

A PREHISTORIC PIT HOUSE VILLAGE SITE ON THE
COLUMBIA RIVER AT WAHLUKE, GRANT COUNTY,
WASH.

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During the spring and early summer months of 1926 and 1927 a regional archeological survey of the middle and upper Columbia River Valley was made by the writer for the Bureau of American Ethnology. This survey is part of a larger project to determine how far the general plateau culture may be classified according to its subareas and to what extent these subareas interrelate with each other and with early cultures on the north, west, east, and south. The survey began with a study of the extensive collections obtained by members of the Columbia River Archeological Society from burials and surface finds at various ancient and historic Indian village sites and cemeteries in the middle and upper Columbia River Valley.

Most noteworthy among the collections studied are those of H. T. Harding, of Walla Walla; the Eells collection of Whitman College, also of Walla Walla, Wash.; of Adams H. East, O. B. Browne, R. T. Congdon, T. H. Grosvenor, of Wenatchee, Wash.; of F. C. Evertsbusch and others of Pateros, Okanogan County, Wash.; of Earl Simmons and others, of Quincy, Wash.; and the extensive and valuable material collected by F. S. Hall and others for the State Museum of Washington in Seattle. Enthusiastic interest in the survey was shown by members of the Columbia River Archeological Society who have done pioneer work in locating many aboriginal villages and burial sites and in gathering and classifying many different types of archeological material.

Information as to location of sites and distribution of type specimens was in every instance cheerfully given. A check was made on data already collected, amplified in several instances by a visit to the reported location of an isolated pit-house ruin, camp site, or talus burial.

The next step in the survey was the plotting of an archeological map of the middle and upper Columbia and tributary river valleys showing known aboriginal village sites and cemeteries. The necessity for obtaining an archeological map of the valley at this time becomes

apparent when one notes that the ancient Indian village site is usually the most favored location chosen by the modern orchardist for his planting. The reason for this lies in the need of each for protection, shelter, and an adequate water supply. A young orchard can successfully be developed only on a level river bench high enough to be secure against seasonal flood waters and near enough to the towering escarpment of the river bluffs for shelter from the winds which sweep over the plateau above. It was just this type of narrow bench land, located above danger from floods and close to the precipitous basaltic or lava-capped river bluff, that was selected by the prehistoric occupant of the Columbia River Valley as a location for his permanent winter home. Here, under the practically inaccessible cliff barrier, was security for the primitive group against attack by hostile bands.

As the middle and upper Columbia River Valley is semiarid and barren to a degree, an adequate water supply is essential. The bench land selected as a village must be neither too high nor the banks too steep to preclude easy access to the river. On the sloping beach below the river bench were obtained useful varieties of stone pebbles, float boulders, and driftwood.

From The Dalles, in Oregon, and Spedis, located on the Washington side of the Columbia, to the environs of Kettle Falls, near the Canadian border, the mapping of archeological stations was continued both along the middle and upper Columbia and tributary river valleys as the lower Snake, Yakima, Walla Walla, Deschutes, John Day, Wenatchee, Methow, Okanogan, and others.

Exploration and study previous to this survey of the prehistoric culture types of the middle and upper Columbia River Valley have been limited in extent or have been supplementary to a project covering another field. Though limited in their scope, these studies have produced conclusive archeological data.

In volume 1, part 2, of the *Memoirs of the American Anthropological Association*, published in 1906, there appears a monograph by Albert B. Lewis on the "Tribes of the Columbia Valley and the Coast of Washington and Oregon." This is an excellent summary of source material concerning the Indian tribes of the Pacific Northwest coast and those of the Columbia and tributary river valleys in so far as early historical contacts, travel, and exploration accounts are concerned. Conclusions drawn by Lewis with regard to aboriginal culture areas and subareas, tribal migrations, and trade relationships as they existed at the time contact was first established with the white race through exploring expeditions such as that of Lewis and Clark are still applicable and are for the most part sound.

"The stone arrowheads, stone mortars and pestles, and carved stone images and animal heads found along the Columbia from the mouth

of the Willamette to near the mouth of the Snake show that the similarities throughout this region are not of recent origin. Some of the finest and best carvings come from above The Dalles, while very few, if any, have been found below the mouth of the Willamette. It would hence appear that this stonework, if it did not originate, at least had its highest development in a region where wood was scarce, and thence probably moved down the river. On the lower river wood carving probably took its place, as the wood here was soft and easily worked with stone and shell tools."

In commenting on the archeology of the interior tribes of the Columbia Valley, Lewis refers to the need for further knowledge regarding culture centers and the various sources of culture diffusion that must have influenced the large area known as the upper plateau and the Great Basin.

A study of a limited area of the upper plateau region at Lytton and other sites on the Thompson River in southern British Columbia with regard to its archeology and early culture connections was made by Harlan I. Smith. A summary of his investigations was published in the Bulletin of the American Geographical Society.¹

Smith also carried on archeological investigations for the American Museum of Natural History during 1903 in the Yakima Valley in Washington between Clealum of the forested eastern slope of the Cascade Mountains and Kennewick on the Columbia River; also between the mouths of the Yakima and Snake Rivers in the treeless arid region of the Columbia Valley and in the vicinity of Priest Rapids. Smith concludes that definite age can not be assigned to archeological finds made during his investigations, but that they antedate the coming of the white man to the valley of the Columbia, as no objects of European manufacture were included.²

Smith finds that the partial identity of the Yakima Valley and Thompson River region in the southern interior of British Columbia is supported by definite evidence. "The preponderance of chipped points over those ground out of stone; cache pits; circular lodges; rings of stones; and of semisubterranean houses with stones on the encircling ridge; pairs of arrow-shaft smoothers, and bone tubes, were all found to be common to both regions. Tubular pipes, modern copper tubes or beads, incised designs consisting of a circle with a dot in it and engraved dentalium shells, each of a particular kind, besides pictographs in red, rock-slide sepulchres, modern graves walled up with parts of canoes, the marking of recent graves with sticks, and the custom of burying artifacts with the dead were also

¹ Vol. 38, May, 1906.

² His larger publication on the "Archeology of the Yakima Valley" appeared as vol. 6, pt. 1, of the Anthropological Papers of the American Museum of Natural History published in 1910. The results of his studies in British Columbia were published in 1900 as a part of the publications of the Jesup North Pacific Expedition.

found to be common to both areas. Circles of stones which mark places where cremated human remains were found in this region sometimes indicate graves in the Thompson River region."

During the months of August and September, 1924, an archeological reconnaissance of the lower Columbia River region was conducted for the University of California department of anthropology by W. D. Strong, W. Egbert Schenck, and H. J. Biddle. One of the features of this reconnaissance was a study of petroglyphs on the Washington or northern side of the Columbia River across from The Dalles, Oreg. Some of the findings of this study were published in the *American Anthropologist*.³ The authors correlate technique and designs shown in the rock paintings and sculptures, especially those of realistically conceived and executed animal figures among which the buffalo, mountain sheep, elk, and deer, with those described by Spinden from Idaho and by Mallery from Utah, also with recently described petroglyphs from Virginia City, Nev. The authors conclude "that while the data are scattered and incomplete The Dalles petroglyphs in question find their closest analogues in the Great Basin area, and would appear to mark the northwesterly limit of that type.

* * * The validity of the tentative conclusions arrived at in this paper can only be substantiated by a more thorough study of the petroglyphic and pictographic art of the upper Columbia River and adjacent areas."

An area contiguous to that of the Middle Columbia River Valley on the east was investigated archeologically and ethnologically by Herbert J. Spinden in the summer of 1907 for the Peabody Museum. The results of this and later studies were incorporated in a monograph appearing in the *Memoirs of the American Anthropological Association* and entitled "The Nez Percé Indians."⁴ The area occupied by the Nez Percés within historic times extended from the Bitterroot Mountains on the east to the Blue Mountains on the west, so that the territory claimed by them included what is now a large part of central Idaho, eastern Washington, and eastern Oregon, located within the basin of the Snake River.

The Nez Percés are of the same linguistic stock as the Shahaptian tribes of the Columbia Valley. Their material culture possesses many traits in common, although environmental differences, due in part to the presence of the bison, and a closer proximity to the Indian tribes of the Plains and remoteness from the tribes of British Columbia have caused a cultural development along somewhat different lines than that possessed by the ancient sedentary tribes of the middle Columbia before the coming of the horse. Other cultural differences may be noted in the type of house structures; art designs

³ Vol. 27, No. 1, January, 1925.

⁴ Vol. 2, pt. 3, 1908.

incorporated on surfaces of horn, wood, bone, and stone; substitution of the bowl for the tubular stone pipe, and the entire absence of jade celts and of ornamental objects of copper was noted in some of the ancient cemeteries excavated by the writer along the lower and middle portions of the Snake River Valley. Ancient basketry designs also varied in the two areas.

Investigations at the better known early centers of Indian population at The Dalles by the department of anthropology of the University of California have led to the discovery of objects and of art designs similar to those of the wooded area of the lower Columbia Basin, although many surface finds of a varied nature have been made there. All of the upper plateau tribes had recourse to the salmon and other varieties of fish in the Columbia and tributary streams and derived in this manner a plentiful food supply. Groups from each of the plateau tribes visited well-known fishing grounds at the several rapids and falls. It is therefore possible to make minor comparisons of the various kinds of abandoned fishing equipment, pestles, bowls, kitchen middens, and other implements and domestic equipment left by these groups at the place of their temporary encampment. Due to the temporary nature of hunting and fishing camps, the large subsurface deposits of charcoal, kitchen refuse, arrow points, canoe parts, and other fragmentary objects found in the vicinity of these great trading and fishing centers afford no reliable indication of age. The impermanent and unstratified character of the soil in the shifting beach or low river bench in which such deposits are found is less likely to yield important archeological results than are the permanent winter village sites, with their ruins of abandoned pit houses and adjacent cemeteries.

The falls and gorge of the Columbia River where this stream breaks through the Cascade Mountains marks the beginning of the wooded area of the lower river valley. The early aboriginal inhabitants of this region possessed a distinct type of culture which was based principally on the use of wood in their arts and crafts, while the tribes occupying the middle and upper river were expert in the utilization of stone, horn, and bone. Realistic carvings of human figurines in wood and bone, and curvilinear surface etchings on wood, bone, and stone characterize the lower valley, while a more formal, conventional rectilinear design executed chiefly on antler and stone distinguish the art of the arid middle Columbia Valley.

Traces of Indian occupation are in process of rapid obliteration by the plow which is to-day the most productive excavator of antiquities. Of the many sites inspected by the writer, excavation was undertaken at eight. The largest collection of material exhumed, such as ceremonial burial offerings and skeletal remains, was obtained from the prehistoric pit house village site and cemetery at Wahluke, Grant County,

Wash. There was no evidence that burials there had ever been disturbed. Neither was there in the objects recovered from the graves any indication of Hudson's Bay Co. influence such as trade beads of glass or of shell beads which in historic times were traded to the Indians as a substitute for the *Dentalium indianorum*, or of iron knives or copper implements. It was likewise impossible to obtain at Wahluke any direct evidence of great antiquity of occupancy or of culture type.

Wahluke is in Grant County on the west bank of the Columbia River, which in this part of its course flows north, immediately south of the point where the stream impinges on the precipitous escarpment formed of yellowish gray volcanic débris, white silt, volcanic dust, and ash known as White Bluffs. Wahluke is the site of a former pit-house village consisting of 30 semisubterranean structures erected in an irregular row extending a distance of 100 rods along the river bench. Each habitation ruin to-day consists of nothing more than a stone-capped rim of earth surrounding a centrally excavated pit of varying depth with a diameter of 30 or more feet. The bench land at Wahluke is broad and high enough to afford protection against the flood waters of the Columbia. The opposite flank of the river is much lower and is subject to seasonal inundations, hence was not occupied by the ancient inhabitants of the region except as a place for procuring game. Low-lying river benches gradually sloping down to the river's edge were favored watering places for animals which often traveled many miles to reach them, although no evidence was uncovered that the bison ever reached this region.

