence. Periods of dryness or periods of increased moisture are reflected in the geological deposits. Increased moisture, for example, initiates lakes and streams, whose deposits can be easily seen.

Another type of evidence is that of paleontology, or the fossil record. We know that certain types of animals required certain types of environments. If we find, for example, the bones of a large prehistoric bison, we know that an extensive grassland grazing environment existed.

Still another line of investigation which quite accurately records changing climates over long periods of time is pollen analysis. Fossil pollens may be found, just as we find the fossilized bones of animals. Peat bogs are the best place to look for fossil pollens, because the chemicals in the bogs act as a preservative and the moist bog protects the delicate pollen as it is blown onto the surface. As different plants grow under different climatic conditions, the identification and counting of pollen grains in microscope slides made from cores drilled through the bogs permits us to detect a sequence of climatic changes. As the climate changes during the thousands of years that a bog is developing, and the pollens characteristic of different climates are deposited in the order of their occurrence, a permanent orderly record of the past climates is preserved for us to read.

Finally, by means of radiocarbon dating (also called Carbon 14 dating) we can determine the age and duration of these various climatic periods. Very briefly, the radiocarbon method of age determination may be explained as follows: The reaction between cosmic rays and atmospheric nitrogen produces an unstable isotope called Carbon 14. All organisms, plant and animal, take in Carbon 14 through food and water until a level is reached at which the rate of intake is matched by the rate of breakdown of this unstable isotope. When the organism dies, the intake of Carbon 14 ceases but the breakdown goes on. Knowing the rate of breakdown and the original amount, which is a constant for all living things, it is possible to determine when the animal died by measuring the radioactivity remaining and figuring back to the original amount present. Radiocarbon dating has been of tremendous help in dating archaeological sites, peat bogs, and other deposits.

In the present study of Early Man in Washington, we need concern ourselves with climatic change only as far back as the Two Creeks interstadial period (table 1, page 2).

The final advance of glacial ice to affect this area probably took place during the Mankato glacial substage and reached its maximum extent around 11,000 years ago. A brief period of warming following this was in turn followed by cool moist conditions, but no more glaciation in our area. This cool moist climatic period, which lasted from about 9,000 to 7,000 years ago, is called the "Anathermal" period. At the beginning of the period, temperatures were lower and the climate was much more moist than at present, but gradually it became warmer and drier, reaching the present level of temperature and rainfall about 7,000 years ago. Pollen profiles from eastern Washington indicate that:

> The initial forests (following the retreat of the glacial ice) consisted largely of lodgepole, but with considerable western yellow pine. Yellow pine may have persisted south of the lodgepole pine belt near the ice front. As the climate warmed and the physiographic conditions left in the wake of the retreating ice became stabilized, yellow pine gained predominance, but continued warming and dessication favored an influx of grasses, Chenopods, and Composites (Hansen, 1947, p. 108).

The next climatic phase in the intermontane west is characterized by temperatures higher than those prevailing at present. Drought conditions during this period are recorded for the Southwest-Great Basin area. This period of time, lasting from approximately 7,000 to 4,500 years ago, is called the "Altithermal" period. These warm dry climatic conditions brought about the drying up of many lakes and the disappearance of mountain glaciers. The plants growing in our area during this period were typically desert and semidesert forms.

The Altithermal period was marked by a great deal of volcanic activity and the deposition of great quantities of volcanic ash over thousands of square miles. In Oregon the top blew off Mount Mazama, leaving what is now called Crater Lake. Newberry Crater was also active. In Washington, Glacier Peak was very active, and probably Mount St. Helens was also.

By about 4,500 years ago, a cool moist climate began to prevail in western North America. The onset of this climatic phase marks the rebirth of lakes and mountain glaciers. This period, which lasted until about 2,500 years ago, is called the "Medithermal" period. With but minor variations, the climate has been as it is today for the past 2,500 years.

It is evident, then, that the period of time since the final retreat of the Pleistocene glaciers has been marked by pronounced climatic variability. The effects of these changing climatic conditions on the early human populations will be seen when we examine the archaeological evidence.

The types of large animals found in eastern Washington have apparently changed but little since late Pleistocene times. By the late Pleistocene, most of the mammals now present were as they

are today. The main changes appear to be the loss or extinction of certain large forms. Several carnivores—the great lion, the short-faced bears, the dire wolf, and the sabertooth tiger—all former residents of the area, became extinct about this time. Other forms that also became extinct are the giant beaver, peccaries, camels, bison, horses, and the giant ground sloth. The mastodon and several species of mammoths also disappeared, but at least one species of mammoth, *Elephas columbi,* lasted into the early postglacial period.

At present, much of eastern Washington can be described as a semidesert region. Common surface features include sandy areas, areas of bare ground, open areas of sage, and exposed basalt outcroppings with their bare talus slopes. Grasses and shrubs are the typical vegetation. Bunchgrass, foxtail, cheat grass, saltbrush, greasewood, sagebrush, rabbit brush, and cactus are common. Cottonwood and willow are to be found along the streams where sufficient moisture is available.

A description of the recent Indians who occupied the territory in which the Lind Coulee Site is located will be fairly representative of most of the recent Indian bands of eastern Washington.

The Moses-Columbia band, as the group is now called, occupied the territory from Priest Rapids on the Columbia River northward to the Grand Coulee-Moses Coulee area. Remnants of this band now reside on the Colville Indian Reservation in north-central Washington.

Linguistically, these people spoke a dialect of the Columbia Language which belongs to the Southwestern Group of the Interior Division of the Salishan Family (Smith, 1953, p. 94).

The political organization of the Columbia consisted of locally autonomous villages, with a slight tendency toward tribal organization; chieftainship was based on heredity and status. The tendency toward tribal organization and the emphasis on heredity and status as prerequisites for leadership are ideas introduced to the group probably rather late in its history.

The economic orientation of the Columbia was toward the seasonal runs of salmon in the Columbia River and its tributaries; toward the hunting of large and small game animals, which necessitated trips into the Cascade Mountains and to the Plains east of the Rockies; and toward the gathering of roots, berries, and seeds. The arid, semidesert area in the vicinity of the Lind Coulee Site probably was of little economic value to the recent Indians, whose villages and campsites tended to concentrate along the rivers.

In late prehistoric times the semisubterranean earth lodge with entrance at top center appears to have been an important type of winter dwelling. The winter villages were usually located along the Columbia or its tributaries at places where an adequate supply of wood and water were available. In the spring and summer, rec-

tangular lean-tos and conical tents were the usual forms of shelter (Teit, 1928, p. 114). By historic times, the rectangular mat lodge was replacing the semisubterranean earth lodge as the winter dwelling. The writer has located numerous recent villages and campsites along the Columbia River and around Moses Lake, but has never discovered evidence of sizable villages or campsites away from the water.

The implements of bone and stone which were manufactured by the Columbia Indians differ little from those possessed by other Indian groups of central Washington. The bow and arrow was the principal weapon, with spears, clubs, and knives also being used. An inventory of their stone tools would include chipped stone projectile points, most commonly triangular in shape with side or corner notches; knife blades, some of which were oval in shape; celts ground into shape from serpentine and nephrite; scrapers of several types, including flake scrapers and flat river cobbles that had been given rough edges through percussion flaking methods; whetstones; stone mortars of various sizes, some of which carried ornamentation along the borders; flat grinding stones which were probably used with open-ended basket hoppers; stone pestles, some conical and some with expanded bases and tops; hammerstones; mauls; tubular and elbow pipes of soft stone; drills; and the ever-abundant notched sinkers for nets or lines (Daugherty, 1952, p. 374-383).

A similar inventory of the bone artifact types would include flaking tools of antler and bone; bone awls, including ulna awls and other straight awls; fish-spear points; incised gambling pieces; and a few bone arrow and spear points.

Ornaments for personal adornment were most commonly made of shell, bone, and animal claws, although, within the historic period, copper was widely used. Perforated discs of shell and bone were strung as necklaces. Pendants have been found which were made of shell and quartz crystals; claw pendants were very common.

EXCAVATIONS

Modern scientific archaeology employs a number of techniques which are designed to provide accurate observations while at the same time assuring that no evidence is lost. By the very nature of the work, archaeological excavations bring about the destruction of the site being investigated. If the work is not done properly and all of the information carefully recorded, there is no way that the site can be restored so that the work can be done over. Each phase of an archaeological excavation is carefully and methodically carried out.

The first step in excavating the Lind Coulee Site was to take a series of photographs of the site from all angles. The crew knew

that once digging was started the location would never look the same again.

The next step was to establish a permanent datum point, or point of permanent reference from which all measurements, both horizontal and vertical, would be taken. The idea of archaeological field work is to take sufficient measurements and photographs; to record observations; and to draw maps, diagrams, and profiles of trench walls, so that this information, along with the tools and weapons

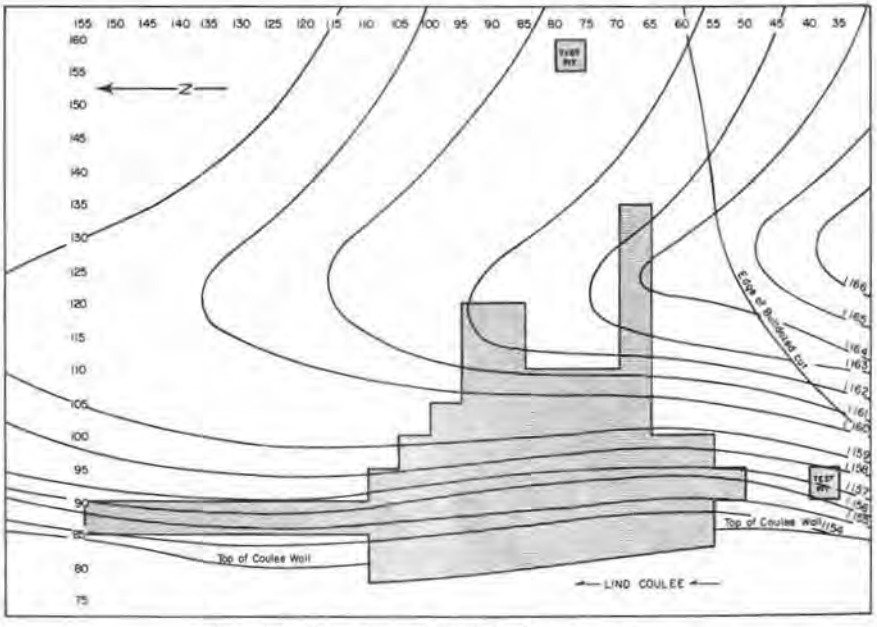

FIGURE 8.—Plan view of Lind Coulee excavation.

(artifacts) recovered, is sufficiently complete to allow the reconstruction of the site in the laboratory.

After the datum point was established, a detailed map of the site area was made with a contour interval of 1 foot (see fig. 8).

The next step was to establish a grid system which would serve to control the excavation and at the same time make the locating of the artifacts and other information accurate and convenient. The datum point had intentionally been established in the southwest corner of the site. By driving lines of stakes in the ground at 25-foot intervals, two base lines—a north-south base line and an east-west base line—were extended from the datum point. The site was then staked out in 25-foot squares, and the areas to be excavated were later staked out in 5-foot squares. Each stake was then numbered to give its distance in feet north and east of the datum point. If one of the workers discovered a spear point, for example, while working

in one of the trenches, he had only to measure to one of the stakes at the side of the trench to locate exactly the horizontal position of the artifact with reference to datum point. He might record the location thus: 75.6′ N/85.3′ E.

The vertical location of the artifact in the deposits was determined through the use of a level and leveling rod. When the artifact was discovered, the rod was placed on the location and a reading taken. In this fashion each artifact and each stratum of the deposits could be related to the datum elevation. With such information being recorded in the field, in the laboratory it is possible to relate all objects, strata, trenches, etc., to the datum point and to each other.

The archaeologist refers to individual objects discovered in the excavations as "finds," and a special find form is filled out at the time the object is discovered (see sample forms at the end of text). There is also a special form used to record the important information about "features." Features are such things as fire-pits, post holes, or other structural objects. Other forms used in the field include site survey forms, burial forms, photography forms, and field catalog forms. Consistent and careful use of field forms tends to assure that no important information is overlooked, and that proper records are made covering the entire excavation. In addition to the field forms, each field worker maintains a field notebook in which he records such observations as seem of possible importance in the final analysis of the site and its contents.

After completing the initial photography, surveying, and gridding of the site, further testing operations to determine the depth of the cultural horizon were begun. When its depth from the surface had been accurately defined, and when it was certain that the overburden was sterile of cultural and paleontological specimens, a bulldozer was employed to remove a large section of the overburden. Much of the sterile material was pushed into the coulee, leaving a wedge-shaped cut approximately 100 feet wide at the edge of the coulee and tapering to approximately 35 feet in width, 50 feet back from the coulee wall. During this operation a safety zone of sterile sand 1 foot thick was left covering the cultural material. From 10 to 12 feet of sterile material was removed by the bulldozer, leaving a surface averaging 1,152.5 feet above sea level. To facilitate the excavations of the 1952 season, a larger area to the north was similarly bulldozed to approximately the same level.

Normally, during excavation, 2 men were assigned to a 5-foot square. At first, arbitrarily established 0.5-foot levels were excavated until the underlying sterile sands were reached. When it was later determined that slight concentrations of the cultural materials occurred at certain levels, the unit levels were shifted to accommodate the levels of concentration. Although compacted into an extremely hard mass throughout most of the site, the sands and silts

FIGURE 9.—Bulldozer at work removing sterile overburden from culture-bearing stratum. The overburden was removed to the level of the flat-topped pedestal in right-center foreground. View facing east.

could be passed through a ¼-inch mesh screen without too great difficulty. The most common practice was for one man, using a sharp, square-point shovel, to slice a thin layer from the surface and deposit it in the screen, where the second man would break up the clods and trowel the material through the screen into a wheelbarrow. The coulee served as a convenient dumping place for the screened sand. Because of the hardness of the deposits, a trowel could be used for little but the fine work of removing specimens. This method proved to be the most rapid and at the same time the most careful that could be devised.

