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FORTY-FOURTH  
ANNUAL REPORT OF THE  
U.S. BUREAU OF  
AMERICAN ETHNOLOGY

TO THE SECRETARY OF THE  
SMITHSONIAN INSTITUTION

1926-1927



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LETTER OF TRANSMITTAL

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SMITHSONIAN INSTITUTION,  
BUREAU OF AMERICAN ETHNOLOGY,  
*Washington, D. C., June 30, 1927.*

SIR: I have the honor to submit herewith the Forty-fourth Annual Report of the Bureau of American Ethnology for the fiscal year ended June 30, 1927.

With appreciation of your aid in the work under my charge, I am,

Very respectfully, yours,

J. WALTER FEWKES,

*Chief.*

Dr. C. G. ABBOT,

*Acting Secretary of the Smithsonian Institution.*





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REPORT OF THE CHIEF OF BUREAU

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FORTY-FOURTH ANNUAL REPORT  
OF THE  
BUREAU OF AMERICAN ETHNOLOGY

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J. WALTER FEWKES, Chief

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The operations of the Bureau of American Ethnology during the fiscal year ended June 30, 1927, were conducted in accordance with the act of Congress approved April 22, 1926, making appropriations for sundry civil expenses of the Government, which act contains the following item:

American ethnology: For continuing ethnological researches among the American Indians and the natives of Hawaii, the excavation and preservation of archæologic remains under the direction of the Smithsonian Institution, including necessary employees, the preparation of manuscripts, drawings, illustrations, the purchase of necessary books and periodicals, and traveling expenses, \$57,160, of which amount not to exceed \$46,000 may be expended for personal services in the District of Columbia.

The chief, as in former years, has endeavored to use this appropriation as economically as possible, being always conscious that the amount available is too small to cover the expense of very extensive field work. His major aim is to make the money go as far as possible in the advancement of our knowledge of the Indian and the diffusion of the information acquired.

Popular interest in anthropology, especially archeology, has increased greatly during the last decade, and each year replies to queries occupy more of the time of our staff. In spite of the limited appropriation, the bureau has had more investigators in the field during the past year than in any similar period of the present régime.

## SYSTEMATIC RESEARCHES

The systematic researches of the chief at Elden Pueblo, begun in the last fiscal year and treated in the report for 1925-26, were continued through July and August. All of the exterior walls and most of the interior rooms were completely excavated, the rough stone walls of the building showing that it was rectangular in outline and included dwellings, storage rooms, and a single kiva. It extended over a space measuring 145 by 125 feet, oriented approximately north and south. The standing walls range from 2 to 7 feet in height. Elden Pueblo is the largest ruin yet excavated in the Flagstaff region, but there are many others of the same general character still hidden from the light and demanding attention. Although the masonry is crude, the pottery of Elden Pueblo is well made, well decorated, and often highly polished, in a few cases closely recalling glazed ware which was rarely manufactured in prehistoric Arizona. Both the masonry and the ceramics of Elden Pueblo are closely allied to those of the little-known cliff ruins, Kietsiel and Betatakin, and the open-air pueblos situated near St. George, Utah. The pueblo shows affinities with a culture antecedent to that of Sikyatki and Homolobi, the former being late prehistoric and the latter post-Columbian.

In the midst of graves forming a cemetery on the east side of Elden Pueblo were found subterranean walled depressions, which remind one of those post-Basket Maker rooms or megalithic pit houses which form such a widespread architectural feature, of archaic age, in the Southwest.

Abundant human burials were discovered in cemeteries situated outside the eastern and northern sides. The skeletons were not flexed but lay at full length, their heads generally turned toward the east; those buried at the greatest depth were surrounded by burial offerings, in one instance covered with adobe or hardened clay. About 500 complete pottery vessels were brought back, half of which were unbroken. The collection also contains nu-

merous sherds and other objects, the whole forming the largest collection of pre-Puebloan material of this epoch in the National Museum. In each burial was found an average of five to six ceramic objects such as bowls. This important collection is timely and, for the study of Pueblo chronology, is much better than pottery fragments. The collection contains some of the oldest types of that southwestern pottery which was manufactured before the introduction of glazed ware. The specimens are also older than the yellow-red-brown type found at Sikyatki and Homolobi. The collection also contains a larger number of bright red bowls with burnished black interiors resembling the Pima and Papago ware of the Lower Gila and California.

In June, 1927, the chief undertook a short reconnaissance to Greenville, S. C., to test the desirability of undertaking field work in the Piedmont region, the archeology of which is little known. Though the trip was a short one, he was much gratified with the prospects for intensive work in the locality and hopes in the autumn to begin elaborate field investigations there. He examined several fine collections containing pottery, stone, and clay pipes, and other objects, none of which has ever been figured or described. He made a number of excursions into the surrounding country and visited several mounds in the Piedmont region, one of which was selected for subsequent explorations. Fragments of pottery picked up on the surface seem to indicate a Cherokee origin. A fine bowl found near the bank of the Savannah River was of Middle Mississippi type and resembled effigy vases from Arkansas. It would seem that the archeology of this region is complex and would well repay investigation, especially as so little attention has thus far been given to it.

The chief obtained many excellent photographs of archeological objects in the collection of Messrs. Thackston and Schwing, of Greenville, to whom, as well as to other citizens of the section, he wishes to express here his thanks for the many kindnesses which he received. The photographs,

made by Dowling, of Greenville, include several unique specimens.

Dr. John R. Swanton, ethnologist, was engaged during the past fiscal year in reading the proof of his papers on "Social Organization and Social Usages of the Indians of the Creek Confederacy"; "Aboriginal Culture of the Southeast"; and the proof of Mr. W. E. Myer's paper on "Trails of the Southeast." These papers are to appear in the Forty-second Annual Report. Doctor Swanton prepared a paper of over 200 pages on the "Social and Religious Beliefs and Usages of the Chickasaw Indians," which has been accepted for publication. With the help of Miss Mae Tucker, he completed a card catalogue of the Timucua words contained in the printed works of Pareja and Movilla, which he is now engaged in studying and correcting. He also has in preparation a bulletin on the social and religious usages of the Choctaw Indians similar to that on the Chickasaw.

During the fiscal year Dr. Truman Michelson, ethnologist, continued his researches among the Algonquian tribes. In the early part of the year he began work among the Arapaho of Wyoming. Although many years ago he pointed out the divergent character of their language as compared with other Algonquian tongues, the past season's work brought this out even more clearly. It can not be denied that Algonquian elements occur in both the vocabulary and grammar of the language, even though the phonetic shifts are highly complex. But certain lexical elements, as well as certain morphological traits, must apparently be derived from other sources. From these preliminary studies it may be said that Arapaho might almost be called a stock in the making. The circumstances render an exhaustive study of the language highly desirable. In Washington Doctor Michelson prepared for publication by the bureau a manuscript entitled "Notes on the Buffalo-head Dance of the Thunder Gens of the Fox Indians." He also corrected the proofs of Bulletin 85, "Contributions to Fox Ethnology."



He furthermore typed the Fox text and English translation of an account of the *wapanowiweni*, a text and translation of the same relating to the mythical origin of a major ceremony of the Thunder gens, and the Indian text of the Thunder dance of the Bear gens. All of these, combined with some additional material, will be presented for publication by the bureau. Doctor Michelson has prepared a brief paper on the St. Lawrence Island Eskimo crania in the United States National Museum, which is to be printed in the American Journal of Physical Anthropology. This proves statistically that the crania are very uniform, and that, although the cranial index is higher than that of the eastern Eskimo, this could not be considered as showing admixture with a broad-headed type. He spent some time studying the alleged proof of the Australian and Melanesian affinities of certain American stocks, and found that it lacks a sound foundation. On his way west Doctor Michelson stopped in Chicago, where he took the important measurements of all the Blackfoot (Siksika) crania in the Field Museum of Natural History. The average height of the male skulls is in round numbers 130 millimeters. These measurements, when combined with those of material in the United States National Museum, should be sufficient to settle a number of disputed points.

Mr. John P. Harrington, ethnologist, during July and August, assisted the chief in the work at Elden Pueblo, described previously in this report. The rest of the year was devoted to the preparation for publication of field data obtained the previous year in the Chumash region of southern California. The Chumash are fast being acculturated to the languages and mode of life of the Mexican and American people with whom they are in daily contact and it is important that what information is still available be made a matter of record without further delay.

Through the cooperation of Mr. Earl V. Shannon, of the division of mineralogy of the National Museum, the

paints used by the Indians were identified chemically, with interesting results, specimens purchased from living Indians and also those taken from graves being used for the purpose.

A very complete linguistic study of the ethnobotany of these Indians was carried out, with special attention to the ancient designations of the parts of the plants and their growth development. The designations of pollen, pistil, stamen, and petal vary widely as we pass from dialect to dialect, various words used for other conceptions being extended to cover them. The same irregularity has also been apparent in comparing the nomenclature of plant species.

Mr. Harrington also read proofs of his Kiowa and Picurís papers, which are now in press. The paper on the Kiowa is important for the classification of the Pueblo Indian languages. In connection with the Picurís paper, Miss Helen H. Roberts prepared transcriptions and analyses of Picurís songs, which will constitute the most complete study in existence of the music of this tribe.

Early in 1926 Mr. J. N. B. Hewitt, ethnologist, completed the manuscript "Iroquoian Cosmology, Second Part, with Introduction and Notes."

He has devoted considerable time to work upon the manuscript report on the Indian tribes of the Upper Missouri made by Edwin Thompson Denig to the Hon. Isaac Stevens, Governor of Washington Territory, which has been under consideration for publication by the bureau for some time. This report has intrinsic merit, as it contains much ethnologic information which it is now impossible to obtain because of changed conditions in the life of the tribes mentioned in it.

Several evenings each week during the autumn and winter Mr. Hewitt devoted to the recording of lexical and grammatical material in the language of the Nez Percé Indians of the Shahaptian linguistic stock of the Powel-ian classification of Amerindian languages north of Mex-

ico. In this work Mr. Hewitt was assisted by Mr. Mark Phinney, an intelligent and well-educated young man of that tribe, who is employed in the Office of Indian Affairs of the Interior Department.

This work was undertaken primarily to obtain ampler and more accurate linguistic material in this language and further to elucidate and confirm certain fundamental conclusions reached by Mr. Hewitt in 1894 in regard to the genetic linguistic relationship of three contiguous northwestern linguistic stocks—namely, the Shahaptian, the Waiilatpuan, and the Lutuamian—of the Powellian classification. These fundamental conclusions were embodied in two formal reports to the director of the bureau, having been prepared for his especial use and at his behest, as appears in the administrative report of the director for 1894. He approved the findings of both reports, although the last was not delivered until after the administrative report had been written; he has been verbally informed of what the conclusions would be. The first of these reports showed genetic linguistic relationship between the Shahaptian and the Waiilatpuan linguistic stocks of the Powellian classification; and the second showed, likewise, genetic linguistic relationship between the Lutuamian stock of languages and the new group, Shahaptian-Waiilatpuan, established by the findings of the first report. Thus these two formal reports brought together into one linguistic stock the Shahaptian, the Waiilatpuan, and the Lutuamian linguistic stocks of the Powellian classification. To this new grouping of languages was tentatively assigned the name *Shapwailutan*, an artificial term made up of the initial syllables of the names of the three combined stocks. Mr. Hewitt has since then found no reason to change his conclusions in these two reports, and his work with Mr. Phinney has only strengthened his findings.

As custodian of manuscripts, Mr. Hewitt reports that, with the exception of a number of cross-references, the cataloguing of the manuscripts had been completed at the close of the fiscal year, and that the cataloguing of the

phonograph records of Indian music was the new work for the year.

On May 8, 1927, Mr. Hewitt went to Brantford, Canada, where he resumed his researches, studying intensively the rituals, laws, customs, and chants characteristic of the League of the Iroquois.

In 1896 Chief Seth Newhouse, a Mohawk, showed Mr. Hewitt a document upon which he had been working for more than 15 years. It purported to be the constitution and by-laws of the League of the Iroquois, in the compilation of which Mr. Newhouse had visited all the Iroquois reservations known to him in both Canada and the United States. Mr. Newhouse was an exceptionally fluent speaker in Mohawk, but instead of recording the material in the Mohawk tongue he painfully recorded it in picturesque broken English. Mr. Hewitt realized that the significance of the materials contained in this document had been lost in the attempted translation and finally convinced Mr. Newhouse that it was his duty to render the ideas underlying the English of the document into Mohawk. This he did in 1898, and the study of this material is one of Mr. Hewitt's present occupations.

Mr. Hewitt also recorded a Cayuga version of the Chant Along the Trails or The Chant of the Roll of the Founders of the Lodge; a Cayuga version of the chant, Over the Great Forest; the music scores of the several chants of the condoling and installation rituals of the league; and an "Introduction" in Cayuga and Onondaga to the second part of the quickening address which is uttered in the principal place of assembly.

Dr. F. H. H. Roberts, jr., archeologist, joined the staff of the Bureau of American Ethnology on November 1, 1926. His winter months were devoted to a study of the ceramics of the San Juan area of the Southwest. Doctor Roberts left Washington April 27 for Boulder, Colo., where a study of early ceramic forms was made in the museum of the University of Colorado.

On May 6 he visited El Paso, Tex., for the purpose of investigating certain caves in a small range of mountains

which lies 25 miles northeast of the city, between El Paso and the far-famed Hueco Tanks. There are 28 of these natural recesses in the faces of the cliffs, in most cases just above the tops of the talus slopes. In general they open to the west or northwest. Most of them bear traces of Indian visitors. In the majority of the caves these traces are largely in the form of pictographs painted on the walls with red pigment. The pictures are in great part highly conventionalized and geometric in form. In two instances they were decidedly suggestive of the decorations on pottery from Casas Grandes in northern Mexico.

Three of the caves showed evidences of an occupation extending over a considerable period, judging from the amount of débris and ash on the floors. In the course of two hours' digging, 12 sandals, a number of spear shafts, a fragment of netting, several pieces of cord, portions of rabbit sticks, a few beads, and two potsherds were found.

The sandals are of a rare and interesting form which is not common in the better-known portions of the Southwest. A loop of yucca was twisted to form the edges of the sole and yucca leaves woven back and forth across this framework. Similar specimens have been found in caves in portions of west Texas, east of the present site, and at one or two places in the Mimbres Valley. Two strands of twisted yucca leaves were fastened together at the toe, running back about halfway on either side. The sandal was presumably held in place by passing the toe portion of the "tie" between two toes. The spear shafts were rather elaborately decorated with streamers of yucca fiber. In some instances a small stone point was used; in others a hardened wood point.

On May 13 Doctor Roberts left El Paso for the Chaco Canyon in northwestern New Mexico, where excavation was begun on some slab houses on the top of the south rim of the canyon 9 miles east of Pueblo Bonito and Chetro Kettle. Between May 17 and June 30, 12 houses, 20 storage cists, and 1 large kiva were excavated.

All of the houses proved to be of the semisubterranean single-room variety, rectangular or slightly oval in shape, averaging about 15 feet in length by about 10 feet in width. They were excavated 2½ to 3 feet deep and found to be lined with large slabs of stone, the whole covered with a pole, brush, and plaster superstructure supported on four poles in the interior of the house. In practically all cases there was a small opening to the south, possibly a door. Many of the features of these houses are similar to those which are found in, and considered characteristic of, the highly developed kivas or ceremonial rooms of the communal dwellings of later periods. The storage cists were small oval or circular pits about 2½ feet deep, lined with stone slabs. Houses and storage cists were grouped about the kiva, which is the first of its type to be excavated in the Southwest. The front of the banquette and the wall of the kiva were made of large slabs of stone; the latter were covered with a thick coating of adobe plaster.

Potsherds and other objects of the material culture of the builders of this slab-house village are scarce. The fragments of pottery found, however, are of the type which in southwestern archeology has been given the term "post-Basket Maker." Doctor Roberts believes them to be from a late phase of the post-Basket Maker culture, probably the end of the period and just prior to the beginning of the pre-Puebloan stage.

Fourteen burials were found and only three had accompanying mortuary offerings. The latter was, in each case, a bowl. Unfortunately the skeletons were in such a poor state of preservation that in all but three instances their removal was out of the question. None of the skulls was deformed, a typical Pueblo trait, and all were dolichocephals or "longheads." A detailed map was made.

#### SPECIAL RESEARCHES

The research in Indian music was conducted in a wider field during the past year than in any year preceding. In July, 1926, Miss Frances Densmore, collaborator in Indian

music, returned to Neah Bay, Wash., to continue her study of the music of the Makah and of Indians from Vancouver Island who have married members of the Makah tribe. More than 140 songs were recorded, including a group of old songs obtained from a woman of the Quileute tribe, a particularly isolated tribe living south of Makah.

An exceptional opportunity for the study of Indian music was afforded by the celebration of "Makah Day" on August 26 and by the rehearsals preceding this annual festivity. The program depicted the arrival of a visiting tribe and the entertainment which in the old days would have taken place on such an occasion. The Indians who took the part of visitors arrived in a gaily decorated boat and were formally welcomed and escorted to the place of entertainment, where dances were given by expert Makah dancers. Several of these dances were dramatic presentations of tribal traditions. For example, it was the old belief of the Makah that many sorts of animals, birds, trees, and rocks were once human beings, and one of the most important dances was an impersonation of human beings who were the ancestors of the elk.

The songs recorded at Neah Bay included the songs of the Makah Day dances, rendered by the leading singers, and songs of the "impersonation dances" that formed part of the Klokali ceremony. In these dances they formerly impersonated the wolf, deer, and wild white geese. An interesting group of Clayoquot songs was addressed to the sea when the breakers were high and it was said "the sea always seemed to become calm soon after these songs were sung." A phase of music hitherto unstudied in detail was the old composed song, distinct from the song received in a dream. It appears from data collected in two localities that physical motion was considered an aid to musical composition, some musicians composing while sitting in a swing, others while walking, and others (on the coast of British Columbia) while riding in a motor boat.

After five weeks at Neah Bay Miss Densmore went to Chilliwack, British Columbia, where Indians from a wide

territory are annually employed as pickers in the hop fields. An effort was made to obtain songs of all important classes, from Indians as widely separated as possible. More than 125 songs were recorded, among the localities represented being the Nass, Skeena, Thompson, and Fraser Rivers, Port Simpson, the west coast of British Columbia and the southwest coast of Vancouver Island. The singers came from a region extending about 400 miles north and south and about 150 miles east and west. Two aged medicine men recorded songs which they use at the present time in treating the sick, and numerous healing songs were recorded by other Indians. One was for the cure of smallpox; in another the doctor addressed the seal, grizzly bear, and deer, asking their help, while the next song contained their favorable response. The medicine men appreciated the value of the work and recorded their songs without reluctance.

Mention should be made of the *slahal* game played often at the hop camp by a large number of Indians, with crowds of Indian spectators. The songs and method of playing the game were recorded, the players were photographed during a game, and the bone game implements were loaned for photographic purposes.

Seven manuscripts on the foregoing field work were submitted to the Bureau of American Ethnology with the following titles: "Songs of the Quileute Indians"; "Makah and Clayoquot songs for treating the sick and Makah songs in honor of the dead"; "Klokali songs of the Makah Indians"; "Songs of Indians living on the Sliamey and Homaco Reserves in British Columbia"; "Songs of Indians living at Port Simpson and on the Skeena and Nass Rivers in British Columbia"; "Makah and Clayoquot songs"; and "Songs and dances presented on Makah Day, 1926, at Neah Bay, Wash." A paper was also submitted entitled "A comparison between Pawnee songs and those previously analyzed," with 18 tables of analysis. The number of manuscript pages was 178 and the number of transcribed songs 124.



In British Columbia, as in the United States, opportunities for the study of genuine Indian music are rapidly passing, though there still remain old people who can sing the ancient songs.

Dr. Aleš Hrdlička, curator of physical anthropology, United States National Museum, made during the spring and summer of 1926 a comprehensive anthropological and archeological survey in Alaska.

Upon reaching the Seward Peninsula he found himself confronted with insurmountable difficulties in the matter of transportation. The arrival of the revenue cutter *Bear* was a fortunate circumstance, for he secured both accommodation and promise of assistance in his work. Doctor Hrdlička left on the *Bear* July 22 with the intention of landing where indications might demand; but notwithstanding certain disadvantages, until the end of the *Bear's* journey he did not feel justified in leaving the ship.

The trip, barring the storms, etc., was propitious. The ship stopped at every place of importance along the whole coast up to Point Barrow. He was given facilities and help to make at least the most necessary observations and collections.

*Scientific results.*—The whole trip was very useful, and threw a definite light on a number of important problems in the regions covered. It suggested definite notions as to what is to be done in the future, among which are the following:

*Antiquity of man.*—Much that was seen strengthens the probabilities, as well as showing the facilities of Asiatic migrations over and along the Seward Peninsula, across Bering Sea, and also by way of the Aleutian Islands. But material evidence of these comings was not found, and must be very limited, if not completely wanting, for the following reasons: The comings could have been only by small numbers of people, and these contingents would effect but small and temporary settlements along the coasts and perhaps the banks of a few streams. The rea-

sions were a relative scarcity of the population in the northeastern parts of Asia, on account of the limited resources of that region; the more or less nomadic habits of the people, due to seasonal conditions and the shifting food supply; their dependence on the sea and rivers for both food and movement, the hinterland being poor in resources and not favorable for migrations toward more desirable regions.

*Old Eskimo sites.*—Older abandoned sites of the Eskimo, from those of small camps with perhaps only two or three “igloos” to good-sized dead villages, are quite common. They occur as a rule on, or just above, the low “spits” and beaches of the sea and on the banks of the rivers or lakes.

*The Teller battle field.*—This consists merely of a tundra plain, dotted with small lagoons. In its vicinity are at least two, and probably more, small old sites, with their graves for the most part already assimilated by the tundra. The plain itself shows, as far as seen, nothing but moss and other similar vegetation.

The archeological objects that it was possible to secure show: (1) Contact with Asia; (2) two varieties of decoration, rectilinear and curvilinear, the latter much superior to the former; (3) extensive trading (“jade,” slate, obsidian); (4) a great differentiation and variety in places, indicating a rather high culture.

This survey of conditions in the northwestern part of Alaska indicates the need of prompt work of archeological and anthropological nature in several directions.

Dr. Walter Hough, head curator of anthropology, United States National Museum, was detailed to examine recent excavations at Indian Mound, Tenn., reported by the Hon. Joseph W. Byrns. In the town of Indian Mound is a large burial mound, from which the place derives its name. The mound is much lowered by cultivation, some of the older settlers affirming that it was several feet higher than at present.

Through the enterprise of Mr. T. W. Seay, jr., excavations in the summit of the mound brought to light several slab-box burials, a number of skeletons, and a few artifacts. From the surface of the mound and adjoining lots, showing rich, black soil containing artifacts, many specimens of stone implements have been picked up. Through the kindness of Mr. Seay, Doctor Hough visited a number of village sites, burial mounds, and flint quarries in the neighborhood of Indian Mound and Dover, collecting numerous specimens.

#### • EDITORIAL WORK AND PUBLICATIONS

The editing of the publications of the bureau was continued through the year by Mr. Stanley Searles, editor, assisted by Mrs. Frances S. Nichols, editorial assistant. The status of the publications is presented in the following summary:

##### PUBLICATIONS ISSUED

- Bulletin 82. Archeological Observations North of the Rio Colorado, by Neil M. Judd. 171 pp., 61 pl., 46 figs.  
 Bulletin 83. Burials of the Algonquian, Siouan, and Caddoan Tribes West of the Mississippi, by David I. Bushnell, jr. 103 pp., 37 pl., 3 figs.  
 List of Publications of the Bureau of American Ethnology, 46 pp.

##### PUBLICATIONS IN PRESS OR IN PREPARATION

- Forty-first Annual Report. Accompanying papers: Coiled Basketry in British Columbia and Surrounding Region (Boas, assisted by Haeberlin, Roberts, and Teit); Two Prehistoric Villages in Middle Tennessee (Myer).  
 Forty-second Annual Report. Accompanying papers: Social Organization and Social Usages of the Indians of the Creek Confederacy; Religious Beliefs and Medical Practices of the Creek Indians; Aboriginal Culture of the Southeast (Swanton); Indian Trails of the Southeast (Myer).  
 Forty-third Annual Report. Accompanying papers: The Osage Tribe: Two Versions of the Child-naming Rite (La Flesche); Wawenock Myth Texts from Maine (Speck); Native Tribes and Dialects of Connecticut (Speck); Picuris Children's Stories with Texts and Songs (Harrington and Roberts); Iroquoian Cosmology—Part II (Hewitt).

- Forty-fourth Annual Report. Accompanying papers: Excavation of the Burton Mound at Santa Barbara, Calif. (Harrington); Social and Religious Beliefs and Usages of the Chickasaw Indians (Swanton); Uses of Plants by the Chippewa Indians (Densmore); Archeological Investigations—II (Fowke).  
 Bulletin 84. Vocabulary of the Kiowa Language (Harrington).  
 Bulletin 85. Contributions to Fox Ethnology (Michelson).  
 Bulletin 86. Chippewa Customs (Densmore).

## DISTRIBUTION OF PUBLICATIONS

The distribution of the publications of the bureau has been continued under the immediate charge of Miss Helen Munroe, assisted by Miss Emma B. Powers. Publications were distributed as follows:

Report volumes and separates.....	1,474
Bulletins and separates.....	7,289
Contributions to North American Ethnology.....	34
Miscellaneous publications.....	1,914

As compared with the fiscal year ended June 30, 1926, there was a decrease of 3,079 publications distributed. This was partly due to the fact that one less publication was distributed to the mailing list than in the previous year.

Six names were added to the mailing list during the year and 31 taken from the list, making a net decrease of 25. The list now stands at 1,713.

## ILLUSTRATIONS

Following is a summary of work accomplished in the illustration branch of the bureau under the supervision of Mr. DeLancey Gill, illustrator:

Illustrations: Photographs retouched and lettered, drawings, etc., prepared and made ready for engraving.....	647
Drawings made, maps, diagrams, etc.....	44
Illustrations, engraver's proof criticized.....	516
Colored illustration proofs examined at Government Printing Office.....	10,500
Photographic prints of archeologic and ethnologic subjects..	603
Negatives made.....	72

Lantern slides-----	16
Photographic enlargements-----	6
Film rolls developed from field exposures-----	24

About 70 per cent of the photographic laboratory work for the bureau was done by Dr. A. J. Olmsted, of the United States National Museum; and 50 per cent of the illustration work by Mr. Gill was for the publications of the various bureaus of the Smithsonian Institution in co-operation. This arrangement has proved eminently satisfactory during the past year, with a substantial saving of more than 80 per cent of the former cost of photographic work.

#### LIBRARY

The reference library has continued under the immediate care of Miss Ella Leary, librarian, assisted by Mr. Thomas Blackwell. The library consists of 27,141 volumes, about 15,937 pamphlets, and several thousand unbound periodicals. During the year 480 books were accessioned, of which 83 were acquired by purchase and 397 by gift and exchange; also 3,950 serials, chiefly the publications of learned societies, were received and recorded, of which only 102 were obtained by purchase, the remainder being received through exchange. Of pamphlets, 225 were obtained. During the year 288 volumes were sent to the bindery. The catalogue was increased by the addition of 1,980 cards. A considerable amount of time was given to preparing bibliographic lists for correspondents. The endeavor to supply deficiencies in the sets of publications of institutions of learning was continued without remission. Requisition was made on the Library of Congress during the year for an aggregate of 300 volumes for official use. The bureau library was frequently consulted by officers of other Government establishments.

#### COLLECTIONS

92528. Collection of archeological and skeletal material (740 specimens) secured along the Upper Columbia River, Washington, during the spring of 1926 by Herbert W. Krieger.

92528. Skeleton of a shaman (less the skull), 2 femora of another shaman, and 2 bleached bones from the skeleton of a chief, all Tlinkit, of Alaska, collected by Dr. A. Hrdlička.
94202. Small collection of shell beads and bracelets, and stone implements, obtained from the ruin of Las Trincheras in the Altar districts of Sonora by S. A. Williams.
94776. Archeological specimens from Arkansas, Colorado, Florida, Kentucky, and Tennessee, secured by various collectors for the bureau. (25 specimens.)
93522. Anthropological, geological, and biological material collected by Dr. Aleš Hrdlička in Alaska during the summer of 1926. (1,374 specimens.)
93607. Material collected during the summer of 1926 in Louisiana and Mississippi by Henry B. Collins, jr. (236 specimens.)
95011. Ten master records of Hopi Indian songs recorded during the summer of 1926 at the Grand Canyon by Dr. J. Walter Fewkes and two master records of a speech by William Jennings Bryan.
95372. One carved and painted wooden figure representing a Hopi snake priest.
96091. Four Indian crania from Elden Pueblo, Ariz., and two from Montezuma Canyon, Colo.
96920. Collection of archeological objects gathered from the bureau at Indian Mound, Tenn., by Walter Hough.
96921. Archeological material collected for the bureau at Elden Pueblo, Ariz., by Dr. J. Walter Fewkes during the summer of 1926.

#### PROPERTY

Office equipment was purchased to the amount of \$123.74.

#### MISCELLANEOUS

*Clerical.*—The correspondence and other clerical work of the office has been conducted by Miss May S. Clark, clerk to the chief, assisted by Mr. Anthony W. Wilding, stenographer. Miss Mae W. Tucker, stenographer, continued to assist Dr. John R. Swanton in compiling a Timucua dictionary and Mr. Hewitt in finishing the reclassifying and cataloguing of the manuscripts in the bureau archives. Miss Tucker was also engaged in classifying and cataloguing the musical records in the posses-

sion of the bureau. Mrs. Frances S. Nichols assisted the editor.

*Personnel.*—Dr. F. H. H. Roberts, jr., archeologist, was appointed on the staff of the bureau November 1, 1926.

Respectfully submitted.

J. WALTER FEWKES,

*Chief, Bureau of American Ethnology.*

Dr. C. G. ABBOT,

*Acting Secretary of the Smithsonian Institution.*





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**EXPLORATION OF THE BURTON MOUND  
AT SANTA BARBARA, CALIFORNIA**

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By **JOHN P. HARRINGTON**



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THE BURTON MOUND, LOOKING SOUTHEAST. PAINTING BY ALEXANDER F. HARMER, 1897



a. THE EARLIEST EXTANT PICTURE OF SANTA BARBARA, SHOWING THE BURTON MOUND IN THE FOREGROUND. FROM ROBINSON, LIFE IN CALIFORNIA BEFORE THE CONQUEST, NEW YORK, 1846, OPP. P. 41



b. PHOTOGRAPH FROM THE SANTA BARBARA MESA LOOKING EAST, SHOWING THE LOWER PART OF SANTA BARBARA IN THE EIGHTIES. THE BURTON MOUND IS SEEN BELOW THE GAP TO THE LEFT OF RINCON HILL

# EXPLORATION OF THE BURTON MOUND AT SANTA BARBARA, CALIFORNIA

By JOHN P. HARRINGTON

## INTRODUCTION

The present paper is a preliminary report on the collection taken from the Burton Mound at Santa Barbara, Calif. (pls. 1, 2), by the Thea Heye expedition in the summer of 1923. It presents our historical discoveries which led to the investigation of the site and describes the artifacts. The writer has in preparation a complete monographic account which will be published at a future date.

The principal rancheria or village of the ancient Santa Barbara Valley was not at the Mission, where the Indians were gathered in later times, but at the beach. It was situated a little to the west of the mouth of Mission Creek, where a landing cove for canoes and two low mounds, one by the beach and a larger one 650 feet inland and now known as the Burton Mound, afforded unusual attraction as a dwelling place for Indians. At a number of places in the locality were cold sulphur springs; also some springs of drinking water. The name of the village was Syujtún,<sup>1</sup> meaning "where the two trails run." There a thriving population lived on the wild food products of the neighboring beach and sea and of the Santa Barbara Valley, rich in acorn-bearing oaks and game animals.

Although the Relation of the Voyage of Cabrillo, 1542, records the name Syujtún and the early land expeditions passed by the village, little has been written on its history. After the establishment of the Santa Barbara Mission, the deserted locality of Syujtún became known as "el rancho de la playa."

In the early thirties this beach ranch of the Padres appears to have passed in rapid succession into possession of the Mexican Government, James Burke, and then Joseph Chapman, a young Englishman, who had been captured at the time of the Bouchard invasion and who erected a small adobe house on the mound. A few years later, tra-

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<sup>1</sup> Indian names in this paper are in Spanish orthography; but c is pronounced as English sh; ñ is near k; ' is the glottal clusive; k', k', t', p' are of the "glottalized" variety; h is not silent as in Spanish but is pronounced as in English; a, e, i, o, u as in Spanish murcielago, "bat."

dition relates, Thomas Robins bought the property and built the massive adobe house which was for more than 70 years the most conspicuous feature of the Santa Barbara water front. During the forties the owner was Capt. George C. Nidever, known in California history as the rescuer of the last surviving Indian woman from San Nicolas Island. Captain Nidever sold the property in 1851 to Augustus F. Hinchman, lawyer and prominent resident of Santa Barbara. In 1860 Mr. Hinchman sold the tract to Lewis T. Burton, who made it his home for 19 years, and after whom the mound has been called in more recent times. Upon the death of Mr. Burton in 1879, the Seaside Hotel Association took possession of the property and the building of a resort hotel on the mound was planned. This project was finally realized in the erection of the Potter Hotel in 1901-2. Ownership of the hotel changed hands in 1913 and the name was altered first to the "Belvedere" and then to the "Hotel Ambassador." The hotel burned to the ground on April 19, 1921, and the site was thereby again released for archeological investigation.

Taking advantage of the unique condition presented by the burning of the hotel, archeological excavation was made possible for the Museum of the American Indian, Heye Foundation, through the generosity of Mrs. Thea Heye, of New York City. By arrangement with the Bureau of American Ethnology the expedition was placed in charge of the writer.

The results of this excavation of the Indian town of Santa Barbara proved rich and interesting beyond expectation. The collection of objects taken from the mound will be placed on exhibit at the Museum of the American Indian in New York City.

Heartfelt acknowledgment is here given to Mr. George G. Heye and to Mrs. Thea Heye, who with their usual generosity and enthusiasm supported the excavation work during many months. I wish also to express my great indebtedness to Dr. J. Walter Fewkes, chief of the Bureau of American Ethnology, for his kindness in arranging the cooperative work and for his assistance in carrying it through to its consummation. Mr. S. W. Strauss, who in the name of the Ambassador Hotel Corporation gave permission to excavate the site, is deserving also of most grateful acknowledgment.

But most of all I want to express indebtedness to my friends Prof. D. B. Rogers and Mr. G. W. Bayley, who were with me during almost the entire work and contributed in innumerable ways to its progress.

The photographs were made by Mr. William Orchard, of the staff of the Museum of the American Indian, who also assisted in many other ways, and by Mr. Albert Sweeney, of the Bureau of American Ethnology. The geological specimens were identified by Dr. Edmund Hovey, of the American Museum of Natural History, and Mr. Earl

V. Shannon, of the United States National Museum's division of geology. Mr. William L. Calver, of New York City, identified the pottery and chinaware specimens. Others whose names should be mentioned here are Miss Elizabeth Mason, who prepared a model of the Burton Mound as it was before the Potter Hotel was constructed; Mr. Foster H. Saville, who cleaned and classified the collections; Dr. Bruno Oetteking, who is working up the skeletal material; Mr. F. W. Hodge; Fr. Zephyrin Engelhardt; Mr. Edward F. Coffin; Dr. E. L. Hewett; Fr. Alexander Buckler; Dr. A. L. Kroeber; Rt. Rev. John J. Cantwell; the late Mrs. Luisa Ignacio; Mr. Barton A. Bean, and Mr. E. D. Reid, who identified the skeletal remains of fishes found in the mound; Prof. H. E. Bolton; Dr. Paul Bartsch; Mr. C. E. Asher; Mr. Jesse E. Wood, who assisted in the excavations; Mrs. Jesse E. Wood, who assisted in identifying the shells; Mr. George H. Gould; Dr. J. S. Miller; Mr. Charles F. Eaton; Mrs. R. Kimberly; Miss Jane Kimberly; Mr. Charles T. Hall; Mrs. Anna West-Bates; Mr. Herbert F. Orris; Miss Doris Overman; Mr. Louis G. Dreyfus; Mrs. Francisca Dibblee; Mr. T. S. Storke; Mr. José Ortega; Mrs. F. Nardi; Mr. Juan Isidoro Pico; Mr. Edward Borein; Mr. Charles F. Lummis; Mr. Carl O. Borg; Mrs. Ida M. Kobida; Miss Mamie L. Goulet; Mrs. Thomas Hicks; Mr. Juan de Jesus Justo; Mr. George D. Morrison; Mr. Ralph Arnold; Mr. W. C. Smith, who surveyed the mound and prepared several of the maps; Mr. Owen H. O'Neill; Mr. Archie B. Cook; Mr. Milo M. Potter; Mr. James M. Carter; Mr. Charles T. Hall; Mrs. Charles T. Hall; Mr. Max Aman; Mr. Arthur Greenwell; Mrs. Ramona Trussell; Mr. Guido C. Hinchman; Miss Stella G. Hinchman; Miss Pearl Chase; Mr. Ole Hanson; Mr. George Emigdio Nidever; Mr. A. M. Gutierrez; Mr. Thomas B. Middleton; Mr. Luis A. M. Ortega; and Dr. Chester Stock. We shall in a later publication mention numerous others, some of them friends of long standing, who have contributed to this study by furnishing historical and other information, by donating specimens taken from Burton Mound and other sites in early years, or by granting permission to explore or to excavate upon their property.





## HISTORY OF THE BURTON MOUND

### EARLIEST HISTORY

There is abundant evidence, traditional, historical, and archeological, that the large Indian village at Santa Barbara was at the beach, at the old Puerto de Santa Bárbara or early landing place at the foot of the present Chapala Street, west of the mouth of Mission Creek and due east of and comprising the Burton Mound. The Indian informants have given the name of this village as Syujtún (fig. 1), meaning "where the two trails run."

One of the most interesting matters in California archeology and ethnology will always remain the recording of Santa Barbara Channel place names by the Cabrillo expedition of 1542. Although it has never before been pointed out, the Indian name of the village at the Puerto de Santa Bárbara occurs in the Relation of the Voyage of Cabrillo.<sup>1</sup> Indeed, it may be mentioned in that document no fewer than four times, with the additional information that the village appeared to be a capital.

/xocotoc/

/qucut/

/yutun/

qucut

FIG. 1.—The four possible occurrences of "Syujtún," the native name of the Burton Mound village, in the original manuscript of the Relation of the Voyage of Juan Rodríguez Cabrillo in the Archivo General de Indias at Seville, Spain.

### MENTION OF SYUJTÚN IN THE RELATION OF THE VOYAGE OF CABRILLO, 1542

The first list of place names given in the Cabrillo account<sup>2</sup> starts with El Rincón, naming in upcoast direction:

Xuco [Cukuw, at El Rincón Creek].

Bis, Sopono [Mishopsnów, at La Carpintería Creek].

Alloc [K'olok, at El Toro Creek].

Xabaagua [Shalwáj, El Montecito].

Xocotoc [Syujtún, El Puerto de Santa Bárbara].

In a subsequent list of mainland coast rancherías,<sup>3</sup> jumbled in arrangement and with rementionings like the first list, the name

<sup>1</sup> Relación ó Diario de la Navegación que hizo Juan Rodríguez Cabrillo, in Buckingham Smith, Colección de Varios Documentos para la Historia de la Florida y Tierras Adyacentes, London, 1857, pp. 173-189. English translations by R. S. Evans in George M. Wheeler, Report upon United States Geographical Surveys West of the 100th Meridian, vol. 7, Washington, 1879, pp. 293-314; and by Herbert E. Bolton in his Spanish Exploration in the Southwest, New York, 1916, pp. 1-39.

<sup>2</sup> Ibid., p. 181.

<sup>3</sup> Ibid., p. 183.

seems to appear twice again, first as Ciucut and then as Yutum (cp. "Yuctu" of the Padrón of Captain Felipe de Goycochea, p. 55), after which the comment is added: "el pueblo de Ciucut parecia ser cabecera de otros pueblos," "the village of Ciucut appeared to be a capital of other villages" (cp. Bancroft, p. 49).

With regard to the spelling of the above forms, Xocotoc, Ciucut, and Yutum, it will be noted that sy is rendered by x (Eng. sh), ci, and y; the sound of Spanish j is represented by c, as is regular in the Cabrillo account, or not at all; u and o interchange; an echo vowel timbre is inserted after the j; and the final aspirated and somewhat decadent n is heard twice not at all and once as m.

MENTION IN THE DIARIES OF THE PORTOLÁ EXPEDITION, 1769-1770

A second point in the history of Syujtún that has never been brought out is that the Portolá expedition camped within two rifle shots of the rancheria on the night of August 18, 1769. We are fortunate in having diary accounts of this expedition by Fr. Crespi, Costansó, and Fages, each telling about passing through the Syujtún vicinity both on the way up coast and on the return journey. Each of these accounts presents facts not given in the other two accounts and helps to explain statements in the other accounts which might remain vague or misunderstood. For instance, Fages places the two ruined villages merely in the vicinity of Syujtún and says that their inhabitants mutually exterminated each other; Fr. Crespi says that one of these ruined rancherias was 1 league, the other 2½ leagues from La Carpintería and that the Indians said of the first of these villages that mountain Indians had attacked it; while Costansó states that between Carpintería and Syujtún they found two ruined rancherias but could not ascertain why they were so. Only the Fages diary gives the number of houses in and population of Syujtún. That either Fr. Crespi or Costansó had seen the other's diary is another amazing fact that comes from a comparison of the wording.

Fr. Juan Crespi notes the following in his diary:<sup>4</sup>

*Miercoles 16 de idem* [16 de Agosto, 1769]:—Como á las seis y media salimos [de los Pitos] siguiendo el mismo rumbo del Oeste que es el que ocurre aquí á la playa, y á las dos leguas llegamos á otro pueblo [el Rincón] mayor que el de la Asuncion, pues contamos sesenta casas bien formadas

*Wednesday, the 16th of the same month* [August 16, 1769].—At about half past 6 we started out [from Los Pitos] following the same westerly direction, which is that which here coincides with the shore, and at 2 leagues' distance we reached another rancheria [El Rincón], which is larger

<sup>4</sup> Documentos para la Historia de Mexico, Cuarta Serie, Tomo VI, México, 1857, pp. 317-321, 416; also Francisco Paloú, Noticias de la Nueva California, California Historical Society's Publication, vol. 2, San Francisco, 1874, pp. 137-142, 237.

de la misma construcción que las del primer pueblo que tiene un buen arroyo de agua corriente buena que va á dar á la mar, aunque poco antes por un altito que tiene se represa y forma como estero; pegado á la ranchería no tiene tierras á la orilla del mar sino para formar el pueblo. Los cerros que tiene á sus inmediaciones son de buena tierra y empastados de buen zacate. No sé si arriba habrá arroyo por abras hacen los cerros ó si tendrá llanos; es necesario registrarlos que teniéndolos podría ser bueno para misión; son los indios muy dóciles y afables, reparamos que tenían en la mar siete canoas que estaban pescando. En cuanto llegamos vino toda la gente á visitarnos y nos trajeron mucho pescado tlatemala ó azado para que comiésemos mientras llegaban las canoas con pescado fresco las que en breve abordaron á la playa y de allí á poco trajeron mucha abundancia de Bonitos y Meros que nos regalaron y ofrecieron en tanta cantidad que hubiéramos podido cargar la recua si hubiéramos tenido proporción de prepararlo y salarlo; diéronnos á mas de lo dicho pescado seco sin sal (que no usan ellos en sus comidas) que llevamos á prevención y sirvió para el viaje de mucho recurso; uno de los capitanes de este pueblo se hallaba en el de la Asumpta cuando pasamos y fué el que mas se esmeró en obsequiarnos; es hombre formado de buen talle y fisonomía regular, gran bailarín, por cuyo motivo nombraron los soldados á su pueblo del Bailarín, mientras que yo lo nombré con el de Santa Clara de Monte Talco: tomé la altura y me salió de treinta y cuatro grados cuarenta minutos. La caja del arroyo de este pueblo tiene mucha arboleda de sauces, álamos, alisos y encinos.

than that of La Asunción [San Buenaventura], for we counted sixty houses, well fashioned, of the same construction as those of the first village, and which has a good creek of good flowing water which empties into the sea, although a little before doing so it is dammed up by an elevation which there is and forms a sort of estero; next to the ranchería there are no lands at the beach except those which form the village. The hills which there are in the vicinity are of good soil and are grassed over with good feed. I do not know whether upstream in the gaps made by the hills there is merely a creek or maybe plains. It is necessary to investigate, and if there are plains it might be good for a mission. The Indians are very docile and affable. We found that they had on the sea seven canoes which were fishing. As soon as we arrived all the people came to visit us, and brought much roasted or baked fish for us to eat until the boats came in with fresh fish, and these shortly landed on the beach, and from them after a little they brought a great abundance of bonitos and jewfish, which they gave us, and offered us in such quantity that we would have been able to load the animals if we had had opportunity to prepare and salt it. They gave us, in addition to the above, dried fish without salt (which they do not use in their food); which we took along as a precaution and which was of much help on the journey. One of the captains of this ranchería was in La Asumpta [San Buenaventura] when we passed through, and it was he who took most pains to be obsequious to us. He is a man of good build and regular features, a great dancer, for which reason the soldiers dubbed his ranchería that of the dancing man, while I named it Santa Clara de Montefalco. I took the latitude and it gave the result of 34° 40'. The creek bed of this ranchería has much tree growth of willows, cottonwoods, sycamores, and live oaks.

*Jueves 17 de idem [17 de Agosto, 1769].*—Salimos de este paraje á las siete y media siguiendo el rumbo de Oeste subimos unas lomas tendidas de buena tierra de zacate que van á rematar acantiladas á la playa, aunque entre ellas y la playa hay paso por los arenales: andariamos como media legua y llegamos á una punta de tierra que con la otra en que está el pueblo antecedente forma la playa como ensenada; sobre esta punta encontramos otro pueblo muy grande en el que contamos treinta y ocho casas de la forma de las ya dichas y algunas de ellas tan grandes que se hospedan muchas familias. A la orilla del pueblo estaba toda la gente aguardándonos que no era menor el gentío que el de la Asumpta, llegamos á la ranchería á saludarlos y el señor comandante regalo al capitán unos abalorios; paramos el real no muy lejos de la ranchería en una llanura que de Norte á Sur tendrá como una legua de tierra buena y prieta muy empastada y del Este á Oeste tiene cuatro leguas de largo. Tiene el paraje mucha saucedá, álamos, alisos y algunos encinos; está muy proveido de leña y la sierra muy alta que tiene al Norte parece tener provision de leña en algunas partes y en otras se divisa pelona.

Como por el Norte baja un arroyo que fué á ver mi companero y dice tiene buen trozo de agua al pié de la sierra, dijeron los soldados y exploradores que hay otra buena ranchería de gentiles; no muy apartado del pueblo vimos unos ojos de brea; tienen muchas canoas y en la actualidad estaban construyendo una por cuyo motivo nombraron los soldados á este pueblo la Carpintería y yo la bauticé con el nombre de San Roque dista del antecedente paraje solo una legua. En cuanto llegamos nos trajeron tanto

*Thursday, the 17th of the same month [August 17, 1769].*—We started out from this place [El Rincón] at half past 7 and following a westerly direction climbed some rolling hills of good grass-grown soil which terminate boldly at the beach, although between them and the beach one can pass along the sands. We must have gone about half a league when we reached a point of land which together with the other point on which the above mentioned rancheria is situated forms a beach like a cove. On this point we found another very large rancheria in which we counted 38 houses of the same shape as those already mentioned and some of them so large that they shelter many families. At the edge of the village all the people were awaiting us and there were no fewer people than at La Asumpta [San Buenaventura]. We arrived at the rancheria to greet them, and the comandante presented the captain with some beads. We made camp not very far from the rancheria on a plain of good black soil, well grassed, which must extend from north to south about a league and be 4 leagues long from east to west. The locality has many willows, cottonwoods, and sycamores and some live oaks; it is well provided with wood, and the high mountain range which there is to the north seems to be provided with wood in some places and in others is seen to be bare.

To the north as it were there comes down a creek which my companion went to see and he says it has a good bit of water at the foot of the range. The soldiers and scouts said that there is another good rancheria of gentiles. Not far from the village we saw some springs of tar. They have many canoes and at the present time were building one, for which reason the soldiers named this village La Carpintería, while I baptized it with the name of San Roque. It is distant from the last-mentioned place

pescado del Bonito fresco, seco y tlatemado que escedieron en el regalo á los antecedentes pueblos. En frente del paraje se divisó una isla aunque por la neblina no se pudieron cerciorar que isla era.

*Viernes 18 de idem [18 de Agosto, 1769].*—A las siete de la mañana salimos del paraje [la Carpintería] y siguiendo el referido llano, rumbo al Oeste por cerca la playa, nos vinieron acompañando el capitán de la ranchería de donde salimos y el del pueblo de donde vino anoche con los exploradores, y á su ejemplo mucha indiana todos muy contentos y festivos. A una legua de andar encontramos las ruinas de una ranchería y nos dijeron los gentiles que los seranos habian bajado de guerra y habian matado á toda la gente hacia como tres meses y á las dos leguas y media de la salida encontramos las ruinas de otra ranchería que habia sucedido la misma desgracia. En estos parajes hay sus ojos de agua de que gastaban dichas rancherías. En esta jornada [desde la Carpintería] que fué de cuatro horas vimos rastros de osos: llegamos á las cuatro leguas de camino á una grande ranchería [Syujtún], mucho mayor que las antecedentes, que estaba cerca de una punta de tierra larga que entra á la mar; pasamos con algun trabajo un grande estero [El Estero de Santa Bárbara] que entra bastante en la tierra, cruzamos cerca de la ranchería [Syujtún], y paramos el real como á dos tiros de fusil de ella. A poco llegados vino toda la gente con un grande regalo de pescado que venia en siete tercios bien grandes; se les correspondió con abalorios y se fueron muy contentos. A poco rato llegaron las canoas que estaban pescando, luego volvieron todos grandes y chicos con su regalo de pescado fresco, que se juntó como cuatro cargas solo del fresco, y con dicho regalo vinieron al real mas

[El Rincón] only 1 league. Upon our arrival they brought us so much bonito fish, fresh, dried, and roasted, that they exceeded in their gift the previous rancherías. In front of this place was seen an island, although because of the fog it could not be ascertained which island it was.

*Friday, the 18th of the same month [Aug. 18, 1769].*—At 7 in the morning we started out from the place [La Carpintería] and followed the above-mentioned plain in a westerly direction along near the beach. The captain of the ranchería that we started from came along with us and also the captain of the village, who came last night with the scouts, and following their example many Indians, all of them very happy and festive. After going a league we came upon the ruins of a ranchería, and the gentiles told us that the mountain Indians had come down in war and had killed all the people about three months before; and at 2½ leagues from our starting point we came upon the ruins of another ranchería to which had happened the same misfortune. In those places they have their springs of water from which they pillaged the said rancherías. In this journey [from La Carpintería] of four hours we saw some bear tracks. After traveling 4 leagues we reached a large ranchería [Syujtún], much larger than the preceding, which was near a long point of land that enters the sea; we crossed with some difficulty a large estero [Santa Barbara estero] which runs back some distance inland; we crossed near the ranchería [Syujtún], and camped at about two rifle shots' distance from the ranchería. Soon after we arrived all the people came with a great present of fish that were brought in seven large bundles; they were given in return beads and went away very happy. Soon afterwards the canoes which were out fishing came in, and straightway all the Indians, big and little,

de quinientas almas de ambos sexos y edades que casi todo el día los tuvimos de visita: cerca de la ranchería [Syujtún] tiene un ojo de agua buena y cerca del real hallamos una laguna grande que parece no ser de temporal sino de algun manantial que tendrá en el centro. Las mesas de este parage tienen muchos y grandes encinos: llamóse este pueblo de la Laguna de la Concepción. No se pudo observar por haber estado el día nublado; desde aquí se ven las islas.

*Sábado 19 de idem. [19 de Agosto, 1769].*—Salimos este día solo para apartarnos de tanto gentío; seguimos al Oeste por las mesas y bajamos á un arroyo seco [el Arroyo del Burro] aunque muy poblado de alisos y encinos, y síguese otra llanada de buena tierra prieta en donde paramos, no habiendo andado mas que media legua apartándonos de la playa acantilada y abordada de altos cerros; hicimos alto dentro de una cañada que tenía agua corriente, aunque la arena se la embebe. No lejos de su nacimiento está la cañada vestida de encinos y alisos y por las cumbres tiene algunos pinos. Nos vino á visitar una ranchería, sin duda vivirían cerca. Los soldados exploradores que salieron esta mañana llegaron esta tarde con la noticia de haber encontrado grandes poblaciones de mucho gentío, y que les hicieron buen recibimiento; por la noche llegaron á este real diez gentiles desarmados con el propósito de guiarnos en la mañana siguiente hasta su ranchería. Se les permitió parar lo restante de la noche algo apartados del real, poniéndoles guardia que los acompañasen y se entretuvieron hasta el día siguiente.

came over with their present of fresh fish, of which alone we got about four mule loads, and with this present there came to the camp more than 500 individuals of both sexes and all ages and stayed visiting us pretty nearly all day. Near the ranchería [Syujtún] there is a spring of good water and near our camp we found a large lagoon, which does not seem to be flood water of a rainstorm but to have a spring in its center. The mesas in this locality have many large live oaks. This village was called that of La Laguna de la Concepción. It was impossible to take observations, since the day was clouded over. From here the islands can be seen.

*Saturday, the 19th of the same month [August 19, 1769].*—The only reason that we started on to-day was to free ourselves from such a crowd of Indians. We went west across the mesas and descended to a dry arroyo [El Arroyo del Burro], which is, however, full of sycamores and live oaks, and then there is another plain of good black soil, where we camped, not having gone more than half a league, leaving the bold shore which is bordered by high hills. We made our halt in a canyada which had running water, although the sand drinks it up. Not far from where it starts the canyada is clothed with live oaks and sycamores and on the hill crests has some pines. A ranchería came to visit us; without doubt they live near by. The soldier scouts who went out this morning arrived this evening with the news that they had found large settlements of much population and which gave them a good reception. Ten unarmed gentiles came to this camp at nightfall with the proposal of guiding us the following morning to their ranchería. They were permitted to remain the rest of the night somewhat separated from our camp, placing over them guards to stay with them and who entertained them until morning.

On the journey back from the north the Portolá expedition passed Syujtún without stopping:<sup>5</sup>

*Miércoles 10 de idem.* [10 de Enero, 1770].—Salimos de los pueblos de las Islas [La Patera] y pasamos por el de la Laguna [Syujtún] sin detenernos y llegamos ya tarde al de la Carpintería ó de San Roque [la Carpintería], habiendo andado cinco y media leguas y paramos en el propio sitio en que estuvimos el 17, de Agosto faltándonos tambien el pescado.

*Wednesday the 10th of the same month* [January 10, 1770].—We set out from the rancherías of Las Islas [La Patera] and passed the ranchería of La Laguna [Syujtún] without stopping and arrived already late at the Ranchería of La Carpintería or of San Roque [La Carpintería], having traveled 5½ leagues, and camped at the same spot where we did August 17, fish being likewise lacking [as at their camp on the preceding day, August 9].

The diary of Miguel Costansó relates for these days as follows:<sup>6</sup>

*Miércoles 16 de Agosto.*—[Saliendo de los Pitos] hizimos otras dos leguas ó poco mas en la mañana [mañana] costeando siempre la marina: llegámos á una ranchería ó mejor dirémos pueblo numeroso de gentiles [el Rincón] situado sobre la misma plaia en una punta de tierra inmediato á la qual corría un arroyuelo de buen agua.

Los gentiles de esta ranchería acudieron inmediatamente al real que situamos de la otra parte del arroyo con pescado tlatemala ó asado en barbacoa para que comieramos mientras sus canoas que estaban á la sazón pescando viniesen con pescado fresco: abordaron estas á la plaia de allí á poco, y trageron abundancia de bonitos y meros que nos regalaron y ofrecieron en tanta cantidad, que huvieramos podido cargar la requa de pescado si huviesemos tenido proporcion de salarlo y prepararlo: dieron nos a mas pescado seco sin sal (que no usan en sus comidas) que llevamos de prevenicion, y nos sirvió de mucho recurso en el viage.

*Wednesday, August 16.*—[Starting out from Los Pitos] in the morning we marched for another 2 leagues, or a little more, steadily following the coast. We arrived at an Indian village, or rather a populous native town [El Rincón], situated right on the shore on a point of land near which ran a small stream of good water.

The natives of this village immediately came to the camp—this we made on the opposite side of the stream—bringing fish, roasted or grilled in barbecue, for us to eat while their canoes, then out fishing, were returning with fresh fish. These canoes landed on the beach shortly afterwards, and brought an abundance of bonito and bass, which they gave us and offered in such quantity that we might have loaded the pack animals with fish if we had had the facilities to salt and prepare it. Moreover, they gave us fish dried without salt (this they do not use in their victuals), which we took as a precaution, and it was of great service to us on the journey.

<sup>5</sup> Op. cit., p. 237.

<sup>6</sup> The Portolá Expedition of 1769-1770, Diary of Miguel Costansó, edited by Frederick J. Teggart, Academy of Pacific Coast History Publications, vol. 2, no. 4, Berkeley, Calif., 1911, pp. 36-41, 152-153.

Uno de los capitanes ó caziques de este pueblo se hallaba en el de La Asumpta [San Buenaventura] quando nosotros pasamos, y fué uno de los que mas se esmeraron en obsequiarnos; éra hombre formado de buen talle y facciones, gran bailarín por cuyo respecto le pusimos a su pueblo el nombre del Bailarín. Pareciónos aun mas numeroso que el de La Asumpta [San Buenaventura] y las casas son de la misma fabrica y hechura.

Al Pueblo del Bailarín 2 leguas. De San Diego 75 leguas.

*Jueves 17 de Agosto.*—Seguimos nuestra marcha por la orilla de la plaia un corto tramo, y despues por lomas altas sobre la costa: parámos cosa de un quarto de legua retirados de la misma cerca de un arroyo de excelente agua, que salía de una cañada de la sierra con mucha arboleda de sauces: teníamos á la vista otra ranchería o pueblo de gentiles compuesta de treinta y dos casas [la Carpintería], tan populoso como los pasados: vinieron al real con pescado fresco y flatelmado, hombres, mugeres, y niños codiciosos de abalorios y cuentas de vidrio, mejor moneda y de maior estimacion entre ellos que el oro y la plata.

Los soldados llamaron á este pueblo de la Carpintería porque estaban a la sazón construyendo una canoa: dista no mas de una legua del Pueblo del Bailarín.

Pareció a todos este sitio mui aparente para mision, respecto de la innumerable gentilidad que havita estas plaias en colo el distrito de seis leguas y por tener muchas tierras al proposito para siembras capaces de dar mucho fruto: lo propio dirémos en el sentido místico, porque la docilidad de esta gente nos dió grandes esperanzas, de que la palabra de Dios fructificará igualmente en sus corazones.

A la Carpintería 1 legua. De San Diego 76 leguas.

*Viernes 18 de Agosto.*—Del Pueblo de la Carpintería marchamos al de La

One of the chiefs or caciques of this town was in La Asumpta [San Buenaventura] when we passed through that place, and was one of those who took the greatest care to please us. He was a robust man, of good figure and countenance, and a great dancer, and for this reason we gave his town the name of El Bailarín. It seemed to us still more populous than La Asumpta [San Buenaventura], and the houses are of the same structure and appearance.

To the Pueblo del Bailarín, 2 leagues. From San Diego, 75 leagues.

*Thursday, August 17.*—We continued our march along the margin of the beach for a short distance, and afterwards over high hills on the coast. We halted about a quarter of a league inland, near a small stream of excellent water which flowed from a canyon of the range; here there were many willows. We saw before us another village or Indian town composed of 32 houses [La Carpintería], and as populous as the previous ones. Men, women, and children came to the camp bringing fish, both fresh and roasted, eager to obtain glass beads and trinkets, which are the best money and more highly valued among them than gold and silver.

The soldiers called this town Pueblo de la Carpintería, because at this time the natives were constructing a canoe. It is only 1 league from the Pueblo del Bailarín.

This place seemed to all of us very suitable for a mission, on account of the innumerable heathen that inhabit these shores within a radius of only 6 leagues, and because it has extensive lands well adapted for cultivation and capable of producing rich crops. We may say the same in a mystical sense, as the gentleness of this people gave us great hopes that the word of God will fructify equally in their hearts.

To La Carpintería, 1 league. From San Diego, 76 leagues.

*Friday, August 18.*—From the Pueblo de la Carpintería we marched to



Laguna [Syujtún] distante tres leguas del primero: campamos sobre una laguna de agua dulce de que se abastecen los gentiles que ocupan y viven en su cercanía: pueblo el mas numeroso de los que hasta aqui se habían visto: inferimos que pasaría de seiscientas almas: ofrecieronnos pescado tlátemlado y fresco quanto pudieramos desear, y vinieron al real con sus mugeres y niños tan cariñosos y afables como en ninguna parte havíamos experimentado.

Hallamos sobre nuestro camino dos rancherías arruinadas: no pudimos averiguar por que causa pero nos persuadimos que serian efectos de las guerras y riñas que entre ellos suelen moverse mui facilmente.

Al Pueblo de la Laguna 3 leguas. De San Diego 79 leguas.

*Savado 19 de Agosto.*—Movimos el real mas para huir de la molestia de los gentiles, que para hacer jornada, pues apenas hicimos media; luego [Media legua] apartandonos de la plaia acantilada y bordada de altos cerros en este parage; hizimos alto dentro de una cañada que tenía agua corriente, bien que esta se resumía en la arena, no lexos de su nacimiento. Estaba la cañada vestida de hermosos encinos y alamos, y no faltaban pinos en las cumbres de los cerros.

Los exploradores que se despacharon en la mañana bolvieron en la tarde con noticia de haver visto grandes poblaciones, y mucha gentilidad, publicando el buen recebimiento que en todas partes les havian hecho.

De noche vinieron diez gentiles al real sin armas, con el fin, decían, de guiarnos por la mañana a su ranchería: se les permitió pasar lo restante de la noche algo distantes del real, embiandoles quienes les hiciesen compañía y los entretuvieron [Me-tretubiesen] hasta el día.

the Pueblo de la Laguna [Syujtún], distant 3 leagues from the first. We pitched our camp close to a pond of fresh water, from which the natives that occupy the land and live in the vicinity take their supply. This was the most populous of all the towns that we, so far, had seen; we estimated that it might contain more than six hundred souls. They offered us as much fish, roasted and fresh, as we could desire, and came to the camp with their women and children; in no other place had we met natives so affectionate and good-natured.

On our way we found two ruined villages; we could not ascertain why they were so, but we concluded that it might be the effect of the wars and quarrels that arise very easily among the natives.

To the Pueblo de la Laguna, 3 leagues. From San Diego, 79 leagues.

*Saturday, August 19.*—We broke camp rather to get away from the annoyance of the natives than to make a day's march; and so, as soon as we made half a league, turning from the shore—at this place steep and fringed by high hills—we halted in a canyon that had running water, although it sank into the sand not far from its source. The canyon was covered with beautiful live oaks and poplars, and pines grew on the hilltops.

The scouts, who had been sent out in the morning, came back in the afternoon with the news that they had seen large towns and many natives, telling everyone of the welcome that had been given them on all sides.

At night 10 unarmed natives came to the camp for the purpose, they said, of guiding us to their village in the morning. We allowed them to pass the remainder of the night at some distance from the camp, and sent them some of our men, who kept them company and entertained them until day-break.

Of passing Syujtún on the return journey Costansó writes:

*Miercoles 10 de Enero.*—Salimos de los Pueblos de la Isla con deseos de alcanzar el de la Carpintería, distante cinco leguas y media con la mira de dejar atras todos los embarazos de la canal, mientras la tierra se mantenía seca y oreada: pasamos sin deteneros por el Pueblo de la Laguna [Syujtún], y llegamos ya tarde al Pueblo de la Carpintería, en cuja emmediacion ocupamos el propio campo, que en diez y siete de Agosto al subir por estas tierras.

Ni en este ni en el de la Laguna [Syujtún] hubo pescado, ya sea que los indios no se huviesen dedicado á la pesca ó que esta costa sea escasa de él, por este tiempo.

Al Pueblo de la Carpintería 5 leguas.  
De la Ensenada de Pinos 86½ leguas.

Gaspar de Portolá in his own diary furnishes briefer information.<sup>7</sup>

*El 16 [16 de Agosto, 1769]* handuvimos tres horas siempre por la orilla del mar, y emos parado en parage de poco pasto: en este parage hay un pueblo que tiene treinta y tantas casas hechas de tule, tiene este pueblo pasadas de 300 personas, han acudido diferentes gentiles de las islas que tenemos en frente; en este pueblo hay siete canoas bien construidas ocho varas de largo, una de ancho, y en lugar de clabos amarran las tablas con cordeles, y bien embreadas, nos regalaron mucho pescado.

*El 17 [17 de Agosto, 1769]* handuvimos dos horas, buen camino, paramos en la orilla del mar, hay un pueblo que tenia 38 cassas, y como 300 personas con sus siete canoas de madera. mui buenas, mucho pasto, y agua.

*Wednesday, January 10.*—We set out from the Pueblos de la Isla, desirous of reaching the Pueblo de la Carpintería, 5½ leagues distant, with the purpose of leaving behind all the obstructions along the channel while the ground was dried by sun and wind. We passed through the Pueblo de la Laguna [Syujtún] without stopping, and arrived quite late at the Pueblo de la Carpintería, near which we occupied the same camping-place as on August 17, when on our way up the country.

There was no fish either in this town or in the Pueblo de la Laguna [Syujtún]; it may be that the Indians have not applied themselves to fishing, or that this coast is without fish this season.

To the Pueblo de la Carpintería, 5 leagues. From the Ensenada de Pinos, 86½ leagues.

*The 16th [August 16, 1769].*—We proceeded for three hours, the whole time along the beach, and have halted in a place where there is little pasture. In this place there is a town which has 30 or more houses made of rushes; the town has more than 300 inhabitants. There have come [to our camp] some natives from the islands off the coast. In the town there are seven canoes, well built, eight yards in length and one in width, and, in lieu of nails, they fasten the boards with cords and pay them well with tar. They made us a present of many fish.

*The 17th [August 17, 1769].*—We proceeded for two hours; a good road. We halted on the beach. [Here] there was a town which had 38 houses and about 300 inhabitants with 7 very fine canoes of wood. Much pasture and water.

<sup>7</sup> Diary of Gaspar de Portolá during the California Expedition of 1769-1770, edited by Donald Eugene Smith and Frederick J. Teggart, Academy of Pacific Coast History Publications, vol. 1, No. 3, Berkeley, Calif., 1910, pp. 26-27, 47-48.

*El 18 [18 de Agosto, 1769] de Agosto* anduvimos cinco horas por la playa; paramos en un pueblo que tenia quarenta y tantas cassas avitadas de mas 500 gentiles, nos regalaron mucho pescado se les correspondio: tenia este pueblo diez canoas, á mas de esto havia á su becindad dos pueblos arruinados, y dessamparados por haverse aniquilado entre ellos mismos.

*El 19 [19 de Agosto, 1769], de Agosto* anduvimos una hora, pasto, y agua, aqui binieron como veinte y tantos gentiles se les regaló de abalorios.

*The 18th [August 18, 1769].*—We proceeded for five hours along the seashore. We halted in a town which had 40 or more houses inhabited by over 500 natives; they made us a present of many fish and we made them a suitable return. This town had 10 canoes. Besides this [one] there were in the vicinity two [other] towns, ruined and deserted, the inhabitants having mutually exterminated each other.

*The 19th [August 19, 1769].*—We proceeded for one hour. Pasture and water. Here about twenty or more natives came [to our camp]; we made them presents of glass beads.

#### Of passing Syujtún on the return journey Portolá notes:

*El 10 [10 De Enero, 1770]* handuvimos algo más de tres jornadas de las hechas que sería como de 6 horas de camino, paramos en el pueblo de la Carpintería, en donde esperavamos mucha provision de pescado, y quasi no hubo nada.

*The 10th [Jan. 10, 1770]*—We proceeded [for a distance] somewhat greater than [we had made in] three marches on the outward journey, which was about six hours travel. We halted in the town of La Carpintería where we expected [to find] a plentiful supply of fish, but it had hardly any.

As is customary, Pedro Fages in his Noticias del Puerto de Monterrey<sup>1</sup> supplies other interesting details:

*Quinto:* Haciendo dos leguas por la Playa Campó cerca de una Rancheria Volante [los Pitos] de Indios pescadores, y este fué el nombre de aquel sitio, por no perder la costumbre de ponerles á todos los parages de nuestro Descubrimiento segun las ocurrencias.

*Sexto:* Por lo notable de habernos festejado un Indio extraordinariamente dos leguas adelante (siempre costeano la Marina) donde hay un numeroso Pueblo [el Rincón] sobre una punta de Tierra en la misma Playa, el qual Indio era un hombre fornido, de buen Talle, y gran Bailaryn, y ya nos habia visto en la Asumpta [San Buenaventura] dos días antes: por su respecto llamamos á este Pueblo [San Buenaventura] de donde

Fifthly. Making 2 leagues along the beach, they camped near a Temporary Rancheria [Los Pitos] of Indian fishermen, and this was the name of that site, not abandoning the custom of naming all the stopping places of our discovery according to the happenings.

Sixthly. For the notable fact of an Indian having entertained us extraordinarily 2 leagues farther on (continually following the shore), where there is a populous pueblo [El Rincón] on a point of land on this same shore, which Indian was a robust man, of good body, and a great dancer, and had already seen us at La Asumpta [San Buenaventura] two days before, for him we called this pueblo [San Buenaventura], of which our friend

<sup>1</sup>Fages, Pedro, Noticias del Puerto de Monterrey; y Diario Historico de los Viajes Hechos al Norte de California, 1775. Original in Mexico City; copy presented to the author through the kindness of Prof. H. E. Bolton in 1913.

era vezino nuestro amigo el Pueblo del Baylarin. Parece aun mas numeroso que el otro, y sus casas son de la misma hechura.

*Septimo:* Sigue un corto trecho de Playa, y luego se pasan algunas Lomas altas sobre la Costa para venir á un Arroyo de exelente agua que sale de una Cañada de la Sierra con mucha Arboleda de Sauces: quedando á la vista otro Pueblo de Gentiles, en que se contaron 32 Casas, y se llamó el Pueblo de la Carpintería [la Carpintería]. Parece todo este sitio muy inapropósito para Mision, así por la innumerable Gentilidad que habita estas Playas en el corto distrito de seis leguas, como por tener tierras exelentes, y mucha Agua para Sembrar. La docilidad, y buena disposición de los Indios, dá motivos de tener por moralmente, cierta su reducción, siempre que se les predicase la palabra de Dios.

*Octavo:* A tres leguas se alcanza otro Pueblo [Syujtún] sin duda alguna el mas numeroso de todos asta aqui, pues pasaría de 600 almas. Está situado cerca de una laguna de agua dulce de que se abastecen los Vezinos; vinieron con sus Mugerres, y Niños á visitarnos, trayéndonos Cantidad de Pescado flatemado, como ellos dicen, (esto es asado) y del fresco, y otros regalos de comer: Llamose este Pueblo de la Laguna [Syujtún].

was an inhabitant, the pueblo of the Dancing-man. It [El Rincón] appears even more populous than the other [San Buenaventura], and its houses are of the same make.

Seventhly. The beach continues a short stretch, and soon some high hills on the coast are passed in reaching an arroyo of excellent water which comes out of a canyada of the mountain range, with many willow trees, there being in view another pueblo of Gentiles in which 32 houses were counted, and it was called the pueblo of La Carpintería [La Carpintería]. All this site appears very appropriate for a mission, both because of the innumerable Gentiles which inhabit these shores in the small district of 6 leagues and because of the excellent lands and much water for planting. The docility and good disposition of the Indians give reason for considering morally certain their reduction, so that the word of God would be continually preached to them.

Eighthly. At 3 leagues another pueblo [Syujtún] is reached, without any doubt the most populous of all thus far, for it would exceed 600 souls. It is situated near a lake of fresh water, from which the inhabitants supply themselves. They came with their women and children to visit us, bringing us a quantity of flatemado, as they say—i. e., roasted—fish, and of fresh, and other gifts to eat. This pueblo was called that of La Laguna [Syujtún].

#### MENTION IN THE FONT DIARY OF THE ANZA EXPEDITION, 1776

The diary of Fr. Pedro Font tells of the Anza expedition passing Syujtún on their way up the channel, February 25, 1776, and again on their way south April 26 of the same year:

*Día 25 [25 de Febrero, 1776] Domingo.*—Dixé missa. Salimos de la Ranchería de la Rinconada [el Rincón] á las nueve de la mañana, y á las tres de la tarde paramos en un parage llamado Las inmediaciones de las Rancherías de Mescaltitan, habiendo caminado unas nueve leguas con rum-

*25th [February 25, 1776] Sunday.*—I said mass. We started from the Ranchería de la Rinconada [El Rincón] at 9 in the morning and at 3 in the afternoon we stopped at a place called Las Imediaciones de las Rancherías de Mescaltitan, having traveled some 9 leagues, in direction 6 west-

bo, como seys al oeste quarta al noroeste, dos al noroeste, y al ultimo una legua corta al sudoeste para desca-bezar unos esteros que hay allí cerca. El camino fue como ayer dixé, siguiendo la playa; á las dos leguas llegamos á las Rancherías de San Buenaventura [la Carpintería] que son dos, una en cada lado de un llano como de una legua de largo, en donde se intentó fundar la Mission de San Buenaventura, que está dotada, y no se fundó por falta de providencias, y hay en el algun pasto, y bastantes encinos, pero poca agua: con otra legua llegamos á otra Ranchería [Shalwáj]: y con una legua mas llegamos a la Ranchería de la Laguna [Syujtún], en donde se tomaron por abalorios algunas coritas, y nos proveimos de pescado, porque en la ocasion llegaba á tierra una lancha que venía de pescar, y traía varios y diversos pescados muy buenos, y de distintos colores y hechuras que no conocí: y con esta ocasion vi como sacan las lanchas del agua, y fue que al llegar á tierra se arrimaron a ella diez ó doze hombres, y cogiendo la lancha en hombros con la pesca, la llevaron a la casa del Patron ó Capitan de la lancha, distinguido con el capotillo de osso: los instrumentos con que pescan son nassas bien grandes, y anzuelos que se hacen de concha y tambien tal qual red pequeña hecha de un hilo muy fuerte como de cánamo. En el Parage me ofreció el Sr Ansa de sus coritas diciendo, que escogiesse las que gustasse; pero como yo no tenia endonde llevarlas le respondí, que si en concluyendo el viage me las daba entonces las tomaria; y mi dixo que me daria quantas quisiesse; pero despues ninguna me dió, porque acabé el viage sin su gracia.

northwest, 2 northwest, and finally 1 short league southwest in order to cut off some esteros which there are near there. The route was, like I stated yesterday, following the shore; at a distance of 2 leagues we arrived at the Rancherías de San Buenaventura [La Carpentería], which are two in number, one on each side of a plain about a league long, where it was intended to found the mission of St. Bonaventure, which has been endowed, but which was not founded because of lack of supplies. There is there some pasture, plenty of live oaks, but little water. With another league we reached another Ranchería [Shalwáj]; and with another league we reached the Ranchería de la Laguna [Syujtún], where we traded beads for some baskets and provided ourselves with fish, because on this occasion a canoe landed which was coming in from fishing and brought various and diverse fishes and very good ones, of distinct colors and shapes which I did not recognize. And on this occasion I saw how they take the canoes out of the water, the method being that on reaching shore 10 or 12 men went to the canoe, put it, fish and all, on their shoulders and carried it to the house of the boss or captain of the canoe, distinguished by a little bearskin cape. The implements with which they fish are large fish-traps, and hooks which they make of shell, and also a kind of little net made of a very strong hemp-like twine. At this place Sr. Ansa offered me some of his baskets, saying that I might choose those which I liked, but since I had no place to carry them I told him that if on finishing the trip he would give them to me I would take them, and he told me that he would give me as many as I wanted; but it turned out that he did not give me any at all, for I finished the journey without his grace.

The entry on the return journey is as follows:

*Dia 26 [26 de Abril, 1776] Viernes.*—Salimos de Cerca las Rancherías de Mescaltitan á las seys y quarto de la

*26th [April 26, 1776] Thursday.*—We started from Cerca las Rancherías de Mescaltitan at quarter past 6 in the

mañana, y á las cinco de la tarde paramos en el Rio de la Assumpta [Rio de San Buenaventura], habiendo caminado unas diez y siete leguas, andando lo mas por la playa, y passando por las misma Rancherías de la ida; en una de las cuales, vi que los Indios estaban tatemando una buena partida de langostas, con algunos cangrejos grandes, que havian pescado entre unos pedrones que havia en la playa, y me regalaron una: yo la entregué al cozinero para que la coziera; y siendo assi que en el camino me havia dicho el Sr Ansa, que era para él una comida muy regalada, y que le quadraban mucho, despues no quiso comer de ella, ni siquiera probarla por instancias que le hize, escusandose con decir que no era comida que el apeteciera y que temia le hiciesse daño: y no era sino que no la quiso probar porque me la havian dado á mi, porque era estilo suyo, que cosa que fuesse mia, o que me diessen á mi, la despreciaba, y desechaba, y mas antes queria que se perdiesse, como me sucedio con una talega de jigote preparado que yo llevaba, y por su respecto no me sirvió; con una codorniz y un pato que me regalaron los Soldados; con un pedazo del pescado Tollo que me dieron en el Puerto dulce; y con unos quessos que me dieron en San Gabriel. Oy despues de parar logramos ver las Yslas de la Canal, que hasta ahora ni á la ida, ni a la buelta las haviamos podido ver claramente, sino muy en confuso y poco, por causa de las neblinas, que son en este mar muy continuas. Con esta ocasion las demarqué segun la fachada que hacian desde este parage de la Assumpta [San Buenaventura], y es la que aqui pongo: [fachada de las islas de Anacapa y de Santa Cruz] y observé que mirando al sur desde dicho parage, la Ysla mas grande, que es la de la Santa Cruz, caia al sudoeste, y las demas se venian siguiendo de ella hasta el sur; y advierto que todas estas Yslas están unas seys ú ocho leguas dentro de la mar, y son las que forman la Canal.

morning, and at 5 in the evening we stopped at the Rio de la Asumpta [San Buenaventura River], having traveled some 17 leagues, going for the most part along the shore and passing the same rancherías as on our trip up. In one of these I saw that the Indians were roasting a good bunch of crawfish with some big crabs, which they had caught among some rocks on the shore, and they gave me one. I handed it to the cook for him to cook it, and, although Sr. Ansa had told me on the road that it was very good for a meal and that he was very fond of them, later he did not care to eat any of it, nor even to taste of it upon my insistence, excusing himself by saying that he had no appetite for it and that he feared that it would injure him; and the only reason was that he did not care to taste it because they had given it to me, for that was his style that anything that was mine or had been given to me he depreciated and declined and would sooner see it spoil, as it was in the case of a bag of prepared jigote which I had along and which on account of him did me no good, also a quail and duck which the soldiers gave me, also a piece of tollo fish which was given to me at Puerto Dulce, and some cheeses which they gave me at San Gabriel. To-day after going into camp we got to see the islands of the channel which until now we had not been able to see clearly either on the way up or back, but very faint and little, because of the fogs which are very continuous on this sea. On this occasion I drew them according to the outline which they present from this locality of La Asumpta [San Buenaventura] and I show it here [profile of Anacapa and Santa Cruz Islands]. And I observed that looking south from this place the largest island, which is Santa Cruz, lay southwest, and the others came following it to the south. And I note that these islands are some 6 or 8 leagues out to sea and it is they that form the channel.

MENTION IN THE ACCOUNTS OF THE FOUNDING OF THE PRESIDIO OF SANTA  
BARBARA, 1782

It is not until the year 1782, in connection with the founding of the Presidio at Santa Barbara, that we find further mention of the village of Syujtún. Fr. Paloú in describing this event writes:<sup>8</sup>

After marching about 9 leagues [from San Buenaventura], they [Governor Felipe de Neve, Fr. Presidente Junipero Serra, and soldiers] came to a place which they judged to be about half way to the end of the channel. Here the governor ordered the troops to halt. Then with the Fr. Presidente and some of the soldiers he explored the region and found a very favorable site for the presidio within view of the beach, which here forms a bay where vessels might anchor and where there was a large Indian village [Syujtún]. The governor gave orders that camp be pitched in a suitable place; whereupon they began cutting timber for the large cross, for the little structure to be used as chapel, and for the altar. On the following day, it being a Sunday, the venerable father presidente blessed the site and the cross, which was then set up and venerated. He also celebrated the first holy mass, which the governor, the officers, and all the soldiers attended. Thereupon his reverence preached an eloquent sermon. The ceremonies concluded with the formal taking possession of the site, not the slightest opposition being made on the part of the natives.

Father Paloú states in his Noticias:<sup>9</sup>

The expedition set out from the Mission of the Seraphic Doctor [San Buenaventura] in April, leaving as guard for the mission 15 leather-jacket soldiers with a sergeant. On the same day they reached the spot called, since the first expedition, San Joaquín de la Laguna. It is 10 leagues distant from the Mission of San Buenaventura and not very far from the beach, in 35 degrees and a few minutes. The presidio was established away from the beach and rancheria [Syujtún], at a good distance from the laguna [the Santa Barbara estero] on the edge of a grove of live oaks. It is said that the place looks dismal and that it has but little water.

Bancroft says of the founding of the presidio:<sup>10</sup>

The site chosen was on the shore of a small bay affording tolerably secure anchorage, at a place said to have been called San Joaquin de la Laguna in the first expedition of 1769, and near a large native town [Syujtún], which, like its temi, or chief, was called Yanonalit. . . . The natives were more friendly than had been anticipated, and Yanonalit was willing to exchange presents. Work was at once begun and oak timber felled for the requisite shelters, and particularly for the palisade enclosure, 60 varas square, which was later replaced by a solid wall enclosing an area of 80 yards square. The natives were hired to work and were paid in articles of food and clothing. Yanonalit had authority over some 13 rancherias, and his friendship proved a great advantage.

It was not until 1786 that the Santa Barbara Mission was founded, half a league northwest of the presidio.

<sup>8</sup> Francisco Paloú, *Relacion Historica de la Vida y Apostolicas Tareas del Venerable Padre Fray Junipero Serra*, México, 1787, cap. LIV, translation taken from Engelhardt, *Santa Barbara Mission*, San Francisco, 1923, p. 33.

<sup>9</sup> Francisco Paloú, *Noticias de la Nueva California*, San Francisco, 1874, Vol. IV, p. 241, translation taken from Engelhardt, *Santa Barbara Mission*, San Francisco, 1923, pp. 33-34.

<sup>10</sup> Bancroft, *California*, Vol. I, San Francisco, 1886, p. 377.

## VANCOUVER'S ACCOUNT OF HIS VISIT TO SANTA BARBARA, 1793

The visit of the Vancouver expedition to Santa Barbara in November, 1793, is described by Vancouver as follows:<sup>11</sup>

The coast continued in this easterly direction about twenty-three miles from Point Conception, to a point where it took a southerly turn, from whence the country gradually rose to mountains of different heights. In the vicinity of the shores, which are composed of low cliffs or sandy beaches, were produced some stunted trees and groveling shrubs; and notwithstanding the dreary appearance of the coast as we passed along, it seemed to be well inhabited, as several villages were seen at no great distance from each other in the small bays or coves that form the coast.

By four in the afternoon we had sailed beyond the influence of our favorable NW. gale, which still continued to blow a little way astern of us, whilst we were perplexed with light variable winds from every quarter. With these, however, we endeavoured to approach the shore of the mainland, in order to anchor for the night. About sunset we were visited by some of the inhabitants in a canoe from one of the villages. Their visit seemed to be dictated by curiosity alone, which being satisfied, as they were about to depart, I gave them some iron and beads, with which they appeared to be highly delighted, and returned to the shore.

By seven in the evening it was nearly calm, and having at that time soundings at the depth of 37 fathoms, muddy bottom, we anchored in company with the Chatham and *Dædalus*.

The surface of the sea, which was perfectly smooth and tranquil, was covered with a thick filmy substance, which, when separated, or disturbed by any little agitation, became very luminous, whilst the light breeze that came principally from the shore, brought with it a very strong smell of burning tar, or of some such resinous substance. The next morning, Sunday the 10th, the sea had the appearance of dissolved tar floating upon its surface, which covered the ocean in all directions within the limits of our view; and indicated, that in this neighbourhood it was not subject to much agitation.

From this anchorage, situated in latitude 34° 24', longitude 240° 32', the coast as before mentioned takes a southerly turn, S. 48 E. about two leagues to a point bearing by compass N. 81 E. half a league distant from our station; the centre of the island of St. Miguel bore from S. 27 W. distant 11 leagues; S<sup>ta</sup> Rosa from S. 11 W. to S. 5 E.; the former 25, the latter 26 miles distant; the island of S<sup>ta</sup> Cruz from S. 81 E. to S. 55 E.; and the main land in sight from S. 82 W. to S. 87 E.

The want of wind detaining us in the situation, afforded an opportunity to several of the natives from the different villages, which were numerous in this neighbourhood, to pay us a visit. They all came in canoes made of wood, and decorated with shells like that seen on the 8th. They brought with them some fish, and a few of their ornaments; these they disposed of in the most cheerful manner, principally for spoons, beads, and scissors. They seemed to possess great sensibility, and much vivacity, yet they conducted themselves with the most perfect decorum and good order; very unlike that inanimate stupidity that marked the character of most of the Indians we had seen under the Spanish jurisdiction at St. Francisco and Monterrey. These people either did not understand the Spanish language, or spoke it in such a manner as to be

<sup>11</sup> Vancouver, George, *A voyage of Discovery to the North Pacific Ocean, and round the World*, Vol. II, London, 1798, pp. 324-338.



unintelligible to us; for as we were totally unacquainted with their native dialect, we endeavoured, but to no effect, by means of Spanish, to gain from them some information.

On a light breeze springing up from the westward, at about eight o'clock, we directed our course along shore to the eastward; our progress was very slow, owing to light winds, though the weather was very pleasant. About two in the afternoon we passed a small bay, which appeared likely to have afforded good anchorage, had it not been for a bed of seaweed that extended across its entrance, and indicated a shallow rocky bottom.

Within this bay a very large Indian village was pleasantly situated, from whence we were visited by some of its inhabitants; amongst whom was a very shrewd intelligent fellow, who informed us, in the Spanish language, that there was a mission and a Presidio not much further to the eastward. About five in the evening this establishment was discovered in a small bay, which bore the appearance of a far more civilized place than any other of the Spanish settlements. The buildings appeared to be regular and well constructed, the walls clean and white, and the roofs of the houses were covered with a bright red tile. The Presidio was nearest to the sea shore, and just shewed itself above a grove of small trees, producing with the rest of the buildings a very picturesque effect.

As I purposed to anchor somewhere for the night, and as this bay seemed likely not only to answer that purpose, but another equally essential, that of procuring some refreshments, we hauled in, and anchored in six fathoms water, sandy bottom; the southern land in sight, called by the Spaniards Conversion Point, bore by compass S. 70 E.; a low cliffy point in the bay N. 42 E.; the Presidio N. 32 W.; the nearest shore NNW. distant half a mile; the northwest point of the bay S. 64 W.; the northwest extreme of the island of S<sup>ta</sup> Rosa S. 34 W. distant thirty-two miles; its western extreme was shut in with the west point of S<sup>ta</sup> Cruz, which bore from S. 22 W. to S. 28 E. seventeen or eighteen miles; the nearest part of this island S. 20 E. distant thirteen miles; and the southeasternmost of the islands in sight S. 28 E.; appearing from our anchorage like a single rock, but consisting of three small islands.

Having thus anchored before the Spanish establishment, I immediately sent Lieutenant Swaine to inform the commanding officer at the Presidio of our arrival, and as I intended to depart in the morning, to request that the Indians, who had shown a great desire to trade with us, might be permitted to bring us, in the course of the night, such articles of refreshment as they had to dispose of; which, as we understood, consisted of an abundance of hogs, vegetables, fowls, and some excellent dried fish.

Mr. Swaine returned, after meeting with a most polite and friendly reception from the commandant, Señor Don Felipe Goycochea, who with the greatest hospitality informed Mr. Swaine that every refreshment the country could afford was perfectly at our command; and desired that I might be made acquainted, that he hoped I would remain a few days to partake of those advantages, and to allow him the pleasure of administering to our wants and necessities.

On his learning from Mr. Swaine which way we were bound, he observed that wood and water would not only be found very scarce, but that a supply could not be depended upon at St. Diego, or any other port to the southward; and if it were necessary that we should replenish our stock of those articles, it would be well to embrace the opportunity which our present situation afforded for so doing.

The general deportment of this officer was evidently the effect of a noble and generous mind; and as this place, which was distinguished by the name

of S<sup>ta</sup> Barbara, was under the same jurisdiction as St. Francisco and Monterrey, our very friendly reception here rendered the unkind treatment we had received on our late visits at the two other establishments the more paradoxical, and was perhaps only to be referred to the different dispositions of the persons in power.

The intelligence communicated to me by Mr. Swaine, and the polite and liberal conduct we had reason to expect from the commandant, induced me to think of accepting the advantages he had so obligingly offered.

The next morning, accompanied by Lieutenants Puget and Hanson, I paid my respects on shore to Señ<sup>r</sup> Don Felipe Goycochea, the commandant of the establishment of S<sup>ta</sup> Barbara, and Lieutenant in the Spanish infantry. He received us with the greatest politeness and cordiality, and renewed, with great earnestness, the offers he had made to Mr. Swaine the preceding evening. He was pleased to say, that he should derive the greatest satisfaction in rendering us every service compatible with the orders under which he acted. These orders only required, that those who were employed for the service of the vessels on shore, or engaged in taking their recreation in the neighbouring country, should return on board every night. This stipulation I assured him should be punctually attended to, as well as every other regulation that his prudence might suggest.

We were likewise introduced to Friar Miguel Miguel, one of the reverend fathers of the mission of S<sup>ta</sup> Barbara, who, in the name of himself, and his companion the Rev. Father Estevan Tapis, expressed the greatest anxiety for our welfare; and repeating the civilities of the commandant, offered whatever services or assistance the mission could afford.

Accompanied by these gentlemen we went from the presidio in order to ascertain the spot from whence we were to obtain our wood and water. As the former was to be procured from the holly-leaved oak that grew at some distance from the waterside, our reverend father offered us the waggons of the mission, and some Indians to carry the wood, when cut, down to the beach. The cart of the presidio was directed by the commandant to be at our orders for that or any other service. The water, which was not of the best quality, was in wells close to the seashore. We were in no imminent want of these necessaries; yet, from the experience of our late retarded progress from light baffling winds, in consequence of the coast taking so easterly a direction, and obstructing the general course of the northwest winds that prevail most part of the year, it was highly probable we might find the same sort of weather farther south, as we must necessarily keep near the shore, for the purpose of examining the coast, which I now found would occupy more time than I supposed. This circumstance, in addition to the information we had received, that the further we advanced the worse we should fare in respect of these essential articles, I thought it prudent, notwithstanding the business appeared likely to be somewhat tedious, to give orders for its being immediately carried into execution; convinced that we should greatly benefit in point of health whilst these services were going forward, by the excellent refreshments the country promised to supply.

The commandant had ordered us to be furnished with fresh meats in such quantities as I might think proper to demand; vegetables and fowls were principally purchased from private individuals, whilst our reverend fathers at the mission, and the commandant, shared the productions of their gardens with us; which, like those of the more northern establishments, were but of small extent.

Since the recreation that had been denied us at Monterrey was here granted without limitation, I felt myself bound to adopt such measures as were most

likely to prevent any abuse of the indulgence, or any just cause of complaint. For when I reflected on the unrestrained manner in which most of the officers and gentlemen had rambled about the country, during our former visit at Monterrey, I was not without my suspicions that the unpleasant restrictions imposed upon us on our late return to that port had been occasioned by our having made too free with the liberty then granted. To prevent the chance of any such offense taking place here, I issued positive injunctions that no individual under my command should extend his excursions beyond the view from the Presidio or the buildings of the mission, which, being situated in an open country of no very uneven surface, admitted of sufficient space for all the exercise on foot or horseback that health or amusement might require.

Notwithstanding the water on the beach was the same as that with which all the Spanish vessels that had visited this roadstead had been supplied, and although much pains had been taken to clean out the wells, yet they were very dirty and brackish; and as they afforded a very scanty supply, we were induced to make search for better water.

At the distance of only a few yards farther than where the wells had been made, a most excellent spring of very fine water was discovered, amongst some bushes, in a kind of morass; and though it flowed but slowly, yet it answered all our purposes, and was obtained with more ease than the water from the wells. This spring was totally unknown to the resident Spaniards, and equally so, I presume, to those employed in their shipping, or they would not so long have been content with the dirty brackish water procured from the wells. At the Presidio is a large well of excellent water, from which also, by the assistance of the cart, a portion of our stock was obtained.

Our business being thus in a train of easy execution, the agreeable society of our Spanish friends, the refreshments we procured, and the daily recreation which the country afforded, rendered our situation at S<sup>ta</sup> Barbara extremely pleasant.

We here procured some stout knees from the holly-leaved oak, for the security of the Discovery's head and bumkins; this and our other occupations, fully engaged our time until the evening of Sunday the 17th, when preparations were made for sailing on the day following.

The pleasing society of our good friends at the mission and presidio was this day augmented by the arrival of Friar Vincente S<sup>ta</sup> Maria, one of the Rev. Fathers of the mission of Bueno Ventura, situated about seven leagues from hence on the seacoast of the southeastward.

The motives that induced this respectable priest to favor us with his company, evidently manifested his christian-like benevolence. Having crossed the ocean more than once himself, he was well aware how valuable the fresh productions of the shores were to persons in our situation; under this impression he had brought with him, for our service, half a score sheep, and twenty mules laden with the various roots and vegetables from the garden of his mission. This excellently good man earnestly entreated that I would accompany him by land back to Bueno Ventura; saying, that I should be better able on the spot to point out to him, and to his colleague the Rev. Friar Father Francisco Dume, such of the productions of the country as would be most acceptable, and contribute most to our future comfort and welfare. Of this journey I should have been very happy to have been able to have availed myself had the existing circumstances not obliged me to decline the pleasure I should thereby have received.

Our new benevolent friend, accompanied by the commandant and Father Miguel, honored us with their company to dine on board, where in the course of conversation, I was informed that the mission of Bueno Ventura was situated near a small bay of easy access; and as Friar Vincente seemed much pleased with his visit on board, I requested he would favor me with his company in the discovery of his residence. This offer he cheerfully accepted and in doing so I had only reason to regret the short time I was to be indulged with the society of a gentleman, whose observations through life, and general knowledge of mankind, rendered him a most pleasing and instructive companion.