The high river bluff which faces Wahluke at right angles on the north is an exposed section of the Ellensburg formation laid down in the late Tertiary in old fresh water lake beds that at one time extended from the Pacific coast to what is now the upper plateau country east of the Cascade Mountains. In the valley of the Yakima River the composition of the Ellensburg formation is coarser than that of the White Bluffs on the Columbia River which contains large quantities of volcanic ash and wind-blown dust.

At Wahluke the Columbia River is deflected in a general southeasterly direction, where it completes the final sector of its course known as the big bend. The vertical escarpment of the White Bluffs formation lies hard against the northern end of the village site; the cemetery proper is an extension of the village and is directly south of the long and irregular row of semisubterranean pit-house ruins. White Bluffs extend in a line reaching from east to west. From the point where the channel of the Columbia is deflected, the escarpment continues on the west as a range of hills known as Saddle Mountains or, locally, as Sentinel Bluffs, forming a relief feature several hundred feet high. Twenty-five miles farther west this range

again lies at right angles to the Columbia, where the channel cuts a gap through it. This gap is just below the confluence of Crab Creek, and about 40 miles by a circuitous course upstream from Wahluke. From the gap through Saddle Mountains to Wahluke the river inscribes a semicircle to which Saddle Mountains and White Bluffs are tangent. During this section of its course, the Columbia River passes over the 15-mile stretch of Priest Rapids, famous as a gathering place for various tribes during the fishing season. Here, on the west bank, was located the village of Smohalla, a leader in the Ghost Dance cult.

Saddle Mountains are of importance ethnologically, as the range forms one of the few natural geographic barriers. Within historic times this range separated the Shahaptian-speaking tribes on the south such as the Wanapûm, or Columbia River Indians, the Palûs, the Yakima, the Walla Walla, the Umatilla, and other tribes from the Salish groups, as the Kalispel, Winatshi, Okanagan, Nespilim, and others that occupied the region of central and eastern Washington north of the range.

Saddle Mountains are geologically important because of their bearing on any attempted interpretation of the antiquity of man in the valley of the Columbia. In the deeply cut gorge of this river, in its escarpment of columnar basalt, is written much of the early Tertiary geologic history of central Washington. South of Saddle Mountains the basaltic lava flow is covered with thick deposits of andesitic materials, volcanic ash and dust, and loess.

During the Miocene, sheet after sheet of basaltic lava was poured out over the greater part of Washington, all of eastern Oregon, part of California, and a large area in the Snake River Valley of Idaho. This basalt represents a great number of flows. About 20 of these are exposed in some of the lava bluffs of the Columbia and Snake Rivers. A cross section of the gorge cut by these rivers shows intervening beds of varying thickness of soil in which trees grew to a thickness of several inches before they were charred and buried by later flows. Embedded sand, clay, gravel, and soil débris all bear evidence of burning and baking.

After the completion of the period of basaltic upheaval and the later depositions of andesitic material in the fresh water lake beds which characterized the Tertiary history of central Washington, there began the gradual uplift of the Cascades in the Pleistocene and the formation of the high plateau region. The invasions of ice sheets from the north and from the northeast date from this period. One of these great ice sheets came down the valley of the Okanogan River from the north and filled the old channel of the Columbia River, causing it to form new and more direct ones, among the more important of which are the Moses and Grand Coulees. Later, on the

recedence of the ice sheet, the Columbia River again followed its old channel, which it still occupies.

Any cursory study of the geological history of the Columbia Valley must indicate that human occupation of this region during the Pleistocene was impossible. Supposedly valid evidence of man's antiquity in the valley of the Columbia has been found, nevertheless, in the form of crude, unfinished stone implements cached in the vicinity of a glacial moraine in the Lake Chelan country. This cache, however, is entirely superficial or intrusive and was deposited at a much later date.

Another cache of unfinished knives or spear points, shaped likewise from andesite porphyry, was found embedded in a cremation burial on a bench of the Columbia River at a location locally known as Simmons' graveyard, near Quincy, Grant County, Wash. The burial here is unique in that it lies directly underneath and several feet below a pit-house village erected at a later date. The crude appearance of the roughly chipped unfinished leaf-shape thick sectioned stone blades has led to the mistaken assumption of great antiquity.

Pleistocene faunal remains which protrude from the vertical escarpment of the White Bluffs formation along the Columbia River near Wahluke and are associated with weapon points and implements of chipped stone are no true indication of a living association of Pleistocene fauna and ancient man, as has been supposed. The elevation above the country surrounding White Bluffs provided a splendid observation point for the Indian hunter in search for game or on the lookout for hostile strangers. White Bluffs also was a well-marked trail used by the Indian when he journeyed eastward and northward away from the river on food-gathering expeditions. The chipped stone objects found are clearly intrusive and belong to a much later date. The geologic history of central Washington does offer, however, an explanation in part of the material culture of the early occupants of Wahluke. Environmental factors there have served as a causative agent, likewise as a barrier to the development of a culture complex within other than certain conscribed limits. This basic fact is most strikingly brought out in a consideration of their stone culture.

Evidence obtained from the nature of the objects exhumed at Wahluke would appear to indicate that in prehistoric times up to some as yet undetermined date there existed a close connection of material culture and tribal practices throughout the entire area of the western plateau in what within historic times became known as distinctly Salish, Shahaptian, and Shoshonean cultures. There is definite evidence that this culture extended far to the south and formed the nucleus or substratum of the Basketmaker culture of the Southwest.

At many places along the banks of the Columbia and tributary streams sedimentary deposits are exposed which were carried down in

the flood waters caused by the melting of the snow in the Cascades and in the Rocky Mountains. These deposits often cover charred cooking stones, heaps of charcoal, kitchen refuse, and occasionally artifacts shaped from stone, horn, and bone, together with other definite evidence of the location of a camp or burial ground. Temporary fishing camps, where many discarded objects of domestic use and weapons and implements of stone and bone were abandoned and covered with several thick deposits of sediment, were again in later years exposed when the stream formed a new bed or when flood waters eroded the banks. At Pateros, in Okanogan County at the confluence of the Methow River with the Columbia, seven strata showing human occupancy with intervening layers of sedimentary deposits are exposed on the flanks of a small island formed on the Methow side of the channel. At Vantage Ferry, Kittitas County, on the west bank of the Columbia River there are three such strata, and so on almost continuously along either bank of the river wherever local conditions as to geologic formation, elevation of sedimentary river bench land above danger from high water, steepness of banks, and bench location, such as width, accessibility, contour, and other factors warranted.

The cemetery at Wahluke contained both primary and secondary burials, but practically no other type than that of ceremonial cremation. Burials were placed in graves forming an irregular row along the river bench south of and upstream from the pit-house ruins which at one time made up a village of semisubterranean habitation structures. There is but one site known in the middle Columbia River Valley where a pit-house village had been erected above a habitation site and cemetery of an older date. This site has become known as Simmons' graveyard and is located about 5 miles downstream from Trinidad, and about 50 miles upstream from Wahluke, and several miles north of Vantage Ferry, where are located the ruins of another pit-house village and cemetery of a later date.

Cremation burials at Wahluke are usually three or more feet below the surface when undisturbed. A layer of flat stones was invariably placed in an oblong or circular ring as a protective cover against marauding animals and to prevent erosion of loose sand which forms the bench at this place. A thin covering of soil consisting of wind-blown ash, dust, and calcareous clay over compactly embedded sand makes up the formation of the village site proper.

The body to be cremated was placed on a piece of matting of Indian hemp, oriented, sometimes with the head facing upstream, sometimes toward the east, or seemingly haphazard, but always with face downward or on the side. Accompanying the burial were ceremonial offerings of personal use and ornamentation—the personal property of the deceased. The pyre was built of driftwood logs. The fire must not have been carefully attended, as many of the skeletons are merely

charred, while sections of logs, together with burial offerings of wood and objects shaped from bone, are often intact. No indication of burial houses such as were erected by tribes on the lower river were found at Wahluke or elsewhere on the middle Columbia.

Several other forms of burial were practiced both at Wahluke and elsewhere along the middle and upper Columbia River. Harlan I. Smith describes burials in domes of volcanic ash in the arid region locally known as scab land. Low knolls of but a few feet elevation composed of fine volcanic ash have been protected from the erosive action of the wind by grass clumps and sagebrush. Such domes may be the remnants of what was formerly a continuous layer of top soil, or they may have been formed as wind-blown deposits. Scab land or scab rock obtains its name from the flat fragments of basaltic rock embedded in the loess but exposed between the volcanic knolls or domes. Burials in such locations were of individuals and were accompanied with offerings of shell ornaments and of weapons. A protective circle of stones surmounts the dome burial similar to that placed on the cremation burials at Wahluke. This form of burial and other burials which were located in the talus or slide rock were observed by the writer at various locations on the sloping river cliffs but not at Wahluke. A child's grave, located on the rim elevation of a pit-house ruin, and several uncremated burials were found in the cemetery outside of the cremation row. The significance of these uncremated burials is not clear.

In some of the graves at Wahluke, skeletons were oriented in such positions as to suggest secondary burial; parts of several skeletons were jumbled in a heap and were accompanied by veritable store-houses of burial offerings. Bodies thus buried had apparently been collected from the mamalose or burial islands where they had been exposed before the ceremonial cremation burial in the village cemetery. Individual cremation burials at Wahluke usually were primary burials. Skeletal remains from such burials were found to be intact in situ except for the several parts consumed in the cremation. Such individual cremation burials were effected with knees flexed and with skull facing downward or on the side. Incineration was so complete as to prevent recovery of any one entire skeleton. Skeletal fragments, including eight skulls, were recovered from the burn, providing sufficient material for reconstruction later at the Museum. In every case the skull showed a degree of frontal-occipital deformation, which was effected by pressure from a wooden cradle-board flap placed over the forehead in infancy, a practice continued by Indian tribes of the lower Columbia Valley within historic times.

The cradle-board used by the modern Wanapûm, or Columbia River Indians does not have this wooden flap or hinged flange passing over the forehead. There is, however, among these Indians a

certain amount of flattening of the occiput due to contact of the plastic infant skull with the uncovered cradle-board. One of the more pronounced artificially deformed skulls found at Wahluke was from an uncremated burial, although some of the cremated skulls uncovered are quite similar to those of the modern brachycephalic or broad-headed Shahaptian tribes, all of which have a certain amount of occipital flattening but not of the anterior part of the skull.

One lesion of a pathologic nature in the skeletal material recovered at Wahluke was noted. This is a fusion of a lower right tibia and fibula, due probably to traumatic origin and occurring probably in sub adult life. Skulls obtained from a cemetery at Vantage Ferry, in Kittitas County, Wash., and from other burial sites farther north which were accompanied by ceremonial burial offerings of a distinctly Hudson's Bay Co. derivation were in every instance similar to those occurring in the prehistoric burials at Wahluke.

Burial offerings found among the burned charcoal and charred bones of the cremation burials at Wahluke were useful and decorative objects constituting the personal belongings of the deceased. Some of the larger pieces, such as hollowed stone bowls and long, polished stone pestles, were intentionally broken or "killed." Just one decorated stone bowl was recovered. It is a beautifully symmetrical, polished granitic piece, uniformly hollowed by pecking and crumbling with hammerstones and polished with pumice. A surface design in the form of repeated V-shape bas-relief figures made by pecking and grinding encircles the outer circumference. Paint cups and mortar bowls of stone are for the most part crudely hollowed out, although showing evidence of constant use. Paint cups still contained fragments of red and yellow ochers but no trace of a green or other colored paint. A green stain covered the surface of elk teeth and certain shell objects. This condition was caused by the penetration of copper salts from near-by copper pendants and beads and was not an intentional paint. A paint cup of *Haliotis rufescens* shell filled with red ocher used as paint was found. Most of the paint containers exhumed along the Columbia are of granitic stone or of worked pumice.

There were no wooden dishes or bowls at Wahluke. A large, flat, circular granitic mortar was picked up at the center of one of the pit-house ruins, at the location of the primitive hearth, as evidenced by the accompanying charred cooking stones of fractured red quartz and charcoal.