A level-bag was kept for each unit level, in which all cultural debris, such as stone flakes and bone fragments, was placed. Later, in the laboratory the bones were removed from the bags and identified as to species of animal. The study of this cultural debris can often provide a great deal of information about the life of the people being studied. One can learn, for example, what animals were hunted for food, how the animals were butchered, and what parts of the animals were customarily brought back to camp.

One of the most useful aids to writing up the final report on an excavation is a large number of good photographs which record the progress of the excavations. In all, nearly 1,000 photographs recorded the excavations at the Lind Coulee Site.

When the archaeologist returns to his laboratory, the task begins of developing some meaningful picture of a culture extinct for hundreds or thousands of years. From a welter of measurements, maps,

diagrams, photographs, field notes, and from the hundreds, or, if he's lucky, thousands, of artifacts, he begins to reconstruct the past. Who were the people and how did they live? What was the basis of their economic life? To what other prehistoric cultures are they closely or distantly related? The answers to these and dozens of other equally important questions must be found in the artifacts and information discovered in the trenches dug in the site.

Each of the artifacts represents an idea or a series of ideas; not random ideas, but culturally patterned ideas. These are ideas held by certain people at a certain period of time. They are characteristic of these people and this period of time, just as certain objects that we have manufactured in recent years are characteristic of the particular time and the ideas current at that time.

If we were to go out and excavate the garbage dump used for the past 50 or 100 years by a modern city, we would find that with a little study we could place in proper chronological order almost all the automobile parts we recovered. The various parts of an automobile reflect the ideas, styles, and the knowledge of the period in which they were made. So it is with spear points, stone pestles, pipes, bone awls, and the hundreds of other objects that might be recovered from an archaeological site thousands of years old.

Not only does the archaeologist attempt to identify objects characteristic of a given group of people at a certain period in time, but by comparisons with reports of other excavations he attempts to trace the distribution of these objects and inherent ideas over larger areas and in this way establish the cultural relationships of the people being studied. To return to our analogy of the automobiles for a moment, we could trace the distribution of these automobiles of different periods of time over the entire United States and would find virtual identity from one end of the country to the other. But if we compared them with European models representing the same time periods, we would see both relationships and differences. We would see that the people of Europe and the United States had similar ideas about wheeled vehicles, but slight differences in construction and appearance could be easily noted. However, if we compared our automobiles with simple carts manufactured in west Africa, for example, we would find very different ideas involved.

Certain ideas are characteristic of certain geographic areas at certain periods of time, and one of the tasks of the archaeologist is to determine this geographic distribution for the light it will shed on population movements, cultural developments, and the relationships between culture and environment.

To state the problem in broader terms, it is the task of the archaeologist to understand all he can about a given group of people at a given point in time, and also to attempt to reconstruct the culture history of the entire region.

STRATIGRAPHY OF THE SITE

In order that the reader might understand how a geological estimate of the age of the cultural deposits is arrived at and how we know something of the geographic conditions at the time the site was occupied, a brief summary of the stratigraphy of the site follows (fig. 10).

BASALT BEDROCK

Lind Coulee has been incised down to and into the uniform basement of Miocene basalt which is one of the most outstanding features of the geology of the Columbia Basin. Where exposures of basalt may be observed along the coulee floor, the smoothed and rounded surface gives evidence of the erosive action of the waters flowing down the coulee, and perhaps also of the former existence of lakes.

BED F

Upon the bedrock of Miocene basalt occurs several feet of sand, gravel, and angular cobbles. This material is almost entirely of basalt, with a few granitic cobbles included. No deposits of granite are known to occur locally, the nearest exposures lying 60 miles or more to the north.

BED E

Bed E exhibits the typical appearance of the Touchet deposits in texture and in the occurrence of clastic dikes (fig. 11). The Touchet deposits are generally thought to be of proglacial origin, probably formed during the Mankato period (Lupher, 1944, p. 1460). Bed E is significant because it gives a maximum possible age of approximately 11,000 years for the bed containing the cultural material, Bed D.

BED D

This unit consists of up to 8 feet of evenly bedded, firmly compacted water-laid sand, containing artifacts and cultural debris. It reaches its greatest depth along the coulee wall, where it may be observed resting directly on Bed F, but to the east it thins perceptibly as it overrides Bed E. It may be that this sand was derived from reworking Touchet Bed E. Bed D has an even dip to the northwest. As the geologists (Campbell, 1956; Culver, 1956; and Nering, 1956) have pointed out, the characteristics of the bed indicate its deposition either in a sluggish stream or a lake. An occasional rounded cobble may be found within the otherwise uniform fine sand deposits. Some of the cobbles were no doubt brought to this locality by man, but others were observed at depths below the cultural horizon, and some other agency, perhaps ice-rafting, must have been responsible. At one point in Bed D, two large rounded boulders which

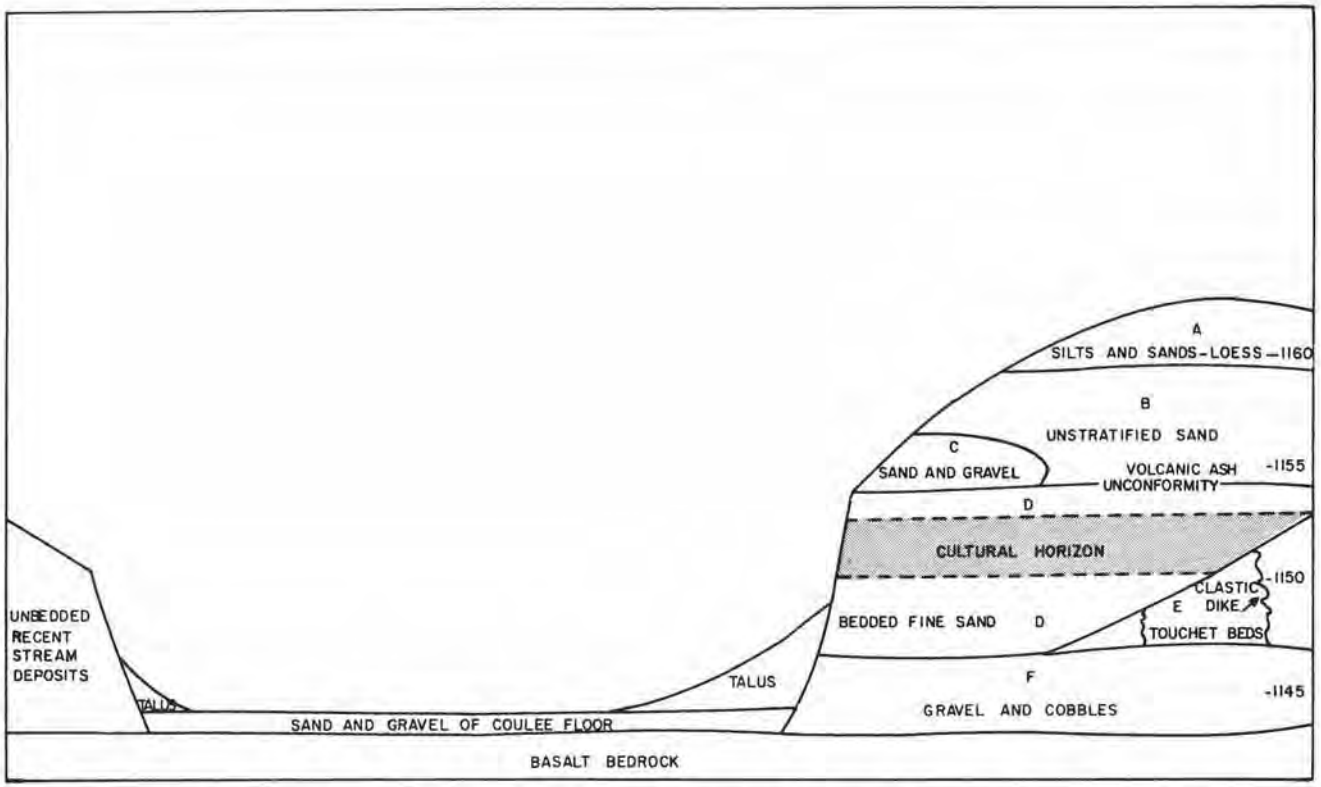

FIGURE 10.—Schematic diagram of Lind Coulee, indicating stratigraphy of deposits. View looking north (downstream). Vertical scale × 2.

FIGURE 11.—Clastic dikes of Touchet beds (Bed E.).

weighed an estimated 500 pounds each were encountered during the excavation (fig. 12). The boulders were oblong and were observed to be standing on end, held in this position by the surrounding sand. At the base of these rocks several smaller boulders were found. The base of the boulders was several feet below the lowest cultural materials, but their tops extended into the cultural horizon. If we concede that it was a sluggish stream or lake that was responsible for the fine, evenly bedded sands of Bed D, then one agency, floating ice, was probably responsible for the occurrence of these boulders. With Bed E, the Touchet deposits, being formed during a proglacial period, it appears that the lowermost levels of Bed D were deposited not long after, when floating rafts of ice carrying rocks were still common.

The cultural horizon is over 2 feet thick and occurs above the center of Bed D. Neither the color nor the texture of this horizon differentiated it from the rest of Bed D. The scattered cultural debris showed no stratigraphic sequence.

A number of the stone flakes and a few artifacts were observed to be lying in the sand in a tilted position as if they had been dropped on soft sand. It appears probable, from the analysis of the deposits and the situation of the artifacts and cultural debris contained therein, that we are dealing with a campsite which was situated on the

FIGURE 12.—Ice-rafted boulders in culture-bearing sands.

shore of a lake or sluggish stream. Seasonal camping on the soft beach sands, along with the possible yearly inundation of the locality during periods of high water, combined to arrange the present distribution of the cultural material.

Radiocarbon analysis of fragments of burned bison bones from the cultural horizon has given a weighted average age of 8,700 plus or minus 400 years. (Radiocarbon analysis of the sample was made by Dr. W. F. Libby of the Institute for Nuclear Studies, University of Chicago, and bears the sample number 827.) It will be noted that this age correlates very well with the dating estimate of approximately 11,000 years for the underlying Touchet deposits (Bed E), and the overlying Bed B, which contains lenses of volcanic ash estimated to date from around 6,000 years ago.

One question concerning the occurrence of cultural materials in Bed D could be fairly asked: "Is the occurrence of the cultural material at this locality due to its use as a campsite, or were the materials washed in from some point of original disposition?" All evidence points to the use as a campsite as the most probable explanation. Areas of charcoal-blackened earth, articulated bones, and the finding of a handstone next to a grinding stone for pigment, all argue against the "washed-in" theory.

After the abandonment of the site by man, more than a foot of sterile Bed D sands accumulated over the cultural horizon before this depositional period was brought to a close. Then followed a period of exposure and erosion of the surface of Bed D, leaving an unconformity between this stratum and the next.

BED C

Resting unconformably on the surface of Bed D are scattered lenses of coarse sand and gravel, occupying a stream meander scar in the bed's surface.

BED B

Resting on the eroded surface of Bed D is a layer of unstratified silt and fine sand of loessial origin. This varies from 3 to 5 feet in thickness. Scattered throughout this stratum are lenses and pockets of moderately pure volcanic ash. Apparently, large quantities of volcanic ash were being blown about during the deposition of Bed B. Hansen has indicated from evidence in pollen profiles that the period around 6,000 years ago was one of great volcanic activity (Hansen, 1947, p. 38). No evidence exists for a period of marked volcanic activity in the Cascade Mountains in Washington since that time. If the ash in Bed B may be attributed to the period of

FIGURE 13.—View of east coulee wall just south of site locality.

vulcanism around 6,000 years ago, this provides us with a minimum date for the deposition of Bed D and its inclusive cultural materials. On the basis of geological evidence we can state that man occupied the Lind Coulee Site at some time during the period between 11,000 and 6,000 years ago, with radiocarbon analysis assigning an age of 8,700 plus or minus 400 years.

BED A

This, the uppermost stratum of the deposits, consists of lighter colored silts and sands of windblown origin. It is this surface layer which supports the sparse semidesert vegetation. At several points along Lind Coulee the writer has observed indication of recent Indian campsites on and in this surface material.