In the evening our friends returned on shore, and I took that opportunity of soliciting their acceptance of a few useful articles which they had no other opportunity of obtaining; though I must confess they were a very incompetent return for their friendly, generous, and attentive services; and I trust they will accept this public acknowledgment as the only means within my reach to show the grateful sense I shall ever entertain of the obligations they so liberally and unexpectedly bestowed.

We attended at breakfast the next morning, Monday the 18th, with our friends from the shore; and the want of wind detained us at anchor until near noon; when we took leave of our S<sup>ta</sup> Barbara friends, and, accompanied by Father Vincente, we directed our course toward Bueno Ventura.

Whilst we remained at S<sup>ta</sup> Barbara Mr. Whidbey, whose time was principally devoted to the several duties on shore, embraced that opportunity of making some necessary astronomical observations with the artificial horizon; the only means we had of ascertaining the latitude, variation, and the longitude by the chronometers. The mean results showed the latitude, by four meridional altitudes of the sun, to be  $34^{\circ} 24'$ ; the variation by six sets of azimuths, differing from  $11^{\circ} 14'$  to  $9^{\circ}$ , to be  $10^{\circ} 15'$  eastwardly; and the longitude, by eight sets of altitudes of the sun between the 11th and 15th, allowing the error and rate as calculated at Monterey, was shown by Kendall's chronometer to  $240^{\circ} 45' 40''$ ; Arnold's No. 14,  $240^{\circ} 44' 16''$ ; No. 176,  $240^{\circ} 56' 45''$ ; and the true longitude deduced from subsequent observations,  $240^{\circ} 43'$ . As I continued to allow the same rate, the situation of the coast has been laid down by No. 14; and I should hope, by the regularity with which it had lately gone, with some degree of precision. The tide, though showing here no visible stream, regularly ebbed and flowed every six hours; the rise and fall, as nearly as could be estimated, seemed to be about three or four feet; and it is high water about eight hours after the moon passes the meridian.

To sail into the bay, or more properly speaking the roadstead, of S<sup>ta</sup> Barbara, requires but few directions, as it is open and without any kind of interruption whatever; the soundings on approaching it are regular, from 15 to 3 fathoms; the former from half a league to two miles, the latter within a cable and half of the shore. Weeds were seen growing about the roadstead in many places; but, so far as we examined, which was only in the vicinity of our anchorage, they did not appear to indicate shallower water, or a bottom of a different nature. The shores of the roadstead are for the most part low, and terminate in sandy beaches, to which, however its western point is rather an exception, being a steep cliff moderately elevated; to this point I gave the name of Point Felipe, after the commandant of S<sup>ta</sup> Barbara.

The interior country a few miles only from the water side, is composed of rugged barren mountains, which I was informed rise in five different ridges, behind and above each other, a great distance inland towards the ENE.; which space is not at present occupied either by the Spaniards or the native Indians.

## MENTION IN THE GOYCOECHEA REPORT, 1796

In 1796 Syujtún was still extant and its chief still living, for in the report of Captain Felipe de Goycoechea,<sup>12</sup> under date of March 12, 1796, it is given as "Yuctu (at the presidio)," its captain "Yanonalí,"<sup>12a</sup> its population estimated at 125. During the first decade or two of the nineteenth century the ancient site of Syujtún evidently became completely depopulated of Indian inhabitants.

## HISTORY SUBSEQUENT TO THE ABANDONMENT OF THE SITE BY THE NATIVES

The abandoned beach at the site of Syujtún was commonly spoken of in Spanish as El Puerto, or La Playa. It was there that vessels visiting Santa Barbara landed; the cove of sandy beach in front of the village had been used in earlier times as the landing place of Indian canoes and a few of these craft were still used by the Indians who were detailed to fish for the padres. The Indian jacales were probably burnt or otherwise destroyed by the Indians themselves when they abandoned their homes. They stood in the vicinity of the foot of Chapala Street and about the adjacent Burton Mound. The tract was acquired by the Church as a part of the great mission lands.

## ALFRED ROBINSON DESCRIBES A VISIT TO SANTA BARBARA IN 1829

Alfred Robinson, in his book published in 1846,<sup>13</sup> describes the appearance of Santa Barbara as seen from the ship in 1829 and, while saying nothing of the Burton Mound, tells of fording the Mission Creek northeast of the mound. He also furnishes the earliest extant picture of Santa Barbara, as seen from the ship, showing the Burton Mound in the foreground, reproduced in this paper in Plate 2, *a*.

From the Mission, we stood over for some small and rocky islands at the southeast point of Santa Cruz; and on the following morning, close under our lee, we beheld the beautiful vale of Sta. Barbara.

See from the ship, the "Presidio" or town, its charming vicinity, and neat little Mission in the background, all situated on an inclined plane, rising gradually from the sea to a range of verdant hills, three miles from the beach, having a striking and beautiful effect. Distance, however, in this case, "lends enchantment of the view," which a nearer approach somewhat dispels; for we found the houses of the town, of which there were some two hundred, in not very good condition. They are built in the Spanish mode, with *adobe* walls, and roofs of tile, and are scattered about outside of the military department; shewing a total disregard of order on the part of the authorities. A ridge of rugged highlands extends along the rear, reaching from St. Bonaventura to Point Conception, and on the left of the town, in an elevated position, stands the *Castillo* or fortress.

<sup>12</sup> Engelhardt, Santa Barbara Mission, San Francisco, 1923, p. 448.

<sup>12a</sup> Here with the final t omitted.

<sup>13</sup> Alfred Robinson, Life in California before the Conquest, New York, 1846, pp. 41-43 and 46.

The port of Santa Barbara is completely sheltered from the northwest and westerly winds, but somewhat exposed to those from the southeast. The anchorage is hard sand, abounding in seaweed, where the ship came to, in six and a half fathoms. The sails were furled, the boat lowered and manned, and we proceeded to the shore.

A heavy westerly wind during the night had "knocked up" considerable swell, which continued to roll in and fall heavily upon the sand. Our men pulled lustily until ordered to lie upon their oars, when we effected our landing. In approaching the shore through the surf, more depends upon the judgment of the person steering the boat than upon the rowers. Usually, there are three consecutive rolls, and then follows a temporary recession; and to land safely, it is necessary to proceed with caution, wait an opportunity by observing the swell; pull in strong on a third roller, and the moment the boat strikes the sand, the oars should be cast on either side, while the men jump out and prevent her being carried back by the retiring surf.

At the landing we found our Yankee friend, Daniel H— [Daniel Hill], and a few others who had come down to greet G— [Gale]. As the town was three quarters of a mile distant, I accepted Daniel's offer of his fine saddled mule, and he getting up behind me, we rode along slowly, until we reached a small descent [opposite the Burton Mound], where flowed a stream which recent rains had swollen beyond its usual bounds. Here the stubborn animal stopped, and seemed disinclined to proceed, but repeated application of the spurs at last urged him forward, and he forded the stream. Ascending the opposite bank, he again stopped, and giving a sudden fling in the air with his heels, sent us both rolling down towards the water. Fortunately we were neither wet nor hurt, but after so decided a manifestation of the creature's abilities, I declined remounting. Daniel, however, nowise disconcerted, mounted the beast and rode off alone.

We returned to town, and at the beach found a lively and busy scene. Our men were passing through the surf to the launch bearing hides upon their heads, while others landed, from smaller boats, portions of the ship's cargo. It was a merry sight, and their shouts mingled with the sound of the waves as they beat upon the sand. We embarked on board ship, where soon our decks were crowded with men and women of all classes; many coming to purchase, some to see the vessel, and others to accompany their friends, so that it was not unusual for us to have a party of twenty or thirty at dinner.

#### GENESIS OF TITLE OF THE BURTON MOUND PROPERTY

The genesis of title of the Burton Mound, quoted from the Santa Barbara Weekly Press, June 7, 1900, is as follows:

The preliminary steps to the building of a hotel on Burton Mound are being taken with considerable rapidity. . . . On June 6th, 1900, a deed was filed from the Santa Cruz Island Co. to Edward R. Spaulding. This clears the entire six blocks included in the original tract of the Sea Side Hotel Association, except two lots facing on Montecito St. . . .

The first individual owner of the Burton Mound property was Santiago Burke, father of the present county tax collector, Mr. M. F. Burke, who held it under a title granted by the Mexican Government.

The abstract made by Judge J. T. Richards in 1875 . . . shows that according to an old "espediente" (record of title) a conveyance was made December 23, 1833, by Santiago Burke to Jose Chapman. In the conveyance Mr. Burke states that "the house which I own, situated in Santa Barbara, near the beach, and that which was known as "The House of the Mission of Santa Barbara" was transferred to Chapman for \$400 in hides and tallow.

The next conveyance was by Isaac J. Sparks, transferring a lot 200 varas square, surrounding the house, enclosed by a fence, and on which a mill was erected. This deed was dated Feb. 6, 1840.

On Dec. 6th, 1851, the city of Santa Barbara, by deed . . . recognized the ownership of the entire tract to be in one Hinchman (that was an action closing all streets on the tract).

On Jan. 26th, 1875, the Sea Side Hotel Association was organized.

OWNERSHIP BY THE MEXICAN GOVERNMENT, JAMES BURKE, JOSEPH  
CHAPMAN

Of the ownership by the Mexican Government and by James Burke, better known as Don Santiago Burke, we have in the present progress of our studies only documentary information. The second individual owner was Joseph Chapman (otherwise Don José Chatman). He must have obtained some form of residence there, since Mr. William H. Manis, grandson of Joseph Chapman, says that he learned from his mother (Joseph Chapman's daughter) that she was born on the Burton Mound in a small building that afterwards became a wing of the massive adobe of later years.

The next traditional owner or occupant was Thomas Robins, who was later a grantee of the Hope Ranch. It is said to have been Robins who built the main part of the adobe house on the mound.

The identity of the next owner is still in doubt. According to Mrs. J. F. Freeman, of Santa Barbara, her husband's great grandfather, — Foxen, owned the place for a short period after Robins gave it up.

OWNERSHIP BY CAPT. GEORGE C. NIDEVER

Capt. George C. Nidever came into possession of the property in 1840 or 1841. Nidever came to Santa Barbara in 1834 from West Virginia, having taken eight years to cross the continent, hunting, trapping and fighting by turn. At Santa Barbara he followed otter hunting by profession. He was the first man to stock San Miguel Island. He was the principal in the rescue of the "lone woman" of San Nicolas Island. He married Sinfarosa Sanchez in 1841. Slow of speech and movement, of unblushing integrity, and a dead shot, he was a terror of evildoers. He resided at the mound for some 10 years and added two outbuildings to the adobe house; one was used as a warehouse for furs, the other as a gristmill. It is said that Nidever made improvements in the grounds, setting out trees and gardens.

To the Bancroft Library of the University of California we are indebted for the following excerpts from a manuscript entitled "Life and Adventures of George Nidever, Recollections furnished by himself to E. F. Murray for the Bancroft Library, 1878." In this inter-

view Nidever tells of his purchase of the mound property from Joseph Chapman in 1840, and of his hiding out in the old adobe house on the mound at the time of the invasion of California by the Americans. He says:

I was born in 1802, Dec. 20, in Sullivan Co., East Tenn. My father, also named George, was a native of Penn.; I do not remember the town. . . .

In the fall of 1840 I bought what is now known as the Burton Mound property from Joseph Chapman, who had purchased it from the mission. It had formerly been used to store hides in by the Fathers.

#### OWNERSHIP BY A. F. HINCHMAN

In 1851 Captain Nidever sold the mound property to A. F. Hinchman, Santa Barbara attorney and a prominent citizen. Miss Stella G. Hinchman, daughter of A. F. Hinchman, has very kindly furnished interesting information and documents on the history of the mound at that period.

In a letter dated July 3, 1923, Miss Hinchman writes as follows:

Having read some articles printed in the Los Angeles papers which tell of the work you are doing in Santa Barbara, I am taking the liberty of writing to you because I am interested in your discoveries, as my father sold the property to Mr. Lewis T. Burton, and it was then called "La Playa" (The Beach). In 1849 my father, Augustus F. Hinchman, in company with his classmate, Mr. Edward Sherman Hoar, of Massachusetts, a brother of the late Judge Hoar, both having graduated from Harvard and also from the Harvard Law School, decided to go to California, but on the trip my father contracted the Panama fever, and when they arrived in San Francisco he was too ill to go to the gold fields, and his doctor advised him to go south and camp until he regained his health. Mr. Hoar and my father went to Santa Barbara expecting to stay a few weeks, but they were so delighted with the place that they decided to remain and open a law office.

After they acquired a practice my father decided to have a home and bought Burton Mound from Mr. George C. Nidever, with the knowledge that it had been an Indian burial ground. The property originally belonged to the church, the church sold it to Mr. Joseph Chapman, Mr. Chapman sold it to Mr. Nidever, and Mr. Nidever to my father.

As soon as my father acquired the property, he started to beautify the place, laying out a garden and planting trees. As soon as they commenced to work, they unearthed mortars, pestles, skulls and bones.

About that time a member of the Smithsonian Institution was in California and my father entertained him and gave him many relics for the Smithsonian. The only thing my father retained was a pipe, and the skulls and bones were cremated. I think that if you look at the records of the Smithsonian of the years 1851 and 1853, you will get some information about them. My brother visited the Smithsonian Institution some years ago and was told that they had been placed with the other Indian relics, but he did not locate them.

In a letter dated December 6, 1851, Mr. Hinchman says:

One of the first things that strikes the eye of a stranger, who comes to Santa Barbara, is a little hill which breaks the uniformity of the plain, rising perhaps 20 feet above the general level of the surrounding land. The hill has a gradual slope on all sides to its base and covers about 15 acres. All the



year around it is green, because in every part of it are welling up beautiful little springs. On the highest part of the hill is an adobe house, which was when new one of the best houses in the country, though now it is somewhat out of repair. There lives a man by the name of Nidever, an otter hunter, in these parts long before the Americans came here.

In a letter dated August 16, 1923, Miss Stella G. Hinchman states:

With regard to the "Mound": In December, 1851, my father purchased the property you speak of as "Burton's Mound." . . .

In August, 1856, my father erected a store building at the foot of the mound on the beach, and formed a copartnership with Lewis T. Burton and Harvey B. Blake, who had previously been in business and were agents for the steamship line and the express company. This firm was dissolved January, 1860. . . .

The beach at the foot of the mound was the favorite bathing spot for the women and girls of the vicinity, and a right to the undivided and sole use of this part of the beach by the women during their bathing hours had been established by long usage and become an unwritten law. . . .

Now, as to the name "La Playa" being applied to the "Mound," which you question. The women when they came to bathe naturally spoke of going to la playa, the beach. However, if the townspeople went to the beach store they spoke of going to La Playa. I remember that during several visits that I made to Santa Barbara I was repeatedly asked if I was born at La Playa. If asked where the Hinchmans lived or they answered any question connected with the mound, they called it La Playa. My father in his correspondence called it "Casa del Mar," but the name did not stick.

Concerning the sulphur springs, my brother says that in 1868 he, while on a visit to Don Lewis Burton, was taken by my father to the north of the house and was shown the sulphur springs. My father took a pole and prodded the mud at the bottom of the spring, releasing the gases, which arose in enormous bubbles through the water and which he ignited with a lighted piece of newspaper. The springs at that time were not in use and there was no talk of exploiting them.

The Indian relics are frequently alluded to in the letters, and in 1854 the intention is expressed of sending them to Dover if a favorable opportunity presented itself. This, however, was never done. My mother remembers the giving of a large quantity of these relics to a representative of the Smithsonian about this time, and thinks his name sounded like Zieglau. She rather regretfully says that it was a besetting weakness of my father's to present almost anything he possessed to any one who expressed a desire for it, or even admired it.

Relative to Indian affairs, my mother—who lives with me, is in her 95th year, who although not active has a very clear memory—relates the following story that was current in her younger days. Nidever in one of his otter-hunting expeditions, found on the island of Anacapa, one of the Santa Barbara Channel islands, a lone Indian maiden, who, together with her belongings, he brought to his home on the mainland. Nobody in Santa Barbara could understand her language. Native Indians from adjacent pueblos were brought and they also failed to understand her dialect, and no clew was ever obtained as to her identity. The maid pined away and finally died, it was thought, of homesickness. When found she was oddly clad, among other articles of attire was a cape composed of bird skins, mainly the breasts of wild fowl with the down on. Tradition has it that after death her belongings were sent to a museum at Francisco. She also recalls a legend of the native Indians, to the effect that at a remote period the Santa Barbara Islands formed a part of the

mainland and their ancestors in bygone days were able to walk there dry shod. The query is presented to my mind, as to whether the Indians who used the "Mound" as a burial place were not inhabitants of the Channel Islands. . . .

OWNERSHIP BY LEWIS T. BURTON, SEASIDE HOTEL ASSOCIATION, POTTER HOTEL COMPANY, AMBASSADOR HOTEL CORPORATION

In 1860 Mr. Hinchman sold the tract to Lewis T. Burton, who was, like Captain Nidever, a native of Tennessee. Mr. Burton made the place his home for the remainder of his life, and from him the mound has taken its name in later years. Upon his death in 1879 the tract came into possession of the Seaside Hotel Association and the immediate building of a hotel on the mound was planned. This plan was, however, not consummated until 20 years later, when Milo M. Potter was the leader in a new movement for the erection of a beach hotel on the site. In the meantime the old adobe house on the mound was inhabited by a number of consecutive tenants, some of whom were interviewed with interesting results. The Potter Hotel was erected in 1901 and 1902, and the grounds were graded and landscape-gardened and made one of the most beautiful spots on the coast. The hotel was sold in 1913 and became the property of the Ambassador Hotel Corporation. It burned to the ground in 1921.

#### INTERVIEW WITH M. AMAN

Mr. Max Aman lived in the Burton adobe house during the three years prior to the construction of the hotel; he was its last occupant. As he remembers it, the total length of the house proper was about 80 feet, and it was 20 feet wide, not including the veranda, which ran around the northern, eastern, and southern sides and was itself some 10 feet in width. The rooms were, therefore, about 20 by 20 feet, but the parlor, which ran across the entire eastern end of the house, was larger and may have been 20 by 40 feet.

Mr. Potter turned the first earth in the construction of his hotel in the spring of 1900. The adobe house was, however, not torn down immediately, but was allowed to remain standing for a year or more—in fact, until the hotel foundations were put in.

When the house was torn down, sheet lead was found laid horizontally at the base of the walls all around. The purpose of this was to keep the moisture of the ground from creeping up into the adobe walls. When the lead was seen by the workmen they became excited and for a moment thought it might be silver.

It was said that one of the workmen found a silver brick buried under the adobe house, but that Mr. Potter heard of the fact and took it away from him.

The sulphur spring which supplied the bathhouse, which Mr. Aman ran most profitably for three years, was covered up and it happened

that the hotel dining room occupied the second story above that spot. The fumes from that spring crept up into the dining room and blackened the silver and it also affected the utensils in the kitchen. Mr. Potter determined to do away with the spring, and had it covered over with a layer of cement a foot thick and 20 feet across.

There were two pipes by the swamp, at a location which is now approximately the middle of the eastern lawn. These pipes were inserted in the ground, projected vertically from the ground, were several feet apart, and one had water or nothing in it, while the other had natural gas, so that sometimes it would burn if you held a match to it. Mr. Aman does not know who put these pipes in the swamp or what the idea was.

The near-by swamp had blue and purple colors on top of the water every once in a while, as if there were an oily film.

Mr. Henry Tallant was agent for the property when Mr. Aman rented it. Once Mr. Aman asked Mr. Tallant if he would have any objection to some one digging for relics. Mr. Tallant did not like the idea at all and said, "Don't you dare to dig for relics."

Mr. Aman found most of the relics that came to light when he was living there at the little vegetable garden, which he cultivated, which as stated above was at the locality of the present palm grove at the west of the mound. There he found arrow heads and Indian bones.

The roof of the adobe was shingled when Mr. Aman lived there. The gable ends of the house were of brick and had evidently been put in later than the adobe.

Mrs. Harry Jenkins had lived at the house just prior to the time when Mr. Aman lived there and she was an artist, and painted the beautiful oil picture of the adobe, showing the red blossoming roses around the veranda, the morning glories climbing up the posts, the old well, the trees, and many other details. Mrs. Jenkins sold this picture to Mr. Aman while he was a resident at the mound for the very modest sum of \$20, and when Mr. Potter had finished the hotel he approached Mr. Aman on the subject of purchasing the picture from him. Mr. Aman refused to sell it. It is still in Mr. Aman's possession.

#### INTERVIEW WITH ARTHUR GREENWELL

Mr. Arthur Greenwell has lived practically all his life as a neighbor of the Burton Mound property and recalled many interesting details concerning the former condition of that site.

Mr. Greenwell recalls fig trees, olives, pomegranates, and pears in the old orchard at the southwestern end of the mound where the palm grove stands at present.

The Santa Cruz Island Co. had their corrals for handling sheep at the southwest corner of the present Ambassador grounds. A fence ran around that corner, forming a single corral, and there was a shack near where Bath Street meets the Cabrillo Boulevard which was used for shearing sheep and for a storage place.

Mr. Greenwell recalls that the swamp extended parallel with the beach from Chapala Street as far as the present eastern driveway of the grounds. It was not a lake, but a place of tules and willows. People used to shoot ducks there.

It was a Seventh Day Adventist [Mr. Eli Kimberly] who started the bathhouse at the sulphur spring at the eastern end of the mound. That gentleman sold the bathhouse to Mr. Jenkins and Mr. Jenkins sold it to Mr. Max Aman.

Mr. Stephen Bowers dug for archeological remains one time at the corner of the grounds, where Chapala Street meets the Cabrillo Boulevard. That corner of the grounds, the extreme corner toward the wharf, was high. This information, wholly volunteered by Mr. Greenwell, has been corroborated by similarly volunteered information from several other informants.

#### INTERVIEW WITH MRS. RAMONA TRUSSELL

Mrs. Ramona Trussell,<sup>14</sup> born in 1836, was interviewed in connection with the mound. Her father was Mr. Sparks. Mrs. Trussell's sister, Mrs. Packard, is also living.

Mrs. Trussell stated that when she was a girl, and she was born at Santa Barbara, the mound was half wild and there was no bathhouse over the sulphur spring. The sulphur springs were, in fact, merely muddy places, but people used to go there to bathe and would drink the water. She could not remember who built the adobe house, but it was there prior to the Burtons, and she imagines that Mr. Chapman may have constructed it.

#### INTERVIEW WITH MILO M. POTTER

We had the unique opportunity of an interview with Mr. Potter on the Ambassador grounds. He explained the grading operations to the minutest detail and told of his burying the relics, also of burying a redwood box of bones somewhere on the grounds, a "coffin" as he called it, but declined to tell us just where.<sup>14a</sup> The information gathered from Mr. Potter was lengthy and will be given in full in a future paper.

<sup>14</sup> Mrs. Trussell died in April, 1924.

<sup>14a</sup> Both the cache of relics and the redwood box have been found.

## INTERVIEW WITH JAMES M. CARTER

Mr. James M. Carter, who at present resides at Hawthorne, Calif., was in charge of the grading and construction work of the Potter Hotel during the entire period of its building. The work on the hotel was started on the 19th of January, 1901.

When the excavations were made for the foundations of the hotel on the inland slope of the mound few, if any, Indian relics were found, but during the small amount of grading that was done at the crest of the mound, at the spot immediately toward the beach from the main entrance of the hotel, and especially toward Chapala Street from the main entrance, quantities of bones and relics were found. Little by little the skulls, bowls, beads, arrowheads, and other curiosities which had come to light in the above-mentioned spot, or at other places on the grounds, were gathered under the direction of Mr. Potter and Mr. Carter and were put in a room at the western end of the old Burton adobe house. After a few months there was quite a museum in that room. Mr. Carter had a lot of 1-by-12-inch boards put in around the walls for shelves, and the skulls and bowls made a gruesome appearance.

It was about May or June of that same year that Mr. Potter came to Mr. Carter one Saturday morning and called him aside from his work. Mr. Potter told Mr. Carter somewhat as follows:

"A great many of our guests will be actors, and especially theatrical people have a superstition about ghosts and spirits from the dead. It would be very unfortunate if they got the report going that this place here was a potter's field, that this hotel is a potter's field, and to me it seems the thing to do for us to bury everything of every kind before the reporters get hold of it and give us an advertising that will do no good."

Mr. Potter suggested that Mr. Carter come the following morning, which was Sunday, and bring with him four or five of the workmen, including one man with a team. Mr. Carter acted accordingly, and came with the workmen Sunday morning. Mr. Carter officiated. The others were Kittie Goux, a big Spanish Californian, of Santa Barbara, who is still living, an Irishman named Dewlaney, an Englishman named John Bebb, and with the three nations, Indian, Irish, and English, represented and an American officiating, the relics, consisting mostly of mortars and pestles and human bones, were hauled to the east annex, and were deposited in a trench which had been freshly dug that Sunday morning as a grave for the materials that were to be reburied. They filled this pit with bones and all kinds of things, most of them in broken condition, up to about 2 feet from the surface of the ground, and they had to tramp the stuff down in order to get them all in the allotted space.

## INTERVIEW WITH A. M. GUTIERREZ

Mr. A. M. Gutierrez recalls the appearance of the mound in the eighties. He said that he and various other boys used to play all over Burton Mound. He remembers the mound at the foot of Chapala Street and says that it was some 6 feet high or more. I asked him if it was of sand, and he added that it was of earth too. He agreed that the wharf butted against it.

## INTERVIEW WITH CHARLES T. HALL

Mr. Charles T. Hall, who resides at 117 Bath Street, proved a good informant on the property which has lain across the street from him for 50 years. The site of the burial ground has always been felt by him to be in the present lawn, that is on the site toward the ocean side of the mound. A second burial ground, in his opinion, was the one at the junction of Chapala Street with Cabrillo Boulevard, and which ought to yield good results to the excavator, if one were not prevented from digging there by the place being covered over by the street and boulevard, at least to a large extent.

Mr. Joe Woods told Mr. Hall that de Sissac, Stephen Bowers, and himself had all prospected around Burton Mound, more or less, for Indian relics. But they never did any digging there that amounted to anything.

The ocean came across the sand sometimes in the days before the boulevard was put in and some of the water got over into the swamp between the mound and the beach.

## AN EARLY DESCRIPTION OF THE BURTON MOUND

The following appreciative summary of information about the Burton Mound is taken from "Santa Barbara As It Is," published by the Independent Publishing Company, Santa Barbara, Calif., 1884, pp. 51-54:

Many of the residents of Santa Barbara know this interesting spot only as the late residence of Don Louis Burton, as a beautiful shady spot for picnics, and as the destined site of a grand seaside hotel. Travelers upon the decks of passing steamers admire the beauty of the place, which stands, a romantic landmark of the past, only a few hundred feet from the landing place. It is a mound, circular in form, standing prominently above the level of the surrounding plain, about 400 feet from the surf which breaks upon the smooth sandy beach at its foot. The top of the mound is about 30 feet above high water and the mound itself comprises about 2 acres, although the property of which it is a part contains 30 acres. From the level summit may be seen the shore line for 30 miles or more to the east; to the south, the channel and its towering islands present a fascinating prospect; to the west, the lighthouse, perched upon the bluff; and nearer, the "Castle Rock" or the Punta del Castillo, around which the restless waves invoke a ceaseless melody. Landward, the city,

the foothills in gold or in green, and the mission towers combine to form an almost unparalleled picture and one generally neglected by visitors.

Some years ago this mound with its adjacent surrounding property was purchased by a number of the prominent citizens of Santa Barbara, organized and incorporated as the Seaside Hotel Association. It is held by this association for the purpose of using it as a grand sanitarium and seaside hotel site.

The mound appears to have been a system of subterranean water courses. Springs flow in all directions, and the most remarkable feature about it is their variety. At one place there is a clear blue spring of sulphur water bubbling up and discharging into the grass beneath the olive groves. At another place an "iron spring," the water of which is strongly impregnated and the surroundings covered with iron rust. Near the summit a spring of pure water, which is used to irrigate an immense vegetable garden, from which Santa Barbara draws its principal supply of vegetables. The property is intersected or traversed by a stream of water from the source of which the city derives its water supply above the mission. The water of the sulphur spring is similar to that of the Montecito Hot Springs, except in its temperature. The following extracts from an article in the Daily Independent of October 19, 1883, give a vivid description of the traditions of the mound:

"For many years the coast of California and Oregon has been explored for ethnological relics. It has been dug up by different experts seeking to obtain the various implements of household goods and gods buried with the dead, who knew the patient labor of the Indian during life passed with him to the grave. In other words, the result of his work did not, as with us, go to the living—that it was superstition, no one in these days doubts. And hence we find in the grave the cooking utensils, the arrows, fish hooks, the crude pan for baking purposes, the tasteful olla for boiling, the flint mortar for grinding corn and beans or seed, and various other implements, the present generation can not understand for what purpose they were made. Even the everlasting pipe is found buried.

"But, speaking of the Burton Mound, its origin is unknown to men now living, but it is known to have been formed of the bones, the trinkets, the cooking utensils, and weapons of thousands of natives of this coast. It is in fact one grand catacomb or deposit of human bodies covered with immense quantities of sea shells. The interior of the mound has never been explored. No defiling spade or shovel has been permitted to unearth the immense quantities of Indian remains and relics therein deposited. Sometimes when a tree has died and it has been deemed desirable to remove the stump or roots, in digging it out, the earth was found full of Indian relics such as stone utensils, skulls, and ingeniously made articles of ornament. Many efforts have been made to obtain permission to explore the interior of this mound, but thanks to the vigilance and care of Capt. William E. Greenwell, a manager of the Sea Side Hotel Association, the valuable ethnological treasures of the mound remain intact. They are perhaps the most complete and valuable collection of aboriginal relics in the United States and will some day be regarded with more interest than at present.

"There is a tradition extant which says that this mound was the regal residence of the Grand Sachem or Inca of all the tribes of this southern coast. Around its base the supreme chief of all the southern tribes held regal court. Upon it the priests and medicine men of the tribes held their mystic conclaves, and no doubt enacted savage tragedies in centuries gone by.

"Vancouver, the English explorer, in his three volumes published in 1798, speaks of this mound as the abode of the Great Chief, which undoubtedly it

was; in the year 1883, or 95 years since his visit, it is yet unexplored, and is covered with luxuriant vegetation and embowered with vines and fruit trees.

“MacGregor in his three volumes, *Progress in America*, published in 1847, speaks of this mound. It is certainly an interesting spot and well worth the consideration of the directors of the various universities throughout the world who might seek to obtain the buried relics of a past race.”

## EXCAVATION OF THE BURTON MOUND

### PREVIOUS EXCAVATING AND RELIC HUNTING BY OTHERS

The present work was the first to be done in a systematic way on the site of Syujtún. Considerable promiscuous digging and pot hunting had been done at the site at one time or another by various individuals.

The prejudice against digging up graves was so strong in Indian and early Mission times that the bodies and accompaniments of the dead remained inviolate. Moreover, practically all of the owners of the property have forbidden excavations.

A. F. Hinchman amassed a considerable number of relics that had been found on the place and it is supposed that part of these found their way to the Smithsonian Institution. (See p. 58.)

Count Leon de Sissac, heading a French archeological expedition to the coast of California in 1878, is said by Mr. B. F. Birabent, of Santa Barbara, and others to have done some digging at the mound.

Rev. Stephen Bowers did a little digging at the foot of Chapala Street in the early eighties, according to Mrs. R. Kimberly and others.

Gill Kimberly, in company with the Streeter boys, the two sons of W. Streeter, a neighbor, used to play at the mound when they were boys in the eighties and dug bones by the present central walk, where we carried on our chief excavations. On one occasion, Mr. Kimberly relates, they dug up four skeletons in sitting position at a place 30 or 40 feet toward Chapala Street from the Burton well.

Chico Leyva, who made the rich finds at the Mispú site in 1908, is said by several informants to have dug at the central walk locality quite extensively, probably during the ownership of the property by the Seaside Hotel Association. Most of the previous digging at this spot we attribute to him. He took only the larger artifacts, throwing the bones and many of the less conspicuous objects back into the holes. The agents of the Seaside Hotel Association, following the wishes of Captain Greenwell, told the tenants not to dig for relics and to allow no one else to do so, but there was considerable pot hunting, nevertheless.

At one of the Fourth of July picnics and barbecues held at the mound in the nineties the writer recalls seeing a man whose



name he did not know, assisted by Mr. Fred Johnston, dig out a complete Indian skeleton just over the crest of the southwest end of the mound on the seaward side. It was common on such occasions for people to have the idea of doing a little digging around the premises for Indian relics.

Mr. Ernest Hunt, of Santa Barbara, had for years a skull from the Burton Mound with an Indian arrowhead embedded in it. This skull he took along when he moved to his present home on San Andres Street. Mr. Hunt instituted for me a thorough search of the barn and premises, and while neither he, Mrs. Hunt, nor his son have any knowledge to the effect that the skull was taken by anyone or thrown away, the search at this late date has been unsuccessful.

Miss Laura Holt, employee of the Santa Barbara post office, informs us that her deceased brother, Philip Holt, once found a skull with an arrowhead in it at the mound. That was many years ago. The arrowhead was struck into the side of the head. Mrs. Rachel Short, of Santa Barbara, had this skull at one time. Miss Holt stated that her brother gave some relics at one time to the Santa Barbara Society of Natural History, and the skull from Burton Mound may have found its way into that collection, or possibly to the Smithsonian Institution.

Mr. William Hayward, of Santa Barbara, once dug up some bones at Burton Mound, and some of these may be included with some relics from Gaviota now stored at Hazard's bicycle store.

Dr. P. M. Jones, of San Francisco, did some archeological work on San Joaquin Valley mounds in December, 1899, and made an archeological reconnaissance trip down the coast of California the following spring. Arriving at Santa Barbara, he learned of the Burton Mound and that the work was about to start on the new hotel there. In vain he appealed to Mr. Frank M. Whitney and other stockholders in the Potter Hotel Co. for permission to excavate.

When the excavations and grading were made for the hotel, which was built over the inland slope of the mound and fronted on its crest, numerous skeletons and relics were discovered by the workmen. These were placed in a room of the Burton adobe house, which was still standing at the time, and were later reburied near the present East Annex of the hotel by Mr. J. M. Carter, according to instructions given him by Milo M. Potter. Information about this cache had been given me by Mr. José Ortega and was later given by Mr. Milo M. Potter and in splendid detail by Mr. J. M. Carter. We found the cache, consisting principally of mortars and pestles, at the spot described.

Also on the beach in front of the Syujtún site Indian objects have repeatedly been found.

On the occasion of a very low tide in 1871 Mr. Charles T. Hall while walking on the beach in front of the mound noticed a peculiarly round boulder, and on turning it over it proved to be an ancient Indian mortar. This mortar was purchased from Mr. Hall. (See p. 77.)

Mrs. Constance D. Ealand informs us that the beach at low tide at the foot of Chapala Street used to be considered by early residents a good place to look for Indian relics. There, near where the sulphur spring (see p. 70) comes out of the beach, Mrs. Ealand used to pick up broken bowls, pestles, and other objects, such as abalone spangles and beads. There is reason to believe that these objects came both from the cemeteries and former habitations of the Indians. Several others have furnished similar information.

#### DESCRIPTION OF THE MOUND

The contour map of Burton Mound (fig. 2) is based on a map probably prepared by J. K. Harrington about 1901 for the Potter Hotel Co. and shows the former shape of the mounds. According to this map, Burton Mound was about 600 feet long in northeast-southwest direction and about 500 feet across. The highest ridge was about 100 feet long by 75 wide, and extended from the center to the northeastern end of the mound. The northeast and northwest slopes were the steepest. The slope of the mound became more abrupt about 400 feet back from the beach, which the long axis of the mound paralleled. The crest of the mound was about 650 feet from the beach. The mound comprised about 2 acres.

The elevation of the mound is given as about 30 feet above high water in the pamphlet "Santa Barbara As It Is," 1884, p. 64. The top of the mound in its present graded condition is 24.27 feet above mean tide level. The contour map gives the elevation as 20 feet above the flat land in front of the mound toward the beach. The flat land at the inland base of the mound was approximately 7 feet higher.

Tules formerly grew in the low land west of the mound. North of the mound, toward Mission Creek, the land was also low and flat. A lagoon with tules and perennial water fed by the springs extended from near the beach in front of the mound along the eastern base, terminating in a shallow gully near its northern end.

A much smaller and lower mound formerly stood at what is now the intersection of Chapala Street and West Cabrillo Boulevard and extended about 125 feet southwest of that intersection, or as some informants have expressed it, to approximately opposite the northeast end of the hotel. Its southwest end is shown on the contour map. Like the Burton Mound, this smaller eminence had its long axis parallel with the beach. The elevation was only about 8 feet over the surrounding flat land.

THE SPRINGS OF THE BURTON MOUND

There were (and still are, if they were reopened) springs of both fresh and sulphur water in the vicinity of the mound; 230 feet east

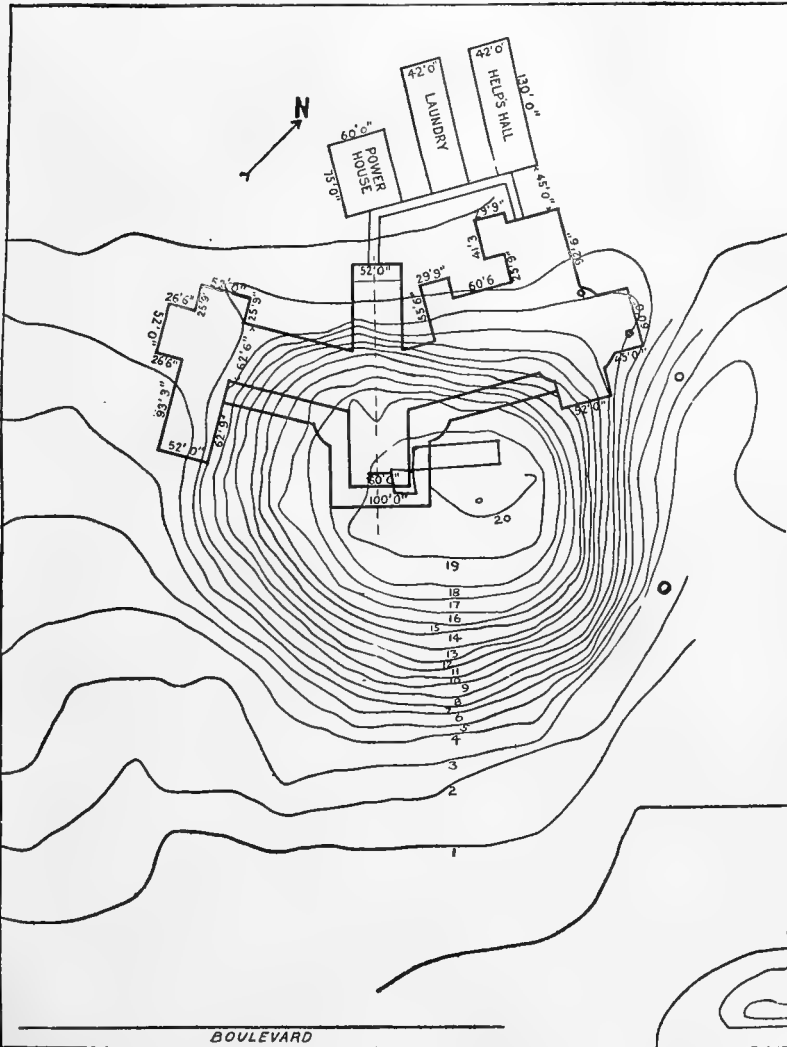


FIG. 2.—Contour map of the Burton Mound, based on a map probably prepared by J. K. Harrington, C. E., about 1901. Scale: 1 inch = 184 feet

of the highest part of the mound was a large spring of fresh water, shown in Figure 2 between the 2 and 3 foot contours.

Near the base of the northern slope of the mound, between the 5 and 10 foot contours, at the eastern end of the Potter Hotel, were

three cold sulphur-water springs, impregnated from the Pleistocene deposits underlying the mound.

Most interesting of all is the sulphur spring in the beach at the foot of Chapala Street. Sulphurous fresh water still runs from a certain spot on the beach there exposed by very low tides. The former Indians knew of this spring.

The Burton well (see pp. 71-72) had an abundance of very good water, although only about 200 feet from the sulphur springs where the bathhouse was. Since most of the wells in the lower part of Santa Barbara were brackish or sulphurous, people living in the neighborhood used to come to get barrels of water at the Burton well.

There was also a well of fairly good water on the inland side of the warehouse of the first wharf.

#### THE GRADING OF THE BURTON MOUND

Fortunately for our understanding of the grading of the Burton Mound, the men who had it in charge are still living and were thoroughly interviewed. They are Milo M. Potter, J. M. Carter, and Marshall Hicks. José Ortega and several others furnished minor information. The grading was done in the years 1901 to 1903. Mr. Potter gave considerable attention to the correct estimation of detail in the various parts of the grounds.

The tule swamp east of the mound was filled in largely with earth hauled from East Haley Street. The fill extended to the region south of the mound. During the latter part of the work earth was hauled from the west corner of the grounds, where the level of the soil was originally nearly 2 feet higher than that of the adjoining streets. Beach sand was used in part as a filling material under the concrete walks and drives, since it does not settle or shrink.

Detection of the scraped surfaces gave us little trouble and we had excellent information as to their extent.

Where the fill was made by scraping loam from the adjacent surface it caused more confusion. But most of the filled-in earth was from a distance and of a character different from that beneath. Sand filling presented, of course, no difficulty.

#### EXCAVATED AREAS

During the season of 1923 test pits were sunk in practically every part of the Ambassador grounds and of the property of Mr. C. F. Eaton, adjoining the Ambassador property across Chapala Street to the east. Our principal finds, however, were made in four localities only. (See fig. 2.)

(1) Near the south corner of the Help's Hall where we found the important cache of material buried by Mr. J. M. Carter in 1901.

(2) On the slope of the southwest end of the mound, in what was known during the hotel period as the palm grove. Here we excavated a large area.

(3) Half way down the slope of the southeast side of the mound, that is, the side of the mound toward the beach, in the vicinity of the central walk which ran from the main entrance of the hotel to West Cabrillo Boulevard. It lay straight in front of the hotel entrance, the upper end of the excavations being 85 feet from the entrance steps. In this occurred rich burial material, disturbed in places, the burials extending to the bottom of the sharper slope of the mound and beyond.

(4) At the Charles F. Eaton lot, at the northern corner of Chapala Street and West Cabrillo Boulevard.

#### THE FOUNDATIONS OF THE ADOBE HOUSE

The foundations of the adobe house were completely uncovered. The house was built parallel to the beach, its axis running east-northeast west-southwest. We discovered the north corner first. The upper surface of the foundation at that point was exactly 2 feet below the surface of the lawn and 21.47 feet above mean tide level. The earth above the top of the foundation was filled in and was partly composed of the battered down walls of the building.

The foundations had been formed by digging a trench in the ground about 3 feet wide and 2 feet deep and this trench was then filled in with beach boulders of sizes ranging from a few inches to a foot or two in diameter. No cement of any kind was employed.

The house was 83 feet long by 20 wide, outside measurements. In uncovering the foundation we found a few pieces of roof tile and floor tile.

#### THE OLD BURTON WELL

The old Burton well was situated some 32 feet beachward from the northeast end of the adobe house and was for many years the only source of good drinking water in that neighborhood. Its water was not sulphurous to the slightest degree and its total depth is said to have been some 25 feet.

It was surmounted in the nineties, and probably earlier as well, by a box of 2-inch pine boards which stood about 3 feet from the surface of the ground and completely hid the construction of the well from view, since a Dayton pump had been placed on top and there was no way to look into the well.

The curbing found in the ground was square and was about a yard tall and exactly a yard across each way. Inside of the four corners was a vertical post, also of pine. The two bottom planks were laid flat all around, but the other planks, forming the sides of the

curbing, were all on edge. This curbing had its northern and western sides injured in the early excavation, but the other sides remain whole, and were removed from their position and laid on the surface of the lawn without breakage. The nails used in the construction of this curbing were partly of the wire variety, and partly old-fashioned square nails.

Below the curbing the shaft of the well is round and averages some 46 inches in diameter. We excavated this shaft to a depth of 10½ feet, but were forced to cease operations because of the entering of water, which in a day or two had filled the bottom of the hole to a depth of 3 feet. It is remarkable that the water rose to so high a level at this elevated position on the mound, and the watering of the surrounding lawn evidently contributes only partially to this flow, if at all. The water was perfectly good and sweet and was free from any taste or odor resembling sulphur. The well is only about 200 feet from the sulphur springs and apparently is supplied with water from the same formation.

### DESCRIPTION OF THE ARTIFACTS

The objects taken from the mound have, at the suggestion of Mr. George G. Heye, been classified according to the material of which they are made, thus conforming with the presentation in his recent paper on the San Miguel Island expedition of the Museum of the American Indian.<sup>15</sup>

Generally speaking, the artifacts had the appearance of being old and long subjected to the havoc of soil and water. Their long history in the ground had been climaxed in more recent times in several of the areas by lying under a well-watered lawn or garden for a period of 20 years. And many of them had patently been broken or damaged before being placed in the graves. We saved everything that was taken from the excavation and time and ingenuity has been used in piecing some of the broken objects together.

Stone, shell, bone, and wood have in this mound resisted the chemical action of the soil with success, decreasing in the order in which they are named. It was not uncommon to find shell beads reduced to chalky softness, and even sandstone fragments were met with in disintegrated condition.

### OBJECTS OF STONE

#### FLAT-RIMMED BOWLS OF SANDSTONE

Flat-rimmed bowls of sandstone with comparatively thin and even walls and flat or somewhat flattish bottom form a definite type. The

<sup>15</sup> Heye, George G. Certain Artifacts from San Miguel Island, California, *Indian Notes and Monographs*, Vol. 7, no. 4. New York, 1921.

edges of the rims are sometimes beveled or rounded. These bowls are of handsome type and would neither have stood heavy pounding or use over a fire. The size is comparatively large. Some bowls of soapstone evidently belong to this same type of vessel.

Entire bowl of gray sandstone, gritty and friable, 301.6 mm. diameter, 158.7 mm. high. Concavity 107.9 mm. diameter. The bowl has a nicely squared rim varying in width from 20.6 mm. to 38.1 mm. The surface of the concavity has no bevel where it joins the rim, but there is a 9.5 mm. bevel of the outside surface forming a somewhat acute angle with the rim. The rim slopes downward to the outside. The bottom is rounded. (Pl. 3, *b*.)

Fragment of mortar of hard gray sandstone, 320.6 mm. diameter, 153.9 mm. high. Rim uniformly 125.4 mm. wide. The rim has a double bevel on its inner and outer edges about 19 mm. in thickness. The concavity of the fragment is 88.9 mm. diameter. The bottom is pecked perfectly flat and measures 101.6 mm. across. The fragment is that of a beautifully made bowl and represents nearly half of the original. (Pl. 3, *a*.)

Entire bowl of greenish gray sandstone, smooth textured. Found in two halves. The left half is more brownish gray than the other half, 214.3 mm. diameter, 133.3 mm. high. Rim nicely squared, 12.7 mm. wide, slightly concave in the brownish half of the bowl. The concavity is 92 mm. diameter. The bottom is quite flat and has a diameter of 117.4 mm.

Entire bowl of greenish gray sandstone, 276.2 mm. diameter, 174.6 mm. high. The rim is nicely squared and varies in width from 22.2 mm. to 25.4 mm. There are conspicuous flecks of asphalt on the rim, but not elsewhere on the bowl, suggesting that there may have been inlay work on the rim. The surface of the concavity has no bevel where it joins the rim, but the outside has a bevel 12.7 mm. wide and forming an acute angle with the rim. The concavity is 117.4 mm. diameter. The bottom is flattish and about 107.9 mm. 107.9 mm. diameter.

Entire bowl of greenish gray sandstone, 231.7 mm. diameter, 158.7 mm. high. The rim is nicely squared and is 25.4 mm. in width. The concavity shows much use and is 112.7 mm. diameter. The bottom is flattish and measures 107.9 mm. diameter.

Entire bowl of gray sandstone, brownish gray in places, rather fine textured, 417.5 mm. diameter, 295.2 mm. high. Rim nicely squared and varies in width from 19 to 26.9 mm. The surface of the concavity is not beveled where it meets the rim but the outer surface has a bevel 15.8 mm. wide at the rim, which curves gracefully into the contour of the sides of the bowl. The concavity is 244.4 mm. diameter. The bottom is somewhat flattish but curves into the sides of the bowl. A stain, as if from iron rust, is seen on the left part of the outer surface.

Entire bowl of grayish sandstone, hard and smooth textured, 295.2 mm. diameter, 155.5 mm. high. Rim squared, 34.9 mm. wide, and without bevel. The concavity is 120.6 mm. diameter. The bottom is quite flat and measures about 177.8 mm. diameter.

Entire bowl of greenish gray sandstone, 368.3 mm. diameter, 222.2 mm. high. The rim is nicely squared and varies in width from 34.9 to 38.1 mm. The surface of the concavity is beveled off a trifle where it meets with the rim. The concavity is 177.8 mm. diameter. The bottom is somewhat flat, about 177.8 mm. diameter, but rounds off gradually into the sides of the bowl. (Pl. 3, *c*.)

Entire bowl of very coarse gray sandstone; the small pebbles contained in the stone can be seen in the photograph; 482.6 mm. diameter, 298.4 mm. high.

The rim is squared and varies in width from 31.7 to 38.1 mm. The inside wall meets the rim without bevel. The outside wall has 15.8 mm. width bevel, forming an acute angle with the rim. The concavity is 244.4 mm. diameter, indicating that the bottom of the bowl is 53.9 mm. thick. The bottom is flat and about 209.5 mm. diameter, there being a rather definite line of demarcation where the bottom joins the sides. (Pl. 3, *e*.)

Fragment of hard gray sandstone bowl found in four pieces. The fragment measures 698.5 mm. diameter and sits 273 mm. high, this being the original height. The rim is squared with great precision and is 41.2 mm. wide. The edges where the rim meets inside and outside walls bulge for a space of about 6.3 mm. The concavity is estimated to have been 203.2 mm. diameter. The bottom is rounded. Enough of the specimen remains for a complete reconstruction of the bowl.

Entire bowl of greenish gray sandstone, fine textured; 333.3 mm. diameter, 180.9 mm. high. The rim is nicely squared and varies in width from 25.4 to 28.5 mm. The inside surface is beveled off a little where it meets the rim. The outside surface has a bevel 12.7 mm. wide forming an acute angle with the rim. The concavity is 133.3 mm. diameter. The bottom is flattish.

#### BOWLS OF SANDSTONE WITH GROOVED RIM

Entire bowl of gray sandstone, 463.5 mm. diameter at the rim, 222.2 mm. high. The rim is squared without bevel and 28.5 mm. wide. A groove averaging 9.5 mm. wide and 4.7 mm. diameter runs around the center of the rim. There is no trace of asphalt in the groove, although the purpose of the groove may have been to hold inlay work: The concavity is rounding and 180.9 mm. diameter. The bottom is flat and is 317.5 mm. diameter. The bottom forms a well defined angle with the sides. (Pl. 3, *f*.)

Fragment of bowl of greenish gray, fine textured, but somewhat friable sandstone, 200 mm. diameter, 127 mm. high. The rim is squared, 17.4 mm. wide, and there was a groove 3.1 mm. wide and 1.5 mm. diameter at the center of the rim. The rim is at present in a worn and to some extent fractured condition. The concavity is 100 mm. diameter. Less than a third of the bowl is missing. (Pl. 4, *a*.)

#### MORTARS

Several of the mortars recovered were merely beach boulders with the outside unshaped, or stones whose surfaces consisted more or less of fractures, that appearing to have been the original condition, or with sometimes a rough corner or projection pecked away to carry out the idea of making the vessel shapely.

Entire bowl of gray sandstone, hard and fine textured, 139.7 mm. diameter, 120.6 mm. high. The rim is rounded, but forms quite a sharp curve where it meets the inside wall. Concavity 93.6 mm. diameter. The bottom is completely rounded. (Pl. 4, *f*.)

Mortar of coarse gray sandstone, 184.1 mm. diameter, 158.7 mm. high. Concavity 88.9 mm. diameter. The lip is rounded. The bottom is flat. The fragment represents one-third of the entire bowl. (Pl. 4, *b*.)

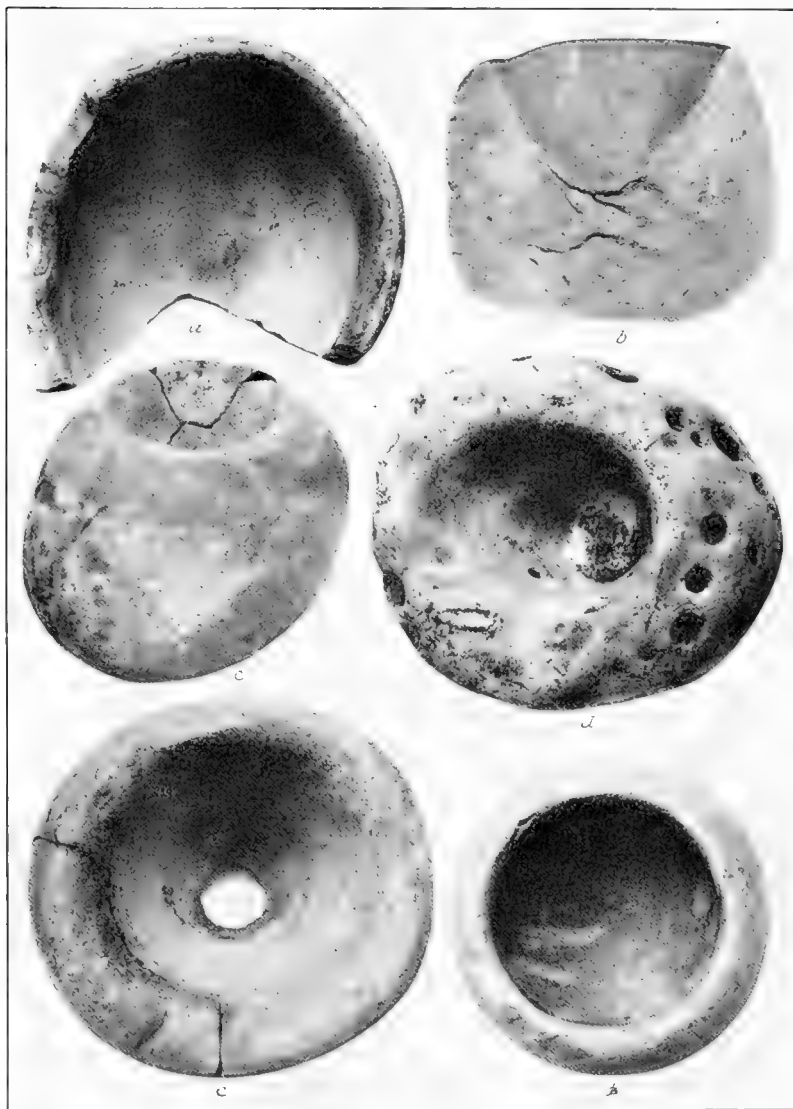
Entire bowl of bright green stone mottled with whitish flecks; 76.2 mm. diameter, 47.6 mm. high. Rim rounded. Concavity 31.7 mm. diameter. Bottom neatly rounded.

Fragment consisting of about one-half of a metate of coarse gray sandstone. The fragment is 215.9 mm. long, 165.1 mm. wide, at the end which is intact.

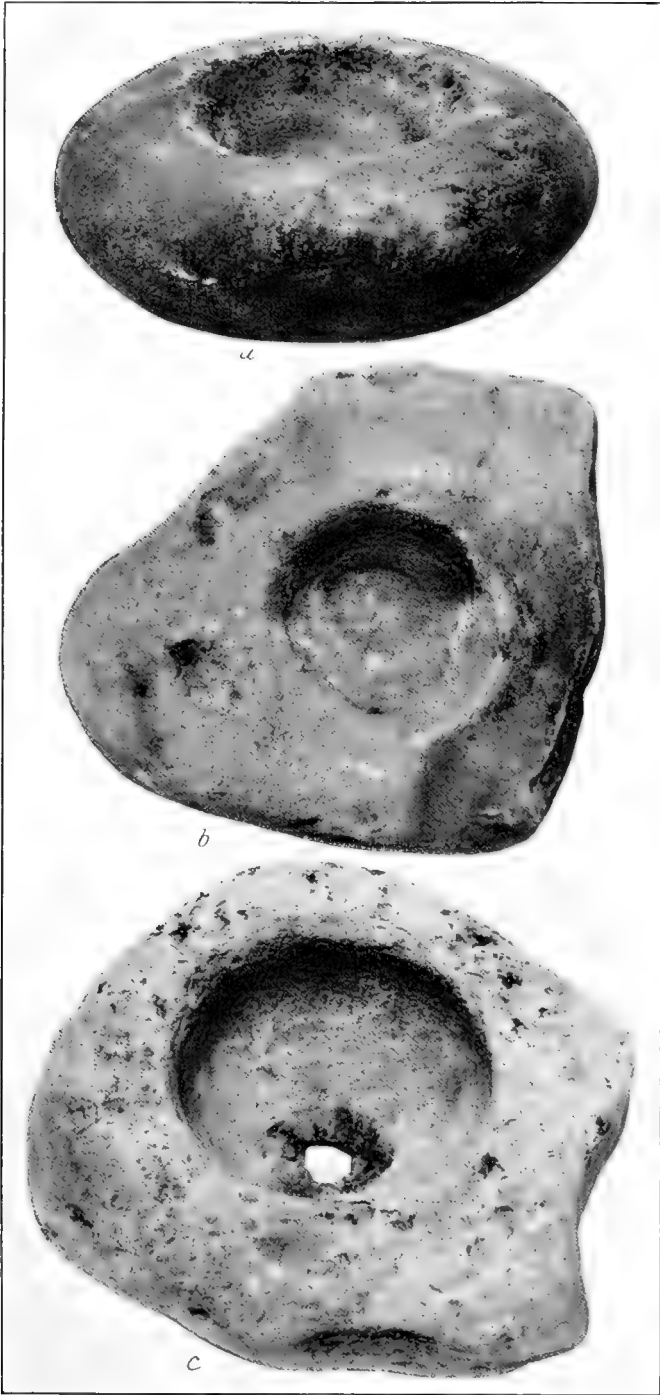




a-e, FLAT-RIMMED BOWLS OF SANDSTONE. f, SANDSTONE BOWL WITH GROOVED RIM



a, SANDSTONE BOWL WITH GROOVED RIM. b-f, MORTARS



MORTARS



MORTARS

317.5 mm. wide at the fracture, and 107.9 mm. high. The concavity is 50.8 mm. deep and 177.8 mm. diameter, the fracture traversing probably its maximum depth. The edges are rounded and the bottom is the original surface of the rock. (Pl. 6, a.)

Entire mortar of somewhat friable gray sandstone. 180.9 mm. diameter, 107.9 mm. high. The outside meets the concavity, forming quite a sharp edge. The concavity is 53.9 mm. diameter. The bottom is rounded, there being no flat portion. Although the two halves were found in the same pit they differ considerably in color, one half being much darker than the other.

Fragment consisting of perhaps one-half of an oblong-shaped bowl of buffish gray sandstone, somewhat friable, 184.1 mm. long, 161.9 mm. wide, 120.6 mm. high. The concavity is 114.3 mm. long in the present fractured condition of the specimen, 98.4 mm. wide, 69.8 mm. diameter. The rim was evidently flattish, but there is a long fracture off the lower edge of the rim. The bottom is flat and about 120.6 mm. wide, but rounds gradually into the sides.

Entire bowl of light greenish gray sandstone, fine textured; 209.5 mm. diameter, 114.3 mm. high. The rim is rounded. The concavity is 103.1 mm. diameter. The bottom is quite flat and its extent is well defined, it being about 123.8 mm. diameter. There is a fracture off nearly half of the rim. The bottom has been knocked out, leaving a hole 42.8 mm. diameter, with edges only 14.2 mm. thick. The thinness of the bottom would indicate in the case of this specimen at least that it may have been broken through by use.

Fragmentary mortar of hard gray sandstone. The fragment measures 180.9 mm. diameter and sits 114.3 mm. high, which is the original height. The rim is rounded but remains intact only in places. The concavity is 93.6 mm. diameter. About one-third of the mortar is broken away, the break being old and encrusted as is the rest of the specimen.

Fragment of mortar of very coarse, friable buff gray sandstone. The fragment is 168.2 mm. diameter, 133.3 mm. high. The concavity is 61.9 mm. diameter. Little if any of the rim remains intact but it was doubtless rounded.

Entire mortar of hard gray sandstone, smooth textured; 228.6 mm. diameter, 95.2 mm. high. The rim is rounded, and there is a rim fracture extending a quarter of the circumference, the missing fragment having been found and stuck in place. The concavity is 79.3 mm. diameter. A hole 38.1 mm. in diameter has been knocked out of the bottom, the thickness of the bottom being only 15.8 mm. The cleavage slants from the inside edge of the hole outward, indicating that the hole was produced by a blow from the inside, probably in the course of use. (Pl. 4, e.)

Fragmentary mortar of gray sandstone with a somewhat greenish cast, rather soft and friable; 355.6 mm. diameter, 163.5 mm. high. Enough of the bottom is left to determine the original height. The rim is rather sharply rounded and is more or less intact. The concavity is 96.8 mm. diameter. The hole in the bottom is 158.7 mm. long and 82.5 mm. wide, and the thickness of the bottom is 68.2 mm. The bottom is rounded uniformly and evidently contains no flat area.

Entire mortar of light gray sandstone. The stone is very sandy in content but not friable, 247.6 mm. long, 227 mm. wide, 69.8 mm. high. The edges are very irregular but are natural, except at the most acute corner, which has been pecked. The rim is broad and flat. The concavity is at the center of the top surface and measures 107.9 mm. diameter and only 22.2 mm. deep. The bottom is somewhat flat and is the original surface. Although this specimen was possibly used as a hopper mortar, there is no proof that it was in the shape of asphalt adhering to the rim. (Pl. 5, b.)

Entire mortar of gray sandstone containing large pebbles of conglomerate material and small white shells, 374.6 mm. long, 336.5 mm. wide, 127 mm. tall. Rim flat and broad. The concavity is 196.8 mm. diameter and 95.2 mm. deep. The hole in the bottom is only 34.9 mm. diameter and the bottom is 31.7 mm. thick. The fracture suggests that the hole was broken from the inside, probably in the course of use. The edges are old fractures, worn smooth. The bottom is flat and rough. (Pl. 5, *c.*)

Entire mortar of very coarse sandstone of yellow ochre color. The stone contains coarse gravel; 200 mm. diameter, 79.3 mm. high. Rim rounded and shows in its present condition no trace of asphalt, although the specimen is surely a hopper mortar. The concavity is 26.9 mm. diameter. Edges rounded. The entire bottom is rounding. (Pl. 7, *f.*)

Entire mortar of brownish gray sandstone, rather coarse and friable; 184.1 mm. diameter, 98.4 mm. high. The rim is rounded, but shows in its present condition no trace of asphalt, although the specimen is surely a hopper mortar. The edges are rounded, as is also the bottom. There is one large chip broken off the edge.

Entire mortar of brownish gray, very coarse and friable sandstone. This mortar is almost spherical in shape, 239.7 mm. diameter, 155.5 mm. high. The rim is rounded and shows no trace of asphalt. The concavity is 133.3 mm. diameter and 47.6 mm. deep. The sides and bottom are rounded, apparently without pecking. (Pl. 4, *c.*)

Entire mortar consisting of a beach boulder full of serpula borings. 234.9 mm. diameter, 123.8 mm. high. The concavity is 76.2 mm. deep. (Pl. 4, *d.*)

Fragment of a metate of greenish gray sandstone, rather coarse; 612.7 mm. long, fragment 196.8 mm. wide, 95.2 mm. high. Rim rounded. Concavity 47.6 mm. diameter. One side of the metate is missing.

Fragment of bowl of brownish gray sandstone which is much disintergrated and appears to have been through fire. The fragment is 234.9 mm. long, 180.9 mm. wide; 177.8 mm. of rounding rim are intact. The other edges consists of old fractures. The bowl had an original height of 177.8 mm. A little of the old bottom is intact and is 44.4 mm. thick.

Entire metate of gray sandstone, somewhat triangular in shape; 479.4 mm. long, 336.5 mm. wide, 177.8 mm. high. The rim is somewhat flat. The concavity is 330.2 mm. diameter and 79.3 mm. deep. The outer edges are irregular, the bottom flat. Donated by Mrs. West-Bates. Obtained from Burton Mound in 1901. (Pl. 6, *c.*)

Entire metate of gray sandstone, somewhat oblong in shape. 485.7 mm. long, 336.5 mm. wide, 177.8 mm. high. Rim rounded. Concavity 122.2 mm. diameter. A hole broken in the bottom measures 88.9 mm. by 49.2 mm. Outer edges rounded, bottom flat. Donated by Mrs. West-Bates. Obtained from Burton Mound in 1901. (Pl. 6, *e.*)

Entire bowl of gray sandstone, round in shape; 393.7 mm. diameter, 180.9 mm. high. The rim is rounded, forming a sharp curve where the concavity begins. The concavity is 222.2 mm. diameter and 88.9 mm. deep. The outer edge is neatly rounded, as is the bottom. Donated by Mrs. West-Bates. Obtained from Burton Mound in 1901. (Pl. 5, *a.*)

Entire bowl of greenish gray sandstone, hard and fine textured; 209.5 mm. diameter, 158.7 mm. high. The rim is rounded but is quite rough and irregular in shape in its present condition. The concavity is 120.6 mm. deep. The bottom is neatly rounded with a natural depression 57.1 mm. diameter at one side. Purchased from Mr. José Ortega, who obtained it from the Burton Mound in 1901.

Entire mortar of greenish gray sandstone, somewhat friable; 333.3 mm. long, 193.6 mm. high. The rim is squared and varies from 22.2 mm. to 19 mm. in width. The concavity is 149.2 mm. diameter and has a hole at its base 114.3 by 88.9 mm. The thickness of the bottom is 34.9 mm. The outside and bottom are rounded. This bowl was discovered by Mr. Charles T. Hall, inverted on the beach at low tide at the foot of Bath Street, south of the Burton Mound, in 1871.

#### HOPPER MORTARS

A ring of asphalt or traces of such a ring adhering to the rim of several mortars proved that such vessels had been augmented by a basketry rim. Such mortars varied from mere slabs to deeply worn bowls.

Entire hopper mortar of buff colored and hard sandstone, 247.6 mm. greater diameter, 204.7 mm. lesser diameter, 69.8 mm. high. The mortar consists of a slab, the edge of which is very roughly rounded. The top surface is not cupped at all but shows a band of asphalt averaging 50.8 mm. in width around its edge, which was used for sticking the basketry rim to the stone. The asphalt that remains is as much as 7.9 mm. thick in places. The bottom is the former surface of the boulder and most of its surface is flecked over with asphalt. (Pl. 7, e.)

Entire hopper mortar of gray sandstone, 187.3 mm. diameter, 98.4 mm. high. Concavity of the upper surface is only 7.9 mm. diameter and a band of asphalt averaging 44.4 mm. in width runs around its periphery. The edge of the mortar consists of four major cleavages. The bottom is flat and half of it has been pecked to its present shape, while the other half is the original surface of the rock. (Pl. 7, c.)

Entire hopper mortar of gray sandstone, somewhat friable; 282.5 mm. long, 212.7 mm. wide, 111.1 mm. high. The rim is flattish and shows only patches and stains of the asphalt which formerly adhered. The concavity is 180.9 mm. long, 165.1 mm. wide, and only 17.4 mm. diameter, and shows pecking on its walls, which would indicate that the specimen had not been used much for pounding. The outside edges are naturally squared, being pecked into shape only in a place or two. The bottom is very flat, consisting of the original surface.

Entire hopper mortar of gray and somewhat friable sandstone; 273 mm. diameter, 139.7 mm. high. The rim is rounded and a band of asphalt adheres to it in places varying in width from 22.2 mm. to 25.4 mm. The concavity is only 15.8 mm. diameter. The outer sides and bottom are rounded and consists of the original surface.

Entire hopper mortar of very green-colored fine-textured sandstone; 288.9 mm. diameter, 95.2 mm. high. The rim is flattish. The concavity is 190.5 mm. diameter and only 36.5 mm. deep. Flecks of asphalt on the surface of the rim indicate the former use of the specimen as a hopper mortar. The edges are roughly rounded in places by pecking. The bottom is flat and consists of the old surface.

Entire hopper mortar of somewhat greenish gray sandstone, somewhat friable; 241.3 mm. long, 190.5 mm. wide, 95.2 mm. high. The rim is rounded and there adheres to it a band of asphalt averaging perhaps 25.4 mm. in width. The concavity is 30.1 mm. diameter. The edges are rounded at places with the help of pecking. The bottom is somewhat flat. (Pl. 7, a.)

Entire hopper mortar of buff sandstone with somewhat greenish cast, rather friable; 320.6 mm. long, 292.1 mm. wide, 130.1 mm. high. The rim is intended to be somewhat flat. The concavity is 244.4 mm. diameter and 49.2 mm. deep. There are stains of asphalt for the attachment of the basket hopper all along the rim. The edges are rounded, the bottom flat.

Entire hopper mortar of coarse greenish sandstone; 215.9 mm. diameter, 123.8 mm. high. Rim rounded with asphalt almost everywhere adhering. The concavity is 22.2 mm. diameter. The edges are rounded, the bottom is pecked flat.

Entire hopper mortar of very coarse and friable greenish gray sandstone; 244.4 mm. diameter, 139.7 mm. high. The rim is intended to be flattish and has sparse flecks of asphalt adhering. The edges are rounded, the bottom flat.

Entire hopper mortar of somewhat dark buff colored sandstone, not friable; 285.7 mm. diameter, 153.9 mm. high. The rim is flattish, and has abundant traces of asphalt. The concavity is 215.9 mm. diameter and 55.5 mm. deep. The edges are rounded, the bottom is flat.

Entire hopper mortar of light gray sandstone; 215.9 mm. diameter, 95.2 mm. high. Edge rounded with traces of asphalt which show in part the exact position of the lower edge of the basket by a bare streak between two bands of asphalt. The concavity is only 22.2 mm. diameter. The edges are rounded, the bottom is also somewhat rounded. (Pl. 7, *b.*)

Entire hopper mortar of brownish gray sandstone, fine textured and hard; 295.2 mm. long, 127 mm. high. The rim is pecked flat in places, in other places rounded. It is much blackened from former asphalt and there are traces from the asphalt far down the sides of the mortar. The concavity is 58.7 mm. diameter. The edges are rounded, the bottom somewhat rounded. (Pl. 7, *d.*)

Entire hopper mortar of buff gray sandstone, very friable and coarse; 247.6 mm. diameter, 133.3 mm. high. Rim flattish and traces of asphalt remain in two places. Concavity 31.7 mm. diameter. The concavity has a ring of discoloration as if some liquid had at some time stained the inner surface. The outer edge is rounded and shows two straight fractures. The bottom is rounded.

Somewhat fragmentary hopper mortar of gray sandstone with brownish cast in places, friable and very coarse; 260.3 mm. diameter, 120.6 mm. high. The rim was evidently originally squared, but has been broken away for the most part. In one section, 171.4 mm. long, asphalt still adheres, suggesting the use of this specimen as a hopper mortar. The concavity is 93.6 mm. diameter, and at its bottom a hole has been broken out 66.6 mm. diameter. The outside and bottom of the specimen are rounded. The specimen was found in two halves.

Fragmentary mortar of greenish gray sandstone, somewhat friable, probably a portion of a former bowl of larger size which has been used secondarily as a hopper mortar, as indicated by the asphalt adhering to the rim; 222.2 mm. long, 200 mm. wide, 165.1 mm. high. The concavity is 57.1 mm. diameter. The longest edge consists in part of the old rim, all other edges are fractures. The corners of the edges have been pecked away somewhat and asphalt has been applied around the periphery of the concavity for the attachment of a basket.

- Fragment of a hopper mortar, consisting of more than half the original mortar. Greenish gray sandstone, somewhat friable, 244.4 mm. diameter, 79.3 mm. high. Rim squared with abundant traces of asphalt, which extends to the concavity and to the outside of the specimen. The concavity is 50.8 mm. diameter. Edges rounded, bottom somewhat flat.



## PESTLES

Ninety per cent of the numerous pestles taken are of sandstone, such as is picked up in the adjacent beach. The rest are andesite or other igneous rock. There is one pestle of scoria or porous lava.

Many of the cruder pestles were evidently picked up in partly shaped condition and a little pecking produced the desired form. Others were entirely unshaped and their use as pestles could be detected only by the abrasion of the end or ends.

A number of short, chunky pestles contrast sharply, for instance, with the very long and nicely shaped pestles which would hardly have stood heavy use.

Several pestles had been broken and reused; others had been broken and mended by lashing the parts together, with asphalt as binding material.

One of the most curious plays of chance in connection with our excavations of the mound was that we did not happen to encounter any of the elliptical manos or sandstones so common at the adjacent sites along the coast and in the mountains.

Entire pestle of gray sandstone with mottled texture; 149.2 mm. long, 63.5 mm. diameter, 57.1 mm. diameter at the top. The butt bulges 15.8 mm.

Entire pestle of greenish gray sandstone, 171.4 mm. long, 57.1 mm. diameter.

Entire pestle of gray sandstone; no marks of pecking; 130.1 mm. long, 57.1 mm. wide, 38.1 mm. thick.

Entire pestle of greenish gray sandstone; no marks of pecking; 147.6 mm. long, 76.2 mm. wide, 50.8 mm. thick.

Butt fragment of pestle of black scoria, the only specimen of this material in the collection. The body of the pestle is somewhat bent. 152.4 mm. long, 73 mm. diameter. The bulge of the butt is 22.2 mm. The butt shows signs of much use.

Butt fragment of nicely made pestle of very hard sandstone, olive green cast; 134.9 mm. long, 57.1 mm. diameter. Bulges of butt 9.5 mm. Very symmetrical.

Entire pestle of creamy gray sandstone; both ends bulging; 98.4 mm. long, 63.5 mm. diameter. Bulge of butt 15.8 mm., bulge of top 12.7 mm.

Entire pestle of gray stone, 161.9 mm. long, 76.2 mm. diameter. Bulge of butt 12.7 mm.

Tip fragment of pestle of gray sandstone; 161.9 mm. long, 60.3 mm. diameter. It is difficult to estimate the original length of the specimen.

Butt fragment of pestle of gray sandstone; 142.8 mm. long, 63.5 mm. diameter. The bulge of the butt is 15.8 mm. The fracture is coated heavily with asphalt as if it had been mended by the Indians.

Tip fragment of pestle of gray sandstone, elliptical in section; 168.2 mm. long, 76.2 wide, 57.1 mm. thick. The sides are the original surface, the edges are pecked rounding.

Entire pestle of gray stone, squarish in section, crudely shaped; 192 mm. long, 57.1 mm. wide, 50.8 mm. thick. Bulge of butt 12.7 mm.

Tip fragment of pestle of gray sandstone; 127 mm. long, 50.8 mm. diameter.

Butt fragment of pestle of gray sandstone; 158.7 mm. long, 63.5 mm. diameter. Bulge of butt 15.8 mm.

Tip fragment of pestle of gray sandstone, rather coarse textured; 136.5 mm. long, 53.9 mm. diameter.

Entire pestle of gray sandstone, smooth textured: 155.5 mm. long, 47.6 mm. diameter. Part of the original butt and also part of the original tip are intact.

Entire pestle of buff gray sandstone, 101.6 mm. long, 57.1 mm. diameter. Tip bulges 15.8 mm.

Entire pestle of yellow ochre colored sandstone, rather coarse-textured but hard; 190.5 mm. long, 66.6 mm. diameter. Bulge of butt 12.7 mm. This is the most pronouncedly curved pestle in the collection.

Entire pestle of greenish gray smooth textured sandstone; 150.8 mm. long, 39.6 mm. diameter. Bulge of butt, 12.7 mm.

Entire pestle of gray sandstone, 390.5 mm. long, 66.6 mm. diameter. Bulge of butt, 23.8 mm. The tip is enlarged at the end, having a diameter of 36.5 mm.

Entire pestle of gray sandstone, rather limy in texture and friable; 676.2 mm. long, 44.4 mm. diameter at the butt, 55.5 mm. diameter at the center, 33.3 mm. diameter at a distance of 38.1 mm. from the tip, at which distance the tapering of the tip starts. Bulge of butt, 12.7 mm. One side of the tip is broken off, slanting with a fracture 31.7 mm. long, but enough of the tip remains to show that it was rounding and quite sharp. The specimen was found broken in two, the break being 263.5 mm. from the butt. This rather remarkable specimen is by far the longest pestle recovered from Burton Mound and is so slender that it can not have been put to any violent use in pounding. (Pl. 8, *h*.)

Entire pestle of gray sandstone; 174.6 mm. long, 50.8 mm. diameter. Bulge of butt 14.2 mm. The extremity of the tip is enlarged and measures 31.7 mm. diameter. Neatly made.

Entire pestle of gray sandstone, smooth textured; 498.4 mm. long, 63.5 mm. diameter. Bulge of butt 9.5 mm. There is a ferrule 39.6 mm. diameter and 15.8 mm. wide, 44.4 mm. from the extreme tip. A companion specimen to that next described below. (Pl. 8, *i*.)

Entire pestle of gray sandstone, smooth textured; 495.3 mm. long, 69.8 mm. diameter. Bulge of butt 9.5 mm. There is a grooved ferrule 44.4 mm. diameter and 25.4 mm. wide, 26.9 mm. from the extreme tip. (Pl. 8, *k*.)

Entire pestle of gray sandstone, 247.6 mm. long, 60.3 mm. diameter. Bulge of butt 12.7 mm. (Pl. 8, *c*.)

Entire pestle of friable gray sandstone; 133.3 mm. long, 57.1 mm. diameter. Bulge of butt 15.8 mm.

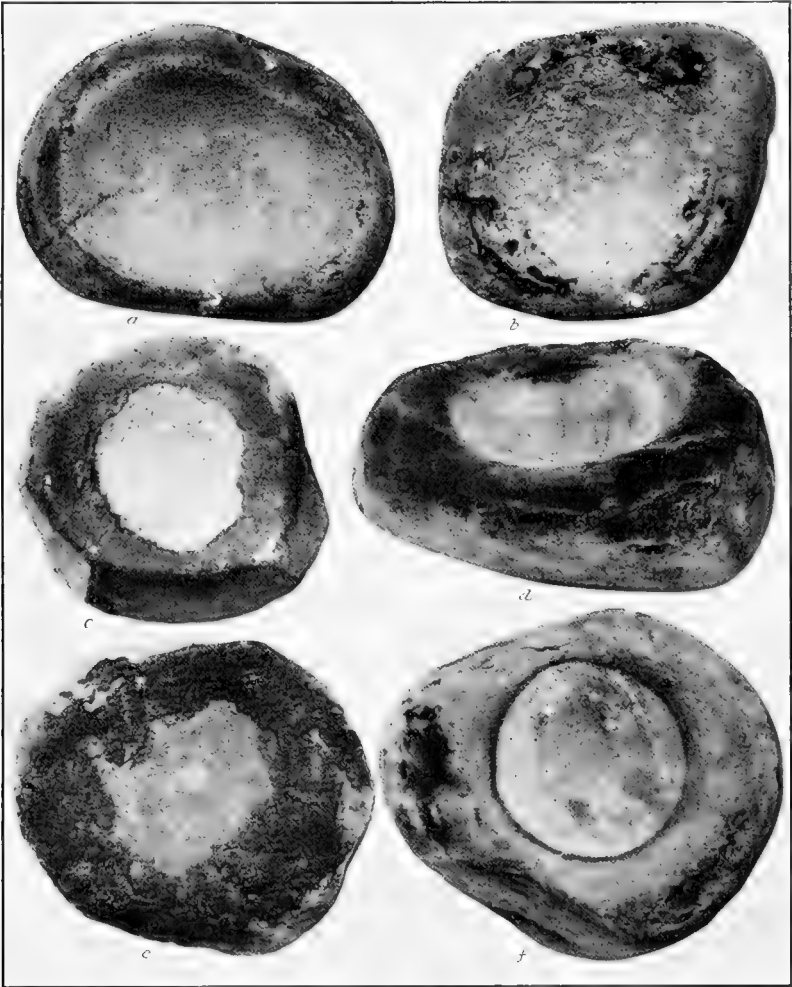
Butt fragment of pestle of greenish gray sandstone, 88.9 mm. long, 57.1 mm. diameter. Bulge of butt 12.7 mm. The surface of the pestle extending from the tip fracture 31.7 mm. is coated with asphalt which bears the imprint of perpendicular splints of some sort, evidently from a former mending of the specimen. There are 66 of these depressions in the asphalt.

Butt fragment of gray sandstone pestle. 76.2 mm. long, 38.1 mm. diameter. Bulge of butt 7.9 mm.

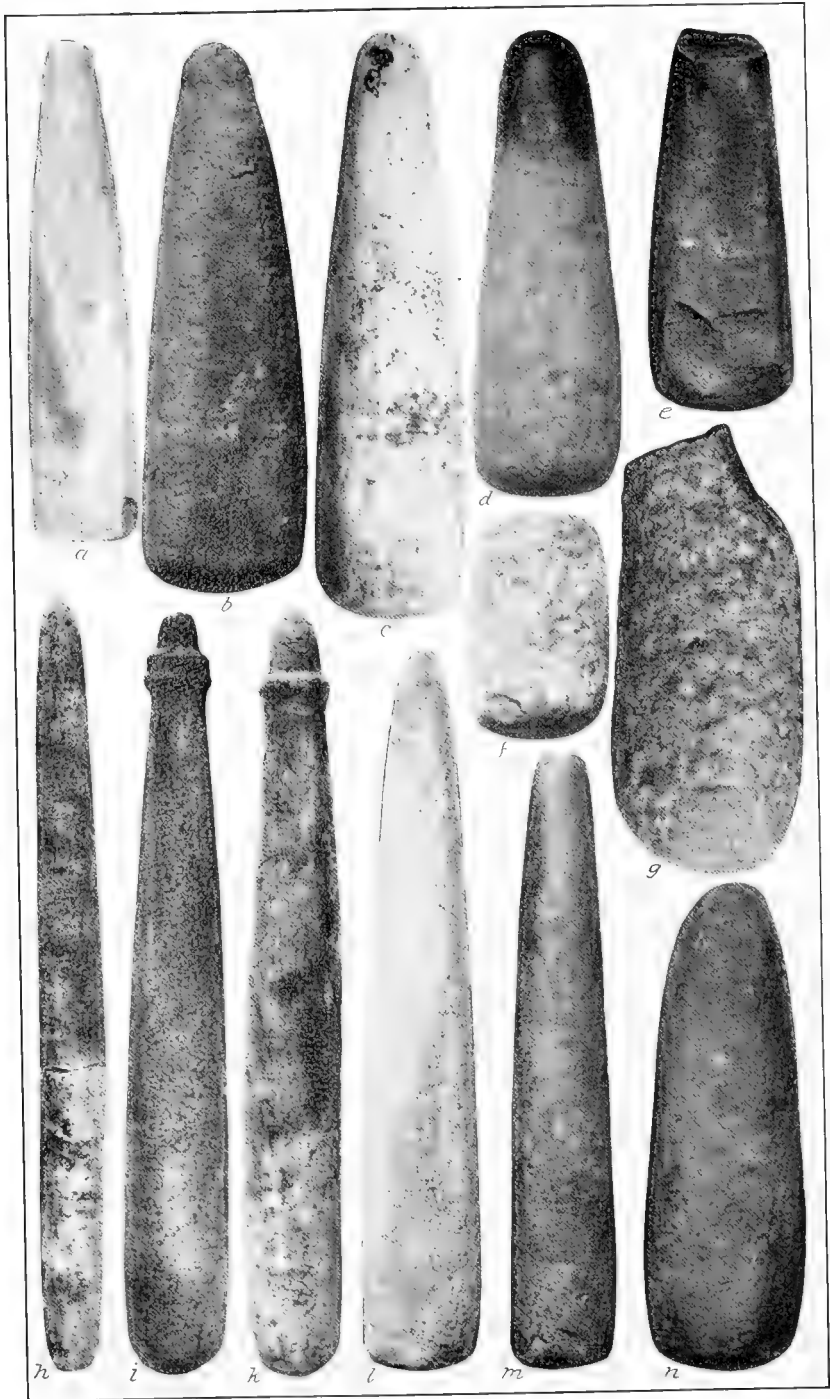
Butt fragment of brownish gray sandstone pestle, 100 mm. long, 41.2 mm. diameter. Bulge of butt 11.1 mm. The reverse surface is a fracture.

Butt fragment of greenish gray sandstone pestle, 92 mm. long, 63.5 mm. diameter. Bulge of butt 9.5 mm. The reverse side is a flat cleavage. (Pl. 8, *f*.)

Entire pestle of greenish gray sandstone, hard textured. The pestle is beautifully made and has a polished surface 203.2 mm. long, 61.9 mm. diameter.



HOPPER MORTARS



PESTLES

Bulge of butt 12.7 mm. The surface of the tip and adjacent sides for a space of some 63.5 mm. from the tip are stained with asphalt and present a blackened and polished surface. (Pl. 8, *d.*)

Entire pestle of greenish gray sandstone, smooth textured, 158.7 mm. long. Elliptical in section 31.7 mm. wide, 25.4 mm. thick. Both obverse and reverse sides are flat near the butt. Bulge of butt 9.5 mm.

Entire pestle of gray sandstone, smooth textured and hard, 441.3 mm. long, 71.4 mm. diameter. Bulge of butt 9.5 mm. A little of the old surface of the rock shows on the obverse near the butt. (Pl. 8, *l.*)

Entire pestle of greenish gray sandstone, fine textured and hard, 384.1 mm. long, 63.5 mm. diameter. Bulge of butt 11.1 mm. Symmetrical and smooth surface. (Pl. 8, *m.*)

Entire pestle of gray and limy sandstone, 320.6 mm. long, 53.9 mm. diameter. Bulge of butt 9.5 mm. A sharper taper starts 114.3 mm. from the tip and the tip is squared and 25.4 mm. diameter. There is a chip off the surface adjacent to the butt. (Pl. 8, *a.*)

Entire pestle of gray sandstone, 146 mm. long, 85.7 mm. diameter, 50.8 mm. diameter near the tip. Bulge of butt 6.3 mm.

Tip fragment of gray sandstone pestle, 120.6 mm. long, 69.8 mm. diameter.

Entire gray sandstone pestle, 127 mm. long, 61.9 mm. diameter. Bulge of butt 12.7 mm.

Entire gray sandstone pestle, 120.6 mm. long, 53.9 mm. diameter. Bulge of butt 12.7 mm.

Entire pestle of gray sandstone with olive green cast, exhibiting very interesting pecking because of its coarseness; 349.2 mm. long, 69.8 mm. diameter. Bulge of butt 25.4 mm. The butt is rounded but neither butt nor tip shows the slightest abrasion, but have just the same surface as elsewhere on the pestle. Evidently the specimen has never been used.

Butt fragment of gray sandstone pestle, 227 mm. long, 107.9 mm. diameter. Bulge of butt 12.7 mm.

Central fragment of gray sandstone pestle, 92 mm. long, 95.2 mm. diameter. The material of this pestle matches that of the one last described above, but the fragment does not fit on the other fragment.

Median fragment of gray sandstone pestle, 190.5 mm. long, 90.4 mm. diameter. Bulge of butt about 25.4 mm.

Entire yellowish sandstone pestle, 222.2 mm. long, 73 mm. diameter. Bulge of butt 12.7 mm. There is a shallow groove around the specimen 25.4 mm. from the extreme tip, forming a sort of neck. (Pl. 8, *b.*)

Butt fragment of yellowish sandstone pestle, 198.4 mm. long, 82.5 mm. diameter. Bulge of butt 25.4 mm. (Pl. 8, *g.*)

Entire pestle of gray sandstone, 201.6 mm. long, 42.8 mm. diameter. Bulge of butt 4.7 mm. (Pl. 8, *m.*)

Butt fragment of gray sandstone pestle, 165.1 mm. long, 60.3 mm. wide, 41.2 mm. thick. Obverse an reverse flat and evidently the original surface. The butt bulges 6.3 mm. (Pl. 8, *e.*)

Entire pestle of gray sandstone, 149.2 mm. long, 63.5 mm. diameter. Bulge of butt 19 mm., bulge of tip 15.8 mm. Both butt and tip show signs of use for pounding.

Central fragment of gray pestle, 63.5 mm. long, 58.7 mm. diameter.

Tip fragment of gray sandstone pestle, 107.9 mm. long, 63.5 mm. diameter.

Central fragment of gray sandstone pestle, 53.9 mm. long, 53.9 mm. diameter.

Butt fragment of gray sandstone pestle, 114.3 mm. long, 63.5 mm. diameter. Bulge of butt 9.5 mm.

Tip fragment of gray sandstone pestle, 53.9 mm. long, 44.4 mm. diameter.

Butt and median fragment of gray sandstone pestle, 131.7 mm. long, 50.8 mm. diameter. Bulge of butt 9.5 mm. The reverse is a fracture.

Butt fragment of gray sandstone pestle, 133.3 mm. long, 60.3 mm. diameter. Bulge of butt 17.4 mm.

Tip fragment of yellowish coarse sandstone pestle, 165.1 mm. long, 47.6 mm. diameter. A sharper taper starts 63.5 mm. from the tip.

Central fragment of gray sandstone pestle, 196.8 mm. long, 76.2 mm. diameter. The butt is an old break, encrusted with earth, has no bulge and shows no use.

Tip fragment of yellowish sandstone pestle, 190.5 mm. long, 63.5 mm. diameter.

Butt fragment of greenish gray sandstone pestle, fine textured and hard; 139.7 mm. long, 57.1 mm. diameter. Bulge of butt 14.2 mm. Purchased from Mr. José Ortega. Obtained by him from Burton Mound in 1901.

Entire pestle of gray sandstone, 119 mm. long, 53.9 mm. diameter. Bulge of butt 12.7 mm. Some of the original tip end is still intact and shows asphalt stains on its surface. There is a large chip off the tip which extends 44.4 mm. down the side. Purchased from Mr. José Ortega. Obtained by him from Burton Mound in 1901.

Entire pestle of greenish gray sandstone, 146 mm. long, 53.9 mm. diameter. Bulge of butt 12.7 mm. Thin surface scales are chipped off the butt. Purchased from Mr. José Ortega. Obtained by him from Burton Mound in 1901.

Entire pestle of gray sandstone, somewhat friable, unique in shape since both ends are the same size and have equal bulge. At double ended pestle consisting of a straight shaft of stone, 252.4 mm. long, 74.6 mm. diameter. Bulge of the butts 12.7 mm. Purchased from Mr. José Ortega. Obtained by him from Burton Mound in 1901.

#### LIMESTONE DISHES

The considerable number of dishes or cups made by pecking out a roundish concavity in a slab or chunk of soft whitish limestone is probably to be explained by the occurrence of this material near at hand. Just what the vessels were used for is a matter of conjecture, none of them containing paint or other material, or even a stain. Several of them had not been used at all, judging from the fresh-looking pecking of their hollows. Their holding capacity is small. The stone is too soft to make the vessel of use for grinding, pounding, or even mashing. One of the specimens has a concavity on both sides.

Dish of yellowish limestone, 85.7 mm. long, 76.2 mm. wide, 44.4 mm. thick. The concavity is 38.1 mm diameter, 76.2 mm. deep. Edges rounded except at one end which is a square fracture.

Dish of whitish, soft limestone, 152.4 mm. long, 95.2 mm. wide, 53.9 mm. thick. Concavity 76.2 mm. diameter, 12.7 mm deep. Edges rounded except one broken side.

Dish of cream-colored limestone, very light in weight, 215.9 mm. diameter, 179.3 mm. wide, 66.6 mm. thick. Edges rounded. Concavity 76.2 mm. diameter, 17.4 mm. deep. The concavity is worn very smooth from use.

Dish of gray limestone, 152.4 mm. long, 117.4 mm. wide, 41.2 mm. thick. Concavity 76.2 mm. diameter, only 9.5 mm. deep. (Pl. 9, *b.*)

Dish of cream-colored limestone, darker in layers; 92 mm. long, 79.3 mm. wide, 44.4 mm. thick. Edges rounded. The concavity is 50.8 mm. diameter and 14.2 mm. deep. The concavity shows peckings.

Dish of cream-colored light-weight limestone, 123.8 mm. long, 95.2 mm. wide, 50.8 mm. thick. Edges squared from old fractures. Concavity 25.4 mm. diameter, 7.9 mm. deep, and has the appearance of having been bored with a blunt point.

Dish of cream-colored limestone, very soft; 142.8 mm. long, 127 mm. wide, 63.5 mm. thick. Edges rounded with exception of the longest edge, which is a squared fracture. This specimen is peculiar in that it has a concavity on both sides. The concavity on the obverse, shown in the photograph, measures 69.8 mm. diameter and 23.8 mm. deep. The reverse concavity is 69.8 mm. diameter and 14.2 mm. deep. (Pl. 9, *a.*)

Dish of cream-colored limestone, very soft and light in weight; 155.5 mm. long, 136.5 mm. wide, 60.3 mm. thick. Edges rounded, apparently the original shape of the stone. Concavity 25.4 mm. diameter, 23.8 mm. deep.

Dish of light-buff chalky limestone, 180.9 mm. long, 149.2 mm. wide, 53.9 mm. thick. Edges rounded; the original shape of the stone. Concavity 82.5 mm. diameter, only 7.9 mm. deep.

Dish of gray limestone, the surface of which is encrusted with dark gray matter; 101.6 mm. long, 76.2 mm. wide, 38.1 mm. thick. Edges somewhat rounded. Concavity 44.4 mm. diameter, 9.5 mm. deep.

Dish of somewhat pinkish gray limestone, 127 mm. long, 117.4 mm. wide, 31.7 mm. thick. Edges rounded. All surfaces are in rough condition. Concavity 57.1 mm. diameter and 11.1 mm. deep.

Dish of whitish limestone, 228.6 mm. long, 101.6 mm. wide, 57.1 mm. thick. Edges rounded. There are straight ridges along the side margins of the obverse surface. The concavity is 120.6 mm. long, 76.2 mm. wide, and 19 mm. deep. (Pl. 9, *e.*)

Dish of light gray limestone which has the appearance of having been reddened by fire, 196.8 mm. long, 26.9 mm. wide, 38.1 mm. thick. The edges consist of old and worn fractures and one more recent fracture. Concavity 50.8 mm. diameter, 6.3 mm. deep.

Dish of light gray limestone, 88.9 mm. long, 69.8 mm. wide, 41.2 mm. thick. Edges rounded with exception of an end fracture, which almost eats into the concavity and is therefore to be considered as a more recent break. Concavity 57.1 mm. diameter, 19 mm. deep. (Pl. 9, *c.*)

Dish of cream-colored limestone, 128.5 mm. long, 123.8 mm. wide, 66.6 mm. thick. Edges rounded. Concavity 95.2 mm. long, 76.2 mm. wide, 22.2 mm. deep.