Pottery was neither made by the ancient occupants of Wahluke nor was its use known to them. The lack of a suitable friable potter's clay may account for this lack in part, but, as in the case of definitely developed culture complexes elsewhere, it is impossible always to explain the absence or presence of pottery, agriculture, and the loom

in terms of environmental factors. Objects recovered from graves in the cemetery and from surface finds at the site of the pit-house village of Wahluke are principally animal, vegetable, and mineral products obtained from regions near by. They consist of objects shaped from stone, bone, horn, the bark of trees, grasses, and various vegetable fibers, human and animal hair, chiefly that of the mountain sheep and of the dog. Many objects shaped from varieties of *Dentalium indianorum* and of abalone (*haliotis*) shell of the varieties *Haliotis kamchatkana*, *Haliotis fulgens*, and *Haliotis rufescens* were exhumed with the burial offerings at Wahluke. Other Pacific coast shells found in quantity in graves along the middle Columbia, especially at Wahluke, are quite distinct from the unio or fresh-water clamshell and must have been brought to the interior by direct or indirect trade with tribes of the Pacific coast, either by way of the lower Columbia River or across the mountains from Puget Sound. That few objects were found shaped from wood either of a useful or ornamental nature is noteworthy. Driftwood must have been plentiful if we are to judge from the large amount used in cremation. It is highly probable that artifacts shaped from wood might have been preserved in the burn along with basketry materials, fabrics, and objects shaped from horn and bone had they ever existed. It must therefore be concluded that burials at Wahluke antedate the highly developed technique in wood as practiced by the tribes of the lower Columbia. The more formal and conventional rectilinear art designs of the early occupants of the arid middle Columbia Valley were executed chiefly on antler and stone.

Tubular steatite pipes found at Wahluke are of two types. The one, a long tubular bowl-shaped object, entirely undecorated, obtained possibly through intercourse with California tribes; the other, a straight, small-bowled, tubular pipe with long narrow stem, etched as to bowl and stem with rectilinear ornamental designs similar to those executed on other objects from stone, bone, and horn, is undoubtedly native to the middle and upper Columbia Valley. This tubular stone pipe is identical with the native tubular pipe of southern British Columbia and of southern Idaho. Another tubular pipe found rarely is the carved bear figurine type which comes from the northwest Pacific coast tribes. A catlinite bowl pipe was exhumed which indicates influence from the East. Nephrite celts of various dimensions and with highly polished surfaces seem to suggest an important exchange of materials with tribes of British Columbia; it is possible that much of the native copper came originally from the interior of British Columbia. It is impossible to determine to what extent objects of carved stone, such as decorated pestles and tubular pipes, or of copper beads, wristlets, amulets, and bangles, or of nephrite celts, enter primitive trade as finished products. This point must be determined by further investigation.

Species of shell from the Pacific coast other than dentalium and haliotis, perforated either at the apex or lip, were used as objects of personal adornment. Several examples mounted on necklace cords of hemp, cedar bark, and sinew were found among the burial offerings in graves at Wahluke, also at Vantage Ferry; several with fragments of cord still intact. Varieties of shell identified are *Diadora aspera*, *Olivella biplicata*, *Glycymeris subobsoleta*, and a Columbia River species of bivalve belonging to the *Protothaca*.

Among the many objects of personal adornment recovered from the cemetery at Wahluke are rectangular, perforated pendants, scrolled ear bangles, laminated wristlets, and tubular beads hammered and rolled from nuggets of native copper brought from the Cascades or obtained by barter from the coast tribes. Pendant cords of twisted fiber or of sinew were recovered only in part. Ornamental pendants and necklaces of elk and beaver teeth, hawk and eagle claws were still in situ as they were when attached to the body at the time of cremation. Such ornaments like those of horn and bone were incrustated with copper salts and thus preserved more completely than might otherwise have resulted. Etched bone tubes and gaming sticks of antler in sets of six, similar to those described by Teit and Smith from British Columbia, were exhumed.

Stone ornaments, implements, and weapon points were shaped from semiprecious agatized and petrified woods, opal, chalcedony, and jasper taken from the river bluffs 40 miles to the north beyond Saddle Mountains. Ornaments, implements, and weapon points shaped from such materials are expressions of some of the most beautiful examples of the stone-chipping art. Small, narrow-stemmed, and symmetrically worked arrow points of agate, chalcedony, carnelian, jasper, and flint were found with the burials at Wahluke.

No weapon points or chipped blades of black obsidian, which is so abundant farther south, were obtained. A chipped elongated, diamond-shape "ceremonial" object of mottled black and red obsidian, 8 inches in length, is the only specimen of obsidian obtained from burial offerings at Wahluke. Five similar "obsidian ceremonials" are represented in individual collections obtained from various sites along the middle and upper Columbia.

To convey an idea of the abundance of resources in stone and of the great variety of uses to which such material was put by the early inhabitants of Wahluke, the following list is appended.

Materials	Uses
Agatized wood.....	Drills; weapon points; scrapers; reamers; knives.
Agate.....	Drills; weapon points; scrapers; etching tools; knives.
Andesite.....	Fish knives; net sinkers.
Argillite.....	Knives; weapon points; weaving implements; beads.

Materials	Uses
Basalt-----	Paddle-shape blades; spindle whorls; abrasives; saws; reamers; knives; wedges; weapon points; mauls; hammers; hammerstones; bowls; paint cups; pestles.
Basalt (columnar escarpment).	Pictographs; petroglyphs; scrapers; spades.
Chrysopase-----	Ear pendants.
Chalcedony-----	Drills; scrapers; weapon points; knives; etching tools.
Diabase-----	Pestles; hammerstones.
Diatomaceous earth and pumice.	Abrasives.
Dyomite-----	Abrasives; whetstones; hammers; knives; net sinkers.
Felsite-----	Net sinkers.
Flint-----	Weapon points; drills; groovers.
Granite-----	Pestles; rollers; mortar stones; net sinkers; clubs; bowls; hammerstones; grooved hammers and mauls; groovers.
Greenstone-----	Drills; hammerstones; abrasives; smoothing stones; pestles.
Jasper-----	Flaked and chipped points; scrapers; etching tools; compasses; groovers; reamers; knives.
Nephrite-----	Adzes; celts; chisels.
Obsidian-----	"Ceremonials."
Opal-----	Weaving implements; weapon points; knives; scrapers.
Petrified wood-----	Drills; scrapers; perforators; weapon points; weaving implements; reamers.
Quartzite-----	Cooking stones; hammerstones; hammers; net sinkers; mortar stones; anchor stones; mauls; clubs; pestles.
Sandstone-----	Arrowshaft smoothers; bowls; abrasives; ornamental disks.
Schist (chlorite and mica)---	Pipes; pendants; weaving implements; beads.
Slate-----	Knives; weapon points.
Steatite or soapstone-----	Ear ornaments; pendants; tubular pipes; beads.

All forms of the stone ax, whether a hafted hammerstone, a monolithic ax, or a grooved and bitted ax, were lacking in the surface finds, and among the grave offerings at Wahluke the aboriginal inhabitants depended on the hafted discoidal stone war club, the flaked hammerstone, the grooved maul, and the stone wedge in its stead.

Utilization of available natural resources by the sedentary, non-agricultural people of Wahluke was indeed thorough. Although the variety of such resources was limited in extent by the practically arid and barren environment, density of the aboriginal population of the middle Columbia Valley may well have been greater than that of the white race occupying the same territory within historic times. To be sure, this utilization depended on native adaptability and a knowledge of the resources afforded by the river which was near at hand and by the distant mountain forests as well.

Then, too, it must be assumed, as in the Southwest, that all vestiges of former habitation do not necessarily presuppose synchronous occupancy. If each permanent pit house village site, and each temporary fishing camp, of which traces have been found along the middle and upper Columbia, had been occupied within the period of one decade, the total native population must well have exceeded that of the white race now occupying the same territory. For example, what once were thriving Indian villages of several hundred individuals, located at two distinct sites on the Columbia at Priest Rapids, is now a practically uninhabited and for the white man an uninhabitable region. It is probable, however, that tribal warfare and habitation traditions limited the permanent native population, except during the fishing season, to small groups of Wanapûm or Columbia River Indians.

The animal resources utilized by members of this tribe as revealed in burial offerings and surface finds at Wahluke are noted in the following:

Elk (<i>Cervus Canadensis</i>).....	Decorated, geometrically etched, perforate ribs used as fillets; gaff for fishhook from section of antler; weaving implement from antler; bone gouges; digging-stick handle; gaming sticks shaped from sections of antler; wedges for splitting; knives for cutting; wristlets and ornamentally incised pendants; teeth perforated for use as pendants; meat dried for food; antler for bow staves.
Deer (<i>Odontocoelus Americanus</i>)---	Horn used as flaking tool, awl, weaving implement; skins used as clothing; sinew for sewing; meat used for food; sinew used to reinforce bow stave; antler used as gouge.
Dog.....	An extinct variety kept for the use of their shaggy coat of hair in blanket making; kept as watch dogs and used on the hunt but not eaten.
Mink (<i>Putorius vison</i>)	Fur as ornaments on headdresses.
Beaver.....	Fur; teeth perforated and carved as pendants; also as knives, beads.
Rabbit.....	Hunted for its meat; skins used in weaving blankets.
Mountain sheep (<i>Ovis cervina</i>)----	Bow stave section; horn spoons.
Fresh-water clam or unio (<i>Protothaca</i> sp.).	Used as a food; shell cut and perforated for use as a pendant.
Land otter (<i>Lutra hudsonica</i>)----	Quiver case.
Porcupine.....	Quills for ornamental display.
Bear.....	Teeth as pendants and weaving implement; claws as ornaments; skins as robes; as food.
Wolf and coyote.....	Teeth used as ornaments; skins for covering.

Long bones of various species-----	Marrow for oil; ornamented tubes; beads; gaming tubes; awls, wedges.
Wing bones of birds-----	Beads; gaming tubes; whistles.
Eagle-----	Feathers for headdress; for feathering arrow shaft; claw used as pendant.
Hawk-----	Same use as eagle feathers and claws.
Sturgeon (<i>Acipenser transmontanus</i>).	As food; dried on racks and stored.
Blue-backed salmon (<i>Oncorhynchus</i> sp.).	As food; dried on racks and stored.
Steel-head salmon (<i>Salmo Gairdneri</i>).	As food; vertebrae perforated as beads.
Trout-----	As food.
Eel (<i>Lampræta cibaria</i>)-----	Do.
Suckers-----	Do.
Whale-----	No artifacts shaped from its bones uncovered.
Bones of fish, birds, rodents and land animals.	Many undetermined uses.
Horse-----	No skeletal material uncovered.
Bison (<i>Bison Americanus</i>)-----	No skeletal material uncovered nor artifacts shaped from bison bones found.

Utilization of other natural resources as shells, berries, tubers and other vegetable or plant products, fiber plants, minerals, wood, and stone extends to a large variety of products obtained from the limited materials near at hand and to others obtained at a distance over well-defined trade or barter routes and on seasonal fishing or hunting trips.

Vegetable and plant products are represented in the finds at Wahu-luke as follows:

Cedar (<i>Thuja gigantea</i>)-----	Bark used in weaving baskets, mats, and as cord; hearth for fire making; bow stave.
Indian hemp (<i>Apocynum cannabinum</i>).	Woven fabrics and as twine.
Squaw grass (<i>Herophyllum tenax</i>)	Woven fabrics; basketry.
Cat-tail (<i>Typha latifolia</i>)-----	Matting and woven fabrics for floors of tipi and sweat house.
Tule (<i>Scirpus lacustris</i>)-----	Matting and as covering for lodges.
Elderberry-----	Whistles; other unknown uses, probably as ferrules, or slip collars, or sockets.
Birch-bark rolls (<i>Betula microphylla</i>).	Uses unknown.
Sagebrush-----	Roughly woven twined fabrics; basketry.
Willow (<i>Salix lasiandra</i>)-----	Framework for sweat house; basketry; bow stave.
Rye grass (<i>Elymus</i>)-----	Fabrics and matting.
Barley grass-----	Twine; fabrics; matting.
Bear grass (<i>Xerophyllum tenax</i>)---	Fabrics.
Cottonwood (<i>Populus trichocarpa</i>)-	Bast or inner bark used as bedding and as twine; trunks hollowed by fire into dug-out canoes.