ANALYSIS OF MATERIAL CULTURE

Because of the depth of the cultural horizon from the surface, and the general paucity of artifacts in the cultural horizon, the total number of artifacts recovered from the Lind Coulee Site is not large. Only 186 artifacts were recovered in the removal of nearly 600 cubic yards of earth. Two seasons of excavation have by no means exhausted the site; in fact, all evidence suggests that the artifact yield was increasing as the excavations progressed in a

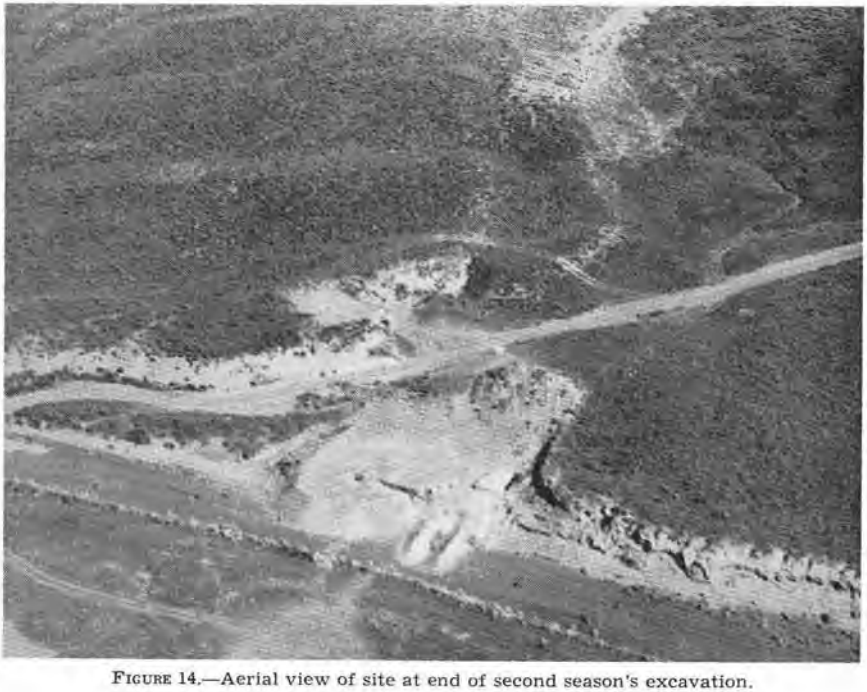

FIGURE 14.—Aerial view of site at end of second season's excavation.

northeasterly direction. It is now evident that the original exposure of artifacts and debris along the coulee wall occurred near the southernmost extent of the site. The erosion of the present channel of the coulee has removed, to an unknown extent, the site's western margin. In the course of the excavations it was observed that the cultural deposits thinned perceptibly and finally disappeared as the culture-bearing sands overrode the underlying Touchet deposits along the eastern edge of the site. The excavations did not reach the site's northern border, but the occurrence of a sharp downward dip of the culture-bearing sands exposed along the coulee wall suggests that the site probably does not extend more than 30 feet beyond the northernmost point reached by the excavations.

On the basis of the nonstratified occurrence of the artifacts, we must consider the cultural horizon as a single unit. This interpretation is supported by an analysis of the various artifact forms.

The material culture of the Lind Coulee Site is represented by artifacts only of stone and bone. The nature of the deposits is such as to work against the preservation of more perishable items.

IMPLEMENTS OF STONE

On the whole, the stone artifacts from the Lind Coulee Site are well made, indicating that their makers possessed a rather high degree of skill in stone-flaking techniques. Both percussion- and pressure-flaking techniques were freely employed.

Nearly all the stone implements were fashioned from fine-grained stone material. Table 2 indicates the types of stone utilized, and the percentage of artifacts in each category. In addition to the materials listed, a number of small pieces of worked red pigment (hematite) were found.

TABLE 2.—*Materials used in the manufacture of stone implements*

Material	Percent
Chalcedony	66
Semi-opal	17
Opal and chalcedony	6
Basalt	6
Opal	3
Jasper	1
Granite	0.5
Semi-opal and chalcedony	0.5
Total	100.0

All these types of stone are available within a distance of 20 miles from the site locality. Basalt is everywhere available in the Columbia Basin region. Granite, while not occurring in outcrops locally, is present in the form of cobbles and boulders, brought into the region as outwash debris during glacial times. The remainder

of the types of stone is to be found in large and small masses in the Miocene basalts. This material is especially abundant in areas of pillow lavas; in vesicles in the basalt flows which have been filled with the silica minerals, opal and chalcedony; and in the region of the middle Columbia, where the silicified trunks of Miocene trees are abundant in the lava flows.

FLAKED STONE IMPLEMENTS

The flaked stone implements have been divided into two categories, those that exhibit edges along which flakes have been removed from one face only, termed "single-bevel" forms, and those implements whose edges have been formed through the removal of flakes from both faces, called "double-bevel" forms. The functional nature of these basic differences in form seems to warrant this distinction.

Single-bevel edges

Artifacts that are included in this category are mainly those whose function appears to have been that of scraping or incising. Side scrapers, end scrapers, and gravers are found in this group. A number of artifacts termed flake knives are also included here. These forms may be distinguished from the scrapers on the basis of their low angle of retouch. This distinction may be more apparent than real, but because of the low angle of retouch, these implements would have been as serviceable as knives as those knives exhibiting double-bevel edges.

SIDE SCRAPERS.—The implements identified as side scrapers have been divided into two groups, thick and thin. On the basis of the subcategories that may be recognized under each of these headings, this distinction appears warranted even though the point at which the division must be made seems somewhat arbitrary.

Thin flake side scrapers.—Thin flake side scrapers are those whose maximum thickness does not exceed 12 mm., with the average for the group approximating 5 mm. On the basis of their outline form, the thin flake scrapers have been divided into two subcategories, irregular and oval.

Irregular thin flake side scrapers.—(fig. 15). Numerically, this group forms the largest category of stone implements. Irregular thin flake side scrapers were found throughout the cultural horizon. The fact that obviously no attempt had been made to alter the gross shape of the flakes in the manufacture of these implements serves as their identifying characteristic. These scrapers are the least specialized of all the stone tools, and they are therefore of little diagnostic value in making cultural comparisons. Because this form of scraper is represented by a number of specimens, it will be designated "Style 1." Style 1 scrapers were fashioned by detaching

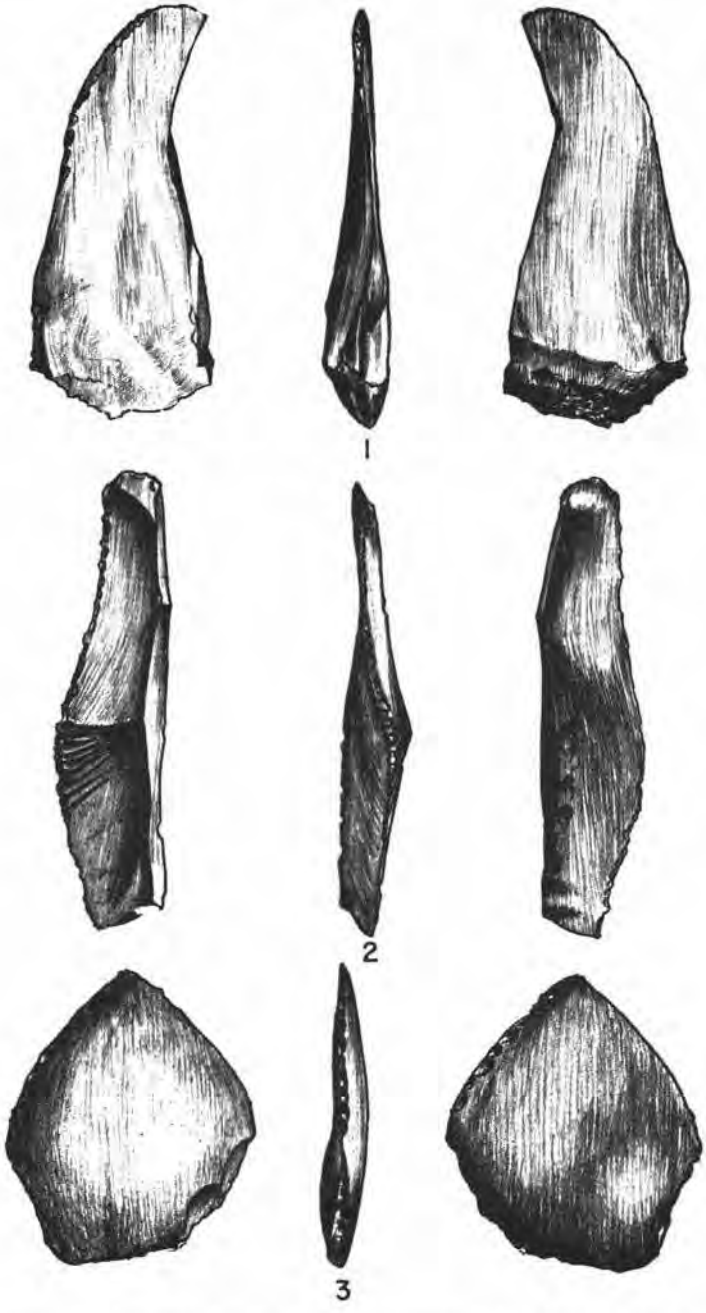

FIGURE 15.—Irregular, thin flake side scrapers, *Style 1*. 1, 70 mm. in length.

a flake by percussion from a parent block of stone and then retouching one or more edges by pressure-flaking methods. On those specimens with more than a single retouched edge, the retouching of the various edges may be on opposite faces. The retouching of the edges on several specimens appears to have been accomplished through use rather than purposeful pressure flaking. In shape, the working edges of Style 1 scrapers may be straight or convex. The angle of retouch varies from 40° to 75°. These implements range in size from 12 mm. to 99 mm. Chalcedony, opal, semi-opal, opal and chalcedony, and basalt have been used in the manufacture of these scrapers.

Oval thin flake side scrapers.—(fig. 16). Implements belonging to this category may be distinguished from the Style 1 scrapers by their oval shape, continuous retouching at least two-thirds of the way around the edges, and the abrupt angle of retouch. These scrapers are designated "Style 2." In size, the Style 2 scrapers vary from 34 mm. to 70 mm., with the thickness varying from 4 mm. to 8 mm. The flaking techniques employed in their manufacture are the same as for Style 1. The shape of the working edge is convex. Five of the specimens are made of chalcedony and one is made of semi-opal. Examples of Style 2 scrapers were found at all levels in the cultural horizon. These scrapers have a rather symmetrical appearance; the under side is flat and smooth, and the upper side, while nearly flat, exhibits a number of percussion-flaking scars and uniformly pressure-flaked edges.

In terms of the diagnostic value of Style 2 scrapers, their wide distribution in early and recent sites makes them of little value as an indicator of specific cultural relationships.

Thick flake side scrapers.—Side scrapers in this category vary in thickness from 16 mm. to 31 mm.

Irregular thick flake side scrapers.—This category of scrapers, which may be identified as "Style 3," differs from the irregular thin flake side scrapers of Style 1 in a number of respects. They are generally of a larger size, ranging from 50 mm. to 91 mm. in length, and because of their greater thickness, which varies from 16 mm. to 25 mm., the angle of retouch is somewhat greater. In the six specimens of Style 3 scraper recovered, the angle of retouch ranged from 52° to 81°. Several resemblances between the Style 3 and Style 1 scrapers may be observed. Both percussion- and pressure-flaking methods were usually employed in the manufacture of both styles. One specimen of Style 3 was found, however, to have been fashioned through percussion flaking only. Both styles have more than one working edge, and in such an occurrence the retouching may be on opposite faces. Again, both styles indicate that the original gross shape of the flake had not been altered except to retouch the edge(s). In terms of their vertical distribution, the Style 3 scrapers

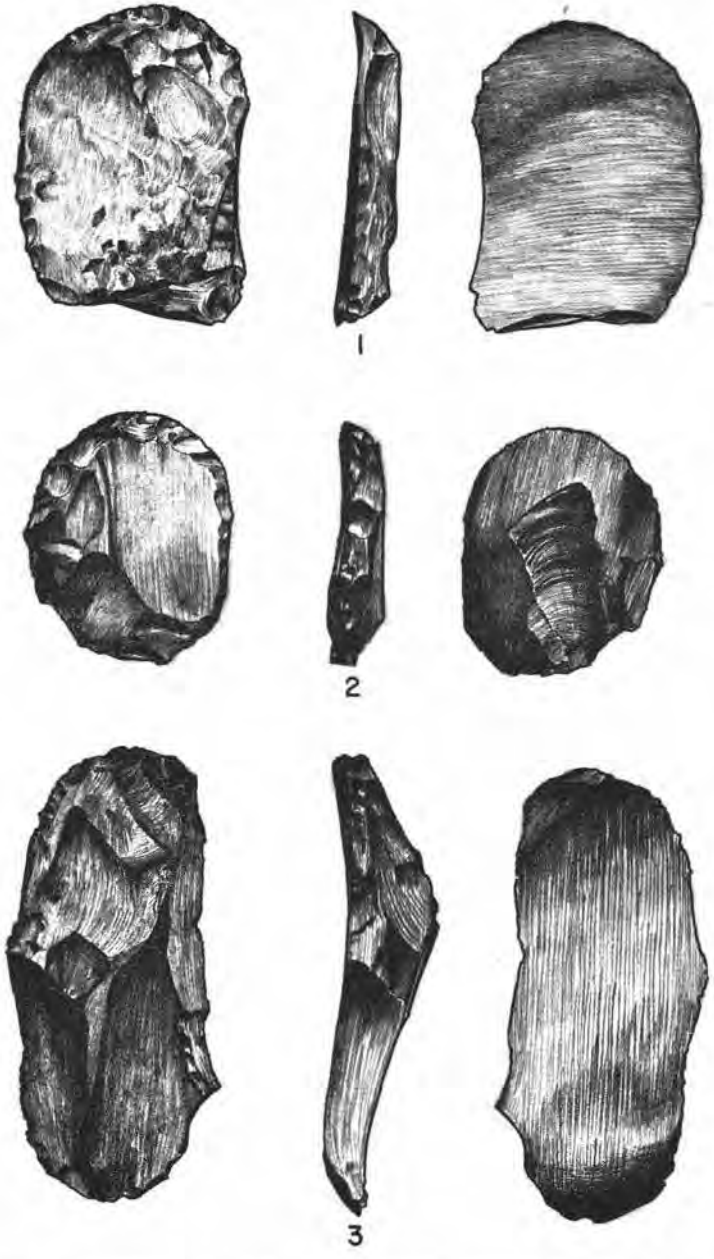

FIGURE 16.—1 and 2, oval, thin flake side scrapers, *Style 2*; 3, end scraper, *Style 4*. 1, 59 mm. in length.

occurred uniformly throughout the cultural horizon. Four of the Style 3 scrapers are of chalcedony, the other two being opal.