Dish of cream-colored limestone, 133.3 mm. long, 104.7 mm. wide, 38.1 mm. thick. Edges rounded with exception of a fracture which evidently breaks the original specimen almost in half and carries away perhaps a third of the concavity. The concavity measures 66.6 mm. diameter and 15.8 mm. deep.

Dish of buff-colored limestone, 179.3 mm. long, 149.2 mm. wide, 55.5 mm. thick. Edges rounded. Very light in weight. Concavity 82.5 mm. diameter and shows coarse peckings.

Dish of gray limestone, very soft, both obverse and reverse surfaces consisting of a yellowish layer. The original shape was evidently oblong with squared edges, but a transverse fracture has reduced the length. 117.4 mm. long, 117.4 mm. wide, 33.3 mm. thick. The concavity is 76.2 mm. diameter and so shallow that its depth is difficult to measure.

Dish of cream-colored limestone, 174.6 mm. long, 153.9 mm. wide, 82.5 mm. thick. Edges and bottom rounded. Concavity 88.9 mm. diameter, 26.9 mm. deep. The specimen was found as two halves.

Dish of cream-colored limestone, 146 mm. diameter, 69.8 mm. thick. Edges rounded. The concavity is 76.2 mm. diameter, 47.6 mm. deep. The concavity shows pecking and has in it three serpula holes from the rock, which was evidently picked up on the beach.

Dish of cream-colored limestone. Very light in weight. The edges contain serpula holes. 231.7 mm. long, 225.4 mm. wide, 104.7 mm. thick. Edges rounded, bottom flattish. The concavity measures 123.8 mm. diameter, 30.1 mm. deep. This is the largest of the dishes of soft limestone.

#### TRAY OF SANDSTONE

Only one specimen was obtained of the typical flat sandstone tray or platter, but this is a large-sized and important one.

Tray of somewhat buff colored grayish sandstone with a very high sand content, 434.9 mm. long, 288.9 mm. wide, 44.4 mm. high. The edges are rounded. The deepest part of the concavity is 19 mm. diameter, the center of the concavity being shallower, measuring only 4.7 mm. lower than the edge of the tray. The concavity starts about 38.1 mm. from the extreme edge. The bottom shows no pecking and is quite flat. (Pl. 9, *d.*)

#### OLLAS OR COOKING POTS OF STEATITE

Fifteen steatite ollas or cooking pots in entire condition or nearly so were obtained, as well as quantities of fragments that would not piece together. Ollas of gray steatite are said to have been obtained by barter from the Catalina Island Indians, who lived, roughly, 100 miles away, and the larger ollas were considered very valuable even at the source of supply. Several of the ollas taken are among the largest and most symmetrical ever obtained in southern California. The largest specimen stands  $15\frac{5}{8}$  inches high and weighs 72 pounds.

The specimens vary considerably as regards relative size of the mouth or orifice. Some are almost bowls in shape and may have been used both as cooking pots and as receptacles.

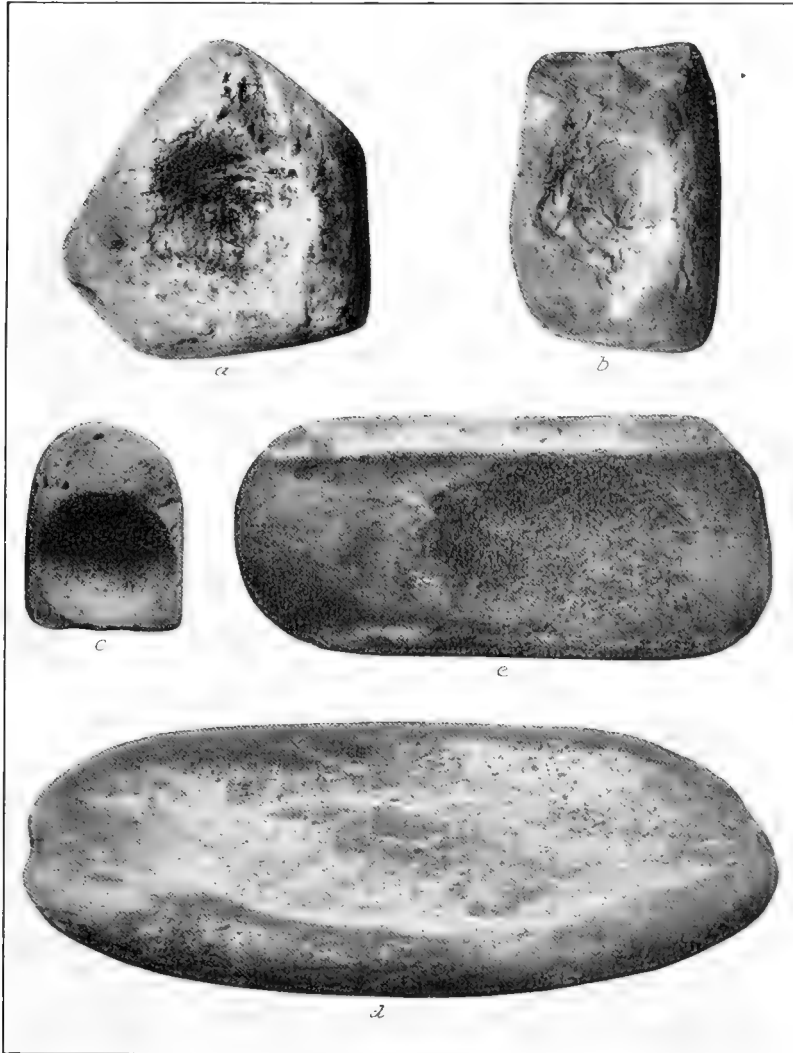
A zigzag incision decorates the rim of several of the specimens.

Olla of gray steatite, 311.1 mm. diameter, 165.1 mm. high, orifice 157.1 mm. diameter, rim squared and varying in width from 12.7 mm. to 17.4 mm. The rim is undecorated. The concavity is 168.2 mm. deep. The bottom is rounded, its flatter portion measuring about 177.8 mm. diameter.

Olla of black steatite, beautifully made and exhibiting minute crinkly veinings and blotchings of a dark gray color on its surface; 155.5 mm. diameter, 95.2 mm. high, orifice 111.1 mm. diameter. Rim squared and 7.1 mm. diameter. A groove runs around 3.1 mm. to 4.7 mm. below the rim. Concavity 87.3 mm. diameter. The bottom is flattish at its central portion. Surfaces highly polished. Such a vessel could be used either as an olla or as a bowl. The clean condition of the present specimen suggests that it had not been used for cooking.

Olla of gray steatite, 130.1 mm. diameter, 101.6 mm. high, orifice 92 mm. diameter. Rim merely rounded. Concavity 92 mm. diameter. Bottom somewhat flat for a space about 88.9 mm. diameter.





*a, b, c, e*, LIMESTONE DISHES. *d*, SANDSTONE TRAY



BOWLS AND OLLAS OF STEATITE

Olla of gray steatite, 161.9 mm. diameter, 107.9 mm. high; orifice 106.3 mm. diameter. Rim rounded, 23.8 mm. to 12.7 mm. wide, a groove running around 4.7 mm. below the rim. Concavity 95.2 mm. diameter. Bottom rounded.

Fragmentary olla of gray steatite, 266.7 mm. diameter, 190.5 mm. high, orifice 146 mm. diameter. Rim squared, 11.1 mm. wide. A groove runs around 9.5 mm. below the rim. Concavity 168.2 mm. diameter. Bottom somewhat flattened.

Olla of gray steatite, 352.4 mm. diameter 247.6 mm. high; orifice 152.4 mm. diameter. Rim squared and 12.7 mm. diameter. A groove runs around 3.1 mm. below the rim. The rim is decorated with zigzag incisions. Concavity 233.3 mm. diameter. Bottom rounded.

Olla of gray steatite, the largest olla in the collection; 406.4 mm. diameter, 396.8 mm. high; orifice, 133.3 mm. The rim is squared and 23.8 mm wide. A groove runs about 9.5 mm. below the rim. The rim is decorated with zigzag incisions. Concavity 330.2 mm. diameter. Bottom rounded. Weight 72 pounds.

Olla of gray steatite, 349.2 diameter, 298.4 mm. high; orifice, 139.7 mm. diameter. Rim, 14.2 mm. wide; squared, and a groove runs around 6.3 mm. below the rim. The rim is decorated with zigzag incisions. Concavity, 268.2 mm. diameter. The bottom is flattish over an area about 203.2 mm. diameter. (Pl. 10, e.)

Olla or bowl of black steatite with gray mottling in the shape of flecks, 152.4 mm. diameter, 98.4 mm. high; orifice, 115.8 mm. diameter. The rim is 7.9 mm. wide, squared, and a groove runs around 3.1 mm. below the rim. The concavity is 85.7 mm. diameter. The bottom is quite flat and measures 101.6 mm. diameter. The specimen was probably used as a bowl, since it shows no signs of having been placed over fire. (Pl. 10, a.)

Olla of gray steatite, 117.4 mm. diameter, 82.5 mm. high; orifice, 74.6 mm. diameter. Rim squared and 6.3 mm. wide. A groove running around 3.1 mm. below the rim. Concavity, 73 mm. diameter. Bottom quite flat and 19 mm. diameter. This little pot is lopsided. (Pl. 10, d.)

Olla of gray steatite, 225.4 mm. diameter, 165.1 mm. high; orifice, 133.3 mm. diameter. Rim, 6.3 mm. wide, and squared. A groove runs around 3.1 below the rim. The rim was decorated with zigzag incisions, but these are now largely worn off. Concavity 141.2 mm. diameter. Bottom flattish, repaired with plaster of Paris as shown in the photograph. (Pl. 10, b.)

Olla of gray steatite that was found in scattered fragments. The olla has been blackened by fire. 165.1 mm. diameter, 111.1 mm. high; orifice 95.2 mm. diameter. The rim is 7.9 mm. wide, squared, and a groove runs around 4.7 mm. below the rim. Concavity 101.6 mm. diameter. Bottom rounded.

Olla of gray steatite, 260.3 mm. diameter, 222.2 mm. high; orifice 130.1 mm. diameter. Rim rounded merely. Concavity 190.5 diameter. Bottom flattish over an area 139.7 mm. diameter.

Olla of gray steatite, 298.4 mm. diameter, 254 mm. high; orifice 142.8 mm. diameter. Rim merely rounded. Concavity 231.7 mm. diameter. Bottom flattish over an area 177.8 mm. diameter. (Pl. 10, f.)

Olla of gray steatite, 263.5 mm. diameter, 158.7 mm. high; orifice 157.1 mm. Rim squared 12.7 mm. wide, a groove running around 4.7 mm. below the rim. Concavity 138.1 mm. deep. Bottom flattish. The specimen was found in fragments and is plentifully pieced together with plaster of Paris.

#### STEATITE BOWLS

The bowls of steatite which resulted from the excavation, although few in number, are handsome in workmanship. The veining and

mottling in some of the specimens is especially fine. The steatite bowls, in distinction to the globular and small-mouthed ollas or cooking pots, are described below.

Bowl of gray steatite, built up of eight or more fragments found in scattered position; 174.6 mm. diameter, 98.4 mm. high; orifice 155.5 mm. diameter. Rim squared and 6.3 mm. wide. Concavity 80.9 mm. deep. Bottom rounded. Some of the fragments show traces of soot.

Bowl of black steatite, 165.1 mm. diameter, 76.2 mm. high; orifice 147.6 mm. diameter. Rim squared, 11.1 mm. wide, a groove running around the bowl 4.7 mm. below the rim. Concavity 69.8 mm. deep. The bottom is rounding and is ornamented by a double-lined cross pricked into its surface. The dots are some of them 3.1 mm. diameter, and the lines are approximately 25.4 mm. apart. The bowl is somewhat blackened with soot.

Bowl of black steatite with beautiful crinkly veins of gray color; found in widely scattered fragments; 301.6 mm. diameter, 133.3 mm. high. The rim is nicely squared and is 15.8 mm. diameter. Both inside and outside surfaces are beveled, beginning 6.3 mm. from the rim. The concavity is 120.6 mm. diameter. The bottom is rounded. The bowl evidently broke in two and was mended by the Indians, as is indicated by the four pairs of holes which were drilled along the crack or break, for the purpose of lashing the halves together. These holes are about 20.6 mm. diameter and average about 25.4 mm. apart; that is, they are drilled about 12.7 distant from the fracture. (Pl. 10, c.)

Bowl of blackish gray steatite. This bowl and the two next to be described below were found nested together; 104.7 mm. diameter, 79.3 mm. high; orifice 88.9 mm. diameter. Rim rounded. Concavity, 73 mm. deep. Bottom flat and 76.2 mm. diameter.

Bowl of slate-gray steatite, very clean and new in appearance, 82.5 mm. diameter, 60.3 mm. high. Rim rounded, 4.7 mm. wide, a groove running around the bowl 4.7 mm. below the rim. Concavity 55.5 mm. deep. Bottom perfectly flat, 53.9 mm. diameter. This was the middle-sized bowl of the nesting of three bowls described above.

Bowl of black steatite, 41.2 mm. diameter, 25.4 mm. high; orifice 31.7 mm. diameter. Rim rounded. Concavity, 20.6 mm. deep. Bottom rounded. The bowl is somewhat lopsided and the rim is very uneven. Found as the smallest bowl of the group of three nested bowls.

Bowl of gray steatite with pretty black veining, found in several fragments; 133.3 mm. diameter, 92 mm. high; orifice 114.3 mm. diameter. Rim squared, 6.3 mm. wide, little of the rim being intact. Concavity, 85.7 mm. deep. Bottom rather flat, 63.5 mm. diameter.

#### CANOE-SHAPED VESSELS OF SANDSTONE AND STEATITE

An end fragment of a unique and evidently large-sized canoe-shaped vessel of sandstone was recovered; also two canoe-shaped vessels cut from steatite. One of these latter was an unusually large canoe, fragmentary, and with the fragments widely scattered. Fortunately, both ends, which furnish practically all the information that we need to know about the shape of the vessel, were recovered. From them the entire craft can be easily reconstructed, except that we do not know the exact length. The specimen appears to be by far the largest steatite canoe ever reported from a California site,

and exceeded in size only perhaps by our sandstone specimen. The other steatite canoe, smaller and more symmetrical, was found intact and is one of the handsomest specimens on record.

An important and very unique specimen is the end fragment of a canoe-shaped vessel of gray sandstone, which has the appearance of having been in the fire. It fortunately preserves the shape of the end of the rim of this vessel, which must have been more than a foot in length. The fragment has a maximum diameter of 140.5 mm. The top of the rim is squared and 10 mm. wide, making a right angle where it bends at the end of the vessel; 61.5 mm. of the rim remains on one side, 39 mm. on the other side. The end of the vessel forms a vertical edge 51 mm. long; the thickness of the bottom of the vessel is 27 mm. It is unfortunate that no further fragments of this interesting sandstone dish were recovered. (Pl. 11, *a*.)

Canoe-shaped vessel of somewhat sparkling slate-colored gray steatite. Recovered from scattered fragments. It was possible to piece these fragments together so as to reconstruct both ends of the canoe, but three fragments from the central portion neither fit together with each other nor are adjacent to the end fragments. Therefore, the length of the canoe can not be determined with accuracy, but is estimated after careful study to have been about 431.8 mm. As reconstructed in Plate 11, *b*, it is 451 mm. long. The canoe may have been considerably shorter, but if so it was irregularly proportioned and had poorly curved lines. Even if the ends which we pieced out are placed touching each other, which would be an absurd reconstruction, the structure is over a foot long. The specimen is, therefore, as far as I am able to learn, the largest steatite canoe taken from Indian graves in southern California. The reconstructed length of the sandstone canoe just described above, only one tip of which is taken, is conjectural.

The large end of the canoe measures as follows: 212.7 mm. long, 106.3 mm. wide, 98.4 mm. high. The keel is flat, 50.8 mm. wide, 11.1 mm. thick. The end of the gunwale projects beyond the end of the keel 53.9 mm.

The smaller end measures 120.6 mm. long, 92 mm. wide, 95.2 mm. high. The keel is flat, as in the larger end fragment, 34.9 mm. wide, 22.2 mm. thick. The end of the gunwale projects beyond the end of the keel 50.8 mm.

The gunwale is squared, 7.9 mm. wide, and a neat groove runs about the canoe about 8 mm. below it. In other words, the gunwale is shaped in the same manner as the rim of many steatite ollas and bowls. (Pl. 11, *b*.)

Entire and unbroken canoe-shaped vessel of gray steatite, neatly made and very symmetrical; 211.1 mm. long, 77.7 mm. wide. The height of the ends of the canoe is 63.5 mm., of the middle of the canoe 57.1 mm. The gunwale is squared, 7.9 mm. wide, but no groove runs below it. The bottom is rounding, not flat as it is in the large steatite canoe. The central part of the bottom is only 7.9 mm. thick.

#### STEATITE COMALS

The comal or steatite slab was a familiar article at the Channel Indian household. The hole in the small end was for the purpose of inserting the poker stick for handling when heated. It was also the hot-water bottle of the Indians; it was heated and laid against the paining part. In addition to the fine specimens listed below, we obtained many fragments of comals.

Comal of slate gray steatite color, which differs from the other comal specimens in having a raised ridge about 22.2 mm. wide around the entire margin of both obverse and reverse sides. The height of this ridge is 4.7 mm. or even 6.3 mm. in places, 273 mm. long, 247.6 mm. wide, 139.7 mm. wide at the upper end. Thickness varies from 30.1 mm. to 34.9 mm. A hole 17.4 mm. diameter is located 38.1 mm. from the smaller end. (Pl. 12, e.)

Comal of slate gray steatite, lopsided. Edges squared. 298.4 mm. long, 254 mm. wide; 193.6 mm. wide at lower end, 153.9 mm. wide at upper end. Thickness varies from 22.2 mm. to 25.4 mm. A hole 14.2 mm. diameter is located 42.8 mm. from the smaller end. (Pl. 12, f.)

Comal of grayish steatite, unusually square cornered. 273 mm. long, lower edge 241.3 mm. wide, upper edge 152.4 mm. wide. Thickness varies from 25.4 mm. to 31.7 mm. The upper edge has an incurve of 9.5 mm. Hole 22.2 mm. diameter, 34.9 mm. from the upper edge. (Pl. 12, c.)

Comal of grayish steatite, differing from the other comals in not having concave surfaces; this specimen is thickest in the center and thinner toward the edges, which are squared; 280.9 mm. long, 187.3 mm. wide, lower edge 127 mm. wide, upper edge 82.5 mm. wide. There is a hole 15.8 mm. diameter located 36.5 mm. from the upper edge. (Pl. 12, d.)

Comal of slate gray steatite, found in broken condition; 206.3 mm. long., 174.6 mm. wide, lower edge 168.2 mm. wide, upper edge 63.5 mm. wide. Thickness varies from 17.4 mm. to 15.8 mm. Hole 12.7 mm. diameter, 22.2 mm. from the upper edge.

Comal of light slate gray color, full of bright sparkle, found in broken condition. The specimen is somewhat lopsided. 247.6 mm. long, 215.9 mm. wide, lower edge about 177.8 mm. wide, upper edge 133.3 mm. wide; thickness varies from 22.2 mm. to 23.8 mm. Hole 15.8 mm. diameter is located 44.4 mm. from the upper edge.

Comal of gray steatite, 225.4 mm. long, 230.1 mm. wide, upper edge 88.9 mm. wide; thickness varies from 15.8 mm. to 23.8 mm. Hole 15.8 mm. diameter, 30.1 mm. from the upper edge. The lower right-hand corner is broken off with a fracture 53.9 mm. long. (Pl. 12, a.)

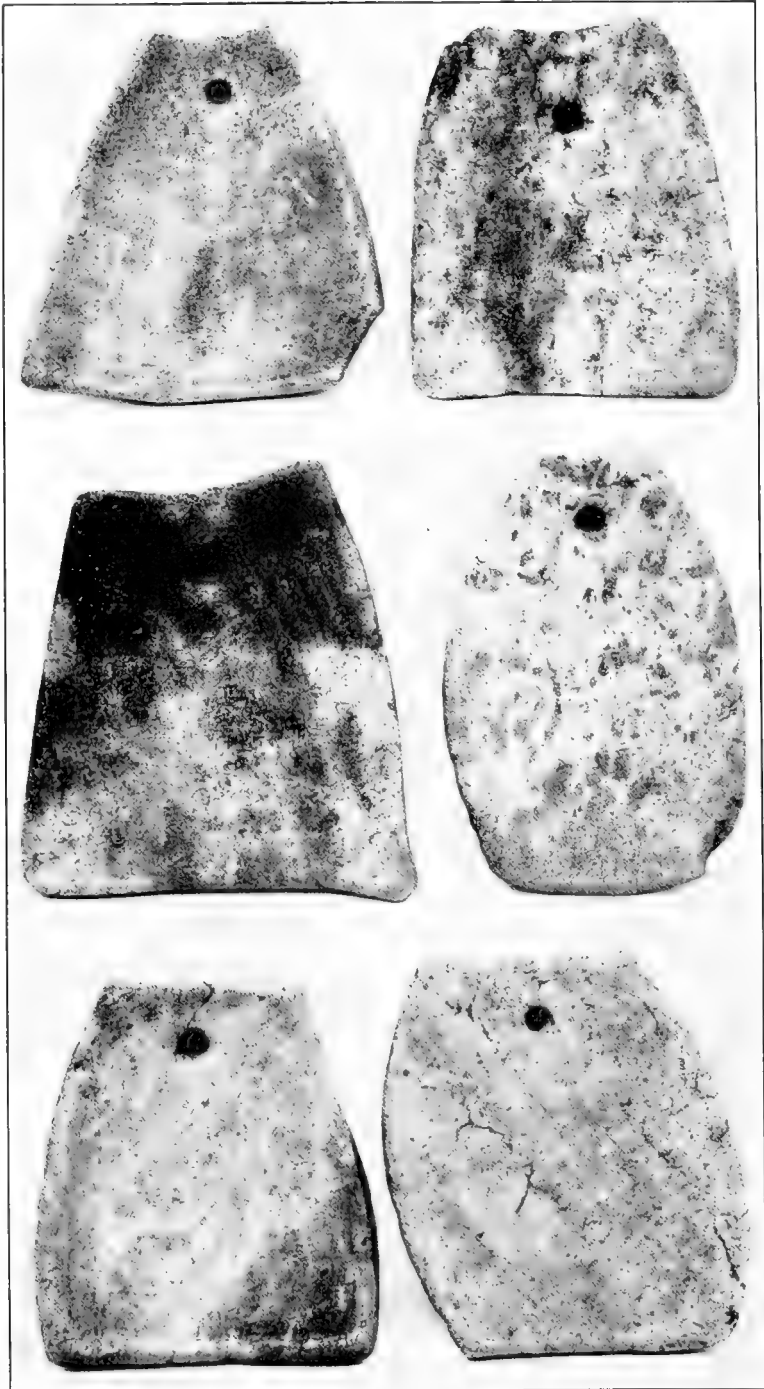
Comal of light slate gray color, 246 mm. long, 209.5 mm. wide, lower edge 203.2 mm. wide, upper edge 107.9 mm. wide, thickness varies from 22.2 mm. to 23.8 mm. Hole 15.8 mm. diameter is located 49.2 mm. from the upper edge. (Pl. 12, b.)

#### STEATITE PIPES

The pipes of the Channel Indians were worked from gray or black steatite, more rarely from other stone. The usual form is a straight conical tube, with the result that the Indian when smoking had to tip the bowl of his pipe upward in order to keep the contents from falling out. The boring was usually done from both ends and is often slender in the central portion of the pipe. A stem of bird bone, for instance the limb bone of a pelican, has been found inserted in the small end of the pipe in a considerable number of southern California specimens, made fast by sticking with asphalt. Some specimens that do not have the mouthpiece of bone show traces of the asphalt adhesive. A pipe from Santa Barbara, collected by Mr. Stephen Bowers



a, FRAGMENT OF CANOE-SHAPED VESSEL OF SANDSTONE. b, FRAGMENTS OF CANOE-SHAPED VESSEL OF STEATITE



COMALS OF STEATITE



and in the National Museum, has a bend of about 20 degrees in the middle and is provided with bone mouthpiece; this specimen is figured by C. C. Abbott on page 130 of the Putnam Report.<sup>16</sup>

Five of these steatite pipes were recovered from the Burton Mound, one of them being a fragment. They are all of medium size and ordinary type, such as are figured by Putnam, Plate VIII. The longer type (Putnam, Pl. VII), the short type (Heye,<sup>17</sup> Pl. XXVII, *a*), and anomalous types also occur on the channel.

Fragment of pipe of gray steatite, 57 mm. long, 32 mm. wide, 22 mm. thick. The hole is 18 mm. diameter at the larger end and 10 mm. diameter at the smaller end, but this does not represent the original diameter. (Pl. 13, *c*.)

Pipe of gray steatite, intact except for lack of mouthpiece; 120 mm. long. 33 mm. diameter at large end, 24 and 19 mm. diameter at small end. The small end has two borings. One of these has broken through the wall of the pipe, making a gap in the edge of the small end 2.5 mm. diameter, besides leaving the edge of almost paperlike thinness. At the large end the edge is squared and 3 mm. wide. The boring is 24.5 mm. diameter at the large end; the borings at the small end are 21 mm. maximum diameter, 12 mm. lesser diameter. (Pl. 13, *c*.)

Pipe of gray steatite, mouthpiece lacking. 99.5 mm. long, 21 mm. maximum diameter, 23.5 mm. diameter at larger end, 13 mm. diameter at smaller end. Edge of larger end sharp, not squared, with a groove 2 mm. back from the edge. Edge of smaller end also rather sharp. The boring is 17 mm. diameter at the larger end, tapering to the smaller end, where it is 10 mm. diameter. The boring was done from both ends and is only 6.4 mm. diam. where these two borings meet in the interior of the pipe. (Pl. 13, *a*.)

Pipe of bluish gray steatite, intact except for loss of mouthpiece. Very neatly made. 120 mm. long, 27.5 mm. diameter at larger end, 17 mm. diameter at smaller end, the extreme end being broken off, but not very much of it since some of the asphalt which was used for sticking the bird bone mouthpiece on is still intact. The edge of the larger end is squared, 5 mm. diameter and has an outward bulge, rounded in shape, extending some 4 mm. down the outside wall of the pipe. The boring is from both ends and is 19 mm. diameter at the larger end, 8 mm. diameter at the smaller end. (Pl. 13, *b*.)

Perfect and entire pipe of dark gray steatite with mouthpiece intact. The body of the pipe is 92 mm. long, including the mouthpiece the pipe is 114 mm. long. The larger end is 31.5 mm. diameter, the smaller end is 16.5 mm. diameter. The edge of the larger end is rather thin and rounded; there is no bulge toward the outside as there is in the specimen last described, but a groove runs neatly around the pipe 4 mm. back from the end. The bird bone mouthpiece is 8 mm. diameter. The end of the mouthpiece is squared straight across. The mouthpiece is inserted in the smaller end of the pipe and fastened in place very neatly and symmetrically with strong black asphalt. The pipe is bored from both ends, the diameter of the boring at the large end being almost that of the end of the pipe, which is 31.5 mm. (Pl. 13, *d*.)

<sup>16</sup> Putnam, F. W., Reports upon Archeological and Ethnological Collections, United States Geographical Surveys West of the 100th Meridian, Vol. VII, Washington, D. C., 1879.

<sup>17</sup> Heye, George G., *op. cit.*

## SPHEROIDAL SINKERS OF SANDSTONE

Sinkers of sandstone, apparently used as weights on primitive fishlines, have as their characteristic shape in the specimens obtained an elongate spheroid form, around the longest axis of which passes a shallow groove for the attachment of the cord. In some specimens this groove is made only at the sharper turns, and does not extend across the flatter sides. The size varies from that of a hen's egg to that of a baseball. Only typical specimens are described below.

Sinker of gray sandstone, friable, 73 mm. long, 57.1 mm. wide, 44.4 mm. thick. The groove is 12.7 mm. wide, and runs around the greatest diameter. (Pl. 13, *f.*)

Sinker of gray sandstone, friable, 68.2 mm. long, 57.1 mm. wide, 57.1 mm. thick. The groove is peculiarly narrow, only 3.1 mm. wide, and runs around the greatest diameter. (Pl. 13, *g.*)

Sinker of gray sandstone, friable, 128.5 mm. long, 104.7 mm. wide, 95.2 mm. thick. The groove is 12.7 mm. wide, and runs around the greatest diameter. (Pl. 13, *h.*)

Sinker of gray sandstone, friable, 127 mm. long, 117.4 mm. wide, 76.2 mm. thick. The groove is 12.7 mm. wide, and is in the plane of the greatest diameter, but extends for 57.1 mm. at one end and consists of a mere abraided patch at the other end, while there is no trace of a groove along the sides of the specimen. (Pl. 13, *i.*)

Sinker of greenish gray sandstone, fine textured and hard, 88.9 mm. long, 79.3 mm. wide, 60.3 mm. thick. The groove is 19 mm. wide, and is pecked as usual around the long axis of the specimen, passing around the greatest diameter.

Sinker of brownish gray sandstone, 123.8 mm. long, 107.9 mm. wide, 88.9 mm. thick. The groove is 12.7 mm. wide, and passes around the greatest diameter. The groove can not be traced on the reverse side of the specimen, though it is carefully cut on the obverse side and around the two ends.

Sinker of light gray sandstone, unusually coarse in texture, 73 mm. long, 66.6 mm. wide, 58.7 mm. thick. Almost a perfect sphere. Groove 12.7 mm. diameter passes around the greatest diameter.

Median fragment of sinker of brownish gray sandstone, 77.7 mm. long, 68.2 mm. wide, 39.6 mm. thick. The groove is 12.7 mm. wide and passes as usual around the longest diameter. The greater part of the obverse surface is broken away.

## SPHERICAL STONES

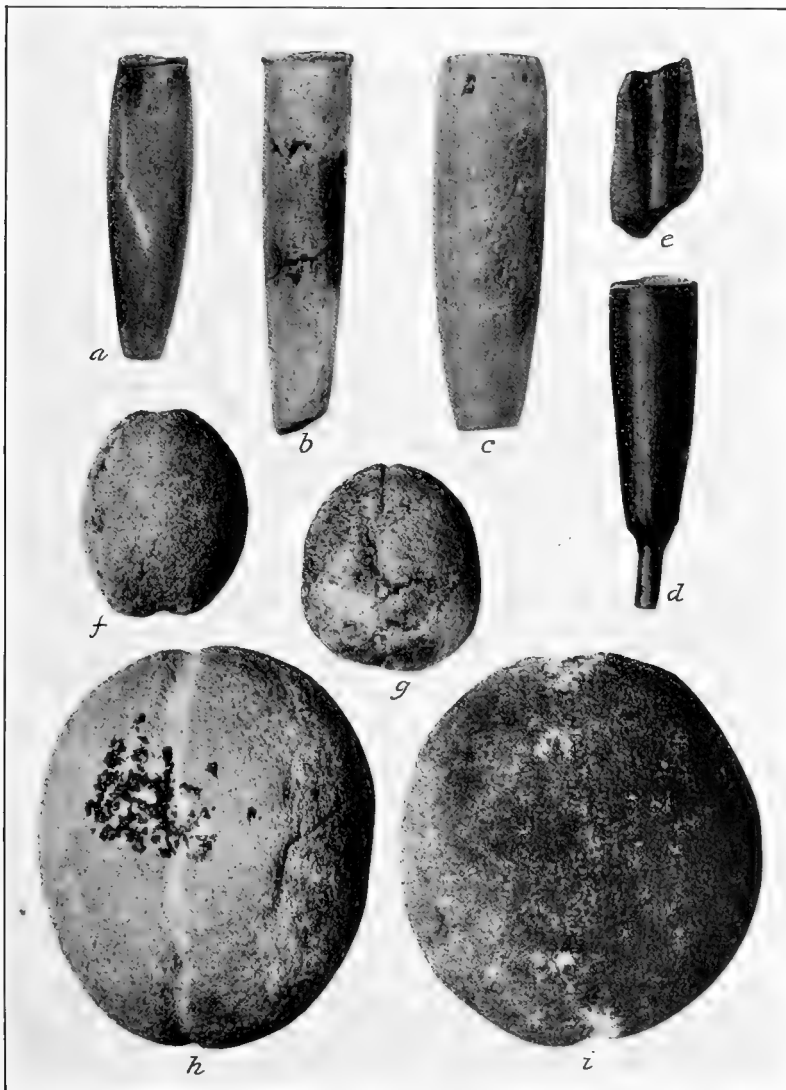
Several worked spherical stones were found in the mound. They may have been used for several purposes. We figure a typical specimen.

Stone ball of smooth textured gray sandstone. 44 mm. diameter. (Pl. 14, *b.*)

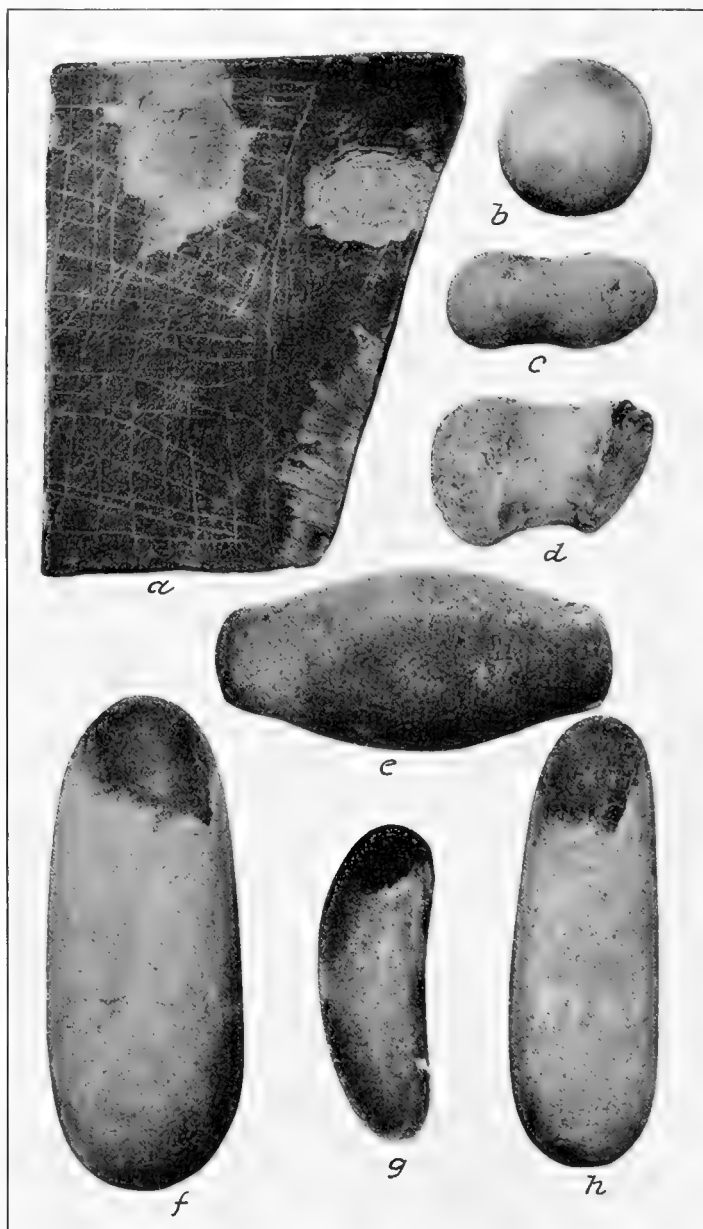
## TWO-LOBED STONES

A larger specimen than that described below was obtained by Mr. Francis Figg-Hoblyn, of Santa Barbara, at the grading operations at the mound in 1901.

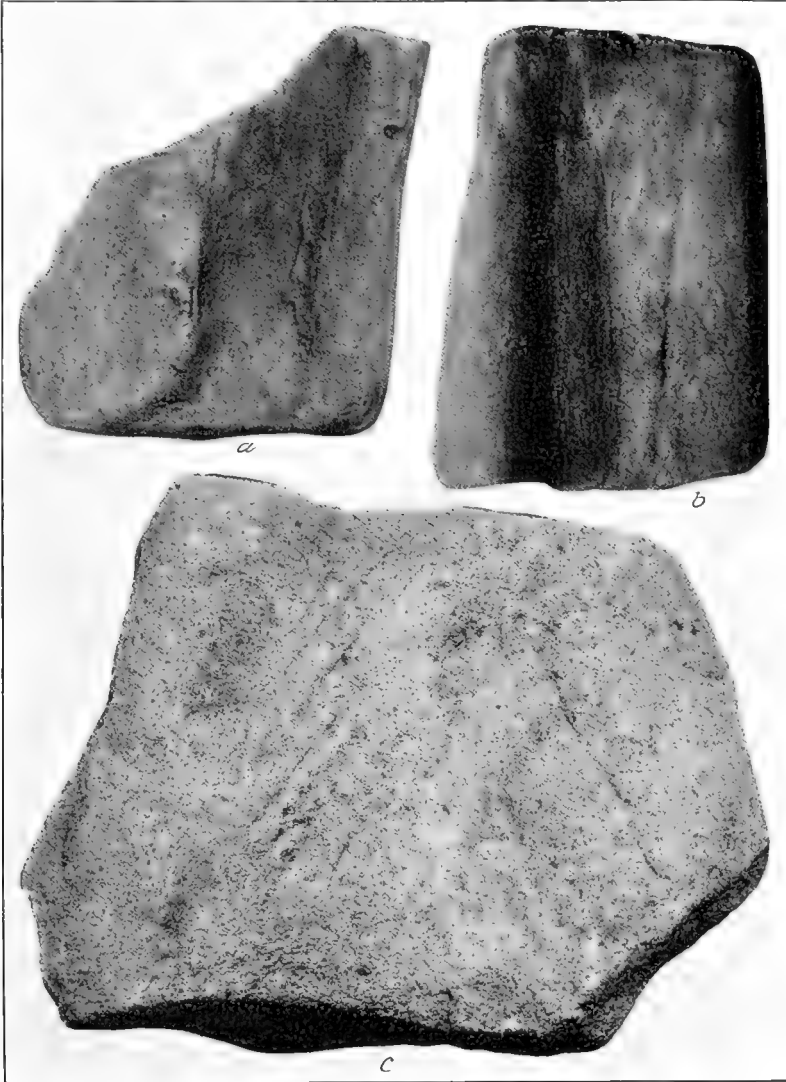
Cylindrical stone with neck at center and rounded ends. Coarse gray sandstone. 58 mm. long, 26 mm. diameter, 23 mm. diameter at neck. Purchased from Mr. José Ortega, who obtained it from Burton Mound in 1901. (Pl. 14, *c.*)



*a-d*, STEATITE SMOKING PIPES. *e*, FRAGMENT OF STEATITE PIPE. *f-i*, SPHEROIDAL SINKERS OF SANDSTONE



*a*, INCISED SLAB OF PAPER SHALE. *b*, BALL OF SAND-  
STONE. *c*, TWO-LOBED STONE. *d*, FRAGMENT OF RING-  
STONE. *e*, BARREL-SHAPED STONE. *f-h*, TARRIED STONES



RUBBING STONES



*a*, GILSONITE PENCIL. *b-d*, QUARTZ CRYSTALS. *e-h*, IRON-STONE CONCRETION CUPS. *i*, CAKE OF HEMATITE

## FRAGMENT OF RINGSTONE

Fragment of a ringstone, about a quarter section, made of hard calcareous sandstone. This is the only ringstone specimen taken from the mound. The material is smooth textured, the fractures old. Fragment 68 mm. long, 41 mm. wide, 22 mm. thick. The original was perhaps 110 mm. diameter. (Pl. 14, *d.*)

## BARREL-SHAPED STONES

Cylindrical stone with bulging center and rounded ends. Coarse gray sandstone. 108 mm. long, 50 mm. diameter at the center, ends 26 mm. diameter, bulge of ends 7 mm. Purchased from Mr. José Ortega, who obtained it from Burton Mound in 1901. (Pl. 14, *e.*)

## INCISED SLAB OF PAPER SHALE

Slab of shale with scratchings on both surfaces. The shale is almost fine enough to be called slate. The surface is blackish but takes on an orange color almost like a lichenous layer in places on both sides. The scratches are not deep but one can feel them with the finger. The scratches are intended to give a cross-hatching pattern but are very irregularly executed. The edges of the slab are squared with straight fractures, making the fragment four-sided in shape. 101.5 mm. long, 82 mm. wide, 8.5 mm. thick. (Pl. 14, *a.*)

## TARRED STONES

Unworked sandstone or andesite pebbles of pestle-like shape with asphalt on one or both ends were found especially at plot *e*. Typical specimens may be described as follows:

Tarred stone, of gray sandstone, unworked. 136.5 mm. long, 53.9 mm. wide, 50.8 mm. thick. Asphalt adheres to the upper end of the stone as figured. (Pl. 14, *f.*)

Tarred stone of gray sandstone, unworked; 127 mm. long, 26.9 mm. diameter. Asphalt adheres to the upper end as figured. (Pl. 14, *h.*)

Tarred stone of gray sandstone, unworked; 88.9 mm. long, 30.1 mm. wide, 4.7 mm. thick. Asphalt adheres to the upper end as figured. (Pl. 14, *g.*)

Tarred stone of gray sandstone, unworked; 196.8 mm. long, 69.8 wide, 25.4 mm. thick. Asphalt adheres to one end.

Tarred stone of gray sandstone, unworked; 111.1 mm. long, 50.8 mm. wide, 11.1 mm. thick. Asphalt adheres to one end.

Tarred stone of gray sandstone, unworked; 139.7 mm. long, 57.1 mm. wide, 28.5 mm. thick. Asphalt adheres to one end.

Tarred stone of gray sandstone, unworked; 155.5 mm. long, 46 mm. wide, 7.9 mm. thick. Asphalt adheres to one end.

Tarred stone of gray sandstone, unworked; 155.5 mm. long, 55.5 mm. wide, 38.1 mm. thick. Asphalt adheres to one end.

Tarred stone of gray asphalt sandstone, unworked; 157.1 mm. long, 53.9 mm. wide, 38.1 mm. thick. Asphalt adheres to both ends.

Tarred stone of gray sandstone, unworked; 125.4 mm. long, 53.9 mm. wide, 25.4 mm. thick. Asphalt adheres to both ends.

Tarred stone of gray sandstone, unworked; 155.5 mm. long, 77.7 mm. wide, 30.1 mm. thick. Asphalt adheres to one end.

Tarred stone of reddish gray sandstone, very coarse, unworked; 142.8 mm. long, 71.4 mm. wide, 31.7 mm. thick. Asphalt adheres to one end.

## RUBBING STONES

The rubbing slabs of coarse sandstone, of which we found several good examples, were evidently obtained at the Santa Barbara mesa, west of the Burton Mound, where the formation occurs in quantities. They were useful for grinding shell, bone, and stone, but there is no way of proving what objects were ground on these particular specimens.

Rubbing stone of coarse gray sandstone, friable and gritty; 363.5 mm. long, 127 mm. wide, 34.9 mm. thick. All edges rounded. The obverse shows especially a broad longitudinal depression varying in width from 95.2 mm. to 133.3 mm. the deepest part of this groove being 9.5 mm. in depth. The groove exhibits in part a more buff color than the remainder of the surface, owing to its penetrating a different formation. The obverse shows two narrower longitudinal grooves of similar appearance. This is the largest rubbing stone.

Rubbing stone of greenish gray sandstone, not very coarse but friable; 139.7 mm. long, 106.3 mm. wide, 25.4 mm. thick. Both ends are fractures. The long edges are rounded. The obverse surface presents a wide longitudinal depression and has numerous flecks of asphalt.

Rubbing stone of gray sandstone, very fine textured; 130.1 mm. long, 79.3 mm. wide, 50.8 mm. thick. The edges are square fractures. Obverse and reverse surfaces present natural longitudinal ridges and depressions.

Rubbing stone of gray, fine-textured sandstone, quite hard; 180.9 mm. long, 158.7 mm. wide, 88.9 mm. thick. The edges are rounded with the exception of the diagonal edge, which seems to be a more recent break. A natural groove 69.8 mm. wide and 36.5 mm. deep runs longitudinally along the obverse surface. The reverse surface is flat. (Pl. 15, a.)

Rubbing stone of very coarse, somewhat greenish gray friable sandstone; 307.9 mm. long, 234.9 mm. wide, 92 mm. thick. A depression varying in width from 127 mm. to 165.1 mm runs across the middle of the slab. The surface of this depression shows coarse irregular diagonal scratches. The reverse has a prominent longitudinal ridge and shows no sign of use. The edges are mostly fractures. (Pl. 15, c.)

Rubbing stone of smooth textured gray sandstone, 196.8 mm. long, 142.8 mm wide, 41.2 mm. thick. A depression 101.6 mm. wide runs longitudinally across the obverse. The ends are square fractures, the side edges are naturally rounded. The reverse is flat. (Pl. 15, b.)

## FRAGMENT OF GILSONITE "PENCIL"

Worked cylindrical piece of white material identified as gilsonite; 18 mm. long, 3.5 mm. diameter. Unbored. The small end seems to have an older break than the larger end. Mr. F. W. Hodge, of the Museum of the American Indian, who happened to see the specimen, says that it suggests to him the medicine pencils used by the Zuñis for rubbing painting parts. (Pl. 16, a.)

## QUARTZ CRYSTALS

Quartz crystals of various sizes were used by the Indians for surmounting ceremonial wands of bone or as pendants, asphalt being applied to one end of the crystal for attachment. Several of these crystals were found in the excavations. The crystals are of what is



known as impure quartz and the source of supply has not been determined. Most of them have a pretty hexagonal cleavage at one end, which was, of course, the end displayed by the Indians.

Quartz crystal. 29.5 mm. long, 15 mm. wide, 12 mm. thick. Six well-formed faces at one end. Not glass clear. (Pl. 16, c.)

Small quartz crystal with somewhat marred cleavage. 15 mm. diameter. (Pl. 16, b.)

Irregular shaped crystal of quartz. Pretty and very clear. Cleavage lopsided. 26 mm. long, 23.5 mm. diameter. (Pl. 16, d.)

Quartz crystal with curious minute fractures throughout. The tip end has symmetrical cleavage, the butt is nicely shaped. 27 mm. long, 17.5 mm. diameter.

Beautiful but minute quartz crystal with very symmetrical cleavages at one end. The quartz at the other end is more cloudy. 14.25 mm. long, 8 mm. diameter.

Quartz crystal, clear as diamond, having well-formed faces at one end. 21 mm. long, 13 mm. wide, 9.5 mm. thick.

Irregular fragment of quartz crystal, with broken hexagonal cleavages at one end. 63 mm. long, 31 mm. wide, 15 mm. thick.

#### IRONSTONE CONCRETION CUPS

The shells of ironstone concretion had a wide use among the southern California Indians as cups and for like purposes. The concretions are usually of a brownish color and resemble a hollow sphere filled with sand. Concretions or fragments of concretions worn to shape by rubbing on a gritty stone make neat little cups. The size varies greatly, the largest listed below measuring 80.5 mm. in diameter.

Fragment of ironstone concretion cup which was used as a small paint bowl. Has two curious projections on the lip. Edge partly worked, partly fractures. Blackish chocolate color. This specimen may have been through fire; it looks as if the surface has been fluxed down a bit on the outside and there are many vesicles visible. 80.5 mm. diameter, 35 mm. high, walls about 8 mm. thick. Concavity 28 mm. (Pl. 16, h.)

Ironstone concretion cup. Lip ground off square. 22 mm. diameter, 10 mm. high; concavity 7.5 mm. deep. Symmetrical and prettily made.

Ironside concretion cup. Lip ground off square. 32 mm. diameter, 10 mm. high; concavity only 5 mm. deep. The rim is about 3 mm. wide. (Pl. 16, f.)

Ironstone concretion cup, the rim of which consists of an unworked square fracture. 28 mm. diameter, 12 mm. high; concavity 6 mm. deep.

Fragment of ironstone concretion cup, consisting of nearly half of original specimen; 61 mm. diameter, 20 mm. high; rim squared and 13 mm. diameter. The bottom of the fragment tapers to a thin edge. There are traces of red paint on the inside of the cup fragment. (Pl. 16, e.)

Ironstone concretion cup, identified as impure lamanite; 48 mm. diameter, 15.5 mm. high; concavity 9.5 mm. deep. The rim is ground more or less squared.

Ironstone concretion cup, 28 mm. diameter, 10 mm. high; concavity 7 mm. deep. Rim squared. About one-third of the rim is broken off with a straight

fracture 22 mm. long. There are scratches running in several directions on the surface of the concavity.

Ironstone concretion, 32 mm. diameter, 11 mm. high; concavity 7.5 mm. deep. The rim is squared. The inside of the concavity shows scratches from former use. (Pl. 16, *g*.)

Ironstone concretion cup, 28 mm. diameter, 19 mm. high, concavity 15 mm. deep. Rim neatly squared.

Ironstone concretion cup, 22 mm. diameter, 10 mm. high, concavity 7 mm. deep.

Ironstone concretion cup, 82 mm. diameter, 28 mm. high, 13.5 mm. deep. Shaped and sized like a deep-cupped rock oyster shell. Rim rounded and uneven.

#### ARROWHEADS, SPEARHEADS, DRILLS, AND KNIFE BLADES

A large number of flint points of this description were taken, many of them in a fragmentary condition. These instruments can be classified according to (1) use, (2) shape, (3) material. All three of these classifications are difficult. We also took quantities of flakes or fragments of the same materials as those used in the manufacture of the chipped implements.

As regards use, it is clear that the great majority of the objects are arrowheads. Those too large or heavy to be arrowheads may have been spearheads or may have been used mounted or unmounted for several other purposes. A class of points triangular in section may have been drills, but may also have been used on arrows. Only when showing traces of handles or of the tarring for handles can blades, although of the right shape and size, be accepted as knife blades. The knives do not necessarily have both edges sharp. (Cp. Wilson,<sup>18</sup> Pl. 51.)

The most elaborate classification of arrowheads according to shape is that offered by Wilson.<sup>18</sup> This classification we reproduce here, suggesting in brackets certain abbreviations by the use of which the shape of arrowheads can be expressed with some degree of satisfaction.

#### I. LEAF SHAPED [L]

This division includes all kinds: elliptical, oval, oblong or lanceolate forms bearing any relation to the shape of a leaf, and without stem, shoulder or barb.

General shape--	{	pointed at both ends [ambipointed, a].
		oval [o].
Base-----	{	long and narrow, parallel edges [slender, sl].
		convex [cx].
		straight [truncate, st].
		concave [cv].

<sup>18</sup> Thomas Wilson, *Arrowheads, Spearheads, and Knives of Prehistoric Times*, Annual Report of United States National Museum for 1897, Washington, 1899, pp. 811-988; classification, pp. 887-946, especially pp. 890-891.

## II. TRIANGULAR [T]

This division includes all specimens which, according to geometrical nomenclature, are in the form of a triangle, whether the bases or edges be convex, straight or concave. They are without stems and consequently without shoulders, though in some of the specimens the extreme concavity of the base produces barbs when the arrowshaft is attached.

Base----- { convex [cx].  
                   { straight [truncate, st].  
                   { concave [cv].

## III. STEMMED [S]

This subdivision includes all varieties of

Stem----- { straight [parallel edges, p].  
                   { pointed [contracting, c].  
                   { expanding [e].  
                   { round [r].  
                   { flat [f].

except those with certain peculiarities and included in Division IV [Irregular]; and whether the bases or edges are convex, straight, or concave.

General shape--- { lozenge-shaped, not shouldered or barbed [un-  
                           shouldered, u; diamond-shaped, rhomboid, d].  
                   { shouldered, but not barbed [shouldered, sh].  
                   { shouldered and barbed [barbed, b].

## IV. PECULIAR FORMS [IRREGULAR, I]

This division includes all forms not belonging to the other divisions, and provides for those having peculiarities, or the specimens of which are restricted in number and locality.

1. Beveled edges.
2. Serrated edges.
3. Bifurcated edges.
4. Long barbs, square at ends. Peculiar to England, Ireland, and Georgia, United States.
5. Triangular in section.
6. Broadest at cutting end, trenchant transversal. Peculiar to western Europe.
7. Polished slate.
8. Asymmetric.
9. Curious forms.
10. Perforators.

In our present collection the leaf-shaped points are the most numerous; then follow the stemmed varieties and a very few triangular

arrowheads. As a fourth class we must regard the points that are triangular in section, which are clearly to be distinguished from all others and are chiefly of the coffee-colored material (see below). With these triangular-sectioned points are probably to be grouped a number of more irregular or poorly made specimens. A first guess would be that the points triangular in section are drills, but none of them show striations or wear such as might be produced by actual use in boring.

As regards nomenclature for the various kinds of rock employed in making the chipped implements, it is convenient to adopt a descriptive scheme based on color, classing all varieties of flaking stone loosely as "flint," just as the Spanish Californians speak of them as "pedernal." As regards the provenance of the stone, the Channel region abounds in pedernal of various colors and qualities. It is found scattered in fragments and in ledges or deposits. Even the beach furnishes abundant specimens. We have therefore adopted the following provisional scheme for classifying our chipped points.

1. Clear obsidian. Black volcanic glass with few or no bubbles, quite translucent.

2. Bubbly obsidian. Black volcanic glass full of minute bubbles.

3. Blackish. Blackish opaque obsidian, of grayish black color, never coal-black. Very few specimens have a pure texture, the majority showing whitish flecks. In some specimens a slight banding can be seen, but specimens at all noticeably banded have been assigned to separate classes.

4. Blackish, slightly banded. The same as subdivision 3 but slightly banded with whitish or gray lines.

5. Blackish banded. The same as subdivision 3 but prominently banded with whitish or gray lines, the light colored lines being as prominent as the blackish lines. The whole at a little distance gives a pleasing gray effect.

6. Blackish with whitish flecks. The same as subdivision 3 with whitish or gray dots or flecks.

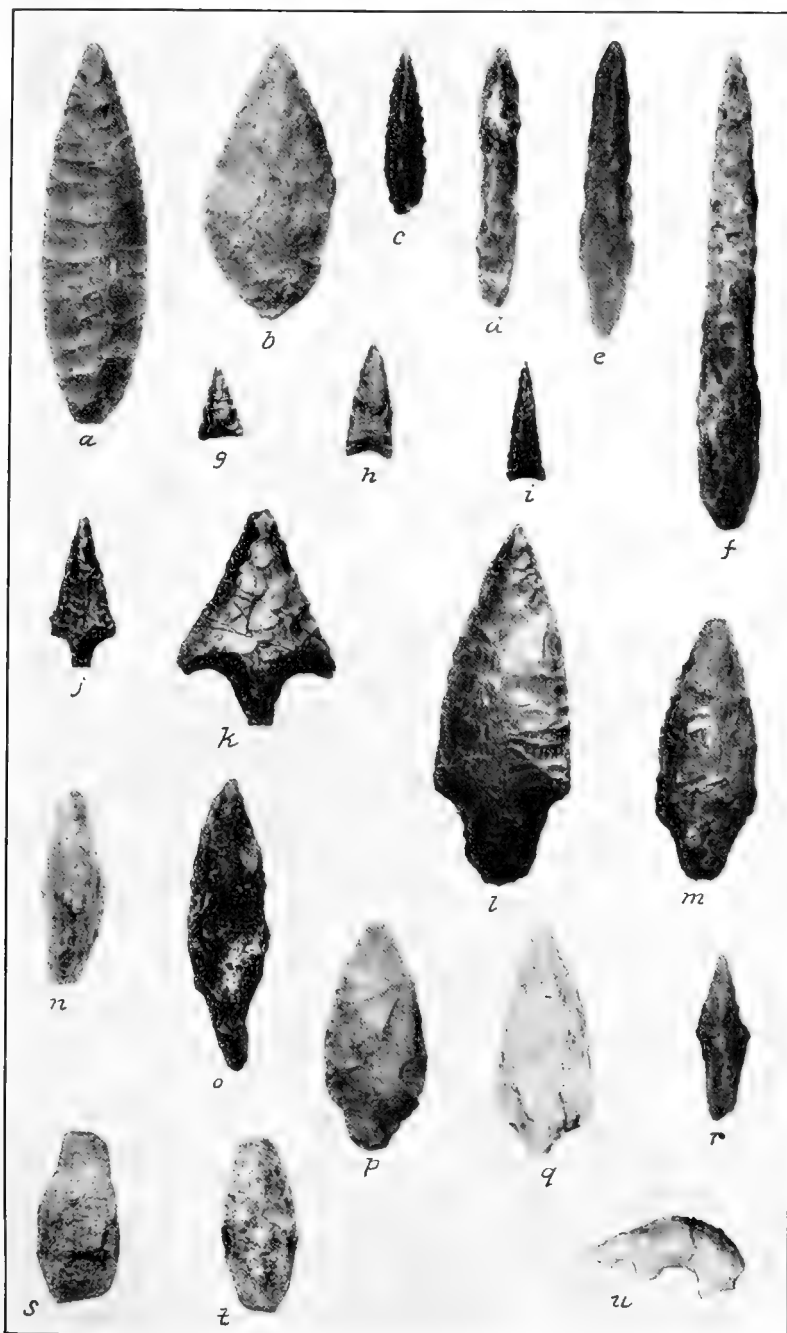
7. Gray. The same as subdivision 3 but moderately dark gray color. Some specimens are banded or flecked.

8. Dark gray. The same as subdivision 7 but darker, approaching the blackish type, but not so dark. Some specimens are banded or flecked, or have a brownish cast.

9. Whitish gray. The same as subdivision 7 but very light. Of quite uniform texture.

10. Reddish gray. The same as subdivision 7 but reddish gray. Distinct from the flesh-colored material. The color of some of the specimens might be termed raw sienna.

11. Greenish gray. The same as subdivision 7 but greenish gray. Several specimens have traces of red banding.



a-r, ARROWHEADS, DRILLS, KNIFE BLADES. s-t, REAMERS OF SANDSTONE. u, FLINT IMPLEMENT WITH ONE EDGE COARSELY TOOTHED



12. Coffee colored. Most specimens show whitish impurities in layers or flecks. Some specimens are very translucent. This group differs from the flesh colored only in being of a different shade. A few specimens show impurities of blackish, pink, and especially whitish color in blotches.

13. Flesh colored. There is considerable variation in color and the impurities are in the form of blotches of whitish color. Evidently a variety of the coffee-colored material. In some places the rock has dark yellow streaks. In two specimens there is more white impurity than flesh-colored body.

14. Flesh colored, banded with darker flesh color.

15. Dark yellow. A very yellow variety of the coffee colored or flesh colored.

16. Red jasper. The red color tends in some specimens to be brownish. Others have green or coffee colored mottlings. A few specimens have white veins. In some specimens the red is quite bright.

17. Green jasper. Some specimens have red or coffee colored mottlings.

18. Whitish, almost pure white.

19. Whitish but of a more gray cast.

20. Whitish but with traces of pinkish hue.

21. Whitish with a bluish cast.

Entire arrowhead. Clear obsidian. Stemmed, straight, truncate base, shouldered. Double convex in section. 25 mm. long, 15.5 mm. wide, 5 mm. thick.

Entire arrowhead or drill, possibly a mere flake. Flesh colored. Truncate base. Triangular in section. 45 mm. long, 13 mm. wide, 9 mm. thick. (Pl. 17, *n.*)

Tip fragment of arrowhead. Coffee colored. Leaf-shaped, truncate base. Double convex in section. 46 mm. long, 11 mm. wide, 6 mm. thick.

Apparently entire arrowhead. Red jasper. Leaf-shaped, truncate base. Double convex in section. 41 mm. long, 10.5 mm. wide, 5 mm. thick. (Pl. 17, *c.*)

Base fragment consisting almost entirely of the stem of an arrowhead. Clear obsidian. Stem contracting. Double convex in section. 19 mm. long, 15 mm. wide, 7.5 mm. thick.

Entire arrowhead. Dark gray. Irregular, truncate, apparently fractured, base. Squarish in section. 39.5 mm. long, 11 mm. wide, 11 mm. thick.

Entire arrowhead. Green jasper. Stemmed, contracting, shouldered. Double convex in section. 33 mm. long, 13 mm. wide, 7 mm. thick.

Entire arrowhead. Coffee colored, with much gray impurity. Leaf-shaped, truncate base. Double convex in section. 39 mm. long, 18 mm. wide, 9.5 mm. thick.

Entire arrowhead. Dark gray. Leaf-shaped, truncate base. Crooked plane. Double convex in section. 43 mm. long, 13 mm. wide, 6.5 mm. thick.

Entire arrowhead. Dark gray. Leaf-shaped, both ends rounded and having equally sharp blade. Slightly twisting plane. Double convex in section. 30 mm. long, 7 mm. wide, 4.5 mm. thick.

Tip fragment of arrowhead. Dark gray with blackish bandings. One edge finely serrated. Double convex in section. 32.5 mm. long, 10.5 mm. wide, 5.5 mm. thick.

Entire arrowhead, the butt of which may be a more recent fracture. Dark gray, with many flecks. Leaf-shaped, truncate base. Double convex in section. 32.5 mm. long, 18 mm. wide, 6.5 mm. thick.

Central fragment of arrowhead. Clear obsidian. Double convex in section. 20 mm. long, 12.5 mm. wide, 9 mm. thick.

Tip fragment of arrowhead or drill. Gray, with minute black particles throughout. Triangular in section. 32.5 mm. long, 12 mm. wide, 12 mm. thick.

Entire arrowhead. Blackish banded, of purple cast. Stemmed, contracting, shouldered. Double convex in section. 46 mm. long, 34 mm. wide, 7.5 mm. thick. (Pl. 17, *k*.)

Entire arrowhead. Dark gray. Leaf-shaped, convex base. All edges sharp and finely serrated. 34 mm. long, 9 mm. wide, 5 mm. thick.

Tip fragment of arrowhead. Flesh color, translucent. Apparently leaf-shaped. Flat convex in section. 50 mm. long, 19.5 mm. wide, 8 mm. thick.

Tip fragment or possibly entire arrowhead; the base appears to be a more recent fracture. Whitish. Leaf-shaped, narrow type, truncate or fractured base. Squarish in section. 44 mm. long, 14.5 mm. wide, 6.5 mm. thick.

Entire arrowhead, except that the base appears to consist of three more recent breaks. Blackish banded. Leaf-shaped, diagonal truncate or fractured base. Double convex in section. 57 mm. long, 24 mm. wide, 14 mm. thick.

Perfect and entire knife blade, with the asphalt for attaching it to the handle still intact. Dark yellow color. Stemmed, contracting, rounding base, shouldered. Double convex in section. Neatly made stem. Edges sharp. 54 mm. long, 36 mm. wide, 9 mm. thick. The asphalt shows the imprint of the longitudinal grain of the wood, and where the former end of the handle came there is a wide bulge of asphalt still adhering on both obverse and reverse surfaces.

Entire arrowhead. Gray. The two ends are much alike and it is impossible to determine which is to be considered the tip. Triangular in section. Symmetrical. 65 mm. long, 11 mm. wide, 10.5 mm. thick. (Pl. 17, *e*.)

Entire arrowhead. Flesh colored. Stemmed, diamond shaped, slanting truncate base. Tar extends 16.5 mm. up from the base. Symmetrical. Double convex in section. 49 mm. long, 13 mm. wide, 6.5 mm. thick.

Entire arrowhead. Whitish gray. Triangular, concave base. Symmetrical and beautifully made. Double convex in section. 20 mm. long, 13 mm. wide, 3 mm. thick.

Central fragment of arrowhead. Brownish gray. Narrow with straight sides. Double convex in section. 28 mm. long, 9.5 mm. wide, 5 mm. thick.

Entire arrowhead. Black. Triangular, concave base. All edges sharp. Double convex in section. 19 mm. long, 13 mm. wide, 3 mm. thick. One of the most neatly made of the arrowheads recovered.

Entire arrowhead or drill, neatly made. Coffee color. Pointed at both ends, but one end slightly fractured. Triangular in section. 67.5 mm. long, 11 mm. wide, 9 mm. thick. (Pl. 17, *d*.)

Entire arrowhead. Somewhat lopsided. Stemmed, straight, shouldered. Blackish. Double convex in section. 47 mm. long, 19 mm. wide, 7 mm. thick, stem 8.5 mm. wide.

Entire arrowhead. Stemmed, diamond-shaped, truncate base. Dark gray. Double convex in section. Some of the asphalt of the attachment still adheres to the base. 34.5 mm. long, 16 mm. wide, 6.5 mm. thick.



Central fragment of arrowhead. Blackish. Stemmed, diamond-shaped. Part of stem and shoulders intact. Double convex in section. 44 mm. long, 25 mm. wide, 12 mm. thick. It appears that the tip has been broken off but this may be the original condition.

Entire arrowhead. Flesh colored. Stemmed, contracting, truncate base, slightly shouldered. Double convex in section. 58 mm. long, 26 mm. wide, 8.5 mm. thick. (Pl. 17, *p.*)

Entire arrowhead. Stemmed, diamond-shaped. Dark gray. Double convex in section. 21 mm. long, 12 mm. wide, 5 mm. thick.

Base fragment of arrowhead. Stemmed, contracting, truncate base, shouldered. Green jasper. Double convex in section. 55 mm. long, 21 mm. wide, 9 mm. thick, stem 6 mm. wide. Estimated length of original 7 mm. longer than the present specimen.

Entire arrowhead. Blackish. Stemmed, contracting, truncate base, shouldered. Double convex in section. 31 mm. long, 15 mm. wide, 7 mm. thick, stem 4 mm. wide, 1.5 mm. thick.

Butt fragment of arrowhead. Blackish. Stemmed with short stem, truncate, apparently broken, base, shouldered. Double convex in section. 33 mm. long, 28 mm. wide, 7 mm. thick.

Entire arrowhead. Greenish gray. Stemmed, diamond shaped, both points much alike. Double convex in section. All edges sharp. 30 mm. long, 12 mm. wide, 6 mm. thick.

Butt fragment of arrowhead. Blackish banded. Stemmed, contracting, shouldered, almost barbed. Double convex in section. 33.5 mm. long, 26 mm. wide, 6 mm. thick.

Entire arrowhead. Red jasper. Leaf-shaped, concave base. Double convex in section. 30 mm. long, 12 mm. wide, 3 mm. thick. (Pl. 17, *h.*)

Entire arrowhead. Flesh color. Triangular, concave base. Double convex in section. 35 mm. long, 12.5 mm. wide, 3 mm. thick.

Entire arrowhead. Bubbly obsidian. Triangular, concave base. Double convex in section. 30 mm. long, 10 mm. wide, 3 mm. thick. (Pl. 17, *i.*)

Base fragment of arrowhead. Dark gray. Apparently the stem of diamond-shaped arrow-head, truncate base. Double convex in section. 24 mm. long, 19 mm. wide, 10 mm. thick. Stem 8 mm. wide.

Entire arrowhead. Red jasper. Stemmed, contracting, truncate base, shouldered at one side. Double convex in section. 51 mm. long, 19 mm. wide, 9 mm. thick, stem 8 mm. wide.

Tip fragment of arrowhead. Dark gray. Double convex in section. 9.5 mm. long, 12 mm. wide, 4.5 mm. thick.

Entire arrowhead. Green jasper. Triangular, concave base. Double convex in section. 29 mm. long, 12 mm. wide, 3.5 mm. thick.

Entire arrowhead. Blackish. Stemmed, diamond-shaped, truncate base. Double convex in section. 47 mm. long, 20 mm. wide, 8 mm. thick, stem 6.5 mm. wide.

Entire arrowhead. Flesh color. Stemmed, diamond-shaped, convex base. Double convex in section. Entire edge sharp. 53 mm. long, 23 mm. wide, 7 mm. thick, stem about 7 mm. wide. (Pl. 17, *q.*)

Entire arrowhead. Stemmed, contracting, rounding base, shouldered. Clear obsidian. Double convex in section. 82 mm. long, 31.5 mm. wide, 8.5 mm. thick. (Pl. 17, *l.*)

Entire arrowhead. Greenish gray. Leaf-shaped, convex base. Double convex in section. All edges sharp. The plane twists almost an eighth turn. 29 mm. long, 10 mm. wide, 2 mm. thick.

Entire arrowhead. Greenish gray. Leaf-shaped, truncate base. Double convex in section. All edges sharp. 28.5 mm. long, 11.5 mm. wide, 7 mm. thick.

Entire arrowhead. Coffee color. Stemmed, diamond-shaped, truncate base, symmetrical. Double convex in section. 60 mm. long, 24 mm. wide, 9 mm. thick, stem 8 mm. wide. (Pl. 17, *m*.)

Base fragment of arrowhead. Flesh color. Stemmed, contracting, irregularly shouldered. The stem seems to show a discoloration from tar or hafting. Double convex in section. 49.5 mm. long, 32.5 mm. wide, 8.5 mm. thick, stem 15 mm. wide.

Entire arrowhead. Whitish. Triangular, concave base. Double convex in section. All edges sharp. 19.5 mm. long, 12 mm. wide, 3.5 mm. thick.

Entire arrowhead. Blackish. Irregular shaped, sharpish at both ends. Somewhat triangular in section. 68 mm. long, 20 mm. wide, 17 mm. thick. (Pl. 17, *o*.)

Entire arrowhead. Flesh colored. Leaf-shaped, convex base. Irregularly double convex in section. 48 mm. long, 17 mm. wide, 12 mm. thick.

Entire arrowhead. Gray. Leaf-shaped, truncate base. Double convex in section. 32 mm. long, 11 mm. diameter, 6 mm. thick.

Entire arrowhead. Flesh colored. Leaf-shaped, convex base. Double convex in section. 27 mm. long, 10 mm. wide, 4 mm. thick.

Entire arrowhead. Green jasper. Leaf-shaped, convex base. Double convex in section. 28 mm. long, 10 mm. wide, 4 mm. thick.

Entire arrowhead. Gray, somewhat bluish. Stemmed, diamond-shaped, small fracture off each end. Double convex in section. 47 mm. long, 24 mm. wide, 8 mm. thick.

Entire arrowhead. Whitish with pink cast. Leaf-shaped, truncate base. Flat convex in section. 34 mm. long, 13 mm. wide, 5.5 mm. thick.

Entire arrowhead. Flesh colored. Truncate base. Triangular in section. 33.5 mm. long, 11 mm. wide, 9 mm. thick.

Entire arrowhead. Black. Stemmed, straight, truncate base, shouldered. Double convex in section. 38.5 mm. long, 14 mm. wide, 6.5 mm. thick.

Entire arrowhead. Whitish, milky quartz-like material. Triangular, concave base. Double convex in section. 22.5 mm. long, 10.5 mm. wide, 3 mm. thick.

Entire arrowhead. Dark gray, practically dull black. Leaf-shaped, truncate base. Double convex in section. 37 mm. long, 12 mm. wide, 7 mm. thick.

Entire arrowhead. Greenish gray. Triangular, concave base. Symmetrical. Double convex in section. 18 mm. long, 11 mm. wide, 3 mm. thick. (Pl. 17 *g*.)

Entire arrowhead. Bubbly obsidian. Stemmed, slightly contracting, truncate base, shouldered. Double convex in section. 35 mm. long, 16 mm. wide, 5.5 mm. thick. (Pl. 17, *j*.)

Apparently entire arrowhead, with possible fracture off base. Dark gray. Stemmed, straight, concave base, shouldered. Double convex in section. 28 mm. long, 17 mm. wide, 6.5 mm. thick.

Base fragment of arrowhead. Gray, one side typical whitish. Stemmed, contracting diamond-shaped. Double convex in section. 34 mm. long, 17 mm. wide, 5 mm. thick.

Central fragment of arrowhead or drill. Dark gray. Triangular in section, with sharp edges. 35 mm. long, 14 mm. diameter.

Tip fragment of knife blade. Greenish gray. Stemmed, truncate fractured base, shouldered, fracture off one shoulder. Double convex in section. The shoulders are well formed and 18 mm. from the tip. 35.5 mm. long, 29 mm. wide, 5 mm. thick.

Entire arrowhead or knife blade. Blackish. Leaf-shaped, truncate base. Symmetrical. Edges sharp with exception of the base, which is neatly squared. 93 mm. long, 27 mm. wide, 7 mm. thick. (Pl. 17, *a*.)

Almost entire arrowhead or knife blade, the base being apparently a fracture. Bubbly obsidian. Stemmed, truncate base, shouldered. Double convex in section. 41 mm. long, 27 mm. wide, 7 mm. thick.

Entire arrowhead. Red jasper, of dark vermilion color. Triangular, convex base. Double convex in section. Incurved butt. 23.5 mm. long, 12.5 mm. wide, 4 mm. thick.

Entire arrowhead. Blackish. Lopsided or curved, truncate base. Blunt point. Double convex in section. 27.5 mm. long, 10 mm. wide, 7 mm. thick.

Entire knife blade. Blackish banded. Double convex in section. 64 mm. long, 31 mm. wide, 8.5 mm. thick. (Pl. 17, *b*.)

Entire arrowhead. Blackish banded. Leaf-shaped, convex base. All edges sharp. Double convex in section. 34 mm. long, 27 mm. wide, 12.5 mm. thick.

Entire arrowhead. Flesh color and quite translucent. Stemmed, diamond-shaped, truncate base, somewhat lopsided. 38 mm. long, 13 mm. wide, 8 mm. thick. (Pl. 17, *r*.)

#### FLINT IMPLEMENT WITH ONE EDGE COARSELY TOOTHED

Just one specimen was recovered, but a typical one, of the implements coarsely toothed along one edge but having the other edge rounding, such as are figured by Wilson from San Miguel Island, Plate 40, Nos. 8, 11, and 14. These implements resemble a leaf-shaped arrowhead with a few roundish bits taken out of one side. Our specimen is of the typical whitish flint (chert) of which many of the arrowheads are made and comes from the screenings of Pit z. It represents a definite type of artifact but of unknown application. 35 mm. long, 14 mm. wide, 6 mm. thick. (Pl. 17, *u*.)

#### SANDSTONE REAMERS

Two easily identified reamers were found, both of the well-known type.

Reamer of coarse and gritty gray sandstone, 39 mm. long, 20 mm. diameter 11 mm. diameter at point. The point is blunt and rounding, and its neck shows abrasion from use as a reamer for enlarging bored holes. (Pl. 17, *s*.)

Reamer of coarse gray sandstone, 40 mm. long, 16 mm. diameter, 8 mm. diameter at the tip. The neck shows abrasion from use as a reamer. (Pl. 17, *t*.)

#### SLATE POINTS

Slender and carefully shaped points of the rather fragile grayish slate rock that occurs in the region may have been used as arrowheads. The specimens vary in size and in having bases either rounded or squared.

Entire slate point. Gray. 42 mm. long, 6 mm. wide, 4.5 mm. thick. Both ends sharp.

Entire slate point. Gray. 45 mm. long, 11 mm. wide, 6 mm. thick. Truncate base.

Entire slate point. Gray. 133 mm. long, 8.5 mm. wide, 5 mm. thick. The base is bluntly rounded. (Pl. 21, o.)

Entire slate point. Gray. 68 mm. long, 12 mm. wide, 5 mm. thick. Both ends bluntly rounded. (Pl. 21, p.)

Base fragment of slate point. Gray. 34 mm. long, 8 mm. wide, 5 mm. thick.

Base fragment of slate point. Gray. 60 mm. long, 9 mm. wide, 4 mm. thick. Truncate base.

Entire slate point. Gray. 36 mm. long, 7 mm. wide, 3.5 mm. thick. Truncate base.

Entire slate point. Gray. 54 mm. long, 9 mm. wide, 4 mm. thick. Base bluntly rounded.

#### PAINTS

Indian pigments yielded up by the excavations consist of cakes or fragments of cakes of rather bright red hematite ( $\text{Fe}_2\text{O}_3$ ), fragments of cakes and also natural fragments of chrome yellow limonite ( $\text{Fe}(\text{OH})_3$ ), and pieces of white earth or chalk (kaolin). The sources of all these substances occur in the vicinity. The cakes nearly enough intact to judge their former shape resemble the oblong cakes figured by Putnam.<sup>18a</sup> The paints, red, yellow, and white, were used both for body painting and for painting the surfaces of wood, shell, and rock. As far as is known, the white earth was never made into cakes. The principal finds are listed below. There were also irregular masses and stains of hematite in several of the graves.

Lump of bright red hematite, 18 mm. long. This lump appears to be a fragment of a larger cake.

Half a cake of bright red hematite, 65 mm. maximum diameter. The old surface is smooth and neatly rounded.

Lump of darker colored, coarser, and somewhat hard-textured red hematite. This lump has a maximum diameter of 58 mm. and its surface presents irregular cleavages everywhere.

Half of a cake of very bright red hematite paint. Maximum diameter 61.5 mm. About half the original cake is intact.

Almost entire cake of the darker colored red hematite paint, unusually gritty. A molded cake the original surface of which is still intact except where the ends are broken off. Squarish in section, the cake in its original form was largest in the middle and tapered toward the ends. 102.5 mm. long, 45 mm. diameter. When moistened it stains a profuse brownish red color. (Pl. 16, i.)

Half of a cake of very bright red hematite paint, 51 mm. maximum diameter.

Fragment of a cake of very brownish red hematite paint which has a burnt appearance. Part of the original surface of the lump can be traced. 51.5 mm. maximum diameter.

Lump of red hematite paint, of burnt appearance; 30 mm. long. A small part of the original surface is intact.

Lump of hard red hematite paint, irregular in shape and dark in appearance; 59 mm. long. When wet it makes a very red stain.

Fragment of the darker red hematite paint, 54 mm. greatest diameter. It shows considerable of the former surface of the cake from which it has been broken.

<sup>18a</sup> Putnam, *op. cit.*, p. 261.

Fragment of a cake of bright red hematite paint, 36.5 mm. greatest diameter. The curvature of the old surface is still intact.

Fragment of hard bright red hematite paint not showing any of the former surface of a cake, 43 mm. long.

Lump of bright red hematite paint, 32 mm. maximum diameter, there being no proof that it is part of a molded cake.

Lump of chrome yellow limonite, 53 mm. long, about half the surface of the specimen being the old surface of the cake.

Piece of yellowish stone identified as limonite marl or clay, very impure; 34.9 mm. long.

Lump of yellow limonite. Part of its surface is possibly the former surface of a cake.

Lump of not very yellow, rather buff-colored paint. Soft. The surface shows small scratches as if it had been rubbed. 45 mm. long.

Lump of chrome yellow limonite paint. Not a molded lump but apparently a natural rock. The pigment has a somewhat dirty yellow color but shows up well on the skin. 79 mm. maximum diameter.

Lumps of white earth, evidently used as paint.

#### PENDANTS OF STONE

Fragmentary pendant of slightly greenish gray and very hard stone, round in section. 42.5 mm. long, 13 mm. diameter at the larger and fractured end; 10 mm. diameter at the smaller end. Hole 5 mm. diameter 3 mm. from the smaller end. (Pl. 23, *d.*)

Pendant of smooth light-gray stone, very symmetrical and neatly made, round in section. 54 mm. long, 11 mm. diameter. Hole 4 mm. diameter. (Pl. 23, *c.*)

#### BEADS OF STONE

##### STEATITE DISK BEADS

Very few specimens of dark gray or blackish disk beads of steatite, neatly made, were found, and may be described as follows: An example is shown in Plate 26, *a.*

Steatite disk bead. Gray. 5 mm. diameter, 1.75 mm. thick. Hole 2 mm. diameter.

Steatite disk bead. Blackish. 5.5 mm. diameter, 1.5 mm. thick. Hole 2 mm. diameter.

Steatite disk bead. Gray. 9 mm. diameter, 1.5 mm. thick. Hole 2.5 mm. diameter.

Steatite disk bead. Gray. 5 mm. diameter, 1 mm. thick. Hole 2 mm. diameter.

Steatite disk bead. Gray. 4.5 mm. diameter, 1 mm. thick. Hole 1.5 mm. diameter.

Steatite disk bead. Gray. 4 mm. diameter, 2 mm. thick. Hole 1.5 mm. diameter.

Steatite disk bead. Black. 6 mm. diameter, 1.5 mm. thick. Hole 2 mm. diameter.

Steatite disk bead. Black. 6 mm. diameter, 1 mm. thick. Hole 2.5 mm. diameter.

Steatite disk bead. Gray. 6 mm. diameter. Hole 2 mm. diameter.

Steatite disk bead. Black. 6.5 mm. diameter, 1 mm. thick. Hole 2 mm. diameter.

## STEATITE DISKS

These are distinguished from the steatite disk beads by their larger size.

Disk of gray steatite, 15.5 mm. diameter, 3 mm. thick. Hole 1 mm. diameter, not exactly at the center.

Curious flat disk of gray, almost flesh-colored steatite; 12 mm. diameter, 1 mm. thick. Unbored.

## CYLINDRICAL BEADS OF STEATITE

Steatite beads of cylindrical shape which would not come under the above classes are:

Bead of blackish steatite, 11 mm. long, 9 mm. diameter. Hole 2 mm. diameter.  
Bead of blackish steatite, 11.5 mm. long, 4.5 mm. diameter. Hole 1.5 mm. diameter.

Bead of gray steatite, 11.5 mm. long, 5 mm. diameter. Hole 1 mm. diameter.  
Twelve beads of gray steatite, very neat in uniform. One measures 9.5 mm. long, 4 mm. diameter. Hole 2.5 mm. diameter.

Bead of slate-colored steatite, 17 mm. long, 6.25 mm. diameter. Hole 2.5 mm. diameter.

Lopsided bead of dark gray steatite, 17 mm. long, 31 mm. diameter. Hole 7.5 mm. diameter.

Blank of black steatite for bead. Finished except that the boring is not completed. 15 mm. long, 11 mm. diameter.

Bead of gray steatite of excellent workmanship, 34 mm. long, 13 mm. diameter. Hole 9 mm. diameter.

Fragment of gray steatite bead. 7 mm. long, 12 mm. diameter.

Bead of gray steatite, 10 mm. long, 5.5 mm. diameter. Hole 2 mm. diameter.

## BEADS OF AMETHYST

Several beads made of amethyst were also found.

Amethyst bead, 16 mm. long, 6 mm. diameter.

Amethyst bead, 7 mm. long, 9 mm. diameter.

Amethyst bead, 14.75 mm. long, 13 mm. diameter.

Amethyst bead, 7.5 mm. long, 9 mm. diameter.

## MISCELLANEOUS STONE BEADS

Cylindrical bead of sandstone. Gray. 36.5 mm. long, 12 mm. diameter. One end seems to be a recent break.

Bead of reddish stone, almost like steatite. 18 mm. long, 18 mm. diam. The boring is from both ends and consists of two concavities of conical shape which barely meet together at the center of the bead.

Bead of gray smooth textured stone, 37 mm. long, 22 mm. diameter.

Bead of dark gray stone, 10.5 mm. long, 14 mm. diameter. Hole 3 mm. diameter. Ends squared.

Curious long bead or two of yellowish marly stone. The ends are nicely squared, the outer surface is chipped off in irregular faces. 76.5 mm. long, 15.5 mm. diameter. The wall varies greatly in thickness, measuring at the ends from 2 mm. to 3.5 mm.

Bead of reddish very fine textured sandstone, globular in form; 9.5 mm. diameter. Hole 3 mm. diameter.

Bead of brownish stone, 2.25 mm. long, 5.5 mm. diameter.

#### OBJECTS OF ASPHALT

These consisted of molded cakes, apparently made and set aside so as to have always ready a supply of adhesive bitumen, and of small fragments broken from pluggings and cementings and the like; also of fragments apparently broken from the coating of a basketry water jug, and many apparently natural pieces. The beach was strewn with pieces of soft asphalt, and La Brea canyon, east of El Toro, the asphalt mine at the Lucian Higgings ranch at Carpinteria, More's Landing, and the asphalt mine at Goleta Point offered further sources of supply.

Asphalt was also found adhering to the bases of arrowheads and knife blades.

Asphalt was also found as a ring on the rim of hopper mortars, as an adhesive for mending broken pestles, on the tarred stones, as an adhesive for stemming pipes with mouthpieces of bone, at the bases of arrowheads, knife blades, and bone points, as the setting for inlay of various kinds, and as a filling for incisions or scratchings so as to bring out incised designs in black.

#### LUMPS OF ASPHALT

The collection of molded lumps of asphalt is the largest that has ever been taken from a Channel site. Most of these have the shape of a spheroid or of an elongated spheroid, but there are many irregularities of shape.

Lump of asphalt, carefully molded. The surface is checked with minute cracks. 11.1 mm. long, 85.7 mm. wide, 38.1 mm. thick. (Pl. 18, *b*.)

Lump of asphalt, 98.4 mm. long, 88.9 mm. wide, 41.2 mm. thick.

Lump of asphalt, 95.2 mm. long, 69.8 mm. wide, 44.4 mm. thick. One end has been broken away a little.

Lump of asphalt of somewhat triangular shape, 84.1 mm. long, 66.6 mm. wide, 31.7 mm. thick.

Lump of asphalt, a perfect spheroid of carefully molded asphalt. 50.8 mm. long, 47.6 mm. wide, 31.7 mm. thick. (Pl. 18, *a*.)

Lump of asphalt, 149.2 mm. long, 123.8 mm. wide, 38.1 mm. thick. The surface is much checked and somewhat rough. (Pl. 18, *c*.)

Lump of asphalt, 104.7 mm. long, 95.2 mm. wide, 28.5 mm. thick. Surface rather rough.

Lump of asphalt, 133.3 mm. long, 127 mm. wide, 57.1 mm. thick.

Lump of asphalt, 108 mm. long, 95.2 mm. wide, 41.2 mm. thick.

Lump of asphalt, probably in fragmentary condition, the edges consisting of one rounded edge and two cleavages. 76.2 mm. long, 41.2 mm. wide, 34.9 mm. thick.

Lump of asphalt. The edges are fractured a little. The reverse side shows a large bubble. 92 mm. long, 79.3 mm. wide, 44.4 mm. thick.

Lump of asphalt, 114.3 mm. long, 92 mm. wide, 57.1 mm. thick.

Lump of asphalt, 82.5 mm. long, 69.8 mm. wide, 53.9 mm. thick. This lump has serpula holes in it and is beach worn.

#### ASPHALT FRAGMENTS WITH TWINED BASKETRY IMPRINT

The twined water bottles of the Indians were frequently coated with asphalt. Two fragments of such asphalt coating were recovered. The basket to which they adhered may have rotted in the ground.

Piece of asphalt with imprint of twined basketry, possibly that of an Indian water bottle. 25 mm. long, 17 mm. wide, 2.5 mm. thick.

Piece of asphalt with imprint very similar to that of the fragment described above, 26 mm. long, 25 mm. wide, 4 mm. thick.

#### UNEXPLAINED OBJECTS OF ASPHALT

Object of black asphalt, 40.5 mm. long, 9.5 mm. wide, 7 mm. thick. The tip is bluntly rounded. The butt has a hole in it which runs in 16 mm. The asphalt is soft and crumbly from long contact with the earth. The hole does not have the appearance of having an irregular surface.

A second specimen of black asphalt object similar to the last described, but only half the length. 22 mm. long, 9 mm. wide, 7.5 mm. thick. Entire and unbroken, the tip sharper than any other specimen, the hole in the butt extending into the specimen 12 mm. and showing no sign of the former insertion of a shaft.

#### OBJECTS OF BONE OR ANTLER

These have been our most difficult objects for the following reasons: (1) We have not yet been able to get them identified zoologically; (2) many of the specimens consist of base, tip, or central fragments; (3) we can not be sure of the use of but few of the specimens—aside from a few obvious needles, basketry awls, and points of composite fishhooks, we have before us a collection of question marks, and it does little good to refer to these objects as many authors do by a large miscellany of names unless the objects can be checked with direct knowledge as to use.

The bone and antler material found was most of it in a peculiarly fragmentary and disintegrated condition.

#### ENTIRE BONE AWLS

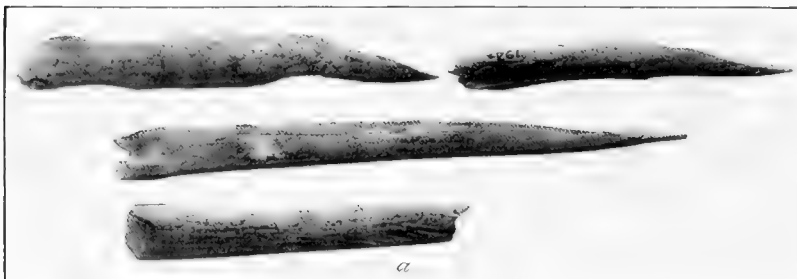
Probably entire bone awl. Obverse outside. 113 mm. long, 16 mm. wide, 5 mm. thick. Entirely unworked except the tip, the left edge being ground off for 14 mm. from the tip, the right edge for 16 mm., the reverse for 14 mm., the obverse not at all. This primitive awl is apparently in its original condition, the edges and butt having always consisted of fractures. (Pl. 19, a, 1.)

Probably entire bone awl of the same type as the last specimen described. Obverse outside. 94 mm. long, 15.5 mm. wide, 5 mm. thick. Entirely unworked except the tip, the left edge being ground off for 33 mm. from the tip, the right





LUMPS OF ASPHALT



*a, a', BONE AWLS. b, SEA-LION RIB IMPLEMENTS; SEA-LION RADIUS*

edge for 35 mm., the obverse and reverse sides scarcely at all. There is no reason to suppose that we do not have the entire artifact. (Pl. 19, *a*, 2.)

Entire bone awl or pin. Obverse outside. 164 mm. long, 15 mm. wide, 7 mm. thick. Fresh and strong bone. The edges are worked throughout, being well rounded, the left edge much thinner than the right. The butt is a recent fracture but the natural end of the bone evidently extended only a few millimeters beyond it. The obverse and reverse begin to taper only 14 mm. from the tip. The extreme tip is broken off. There is also an irregular fracture off the left edge near the tip. (Pl. 19, *a*, 3.)

Butt fragment of bone awl or pin. Obverse outside. 94 mm. long, 16.5 mm. wide, 3 mm. thick. The original butt is partly intact but a large flake is broken off its central portion on the obverse side. The edges are nicely rounded and perfectly straight, but start to taper more abruptly in the immediate vicinity of the tip fracture. The specimen was evidently very similar to the one last described, but more neatly made. (Pl. 19, *a*, 4.)

Entire bone awl with asphalt handle still intact. Made of tubular long bone. 55.5 mm. long, 23 mm. wide, 18.5 mm. thick. The asphalt handle extends from the butt for 24.5 mm. A little of the end of the bone sticks through the asphalt at the butt. The asphalt is black and smooth surfaced. The beveling commences 27 mm. from the tip. The taper of the left edge commences 25 mm. from the tip. The edges are straight, the tip sharp. This and the other awls shown in Plate 19 are such as were used in basket making. (Pl. 19, *a'*, 1.)

Entire bone awl. Obverse outside. 72.5 mm. long, 7 mm. wide, 5 mm. thick. The shaft and butt are entirely unworked and the butt is the joint end of a long bone. The tip tapers from all sides beginning 17 mm. back and is sharp and symmetrical. The specimen is somewhat triangular in section, the reverse consisting of the interior trough of the bone. (Pl. 19, *a'*, 2.)

Entire bone awl except that perhaps 3 mm. of the tip is missing. Obverse outside. 94 mm. long, 23 mm. wide, 11 mm. thick. The butt is the old joint end of the bone. The tip starts to taper from all sides commencing 40 mm. back, almost half the length of the specimen. The extreme tip is round in section. (Pl. 19, *a'*, 3.)

Entire bone awl. Obverse outside. 72.5 mm. long, 16 mm. wide, 11 mm. thick. The butt is formed by the old joint end. The beveling of the tip begins 12 mm. back. There are some transverse hackings on the lower part of the obverse. The extreme tip is broken off, perhaps a couple of millimeters being lacking. (Pl. 19, *a'*, 4.)

Entire bone awl. Obverse outside. 75 mm. long, 12.5 mm. wide, 5.5 mm. thick. The reverse consists of a prominent furrow. The tip is beveled from all sides from 30 to 35 mm. Extreme tip broken off. (Pl. 19, *a'*, 5.)

Entire bone awl. Obverse outside. 58 mm. long, 15 mm. wide, 11 mm. thick. The extreme two or three millimeters of the tip are broken off. The left edge is quite sharp in its central portion. The entire specimen tapers toward the point but the sharper taper of the edges sets in only 15 mm. back. (Pl. 19, *a'* 6.)

Entire bone awl. Obverse outside. 48 mm. long, 11.5 mm. wide, 5 mm. thick. The butt is the old articulation. The reverse surface shows much sponginess. The beveling to the tip starts 17 mm. back. Extreme tip broken off. (Pl. 19, *a'*, 7.)

Entire bone awl. Obverse outside. 83 mm. long, 20.5 mm. wide, 10 mm. thick. The butt is the old joint. The tip tapers more sharply, starting 15 mm. back. The reverse consists of a single furrow from the old inside of the long bone. Tip intact. (Pl. 19, *a'*, 8.)

Entire bone awl. Obverse outside. Made of light and porous bone. Extreme tip broken off. 42 mm. long, 14 mm. wide, 11 mm. thick. The butt fracture extends almost half way up the obverse side.

Entire bone awl. Obverse outside. 72.5 mm. long, 10.5 mm. wide, 5 mm. thick. The butt is an old break but is undoubtedly the original condition. The edges taper from about 45 mm. more sharply from about 12 mm. The extreme tip is broken off. The reverse side in the vicinity of the butt end is spongy.

#### SEA-LION RIB IMPLEMENTS

Of similar implements Heye says:<sup>19</sup> "Still other curved bone implements are exhibited in Pl. L, all made from the ribs of deer or sea-lion. The butt end has been left in its natural state, while the other end, in the examples shown in *a* and *d*, is ground to a point. The smaller ends of *b* and *c*, although blunt, likewise show evidence of working. These latter two objects would have made ideal tools for chipping stone, the natural curve of the rib fitting the hand in such a way as to afford a firm grip."

Tip fragment of sea-lion rib implement, mellowed color, quite brown. 35.5 mm. long, 11.5 mm. wide, 5 mm. thick. The end is beveled to the flat side of the rib from about 10 mm. from the tip. The extreme tip is broken off, as if it had not been cut wholly through at the time of making.

Tip fragment of sea-lion rib implement, 23 mm. long, 8 mm. wide, 8 mm. thick. The tip is beveled to the flat side from 5 mm. back from the tip. The beveled surface shows an outcropping of the spongy interior of the bone near the extremity. The specimen may have been through fire. (Pl. 19, *b*, 1.)

Entire sea-lion rib implement, showing the original form. 98 mm. long, 10 mm. wide, 6 mm. thick. The beveling to the flat side starts 10 mm. from the extremity. This beveling discloses no hole or sponginess. The butt is unbroken, but is concave and rough surfaced, being the natural articulation of the rib. The specimen is flesh colored, lighter than that of most of these rib implements. (Pl. 19, *b*, 2.)