White pine (<i>pinus monticola</i>)-----	Firewood; canoes.
Red fir (<i>Pseudotsuga mucronata</i>)--	Firewood.
Juniper (<i>Juniper occidentalis</i>)----	Berries for food; uses varied.
Wild onion (<i>Alium geyeri</i>)-----	Food.
Wild carrot (<i>Daucus pusillus</i>)-----	Do.
Ash wood-----	Used as bow staves.
Wild tobacco "kinnikinnik" (<i>Valeriana edulis</i>).	Smoked in pipes as tobacco.
Lichen (<i>Alectoria</i> sp.)-----	Used as a food when stripped from bark of pine trees and boiled.
Huckleberry (<i>Vaccinium membra- naceum</i>).	Used as food, both fresh and preserved.
Spruce root-----	As a twine and in making coiled or twined baskets.
Sunflower seed (<i>Helianthus</i> sp.)--	Food.
Currant (<i>Ribes aureum</i>)-----	Do.
Gooseberry (and many other varie- ties of berries gathered in the mountains in midsummer).	Do.
Salmonberry (<i>Rubus spectabilis</i>)--	Used as a food.
Wapato (<i>Sagittaria latifolia</i>)-----	Roots used as a food.
Kouse (<i>Lomatium kaus</i>)-----	Tubers used as a food in much the same manner as camas.
Camas (<i>Camassia esculenta</i>)-----	Tuberous roots used as food which was roasted in ovens and dried.

Habitation structures at Wahluke, as indicated by their ruins, were semisubterranean circular pit houses. They were 30 in number. No evidence remained to show the type of superstructure, as practically all of the original framework had rotted away. This condition is in striking contrast with the well-preserved artifacts of wood that were exhumed from cremation burials. Similar conditions of decay in pit-house ruins were noted at Pasco, Vantage Ferry, at the mouth of the Yakima River, and elsewhere. One possible explanation of this condition is to attribute greater age to such structures than to the cremation burials. Another more plausible explanation is that the excavations for pit-house structures are usually on a lower bench than the cemetery and that during an unusually high stage of the river were inundated, water often remaining within these pits for an entire season. Decay of all wood framework and utensils, such as were used, was inevitable. The pit house as a habitation was formerly built by peoples in British Columbia, in Alaska along the Yukon, and on the coastal islands from the Aleutians to Bering Straits, also in Siberia. This habitation structure was formerly known to groups of Plains Indians, as the Pawnee, Mandan, and others. It survives as a ceremonial chamber among the Pima, Pueblo, and certain California tribes, and as a sweat house among the Columbia River Indians.

Two such structures were observed by the writer—one at the lower falls of the Yakima River and the other at the mouth of Crab Creek.

Another form of sudatory like that of the Nez Percés, figured and described by Spinden,⁵ is on the west bank of the Columbia 6 miles below the confluence of the Methow River. It is also identical with that of the Shuswap, Cree, Tinne, and other northern peoples.

The skin-covered conical tent appears never to have been introduced into the valley of the Columbia. The framework of the conical mat-covered tipi of the Columbia River tribes is probably a local development and was apparently not introduced from the Shoshoni with the horse. The difficulty encountered by the Columbia River Indians in transporting skins of the buffalo from the east, beyond the Rocky Mountains, prevented any considerable use of the products of the buffalo. Danger of contact with hostile tribes probably also prevented the acquiring of obsidian from the east, deposits of which occur at various points in the volcanic area of the Yellowstone and of the Snake River Valleys. Essential characteristics in the art designs of the ancient Columbia River Indians and in the mode of their application and execution are those of the historic Indian tribes of the middle and upper Columbia Basin. They are similar, in many instances identical, with those of the tribes of southern British Columbia on the north, the Nez Percés on the east, and in a more limited, though none the less definite manner, with those executed on certain plastic materials as sandstone, wood, and horn, by the Shoshonean and other southern stocks. Both curvilinear and rectilinear surface designs are applied by etching with bone, stone, or horn points, by rubbing, and by crumbling, though to a lesser extent also by carving out of the solid, by chipping, drilling, and by burning.

A small slab of sedimentary sandy limestone was used as a tablet by the ancient dwellers at Wahluke on which to sketch decorative surface designs resembling somewhat the veins and outline form of a lanceolate-shape leaf. No evidence was obtained that such objects had ever been worn as pendants or that they represented more than casual sketches by some artistically inclined aborigine. The etched design is identical with that described by Harlan I. Smith from a sandstone pipe of the Nez Percés.

Etched designs are more commonly applied to such media as dentalium shell and elk horn or bone than to other varieties of shell, of stone, or of wood. Rectilinear designs are commonly etched on bowls of tubular pipes of stone, also on stone weaving and plaiting implements. Etching tools are simple yet effective. Some of the more interesting and ingenious devices are two-point compasses and spaced grooving tools. A few beautiful etching tools or points of chipped jasper, chalcedony, and agate are remarkable for the almost microscopical dimensions of the working surfaces. Designs executed with

⁵ The Nez Percé Indians, vol. 2, pt. 3, p. 199, *Memoirs of the American Anthropological Association*.

such etching tools may be seen to advantage on several dentalia shell where, through the surface etching of curvilinear lines in series and the presence of the surface in relief on intervening panels, beautiful patterns are obtained having much the appearance of an overlay twining basketry weave.

The circle and dot design is applied with the three-point compass, or with spaced grooving tools. These decorative designs are applied in series on the surfaces of bone combs, gaming sticks, tubular bone objects, and on pendants, ear ornaments, and wristlets of antler. Many surface designs were found etched or pecked on horn, shell, stone, and bone resembling conventional geometric patterns etched, incised, or pecked on similar materials by the Thompson River Indians of southern British Columbia, as described by Teit and Boas. Other surface designs resemble more those utilized in basketry decoration by the Umatilla, Wasco, and Yakima tribes. Others are entirely unique.

A wristlet of elk antler was found with triangular surface etchings built up in series of V-shape paneling entirely encircling the object. Each of the small triangular panels has as one of its sides a portion of the larger V-shape panel or triangle. The same rectilinear design appears on the surface of an overlay twined basket fashioned by the Umatilla (Cat. No. 330551 U.S.N.M.). Etched zigzag lines appear as the decorative effort on bone or stone (schistose) pendants and ear ornaments and are repeated again and again in variations of rectilinear surface decorations. Even such rare etchings and carvings of the human figure as do occur appear as rectilinear designs rather than in the more realistic curvilinear style described by J. H. Steward in the *American Anthropologist*.⁶ The carvings from Millers Island and from the mouth of the Deschutes River belong to the coast type. When the horse was introduced from the plateau country on the south and east, the culture of the ancient Columbia River Indians became much altered. The natives were now no longer so much dependent upon the river for food and for transportation as they had been heretofore. The open country between the Snake River, which reaches the Columbia from the southeast, adjoins the territory traversed by the headwater tributaries of the Colorado. The culture of the horse increased rapidly on the Plains, after the nucleus of the herd had been formed by the few horses which escaped from Coronado's troops. Trade and intercourse with the tribes living to the east of the Columbia increased, and many features of the culture of the Plains tribes were introduced.

The absence of many objects of daily use and adornment in the culture of the Plains tribes was noted in the burials at Wahluke.

⁶ "A new type of carving from the Columbia Valley," *Amer. Anthropol.*, vol. 29, No. 2, N. S., April-June, 1927.

The lack of chipped obsidian blades and knives has been mentioned. There were no horse trappings, such as braided ropes of horsehair, nor do any rock sculptures of the figure of the horse appear anywhere except at Rock Island among the petroglyphs pecked into the crudely columnar basaltic cliffs of the Columbia River north of Wahluke, either at Vantage Ferry, Sentinel Bluffs, or Beverly. No objects made from horn of the bison were exhumed, nor were there any other indications of the use of buffalo products. There were no hafted and grooved axes; neither was there any indication in the burials that the Plains type of costume was used. Petroglyphs of the human figure on the west escarpment of the Columbia at Vantage Ferry, also at Beverly and at Sentinel Bluffs, appear to indicate, on the contrary, the use of some sort of a feathered headdress. That the practice of wearing feathered headdresses was an early one is further strengthened by the etching of a costumed human figure on a wooden comb which was exhumed at Vantage Ferry, and by a carving on wood of a fully costumed human figurine showing use of a feather headdress, exhumed at Tampico.

EXPLANATIONS OF PLATES

Unless otherwise noted, all objects described are from Wahluke, Wash.

PLATE 1

Hand Pestles of Stone

No. 1. Large pestle of vesiculate basalt shaped by pecking and crumbling. The pestle is symmetrical in outline and shows tapering from center of shaft upward. Top section has been broken off. Two parallel decorative grooves encircle the pestle at a distance of 11.5 cm. (4.5 in.) from the base. Incised grooves are 1 cm. apart and are each $\frac{1}{2}$ cm. deep. Dimensions: 21 cm. (8.3 in.) long; 7 cm. (2.7 in.) basal diameter. Collection of H. T. Harding, Walla Walla, Wash.

No. 2. Flat-sectioned pestle of calcareous sandstone. Tapered shaft; bulbous enlargement of basal end. Cap section has shallow cleft at center. Shaped by pecking with celt or hammerstone and smoothing with pumice. Dimensions: 16.5 cm. (6.5 in.) long; 7 cm. (2.8 in.) wide at base. Other stone pestles found at Wahluke have decorative heads showing more deeply incised cleft. Cat. No. 333581, U.S.N.M.

No. 3. Hand pestle pecked from native greenstone. Tapered circular walls somewhat flattened at sides due to limitations in size of boulder from which pestle has been shaped. Characteristic basal section and irregularly shaped enlargement at top. Found with burial offerings in grave 1. Dimensions: 18 cm. (7.1 in.) long; 10 cm. (4 in.) basal diameter; diameter of head cap 5 cm. (2 in.). Cat. No. 333578, U.S.N.M.

No. 4. Hand pestle of diabase. More symmetrical in shape than No. 3. The bulbous basal section is short; tapered walls are slightly convex; cap section is symmetrically rounded and convexly beveled at the top. Dimensions: 16.5 cm. (6.5 in.) long; 8.5 cm. (3.3 in.) in diameter at base. Cat. No. 331995, U.S.N.M.

No. 5. Decorated head of pestle of worked diabase. Polished surface; carved image of animal figure forms the cap or head section; the figure has been shaped out of the solid, while features as mouth and eyes are indicated by incised lines; the eye is represented by the circle and dot design. Dimensions: Diameter of pestle head, 7 cm. (2.8 in.). Cat. No. 333593, U.S.N.M.

No. 6. Cigar-shape hand pestle of smoked greenodiorite. Surface symmetrically rounded by pecking and beveled to tapering top and basal sections, with greatest diameter near basal end. Similar pestles of greenstone in graves at Wahluke are larger and have polished surfaces, which this pestle does not have. Cat. No. 333587, U.S.N.M. Exhumed from grave 2. Dimensions: 20 cm. (7.9 in.) long; 6 cm. (2.4 in.) greatest diameter.

No. 7. Small pestle of worked diabase. Pecked into a concavely beveled cylinder with no basal extension or knob at the top. From grave 3. Dimensions: 10 cm. (4 in.) long; 5 cm. (2 in.) diameter. Cat. No. 333585, U.S.N.M.

No. 8. Small plummet-shape hand pestle of calcareous sandstone. A decorative design of beveled encircling rings and intervening pecked grooves forms the head or knob. Side walls are beveled to form a bulbous base. Dimensions: 12.3 cm. (4.9 in.) long; 5 cm. (2 in.) wide.

No. 9. Decorative knobbed head of pestle shaped from diabase. The surface is polished and symmetrically rounded. Neither this head nor those of Nos. 5 and 8 are as characteristic of the stone pestles of Wahluke as are Nos. 2-4, and 6. Grave find. Dimensions: 7.5 cm. (2.9 in.), diameter of knobbed head; distance from rim of knob to tip, 6 cm. (2.4 in.); diameter of shaft below rimmed knob, 5.5 cm. (2.2 in.). Cat. No. 333594, U.S.N.M.