END SCRAPERS.—Two main categories of end scrapers, the elongate and oval, occur at the Lind Coulee Site. The principal difference between the two is that of shape. Those classified in the oval category are definitely egg-shaped in outline, while the elongate style lacks this distinctive characteristic, has a greater length relative to width, and is much less regular in form.

Elongate.—(fig. 16). Though few in number, this category of scrapers appears to have sufficient stability to qualify as a distinctive style, and is therefore designated "Style 4." There are elongated scrapers with a length ranging from 56 mm. to 82 mm., and the width varying from 36 mm. to 38 mm. The working edge is at one end; the angle of retouch varies from 68° to 72°. Both percussion- and pressure-flaking methods were employed in their shaping. Two types of stone, chalcedony, and chalcedony and opal, were used for these scrapers. Like other scraper styles, Style 4 scrapers are so widely distributed in early and recent sites that one can only record their presence or absence.

Oval end scrapers.—This group of scrapers is identified by the purposely shaped oval form. They may be distinguished from Style 4 scrapers not only on the basis of their oval shape, but also by their keeled or dome-shaped upper surface. The flaking scars along the working edge are uniformly on one surface only, the upper surface.

Keeled.—(fig. 17). Designated "Style 5," these scrapers are identified by the distinct keel or ridge which runs longitudinally along the upper surface. The under surface is flat to slightly concave. The five specimens of this style recovered were manufactured entirely by percussion-flaking methods. It is not certain whether the minute percussion-flaking scars along the very margin of the working edge are the result of intentional flaking or were developed through use. From above, these scrapers are egg-shaped in outline, the broad end carrying the working edge which extends to the point of greatest width. The length ranges from 61 mm. to 65 mm., the width from 45 mm. to 57 mm. The face of the working edge is quite abrupt, the angle of retouch ranging from 65° to 83°. Three of the Style 5 scrapers were of chalcedony, the other two of semi-opal. An analysis of their vertical distribution finds them occurring throughout the cultural deposit.

The keeled oval thick flake scrapers, identified as Style 5, are often included in the category "snub-nosed" scrapers by various authors. While the "snub-nosed" scrapers have a wide distribution in recent as well as early sites, the truly "keeled" specimens appear to be limited to sites with some antiquity. Scrapers nearly identical to our Style 5 were found at the Lindenmeier Site (Roberts, 1935,

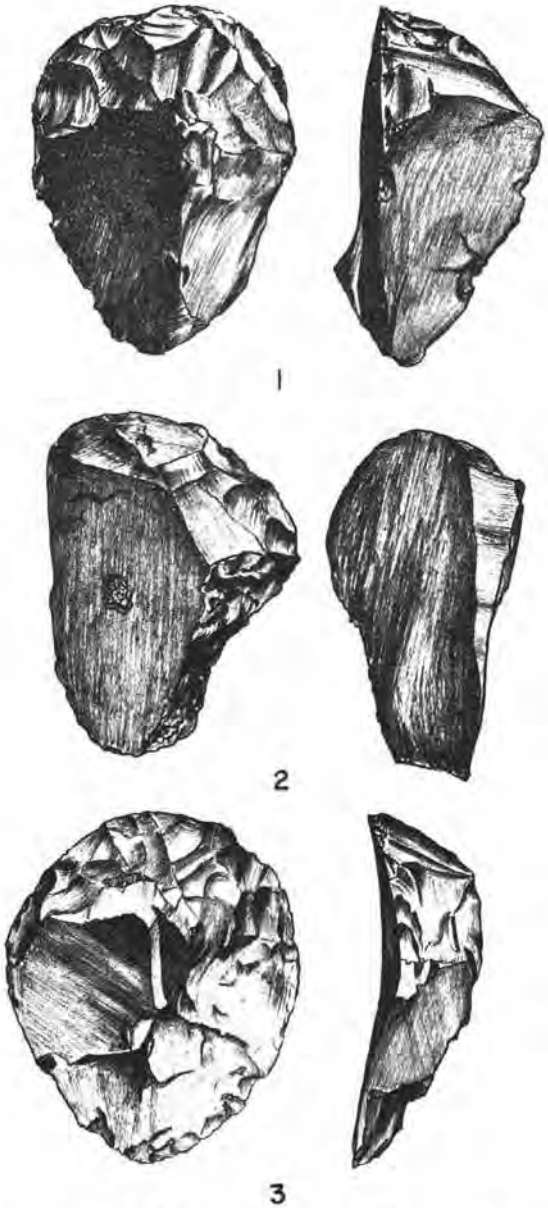

FIGURE 17.—1 and 2, keeled end scrapers, *Style 5*; 3, domed end scraper, *Style 6*. 1, 64 mm. in length.

pl. 9, *b*, *c*, *h*). However, it is probable that one should not assign too great weight to these scrapers for purposes of cultural comparison because of the wide range of variations on this basic theme.

Domed.—Though differing slightly in appearance from the Style 5 keeled scrapers, the domed scraper, designated "Style 6," appears to be functionally the same implement. The Style 6 scrapers range from 23 mm. to 69 mm. in length, and from 17 mm. to 61 mm. in width. With the exception of one specimen, the size ranges are nearly the same as for the Style 5 scrapers. The Style 6 scrapers have a generally more rounded shape than those of Style 5. The under surface tends to be flat or slightly concave, while the upper surface has a rounded to dome-shaped appearance. One specimen (fig. 17) has an upper surface intermediate in appearance between the Style 5 and Style 6 scrapers, possessing slight indications of a keel. This may indicate that whereas no functional difference existed between the two styles, definite preferences in form were expressed. The angle of the working edge is quite abrupt, ranging from 56° to 85°. Though the angle of retouch is approximately the same as that of the Style 5 scrapers, the working edge of Style 6 covers over two-thirds of the periphery. Pressure as well as percussion flaking was used in the manufacture of the specimens. All the examples of Style 6 scrapers are made of chalcedony. All but one of the specimens were found at the top of the cultural horizon, the exception coming from a point near the middle.

Style 6 scrapers are less diagnostic than Style 5, fitting well within the category of "snub-nosed" scrapers from many early as well as recent sites.

CONCAVE SCRAPERS.—(fig. 18). A number of scraping implements have been assigned to this category on the basis of having one or more working edges which are concave in shape. One difficulty is encountered in the classifying of this group of implements; whereas all specimens have the identifying concave working edge(s), several have an additional working edge which is convex in shape and thus they would fit into one of the other categories with equal ease. The irregular gross shape of these scrapers, which are designated "Style 7," indicates that only the working edge received special attention. These scrapers range in thickness from 5 mm. to 12 mm. The range in length is from 22 mm. to 70 mm. The flakes had been detached from the parent block of stone by percussion flaking, with pressure flaking having been used to shape the working edge(s). The angle of retouch of the working edge varies from 36° to 66°. Style 7 scrapers tended to be concentrated in the middle and upper levels of the cultural stratum. Chalcedony, semi-opal, opal and chalcedony, and opal were used in the manufacture of these implements.

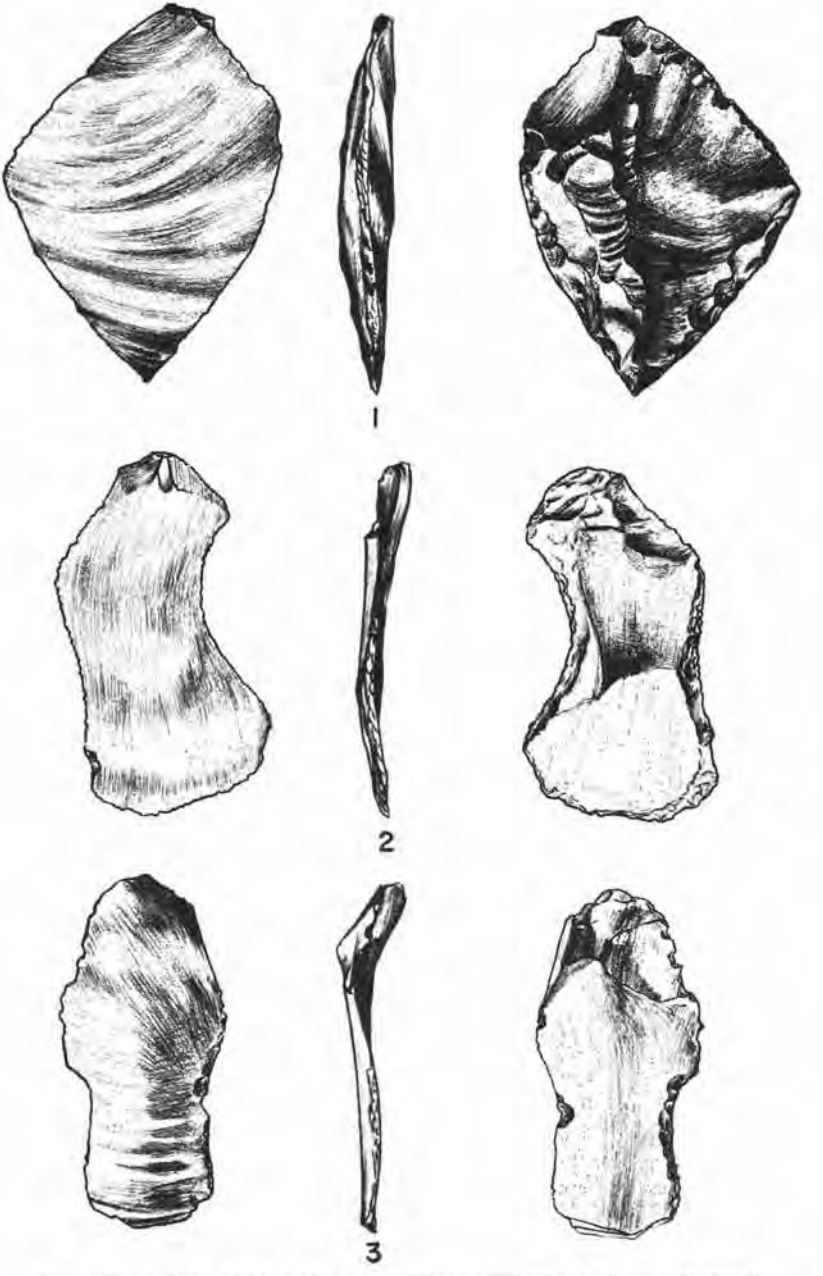

FIGURE 18.—1, flake knife; 2 and 3, concave side scrapers. 1, 62 mm. in length.

Two of the specimens found are elongated flakes with opposing concave working edges. Scrapers closely resembling these and identified as "spokeshaves" are listed by Rogers as belonging to Phase II of the Playa Industry of southern California (Rogers, 1939, p. 33, pl. 8). It is doubtful, however, whether opposing concave edges are more significant than a concave edge opposite a convex edge, or even a single concave edge. This category of scrapers, too, is probably without much diagnostic value because of its generalized nature.

FLAKE KNIVES.—(fig. 18). As previously indicated, this category of implements is differentiated from the Style 1 scrapers on the basis of the angle of retouch, which, on the flake knives, ranges from 22° to 35°. As with the Style 1 scrapers, no attempt has been made to alter the natural shape of the flake, more than one edge may show signs of retouching, and the edges are straight or convex in shape. The flake knives vary from 2 mm. to 16 mm. in thickness, and from 12 mm. to 80 mm. in length. Chalcedony, chalcedony and opal, semi-opal, and jasper were used for these implements, which were found evenly distributed through the cultural stratum. Both percussion- and pressure-flaking methods were used in the fashioning of these tools.

As is the case with Style 1 scrapers, the flake knives lack sufficient diagnostic value to be of use in making cultural comparisons.

GRAVER.—(fig. 21). A single implement identifiable as a graver was found at the top of the cultural stratum. This graver appears to have been a multipurpose tool. Along one side two concave scraping edges are separated by the graving projection. The opposite side gives the appearance of a well-made flake scraper with a slightly convex working edge. The angle of retouch is 50° for the concave edges, and 35° for the convex edge. The graver is 52 mm. long, and 41 mm. wide, with a maximum thickness of 5 mm. The under surface is flat and slightly concave, while the convex upper surface carries several percussion-flaking scars. Pressure flaking was used to prepare the working edges. The material is semi-opal.

Gravers occur widely in early horizons in North America, but they also occur in more recent cultural periods as well. The form represented here resembles closely the gravers from the Lindenmeier Site (Roberts, 1935, pl. 13; Roberts, 1936, pl. 9), but on the basis of a single specimen it is dangerous to generalize too widely in making specific cultural comparisons.

Double-bevel edges

Artifacts included in this category are those whose function appears to have been piercing, cutting, and chopping. Projectile points, crescentic blades, knives, and choppers are found in this category. With the exception of the choppers, one characteristic of

this group is that the original surface of both faces has been entirely obliterated by secondary flaking.

PROJECTILE POINTS AND FRAGMENTS.—Of the 21 projectile points found distributed evenly throughout the site, only 7 are sufficiently complete to be useful for purposes of classification. Of the remainder, 7 fragments are from the tips of blades, 1 from the midsection, and 6 from the base ends of points. A comparison of the average size of the Lind Coulee points with that of points from recent sites in the Columbia Basin finds the Lind Coulee points to be noticeably larger. While crude examples occur in the collection of points from Lind Coulee, a number of specimens indicate that their makers could fashion excellent projectile points.