Tip fragment of sea-lion rib implement, 37 mm. long, 11 mm. wide, 10 mm. thick. The beveling to the flat side starts 9 mm. from the tip. The rib is solid. (Pl. 19, *b*, 3.)

Tip fragment of sea-lion rib implement, 39 mm. long, 12 mm. wide, 10 mm. thick. The beveling to the flat side tapers from only 7 mm. from the extremity. The beveling exposes sponginess of the interior of the rib. The obverse surface has a transverse notch 13 mm. below the tip. (Pl. 19, *b*, 4.)

Tip fragment of sea-lion rib implement, 28 mm. long, 12 mm. wide, 7 mm. thick. Beveled to the flat side from 7 mm. from the tip. (Pl. 19, *b*, 5.)

Tip fragment of sea-lion rib implement, 48 mm. long, 11 mm. wide, 6.75 mm. thick. The beveling to the flat side starts 8 mm. from the tip. (Pl. 19, *b*, 6.)

Tip fragment of sea-lion rib implement, 38.5 mm. long, 13 mm. wide, 9 mm. thick. The point is beveled off to the flat side from 8 mm. back from the tip. (Pl. 19, *b*, 7.)

Tip fragment of sea-lion rib implement, but possibly representing the original condition of the specimen, although the butt end is broken off. 91.5 mm. long, 10 mm. wide, 7 mm. thick. This specimen is more curved than the others.

<sup>19</sup> Heye, op. cit., pp. 81-82.

The beveling to the flat side starts 8 mm. from the end. Only part of the specimen is shown in the plate. (Pl. 19, *b*, 8.)

Tip fragment of sea-lion rib implement, 48 mm. long, 8 mm. wide, 7 mm. thick. The beveling to the flat side starts 9 mm. from the tip and exposes the interior hollow of the rib, which is very straight.

#### SEA-LION RADII

Altogether nine of these bones were found in the graves, all but one tip fragments, and none of them showing signs of having been used. The sturdiness of the bone and the hardness of the point would suggest that they would make good flakers for chipping flint. A sea-lion radius is figured by Putnam.<sup>20</sup>

Entire unworked California sea-lion radius bone possibly used as an implement. 131 mm. long, 36 mm. wide, 23 mm. thick. The only entire specimen obtained. (Pl. 19, *b*, 9.)

#### BROAD BONE POINTS, WEDGE-SHAPED BONE IMPLEMENTS

Tip fragment of bone point, 47 mm. long, 9 mm. wide, 4 mm. thick. Edges rounded. Inside surface has a deep furrow in its lower half. The extreme tip is broken off.

Central fragment of bone point, 44 mm. long, 9 mm. wide, 4 mm. thick. The inside surface is much troughed. Edges rounded. The tip is broken off, leaving a stub 3.5 mm. wide, 3 mm. thick.

Tip fragment of bone point, 35 mm. long, 12 mm. wide, 5 mm. thick. Inside surface much troughed. Edges rounded. Extreme tip broken off.

Tip fragment of bone point, 37.5 mm. long, 8.5 mm. wide, 4.5 mm. thick. White all through, though the surface is whiter. Edges rounded.

Central fragment of bone point, 49 mm. long, 10 mm. wide, 5 mm. thick. Left edge rounded, right edge squared. Stout enough to have been an awl.

Tip fragment of bone point. Inside surface consists of a deep furrow, the only place worked being the edges of this furrow and the extreme tip; 52 mm. long, 11 mm. wide, 9 mm. thick. Very strong. Can be classed as an awl fragment.

Tip fragment of bone point, possibly to be regarded as entire bone awl, the butt of which was originally a fracture. Inside surface furrowed, 65 mm. long, 2 mm. wide, 4 mm. thick. Edges squared but become quite right rounding 20 mm. from the tip, while the awl becomes round in section 10 mm. from the tip.

Tip fragment of bone point, 36 mm. long, 9 mm. wide, 3.75 mm. thick. The inside surface has a large furrow. Edges rounded. A fracture extends 12 mm. up the right edge.

Central fragment of bone point, 43 mm. long, 7 mm. diameter. Edges rounded. The specimen has no taper.

Tip fragment of bone point, 28 mm. long, 9 mm. wide, 5 mm. thick. The surface of the inside is somewhat spongy. Edges rounded.

Tip fragment of bone point, 24 mm. long, 9 mm. wide, 4 mm. thick. Extreme tip broken off. The inside surface consists largely of the natural furrow.

<sup>20</sup> Putnam, *op. cit.*, Pl. XI, 23.

Tip fragment of bone point, 36.5 mm. long, 10 mm. wide, 4 mm. thick. Edges rounded, the left edge forming quite a sharp corner with the obverse. The inside surface consists largely of a furrow. The tip bends to the right. The extreme tip is broken off.

Tip fragment of bone point, 44 mm. long, 5.5 mm. wide, 3 mm. thick. This is a splinter of a bone point, only the original tip remaining intact. All other surfaces except the outside are fractures.

Central fragment of bone point, 55 mm. long, 7 mm. wide, 6.5 mm. thick. Perhaps a half inch of the tip is missing.

Tip fragment of bone point, 34 mm. long, 10.5 mm. wide, 5.5 mm. thick. There is a slanting flake off the inside surface of the point.

Entire bone point or awl, 67 mm. long, 11 mm. wide, 2.75 mm. thick. The butt end is worked somewhat rounding and a browner color extends about a third of the way up the inside surface. The specimen is very strong. The extreme tip is broken off.

Apparently butt fragment of bone point, 63 mm. long, 9 mm. wide, 6.5 mm. thick. Both edges are old breaks worn smooth by use but not worked. The lower third of the specimen is quite black. The tapers on the inside from 15 mm., on the inside surface from 25 mm.

Tip fragment of or perhaps entire bone point. Inside surface flat and shows longitudinal corrugations. 64.5 mm. long, 8.5 mm. wide, 5 mm. thick. Both edges are squared. The butt is a fracture but is considerably worn. There are flecks of coquina material stuck on the surface near the butt.

Tip fragment of bone point, 18 mm. long, 9.5 mm. wide, 4 mm. thick. The surface is blackened in places. The inside surface consists of a furrow. The outside is beveled from 4 mm., the inside hardly at all. Edges rounded. A mere tip fragment.

Central fragment of bone point. Inside surface shows longitudinal groove. 33 mm. long, 10 mm. wide, 4.5 mm. thick. Edges rounded, the left edge being thicker than the right. The beveling off the tip starts about 7 mm. from the tip fracture.

Tip fragment of bone point, 28 mm. long, 10 mm. wide, 5 mm. thick. The inside surface is spongy and irregularly bulging and seems like a fracture. The left edge is quite sharp, the right rounded.

Tip fragment of bone point, 54 mm. long, 9.5 mm. wide, 9 mm. thick. The extreme tip has been broken off. The left edge is the original surface of the bone. The specimen starts to taper 23 mm. from the tip.

Central fragment of bone point, 38.5 mm. long, 6 mm. wide, 4 mm. thick. The outside consists of a single fracture. The right edge is also formed of the old inside surface of the bone. Extreme tip broken off.

Tip fragment of bone point, 55 mm. long, 12.5 mm. wide, 3.5 mm. thick. Dark coffee color. Tip charred. Tip tapers from 13 mm. on obverse and reverse sides. Butt broken diagonally.

Tip fragment of bone point, 24 mm. long, 29 mm. wide, 4.5 mm. thick. Outside consists of a shallow furrow. Tip is ground off square, leaving a stub 3 mm. wide and 1.75 mm. thick. Though the edges are somewhat rounded, a section of the specimen is rectangular.

Tip fragment of bone point, 37 mm. long, 9 mm. wide, 4 mm. thick.

Butt fragment of bone point, 37 mm. long, 13 mm. wide, 9.5 mm. thick. The butt consists of a natural articulation of the bone, but has been somewhat ground off. The edges have been worked rounding. Evidently a fragment of an awl.

Tip fragment of bone point. Inside furrowed. 52 mm. long, 14 mm. wide, 3.5 mm. thick. Obverse tapers from 4 mm., outside from 5.5 mm. Tip intact. Working of the left edge near the tip is especially noticeable.

Tip fragment of bone point, 36 mm. long, 7.5 mm. wide, 5 mm. thick. Inside is spongy, but shows no hollow. Broken-off stub of tip 3 mm. wide, 2 mm. thick. Edges rounded.

Central fragment of bone point. Inside has longitudinal furrow. 62.5 mm. long, 10 mm. wide, 5 mm. thick. The entire obverse left and right edges show diagonal rasping. Edges nicely rounded. A central section of a well-made hairpin or the like.

Tip fragment of bone point, 36 mm. long, 11 mm. wide, 2 mm. thick. Edges rounded. The outside is not as flat as the inside. Tip intact. Outside tapers from 2 mm., inside from 5 mm. Some earthy material is stuck to the lower part of the obverse.

Tip fragment of bone point, 36 mm. long, 10 mm. wide, 4 mm. thick. Elliptical in section. Right edge is sharper than left edge. The inside shows two furrows. The extreme tip is broken off diagonally.

Tip fragment of bone point, 28 mm. long, 10 mm. wide, 5 mm. thick. The fragment shows signs of being burnt and is also coated somewhat with earthy material. The tip is quite sharp. The outside and inside are beveled only from 5 mm. Edges rounded.

Tip fragment of bone point, 36 mm. long, 10 mm. wide, 6 mm. thick. Edges rounded. The tip bends a trifle to the right. The outside tapers from 16 mm. The lower part of the specimen is coated over with sandy asphalt.

Tip fragment of bone point, 27 mm. long, 11 mm. wide, 5.5 mm. thick. Tip intact. The fragment is much calcined.

Tip fragment of bone point. Inside surface consists largely of the furrow. 39 mm. long, 7.5 mm. wide, 3.5 mm. thick. Edges rounded and start to taper from the middle of the specimen. Extreme tip broken off. Some ashlike material adheres to the inside surface.

Central fragment of bone point, 31 mm. long, 7 mm. wide, 3.5 mm. thick. Edges rounded and start to taper about 15 mm. from the tip. Tip bends to right. Extreme tip broken off.

Tip fragment of bone point. Edges squared. 41 mm. long, 6.5 mm. wide, 3 mm. thick. Very glassy and mellowed color. Extreme tip broken off.

Tip fragment of bone point, 45 mm. long, 10 mm. wide, 4 mm. thick. The edges are square fractures. The only working of this specimen is the beveling off of the outside from 7 mm. and the working of the right edge for a distance of 16 mm. from the tip.

Tip fragment of bone point, 43 mm. long, 12 mm. wide, 3.5 mm. thick. All edges are fractures except about 13 mm. near the tip.

Tip fragment of bone point, 29 mm. long, 11 mm. wide, 5 mm. thick. A sharper taper of the right edge starts 10 mm. from the butt fracture. The fragment is roundish in section near the tip. Extreme tip broken off.

Tip fragment of bone point, 34 mm. long, 10 mm. wide, 4.5 mm. thick. The edges are squared. The left edge makes a jog 9.5 mm. from the tip as if an original point had been broken and the splintered stub sharpened. The slender point is round in section.

Tip fragment of bone point. The specimen is unique in the collection, since it consists of a tubular long bone the end of which is beveled off slanting. 43.5 mm. long, 9 mm. diameter. The bone is mellowed in color but hard and strong.

The edges are rounded and at the extreme tip the wall of the bone is beveled a little on the outside and inside surfaces. (Pl. 20, *a*, 1.)

Tip fragment of bone point, 40 mm. long, 9.5 mm. wide, 4 mm. thick. All edges are fractures, yet were probably purposely broken so as to shape the implement. The tip is the full thickness of the specimen, the edges only tapering in to form the point. (Pl. 20, *a*, 2.)

Tip fragment of bone implement made of the cannon bone of the deer, 78 mm. long, 21.5 mm. wide. The wall of the bone averages perhaps 6 mm. in thickness. The only working is the beveling of the bone to a point, which continues throughout the fragment. The entire specimen was presumably similar in shape to the next specimen described below. The butt is an old fracture. The implement was evidently large and strong. The extreme tip is beveled a little from both sides. (Pl. 20, *a*, 3.)

Entire bone implement made of the cannon bone of the deer, 104 mm. long, 29 mm. wide, 14 mm. thick. The wall of the bone averages perhaps 6 mm. in diameter. The beveling starts 45 mm. from the tip but there is a fracture off both edges so as to make the tip narrower than it originally was. (Pl. 20, *a*, 4.)

#### MISCELLANEOUS BONE POINTS

Tip fragment of bone point, 32 mm. long, 5.5 mm. diameter. The entire inside is a fracture. This is a splinter from the edge or corner of a worked bone implement. There are transverse raspings all along the left half of the obverse surface.

Tip fragment of bone point, 29 mm. long, 9 mm. wide, 4 mm. thick. The butt is a fracture. The tip is blunt and there is an adjacent fracture on the left edge. The specimen is made of the wall of the large long bone. The left edge consists largely of a fracture. The point was originally sharper and it is evidently a fragment of a bone awl or like implement.

Fragment of a bone implement, 24 mm. long, 5 mm. wide, 2 mm. thick. All surfaces except the outside are fractures.

Central fragment of bone implement, probably a bone point, 48 mm. long, 10.5 mm. wide, 7 mm. thick. Inside has some white discoloration.

Central fragment of bone implement, 27 mm. long, 6 mm. wide, 4 mm. thick. Perhaps a section of a bone point. The specimen has so little taper that one can not be certain which was the former tip end. The obverse has a natural groove running down its center.

Tip fragment of bone point, 43.5 mm. long, 9.5 mm. diameter. The reverse is flattish. The outside and one edge are the former surface of the bone. The other surfaces are very rough, abraded and dirty. The specimen is somewhat triangular in section.

Tip fragment of bone point. Outside can not be determined. 36.5 mm. long, 15 mm. wide, 11 mm. thick. A most curious fragment, different from anything else in the collection. The bone is solid and hard and has been thought by some to be that of some fossilized animal. The surface shows fine checks or faults that run in irregular direction. One surface is flat, but is not a former outside surface of bone. The point is blunt and shows no sign of use. The reverse surface has some larger transverse faults near the butt fracture. The specimen was determined by Mr. Earl V. Shannon, of the Division of Geology, U. S. National Museum, to be bone.

Central fragment of bone point; outside can not be determined. 29.5 mm. long, 3 mm. wide, 2 mm. thick. Almost round in section. Evidently a fragment of a bone pin or like implement.



Central fragment of bone implement. Reverse consists of the former inside surface. 43 mm. long, 14.5 mm. wide, 4 mm. thick. The edges are squared. Outside and inside surfaces are apparently unworked.

Tip fragment of bone point, 24 mm. long, 6 mm. wide, 3.5 mm. thick. Elliptical in section. Edges rounded. The lower part of the left edge is broken away. Tip abraded but evidently extended no farther formerly. Inside shows a natural furrow. Tip bends to the left.

Tip fragment of bone point. Outside can not be determined. 15 mm. long, 5 mm. diameter. Jet black in color. Tip taper starts 7.5 mm. back and tapers equally from all sides. Elliptical in section. Butt broken off diagonally.

Fragment of bone implement, 42 mm. long, 6 mm. wide, 5 mm. thick. The right edge is a fracture, the left edge is natural surface.

Tip fragment of bone point. Outside can not be determined. 30 mm. long, 4 mm. wide, 3.5 mm. thick. The point bends to the right and twists in clockwise direction. The obverse is flat, the reverse has two faces, making the specimen triangular in section.

Tip fragment of bone point. Outside can not be determined, since obverse and reverse surfaces are fractures. 30 mm. long, 5 mm. wide, 4.5 mm. thick. The upper end is worked to a tip in the usual manner. The breaks are old and the color of the bone is mellowed.

Central fragment of bone implement, 44 mm. long, 7 mm. wide, 5.5 mm. thick. Rather fresh looking. Triangular in section. Cracked longitudinally. There are several transverse scorings on the right half of the upper inside.

Central fragment of bone implement, 32.5 mm. long, 15 mm. wide, 2.5 mm. thick. Both edges are square fractures, as if by chance. The top is broken off. A transverse groove has been cut in the specimen and the tip fracture is just beyond this groove.

Tip fragment of bone point. Outside can not be determined. 30 mm. long, 5 mm. wide, 4 mm. thick. Black and glassy, one of the most mineralized of the specimens. The butt fracture reveals a spongy interior. The point is shaped very blunt, taper starting only two or three millimeters from the end. The specimen is nearly round in section and its surface presents several longitudinal grooves.

Tip fragment of bone point. Outside can not be determined. 37.5 mm. long, 8.5 mm. wide, 2 mm. thick. The extreme thinness and the flatness of the obverse make this specimen unique. The edges are rounded, and there is a well-made elbow in the left edge 10 mm. from the butt fracture. The thinness of the specimen would preclude its use for any purpose for which strength is required.

Tip fragment of bone point. Outside can not be determined. 23 mm. long, 5.5 mm. wide, 2.5 mm. thick. Dark mellowed color. Flattish in section.

Central fragment of bone implement. Outside can not be determined. 53 mm. long, 5.5 mm. diameter. The specimen is somewhat crooked and twisted.

Central fragment of bone implement. Outside can not be determined and a little of the original surface is left. 35 mm. long, 6 mm. wide, 2 mm. thick. Both ends are sharp as the result of old fractures. Mellowed color, glassy.

Central fragment of bone point. Outside can not be determined. 38 mm. long, 6 mm. diameter. Round in section. Ashy gray color, verging toward flesh color. Made of spongy bone.

Tip fragment of bone implement, 27 mm. long, 7 mm. wide, 4 mm. thick. The outside consists of a fracture. Dark earth-colored substance is stuck on more or less all over the specimen. Both edges tend to be quite sharp.

Tip fragment of bone point, 31 mm. long, 6 mm. wide, 4 mm. thick. Dark mellowed, glassy. The inside consists of three fractures. Left edge sharp. The tip is beveled from 7 mm. with a straight bevel.

Tip fragment of bone point. Outside can not be determined. 24 mm. long, 4 mm. wide, 3.5 mm. thick. The obverse and right edge is the former surface of an artifact; all other surfaces are fractures and exhibit five different cleavages. The tip is formed by these cleavages and shows no workings. A mere splinter off a bone artifact.

Central fragment of bone point. Outside can not be determined. 31 mm. long, 3 mm. diameter. The lower end is square, as if rubbed to this shape. Round in section. Old mellowed color, blackened except at the tip.

Butt fragment of bone implement, 33.5 mm. long, 10 mm. wide, 8.5 mm. thick. The smaller end is evidently the butt and is neatly squared. Elliptical in section. The other end is broken with an old fracture. Coffee color, of more or less mineralized appearance.

Central fragment of bone implement. Outside can not be determined. 50 mm. long, 9 mm. wide, 8 mm. thick. On the obverse surface at the tip there is a flat beveling which extends two-thirds of the way through the specimen. The lower part of the observe surface is broken away. Mellowed color, glassy.

Tip fragment of bone point, 23 mm. long, 10 mm. wide, 2.5 mm. thick. The left edge is rounded. Outside and inside are original surfaces. The upper right edge which forms the point is a fracture, but was probably made intentionally.

Tip fragment of bone point, 47.5 mm. long, 7 mm. wide, 3.5 mm. thick. Reverse has broad longitudinal furrow. All edges nicely rounded. The upper right edge slants to form the tip, presenting a straight edge 18.5 mm.

Tip fragment of bone point. Inside shows a furrow. 24 mm. long, 5 mm. wide, 3.5 mm. thick. Squarish in section. Crudely made of the wall of a long bone.

Tip fragment of bone point. Outside can not be determined. 30 mm. long, 5 mm. wide, 3 mm. thick. The surfaces consist mostly of fractures, which makes the specimen triangular in section.

Tip fragment of bone point. Outside can not be determined. 31 mm. long, 3.5 mm. diameter. Round in section. The left edge is the old surface of the artifact, all other surfaces are fractures.

Central fragment of bone point, 32.5 mm. long, 9 mm. wide, 5 mm. thick. The reverse has a wide furrow. Both edges are fractures. Outside and inside surfaces taper from 8 mm. The point consists of a broad rounding edge.

Central fragment of bone point, 34.5 mm. long, 10.5 mm. wide, 6 mm. thick. A furrow is seen in the lower half of the inside surface. Blackish color.

Central fragment of bone implement. Outside can not be determined. 35 mm. long, 9 mm. wide, 7 mm. thick. All surfaces are smooth. Obverse and reverse are natural surfaces and the left edge is the unworked corner between them. The right edge has two worked corners with a wide furrow, making the specimen triangular in section.

Central fragment of bone point. Outside can not be determined. 38 mm. long, 7 mm. diameter. The right edge is a fracture except for a section 4 mm. in the central portion of the specimen. Blackish and glassy.

Central fragment of bone point, 53 mm. long, 8 mm. wide, 5 mm. thick. Very irregular shape owing to surface fractures. The right edge is rounded and shows hair like transverse raspings throughout its length. The reverse is a natural inside surface of the bone. The left edge consists of two fractures, the upper one of which hits the top of the specimen, taking the original tip

with it. The lower central part of the outside surface shows a blood vessel foramen.

Tip fragment of bone point. Outside can not be determined. 32 mm. long, 5 mm. wide, 4.75 mm. thick. Shape somewhat like a tooth but artificially worked. Elliptical in section. The size increased from the broken butt up to 7 mm. from the tip, where it starts to taper to the point, tapering most abruptly on the right edge. The lower part of the butt curves to the right.

Tip fragment of bone point. Outside can not be determined. 29 mm. long, 8.5 mm. diameter. The surface is discolored white in the region about the tip. The inside is porous but has no hole. Elliptical in section. The tip is bluntly rounded and tapers from all sides beginning about 10 mm. back.

Central fragment of bone point. Outside can not be determined. 39 mm. long, 6 mm. wide, 4 mm. thick. The edges are almost square but nicely worked. The specimen shows no taper, but is evidently a section of a bone point.

Curious object of bone, apparently unfinished; 52.5 mm. long, 11 mm. wide, 7 mm. thick. Whitish flesh color. Has working only at the two ends, which are beveled from all sides, commencing about 5 mm. from the end. This beveling does not come to a point, but was whittled to neck about 4 mm. in diameter, which was then broken.

Tip fragment of bone point. Outside can not be determined. 48 mm. long, 8 mm. wide, 6 mm. thick. Elliptical in section. The surface shows many longitudinal ridges due to disintegration in the ground. The specimen has a well-defined neck 5.5 mm. wide, commencing 10 mm. from the tip, extending completely around the specimen. The tip is sharp. There are also two large irregular hackings below the neck on the obverse surface.

Butt fragment of bone point. Obverse can not be determined. 72.5 mm. long, 6.5 mm. wide, 5 mm. thick. The butt and shaft of a neatly made bone point, highly polished. The butt is rounded, with several faces. The reverse presents a furrow which can be traced entire length of the specimen and which renders it somewhat crescent shape in section. Very dark coffee, almost black, with glassy fracture.

#### FRAGMENTARY BONE POINTS

Tip fragment of bone point. Obverse inside. 25 mm. long, 7 mm. wide, 4 mm. thick. Edges rounded. Edge taper starts 20 mm. from tip. Obverse and reverse taper starts 10 mm. from tip. The extreme tip is broken. Dark mellowed color.

Central fragment of bone point. The inside has a natural furrow which extends the whole length of the fragment. 25 mm. long, 9 mm. wide, 7 mm. thick. The left edge consists of a straight taper. Evidently a fragment of a point of considerable size. Dark mellowed color.

Tip fragment of rather fresh looking bone point. 39 mm. long, 5.5 mm. wide, 3 mm. thick. The taper is gradual and extends throughout the specimen. The inside is flat toward the butt. The tip is intact and sharp. The butt fracture has two cleavages meeting in the middle.

Tip fragment of bone point. The inside has a narrow natural longitudinal groove from the old inner surface of the bone. Black and glossy. Diamond shape in section. The tip was probably longer originally but is reduced by a chip off the reverse surface. 21 mm. long, 4 mm. wide, 3 mm. thick.

Tip fragment of bone point. The outside can not be determined. 21.5 mm. long, 4 mm. wide, 2.25 mm. thick. Elliptical in section. Extreme tip broken off slanting, leaving a fracture 1.5 mm. wide, and .75 mm. thick.

Tip fragment of bone point. Inside is an old furrow. 56 mm. long, 5 mm. wide, 3.5 mm. thick. The reverse is the former outside and is flat. Edges nicely rounded. Mellowed color. Well made and sharp. Obverse and reverse taper from 8 mm.

Central fragment of bone point. Inside has a narrow furrow. 30.5 mm. long, 6 mm. wide, 4 mm. thick. Edges rounded. The tip scarcely begins to taper before it is broken off.

Tip fragment of bone point. One surface is flat and may be the former inside of the bone wall. 43 mm. long, 8 mm. wide, 6.5 mm. thick. The outside and inside bevelings begin about 8 mm. from the tip. The butt is broken and a sliver is off the right edge for 16 mm. from the butt. The tip is intact, blunt, and strong.

Tip fragment of bone point, 23 mm. long, 5.5 mm. wide, 3 mm. thick. Sides somewhat flat, edges rounded.

Tip fragment of bone point. Outside can not be determined. 27 mm. long, 4 mm. wide, 4 mm. thick. Rounded in section.

Tip fragment of bone point. Dull white chalk color. 23.5 mm. long, 8 mm. wide, 4 mm. thick. The edges are well rounded, the tip quite sharp.

Tip fragment of bone point, 36 mm. long, 6 mm. wide, 6.5 mm. thick. The specimen tapers throughout. A long splinter has broken off the right side. There are two transverse hackings on the outside near the tip.

Tip fragment of bone point, 36 mm. long, 5 mm. wide, 4 mm. thick. The surface is grayish but the interior black. The tip has been broken off somewhat.

Tip fragment of bone point, elliptical in section. Blotches of grayish substance stuck to its surface. Extreme tip broken off outside can not be determined since none of the original surfaces are left. The edges are nicely rounded. 29 mm. long, 5 mm. wide, 3 mm. thick.

Central fragment of bone point. Outside can not be determined. 22.5 mm. long, 3.5 mm. wide, 2 mm. thick. Only the mere tip is missing from the small end. Elliptical in section. The reverse has a trace of a longitudinal furrow.

Tip fragment of charred bone point. Outside can not be determined. 24 mm. long, 7 mm. wide, 4.5 mm. thick. The bone is soft and friable and is spongy throughout. Elliptical in section.

Tip fragment of bone point, 31 mm. long, 6.5 mm. wide, 5 mm. thick. Edges rounded. Edges taper from 12 mm.

Tip fragment of bone point. Outside can not be determined. 21.5 mm. long, 3.5 mm. diameter. White. Round in section.

Tip fragment of bone point, 18 mm. long, 5.5 mm. wide, 4 mm. thick. The inside is flat and its surface is the former inside wall of the bone.

Tip fragment of bone point. Outside can not be determined. 17 mm. long, 4 mm. diameter. White throughout. Round in section.

Tip fragment of bone point. 28 mm. long, 4 mm. diameter. Round in section. The more acute taper starts about midway of the specimen. The butt break seems recent.

Tip fragment of bone point. Outside can not be determined. 23.5 mm. long, 5 mm. diameter. Glassy fracture. Round in section. The reverse especially has charred surface blotches. The extreme tip is broken off.

Tip fragment of bone point. Inside has a trace of a furrow. 26 mm. long, 5 mm. diameter. Irregularly roundish in section. The outside is chipped off somewhat.

Tip fragment of bone point. 18 mm. long, 5 mm. diameter. The edges are sharp. The outside is intact; most of the reverse is splintered off. The tip is neatly double convex in section.

Tip fragment of bone point. Outside can not be determined. 10 mm. long, 3.5 mm. diameter. Practically round in section. A mere tip.

Tip fragment of bone point, 13 mm. long, 4 mm. wide, 3 mm. thick. Elliptical in section. Mellowed and glassy. Reverse has a natural furrow.

Tip fragment of bone point. Outside can not be determined. 25.5 mm. long, 6.5 mm. wide, 3 mm. thick. Bluish gray color. Edges rounded. Obverse and reverse flat. Tapers from all sides.

Tip fragment of bone point. Reverse is a fracture. 26 mm. long, 6.5 mm. wide, 5 mm. thick. The outside and one edge are old surfaces and form a sharp corner where they join. The tip of this specimen is not the old point, but may be from near it.

Tip fragment of bone point. The inside has a narrow furrow. 26.5 mm. long, 5 mm. wide, 4 mm. thick. A splinter 17 mm. long is broken off the right edge. Obverse tapers from 5 mm., reverse from 9 mm.

Tip fragment of bone point, 39.5 mm. long, 6.75 mm. wide, 5 mm. thick. Very dark, rich color. Elliptical in section. The tip is beveled equally from all sides.

Tip fragment of bone point. Outside can not be determined. 21 mm. long, 4 mm. diameter. Quite round in section. There is a slight longitudinal natural furrow in the left edge.

Tip fragment of bone point, 22.5 mm. long, 6 mm. wide, 5 mm. thick. The left edge is a fracture. Although a break at the upper right reaches the tip, the tip evidently originally extended no farther.

Tip fragment of bone point, 27 mm. long, 6 mm. wide, 5 mm. thick. The surface is white but the interior black. Extreme tip broken off. Elliptical in section. The limit of the beveling is hard to judge.

Tip fragment of bone point. Outside can not be determined with certainty. 8.5 mm. long, 3.5 mm. diameter. White but has blackish core. Round in section. Tip intact.

Tip fragment of bone point. Outside can not be determined. 29 mm. long, 8 mm. wide, 5 mm. thick. Dark gray color. Butt break shows solid texture of the bone.

Tip fragment of bone point. Outside can not be determined. 27 mm. long, 4 mm. diameter. Round in section. The specimen shows some minute diagonal raspings on its surface at various places. Tip intact.

Tip fragment of bone point. Outside can not be determined. 25 mm. long, 4 mm. diameter. Extreme tip broken off.

Tip fragment of bone point. Outside can not be determined. 21 mm. long, 5 mm. wide, 4 mm. thick. Almost round in section. The tip is chipped off a little at the left edge.

Tip fragment of bone point, 21 mm. long, 5 mm. diameter. There is a splinter 9 mm. long off one edge at the point. The furrow near the butt fracture indicates the former inside wall.

Tip fragment of bone point. Outside can not be determined. 15 mm. long, 3 mm. diameter. Round in section. Tip intact.

Tip fragment of bone point. Outside can not be determined. 18 mm. long, 6.5 mm. wide, 4 mm. thick. Elliptical in section. Reverse flattish. Tip intact.

Tip fragment of bone point, 17.5 mm. long, 6.5 mm. wide, 4 mm. thick. The obverse is flat, almost troughed. The inside has a natural furrow. The edges are rounded. The tip bends to the left.

Tip fragment of bone point. Outside is flat. 33 mm. long, 7 mm. wide, 5.5 mm. thick. The inside has a natural furrow which extends nearly to the tip. Edges rounded. The obverse tapers starting 9.5 mm. from the top.

Tip fragment of bone point. Outside can not be determined. 19.5 mm. long, 7 mm. diameter. Light grayish color with blackish blotches on obverse surface. Round in section. Point bluntly rounded.

Tip fragment of bone point. Inside has a lengthwise furrow. 40 mm. long, 7.5 mm. wide, 5 mm. thick. Triangular in section. The right edge and obverse are natural surfaces and form a right-angled corner. The tip is formed by beveling the right and left corners of the obverse from 15 mm. back, the outside and inside are not doubled at all. Old bone color, almost blackish.

Tip fragment of bone point. Outside can not be determined and no former surface is intact. 22 mm. long, 5 mm. wide, 4 mm. thick. Elliptical in section.

Tip fragment of bone point. Outside can not be determined. 16 mm. long, 6 mm. wide, 4.5 mm. thick. Elliptical in section. Tip curves to the left.

Central fragment of bone point. Inside consists of a furrow. 33 mm. long, 7 mm. wide, 4 mm. thick. White throughout. Edges rounded. Tip and butt broken off.

Tip fragment of bone point. Outside can not be determined. 24.5 mm. long, 5 mm. diameter. Whitish surface but blackish inside. Round in section. Tip curves slightly to the reverse. A longitudinal crack does not extend through the specimen.

Tip fragment of bone point. Outside can not be determined. 38 mm. long, 7 mm. wide, 4.5 mm. thick. Elliptical in section. Dark brown color. The entire specimen, including the butt fracture, is gummed over with gray colored material, with exception of the tip which is bare and smooth. The extreme tip is broken off and the butt fracture extends 11 mm. up the right edge.

Tip fragment of bone point. Outside can not be determined. 22 mm. long, 33 mm. diameter. Round in section, evidently the end of a slender implement. Tip intact and sharp.

Tip fragment of bone point, 29 mm. long, 6.5 mm. wide, 4 mm. thick. Point intact and very sharp. There is a fracture in two cleavages off the inside surface extending to 11.5 mm. from the tip. Color almost black.

Tip fragment of bone point. Former outside surface of the bone extends down the center. 40.5 mm. long, 9 mm. wide, 7 mm. thick. One edge tapers pronouncedly, starting 6 mm. from the tip. Extreme tip broken off.

Tip fragment of bone point. Outside can not be determined. Elliptical in section. 25.5 mm. long, 4 mm. wide, 3.25 mm. thick. Tip intact. Tip curves to the right.

Central fragment of bone point, 33 mm. long, 5 mm. wide, 3.5 mm. thick. The outside has a slender natural groove running around lengthwise. Edges rounded. The upper end is slenderer and was evidently near the former tip.

Tip fragment of bone point, 41.5 mm. long, 8 mm. wide, 6 mm. thick. Inside tapers for 21 mm. from tip, outside tapers 15 mm. from tip. The tip is blacker than the rest of the specimen, having a charred appearance. The edges are rounded and show several faces.

Tip fragment of bone point. 17 mm. long, 6 mm. wide, 3 mm. thick. Edges rounded. Tip intact.

Tip fragment of bone point. Outside can not be determined. 22.5 mm. long, 4 mm. diameter. Rather square in section but with rounding corners. Tip intact.

Central fragment of bone point. Outside can not be determined. 19.5 mm. long, 5 mm. wide, 4 mm. thick. Elliptical in section. A little tar adheres to the surface of the corner of one edge.

Tip fragment of bone point, 18.5 mm. long, 7 mm. wide, 3.5 mm. thick. Dark mellowed color, glassy. Edges rounded. Inside convex, outside somewhat concave.

Central fragment of bone point. Outside can not be determined. 25 mm. long, 4.5 mm. diameter. Blackish and glassy. Round in section.

Tip fragment of bone point. Natural furrow extends to within 10 mm. from the tip of the inside. 29 mm. long, 7 mm. wide, 4.5 mm. thick. Edges rounded.

Tip fragment of bone point. Outside can not be determined. 15 mm. long, 4.5 mm. diameter. Dark mellowed color with more or less of a whitish thin coating on the surface. A section of the tapering portion of a somewhat stout bone point.

Central fragment of bone point. Outside can not be determined. 26 mm. long, 4 mm. wide, 3.5 mm. thick. Practically round in section. Tar stains on the lower half of the left edge and on the reverse side. The bone is rather soft and friable.

Central fragment of bone point. 35 mm. long, 6 mm. wide, 4.5 mm. thick. One edge is the former surface. The inside consists of a single fracture which extends to the tip. A mere fragment. The butt is an old cut, not a split or break.

Tip fragment of bone point. Outside can not be determined. 22 mm. long, 1.6 mm. wide, 4 mm. thick. Obverse and reverse absolutely flat. Edges rounded with several faces, somewhat squarely. Extreme tip broken off. Dark flesh color.

Tip fragment of bone point. Inside is somewhat troughed. 14 mm. long, 9.5 mm. wide, 8 mm. thick. The obverse tapers from 7 mm. Edges rounded, elliptical in section.

Tip fragment of bone point. Outside can not be determined. 26 mm. long, 6 mm. diameter. The specimen tapers equally from all sides. Round in section. Tip intact.

Tip fragment of bone point, 19 mm. long, 5 mm. wide, 2.5 mm. thick. Edges rounded. Inside flatish and grooved. Tip intact.

Tip fragment of bone point. Obverse can not be determined. 24 mm. long, 4.5 mm. wide, 3.5 mm. thick. Dark mellowed color, almost blackish. Elliptical in section.

Tip fragment of bone point. Inside has furrow. 42 mm. long, 9 mm. wide, 4 mm. thick. Outside and inside have tip tapered from 7 mm. There is more or less asphalt still adhering, showing that there was formerly asphalt over the entire surface of the specimen. Edges rounded.

Tip fragment of bone point, 32 mm. long, 8 mm. wide, 4.5 mm. thick. Edges rounded. A large furrow occupies most of the inside surface. The surface has blackish blotches. Dark mellowed color and glassy.

Tip fragment of bone point, 28.5 mm. long, 6.5 mm. wide, 4.5 mm. thick. Elliptical in section with a little depression in the inside surface. The tip is intact and is peculiarly blunt.

Tip fragment of bone point, 26 mm. long, 4 mm. diameter. The obverse shows traces of a furrow. There are fractures off both edges, but the tip is intact. Inside and outside taper from about 8 mm.

Tip fragment of bone point. Outside has a natural furrow extending its whole length. 36 mm. long, 9 mm. wide, 6 mm. thick. The tip has been broken off, but is an old break, showing worn surfaces. The butt break is newer. It appears that the original tip was broken off and resharpened.

Tip fragment of bone point. Outside can not be determined. 15.5 mm. long, 4 mm. wide, 2.5 mm. thick. Both sides flat. The obverse side is smooth, the reverse side rough with diagonal raspings. Edges squared. Tip quite sharp.

Tip fragment of bone point, 18 mm. long, 5 mm. diameter. Round in section. Sponginess extends to the very tip, which is intact.

Tip fragment of bone point. Outside can not be determined. 16 mm. long, 4.5 mm. diameter. Extreme tip is broken off diagonally. The whole fragment tapers.

Tip fragment of bone point. Outside can not be determined. 39 mm. long, 5.5 mm. wide, 4 mm. thick. Round in section. The beveling starts 12 mm. from the tip on the obverse, 15 mm. from the tip on the reverse side.

Tip fragment of bone point, 28 mm. long, 5.5 mm. wide, 4 mm. thick. The specimen is charred, especially at the butt. Outside surface and one edge are intact. The edge is squared. The present tip is formed by a fracture off the left edge.

Tip fragment of bone point. Outside can not be determined. 39 mm. long, 8.5 mm. wide, 4 mm. thick. Blackish color. The surface is gummed over with dirt. The left edge is sharper than the right. The extreme tip is broken off.

Tip fragment of bone point. Outside can not be determined. 21 mm. long, 3.5 mm. diameter. Black, charred, especially at the tip. Round in section. Glassy. Obverse starts to taper 7 mm. from the tip.

Tip fragment of bone point. Outside can not be determined. 18 mm. long, 4.5 mm. wide, 2.75 mm. thick. The reverse surface is hard and flattish. The obverse surface is spongy, indicating that it may be the inside of the bone. Elliptical in section.

Tip fragment of bone point. Outside can not be determined. 32.5 mm. long, 4 mm. diameter. Round in section. All sides taper steadily. A little tar-like material adheres to the reverse side near the butt.

Tip fragment of bone point, 16 mm. long, 6.4 mm. wide, 6 mm. thick. Elliptical in section.

Tip fragment of bone point. Outside can not be determined. 30 mm. long, 9 mm. wide, 8 mm. thick. Perfectly elliptical in section. Solid hard bone of mellowed color, blackish at the core. Probably has been through fire.

Tip fragment of bone point. Outside can not be determined. 18.5 mm. long, 5 mm. wide, 3.5 mm. thick. Extreme tip broken off. Elliptical in section.

Tip fragment of bone point. Outside can not be determined. 27 mm. long, 5.5 mm. wide, 4 mm. thick. Obverse and reverse flat, edges rounded.

Tip fragment of bone point. Inside has a furrow its entire length. 18 mm. long, 4.5 mm. wide, 3 mm. thick. Edges rounded. Outside tapers from 4.5 mm. inside scarcely at all. Patches of the surface are lighter owing to the darker discoloration being worn off in places.

Tip fragment of bone point. Inside furrowed. 23 mm. long, 7 mm. wide, 3 mm. thick. Edges rounded. There is a chip-off the inside near the point. The outside tapers from 3.5 mm. from the tip, producing a tip of the broad type. Mellowed color, glassy.

Central fragment of bone point. Blackish color. Surface stuck with ashlike material. 18.5 mm. long, 4.5 mm. wide, 3 mm. thick. The outside and inside are flattish, edges squarish. Round in section at the tip break.

Tip fragment of bone point, 27 mm. long, 4 mm. wide, 3.5 mm. thick. White outside, dark mellowed color at the core, the white layer being only about 0.75 mm. thick. Round in section. The inside has a narrow natural groove. Outside and inside taper from about 10 mm. Tip very sharp.



Central fragment of bone point. Outside can not be determined. 21 mm. long, 4 mm. wide, 3 mm. thick. Blackish.

Tip fragment of bone point. Outside can not be determined. 18 mm. long, 6 mm. wide, 6 mm. thick. Elliptical in section.

Tip fragment of bone point. Outside can not be determined. 15 mm. long, 5 mm. wide, 4.5 mm. thick. Tip intact. Elliptical in section. The reverse is flattish.

Tip fragment of bone point. 3.5 mm. long, 6 mm. wide, 4 mm. thick. Elliptical in section. The inside has a natural furrow. The edges taper from 20 mm., the outside from 2 mm., the inside from 5 mm. Tip intact.

Tip fragment of bone point. Outside can not be determined. 24.5 mm. long, 4.5 mm. wide, 3.5 mm. thick. Elliptical in section. The specimen tapers equally from all sides. Tip intact.

Tip fragment of bone point. Outside can not be determined. 24.5 mm. long, 4.5 mm. wide, 3.5 mm. thick. Elliptical in section. Extreme tip broken off. The tip bends a little to the reverse. The right edge starts to taper pronouncedly from 14 mm. Round in section toward the tip.

Tip fragment of bone point. Outside can not be determined. 21 mm. long, 3.5 mm. diameter. Round in section. The tip is more slender than it originally was because of a slanting fracture 5.5 mm. long off the right edge.

Central fragment of bone point, 18.5 mm. long, 4.5 mm. wide, 3.5 mm. thick. Mellowed color and glassy, somewhat blackened toward the tip. Elliptical in section, except that the outside is very flat.

Tip fragment of bone point. Outside can not be determined. 43 mm. long, 11 mm. wide, 9 mm. thick. The fracture of the butt is straight and glassy. The right edge is sharp, the left edge flat. The tapering is from all sides.

Tip fragment of bone point. Outside can not be determined. 37 mm. long, 3 mm. diameter. The reverse has a large furrow. A splinter 20 mm. long is broken off the right edge. Obverse and reverse taper from about 9 mm.

Central fragment of bone point. Outside can not be determined. 28.5 mm. long, 2.5 mm. diameter. There is a large chip off the base of the reverse. Edges rounded. The obverse tapers from 5 mm., the reverse from 4 mm. The extreme tip curves a little to the left.

Tip fragment of bone point. Outside can not be determined. 21 mm. long, 3 mm. diameter. Almost round in section. Point intact and neatly made. Specimen bulges to the left.

Butt fragment of bone point. Outside can not be determined. 27 mm. long, 5 mm. diameter. Round in section. The butt is somewhat squared off at the end. Very symmetrical and neatly made.

Tip fragment of bone point. Outside can not be determined. 37 mm. long, 3 mm. diameter. The diameter is greatest two-thirds of the distance back from the point. The upper portion is black as if from fire. A little asphalt is stuck on the left edge. The tip bends to the right.

Central fragment of bone point. Outside can not be determined. 28.5 mm. long, 2.5 mm. diameter. Beautifully made of solid wall of bone, perfectly round in section. The butt end is just a little larger than the tip.

Central fragment of bone point. Outside can not be determined. 20 mm. long, 3 mm. diameter. Round in section. Blackish and glassy.

Tip fragment of bone point. Outside can not be determined. 35.7 mm. long, 2.5 mm. diameter. Round in section. The extreme tip is broken off a little on the left side. The butt end is a little larger than the tip. Blackish.

Entire bone point, 33.5 mm. long, 8.5 mm. wide, 6.5 mm. thick. A shallow groove 5 mm. broad lies across the obverse surface, cutting well into the edges

but not extending to the inside surface. The butt is neatly squared. The tip is bluntly pointed, tapering from about 7 mm. from all sides except the inside. The point is evidently made for a definite purpose.

A larger specimen of entire bone point of the same kind as the preceding, 37 mm. long, 10 mm. wide, 7 mm. thick. The transverse groove is 6 mm. broad and 15 mm. from the tip. The butt is neatly squared, the tip bluntly pointed and tapers from 7 mm. In neither of these specimens is there any trace of grooving of tar. The use remains problematical.

Tip fragment of bone point. Inside consists of the former flattish surface of the inside of the bone. 25.5 mm. long, 9 mm. wide, 4.5 mm. thick. The tip curves to the right and is very blunt.

Central fragment of bone point, 37 mm. long, 9 mm. wide, 5 mm. thick. The tip curves markedly to the right as in the preceding specimen. The left edge has an elbow 5 mm. from the butt fracture. The use of these two specimens is problematical.

Central fragment of bone point. Outside can not be determined. 25.5 mm. long, 4 mm. wide, 2 mm. thick. The edges are more or less squared. The specimen is too small to judge from what artifact it is derived.

Central fragment of bone point. Outside can not be determined. 13 mm. long, 3.5 mm. wide, 1.5 mm. thick. Both edges squared neatly. Sides flat. A mere fragment.

#### COMPOSITE FISHHOOK POINTS

Fishhooks were made of two worked bones, known technically as the shank and the point, lashed together so as to form an acute angle. Such hooks are described by Stephen Bowers as follows:<sup>21</sup> "The true fishhook of what may be termed the Santa Barbara Indians, has never, to my knowledge, been figured. . . . These hooks were made of two slightly curved pieces of bone pointed at each end, and firmly tied together at the lower end and cemented with asphaltum." Although no complete specimen with shank and point lashed together was found, we obtained abundant specimens of the bone points of this kind of hook, some showing the imprint in the asphaltum from the former apparently sinew lashing that held the hook together. Some of these points have squared base, some sharp or rounded base. They varied in size even more than the one-piece fishhooks of bone or abalone.

#### ENTIRE COMPOSITE FISHHOOK POINTS WITH SQUARED OR BLUNT BASES

Entire point, 55.5 mm. long, 6.5 mm. wide, 3.5 mm. thick. Edges rounded. The left edge has an elbow 20 mm. from the butt. The right edge has several transverse grooves for wrapping in the vicinity of the butt. The extreme bottom end shows erosion. Tip curves to the left.

Entire point, 36.5 mm. long, 9 mm. wide, 5 mm. thick. Edges rounded. The left edge has an elbow 23 mm. from the butt. The lower part of the right edge has asphalt stuck on and three transverse depressions in it from the old wrapping. The obverse has a natural furrow. The butt is a rounded point. The tip curves to the left.

<sup>21</sup> Bowers, Stephen, Fishhooks from Southern California. In *Science*, vol. 1, Cambridge, Mass., 1883, p. 575.

Entire point. Obverse outside. 38 mm. long, 9 mm. wide, 6 mm. thick. The edges are rounded. The left edge has an elbow 23 mm. from the butt. The right edge has transverse scorings for wrapping from its central portion to the butt. The butt is neatly squared. The tip curves to the left. (Pl. 20, *b*, 1.)

Entire point. Obverse outside. 22 mm. long, 6 mm. wide, 3 mm. thick. The left edge is somewhat squared, the right sharpened. The butt is rounded. Close examination shows that this specimen is to be classed with the barbs and illustrated extreme variation in form. (Pl. 20, *b*, 2.)

Entire point. Obverse outside. 35 mm. long, 6.5 mm. wide, 4 mm. thick. White in color throughout, but strong bone. Edges squared toward the butt, rounded toward the tip. The left edge has a shoulder 7 mm. from the butt. There are faint transverse scorings for wrapping on the lower part of the right edge at its greatest incurving. Tip curves to the left. (Pl. 20, *b*, 3.)

Entire point. Obverse outside. 37 mm. long, 4 mm. diameter. Edges rounded. Butt rounded. No trace of tar wrapping. Tip curves to right. The specimen has no shoulder. (Pl. 20, *b*, 4.)

Entire point. Obverse outside. 41.5 mm. long, 7.5 mm. wide, 5 mm. thick. Edges rounded. The left edge has a shoulder 16 mm. from the butt. The right has no asphalt or grooving. Tip bends to the left. Butt rounded. (Pl. 20, *b*, 5.)

Entire point. Outside can not be determined. 33 mm. long, 7 mm. wide, 5 mm. thick. White colored and somewhat soft bone with blackish blotchings on the obverse side. Edges rounded. There is no shoulder. Butt squared, but only 2.5 mm. diameter. Point blunt, but may have been sharper. (Pl. 20, *b*, 6.)

Entire point. Outside can not be determined. 50 mm. long, 6 mm. wide, 4 mm. thick. Edges rounded. The left edge has a shoulder or bend 35 mm. from the butt. Butt squared and 2 mm. diameter. Tip bends to the right. (Pl. 20, *b*, 7.)

Entire point. Obverse outside. 53.5 mm. long, 6.5 mm. wide, 4 mm. thick. The general shape resembles that of the last-described specimen. Edges rounded. The butt is bluntly rounded. No trace of scoring or asphalt. The tip turns gracefully to the right. (Pl. 20, *b*, 8.)

Entire point. Obverse outside. 52.5 mm. long, 5 mm. wide, 3 mm. thick. Edges rounded. The butt is squared and 2 mm. diameter. The butt and the adjacent base of the specimen are covered with asphalt, but no trace of wrapping depressions can be detected. The tip curves to the right. (Pl. 20, *b*, 9.)

Entire point. Obverse outside. 58 mm. long, 6 mm. wide, 4 mm. thick. Edges rounded. The left edge has a shoulder 8 mm. from the butt. The left edge has a number of transverse scorings just above this shoulder, although one would expect to find them on the right edge opposite, judging from analogy with the other specimens. A fleck of asphalt adheres to the specimen on the reverse side 15 mm. from the butt; this fleck is 9 mm. long and nearly as wide. The tip curves to the left. Butt squared and 2 mm. diameter. (Pl. 20, *b*, 10.)

Entire point, 61 mm. long, 7 mm. diameter. Round in section. Butt nicely squared and 5 mm. diameter. Point rather blunt but intact. Tip curves to the right. No shoulder. No trace of asphalt or grooving.

Entire point, 45 mm. long, 6 mm. diameter. Round in section. Butt squared and 2 mm. diameter. The surface is not smoothly rounded but consists of long narrow faces, as if produced by scraping. Tip curves slightly to the right.

Entire point, 34.5 mm. long, 7.5 mm. wide, 5.5 mm. thick. Edges rounded. Butt squared and 4 mm. diameter. Tip bends slightly to the left.

Entire point. Obverse outside. 46 mm. long, 10 mm. wide, 8.5 mm. thick. A nicely made specimen. Butt very square and 10 mm. diameter. The lower half

of the right edge has a number of hairlike transverse scorings for the wrapping. The left edge has its sharpest bend 20 mm. from the butt. The tip curves to the left with a peculiarly sharp bend. (Pl. 20, *b*, 11.)

Entire point. Obverse inside and the porousness can be seen in the picture. 28 mm. long, 5.5 mm. diameter. Edges rounded. The bend of the left edge is about 12 mm. from the butt. Butt squared and 5 mm. diameter. The tip curves slightly to the left. (Pl. 20, *b*, 12.)

Entire point. Obverse outside. 66 mm. long, 7.5 mm. wide, 6.75 mm. thick. Edges neatly rounded. Butt 4 mm. diameter and intended to be squared, though slightly bulging. The tip swings to the left from about 15 mm. The specimen is jet black, beautifully made and very strong. The left edge has a shoulder 10 mm. from the butt and between the shoulder and the butt exhibits four transverse scratchings. Whether these were holding the original wrapping is doubtful, since judging from the other specimens we would expect the scorings higher up and on the opposite edge. (Pl. 20, *b*, 13.)

Entire point. Obverse outside. 49.5 mm. long, 7 mm. wide, 5.5 mm. thick. Edges rounded. The lower two-thirds of the specimen is covered with strong black asphalt and the right edge in its central portion shows twenty or more depressions from the wrapping. Butt squared and 3 mm. diameter. The maximum diameter of the specimen is 25 mm. from the butt. The tip curves slightly to the right. (Pl. 20, *b*, 14.)

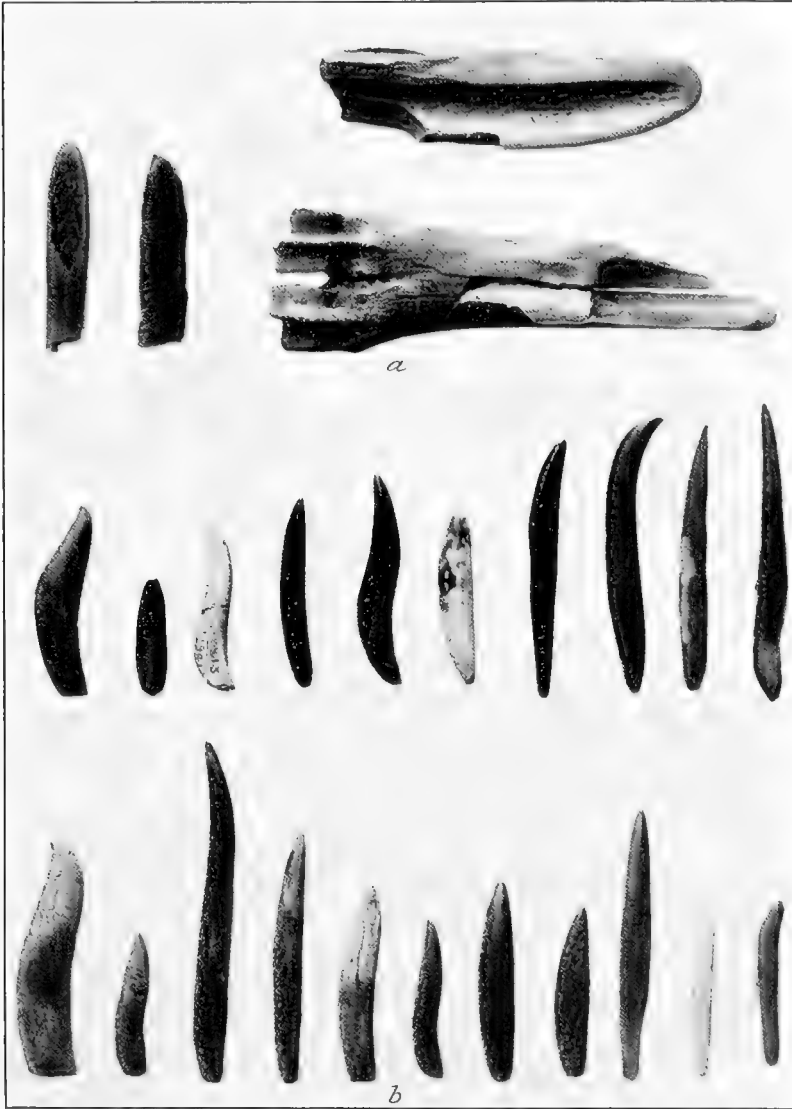
Entire point. Obverse outside. 39 mm. long, 6.5 mm. wide, 4.5 mm. thick. Whitish gray color. Edges rounded. A thin coating of asphalt adheres to the lower half of the specimen. The left edge has its greatest bend 18 mm. from the butt. The right edge shows a number of transverse impressions from the wrapping from 5 to 10 mm. from the butt. Butt squared and 5 mm. diameter. The tip bends to the left. (Pl. 20, *b*, 15.)

Entire point. Outside can not be determined. 31 mm. long, 5 mm. diameter. Edges rounded. Obverse flat, reverse is more rounded. Extreme bend of left edge is 8 mm. from the butt. The right edge has a number of transverse scorings and minute specks of asphalt extending from almost at the butt for a space of 10 mm. up the edge. On the left edge also are minute specks of asphalt. Butt squared and 4 mm. diameter. The tip bends slightly to the left. (Pl. 20, *b*, 16.)

Entire point. Obverse outside. 40 mm. long, 7.5 mm. diameter. Edges rounded, making the specimen almost round in section. Butt squared and 2.75 mm. diameter. The left edge shows a number of fine transverse groovings commencing 10 mm. from the butt and extending up the edge for 8 mm. The maximum diameter is approximately at the middle of the specimen. The specimen bulges slightly to the left, making the point swing to the right. (Pl. 20, *b*, 17.)

Entire point. Obverse inside and the entire obverse surface is spongy. Edges rounded. The maximum diameter of the specimen is 10 mm. from the butt, the left edge forming a sort of shoulder. Butt squared and 4 mm. diameter. The right edge has a number of well-made transverse grooves, which can be seen in the photograph, beginning 4 mm. from the butt and extending 13 mm. The tip bends very slightly to the right. (Pl. 20, *b*, 18.)

Entire point. Obverse outside. 53 mm. long, 6 mm. wide, 4.5 mm. thick. Edges rounded. The right edge has a peculiar shoulder 16 mm. from the butt. The butt is rounded and 3.5 mm. diameter. The specimen exhibits several dark blotches on its surface, evidently from asphalt, but there are no scorings on the right edge. (Pl. 20, *b*, 19.)



a, BROAD BONE POINTS. WEDGE-SHAPED BONE IMPLEMENTS.  
b, COMPOSITE FISHHOOK PARTS



*a*, COMPOSITE FISHHOOK PART. *b*, *c*, BIRD BONE WHISTLES. *d*, WOODEN AWL. *e*, *k*, AWL-SHAPED ARTIFACTS OF BIRD BONE. *f*-*h*, TUBULAR BEADS OF DEER BONE. *i*, *j*, NEEDLES OF THE SPLINT BONES OF THE CALIFORNIA MULE DEER. *l*, *m*, *n*, WEDGES OF DEER ANTLER. *o*, *p*, SLATE POINTS

Entire point. Obverse outside. 33.5 mm. long, 4 mm. diameter. Edges rounded. Chalk-white color throughout. Practically round in section. The butt is intended to be squared but is in reality a blunt point. The maximum diameter of the specimen is 15 mm. from the butt. The tip bends slightly to the right. (Pl. 20, *b*, 20.)

Entire point. Obverse outside. 33 mm. long, 4 mm. diameter. Edges rounded. Butt squared and 2 mm. diameter. There is no trace of asphalt or grooving. The left edge makes an abrupt bend 6 mm. from the tip. The tip bends to the right and is blunt. There is a tiny splinter off the obverse side of the tip extending down the side 3.5 mm. (Pl. 20, *b*, 21.)

Entire point, 72.5 mm. long, 7 mm. wide, 5 mm. thick. Edges rounded. The maximum diameter is 30 mm. from the butt. Traces of asphalt are gummed especially to the inside surface from the butt extending up the specimen 17 mm., but no trace of wrapping depressions can be detected on the right edge. The specimen twists almost a quarter turn in clockwise direction. The inside is troughed to within 30 mm. of the tip. The butt is squared and is 2.5 mm. diam. The tip curves to the right. A strong and well-made specimen.

Entire point. 55.5 mm. long, 12 mm. maximum diameter, curve of tip 7 mm. Perfectly shaped and symmetrical. Dark in color. The porous interior of the bone shows at two places on the inside surface. The tip seems to be somewhat charred. The butt is rounded, the tip quite sharp. No trace of asphalt adhering at the base. (Pl. 21, *a*.)

#### ENTIRE COMPOSITE FISHHOOK POINTS, SHARP AT BOTH ENDS

Entire point. 73.5 mm. long, 7.5 mm. wide, 5.5 mm. thick. Edges rounded. The butt consists of a rather sharp point, tapering from 20 mm. There is a natural foramen 13 mm. from the butt on the inside. No trace of asphalt or grooving.

Entire point, 42.5 mm. long, 4.5 mm. wide, 3.5 mm. thick. Edges rounded. Butt tapers to a sharp point from only about 3 mm. Tip curves to right. Extreme tip broken off. The tip also twists considerably toward the obverse.

Entire point. Outside can not be determined. 30 mm. long, 5 mm. wide, 4 mm. thick. Edges rounded. The butt is sharp and tapers from 10 mm. Extreme tip broken off.

Entire point. Outside can not be determined. 29.5 mm. long, 4 mm. wide, 2.5 mm. thick. The butt is as sharp and slender as the tip, the maximum diameter of the specimen being in the middle. Elliptical in section. The barb bulges toward the left edge.

Entire point. Outside can not be determined. 56 mm. long, 5.5 mm. wide, 4.5 mm. thick. The butt is as sharp as the tip, tapering from about 17 mm. Edges rounded. The tip tapers steadily from 35 mm., bending to the right.

Entire point, 35.5 mm. long, 5.5 mm. wide, 4 mm. thick. Elliptical in section. There is considerable spongy surface on the inside. There are irregular shaped blotches of asphalt on the central and lower portions of the specimen, but no trace of wrapping. The tip bends slightly to the right.

Entire point, 63.5 mm. long, 8.5 mm. wide, 4.5 mm. thick. The edges rounded. The butt is as sharp as the tip and tapers from 25 mm. Tip straight.

Entire point, 35 mm. long, 6 mm. wide, 5 mm. thick. Edges rounded. Porousness of the bone crops out along the upper left edge. The lower right edge has about fifteen transverse groovings of threadlike thickness. The greatest diameter is at the center of the specimen.

Entire point. Outside can not be determined. 38.5 mm. long, 5 mm. wide, 4 mm. thick. Edges rounded. The butt consists of a blunt point. Maximum diameter at the middle of the specimen. Tip straight and darker than the rest of the barb.

Entire point, 43.5 mm. long, 5.5 mm. wide, 4.5 mm. thick. Edges rounded. The butt is sharp but much blunter than the point. Both the left and right edges have transverse groovings beginning about 3 mm. from the butt and extending for about 5 mm. It is usual in such specimens to find the grooving only on the lower right edge. The upper part of the inside has a natural furrow. The tip curves rather sharply to the right.

Entire point. Outside can not be determined. 40 mm. long, 4.5 mm. diameter. Edges rounded. The butt is even sharper than the tip, but this is caused by a small splinter off the lower left edge.

Entire point. Outside can not be determined. 30.5 mm. long, 7 mm. wide, 4 mm. thick. The obverse surface consists of four fractures. The reverse surface is also largely a fracture. The right edge is somewhat squared. Tip intact.

Entire point, 48.5 mm. long, 7.5 mm. wide, 4 mm. thick. The butt is as sharp as the tip, and the two ends were doubtless used indifferently in such a specimen. The maximum diameter is at the center of the specimen.

Entire point. Outside can not be determined. 39 mm. long, 5 mm. wide, 3 mm. thick. Edges rounded. The ends are equally sharp.

Entire point. Outside can not be determined. 35.5 mm. long, 7 mm. wide, 5 mm. thick. Edges rounded. The ends are equally sharp. The tip bends to the right.

Entire point, 37 mm. long, 5 mm. wide, 3.5 mm. thick. Edges rounded. The ends are equally sharp. The specimen has a few black flecks on its surface as if from asphalt.

Entire point. Outside can not be determined. 22.5 mm. long, 4.5 mm. wide, 3.5 mm. thick. Edges rounded. Ends equally sharp.

Entire point, 65 mm. long, 5.5 mm. wide, 3 mm. thick. The ends are equally sharp. One edge forms an elbow 40 mm. from the butt. There are traces of asphalt at the center of the specimen extending 33 mm. on the outside and 20 mm. on the inside. The left edge has depressions from wrapping extending from 12 mm. at its greatest incurve. The tip bends to the right.

Entire point. Outside can not be determined. 41 mm. long, 3 mm. diameter. Round in section. Equally sharp at both ends. The entire central portion is gummed over with a thick coating of asphalt and there are depressions of wrapping extending for 4 mm. at the center of the right edge.

Entire point. Outside can not be determined. 57 mm. long, 7 mm. wide, 5 mm. thick. Edges rounded. The ends are equally sharp and equally curved to the right. The central part of the specimen, extending from 28 mm., is covered with asphalt which bulges to the left, making a prominent elbow 28 mm. from the butt. The asphalt is 6 mm. thick at the elbow. Extending along the right edge for a space of 22 mm. at the center of the specimen are transverse depressions from the former wrapping. The specimen and the adhering asphalt are unusually well preserved.

#### COMPOSITE FISHHOOK POINTS WITH FLATTENED INNER WALL OF INCURVE, ANOMALOUS POINTS, AWL-LIKE POINTS

Entire point. Outside can not be determined. 55 mm. long, 8 mm. wide, 6 mm. thick. The left edge has a shoulder 17 mm. from the butt. Beyond the shoulder the edge is neatly squared, while the right edge is nicely rounded



throughout its extent. From the butt to a little beyond the vicinity of the shoulder the specimen is coated with black asphalt which is especially thick at the shoulder and presents a rounded bulging surface. The right edge of this asphalt shows depressions from former wrapping extending for a distance of 13 mm. along the edge, commencing almost flush with the butt. The butt is neatly squared and is 8 mm. diameter. The tip curves to the left.

Entire point. Outside can not be determined. 38 mm. long, 7 mm. wide, 5.5 mm. thick. The left edge has a shoulder 22 mm. from the butt. Beyond the shoulder the left edge is squared. The lower left edge and entire right edge are rounded. The lower right edge has depressions from wrapping starting 3 mm. from the butt and extending 15 mm. The butt is squared and 7 mm. diameter. Tip curves to the left.

Entire point, 47 mm. long, 10.5 mm. wide, 5 mm. thick. The left edge has a shoulder 26 mm. from the butt. Beyond the shoulder the left edge is squared. The lower part of one edge and entire other edge are rounded. The edge has depressions of wrapping starting 5 mm. from the butt and extending 17 mm. The butt is rounded and 5 mm. diameter. The tip curves sidewise.

Entire point, 54.5 mm. long, 8 mm. wide, 4.5 mm. thick. The left edge has a shoulder 20 mm. from the butt and is squared beyond the shoulder. One lower edge and entire other are rounded. The lower edge has no trace of wrapping. The butt is rounded and 5.5 mm. diameter. The tip curves to the left.

Entire point, 39 mm. long, 8.5 mm. wide, 7 mm. thick. The left edge has a shoulder 23 mm. from the butt and is squared beyond the shoulder. One lower edge and entire other edge are rounded. Edge has transverse scorings for wrappings starting practically at the butt and extending 22 mm. The butt is 7 mm. diameter and nicely squared. The tip curves sidewise.

Entire point. Outside can not be determined. 44.5 mm. long, 7 mm. wide, 4 mm. thick. The left edge has a shoulder 24 mm. from the butt and is squared beyond the shoulder. One lower edge and entire other edge are rounded. There is a splinter 17 mm. long off the upper central portion of rounded edge. The butt is bluntly rounded. The tip is straight and its extreme portion is round in section.

Entire point. Outside can not be determined. 33.5 mm. long, 6 mm. wide, 4 mm. thick. White color but strong. The maximum diameter is at the middle of the specimen. Both edges rounded. The upper central portion of the specimen is coated with asphalt for a distance of 18 mm. The right edge has two transverse grooves for wrapping, 2.5 mm. broad and about 1 mm. deep. The center of the first of these grooves is 10 mm. from the butt, that of the second groove is 15 mm. from the butt. The butt is squared and is 3 mm. diameter. The tip is rather blunt and straight.

Entire point, 84 mm. long, 7 mm. diameter. Edges rounded. Neatly cut from the wall of a long bone. The reverse surface consists of a long furrow and shows considerable sponginess. Edges rounded. The butt forms a blunt point and there are two transverse hackings on the outside just above the butt end. The tip starts to taper from 25 mm. and forms a sharp point, one edge being broken off a little at the extreme tip.

Entire point, 71.5 mm. long, 9 mm. wide, 5 mm. thick. Strongly made. Edges rounded. Asphalt adheres to the specimen starting 5 mm. from the butt and extending 25 mm. One edge shows depressions in asphalt from wrapping for a distance of 20 mm. The butt is a fracture but that is very likely the original condition of the specimen. The tip curves gracefully to the left. The bone is of unusually clean and fresh appearance. The inside shows a narrow longi-

tudinal furrow in the lower half of the specimen. This point is evidently a barb.

Entire point, 59.5 mm. long, 8 mm. wide, 4.5 mm. thick. Edges rounded. Both outside and inside have longitudinal furrows extending from the butt to beyond the central portion of the specimen. The butt consists of a diagonal cut. The tip is straight. There is no asphalt or grooving. The bone has a fresh appearance.

Entire point, 69 mm. long, 7 mm. wide, 5.5 mm. thick. Edges rounded. The butt is a fracture, but is probably the original condition. There is a chip off the inside extending 18 mm. from the butt. One edge tapers from 26 mm., the other edge from 16 mm. The extreme tip is broken off. A splinter projects into the left edge just above where it starts to taper.

Entire point. Outside can not be determined. 51 mm. long, 4.5 mm. wide, 3.5 mm. thick. Edges rounded. The butt consists of two fractures. There is a sort of transverse backing on the left edge 15 mm. from the butt. The tip tapers from 12 mm. There is no trace of asphalt or grooving.

Entire point. Obverse outside. 53.5 mm. long, 8.5 mm. wide, 5 mm. thick. Edges rounded. The butt is a fracture, but probably the original condition. One edge tapers from 22 mm., the other edge from 30 mm. The extreme tip is broken off. The outside is the inside surface of the bone and has a furrow in its center. The bone has a bleached appearance.

Entire point, 65 mm. long, 5.5 mm. wide, 3 mm. thick. Edges rounded. A splinter extends 44 mm. up the right edge. The butt is a fracture. Tip intact.

Entire point, 79 mm. long, 7 mm. wide, 6 mm. thick. Triangular in section. The butt is a fracture. The tip tapers from 40 mm. The upper portion of the tip has a much abraded surface and the extreme tip is broken off.

Entire point, 85.5 mm. long. Edges rounded. Butt squared and 2 mm. diameter. One edge tapers to tip from 30 mm., the other edge from 20 mm. Grooves in lower edges are accidental.

Entire point, 66 mm. long, 8 mm. wide, 2.5 mm. thick. Edges rounded. The outside has two surfaces from the former inside wall of the bone. Butt rounded irregularly and 7 mm. diameter. Extreme tip broken off a little.

#### FRAGMENTARY COMPOSITE FISHHOOK POINTS

Almost entire point. Obverse can not be determined. 31.5 mm. long, 5 mm. diameter. Round in section. The butt is bluntly rounded. Extreme tip broken off. Tip bends to right.

Almost entire point, 36 mm. long, 5 mm. diameter. The inside consists of two fractures which almost meet at the center of the specimen. The lower of these fractures splits the butt of the specimen in half. It is therefore impossible to determine whether the butt was pointed or squared, but it appears from the general contour of the specimen to have been of the pointed variety.

Tip fragment of point. Outside can not be determined. 21 mm. long, 5.5 mm. wide, 5 mm. thick. Dark mellowed color, glassy. Tip intact, curves to the right.

Tip fragment of point, 38 mm. long, 5 mm. wide, 4 mm. thick. The butt is broken off diagonally. The extreme tip is also broken off.

Butt fragment of point, 31.5 mm. long, 5.5 mm. wide, 4 mm. thick. The inside has a longitudinal furrow commencing 5 mm. from the butt. The butt is squared and 2 mm. diameter. The specimen is broken off in its central portion.

Tip fragment of point, 28 mm. long, 6 mm. wide, 3 mm. thick. The inside consists of a broad furrow. The tip curves to the right.

Almost entire point. Outside can not be determined. 33 mm. long, 4.5 mm. wide, 4 mm. thick. Almost round in section. The butt is bluntly rounded. The thickest portion of the specimen is 14 mm. from the butt, giving the point a toothlike shape. The tip bends to the right and its extreme point is broken off.

Tip fragment of point, 45 mm. long, 8.5 mm. wide, 6.5 mm. thick. Edges nicely rounded. The inside has a broad furrow. Tip curves to right.

Tip fragment of point. Outside can not be determined. 31 mm. long, 5 mm. diameter. Round in section. The maximum diameter is 17 mm. from the tip and was evidently about the middle of the entire specimen. The butt is broken off diagonally and analogy with other specimens would indicate that it was of the sharp variety. The tip curves slightly to the right.

Tip fragment of point. Outside can not be determined. 36.5 mm. long, 5.5 mm. wide, 3 mm. thick. Whitish, with dark gray mottlings on the surface. The left edge forms an elbow 20 mm. from the tip. The butt is broken off but was probably of the sharp variety.

Tip fragment of point. Inside shows furrow in its lower half. 25 mm. long, 7 mm. wide, 4.5 mm. thick. Tip bends to right.

Tip fragment of point, 36 mm. long, 7 mm. wide, 4 mm. thick. The left edge has groovings extending from the butt for a distance of 12 mm., indicating the former presence of wrapping. The butt is a square fracture. The tip bends to the right.

Butt fragment of point. Outside can not be determined. 30 mm. long, 6.5 mm. wide, 6 mm. thick. Edges rounded. Tip starts to curve to the right before it is broken off. Perhaps 5 mm. of the former tip is missing. The butt fracture is very straight.

Tip fragment of point. Inside shows a broad furrow. 59.5 mm. long, 7.5 mm. wide, 5 mm. thick. Edges nicely rounded. Butt broken off diagonally.

Tip fragment of point, 33.5 mm. long, 4.5 mm. wide, 4 mm. thick. The entire outside is a fracture. The tip curves a little to the right.

Tip fragment of point. Outside can not be determined. 27 mm. long, 4 mm. wide, 3 mm. thick. Edges rounded. The surface is light ash-gray color but dirty gray color inside. Tip straight and rather blunt.

Central fragment of point, 26.5 mm. long, 5.5 mm. wide, 4.5 mm. thick. Edges rounded. Maximum width 14 mm. from the tip fracture. Both butt and tip are broken off. The specimen may have been bipointed.

Tip fragment of point. 25.5 mm. long, 6 mm. wide, 5 mm. thick. Edges rounded. The butt fracture runs up the obverse for 12 mm. Tip bends to the right. A few small flecks of asphalt still adhere to the left edge.

Tip fragment of point, 37 mm. long, 7.5 mm. wide, 6 mm. thick. Edges nicely rounded. Tip curves gracefully to the right.

Tip fragment of point, probably a barb. Inside consists of a shallow furrow which extends to 6 mm. from the tip. 37.5 mm. long, 7 mm. wide, 6 mm. thick. A fracture extends 14 mm. up one edge. Tip curves sidewise.

Tip fragment of point. Inside shows somewhat spongy surface with traces of a longitudinal furrow. 40.5 mm. long, 6 mm. wide, 3.5 mm. thick. Edges nicely rounded. Maximum diameter is at the center of the specimen.

Almost entire point, probably a barb of the bipointed type. All surfaces are so worked that it is impossible to determine which is the former outside of the bone. 37.5 mm. long, 6 mm. wide, 5 mm. thick. Edges rounded. Maximum diameter at the center of the specimen. The butt is a sharp point. The extreme tip is broken off.

Tip fragment of point, evidently a mere tip fragment of a point of considerable size. Outside can not be determined. 27 mm. long, 7.5 mm. wide, 4 mm. thick. Edges rounded. A few flecks of ashy material adheres to the obverse and reverse sides.

Almost entire point of unusually slender type. Outside can not be determined. 37.5 mm. long, 3 mm. wide, 2.5 mm. thick. Almost round in section. Maximum diameter at the middle of the specimen. Butt broken off, leaving a stub of 1.5 mm. diameter, but evidently originally tapered to as sharp a point as the tip. No trace of asphalt or grooving. Blackish color, somewhat lighter toward the butt end.

Tip fragment of point, probably of composite hook. Outside can not be determined. 33 mm. long, 5 mm. wide, 3 mm. thick. Edges rounded. Left edge forms a shoulder 12 mm. from the butt fracture. Tip curves to the left.

Almost entire barb, 39.5 mm. long, 8 mm. wide, 5.5 mm. thick. One edge forms a shoulder 18 mm. from the butt. The butt is a blunt point. All edges rounded, but the left edge becomes a little squarish in the vicinity of the shoulder. The tip is broken off, leaving a fracture 3.25 mm. diameter. There is no trace of asphalt or wrapping.

Tip fragment of point. Outside can not be determined. 22 mm. long, 4.5 mm. diameter. The surface is much disintegrated but the obverse surface is so spongy as to suggest that it is the old inside of the bone. Edges rounded. The tip bends somewhat to the right.

Tip fragment of point, 45.5 mm. long, 8 mm. wide, 4 mm. thick. The surface is whitened in places but the interior is flesh colored. Edges nicely rounded. The maximum width is at about the center of the specimen. The point leans to the right.

Central fragment of point. Outside can not be determined. 20 mm. long, 3.5 mm. diameter. Round in section. Tip curves to right. The right edge has a little stain of red paint near its center.

Central fragment of point. Outside can not be determined. 20 mm. long, 3.5 mm. wide, 2.5 mm. thick. Almost round in section. Very similar to the fragment last described, but white as chalk throughout. The butt fracture extends half way up one face.

Tip fragment of point. Outside can not be determined. 30 mm. long, 4.5 mm. diameter. Round in section. White as chalk throughout. The tip is rather blunt and tapers only 5 mm. The tip bends to recurve to the left.

Tip fragment of point. Outside very flat. 27.5 mm. long, 6.5 mm. wide, 4 mm. thick. Edges rounded. The inside shows a furrow in its lower half. Tip sharp and strong.

Central fragment of point, 16 mm. long, 4.5 mm. wide, 3 mm. thick. Edges rounded. The tip curves sidewise.

Central fragment of point, 21.5 mm. long, 4.5 mm. wide, 2.5 mm. thick. Edges rounded. White as chalk throughout. Tip curves sidewise.

Tip fragment of point, 49 mm. long, 6 mm. wide, 4 mm. thick. Edges rounded. Tip curves to right. The obverse is discolored, evidently from asphalt, but there is no trace of wrapping. A little ashy material adheres near the center of the obverse side.

Tip fragment of point. 19.5 mm. long, 7 mm. wide, 2.5 mm. thick. Edges rounded. A mere tip fragment of a point of considerable size. Tip curves sidewise.

Almost entire point. Outside can not be determined 42 mm. long, 8 mm. wide, 6 mm. thick. Edges rounded. The butt is a fracture which runs up both ob-

verse and reverse surfaces. There is also a splinter off the central part of one edge and another splinter off the same edge near the point.

Tip fragment of point, 52 mm. long, 9 mm. wide, 5.5 mm. thick. Edges rounded. The tip is charred and there is a blood vessel opening on the obverse side 10 mm. from the tip. The extreme tip is broken off.

Tip fragment of point, 49 mm. long, 7.5 mm. wide, 4 mm. thick. Edges rounded. The right edge has transverse grooving beginning at the butt fracture and extending 12 mm. The outside shows two small flecks of asphalt near the butt fracture. The inside consists almost entirely of the former furrow of the bone. The tip curves sidewise and starts to taper from 15 mm.

Tip fragment of point. Outside can not be determined. 26 mm. long, 5 mm. diameter. White as chalk throughout. Edges rounded. The tip starts to taper from 20 mm. and curves to the right.

Tip fragment of point, 41.5 mm. long, 8.5 mm. wide, 3.5 mm. thick. Edges rounded. Inside consists almost entirely of a shallow furrow.

Almost entire point, evidently a barb. Inside surface very spongy. 34.5 mm. long, 6 mm. wide, 5 mm. thick. The butt is squared and 3 mm. diameter. There is a fracture off the lower portion of the outside. The tip extends to the right. Extreme tip broken off.

Tip fragment of point. Outside can not be determined. 32 mm. long, 4.5 mm. wide, 3 mm. thick. The tip curves to the left and the taper extends throughout the specimen.

Almost entire point, 36 mm. long, 3 mm. wide, 3.25 mm. thick. Edges rounded. The butt is as sharp as the tip. The maximum diameter of the specimen is about one-third of the distance from the butt. The extreme tip is broken off.

Butt fragment of point, 56 mm. long, 8.5 mm. wide, 3.5 mm. thick. Edges rounded. The butt is squared and is 3.5 mm. wide. A diagonal fracture has carried away the tip part of the specimen, leaving a butt fragment perhaps half the length of the original. There is some discoloring of the surface near the butt, as if from asphalt, but no trace of wrapping.

Tip fragment of point. Outside can not be determined. 35 mm. long, 3.5 mm. diameter. Round in section. The maximum diameter is at the center of the specimen. The tip starts to taper from 10 mm., curves to the right, and is quite blunt. A splinter 6 mm. long is off the reverse side of the tip but the obverse half of the tip is intact.

Almost entire point, evidently a bipointed barb. Outside can not be determined. 38 mm. long, 5.5 mm. diameter. Round in section. White as chalk throughout. Both tips are broken off a little and were probably sharp. The specimen bulges to the left and its greatest diameter is at the center.

Butt fragment of point. 43.5 mm. long, 8.5 mm. wide, 5.5 mm. thick. Edges rounded. The outside consists of the furrow of the bone. Butt squared and 3 mm. diameter. The tip is broken off a little beyond the center of the specimen, leaving a stub 6 mm. wide.

Tip fragment of barb, 34 mm. long, 7.5 mm. wide, 6 mm. thick. Edges rounded. The left edge forms a shoulder 19 mm. from the butt fracture. Tip bends to left.

Tip fragment of point. Outside can not be determined. 40.5 mm. long, 4.5 mm. wide, 4 mm. thick. Roundish in section. The tip bends a little sidewise.

Tip fragment of point, 45 mm. long, 7 mm. wide, 4.5 mm. thick. Edges rounded. Tip bends sidewise.

Tip fragment of point, 44.5 mm. long, 6 mm. wide, 5 mm. thick. Edges rounded. A furrow extends 15 mm. from the butt fracture up the obverse side. Extreme tip broken off.

Tip fragment of point. 44 mm. long, 8.5 mm. wide, 4 mm. thick. Edges rounded. Considerable ashy material adheres to the inside near the butt. Tip curves to left.

Tip fragment of point, probably a fishhook part. 45 mm. long, 8 mm. wide, 5 mm. thick. Edges rounded. A natural furrow extends two-thirds of the way up the reverse side. Ashy material adheres to the obverse near the butt. Tip bends to left.

Tip fragment of point. Outside can not be determined. 34.5 mm. long, 5 mm. wide, 4.5 mm. thick. Practically round in section. White as chalk throughout. The butt is a recent break.

Almost entire point, 28 mm. long, 4.5 mm. diameter. Round in section. Greatest diameter at the center of the specimen. Butt squared and 2 mm. diameter.

Almost entire point. Outside can not be determined. 32 mm. long, 4 mm. wide, 2 mm. thick. Elliptical in section. The butt has crumbled off and leaves a fracture consisting of two planes. Greatest diameter at the center of the specimen. The tip curves somewhat to the right. Extreme tip broken off.

Tip fragment of point. 34 mm. long, 7 mm. wide, 5 mm. thick. Edges rounded. The tip is somewhat blunt, owing to the abrasion of its extreme portion.

Practically entire point, 43.5 mm. long, 10.5 mm. wide, 9 mm. thick. Edges rounded. The greatest width is at the center of the specimen. The butt consists mostly of a slanting fracture but a bit of the original squared butt 3.5 mm. by 2 mm. is still intact at the right-hand side. The left edge has seven transverse grooves starting 8 mm. from the butt and extending 10 mm. One edge has sixteen transverse grooves beginning 3 mm. from the butt and extending 15 mm. The tip is strong and deflects somewhat sidewise.

Tip fragment of point. Outside can not be determined. 40 mm. long, 5 mm. diameter. Round in section. The tip tapers from 30 mm. The specimen is coated with asphalt extending 15 mm. from the butt. The right edge shows transverse depressions from wrapping throughout the extent of the asphalt. The tip is sharp.

Tip fragment of point, 82 mm. long, 10 mm. wide, 6 mm. thick. Elliptical in section. There is a fracture off the left edge extending 29 mm. from the butt.

Tip fragment of point, 69.5 mm. long, 9.5 mm. wide, 7 mm. thick. Elliptical in section. There is a splinter off the left edge extending 45 mm. from the butt. The taper is more abrupt than in the specimen last described, while otherwise very similar.

Tip fragment of point. Tubular bone with hollow interior. 67 mm. long, 11.5 mm. wide, 6 mm. thick. Elliptical in section. The tip tapers commencing 30 mm. back. The interior hollow of the bone is exposed at one edge near the tip. The tip and evidently the bone from which the specimen was made curves.

Tip fragment of point. Tubular bone with hollow interior. 67 mm. long, 11 mm. wide, 6 mm. thick. Elliptical in section. The interior hollow of the bone is exposed for a space of 19.5 mm. at the right edge adjacent to the tip. This specimen is very similar to the last one described above; they are evidently made of ribs.

Tip fragment of point, 54.5 mm. long, 11.5 mm. wide, 5.5 mm. thick. Edges rounded. Tip starts to taper from about 23 mm. A quantity of ashy material adheres below the center of the obverse. A fracture 28 mm. long runs from the butt up the right edge.

Tip fragment of point, 43 mm. long, 11 mm. wide, 4.5 mm. thick. The greatest width is at the center of the specimen. Edges rounded. The butt is a fracture

which extends 17 mm. up the right edge. Asphalt adheres in irregular patches to the upper outside and inside surfaces, but there is no trace of wrapping.

Entire point, 47 mm. long, 10 mm. wide, 6 mm. thick. Edges rounded. The lower half of the specimen was originally covered with asphalt, which has been broken off, leaving the bare surface of the bone. No trace of wrapping. The butt is not a fracture but is ground off diagonally.

Entire point, 47 mm. long, 9 mm. wide, 6 mm. thick. Edges rounded. The lower half of the specimen was originally coated with asphalt, but this has been broken away, leaving only irregular patches. The butt is squared and is 5 mm. in width. The tip is unusually rounding.

#### ONE-PIECE FISHHOOKS OF BONE

These have the same shapes as the one-piece shell fishhooks and are included among them (p. 139).

#### BIRD BONE WHISTLES

The bird bone whistles were of the familiar type.

Entire and intact bone whistle, made from the slender long bone of a bird. 57 mm. long, 5 mm. wide, 4.5 mm. thick. The notch starts 29 mm. from the mouth end, which is carefully squared. Asphalt traces are visible in this notch, it having been partly filled with asphalt. The lower end is closed with a piece of asphalt which forms a knob-like protuberance beyond the bone and runs back into the whistle 6.5 mm. (Pl. 21, *b*.)

Bird bone whistle, intact except for the loss of the asphalt 60.5 mm. long, 9 mm. wide, 7 mm. thick. The hole in the side is unusually large, being 13.5 mm. long and so deep as to cut through nearly two-thirds of the bone. This hole starts only 14 mm. from the mouth end of the whistle. (Pl. 21, *c*.)

Fragment of bird bone whistle, 27 mm. long, 6.25 mm. wide, 5 mm. thick. The slanting side of the side notch of the whistle is intact, the fracture occurring just beyond it. This notch commences 23.5 mm. from the squared butt end of the whistle.

#### AWL-SHAPED ARTIFACTS OF BIRD BONE

Butt fragment of awl-shaped artifact of bird bone with asphalt knob intact. 60 mm. long, diameter of shaft 6 mm., length of head 18 mm., diameter of head 17 mm. (Pl. 21, *e*.)

Entire awl-shaped artifact of bird bone, 170 mm. long, diameter of shaft 6 mm., diameter of head 8 mm. This consists of the former articulation of the bone. The working of the tip commences 10 mm. back. (Pl. 21, *k*.)

#### SPLINT-BONE NEEDLES FROM THE MULE DEER

The California mule deer carries in what corresponds to our palm two splint bones which need only to be supplied with eyes and perhaps sharpened a little to make them into needles. These are the two lateral metacarpals and lie, point upward, behind the lower end of the cannon bones. The splint bones of the hind leg of the mule deer are too short to be used for this purpose.

Splint-bone needle, 34 mm. long, 5 mm. wide, 3 mm. thick. Hole 1.5 mm. diameter. Unworked except the head and the tip. A bit of the extreme tip is broken off. The concave side is obverse.

Tip fragment of splint-bone needle, 37 mm. long, 4.5 mm. wide, 2.5 mm. thick. The tip appears to be unworked, but may have been rubbed a little to make it sharper. The surfaces are about equally convex. The specimen bulges toward the reverse.

Splint-bone needle, the largest in the collection. 61 mm. long, 7 mm. wide, 5 mm. thick. The hole is only 1 mm. in diameter smaller than in any other specimen. The head and 10 mm. of the tip have been worked, but the rest of the specimen has the original shape. The middle of the specimen bulges to the reverse.

Splint-bone needle, 49 mm. long, 5 mm. wide, 3 mm. thick, with eye a little more than 1 mm. diameter. The head is worked, also the tip, the grinding off extending 16 mm. up the left edge, 24 mm. up right edge. The specimen bulges toward the reverse. All edges are rounded; toward the tip they are sharper. (Pl. 21, j.)

Splint-bone needle, 51 mm. long, 5.5 mm. wide, 3 mm. thick. Hole 1.5 mm. diameter. Only the head of this specimen appears to be worked. The tip is lopsided and as far as can be detected seems to be natural. The specimen bulges toward the reverse. (Pl. 21, i.)

Butt fragment of splint-bone needle. The break is recent but the tip portion could not be found. 32.5 mm. long, 5 mm. wide, 3 mm. thick. The hole is 1.5 mm. diameter. The obverse surface has several transverse hackings, which are of recent origin. The specimen bulges toward the reverse.

#### WHALEBONE SLABS USED FOR LINING GRAVES

The present specimens consist of worked ribs and unworked scapulae. The crosscuts of the rib specimens are trimmed smooth and straight with native tools. These specimens are considered very unique by Mr. George G. Heye.

In addition to the specimens listed below, there are many fragments of similar slabs and scapulae which could not be pieced together to make slabs. The nature of the fragments was, however, evident from the working on the edges.

Whalebone slab with neatly squared ends, 51.3 cm. long, 31.1 cm. wide, 2.5 cm. thick. The side edges are rounded and thin. (Pl. 22, a.)

Whalebone slab with neatly squared ends, 68.5 cm. long, 22.8 cm. wide, 3.1 cm. thick. (Pl. 22, b.)

Whalebone slab with neatly squared ends, 87.6 cm. long, 2.7 cm. wide, 3.8 cm. thick. This is the longest slab.

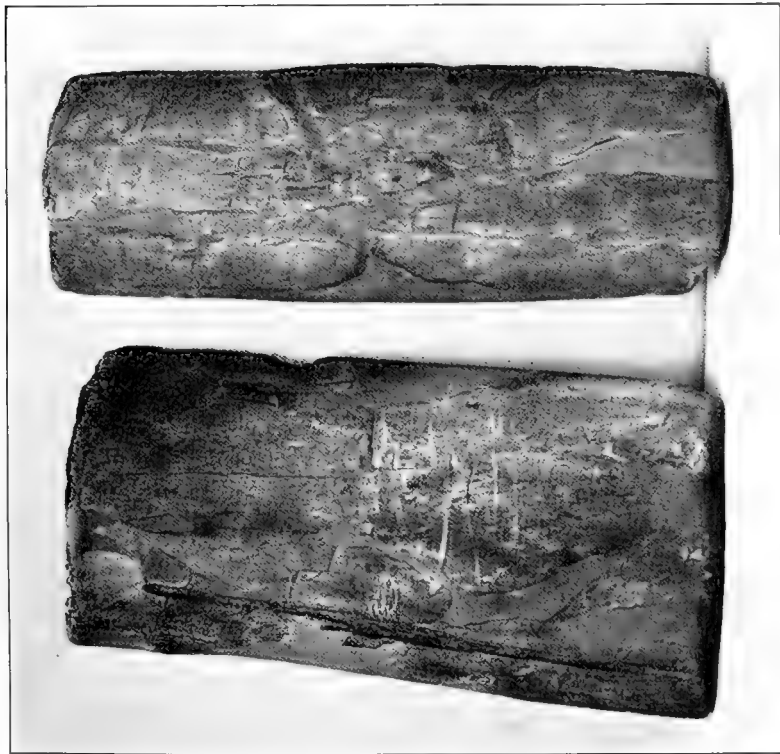
Fragmentary whalebone slab with neatly squared end, 35.5 cm. long, 33.3 cm. wide, 4.1 cm. thick.

Fragmentary whalebone slab with neatly squared end and sides, 33.3 cm. long, 30.4 cm. wide, 2.5 cm. thick.

Entire scapula of whale, 104.1 cm. long, 62.8 cm. wide. The articulation is 31.7 cm. long, 10.1 cm. wide.

Entire scapula of whale, 139.7 cm. long, 7.8 cm. wide. The articulation is 38.7 cm. long, 14.6 cm. wide. This is the largest whale scapula recovered. (Pl. 22, c.) Mr. C. E. Asher is shown standing beside it.