PLATE 2

Types of Arrow and Spear Heads

No. 1. Arrowhead of red jasper. Triangular shape with slightly convex lateral edges. Deeply concave base. Stem has straight sides and base chipped to a thin edge with cleft at center. Dimensions: 4.4 cm. (1.7 in.) long; 3.6 cm. (1.4 in.) wide at base. Grave find. Cat. No. 333947, U.S.N.M.

No. 2. Arrowhead of smoky reddish-white translucent agate. Barbed; straight base with cleft; obliquely chipped facets. Found at mouth of the Deschutes River by H. T. Harding. Dimensions: 5.6 cm. (2.2 in.) long; 2.6 cm. (1 in.) wide.

No. 3. Triangular arrowhead of smoky chalcedony. Deeply concave lateral edges and base; no stem. Dimensions: 4.8 cm. (1.9 in.) long from wing tip to point. Found near Castlerock on the Cowlitz River, Wash. Cat. No. 317360, U.S.N.M.

No. 4. Long arrowhead of brownish black and white agatized wood. Lanceolate leaf shape; concave base chipped to thin edge; no stem. Columbia River beach, near Trinidad, Wash. Dimensions: 6.7 cm. (2.5 in.) long; 3.1 cm. (1.2 in.) wide. Cat. No. 333941, U.S.N.M.

No. 5. Arrowhead of flint. Ovoid; stem has expanding sides and straight thin-edged base; irregularly chipped facets. Dimensions: 6.5 cm. (2.5 in.) long; 3.5 cm. (1.4 in.) wide. Cat. No. 317360, U.S.N.M.

No. 6. Arrowhead of gray flinty quartz. Thick sectioned, leaf shape; convexly rounded edges slightly constricted at neck, terminating in wide stem with thick sectioned unchipped base. Dimensions: 8.2 cm. (3.2 in.) long; 3.2 cm. (1.3 in.) wide. Cat. No. 317360, U.S.N.M.

No. 7. Arrowhead of gray flint. Triangular in shape; blunt of point with concave base; no stem. Dimensions: 3.7 cm. long; 2.9 cm. wide at base. Cat. No. 317359, U.S.N.M.

No. 8. Arrowhead of dull red jasper. Triangular; concave base chipped to thin edge; no stem. Grave 3. Dimensions: 4.6 cm. (1.8 in.) long; 3 cm. (1.2 in.) wide. Cat. No. 333941, U.S.N.M.

No. 9. Long, narrow arrowhead of agate. Triangular in shape, with long, acute point and concave base. Stem has expanding edges and straight base. Symmetrically chipped surfaces. Exhumed with burial offerings from grave 4. Dimensions: 7.8 cm. (3 in.) long; 2.2 cm. (0.9 in.) wide at base. Cat. No. 333944, U.S.N.M.

No. 10. Spear point of grayish white flint. Triangular in section; edges parallel near base, which is straight; no stem. In collection of H. T. Harding from beach of Columbia River 2 miles below Vulcan, Wash.

No. 11. Leaf-shape flint arrowhead. Convexly rounded edges of point and stem. From the Cowlitz River, near Castlerock. Cat. No. 317360, U.S.N.M.

No. 12. Arrowhead of agatized wood. Ovoid, leaf shape; base is concavely rounded and chipped to thin edge. No stem. Collection of H. T. Harding, from Vulcan, Wash. Dimensions: 6.8 cm. (2.7 in.) long, 4.2 cm. (1.6 in.) wide.

No. 13. Chipped spear point of translucent brown agate. Oval in shape with concave base; no stem; obliquely chipped facets. Dimensions: 10.5 cm. (4.1 in.) long; 4 cm. (1.6 in.) wide; 0.9 cm. sectional thickness. Cat. No. 333850, U.S.N.M.

No. 14. Chipped spear point of reddish gray flint. Roughly triangular in shape with edges slightly rounded near point; convex base has wide crescentic cleft at center chipped to thin edge, although unchipped and thick sectioned on the obliquely truncated portions near edges. Dimensions: 9.9 cm. (3.8 in.) long; 4.4 cm. (1.7 in.) wide. Cat. No. 333852, U.S.N.M.

No. 15. Chipped arrowhead of crystalline quartz with opaline incrustations. Triangular in shape, with edges rounded near weapon point. Crescentic, unchipped, truncated base cut into three sections by two narrow obliquely chipped clefts which form a central stem with expanding edges. Dimensions: 7 cm. (2.7 in.) long; 3.4 cm. (1.3 in.) wide. Cat. No. 333947, U.S.N.M.

PLATE 3

Types of Arrowheads

No. 1 Thick-bodied arrow point of whitish yellow jasper. Triangular, with slightly convex rounded edges; base, straight; stem, long necked with expanding sides. Dimensions: 3.1 cm. (1.2 in.) long; 2.4 cm. (0.9 in.) wide; 0.9 cm. thick. Cat. No. 333943, U.S.N.M.

No. 2. Thin sectioned arrowhead of black slate. Rough granular surface, irregularly chipped. Bilaterally cleft near base for cross lashing of sinew in hafting; base concave; no stem. Dimensions: 4.1 cm. (1.6 in.) long; 1.9 cm. (0.8 in.) wide. Cat. No. 333949, U.S.N.M.

No. 3. Arrowhead of gray flint. Oval shape with acute point; bilaterally cleft for diagonal lashing of sinew seizing. Base, straight. Dimensions: 4.1 cm. (1.7 in.) long. Found in grave on Cowlitz River near Castlerock. Cat. No. 317360, U.S.N.M.

No. 4. Arrowhead of dull red jasper with incrustation of agate at tip. Uniformly chipped to a beveled section with high mid section. Oval in outline; notched at the edges near base for diagonal lashing of sinew in hafting. Base, straight, chipped to a thin edge. Dimensions: 3.8 cm. (1.5 in.) long; 2.7 cm. (1.1 in.) wide. Cat. No. 333943, U.S.N.M.

No. 5. Thick sectioned arrowhead of opaque black obsidian. Oval shape; base, straight. Stem has expanding sides and straight base. Dimensions: 3.7 cm. (1.5 in.) long; 2 cm. (0.8 in.) wide. Cat. No. 333943, U.S.N.M.

No. 6. Triple bilaterally barbed arrowhead of reddish brown jasper with incrustations of agate. Narrow cleft base. Dimensions: 5 cm. (2 in.) long; cm. (0.8 in.) wide. Cat. No. 333947-R, U.S.N.M.

No. 7. Arrowhead of smoky white chalcedony. Leaf shape, with elongated neck constriction and flaring bilateral wing barbs. Base, concave. Dimensions: 3.8 cm. (1.5 in.) long; 1.4 cm. (0.5 in.) wide. Cat. No. 333947-T, U.S.N.M.

No. 8. Arrowhead of reddish white mottled chalcedony. Triangular; deeply concave base inset with stem with expanding sides and straight base. Dimensions: 4 cm. (1.6 in.) long; 2.4 cm. (0.9 in.) wide. Cat. No. 333944, U.S.N.M.

No. 9. Long, narrow-bodied arrowhead of chocolate-brown agate. Facets chipped obliquely to high mid section. Base, straight; stem has convex base and expanding sides. Dimensions: 5 cm. (2 in.) long; 1 cm. (0.4 in.) wide. Cat. No. 333948, U.S.N.M.

No. 10. Arrowhead of red jasper with opaline incrustations. Oval shape, serrated edges; convexly rounded base. Surface shows evidence of much

rechipping. Dimensions: 5.5 cm. (2.2 in.) long; 2 cm. (0.8 in.) wide. Cat. No. 333947-S, U.S.N.M.

No. 11. Long, narrow-bodied arrowhead of smoky white agate. Slightly oval outline; base, straight inset with lenticular, diamond-shaped stem. Dimensions: 5 cm. (2 in.) long; 1.4 cm. (0.5 in.) wide. Cat. No. 333947-K.

No. 12. Arrowhead of gray flint. Triangular; irregularly chipped surfaces; thick-sectioned body with straight base; stem, wide with expanding sides and deeply cleft base for the diagonal cross lashing of seizing sinew in haftings. Dimensions: 5 cm. (2 in.) long; 2 cm. (0.8 in.) wide. Cat. No. 333947-A.

No. 13. Arrowhead of yellow jasper. Triangular; wide stem, with expanding sides, inset in deeply concave base. Diagonally laid on notches separating base from stem are designed for use in hafting arrow shaft. Dimensions: 3.6 cm. (1.4 in.) long; 2.7 cm. (1.1 in.) wide. Cat. No. 333947-A.

No. 14. Chipped arrowhead of glassy moss agate. Triangular; diagonally laid notches at base; stem has expanding sides and straight base. Found by H. T. Harding on beach of Columbia River 2 miles above Sandy Point, Grant County, Wash. Dimensions: 3.5 cm. (1.4 in.) long; 2.2 cm. (0.8 in.) wide.

No. 15. Arrowhead of pinkish white jasper. Triangular, with convexly rounded sides. Base, straight; long-necked stem with concavely rounded edges expanding at base, where it is chipped thin for hafting. Dimensions: 4.4 cm. (1.7 in.) long; 2.2 cm. (0.8 in.) wide. Exhumed by H. T. Harding at mouth of Deschutes River, Oreg.

No. 16. Arrowhead of creamy gray jasper mottled with red. Lanceolate leaf shape; irregularly serrated rechipped edges; thick sectioned. Stem is wide and has expanding sides and straight thick base. Dimensions: 4.6 cm. (1.8 in.) long; 2 cm. (0.8 in.) wide. Found on beach at mouth of Deschutes River. Cat. No. 333943, U.S.N.M.

No. 17. Arrowhead of opaque creamy white jasper. Triangular, with flaring wing barbs at base. Base is deeply concave and has a stem or neck of even proportions. Chipped facets are regularly transverse, producing serrations on lateral edges. Dimensions: 4.3 cm. (1.7 in.) long; 2.2 cm. (0.8 in.) wide at base. Cat. No. 333944, U.S.N.M.

No. 18. Arrowhead of cream colored jasper. Long, narrow body with evenly chipped serrated edges; convexly rounded base terminating in pointed stem or tang at the center. Goldendale, Wash. Collection of H. T. Harding. Dimensions: 4.9 cm. (1.9 in.) long; 1.4 cm. (0.5 in.) wide.

No. 19. Arrowhead of creamy white jasper. Triangular, flat section obliquely laid notches near edges, and wide stem with expanding edges and rounded concave base at center of base. Dimensions: 3.9 cm. (1.5 in.) long; 1.9 cm. (0.7 in.) wide. Cat. No. 333947-A, U.S.N.M.

No. 20. Arrow point of light brown jasper. Thick-sectioned, evenly chipped, serrated edges terminating in bilaterally chipped barbs at base. Base is convexly rounded, terminating in inversely triangular stem or neck for hafting. Dimensions: 4.6 cm. (1.8 in.) long; 1.7 cm. (0.7 in.) wide. Cat. No. 333939, U.S.N.M.

No. 21. Chipped arrowhead of red jasper. Narrow body with flaring bilaterally laid wing barbs at base. Base is deeply concave and is inset with stem of uniform width. Dimensions: 3.9 cm. (1.5 in.) long; 2 cm. (0.8 in.) wide at base. Cat. No. 333944, U.S.N.M.

No. 22. Arrowhead of slaty gray diabase. Triangular sectioned, with two pairs of bilateral, obliquely laid barbs, separated by wide notches for diagonal lashing of sinew in hafting. Base is concave and is chipped to thin edge. Dimensions: 3 cm. (1.2 in.) long; 2.3 cm. (0.9 in.) wide at base. Cat. No. 333947-I, U.S.N.M.

No. 23. Arrowhead of red jasper. Long, narrow, thick section; serrated edges. Base, straight; stem has straight sides and is rounded at base. Dimensions: 4 cm. (1.6 in.) long; 1.3 cm. (0.5 in.) wide at base. Cat. No. 333939, U.S.N.M.