Stemmed projectile points.—Twelve of the twenty-one projectile points and fragments can be identified as being stemmed. Ten of them possess a slight taper to the stem, but the stem of one appears to be parallel-sided. In all complete examples of stemmed points, the length of the stem constituted a third of the total length of the point. Two basic styles of tapered stem points can be recognized.

Tapered stem. Style 1.—(fig. 19). Two specimens, one complete and the other fragmentary, identify this style. Both points are chalcedony. The broken specimen in its complete form would be much larger than the other. Both possess the identifying characteristics of tapered stem, rounded shoulders, and convex base. The complete specimen is rather long and slender in shape. The length is 66 mm., the maximum width 21 mm., and the maximum thickness 4 mm. The maximum thickness of the fragmentary specimen is 6 mm. The sharp edges of the stem of the fragmentary point have been ground smooth, but no indications of this can be found on the complete specimen. Both percussion- and pressure-flaking methods were used in the shaping of these points. The flaking scars indicate pressure flaking for the final shaping. In some specimens these scars extend completely across the face; in others, flakes struck from opposing sides meet at the midline. The final retouching along the edges and especially at the base also was done by pressure flaking.

Tapered stem. Style 2.—(fig. 19). These points may be distinguished from those of Style 1 by their sharp lateral shoulders. One of these points is opal, one chalcedony, and one basalt. The basalt point is fragmentary, lacking the base of the stem and the tip of the blade. The complete specimens are long and slender in shape, the larger of the two measuring 70 mm. in length, 21 mm. in width, and 5 mm. in thickness, whereas the other measures 63 mm. in length, 18 mm. in width, and 5 mm. in thickness. One very interesting characteristic of these two points is the asymmetry of the shoulders. On each point, one shoulder is sharp and the other rounded. While the form of these points is somewhat reminiscent of Sandia points,

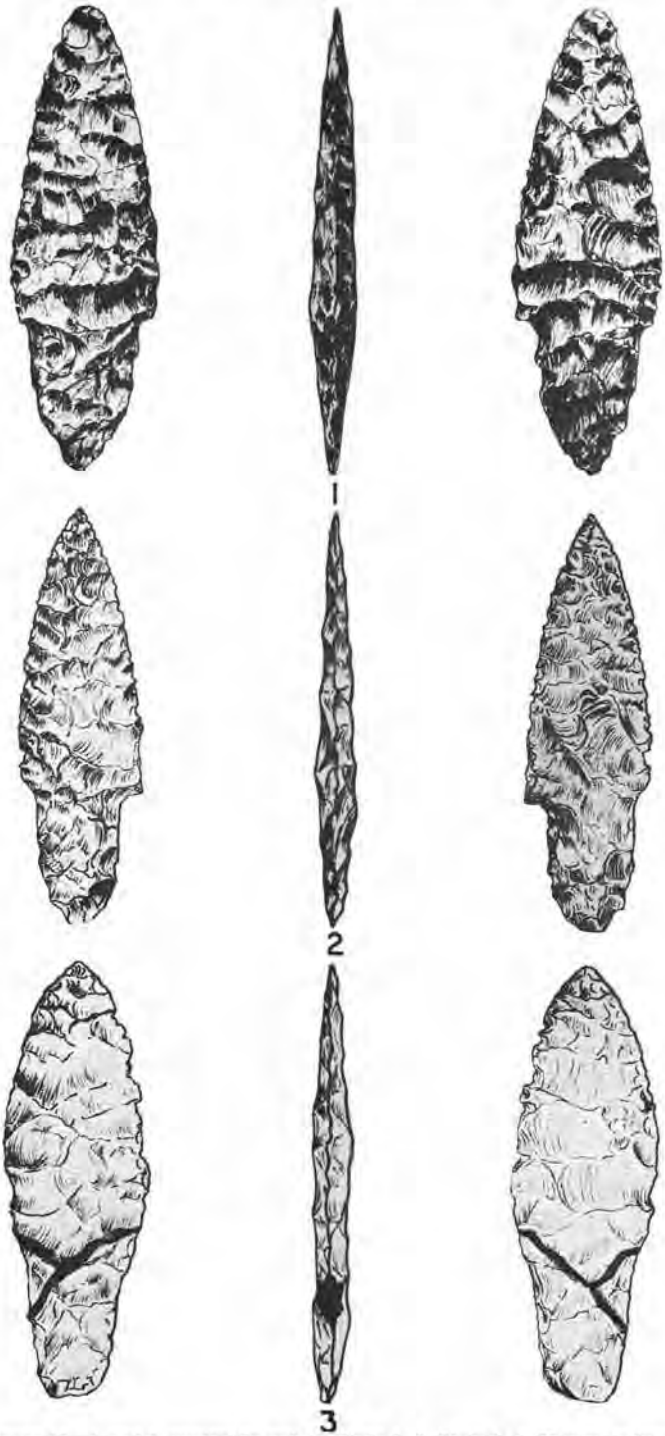

FIGURE 19.—1 and 2, projectile points, *Style 2*; 3, *Style 1*. 1, 70 mm. in length.

the probable age difference between the Sandia and Lind Coulee specimens and the much finer workmanship of the Lind Coulee points suggests that no relationship exists. The flaking techniques are identical to Style 1, with the flaking scars forming an even more symmetrical ribbon-like pattern. The smaller of the two complete specimens of Style 2 projectile points exhibits the effects of grinding along the sides of the stem.

Parallel-sided stem.—(fig. 20). As only a single specimen of this form was found, it cannot be designated a style. It is shorter and broader than Styles 1 and 2, being more triangular in shape. The length is 57 mm., the width 24 mm., and the thickness 6 mm. The material is jasper. Like the other points, it was fashioned almost entirely by pressure flaking. No grinding of the sides of the stem is evident in this single example.

Non-stemmed projectile points.—(fig. 20). The basal portion of a non-stemmed, concave-base point was found near the base of the cultural stratum. It is a well-made point. So skillfully was the flaking done that scars of flakes detached from each edge, meeting imperceptibly at the midline, give the appearance of a single narrow, ribbon-like flake running diagonally completely across the face. The concave base was formed by even pressure flaking. It would be tempting to say that this is evidence of a Folsom-like point in the Columbia Basin, but in reality at least two of the characteristic Folsom features are lacking. This specimen shows no sign of fluting or basal grinding. It is probable, however, that were the specimen complete it would closely resemble the classic Folsom points in shape and size. There remains the possibility that this point was broken while being made and before such steps as fluting and grinding would have taken place. This provocative question can only be answered by further excavations at the Lind Coulee Site.

In addition to the example of a broken Style 2 projectile point, fragments of three other points are also of basalt. One of these, a stem, shows evidence of grinding along the edges.

One broken specimen is considerably larger than the other points. The writer is not certain whether this specimen is a large projectile point, or would be more properly identified as a knife.

The projectile points from the Lind Coulee Site show no resemblance to recent points from the Columbia Basin, nor do they resemble any of the points from "Early Man" sites with which the author is familiar. It may be that we are dealing with localized variants of stemmed and non-stemmed projectile points with well-controlled flaking, having a wider distribution in early archaeological horizons. A larger collection of projectile points is needed before specific relationships can be established.

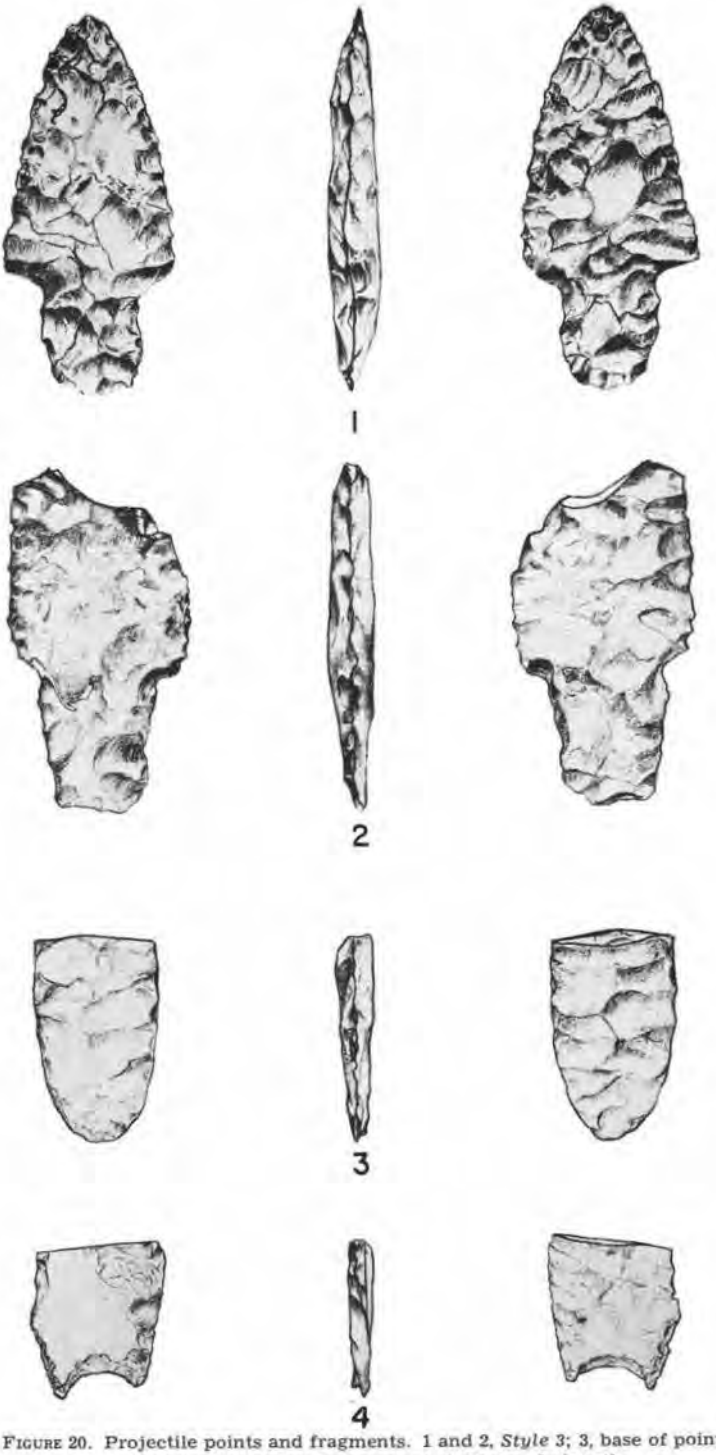

FIGURE 20. Projectile points and fragments. 1 and 2, *Style* 3; 3, base of point; 4, fragment of concave base point. 1, 57 mm. in length.

CRESCENTIC BLADES.—(fig. 21). One complete specimen and a fragment from the center of the blade of another represent this category of implements. The complete crescentic blade measures 56 mm. in a straight line from tip to tip, and 88 mm. from tip to tip measured around the outside arc of the blade. The maximum thickness of the jasper blade is 6 mm. The fragmentary specimen, which is made of semi-opal, also has a maximum thickness of 6 mm. Pressure flaking was the basic technique employed in the manufacture of both specimens.

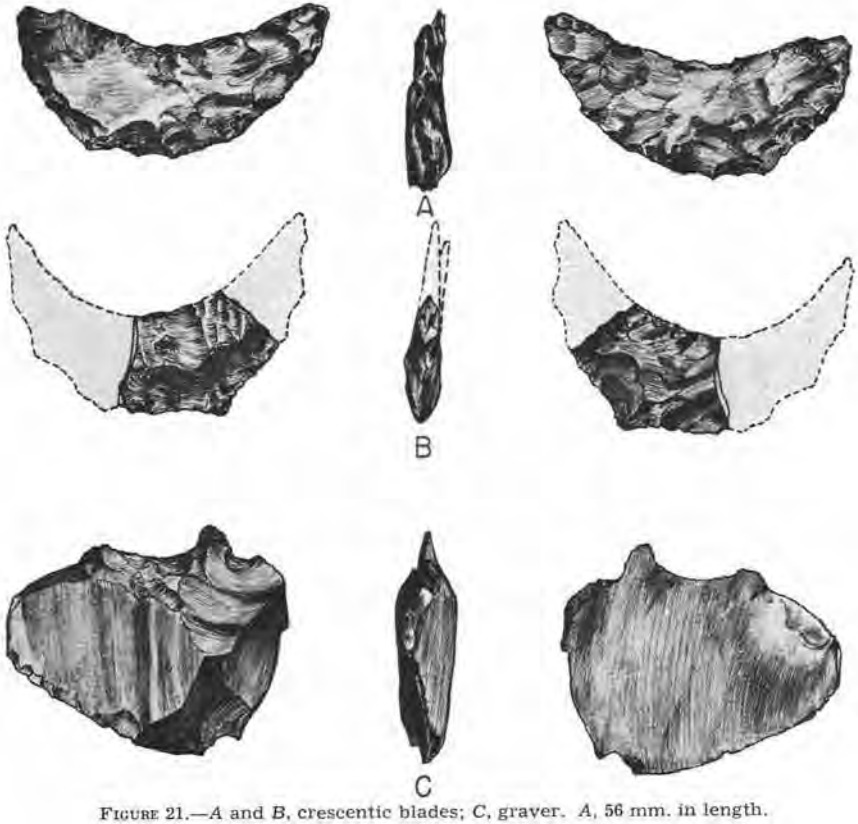

FIGURE 21.—*A* and *B*, crescentic blades; *C*, graver. *A*, 56 mm. in length.