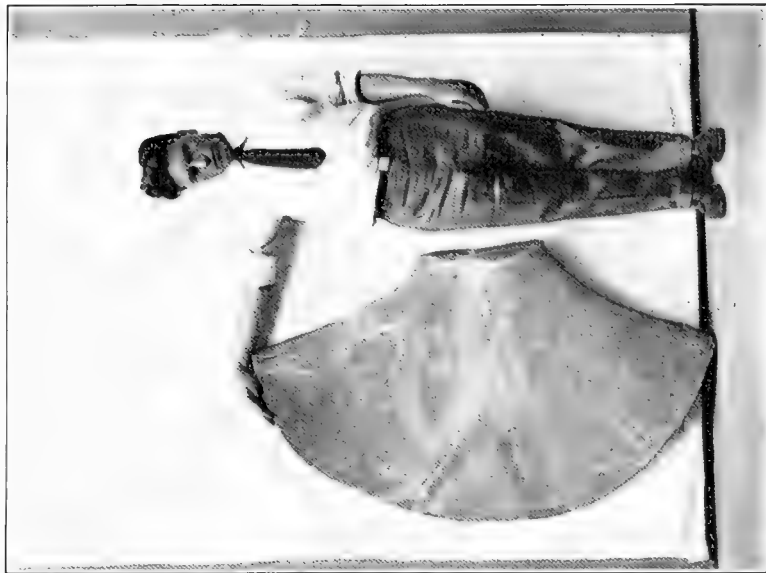




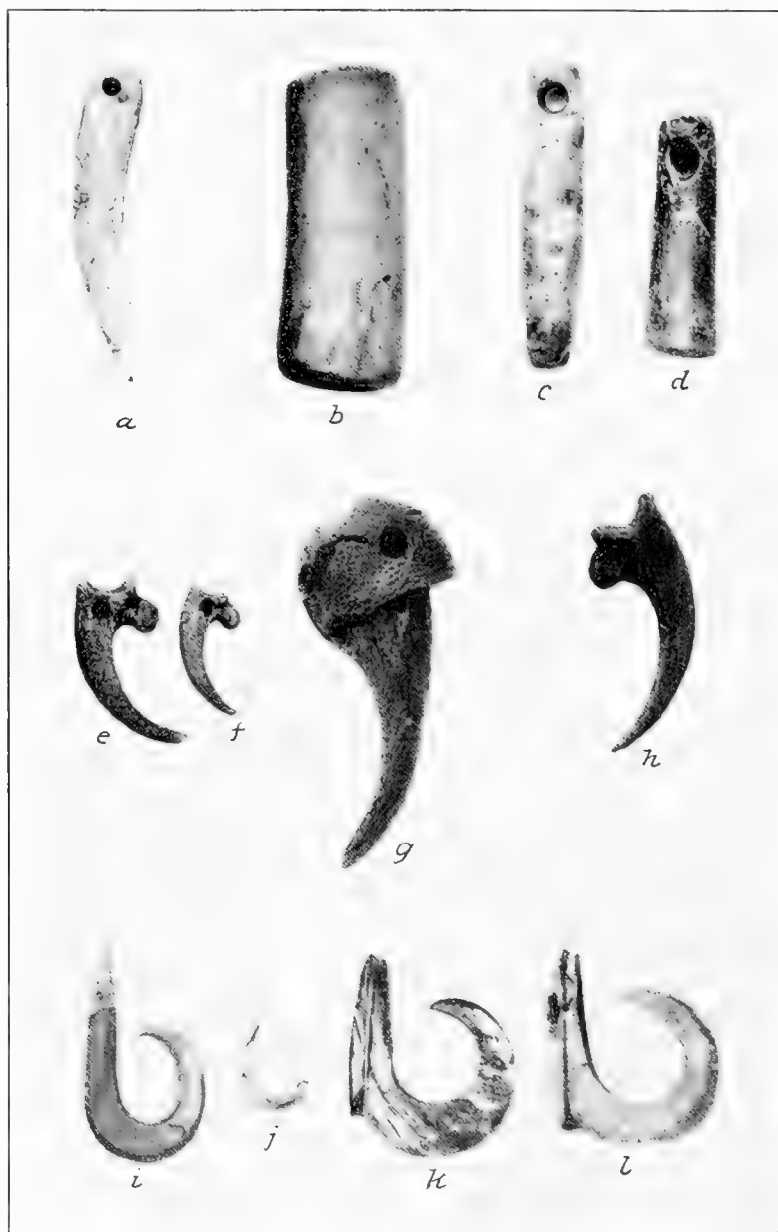
a

b

WHALEBONE SLABS USED FOR LINING GRAVES



c



a, PENDANT OF SEA-LION TOOTH. b, TUBULAR BEAD OF DEER BONE. c, d, PENDANTS OF STONE. e-h, BONES REMAINING FROM BIRD CLAW PENDANTS. i-l, ONE-PIECE FISHHOOKS

## WEDGES OF DEER ANTLER

Only three deer antler wedges were found, all of them in a fair state of preservation. The burr of the antler forms the head of the wedge. The bevel has been ground so as to leave a rounding point.

Wedge of deer antler, old and with disintegrated surface; 104.5 mm. long, 32 mm. diameter. The bevel starts 50 mm. back from the point. The knob at the butt of the wedge is formed by the proximal bulge of the antler. (Pl. 21, *l.*)

Wedge of deer antler, 87 mm. long, 29 mm. diameter. The bevel starts 50 mm. back from the tip, exactly the same distance as in the specimen just described above. The butt of the specimen is rounded. There is a curious shallow groove 12 mm. wide around the shaft of the specimen, 36 mm. from the butt end, the use of which can not be easily conjectured. (Pl. 21, *m.*)

Wedge of deer antler, the tip of which has been broken off somewhat; 81 mm. long, 26 mm. wide, 23 mm. diameter at the butt. The bevel starts 48 mm. from the tip fracture and cuts into the porous inside of the antler, which has produced a depression. The spur seen to the left in the photograph is from a natural bend of the surface of the antler. (Pl. 21, *n.*)

## FRAGMENTS OF DEER ANTLER

Tip fragment of deer antler, not hollow but has a spongy core; 28 mm. long.

Tip fragment of deer antler with spongy interior, 32 mm. long.

Tip fragment of deer antler, solid; 39 mm. long.

Tip fragment of deer antler, interior spongy, round in section. 30.5 mm. long.

Large tip fragment of deer antler of rather recent appearance. The reverse side has a number of transverse scorings, evidently made by the Indians, possibly accidentally in trying to sever the horn from the head. Apparently a young horn and not a tine. Interior is hollow. 64 mm. long.

Central fragment of deer antler, round in section. 32.5 mm. long.

Tip fragment of deer antler, 32 mm. long.

Tip fragment of deer antler which has an almost charred appearance. The hollow extended to the butt fracture of this fragment. 30 mm. long.

## FISHBONES

With the exception of a large shark vertebra the natural concavity of which had been used as a paint cup (p. 136), the numerous fishbones collected are apparently all unworked and unused. They have been studied in part by Mr. E. D. Reid, of the National Museum's division of fishes, and will be reported on at a later date. Although fishbones were used as perforators and awls by the Indians, we found no such specimens. Nor do the tooth plates of the eagle-ray, figured by Heye,<sup>22</sup> of which we took many specimens, show any sign of use, nor

<sup>22</sup> Heye, *op. cit.*, p. 111.

the large tip fragment of the swordfish. Nor had any of the numerous fish vertebrae been drilled, although some in their present condition showed natural longitudinal perforations.

#### SHARK VERTEBRA PAINT CUP

Paint cup made of a large shark vertebra. The vertebra was broken in two in the middle, the fracture forming the rough base of the cup. A fragment is broken out of the rim. 54 mm. diameter, 42 mm. deep. The inside surface is entirely coated with bright red paint made from hematite.

#### EXCRESCENCES FROM THE SCAPULA OF THE HORSE MACKEREL

Thick bony masses from the anterior lower end of the scapula of the *Caranx hippos* or horse mackerel (Span. caballo). At least this is the tentative identification made by Mr. Barton A. Bean and Mr. E. D. Reid of the division of fishes of the United States National Museum, who have spared no pains in trying to determine the provenance of these curious excrescences found in the Indian graves and clearly from some local fish species. The specimens are six in number and are triangular in section. The two smaller surfaces were evidently articulated to the scapula of the horse mackerel if the identification is correct. The larger surface is bulging. The interior is very porous and all of the specimens are of a dark-brown color and somewhat mineralized appearance. The measurements of the specimens are as follows: 33.5 mm. long, 13 mm. wide, 10 mm. thick; 28 mm. long, 9 mm. wide, 7 mm. thick; 25.5 mm. long, 8 mm. wide, 6 mm. thick; 36 mm. long, 14 mm. wide, 11 mm. thick; 35 mm. long, 12 mm. wide, 9.5 mm. thick; 20 mm. long, 10 mm. wide, 8 mm. thick.

#### BONE PENDANTS

##### BONES REMAINING FROM BIRD-CLAW PENDANTS

It is well known that the Channel Indians used on their necklaces the transversely perforated claws of eagles and various hawks as well as of the bear, etc. None of them showed traces of the claw or of asphalt coating at the drilled end. Putnam<sup>22a</sup> shows a specimen with claw still intact; Heye<sup>22b</sup> shows a specimen with asphalt still adhering to the butt. The unperforated claw bones obtained resemble the perforated ones, except that they lack the drilling.

Bird-claw pendant, 63 mm. long, 28 mm. wide, 16.5 mm. thick. Round hole drilled from both sides runs transversely through the butt, about 5 mm. from the base. (Pl. 23, *g*.)

Bird-claw pendant, 25 mm. long, 11 mm. wide, 4 mm. thick. A hole 1.25 mm. diameter through the butt.

Bird-claw pendant, 37 mm. long, 9 mm. wide, 6 mm. thick. Perforated at butt.

Bird-claw pendant. 25.5 mm. long, 6.5 mm. wide, 4.5 mm. thick. Hole 3 mm. diameter through butt.

Bird-claw pendant, 23 mm. long, 4.5 mm. wide, 3.5 mm. thick. Perforated at butt.

<sup>22a</sup> Putnam, op. cit., Pl. XI.

<sup>22b</sup> Heye, op. cit., fig. 14.

Bird-claw pendant, 32 mm. long, 7.5 mm. wide, 5.5 mm. thick. Perforated at butt.

Bird-claw pendant, the extreme tip of which is broken off; 31 mm. long. Hole 3 mm. diameter through the butt. (Pl. 23, *c.*)

Bird-claw pendant, 23 mm. long. Hole 2.25 mm. diameter through the butt. (Pl. 23, *f.*)

Bird-claw pendant, 24 mm. long, 10 mm. wide, 6 mm. thick. Hole 2 mm. diameter through the butt.

Bird-claw pendant, 23 mm. long, 9 mm. wide, 5.5 mm. thick. Hole 1.5 mm. diameter through the butt.

Bird-claw pendant, 26 mm. long, 11 mm. wide, 6 mm. thick. Hole 2 mm. diameter through the butt.

Bird-claw pendant, 57 mm. long, 24 mm. wide, 14.5 mm. thick. Hole 13 mm. diameter through the butt.

Bird-claw pendant, 25 mm. long, 11 mm. wide, 6 mm. thick. Hole 1.5 mm. diameter through the butt.

Bird-claw pendant, 50 mm. long, 22.5 mm. wide, 16.5 mm. thick. Hole 3.5 mm. diameter through the butt.

Bird-claw pendant, 51 mm. long, 19.5 mm. wide, 15 mm. thick. Hole 3.5 mm. diameter through the butt.

Bird-claw pendant, 37 mm. long (the tip is broken off), 19 mm. wide, 16 mm. thick. Hole 3.5 mm. diameter through the butt.

Bird-claw pendant, 41 mm. long (the tip is broken off), 26.5 mm. wide, 15 mm. thick. Hole 3.5 mm. diameter through the butt.

Bird-claw pendant, 31 mm. long, 22 mm. wide, 14 mm. thick. Hole 3.5 mm. diameter through the butt.

Bird-claw bone, 26 mm. long, 6.5 mm. wide, 5 mm. thick. Unperforated.

Bird-claw bone, 47 mm. long, 19 mm. wide, 11 mm. thick. Unperforated. (Pl. 23, *h.*)

Bird-claw pendant, 24.5 mm. long, 14 mm. wide, 5 mm. thick. Hole 2 mm. diameter 1.5 mm. from the base.

Bird-claw bone, 23 mm. long, 13.5 mm. wide, 4.5 mm. thick. Unperforated.

Bird-claw pendant, 27 mm. long, 16 mm. wide, 4 mm. thick. Perforated at base.

#### PENDANT OF SEA-LION TOOTH

Curved ivory pendant of sea-lion tooth, 63 mm. long, 11 mm. diameter. A neatly drilled hole 3 mm. diameter is located 2 mm. from the butt end. (Pl. 23, *a.*)

#### BONE BEADS

##### TUBULAR BEADS OF DEER BONE

Bone tubes, plain, pitted, incised or inlaid, and frequently with a groove cut around near each end, or reamed out at the ends, were apparently used as beads. Of seven specimens recovered, three have inlay, adhering only in part, and four had apparently always been undecorated. Similar tubes to those found are figured by Heye.<sup>23</sup> Similar tubes were made of steatite and of other stone.

Inlaid bone bead, a tubular section of a long bone, 88 mm. long, 21 mm. diameter. Ends nicely squared, the wall of the bone being about 4 mm. thick.

<sup>23</sup> Heye, *op. cit.*, Pl. LXXII, *b* and *c.*

A patch of inlay still remains at one place on the surface. The inlay consists of olivella disk beads neatly arranged in parallel rows, imbedded in a very thin layer of black asphalt so that the beads rest on the surface of the bone. Some of the beads are discolored, others whiter, in the present condition with the specimen. The patch intact is 34 mm. long, 11 mm. wide. The remainder of the surface of the bone is free from asphalt, but was apparently covered with inlay over its entire surface. This specimen has no grooves near the ends. (Pl. 21, *f.*)

Median fragment of inlaid bone bead, a tubular section of a long bone, 76.5 mm. long, 19.5 mm. diameter. Ends squared. A groove runs around 3 mm. back from the ends. The thickness of the wall of the bone is about 4 mm. The median half of this bone is broken away, but this does not show in the illustration. Portions of the original inlay, executed in the same manner as that of the specimen above described, remain intact at two places on the surface, the beads being arranged in neat rows. (Pl. 21, *g.*)

Median fragment of inlaid bone bead, tubular section of a long bone, 44.5 mm. long, 22 mm. diameter. Ends nicely squared, the wall of the bone being about 5 mm. thick. A groove runs around 4 mm. from the ends. The inlay was the same as in the two other specimens from this pit and adheres in one locality only. (Pl. 21, *h.*)

Bead of deer bone, 41.5 mm. long, 14 mm. diameter, walls 2.5 mm. thick. (Pl. 23, *b.*)

Median half of a thin-walled tubular bead of deer bone, 38 mm. long, 8 mm. diameter, wall 2.5 mm. thick.

Bead of deer bone, 40 mm. long, 15 mm. diameter, walls 1.5 mm. thick.

Bead of deer bone, 42.5 mm. long, 21.5 mm. diameter, walls 2.5 mm. diameter.

#### TUBULAR BEADS OF BIRD BONE

In addition to the inlaid deer-bone tubes just described, a number of bird-bone beads were found. They consisted of sections cut from the long bones of birds. One of these has asphalt adhering to the outside surface which may have borne an inlay. Some of these beads may be listed as follows:

Bead of bird bone with neatly squared ends, 17.5 mm. long, 4 mm. diameter.

Bead of bird bone, 14 mm. long, 5 mm. diameter.

Bead of bird bone, 13 mm. long, 4 mm. diameter.

Bead of bird bone, 11 mm. long, 3.5 mm. diameter.

#### OBJECTS OF SHELL

##### ONE-PIECE FISHHOOKS

The Channel Indian fishhook is as effective as it is curious in appearance. In making a hook the Indian took a shell or the wall of a long bone of the deer or some such mammal. First the outline was cut and ground true, and then perforation was drilled and enlarged to have the form of a narrow-mouthed opening, even in some of the larger specimens less than 5 mm. across.<sup>24</sup>

<sup>24</sup> Compare, e. g., the specimen illustrated by Putnam, *op. cit.*, Pl. XI, 3.

There are two principal patterns of butts: (1) Knobbed with a groove around it; in many specimens the knob is elongated to form a straight shank around which the groove passes longitudinally.<sup>25</sup> (2) Knobless butt having a series of distinct notches.<sup>26</sup> There are also intermediate types, and some specimens have adhesive still adhering to the butt. There are two patterns of point, the barbed and the unbarbed. Some points describe the arc of a circle, others are considerably incurved.

The material of the one-piece hooks of our present collection is the shell of the black abalone, red abalone, or mussel, and apparently deer bone. There are in Polynesia one-piece fishhooks of shell, bone, and stone, but none of the last-named substance have been found in southern California.

#### ENTIRE FISHHOOKS

Entire fishhooks of black abalone. Obverse dorsal. 34 mm. long, 20 mm. wide; shaft 6 mm. wide, 2.5 mm. thick. The outer edge at the butt contains two notches with centers 3 mm. and 7.5 mm. from the butt. (Pl. 23, *i*.)

Entire fishhook of red abalone. Obverse ventral. 36 mm. long, 32 mm. wide, shaft 11 mm. wide, 3 mm. thick. Shank 30 mm. long. The ends of the shank are grooved but the groove does not extend along the sides of the shank.

Entire fishhook of black abalone, 28 mm. long, 26 mm. wide, shaft, 7 mm. wide, 3.5 mm. thick. Shank 24 mm. long, with well-made groove extending entirely around it. (Pl. 23, *k*.)

Entire fishhook of black abalone. Obverse ventral. 29 mm. long, 22.5 mm. wide, shaft 8 mm. wide, 2.5 mm. thick. Shank 22 mm. long. A rather poorly made groove runs completely around the shank. The extreme tip is broken off.

Entire fishhook of black abalone. Obverse dorsal. 38 mm. long, 26 mm. wide, shaft 8 mm. wide, 3 mm. thick. Shank 30 mm. long. A groove passes entirely around the shank.

Entire fishhook of black abalone. Obverse dorsal. 35 mm. long, 26 mm. wide, shaft 9 mm. wide, 3 mm. thick. Shank 8 mm. long. A narrow groove runs around the shank.

Entire fishhook of bone. Obverse outside. 42 mm. long, 28 mm. wide, shaft 9 mm. wide, 2.5 mm. thick. Shank 31 mm. long, with well-made groove passing entirely around it.

Entire fishhook of black abalone. Obverse dorsal. 27 mm. long, 22 mm. wide, shaft 6 mm. wide, 2 mm. thick. Shank 24 mm. long. A well-made groove passes entirely around the shank. (Pl. 23, *l*.)

Entire fishhook of black abalone. Obverse dorsal. 28 mm. long, 20 mm. wide, shaft 7 mm. wide. Shank 22 mm. long. A narrow groove runs entirely around the shank.

Entire fishhook of black abalone. Obverse outside. 16 mm. long, 11 mm. wide, shaft 2.5 mm. wide, 1.75 mm. thick. Shank 7.5 mm. long. A well-made groove runs neatly around the shank. (Pl. 23, *j*.)

#### FISHHOOK FRAGMENTS

Butt fragment of black abalone fishhook, 29 mm. long, 4 mm. wide, 2.5 mm. thick. Outer edge at butt contains three notches with center 1 mm., 3.5 mm., and 7 mm. from end of butt. Strong and well made. Dark slate color.

<sup>25</sup> E. g., Putnam, *op. cit.*, Pl. XXIII, *j, k, l*.

<sup>26</sup> E. g., *ibid.*, Pl. XXIII, *i*.

Butt fragment of black abalone fishhook, having 8 mm. of nicely grooved shank intact. 24 mm. long, 5 mm. wide, 3 mm. thick. Inner edge neatly squared.

Central fragment of red abalone fishhook, 21.5 mm. long, 7.5 mm. wide, 2 mm. thick, but it appears that it was originally thicker and that lamina have peeled off of both surfaces. Originally a large and strong hook.

Butt fragment of black abalone fishhook. Obverse ventral. 35 mm. long, 6.5 mm. wide, 4.5 mm. thick. Outer edge at butt contains three notches with center 1.5 mm., 6 mm., and 11 mm. from butt end. Inner edge somewhat squared.

Butt fragment of fishhook. Flesh colored but from a black abalone shell. Dorsal surface can not be determined. 13 mm. long, 2 mm. wide, 2.25 mm. thick. The shank is 6 mm. long, and its groove extends along obverse and reverse surfaces only, but does not pass around the ends of the shank. This was one of the more delicate hooks, used for fish as small as the smelt and the like.

Central fragment of black abalone fishhook, gray in color and having en-crustured surface. 19 mm. long, 4.5 mm. wide, 4 mm. thick. The fragment consists of the portion of the hook toward the butt end.

Butt fragment of black abalone fishhook, 24 mm. long, 5 mm. wide, 3 mm. thick. Outer edge at butt contains three notches, their centers being 3.5 mm., 6 mm., and 8 mm. from the butt end, respectively. The fishhook shows blotches of mother of pearl from the inside surface of the shell on its obverse face. The inside edge is somewhat squared.

Central fragment of black abalone fishhook, 22.5 mm. long, 5 mm. wide, 3 mm. thick. Evidently very little is missing from the butt extremity.

Central fragment of black abalone fishhook, 12 mm. long, 2 mm. wide, 1 mm. thick. A small fragment, the curve of which shows it to be from near the tip of the hook, evidently from one of the slenderer hooks.

Tip fragment of black abalone fishhook, 17 mm. long, 4 mm. wide, 3 mm. thick. The outer edge is neatly rounded, the inner edge squared. The tip is very sharp. Perhaps about two-thirds of the hook is present. The fragment is blackish gray colored throughout.

Fragment of what is possibly a fishhook of black abalone in the process of making. The unbroken edges are neatly cut and rounded and the hole, 15 mm. diam., has been left as it was when first bored, not having been enlarged so as to conform to the outer edge of the hook as is done in the finished hook. Maximum length of fragment, 39.5 mm. long, 35 mm. wide, 5 mm. thick. The inside surface has flecks of mother of pearl.

Central fragment of a black abalone fishhook, 12 mm. long, 2 mm. wide, 1.5 mm. thick. The fragment is from a slender hook of the smallest size and comes from the middle portion of the hook.

Central fragment of a very large black abalone fishhook showing purplish and yellowish flesh color tint. The fragment comes from the middle of the hook and shows an unusually sharp elbow, 26 mm. long, 8 mm. wide, 2.5 mm. thick.

Central fragment of black abalone fishhook. The fragment comes from the middle part of the hook and shows a rather sharp shoulder formed by the outer edge. 16 mm. long, 4 mm. wide, 3 mm. thick.

Central fragment of black abalone fishhook. The fragment comes from the part of the hook adjacent to the butt, and may in fact be regarded as a butt fragment. The elbow is quite pronounced and more than half the hook is present.

Tip fragment of black abalone fishhook, strong and well made, the point being very sharp and slender and exhibiting a natural furrow near the outer



edge of this surface in the vicinity of the butt. 33 mm. long, 7 mm. wide, 3.5 mm. thick. The hook must have been large to show so gentle a curve.

Central fragment of black abalone fishhook, 17 mm. long, 4 mm. wide, 4 mm. thick. The middle portion of a medium sized hook.

Tip fragment of black abalone fishhook, 20 mm. long, 4 mm. wide, - mm. thick.

Central fragment of black abalone fishhook, only the extreme butt and tip being missing. 21 mm. long, 6 mm. wide, 2 mm. thick. The outer edge in the vicinity of the butt may have originally had three notches, as is the case in certain other hooks of similar shape. The hook shows only a tendency to an elbow.

Butt fragment of a black abalone fishhook important for its extreme slenderness and small size. It is impossible to determine the dorsal surface. The specimen is very black in color and carefully made. There is a single notch in the outer edge near the butt end, which terminates without the formation of a head. Such a hook was used for catching smelts and smaller fish.

Central fragment of black abalone fishhook, 24.5 mm. long, 4.5 mm. wide, 2 mm. thick. Perhaps about a third of the shank is intact and has a neatly made groove for the attachment of the cord.

Central fragment of a curious but apparently finished black abalone fishhook with unusually pronounced and wide shank, apparently a butt fragment. This specimen probably belongs to a distinct type of fishhook. Obverse dorsal. 35 mm. long, 13.5 mm. wide, 2.5 mm. thick. All edges are squared. Only the extreme point is missing from the butt end.

Central fragment of black abalone fishhook. Obverse dorsal. Inside squared. 22 mm. long, 5 mm. wide, 3 mm. thick.

Central fragment of red abalone fishhook. The ventral side is orange, the dorsal white. Inner edge is squared, apparently from the original boring, the perforation not having been enlarged or altered. The specimen exhibits an elbow and comes from the middle portion of the original hook. 14 mm. long, 5 mm. wide, 2 mm. thick. Possibly a reject of a hook that was spoiled in the process of manufacture.

Butt fragment of abalone fishhook showing the characteristic three notches in the outer edge, which are respectively 4 mm., 7 mm., and 11 mm. from the butt end. The outer edge is unusually thin. The fragment is 22 mm. long, 5 mm. wide, 3 mm. thick.

Butt fragment of bone fishhook. The butt tapers to a sharp point. The elbow almost forms a rectangle. The inside edge is neatly squared, the outer edge is rounded. 28 mm. long, 4.5 mm. wide, 3 mm. thick. The specimen is more or less coated with a dark sticky substance.

Central fragment of an unfinished black abalone fishhook which looks as if it has been through fire. 28.5 mm. long, 10 mm. wide, 2.5 mm. thick. The hole is 9 mm. in diameter.

Central fragment of black abalone fishhook. Only the most extreme tip is missing. The hook was very round in type. 20 mm. long, 5 mm. wide, 3 mm. thick.

Central fragment of black abalone fishhook, 20.5 mm. long, 4 mm. wide, 3 mm. thick. Evidently from the butt section of the hook.

Almost entire black abalone fishhook, only some 3 mm. of the tip having been broken off. The ventral side has considerable nacre adhering to its surface. 24 mm. long, 8 mm. wide, 3.5 mm. thick. The shank is 22.5 mm. long, and on the obverse side the groove extends only two-thirds of the way across, while on the reverse side it extends entirely across the shank. The specimen is neatly made and must have had a very narrow opening.

Central fragment of black abalone fishhook, found with and similar to the one last described. This specimen has perhaps a third of the shank broken off and also the greater part of the tip is missing. It was originally a stout hook. Obverse ventral and wholly covered with bright naere. The reverse surface is quite black. 29.5 mm. long, 9 mm. wide, 4 mm. thick. The inner is squared, the outer edge rounded. The portion of the shank which is still extant is 15 mm. long. The shank has no trace of a groove on its obverse surface, while a well-made groove extends across the reverse.

Central fragment of black abalone fishhook showing well-made elbow. Very black, evidently a fragment of a large hook. 21 mm. long, 10 mm. wide, at the elbow, 5 mm. thick.

Central fragment of black abalone fishhook. The specimen is of a grayish color and yet is probably from the black abalone. 18 mm. long, 5 mm. wide, 3 mm. thick. Inner edge squared. Only a little of the tip is missing.

Tip fragment of red abalone fishhook, yellowish in color. 26 mm. long, 7 mm. wide, 2.5 mm. thick. The point is undamaged, the inner edge somewhat squared, the outer edge rounded. Evidently about half the fishhook is present.

Butt fragment of black abalone fishhook, slender and well made, with nicely grooved shank. About a third of the fishhook is missing. The specimen is very black in color. 18.5 mm. long, 3 mm. wide, 2 mm. thick. The shank is 7 mm. long, and the groove extends completely around it. The inner edge is more or less squared.

Butt fragment of black abalone fishhook, only the tip third being missing; 21.5 mm. long, 3.5 mm. wide, 1.5 mm. thick. The outer edge has six or more minute transverse scorings extending from 2 mm. from the butt end to 7.5 mm. from that end.

Butt fragment of probably red abalone fishhook, now bleached to whitish color. There are flesh-colored patches on the surface. The specimen is in friable condition. 14 mm. long, 3 mm. wide, 2 mm. thick. The inner edge is squared; the outer end is rounded. The shank is 6 mm. long, and a neatly cut groove extends entirely around it.

Butt fragment of black abalone fishhook, 14 mm. long, 1.5 mm. wide, 2 mm. thick. The butt has a knoblike shank 4 mm. long, with a depression running around it for the attachment of the cord.

Central fragment of black abalone fishhook, 22 mm. long, 5 mm. wide, 2.5 mm. thick. The gentle curve would indicate that this was a specimen of some size.

Tip fragment of black abalone fishhook, 13 mm. long, 3 mm. wide, 2.5 mm. thick.

Central fragment of black abalone fishhook, 17 mm. long, 4 mm. wide, 2.5 mm. thick. The fragment comes from the middle section of the hook.

Central fragment of black abalone fishhook, grayish in color and showing well-made shoulder; 12 mm. long, 3.5 mm. wide, 2 mm. thick.

Tip fragment of black abalone fishhook, 24 mm. long, 6 mm. wide, 2.5 mm. thick. The curve shows it to have been a specimen of medium size.

Central fragment of black abalone fishhook, 19 mm. long, 6 mm. wide, 2.5 mm. thick.

Central fragment of black abalone fishhook showing round boring unaltered and very prominent elbow; evidently a fragment of an unfinished specimen. 17 mm. long, 7 mm. wide, at the elbow, 2 mm. thick.

Butt fragment of black abalone fishhook, dark gray color. Obverse and reverse sides are worn off somewhat by rubbing as if by action of sand or wear so that they have a purplish slate-gray color while the rest of the specimen is

blackish. 27 mm. long, 5 mm. wide, 4 mm. thick. The shank is 9 mm. long, and has a groove extending completely around it. All edges are rounded and the curve at the elbow is quite pronounced.

Central fragment of black abalone fishhook, cream colored, purplish on the obverse side; 29 mm. long, 8 mm. wide, 3 mm. thick. The specimen consists chiefly of the shank, which had a well-made groove extending completely around it, but the upper end of it is broken off.

Central fragment of black abalone fishhook, 19 mm. long, 4.5 mm. wide, 3 mm. thick. The inner edge is apparently the original boring.

Central fragment of black abalone fishhook, 21.5 mm. long, 6.75 mm. wide, 4 mm. thick. The inner edge is somewhat squared.

Butt fragment of black abalone fishhook, only the tip being missing. This specimen has a purple color almost like that of the beads made from the hinge of the rock oyster. Ventral surface shows blotches of nacre. 23 mm. long, 5 mm. wide, 3 mm. thick. The inside edge is square and the outside edge is rounded. The shank is 16.5 mm. long, and a groove runs completely around it except for a small distance at the middle of the obverse side.

Butt fragment of black abalone fishhook. The ventral surface shows flecks of nacre. 22 mm. long, 4 mm. wide, 3 mm. thick. The inside edge is squared, the outside edge rounded. Only the tip is missing from the specimen. The shank is only 9 mm. long, and a well-made groove runs completely around it.

Butt fragment of an interesting black abalone fishhook, slender and well made, quite purplish in color. 16 mm. long, 3 mm. wide, 2 mm. thick. The shank consists of a round knob 3 mm. diameter around which runs a broad and symmetrical groove.

Central fragment of black abalone fishhook, the surface of which is considerably encrusted with calcareous deposits from the earth. Obverse ventral. 19 mm. long, 5 mm. wide, 3 mm. thick. What remains of the shank is 6 mm. long, and neatly grooved; perhaps half of it is broken away.

Central fragment of black abalone fishhook, slate gray color; 17 mm. long, 4 mm. wide, 2 mm. thick. The inner edge is squared, the outer edge somewhat rounded.

Butt fragment of black abalone fishhook, 32 mm. long, 7 mm. wide, 4.5 mm. thick. There is a single smooth notch in the outer edge 10 mm. from the butt fracture. Probably only a little of the butt end is broken off.

Butt fragment of black abalone fishhook of the slender and small variety. Nacre adheres in two places to the ventral surface. 15 mm. long, 2 mm. wide, 2 mm. thick. The shank is 5.5 mm. long, and the groove extends entirely around it. The inner is squared, the outer edge rounded.

Central fragment of black abalone fishhook, consisting of the greater part of the butt of a hook larger than medium size. The elbow or bend is quite sharp.

Central fragment of black abalone fishhook, 18 mm. long, 4.5 mm. wide, 2.75 mm. thick. Inner edge squared, outer edge rounded.

Central fragment of probably red abalone fishhook, but now whitish; 21 mm. long, 6 mm. wide, 3 mm. thick.

Central fragment of red abalone fishhook. The specimen is yellowish gray in color. 19 mm. long, 5 mm. wide, 2 mm. thick.

Central fragment of black abalone fishhook, somewhat translucent in places; 21.5 mm. long, 6.5 mm. wide, 2 mm. thick. The specimen shows an almost right-angled elbow.

Central fragment of an unfinished red abalone fishhook. Ventral surface is coated with nacre and shows considerable concavity. 24 mm. long, 15 mm.

wide, 2 mm. thick. The outside edge is ground off and the hole, which was bored, is 8.5 mm. diameter.

Tip fragment of red abalone fishhook, somewhat disintegrated; 28 mm. long, 9 mm. wide, 3 mm. thick.

Central fragment of black abalone fishhook, 14 mm. long, 3 mm. wide, 2 mm. thick.

Central fragment of black abalone fishhook, 13.5 mm. long, 7 mm. wide, 3 mm. thick. Elbow can be distinguished.

Central fragment of black abalone fishhook, 13.5 mm. long, 3 mm. wide, 2.5 mm. thick.

Butt fragment of black abalone fishhook, 35.5 mm. long, 7 mm. wide, 1.5 mm. thick. The butt end is intact and the outer edge has no grooves. The inner edge is squared, the outer edge rounded. The elbow is fairly sharp.

Tip fragment of black abalone fishhook, dark slate gray color. Ventral surface is quite concave. 27 mm. long, 9.5 mm. wide, 3 mm. thick. The specimen is broken off just at the elbow.

Tip fragment of black abalone fishhook, 17 mm. long, 4 mm. wide, 2 mm. thick.

Central fragment of bone fishhook, 21 mm. long, 8.25 mm. wide, 6 mm. thick. The inner edge is neatly squared off, the outer edge rounded.

Central fragment of black abalone fishhook, 17 mm. long, 7 mm. wide, 3 mm. thick.

Butt fragment of black abalone fishhook, 28 mm. long, 5 mm. wide, 2.25 mm. thick. The shank is 9 mm. long and its butt is broken off somewhat. A groove extends around the shank. The inner edge is squared.

Central fragment of black abalone fishhook, 12 mm. long, 3.5 mm. wide, 2 mm. thick.

Butt fragment of black abalone fishhook, 25 mm. long, 5 mm. wide, 2.75 mm. thick. There is a single notch less than 1 mm. deep, having a center 5 mm. from the butt end.

Butt fragment of red abalone fishhook, 28 mm. long, 6 mm. wide, 5 mm. thick. The shank is 13 mm. long and a considerable part of its extremity is broken off. The groove is only on the obverse side, there being no trace of a groove on the reverse surface of the shank. The specimen is flesh colored but has been identified as coming from the red abalone.

Central fragment of black abalone fishhook, 24 mm. long, 6 mm. wide, 3 mm. thick.

Butt fragment of black abalone fishhook, 31 mm. long, 7.5 mm. wide, 3.5 mm. thick. The inner edge is squared, the outer edge quite sharp. A notch 1 mm. deep begins 1.5 mm. from the butt end and extends along the outer edge about 4 mm. The extreme butt end appears to have been broken off a little.

Central fragment of black abalone fishhook. The edges are more or less beveled and rounded, and the elbow is distinguishable. 20.5 mm. long, 5.5 mm. wide, 2.5 mm. thick.

Tip fragment of black abalone fishhook, 22.5 mm. long, 6 mm. wide, 2 mm. thick.

Central fragment of black abalone fishhook, evidently an unfinished hook or one unusually wide for the size of the boring. Obverse ventral. 21 mm. long, 9 mm. wide, 2.5 mm. thick.

Central fragment of black abalone fishhook, 30 mm. long, 8 mm. wide, 3 mm. thick.

Central fragment of black abalone fishhook, 19 mm. long, 7.5 mm. wide, 2 mm. thick. From near the tip of the hook.

Central fragment of black abalone fishhook, 16 mm. long, 6.5 mm. wide, 2.5 mm. thick.

Tip fragment of black abalone fishhook. Slender and well made. 12 mm. long, 2.5 mm. wide, 2.5 mm. thick.

Central fragment of black abalone fishhook, 18 mm. long, 4 mm. wide, 2 mm. thick.

Butt fragment of black abalone fishhook, 28.5 mm. long, 5.5 mm. wide, 5 mm. thick. The shank is 11 mm. long, and its extremity has been broken off. A neat groove runs around the shank. The inner edge is square, the outer edge rounded. Note the unusual thickness of the specimen.

Central fragment of black abalone fishhook, 17 mm. long, 6 mm. wide, 4 mm. thick.

Central fragment of black abalone fishhook, 20 mm. long, 4.5 mm. wide, 3 mm. thick.

Central fragment of black abalone fishhook. Dorsal surface can not be determined. 15 mm. long, 3.5 mm. wide, 1.5 mm. thick.

Central fragment of black abalone fishhook, 13 mm. long, 3 mm. wide, 2 mm. thick.

Butt fragment of black abalone fishhook, 20 mm. long, 3 mm. wide, 2.5 mm. thick. The inside edge is squared, the outside edge more or less rounded. The elbow is well pronounced and only the tip is lacking from the specimen. The butt has no grooves.

Tip fragment of black abalone fishhook similar in type to the one last described and found with it; 13.5 mm. long, 3 mm. wide, 2 mm. thick. The tip is slender and beautifully formed. The specimen is very black in color. The elbow is prominent, the inner edge squared, the outer edge rounded.

Central fragment of black abalone fishhook, 20 mm. long, 8 mm. wide, 2 mm. thick.

Central fragment of black abalone fishhook, 13 mm. long, 2 mm. wide, 1.5 mm. thick.

Central fragment of black abalone fishhook, 23.5 mm. long, 5.5 mm. wide, 3.5 mm. thick.

Central fragment of black abalone fishhook, 12 mm. long, 2 mm. wide, 1.5 mm. thick.

Central fragment of black abalone fishhook, slate colored; 24 mm. long, 8.5 mm. wide, 3.5 mm. thick.

Central fragment of black abalone fishhook, 32.5 mm. long, 9.5 mm. wide, 3 mm. thick. The middle portion of a very large and strong hook.

Central fragment of black abalone fishhook. Obverse dorsal. Fragments of nacre adhere to the reverse surface. 15 mm. long, 3 mm. wide, 1 mm. thick. A mere fragment of the shank remains. The hook is unusually thin, yet well made.

Central fragment of black abalone fishhook, the surface of which is much encrusted; 16.5 mm. long, 4 mm. wide, 3 mm. thick.

Central fragment of black abalone fishhook. Obverse ventral. 14 mm. long, 3.5 mm. wide, 3 mm. thick.

Central fragment of red abalone fishhook, 19 mm. long, 6 mm. wide, 3.5 mm. thick.

Central fragment of black abalone fishhook, 21 mm. long, 7 mm. wide, 3 mm. thick.

Butt fragment of black abalone fishhook, 34 mm. long, 8 mm. wide, 4 mm. thick. The lower part of the inside edge is somewhat squared. The hook has a well-defined elbow. There is no trace of grooving at the butt.

Central fragment of black abalone fishhook of the most slender variety, 11 mm. long, 2.5 mm. wide, 1 mm. thick. Very black color.

Butt fragment of black abalone fishhook, dark slate color, well preserved; 25 mm. long, 7 mm. wide, 2.5 mm. thick. The inner edge squared, the outer edge rounded. The shank is 17 mm. long, and shows no trace of a groove either on the obverse or reverse side, merely a notch cut at each end. This is the only example of this kind of shank in the collection.

Butt fragment of black abalone fishhook, 13 mm. long, 2 mm. wide, 1.5 mm. thick. The shank is 5 mm. long, and a shallow groove runs completely around it.

Central fragment of black abalone fishhook, dark yellowish color in places, blackish in places; 25 mm. long, 6 mm. wide, 3 mm. thick. The inner edge is squared, the outer edge rounded. Perhaps about equal portions of butt and tip are missing.

Butt fragment of black abalone fishhook, dark slate color; 25 mm. long, 7 mm. wide, 3.5 mm. thick. The inner edge is squared, but the specimen is peculiar in having not only the outer edge but also the edge of the shank sharp. The shank is 16 mm. long, and the groove is absent from the central part of each surface.

Central fragment of bone fishhook, 14 mm. long, 7 mm. wide, 4.5 mm. thick. The inner edge is square, the outer edge rounded.

Central fragment of black abalone fishhook. The surface is much encrusted, the interior of a specimen is gray colored. 17 mm. long, 10 mm. wide, 5 mm. thick. The inner edge is squared, the outer edge rounded.

Butt fragment of black abalone fishhook. This fragment consists of the shank only, which is 10.5 mm. long, 5 mm. wide, 3.5 mm. thick. A groove extends completely around the shank.

Central fragment of black abalone fishhook, 17 mm. long, 5 mm. wide, 3 mm. thick. The specimen has quite an elbow and a notch in the outer edge 2.5 mm. from the broken butt. Judging from the shape, it may originally have had three notches.

Central section of red abalone fishhook, 12 mm. long, 2 mm. wide, 2.5 mm. thick.

Central fragment of black abalone fishhook, 12 mm. long, 6.5 mm. wide, 2.5 mm. thick.

#### DISHES OF ABALONE SHELL

Dishes of abalone shell, of either the black or red variety, with the siphonal openings neatly plugged with asphalt, were perhaps the commonest small vessel of the Indians. Some well-preserved specimens were taken from the mound. Heye<sup>27</sup> figures such a vessel, calling it a haliotis shell scoop. "Dish" would probably be a better term, for they were primarily receptacles or containers, although used also on occasion as scoops, dippers, bailers and spades.

Black abalone shell dish. Holes plugged with asphalt. Only the hole nearest the rim of the shell has the plug missing. The entire inside and outside of the shell are smeared with red paint. 147.6 mm. long, 115.8 mm. wide, 41.2 mm. high.

Black abalone shell of very greenish color, found half filled with fine-textured asphalt. The shell is deformed, having no siphonal openings. 93.6 mm. long, 69.8 mm. wide, 28.5 mm. high. (Pl. 24, *d*.)

<sup>27</sup> Heye, *op. cit.*, p. 118.

Black shell dish. The holes have a trace of former plugging seen on the back of the shell. 190.5 mm. long.

Fragment of black abalone shell dish. Fragment 136.5 mm. long, and shows four holes still plugged with asphalt and one from which the plugging has dropped out.

Black abalone shell dish, 161.9 mm. long, 136.5 mm. wide, 47.6 mm. high. Fifty-six transverse incisions have been cut as ornamentation along the rim. Of the four holes occurring in the shell in its present fragmentary condition, only two still have the asphalt plugging intact. (Pl. 24, b.)

Fragmentary black abalone shell dish, 120.6 mm. long, 101.6 mm. wide, 44.4 mm. high. Seven holes occur in the specimen, only one of which is still plugged with asphalt.

Fragmentary black abalone dish. Fragment 98.4 mm. long, 52.3 mm. wide. One hole plugged with asphalt occurs in the fragment.

Beautiful red abalone shell dish, 225.4 mm. long, 187.3 mm. wide, 57.1 mm. high. The back of the shell is partly ground off and shows pretty veining. There are five holes. The two nearest apex and rim are still plugged with asphalt.

Black abalone shell dish. 114.3 mm. long, 88.9 mm. wide, 25.4 mm. high. The plugging has fallen out of the siphonal holes.

#### SHELLS USED AS PAINT CUPS

In addition to stone mortars or bowls, limestone cups, ironstone concretions, and fish vertebrae, the Indians employed shells of various kinds as containers for pigment. Typical paint cups, the use of which was unmistakable, may be listed as follows:

Rock oyster shell which was used as a paint cup. The central part of the cupping shows a bright stain of red hematite. 88 mm. long, 18 mm. diameter.

Owl limpet shell found filled with red hematite paint; 79 mm. long, 57 mm. wide, 16 mm. diameter. The paint varies in color from blackish gray to bright red, and is fine textured and like asphalt in hardness. (Pl. 24, c.)

#### BEADS, PENDANTS, AND ORNAMENTS

The favorite material for Indian jewelry was shell, and among the various shells employed the abalone, Pismo clam, olivella and rock-oyster had, perhaps, the preference. These shells were treated in almost every conceivable way in the manufacture of Indian finery. No known substance is more handsome than mother-of-pearl, and the Indian ornaments, when new and properly strung or otherwise attached, made a beautiful and showy appearance.

European beads were introduced in quantities very early and at the time of the American occupation were about the only ones worn by the Mission Indians.

The small beads especially escaped being broken, and many of them survived the action of the soil almost perfectly. The method of stringing, however, which is of ethnological importance, can never be to any extent recovered. Bone and stone beads were also used in surprising variety.

## SHELLS FOR STRINGING

Several species of shell were found perforated for stringing entire. Conspicuous among these is the small species of olivella with spire ground off by rubbing on a rock so that a string can be inserted. (Pl. 26, *r.*) A few specimens of the large olivella were found prepared in the same way. Cowrie shells were found with the back broken through, apparently for stringing.

The dentalium is a natural tube and does not have to be perforated for stringing. It was rare on the Channel, occurring only in the deeper waters, but was known to the Indians and a number of specimens were taken. Sections of dentalium were used as bushings for the ends of cylindrical and other types of beads.

Two specimens of clamshell were found which had been bored near the hinge, apparently for the purpose of stringing. The holes are about 3 mm. diameter. The maximum diameter of the shells is about 43 mm.

## RIM PENDANTS OF ABALONE

These are cut from the inner lip of the abalone shell, from the red abalone in the specimens obtained. An ornamentation of zigzag or transverse incisions is found on some rim pendants.

Butt fragment of abalone rim pendant, 44 mm. long, 8 mm. wide, 4 mm. thick. Hole 2 mm. diameter, 2 mm. from butt end. The outside edge is ornamented with transverse incisions cut about 1 mm. apart.

Butt fragment of abalone rim pendant, 36 mm. long, 6 mm. wide, 1.5 mm. thick. Hole 1.5 mm. diameter bored 3 mm. from the butt end.

Butt fragment of abalone rim pendant, 47 mm. long, 9 mm. wide, 2 mm. thick. Hole 1.5 mm. diameter bored 2 mm. from the butt end.

Butt fragment of abalone rim pendant, 52 mm. long, 14.5 mm. wide, 5 mm. thick. Hole 2 mm. diameter 3 mm. from butt end.

Entire abalone rim pendant, 125 mm. long, 7.5 mm. wide, 2.75 mm. thick. Hole 2 mm. diameter, 2.5 mm. from the butt end. From the butt extending to 13 mm. from the tip, the outer edge is ornamented with zigzag incisions. (Pl. 25, *a.*)

Central fragment of abalone rim pendant, 51 mm. long, 7 mm. wide, 3 mm. thick. The fragment contains no perforation. The outer edge has remains of transverse incisions, 1.25 apart; these incisions have been partly worn off.

Entire abalone rim pendant, 41 mm. long, 6 mm. wide, 3.75 mm. thick. Hole 1.5 mm. diameter, 3 mm. from the butt.

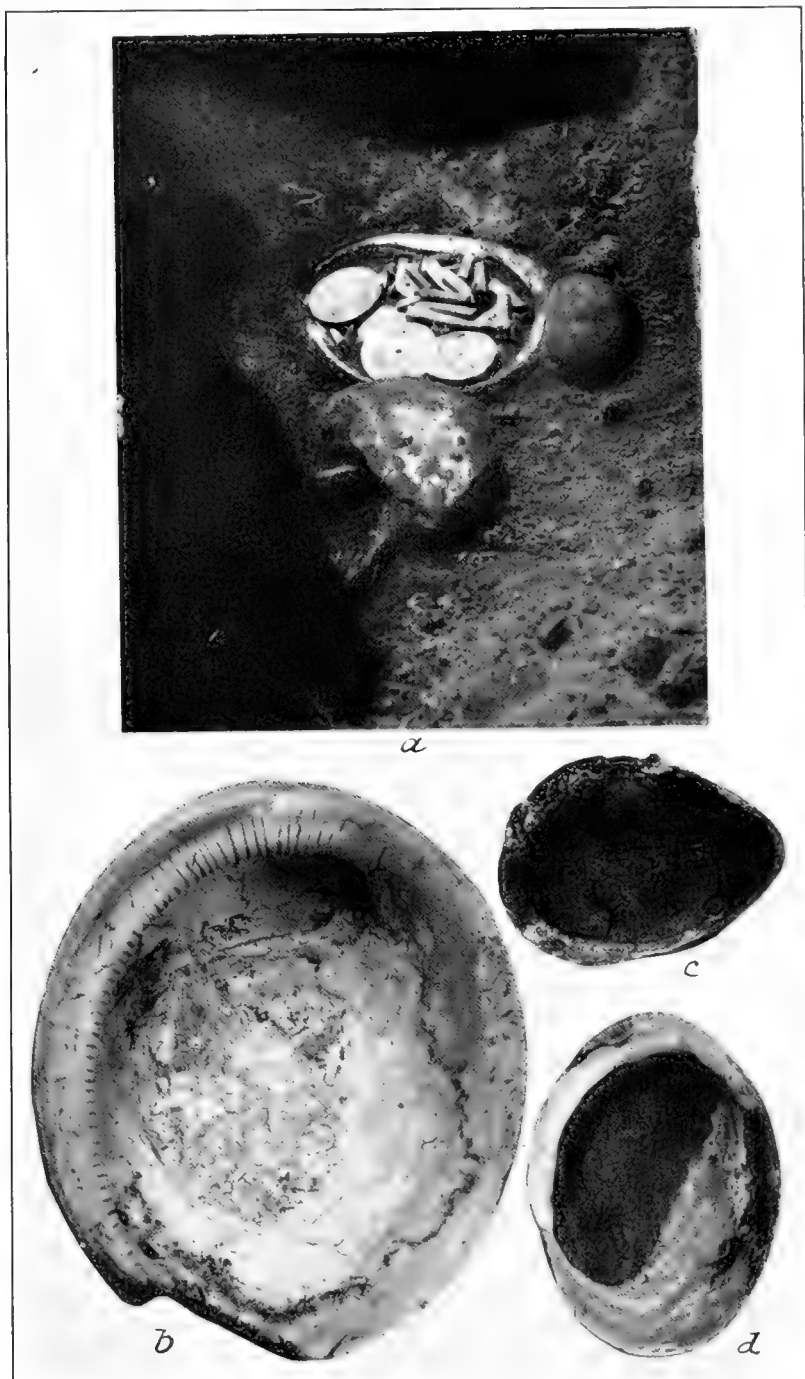
Central fragment of abalone rim pendant, 52.5 mm. long, 7.5 mm. wide, 3 mm. thick.

Central fragment of abalone rim pendant, 47.5 mm. long, 9.5 mm. wide, 2 mm. thick. In quite decayed condition.

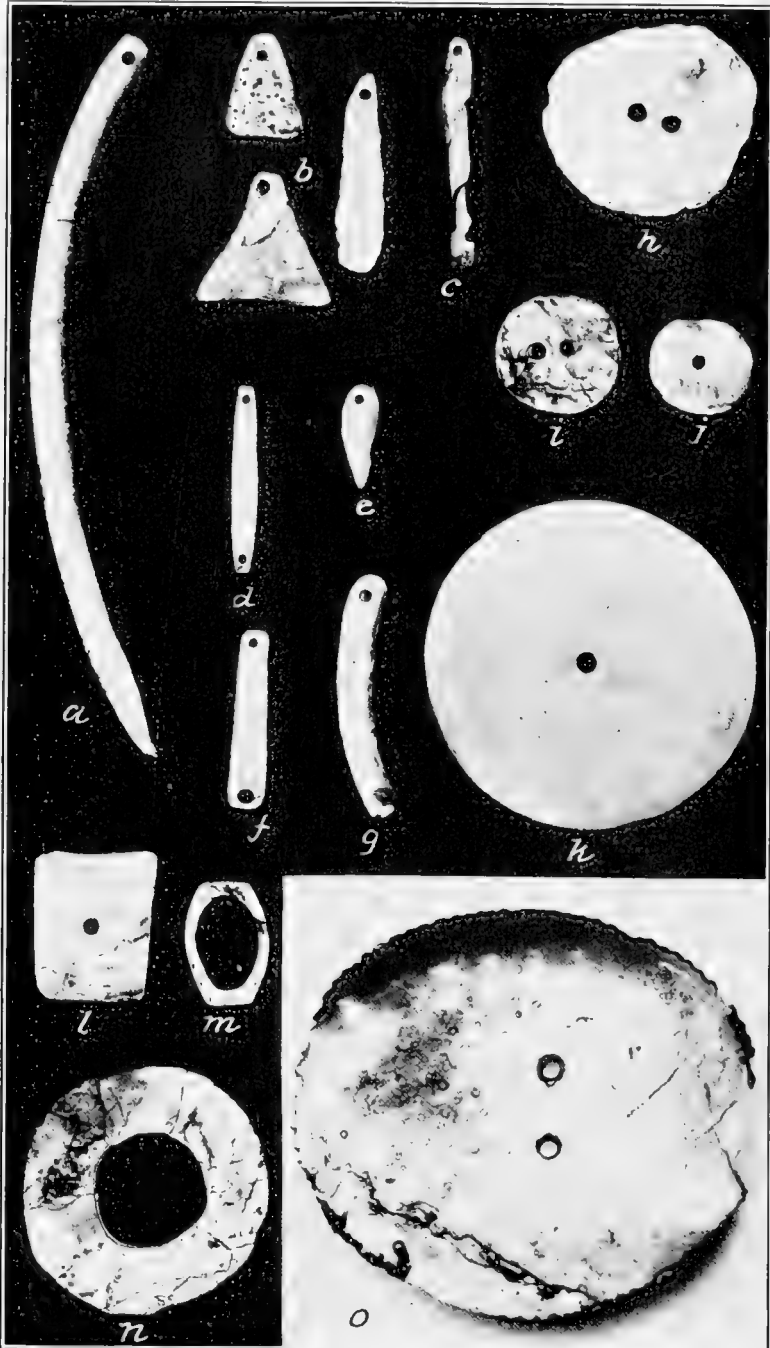
Fragment of abalone rim pendant, 27.5 mm. long, 6.5 mm. wide, 2 mm. thick. The entire outer edge is incised with transverse scorings.

Butt fragment of abalone rim pendant, 76 mm. long, 6 mm. wide, 3.5 mm. thick. The hole is 2 mm. diameter and the end of the specimen beyond the hole has been broken away. Traces of transverse incisions are still visible along the lower portion of the outer edge.





*a*, CACHE OF CLAMSHELL DISKS AND LONG BEADS IN AN ABALONE DISH. *b*, ABALONE DISH WITH TRANSVERSELY INCISED RIM. *c*, OWL LIMPET SHELL USED AS A PAINT CUP. *d*, ABALONE SHELL USED AS A PAINT CUP



*a*, ABALONE RIM PENDANT. *b*, TRIANGULAR PENDANTS OF ABALONE. *c*, COLUMELLA PENDANT. *d*, *f*, *g*, OBLONG PENDANTS OF ABALONE. *e*, LEAF-SHAPED PENDANT OF CLAM-SHELL. *h*, *i*, CIRCULAR PENDANTS OF ABALONE. *j*, *k*, DISKS OF CLAM-SHELL. *l*, SQUARE PENDANT OF ABALONE. *m*, LIM-PET RING. *n*, RING-SHAPED ORNAMENT OF ABALONE. *o*, ABALONE GORGET

Butt fragment of abalone rim pendant, 97 mm. long, 7 mm. wide, 5 mm. thick. Hole 2.5 mm. diameter. Half the hole is extent, the end of the specimen being broken off.

Tip fragment of abalone rim pendant, 85.5 mm. long, 11 mm. wide, 3 mm. thick. Hole 1 mm. diameter, 0.75 mm. from the butt. The specimen is so disintegrated that one can not be sure of any trace of incisions on the outer edge.

Central fragment of abalone rim pendant, 38 mm. long, 5 mm. wide, 1.5 mm. thick. There are transverse incisions along the entire outer edge.

Tip fragment of abalone rim pendant, 46.5 mm. long, 5.5 mm. wide, 1.5 mm. thick.

Central fragment of abalone rim pendant, 62.5 mm. long, 8 mm. wide, 2 mm. thick. The entire outer edge has zigzag incisions.

Butt fragment of abalone rim pendant, 30.5 mm. long, 10 mm. wide, 3.5 mm. thick. Hole 1.5 mm. diameter, 2 mm. from butt.

Central fragment of abalone rim pendant, 40.5 mm. long, 9 mm. wide, 3.5 mm. thick.

Central fragment of abalone rim pendant, 46 mm. long, 7 mm. wide, 2 mm. thick.

Tip fragment of abalone rim pendant, 91 mm. long, 12.5 mm. wide, 6.5 mm. thick.

Tip fragment of abalone rim pendant, 26 mm. long, 6 mm. wide, 5 mm. thick.

Tip fragment of abalone rim pendant, 42 mm. long, 8 mm. wide, 2.5 mm. thick.

#### OBLONG PENDANTS OF CLAMSHELL

One of the specimens measures 22 mm. long, 4 mm. wide, 2 mm. thick. A hole 0.75 mm. diameter is bored near one end. One edge is serrated. The serrations appear to be artificial. It appears that the marginal region of one side was transversely incised, giving a serrated edge, although it was thought at first that the corrugated surface or serrated ventral margin of some bivalve had been used to produce this effect. (Pl. 26, *m.*)

#### COLUMELLA PENDANTS

Only three pendants made from columella with spiral groove were obtained and they may be described as follows:

Butt fragment of columella pendant, 17.5 mm. long, 3.5 mm. diameter. Hole 1 mm. diameter, 1 mm. from butt.

Columella pendant, 33.5 mm. long, 4 mm. diameter. Hole 1.5 mm. diameter, 2 mm. from butt.

Columella pendant, 39 mm. long, 5 mm. diameter. Hole 1 mm. diameter, 1.5 mm. from butt. (Pl. 25, *e.*)

#### TRIANGULAR PENDANTS OF ABALONE

Triangular abalone pendants have a variety of forms. The edge of the pendant was frequently ornamented by incision and a single hole was bored near one corner after the manner of the hole of a comal. Typical specimens are shown. (Pl. 25, *b.*)

Triangular pendant, 16.5 mm. long, 6.5 mm. wide. Hole 1 mm. diameter.

Triangular pendant, 19 mm. long, 11.5 mm. wide. Hole 1 mm. diameter at apex.

Triangular pendant, 24.5 mm. long, 21 mm. wide. Hole 1 mm. diameter at apex.

Triangular pendant, 21 mm. long, 15 mm. wide. Hole 1.25 mm. diameter.

Fragment of triangular pendant, 61.5 mm. long, 33.5 mm. wide. Hole 2 mm. diameter.

Fragment of triangular pendant, 22 mm. long, 8 mm. wide. Hole 1 mm. diameter.

Triangular pendant, 22 mm. long, 10 mm. wide. Hole 1.5 mm. diameter, 3 mm. from the edge of the middle of one of the sides.

Somewhat disintegrated triangular pendant, 18 mm. diameter. Hole 1.5 mm. diameter.

Triangular pendant, 17.5 mm. long, 21 mm. wide. Hole 2 mm. diameter.

Triangular pendant, 21 mm. diameter. Hole 1 mm. diameter.

Beautifully preserved triangular pendant, 25.5 mm. long, 24 mm. wide. Hole 1 mm. diameter. Entire edge incised with crosswise scorings.

Butt fragment of triangular pendant, 17.5 mm. long, 8 mm. wide. Hole 3 mm. diameter. This fragment is as thin as paper, being the last remnant.

Triangular pendant, 18.5 mm. long, 14 mm. wide. Hole 1.5 mm. diameter.

Triangular pendant, 35.5 mm. long, 9 mm. wide. Hole 1.75 mm. diameter.

Triangular pendant, 23 mm. long, 25 mm. wide. Hole 1.5 mm. diameter. Entire edge incised with crosswise scorings.

Triangular pendant, 17.5 mm. long, 9 mm. wide. Hole 1 mm. diameter.

Triangular pendant, 38 mm. long, 16 mm. wide. Hole 1.5 mm. diameter.

Triangular pendant, 33.5 mm. long, 7 mm. wide. Hole 1 mm. diameter at the obtuse angle.

Triangular pendant, one corner of which is broken off. Original computed to have been 37 mm. long, 14 mm. wide. Hole 1 mm. diameter.

#### LEAF-SHAPED PENDANTS OF CLAMSHELL

An example is shown in Plate 25, *e*.

Pendant of clamshell, 17 mm. long, 6 mm. wide. Hole 1 mm. diameter.

Pendant of clamshell, 10 mm. long, 6 mm. wide. Hole 1 mm. diameter.

Pendant of clamshell, 15 mm. long, 5 mm. wide. Hole 1 mm. diameter.

Pendant of clamshell, 17 mm. long, 5 mm. wide. Hole 1 mm. diameter.

#### CIRCULAR AND SQUARISH PENDANTS OF ABALONE

These have one or two perforations. Specimens are shown in Plate 25, *h*, *i*, and *l*.

Abalone pendant, 12 mm. diameter. Hole 1.5 mm. diameter at center.

Abalone pendant, 9 mm. diameter. Hole 1.5 mm. diameter at center.

Abalone pendant, 9 mm. diameter. Hole 1.25 mm. diameter.

Abalone pendant, 14 mm. diameter. Hole 2.5 mm. diameter at center.

Abalone pendant, 10 mm. diameter. Hole 1.75 mm. diameter at center.

Abalone pendant, 14.5 mm. diameter. Hole 1.5 mm. diameter at center.

Abalone pendant, 17 mm. diameter. Hole 1.5 mm. diameter at center.

Abalone pendant, 12.5 mm. diameter. Hole 1.5 mm. diameter at center.

Abalone pendant, 13.5 mm. diameter. Hole 1 mm. diameter not exactly at the center.

Abalone pendant, 30 mm. diameter. Hole 2 mm. diameter at center.

Abalone pendant, 10 mm. diameter. Hole 2 mm. diameter not exactly at the center.

Abalone pendant, 8.5 mm. diameter. Hole 2.5 mm. diameter. A very thin lamina.

Abalone pendant, 33 mm. diameter. Hole 4 mm. diameter at center. Edge incised.

- Abalone pendant, 12 mm. diameter. Hole 2.5 mm. diameter at center.
- Abalone pendant, 13 mm. diameter. Hole 2 mm. diameter at center.
- Abalone pendant, 13.5 mm. diameter. Hole 2.75 mm. diameter.
- Blank for squarish abalone pendant, 11.5 mm. diameter. Unbored.
- Abalone pendant 26 mm. diameter. Two holes 3 mm. diameter. Edge incised.
- Abalone pendant. Square. 75 mm. diameter. Hole 2.5 mm. diameter.
- Abalone pendant, 8.5 mm. diameter. Hole 3 mm. diameter at center.
- Abalone pendant, 13 mm. diameter. Hole 2.5 mm. diameter at center.
- Abalone pendant, 28.5 mm. diameter. Two holes 4 mm. diameter.
- Abalone pendant, 27 mm. diameter. Hole 1 mm. diameter.
- Abalone pendant, 17 mm. diameter. Hole 5.5 mm. diameter at center.
- Abalone pendant. Square. 15 mm. diameter. Two holes 1 mm. diameter.
- Abalone pendant, 18 mm. diameter. Two holes 3 mm. diameter.
- Abalone pendant, 8.5 mm. diameter. Two holes 1 mm. diameter.
- Abalone pendant, 10 mm. diameter. Hole 1 mm. diameter at center. A mere lamina.
- Abalone pendant, 12 mm. diameter. Hole 1 mm. diameter at center. Entire edge incised.
- Abalone pendant, 14.5 mm. diameter. Two holes 1.5 mm. diameter.
- Abalone pendant, 10 mm. diameter. Hole 1 mm. diameter 1 mm. from the edge.
- Abalone pendant, 16 mm. diameter. Two holes 1 mm. diameter.
- Abalone pendant. Square. 7.5 mm. diameter. Hole 2.5 mm. diameter at center.
- Abalone pendant, 14 mm. diameter. Hole 2 mm. diameter near center.
- Abalone pendant, 19 mm. diameter. Hole 2 mm. diameter near center.
- Abalone pendant, 11 mm. diameter. Hole 1.5 mm. diameter at center.
- Abalone pendant, 10 mm. diameter. Two holes 1 mm. diameter.
- Abalone pendant, 23 mm. diameter. Hole 2.5 mm. diameter. Edge incised.
- Abalone pendant, 38.5 mm. diameter. Two holes, 2 mm. diameter.
- Abalone pendant, 8.5 mm. diameter. Two holes, 1 mm. diameter. A mere lamina.
- Fragmentary abalone disk or gorget, 36 mm. diameter. Two holes, 3 mm. diameter, 7.5 mm. apart.
- Abalone pendant, 17 mm. diameter. Hole 1.75 mm. diameter.
- Abalone pendant, 20 mm. diameter. Two holes, 1.75 mm. diameter.
- Abalone pendant. Square. 6.25 mm. diameter. Hole 3 mm. diameter.
- Abalone pendant. Oblong. 13 mm. long, 8 mm. wide. Hole 2 mm. diameter.
- Abalone pendant. Square. 24.5 mm. diameter. Hole 2 mm. diameter at center.
- Abalone pendant 16.5 mm. diameter. Two holes, 1 mm. diameter.
- Blank for abalone pendant, 12 mm. diameter. Unbored.
- Abalone pendant, 19.5 mm. diameter. Two holes, 1.5 mm. diameter.
- Abalone pendant, 9 mm. diameter. Hole 1 mm. diameter at center.
- Blank for abalone pendant, 21.5 mm. diameter. Unbored.
- Abalone pendant, 10 mm. diameter. Hole 1.5 mm. diameter.
- Abalone pendant, 10.5 mm. diameter. Two holes, 1.5 mm. diameter.
- Abalone pendant. Square. 7 mm. diameter. Hole 3 mm. diameter.
- Abalone pendant, 15 mm. diameter. Two holes, 1.5 mm. diameter.
- Abalone pendant. Square. 8 mm. diameter. Hole 2.5 mm. diameter.
- Abalone pendant, 7 mm. diameter. Hole 2.75 mm. diameter.
- Abalone pendant. Square. 8 mm. diameter. Hole 2.25 mm. diameter.

- Abalone pendant, 17 mm. diameter. Hole 1.25 mm. diameter.
- Abalone pendant, 11 mm. diameter. Hole 2 mm. diameter.
- Abalone pendant. Oblong. 10 mm. long, 0.75 mm. wide. Two holes, 1 mm. diameter.
- Abalone pendant. Oblong. 9.5 mm. long, 6 mm. wide. Two holes, 1 mm. diameter.
- Abalone pendant. Square. 8 mm. diameter. Hole 2.5 mm. diameter.
- Abalone pendant, 8.5 mm. diameter. Hole 3 mm. diameter. A mere lamina.
- Abalone pendant, 14.5 mm. diameter. Two holes, 1.25 mm. diameter.
- Abalone pendant, 13 mm. diameter. Two holes, 1.75 mm. diameter.
- Blank for abalone pendant, 15.5 mm. diameter. Unbored.
- Abalone pendant. Oblong with bulging sides. 10.5 mm. long, 5 mm. wide. Hole 5 mm. diameter at center. Very thin.
- Abalone pendant. Oblong. 11 mm. long, 9 mm. wide. Two holes, 2 mm. diameter.
- Abalone pendant, 16 mm long. Hole 1 mm. diameter. To one side of center.
- Blank for abalone pendant, 21.5 mm. long, 13 mm. wide. Unbored.
- Blank for abalone pendant, 19 mm. long, 15 mm. wide. Unbored.
- Fragment of abalone pendant. Representing about half the original specimen. 23.5 mm. long, 12 mm. wide. Two holes, 2.5 mm. diameter.
- \*Blank for abalone pendant, 9 mm. diameter. Unbored.
- Blank for abalone pendant, 44 mm. diameter. Unbored.
- Blank for abalone pendant, 44 mm. long, 18.5 mm. wide. Unbored.
- Abalone pendant, 19.5 mm. diameter. Two holes, 1.5 mm. diameter.
- Abalone pendant, 15 mm. diameter. Two holes, 1 mm. diameter.
- Abalone pendant, 15 mm. diameter. Two holes, 1 mm. diameter.
- Abalone pendant, 32 mm. diameter. Two holes, 3.5 mm. diameter.
- Blank for abalone pendant. 15.5 mm. diameter. Unbored.
- Blank for abalone pendant, 24.5 mm. diameter. Unbored.

#### ABALONE GORGETS

Distinguished from the pendants just described only by size are the gorgets of abalone shell, worn at the throat or on the breast of the Indian. These were made of black or red abalone. The best specimens are as follows. A specimen is shown in Plate 25, *o*.

Gorget made of young red abalone shell. One side partly broken off. 89 mm. long, 108.5 mm. wide. The breathing holes do not go through the shell. Two holes, 5.5 mm. diameter. The entire edge is ornamented with incisions about 1.5 mm. apart.

Gorget of abalone, 81 mm. long, 62 mm. wide. Two holes, 4 mm. diameter. Part of the edge of the specimen is broken away.

Gorget of abalone, 78 mm. long, 67 mm. wide. Two holes, 3 mm. diameter. The entire edge was incised.

Fragment of abalone gorget, 39 mm. diameter. The fragment shows one hole, 5 mm. diameter.

Fragment of abalone gorget, 59 mm. long. The fragment shows parts of two holes which had a diameter of about 2.5 mm.

Abalone gorget, 62.5 mm. diameter. Two holes, 1.5 mm. diameter. The entire edge is incised, or rather toothed, with projections 2.5 mm. apart.

Abalone gorget, 49.5 mm. diameter. Two holes, 5 mm. diameter somewhat lopsidedly placed.

Fragment of abalone gorget, 59 mm. long. The fragment shows two holes which were 5 mm. or more in diameter, and is unusually flat. The edge is incised.

Abalone gorget in fragmentary condition, 58 mm. long. Two holes, 3 mm. diameter. This gorget has two larger holes, which were some 14 mm. diameter; these were plugged with asphalt, the surface of which was inlaid with shell beads. The plugging of one hole is still intact and two shell beads adhere to the outer surface, also two to the inner surface. The plugging of the other hole has fallen out and the hole is partly broken away.

Fragment of abalone gorget, representing about half the original specimen, 44 mm. long. The specimen shows one hole 4 mm. diameter, but there were doubtless two holes.

#### DISKS OF CLAMSHELL

Examples of disks from the Pismo clamshell are shown. (Pl. 25, *j* and *k*.) Their size varies from that of a dime to that of a dollar. A cache of these, together with cylindrical beads, is shown in Plate 24, *a*.

Disk of clamshell, 51.5 mm. diameter. Hole 1.5 mm. diameter.

Disk of clamshell, 50.5 mm. diameter. Hole 1 mm. diameter.

Disk of clamshell, 50.5 mm. diameter. Hole 1.5 mm. diameter.

Disk of clamshell, 47 mm. diameter. Hole 1 mm. diameter.

Disk of clamshell, 49 mm. diameter. Hole 1 mm. diameter. Part of the edges broken away.

Disk of clamshell, 46 mm. diameter. Hole 1 mm. diameter.

Disk of clamshell, 37 mm. diameter. Hole 1 mm. diameter.

Disk of clamshell, 36 mm. diameter. Hole 1 mm. diameter.

Disk of clamshell, 35 mm. diameter. Hole 1 mm. diameter.

Disk of clamshell, 41.5 mm. diameter. Hole 1.5 mm. diameter.

#### OBLONG PENDANTS OF ABALONE

Examples of oblong pendants of abalone are shown in Plate 25, *d*, *f*, *g*.

Pendant of black abalone, 26 mm. long, 8.5 mm. wide. A hole at each end.

Pendant of black abalone, 34 mm. long, 4 mm. wide. A hole at each end.

Pendant of black abalone, 19.5 mm. long, 8 mm. wide. A hole at each end.

Pendant of black abalone, 17.5 mm. long, 5 mm. wide. A hole at each end. The holes are partly broken away.

Pendant of black abalone. Oblong but with rounded ends. 20.5 mm. long, 6 mm. wide. A hole at each end.

Pendant of black abalone. A trace of a hole can still be seen at one end. The other end seems to have been squared and to have had no hole. 25 mm. long, 3.5 mm. wide.

Pendant of black abalone. The hole is intact at one end. The other end is so crumbled away that one can not tell whether it also had a boring. 26.5 mm. long, 7 mm. wide.

Pendant of black abalone. The hole at one end is partly broken away, 29 mm. long, 15.5 mm. wide.

Pendant of black abalone. Oblong with large curved notches out of each of the longer sides. 25.5 mm. long, 18 mm. wide. Two holes at each end.

Pendant of black abalone. There is a large curved notch out of the central part of one side. The ornament is almost square. 25 mm. diameter.

Pendant of black abalone, 41 mm. long, 12 mm. wide. Hole at each end.

Pendant of black abalone, 45.5 mm. long, 10 mm. wide. Hole at each end.

Pendant of black abalone, 29 mm. long, 6 mm. wide. Hole at each end.

Pendant of black abalone. This is possibly a fragment, having a hole in one end only. 23.5 mm. long, 9.5 mm. wide.

Pendant of black abalone, 22 mm. long, 4 mm. wide. Hole in each end.

Pendant of black abalone. Wider in the middle and tapering toward the ends. 33.5 mm. long, 5 mm. wide. Hole in each end.

Pendant of black abalone. This has no holes and is possibly a central fragment. 25 mm. long, 4.75 mm. wide.

Pendant of black abalone, 22.5 mm. long, 7.5 mm. wide. Hole in each end.

Pendant of black abalone, 24.5 mm. long, 4 mm. wide. Hole in each end.

#### RING-SHAPED ORNAMENTS OF ABALONE

An example of the abalone ring pendants is shown in Plate 25, *n*.

Ring-shaped ornament from which a section 14 mm. in length has been broken out, 35 mm. diameter, width of band 9.5 mm.

Fragment of ring-shaped ornament. Outer edge decorated with incisions, 27.5 mm. long, width of band 8 mm.

Ring-shaped ornament, 44 mm. diameter; width of band 14 mm.

Fragment of ring-shaped ornament. The outer decorated with incisions. 31.5 mm. long; width of band 14.5 mm.

Ring-shaped ornament. 16.5 mm. diameter width of band 6 mm.

Ornament consisting of a ring with attached shaft. Diameter of ring 13.5 mm.; width of band 5 mm. Length of entire ornament, 33 mm. There was evidently a hole near the end of the shaft, but this has been mostly broken away.

#### LIMPET RINGS

The edge of the siphonal opening of the great keyhole-limpet was made into an elongated ring by grinding away the rest of the shell. The ends of most of our specimens are squared. An example is figured in Plate 25, *m*.

Limpet ring, 16 mm. long, 13 mm. wide.

Limpet ring, 7 mm. long, 5.5 wide. Ends not squared.

Extra wide banded limpet ring, 29 mm. long, 20 mm. wide, band 7 mm. wide.

Limpet ring, 22 mm. long, 14.5 mm. wide.

Limpet ring, 22 mm. long, 15.5 wide.

Limpet ring, 22 mm. wide, 19 mm. wide.

Limpet ring, 19.5 mm. long, 14 mm. wide.

Limpet ring, 18 mm. long, 14 mm. wide.

Limpet ring. Ends not squared. A curious projection, 2 mm. long, sticks out from one end. 25.5 mm. long, 18 mm. wide.

Limpet ring, 17 mm. long, 14 mm. wide.

Limpet ring, 19.5 mm. long, 14 mm. wide.

Limpet ring, 30 mm. long, 21.5 mm. wide. Ends not squared. This is the largest specimen in the collection.

Limpet ring, 12 mm. long, 10 mm. wide.

Limpet ring, 26 mm. long, 14 mm. wide. Ends not squared.



- Limpet ring, 16 mm. long, 10 mm. wide. Squared at one end only.
- Limpet ring, 16 mm. long, 8 mm. wide.
- Limpet ring, 18 mm. long, 10 mm. wide.
- Limpet ring, 10 mm. long, 6 mm. wide.
- Limpet ring, 24 mm. long, 16 mm. wide.
- Limpet ring, 19 mm. long, 10 mm. wide.

## LONG BEADS

## CYLINDRICAL BEADS

White cylindrical beads were made from the thick part of the shell of the Pismo clam. They differ considerably in size and shape, also in the diameter of the boring, which was made from both ends. Many of the specimens taken have the surface much disintegrated. Typical specimens are shown in Plate 26, *j*, *k*, and *l*.

Blanks, broken and rubbed, from the Pismo clamshell, for making these beads were also found.

End fragment of cylindrical bead, 16 mm. long, 5.5 mm. diameter. Hole 5 mm. diameter.

Blank for cylindrical bead, 44 mm. long, 20.5 mm. wide, 11 mm. thick. Square in section.

Blank for cylindrical bead, 27 mm. long, 9 mm. wide, 7 mm. thick. Round in section.

Entire cylindrical bead, 29 mm. long, 5 mm. diameter. Hole 1 mm. diameter.

Blank for cylindrical bead, 55 mm. long, 18 mm. wide, 10.5 mm. thick. Square in section.

Entire cylindrical bead, 25.5 mm. long, 5 mm. diameter. Hole 0.75 mm. diameter.

Entire cylindrical bead, 20 mm. long, 5 mm. diameter. Hole 0.75 mm. diameter.

Entire cylindrical bead with flutings at each end, 28 mm. long, 5 mm. diameter. Hole 1 mm. diameter.

Entire cylindrical bead, 23 mm. long, 7 mm. diameter. Hole 1 mm. diameter.

Blank for cylindrical bead, 36.5 mm. long, 9.5 mm. diameter. Square in section.

Blank for cylindrical bead, 44 mm. long, 8.5 mm. diameter. Square in section.

Entire cylindrical bead, 24 mm. long, 4.5 mm. diameter. Hole 2.5 mm. diameter.

Entire cylindrical bead, 27 mm. long, 6 mm. diameter. Hole 3 mm. diameter, with bushings at each end.

Entire cylindrical bead, 24 mm. long, 8 mm. diameter, with bushings at each end.

Entire cylindrical bead, 29.5 mm. long, 6 mm. diameter. Hole 3 mm. diameter, with bushings at each end.

Entire cylindrical bead, 31 mm. long, 4.5 mm. diameter. Hole 3.5 mm. diameter. The bushings have fallen out. The walls at the ends of the bead are very thin.

Entire cylindrical bead, 49 mm. long, 7 mm. diameter. Hole 2.5 mm. diameter, with bushings at the ends.

Entire cylindrical bead, 30.5 mm. long, 6 mm. diameter. Hole 3 mm. diameter, with bushings.

Entire cylindrical bead, 36 mm. long, 8 mm. diameter. Hole 3 mm. diameter, with bushings.

Entire cylindrical bead, 37.5 mm. long, 6 mm. diameter. Hole 3 mm. diameter, with bushings.

Entire cylindrical bead, 31 mm. long, 5 mm. diameter. Hole 2 mm. diameter.

Entire cylindrical bead, 28.5 mm. long, 4.5 mm. diameter. Hole 2 mm. diameter.

Entire cylindrical bead, 43 mm. long, 4 mm. diameter. Hole 0.75 mm. diameter.

Central fragment of unbored cylindrical bead, 22.5 mm. long, 4 mm. diameter.

End fragment of cylindrical bead, 29 mm. long, 7 mm. diameter. Hole 2.75 mm. diameter.

Entire cylindrical bead, 24 mm. long, 5 mm. diameter. Hole 0.75 mm. diameter.

Entire cylindrical bead, 24 mm. long, 5.5 mm. diameter. Hole 3 mm. diameter.

Entire cylindrical bead, 24 mm. long, 26 mm. diameter. Hole 2 mm. diameter.

Entire cylindrical bead, 67 mm. long, 7.5 mm. diameter. Hole 2 mm. diameter.

Entire cylindrical bead, 66 mm. long, 7 mm. diameter. Hole 2 mm. diameter.

Entire cylindrical bead, 47 mm. long, 7 mm. diameter. Hole 2 mm. diameter.

Entire cylindrical bead, 44 mm. long, 7 mm. diameter. Hole 2.5 mm. diameter.

Entire cylindrical bead, 50.5 mm. long, 7.5 mm. diameter. Hole 2 mm. diameter.

Blank for cylindrical bead, 40 mm. long, 10 mm. diameter. Square in section.

Blank for cylindrical bead, 50.5 mm. long, 9 mm. diameter. Square in section.

Entire cylindrical bead, 33.5 mm. long, 5.5 mm. diameter. Hole less than 1 mm. diameter.

Entire cylindrical bead, 48.5 mm. long, 5 mm. diameter. Hole 1 mm. diameter.

Entire cylindrical bead, 15.5 mm. long, 5.5 mm. diameter. Hole 2 mm. diameter.

Entire cylindrical bead, 30 mm. long, 5 mm. diameter. Hole 1.5 mm. diameter.

Entire cylindrical bead, 27 mm. long, 5 mm. diameter. Hole 2 mm. diameter.

Entire cylindrical bead, 27.5 mm. long, 6 mm. diameter. Hole 3 mm. diameter.

Blank for cylindrical bead, 39 mm. long, 13 mm. wide, 6 mm. thick. Oblong in section.

Blank for cylindrical bead, 45 mm. long, 17 mm. wide, 9 mm. thick. Oblong in section.

Entire cylindrical bead, 19.5 mm. long, 5 mm. diameter. Hole 2 mm. diameter.

Entire cylindrical bead, 33 mm. long, 6 mm. diameter. Hole 2.5 mm. diameter.

Blank for cylindrical bead, 42 mm. long, 9 mm. diameter. Square in section.

A hole has been bored 1 mm. into one end and 2 mm. into the other end. These holes are about 1 mm. diameter.

Entire cylindrical bead, much decomposed, 14 mm. long.

Entire cylindrical bead, 13.5 mm. long, 4 mm. diameter. Hole 2 mm. diameter.

Entire cylindrical bead, 12 mm. long, 4 mm. diameter. Hole 2 mm. diameter, with black wampum bushing in each end.

Entire cylindrical bead, 23.5 mm. long, 5 mm. diameter. Hole 2 mm. diameter.

Entire cylindrical bead, 36.5 mm. long, 4.5 mm. diameter. Hole less than 1 mm. diameter.

Blank for cylindrical bead, 40 mm. long, 12 mm. wide, 10 mm. thick. Squarish in section.

Entire cylindrical bead, 48.5 mm. long, 9 mm. diameter. Hole 3 mm. diameter.

Entire cylindrical bead, 24 mm. long, 5 mm. diameter. Hole 1 mm. diameter.

Blank for cylindrical bead, 49 mm. long, 9 mm. diameter. Round in section.

Entire cylindrical bead, 65 mm. long, 9 mm. diameter. Hole 3.5 mm. diameter.

Entire cylindrical bead, 29 mm. long, 3.5 mm. diameter. Hole 1 mm. diameter.

Entire cylindrical bead, 23.5 mm. long, 4.5 mm. diameter. Hole 1 mm. diameter.

Blank for cylindrical bead, 25 mm. long, 4.5 mm. diameter. Round in section.

Entire cylindrical bead, 17.5 mm. long, 4 mm. diameter. Hole 0.75 mm. diameter.

Entire cylindrical bead, 43 mm. long, 4 mm. diameter. Hole 1 mm. diameter.

Blank for cylindrical bead, 24.5 mm. long, 7 mm. diameter. Round in section.

Blank for cylindrical bead, 48.5 mm. long, 9 mm. diameter. Round in section.

Entire cylindrical bead, 30.5 mm. long, 4.5 mm. diameter. Hole 1 mm. diameter.

Blank for cylindrical bead, 36 mm. long, 7 mm. diameter. Round in section. Entirely finished except that it lacks the boring.

Entire cylindrical bead, 36 mm. long, 7 mm. diameter. Hole 0.75 mm. diameter.

Entire cylindrical bead, 34 mm. long, 8 mm. diameter. Hole 3 mm. diameter, with bushings at the ends.

Entire cylindrical bead, 29 mm. long, 7 mm. diameter. Hole 2 mm. diameter.

Entire cylindrical bead, 41 mm. long, 5 mm. diameter. Hole less than 1 mm. diameter.

Entire cylindrical bead, 49 mm. long, 4.5 mm. diameter. Hole 2 mm. diameter.

Entire cylindrical bead, 37 mm. long, 4.5 mm. diameter. Hole 2 mm. diameter.

Entire cylindrical bead, 57 mm. long, 6.5 mm. diameter. Hole 3 mm. diameter.

Entire cylindrical bead, 21.5 mm. long, 4.5 mm. diameter. Hole 0.75 mm. diameter.

Entire cylindrical bead, 28.5 mm. long, 5.75 mm. diameter. Hole 1 mm. diameter.

Entire cylindrical bead, 25 mm. long, 4 mm. diameter. Hole 0.75 mm. diameter.

Entire cylindrical bead, 41 mm. long, 5 mm. diameter. Hole 1 mm. diameter.

Entire cylindrical bead, 51.5 mm. long, 7 mm. diameter. Hole 1.25 mm. diameter.

Entire cylindrical bead, 54 mm. long, 6.5 mm. diameter. Hole 1 mm. diameter.

Blank for cylindrical bead, 29.5 mm. long, 6.25 mm. diameter. Square in section.

Entire cylindrical bead, 23 mm. long, 5.5 mm. diameter. Hole less than 1 mm. diameter.

Blank for cylindrical bead, 51 mm. long, 7.5 mm. diameter. Round in section. Complete except for the boring.

Entire cylindrical bead, 23.5 mm. long, 5 mm. diameter. Hole 1 mm. diameter.

Entire cylindrical bead, 34 mm. long, 6 mm. diameter. Hole 1 mm. diameter.

Entire cylindrical bead, 27.5 mm. long, 5.25 mm. diameter. Hole 0.75 mm. diameter.

Entire cylindrical bead, 21 mm. long, 5 mm. diameter. Hole 1 mm. diameter.

End fragment of cylindrical bead, 17 mm. long, 5 mm. diameter. Hole 1 mm. diameter.

Blank for cylindrical bead, 45.5 mm. long, 20 mm. wide, 10 mm. thick. Ob-long in section. The sides consist clearly of the original surfaces of a large clamshell.

Entire cylindrical bead, 30 mm. long, 6 mm. diameter. Hole 2.75 mm. diameter, with bushing at both ends.

Entire cylindrical bead, 32 mm. long, 5 mm. diameter. Hole 1.5 mm. diameter.

End fragment of cylindrical bead, 14 mm. long, 5 mm. diameter. Hole 0.75 mm. diameter.

Blank for cylindrical bead, 50 mm. long, 9 mm. diameter. Round in section. Finished except for the boring.

Entire cylindrical bead, 17 mm. long, 6.5 mm. diameter. Hole 3.25 mm. diameter, with bushings in the ends.

Entire cylindrical bead, 37 mm. long, 5 mm. diameter. Hole 0.75 mm. diameter.

Blank for cylindrical bead, 45 mm. long, 12 mm. wide, 7 mm. thick. Square in section.

Entire cylindrical bead, 48.5 mm. long, 6 mm. diameter. Hole 1 mm. diameter.

Entire cylindrical bead, 18.5 mm. long, 6 mm. diameter. Hole 2.5 mm. diameter.

Entire cylindrical bead, 27.5 mm. long, 5.5 mm. diameter. Hole 1 mm. diameter.

Entire cylindrical bead, 31 mm. long, 6 mm. diameter. Hole 1.5 mm. diameter.

#### COLUMELLA BEADS

Long, tapering white columella beads, with a spiral groove winding about the surface, were made in part from the columella of the Top-shell, the large, straight-sided univalve that is still seen occasionally tossed out on the beaches of the vicinity. Specimens illustrating all stages of the process of manufacture were obtained. Typical specimens are shown in Plate 26, *n* and *o*.

Butt fragment of columella bead, 53 mm. long, 5.5 mm. diameter. Hole 3.5 mm. diameter at butt.

Columella bead, 77 mm. long, 8 mm. diameter. Hole 3.5 mm. diameter.

Blank for columella bead, 61 mm. long, 14.5 mm. diameter.

Blank for columella bead, finished except that it is unbored, 100 mm. long, 9.5 mm. diameter.

Tip fragment of columella bead, 28 mm. long, 5 mm. diameter. Hole 2.5 mm. diameter. The hole is bored crooked, breaking a groove through the side of the bead at the tip 6.5 mm. long.

Blank for columella bead, finished except that it is unbored, 62 mm. long, 7 mm. diameter.

Columella bead, 71 mm. long, 7.5 mm. diameter. Hole 2.5 mm. diameter.

Columella bead, 70.5 mm. long, 7 mm. diameter. Hole 3 mm. diameter.

Columella bead, 50 mm. long, 7 mm. diameter. Hole 3 mm. diameter.

Columella bead, 61 mm. long, 6.5 mm. diameter. Hole 2.5 mm. diameter.

Columella bead, 30 mm. long, 6 mm. diameter. Hole 2 mm. diameter.

Columella bead, 67 mm. long, 7 mm. diameter. Hole 3 mm. diameter.

- Columella bead, 63.5 mm. long, 7 mm. diameter. Hole 3 mm. diameter.
- Columella bead, 39 mm. long, 6 mm. diameter. Hole 2 mm. diameter.
- Tip fragment of columella bead, 22.5 mm. long, 4.5 mm. diameter. Hole 2 mm. diameter.
- Central fragment of columella bead, 61 mm. long, 6.5 mm. diameter. Hole 2.5 mm. diameter.
- Tip fragment of columella bead, 20 mm. long, 5 mm. diameter. Hole 1 mm. diameter.
- Columella bead, 55 mm. long, 6.5 mm. diameter. Hole 2 mm. diameter.
- Columella bead, 45 mm. long, 5 mm. diameter. Hole 2 mm. diameter.
- Tip fragment of columella bead, 24 mm. long, 4 mm. diameter. Hole 1 mm. diameter.
- Central fragment of columella bead, 62 mm. long, 9 mm. diameter. Hole 3 mm. diameter.
- Tip fragment of columella bead, 20.5 mm. long, 4.5 mm. diameter. Hole 2 mm. diameter.
- Columella bead, 91.5 mm. long, 10 mm. diameter. Hole 2.5 mm. diameter.
- Columella bead, 14 mm. long, 4.5 mm. diameter. Hole 1.5 mm. diameter.
- Columella bead, 54 mm. long, 8 mm. diameter. Hole 3 mm. diameter, with a bushing of white dentalium at the small end.
- Tip fragment of columella bead, 55 mm. long, 7 mm. diameter. Hole 2 mm. diameter.
- Columella bead, 37 mm. long, 5.5 mm. diameter. Hole 2 mm. diameter, with hexagonal bushing at each end.
- Columella bead, 45.5 mm. long, 4.5 mm. diameter. Hole 2 mm. diameter.
- Tip fragment of columella bead, 25 mm. long, 5 mm. diameter. Hole 1.5 mm. diameter.
- Columella bead, 83.5 mm. long, 8.5 mm. diameter. Hole 3 mm. diameter.
- Central fragment of columella bead, 28 mm. long, 4 mm. diameter. Hole 1.5 mm. diameter.
- Columella bead, 98.5 mm. long, 9 mm. diameter. Hole 5 mm. diameter.
- Columella bead, 88 mm. long, 8 mm. diameter. Hole 4 mm. diameter.
- Columella bead, 73 mm. long, 7.5 mm. diameter. Hole 3 mm. diameter.
- Columella bead, 83 mm. long, 7 mm. diameter. Hole 3 mm. diameter.
- Columella bead, 78.5 mm. long, 7.5 mm. diameter. Hole 3 mm. diameter.
- Columella bead, 67 mm. long, 7 mm. diameter. Hole 3 mm. diameter.
- Columella bead, 64.5 mm. long, 6.5 mm. diameter. Hole 3 mm. diameter.
- Columella bead, 63 mm. long, 6 mm. diameter. Hole 2 mm. diameter.
- Central fragment of columella bead. 59 mm. long, 7 mm. diameter. Hole 2.5 mm. diameter.
- Central fragment of columella bead. 41 mm. long, 6.5 mm. diameter. Hole 2.5 mm. diameter.
- Central fragment of columella bead, 45 mm. long, 6 mm. diameter. Hole 2.5 mm. diameter.
- Tip fragment of columella bead, 30 mm. long, 5 mm. diameter. Hole 2 mm. diameter.
- Central fragment of columella bead, 41 mm. long, 8 mm. diameter. Hole 2 mm. diameter.
- Columella bead, 82 mm. long, 7.5 mm. diameter. Hole 4 mm. diameter.
- Central fragment of columella bead, 51 mm. long, 6.5 mm. diameter. Hole 2 mm. diameter.
- Columella bead, 67 mm. long, 6.5 mm. diameter. Hole 3 mm. diameter.
- Columella bead, 70 mm. long, 7 mm. diameter. Hole 3 mm. diameter.

Central fragment of columella bead, 69.5 mm. long, 6 mm. diameter. Hole 3 mm. diameter.

Tip fragment of columella bead, 30 mm. long, 5 mm. diameter. Hole 2 mm. diameter.

Columella bead, 44.5 mm. long, 6 mm. diameter. Hole 2.5 mm. diameter.

Columella bead, 42 mm. long, 5 mm. diameter. Hole 2.25 mm. diameter.

Columella bead, 89.5 mm. long, 9 mm. diameter. Hole 4.5 mm. diameter.

Blank for columella bead, finished except that it is unbored, 81 mm. long, 7 mm. diameter.

Columella bead, 74.5 mm. long, 4.5 mm. diameter. Hole 3 mm. diameter.

Butt fragment of columella bead, 29 mm. long, 9 mm. diameter. Hole 2 mm. diameter.

Blank for columella bead, 65 mm. long, 18 mm. diameter.

Blank for columella bead, 64 mm. long, 18.5 mm. diameter.

Blank for columella bead, 40 mm. long, 15 mm. diameter.

Blank for columella bead, 63 mm. long, 35 mm. diameter.

Blank for columella bead, 74 mm. long, 30 mm. diameter.

Blank for columella bead, 61 mm. long, 37 mm. diameter.

Blank for columella bead, finished except that it is unbored. 57 mm. long, 8 mm. diameter.

#### HINGE BEADS

The beads made from the straight edge of the hinge of the rock-oyster shell can be recognized not only by their purple color but by the transverse groove across the middle of the bead which remains from the ligamental notch at the center of the hinge. These beads are usually barrel-shaped. The size varies materially. A specimen with profile of the natural center groove is shown in Plate 26, *m*. Typical specimens may be listed as follows:

Hinge bead, 42 mm. long, 5 mm. diameter. Hole 1.5 mm. diameter.

Hinge bead, 26 mm. long, 3.5 mm. diameter. Hole 1.5 mm. diameter.

Hinge bead, 23 mm. long, 4 mm. diameter. Hole 1 mm. diameter.

Hinge bead, 20.5 mm. long, 3.5 mm. diameter. Hole 1 mm. diameter.

Hinge bead, 23 mm. long, 3.5 mm. diameter. Hole 1 mm. diameter.

Hinge bead, 23.5 mm. long, 3.5 mm. diameter. Hole 1 mm. diameter.

Hinge bead, 25 mm. long, 6 mm. diameter. Hole 1.5 mm. diameter.

Hinge bead, 25 mm. long, 4.5 mm. diameter. Hole 1 mm. diameter.

Hinge bead, 30.5 mm. long, 5.75 mm. diameter. Hole 1.5 mm. diameter.

Hinge bead, 23.5 mm. long, 5 mm. diameter. Hole 2 mm. diameter.

Hinge bead, 32 mm. long, 6 mm. diameter. Hole 1 mm. diameter.

Hinge bead, 23.5 mm. long, 4 mm. diameter. Hole 1 mm. diameter.

Hinge bead, 36.5 mm. long, 5 mm. diameter. Hole less than 1 mm. diameter.

Hinge bead, 29 mm. long, 5.5 mm. diameter. Hole 2 mm. diameter.

Hinge bead, 28 mm. long, 6 mm. diameter. Hole 1 mm. diameter.

Hinge bead, 31 mm. long, 4.25 mm. diameter. Hole less than 1 mm. diameter.

Hinge bead, 21.5 mm. long, 4 mm. diameter. Hole 1 mm. diameter.

Hinge bead, 41 mm. long, 6 mm. diameter. Hole 1 mm. diameter.

Hinge bead, 35.5 mm. long, 5.5 mm. diameter. Hole 1 mm. diameter.

Hinge bead, 38 mm. long, 6 mm. diameter. Hole 1 mm. diameter.

Hinge bead, 32 mm. long, 7 mm. diameter. Hole 1 mm. diameter.

Hinge bead, 25 mm. long, 4.5 mm. diameter. Hole 1 mm. diameter.

Hinge bead, 18 mm. long, 4.5 mm. diameter. Hole 1 mm. diameter.

Tip fragment of hinge bead, 29 mm. long, 6 mm. diameter. Hole 1.5 mm. diameter.