No. 24. Arrowhead of glassy, translucent, smoky chalcedony with mottlings of agate at tip. Thin sectioned, finely chipped over all. Transversely deeply chipped notches laid at the edges near base, forming bilateral wing barbs. Base is concave and is chipped to thin edge. This arrowhead and the previously described No. 23 and No. 9 are the more characteristic types at Wahluke. Dimensions: 3.7 cm. (1.5 in.) long; 1.2 cm. (0.5 in.) wide. Cat. No. 333949, U.S.N.M.

No. 25. Arrowhead of mottled agate. Triangular, thin in section; straight base cleft with notch at its center; transverse notches are chipped at sides near the base for lashing seizing of sinew in hafting. Dimensions: 3.1 cm. (1.2 in.) long; 2 cm. (0.8 in.) wide at base. Cat. No. 333947-G.

PLATE 4

Hammerstones and Scaling Knives

No. 1. Hammerstone of andesite, with weathered natural lateral surfaces. Flakes have been struck off at the edges from either side entirely around the circumference. Found on river beach below site of village located on the bench above. Dimensions: 14.5 cm. (5.7 in.) diameter, 3.3 cm. (1.3 in.) thick. Cat. No. 333627, U.S.N.M.

No. 2. Hammerstone of weathered greenstone. Oblong and roughly rectangular in section. The edges are abraded and crudely flaked at one end, also half the distance of one lateral edge. Found on beach below village. Greenstone pestles and celts are uniformly highly polished and symmetrically finished. This object shows no evidence of intentional working either on lateral surfaces or edges. Dimensions: 19.8 cm. (9.6 in.) long; 2.8 cm. (1.1 in.) thick; 9.4 cm. (2.5 in.) wide. Cat. No. 333560, U.S.N.M.

No. 3. Rectangular worked hammerstone of reddish-brown quartzite. Surface is naturally smooth due to weathering except at the edges, sides, and on one end where intentional fracturing and abrasion by use are shown. The section at center shows less fracturing and is expanded, giving the hammerstone an oblong lenticular diamond-shape appearance. Surface find near cemetery. Dimensions: 15.6 cm. (9.1 in.) long; 5.7 cm. (2.2 in.) wide; 3.5 cm. (1.4 in.) thick. Cat. No. 333557, U.S.N.M.

No. 4. Crudely fractured hammerstone of reddish quartzite. One of the many similar unworked tools fractured through use. This object and many similar hammerstone and cooking stones were found on the high bench land above cemetery site. Dimensions: 13.3 cm. (5.3 in.) long; 10 cm. (3.9 in.) wide; 6.5 cm. (2.5 in.) thick. Cat. No. 333564, U.S.N.M.

No. 5. Unworked hammerstone of metamorphic greenstone. Smooth surfaces except at ends which show abrasion by use. Found on beach below village site. Dimensions: 10.1 cm. (4 in.) long; 7.1 cm. (2.3 in.) wide; 4.5 cm. (1.7 in.) thick. Cat. No. 333562, U.S.N.M.

No. 6. Scaling knife of andesite. A flat, circular, water-worn pebble which has been given rectangular form by use and some additional intentional bilateral chipping at edges. Removal of facets by fracturing has provided four cutting edges at right angles. Chipping of edges is bilateral and uniform. Surface find on beach below village site. Dimensions: 9 cm. (3.5 in.) diameter; 1.5 cm. (0.6 in.) sectional thickness. Cat. No. 333618, U.S.N.M.

No. 7. Scaling knife of basalt. Weathered flat surfaces of pebble bilaterally chipped and fractured at two opposite edges only, providing but two cutting

edges, in contrast with the four cutting edges of No. 6. Other similar flat surfaced rectangular scaling knives have three cutting edges. Dimensions: 9.7 cm. (3.8 in.) diameter. Cat. No. 333623, U.S.N.M.

No. 8. Flaked sandstone knife. This oval form of stone flake is used as a general utility knife and is essentially a flake struck off a larger core by fracturing. A large flake has been struck off the mid section and there is rechipping entirely around the circumference on one side only. Beach surface find. Dimensions: 10.3 cm. (4 in.) long; 5.9 cm. (2.3 in.) wide; 2.4 cm. (0.9 in.) thick. Cat. No. 333625, U.S.N.M.

No. 9. Oval-shaped blade or scraper from a core of diorite. Reverse lateral surface is sand weathered with chipped and flaked edges; obverse surface has been shaped by fracturing over all and by rechipping entirely around the circumference. Dimensions: 10.7 cm. (4.2 in.) long; 9.9 cm. (2.7 in.) wide; 2.4 cm. (0.9 in.) thick. Cat. No. 333626, U.S.N.M.

No. 10. Scaling knife or scraper of brown sandstone. This form of flake knife is similar to No. 8, and is itself a flake from a larger core. A large flake has been struck off its exposed or weathered surface by fracturing from one edge. Surface find. Dimensions: 13 cm. (5.1 in.) long; 5.9 cm. (2.3 in.) wide. Cat. No. 333612, U.S.N.M.

No. 11. Worked oblong granitic pebble used as scaling knife or scraper. Natural, smooth, weathered lateral surfaces fractured on longitudinal edges but not at the ends by intentional bilateral pecking and further abraded by use. Surface find on beach below village site. Dimensions: 18.9 cm. (7 in.) long; 8.9 cm. (3.5 in.) wide; 5 cm. (2 in.) thick. Cat. No. 333558, U.S.N.M.

PLATE 5

Objects of Personal Adornment

No. 1. Rectangular slab of argillite probably used as a mirror. Edges have been worked and corners rounded. No etched figures appear on the lateral surfaces, nor is there a perforation for suspension. Surface find on cemetery site. Dimensions: 4.6 cm. (1.8 in.) long; 3.1 cm. (1.2 in.) wide; 0.3 cm. sectional thickness. Cat. No. 333688, U.S.N.M.

No. 2. Lump of copper carbonate and malachite found with the burial offerings in grave 3. This material is not copper but occurs naturally between layers of mineral rock. Used probably as a paint ingredient.

No. 3. Lump of red ocher found in grave 4. There was no paint cup found near the object. The ocher crumbles easily and must have produced a very effective paint. Dimensions: 4.1 cm. (1.6 in.) long; 3.1 cm. (1.2 in.) wide. Cat. No. 333669, U.S.N.M.

No. 4. Fragment of yellow ocher. Found in grave 5 with other burial offerings. Dimensions: 4.8 cm. (1.9 in.) long; 2 cm. (0.8 in.) wide. Cat. No. 333669, U.S.N.M.

No. 5. Pendant of abalone shell (*Haliotis rufescens*). Perforated for suspension at one end near center by drilling; perforation is of uniform diameter. The edges of the shell have been cut to the form of a rectangle, rubbed at the ends and rounded at the corners. Incised marginal etchings in series of three and five appear at one lateral edge. Dimensions: 12 cm. (4.7 in.) long; 6.3 cm. (2.5 in.) wide; 0.7 cm. sectional thickness. Collected by H. T. Harding at the railroad terminal in Wenatchee, Wash. Probably part of an exposed burial offering.

No. 6. Chalcedonic notched pendant or scraper. Found at Lyons Ferry near Almonta, on the Snake River. Lateral edges have been chipped to thin surfaces and are convexly rounded in shape. There is evidence of rubbing through use. End sections are concave, forming grooves for hafting or for cross lashing of

sinew cord for suspension. Dimensions: 2.7 cm. (1.1 in.) wide; 2.5 cm. (1 in.) long.

No. 7. Hammered nugget of native copper used probably as an amulet. Lateral surfaces have been flattened by cold hammering and the edges are quite irregular. These irregular edges have been used as a hafting hold for the suspension cord of twisted fiber, probably Indian hemp. Two strands of this cord appear in crosswise lashing at the center of object. They have become mineralized through impregnation with copper salts. Found with burial offerings in grave 1. Dimensions: 5.5 cm. (2.2 in.) long; 1 cm. (0.4 in.) sectional diameter. Cat. No. 333700, U.S.N.M.

No. 8. Fragment of pendant of abalone (*Haliotis rufescens*) shell. The fragment has a circular beveled perforation drilled bilaterally for suspension. Found in grave 3. Cat. No. 333680, U.S.N.M.

No. 9. Ear pendant of abalone (*Haliotis kamchatkana*) shell. Perforated for suspension near margin and at center. The edge has incised serrations extending around the circumference. There is one incomplete perforation near margin. This variety of *Haliotis* has a corrugated, convex, reddish tinged outer surface and a typically blue-green concave inner surface; it is an unusual variety among shell offerings in burials. Dimensions: 3.5 cm. (1.4 in.) in diameter. Cat. No. 333681, U.S.N.M.

No. 10. Perforated shell bead. (*Glycymeris suboboleta* Carpenter.) A flat shell perforated at apex for suspension. Found with burial offerings in grave 7. Dimensions: 2 cm. diameter. Cat. No. 333739, U.S.N.M.

No. 11. Bead, perforated; cut from leg bone of a bird. Convexly rounded outer surface. 1 cm. in diameter; 0.8 cm. diameter of perforation. Cat. No. 333690, U.S.N.M.

No. 12. Bone bead from perforated wing bone of a bird. Roughly triangular in section. Worked on both inner and outer surfaces. Cat. No. 333690, U.S.N.M.

No. 13. Perforated shell bead of *Glycymeris suboboleta*. Illustration shows perforation at apex similar to that of No. 10. Diameter of shell, 2.4 cm. (0.9 in.). Cat. No. 333739, U.S.N.M.

No. 14. Chipped stone drill or pendant. The object is ovoid and has neck constriction terminating in a three-faceted point. Dimensions: 3.8 cm. long; 1.8 cm. wide.

No. 15. Bead or pendant from claw of an eagle or hawk. Stained a light green by contact with oxidizing copper in burial offerings. 4.1 cm. long. Cat. No. 333890, U.S.N.M.

No. 16. Discoidal bead of steatite. Circular stone bead perforated at center hourglass fashion with a bilateral bevel from center. Irregularly cut outer circumference. Dimensions: 0.8 cm. diameter; 0.3 cm. sectional thickness.

No. 17. Small shell (*Olivella biplicata*) perforate for suspension at basal end for suspension in line with natural opening at the end fold or apex of shell.

No. 18. Discoidal shell bead cut from a bivalve species of protothaca or clam-shell. Bilaterally beveled perforation at center. Dimensions: 1 cm. diameter; 0.2 cm. thickness; 0.3 cm. diameter of perforation. Cat. No. 333691, U.S.N.M.

No. 19. Shell bead of *Diadora aspera*, pierced at apex for suspension. Dimensions: 2.3 cm. (0.9 in.) greatest diameter; 1.2 cm. thickness. Cat. No. 333740, U.S.N.M.

No. 20. Large *Olivella biplicata* shell bead perforated like No. 17. Cat. No. 333741, U.S.N.M. Dimensions: 2 cm. (0.8 in.) long; 1.3 cm. (0.5 in.) diameter.

No. 21. Elk-tooth bead perforate for suspension.

No. 22. Bear-tooth bead perforate for suspension at end of root. The perforation is drilled and is of uniform width throughout.

PLATE 6

Decorated Objects of Stone, Bone, Horn, and Wood

No. 1. Section of carved deer horn from which fibrous core has been removed. Exhumed from burial at Vantage Ferry, Kittitas County, Wash. This carved fragment is similar to the carved antler animal figures obtained by H. I. Smith, at Lytton, British Columbia. Use unknown. Dimensions: 16.3 cm. (6.4 in.) long; 5 cm. (2 in.) wide; 0.3 cm. thick. Cat. No. 330820, U.S.N.M.

No. 2. Decorated pendant of stone (mica schist). Elongated oval shape flat lateral surfaces; thin in section. Perforation for suspension near smaller end is cut hourglass fashion at a bevel from both obverse and reverse sides. Transversely incised parallel decorative lines. Dimensions: 9.3 cm. (3.6 in.) long; 6 cm. (2.4 in.) wide.

No. 3. Weaving heddle of rectangular slab of mica schist. The object shows much evidence of use in the abraded surface near the lower end. Incised on the obverse lateral surface are decorative designs resembling figures of plants and of leaves. Found by H. T. Harding 2 miles below Vulcan in burial offerings; 9 cm. (3.5 in.) long.