It is now evident that crescent-shaped blades such as these found at the Lind Coulee Site are quite widespread in the Early Man sites west of the Rocky Mountains. It is also of interest that very similar appearing objects have been found in sites of more recent age, especially in California. The first problem that arises concerning these objects is that of function. Rogers (1939, p. 36, pl. 8, *a*, *b*, *c*) identifies identical-appearing blades from Lake Mohave and the San Dieguito industry as "amulets." Harrington (1948, p. 93-95,

pl. 24) terms these same implements from the Borax Lake Site, "crescents." From the lower horizon at Buena Vista Site 2, Wedel (1941, p. 99-100, 147, pl. 39, *w*, *x*, *y*) recovered six "crescentic flints" which he indicates are of unknown use. Jesse D. Jennings (1957, fig. 156) in his report on the excavations at Danger Cave, Utah, illustrates a crescentic blade which he describes as "unique." Cressman (1941, p. 84-85) reports the finding of a biconvex crescentic blade below the pumice at Paisley Five-Mile Point Cave No. 1. This implement he identifies as his Type 8, "Crescent," scraper. Crescentic blades also have been found in ancient surface campsites along the shorelines of ancient southern Oregon lakes of Anathermal age (Cressman, 1936).

In terms of function, then, we find one author identifying the crescentic blades as "amulets," another as "crescent scrapers," and others simply identifying them descriptively as "crescents," "crescentic flints," and "crescentic blades." It is the present author's opinion that the double-bevel edge indicates a cutting rather than a scraping function. It appears entirely possible that the crescentic blades found in Early Man sites in western North America were originally functional cutting implements, probably hafted, and that these same implements survived into more recent times, but with a ceremonial function indicated by a pendantlike constriction at one end.

The crescentic blades found at the Lind Coulee Site are the only implements of sufficient diagnostic value, and with specific resemblance to similar forms from other early archaeological sites, to warrant designation as a distinct "Type."

KNIVES.—Six double-bevel blades, biconvex in cross section, probably were utilized as knives. These implements differ from the flake knives in being of greater average thickness (4 mm. to 10 mm.), and in the possession of double-bevel edges. While all the specimens are fragmentary, the original shape appears to have been ovate in outline, with the small end forming a blunt point. The pressure flaking is less symmetrical than that of the projectile points. The working edges, which have an angle of retouch varying from 27° to 37°, extend completely around the perimeter. With the exception of one semi-opal knife, all the specimens in this category are of chalcedony. The vertical distribution of the knives ranges throughout the cultural horizon.

The generalized nature of these implements lends little toward the establishment of specific cultural relationships. Similar artifacts are common in early archaeological sites. A larger sample of knives from the Lind Coulee Site might well show an overlapping in form with recent knives from the Columbia Basin.

CHOPPERS.—(fig. 22). Three massive stone implements with crude percussion-flaked edges and identifiable as choppers, were

found in the lower, middle, and upper levels of the cultural horizon, respectively. The largest specimen is a broad flat piece of basalt with bi-facial percussion-flaking scars along the edge at the wide end. This chopper has a length of 163 mm., a maximum width of 134 mm., and a maximum thickness of 145 mm. The second chopper is of chalcedony, with a length of 134 mm., a maximum width of 63 mm., and a maximum thickness of 39 mm. The third specimen, also of chalcedony, measures 120 mm. in length, 71 mm. at its maximum width, and its greatest thickness is 46 mm. No attempt was made to alter the gross shape of the stone; the only requirement was a large piece of stone with at least one narrow edge which could be sharpened by percussion flaking.

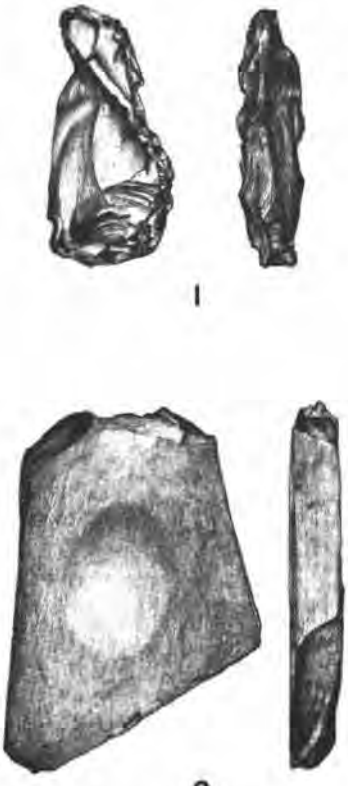

FIGURE 22.—1, chopper; 2, pigment palette. 1, 134 mm. in length.

While it may be shown that implements classified as choppers are widely found in early as well as recent sites, a complete lack of diagnostic characteristics makes them of little use in determining cultural relationships.

GROUND STONE IMPLEMENTS

Of the total number of stone implements found at the Lind Coulee Site, 12.09 percent were shaped by grinding processes. A fundamental distinction is made between implements which indicate the use of grinding techniques in the shaping process and those that indicate grinding through use only. Only implements fitting into the latter category were found at Lind Coulee. It is interesting to note that, although ground stone implements occur, none of them appears to have been used in connection with the preparation of food. Rather, it was in the preparation of coloring pigment, red and yellow ocher, that the grinding implements were employed.

Ground surface developed through use

All the implements in this category are directly concerned with the preparation of red and yellow pigment. These include 2 palettes, 4 handstones used with the palettes, and a number of pieces of pigment.

PALETTES.—(fig. 22). Two naturally flat pieces of basalt, each having a single smoothed surface, were recovered from the cultural deposit. One specimen is complete, the other is a corner fragment of a palette which appears to have been approximately the same size as the complete specimen. The grinding surface of each specimen is liberally stained with red pigment. The grinding surface of the complete specimen is in the form of a shallow depression in the center of one face. Numerous fine abrasions indicate that a back-and-forth rather than a circular motion was used. The other specimen is too fragmentary to give much information, but it appears that a larger area of the surface was used. The complete specimen measures 191 mm. in length, has a maximum width of 127 mm., and a maximum thickness of 20 mm. Both palettes were found at the base of the cultural deposit.

Nearly identical artifacts are reported from the Lindenmeier Site. Roberts states,

> One stone is flat, roughly oval in outline, and has a shallow concavity in one face (pl. 16, *c*). Traces of red pigment still adhering to the stone suggests that it functioned as a pigment bowl. It does not seem likely that this was a mortar for grinding paint, as it shows no effects of a pestle. It was merely a palette (Roberts, 1935, p. 30).

Cressman (1942, p. 89) found a metate which had been used for grinding hematite in Catlow Cave No. 1, but does not indicate at what level the metate was found. Heizer (1949, p. 23) reports the finding of a sandstone palette in an Early Horizon site in central California. This artifact, while considerably larger and of much finer workmanship than the Lind Coulee specimen, also carried red pigment stains.

In the Columbia Basin, the use of red and yellow pigment continued into historic times. In the recent sites, however, the method of grinding pigment appears to have been through the use of mortar-shaped rather than palettelike grinding stones.

HANDSTONES.—Handstones or manos were used with palettes in the preparation of red and yellow pigment. Of the 4 handstones found, 3 are fist-size, naturally ovate, waterworn river cobbles. The other is a somewhat angular waterworn cobble, a third of which is missing along a longitudinal break. With the exception of one ovate handstone which is granite, all are basalt. The largest of the ovate handstones measures 99 mm. in length, 80 mm. in width, and has a maximum thickness of 57 mm. The smallest ovate specimen measures 80 mm. in length, 55 mm. in width, and is 38 mm. thick. The angular handstone measures 130 mm. in length. When found, the smallest of the ovate handstones was lying beside the complete palette (fig. 22). The surfaces of the ovate handstones carry the reddish stains of pigment. The angular specimen carries pigment stains only on the end of a wedge-shaped projection, as if this projection had been used to crush the larger pieces of pigment-bearing stone. Since it is a broken specimen, however, it is possible that the missing face might have been used as an abraiding surface.

Handstones of this style are so common in early as well as recent sites that little can be said of cultural relationships. Perhaps their most significant characteristic at the Lind Coulee Site is the fact that they appear to have been used only for the preparation of pigment, and not for the grinding of food.

PIGMENT.—Sixteen pieces of pigment were found, fourteen of which were red in color (hematite), with the remaining two pieces being yellow (limonite). Four of the specimens of red pigment are softer than the others and have surfaces that show signs of rubbing. It is probable that these are fragments resulting from grinding and mixing with grease, oil, or water. The raw material for the preparation of red and yellow pigment is common in the exposed basalt flows of the Columbia lavas. The fragments of pigment occurred throughout the cultural deposit.

In his petrographic analysis of the deposits, Nering (1956, p. 266) reports finding considerable numbers of minute fragments of hematite in the sands of the cultural horizon.

The use of red and yellow pigment appears to be a trait of considerable antiquity in the New World. Many Early Man sites in western North America indicate the use particularly of red pigment. Evidence of its ceremonial use in the Windmiller Facies sites indicates considerable antiquity for this function (Heizer, 1949, p. 31).

IMPLEMENTS OF BONE

Bone artifacts apparently formed a rather small portion of the total inventory of tools utilized by the inhabitants of the Lind Coulee Site. Only four readily identifiable bone tools, plus a fragment of bone bearing incised marks, were recovered from the site. Preservation, of course, may have played a part here, but large quantities of food bones were recovered which were well preserved and, like the artifacts of bone, rather heavily mineralized. As was the case with the stone artifacts, a heavy encrustation of lime coated the bone implements. In fact, until the coating was removed it was often difficult to determine whether or not a bone had been worked.

The shaping of the bone tools appears to have been accomplished almost entirely by cutting and scraping green bone with the sharp edges of stone tools. A series of minute parallel grooves records the effects of the flaked edges of stone knives and/or scrapers. Only one implement, a serrated bone point, shows any indication of grinding subsequent to the basic shaping process.

Many of the food bones carried the marks of cutting implements, but these marks probably were made at the time of dismembering the animals.

All the bone implements appear to have been made from sections of long bones.

BONE IMPLEMENTS

BONE SHAFTS.—(fig. 23). Included in this category are three nearly complete shafts. It is improbable that all three were intended to serve the same function. However, owing to the fact that one or both of the ends of each shaft are missing, it is not possible to be at all certain of their intended purpose. One shaft, broken through carelessness while being removed, has one end which has been diagonally cut along one side to form a wedge-shaped point, plano-convex in cross section. Because of an old break, the shape of the opposite end could not be determined. The incomplete length of this implement is 77 mm., and the slightly oval shaft has a maximum thickness of 14 mm. It is possible that the wedge-shaped end was designed for hafting. This shaft was recovered from near the middle of the cultural stratum.

A second bone shaft (fig. 23), somewhat smaller than the first, has a very curious appearance. The basal end is missing, but the opposite end tapers to a blunt point. In cross section, this shaft has a very definite plano-convex shape. The flat side of the shaft is the result of purposeful shaping, and is not merely a split surface. The convex side rises to a slight keel running longitudinally along the shaft. The length of this broken shaft is 172 mm. and the maximum thickness is 11 mm. This shaft also was recovered from near the middle of the cultural stratum. The third specimen is the largest

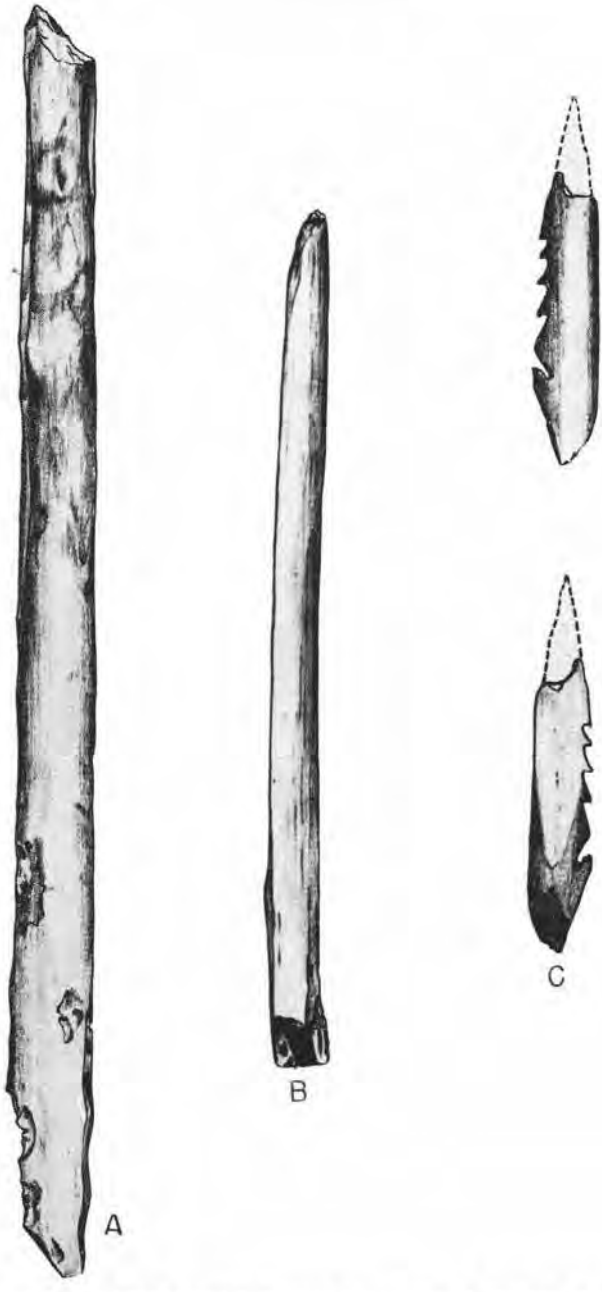

FIGURE 23.—*A* and *B*, bone shafts; *C*, notched bone point. *A*, 251 mm. in length.

of the three. Unfortunately, both ends of the shaft are missing, but the characteristics of the body of the shaft can be described. At one end, the shaft is nearly round in cross section; at the other, nearly rectangular. The surface is very irregular and has many scratches and depressions. The incomplete length of this shaft is 251 mm., and the maximum thickness of the shaft, measured at the rectangular end, is 15 mm. The only possible suggestion of use for this implement is that of a flaking tool. Like the other two bone shafts, this example was found near the middle of the cultural horizon.