ROCK-OYSTER CYLINDRICAL BEADS

In addition to the hinge beads just described there is another type of bead cut from the rock-oyster shell which does not have the transverse notch, but which appears to imitate as nearly as possible the white cylindrical bead, size and shape being of course restricted by the comparative thinness of the rock-oyster shell in contradistinction to that of the Pismo clamshell. These beads have been termed cylindrical beads of rock-oyster shell. Many of them have an almost scarlet color and must have made handsome necklaces when new.

End fragment of rock-oyster cylindrical bead, 21 mm. long, 5.5 mm. diameter. Hole 1.5 mm. diameter.

Rock-oyster cylindrical bead, 35 mm. long, 5 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 24 mm. long, 6.5 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 34.5 mm. long, 5 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 8.5 mm. long, 3.5 mm. diameter. Hole 0.75 mm. diameter.

Rock-oyster cylindrical bead, 21 mm. long, 5 mm. diameter. Hole 0.75 mm. diameter.

Rock-oyster cylindrical bead, 15 mm. long, 4 mm. diameter. Hole 0.75 mm. diameter.

Rock-oyster cylindrical bead, 14 mm. long, 3.5 mm. diameter. Hole 1.5 mm. diameter.

Rock-oyster cylindrical bead, 34 mm. long, 5.5 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 17.5 mm. long, 3.5 mm. diameter. Hole 0.75 mm. diameter.

Rock-oyster cylindrical bead, with bushing at both ends; 20.5 mm. long, 4 mm. diameter. Hole 1 mm. diameter.

Central or possibly tip fragment of rock-oyster cylindrical bead, 19 mm. long, 6 mm. diameter. Hole 2 mm. diameter.

Rock-oyster cylindrical bead, 16 mm. long, 4 mm. diameter. Hole 2 mm. diameter.

Rock-oyster cylindrical bead, 15 mm. long, 3 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 9 mm. long, 3 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 18.5 mm. long, 4 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 13 mm. long, 4 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 17.5 mm. long, 4 mm. diameter. Hole 1.25 mm. diameter.

Rock-oyster cylindrical bead, 20 mm. long, 3.5 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 21.5 mm. long, 5 mm. diameter. Hole 1.5 mm. diameter.

End fragment of rock-oyster cylindrical bead, 31 mm. long, 4.5 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 20 mm. long, 4 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 23 mm. long, 3 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 24.5 mm. long, 4.5 mm. diameter. Hole less than 1 mm. diameter.

Rock-oyster cylindrical bead, with dentalium bushing at both ends; 33 mm. long, 3.5 mm. diameter. Hole 1.5 mm. diameter.

Rock-oyster cylindrical bead, 34.5 mm. long, 5.5 mm. diameter. Hole 1.5 mm. diameter.

Rock-oyster cylindrical bead, 15.5 mm. long, 4.5 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 37 mm. long, 4.5 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, with dentalium bushing at one end. The bushing has probably fallen out of the other end. 26 mm. long, 4.75 mm. diameter. Hole 1.5 mm. diameter.

Rock-oyster cylindrical bead, with dentalium bushing intact at both ends; 14 mm. long, 4 mm. diameter. Hole 1 mm. diameter.

Central fragment of rock-oyster cylindrical bead, 12 mm. long, 6.5 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, with dentalium bushing intact at both ends; 20 mm. long, 3 mm. diameter. Hole 0.75 mm. diameter.

Rock-oyster cylindrical bead, with dentalium bushing intact at both ends; 23 mm. long, 3 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, with dentalium bushing intact at both ends; 24 mm. long, 3.5 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 32 mm. long, 5.5 mm. diameter. Hole 1 mm. diameter.

Central fragment of rock-oyster cylindrical bead, 28 mm. long, 6 mm. diameter. Hole 0.75 mm. diameter.

Rock-oyster cylindrical bead, 27.5 mm. long, 5 mm. diameter. Hole 1.5 mm. diameter.

Rock-oyster cylindrical bead, 31 mm. long, 4.5 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 17 mm. long, 4 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 14.5 mm. long, 4 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 18 mm. long, 4 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 18 mm. long, 4.5 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 14 mm. long, 3.5 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 12.5 mm. long, 2.5 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 13 mm. long, 4 mm. diameter. Hole 1 mm. diameter.



Rock-oyster cylindrical bead, 14.5 mm. long, 3.5 mm. diameter. Hole 1 mm. diameter.

Rock-oyster cylindrical bead, 12 mm. long, 3.5 mm. diameter. Hole 1 mm. diameter.

Much decomposed fragment of rock-oyster cylindrical bead, 17 mm. long, 5 mm. diameter. Hole 3 mm. diameter.

Rock-oyster cylindrical bead, 22.5 mm. long, 4.5 mm. diameter. Hole 3 mm. diameter.

Rock-oyster cylindrical bead, with dentalium bushing at both ends; 30.5 mm. long, 5 mm. diameter. Hole 2.5 mm. diameter.

#### DISK BEADS AND OTHER SMALL BEADS

##### OLIVELLA DISK BEADS

The common olivella abalorio of the Channel was about 4 mm. diameter, somewhat curved in plane, with edge trimmed round and a central hole averaging perhaps 1.75 mm. diameter. These disks were prepared from the shell of the olivella and were manufactured in enormous quantities. The specimens taken vary in size from 3 mm. diameter up to 8 mm. diameter. (Pl. 26, *i*.)

##### OLIVELLA LIP BEADS

These are made of the entire lip portion of the last whorl of the olivella. They also vary greatly in size. (Pl. 26, *g*.)

##### MINUTE OLIVELLA DISK BEADS

Ring-shaped olivella disk beads, with relatively large hole, because of their size, and neatly trimmed outer edge, were also found widely scattered. The diameter is only about 2 or 2.25 mm. (Pl. 26, *h*.)

##### PINK DISK BEADS

These resemble the common disk beads but are prepared from the rock-oyster. They measure about 4.5 mm. diameter.

##### BLACK DISK BEADS

Disk beads prepared from the mussel shell vary in diameter from 3 to 6 mm. They have the typical shape.

##### ABALONE DISK BEADS

Abalone disk beads 4.5 mm. diameter, resembling the ordinary disk beads in every other way, were found very sparsely.

##### THIN CLAMSHELL DISK BEADS

Disks of clamshell of button-like appearance were also a scarce article in the diggings and screenings. These varied in diameter from 3.5 to 10 mm. An example is shown in Plate 26, *a*.

## THICK CLAMSHELL DISK BEADS

Thick disks of white clamshell may be enumerated as follows. Examples are shown in Plate 26, *b*, *c*.

- Blank for thick disk bead, 13 mm. diameter, 12.5 mm. thick.
- Thick disk bead, 9.5 mm. diameter, 2.5 mm. thick. Hole 2 mm. diameter.
- Thick disk bead, 12 mm. diameter, 4.25 mm. thick. Hole 1.5 mm. diameter.
- Blank for thick disk bead, 12 mm. diameter, 7 mm. thick. Unbored.
- Thick disc bead, 8.5 mm. diameter, 3 mm. thick. Hole 2 mm. diameter.
- Thick disk bead, 9 mm. diameter, 5 mm. thick. Hole 2 mm. diameter.
- Thick disk bead, 13 mm. diameter, 4 mm. thick. Hole 2.5 mm. diameter.
- Thick disk bead, 9.5 mm. diameter, 6 mm. thick. Hole 1.5 mm. diameter.
- Thick disk bead, 12 mm. diameter, 3 mm. thick. Hole 2 mm. diameter.
- Thick disk bead, 9.5 mm. diameter, 4 mm. thick. Hole 2 mm. diameter.
- Blank for thick disk bead, 11.5 mm. diameter, 7 mm. thick. Unbored.
- Blank for thick disk bead, 11 mm. diameter, 6 mm. thick. Hole 2 mm. diameter.
- Thick disk bead, 6 mm. diameter, 6.5 mm. thick. Hole 3 mm. diameter.
- Blank for thick disc bead, 14 mm. diameter, 11 mm. thick. Unbored.
- Blank for thick disk bead, 10 mm. diameter, 9 mm. thick. Unbored.
- Blank for thick disk bead, 12 mm. diameter, 8.5 mm. thick. Unbored.

## GLOBULAR BEADS OF CLAMSHELL

A few globular beads of white clamshell were found. They have the shape of globular glass beads. An average specimen measures 6 mm. diameter. Hole 1 mm. diameter. An example is shown in Plate 26, *f*.

## SMALL CYLINDRICAL BEADS OF CLAMSHELL

The average measurements of these white cylinders of clamshell are 4 mm. diameter, 4 mm. long, hole 1 mm. diameter. Examples are shown in Plate 26, *g*.

## SQUARE BEADS OF ABALONE

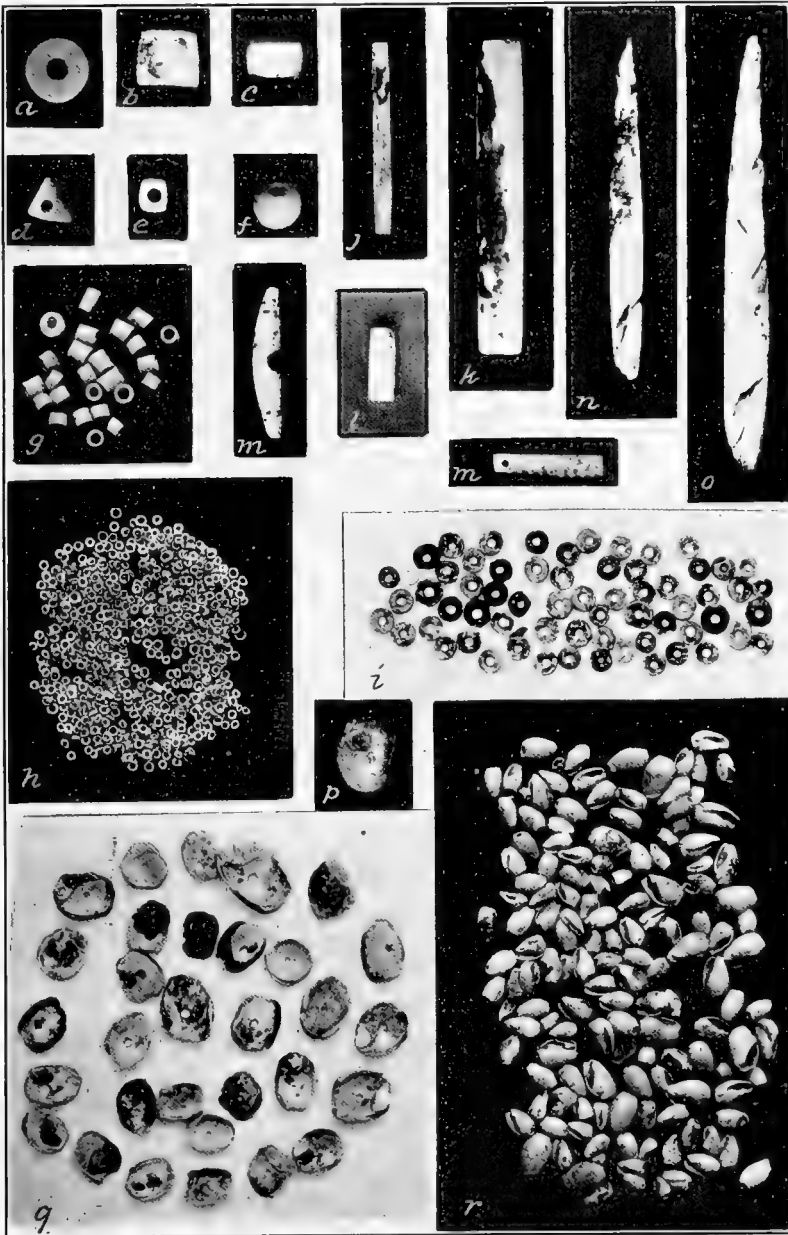
Square plates cut from abalone shell, about 6 mm. diameter and with a hole at the center about 2 mm. diameter, were infrequently met with. An example is shown in Plate 26, *e*.

## TRIANGULAR BEADS OF CLAMSHELL

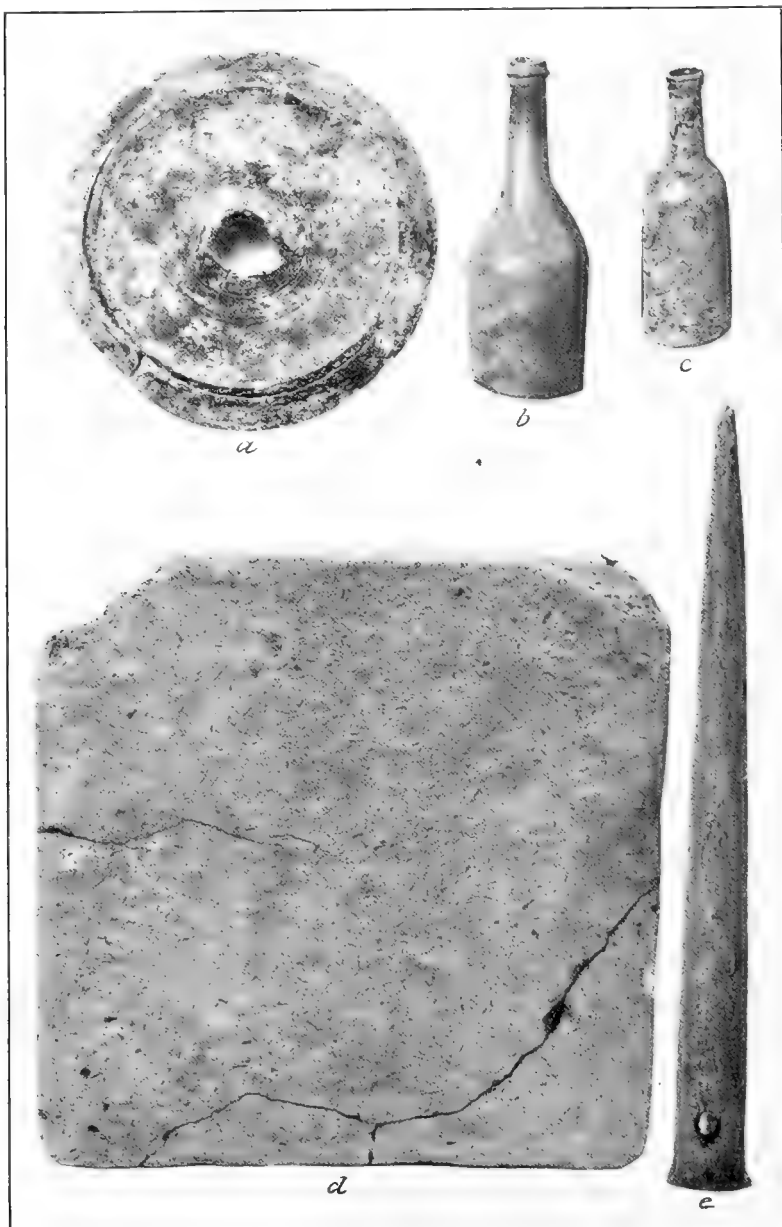
A plate cut from clamshell and forming a neat triangle in outline was found. It is the only bead of its kind and has a maximum diameter of 10 mm. with a hole 2 mm. diameter at the center. (Pl. 26, *d*.)

## ABALONE BLISTER PEARL BEAD

The most valuable bead of the collection is one made from a large blister pearl taken from an abalone. The pearl has taken on the shape of an elongated spheroid and is quite symmetrical. The bead



*a*, THIN CLAMSHELL DISK BEAD. *b*, *c*, THICK CLAMSHELL DISK BEADS. *d*, TRIANGULAR BEAD OF CLAMSHELL. *e*, SQUARE BEAD OF ABALONE. *f*, GLOBULAR BEAD OF CLAMSHELL. *g*, SMALL CYLINDRICAL BEADS OF CLAMSHELL. *h*, MINUTE OLIVELLA DISK BEADS. *i*, COMMON OLIVELLA DISK BEADS. *j*, *k*, *l*, CYLINDRICAL BEADS. *m*, OBLONG PENDANT OF CLAMSHELL. *n*, *o*, COLUMELLA BEADS. *p*, ABALONE BLISTER PEARL BEAD. *q*, OLIVELLA LIP BEADS. *r*, SPIRE-LOPPED SHELLS FOR STRINGING, SMALLER SPECIES OF OLIVELLA



*a*, BASE OF CANDLESTICK OF BRASS. *b*, *c*, GLASS BOTTLES.  
*d*, SPANISH FLOOR TILE. *e*, MARLINE PIN

is 13 mm. long, 9.5 mm. maximum diameter, 5.5 mm. minimum diameter. The hole is 2 mm. diameter. There is a hexagonal dentalium bushing in one end of the hole, but the other end of the hole never had any bushing. (Pl. 26, *p.*)

#### OBJECTS OF VEGETAL MATERIAL

Although special care was taken in the excavation of the graves for the detection of the remains of the stumps of grave posts which no doubt originally existed at the cemetery site, no such traces were discovered. The only wooden object recovered in the entire work of the expedition was a wooden awl (pl. 21, *d*). The asphalt of certain arrowheads and that adhering to one of the flint knives indicate that the wooden portions were intact at the time of burial. For evidence of twined basketry in asphalt imprint see page 106.

#### WOODEN AWL

Unique and alone in its class is a specimen of awl of a species of wood not yet identified, which through a freak of fate survived in the ground and was taken from the trench which followed the north wall of the Burton adobe house. Such awls of wood are known to have been used by the Indians and it was therefore gratifying to recover this specimen.

The awl is entire and measures 82 mm. long, 9.5 mm. wide, 8 mm. thick. The tip is slender and sharp, the butt rounding, it being largely formed by a diagonal cut. The side of the awl exhibits two natural longitudinal grooves. Such awls were used in basketry in much the same way as the bone awls of similar size and shape. (Pl. 21, *d.*)

#### OBJECTS OF MODERN MANUFACTURE

We found many fragments of Spanish tile, apparently from the floor and roof of the early adobe house, also some important Spanish objects of brass, interesting lead bullets of an early type, two early hand-blown greenish glass bottles, modern pottery fragments and glass beads. The most typical of these articles are described below.

#### SPANISH FLOOR TILES

Almost entire Spanish floor tile, 51.8 cm. square, 47.6 mm. thick. Many other fragments of floor tiles were recovered. The obverse is the smoother surface and shows signs of wear. (Pl. 27, *d.*)

#### FRAGMENTARY SPANISH ROOF TILES

A considerable quantity of fragments of roof tiles was recovered.

## SPANISH CANDLESTICK OF BRASS

Base of probably Spanish candlesticks of brass. 136.5 mm. diameter. (Pl. 27, *a.*)

## IRON MARLINE PIN

Iron marline pin. 304.8 mm. long, 28.5 mm. diameter. Found at the Burton house excavations. (Pl. 27, *c.*)

## GLASS BOTTLES

Bottle of hand-blown dark green glass. 277.8 mm. long, 101.6 mm. maximum diameter. Concavity of bottom 31.7 mm. Mr. Coulter, who kindly examined the bottles, believes that this bottle is from about 1830, perhaps earlier. (Pl. 27, *b.*)

Bottle of hand-blown dark green glass. 225.4 mm. long, 55.5 mm. maximum diameter. Concavity of bottom 26.9 mm. Mr. Coulter places this bottle much earlier than the other specimen, possibly from the beginning of the nineteenth century. (Pl. 27, *c.*)

## BELL CLAPPER OF BRASS

Bell clapper of brass, probably of Spanish manufacture; 30.1 mm. long.

## THIMBLE OF BRASS

Thimble of brass, 17 mm. long, 15 mm. diameter. Apparently of the kind made in Germany.

## LEAD BULLETS

Lead bullet, 12 mm. diameter. This is a big buckshot, very crude and looks as if it had been whittled out of a piece of lead.

Lead bullet, 5.5 mm. diameter. Spherical, of modern appearance.

Lead bullet, 16.5 mm. diameter. The surface is rough, and it has the appearance of being a large and crude buckshot from early times.

## SPANISH BRASS BUTTONS

Brass buttons of Spanish manufacture. Average dimensions; 17.5 mm. diameter, shank 8.5 mm. long. The buttons had evidently been strung together with glass beads, probably as a necklace, a bit of the thread remaining intact with a bead each side of the hole of the shank of the button.

## IRON BLADES

A much rusted iron blade of knife or sword. Fragment 228.6 mm. long, 22.2 mm. wide, 6.3 mm. thick.

A much rusted blade of iron, 88.9 mm. long, 33.3 mm. wide, 6.3 mm. thick.

## PEWTER SPOON

Fragment of a pewter spoon, much disintegrated, 78.5 mm. long, 6 mm. thick. The handle had apparently a width of only 7 mm. The bowl of the spoon can be estimated from what remains of it to have been about 20 mm. wide.

## BROOCHES

A little silver brooch of very modern appearance, 24.5 mm. long.

Brooch of black enameled metal with raised figures of a bird and plant. Elliptical in shape, 29 mm. long, 9.5 mm. wide. Probably Japanese manufacture.

## MEXICAN POTTERY FRAGMENTS

Fragments of Mexican pottery bowls and crocks were identified by Mr. William L. Calver as follows:

Fragment of probably Mexican pottery, 49 mm. long, 5 mm. thick. The outside surface is coated with a black glaze.

Fragment of probably Mexican pottery. 32 mm. long, 7 mm. thick. Inside surface dark buff, outside surface brick red.

Central fragment of pottery, of Mexican or possibly American manufacture, 18.5 mm. long, 7 mm. thick. The outside surface has a brown glaze.

Fragment of probably Mexican pottery, 35 mm. long, 6.5 mm. thick. Reddish on both outside and inside surfaces, darker color in the interior.

Fragment of Mexican pottery. Surface not glazed. Reddish on outside and inside surfaces, dark gray interior. 42 mm. long, 8 mm. thick.

Another fragment of the same vessel from which the piece last described was taken, 34 mm. long, 8 mm. thick.

## MODERN CHINAWARE AND PORCELAIN

The large number of modern chinaware and porcelain fragments taken were mostly from the excavations in the vicinity of the Burton adobe house, as might be expected. These fragments also were studied by Mr. Calver, who found pieces dating as early as 1820 and as recent as from the hotel.

A chinaware pitcher bearing a "transfer" design is from 1850, more probably from 1840. The fragment bearing the trade name "Spode" is old. Spode quit making pottery some sixty years ago. The piece marked "Japan" is from 1850. The piece with the "tapeworm" design is from 1840. The "tapeworm" runs entirely around the vessel. The fragments with green leaves and red berries are quite early, from the twenty's or thirty's of the past century. The orange-colored fragments are probably American and not Mexican ware.

## GLASS BEADS

A very satisfactory group of glass-bead material was taken in the excavations. It includes practically every kind of European bead that has been reported from the Channel region.

One of the omnipresent types was the red bead with blackish inside lining. These were found in several sizes, the most frequent sizes being about 4 mm. diameter.

A few translucent red globular beads were found.

We recovered 10 pink-colored glass beads, triangular in section, which had been much disintegrated while in contact with the damp ground.

Barrel-shaped red glass beads.

Blue globular beads were found in several sizes and in three colors, which can be distinguished as blue, indigo, and bluish black. The last mentioned have an almost burnished appearance and show gleams of metallic luster.

Green beads also occur in four or five sizes, the commonest being about 3 mm. diameter. They are a light green color.

European beads of black color are rare but a few specimens were found. They are globular and 4.5 mm. diameter.

A few globular European beads were found of a purple or maroon color resembling that of grape jelly. One of these measures 3.75 mm. diameter, another 8.5 mm. diameter.

European beads of globular shape made of clear transparent glass were also encountered, and in several different sizes. They must have reminded the Indians of their own quartz crystals.

Glass beads of a lemon yellow color were also represented in the graves.

European beads of white color were among the commonest, perhaps next in frequency after the red, blue, and green. The 4 mm. diameter size was the commonest.

“Venetian” beads with dotted or striated surfaces were well represented. They occurred in globular and cylindrical form. One cache had these the size of marbles, the interior being blue and the surface ornamented with longitudinal white stripes.



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**SOCIAL AND RELIGIOUS BELIEFS AND  
USAGES OF THE CHICKASAW INDIANS**

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By **JOHN R. SWANTON**

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# SOCIAL AND RELIGIOUS BELIEFS AND USAGES OF THE CHICKASAW INDIANS

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By JOHN R. SWANTON

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## INTRODUCTION

In the Forty-second Annual Report of the Bureau of American Ethnology I treated the social, religious, and medical usages of the Indians of the Creek Confederation, and the present paper is an attempt to perform an identical service for the Chickasaw. The same general system has been followed, but the tribe now under discussion constituted a much smaller and much more homogeneous group, occupied less territory, and attracted less attention from early writers. Moreover, the publication of the Creek material has rendered unnecessary an equally elaborate account of a tribe resembling the Creeks as closely as did the Chickasaw.

The outstanding character of the work of the English trader James Adair required the constant use of his narrative as a basis in considering Creek culture, but the greater part of his information applies more immediately to the Chickasaw, and hence, in the present volume, it has been necessary to repeat much of the material furnished by him. A short sketch of the early history of this tribe is contained in Bulletin 73. Their later fortunes have been traced by James H. Malone in "The Chickasaw Nation," and in various articles in the Publications of the Mississippi Historical Society. A relatively recent paper by Prof. Frank G. Speck constitutes an invaluable contribution to the subject. From living Indians I have been able to add a certain amount of material, particularly on the side of Chickasaw social organization, but there are surprisingly few who can furnish reliable information. The material culture of all the southeastern Indians was so much alike, and so few of the local peculiarities, which undoubtedly did exist, have been preserved that this subject is best considered for the region taken as a whole. Something has been said regarding it in my small paper on "The Culture of the Southeast" in the Forty-second Annual Report, but an adequate presentation of the subject is still awaited.

## ORIGIN LEGENDS

Like other Muskogean tribes, the Chickasaw had a well-defined legend of a former home somewhere in the west, beyond the Mississippi River. The earliest versions of this are given by Adair, who alludes to it several times. In one place he says, "they, and the Choctah, and also the Chokchooma, who in process of time were forced by war to settle between the two former nations, came together from the west as one family"<sup>1</sup>; and in another, "the Indians have an old tradition, that when they left their own native land, they brought with them a *sanctified rod* by order of an oracle, which they fixed every night in the ground; and were to remove from place to place on the continent towards the sun-rising, till it budded in one night's time; that they obeyed the sacred mandate, and the miracle took place after they arrived to this side of the Mississippi, on the present land they possess."<sup>2</sup> It is added that Yaneka, "the most southern old town," was the one which they first settled after reaching the country later occupied by them.<sup>3</sup> Again he remarks: "The old waste towns of the Chikkasah lie to the west and southwest, from where they have lived since the time we first opened a trade with them; on which course they formerly went to war over the Mississippi, because they knew it best, and had disputes with the natives of those parts, when they first came from thence."<sup>4</sup> Some items regarding this migration, such as the fact that they brought horses with them, and on the way despoiled a caravan laden with gold and silver, may be dismissed as late embellishments by the Indians or by Adair.

As among the Choctaw, however, we find along with the above stories a tradition that the people had come out from under the earth, and Adair cites the case of "one of their politicians," who persuaded them that the cave from which they had ascended was "in the Nanne Hamgeh old town, inhabited by the Mississippi-Natchee Indians, which is one of the most western parts of their old-inhabited country." This seer undertook to reopen communication with the brethren who had remained in their subterranean world, but was shut in by the Indians so that he might be purified.<sup>5</sup> It is a

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<sup>1</sup> Adair, *Hist. Am. Inds.*, p. 352.

<sup>2</sup> *Ibid.*, p. 162, note.

<sup>3</sup> *Ibid.*, p. 66.

<sup>4</sup> *Ibid.*, p. 196.

<sup>5</sup> *Ibid.*, pp. 195-196.

little surprising to find a place selected by this seer on the eastern side of the Mississippi when the tradition points to some region beyond it, but it happened to suit his own purposes, which were to act as an intermediary between the underworld and above-world people with profit to himself.

Romans (1771) says the Chickasaw "have a tradition that they were a colony from another nation in the West, and that they first set themselves down near the *Ohio*, but soon removed to their present Site."<sup>6</sup>

The next migration legend of the Chickasaw is recorded by Schoolcraft, who obtained it through the medium of the United States Indian agent located among them after their removal west of the Mississippi. It is said to have been obtained "from the most authentic sources," meaning, of course, the native informants supposed to be best versed in tribal lore.

By tradition, they say they came from the West; a part of their tribe remained in the West. When about to start eastward, they were provided with a large dog as a guard, and a pole as a guide; the dog would give them notice whenever an enemy was near at hand, and thus enable them to make their arrangements to receive them. The pole they would plant in the ground every night, and the next morning they would look at it, and go in the direction it leaned. They continued their journey in this way until they crossed the great Mississippi River; and, on the waters of the Alabama River, arrived in the country about where Huntsville, Ala., now is. There the pole was unsettled for several days, but finally it settled, and pointed in a southwest direction. They then started on that course, planting the pole every night until they got to what is called the Chickasaw Old Fields, where the pole stood perfectly erect. All then came to the conclusion that that was the "Promised Land," and there they accordingly remained until they emigrated west of the State of Arkansas, in the years 1837 and 1838.

While the pole was in an unsettled situation, a part of their tribe moved on East, and got with the Creek Indians, but as soon as the majority of the tribe settled at the Old Fields, they sent for the party that had gone on East, who answered that they were very tired, and would rest where they were a while. This clan was called *Cush-eh-tah*. They have never joined the parent tribe, but they always remained as friends until they had intercourse with the whites; then they became a separate nation.

The great dog was lost in the Mississippi, and they always believed that the dog had got into a large sink hole, and there remained; the Chickasaws said they could hear the dog howl just before the evening came. Whenever any of their warriors get scalps, they give them to the boys to go and throw them into the sink where the dog was. After throwing the scalps, the boys would run off in great fright, and if one should fall, in running off, the Chickasaws were certain he would be killed or taken prisoner by their enemies. Some of the half-breeds, and nearly all of the full bloods, now believe it.

In travelling from the west to the east, they have no recollection of crossing any large water-course except the Mississippi River. When they were travelling from the West to the Promised Land in the East, they had enemies on all sides,

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<sup>6</sup> Romans, E. and W. Fla., p. 69.

and had to fight their way through, but they can not give the names of the people they fought with while travelling.

They were informed, when they left the West, that they might look for whites; that they would come from the East; and they were to be on their guard, and to avoid the whites, lest they should bring all manner of vice among them.<sup>7</sup>

This is of course an accretion. It differs from the narratives quoted by Adair in carrying the Chickasaw migration east of their later settlements before their final location in Mississippi. Whatever truth there may be in this there is every reason to believe that at one time a considerable portion of the nation did live at the Chickasaw Old Fields on the north bank of the Tennessee River in Madison County, Ala. It is interesting to compare the way in which the Chickasaw here express their friendship for the Kasihta with the way in which in the migration legends of the Creeks the Kasihta express their friendship for the Chickasaw. The Chickasaw represent the Kasihta as an offshoot from themselves, while the Kasihta introduce the Chickasaw as one of the original tribes from which the Creeks were descended and associate them with three tribes which, so far as we know, always have been Creek.

In a speech made by the Kasihta chief Tussekiah Mico in the Coweta Square, October 28, 1797, he says that the Kasihta, Coweta, and Chickasaw were all of one fire, and he calls the last mentioned "younger brothers" of all the other Creeks, including the Abihka.<sup>8</sup>

Almost the only late versions of this legend are the ones given by Warren and are as follows:

Molly Gunn, a Chickasaw woman, grandmother of Cyrus Harris, who became Governor of the Chickasaws, in the Indian Territory, related to him the Chickasaw tradition of that tribe's journeying to Mississippi. Mr. Harris gave the author a manuscript copy of this tradition, translated from the language of Molly Gunn. He wrote that "she talked all Chickasaw." It reads as follows:

"The Chickasaws started east carrying with them a long pole, and at night the pole was stuck in the ground, erect. Next morning the pole would be found leaning towards the east, which they considered their guide, and would, from day to day, follow, or travel in the direction that the pole lent. Each morning this was continued until they reached the place that is known as the 'Chickasaw Old Fields.' By some it was called 'Old Town.' When they reached that place, at night, as usual, the pole was stuck in the ground as erect as they could possibly put it. On the following morning the leader of the party rose early as usual (the Chickasaws were early risers in those days). On examining the pole he found it standing in the exact position that it was left [in] the night before. He proclaimed to the party that they had reached their future home, and the party settled down and made that place their home. After this, the Creek Indians occasionally made war against the Chickasaws, but were always repulsed and driven away. They were after this encroached upon by the French, . . . and several battles were fought; but the Chickasaws had a very large war dog that always gave them warning when the enemy was approaching, and, in the heat of battle kept ahead of the Chickasaws, mak-

<sup>7</sup> Schoolcraft, *Ind. Tribes*, I, pp. 265-268.

<sup>8</sup> *Ga. Hist. Soc. Colls.*, vol. ix, p. 213.



ing heavy attacks on the enemy. By this assistance, the French generally got the worst of the fight. . . . The Chickasaw Old Town, or 'Old Fields,' is somewhere not far from Ripley or Tupelo. The road leading from Pontotoc to Tuscombua, Ala., formerly ran through those 'Old Fields.' . . ."

Rev. F. Patton, who wrote some reminiscences of the Chickasaws and who acted as amanuensis of Rev. T. C. Stewart, one of the early American teachers to the Chickasaws, relates the tradition somewhat differently. Tradition says that the Chickasaws and Choctaws were once one tribe and lived in the West, where they had powerful enemies who kept them in alarm. In a council they determined to seek *a land of life*, as they termed it. They divided into two parties, under the head of Chickasaw and Choctaw, two brothers. The brothers, after crossing the Mississippi River, separated, but settled in contiguous territory; the two parties (the Chickasaws and Choctaws) remained distinct, and in time became hostile to each other. Before they commenced their journey, they sought guidance of the Great Spirit. A pole was set up, and the war dance danced till late at night. They then retired. Next morning they found that the pole bent eastwardly. They took this as a Divine sign, and journeyed in the direction the pole leaned. As they marched on they observed a like ceremony every night, and, with the same result. As they went over the country which they afterwards inhabited, the pole appeared to be nearly erect; but as it was considered to be not exactly perpendicular, they continued to move eastwardly. Two tales are told as to the end of their journey, one, that they took a northwesterly course until they reached the Tennessee River and that there the pole pointed in an opposite direction, [upon which] they retraced their steps until they reached what was afterwards known as the "Chickasaw Old Fields" (in Lee County [Miss.]) where the pole stood erect. They rested at that place, built a town, cleared the forest, and cultivated maize. The "Old Fields" became the metropolis of the Chickasaw Nation as well as its center. The other tradition is that they followed a more southern direction after crossing the Mississippi, and reached the Alabama River. When the war dance was renewed around the pole, and after they had reposed, they learned that their course was westwardly. They left the Alabama River for the "Chickasaw Oil Fields."<sup>9</sup>

Malone states that he has obtained a long version of the migration legend from Hon. Charles D. Carter, but he gives only the closing section of it, which runs thus:

They camped for the night on the banks of the great river [Mississippi], and since the leader's pole still leaned toward the east the young men began to make rafts and canoes for crossing the river and proceeding on their journey. When the crossing was finally attempted, the little white dog which had so faithfully kept his course toward the rising sun was drowned, and upon reaching the opposite bank of the river the sacred pole, after wobbling around and pointing in many directions finally stood erect, and the medicine men interpreted this as an omen that the promised land had been reached.

Scouting expeditions were sent out by nearly all the clans in search of game and other food and to ascertain the exact character of country to which the Great Spirit had led them. Finally the headman of a certain clan, the members of which were described as taller and of fairer skin than the rest of the tribe, appeared before the general council and asserted that, according to his best information and judgment, the promised land had not yet been reached; that

<sup>9</sup> Warren in Pubs. Miss. Hist. Soc., vol. VIII, pp. 546-548.

a much better country, more productive in soil, more bountiful in game, fruit, and fish, lay somewhat to the north and still farther toward the rising sun. After debating the question for many hours a vote was taken as to whether the move should be made, and it was decided by a large majority that the desired place had been reached and that no further move was necessary. Upon hearing the vote, the leader of the taller and fairer clan rose up and, striding majestically out of the council, dramatically uttered the following words:

"All those who believe the promised land is farther towards the rising sun follow me."

His entire clan arose and went with him, but few others. Upon seeing this the Choctaw warriors and some of their headmen grabbed their spears, tomahawks, and bows and arrows as if to restrain this clan by force. But the old head minko arose, extended his hand above his head, palm out, and exclaimed:

"Hamonockma, ikia ahnishke, chickasha!" (Halt, follow them not; they are rebels!)<sup>9a</sup>

Thus the division of the Choctaws and Chickasaws into two separate tribes came about, and on account of the old chief's reference to them as "rebels" this taller and fairer tribe were ever thereafter known as "Chickasha."<sup>10</sup>

Many of the living Chickasaw remember the story, but in a very fragmentary form. The name given to the mythic pole is simply *kohta* "pole" or *kohta fálaha*, "long pole." By a few the dog is also remembered. They believe that they started from the Rocky Mountains and traveled east guided by this pole, as one Indian expressed it, "in search of the center of the world." It stood upright after they had crossed the Mississippi River (*Sákti la<sup>2</sup>fa*, "boundary bank" river). As the place from which they started is sometimes called "the navel of the world," it is interesting to note that the Chickasaw called the large mounds in their country "navels." "They thought," says Schoolcraft's informant, "that the Mississippi was the center of the earth, and those mounds were as the navel of a man in the center of his body."<sup>11</sup>

Besides the above facts, I have one longer version written down in Chickasaw by my interpreter, Mr. Zeno McCurtain, which, including some necessary alterations and simplifications, may be rendered in English as follows:

This is the story of how the Indian people came to this country. Their earlier home was in the continent of Asia, but after a time they got tired of living there and wanted to move to some place where they could live in comfort, have a country of their own, and be independent. They called a meeting to decide what course to take, and it was determined to move. It was then that their trials and hardships began.

They depended upon the Creator for their guidance, and it was revealed to them that they must move toward the East; so they set out in that direction. They had a dog who guarded their camp every night and kept the wild animals

<sup>9a</sup> *Hamonockma ikia ahnishke.* ("Let no one think of going!") The supposed meaning of "chickasha" I have been unable to establish.

<sup>10</sup> Malone, James H.: *The Chickasaw Nation: A Short Sketch of a Noble People.* Louisville, Ky., John P. Morton & Co., 1922, pp. 22-23.

<sup>11</sup> Schoolcraft, *Ind. Tribes*, vol. 1, p. 311.

away. During the night he walked in advance to direct them. The name of this dog was Pânti.<sup>22</sup> He led them out of all difficulties and kept them from getting into places from which they might not be able to extricate themselves. If anyone fell sick, they would stop for several days and treat him by means of an herb steeped in water. If one was bitten by a snake, the dog would lick the place and the person would get well.

The tribe kept moving eastward in this manner until they came to a big body of water which they called Ok-hâta icto ("Big Ocean"), and the original narrator of this story thought that the Okhotsk Sea must have derived its name from this term. When they could go no farther they camped on the shore of this big water for several days. At that place they were able to see the land on the other side. (The place was identified with Bering Strait by the story teller.) So they determined to cross to the other side and held councils to work out a plan by which the passage might be accomplished. Finally they decided that they must construct a raft. They went to work at once, but after they had finished it discovered that they could cross only at certain times when the water moved back (i. e., when the tide ebbed). At last they got safely to North America, but it was so cold there that they started on again southward until they came to the neighborhood of Montana, where they remained a long time.

At the end of that period they held a council and some wanted to move on again, while others preferred to remain. Therefore they divided. Those that wished to emigrate took the dog Pânti with them. They loved him dearly, for he was a great help to them. Moving on eastward they came to a prairie country where were numerous wild animals, some of which Pânti killed for them to eat, while he drove the rest away. There were at that time plenty of deer, prairie chickens, turkeys, squirrels, fish, and many other creatures good to eat. There were also some dangerous animals, like panthers and wolves, but they moved along cautiously so that these creatures could not get at them. There were several kinds of poisonous snakes, and they also avoided them carefully. In case anyone did get bitten they had a good remedy to apply.

Whenever they wanted to move forward they began several days in advance to prepare breadstuffs like blue or shuck bread (bânaha) and cold flour (tam-bota). They put up so much of this that they had plenty to eat for several days.

When they reached the Mississippi River they camped upon its banks for some time, uncertain how they could get to the other side. Finally they decided to construct another raft and they did so, but during the passage their raft came to pieces and they lost their faithful dog.

After this sad event they did not at first know what to do, but finally they decided to use a wooden pole (kohta) as their guide. Every night, when they made camp, they stuck this pole into the ground, and in the morning it would be found leaning in a certain direction. This was the direction in which they were to march. They kept on, guided thus, for many days, until finally the pole was found standing perfectly erect, and they said "This must be the place for which we are looking." So they began a settlement and continued there for a long time, living by hunting and fishing.

This is all of the story that really concerns us, although the manuscript devotes considerable additional space to detailing subsequent relations between the Chickasaw and the whites.

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<sup>22</sup> Pânti means "cat-tail," at least in Choctaw.

Only dim memories are preserved of the numerous wars waged by the ancestors of the present Chickasaw when they were living in Mississippi. There is a belief that they were then fighting all of the surrounding peoples. They remember their last war with the Creeks, which took place in the last decade of the eighteenth century and resulted in a brilliant victory for the Chickasaw. The story has it that about 100 Chickasaw beat off 2,000 hostile Creeks, and this is not far from the truth, the Creeks having been seized by a panic. The native story also states that the Cherokee had vainly endeavored to dissuade the Creeks from entering upon this contest.

When they were fighting another tribe, they were guarded by two dogs, one white and one yellow, which were invisible to themselves but visible to the enemy. These would run among the latter and knock them over so that the Chickasaw could kill them more readily. When the Chickasaw started out to fight, they could hear the noise made by these dogs, which was like that of a thunderstorm, but they could not see them. It is thought that they might have lived in the ground.

On another occasion seven Chickasaw were surrounded in a small cave by a large body of Osage (Wacaci). By some magic means the latter were caused to fall asleep and the Chickasaw killed them all.

They say that they used to trade at a town of the whites called Balbancha situated on a river which they would descend in bark canoes. Balbancha appears to have been the old name of New Orleans; the Mississippi River was known as Sakti la<sup>a</sup>fa okēna ("Chickasaw bluff watercourse"). It is improbable that they ever used bark canoes to any extent; they ordinarily employed dugouts.

#### TERMS OF RELATIONSHIP

The Chickasaw and Choctaw terms of relationship cover, for the most part, the same categories as the corresponding terms in Muskogee,<sup>13</sup> but there are some notable differences. In the following discussion the Muskogee terms, as given in the Forty-second Annual Report, are constantly referred to, but the application of the Chickasaw terms is sufficiently indicated in the two tables.

#### BIRTH RELATIONSHIPS

1. afo (grandfather) is very nearly equivalent in use to the Muskogee potca. When applied to the father's sister's husband, however, and the husbands of his female descendants, it takes the diminutive suffix -osi. Since Choctaw and Chickasaw do not, like Muskogee, categorize all of the father's sister's male and female descendants together, the use of this term varies correspondingly.

<sup>13</sup> See 42d Ann. Rept. Bur. Amer. Ethn., pp. 80-86.

A varying application is also found in that this term is used by a woman in speaking to her father-in-law.

2. *posi* (Chickasaw), *pokni* (Choctaw) (grandmother) correspond to Muskogee *posi*, and they are used in the same manner in their primary applications to the grandmother, and the women of her generation and preceding generations. However, in a manner analogous to the term preceding, they are bestowed by a woman upon her husband's mother. The Chickasaw, like the Muskogee, employed *posi* also for the father's sister, but bestowed it only upon those of her female descendants connected through the females. The Choctaw, on the other hand, introduced a new term, *hukni*, used for the father's sister and, as in Chickasaw, for her descendants through females. It is probable that this word is etymologically connected with *pokni*.

3. *ki* (father) and *kosi* (little father). These are equivalent in nearly all particulars to Muskogee *lki*, except that they are applied mainly to the descendants of the father's sister through females.

4. *cki* (mother) and *ckosi* (little mother). Used like Muskogee *tcki*, with the limitation on the father's side already several times mentioned. There is also one striking difference in the fact that they are used for the maternal uncle's wife, and, presumably, for the wives of all of those called by the same term as the maternal uncle. The Choctaw, however, call the mother's brother's wife *haiya* (q. v.).

5. *moci* (maternal uncle). This seems to be absolutely identical in use with Muskogee *pawa*.

6. *tikba* (Chickasaw), *anni* (Choctaw) (elder brother, m. sp.; elder sister, w. sp.). These apparently vary little from Muskogee *laha*.

7. *nakfic* (younger brother), almost identical in use with Muskogee *tcusi*. However, the term is also applied, according to Morgan, to some of the children of the men on the father's side called by the same term as the father. Presumably this would also hold good for the daughters when a woman is speaking.

8. *tek* (sister, m. sp.). The equivalent of Muskogee *wánwa* but bestowed also upon daughters of those male relatives on the father's side called by the same term as the father.

9 and 10. *so* (Chickasaw and Choctaw) (child, son, daughter), *tcipota* (Chickasaw) (child), *ála* (Choctaw) (son). As used by a man these are equivalent to the Muskogee terms *kputci* and *ttusti* taken together. The daughter is distinguished if necessary by the addition of the feminine sign *tek*, as *so tek*, *ála tek*. The stepson is called *so toba*, and the stepdaughter *so tek toba* or *so tek pila*.

11. *baiyi* (nephew, or, more exactly, sister's son). The counterpart of Muskogee *hopwiwa*.

12. *bitek* (niece). Corresponds to Muskogee *hâkpade*, but is probably a contraction of *baiyi* plus the feminine sign *tek*.

13. pok (grandchild). The equivalent of Muskogee osuswa. Masculine and feminine are differentiated by suffixing the male and female terms nakni and tek, but it is rather surprising that in Morgan's lists it is the male who is normally distinguished from the female in this manner and not the reverse. This would suggest that the original term applied rather to women than to men. It has the same general application as the Muskogee equivalent. One peculiar usage, however, by both sexes, is to designate by it the son's wife, the sister's son's wife, and the brother's son's wife. In this situation it takes the feminine sign tek, which may perhaps account for the fact that this does not ordinarily appear in its more general usage. Byington says that the term was extended to the son-in-law. The application of the terms for "son" and "daughter" and "brother" and "sister" being so widely extended it was only natural that this one should cover a still broader field. Thus Cushman very well says: "Every grandson and granddaughter became the grandson and granddaughter of the whole tribe, since all the [paternal] uncles of a given person were considered as his fathers also; and all the mother's sisters were mothers; the cousins, as brothers and sisters; the nieces [through parents of the same sex as the speaker], as daughters; and the nephews [under the same circumstances] as sons."<sup>14</sup>

#### MARRIAGE RELATIONSHIPS

14. waya or iho (Chickasaw), taketci (Choctaw) (wife). Corresponding to Muskogee hewa.

15 and 16. potci (father-in-law), potci ohoyo (mother-in-law). These correspond to Muskogee mahe and hoktálwa, respectively, differing in that they are founded on one stem, and also in being applied only by males. Like mahe and hoktálwa they are also extended to the brothers, sisters, and antecedents of the parents-in-law.

17. alok (brother-in-law). This was bestowed by a man or woman upon the sister's husband. With the diminutive ending, in the form alokosi, it was also used for the wife's or husband's brother, and, with the feminine sign ohoyo, for the wife's or husband's sister. In Choctaw, however, a woman calls her husband's brother ombálaha. This corresponds most closely to Muskogee kaputci, the functions of which are, however, covered in part by haiya and kanohmi.

18. kanohmi, "my relative" (Chickasaw). Applied by a man to his wife's sister's husband and his wife's brother's wife, and by a woman to her husband's sister's husband and his brother's wife. I have no examples of the use of this term in Choctaw. The nearest Muskogee correspondents are hátcawa and ehiwa.

<sup>14</sup> Cushman, *Hist. Choc., Chic., and Natchez Inds.*, p. 528.

19. *haiya* (sister-in-law). Applied by individuals of both sexes to the brother's wife. It is the Choctaw term for the mother's brother's wife. It corresponds in part to Muskogee *teukowáki*.

20. *yup* (son-in-law). Applied by persons of both sexes to the daughter's husband and by derivation to the husbands of all those whom the speaker calls "daughters"; also by persons of both sexes to the sister's daughter's husband and by a woman to her brother's daughter's husband. It corresponds in part to Muskogee *hâtisi*, but while the latter is also used for the daughter-in-law, Chickasaw and Choctaw, as stated above, cover the latter relation by the use of the term for grandchild plus the feminine sign.

#### FURTHER NOTES ON THE TERMS USED BY A WOMAN

The terms used by a woman are the same as those employed by a man except as already indicated and in the following additional points. Mention has already been made of the employment of *tikba* (or *anni*) and *nakfi* for the elder and younger brothers of a man and the elder and younger sisters of a woman.

21. *nákfi* (brother) is applied by a woman to her brothers, and is the equivalent of Muskogee *teíłwa*.

22. Differently from Muskogee, the terms used by a Chickasaw or Choctaw woman for her child are identical with those which a man employs.

Like Muskogee, a Chickasaw or Choctaw woman anciently called her brother's children "grandsons" and "granddaughters," but in later years these appellations seem to have given place to a descriptive term, *nákfi uci*, "brother's child."

23. *háták*, "man," or *laueli*, "the one who leads" (husband). These are the Chickasaw and Choctaw equivalents of Muskogee *he*.

#### SUPPLEMENTARY TERMS

24. *itibapicili*, "those who suck together," corresponds in a way to Muskogee *itetcaketa*. It appears to have been used on occasion by persons of either sex for their brothers or sisters collectively, but inasmuch as men had another collective term for their sisters and women one for their brothers it would naturally be an especially convenient word for a man to employ when he wished to speak of all of his brothers or for a woman when she wished to speak of all of her sisters. Otherwise they would be obliged to say "my elder brothers and my younger brothers," or "my elder sisters and my younger sisters." This is perhaps why Morgan's three authorities unite in giving *itibapicili* as the term which a man applied to his brothers

collectively, and his Chickasaw informant and one Choctaw informant give it as the term which a woman applied to her sisters collectively, while substitute terms appear in three cases when it is a question of the use of a collective term by a man for his sisters and a woman for her brothers. In the more extended applications we find a still greater tendency to employ *itibapicili* for persons of the same sex. According to this the term was used by a Chickasaw man for the father's brother's sons (older or younger), the mother's sister's sons, the father's sister's sons's sons, and the elder of the father's father's brother's son's sons, and by a Chickasaw woman for the father's brother's daughters (older or younger), the mother's sister's daughters, and the father's sister's son's daughters. If we are to trust the same list the employment of this term was not so general in Choctaw, since it was not used for the mother's sister's children by individuals of either sex, nor for the father's father's brother's sons's sons, or the father's sister's son's sons, while but one of Morgan's Choctaw informants gives it for the father's brother's children and the father's sister's son's daughters.

*apopik* is said to have been an old Choctaw term applied by a woman to her husband's brothers, uncles, and nephews.

*haloka*, "sacred," "beloved," was used in Choctaw for the son-in-law, father-in-law, and mother-in-law.

*kamassa*, "strong," "ripe in years," was a name given by a man or woman to his or her father-in-law and mother-in-law. They would call their son-in-law *tōpaca*, or, if he had children, *tcipota inki*, "the children's father," while they called their daughter-in-law *sāpok tēk*, "my granddaughter." Parents-in-law and children-in-law would never jest with each other. Sons-in-law and daughters-in-law would not even enter a house in which sat a parent of the wife or husband. If it was necessary for them to get anything out of that house, they would throw into it a stick of wood or a corncob, whereupon the tabooed persons would go out and give them a chance to enter. All of the other relatives could jest freely together, especially brothers-in-law and sisters-in-law.

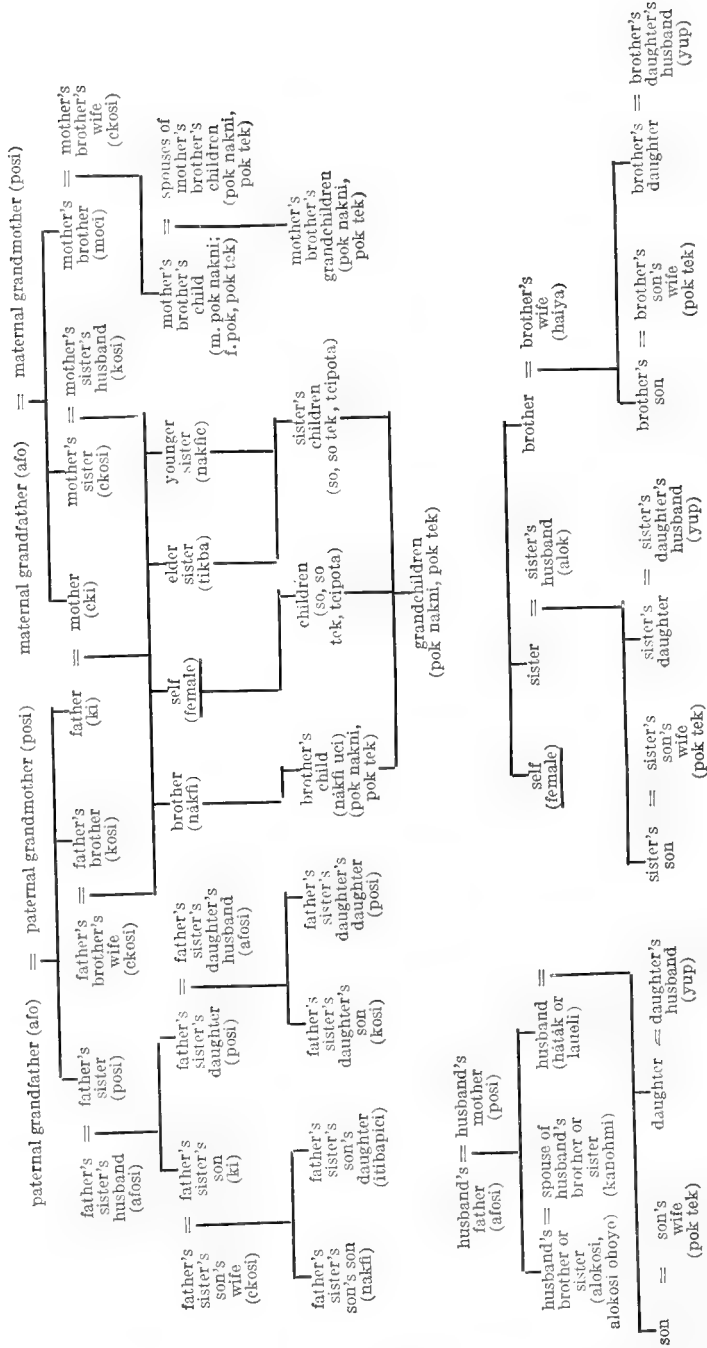
Following is a tabulation of the Chickasaw system; the Choctaw variants can readily be introduced by the reader.





CHICKASAW TERMS OF RELATIONSHIP

SELF FEMALE



## PERSONAL NAMES

Adair's remarks on the naming system of the Chickasaw have been quoted in my report on the social organization of the Creeks, but it will be best to reinsert them, along with some supplementary material gathered from other parts of his work.

"They give their children names expressive of their tempers, outward appearances, and other various circumstances; a male child they will call *Choola*, 'the fox'; and a female *Pakahle*, 'the blossom or flower.' The father and mother of the former are called *Choollingge* and *Choollishke*, 'the father and mother of the fox'; in like manner those of the latter, *Pakahlingge* and *Pakahlishke*, for *Ingge* signifies the father and *Ishke* the mother. In private life they are so termed till that child dies, but after that period they are called by the name of their next surviving child, or, if they have none, by their own name; and it is not known that they ever mention the name of the child that is extinct. They only faintly allude to it, saying 'the one that is dead,' to prevent new grief, as they had before mourned the appointed time. They who have no children of their own adopt others and assume their names in the manner already mentioned."<sup>15</sup>

"When the Indians distinguish themselves in war their names are always compounded—drawn from certain roots suitable to their intention and expressive of the characters of the persons, so that their names, joined together, often convey a clear and distinct idea of several—as of the time and place, where the battle was fought, of the number and rank of their captives, and the slain. The following is a specimen: One initiating in war titles is called *Tannip-Abe*,<sup>16</sup> 'a killer of the enemy'; he who kills a person carrying a kettle is crowned *Soonak-Abe-Tuska*;<sup>17</sup> the first word signifies a kettle and the last a warrior; *Minggáshgabe*<sup>18</sup> signifies 'one who killed a very great chieftain,' compounded of *Mingo*, *Ash*, and *Abe*. *Pae-Máshgabe*<sup>19</sup> is one in the way of war gradation or below the highest in rank, *Pae* signifying 'far off.' *Tishu Mashgabe*<sup>20</sup> is the name of a warrior who kills the war chieftain's waiter carrying the beloved ark."<sup>21</sup>

Adair adds a wrong analysis of the name *Shulashummastabe*,<sup>22</sup> "Red shoe killer," known to the whites as Red-shoes. He gives also the names *Chetehkabe* or *Chetehkabesho*,<sup>23</sup> "You are weary killer," or "You are very weary killer"; *Noabe*,<sup>24</sup> "one who kills a rambling enemy"; *Pas'pharáabe*,<sup>25</sup> "a killer of a long-haired person," i. e., of a Choctaw; and *Yanasabe*,<sup>26</sup> "the buffalo-killer," given to one who has killed a distinguished enemy.<sup>27</sup> He says that the name of the turtle dove (i. e., the mourning dove) was also applied to a female child.<sup>28</sup>

<sup>15</sup> Adair, Hist. Am. Inds., p. 191.

<sup>16</sup> *Tánáp*, "enemy"; *ábi*, "to kill."

<sup>17</sup> *Asonak*, "kettle"; *ábi*, "to kill"; *tácka*, "warrior."

<sup>18</sup> *Mi<sup>n</sup>ko*, "chief"; *a<sup>n</sup>sha*, "to have" "to keep"; *t*, "and"; *ábi*, "to kill."

<sup>19</sup> *Pae* from Creek *hopai* or Chickasaw *hopaki*, see p. 249; *ima<sup>n</sup>sha*, "to have or keep something"; *t*, "and"; *ábi*, "to kill."

<sup>20</sup> *Tishu*, "the war-chief's waiter"; *mashtabe* as above.

<sup>21</sup> Adair, op. cit., p. 193.

<sup>22</sup> *Culuc*, "shoe"; *humma*, "red"; (*ma*)*stabe*=*mashtabe*.

<sup>23</sup> *Tci-*, "you"; *tikabi*, "weary"; *ictó*, "big," "very."

<sup>24</sup> *Nowa*, "to walk," "to ramble"; *ábi*, "to kill."

<sup>25</sup> *Pa<sup>n</sup>ci*, "hair of head"; *falaya*, "long"; *ábi*, "to kill."

<sup>26</sup> *Yanasa*, "buffalo"; *ábi*, "to kill."

<sup>27</sup> Adair, op. cit., pp. 192-193.

<sup>28</sup> *Ibid.*, p. 26.

Speck has the following regarding the bestowal of names:

On the third day after birth the father consults among his clansmen for a name for the child. When someone has suggested one from memory of former names in the clan, he reports it to his wife, and she puts a handkerchief, ribbon, or beads about the child's neck in token of it.<sup>20</sup>

From this it seems probable that the custom was the same as among the Creeks, when the men of a clan selected names for the children born to the clan, children who themselves necessarily belonged to other clans. In later life these gave way to, or were supplemented by, war titles, as we know from Adair. The kinds of names were very similar to those in use among the Choctaw.

According to information obtained by myself, any boy was called *kābi* and any girl *kiū'ō* until their families were ready to name them. At that time boys were said to be named after their grandfathers or fathers and girls after their grandmothers, great-grandmothers, or other female antecedents. There was no naming ceremony at this time; none until war names were bestowed. The mention of the bestowal of the father's name upon a boy is probably incorrect, or, at least, it is probable that the word is intended in the sense of male ancestor.

The following personal names were obtained by the writer from two informants, Atchison Anowatabi and George Wilson:

#### MALE WAR NAMES

Ābinitābi, "he sat by and killed."	Ayahōtābi, "he searched for him and killed him."
Abitānta, "he killed and lived."	Ayakā <sup>21</sup> bi, (?).
Abito <sup>21</sup> hika, "he stood on after killing."	Ayākatābi, "he (?) and killed."
Ahōtānkābi, "he killed him on the other side, out of sight."	Binilābi, (?).
Ahōtinābi, "he counted and killed."	Falamictābi, "he called him back and killed him."
Aiapi <sup>21</sup> hābi, "he went along with and killed."	Filītātābi, "he turned round and killed."
Aipa <sup>21</sup> tābi, "he shook hands and killed."	Hāgalūntābi, "he (?) and killed."
Aitūntābi, "he went and killed."	Haitotābi, "lying close to (but not touching) he killed."
Anhitābi, "he (?) and killed."	Haiyūctitībi, (?).
Anowatābi, "he came and killed."	Hākalotcābi, (?).
Anūkteitābi, "he (?) and killed."	Hallatlitābi, "he held and killed."
Apatūntābi, "he went by his side and killed."	Hikābi, "the one he killed stood up."
Apatūntābi, "he (?) and killed."	Hikatābi, "he stood up and killed."
Apūlatābi, "he (?) and killed."	Hikiyābi, "he killed him standing."
Acalātābi, "he crawled up and killed."	Hīmōnālōctābi, "he killed him immediately."
Atcakata <sup>21</sup> bi, (?).	Hōpak <sup>21</sup> letābi, "he took him far off and killed him."
Atcākāntābi, "he killed him over."	Hopaitābi, "he prophesied and killed."
Atēnatābi, "he (?) and killed."	
Ayahōkātābi, "he (?) and killed."	

<sup>20</sup> Speck, Jour. Am. Folk-Lore, vol. xx, p. 57.

- Ibāhotā<sup>u</sup>bi, (?).  
 Ibahōyātābi, "he had to find him to kill him."  
 Ibāmihābi, (?).  
 Ibaonatābi, "he went with him and killed."  
 Ibātā<sup>u</sup>bi, "he (?) and killed."  
 Ikaiyūkāmoktābi, "he did not go far to kill."  
 Ikaiyūkāmotābi, "he killed without going far."  
 Iahotābi, "he hunted for and killed him."  
 Iapābi, (?).  
 Iāpōnābi, "he killed by himself."  
 Iapōtābi, "he killed him himself."  
 Iatī<sup>u</sup>batābi, "he killed him first."  
 Iomātābi, "he hid from the enemy and killed him."  
 Imaiya<sup>u</sup>nitābi, "he (?) and killed."  
 Imātpistābi, "he (?) and killed."  
 Imilatābi, "he (?) and killed."  
 Imitcābi, "something having been taken away, he killed him."  
 Imohotaidji, (?).  
 Imōlāsābi, "he let his enemy come close and killed him."  
 Imo<sup>u</sup>nābi, "an enemy came to his house and he killed him."  
 Impātābi, "he whooped and killed."  
 Iepātābi, "he (?) and killed."  
 Ietī<sup>u</sup>fālāmātābi, "he went back and killed."  
 Ictikaiyōkitābi, (?).  
 Icto<sup>u</sup>nābi, (?).  
 Itihōtābi, "several got together and killed."  
 Itilawitābi, "he evened (accounts) by killing."  
 Kaisatābi, "he (?) and killed."  
 Kānahōtābi, "hunting someone to kill."  
 Kanantcitābi, (?).  
 Lomhetābi, "he hid the enemy and killed."  
 Lākofintābi, "he got away (from the same person or another) and killed him."  
 Lāō<sup>u</sup>htābi, "he ran after him and killed him."  
 Mihāci<sup>u</sup>tābi, "the same man killed."
- Micūteitābi, "he was some distance from the enemy and killed him."  
 Micontāmbi<sup>u</sup>, "he will go over yonder and kill."  
 Micūtābi, "he (?) and killed."  
 Nāgānitcābi, (?).  
 Nibateukwātābi, "he went in on him and killed him."  
 Ninakā<sup>u</sup>bi, "he killed him in the night."  
 Nūkwayikeugitābi, "he had courage and killed."  
 Okāyāmbi, "among them he killed."  
 Okōla<sup>u</sup>nānābi, (?).  
 Okōlohactābi, "he (?) and killed."  
 Okteā<sup>u</sup>tābi, "he killed him alive."  
 Okulō<sup>u</sup>hābi, "he (?) and killed."  
 Oāiitci<sup>u</sup>, (?).  
 Onnāhābi, "he killed after daylight."  
 Onnahintābi, "he killed his enemy early in the morning."  
 Onahotcābi, (?).  
 Ōnātābi, (?).  
 Ōnteyābi, (?).  
 Ōntiātābi, "he passed and killed him."  
 Ōntikanōtābi, "he (?) and killed."  
 Opiasābi, "late in the evening he killed him."  
 Opiyāctābi, "it was evening and he killed."  
 Oca<sup>u</sup>bi, (?).  
 Pisahōtābi, "he saw him and killed him."  
 Pisa<sup>u</sup>magentābi, "he killed him as soon as he saw him."  
 Pisamontābi, "he killed him at first sight."  
 Pisatābi, "he saw and killed."  
 Pistūkteā<sup>u</sup>bi, "he (?) and killed" (oktea="awake").  
 Pistūktea<sup>u</sup>tābi, "he (?) and killed."  
 Sakitābi, "he followed, overtook, and killed."  
 Sākābi, (?).  
 Tcāfatābi, "he killed one of them."  
 Teakata<sup>u</sup>bi, (?).  
 Teali, the English word Charlie.  
 Tāhiyābi, "he (?) and killed."  
 Tāyactābi, "he (?) and killed."  
 Tukolōctābi, "he killed two men."  
 Untā<sup>u</sup>yābi, (?).

These names are thought to have varied in accordance with the house group, but in few cases did my informants remember to what house group the owner of a name belonged. Ilati<sup>n</sup>batābi, Aitūntābi, Aipa'fābi, and Falamictābi were brothers belonging to one of the house groups called Intiliho, and Anowatābi belonged to the I<sup>n</sup>holihita lipa. Ibāmihābi, Ilapābi, Imohotaidji, Teali, and Ikaiyūkāmotabi belonged to Teukillissa and Ōlaiitci' and Imiātābi to Teuka falaha, but I do not know the house groups. For some reason one of my informants remembered the names of the house groups to which female names belonged better than the allocation of male names, but the signification of almost all such feminine names seems to have been lost.

## WOMEN'S NAMES

Name	House group	Name	House group
Akōyūke	Impitca teaha.	Pōye	Intcufāk.
Atcayi'		Cālica'	
Finūye	Imatōle.	Canōya	Imatonōha.
Homaho'ti'		Cāpayōpe'	Impitca teaha.
Homaiyetca'		Cāpihōyi'	
Ictahōyāhi'	I'sāktikā.	Cātilo'ke'	
Ictāpaiye'	Takāsa.	Cimhōyi'	
Ictapaiyihca		Cimahaye'	
Ictīcahōye'	Intiliho (Skunk).	Cimōnāti	Imaboha ictō.
Ictimake'tea		Cimpalihca'	
Ilai	Intabōka.	Citāye	Intōfala.
Itcā'	Inteuka bātea.	Cōci' (English Susie)	
Koihke	Impitca teaha.	Cōmaliyu'	
Koyaihi'		Comhohke	Intokālba.
Kōyoke'		Tcōneya'	
Latehtca	Intiliho (Skunk).	Tāekayōki	Iyātkāca.
Mahoma'ti'	Imokākinafa'.	Tohk'i'	
Nācki'		Wictōnaye	Intiliho (Wildcat).
Nānūkpāni		Yūlaiike	Intiliho (Skunk).
Onahaye'			
Ohaiki			

## SOCIAL ORGANIZATION

The ancient social organization of the Chickasaw is now so completely discarded that practically all of the younger people know nothing about it, and even the older ones can furnish only fragmentary information on the subject. If a careful study of this organization could have been made when it was in its prime it would have been of the greatest value to all students of primitive society. However, enough has been preserved to give us a fair idea of its general character and its probable position among the social systems of the Southeast.

Our earlier data regarding the moiety and clan divisions consists of a short but important sketch prepared for Henry R. Schoolcraft by a United States Indian agent from information obtained from several old Chickasaw chiefs shortly after the period of their emigration from Mississippi,<sup>30</sup> a list of Chickasaw clans and phratries collected by the Rev. Charles C. Copeland, missionary among the Chickasaw, incorporated into Lewis H. Morgan's Ancient Society,<sup>31</sup> and a second contained in a manuscript note to George Gibbs's Chickasaw vocabulary, collected for the Bureau of American Ethnology. This last, along with a reproduction of Morgan's list, was published by Dr. A. S. Gatschet in his Migration Legend of the Creek Indians.<sup>32</sup>

The most important modern contribution to this subject has been made by Prof. Frank G. Speck in a short article entitled "Notes on Chickasaw Ethnology and Folk-Lore," published in the Journal of American Folk-Lore.<sup>33</sup> This embraces information obtained principally from a Chickasaw named Ca'bitci encountered by Professor Speck while engaged in ethnological work among the Yuchi in 1904 and 1905. It contains valuable material which it seems impossible to duplicate out of the memories of the Chickasaw now living.

As it will be necessary to piece together all of this data and that which I collected myself in 1915, 1919, and 1924, it will be best to incorporate these original narratives entire so that they may be constantly before the reader for consultation.

Following is the account furnished by Schoolcraft's informant:

The government of the Chickasaws, until they moved to the west of the Mississippi, had a king, whom they called *Minko*, and there is a clan or family by that name, that the king is taken from. The king is hereditary through the female side. They then had chiefs out of different families or clans.

The highest clan next to the *Minko* is the *Sho-wa*. The next chief to the king is out of their clan. The next is *Co-ish-to*, second chief out of this clan. The next is *Oush-peh-ne*. The next is *Min-ne*; and the lowest clan is called *Hus-con-na*. Runners and waiters are taken from this family. When the chiefs thought it necessary to hold a council, they went to the king, and requested him to call a council. He would then send one of his runners out to inform the people that a council would be held at such a time and place. When they convened the king would take his seat. The runners then placed each chief in his proper place. All the talking and business was done by the chiefs. If they passed a law they informed the king of it. If he consented to it it was a law; if he refused, the chiefs could make it a law if every chief was in favor of it. If one chief refused to give his consent the law was lost.

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<sup>30</sup> Schoolcraft, Ind. Tribes, vol. 1, p. 311.

<sup>31</sup> Ancient Society, New York, 1878, p. 163.

<sup>32</sup> Philadelphia, 1884, vol. 1, p. 97.

<sup>33</sup> Jour. Am. Folk-Lore, vol. xx, pp. 50-58.

The table of phratries and clans furnished Morgan by Copeland is as follows:

I. PANTHER PHRATRY (Koi)<sup>34</sup>

1. Wildcat (Ko-in-chush)	2. Bird (Hä-täk-fu-shi)	3. Fish (Num-ni)	4. Deer (Is-si)
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II. SPANISH PHRATRY (ISH-PÄN-EE)

1. Raccoon (Shä-u-ee)	2. Spanish (Ish-pän-ee)	3. Royal (Ming-ko)	4. Hush-ko-ni
5. Squirrel (Tun-ni)	6. Alligator (Ho-chon- chab-ba)	7. Wolf (Nä-sho-lä)	8. Blackbird (Chuh-hlä)

Next comes Gibbs's list, as copied by Gatschet, and verified by the writer:

Späne or *Spanish* gens; mīngos or chiefs could be chosen from this gens only, and were hereditary in the female line; shä-é or *raccoon* gens; second chiefs or headmen were selected from it; kuishto or *tiger* gens; ko-intchūsh or *catamount* gens; nāni or *fish* gens; issi or *deer* gens; halóba or ? gens; foshé or *bird* gens; hu<sup>n</sup>shkoné or *skunk* gens, the least respected of them all.

Dr. Speck's treatment of Chickasaw social organization is naturally more elaborate. He says:

Clans are arranged in two groups, each of which has its own religious ceremony of a shamanistic nature. The tribe is thus broken up into two distinct parts with quite different interests.

The groups are named *Imosaktcà<sup>n</sup>*, "their hickory chopping," and *Intcukwalipa*, "Their worn-out place." The former is the superior group, as its men were warriors inhabiting substantial lodges, while the latter were known as inferior people who lived mostly under trees in the woods. From the leading clan of each group a shaman, or prophet (*hopáye*), was chosen for life, who held communion with the gods in its behalf. In connection with sickness, war, or migration his services were required before action was taken. He was also consulted before the celebration of the *Picofa* ceremony.

This prophet, in former times exercising his powerful leadership, is said to have followed the Milky Way (*ofit<sup>s</sup>óxube ihinna*), and other supernatural manifestations such as the direction in which an upright pole leaned at certain times, or the direction indicated by the shape of some bear's excrement.

Facial painting indicated the group of the wearer, but was only used on occasion of war. The *Imosaktcà<sup>n</sup>* group painted across and above the cheek bones, while the *Intcukwalipa* decorated only below the cheek bones.

When the tribe was called to assemble, the various clans had assigned places of encampment on each side of an imaginary line running north and south, forming altogether a square which corresponded in general to the camp circle of the prairie tribes.

The clans of the *Imosaktcà<sup>n</sup>* group, with the remarks of informants, are as follows:

(1) *Insaktalá<sup>r</sup>fa*, "their bank of the river boundary." It is the highest clan of this group, from which the prophet is chosen. They are said to be the

<sup>34</sup> The Chickasaw equivalents are given separately in a footnote in the original. Hä-täk, man, is properly no part of the name of the Bird clan; it is employed to designate so-and-so as a member of the clan in question. Tun-ni is evidently a misprint for Fun-ni and Nä-sho-lä for Nä-sho-bä.



brightest and bravest of the Chickasaw. Their name refers to the Mississippi River, which is called *saktalá<sup>n</sup>fa*. In the tribal camp their place is at the centre of the north side, east of the dividing line between the groups.

(2) *Imosaktè<sup>n</sup>*, "their hickory chopping." This clan stands in very high esteem, the men being known as great fighters. They are said to have walked from Mississippi to Indian Territory during the removal.

(3) *Inkobukè<sup>c</sup>*, "their hump," referring to the hump of a large game animal. They are great hunters.

(4) *Hataqanan<sup>è</sup>*, "fish person." They are expert fishermen and trade in fish.

(5) *Intcukapáta*, "their neighborhood."

*Incaktcakáfa*, "they are crawfish." They are very bright and active people.

*Inpitca<sup>n</sup>hateáha*, "their corner high." They are signally industrious in agriculture.

The clans of the Intcukwaípa group are as follows:

(1) *Inkúni*, "they are skunks." They are the leading clan of this group, having the position opposite the *Insaktalá<sup>n</sup>fa* at the north side of the camp square. They are hunters and eat skunks.

(2) *I<sup>n</sup>yáلكacè<sup>è</sup>*, "they are dung people." From this clan the prophet of the group is chosen.

(3) *Intcicawáya*, "their post oak bends." They were known by their habit of living under the trees.

*Intcúkakolófa*, "their house cut off," meaning that they lived only in broken houses or parts of houses.

*Intciskílikkobáfa*, "their blackjack (oak) broken off," meaning that they dwelt under blackjack oaks.

*Intcúkwazípa*, "their house worn out." These last three are the meanest of all.

The accompanying sketch [fig. 3] shows arrangement of camp square.

. . . The list given above does not assume to be complete, nor is the order of precedence very strictly recognized to-day, after the first three names in each group. Matters of this sort are rapidly disintegrating among the Chickasaw. The clans of each group are in close alliance with each other, being, however, exogamic without regard to their group.

The agreements and disagreements in these lists are largely explained by the fact that three different sorts of associations existed in Chickasaw society: (1) A dual division, (2) totemic subdivisions or clans, and (3) a great number of cantonal or local groups, usually bearing names descriptive of some natural object or feature. The towns were distinct from all of these.

The dual division is recognized by Copeland and Speck, but Schoolcraft's informant and Gibbs seem to have missed it. It is clearly remembered by some of the living Chickasaw, however, and there can be no question regarding it. It is a curious fact that Copeland, Speck, and the writer each obtained a different set of names for the two moieties. The terms used by Copeland, "Panther Phratry" and "Spanish Phratry," are derived from clans on the respective sides; those obtained by Speck (*Imosaktè<sup>n</sup>* and *Intcukwaípa*) are taken in a similar manner from local or house groups; while those which I secured, *Tcukilissa*, "empty or abandoned house," and *Tcuka*

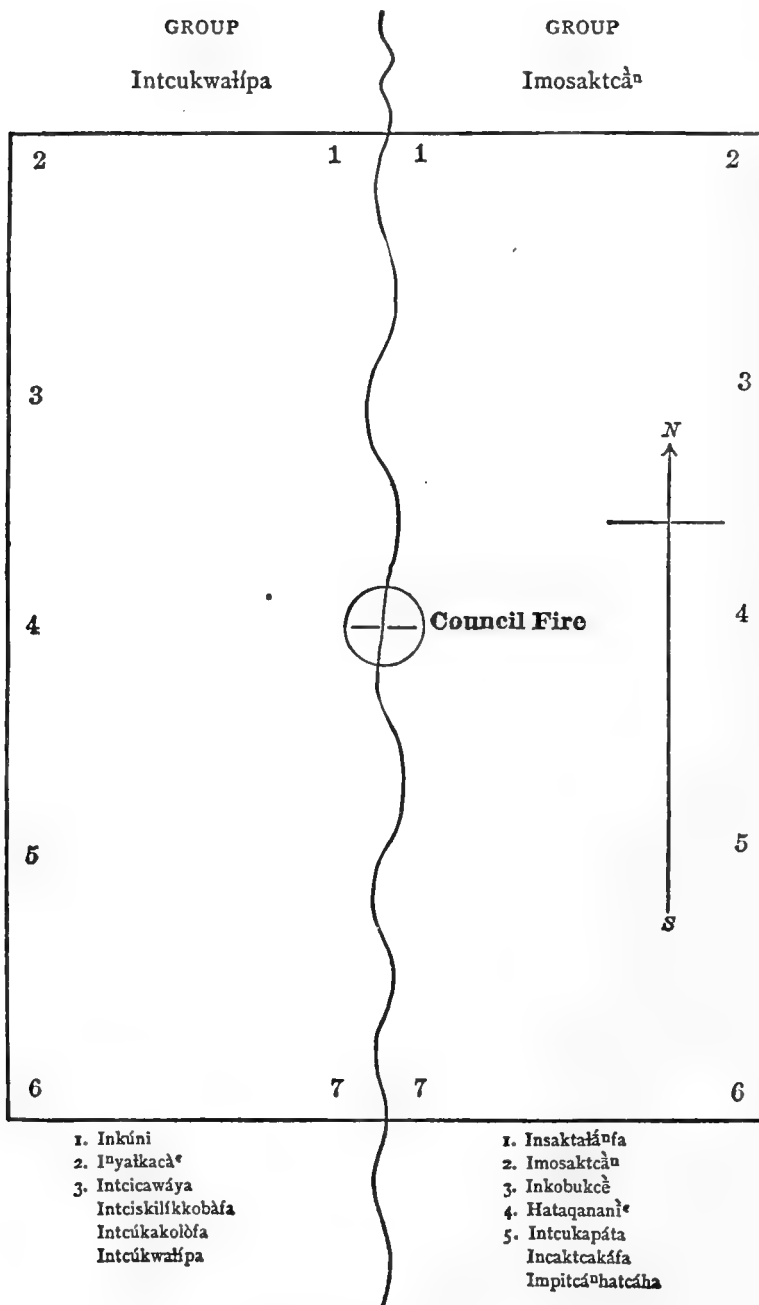


FIG. 3.—Chickasaw camp square. (From Speck.)

falaha,<sup>35</sup> "long house," prove to be names of two of the ancient Chickasaw towns. If each moiety was exogamous, as has usually been assumed, a town could not have been occupied exclusively by representatives of either of them and we should have to suggest that one moiety was particularly prominent in one town and the other in the second. However, more recent investigations, to which reference will be made presently, render it evident that these moieties were prevailingly endogamous like the town moieties of the Creeks. The uncertainty and diversity in naming these groups strengthens their resemblance to the Creek moieties and at the same time differentiates them from those of the Choctaw which seem to have borne distinct, universally understood titles. As members of these moieties were probably opposed in the ball games, they perhaps ordinarily used such terms as "own side" and "opposite side" and required nothing further, the name of a house group, clan, or town prominently associated with each being a mere temporary designation. The moieties resembled those of the Creeks once more in the attitude of suspicion which they maintained toward each other. Thus Speck says that malevolent conjuration resulting in sickness was "believed, with a certain degree of hostility, to come from the opposite group."<sup>36</sup> And again: "It is considered a grave offense, frequently punishable by death, for a member of one group to be present at the *Picófa* of the other group, as his presence would nullify the good effect of the ceremony."<sup>37</sup>

Chickasaw moieties disagree with those of the Creeks in the fact that, for the most part, clans (as well as house groups) were divided by moiety lines. However, there are said to have been some exceptions. The Raccoon clan, in particular, is said to have married indifferently into both moieties, while there was a house group on each side called Intiliho, which may have had a common origin.

The little that I learned of the supposed peculiarities of the moieties is in agreement with Speck's data. Thus I was told that the Tcuka falaha were warlike and lived on a flat or prairie country, while the Tcukilissa were peaceful people living in the timber.

Mr. Zeno McCurtain, my interpreter, recorded, from the mouths of some of the older men, the following beliefs regarding a Chickasaw people, who were in the habit of living in timbered country. As there is no house group in my list bearing a similar name, it is probable that these were the Tcukilissa.

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<sup>35</sup> One of my informants called this moiety, "Táshka," "warrior," but this seems to have been due to a supposed association of the side in question with warlike occupations.

<sup>36</sup> Speck, Frank G., *Journ. Am. Folk-Lore*, vol. xx, p. 54.

<sup>37</sup> *Ibid.*, p. 56.

## THE TIMBER PEOPLE

These people had ways of their own but it is difficult to tell in what these consisted. They lived in forested country, minded their own business, and did not bother others. What they liked best was to hunt and feast on wild game. That was why they were fond of forests. They made dwellings out of logs and wore skins of wild animals such as bear, deer, fox, skunk, raccoon, and panther. They tanned the hides of these animals and made clothing out of some while they exchanged others for the clothing used by whites. They loved one another and when one of them got into trouble of any kind, the others would help him out. But if they found that he had been stealing or committing some other depredation outside of their group they would not assist him. If it was proven that such an one, whether a man or a woman, was guilty, that person would have to suffer the death penalty. That was how they got rid of violators of law among them. Sometimes a person would be accused of something and it would be proved that he was innocent. The accusing witness would then be branded as a liar and people would never believe him afterwards. When a member of this group was found guilty of something not worthy of death, he was whipped and then liberated.

One may doubt whether the superiority of one particular moiety was unanimously admitted by members of both as stated by Speck's informant. He himself belonged to that which he asserted to be superior. But there appears to be no doubt that certain local groups were considered inferior to the rest. I have no information regarding the camp square other than that which Speck gives. In any case the custom must have applied rather to certain sections of the Nation than to the entire people, who could have been accommodated with difficulty in a temporary camping place. The tradition of such a custom possibly reflects some memory of the grouping of towns in the old country which formed three sides of a hollow square.

The clan was called *iksa*, and the names of 15 *iksa* have been recorded: *Minko* (Chief), *Sfani* or *Spani* (Spanish), *Cawi* (Raccoon), *Kō ictō* (Panther), *Kō intcus* (Wildcat), *Nāni* (Fish), *Isi* (Deer), *Foci* (Bird), *Koni* or *Hockoni* (Skunk), *Fāni* (Squirrel), *Hatcūntcūba* (Alligator), *Nacoba* (Wolf), *Tcāla* (or *Oktcāla*) (Blackbird), *Fox* (*Tcula*) or *Red Fox* (*Tcula homa*), *Haloba* (?).<sup>38</sup> *Haloba* is given by Gibbs alone, while the Alligator, Wolf, and Blackbird appear only in the list collected for Morgan. It is possible that the word for squirrel (*fāni*) has been confounded with that meaning Spanish (*Sfani* or *Spani*), although one of my informants claimed to know of a Squirrel clan. I have no explanation of the others which may have become extinct. It is unfortunate, however, that their existence is vouched for by but one authority. I learned of the Fox

<sup>38</sup> Adair (*Hist. Am. Inds.*, p. 31) seems to imply the existence of Eagle and Buffalo clans, but he probably had in mind clans among the Creek Indians. He also speaks of a Chickasaw war leader called "the Torrepine Chieftain" or "the leader of the land-tortoise family," implying that there was a clan of that name, but I think his deduction was erroneous. (Adair, p. 290.)

or Red Fox clan myself and all that is known about it is given below.<sup>39</sup> The others are mentioned by at least two authorities and must have had an actual existence. The Spanish, Raccoon, and Skunk clans are mentioned by all three and are known to living Indians.<sup>40</sup> If, as appears certain, "Min-ne" in Schoolcraft is a misprint for Nun-ne the Fish clan also appears in all lists. The Panther and Wildcat are also known to living Indians, but they seem to have been classed together or sometimes confounded, and this will explain the fact that Schoolcraft mentions only the Panther, while Copeland gives the Panther as the name of a "phratry" and Wildcat as the name of a clan under that phratry. The Bird and Deer appear in the lists of Gibbs and Copeland and are well known to living Indians but are wanting from the statement in Schoolcraft. Finally, the Minko or Chief clan occupies a distinct place in Schoolcraft and Copeland but by Gibbs appears to be combined with the Spanish clan. My own inquiries elicited no information whatever regarding the former existence of such a clan, and it may have been merged into the Spanish clan in later times just as the Panther seems to have disappeared in the Wildcat. Doctor Speck, or his informant, confounded local groups and clans, so that only one of the latter is mentioned, the Hataqanani<sup>ε</sup>, from hatak, man, and nani, fish. The "In-kuni" just below, although called by the name of their totem animal, are properly a house group.

The gradation in rank which Speck attributes to the house groups applied also to the clans as appears from Schoolcraft and Gibbs. The following comparison of the lists furnished by them shows that such a gradation actually existed and that the relative order of some clans was maintained over a considerable period, though with others changes seem to have taken place.

	Schoolcraft	Gibbs
1	Chief (Minko)-----	Spanish.
2	Raccoon-----	Raccoon.
3	Panther-----	Panther.
4	Spanish-----	Wildcat.
5	Fish (given as Min-ne)-----	Fish.
6	Skunk-----	Deer.
7	-----	Haloba.
8	-----	Bird.
9	-----	Skunk.

In both lists the Raccoon is second, the Panther third, the Fish fifth, and the Skunk last. Since the Panther and Wildcat were con-

<sup>39</sup> Pp. 201-202.

<sup>40</sup> The first, "Sphani," is mentioned by Adair. (Op. cit.)

stantly counted together, the only discrepancies between these lists are in the apparent elevation of the Spanish clan to the first position in Gibbs's time and the insertion by him of three clans between the Fish and Skunk. From the wording of the description of clans in Schoolcraft, however, it is not certain that his informant pretends to give a complete clan list.

Speck says that those clans which had totemic names had no taboo against eating the flesh of the animal after which they were named, and this is indicated also by the statement of his informant that the men of the Hataqanani<sup>ε</sup> "are expert fishermen, and trade in fish."<sup>41</sup> He also says: "The totemic clans assign a mythical origin to themselves from the animal whose name they bear, such as fish, skunk, and crawfish," and he cites as "a good instance" the origin story of the "cognate Choctaw crawfish clan."<sup>42</sup> This, however, is not a good instance because the supposed crawfish clan is in reality an incorporated tribe. Were the data preserved, I believe we should find that, as in the case of the Creek Indians, while descent from the totem animal is frequently asserted in general terms, specific stories bearing upon the subject accounted for the totemic name by some early association of individuals of the clan and the clan animal not involving blood relationship between the two. Speck is on firmer ground in stating that "the totem of the clan is also the guardian spirit of the men of that clan, who hold their totem animal and his earthly representatives as guides, kinsmen, and spiritual overseers." "Hence," he adds, "it was and is customary for them to maintain jealously the honor of their totemic animal. Numerous tales, descriptive of his wonderful exploits, are told by each clan. Also myth elements from negro sources have been introduced, where such fall in well with the character of the exploit and cast credit upon some particular totem."<sup>43</sup> The fact is that, again as in the case of the Creeks, the association of an animal name with a body of people has brought about an association of everything connected with that animal and the aforesaid body. The honor of the group is in some way bound up with due respect to the animal whose name the group bears, and a kind of proprietary right is extended over tales in which the totem animal is conspicuous, although it is probable that very few of these were composed or repeated primarily as "clan tales."

Stories about the Raccoon, Panther, Wildcat, Bird, and Red Fox clans were written down for me by a native Chickasaw, but these consist of bits of gossip and the relation of certain customs and habits which may not have been peculiar to them. Some of these clans are represented as endogamous. Probably, however, in the breakdown

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<sup>41</sup> Journ. Am. Folk-Lore, vol. xx, p. 52.

<sup>42</sup> Ibid.

<sup>43</sup> Ibid, p. 54.

of Chickasaw institutions, there has been a confusion between clan and moiety endogamy, each clan having been endogamous merely as regards some of the other clans. In the case of the Raccoon it is said that it would not intermarry with other clans, yet I was told specifically that it was exceptional in that it married into both moieties. It seems pretty clear that clans and house groups were ordinarily exogamous and moieties endogamous. It is also clear that marriage with blood relations was studiously avoided. Certain of my informants likened the clan institution to masonry, something for mutual aid. The antiquity of certain of the beliefs regarding clans given in these stories is questionable, but they at least furnish an interesting study in the association of ideas. With sundry unessential parts eliminated, the stories are as follows:

STORY OF THE RACCOON CLAN (CAWI IKSA)

These people dressed differently from others but in most of their customs they were similar. They had a certain habit, however, in which they were unique and that was that they would kill one another. Their taste in the matter of food was also peculiar. They liked to dance as well as any other people and would rather dance the Raccoon dance than eat. When they were going to have a dance they would send out a messenger to announce the fact, and afterward the old men and old women would dance all night. When they were preparing for a dance they would boil certain roots to make a kind of tea which they considered stimulating. They could dance all night without feeling any ill effects. The foods of which they were fondest were fish and all kinds of fruits such as grapes. When fruit was plentiful they liked that best which ripens early in the winter. In the spring they ate every kind of thing that was eatable. In the fall they hung bunches of grapes up to dry and then stored them away for winter's use. In summer they dried green corn for the winter. Some made shuck (or blue) bread, some made cold flour, and some laid away meal out of which porridge is made. Such foods would last as long as they desired.

These people were very cunning. They knew just what to do and how to do it and could not be cheated by others, except for the younger people, who were easily deceived. They would not undertake anything of which they were not sure in advance. They would not let other clans intermarry with theirs.

They had clever ways of finding out what they wanted to know, and they depended very much upon a conjurer (apóloma'), who could excel in the game of hiding-the-bullet, in horse racing, and in the ball game. Sometimes the conjurer was called a wizard (icta holo'). They had great faith in him and he was not afraid of undertaking any task assigned to him, yet he was not as good as a doctor (alektei). He could imitate any sort of animal or bird, but he could work only among his own people, or near his own side, fearing lest the opponents would kill him. The others did not know what he might do. Whatever the conjurer chose to do was considered right, but some conjurers were afraid to do as they ought by their own side lest the opponents should injure them afterwards. The conjurer foretold what was going to happen to the ball players and those that heeded his advice did not get into trouble, but some would forget and suffer injuries and be sorry that they had not been

obedient. When the people heeded the conjurer's warning they usually won, i. e., if their conjurer was better than that on the side of the opponents [!].

These people had great faith in their leaders and most of them would heed their advice, but there were a few who would not listen to the advice of the older people, and through these in course of time all went to the bad. Some would not visit the sick or have anything to do with them though they were under oath to assist them. They were too proud. They became utterly incompetent because they would listen neither to the conjurer nor the old people. Sometimes, too, the conjurer told them lies and they found it out and for that reason would not listen to him.

#### STORY OF THE PANTHER CLAN (KOI ICTO IKSA)

The people of this clan knew how to make use of the terror inspired by the name of their totem animal to accomplish their desires.

The Wildcat and Panther clans appear to have been related to each other but, owing to a certain law, they were not allowed to intermarry. In those days people were law-abiding and stuck to their old customs. If one wanted to do a thing he asked advice of the old people.

These people lived principally on wild animals and would not touch anything unless it were clean. They lived usually in the hills and mountains, not far from water but not too close to it because they were afraid of it. They had plenty of horses and other property. They were quick to learn.

Once they made a feast and invited all of the neighboring people to come to it. They had a great celebration but in the course of it some began quarreling and a fight followed in which many persons were killed. [This last episode is probably introduced to show that they shared the bellicose characteristics of their totem animal.]

#### STORY OF THE WILDCAT CLAN

This clan differs from other clans principally in what its members eat. They seldom go out in the daytime but roam about at night in search of food. They do not, however, try to steal. They are swift of foot and when an accident happens to them they depend on their swiftness to escape. They care very little about women, but when they want anything they generally get it. They think more of their feet than of any other parts of their bodies and their eyes are so keen that they can see anyone before he detects them. When one of them wants a wife he gets his parents to obtain one. They do not select any kind of woman but are careful in choosing. The younger always get a woman first. These generally sleep in the daytime. If they do not have good luck at night their rest is disturbed but if they have good luck they sleep through most of the day.

Once a number of men belonging to this clan went hunting and camped a considerable distance from home. Afterward they scattered to see what they could find but remained within call of one another, having made an agreement that if anything happened to one of them he should shout for help. But one of them ventured farther than he was aware and got a long distance off. Presently he got tired and sat down to rest, but while he was there a *lo<sup>o</sup>fa* " came up and said, "What are you doing here? You are intruding upon my land and had better get up and return to your own place." But the Indian believed himself to be strong enough for any situation, so he sat still without speaking. Presently the *lo<sup>o</sup>fa* ordered him off again and added, "If you do not get up and go away I will tie you up and carry you to my place." "You may do so

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<sup>o</sup>*Lo*fa means "skinned." The being was thought to have long hair like an animal.



if you can," the man replied, and upon this the lo<sup>o</sup>fa seized him. At first it seemed as if the man were the stronger of the two and he was able to throw the lo<sup>o</sup>fa down, but the latter smelled so bad that it was too much for his antagonist, and the lo<sup>o</sup>fa overcame him, hung him up in a tree and went away.

The man hung there all night, and when he did not make his appearance at camp the other hunters began a search for him and, when they found him, cut the grapevine by which he was fastened so that he fell to the ground. They asked him what had treated him in this manner but he would not speak and they thought he might have seen a ghost or something of that sort. Some time later, however, he came to himself and related what had happened. Afterward, although he was very fond of hunting and knew that he would be successful, he would not venture out unless someone were with him.