No. 4. Tubular bone object. Incised parallel grooved lines encircle circumference at either end near margin and one at the center. Dimensions: 4.4 cm. long; 1.4 cm. diameter.

No. 5. Rectangular slab of carved wood decorated with incised punctated designs. Identical number of punctations appear on each of the four lateral surfaces. Dimensions: 4.7 cm. (1.9 in.) long; 0.9 cm. sectional diameter.

No. 6. Decorated bone object. Edges are cut in roughly rectangular form, representing a garment. Extensions which had been cut at the sides near the top margin have rotted away or have been broken. The punctated design consisting of two parallel rows of incised dots probably represent beads of elk teeth. Found in grave 2. Dimensions: 9.1 cm. (3.6 in.) long; 3.6 cm. (1.4 in.) wide. Cat. No. 333928, U.S.N.M.

No. 7. Carved and decorated comb of wood. The figure consists of a convexly triangular base which is perforated near the apex, and of eight teeth, each of which are broken off. Incised lines appear in parallel combined with the circle and dot design on the reverse side. The obverse has the figure of a woman appareled in a fringed garment etched on the surface. The comb, as it appears with teeth broken off, is 3.2 cm. (1.3 in.) wide; 0.5 cm. thick; and 8 cm. (3.2 in.) long.

Nos. 8, 10-12. Gaming sticks of bone or horn. These objects were much charred or burned in the cremation fire and have become very brittle. The decorative designs are etched on one lateral surface only, the reverse smooth surfaced. The sticks are oblong and are tapered toward each end. The etched designs are in the form of punctations, each from one to two tenths centimeters in depth, and in series of etched parallel zigzag lines in duplicate, triplicate, and in series of four. Dimensions: 8-9 cm. (3-3½ in.) long; 1-1½ cm. wide. Cat. Nos. 333661-333665, U.S.N.M.

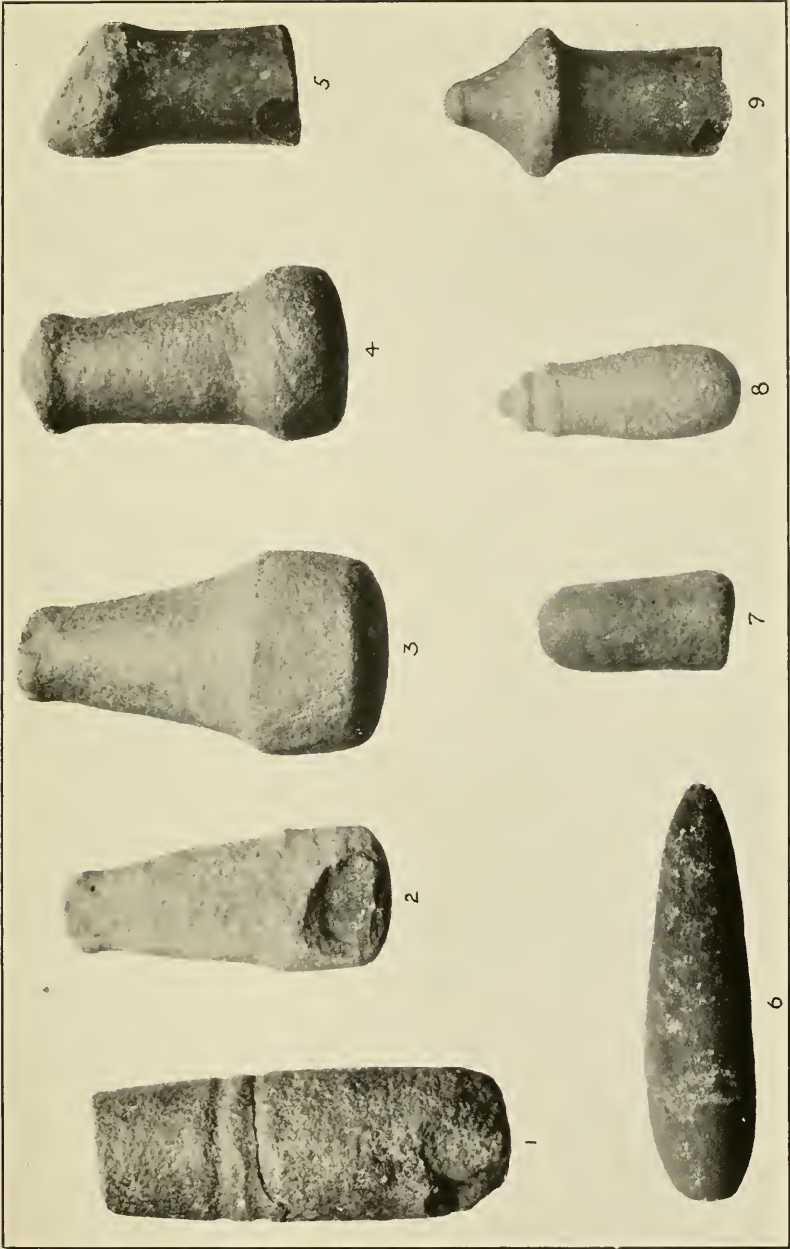
PLATE 7

Western end of White Bluffs escarpment at Wahluke, Grant County, Wash. The point where the Columbia River strikes these bluffs may be seen in the vertical, eroded walls of the escarpment on the right. The vegetation in the foreground is sagebrush; most of the grasses formerly occupying this area have disappeared within historic times. The ancient village of Wahluke is on the right and does not appear in this picture.

The Columbia River at Wahluke. White Bluffs appear in the background, extending from the extreme left to the distant right. The pit house village ruins are in the foreground and are covered in part with driftwood from the extremely high flood waters of the Columbia River which covered the site in 1894. The cemetery is on the right in the foreground and does not appear in the illustration. It is located on higher bench land and has never been covered with the flood waters of the Columbia. The western extension of White Bluffs where it joins with Saddle Mountains is on the left and does not appear in the illustration.