Bone shafts are not unknown from other Early Man sites. Cotter (1937, pl. 2) found bone shafts, sharp at one end and beveled at the other, at the Clovis Site. Cressman (1942, p. 99-100) reports the finding of nearly identical bone shafts, which he identifies as "foreshafts," at the Narrows on Lower Klamath Lake. The beveled end of the first bone shaft described here from Lind Coulee may indicate a functional similarity and perhaps cultural relationships with the bone shafts from Clovis and/or the Lower Klamath Lake site.

NOTCHED OR SERRATED BONE POINT.—(fig. 23). This very interesting artifact is, unfortunately, too fragmentary to indicate with certainty what its original function might have been. Both the tip and the base of the point are missing, and although one can probably extrapolate the shape of the tip with little error, the broken base gives but a slight clue as to means of attachment. The point was apparently made from a thick piece of a long bone which was first rounded, then cut diagonally from one side to the other, leaving it plano-convex in cross section toward the tip. Four shallow serrations angle toward the tip, with one serration oriented in the opposite direction. The latter appears to have served as an aid to hafting. Scars on the surface indicate that the point was shaped by cutting with a stone blade. The rounded surface shows signs of smoothing by grinding or abrasion. The length of this fragmentary piece is 59 mm., and the maximum thickness at the basal end is 11 mm. The small size of the point and the shallowness of the serrations indicate that it probably was not used on large animals. Small mammals, fish, or birds might have been hunted with some success with such a point. The writer can find no mention of comparable serrated or barbed points in the literature. On the basis of the radiocarbon date of 8,700 plus or minus 400 years for the archaeological deposits, this appears to be the earliest recorded use of serrated bone points in the New World.

MISCELLANEOUS BONE OBJECTS

A sizable fragment of a long bone of some large animal, probably bison, is of interest because of a great many fine cuts which scar its surface. The cuts are oriented across the bone rather than longitudinally along it. The only purpose that can be suggested for this

fragment of bone is that of a base for some type of cutting operation. This bone fragment came from near the bottom of the cultural deposit.

DATING THE CULTURAL HORIZON

In attempting to arrive at the age of the cultural materials in the Lind Coulee Site, data from a number of lines of evidence have been employed. It may be noted in the following discussion how closely the data from one line of evidence tend to be supported by those from other methods of approach.

GEOLOGY

We have seen in the discussions of the geology and stratigraphy of the site that if the radiocarbon dates from late-Pleistocene and post-Pleistocene events are accepted, geological evidence indicates that the occupation of the site occurred at some time within the period of from 11,000 to 6,000 years ago.

PALEONTOLOGY

Evidence from the faunal remains recovered from the cultural horizon is less conclusive than the geological evidence, but in a general way tends to substantiate the geologically derived dating estimate. The relatively high degree of mineralization of the bones is suggestive of some antiquity, particularly in light of the low calcium carbonate content of the deposits, which would indicate rather slow mineral replacement. It is unfortunate that no bison remains of sufficient diagnostic value for species identification could be found. It is not necessary, however, that the remains of the bison found in the cultural deposits be those of some fossil form, for *Bison bison bison* apparently flourished in the area within the period of time suggested by the geological evidence (Skinner and Kaisen, 1947, p. 127-256).

A study of the types of fauna represented in the collection from the cultural deposits suggests that the climatic conditions differed considerably from the semidesert environment of today. Muskrat, beaver, bison, greenwinged teal, and goose indicate a period of greater moisture and a different type of vegetative cover. The cool, moist conditions of the Anathermal period could have provided the sluggish stream or lake in which the sediments of Bed D developed, and the general environmental conditions suitable for the type of faunal assemblage recovered.

PALEOCLIMATOLOGY

Evidence of the climatic conditions prevailing during the occupation of the site is supplied by geological, paleobotanical, and paleontological studies. Prior to the deposition of the culture-bearing sands a proglacial climate prevailed. Evidence for this is sup-

FIGURE 24.—Bison bones in situ in north-south trench shown in figure 25. View looking south.

plied by the underlying Touchet beds, which are considered to have formed under such conditions. The culture-bearing sands were deposited when large quantities of water existed in the now-desert environment of the Columbia Basin. The cool, moist Anathermal period is suggested for this event. As previously mentioned, the faunal types suggest greater moisture than now prevails in the Columbia Basin for the period of occupation of the site. Overlying the culture-bearing sands is a thick layer of loessial material containing lenses of volcanic ash. The warm, dry climate of the Altithermal period, during which a great deal of volcanic activity is known to have occurred, is probably the period of time of this loessial deposition.

RADIOCARBON DATING

In the process of excavating the site during the 1951 season, fragments of burned bison bones were collected for purposes of radiocarbon analysis. Burned fragments were selected because they demonstrate cultural association and, because of being burned, were less mineralized and therefore more suitable for radiocarbon analysis. The radiocarbon dates obtained were: 9,400 plus or minus 940 years, 8,518 plus or minus 460 years, for a weighted average of 8,700 plus or minus 400 years.

WAY OF LIFE

On the basis of the artifacts and other information discovered in the excavations at the Lind Coulee Site, what have we learned about the way of life of the people who lived here at the beginning of the postglacial period, and what can we say about their cultural relationships with peoples living in adjacent regions at the same period of time?

We can be certain that the group was small, probably made up of simple family bands numbering no more than 30 people. The occupation evidence at the site indicates a small band of people repeatedly (perhaps annually) camping at the site for a brief period of time. We know from other evidence, including studies of recent Indians, that it takes a large geographic area to support a small group of people when the economic life is oriented around hunting, fishing, and the gathering of wild plant foods. It is not until man has developed the techniques of agriculture that he is able to live in densely populated urban areas and lead a sedentary existence.

Not only was the population small, but because of their economic orientation toward hunting and some gathering of plant foods, they must have been quite nomadic. Hunting and gathering peoples must be almost constantly on the move in search of food. The preservation and storing of food probably was not very important to these people, because they had no means of carrying it except on their backs. At best they could only cache some of the surplus food for possible emergency use. However, the Lind Coulee people were primarily hunters, with little emphasis, if any, on the gathering of wild grass seeds, nuts, or other such foods that could be easily stored. As meat does not store well under the primitive techniques of sun and smoke drying, we can be fairly certain that relatively little food was cached.

We have a picture, then, of a small band of nomadic people camping temporarily on the shore of a lake or slow-moving stream as they carried on their constant quest for food.

It is likely that this particular campsite was visited time and again, as it was adjacent to water and the surrounding region probably afforded good hunting. Bones of ducks and geese were found in the camp debris, suggesting that there were nesting grounds for these birds nearby. With the hunting techniques used at this time, it is most likely that our primitive hunters would have had greatest success during the period when the birds were raising their young. The quantities of bison bones in the deposits indicate that the area was particularly good for the hunting of these large mammals.

No evidence was discovered that indicated anything about the type of dwelling that was used. As the people were nomadic and had no animals or vehicles for carrying their belongings, we can

assume that the housing was of an extremely temporary kind. Quite likely it was a simple brush shelter much like that used by recent Indians in the Great Basin area to the south. In winter time the shelter could have been made more weatherproof by covering it with the skins of recently killed animals. So few caves and rock-shelters are to be found in the Columbia Basin region that it is unlikely that these were used extensively as dwelling sites. Only a very few of the caves that have been excavated show any evidence of being visited by Early Man. Of the many semisubterranean house pits that have been excavated, none appears to have been used earlier than perhaps 2,000 years ago.

These early residents of Washington wore skin garments of some type. Numerous hide-scrapers used for removing flesh, fat, and hair from animal skins were found in the excavations. The style of the garments is unknown, but they were most likely loose-fitting wrap-around affairs. It is quite likely that in the warm seasons of the year very little, if any, clothing was worn.

The numerous pieces of red and yellow pigment found in the site deposits indicate that some form of personal beautification was being practiced. Most likely the pigment was used on the face and body, but it could also have been used to color the clothing.

The principal hunting weapon probably was a short spear and a spear thrower. The bow and arrow appears not to have been used in the New World until the past few thousand years. Armed with his spears, which were the basic weapons used by the earliest hunters of the Americas, Early Man hunted the huge bison with considerable success. The same hunting technique could be used with equal success on smaller mammals and the larger birds.

No evidence was found to indicate that Lind Coulee man did any fishing. It is entirely likely, however, that this was not a fishing site and that this accounts for the absence of fish bones and fishing equipment in the deposits. In time other campsites used by people of this period may be found, campsites located at strategic spots along streams where fishing might have been practiced. Recent excavations by Cressman at The Dalles on the Columbia River give evidence of people fishing there at least 9,000 years ago.

Because of the small size of the band the political and social organization of the group was probably quite simple. Leadership was probably informally vested in a man who, because of his personality and hunting ability, had acquired the respect and following of the group. Descent was probably traced through the father's side of the family, because this is by far the most common practice for this type of social group. It is likely that little attention was paid to such matters as inheritance, because with their nomadic way of life and few possessions, there was no way of acquiring wealth, no interest in it, and therefore little, if anything, to inherit.

FIGURE 25.—View of excavations during 1952 season. The men working in the north-south trench are uncovering the bison bones shown in figure 24. The original surface at this point was approximately 6 feet above the top of the trench walls before removal of overburden by the bulldozer. View looking north.

The life expectancy was undoubtedly low and the infant mortality rate high. These are practically universal characteristics of primitive people with little medical knowledge and a very harsh way of life. This is particularly true of nomadic nonagricultural groups, where they are often on a near-starvation level, have inadequate shelter, and must move constantly. The hunting of big game animals is a dangerous occupation, particularly when armed only with a spear. Malnutrition, hunting accidents, and various types of illnesses that could not be treated with their level of medical knowledge, served to keep the population at a low level and in balance with nature and their way of life.

CULTURAL RELATIONSHIPS

It is unfortunate, but the Lind Coulee Site is the only locality which has so far contributed any significant amount of information about Early Man in Washington. A few other sites are known, but some of them have not yet been excavated, and in the others very little has been found. In addition, a number of isolated projectile points of early types have been picked up at scattered localities

around the State, but their occurrence is difficult to interpret, and at best they tell us very little about the way of life of the people who lost them. Osborne (1956, p. 38-44) has reported in detail on these finds.

Three Clovis Fluted points have been found in Washington—one near Olympia, one near Bridgeport, and one along the Snake River near Central Ferry. Nothing else was found in association with these points that would indicate the existence of a campsite.

One Folsom Fluted point was discovered along the Columbia River in a sand blowout across from The Dalles, Oregon.

A Plainview point was found in the Chehalis River valley. The Plainview point (fig. 26) resembles a Folsom point but does not have the characteristic fluting. Plainview points are widely distributed in the Plains area east of the Rockies, and have been found from northern Canada to Mexico. The age of these points is the Anathermal period, and they are often found in association with the bones of extinct bison.

Two Scottsbluff points have been found in the Pacific Northwest. One was found in southeastern British Columbia, and the other was probably from western Washington.

An Eden point was discovered in a sand blowout along the Snake River, downstream from the mouth of the Palouse River.

Scottsbluff and Eden points (figs. 27 and 28) are also characteristic of the Plains region and date from the Anathermal period around 7,000 to 9,000 years ago.

FIGURE 26.—Plainview point.

FIGURE 27.—Scottsbluff point.

FIGURE 28.—Eden point.

The significance of these isolated finds of projectile points of early types is not clear. It could mean that people possessing the cultures characterized by these points were once residents in our area. There is also the possibility that recent Indians from Washington, who, we know, frequently traveled to the Plains to hunt bison, might have discovered these points on such a trip and brought them back as souvenirs.

At the moment we have no basis for saying that these points were made and used in our area, although there is a distinct possibility that such was the case.

A few years ago a crew from the University of Washington excavated a cave located a short distance upstream from Vantage Ferry on the Columbia River. Deep in the deposits of the cave, evidence was discovered that indicated man had occupied the cave at about the same time that the Lind Coulee Site was being occupied (Swanson, 1956). Unfortunately, only five artifacts were discovered and these are not sufficiently diagnostic to indicate cultural relationships with other Early Man sites.

A possible Early Man site has been discovered and excavated near Goldendale (Cressman, n. d.). Projectile points from the site bear a slight resemblance to those from Lind Coulee, but another very interesting and distinctive type of artifact was discovered which sheds more light on the age of the site. This artifact type is descriptively referred to as an "edge-ground cobble." It is simply a flattened oval-shaped river cobble that has had one or both of the long edges ground smooth and flat. At the Five Mile Rapids site near The Dalles, Oregon, Cressman (n. d.) found identical objects in cultural deposits dating from early Anathermal (ca. 9,000 years ago) to late Altithermal (ca. 4,500 years ago).

Another site containing these edge-ground cobbles recently has been discovered in a side canyon off the Snake River near Pullman. Although the site has not as yet been excavated, the geologic circumstances of their occurrence suggest an Anathermal age.

Comparing the Lind Coulee materials with those from sites outside of Washington is somewhat more profitable. At Fort Rock Cave, located in the Harney-High Desert section in Oregon, Cressman discovered stemmed and unstemmed projectile points, scrapers, drills, manos, spear-thrower fragments, basketry, and sandals underlying Newberry Crater pumice (Cressman, Williams, and Krieger, 1940, p. 64-69). A radiocarbon date of 9,053 plus or minus 350 years was secured on sandals from this horizon (Libby, 1952, p. 87). Stratigraphic evidence indicates that only a brief period of time elapsed following the deposition of the pumice before the cave was reoccupied. It appears that Fort Rock Cave was sporadically occupied from the Anathermal period until recent times.