#### STORY OF THE BIRD CLAN

This clan was not very numerous. Their origin was not known for some time, but finally it was discovered. There were some people living on two neighboring hills, but for a long time it was not thought that these had inhabitants because other people did not see how they could get down from them to hunt. When they found that they actually were inhabited they thought that the occupants must have wings, and so they called them Birds. They were people who were up and off before day. They did not have many peculiar customs. They were like real birds in that they would not bother anybody. They usually had many wives, and they had a good custom of not marrying anyone outside of their clan or those belonging to another house group. A woman might belong to the very same clan as a man, but if her house name was different from his he would not marry her. The reason was that they did not want to mix their blood with that of other people. They kept to the ways of their ancestors without disturbing anyone else. They were satisfied with what had been handed down to them. The people of this clan have different sorts of minds, just as there are different species of birds. Some have the minds of woodpeckers, others of crows, others of pigeons, eagles, chicken hawks, horned owls, common owls, buzzards, screech owls, day hawks, prairie hawks, field larks, red-tailed hawks, red birds, wrens, humming-birds, speckled woodpeckers, cranes, bluebirds, blackbirds, turkeys, chickens, quails, *teōwē<sup>o</sup>cāk* (birds found only in winter and looking like martins), yellow hammers, whip-poor-wills, and like all other kinds of birds. Some have homes and some have not, as is the case with birds. It seems as though the best people of the Bird clan were wiser than any others. They do not work at all, but have an easy time going through life and go anywhere they want to. They have many offspring, as birds have. They do whatever they desire, and when anything happens to them they depend on persons of their own house group without calling in strangers. This is the end of the story of the Birds, although much more might be written about them.

#### STORY OF THE RED FOX CLAN

Red Fox (Teula)<sup>44a</sup> was once found in a cave asleep by a hunter. The hunter crept up to him and saw that it was Teula. As he lay there asleep he looked red all over, and in consequence the hunter called him Red Fox. From that time on his descendants have been known as the Red Fox clan.

Some time after this Red Fox took up with a woman belonging to the Wildcat clan. Their descendants were known as Teula homa iksa, and they lived only

<sup>44a</sup> Teula simply means "fox," but this is the way it was given.

in the woods. They made a living by stealing from other people, and that was why they wanted to live in the timber continually. If this clan had been handed down through the women, it would have been numerous to-day; but since it depended on the father's side it did not last long. They kept on stealing until about 1880, when the other people got tired of them and killed nearly all, so that there are now only a few remaining among the Choctaw and Chickasaw.<sup>45</sup>

A person of the Red Fox clan did whatever he liked. Once a man of this clan went hunting. He did not return that day nor on the day after. In fact he was gone for several days, and presently the people thought something had happened to him and chose three men to send in search of him. These men at length reached a place where they expected to find him, but when they got close to it he was not there. They discovered that he had taken up with a woman of the Bird clan; that was why he had not returned home. When they at length came to the place where he was living, he told them that he did not think it was harmful to take any woman, whether she was of the same clan or not. Therefore, when he met this woman and found that he liked her and that she liked him, they lived together. The men told him that it was against the will of his people and contrary to their customs, but he could not be persuaded and after a while they left him. Before he left his people he had already been married. Afterwards he wanted to go back to live with them as he had before, but they would not listen to him.

It was the belief of the people of the Red Fox clan that one should not marry outside, and it was their law that if one did so they would not have anything to do with him. They would not help him in any way, but he who obeyed their customs was held in respect among them. They believed that things moved on as was intended by the Creator, but some people did not have any regard for this and did not care what happened to them.

The customs and habits of the Red Fox clan are different from those of any other, and the same was true of those of the Double Mountain people. Anyone who wanted to learn their ways must marry one of their women [which, judging by what was said in the last paragraph in the case of the Red Foxes, would seem to have been difficult].

When winter was approaching and these people wanted to go on a hunt, they began their preparations a considerable time in advance. Some of them would get together and decide how many were to go and how long they would be gone. Then these persons would fast for four days and meanwhile the women would cook food for them to take, enough to last for the time determined upon. They made sacks into which to put cold flour (*bánaha*). While the men were fasting they would not sleep with their wives, for if one did he thought that luck would abandon him and he would kill no deer. Some would not observe these rules and in consequence they were usually excluded from the party. If such a person were permitted to go, the deer would see him first and run off. But those who obeyed the regulations would have good luck and kill many deer and bear to bring home. When they killed a deer they dried the meat to last them through the winter. When they went after bear they hunted about until they discovered his lair and then one of the hunters went into it bearing a pine torch.

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<sup>45</sup> The descendants of a Wildcat woman would ordinarily have been reckoned as of the Wildcat clan. If an exception had been made in the first instance and the children had been called "Red Fox clan" the clan could have been perpetuated through the female children alone. An attempt to perpetuate it by reversing the ordinary Chickasaw laws of descent would undoubtedly have failed. Therefore this story can not be taken seriously. Still there was a clan of this name which has almost died out.

The following story refers to a clan, or supposed clan, of which I have absolutely no other information. It may have been in reality a house group, but the word *iksa* is ordinarily bestowed upon a clan or larger division. Perhaps this may refer to some low-caste, wandering element in the population similar to one mentioned in an old French narrative dealing with the Choctaw.<sup>46</sup>

STORY OF THE WANDERING IKSA (NO HOME IKSA)

People used to wonder about the origin of this *iksa* and how they got their name. They were with the Chickasaw and Choctaw when they came to this country. They were shiftless people who did not want to own anything, but wandered from one place to another, and so were called Wandering *Iksa*. There are still such people among the Indians. They are rightly named, for they do not do anything for themselves, nor do they want to do anything for anyone else. Some pitied them and some did not, but it appeared that they were satisfied with the way they lived. They are healthy looking, strong people, for they did not do anything to run themselves down, but they did not move about like others. They moved very slowly, except about something that concerned their own welfare, when they were quick enough. They thought they were going to live forever. They did not care how they dressed or appeared. Their women did not take care of their hair like women of other clans, but let it hang down uncombed. Though some of the women were good looking they would not make good wives. Sometimes they wore dirty dresses. They wanted people to give them food for nothing, and when they could not get anyone to do so they would work, but they would not do any hard work.

The local groups or "house names" (*intcuka hotcifo*'), as the Chickasaw called them, were very numerous. I have about 50 in my lists, and the Indians believe that, during the smallpox epidemics, many were entirely wiped out. The interests of a man or woman centered more in the local group than in the larger divisions already mentioned. Indeed, one of my informants asserted emphatically that the totems were of importance only in international relations, as in dealings with the Creeks, when they determined the position in which visiting Chickasaw and Creeks stood to one another. Those belonging to totemic groups having the same animal names then considered themselves relatives, and hospitalities were exchanged. Each local group had its own set of personal names, which appear to have been passed down from one generation to another much as was the custom among the Creek Indians. According to native tradition the house names were established just after the Chickasaw had crossed the Mississippi from the west and occupied their historic seats. The prophet under whose guidance they had conducted their journey then visited the different camps and named each from some peculiarity he observed connected with the camp or its surroundings. Until then they had been fighting with all of their neighbors, and so they were given their war names at the same time. Of course this is

<sup>46</sup> *Memoirs Am. Anthropol. Asso.*, vol. v, pt. 2, p. 72.

merely an attempt to simplify and represent by one concrete story a process that covered a long period and probably continued even after white contact, new groups being introduced and older ones dying out. It was an old saying among the Chickasaw that each person must know his own house name and his own clan name.

In the following table are contained all of the names of these local groups of which I have been able to learn, classified as far as possible under the proper dual and totemic divisions:

## TCUKA FALAHA

(This embraced the Fish, Deer, Bird, Panther, and Wildcat clans.)

"Anecheir" (Fish clan), so given in writing by one informant.

Imaieksaka.

Imabōha ictō', or Imabo ictō' (Bird clan), "big house."

Imbihi wa ictō' (Bird clan), "big ripe mulberry."

Imitākciē (Deer clan), "a root barely projecting above the ground" (or "a tree lying down").

Immaboha (Wildcat clan), "their house."

Immokakina'fa' (Fish clan), "hole dug for clay in plastering a house."<sup>47</sup>

Imok'waca' (Deer clan) (waca' means "to sift").

Imosāktca'a' (Fish clan), "hickory tree chopped to pieces."<sup>48</sup>

Impitca teaha (Bird clan), "high cornerib."

Inkafāltcāba' (Wildcat clan), "sassafras footlog."<sup>49</sup>

Inkobukcē, "their hump" (from Speck).<sup>50</sup>

Innanih teiya' (Bird clan), "double hill."

Insakti ĩa'fa, "their bank of the river boundary" (from Speck).

Inteiskilik kōba'fa' (Deer clan), "broken blackjack."<sup>51</sup>

Inteica kōba'fa' (Deer clan), "broken post oak."

Inteica waya' (Deer clan), "their post oak bends over."

Inteufāk' (Wildcat clan), "having a fork in a tree."

Inteuka abātca' (Bird clan), "to learn something new" or "to practice something at home."

Inteuka homa' (Panther clan), having a "red house."

Inteuka' pātha (Wildcat clan?), "wide house."

Inteuka takāssa' (Wildcat clan), "house with a flat roof."<sup>52</sup>

Intaboka.

Intiliho (part) (Wildcat clan), name of a kind of weed.<sup>53</sup>

Intōfoka (Bird clan).

I'hina kotca.

I'holihta ĩpa' (Bird clan), "a rotten rail fence."

I'kāsbiĩco (or I'kāsbi ĩco) (Wildcat clan), "having no yard."

I'kāctaca', "having fleas."

I'koa'aca' (Wildcat clan), "cat place."<sup>54</sup>

I'cāktei akāfa' (Fish clan), "crawfish dragged along."

I'cintuk (Fish clan), "a little round hillock."

I'yaĩlkāca (Wildcat clan), "having dung about it."

Kō ictō (Panther clan), "panther."

## TCUKILISSA

(This embraced the Raccoon, Spanish, and skunk clans; perhaps anciently also the Squirrel and a clan called Mi'ko.)

Ibaiteoka (or I'haiteoka).

Imatā'po', a kind of tent.

Imoktakali (Spanish clan).

Imiti kōbō'pa', "a hollow tree" (beaten on as a kind of drum).<sup>55</sup>

Imosāk āpi (Skunk clan).

Imotak tealāka.<sup>56</sup>

Footnotes are on page 205.

Inteuka kolofa (or Inteuka istokolofa) (Raccoon clan), "house cut off" or "low house."	Intökälba' (Raccoon clan), "old waste field," or "a lot of weeds in the crop."
Inteuka lipa, "their house worn out" (given by Speck).	Intonink kobā'fa' (Spanish clan), having "broken posts."
Intabana (Raccoon clan).	I <sup>n</sup> hāci kōtea'ka' (Spanish clan), "sunrise," "east." <sup>57</sup>
Intākon lāhpa (Raccoon clan), "a number (of people) eating peaches."	I <sup>n</sup> hacōk teuka (Skunk clan), having a "grass house."
Intanak coha.	I <sup>n</sup> koni' (Skunk clan), "skunk."
Inta <sup>n</sup> hici <sup>e</sup> (Spanish clan), "corn husks."	I <sup>n</sup> konoma', or I <sup>n</sup> koni homa (Skunk clan), "red skunk." <sup>58</sup>
Intiliho (part) (Skunk clan), name of a kind of weed. <sup>59</sup>	I <sup>n</sup> cinuk teaha (teaha="high").

The following local groups remain unclassified:

Imatōli, "ball ground."

Imātōnōha', "rolling" people.

Imbihi toma', "under the mulberry tree."

Imiti kolofa, "a block cut out of a tree," or "a bucket."

Imoktak tealāca, name of a kind of weed (oktak, "prairie").

Imomboha fālaha, "their house long."

Imōntcaba ictō', "big hill."

Imosa foloma', (meaning ?).

Impasāktcāla<sup>e</sup>, "button snakeroot."

Impitea' kolofa', "low cornerib."<sup>59</sup>

Imusatūia, any species of climbing vine.<sup>60</sup>

Intōgōla, a word used when a thing is carried along and put into the water.

Intcica kano<sup>n</sup>ka, "small post oaks."

Inteuka āli, "his own house."

Inteuka teaha, "tall house."<sup>59</sup>

Inteukutci, "little house."

Intiacāka<sup>e</sup>, "behind a tree."

Intōfala', "a grown-over field," "an old field."

I<sup>n</sup>bickūn, a plant used as medicine which grew in little patches near camping places.

I<sup>n</sup>sākti falaha, "long bank."

<sup>57</sup> By one informant placed in the Teukilissa moiety.

<sup>58</sup> These are said to have been people of wealth. One of my informants assigned this group to the Spanish clan, but Speck confirms the classification here made.

<sup>59</sup> The name is said to have been derived from the circumstance that a family of this group formerly lived on both sides of a creek spanned by a footlog of sassafras.

<sup>60</sup> According to one informant, instead of farming like other house groups, the male portion of this community hunted and fished while the women collected wild fruits and roots. They are said to have been the first Chickasaw to play the game of "hiding the bullet," i. e., "the moccasin game."

<sup>61</sup> According to the story, a runaway woman was found under a broken blackjack tree and from that circumstance the name was given to her and her descendants.

<sup>62</sup> It is said that a man of this group was too lazy to build a good house and so his wives were obliged to put up a low, flat-roofed house of some nondescript pattern.

<sup>63</sup> It is not known whether the two house groups called Intiliho had entirely independent origins or whether they represented one house group which became separated in course of time. One informant placed the Intiliho belonging to the Teukilissa moiety in the Spanish clan instead of the Skunk clan.

<sup>64</sup> Said by another informant to have belonged to the Skunk clan.

<sup>65</sup> One informant thought that this belonged to the Panther clan, in which case it should be in the other moiety.

<sup>66</sup> Placed by one informant in the Bird clan and hence in the Teuka falaha moiety.

<sup>67</sup> By others this is said to have belonged to the Skunk clan.

<sup>68</sup> Another informant thought that this belonged to the Spanish clan.

<sup>69</sup> Given by but one informant.

<sup>70</sup> This is probably identical with the "Emisha taluyah" which Cushman gives as the name of the house group to which Governor Cyrus Harris belonged.

I<sup>s</sup>áktika, "having a fork in the creek."

I<sup>s</sup>a<sup>n</sup>kona, (meaning ?).

I<sup>y</sup>akni chula (original orthography Ayaknee chuelah), "Fox land," said by the native who furnished this name to belong to the Fox clan.<sup>60a</sup>

Calakálak, "geese."

Cawihá<sup>n</sup>ka', "shouting to the racoon." (?).

The reader should be on his guard against assuming that this list represents an absolutely accurate classification. While most of my informants agreed among themselves, there were, as indicated in the footnotes, discrepancies in their testimony. More important are the discrepancies between my list and that of Doctor Speck. It is true that the side that he calls Imosaktà<sup>n</sup> agrees in its make up, so far as material is available, with that I have called Teuka falaha, but three of the clans listed by him on the opposite side were placed by my informants among the Teuka falaha also—the I<sup>y</sup>álkaca, from which the prophet of the side is said to have been taken, the Inteica waya', and the Inteiskilik kōba'fa'. Only the I<sup>n</sup>koni, Inteuka kolofa, and perhaps the Inteuka lipa are with the Teukilissa where we should expect to find them. The rapid fading of native knowledge regarding such things sufficiently accounts for the discrepancies, although the occurrence of two branches of the Intiliho on opposite sides indicates that the position of many of the local groups may not have been as rigid as would at first be supposed. The following items regarding house group usages are taken from a native text:

If any accident befell a man married into a house group from outside or adopted in any other manner, the people of that group would care for him as if he were one of themselves, but if they found a man among them for some other purpose they would send him away. Sometimes people of suspicious character came to live among them but then they would not have anything to do with them or help them in any manner and not infrequently such persons died in consequence. But if one of their own people fell ill the members of the group cared for him faithfully.

These people usually trusted in their prophets, doctors, and leading men, followed their advice, and were themselves respected in consequence, but the ignorant among them did not have any respect for the law or themselves and would move about from one place to another thinking to better their condition. They could not find any place to suit them, however, because others distrusted them and they suffered accordingly. Some of these people had families. At times such a person would go to an Indian whom he believed to be a friend and stay with him for a while but the latter would soon get tired of him, and he would have to move away. If they had been properly brought up they would have managed differently, but they did not know how to behave, would take things that did not belong to them, and finally ceased to care what they did. After the others had stood this for a while they generally took them out and whipped them. If they did not then move out of the way, they would whip them again, and if they still hung about they would kill them. After a man had been whipped once he was an outcast and was not allowed to take part in any collective undertakings. He could not be restored to favor among his own people but he might go to some other group where he was not known, and if

<sup>60a</sup> Information from a single informant.

he now lived as he ought he would be accepted as a respectable man. But if it was found that he had been whipped once or twice, they would treat him as his first neighbors had. After they had been whipped some of these people reformed but others did still worse until they provoked their neighbors to kill them.

The following stories regarding several of the house groups are from the same source as the clan stories already given and of the same general character. Similar allowances must be made for the assertions of endogamy.

CUSTOMS OF THE DOUBLE MOUNTAIN HOUSE GROUP (INNĀNIH TCĪYA')

It was the endeavor of these people to raise their children in the right way so that they would not depart from it after they were grown up. In order to make their boys strong and healthy they compelled them to dive into the water four times for four mornings, once every month, throughout the winter. If they were brought up this way they would be early risers and strong and would not be lazy. Whatever they set out to do they worked at with all their might. But anyone could tell those who had not been well brought up by their appearance.

A girl was taught how to cook, sew, patch clothing, and pound up corn. This training was continued until she was grown up when, if she married, she knew how to keep house. She would be a respectable woman who loved her husband and children and of whom everyone was fond.

STORY OF THE BENDING-POST-OAK HOUSE GROUP (INTCICA WAYA')

These people were not numerous. They received their name from the fact that they usually lived in the woods near some bending-post-oak tree. When they got tired of one place they moved to another and they seemed to seek a place to camp where there was a bending-post-oak. They were not very energetic, but they loved to dance. It is natural for people to look sad when anything serious happens, but it was particularly conspicuous in the case of these people. They often met to discuss what they would do in case they should lose their hunting grounds. They taught their children that, whatever happened, they must not abandon their customs but keep them up carefully. They were not people of foresight, however, and depended much on others for advice. They were early risers. They made many mistakes, but usually through ignorance. They did not care much whom they married, whether outside of the group or not—at least this was the case with the men; but the women were different. The women would marry no one unless he were a good hunter, and if a man were not it was hard for him to get one of these women. One time a poor hunter wanted to get a woman of this house group, so he got another man to kill a deer for him and carried the same deer past the woman's house several days in succession, in fact until it spoiled. And after all he was unsuccessful.

STORY OF THE HIGH CORNCRIB HOUSE GROUP (IMPITCA TCAHA)

These people were not much esteemed by others but they thought a great deal of themselves. They were very industrious and raised big crops every year, for which they put up high cornercibs. When other people saw what they were doing and how high their cornercibs were they called them the High Corncrib people. They did not hunt much and therefore bartered corn for venison, bear fat, or bear meat. In this way they made their living and so they were a very wise people. They were people of one mind and would not let any of

their members marry outside if they could prevent it. They were truthful people, and they knew a great deal about the weather. They could tell what sort of weather was to be expected when the bear hunting season arrived. They could tell whether it would be wet or dry, and therefore they would wait for dry weather before going on a hunt.

Their beliefs were like those of other people. They thought that God was ruling somewhere in the universe, but they did not know where He lived. Some worshipped Him but others did not believe there was any God. Some did not care what others thought of them; some did not care how they lived. They loved horse races, to dance, play ball, and play the game of hide-the-bullet. After a time they knew that they must give up their peculiar customs and habits and began to plan how they should live among others. . . .

These people of the High Corncrib will live until the end of time.

#### STORY OF THE RED SKUNK HOUSE GROUP (INKONI HOMA)

The Red Skunk people had ways different from others. They lived in dugouts underground and hence seldom saw the sun rise. They fitted up these holes on the inside so that they were suitable as habitations, but they seldom permitted others to come to live with them. The underground dwellings varied in size in accordance with the size of the family, and they were arranged in such a manner that their enemies could not get at them. They lived on a low flat at one time, and while they were there were nearly destroyed by a flood, upon which the survivors moved away and lived in the mountains.

One winter a man went off hunting. He travelled every day, camping at night, until he came to Smoky Mountain (ontcába cōbōli). He did not know anything about this mountain, but camped near it intending to hunt for several days. He hunted morning after morning until he had accumulated a quantity of venison and bear meat, when he began to think of returning. On the very morning of his departure the mountain began to smoke. He started off but after a time returned to the spot he had left and this happened repeatedly. He continued his attempts for several days. At last he lay down to sleep. Before sleep came to him, however, a creature looking like a human being approached, but he did not speak to it nor did the strange being address him. Finally it went away. Then the dog he had brought along told him that if he remained there all that night he would surely die. He debated how he might escape from the creature he had seen which he already suspected was not a human being and he asked his dog what he should do. "If you follow my instructions implicitly, you will escape," said the dog, and the man agreed to do so. Then the dog said, "When that being comes back you must rise, take your bow and arrows, and shoot an arrow a great distance away. The being will pursue it and while he is gone get up and run off and be ready for him when he returns." As the dog had said, the strange being presently returned. Then the man shot an arrow to a distance and while the creature was in pursuit of it he and the dog began to run. After the being had gotten the arrow, he pursued them and when he came up the man shot off another arrow. After he had discharged his last arrow, the dog said, "Let us enter this hollow tree." They did so and afterwards the dog licked at the opening with his tongue until he had licked it together. When the being returned he could not get in to them and presently went off, and next morning the dog began licking at the hole until it was again open.

The dog and his master crawled out and started toward home, but just before they reached it the dog said, "Your wife will have the soup ready. You must let me eat some first and then you can eat." They found it to be as the dog had said and the dog's master allowed him to eat of the soup



first, whereupon he walked out to the yard, lay down, and died. This proved how much the dog loved his master because, if the man had eaten first, he would have been the one to perish. After the people learned what had happened to this hunter, they selected certain men to investigate and they went to the place where the man had camped, but could learn nothing.

Another time two men made arrangements to go on a hunting trip. They set out and travelled for several days before making a permanent camp. After they had been there for some time the actions of one of them excited suspicions in the other. He would go out hunting and not come back until late at night and sometimes he would not return until next day. At last his companion inquired of him the reason for this but, getting no satisfactory reply, he meditated how he should discover what was wrong. So one morning, when his companion started out, he followed him stealthily and saw him enter a cave in the side of a mountain. He followed him through this and discovered that beyond it, under a water hole near some rocks, lived two young women, with one of whom the first hunter had taken up. The second hunter wanted to speak to the other woman but could not get a chance and therefore returned to his camp. When the first man returned, the other asked him a second time about his doings, and now the man related everything because he knew what his friend had learned. He also told him he could get the second girl if he wanted her. The man answered that he would do anything to accomplish it, and so his comrade directed him to go into the cave and wait there. Several terrible creatures would come toward him, but he must not run away. The man obeyed these instructions and stood his ground against the fearsome beings who presented themselves until something which seemed to be Thunder came when he became terrified and ran out. If he had remained, the woman would have come last of all. In this way he lost his chance of getting her and after a time wished to return home. His companion, however, was unwilling to leave his wife, so the two stayed on together for a longer period, indeed for about a year. At the end of that time the unmarried Indian said, "I am going home to my own country," but still the other would not consent to leave and the first man remained with him. At last some of their relatives set out to search for them and came to the place where they were living. They asked why the hunters had not returned and were told that it was because one of them had taken a certain woman. They would not believe the story at first until they had been shown the woman living under the water-hole by the rocks, after which they returned home.

#### STORY OF THE ROLLING PEOPLE (IMĀTŌNŌHA')

There was a peculiar people whose house name was Imātōnōha' ("to them rolling"). They were a peculiar people, indeed, different from all others. Their customs and habits were such that they did not ordinarily want others to know anything about them, but when their property was in danger they did not care, so the other people thought they would see what would happen if they were molested.

These people had a prophet on whom they depended for advice, and they believed, if they took it, their property would be protected from their enemies, while those who were disobedient would lose it. When they were first told that plans were being made to get rid of them, they forgot about their prophet and began to make preparations for their safety without regard to him. But presently one among them remembered the prophet and they sent for him. He understood what they wanted to know and informed them, and they were saved by taking his advice. But some would not believe him and had their property destroyed.

When their enemies wanted to get rid of them they thought they would have no trouble for they lived in holes in their yards, out of which they thought these people could not emerge without being shot. Their prophet, however, knowing when the enemies would come, told them to remain in their houses until some time afterward. They were careful about showing themselves for several days. Those who would not take their prophet's advice, kept going out as usual and were killed.

When these people got their minds set upon anything, it was not easy to change them. They were wise managers and were able to get along with comparatively little work. They reared their girls and boys in accordance with their own ideas, and on account of this training their boys had little difficulty in earning a living after they had grown up. Such a person also had no difficulty in getting a wife, because it had been arranged by his parents. The boys were obedient to their parents while they were growing up and afterwards to the end of their lives, and they were well thought of by others. People also observed that they were of a peaceable disposition.

They would not marry or have dealings with any except their own clan and house relations. A boy would not marry a woman belonging to other peoples. The parents of the youth, who understood who were and who were not of the same clan and house group, would arrange this marriage with the parents of the girl, and when the couple were old enough they were married. They had been so carefully brought up that they knew exactly how to make a living and went to keeping house at once. But some of the same people brought their children up in such a way that they did not know anything and had a hard time getting along.

They brought up their girls in the same careful manner, though they were not as hard upon them. Sometimes a girl committed adultery, and when that happened they considered her an outcast. But occasionally a man outside of her clan would take a fancy to her and ask her parents to let him have her, and if they were willing he would marry her. This is the way these people brought up their children.

They found that their manner of life worked satisfactorily and were very much pleased with it; from time to time they changed it slightly when they found such changes were for the better. By and by, however, they added a new element, but this did not work as they had expected and was the beginning of their ruin. This consisted in permitting certain doctors to practice witchcraft. These persons were proud of their abilities, but the people observed that something was threatening the ruin of the tribe, and they set themselves to find out the cause. They again thought of their prophet and sent for him. Then the prophet told them that things would run smoothly as before if they would do away with all of those who indulged in witchcraft. He said that those who had practiced it must repent of their own accord or suffer the consequences. Some wizards did not hear about the order and kept on as they had been doing, and the people had pity on them because they did not know the order; but there were others who knew of the order and, without saying anything, continued their practices. The people, having determined to put the order against wizardry into effect, sent spies about to find who was guilty of it, and they discovered that many had been overawed by them. But when the wizards discovered that they had been doing wrong they offered to bear the blame, for when persons of this clan got into difficulties all would come together and adjust it because they all loved one another.

There are a few members of this house group still in existence, but nothing to compare with the numbers of their ancestors. Their ways were so peculiar that unless one were a member of the house group or married into it he could

know nothing about it. Those people love more to think of their house group and to talk about it than anything else. They would not practice their regulations merely from choice but it was a law among them. A few of them married their own near relatives.

The people of this house group had beliefs distinct from those of others. They believed there was a Creator of all things but did not know what it was. They did not know whether it was the Sun or the Moon or anything in this world. Though they did not worship the Sun or the Moon like some people, they believed there was something that had a right to do what was best for the people of this world. For that reason they were afraid to do anything wrong. They loved to talk about their beliefs. Whenever anything went wrong they relied for help more on this heavenly being, whatever it was, than they formerly had on their prophet. When they found out that would benefit them they were glad. They thought they were wiser and stronger than any other people and therefore they were proud of themselves. They all occupied the same territory.

Just before their downfall began the people ceased to live as they had formerly, i. e., they ceased to love one another. They lost confidence in one another, and thought of their old ways too late to save themselves. Some had no respect for others besides themselves and, not having been brought up right, were distinguished from the rest by the way in which they dressed.

The working of this rather complicated social system would be much plainer if the ancient marriage regulations had been preserved, but to-day the marriages shed comparatively little light on the question and, in fact, few of the young people know to what clan or what house group they belong.

The following marriages between local groups are known to have occurred. The numbers indicate the moiety where that is known.

Husband	Wife
Imitákcié (Deer) (1)-----	I <sup>c</sup> intuk (Fish) (1).
Intiliho (Wildcat or Skunk) (1 or 2)-----	Intōfala'.
Inteuka' pātha (Wildcat?) (1)-----	Intōfoka (Bird) (1).
Inteuka abātea' (Bird) (1)-----	Imitákcié (Deer) (1).
I <sup>c</sup> ákctei' akāfa' (Fish) (1)-----	Imosákctea'a' (Fish) (1).
I <sup>h</sup> olihta lipa' (Bird) (1)-----	Inkáfāltcāba' (Wildcat) (1).
Imusatūia-----	Calakálak.
I <sup>k</sup> konoma' (Skunk) (2)-----	Intiliho (Wildcat or Skunk) (1 or 2).
Imabo icto' (Bird) (1)-----	Inteuka āli.
Inteuka' pātha (Wildcat?) (1)-----	Intiácāka <sup>ε</sup> .
Inteuka' pātha (Wildcat?) (1)-----	I <sup>k</sup> koni' (Skunk) (2).
I <sup>k</sup> konoma' (Skunk) (2)-----	Okla falaya (Choctaw tribe).
I <sup>k</sup> konoma' (Skunk) (2)-----	Impitca tcaha (Bird) (1).

Of the above cases there are only two, or perhaps three, in which marriage occurred between groups of opposite sides, and at least four in which they were of the same side, while in one case the individuals even belonged to the same totemic clan.

Cushman speaks of three Chickasaw districts in existence in Mississippi before the removal, but these must have represented either a late reflection of the tribal division of the Choctaw or a transitory condition. He says:

Up to the time the Chickasaws moved west . . . their country was divided into three districts, viz: Tishomingo, Sealy, and McGilvery. At the time of their exodus west to their present places of abode, Tishomingo (properly Tishu miko, chief officer or guard of the king) was the chief of the Tishu Miko district; Samuel Sealy, of the Sealy district, and William McGilvery, of the McGilvery district.<sup>61</sup>

Five lists of Chickasaw towns are known, two from English and three from French sources, made within about 70 years of each other. These agree in part, and it is probable that in certain of the remaining cases the same town is indicated under different names, though there is now no way of identifying these. These lists are given in the following table with the more probable identifications:

Iberville <sup>1</sup> (1702)	Adair <sup>2</sup> (1720)	De Batz <sup>3</sup> (1737)	French Memoir <sup>4</sup> (1755)	Romans <sup>5</sup> (1771)
Ayarraca.....	Yaneka.....		Ayanaqua.....	
Chatata.....	Shatara.....	Tchitchatala.....		Chatelaw.
Thoucaliga.....	Chookheereso.....			Chucalissa.
Ayéheguiya.....	Hykehah.....	Ækya.....	Æcquina.....	Hikihaw.
Tascaouilo.....	Tuskawillao.....	Taskaouilo.....	Tasea oullou.....	
Tolatchao.....	Phalacheho.....	Falatchao.....	Falatché.....	
Thouquoa fola.....	Chookka Pharáah.....	Tchoukafala.....	Coucqua fala.....	Chukafalaya.
	Amalahta.....			Melattaw.
Sebafone (?).....		Apeony.....	Apeonné.....	
		Achoukouma.....	Achouque ouma.....	Ashuck hooma.
		Ogoula-Tchetoka.....	Goulatchitou.....	
			Outanquatle.....	
			Couii loussa.....	
				Tuckahaw.
		Etoukouma.....		
Apilé faplimengo.....				
Gouytola.....				
Tanyachilca.....				
Onthaba atchosa.....				
Thanbolo.....				
Ayebisto (a fenced vil- lage).....				
Alaoute.....				
Oucahata.....				
Ouchthambolo.....				
Chinica.....				

<sup>1</sup> "Documents concernant l'histoire des Indiens de la Région orientale de la Louisiane," par le Baron Marc de Villiers. (Journal de la Société des Américanistes de Paris, n. s., vol. xiv, pp. 138-140.)

<sup>2</sup> Hist. Am. Inds., pp. 352-354. The date is that to which Adair's information applies, not the date of writing.

<sup>3</sup> Note sur deux Cartes dessinées par les Chickachas en 1737, par le Baron Marc de Villiers. (Journal de la Société des Américanistes de Paris, n. s., vol. xiii, 1921, Plate I.)

<sup>4</sup> Anonymous French Mémoire. (Ayer Library of American Ethnology and Archaeology, in Newberry Library, Chicago, Ill.)

<sup>5</sup> A Concise Natural History of East and West Florida, p. 63.

<sup>61</sup> Hist. of the Choc., Chick., and Natchez Inds., p. 496.

The placing of some of these names, such as Ayarraca, Thoucaliga, Tolatchao, Thouquoa fola, Sebafone, Coucqua fala, and Goulatchitou, assumes mistakes in copying or printing. Adair gives an interpretation of only one of them, the seventh, which is plainly enough "the long house," and by derivation "the long town" as Romans has it. Romans says that Chatelaw signifies "copper town," but the word probably applied to some ornament or object made of copper. The word chuka appears again in Chucalissa, which Romans interprets "great house." Ishto is the word for "great," however, and the second part of this compound would rather appear to be ilissa, "to abandon, surrender, or give up," the whole meaning "abandoned house." The name of the fourth town is correctly interpreted by Romans "stand still," from the native word hikia. He is also plainly right in his translation of the name of the tenth as "red grass" (hâshuk, "grass;" homa, "red"). Tuckahaw he gives as the name of "a certain weed," and Melattaw "hat and feather," but I can not certify as to the correctness of these. The name of the eleventh town means "big people" if De Batz's spelling is correct; and that of the thirteenth "black panther." From the use of the word "mengo" in the name of a town given by Iberville it would seem that it was named from some chief. Gouytola appears to mean "the place of the panther," perhaps referring rather to the clan than the animal. Possibly the name given as Ouchambolo by Iberville may be Ok'champuli, "sweet water." From the use of Choctaw chito for Chickasaw ishto, "big," and Choctaw falaya, instead of Chickasaw falaha, "long," it would seem that all of these lists except that of Adair, and possibly that of Iberville, were taken down in Choctaw or the Mobilian trade language.

### GOVERNMENT

The best, indeed almost the only, account of the ancient government of the Chickasaw tribe is that printed by Schoolcraft and already quoted, which has, as we have seen, been partially confirmed by Gibbs. From this it appears that each totemic iksa or clan had a chief and that they differed in rank in accordance with a difference in the ranking of the clans. The leader of the clan highest in rank was chief or "king" of the entire Chickasaw nation. To complete our knowledge of this subject we ought to be informed in what manner the chiefs of the totemic iksas were selected, whether these chieftainships were prerogatives of certain local groups, with or without the suffrages of the others having the same totem, and

whether the local groups themselves had chiefs. A little light is shed upon these questions by Speck, who says:

Each clan was under the leadership of a chief (*miñko*), chosen by the council of clan elders for life in the old days, but at present only for a term of years. He was sometimes called by the name of *capitani*. A clan could take the warpath under the leadership of the *miñko*.<sup>61a</sup>

The "present" to which he refers is already past, and the unfortunate confusion in Speck's material between the totemic *iksa* and the local groups prevents us from knowing with certainty to which kind of group the above information applies. However, it is a probable inference that each local group was organized something like the various local bodies of Creek clans, the "uncle" who was esteemed to combine years and wisdom in the highest degree being recognized as leader, common protector, and general advisor to the youth of the clan. It may be inferred that one of these was selected to represent the totemic *iksa*, but how this choice was effected it would now be impossible even to guess.

Cushman says:

The Chickasaw ruler was styled king instead of chief; and his chief officer was called Tishu Miko.

Ishtehotohpih was the reigning king at the time they left their ancient places of abode east of the Mississippi River for those west. He died in 1840. He was the last of the Chickasaw rulers who bore the title, king. After his death the monarchical form of government, which was hereditary, as I was informed by Gov. Cyrus Harris, was abolished, and the form of republicanism adopted. The power of their kings was very circumscribed, being only about equal to that of their present governor. The king's wife was called queen, but clothed with no authority whatever, and regarded only as other Chickasaw women.

[That] Tishu Miko was a wise counselor and brave warrior among the Chickasaws is about all that has escaped oblivion, as little has been preserved of his life by tradition or otherwise. He was the acting Tishu Miko of Ishtehotohpih at the time of the removal of his people to the west. He died in 1839, the year before his royal master. He was appointed during life as one of the chief counselors to Ishtehotohpih; and when he advised the king upon any mooted question, so great was his influence over the other counselors, as Governor Harris stated, that they at once unanimously acquiesced to his propositions, but invariably with the reiterated exclamation, "That's just what I thought! That's just what I thought!" while the king said but little, but generally adopted the suggestions of Tishu Miko.<sup>62</sup>

Whether one translates the word *Miñko* "chief" or "king" and calls his wife "chief's wife" or "queen" is a matter of indifference if the connotation of the terms is not suffered to mislead. As Cushman himself says, the power of their kings was very closely circumscribed. The constitution put in force in 1840 was more democratic than the older unwritten laws of the tribe, not so much in taking

<sup>61a</sup> Jour. Amer. Folk-Lore, vol. xx, pp. 52, 54.

<sup>62</sup> Cushman, Hist. Choc., Chick., and Natchez Inds., p. 496.

away power from the Mi<sup>n</sup>ko as in taking it from the whole body of chiefs and in making them all elective. When the Chickasaw first moved west they agreed to come under the Choctaw laws in accordance with which a chief was elected every four years and captains every two years, the judges being elected by the general council.<sup>63</sup> In 1856 the Chickasaw were separated from the Choctaw and established an independent government on the same model.

Romans introduces the following commentary regarding qualifications for chieftainship under the ancient system and the prerogatives which went with it:

Their grand chief is called *Opaya Mataha*, and it is said he has killed his man upwards of forty times, for which great feats he has been raised to this nominal dignity, which by all savages is as much regarded, as among us a titular nobleman would be if he should be obliged to be a journeyman taylor for his maintenance.<sup>64</sup>

Of course regard for the above-mentioned "journeyman taylor," or his equivalent, is considerably greater in our time than in the time of Romans. He wrote just previous to the American Revolution.

In what Cushman says of the Tishu Mi<sup>n</sup>ko he has woven together statements applying to an institution and statements applicable only to a particular bearer of the title Tishu Mi<sup>n</sup>ko. This functionary, "the servant chief," or "assistant chief," was evidently the same as the Tishu Mi<sup>n</sup>ko of the Choctaw, and almost the same as the Yatika, or "interpreter," of the Creeks, who combined the functions of speaker for the chief with that of chairman of the committee of arrangements when any ceremony took place.

According to Speck each moiety had one leading prophet (*hopáye*)<sup>65</sup> who attended to its spiritual interests (see p. 192), but one of these evidently had precedence of the other and acted for the tribe on occasion. So, at least, we must interpret Adair's words when he says, "The title of the *old beloved men*, or *archi-magi*, is still hereditary in the *panther*, or *tyger* family."<sup>66</sup> The "panther or tyger family" would be the Kō icto. The prophet of one of Speck's two moieties came from the I<sup>y</sup>álkáca of the Wildcat totem group which was closely associated with the Panther, and it is possible that the Insakti ła<sup>n</sup>fa, from whom the other prophet was taken, was also Panther or Wildcat, since my informants place both of these on the same side. From Adair's narrative it is evident that this tribal prophet corresponded very closely to the Hilis ha<sup>n</sup>ya or "medicine maker" with whom every Creek town big enough to conduct a busk was provided.

<sup>63</sup> Schoolcraft, *Ind. Tribes*, I, p. 312.

<sup>64</sup> Romans, *Nat. Hist. E. and W. Fla.*, p. 64.

<sup>65</sup> Hopaye is also a name used for a war leader, so that there may be some confusion here.

<sup>66</sup> Adair, *Hist. Am. Inds.*, p. 31.

The general interest in their governmental affairs on the part of the mass of Chickasaw people is vouched for by Adair, who says: "When any national affair is in debate, you may hear every father of a family speaking in his house on the subject, with rapid, bold language, and the utmost freedom that a people can use. Their voices, to a man, have due weight in every public affair, as it concerns their welfare alike."<sup>67</sup>

### PROPERTY RIGHTS

As with the Creeks, the lands of the Chickasaw appear to have been held in common except for the use ownership of those who built houses or cleared fields in certain places. The town gardens were also cultivated in much the same manner as those of the Creeks, but—partly owing to their wars—they did not produce as much of their own food as did the Choctaw, to whom Romans says they applied annually for corn and beans.<sup>68</sup>

Such of the personal property of the deceased as was not destroyed or buried with the body went to the brothers, sisters, or sisters' children, that is, it was inherited in the clan.<sup>69</sup>

### CRIME AND PUNISHMENT

This subject may best be introduced by quoting some passages from my report on the Creek Indians, including several paragraphs from Adair:

The word *haksi* was used by Chickasaw of Adair's time "to convey the idea of a person's being a criminal in any thing whatsoever," and "such unfortunate persons as are mad, deaf, dumb, or blind, are called by no other name."<sup>70</sup> The original meaning of this word is "deaf," but it has come to signify drunken, roguish, wicked, sinful, etc.

Institutional killing will be treated under its proper head. It was based on the principle of retaliation, or, as more popularly expressed, "getting even," and was considered necessary in order to placate the souls of the departed. I have already remarked that the victim was sometimes devoted to death in advance, and Bartram mentions a case [among the Creeks] in which he was selected by lot. The following quotation from Adair shows what happened when murder was committed within the tribe, as well as the Indian attitude toward man killing generally:

"[The Indians] transmit from father to son the memory of the loss of their relation, or of one of their own tribe or family, though it were an old woman, if she was either killed by the enemy or by any of their own people. If, indeed, the murder be committed by a kinsman, the eldest can redeem; however, if the circumstances attending the facts be peculiar and shocking to nature, the mur-

<sup>67</sup> Adair, *Hist. Am. Inds.*, p. 428.

<sup>68</sup> Romans, *Nat. Hist. E. and W. Fla.*, p. 62.

<sup>69</sup> *Publ. Miss. Hist. Soc.*, vol. VIII, p. 552; Cushman, *Hist. Choc., Chick., and Natchez Inds.*, p. 495.

<sup>70</sup> Adair, *Hist. Am. Inds.*, p. 157, footnote.



derer is condemned to die the death of a sinner, 'without anyone to mourn for him,' as in the case of suicide, contrary to their usage toward the rest of their dead. . . .

"There never was any set of people who pursued the Mosaic law of *retaliation* with such a fixt eagerness as these Americans. They are so determined in this point that formerly a little boy shooting birds in the high and thick corn-fields unfortunately chanced slightly to wound another with his childish arrow; the young vindictive fox was excited by custom to watch his ways with the utmost earnestness till the wound was returned in as equal a manner as could be expected. Then 'all was straight,' according to their phrase. Their hearts were at rest by having executed that strong law of nature, and they sported together as before. . . . They forgive all crimes at the annual atonement of sins, except murder, which is always punished with death. The Indians constantly upbraid us in their bacchanals for inattention to this maxim of theirs; they say that all nations of people who are not utterly sunk in cowardice take revenge of blood before they can have rest, cost what it will. The Indian Americans are more eager to revenge blood than any other people on the whole face of the earth. . . .

"I have known the Indians to go a thousand miles for the purpose of revenge, in pathless woods, over hills and mountains, through large cane swamps full of grapevines and briars, over broad lakes, rapid rivers, and deep creeks; and all the way endangered by poisonous snakes, if not with the rambling and lurking enemy, while at the same time they were exposed to the extremities of heat and cold, the vicissitude of the seasons, to hunger and thirst, both by chance and their religious scanty method of living when at war, to fatigues, and other difficulties. Such is their overboiling revengeful temper that they utterly condemn all those things as imaginary trifles, if they are so happy as to get the scalp of the murderer or enemy to satisfy the supposed craving ghosts of their deceased relations. Though they imagine the report of guns will send off the ghosts of their kindred that died at home to their quiet place, yet they firmly believe that the spirits of those who are killed by the enemy, without equal revenge of blood, find no rest, and at night haunt the houses of the tribe to which they belonged; but when that kindred duty of retaliation is justly executed they immediately get ease and power to fly away. This opinion, and their method of burying and mourning for the dead, of which we shall speak presently, occasion them to retaliate in so earnest and fierce a manner. . . . When any casual thing draws them into a war it grows every year more spiteful, till it advances to a bitter enmity so as to excite them to an implacable hatred to one another's very national names. Then they must go abroad to spill the enemy's blood and to revenge crying blood. We must also consider it is by scalps they get all their war titles which distinguish them among the brave; and these they hold in as high esteem as the most ambitious Roman general ever did a great triumph."<sup>71</sup>

The law of retaliation in cases of murder is thus concisely stated by Warren on the authority of Cyrus Harris:

If a man or woman killed another, he or she was killed by the relatives of the slain. If the murderer could not be found, it was lawful to put to death the brother of the one who had done the killing, which made an end of the difficulty.<sup>72</sup>

<sup>71</sup> Adair, *Hist. Am. Inds.*, pp. 148-151. <sup>72</sup> *Pubs. Miss. Hist. Soc.*, vol. VIII, pp. 552-553.

Cushman, who seems to depend on the same source of information, states that a man was killed for a man and a woman for a woman. His account is much longer and runs as follows:

The law of murder . . . placed the slayer wholly and exclusively in the hands of the oldest brother of the slain, who never failed to execute the law whose claims were thus entrusted to his care and keeping, the standard verdict of which was "An eye for an eye and a tooth for a tooth"—death. In case the deceased had no brother or brothers, then one of the next nearest and oldest male relatives became the self-appointed executioner of the violated law . . . Nor did anyone, not even the nearest relations of the slayer, interfere in the matter in any way whatever—either to assist or oppose. If the slayer fled, which was very seldom if ever the case, his oldest brother, and if he had no brother, then the next nearest and oldest relative in the male line was slain in his place; after which he could return in safety and without fear of molestation, but to be ostracized and forever stigmatized as a coward wherever he went, a punishment more to be dreaded by all North American Indians than a hundred deaths. In all such cases a woman was never slain in the place of a man. On account of this rigid and inexorable custom of dealing with him who had slain his fellowman, murders were very few and far between, as the slayer well knew the inevitable consequence that would follow unless he fled to parts unknown, which would be attended with eternal disgrace to himself, family, and kindred, at the sacrifice also of his brother's life or next nearest male relative.<sup>73</sup>

A suspected witch or wizard was usually killed with the greatest promptitude.

Adair thus describes the Chickasaw punishment for adultery:

The middle aged people of a place, which lies about halfway to Mobile and the Illinois [from Carolina], assure us that they remember when adultery was punished among them with death, by shooting the offender with barbed arrows, as there are no stones there. But that with the losses of their people at war with the French and their savage confederates, and the constitutional wantonness of their young men and women, they have through a political desire of continuing, or increasing their numbers, moderated the severity of that law, and reduced it to the present standard of punishment, which is in the following manner: If a married woman is detected in adultery by one person, the evidence is deemed good in judgment against her; the evidence of a well-grown boy or girl they even reckon sufficient, because of the heinousness of the crime and the difficulty of discovering it in their thick forests. . . . When the crime is proved against the woman, the enraged husband, accompanied by some of his relations, surprises and beats her most barbarously, and then cuts off her hair and nose, or one of her lips. There are many of that sort of disfigured females among the Chickasaw, and they are commonly the best featured, and the most tempting of any of their countrywomen, which exposed them to the snares of young men. But their fellow criminals, who probably first tempted them, are partially exempted from any kind of corporal punishment.<sup>74</sup> . . .

They observe, however, a graduation of punishment, according to the criminality of the adulteress. For the first breach of the marriage faith they crop

<sup>73</sup> Cushman, *Hist. Choc., Chick., and Natchez Inds.*, p. 495.

<sup>74</sup> At this point Adair introduces an account of the custom among the Creeks and returns to discuss Chickasaw usages so abruptly that it is only by the context that it is evident that he has that tribe principally in mind.

her ears and hair, if the husband is spiteful; either of those badges proclaim her to be a whore, or *Hakse Kaneha*, . . . for the hair of their head is their ornament; when loose it completely reaches below their back and when tied it stands below the crown of the head, about 4 inches long, and 2 broad. As the offender cuts a comical figure among the rest of the women, by being trimmed so sharp, she always keeps her dark winter hot house, till by keeping the hair moistened with grease, it grows so long as to bear tying. Then she accustoms herself to the light by degrees; and soon some worthless fellow, according to their standard, buys her for his *Aná*; which term hath been already explained.

The adulterer's ears are flashed off close to his head, for the first act of adultery, because he is the chief in fault.<sup>74</sup> If the criminal repeat the crime with any other married persons, their noses and upper lips are cut off. But the third crime of the like nature, is attended with more danger; for the law says, that for public heinous crimes, satisfaction should be made visible to the people, and adequate to the injuries of the virtuous—to set their aggrieved hearts at ease, and prevent others from following such a dangerous crooked copy. As they will not comply with their mitigated law of adultery nor be terrified, nor shamed from their ill course of life; that the one may not frighten and abuse their wives, nor the other seduce their husbands and be a lasting plague and shame to the whole society, they are ordered by their ruling magi and war chieftains, to be shot to death, which is accordingly executed; but this seldom happens.

When I asked the Chikkasah the reason of the inequality of their marriage law, in punishing the weaker passive party, and exempting the stronger, contrary to reason and justice, they told me, it had been so a considerable time—because their land being a continual seat of war, and the lurking enemy forever pelting them without, and the women decoying them within, if they put such old cross laws of marriage in force, all their beloved brisk warriors would soon be spoiled, and their habitations turned to a wild waste.<sup>75</sup> . . .

Romans says:

This [Chickasaw] nation is the most imperious in their carriage towards their women, of any I have met with; they are very jealous of their wives, and adultery in them is punished by the loss of the tip of the nose, which they sometimes cut, but more generally bite off, but this does not deter them, for they are a very salacious race and the mark is pretty general.<sup>76</sup>

The same writer adds:

They are horribly given to sodomy, committing that crime even on the dead bodies of their enemies, thereby (as they say) degrading them into women.<sup>77</sup>

The punishment for minor offenses, such as horse stealing, was whipping. Cushman says that afterward "the culprit was reinstated to favor without any disgrace being attached to his name for his offense or punishment. He had violated the law, but had paid the penalty thereunto attached. The claims of the law were satisfied and therefore it was a thing of the past, to be mentioned no more, and it never was."<sup>78</sup>

<sup>74</sup> The punishment of the adulterer is to be understood as enforced only by the Creeks.

<sup>75</sup> Adair, *Hist. Am. Inds.*, pp. 142–143, 144–145.

<sup>76</sup> Romans, *Nat. Hist. E. and W. Fla.*, p. 64.

<sup>77</sup> *Ibid.*, p. 70.

<sup>78</sup> Cushman, *Hist. Choc., Chick., and Natchez*, p. 495.

While, in its application to young people, this was an old punishment it is doubtful to what extent it was employed against adult offenders until a comparatively late period.<sup>79</sup>

Adair expresses a high opinion of this tribe, but Romans, perhaps owing to one particularly unhappy experience with them, held them in slight esteem. He says:

The morals of this nation are more corrupt than those of any of their neighbours; the Choctaws are said to be thieves, but I can assure the reader that the Chickasaws are a thousand times more so; I have had ample proof of it by losing incomparably more in one day at the Chickasaw town than I did in two months going through seventy-four Choctaw towns, notwithstanding I had been warned, and was on my guard against the Chickasaws; my razors and a case of instruments, and other trifles of no real use to them, besides every horse I had with me, vanished in one day among these deceitful people. Their discourse is really intolerable, nothing but filth is heard from them.<sup>80</sup>

Adair speaks of the nonobservance of the separation of a woman during her menstrual periods as a crime on a par with murder and adultery. "Should any of the Indian women violate this law of purity," he says, "they would be censured, and suffer for any sudden sickness, or death that might happen among the people."<sup>81</sup>

Adair, again, is the only writer to say anything about oaths used in adjuring a witness to give true evidence. The Chickasaw and Choctaw oath he gives as *Chicklooska ke-e-u Chua*,<sup>82</sup> which he interprets "Do not you lie? Do you not, of a certain truth?" And the answer is *Aklooska Ke-e-u-que-Ho*, "I do not lie; I do not, of a certain truth."<sup>83</sup> Regarding epithets he says, "the sharpest and most lasting affront, the most opprobrious, indelible epithet, with which one Indian can possibly brand another, is to call him in public company, *Hoobuk Waske*, Eunuchus, *praeputio detecto*."<sup>84</sup>

## REGULATIONS REGARDING WOMEN

Adair has the following to say on this subject:

. . . They oblige their women in their *lunar retreats*, to build small huts, at as considerable a distance from their dwelling-houses, as they imagine may be out of the enemies reach; where, during the space of that period, they are obliged to stay at the risque of their lives. Should they be known to violate that ancient law, they must answer for every misfortune that befalls any of the people, as a certain effect of the divine fire; though the lurking enemy sometimes kills them in their religious retirement. Notwithstanding they reckon it conveys a most horrid and dangerous pollution to those who touch

<sup>79</sup> See Speck in *Jour. Am. Folk-Lore*, vol. xx, p. 54.

<sup>80</sup> Romans, *Nat. Hist. E. and W. Fla.*, pp. 61-62.

<sup>81</sup> Adair, *Hist. Am. Inds.*, p. 124.

<sup>82</sup> *Lushka* is a Chickasaw word meaning "to lie"; *chiklushko* signifies "you do not lie"; *ke-e-u* (or *keyu*) is the negative. The form used here is a strengthened one.

<sup>83</sup> Adair, *Hist. Am. Inds.*, p. 51. See also p. 221 following.

<sup>84</sup> *Ibid.*, p. 136.

or go near them, or walk anywhere within the circle of their retreats; and are in fear of thereby spoiling the supposed purity and power of their holy ark, which they always carry to war; yet the enemy believe they can so cleanse themselves with the consecrated herbs, roots, etc., which the chieftain carries in the beloved war-ark, as to secure them in this point from bodily danger, because it was done against their enemies.

The nonobservance of this separation, a breach of the marriage law, and murder, they esteem the most capital crimes. When the time of the women's separation is ended, they always purify themselves in deep running water, return home, dress, and anoint themselves. They ascribe these monthly periods to the female structure, not to the anger of *Ishtohoollo Aba*.<sup>86</sup>

Romans has the following:

These savages are the only ones I ever heard of who make their females observe a separation at the time of their *menses* (some ancient almost extirpated tribes to the northward only excepted, and these used to avoid their own dwelling houses). The women then retire into a small hut set apart for that purpose, of which there are from two to six round each habitation, and by them called "moon houses."<sup>86</sup>

Romans is correct as to the custom, but, of course, in error in considering it so nearly confined to the Chickasaw. It was, as has been abundantly proved elsewhere, a custom common to both the Creeks and the Choctaw.

A young girl's first menstrual experiences (*hulabe*) [says Speck] are not accompanied by any ceremony or shamanistic rites, but she is not allowed to ride a horse or come in contact with any male children.<sup>87</sup>

Regarding the subsequent menstrual periods, he says:

During her periods of menstruation the Chickasaw woman is strictly segregated from her family, remaining for three days in a brush shelter near the house. Her husband also refrains from mingling freely with his friends at these times, in the hunt or in social gatherings.<sup>88</sup>

My own informants stated that, at the time of their monthly periods, women were confined in small houses apart and could not leave them until their clothes had been thoroughly washed. This purification took about a week. In the meantime men would not go anywhere near them lest they suffer misfortune in hunting, war, and so on. The procedure at the time of the first menstrual period was in no way different from that on subsequent occasions.

## CHILDBIRTH AND EDUCATION OF CHILDREN

Our earliest authority is, as usual, Adair, who gives the following details:

Correspondent to the Mosaic law of women's purification after *travail*, the Indian women absent themselves from their husbands and all public company

<sup>86</sup> Adair, *Hist. Am. Inds.*, pp. 123-124.

<sup>86</sup> Romans, *Nat. Hist. E. and W. Fla.*, p. 64.

<sup>87</sup> Speck in *Jour. Am. Folk-Lore Soc.*, vol. xx, p. 57.

<sup>88</sup> *Ibid.*, pp. 56-57.

for a considerable time—The *Muskōhge* women are separate for three moons, exclusive of that moon in which they are delivered. . . .

Should any of the Indian women violate this law of purity, they would be censured and suffer for any sudden sickness or death that might happen among the people, as the necessary effect of the divine anger for their polluting sin, contrary to their old traditional law of female purity. Like the greater part of the Israelites, it is the fear of the temporal evils and the prospect of temporal good that makes them so tenacious and observant of their laws. At the stated period the Indian women's impurity is finished by ablution and they are again admitted to social and holy privileges.<sup>80</sup>

At the birth of a child [says Speck] the mother must be kept from public view for the space of two months, generally residing in the menstrual lodge. She eats no fresh meat. The father is not allowed to engage in work for about a month, and he is looked upon by his townsmen as an undesirable companion on the hunt and elsewhere. The navel cord is first corded, and after a short time is clipped and placed in a secret place until the prophet of the child's group can examine it to determine the future prospects of the infant.

Similarly to the Choctaw, Natchez, and other tribes of the southeastern area, the Chickasaw practiced head flattening of both sexes by artificial compression. The custom, however, has been obsolete for many generations. Soon after birth, and every night for six months, a wooden block thickly padded with buckskin was placed upon the infant's frontal bone and bound in place. The process was continued during later childhood by hand pressure. Deformation of this sort was believed to develop the most admirable qualities and was a sign of high social rank.

Twin children are considered as supernatural manifestations and are brought before the prophet to have their futures foretold also. Should one of them be a boy, he is likely to become the *mūko* of his clan, being called *Itapōtka*, "double."<sup>81</sup>

The following note by the same writer should be added in this connection:

They never allowed children to make use of anything that was double for food, such as double strawberries, fruit, or chicken gizzard, and when a young man killed his first game of any sort he did not eat it himself, but distributed the meat among his clansfolk.<sup>81</sup>

If this last regulation were not observed it was thought that the youth would not kill any more game.

Adair has the following to say regarding the sympathetic magic practiced on Chickasaw babies in order to insure them good fortune:

Their male children they chuse to raise on the skins of panthers, on account of the communicative principle, which they reckon all nature is possessed of, in conveying qualities according to the regimen that is followed; and as the panther is endued with many qualities beyond any of his fellow animals in the American woods, as smelling, strength, cunning, and a prodigious spring, they reckon such a bed is the first rudiments of war. But it is worthy of notice they change the regimen in nurturing their young females; these they lay on the skins of fawns or buffalo calves because they are shy and timorous.

<sup>80</sup> Adair, *Hist. Am. Inds.*, p. 124.

<sup>81</sup> *Ibid.*, p. 54.

<sup>80</sup> Speck in *Jour. Am. Folk-Lore*, vol. xx, p. 57.

and if the mother be indisposed by sickness, her nearest female relation suckles the child, but only until she recovers.<sup>92</sup>

According to my own notes, when a woman was about to be confined, she entered a special house of a more permanent character than the one used by menstruant women. This house, called *anînka*, seems, from the description, to have been identical with the ancient winter house. It is described as "like an Indian potato house," made of logs and daubed inside and out with clay. It was larger than the common dwelling house and was often used for dances. The door was the only opening and a fire in the center kept it warm day and night. During the woman's confinement she was waited upon by women, not even her husband being allowed to approach her. The men merely brought firewood as far as the door. The woman could eat only venison, chicken, and bacon, but no vegetables. She could not leave this house until she had been purified, about a month after her child was born.

Children were nursed for a very long time. They would not let them sleep with old people; probably from the same fear as that experienced by the Creeks that they would be bewitched.

Cushman enlarges as follows on the education of Chickasaw children:

The greatest care was bestowed upon their children by the Chickasaw mothers, whom they never allowed to be placed upon their feet before the strength of their limbs would safely permit; and the child had free access to the maternal breast as long as it desired, unless the mother's health forbade its continuance. Children were never whipped by the parents, but, if guilty of any misdemeanor, were sent to their uncle for punishment (the same as the Choctaws), who only inflicted a severe rebuke or imposed upon them some little penance, or, what was more frequent, made appeals to their feelings of honor or shame. When the boys arrived at the age of proper discrimination—so considered when arrived at the age of 12 or 15 years—they were committed to the instructions of the old and wise men of the village, who, at various intervals, instructed them in all the necessary knowledge and desired qualifications to constitute them successful hunters and accomplished warriors. As introductory lessons they were instructed in the arts of swimming, running, jumping, wrestling, using the bow and arrow; also, receiving from these venerable tutors those precepts of morality which should regulate their conduct when arrived at manhood. The most profound respect (a noted characteristic of the North American Indians) was paid everywhere to the oldest person in every family, whether male or female, whose decisions upon all disputed points were supreme and final, and were received with cheerful and implicit obedience. No matter how distant their blood relations might be, all the members of a family addressed its head as father or mother, as the case might be; and whenever they meant to speak of him (their natural father), they said, "My real father," in contradistinction to that of father applied to the chief or head of the family.<sup>93</sup>

In this narrative the paternal and maternal uncles have been confounded. The leading man of a person's own clan was called uncle,

<sup>92</sup> Adair, *Hist. Am. Inds.*, pp. 420-421.

<sup>93</sup> Cushman, *Hist. Choc., Chick., and Natchez Inds.*, pp. 488-489.

never father, and the term used was restricted to males related through his mother. It was he who lectured and advised the wayward. The leading man of the father's clan was no doubt held in high honor, but he would offer no advice regarding children of another clan unless especially asked to do so. The following quotation from Adair shows that correction sometimes went beyond mere reproof:

It ought to be remarked that they are careful of their youth and fail not to punish them when they transgress. Anno 1766, I saw an old head man, called the *Dog-King* (from the nature of his office), correct several young persons—some for supposed faults and others by way of prevention. He began with a lusty young fellow who was charged with being more effeminate than became a warrior and with acting contrary to their old religious rites and customs, particularly because he lived nearer than any of the rest to an opulent and helpless German, by whom they supposed he might have been corrupted. He bastinadoed the young sinner severely with a thick whip about a foot and a half long composed of plaited silk grass and the fibres of the button snake-root stalks, tapering to the point, which was secured with a knot. He reasoned with him as he corrected him; he told him that he was *Chehakse Kanèha-He* [teihaksi kània he], literally, "you are as one who is wicked, and almost lost." . . . The grey-hair'd corrector said, he entreated him in that manner according to ancient custom, through an effect of love, to induce him to shun vice, and to imitate the virtues of his illustrious forefathers, which he endeavoured to enumerate largely; when the young sinner had received his supposed due he went off seemingly well pleased.

This Indian correction lessens gradually in its severity according to the age of the pupils. While the *Dog-King* was catechising the little ones, he said *Che Haksinna* [teihaksina], "do not become vicious." And when they wept, he said *Che-Abela Awa* [teiabila awa], "I shall not kill you."<sup>94</sup>

In another place the same writer remarks that in his time children who killed the pigs and poultry of the traders were merely given "ill names" by their parents, whereas "the mischievous and thievish were formerly sure to be dry-scratched."<sup>95</sup>

Probably the "Dog-King" was the maternal uncle of the children he was correcting, though the reference to his title indicates a possibility that he had some more general function.

In order to make boys strong they gave them herbs and afterwards made them plunge into water, no matter what time of the year it happened to be. This bath was taken before day each morning and was continued through life. They were more careful to take it in winter than in summer, and especially on cold frosty mornings, and they believed it would help them to withstand cold weather, give them health, and enable them to live to a good old age. Adair says of this:

However, they practice it (bathing) as a religious duty, unless in very hot weather, which they find by experience to be prejudicial to their health, when they observe the law of mercy, rather than that of sacrifice. In the coldest

<sup>94</sup> Adair, *Hist. Am. Inds.*, pp. 156-157.

<sup>95</sup> *Ibid.*, p. 413.



weather, and when the ground is covered with snow, against their bodily ease and pleasure, men and women turn out of their warm houses or stoves, reeking with sweat, singing their usual sacred notes, *Yo, Yo*, etc., at the dawn of day . . . and thus they skip along, echoing praises, till they get to the river, when they instantaneously plunge into it. If the water is frozen, they break the ice with a religious impatience: After bathing, they return home, rejoicing as they run for having so well performed their religious duty, and thus purged away the impurities of the preceding day by ablution. The neglect of this bath hath been deemed so heinous a crime that they have raked the legs and arms of the delinquent with snake's teeth, not allowing warm water to relax the stiffened skin.<sup>96</sup>

He adds that the women were less rigid in the performance of this duty, "for they only purify themselves as their discretion directs them."<sup>97</sup>

Boys were more desired than girls and were more carefully educated. They were not allowed to run about freely as they do to-day, and it is claimed that they were not permitted to marry until they were about 30, though this is certainly a considerable exaggeration. Nevertheless they were usually affianced in childhood. Children of opposite sexes were not allowed to play together after they had attained the age of three or four years, and a girl could not go anywhere by herself until after she was married.

### MARRIAGE CUSTOMS

As in the case of so many other customs, we can not introduce this subject better than by inserting what Adair has to say regarding it:

It is usual for an elderly man to take a girl, or sometimes a child to be his wife, because she is capable of receiving good impressions in that tender state: frequently, a moon elapses after the contract is made, and the value received, before the bridegroom sleeps with the bride, and on the marriage day, he does not appear before her till night introduces him, and then without tapers . . .

The Indians also are so fond of variety, that they ridicule the white people, as a tribe of narrow-hearted, and dull constituted animals, for having only one wife at a time; and being bound to live with and support her, though numberless circumstances might require a contrary conduct. When a young warrior can not dress *a la mode America*, he strikes up one of those matches for a few moons, which they term *Toopsa Táwah*,<sup>98</sup> "a make haste marriage," because it wants the usual ceremonies, and duration of their other kind of marriages. . . .

When an Indian makes his first address to the young woman he intends to marry, she is obliged by ancient custom to sit by him till he hath done eating and drinking, whether she likes or dislikes him; but afterward, she is at her own choice whether to stay or retire. When the bridegroom marries the bride, after the usual prelude, he takes a choice ear of corn, and divides it in two before witnesses, gives her one half in her hand, and keeps the other

<sup>96</sup> Adair, *Hist. Am. Inds.*, p. 120.

<sup>97</sup> *Ibid.*, p. 121.

<sup>98</sup> This should be *tushpa itauaya*, from *tushpa*, in haste, and *itauaya*, to marry.

half to himself; or otherwise, he gives her a deer's foot, as an emblem of the readiness with which she ought to serve him; in return, she presents him with some cakes of bread, thereby declaring her domestic care and gratitude in return for the offals; for the men feast by themselves and the women eat the remains. When this short ceremony is ended, they go to bed like an honest couple.

Formerly, this was an universal custom among the native Americans; but this, like every other usage of theirs, is wearing out apace. The West Floridans, in order to keep their women subject to the law of adultery, bring some venison or buffalo's flesh to the house of their nominal wives, at the end of every winter's hunt: that is reckoned a sufficient annual tye of their former marriages, although the husbands do not cohabit with them. The Muskóhge men, if newly married, are obliged by ancient custom, to get their own relations to hoe out the cornfields of each of their wives, that their marriages may be confirmed, and the more jealous repeat the custom every year to make their wives subject to the laws against adultery. But the Indians in general reckon that before the bridegroom can presume to any legal power over the bride, he is, after the former ceremonies, or others something similar, obliged to go into the woods to kill a deer, bring home the carcass of venison, and lay it down at her house wrapt up in its skin, and if she opens the pack, carries it into the house, and then dresses and gives him some of it to eat with cakes before witnesses, she becomes his lawful wife, and obnoxious to all the penalties of an adulteress. . . .

When the Indians would express a proper marriage, they have a word adapted according to their various dialects, to give them a suitable idea of it; but when they are speaking of their sensual marriage bargains, they always term it "buying a woman"; for example, they say with regard to the former, *Che-Awcalas*, "I shall marry you," . . . *Che-Awala Awa*, "I shall not marry you." But the name of their market marriages is *Otoolpha*.<sup>99</sup> [They say] *Eho Achumbáras*, *Saookcháa*,<sup>1</sup> "in the spring I shall buy a woman, if I am alive." Or *Eho Achumbára Awa*,<sup>2</sup> "I shall not buy a woman," *Sâlbasa toogat*,<sup>3</sup> "for indeed I am poor." . . .

They sometimes marry by deputation or proxy. The intended bridegroom sends so much in value to the nearest relations of the intended bride, as he thinks she is worth; if they are accepted, it is a good sign that her relations approve of the match, but she is not bound by their contract alone; her consent must likewise be obtained, but persuasions most commonly prevail with them. However, if the price is reckoned too small, or the goods too few, the law obliges them to return the whole, either to himself, or some of his nearest kindred. If they love the goods, as they term it . . . the loving couple may in a short time bed together upon trial, and continue or discontinue their love according as their fancy directs them. If they like each other, they become an honest married couple when the nuptial ceremony is performed, as already described. When one of their chieftains is married, several of his kinsmen help to kill deer and buffalos, to make a rejoicing marriage feast, to which their relations and neighbors are invited: there the young warriors sing with their two chief musicians, who beat on their wet deer skin tied over the mouth of a large clay pot, and raise their voices, singing *Yo Yo*, etc. When they are tired with feast-

<sup>99</sup> Probably from *itola*, "to lie down."

<sup>1</sup> *Ohoyo*, "woman"; *atcumpalas*, "I buy"; *saoktaha*, "I hoe up land."

<sup>2</sup> *Ohoyo atcumpala awa*.

<sup>3</sup> *Sâlbâsha*, "I am poor"; *tuk*, sign of recent past time; *ât*, demonstrative article.

ing, dancing, and singing the Epithalamium, they depart with friendly glad hearts, from the house of praise.<sup>4</sup>

The following account was obtained by Warren in the year 1881 from Cyrus Harris, at one time governor of the Chickasaw Nation.

When a man found a girl that suited his fancy, he would send his mother or sister with perhaps calico enough to make one or more dresses, tied up in a shawl or handkerchief, with instructions to ask the father and mother of the girl to give their approval of the intention of the sender. If they gave their consent, the bundle was handed to the girl. If she took the bundle, it was considered a bargain made. The mother or sister brings back news of her errand. The man then hunts up his clothes and dresses himself from head to foot, paints his face with vermilion and other paints, and starts for the residence of his intended. On reaching the place he is invited to take a seat on a cowhide or the hide of any "varmint" generally used for seats in those days. After the general topics of the day are talked over, supper is announced. The visitor and the intended father-in-law, in the absence of any other visitor, take supper, unaccompanied by the intended wife or her mother. Some time after supper, a bed commonly occupied by the girl is prepared for their accommodation, the girl getting in bed first, previous to the man's entering the bedroom. The man comes in and occupies the front side of the bed. This makes them man and wife, and at any time, either one of them getting dissatisfied with the other, by jealousy or otherwise, they separate mutually. This, sir, was ancient marriage ceremony among the Chickasaws.<sup>5</sup>

Cushman was personally acquainted with Cyrus Harris and may have derived part of his information from the same source. As usual his description is unnecessarily embellished; it runs as follows:

The ancient manner of Chickasaw courtship was not very taxing upon the sensitiveness of the bashful, prospective groom; since, when he wished to make known to any young lady of his tribe the emotions of his heart in regard to her, he had but to send a small bundle of clothing carefully tied up in a large cotton handkerchief (similar in dimensions to a medium-sized table cloth, very common in those primitive days of ignorant bliss, when fashion and folly were unknown) by his mother or sister to the girl he desired to make his wife. This treasure of acknowledged love was immediately taken possession of by the mother of the wished-for bride and kept for a few days before presenting it to her daughter; and when presented, if accepted, it was a bona fide acknowledgment on her part of her willingness to accept him as her husband, of which confession he was at once duly notified; if otherwise, the subject was there and then forever dropped, and the disappointed and disconsolate swain found consolation in the privilege extended to all such cases, that of presenting another bundle of clothes wrapped in a similar mantle of cotton to some other forest beauty in which his country so profusely abounded. Best of all, the swain, whether bold or timid, was always spared that fearful and dreadful ordeal of soliciting the "yes" of the "old folks," as his mother took that imperative and obnoxious duty upon herself, and was almost always successful in the accomplishment of the desired object. The coast being clear of all breakers, the elated lover painted his face in exact conformity to the latest and most approved style, donned his best suit, and sought the home of his

<sup>4</sup> Adair, *Hist. Am. Inds.*, pp. 138-141.

<sup>5</sup> *Pubs. Miss. Hist. Soc.*, vol. VIII, p. 551.

betrothed with fluttering heart, who, strictly on the lookout, met him a few rods from the door and proudly and heroically escorted him into the house, where they themselves, in the presence of friends and relatives, performed the marriage ceremony by the man presenting the woman with a ham of venison or a part of some other eatable animal of the chase, she at the same time presenting him with an ear of corn or sack of potatoes, all of which betokened the man should provide the household with meat and the woman with bread. Thus they were made man and wife and so considered by all.<sup>6</sup>

Speck says:

There is no regular marriage ceremony recognized by the Chickasaw. When a man has made a choice of a maiden he tells his best friend about it, who communicates with her parents. He may choose one or more from the same family, the family of the girl naming the price, usually in horses. The man, before he can marry, must be a good hunter and own a log house. A person may marry in any band but his own, but becomes subject to the regulations of his wife's clan. He still, however, retains his original clan identity.<sup>7</sup>

As has been remarked elsewhere, my own informants stated that children were betrothed when they were very young. When they were old enough to marry a day was fixed upon and the relatives of each of the contracting parties brought the bridegroom or bride as the case might be to the place agreed to. The pair would shake hands and afterwards they would live together for a time with the parents of one or the other before acquiring a house of their own.

#### DIVISION OF LABOR BETWEEN THE SEXES

Romans has the following passages bearing on this subject:

The vanity of being accounted great hunters and warriors has the better of every consideration, and rather than condescend to cultivate the earth (which they think beneath them) they sit and toy with their women; or if they send them to labour, they play on an awkward kind of flute made of a cane, lolling thus their time away with great indifference, which obliges them yearly to apply for corn and pulse to the Choctaws.<sup>8</sup>

These [women] labour vastly hard, either in the field for cultivation of corn, or fetching nuts, firewood and water, which they chiefly carry on their backs; the two first articles generally two or three miles, and the last often a mile. Their burthens would amaze a stranger, being rather fit for asses than women to carry.<sup>9</sup>

But as Romans entertained no love for this particular tribe, it is probable that he has not presented their usages in the most favorable light. While there is evidence that the constant warfare of the Chickasaw reacted unfavorably on the social position of women, it probably differed little from their position among the Creeks, where the cultivation of the town fields was a male as well as a female obli-

<sup>6</sup> Cushman, *Hist. Choc., Chick., and Natchez*, p. 498.

<sup>7</sup> Speck in *Jour. Am. Folk-Lore*, vol. xx, p. 57.

<sup>8</sup> Romans, *Nat. Hist. E. and W. Fla.*, p. 62.

<sup>9</sup> *Ibid.*, p. 64.

gation. The men also seem to have had most to do with house building and the making of implements for war, the chase, and games, and practically entire charge of hunting, war, and the ball game. Women again had a relatively small part in ceremonies. In the busk described by Adair only four old women had parts of consequence, and, indeed, Adair says that in their own town houses the women were separated from the warriors, and were merely allowed to sit at each side of the entrance "as if they were only casual spectators."<sup>10</sup>

### BURIAL CUSTOMS

After stating that the bones of those who had died at a distance from home were gathered and brought back and that in burying they separated them carefully from the remains of other people—by which he probably means not only other tribes but other clans of the same tribe—Adair continues to enlarge on this subject as follows:

When any of them die at a distance, if the company be not driven and pursued by the enemy they place the corpse on a scaffold, covered with notched logs to secure it from being torn by wild beasts or fowl of prey; when they imagine the flesh is consumed and the bones are thoroughly dried they return to the place, bring them home, and inter them in a very solemn manner. They will not associate with us when we are burying any of our people who die in their land, and they are unwilling we should join them while they are performing this kindred duty to theirs. Upon which account, though I have lived among them in the raging time of the smallpox, even of the confluent sort, I never saw but one buried, who was a great favorite of the English, and chieftain of *Oocasa* as formerly described.

The Indians use the same ceremonies to the bones of their dead as if they were covered with their former skin, flesh, and ligaments. It is but a few days since I saw some return with the bones of nine of their people who had been two months before killed by the enemy. They were tied in white deer skins, separately, and when carried by the door of one of the houses of their family they were laid down opposite to it till the female relations convened, with flowing hair, and wept over them about half an hour. Then they carried them home to their friendly magazines of mortality, wept over them again, and then buried them with the usual solemnities, putting their valuable effects and, as I am informed, other convenient things in along with them, to be of service to them in the next state. The chieftain carried 12 short sticks tied together in the form of a quadrangle, so that each square consisted of 3. The sticks were only peeled, without any paintings, but there were swans' feathers tied to each corner, and they called that frame *Tereekpe tobek*,<sup>11</sup> "a white circle," and placed it over the door, while the women were weeping over the bones. . . .<sup>11a</sup>

When a warrior dies a natural death (which seldom happens) the war drums, musical instruments, and all other kinds of diversion, are laid aside for the space of three days and nights.<sup>11b</sup> . . . [And whether the deceased is a warrior or not] they wash and anoint the corpse, and soon bring it out of doors for

<sup>10</sup> Adair, *Hist. Am. Inds.*, p. 121.

<sup>11</sup> Byington gives *tilikpi* as an ancient word meaning "shield" and distinct from the word circle. *Tohbi* is "white."

<sup>11a</sup> Adair, *op. cit.*, p. 180.

<sup>11b</sup> *Ibid.*, p. 18.

fear of pollution; then they place it opposite to the door, on the skins of wild beasts, in a sitting posture, as looking into the door of the winter house, westward, sufficiently supported with all his movable goods; after a short eulogium, and space of mourning, they carry him three times around the house in which he is to be interred, stopping half a minute each time, at the place where they began the circle, while the religious man of the deceased person's family, who goes before the hearse, says each time, *Yâh*, short with a bass voice, and then invokes in a tenor key, *Yo*, which at the same time is likewise sung by all the procession, as long as one breath allows. Again, he strikes up, on a sharp treble key, the feminine note, *McC*, which in like manner, is taken up and continued by the rest: then all of them suddenly strike off the solemn chorus and sacred invocation by saying in a low key, *Wâh*. . . This is the method in which they performed the funeral rites of the chieftain before referred to; during which time, a great many of the traders were present, as our company was agreeable at the interment of our declared patron and friend. . . .

When they celebrated these funeral rites of the above chieftain they laid the corpse in his tomb, in a sitting posture, with his face towards the east,<sup>12</sup> his head anointed with bear's oil, and his face painted red, but not streaked with black, because that is a constant emblem of war and death; he was drest in his finest apparel, having his gun and pouch, and trusty hiccory bow, with a young panther's skin, full of arrows, alongside of him, and every other useful thing he had been possessed of—that when he rises again they may serve him in that tract of land which pleased him best before he went to take his long sleep. His tomb was firm and clean inside. They covered it with thick logs, so as to bear several tiers of cypress bark, and such a quantity of clay as would confine the putrid smell and be on a level with the rest of the floor. They often sleep over those tombs; which, with the loud wailing of the women at the dusk of the evening, and dawn of the day, on benches close by the tombs, must awake the memory of their relations very often; and if they were killed by an enemy, it helps to irritate and set on such revengeful tempers to retaliate blood for blood. . . .

These rude Americans . . . imagine if any of us were buried in the domestic tombs of their kindred, without being adopted, it would be very criminal in them to allow it; and that our spirits would haunt the eaves of the houses at night and cause several misfortunes to their family. . . .

To perpetuate the memory of any remarkable warriors killed in the woods, I must here observe that every Indian traveler as he passes that way throws a stone on the place, according as he likes or dislikes the occasion, or manner of the death of the deceased.

In the woods we often see innumerable heaps of small stones in those places, where, according to tradition, some of their distinguished people were either killed or buried, till the bones could be gathered; there they add Pelion to Ossa, still increasing each heap, as a lasting monument, and honor to them, and an incentive to great actions. . . .

The Indians place those heaps of stones where there are no dividings of the roads, nor the least trace of any road. And they then observe no kind of religious ceremony, but raise those heaps merely to do honor to their dead, and incite the living to the pursuit of virtue. . . .<sup>12a</sup>

To prevent pollution, when the sick person is past hope of recovery, they dig a grave, prepare the tomb, anoint his hair, and paint his face; and when

<sup>12</sup> In later times, when the body was buried at full length on the back, the head was consequently toward the west. This seems to have been the custom of most of the Southeastern Indians in later times.

<sup>12a</sup> Adair, op. cit., pp. 181-185.

his breath ceases they hasten the remaining funeral preparations, and soon bury the corpse. One of a different family will never, or very rarely, pollute himself for a stranger; though, when living, he would cheerfully hazard his life for his safety; the relations, who become unclean by performing the funeral duties, must live apart from the clean for several days, and be cleansed by some of their religious order, who chiefly apply the button snakeroot for their purification, as formerly described, when they purify themselves by ablution. After three days the funeral assistants may convene at the townhouse and follow their usual diversions. But the relations live recluse for a long time mourning the dead. . . .<sup>12b</sup>

The modern Indians bury all their removable riches, according to the custom of the ancient Peruvians and Mexicans, in so much that the grave is heir of all. . . .

Notwithstanding . . . they never give them the least disturbance; even a blood-thirsty enemy will not despoil nor disturb the dead. The graves prove an asylum and a sure place of rest to the sleeping person, till, at some time, according to their opinion, he rises again to inherit his favorite place—unless the covetous or curious hand of some foreigner should break through his sacred bounds.<sup>13</sup>

Adair cites an instance of reform, however, in the case of Malahche, chief of Coweta, and a long-standing friend of the whites, who left all of his property to his relations instead of allowing it to be buried with his corpse.<sup>14</sup>

In another place Adair says that—"When any of their relations die, they immediately fire off several guns, by one, two, and three at a time, for fear of being plagued with the last troublesome neighbors [the souls of the departed]; all the adjacent towns also on the occasion whoop and halloo at night; for they reckon this offensive noise sends off the ghosts to their proper fixed place till they return at some certain time to repossess their beloved tract of land and enjoy their terrestrial paradise."<sup>15</sup>

In still another place he notes that when a person had died the father or a brother of the deceased took a live firebrand, brandished it two or three times about his head with lamenting words, dipped it into the water with his right hand, and let it sink down.<sup>16</sup>

Besides the above we have items of information on this subject from several other sources. Romans says:

They bury their dead almost the moment the breath is out of the body in the very spot under the couch on which the deceased died, and the nearest relations mourn over it, but the men do it in silence, taking great care not to be seen any more than heard at this business; the mourning continues about a year, which they know by counting the moons; they are every morning and evening, at first throughout the day at different times, employed in the exercise of this last duty.<sup>17</sup>

<sup>12b</sup> Adair, *Hist. Am. Inds.*, pp. 125-126.

<sup>13</sup> *Ibid.*, p. 178.

<sup>14</sup> *Ibid.*, p. 178.

<sup>15</sup> *Ibid.*, p. 36.

<sup>16</sup> *Ibid.*, p. 405.

<sup>17</sup> Romans, *Nat. Hist. E. and W. Fla.*, p. 71.

The following is from Cushman:

The ancient Chickasaws, unlike the Choctaws, buried their dead soon after life became extinct; placing in the grave with the corpse, if a man, his clothes, war, and hunting implements, pipe and tobacco, and a few provisions; if a woman or child, the clothes and other little articles the deceased may have prized in life and a few provisions. A Chickasaw widow mourned 12 full moons for her deceased husband, while the other relatives prolonged their mourning only three, at the close of which a special cry was appointed at night, which was kept up until the break of day; then the end of the hair of the mourners was clipped and a string handed to them, with which they tied up their hair, which had been permitted to hang loose over their shoulders from the death of their kindred to the end of the three moons, the appointed time for mourning.

Suicide was sometimes committed by the ancient Chickasaws, but very seldom. When it was it was invariably done with their favorite instrument of death, the rifle.<sup>15</sup>

The ancient Chickasaws, like the Choctaws, had their specified cries over the graves of their dead. At the day appointed, the relatives, friends, and neighbors assembled and one little group after another took their seats on the ground in a circle around the grave, then drew their shawls and blankets over their heads and commenced their doleful lamentations, which must be seen and heard to form any just idea of the scene. The "cry" continued for several days and nights, then terminated with a feast; after which the name of the deceased was pronounced no more. The dead are with the past; for them how fruitless our despair, was their final and just conclusion.<sup>19</sup>

While Cushman says nothing about burials in the house, Romans's statement to that effect is confirmed by the personal experience of Hodgson, which he narrates as follows:

I was told that they bury their dead in their houses. While getting a cup of coffee at Amubee's, a full-blooded Chickasaw, a little negro girl, the only person about the house who could speak English, said, "Master's wife is lying behind you." On looking round I saw nothing but a bed; when the little girl told me to look under it. When she observed that I was disappointed on perceiving nothing, she said: "Mistress is buried there; but don't speak loud, or master will cry."<sup>20</sup>

To this may be added the experience of another traveler. One day in the year 1834, while journeying through the Chickasaw Nation Edwin G. Thomas heard a wailing noise about sundown in a southeasterly direction. "None of the crowd [who accompanied him] knew what it was, but a negro told us it was the Indians mourning for their dead. The Indians also came in[to] the house and mourned. We were told that they were buried in the house."<sup>21</sup>

The memory of this form of burial was preserved down to modern times. Doctor Speck was told by his informants that—

At the death of a member of the tribe all personal belongings were buried with the body beneath the floor of the house, the family continuing to live there.

<sup>15</sup> Cushman, *Hist. Choc., Chick., and Natchez Inds.*, pp. 496-497.

<sup>19</sup> *Ibid.*, p. 502.

<sup>20</sup> Hodgson, *Jour. through N. A.*, p. 284.

<sup>21</sup> Narrative of Edwin G. Thomas, May 10, 1880, as quoted by Harry Warren in *Publ. Miss. Hist. Soc.*, vol. VIII, p. 552.



Husband and wife were interred together. A chief was honored at death by a salute of guns, and a horse, saddled and bridled, was shot above his grave. The women of the village came to the bereaved household, stopping before it to cry for about half an hour before they offered any words of consolation or praise of the deceased. Relatives visit the graves every day to cry for an hour or so. Log structures are erected over the spot in most cases, at the present day, since burial beneath the floor has been discontinued.<sup>22</sup>

Schoolcraft's Chickasaw informants said only:

When one of the Chickasaw dies they put the finest clothing they have on him; also all their jewelry, beads, etc.; this, they say, is to make a good appearance so soon as they die. The sick are frequently dressed before they die.<sup>23</sup>

Like the writers who have been quoted, I learned that the body of a dead person was formerly buried inside of the house in which his family lived. The head was always placed toward the west, for otherwise it was thought the soul would lose its way. If one died during the night, a gun was discharged four times as a signal to the relatives, all of whom would then assemble to attend to the interment. The fire was also extinguished, all the ashes removed from the house, and a new fire started.<sup>24</sup>

After the loss of husband or wife the survivor wept over the grave morning and evening for a month, just before sunup and sundown. A widow stayed in a part of the house separated from the rest for a month, was waited upon by others, allowed her hair to go uncombed, and ate no food containing salt. They also cut off a little of her hair in front. At the end of that time her relatives combed her hair and dressed her up and she was allowed to go about as before. A widower was treated in the same way, except that he wore a belt of a peculiar pattern plaited out of a kind of wool; they also cut his hair a little in front.

According to one informant a widow had to eat apart from the rest of the family for an entire month, but a widower only until the moon changed, and meanwhile either had to abstain from food containing salt. A widow had to remain single for from two to three years while a widower could remarry as soon as he desired.

On this subject I will again quote from Adair:

All the Indian widows, by an established strict penal law, mourn for the loss of their deceased husbands; and among some tribes for the space of three or four years. . . .

The Muskohge widows are obliged to live a chaste, single life for the tedious space of four years; and the Chikkasah women for the term of three, at the

<sup>22</sup> Speck in Jour. Am. Folk-Lore, vol. xx, pp. 57-58.

<sup>23</sup> Schoolcraft, Ind. Tribes, I, p. 310.

<sup>24</sup> But without any death having taken place, it was customary to put out the fire and start a new one every four days. The base stick employed in fire making was taken from a large vine found hanging to trees and called *cohkô'le*; the other was of a soft white wood called *loktobaape*, perhaps what is called "matchwood" by the whites. A kind of tree fungus was used as punk. They also made fire by means of a flint and a piece of iron called *käsältci*, articles always carried in their bags.

risque of the law of adultery being executed against the recusants. Every evening, and at the very dawn of day, for the first year of her widowhood, she is obliged, through the fear of shame, to lament her loss in very intense audible strains. . . .

Their law compels the widow, through the long term of her weeds, to refrain all public company and diversions at the penalty of an adulteress; and likewise to go with flowing hair, without the privilege of oil to anoint it. The nearest kinsmen of the deceased husband keep a very watchful eye over her conduct in this respect. The place of interment is also calculated to wake the widow's grief, for he is intombed in the house under her bed. And, if he was a war leader, she is obliged for the first moon to sit in the day-time under his mourning war-pole,<sup>25</sup> which is decked with all his martial trophies, and must be heard to cry with bewailing notes. But none of them are fond of that month's supposed religious duty; it chills or sweats and wastes them so exceedingly, for they are allowed no shade or shelter. This sharp, rigid custom excites the women to honour the marriage-state, and keeps them obliging to their husbands by anticipating the visible, sharp difficulties which they must undergo for so great a loss. The three or four years monastic life which she lives after his death makes it her interest to strive by every means to keep in his lamp of life, be it ever so dull and worthless; if she is able to shed tears on such an occasion, they often proceed from self-love. We can generally distinguish between the widow's natural mourning voice and her tuneful, laboured strain. She doth not so much bewail his death as her own recluse life and hateful state of celibacy, which to many of them is as uneligible as it was to the Hebrew ladies. . . .

The Choktah Indians hire mourners to magnify the merit and loss of their dead, and if their tears can not be seen to flow their shrill voices will be heard to cry, which answers the solemn chorus a great deal better. However, they are no way churlish of their tears, for I have seen them on the occasion pour them out like fountains of water; but after having thus tired themselves, they might with equal propriety have asked bystanders in the matter of the native Irish, *Ara ei fuar bass*—"And who is dead?"

They formerly dressed their head with black moss on those solemn occasions, and the ground adjacent to the place of interment they now beat with laurel bushes, the women having their hair disheveled. . . .

The [Chickasaw] Indian women mourn three moons for the death of any female of their own family or tribe. During that time they are not to anoint or tie up their hair; neither is the husband of the deceased allowed, when the offices of nature do not call him, to go out of the house, much less to join any company; and in that time of mourning he often lies among the ashes. The time being expired, the female mourners meet in the evening of the beginning of the fourth moon, at the house where their female relation is intombed, and stay there till morning, when the nearest surviving old kinswoman crops their forelocks pretty short. This they call *Ehó Intándah*,<sup>26</sup> "the women have mourned the appointed time." . . . When they have eaten and drank together, they return home by sunrise, and thus finish their solemn *Yah-ah*.

Although a widow is bound, by a strict penal law, to mourn the death of her husband for the space of three or four years; yet, if she be known to lament

<sup>25</sup> The war-pole is a small peeled tree painted red, the top and boughs cut off short; it is fixt in the ground opposite to his door, and all his implements of war are hung on the short boughs of it till they rot.—Adair.

The use of this war-pole was not shared by the Indians of the Creek confederacy.

<sup>26</sup> *Ehó=ohoyo*, "woman"; *intándah*, probably from *tani*, "to rise up from a prostrate position."

her loss with a sincere heart, for the space of a year, and her circumstances of living are so strait as to need a change of her station—and the elder brother of her deceased husband lies with her—she is thereby exempted from the law of mourning, has a liberty to tie up her hair, anoint and paint herself. . . .

The warm-constituted young widows keep their eye so intent on this mild beneficent law, that they frequently treat their elder brother-in-law with spirituous liquors till they intoxicate them, and thereby decoy them to make free, and so put themselves out of the reach of the mortifying law. If they are disappointed, as it sometimes happens, they fall on the men, calling them *Hoobuk Wakse*, or *Skoobále*, *Hassé kroopha*, “Eunuchus praeputio detecto, et pene brevi”; the most degrading of epithets.<sup>27</sup>

### WAR CUSTOMS

The best account of war customs among the southeastern Indians is that of Adair, which is reprinted in the Forty-second Annual Report of this Bureau.<sup>27a</sup> It is so extensive that I will not repeat it here in its entirety but give only Adair's description of the ceremonies actually witnessed by him after the return of a Chickasaw war party from the Illinois territory.

In the year 1765, when the Chikkasah returned with two French scalps, from the Illinois (while the British troops were on the Mississippi, about 170 leagues below the Illinois), as my trading house was near the Chikkasah leader, I had a good opportunity of observing his conduct, as far as it was exposed to public view.

Within a day's march of home, he sent a runner ahead with the glad tidings—and to order his dark winter house to be swept out very clean, for fear of pollution. By ancient custom, when the outstanding party set off for war, the women are so afraid of the power of their holy things, and of prophaning them, that they sweep the house and earth quite clean, place the sweepings in a heap behind the door, leaving it there undisturbed till *Opáe*, who carries the ark, orders them by a faithful messenger to remove it. He likewise orders them to carry out every utensil which the women had used during his absence for fear of incurring evil by pollution. The party appeared next day painted red and black, their heads covered all over with swan-down, and a tuft of long white feathers fixt to the crown of their heads. Thus they approached, carrying each of the scalps on a branch of the ever-green pine, singing the awful death song, with a solemn striking air, and sometimes *Yo He Wah*; now and then sounding the shrill death *Whóo Whoop Whoop*. When they arrived, the leader went ahead of his company, round his winter hothouse contrary to the course of the sun, singing the monosyllable *Yo*, for about the space of five seconds on a tenor key; again, *He He* short, on a bass key; then *Wah Wah*, three times, gutturally on the treble, very shrill, but not so short as the bass note. In this manner they repeated those sacred<sup>28</sup> notes, *Yo, He He, Wah Wah*, three times, while they were finishing the circle, . . .

The leader's *Hetissu*, or “waiter,” placed a couple of new blocks of wood near the war pole, opposite to the door of the circular hothouse in the middle of

<sup>27</sup> Adair, *Hist. Am. Inds.*, pp. 186-190.

<sup>27a</sup> Forty-second Ann. Rept. Bur. Amer. Ethn., pp. 407-424.

<sup>28</sup> Adair calls them “sacred” because he believed the Indians to be descended from the Hebrews and these meaningless syllables to be an attempt at the name Jehovah.

which the fireplace stood, and on these blocks he rested the supposed sacred ark, so that it and the holy fire faced each other. The party were silent a considerable time. At length the chieftain bade them sit down, and then enquired whether his house was prepared for the solemn occasion, according to his order the day before; being answered in the affirmative, they soon rose up, sounded the death whoop, and walked round the war pole, during which they invoked and sung three times Yo, He, He, Wah, Wah, in the manner already described. Then they went with their holy things in regular order into the hothouse, where they continued, exclusive of the first broken day, three days and nights apart from the rest of the people, purifying themselves with warm lotions and aspersions of the emblematical button-snakeroot, without any other subsistence between the rising and the setting of the sun.