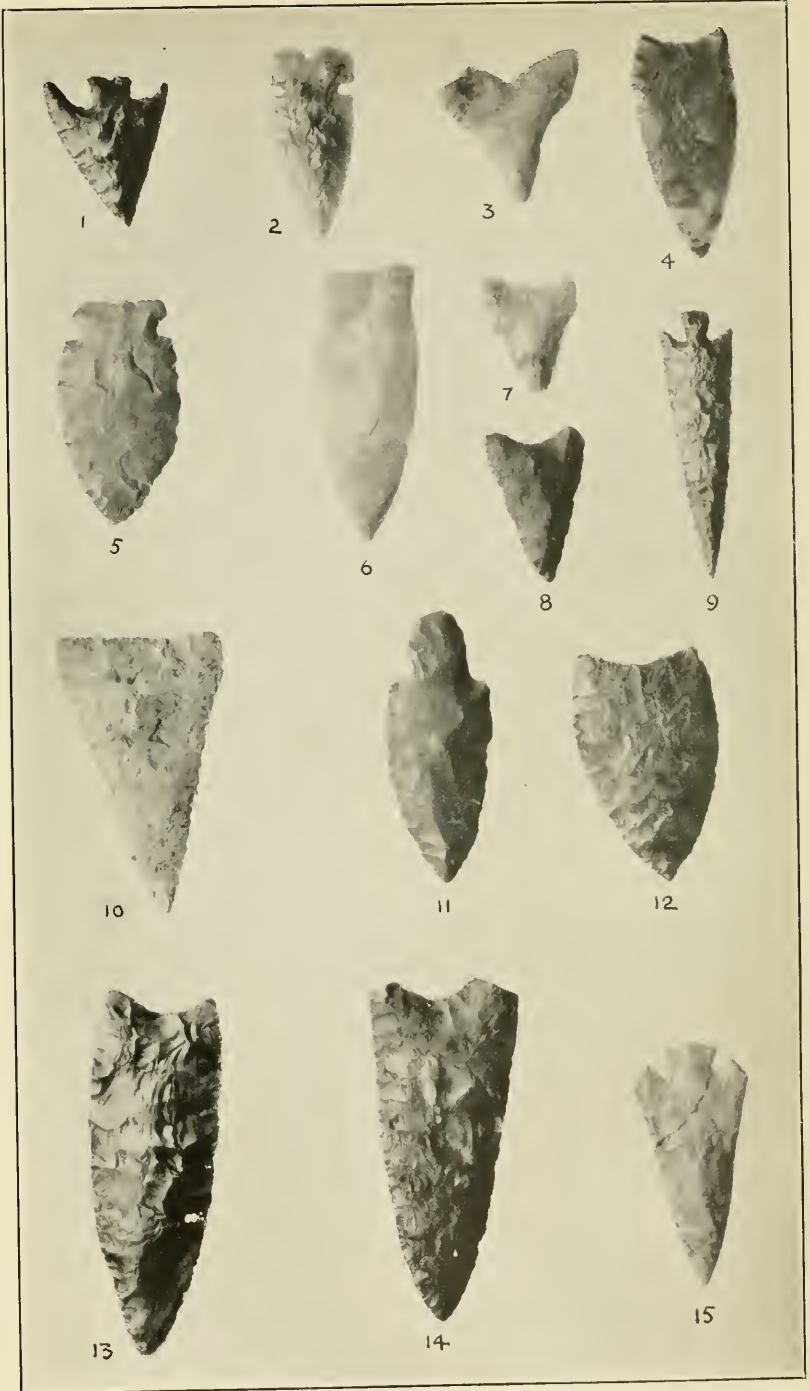






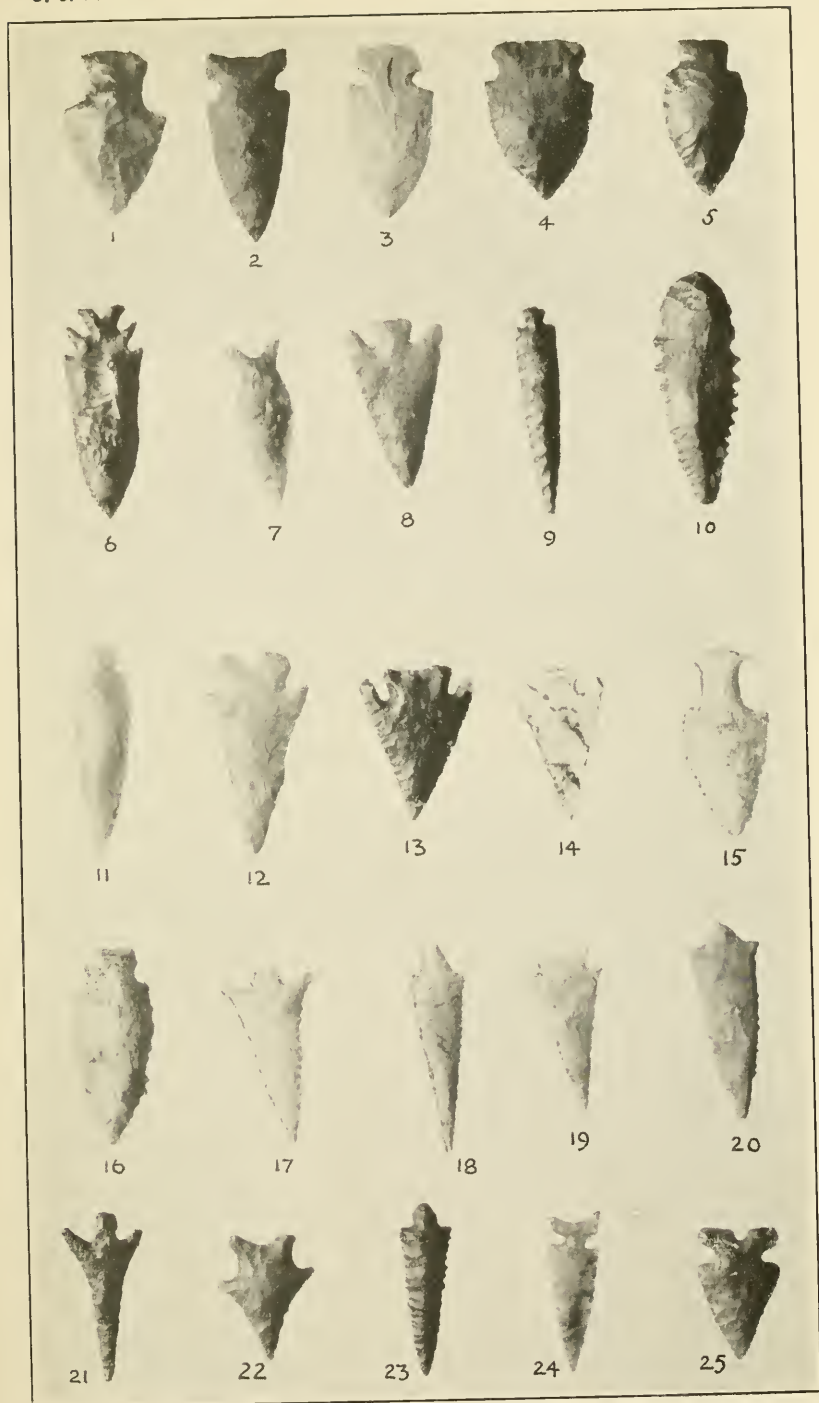
HAND PESTLES OF STONE

FOR EXPLANATION OF PLATE SEE PAGES 21 AND 22



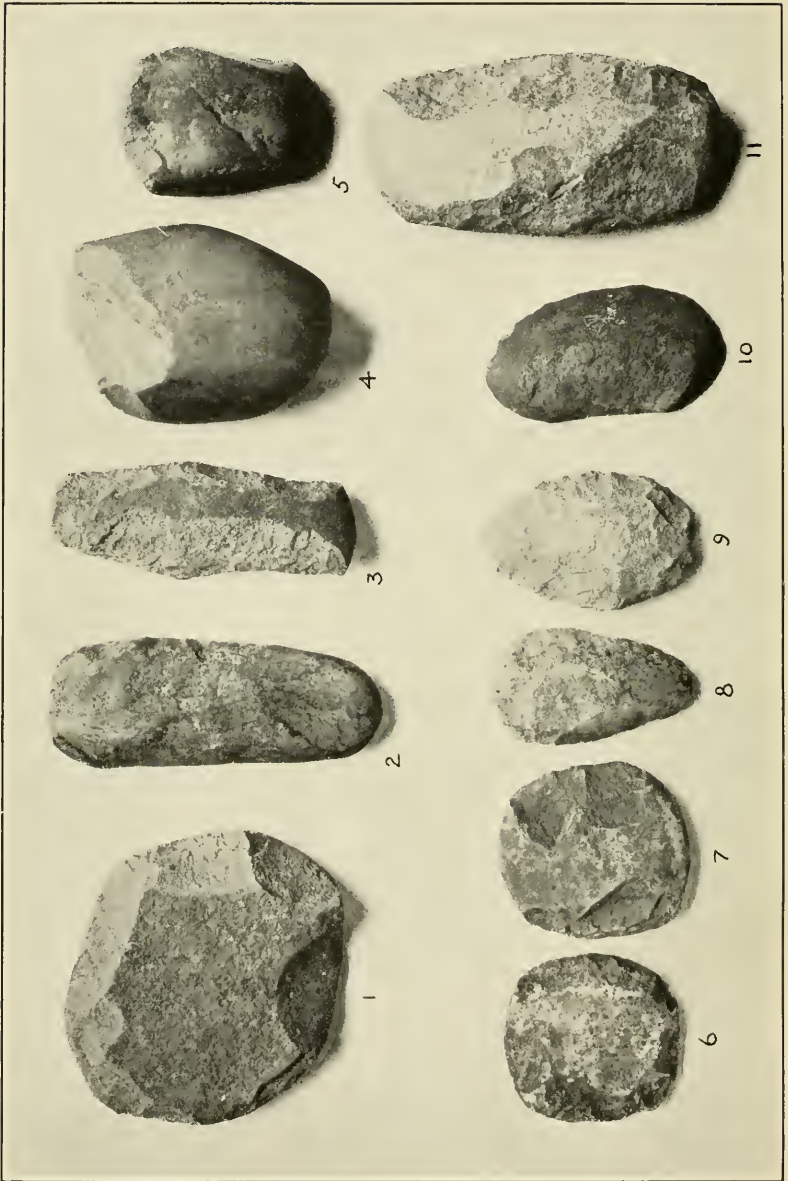
TYPES OF ARROW AND SPEAR HEADS

FOR EXPLANATION OF PLATE SEE PAGES 22 AND 23



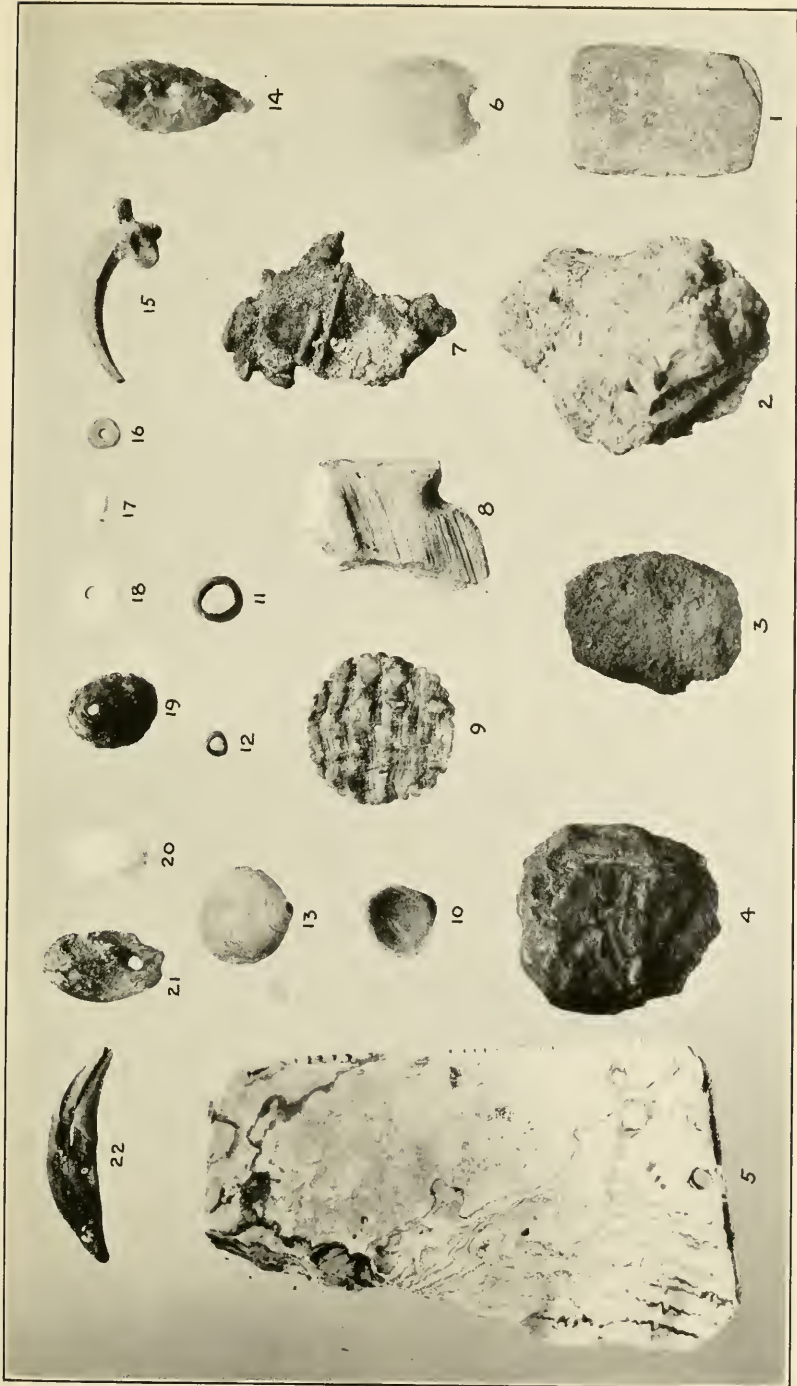
TYPES OF ARROWHEADS

FOR EXPLANATION OF PLATE SEE PAGES 23 TO 25



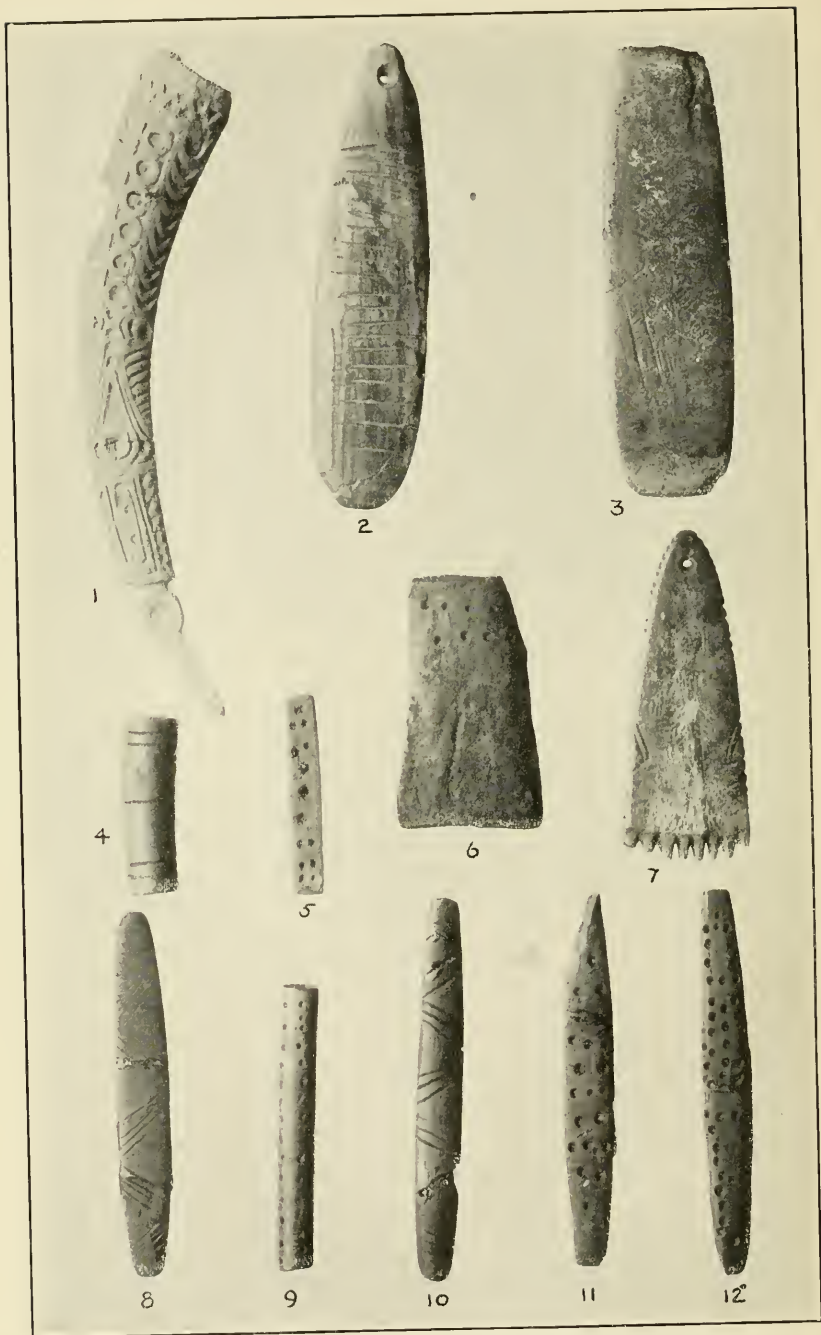
HAMMERSTONES AND SCALING KNIVES

FOR EXPLANATION OF PLATE SEE PAGES 25 AND 26



OBJECTS OF PERSONAL ADORNMENT

FOR EXPLANATION OF PLATE SEE PAGES 26 AND 27



DECORATED OBJECTS OF STONE, BONE, HORN, AND WOOD

FOR EXPLANATION OF PLATE SEE PAGE 28



WHITE BLUFFS ESCARPMENT AT WAHLUKE, WASH.



THE COLUMBIA RIVER AT WAHLUKE, WASH.

FOR EXPLANATION OF PLATE SEE PAGES 27 AND 28