At Odell Lake, which lies north and west of the Fort Rock Valley, Cressman tested an early campsite located on the lake's shore (Cressman, 1948, p. 57-58). Projectile points, flakes, hammerstones, and the remains of fires were found underlying a layer of waterlaid Crater Lake pumice. According to Cressman, the closest resemblances of these artifacts seem to be with the lower Klamath Lake localities.

Northwest of Odell Lake, and in the vicinity of Wikiup Dam, two thin ovoid knives or scrapers were recovered from a soil test pit by U. S. Bureau of Reclamation workmen (Cressman, 1937, p. 53-67). The implements are believed to have come from a level underlying a layer of Crater Lake pumice. Cressman believes that, because of

typological resemblance to early scrapers from southern Oregon, and because of their occurrence under Crater Lake pumice, these specimens should be attributed to Early Man in Oregon.

The questionable association of artifacts and mammoth remains at two sites in the Willamette Valley has been reported. At the Kirt School Site, two points described by Cressman (1947, p. 177-179) as resembling "collateral Yuma" points and "Sandia" points were recovered from a drainage ditch, reportedly from a stratum containing mammoth bones. At the Lebanon Site near Lebanon, Oregon, flint chips, a worked bone chisel, and mammoth bones were taken from debris removed while cleaning out a spring (Cressman and Laughlin, 1941, p. 339-342).

In the Johnson Park Reservoir area of Idaho, lying within the Malheur-Boise section, Louis Caywood (1948, p. 251) picked up a point which he feels falls within the Yuma category. The point was recovered from the bed of a small stream, and no cultural, geological, or paleontological association was evident.

The knives from the Wikiup Dam Site offer little in the way of suggesting cultural relationships. Had the knives been found under less favorable geologic circumstances, it probably would have been impossible to equate them with early cultural horizons on the basis of typologic resemblance alone.

It is Cressman's opinion that the cultural material from the Odell Lake Site shows closer affinities to the Lower Klamath Lake material than it does to that from the southern Oregon caves (Cressman, 1948, p. 57-58). With the publication of radiocarbon dates for the Mankato advance, Cressman has probably revised downward his dating estimates for the Odell Lake Site. The writer can see no evidence supporting the original estimate of from 10,000 to 14,000 years ago (Cressman, 1948, p. 58).

As was the case with the Odell Lake Site, the Fort Rock Cave materials show closer resemblances to materials from outside the Columbia Intermontane province than to material from within. One difficulty in comparing this material with that from early sites within the Columbia Intermontane province arises from the fact that Fort Rock Cave artifacts are largely perishable materials such as sandals, matting, and basketry. It is natural that resemblances would appear to be closer to sites containing comparable materials. These other sites are located outside the Columbia Intermontane province, specifically, other Great Basin caves, and relationships appear strongest in this direction. Some slight resemblances between the Fort Rock Cave material and the Lind Coulee artifacts may be noted. Side scrapers, snub-nosed scrapers, and plano-convex scrapers from both sites are quite similar in appearance. One paint mano was found at Fort Rock Cave, and several were found at the Lind Coulee Site. Certain marked differences in material culture may be noted, however. Whereas at Fort Rock Cave the bulk of the

projectile points were of stemless varieties, only one stemless point was found at the Lind Coulee Site. The stemmed points from Fort Rock Cave are either corner-notched or side-notched, but the stemmed points from Lind Coulee are narrow-shouldered, with parallel-sided or contracting stems. It is plain, then, that only the most general resemblances exist between the Fort Rock Cave Site and the Lind Coulee Site.

The writer has no intention of reproducing the detailed evidence linking the southern Oregon cave material with other caves in the Great Basin area and with certain California sites. This has been done in a detailed manner by Cressman (1942, p. 135-140). Rather, a general reassessment of this relationship will be presented with the additional new evidence offered by the Lind Coulee material, and the recent report on the Danger Cave Site (Jennings, 1957).

We are somewhat handicapped in our comparison of the Lind Coulee material with that from other early sites because of the lack of perishable items so common in the Early Man sites from the Great Basin, and because of an assemblage of stone tools which is made up largely of rather nondiagnostic scrapers. Certain specific relationships can be pointed out, however. Perhaps the most outstanding of these relationships is based on the occurrence of crescentic blades at the Lind Coulee Site, and the distribution of identical objects in early sites in Oregon, California, and Utah. Cressman has reported the finding of these blades below the pumice in Paisley Five-Mile Point Cave No. 1 (Cressman, 1942, p. 84-85), and in Guano Valley in southeastern Oregon (Cressman, 1936, p. 35, pl. 10, fig. 13). Jennings (1957, fig. 156) reports similar objects from Danger Cave. Harrington (1948, p. 93-95, pl. 24) indicates their occurrence at Borax Lake, and Rogers (1939, p. 33, pl. 8) also records them from Phase II of the Playa Industry of the lower Colorado region.

The projectile points from Lind Coulee are, for the most part, unique when compared with other early projectile points from North America. The only non-stemmed point is the basal section of a concave-base point. In general outline, this point resembles the Folsom points of the Plains region. However, there is no indication of fluting or basal grinding of the edges. One cannot justify claiming Folsom relationship on the basis of a single broken specimen.

Three other classes of implements show resemblances to materials found at the Lindenmeier Folsom Site in Colorado. The first of these classes comprises the large keeled scrapers (Roberts, 1935, pl. 9, *b*, *c*, *h*). A graver from the Lind Coulee Site also shows close identity with certain Lindenmeier specimens (Roberts, 1935, pl. 13; 1936, pl. 9). A flat basalt grinding palette for pigment and several cobble manos from the Lind Coulee Site suggest similarity to a pigment-stained palette from Lindenmeier.

The use of pigment and grinding stones is also reported from Roaring Springs Cave and Catlow Cave (Cressman, 1942, p. 89-90). The Roaring Springs Cave specimen is reported from the basketry level, but the provenience of the Catlow Cave specimen is not indicated. Heizer (1949, p. 23) reports the use of pigment and grinding palettes in an Early Horizon site in central California.

Several bone shafts were recovered at the Lind Coulee Site. One of these exhibits a beveled end which may indicate a functional relationship to similar shafts recovered at the Clovis Site and at the Narrows on Lower Klamath Lake (Cotter, 1937, pl. 2; Cressman, 1942, p. 99-100).

In summary, it can be seen that the limited collection of artifacts from the Lind Coulee Site, while appearing basically unique in the light of present knowledge, suggests general relationship with other sites. The few general resemblances referred to between the Lind Coulee material and that from the Lindenmeier Site appear insufficient to imply relationship. The closest resemblances are found between the Lind Coulee material and certain implements from the early sites of southern Oregon, Danger Cave in Utah, and the Borax Lake and Playa Industry sites of California. The diagnostic crescentic blades are included in the collections from each of these sites. Concave base points were found at the Lind Coulee Site and at Borax Lake. Bone shafts from the Lind Coulee Site appear to resemble similar implements from the Narrows locality of Lower Klamath Lake. Resemblances of a more general order, implying relationship, may be observed with the Great Basin area on a less specific level. The assemblage of artifacts, including stemmed points, large keeled or domed scrapers, and gravers, together with the use of grinding implements, suggest certain cultural similarities throughout this general region. This view is consistent with the earlier views of Cressman and with the recent findings of Jennings.

CONCLUSIONS

In the cool moist Anathermal period that followed the retreat of the final Pleistocene continental glaciers, a small population of nomadic hunters was resident in central Washington. Some slight evidence exists that man may have been hunting large game animals in Washington as early as 13,000 to 17,000 years ago.

Excavations at the Lind Coulee Site have provided us with information about the way of life of these early Washingtonians. It is clear, however, that much more archaeological work needs to be done before we will have a complete picture of the early cultures of this region. The people of Washington can do a great deal toward furthering this program if they will report the locations of archaeological sites to the professional archaeologists.

For those readers who wish to learn more about Early Man in North America and the Pacific Northwest, it is suggested that they read "Ancient Man in North America," by H. M. Wormington, and "Early Man in the Columbia Intermontane Province," by Richard D. Daugherty. To learn about the more recent archaeological periods of our State, the reader is referred to "Archaeology in Washington," by Bruce Stallard. Complete references to these publications may be found in the list of references cited at the end of this report.

Included as an appendix to this study of Early Man are copies of the forms used in the geological and paleontological appraisals of the Lind Coulee Site which have enabled us to determine the age of the deposits and learn about the geography of the area at the time the early inhabitants of the State were living here.

The archaeology of Washington is a great and largely undeveloped resource. Through continued archaeological research it is hoped that some day the full, fascinating picture of the prehistory of the region can be presented to the people of Washington.

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APPENDIX

Archaeological Field Forms

Reproductions of field forms typical of those in common use are appended to this report. By studying these forms the amateur archaeologist can get some indication of the kinds of information that are important to record when archaeological excavations are in progress.

ARCHAEOLOGICAL FIELD FORMS
Site Survey Form

County..... Site No.....

1. Map reference .....
2. Type of site.....
3. Cultural affiliation.....
4. Location.....
   .....
   ..... Sec..... T..... R.....
5. Owner and address.....
6. Previous owners.....
7. Tenant .....
8. Informants.....
9. Previous designations for site.....
10. Size description.....
    .....
    .....
11. Position of site and surroundings.....
    .....
    .....
12. Area of occupation.....
13. Depth and character of fill.....
    .....
14. Present condition.....
    .....
15. Previous excavations.....
    .....
16. Material collected.....
    .....
    .....
17. Material observed.....
18. Material reported and owner.....
    .....
19. Recommendations for further work.....
    .....
    .....
20. Photograph Nos.....
21. Maps of site.....

Recorded by..... Date.....

ARCHAEOLOGICAL FIELD FORMS
General Feature Form

Feature No. ..... Site No. .....

Square No. ..... County .....

1. Definition .....

2. Location
   a. Horizontal .....
   b. From surface ..... c. From datum .....

3. Dimensions
   a. Maximum length ..... Direction .....
   b. Maximum width ..... Direction .....
   c. Vertical thickness or depth .....

4. Fill .....

5. Preservation .....

6. Associations
   a. Features .....
   b. Specimens .....

7. Neg. Nos. .....

8. Remarks .....

Recorded by ..... Date .....

ARCHAEOLOGICAL FIELD FORMS
Burial Form

Feature No..... Site No. .....

Burial No..... County .....

1. LOCATION
   a. Square .....
   b. Horizontal .....
   .....
   c. Depth from surface.....
   d. Depth from datum.....
2. BURIAL TYPE
   a. Extended ..... d. Reburial .....
   b. Flexed ..... e. Cremation.....
   c. Semiflexed ..... f. Part crem.....
   g. Other.....
3. BURIAL DIMENSIONS
   a. Max. length..... Dir.....
   b. Max. width ..... Dir.....
   c. Thickness .....
4. DEPOSITION
   a. Position .....
   b. Head to.....

5a. GRAVE TYPE
   1. Surface..... 3. Cairn.....
   2. Pit ..... 4. Other.....

5b. GRAVE SHAPE .....

6. GRAVE DIMENSIONS
   a. Max. length..... Dir.....
   b. Max. width..... Dir.....
   c. Depth .....

7. STRATIFICATION
   a. Inclusive ..... c. Precedent.....
   b. Intrusive ..... d. Disturbed.....
   e. .....

8. ASSOCIATIONS
   a. Features.....
   .....
   .....
   .....
   .....
   .....
   .....
   b. Specimens .....
   .....
   .....
   .....
   .....

9. PRESERVATION
   a. Poor ..... Fair..... Good.....

10. COMPLETENESS .....
    .....

11. SEX
    a. M..... F..... Indeterminate.....

12. AGE
    a. Infant ..... d. Adult .....
    b. Child ..... e. Mature .....
    c. Adolescent .... f. Senile .....

13. NEG. Nos. .....

14. REMARKS .....
    .....
    .....
    .....

Recorded by..... Date .....

ARCHAEOLOGY FIND DATA FORM

Location: Horizontal Location: Vertical Find No.....

..... N-S Datum ..... Cat. No.....

..... E-W Surface ..... Site No. .....

Photo .....

RELATIONSHIP
DISPOSITION: .....
Inclusive,
Intrusive, etc. .....

.....

.....

.....

DESCRIPTION
MEASUREMENTS .....

.....

.....

ASSOCIATED SPECIMENS Catalog No. Distance

.....

.....

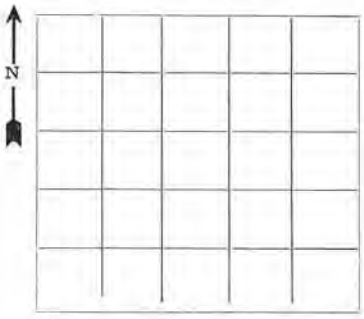
.....

OBSERVER ..... DATE.....

REMARKS:

Location of find

SKETCH OF FIND



ARCHAEOLOGY FIELD CATALOG FORM

Site..... Sheet..... Date.....

Find No.	Eurial No.	Feature No.	Location: Horizontal	Loc. Surf.	Vert. Dat.	Description	Associations	Photo No.

ARCHAEOLOGICAL FIELD FORM
Photograph Data Form

Photo No.....
Pack No.....
Film No.....

Direction camera is facing: .....
Light conditions: .....

Shutter-speed: ..... Aperture - f.....
Subject. If desirable give sketch pointing out important features:
Remarks: .....
.....

Photograph by..... Date.....
Developed by..... Date.....
Printed by..... Date.....