During the other part of the time the female relations of each of the company, after having bathed, anointed, and dressed themselves in their finest, stood in two rows, one on each side of the door, facing each other, from the evening till the morning, singing Ha Ha, Ha He, with a soft shrill voice and a solemn moving air for more than a minute, and then paused about ten minutes, before they renewed their triumphal song. While they sung they gave their legs a small motion by the strong working of their muscles, without seeming to bend their joints. When they had no occasion to retire, they have stood erect in the same place, a long, frosty night, and except when singing observed a most profound silence the whole time. During that period they have no intercourse with their husbands, and they avoid several other supposed pollutions, as not to eat or touch salt, and the like.

The leader, once in two or three hours, came out at the head of his company and, raising the death whoop, made one circle round the red-painted war pole, holding up in their right hands the small boughs of pine with the scalps fixed to them, singing as above, waving them to and fro, and then returned again. This religious order they strictly observed the whole time they were purifying themselves, and singing the song of safety and victory to the goodness and power of the divine essence. When the time of their purification and thanksgiving expired, the men and women went and bathed themselves, returned in the same manner, and anointed again, according to their usual custom.

They joined soon after in a solemn procession, to fix the scalps on the tops of the houses of their relations who had been killed without revenge of blood. The war chieftain went first—his religious attendant followed him; the warriors next, according to their rising merit; and the songstresses brought up the rear. In this order they went round the leader's winter house from the east to the north, the men striking up the death whoop and singing the death song; and then Yo, He He, Wah Wah, as described, the women also warbling Ha Ha, Ha He, so that one might have said, according to the sacred text, "great was the company of the women, who sung the song of triumph."<sup>29</sup> Then they fixed on the top of the house a twig of the pine they had brought with them, with a small piece of one of the scalps fastened to it, and this order they observed from house to house, till in their opinion they had appeased the ghosts of their dead. They went and bathed again, and thus ended their purification and triumphal solemnity—only the leader and his religious waiter kept apart three days longer, purifying themselves. I afterward asked the reason of this; they replied they were *Ishtohoollo*.<sup>30</sup>

<sup>29</sup> Last year I heard the Choktah women, in those towns which lie next to New Orleans, sing a regular anthem and dirge, in the dusk of the evenings, while their kinsmen were gone to war against the Muskohge.—Note by Adair.

<sup>30</sup> Adair, Hist. Am. Inds., pp. 164-167.

In other words, these men were temporarily of the same class as the priests, of whom he says elsewhere :

The Indian *Ishtohoolo* "holy men" [ishto, "great" holo, "holy"] are by their function absolutely forbidden to slay, notwithstanding their propensity thereto even for small injuries. They will not allow the greatest warrior to officiate when the yearly grand sacrifice of expiation is offered up, or on any other religious occasion, except the leader. All must be performed by their beloved men who are clean of every stain of blood and have their foreheads circled with streaks of white clay.<sup>31</sup>

The following information may be added. Says Romans :

In their war parties they have generally one who has done most mischief to the enemy for their leader; but he is so far from having a command that an attempt to do more than proposing whether such or such an undertaking would not be most advisable, or at most persuading them to it, would at least be followed by a total desertion.

They are very ceremonious in their preparations for war, and their fondness for witchcraft makes them look for omens of futurity.

They and all other savages have the greatest share of patience imaginable; when a scalp or prisoner is in question they will travel hundreds of miles in the deserts with amazing precaution, enduring hunger, and often thirst, at a great rate; nay, if their provisions fail before they strike the blow, they have been known to return to hunt for more in some safe place, and, without going home, to make a second or third attempt.

They make war by stratagem, surprise, or ambush, despising us as fools for exposing ourselves to be shot at like marks. A man's valour with them consists in their cunning, and he is deemed the greatest hero who employs most art in surprising his enemy; they never strike a blow unless they think themselves sure of a retreat, and the loss of many men is an infamous crime laid to the charge of the party.<sup>32</sup>

Cushman's account runs thus :

When preparing for war the Chickasaws, like their entire race, of whom I have read or personally known, painted their faces in such a manner (known only to the North American Indians) as to give the face an expression of fierceness that must be seen to be justly comprehended. A few days before going upon the warpath a day was solemnly appointed for a great feast, consisting of all the varieties of food that could be obtained; but every night previous to the day of the feast those contemplating going upon the warpath engaged in the war dance during the greater part of the nights, dressed in all the paraphernalia of Indian warfare. The warriors also came to the prepared feast fully equipped with every necessary appertaining to the warpath, but with no superfluous articles whatever that might have a tendency to impede their actions. Before they partook of the waiting repast some celebrated old chief or noted old warrior, with the war pipe in his hand, who from the decrepitude of age had been placed upon the "retired list" among the seers and prophets of the nation, delivered a speech to the war-going company, in which he rehearsed his own exploits, not in the spirit of self-adulation but as an honest exhortation to them to emulate his deeds of heroic valor; then encouraged them to go in trusting confidence; to be great in manly courage and strong in heart; to be

<sup>31</sup>Adair, *Hist. Am. Inds.*, p. 152.

<sup>32</sup>Romans, *Nat. Hist. E. and W. Fla.*, p. 70.

watchful, keen in sight, and fleet in foot; to be attentive in ear and unflinching in endurance; to be cunning as the fox, sleepless as the wolf, and agile as the panther; not to be eager beyond prudence; and when wisdom so dictates to flee as the swift antelope, as your lives are of great worth to your nation, and even one life necessarily or unnecessarily sacrificed will bring sorrow to the hearts of your people. But to the appreciation of which no outward manifestation whatever was made, as an Indian warrior is ever silent upon any and all emotions of his heart, yet the aged orator plainly read its significance in each silent and attentive face and was satisfied. Then he filled the war pipe with prepared sumac leaves and tobacco, lighted it, drew a few whiffs, then passed it to the war chief, the leader of the forthgoing war party, who also drew a few puffs, and from him it went the rounds of the entire party, each in profound silence drawing a whiff or two and then passing it to the next in turn. After this impressive ceremony they turned to the prepared feast and did ample justice thereto, after which the "war post," painted red, was set up, at which the chief of the war party rushed and struck with his tomahawk with all his strength, as if one of the enemy. Then followed his warriors in regular order, each doing the same.

Then followed again the war dance, the finale of the war ceremonies, which continued two or three consecutive nights, during the intervening days of which their relatives and friends observed a strict fast and engaged in solemn and supplicating prayer to the Great Spirit for their success against their enemies and their safe return.<sup>33</sup>

At night, whether on a war expedition or traveling for any other purpose, they guided themselves by means of "the seven stars" (the Great Dipper). I was told by an old woman who had seen the war dances of both the Chickasaw and Choctaw at the time of the Civil War that they were entirely different from each other and that the songs differed also.

Adair gives two accounts of ceremonies gone through in reestablishing peace. The first is as follows:

When two nations of Indians are making or renewing peace with each other, the ceremonies and solemnities they use, carry the face of great antiquity, and are very striking to a curious spectator, which I shall here relate, so far as it suits the present subject. When strangers of note arrive near the place where they design to contract new friendship or confirm their old amity, they send a messenger ahead to inform the people of their amicable intention. He carries a swan's wing in his hand, painted all over with streaks of white clay, as an expressive emblem of their embassy. The next day, when they have made their friendly parade, with firing off their guns and whooping, and have entered the beloved square, their chieftain, who is ahead of the rest, is met by one of the old beloved men, or magi, of the place. He and the visitant approach one another, in a bowing posture. The former says, *Yò, ish la chu Anggónna?*<sup>34</sup> . . . The other replies, *Yah—Arahre-O, Angonna.*<sup>35</sup> The magus then grasps the stranger with both hands, around the wrist of his right hand, which holds some green branches—again, about the elbow—then around the arm, close to his shoulder, as a near approach to the heart. Then his immediately waving the eagle tails over the head of the stranger is the strongest pledge of good faith.<sup>36</sup>

<sup>33</sup> Cushman, *Hist. Choc., Chick., and Natchez Inds.*, pp. 492-493.

<sup>34</sup> *Yò*, imp.; *ishla*, thou hast come; *cho*, sign of interrogation; *a<sup>n</sup>kana*, my friend.

<sup>35</sup> *Yau*, yes; *alali*, I am come; *O*, strengthening particle; *a<sup>n</sup>kana*, my friend.

<sup>36</sup> Adair, *Hist. Am. Inds.*, p. 60.

The later statement runs thus:

I can not, however, conclude this argument without a few remarks concerning the Indian methods of *making peace* and of renewing their old friendship. They first smoke out of the friend pipe and eat together; then they drink of the *Cussena*, using such invocations as have been mentioned, and proceed to wave their large fans of eagles' tails, concluding with a dance. The persons visited appoint half a dozen of their most active and expert young warriors to perform their religious duty, who have had their own temples adorned with the swan-feather cap. They paint their bodies with white clay and cover their heads with swan down; then approaching the chief representative of the strangers, who by way of honour and strong assurance of friendship is seated on the central white or holy seat, "the beloved cabin" (which is about 9 feet long and 7 feet broad), they wave the eagles' tails backward and forward over his head.<sup>37</sup> Immediately they begin the solemn song with an awful air; and presently they dance in a bowing posture; then they raise themselves so erect that their faces look partly upwards, waving the eagles' tails with the right hand toward heaven, sometimes with a slow, at others with a quick motion; at the same time they touch their breast with their small calabash and pebbles fastened to a stick about a foot long which they hold in their left hand, keeping time with the motion of the eagles' tails; during the dance they repeat the usual divine notes, *Yo*, etc., and wave the eagles' tails now and then over the stranger's head, not moving above two yards backward or forward before him. They are so surprisingly expert in their supposed religious office and observe time so exactly with their particular gestures and notes that there is not the least discernible discord. . . .

The Indians can not show greater honor to the greatest potentate on earth than to place him in the white seat—invoke *Yo He Wah* while he is drinking the *Cussena* and dance before him with the eagles' tails. When two chieftains are renewing or perpetuating friendship with each other they are treated with the same ceremonies. And in their circular friendly dances, when they honour their guests and pledge themselves to keep good faith with them, they sometimes sing their divine notes with a very awful air, pointing their right hand towards the sky. Some years ago I saw the *Koosahte* Indians (200 miles up *Mobile River*) perform this rite with much solemnity, as if invoking the deity with their notes and gestures, to enable them to show good will to their fellow creatures, and to bear witness of their faithful vows and conduct.<sup>38</sup>

A peace-making ambassador, besides carrying the swans' wings, was provided with eagles' tails, white beads, white pipes, and tobacco.<sup>39</sup> When *Adair* visited the *Choctaw* for the purpose of concluding peace with them, they tied strings of beads about his neck, arms, and legs, and in return he presented to them silver arm plates, gorgets, wrist plates, earbobs, and so on.<sup>40</sup>

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<sup>37</sup> When they are disaffected, or intend to declare war, they will not allow any of the party against whom they have hostile views, to approach the white seat; as their holy men, and holy places, are considered firmly bound to keep good faith and give sure refuge.—*Adair*.

<sup>38</sup> *Adair*, *Hist. Am. Inds.*, pp. 167–169.

<sup>39</sup> These things are numerated by *Adair*, *Hist. Am. Inds.*, pp. 269–270, and 316.

<sup>40</sup> *Ibid.*, p. 331.

## HUNTING

In contradistinction to the Choctaw, who were more inclined toward agriculture, the Chickasaw were very fond of hunting. In this particular they resembled the Creeks, and both tribes had very wide hunting grounds, those of the Chickasaw extending to the Tennessee River and as far down that stream as its junction with the Ohio. On the south the Oktibbeha separated their territories from those of the Choctaw, but Romans states that "these two nations are by no means jealous of each other in this respect, and hunt in each others' grounds without let or hindrance from either side." He adds that "although their country abounds in beaver, they kill none, leaving that to the white men; they think this kind of hunting beneath them, saying anybody can kill beaver, but men only deer; this is exactly the reverse of the northern Indians." He then proceeds to describe the well-known method of stalking deer by the use of a prepared deer's head.<sup>41</sup> Unlike most of the Choctaw, this author reports that they were all good swimmers, "notwithstanding they live so far from waters, but they learn [!] their children to swim in clay holes, that are filled in wet seasons by rain."<sup>42</sup>

Romans has the following to say about their skill as trackers:

They are the most expert of any perhaps in America in tracking what they are in pursuit of, and they will follow their flying enemy on a long gallop over any kind of ground without mistaking.

Since I am on this subject, I can not forbear taking notice of one thing related by many writers on America, which is the knowledge the savages have by the track of what kind of people they pursue. This is very true, and this sagacious particular deserved admiration, but the wonder must cease when I tell my reader that I have found in it much of a juggle, for instead of knowing it by the footsteps (which they pretend to measure very ceremoniously with their hands) they know it by the strokes of the hatchets in the trees and branches as they go along, which no two savage nations agree in, be it in the height from the ground or in the slope of the cut. They can also distinguish the different ways of making camps and fires; for instance, a Choctaw war camp is circular, with a fire in the center, and each man has a crutched branch at his head to hang his powder and shot upon and to set his gun against, and the feet of all to the fire; a Cherokee war camp is a long line of fire, against which they also lay their feet; a Choctaw makes his camp in traveling in form of a sugar loaf; a Chickasaw makes it in form of our arbors; a Creek like to our sheds, or piazzas, to a timber house. In this manner every nation has some distinguishing way.<sup>43</sup>

I was told personally that when a party intended to go hunting they camped by themselves and took medicine for four days under the supervision of a doctor, who also went with them. The medicine was made by this doctor and after they had taken it, he made them

<sup>41</sup> Romans, *Nat. Hist. E. and W. Fla.*, p. 66.

<sup>42</sup> *Ibid.*, pp. 64-65.

<sup>43</sup> *Ibid.*, p. 65.



jump into the water and throw up all they had swallowed. Red willow (*hāhtok*), the *miko hoyanidja* of the Creeks, was sometimes used for this purpose. Some Indians carried along a certain root with which to charm the game. It was used solely by hunters and bears an Indian name meaning "deer tail." The plant from which these roots come bears a white flower and grows in the territory of the old Chickasaw Nation in Oklahoma. The medicine was carried in a pocket or pouch on the right side, supported by a strap over the left shoulder.

When they camped they laid their fire logs north and south and none of them was allowed to sit on the ends of these. Sometimes hunters took their families along to do the cooking, and in such cases the man got up long before day, awoke the rest, and would not allow any of them to lie down again, claiming it would spoil the luck if they did so. If there was a stump or prostrate log near the fire, no one could sit upon it. If the hunter were a good one and there happened to be plenty of game near his camp, he would frequently go to a distance after large deer, leaving the smaller ones about his camp to grow up. The large deer were more in demand for the manufacture of moccasins, leggings, and other articles of clothing. Trousers made from deer hides would not wear out, but they threw them away from time to time to replace them with new ones. When the soles of their moccasins wore out they replaced them with hog skin. At an earlier day it may be suspected that bison hide was used for this purpose. Adair and his contemporaries say practically nothing about the hunting of bison and the small number of references to this animal in the Gulf region during this period lends color to an assertion by Claiborne that they left the country early in the eighteenth century, owing to an excessive drought. Even in De Soto's time, however, they do not appear to have been common, though the explorers obtained a "cow-hide" from some place north of the Tennessee River and horns, undoubtedly those of bison, adorned the heads of warriors whom he encountered in the "Province of Alibamo," west of the Chickasaw country, while "shields of raw cow-hide" were found in a town just beyond the Mississippi River.

The following data regarding bear hunting were written down for me by Zeno McCurtain from native informants:

Bear hunters would wait until toward the middle of winter before starting out. When the bear hid it is usually in some cave, and experienced bear hunters were needed to find them. Before they set out they took medicines and fasted four days. Some hunters would also remain away from their wives. They had to provide themselves with torches, and when they set out they would seek the highest mountains. After they had found the bear cave, they selected certain persons to go inside with torches. When these saw the shining eyes of

the bear they would kill him. Sometimes the bear would start out toward them before they were ready to shoot, whereupon they would lie down on their bellies and let the bear walk over them out of the cave, when the men left there would dispatch him. If he did not try to go out, those inside killed him and dragged his body outside.

## GAMES

The men's ball game (*tōli*) was played in the same manner as by the neighboring tribes. It is said that the Choctaw doctor employed to conjure for a game had a big loggerhead turtle (alligator turtle?) brought to him and he made a ball out of that. Scratching was not performed on the Chickasaw and Choctaw players as on the Creeks but they danced nearly until day the night before.

Following is Adair's description of the game as played in his time:

The Indians are much addicted to gaming and will often stake everything they possess. Ballplaying is their chief and most favourite game and is such severe exercise as to show it was originally calculated for a hardy and expert race of people like themselves and the ancient Spartans. The ball is made of a piece of scraped deerskin, moistened and stuffed hard with deer's hair and strongly sewed with deer's sinews. The ball sticks are about 2 feet long, the lower end somewhat resembling the palm of a hand, and which are worked with deerskin thongs. Between these they catch the ball and throw it a great distance when not prevented by some of the opposite party, who fly to intercept them. The goal is about 500 yards in length; at each end of it they fix two long, bending poles into the ground 3 yards apart below, but slanting a considerable way outward. The party that happens to throw the ball over these counts one; but if it be thrown underneath, it is cast back and played for as usual. The gamesters are equal in number on each side, and at the beginning of every course of the ball they throw it up high in the center of the ground and in a direct line between the two goals. When the crowd of players prevents the one who caught the ball from throwing it off with a long direction, he commonly sends it the right course by an artful sharp twirl. They are so exceedingly expert in this manly exercise that between the goals the ball is mostly flying the different ways, by the force of the playing sticks, without falling to the ground, for they are not allowed to catch it with their hands. It is surprising to see how swiftly they fly when closely chased by a nimble-footed pursuer; when they are intercepted by one of the opposite party, his fear of being cut by the ball sticks commonly gives them an opportunity of throwing it perhaps 100 yards; but the antagonist sometimes runs up behind and by a sudden stroke dashes down the ball. It is a very unusual thing to see them act spitefully in any sort of game, not even in this severe and tempting exercise.

Once, indeed, I saw some break the legs and arms of their opponents by hurling them down when on a descent and running at full speed. But I afterwards understood there was a family dispute of long continuance between them; that might have raised their spleen as much as the high bets they had then at stake, which was almost all they were worth. The Choktah are exceedingly addicted to gaming, and frequently on the slightest and most hazardous occasions will lay their all and as much as their credit can procure.

By education, precept, and custom, as well as strong example, they have learned to show an external acquiescence in every thing that befalls them, either as to life or death. By this means, they reckon it a scandal to the char-

acter of a steady warrior to let his temper be ruffled by any accidents—their virtue, they say, should prevent it. . . . To move the deity to enable them to conquer the party they are to play against, they mortify themselves in a surprising manner; and, except a small intermission, their female relations dance out of doors all the preceding night, chanting religious notes with their shrill voices, to move *Yo He Wah*<sup>44</sup> to be favorable to their kindred party on the morrow. The men fast and wake from sunset, till the ball play is over the next day, which is about 1 or 2 o'clock in the afternoon. During the whole night, they are to forbear sleeping under the penalty of reproaches and shame; which would sit very sharp upon them, if their party chanced to lose the game, as it would be ascribed to that unmanly and vicious conduct. They turn out to the ball ground in a long row, painted white, whooping, as if Pluto's prisoners were all broke loose; when that enthusiastic emotion is over, the leader of the company begins a religious invocation by saying *Yah*, short; then *Yo*, long, which the rest of the train repeat with a short accent and on a low key like the leader; and thus they proceed with such acclamations and invocations, as have been already noticed, on other occasions. Each party are desirous to gain the twentieth ball, which they esteem a favourite divine gift. As it is in the time of laying by the corn, in the very heat of summer, they use this severe exercise, a stranger would wonder to see them hold it so long at full speed, and under the scorching sun, hungry also, and faint with the excessive use of such sharp physic as the button snakeroot, the want of natural rest, and of every kind of nourishment. But their constancy, which they gain by custom, and their love of virtue, as the sure means of success, enable them to perform all their exercises without failing in the least, be they ever so severe in the pursuit.<sup>45</sup>

The single-pole game is as old as the time of Adair, but there is no lengthy description of it dating from an early period.<sup>46</sup>

Another ancient and popular game, yet one apparently devoid of the social significance of the two-goal ball game, was known to the traders as the chunky game. I again quote from Adair:

The warriors have another favorite game, called *Chungke*; which, with propriety of language, may be called "Running hard labor." They have near their state house a square piece of ground well cleaned, and fine sand is carefully strewed over it, when requisite, to promote a swifter motion to what they throw along the surface. Only one or two on a side play at this ancient game. They have a stone about two fingers broad at the edge and two spans round; each party has a pole of about 8 feet long, smooth, and tapering at each end, the points flat. They set off abreast of each other at 6 yards from the end of the playground; then one of them huris the stone on its edge, in as direct a line as he can, a considerable distance toward the middle of the other end of the square; when they have run a few yards each darts his pole anointed with bear's oil, with a proper force, as near as he can guess in proportion to the motion of the stone, that the end may lie close to the stone—when this is the case, the person counts two of the game, and, in proportion to the nearness of the poles to the mark, one is counted, unless by measuring, both are found to be at an equal distance from the stone. In this manner, the players will keep running most part of the day, at half speed, under the violent heat of the sun, staking their silver ornaments, their nose, finger, and ear rings; their breast, arm, and wrist plates, and even all their wearing apparel, except that which barely covers

<sup>44</sup> Adair is reverting again to his favorite theory that these meaningless syllables had reference to the Jehovah of the Hebrews.

<sup>45</sup> Adair, *Hist. Am. Inds.*, pp. 399-401.

<sup>46</sup> *Ibid.*, pp. 113-114; see also, p. 263 of this article.

their middle. All the American Indians are much addicted to this game, which to us appears to be a task of stupid drudgery; it seems, however, to be of early origin, when their forefathers used diversions as simple as their manners. The hurling stones they use at present were time immemorial rubbed smooth on the rocks, and with prodigious labour; they are kept with the strictest religious care, from one generation to another and are exempted from being buried with the dead. They belong to the town where they are used and are carefully preserved.<sup>47</sup>

Akabátle was the name of a game in which the men and women opposed each other. There was a goal on each side made of posts about 3 feet tall and placed 2 feet apart. They used a ball about the size of a baseball which they propelled along the ground by means of bent sticks. They played for 12 points and the games continued four days, after which they had a feast.

Towácto-cōli, "carrying the big ball," was like the above, except that the ball used was larger, something like a football, and no sticks were used in driving it. The men kicked it and were not allowed to use their hands, while the women could use both hands and feet. As in the case of the other game, they played for 12 points, had a feast afterwards, and sometimes followed it with a dance. While the game was in progress there would be a man out after venison, which would be cooked for the men while the women were served another dish. Each, however, shared his or her dish with members of the opposite sex.

The game of hiding the bullet was played by men only, and not very often even by them. A time was set for this in advance, sometimes during the day, but more often at night, and usually in winter. They built a big fire for the occasion and wagered horses, cows, saddles, guns, money, and all sorts of things. There were two sides and one from each side played in turn. One of these would take a bullet and try to hide it so skillfully under one of four socks or gloves that his opponent could not guess where it was. He passed his hand under all of them in the process of concealing it. The socks and gloves were made of wool and woven by themselves. If the one who was to guess found the bullet when he turned a sock over, he struck his breast with his hand and his side scored four; if he found it on the second guess they scored two. If he then failed to guess the location of the bullet, his opponent concealed it again and a second man guessed. The one who found the bullet was the one who hid it next. They decided in advance how many points should constitute a game and used counters made of slivers of cane about the size of a match, which passed from side to side as points were won or lost. If one side won all of the property from the other, they would give the latter a chance to recover it, and in this way they kept the game going all day and all night.

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<sup>47</sup> Adair, *Hist. Am. Inds.*, pp. 401-402.

## MEASURES AND INTERCOMMUNICATION

Adair says of the Chickasaw:

They count the day also by the three sensible differences of the sun, like the Hebrews—sunrise they term *Hassé kootcha meente* [háci kutca minti], “the sun’s coming out”; noon, or midday, *Tabookòre* [tabokoli]; and sunset, *Hassé Oobea* [háci ábia], literally, “the sun is dead”; likewise, *Hasse Ookka’tóra* [háci okatula]; that is, “the sun is fallen into the water”; the last word is compounded of *Ookka* [oka], water, and *Etóra* [ítola], to fall; it signifies also “to swim,” as instinct would direct those to do who fell into the water. And they call dark, *Ookkille* [okíili], derived from *Ookka* [oka], water, and *Illeh* [illi], dead;<sup>48</sup> which shows their opinions of the sun’s disappearance according to the ancients, who said the sun slept every night in the western ocean. They subdivide the day by any of the aforesaid three standards—as halfway between the sun’s coming out of the water, and in like manner by midnight or cock-crowing, etc.<sup>49</sup>

On the subject of seasons I will quote the following from an earlier paper:

Adair says that the Indians divided the year into four seasons—spring, summer, autumn, and winter—and numbered the years by any one of them. He gives the names of these periods in the Cherokee and Chickasaw languages. The last are “Otoolpha, Tóme palle, Ashtóramóona, Ashtóra.”<sup>50</sup> He derives Otoolpha from ‘oolpha, the name of a bud, or to shoot out,’ but I am unable to identify the word in Choctaw unless it is *álba*, ‘vegetation, herbs, plants, weeds,’ and it may be a Chickasaw term. Tóme palle signifies ‘bright and warm’ or ‘warm brightness.’ Palle, or pálli, is a Chickasaw word, and it would seem from Byington’s dictionary<sup>51</sup> that it was later used by itself to signify ‘summer.’ The next name would be in Choctaw *háctula hímona* or *háctulámmona*, ‘the beginning of winter,’ and the last *háctula*. *Háctula* means ‘winter’ in Choctaw as well as Chickasaw, but autumn is *háctulahpi*, ‘the beginning of winter,’ the significance being about the same. The Choctaw, however, use *tofa* for summer and *tofahpi* for spring.

Adair says of the Indians of his acquaintance: “They pay great regard to the first appearance of every new moon, and, on the occasion, always repeat some joyful sounds, and stretch out their hands toward her—but at such times they offer no public sacrifice.<sup>52</sup> And in another place he remarks that they “annually observed their festivals . . . at a prefixed time of a certain moon.”<sup>53</sup>

The names of the months were probably nearly identical with those used by the Choctaw. All that I know regarding the latter has been given under the head of “háshi” in Byington’s “Dictionary of the Choctaw Language.”<sup>54</sup>

In the eighteenth century they figured out mercantile transactions on the ground, calling this system “yakâ-ne Tlápha,”<sup>55</sup> or “scoring on

<sup>48</sup> The etymology is probably altogether wrong.

<sup>49</sup> Adair, *Hist. Am. Inds.*, p. 76.

<sup>50</sup> *Ibid.*, p. 74.

<sup>51</sup> *Bull.* 46, *Bur. Amer. Ethn.*

<sup>52</sup> Adair, *op. cit.*, p. 76.

<sup>53</sup> *Ibid.*, pp. 99–100.

<sup>54</sup> *Bull.* 46, *Bur. Amer. Ethn.*, pp. 146–147.

<sup>55</sup> *Yakni* ápa, “ground spread out.”

the ground." They made single straight marks for units and crosses for tens, which Adair believed to have been adopted from the whites, but this is by no means certain.<sup>56</sup>

As among the Creeks, the number of days which were to elapse before a ceremonial or other community enterprise was registered by means of bundles of small sticks, called "the broken days." The person in charge of this bundle threw away one every morning and when one was left all knew that the day agreed upon had arrived. Adair tells us that, instead of bundles of sticks, they sometimes used sticks with a definite number of notches in each, one of which was cut out every day. But sometimes, especially when the anticipated date was indefinite, notches were made daily.<sup>57</sup> More interesting, on account of its resemblance to the famous quipu of Peru, was the employment of knotted cords. The time of an event was sometimes fixed by tying as many knots as there were days intervening, one to be untied for each period of daylight. Or days might be marked by tying in knots. The important point for us, however, is contained in the following statement of Adair: "They count certain very remarkable things, by knots of various colours and make, after the manner of the South American Aborigines."<sup>58</sup> According to Milfort, the Creeks had similar records composed of strings of beads.<sup>59</sup>

The following from Adair contains nearly all that we know of a shell currency:

Before we supplied them with our European beads they had great quantities of wampum (the *Buccinum* of the ancients) made out of conch-shell, by rubbing them on hard stones, and so they form them according to their liking. With these they bought and sold at a stated current rate, without the least variation for circumstances either of time or place; and now they will bear nothing patiently of loss or gain, or allow us to heighten the price of our goods, be our reasons ever so strong, or though the exigencies and changes of time may require it. Formerly four deerskins was the price of a large conch-shell bead, about the length and thickness of a man's forefinger, which they fixed to the crown of their head as an ornament—so greatly they valued them.<sup>60</sup>

There is reason to believe that, although it had an aboriginal base, the use of shell money was much stimulated by white contact.

Communication between tribes or bands was maintained by means of runners, smoke signals, and by variously intoned whoops, such as the death whoop, the whoop of the successful warrior when he arrived within hearing of the village, the whoop of friendship, the whoop of defiance, and the news whoop.<sup>61</sup> Judging by the following

<sup>56</sup> Adair, *Hist. Am. Inds.*, p. 77.

<sup>57</sup> *Ibid.*, p. 75.

<sup>58</sup> *Ibid.*, p. 75.

<sup>59</sup> Milfort, *Mémoire*, pp. 47-48.

<sup>60</sup> Adair, *op. cit.*, p. 170. Cf. also Lawson, *Hist. Car.*, pp. 315-317.

<sup>61</sup> Adair, *op. cit.*, pp. 165, 166, 254, 273, 276, 277, 301, 318, 323, 326.

quotation from Adair there must have been some sort of sign language:

The present American aborigines seem to be as skilful pantomimi as ever were those of ancient Greece or Rome or the modern Turkish mutes, who describe the meanest things spoken by gesture, action, and the passions of the face. Two far-distant Indian nations, who understand not a word of each other's language, will intelligibly converse together and contract engagements without an interpreter in such a surprising manner as is scarcely credible.<sup>62</sup>

He has the following on travel:

When the Indians are traveling in their own country they inquire for a house of their own tribe [i. e., clan]; and if there be any, they go to it, and are kindly received, though they never saw the persons before—they eat, drink, and regale themselves with as much freedom as at their own tables, which is the solid ground covered with a bearskin. It is their usual custom to carry nothing along with them in their journies but a looking-glass and red paint hung to their back—their gun and shot pouch—or bow and quiver full of barbed arrows; and frequently both gun and bow; for, as they are generally in a state of war against each other, they are obliged as soon as able to carry those arms of defence. Every town has a state-house, or synedriion, as the Jewish sanhedrin [i. e., the *teokofa*] where almost every night the headmen convene about public business or the town's-people to feast, sing, dance, and rejoice, . . . as will fully be described hereafter. And if a stranger calls there, he is treated with the greatest civility and hearty kindness—he is sure to find plenty of their simple home fare and a large cane-bed covered with the softened skins of bears or buffaloes to sleep on. But when his lineage is known to the people (by a stated custom they are slow in greeting one another), his relation, if he has any there, addresses him in a familiar way, invites him home, and treats him as his kinsman.<sup>63</sup>

The usual Chickasaw form of salutation when one person came to visit another was as follows: The householder would say *Icla tco?* ("Are you come?") and the guest would reply *Alali-o* ("I am come.").<sup>64</sup>

#### RELIGIOUS BELIEFS IN GENERAL

The Chickasaw have not even the tradition of a time when they were without belief in one supreme being whom they call *Ababinili*, "Sitting-above," or "Dwelling-above," a being who "guided them and told them what to do." He is now spoken of at times as *Abainki*, "Father-above," evidently under Christian influence, and under the same influence human beings came to be named *aba hatak*, "Men-from-above."

In spite of the Christian accretions, it seems fairly clear that there was anciently belief in a supreme, but hardly a sole, deity associated with the sky or sun. A multiplicity of celestial powers is suggested by the Chickasaw who told John Wesley that they regarded "four

<sup>62</sup> Adair, *Hist. Am. Inds.*, p. 79.

<sup>63</sup> *Ibid.*, pp. 17-18.

<sup>64</sup> *Ibid.*, p. 60.

Beloved Things above; the clouds, the sun, the clear sky, and He that lives in the clear sky.”<sup>65</sup> Adair’s references to Ababinili all indicate solar or celestial associations. He calls him “Loak-Ishtohoollo-Aba,” “the great holy fire above,” and says that he “resides (as they think) above the clouds, and on earth also with unpolluted people. He is with them the sole author of warmth, light, and of all animal and vegetable life.”<sup>66</sup> In another place he remarks, “they worship God, in a smoke and cloud, believing him to reside above the clouds, and in the element of the, supposed, holy annual fire.”<sup>67</sup> And, again: “Though they believe the upper heavens to be inhabited by Ishtohoollo Aba, and a great multitude of inferior good spirits, yet they are firmly persuaded that the divine omnipresent Spirit of fire and light resides on the earth, in their annual sacred fire while it is unpolluted; and that he kindly accepts their lawful offerings, if their own conduct is agreeable to the old divine law, which was delivered to their forefathers.”<sup>68</sup>

To this point the excerpts merely suggest a solar deity, but elsewhere the same author quotes a Chickasaw seer to the effect that “he very well knew, the giver of virtue to nature resided on earth in the unpolluted holy fire, and likewise above the clouds and the sun, in the shape of a fine fiery substance, attended by a great many beloved people.”<sup>69</sup> Here the supreme being is differentiated from the sun, and perhaps we are to understand by the “fine fiery substance” the shining, overarching sky. This view is strengthened by the unimpressive idea of the solar body which the Chickasaw high priest in Adair’s time entertained. “It might possibly,” he said, “be as broad and round as his winter-house; but he thought it could not well exceed it.”<sup>70</sup>

In the absence of proof that the Chickasaw had a busk ceremonial or anything corresponding to it, I hardly know how to interpret the references to the ceremonial fire, though they have applicability in the case of the Creeks.<sup>71</sup> Sacred fires were so common in the Southeast, however, that it is probable the Chickasaw kindled them at times.

In one place Adair calls the supreme being “Ishtohoollo Aba Eloa” (the big holy one above who thunders),<sup>72</sup> and he says that the power of distributing rain at his pleasure “belonged only to the great beloved thundering Chieftain, who dwells far above the clouds, in the

<sup>65</sup> Jones, *Hist. of Savannah*, p. 85.

<sup>66</sup> Adair, *Hist. Am. Inds.*, p. 19.

<sup>67</sup> *Ibid.*, p. 35.

<sup>68</sup> *Ibid.*, p. 116.

<sup>69</sup> *Ibid.*, pp. 92-93.

<sup>70</sup> *Ibid.*, p. 19.

<sup>71</sup> See Forty-second Ann. Rept. Bur. Amer. Ethn., pp. 33-74; 546-613.

<sup>72</sup> Adair, *op. cit.*, p. 94.



new year's unpolluted holy fire."<sup>73</sup> On this subject he enlarges elsewhere as follows:

The Indians call the lightning and thunder *Eloha* [*Hiloha* is thunder], and its rumbling noise, *Rowah*, . . . and the Indians believe . . . that *Minggo Ishto Eloha Alkaiasto*, "the great chieftain of the thunder, is very cross or angry when it thunders," and have heard them say, when it rained, thundered, and blew sharp, for a considerable time, that the beloved, or holy people, were at war above the clouds. And they believe that the war at such times is moderate, or hot, in proportion to the noise and violence of the storm.

I have seen them in these storms fire off their guns, pointed toward the sky; some in contempt of heaven and others through religion—the former to show that they were warriors and not afraid to die in any shape; much less afraid of that threatening, troublesome noise, and the latter because their hearts directed them to assist *Ishtohoolo Eloha*.<sup>74</sup>

From the above quotations we learn that the supreme spirit was accompanied by a number of subordinate spirits. Adair states that the Chickasaw called these "Hottuk Ishtohoolo" [*Hätäk ishto holo*, holy great persons]." With them he contrasts the "Hottuk ookproose" [*Hätäk okpulosi*], or "Nana ookproose" [*Nana okpulosi*], "very bad men," or "very bad people," who, he says, were supposed to inhabit the dark regions of the west.<sup>75</sup> Further on will be found a reference to a Thunder being who seemingly had no connection with the Sky God.

The respect entertained for fire in general is thus enlarged upon by the same writer when he has occasion to describe native methods of deadening the trees and clearing fields:

With these trees they always kept up their annual holy fire; and they reckon it unlawful, and productive of many temporal evils, to extinguish even the culinary fire with water. In the time of a storm, when I have done it, the kindly women were in pain for me, through fear of the ill consequences attending so criminal an act. I never saw them to damp the fire, only when they hung up a brand in the appointed place, with a twisted grape-vine, as a threatening symbol of torture and death to the enemy; or when their kinsman dies. In the last case, a father or brother of the deceased takes a firebrand, and brandishing it two or three times round his head, with lamenting words, he with his right hand dips it into the water and lets it sink down.<sup>76</sup>

In the woods certain beings were supposed to live which had the appearance of men 10 feet or more in height and with long arms but small heads. They carried off women, but most Indians thought they seldom attacked men. However, one informant claimed that they sometimes killed and flayed men, and from this circumstance derived their name *lo<sup>o</sup>fa*, which means "to skin." They could run very fast. Some were stronger than men; some not so strong. They

<sup>73</sup> Adair, *Hist. Am. Inds.*, p. 92.

<sup>74</sup> *Ibid.*, p. 65.

<sup>75</sup> *Ibid.*, p. 36.

<sup>76</sup> *Ibid.*, p. 405.

were seen by doctors and sometimes by hunters, as elsewhere described.<sup>77</sup>

The iyagánasha<sup>78</sup> were little people, only about 3 feet tall. They were also seen at times by doctors and hunters. They carried some people off and made doctors of them, and they taught others how to get deer, since they were experts in pursuing game. In this they were quite different from the lo<sup>n</sup>fas, who would drive deer away from the hunters and hide them. Still, the Chickasaw would soon move away from a place if they thought there were iyagánasha about. The following information regarding them was obtained for me by Zeno McCurtain:

STORY OF THE INVISIBLE LITTLE PEOPLE (IYAGÁNACA)

These little people lived at a certain time, but everyone could not see them. They did not live in all places, but sometimes under high banks or along a branch which had such high banks. It was necessary for their preservation that most other people should not be able to see them. They, on their part, could see everybody, but they showed themselves to few. When they saw a person whom they liked, a man in good health, dreaming good dreams, they would make a doctor out of him. Having selected him, they would lead him off into the woods where others could not find him. People might be in search of him and close to the place where he was, but they would not see him. After a certain time, however, the little people would conduct him to a place near his home and tell him to return to his family. Sometimes, when a child disappeared, the people knew that the little people had carried him off and they would not trouble to look for him for several days, knowing who had him and that they would bring him back.

When a person who had been carried off in this manner returned he would not tell his friends where he had been or whom he had been with, for the little people warned him against divulging anything. The little people told him that if he related what he had seen, or told where he had been he would fall sick, forget all he had learned, and never become a doctor, but otherwise he would become whatever the little people had trained him for. He generally became a good doctor.

The little people were believed to be powerful, though some denied that they had any existence. They had their own way of living, like other creatures, but no one could tell what it was except the persons who had been made doctors by them. It was said that when they were travelling along and came to the bank of a large creek they would jump across it as if it were a small branch. If a human being happened to be with them, and found that he was unable to cross, one of the little people would leap back, take him by the arm, and swing him over. But when they came to a little branch the little people could not spring over and the man would assist them across in the same way. The worst enemy of these pygmies was the wasp. When they found a wasp's nest anywhere they made elaborate preparations to attack it. If a wasp stung one of them he would surely die. A human being

<sup>77</sup> See pp. 200-201.

<sup>78</sup> This word seems to be compounded of yakni, "earth," and a<sup>n</sup>ca, "to sit," or "to dwell."

who might be with them would go to the nest and knock it down with a stick, and the little people would then think that he could perform miracles.

Whenever they took a man away in order to instruct him, they would first test him to see whether he would divulge anything. If they found that he was easily excited and would let things slip out, they would not teach him anything, but if they discovered that he was strong minded they would teach him because that was the kind of man they wanted. One way they had of testing a man was to leave him all alone in the evening when they camped and then send some one back to attempt to scare him. If he withstood all such tests he was selected as one who could be trusted.

If a person had been made a doctor by the little people, the fact was betrayed by his actions, but if one who had been with them told anything about them he would become of little use to himself or anybody else, because the power that they had given him would be taken away.

When a person got lost and these little people found him, they usually led him along to a place which was familiar to him. When they took a child away and instructed him, the child would not begin to follow their instructions until he had grown up.

Some doctors like to talk about the little people and describe their doings, but those are not good doctors. When a doctor was not careful about what he had been taught, talked of what he could do, and tried to do it, he was sometimes looked upon as a wizard and sometimes they wanted to kill him. Witch doctors owe their origin to the little people, and at times many innocent people suffer because of them. They are in the habit of lying in order to increase their pay while real doctors generally tell what is true.

A third being of the forest was called *tibōli*. It was about the size of a man and had an arm shaped like a club, with which it pounded on trees. These creatures did so only in winter, and my informant claimed to have heard the noise made by them very often.

A horned snake called *sint-holo* ("sacred snake") lived along big creeks or in caves. Not all persons could see these snakes, but sometimes a boy would get near one of them or even see him, and when this happened people said the snake would cause him to be wiser than other people. These snakes often moved from one stream to another, and it was claimed that they would make it rain in order to raise the rivers so that they could leave their hiding places with more facility. Such snakes harmed neither people nor cattle. The *sint-holo* is said to have made a noise like thunder. Once a hunter discovered a *sint-holo* fighting with the Thunder. Each of the contestants begged for help, and finally he decided in favor of the Thunder and shot the snake. The Thunder told him to run as soon as he had done this, and as he did so he heard thunder behind him and saw lightning flashing about. He climbed a hill, when water from the creek rushed after him and nearly caught him, but he escaped. My informants knew nothing about the thunder-bird, nor any story bearing on the rainbow. The galaxy was called *ofi' to'bi ihina*, "the white dog's road," but no story about it was remembered.

Another big snake was called nickin-fitcik ("eye-star") because it had a single eye in the middle of its forehead. If anything passed in front of its lair the snake would catch it, but none have been seen in the western country.

There were formerly many tie-snakes, some with bodies half a foot through. If one of these came upon the trail of a hunter, it followed him, making a great noise. If a person were caught, as happened in at least one instance, the snake would wrap itself about his body and crush him to death; but one could escape from this snake by running a short distance and turning back on the same track, running on and repeating the operation, meantime shouting for the other hunters to assemble and dispatch his pursuer.

My informants had not heard of the water panther or the sharp-breasted snake, beings which figure in Creek mythology.

When an Indian killed a snake he would say, "Well, I helped you all I could, but the One-above (or Father-above) has come and killed you and I throw you away." Anciently fear of snakes seems to have been very much greater, Adair remarking that misfortune was predicted because he once killed a rattlesnake.<sup>79</sup>

When Chickasaw Indians heard the screech owl they thought that witches were about, and they went quickly to the doorway and laid their moccasins there turned upside down.

The use of charms in the Southeast was so general that it extended to many of the white traders. Adair says that he "took the foot of a guinea deer" out of the shot pouch of one of these men "and another from my own partner, which they had very safely sewed in the corner of each of their otter-skin-pouches, to enable them, according to the Indian creed, to kill deer, bear, buffaloe, beaver, and other wild beasts in plenty."<sup>80</sup> He also tells us that a beaded string of buffalo hair was tied by the women around their legs as "a great ornament, as well as a preservative against miscarriages, hard labor, and other evils."<sup>81</sup>

Sacrifices and taboos were very much interwoven, and the following observances partake of both:

They sacrifice in the woods, the milt, or a large fat piece of the first buck they kill, both in their summer and winter hunt; and frequently the whole carcass. This they offer up, either as a thanksgiving for the recovery of health and for their former success in hunting; or that the divine care and goodness may be still continued to them. . . . Formerly, every hunter observed the very same religious economy, but now it is practiced only by those who are the most retentive of their old religious mysteries. . . .

The common sort of Indians, in these corrupt times, only sacrifice a small piece of unsalted fat meat, when they are rejoicing in their divine presence,

<sup>79</sup> Adair, *Hist. Am. Inds.*, pp. 272-273.

<sup>81</sup> *Ibid.*, p. 169.

<sup>80</sup> *Ibid.*, p. 239.

singing Yo Yo, etc. for their success and safety [in case they have lost none of their companions]: but . . . both the war-leader and his religious assistant go into the woods as soon as they are purified, and there sacrifice the first deer they kill. . . .

They who sacrifice in the woods, do it only on the particular occasions now mentioned; unless incited by a dream, which they esteem a monitory lesson of the Deity.<sup>82</sup>

Elsewhere he states that "when in the woods the Indians cut a small piece out of the lower part of the thighs of the deer they kill, lengthways and pretty deep. Among the great number of venison hams they bring to our trading houses, I do not remember to have observed one without it."<sup>83</sup> Again, "the Indian women always throw a small piece of the fattest of the meat into the fire when they are eating, and frequently before they begin to eat. Sometimes they view it with a pleasing attention, and pretend to draw omens from it. They firmly believe such a method to be a great means of producing temporal good things and of averting those that are evil." He was informed by those whites who had become used to living in the Indian manner "that the Indian men observe the daily sacrifice both at home and in the woods with new-killed venison, but that otherwise they decline it."<sup>84</sup>

The remainder of the material on this subject has already been given in my report on the Creek Indians, but it is drawn entirely from Adair and is at least as true of the Chickasaw as of the Creeks. It may therefore be repeated:

They believe that nature is possessed of such a property as to transfuse into men and animals the qualities either of the food they use or of those objects that are presented to their senses. He who feeds on venison is, according to their physical system, swifter and more sagacious than the man who lives on the flesh of the clumsy bear or helpless dunghill fowls, the slow-footed tame cattle, or the heavy wallowing swine. This is the reason that several of their old men recommend and say that formerly their greatest chieftains observed a constant rule in their diet and seldom ate of any animal of a gross quality or heavy motion of body, fancying it conveyed a dullness through the whole system and disabled them from exerting themselves with proper vigor in their martial, civil, and religious duties.<sup>85</sup>

A little farther on he tells us that it was customary in all the Indian tribes to eat the heart of a slain enemy "in order to inspire them with courage." He had seen some of their warriors drink out of a human skull in order to "imbibe the good qualities it formerly contained."<sup>86</sup>

This idea is one of the cardinal principles on which their medicine is built and was shared by every tribe in America that has been investigated. Adair introduces it in order to draw a parallel between the taboos of the Israelites and those of the Indians, but most of the Indian instances which he cites are to be accounted for in the way explained by him above or because it was

<sup>82</sup> Adair, *Hist. Am. Inds.*, pp. 117-119.

<sup>83</sup> *Ibid.*, pp. 137-138.

<sup>84</sup> *Ibid.*, p. 115.

<sup>85</sup> *Ibid.*, p. 133.

<sup>86</sup> *Ibid.*, p. 135.

believed that the animal in question would bring on a certain disease, a matter to be elaborated presently. Nevertheless it is worth while to take note of the things from which they abstained in his time, even though we fail to discover in that traces of a Jewish origin. He says that they refused to eat all birds of prey and birds of night, and a little further on he mentions specifically eagles, ravens, crows, buzzards, swallows, bats, and every species of owl. He also adds flies, mosquitoes, and gnats. They did not eat carnivorous animals or such as lived on nasty food, as hogs, wolves, panthers, foxes, cats, mice, rats. All beasts of prey except the bear were "unhallowed"; also all amphibious quadrupeds, horses, fowls, moles, the opossum, and all kinds of reptiles.<sup>87</sup> He says that the old traders could remember when they first began to eat beaver.<sup>88</sup>

Hogs and domestic fowls were probably tabooed at first because strange to the Indians and in the case of the hog because it is a heavy, awkward looking animal and might communicate such properties to the eater.

"When swine were first brought among them, they deemed it such a horrid abomination in any of their people to eat that filthy and impure food, that they excluded the criminal from all religious communion in their circular town-house, or in their quadrangular holy ground at the annual expiation of sins, equally as if he had eaten unsanctified fruits. After the yearly atonement was made at the temple, he was indeed readmitted to his usual privileges."<sup>89</sup>

From want of any independent information on this point this must be left without comment. Of course, Adair is anxious to make the most of such a taboo in his desire to establish a Hebrew origin for his red friends, and this is naturally extended to the opossum, after which the Indians named the hog. Still, what he says may be true, that "several of the old Indians assure us, they formerly reckoned it as filthy uneatable an animal, as a hog."<sup>90</sup> The instances which Adair gives in proof of the existence of these taboos all tend to prove that they abstained from them generally for fear of some disease or limitation which the animal might communicate. He says that they abstained from swallowing flies, mosquitoes, or gnats because they believed that they bred sickness or worms, "according to the quantity that goes into them."<sup>91</sup> Upon one occasion Adair shot a small fat hawk which he strongly importuned an old woman to take and dress, but although there was no meat of any kind in camp, "she, as earnestly refused it for fear of contracting pollution, which she called the 'accursed sickness,' supposing disease would be the necessary effect of such an impurity."<sup>92</sup> Again he says that "they abhor moles so exceedingly that they will not allow their children even to touch them for fear of hurting their eyesight; reckoning it contagious."<sup>93</sup>

Other food taboos mentioned by Adair are against eating an animal that had died of itself, a young animal newly weaned, and blood. The first of these may be commended as a taboo of real medicinal value and the reason given by themselves, that the animal might have died of a contagious disease, is just as valid to-day. Adair has the following to say regarding this taboo.

"None of them will eat any animal whatsoever if they either know or suspect that it died of itself. I lately asked one of the women the reason of throwing a dung-hill fowl out of doors on the cornhouse; she said that she was afraid, *Oophe Abecka Hakset Illeh*, 'it died with the distemper of the mad dogs,' and that if she had eaten it it would have affected her in the very same manner. I said, if so, she did well to save herself from danger, but at the same time it seemed she had forgotten the cats. She replied, 'that such impure animals

<sup>87</sup> Adair, *Hist. Am. Inds.*, pp. 16, 130-134.

<sup>88</sup> *Ibid.*, p. 132.

<sup>89</sup> *Ibid.*, p. 133.

<sup>90</sup> *Ibid.*, p. 16.

<sup>91</sup> *Ibid.*, p. 131.

<sup>92</sup> *Ibid.*, pp. 130-131.

<sup>93</sup> *Ibid.*, p. 133.

would not contract the accursed sickness on account of any evil thing they eat, but that the people who ate of the flesh of the swine that fed on such polluting food, would certainly become mad."

"In the year 1766 a madness seized the wild beasts in the remote woods of West Florida, and about the same time the domestic dogs were attacked with the like distemper; the deer were equally infected. The Indians in their winter's hunt, found several lying dead, some in a helpless condition, and others fierce and mad. But though they are all fond of increasing their number of deerskins, both from emulation and for profit, yet none of them durst venture to flay them, lest they should pollute themselves and thereby incur bodily evils. The headman of the camp told me he cautioned one of the *Hottuk Hakse*, who had resided a long time at Savannah, from touching such deer, saying to him *Cehaksinna*, "Do not become vicious and mad," for *Isse Haksct Illehtahah*, 'the deer were mad and are dead'; adding that if he acted the part of *Hakse* he would cause both himself and the rest of the hunting camp to be spoiled; nevertheless he shut his ears against his honest speech and brought those dangerous deerskins to camp. But the people would not afterward associate with him, and he soon paid dear for being *Hakse* by a sharp-splintered root of a cane running almost through his foot, near the very place where he first polluted himself; and he was afraid some worse ill was in wait for him."<sup>94</sup>

Adair is also very insistent regarding the blood taboo, and cites the case of a woman who believed "she had *Abecka Ookproo*, 'the accursed sickness,' because she had eaten a great many fowls after the manner of the white people with the *Issish Ookproo*, 'accursed blood,' in them." Afterwards she would never eat fowls unless they had been bled to death.<sup>95</sup> This must also be left unverified. While there was probably truth in it, it is doubtful whether it had the importance attributed to it by Adair, who is again anxious to make a point for his Hebrew theory. The taboo against eating a newly weaned animal is probably correct, since one kind of disease was traced to such an animal in later times. . . . Adair says that the old men not merely refrained from eating it but thought "they would suffer damage even by the bare contact."<sup>96</sup>

He also cites instances of Indians refusing to eat with the traders for fear of pollution,<sup>97</sup> but this was less on account of the whites themselves than what might be contained in their dishes. Taboos were so numerous with the old-time Indians that parallels with the taboos of any other nation could be found without a great deal of difficulty.

An interesting statement was made to me in connection with dreams. It was said that only those dreams were prophetic which impressed the sleeper so profoundly that he did not forget them or did not forget them readily; other dreams were of no consequence.

## THE FATE OF SOULS

Creek and Chickasaw beliefs regarding a post-mortem state of existence seem to have been practically the same, and therefore I will again quote from the sections of my Creek report dealing with this subject, the authorities there used having been equally familiar with the usages of the two peoples.

<sup>94</sup> Adair, *Hist. Am. Inds.*, pp. 131-132.

<sup>95</sup> *Ibid.*, p. 135.

<sup>96</sup> *Ibid.*, p. 136.

<sup>97</sup> *Ibid.*, pp. 133-134.

Adair is probably correct in attributing fatalistic beliefs to the southern Indians as to the time when each man's life was to come to an end. He says that they had a common proverb "*Nectak Intàhàh* [Ní'tak intaha], 'The days appointed, or allowed him, were finished' [the days finished for him]. And this is their firm belief; for they affirm, that there is a fixt time, and place, when, and where, every one must die, without any possibility of averting it. They frequently say, 'Such a one was weighed on the path, and made to be light.'"<sup>98</sup>

He also says that many believed marriages to be equally fated.<sup>99</sup>

We learn from Adair, in places already quoted, that the Chickasaw discharged guns and whooped in order to drive the ghost of a dead man to his fixed abode, but that it was believed that if he had been slain in war his soul would haunt the eaves of the house until equal blood had been shed for him.<sup>1</sup> All accounts agree that after the soul had been induced to leave the neighborhood of his living relatives he traveled westward, passed under the sky and proceeded upward upon it to the land of The One Above or the Breath Holder. The name "spirits' road" given to the milky way shows that this was regarded as the trail upon which souls ascended.

The last-mentioned writer says that the good spirits of the world above attend and favor the virtuous while the bad spirits in the west accompany and have power over the vicious,<sup>2</sup> but this probably gives a somewhat distorted view of the actual native belief. It is probable that the good spirits of which he speaks included most of those who became human helpers, whether in the sky or in other parts of the universe, while the bad spirits were the ghosts of the dead, or at any rate spirits associated with the western world, through which the soul first passed. This is suggested by what he tells us immediately afterwards. "On which account, when any of their relations die, they immediately fire off several guns, by one, two, and three at a time, for fear of being plagued with the last troublesome neighbors [i. e., the evil spirits of the west]: all the adjacent towns also on the occasion, whoop and halloo at night; for they reckon this offensive noise sends off the ghosts to their proper fixed places till they return at some certain time, to repossess their beloved tract of land, and enjoy their terrestrial paradise."<sup>3</sup> The good spirits could be attached to individuals somewhat like the personal manitous of the Algonkian Tribes. This is made evident in the case of the Chickasaw by Adair, who says: "Several warriors have told me that their *Nana Ishtohoollo*, 'concomitant holy spirits,' or angels, have forewarned them, as by intuition, of a dangerous ambuscade, which must have been attended with certain death, when they were alone, and seemingly out of danger; and by virtue of the impulse they immediately darted off, and with extreme difficulty escaped the crafty pursuing enemy."<sup>4</sup>

Adair is our only early authority for the expected ultimate return of souls to earth,<sup>5</sup> but there appears to be no good reason to doubt that such an idea prevailed with certain Indians, and he is confirmed by the Chickasaw interviewed on Schoolcraft's behalf during the middle of last century. "They believe," he says, "that the spirits of all the Chickasaws will go back to Mississippi and join the spirits of those that have died there; and then all the spirits will return to the west before the world is destroyed by fire."<sup>6</sup>

<sup>98</sup> Adair, *Hist. Am. Inds.*, p. 33.

<sup>99</sup> *Ibid.*, p. 26.

<sup>1</sup> Schoolcraft, *Ind. Tribes*, vol. 1, p. 310.

<sup>2</sup> Adair, *op. cit.*, p. 36.

<sup>3</sup> *Ibid.*

<sup>4</sup> *Ibid.*, p. 37.

<sup>5</sup> *Ibid.*, pp. 178, 182, 397.

<sup>6</sup> Schoolcraft, *op. cit.*, p. 310.



## DANCES

The following dances are remembered:

Akánka hīa', "chicken dance," having four songs.

Bála' hīa', "bean dance," with five songs.

Fala hīa', "crow dance," with four songs.

Fōtcō hīa', "duck dance," with four songs.

Hatcūntcūba' hīa', "alligator dance," with three songs.

Ickōbō tōkolo' hīa', "double-headed dance," with one song.

Iso<sup>c</sup> homa hīa', "red ant dance," with three songs.

Iti<sup>s</sup>ánāli hīa', "dance in which they danced against each other," with four songs.

Kōfe hīa', "quail dance," with four songs.

Lūksi hīa', "turtle dance," with five songs.

Nāni kálo hīa', "garfish dance," with three songs.

Nítak cōbōli hīa', "beating-on-a-bearskin-hide dance," with six songs.

Nīta hīa', "bear dance."<sup>7</sup>

Ofe' hīa', "dog dance," with five songs.

Okaicko' hīa', "drunken man's dance," with ten songs.

Sinti' hīa', "snake dance," with three songs.

Sipōkni hīa', "old dance," with one song.

Sōba hīa', "horse dance," with four songs.

Cātāni hīa', "tick dance," with eight songs repeated four times.

Cawi hīa', "raccoon dance," with four songs.

Tcalōk'loka' hīa', "turkey dance," with three songs.

Teukfi hīa', "rabbit dance."<sup>7</sup>

Tákha hīa', "catfish dance," with three songs.

Tántci hīa', "corn dance," with three songs.

Yanáac hīa', "buffalo dance," with four songs.

The dancing was usually at night, and they began with the "drunken man's dance" and ended with the "old dance," which was sometimes gone through after sunup. In the first the men and women would form two opposing lines. The women would then dance forward until close to the men and dance back, the men following, and they would alternately move forward and back as long as the dance lasted. The men and women sang together in this dance and the women also sang in the chicken, tick, and bean dances, but not in the others. Like the Creek women, they wore terrapin-shell rattles on their calves, but no other rattles are said to have been used at their dances, though there was always a drum.

In the corn dance men and women were in two opposing lines and when the lines approached the women were privileged to snatch handkerchiefs or other objects from the men or to pull their hair, and no resistance could be offered. When they danced in a circle, they usually went sinistrally. In the snake dance they went round first in sinistral circuit and then in dextral circuit. The bean dance

<sup>7</sup> Mentioned by Speck in Jour. Am. Folk-Lore, vol. xx, p. 55.

was one of those in which they passed entirely round the fire and the house. These three dances and the bison dance were among the ones used in the Pishofa. The Pishofa dances alone were kept up in later years, the others having been abandoned about 1882, except for some sporadic attempts to revive them by some of the young people, who, however, did not know how to execute them properly.

### THE PISHOFA CEREMONY

The most important ceremony known to the Chickasaw, in later times at least, was the Pishofa dance.<sup>8</sup> The earliest mention of this is in the following excerpt from Schoolcraft:

When they are sick they send for a doctor (they have several among them); after looking at the sick awhile, the family leave him and the sick alone. He then commences singing and shaking a gourd over the patient. This is done, not to cure, but to find out what is the matter, or disease; as the doctor sings several songs he watches closely the patient, and finds out which song pleased; then he determines what the disease is; he then uses herbs, roots, steaming, and conjuring; the doctor frequently recommends to have a large feast (which they call *Tonsh-pa-shoo-phah*); if the Indian is tolerably well off, and is sick for two or three weeks, they may have two or three *Tonsh-pa-shoo-phahs*. They eat, dance, and sing at a great rate at these feasts; the doctors say that it raises the spirits of the sick and weakens the evil spirit.<sup>9</sup>

The doctor who presided at a Pishofa dance is said by Speck to have been chosen by the prophet of the sick man's moiety.<sup>10</sup> The ceremony proper did not begin until the last day of the treatment, which is reported sometimes to have been the third day and sometimes the fourth.

It took place ordinarily in the yard of the patient, which, like every other Chickasaw house yard, was kept clear of grass, weeds, and similar small growths. The door of the house normally faced east, and if it happened to be directed toward any other quarter the ceremony took place elsewhere in a house with eastern outlook. During the entire time of the ceremony, until the evening of the last day, a fire was kept burning in front of the door, usually at the edge of the yard, but nearer if the doctor so ordered. One informant spoke as if it were occasionally in the northeastern corner of the yard, and instead of occupying one spot it was sometimes extended along a line parallel with the front of the house. Again there might be two fires, one in the northeastern corner of the yard and one in the southeastern corner. The fire was kept supplied with fuel by the doctor's tishu or assistant.

<sup>8</sup> The name is abbreviated from *Ta'ci át picofa*, "the corn is bulled." Speck (*Jour. Am. Folk-Lore*, vol. xx, p. 54) is thus in error in translating it "a fast"; in fact, there was no fasting. It was a feast and dance.

<sup>9</sup> Schoolcraft, *Ind. Tribes*, vol. I, p. 310.

<sup>10</sup> *Jour. Am. Folk-Lore*, vol. xx, p. 54.

Between the door and the fires, by the direction of the doctor, certain objects were placed, supposed to be of great assistance in combating the disease. These were usually wands of prescribed number, size, pattern, and disposition, and there were infinite varieties, depending on the system of the doctor who had been employed and the nature of the sickness. At times the wands appear to have been halfway between the door and the fire, but more often they were about the fire—or about the fires in case there were two. The wands were usually painted, sometimes all over, sometimes only at the upper ends, and ribbons were frequently attached to the tops. One informant mentioned two wands painted red at the tips, one having a red ribbon tied to it at the upper end and one a black ribbon. Another saw three wands in use, a longer pole close to the fire, capped with eagle feathers, and in the line marked out by this pole, the fire, and the door, two shorter wands. At the top of the one nearest the long pole was tied a blue ribbon and a feather; at the top of the other a blue ribbon and a red ribbon. In certain sicknesses they put up four poles, about 4 feet in length, painted in different colors, and ornamented with variously colored ribbons. Again they might erect a single tall pole in the very center of the open space. Instead of ribbons, the wings of owls were at times fastened to the poles, and the species of trees from which the wands were taken also varied. The single tall pole, as employed on one occasion at least, was willow. The shorter wands might be of willow, cedar, persimmon, or other wood. At times a human figure about 6 inches long, carved out of wood and with the face painted red and black, was substituted for the poles. Four men, called tishu, were appointed guardians of the yard, to see that no human being, themselves excepted, or any animal passed between the fire and the house door.

The patient was seated just inside the door facing out and the doctor took his station immediately behind him. The medicine, consisting of various roots and barks steeped in water, was in an earthen bowl close at hand. The doctor blew into this through a reed, sang the song which went with that particular remedy, and then drew some of the medicine into his mouth and blew it upon the patient. This was repeated four times, and afterwards, Speck states, the dregs were heaped upon the sufferer's head.<sup>11</sup> Speck also says that one of the doctor's helpers stood near the medicine armed with a small bow and arrows which latter he discharged into the medicine at intervals, whenever he suspected that unfavorable spirits were near who might detract from its power.<sup>12</sup> He also says that an emetic was administered before giving the medicine proper.<sup>13</sup> In treating the "hot sickness" the doctor accompanied his song with a gourd rattle.

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<sup>11</sup> Op. cit., p. 55.<sup>12</sup> Ibid.<sup>13</sup> Ibid.

A treatment was given early in the morning and it was repeated later in the forenoon and twice in the afternoon. Four is the magic number throughout most of the Southeast and therefore there were probably but four treatments in all, though one of my informants thought there might be six. Four treatments were also given on the second day and four on the third.

At noon on the last day of the ceremony those who were to take part in the dance—according to Speck, those who belonged to the clan, or rather the house group, of the patient's moiety—assembled and feasted until night. The food was usually prepared by two women, especially appointed for the purpose, at a second fire near the southeast corner of the yard and directly south of the ceremonial fire. The feasters sat in two rows, one on each side of the line between the fire and the door, the women on one side and the men on the other. A split log was laid down for each and the food was placed on the ground in front of them. At sundown the fire was built up higher and the dance began, continuing all night. The fire was not maintained all night, however, unless the weather was cold; otherwise they let it die out and continued dancing by the light of the moon. In the middle of the open space or by the fire sat a man with a drum made of a keg with a deerskin stretched over the open end. The women seldom sang but they wore on their calves rattles made of terrapin shells containing pebbles and covered with bison hide. The dance leader was called *tikba hēka*. Some doctors specified that the dance must begin in the middle of the open space; others had it start at the door, the women coming round from one side and the men from the other. Dancing was confined for the most part to the space between the house and the fire, but as the night wore on the participants would vary it by completely encircling the fire and even the house, as in the bean dance.

Speck has the following to say regarding these dances:

The order is single file, with the leader at the head, all the rest stepping in unison with their bodies inclined forward. The leader wears a feather or some symbol to indicate the animal to which the dance is addressed. He sings the song of that dance, for the most part composed of meaningless syllables, a sort of chorus being taken up by the other dancers in response to the first trophy. The dances are propitiatory and are also performed as prayers to the various animal deities and totems for the relief of the afflicted person. The first dance of the *Picófa* is named from the animal that is believed to be responsible for the patient's trouble. This is to strengthen the medicine. . . . Dancers paint their cheeks and forehead red; the chief shaman, however, is usually unadorned.

The dancing is continued until sunrise, then the shaman's assistant and three or four others take an emetic, but must have finished with it before the sun appears. They then take a bath, and the ceremony is concluded. It is considered a grave offense, frequently punishable by death, for a member of

one group [or moiety] to be present at the *Picófa* of the other group, as his presence would nullify the good effect of the ceremony.<sup>14</sup>

The vigorous actions of the dancers were supposed to communicate strength to their kinsman, and every effort was made to have him sit up so as to receive the full benefit of it and assist it by the exertion of his own powers. When the dancers scattered at the end of the ceremony it was believed that the disease would tend to become scattered also, each participant taking a part of it with him. It is furthermore said that the doctor sometimes transferred the disease to a piece of meat in the stew served to the feasters, this meat being taken from the bird whose feathers were used on the wands, and that whoever got that piece would carry the disease off with him. When the dance broke up, or, according to some, after the fourth dance, the doctor's waiters (*tishu*) ran to the wands or other sacred objects about the fire and seized them. They then ran with them to the ceremonial fire, jumped over it, and carried them 20 or 30 paces beyond it or as much farther as the doctor had directed, and there threw them away. This action was also supposed to remove the disease from the patient. For three days after this dance the sick man must not expose himself to the public gaze.

Evidently the doctors had regard to possible fatal consequences for themselves should the patient die, for it is said that if he were very low no one could be gotten to treat him.

Some say that the Choctaw formerly had dances like these, but I think their own ancient ceremonies differed, though they may sometimes have imitated Chickasaw rites.

Adair thus records a dance supposed to be efficacious in keeping away evil spirits and wizards:

In the summer season of the year 1746 I chanced to see the Indians playing at a house of the former Mississippi-Natchee, on one of their old sacred musical instruments. It pretty much resembled the Negroe-Banger in shape but far exceeded it in dimensions, for it was about five feet long and a foot wide on the head-part of the board, with eight strings made out of the sinews of a large buffalo. But they were so unskillful in acting the part of the Lyrick that the *Loache*, or prophet, who held the instrument between his feet and alongside of his chin, took one end of the bow, whilst a lusty fellow held the other; by sweating labour they scraped out such harsh, jarring sounds as might have been reasonably expected by a soft ear to have been sufficient to drive out the devil if he lay anywhere hid in the house. When I afterward asked him the name and the reason of such a strange method of diversion, he told me the dance was called *Kectla Ishto Hoollo*, "a dance to or before the great holy one";<sup>15</sup> that it kept off evil spirits, witches, and wizards from the red people and enabled them to ordain elderly men to officiate in holy things, as the exigency of the times required.

<sup>14</sup> Speck, *op. cit.*, pp. 55-56.

<sup>15</sup> *Hila ishto holo*, "dance of the spirit or spirits"; *hila*, "dance"; *ishto*, "big"; *holo*, what is "holy," "sacred," or "supernatural."

He who danced to it kept his place and posture in a very exact manner, without the least perceivable variation, yet by the prodigious working of his muscles and nerves he in about half an hour foamed in a very extraordinary manner, and discontinued it proportionally till he recovered himself.<sup>16</sup>

Under the heading of ceremonies Speck gives the following:

Another ceremony of a less formal nature is cognate to the elaborate town ceremonies of the Creek and Yuchi held in connection with harvesting the first green corn of the season. When the Chickasaw community is ready to gather the first corn, broken sticks are sent throughout the region to each family, indicating the number of days to pass before the ceremony is to occur. Each morning a stick is thrown away until only one remains. This is the day of the event. On this day every one fasts until high noon. Then each member of the household drinks an emetic made of the red root (*hákic hímma*, root red), concluding with a feast of the fresh roasting ears.

At certain times during the summer communities gather together to secure quantities of fish, which they do by throwing vegetable poisons into the water and shooting the stupefied fish with bows and arrows. Such gatherings are frequently the occasions of dancing and gaming.<sup>17</sup>

To what extent the Creek busk was adopted by the Chickasaw is a difficult question. Certainly Adair gives a description of a busk ceremony which seems to have been quite elaborate, and as the native words he cites in connection with this are Chickasaw, the natural inference is that he is describing a Chickasaw ceremony.<sup>18</sup> However, it is strange that there is no other mention of such a ceremony except the brief note by Speck. The ceremony described by Adair may have been in that Chickasaw town which was established among the Upper Creeks in the eighteenth century. It would seem as if the ceremony must have been adopted from the Creeks and subsequently dropped.

Adair also describes the ceremony of the black drink as if it were in vogue among the Chickasaw.<sup>19</sup> In another place he refers to social dances similar to those noted among the Creeks, though he places them in the spring of the year. He says:

Every spring season, one town or more of the Mississippi Floridians, keep a great solemn feast of love, to renew their old friendship. They call this annual feast, *Hottuk Aimpa*, *Heettla*, *Tanáa* [*háták aiimpa*, *híla*, *tánaa*], "the people eat, dance, and walk as twined together."<sup>20</sup> The short name of their yearly feast of love is *Hottuk Impanáa*, "eating by a strong religious, or social principle." . . .<sup>21</sup>

They assemble three nights previous to their annual feast of love; on the fourth night they eat together. During the intermediate space, the young men and women dance in circles from the evening till morning. The men masque

<sup>16</sup> Adair, *Hist. Am. Inds.*, p. 175.

<sup>17</sup> *Jour. Am. Folk-Lore*, vol. xx, p. 56.

<sup>18</sup> Adair, *op. cit.*, pp. 96-111; copied in *Forty-second Ann. Rept. Bur. Amer. Ethn.*, pp. 590-601, 606-607.

<sup>19</sup> Adair, *op. cit.*, pp. 46-48; copied in *Forty-second Ann. Rept. Bur. Amer. Ethn.*, pp. 539-540.

<sup>20</sup> *Tana* means to knit, weave, or plait.

<sup>21</sup> There seems to be no special religious connotation in these words.

their faces with large pieces of gourds of different shapes and hieroglyphic paintings. Some of them fix a pair of young buffalo horns to their head; others the tail, behind. When the dance and their time is expired, the men turn out a hunting, and bring in a sufficient quantity of venison, for the feast of renewing their love, and confirming their friendship with each other. The women dress it, and bring the best they have along with it; which a few springs past, was only a variety of Esau's small red acorn pottage, as their crops had failed. When they have eaten together, they fix in the ground a large pole with a bush tied at the top, over which they throw a ball. Till the corn is in, they meet there almost every day, and play for venison and cakes, the men against the women; which the old people say they have observed for time out of mind.<sup>22</sup>

### DOCTORING AND MEDICINES

The doctors mentioned in connection with the Pishofa ceremony seem to have had official positions in the clan or house group similar to that enjoyed by the priestly class among the Creeks. This is plainly indicated by the subjoined quotation from Adair:

*Ishtohoollo* is the name of all their priestly order, and their pontifical office descends by inheritance to the eldest: those friend-towns, which are firmly confederated in their exercises and plays, never have more than one *Archi-magus* at a time. . . . They, who have the least knowledge of Indian affairs, know, that the martial virtues of the savages, obtains them titles of distinction; but yet their old men, who could scarcely correct their transgressing wives, much less go to war, and perform those difficult exercises, that are essentially needful in an active warrior, are often promoted to the pontifical dignity, and have great power over the people, by the pretended sanctity of the office.<sup>23</sup>

Elsewhere he speaks of a national high priest. "The title of the *old beloved men*, or *archimagi*, is still hereditary in the *panther* or *tyger family*."<sup>24</sup> It would seem that these priests were forced to undergo a special fast and purification before taking their posts.

The Indian priests and prophets are initiated by unction. The Chickasaw some time ago set apart some of their old men of the religious order. They first obliged them to sweat themselves for the space of three days and nights, in a small green hut, made on purpose, at a considerable distance from any dwelling; through a scrupulous fear of contracting pollution by contact, or from the effluvia of polluted people—and a strong desire of secreting their religious mysteries. During that interval, they are allowed to eat nothing but green tobacco, nor to drink anything except warm water, highly imbittered with the button snakeroot, to cleanse their bodies, and prepare them to serve in their holy, or beloved office, before the divine essence, whom during this preparation they constantly invoke by his essential name, as before described. After which, their priestly garments and ornaments, mentioned under a former argument, page 84, are put on, and then bear's oil is poured upon their head.<sup>25</sup>

Regarding the practice of Chickasaw doctors in general, the same writer says:

When the Indian physicians visit their supposed irreligious patients they approach them in a bending posture, with their rattling calabash, preferring

<sup>22</sup> Adair, *Hist. Am. Inds.*, pp. 113-114.

<sup>23</sup> *Ibid.*, p. 81.

<sup>24</sup> *Ibid.*, p. 31.

<sup>25</sup> *Ibid.*, p. 122.

that sort to the North American gourds; and in that bent posture of body they run two or three times round the sick person, contrary to the course of the sun, invoking God as already exprest. Then they invoke the raven, and mimic his croaking voice. . . . They also place a basin of cold water with some pebbles in it on the ground near the patient; then they invoke the fish, because of its cool element, to cool the heat of the fever. Again, they invoke the eagle (*Ooóle*); they solicit him, as he soars in the heavens, to bring down refreshing things for their sick and not to delay them, as he can dart down upon the wing quick as a flash of lightning. They are so tedious on this subject that it would be a task to repeat it; however, it may be needful to observe that they chuse the eagle because of its supposed communicative virtues; and that it is according to its Indian name, a cherubimical emblem, and the king of birds, of prodigious strength, swiftness of wing, majestic stature, and loving its young ones so tenderly as to carry them on its back and teach them to fly.<sup>26</sup>

Adair furnishes us with some further information on medical treatment showing a mixture of the practical and the superstitious in methods of approach. It was natural that the former should predominate in disturbances of such obvious origination as wounds. Adair thus describes the procedure:

The Indians . . . build a small hut at a considerable distance from the houses of the village for every one of their warriors wounded in war and confine them there . . . for the space of four moons, including that moon in which they were wounded, as in the case of their women after travail; and they keep them strictly separate, lest the impurity of the one should prevent the cure of the other. The reputed prophet, or divine physician, daily pays them a due attendance, always invoking *Yo He Wah* to bless the means they apply on the sad occasion, which is chiefly mountain allum and medicinal herbs, always injoyning a very abstemious life, prohibiting them women and salt in particular during the time of the cure, or sanctifying the reputed sinners. Like the Israelites, they firmly believe that safety or wounds, etc., immediately proceed from the pleased or angry deity for their virtuous or vicious conduct in observing or violating the divine law.

In this long space of purification each patient is allowed only a superannuated woman to attend him, who is past the temptations of sinning with men, lest the introduction of a young one should either seduce him to folly; or she, having committed it with others—or by not observing her appointed time of living apart from the rest, might thereby defile the place and totally prevent the cure. But what is yet more surprising in their physical, or rather theological regimen, is that the physician is so religiously cautious of not admitting polluted persons to visit any of his patients, lest the defilement should retard the cure or spoil the warriors, that before he introduces any man, even any of their priests, who are married according to the law, he obliges him to assert either by a double affirmative or by two negatives that he has not known even his own wife in the space of the last natural day.<sup>27</sup>

The native method of treating bites of venomous serpents also attracted his attention.

I do not remember to have seen or heard of an Indian dying by the bite of a snake when out at war or a hunting, although they are often bitten by the most dangerous snakes; everyone carries in his shot pouch a piece of the best snake-

<sup>26</sup> Adair, *Hist. Am. Inds.*, pp. 173-174.

<sup>27</sup> *Ibid.*, pp. 124-125.



root, such as the *Senecka*, or fern snakeroot, or the wild horehound, wild plantain, St. Andrew's cross, and a variety of other herbs and roots, which are plenty and well known to those who range the American woods and are exposed to such dangers, and will effect a thorough and speedy cure if timely applied. When an Indian perceives he is struck by a snake he immediately chews some of the root, and, having swallowed a sufficient quantity of it, he applies some to the wound, which he repeats as occasion requires and in proportion to the poison the snake has infused into the wound. For a short space of time there is a terrible conflict through all the body by the jarring qualities of the burning poison and the strong antidote, but the poison is soon repelled through the same channels it entered, and the patient is cured.<sup>28</sup>

Elsewhere he says that the button-snakeroot was used as a remedy<sup>29</sup> and upon one occasion he "saw the Chikkasah Archi-magus chew some snakeroot, blow it on his hands, and then take up a rattlesnake without damage," though it is not clear whether this medicine was identical with one of the remedies used in cases of actual bites or had purely magical efficacy.

He speaks of an aquatic plant, probably a species of yellow-flowered water lily (*Nymphaea*), the seeds of which were used as food, and adds: "It is . . . reckoned a speedy cure for burning maladies, either outward or inward—for the former, by an outward application of the leaf, and for the latter by a decoction of it drank plentifully."<sup>30</sup>

Ginseng, mentioned by him as employed on religious occasions,<sup>31</sup> was also a valued remedy. He speaks of the old year's fire as "a most dangerous pollution,"<sup>32</sup> and the north wind as "very evil and accursed,"<sup>33</sup> though it does not appear in the case of the latter whether it was because it brought cold weather or some sort of disease.

The black drink (*Ilex vomitoria*) is often mentioned by Adair, but it is difficult to tell to what extent he is referring to Chickasaw usages and to what extent to those of the Creeks.<sup>34</sup>

Adair gives us also an account of the origin and naming of a new disease. He says:

In 1767 the Indians were struck with a disease which they were unacquainted with before. It began with sharp pains in the head at the lower part of each of the ears, and swelled the face and throat in a very extraordinary manner, and also the testicles. It continued about a fortnight, and in the like space of time went off gradually, without any dangerous consequence or use of outward or inward remedies; they called it *Wahka Abceka*, "the cattle's distemper" or sickness. Some of their young men had by stealth killed and eaten a few of the cattle which the traders had brought up, and they imagined they had thus polluted themselves and were smitten in that strange manner, by having their heads, necks, etc., magnified like the same parts of a sick bull. They first concluded either to kill all the cattle or send them immediately off their land, to prevent the like mischief or greater ills from befalling the beloved people—for their

<sup>28</sup> Adair, *Hist. Am. Inds.*, pp. 235-236.

<sup>29</sup> *Ibid.*, p. 103.

<sup>30</sup> *Ibid.*, p. 410.

<sup>31</sup> *Ibid.*, p. 362.

<sup>32</sup> *Ibid.*, p. 22.

<sup>33</sup> *Ibid.*

<sup>34</sup> *Ibid.*, p. 361.

cunning old physicians or prophets would not undertake to cure them, in order to inflame the people to execute the former resolution; being jealous of encroachments and afraid the cattle would spoil their open cornfields; upon which account, the traders' arguments had no weight with these red Hebrew philosophers. But fortunately one of their head warriors had a few cattle soon presented to him to keep off the wolf; and his reasoning proved so weighty as to alter their resolution and produce in them a contrary belief.<sup>35</sup>

My principal informant on the subject of medicine, himself a doctor, was acquainted with the following diseases and the remedies used for them:

*Sinti abēka*, "snake sickness." Symptoms: The patient's stomach is out of order, he has fever, and his legs are unusually warm up as far as the knees. Remedy: There was a single herb used in curing this disease, and it was effective with no other, but my informant knew no name for it in Chickasaw or English.

*Ofe abēka*, "dog disease." Symptoms: The patient vomits continually, is unable to keep anything on his stomach. Remedy: An herb growing on the prairie having a yellow flower, for which the doctor knew no name.

*Isi abēka*, "deer disease." Symptoms: The jaws and adjacent parts of the face swell up and sometimes there is toothache. Remedy: A third herb with unknown name, or failing that, a certain bush.

*Sinti homa abēka*, "red snake disease." Symptoms: The legs, arms, or other parts of the body draw up, sometimes to the extent of breaking the back. Remedy: "A vine called sarsaparilla," growing along creeks and having yellow flowers.

*Iyagānaca abēka*, "Little people's disease." Symptoms: The patient is out of his head, talks incoherently, and sometimes falls to the ground like an epileptic. Remedy: The root of the huckleberry (*osik'ōkci*).

*Hōlābi abēka*, "head sickness."<sup>35a</sup> Symptoms: Headache and sometimes nosebleed. Remedy: The roots of the red willow (*hahtok*), and if that can not be found, the roots of the black locust (*kāte lūsa*).

*Nācōba abēka*, "wolf disease." Symptoms: A pain on the left side which moves upward into the chest and causes the patient to vomit. Remedy: A weed called *Nīta nācōba* (bear-wolf) which grows on the prairie.

*Nīta abēka*, "bear sickness." Symptoms: Pains in the abdomen, sometimes extending through the entire body, and loose bowels. Remedy: The bark of a tree called *fōshāpā* ("which birds eat"). While there are a few of these trees near Red River, there are not many in the Chickasaw Nation as a whole, but it is plentiful in the Choctaw Nation.

<sup>35</sup> Adair, *Hist. Am. Inds.*, p. 132.

<sup>35a</sup> There seems to have been some mistake here. *Hōlābi* means "to lie," or "a lie"; head is *nushkōbo*.

*Kōni abēka*, "skunk sickness." Symptoms: The bowels move continually as in dysentery, and may ultimately cause piles. Remedy: The bark of a tree called *iti kōni* (skunk tree).

*Cōkha icto abēka*, "big hog sickness." Symptoms: There is a pain in the breast, the bowels move too freely, and the patient can scarcely stand erect. Specific: The roots of a plant about 3 feet high, growing along the banks of streams and bearing numerous white flowers. It is called *hīci' lipa* (leaves worn out).

*Fāni homa abēka*, "red squirrel disease." Symptoms: Toothache or swollen jaws and sometimes nosebleed. Specific: *Fāni cākha* (squirrel's flag), which is mistletoe.

*Fāni abēka*, "squirrel sickness." Symptoms: Cramp in the neck which is drawn together, pains being felt all over it. Remedy: Rotted leaves in the drift on a creek. Another remedy for this disease was yarrow.

*Pale' abēka*, "heat sickness." Symptoms: Continuous fever, especially at night. The Pishhoha dance, described elsewhere, is resorted to in sickness of this kind. The medicine used consisted of the following plants: *Colōp tilēli* (ghost driver), *sinti i<sup>h</sup>olonksa'* ("snake wind," so called from its disagreeable odor), *hākcic fālākto'* (forked root—which is sweet anise), *pāsāktcāla'*, or in English "flag," and young cottonwood trees (*acōmālā*). These are placed in a pot with cold water and the whole warmed. When the doctor sang the song belonging with this remedy he accompanied himself with a gourd rattle.

*Kinta' abēka*, "beaver sickness." Symptoms: Dysentery. Remedy: *Acōmālā hākcic* (cottonwood root) and *tanaco* (willow (root)) boiled together and taken internally.

*Ōcān abēka*, "otter sickness." Symptoms: Pain in the breast and through the back, causing the patient to vomit bile; water passed by him is yellow. This disease is apparently jaundice. Remedy: *Ōcān ithi<sup>nc</sup>* (otter medicine), which, from a specimen shown, appears to be common dock. This was the only remedy for this disease of which my informant knew.

*Yūlkūn abēka*, "mole disease." Symptoms: Pain in the lower part of the abdomen and some blood passed with the urine. Remedy: Black watermelon seeds mashed up, boiled, and taken internally.

*Ō<sup>ns</sup>' abēka*, "eagle disease." Symptoms: A severe headache which prevents the patient from exerting himself in any manner; the eyes are affected and there is a cramp in the back of the head and neck. Remedy: The ends of cedar limbs (*tcowā<sup>h</sup>hāla'*) and the elder (*bāco<sup>nk</sup>ctci*), warmed together in water and placed upon the patient's head.

*Ōpa abēka*, "owl disease." Symptoms: The eyes are affected and the patient feels sleepy long before noon. Remedy: Roots of a bush called *cāktei imiti'* (crawfish tree), in English "willow button," warmed and placed on the head. They also used *colōp tikēli*, a plant of the mint family resembling Oswego tea.

*Sinti imōma abēka*, "ground rattlesnake disease." Symptoms: The joints in the hands and feet swell up and there are very acute pains there. Remedy: A plant bearing only one leaf, and hence called *hici teāfa* (one leaf).

*Sinti okteamale' abēka*, "blue snake disease." Symptoms: Itching which gets worse and is followed by sores when the place is scratched. Remedy: Take an old rotten corn cob lying about in a pen where hogs are being fattened, burn it, and hold the affected part over the smoke.

*Colōp anāntitci abēka*, "burning ghost disease." Symptoms: The feet swell up and big blisters develop upon them. Remedy: Take dirt from the top of an old grave and heat it in a pan over the fire until it is absolutely dry. Then apply this dirt to the sores.

*Ofonlo abēka*, "screech owl disease." Symptoms: The eyes water, preventing one from seeing well, and they also itch. Remedy: *Colōp tilēli iskanō* "little ghost driver," which is pennyroyal, is allowed to soak in water for a while and is then placed on the forehead.

When not otherwise specified it is to be understood that the part of the medicinal plant used was the roots which were heated in water. The doctor also sang a song each time he treated a person. There was a different song for each disease and the songs of the doctors themselves differed from one another.

The red willow, the famous *miko hoyanīdja* of the Creeks, is known to the Chickasaw as *hāhtok*. It was generally taken toward morning, after a dance, and then vomited out in order to make one feel strong and healthy.

The only story of the origin of medicines is that they were believed to have been given by The One Above in very ancient times.

Regarding rain makers I may as well quote from what I said on this subject in my report on the Creeks:<sup>36</sup>

Some interesting particulars regarding rain makers are also given us by Adair. According to him, these persons obtained rain by interceding through their conjurations with "the bountiful holy Spirit of Fire," by which he supposes they refer to the supreme deity of the southern Indians, although in fact it may have been the particular being presiding over thunder.<sup>37</sup> This power of intercession had been established in ancient times and was not exercised merely at the option of its possessor, but was a duty which he owed to the community and which the community could demand from him. If he failed he was likely to be shot dead, because it was supposed that he really had the power but refused to exercise it and was thus an enemy to the state. However, he fre-

<sup>36</sup> Forty-second Ann. Rept. Bur. Amer. Ethn., pp. 630-631.

<sup>37</sup> Adair, *Hist. Am. Inds.*, p. 85.

quently saved himself by laying the blame upon lay infractions of the sacred regulations or taboos—among them the payments which they owed to him—which rendered his best endeavors unavailing. If the drought were prolonged as much as two years, a council was held at which they did not fail to discover that the trouble was due to persistent violations of the taboos by certain individuals, who were then promptly dispatched. Too much rain might work as much to the harm of the rain maker as too little, Adair instancing a case of a Creek rain maker who was shot because the river overflowed their fields to a great height in the middle of August.<sup>38</sup> These men had a transparent stone “of supposed great power in assisting to bring down the rain when it is put in a basin of water,” and this power was supposed to have been passed down to this one from a stone to which the power had originally been committed. As usual, this stone could not be exposed to the gaze of the vulgar without losing mightily in efficacy.<sup>39</sup> The control of the rain maker extended only to the summer rains and not to those which fell in winter, and it was believed that this was also of supernatural ordination. The summer rain had to be sought for; the winter rain was given unsought. If the seasons were good, the rain maker was paid a certain proportion of each kind of food. It is amusing to note that, like the apologist for obsolescent institutions at the present day, the Chickasaw rain maker with whom Adair conversed took the ground “that though the former beloved speech had a long time subsided, it was very reasonable that they should still continue this their old beloved custom; especially as it was both profitable in supporting many of their helpless old beloved men, and very productive of virtue, by aving their young people from violating the ancient laws.”<sup>40</sup>

Adair thus comments upon the belief in witchcraft among the Chickasaw of his period:

There are no greater bigots in Europe, nor persons more superstitious, than the Indians (especially the women), concerning the power of witches, wizards, and evil spirits. It is the chief feature of their idle winter nights' chat; and both they, and several of our traders, report very incredible and shocking stories. They will affirm that they have seen, and distinctly, most surprising apparitions, and heard horrid shrieking noises.<sup>41</sup>

He has preserved for us the following interesting account of an exorcism to protect the house from evil influences:

In the year 1765, an old physician, or prophet, almost drunk with spirituous liquors, came to pay me a friendly visit; his situation made him more communicative than he would have been if quite sober. When he came to the door, he bowed himself half bent, with his arms extended north and south, continuing so perhaps for the space of a minute. Then raising himself erect, with his arms in the same position, he looked in a wild frightful manner, from the southwest toward the north, and sung on a low bass key *Yo Yo Yo Yo*, almost a minute, then *He He He He*, for perhaps the same space of time, and *Wa Wa Wa Wa*, in like manner; and then transposed and accented those sacred notes several different ways, in a most rapid guttural manner. Now and then he looked upwards, with his head considerably bent backward; his song continued about a quarter of an hour. As my door which was then opened stood east, his face of course looked toward the west; but whether the natives thus usually invoke the deity, I can not determine; yet as all their winter houses have their

<sup>38</sup> Adair, *Hist. Am. Inds.*, pp. 85–86.

<sup>39</sup> *Ibid.*, pp. 86–87.

<sup>40</sup> *Ibid.*, pp. 84–94.

<sup>41</sup> *Ibid.*, p. 36.

doors toward the east, had he used the like solemn invocations there, his face would have consequently looked the same way, contrary to the usage of the heathens. After his song, he stepped in. I saluted him, saying, "Are you come my beloved old friend?" He replied, *Arahrc-O*, "I am come in the name of Oea." I told him I was glad to see, that in this mad age, he still retained the old Chickasaw virtues. He said, that as he came with a glad heart to see me his old friend, he imagined he could not do me a more kind service than to secure my house from the power of the evil spirits of the north, south, and west—and from witches and wizards who go about in dark nights in the shape of bears, hogs, and wolves, to spoil people. "The very month before," added he, "we killed an old witch for having used destructive charms." Because a child was suddenly taken ill and died, on the physician's false evidence, the father went to the poor helpless old woman who was sitting innocent and unsuspecting, and sunk his tomohawk into her head without the least fear of being called to an account. They call witches and wizards, *Ishtabc*, and *Hoolabc*, "man-killers," and "spoilers of things sacred."<sup>42</sup> My prophetic friend desired me to think myself secure from those dangerous enemies of darkness, for (said he) *Tarooa Ishtohoollo-Antarooare*, "I have sung the song of the great holy one."<sup>43</sup> The Indians are so tenacious of concealing their religious mysteries, that I never before observed such an invocation on the like occasion—adjuring evil spirits, witches, etc. by the awful name of the deity.<sup>44</sup>

This exorcism probably gives a clue to one of the reasons why the doors of the winter houses opened eastward.

The following material on this subject is a translation of some information originally written down in Chickasaw by a native informant, Zeno McCurtain:

The procedures of the conjurer and the wizard were slightly different, but the ignorant did not know in what this difference consisted. The conjurer had to employ his arts in horse races, in shooting at corn stalks, and in the game of *akabátte*, between men and women. This was not an easy thing for him, because when a game was to be played he had to begin his preparations several days ahead. He had to fast for a certain number of days and drink medicine made out of particular herbs, nor was he allowed to sleep during a considerable period. When his side won, he was always well paid, but if it lost he received nothing and if he was suspected of helping the opponents he would be killed. Whenever the people played, their conjurer—for each house group generally employed the same one all of the time—had to work faithfully for them. After the game was over he usually felt sick or indisposed for several days on account of the sleep he had lost and the medicines he had taken. The players also had to take some of this medicine, which was supposed to clear out their systems and make them feel light and fit.

There was another kind of wizard whose methods were somewhat different. He had magic power to injure or kill persons at a distance, but he could do nothing else and so was not a true wizard. Yet he was called by the same name. (One of the functions of a doctor was to suck the witch arrow from a patient.) These wizards sometimes killed children. It is claimed that a well-educated Choctaw at Antlers, a minister in the Cumberland Presbyterian Church named Solomon Hotema, killed two children by witchcraft and was

<sup>42</sup> *Ishto*, big; *ábi*, to kill; *holo*, what is sacred; *ábi*, to kill.

<sup>43</sup> *Taloo*, song; *ishto*, big; *holo*, sacred; *ontalooi*, or *intalooi*, I have sung to them.

<sup>44</sup> Adair, *Hist. Am. Inds.*, pp. 176-177.

in consequence shot by their father. The doctor is supposed to hold himself entirely apart from either conjurers or wizards. The wizards claimed that there were certain times in the year when they were obliged to practice. A lizard worked in the bodies of each, putting him into a state of intense misery until he killed some one. He might exercise his evil genius at other times by choice, but at these special seasons the deed was practically forced upon him. When it was learned that anyone was practicing witchcraft, people went to him and ordered him to desist, and if he refused to listen they killed him. That sort of wizard claimed he could turn himself into a dog, a bird, or any creature he chose when he went to carry out his evil intentions. Usually he chose the form of a night hawk, an owl, or some other creature that goes about after dark and to which not much attention is paid. It was said that, before making the transformation, he would go to some secluded spot, take out his stomach and other internal organs, and leave a knife, a pair of shoes, or some object to guard them. Usually the wizard left after all had gone to sleep, and he planned to get back before daylight. Sometimes while he was off exercising his arts, an animal would come along and eat his entrails, thus killing him.

When a man heard that a wizard was operating against him, he would often go to him and pay him to stop. If this were the time of the year when the wizard was under compulsion, the reward might have no effect; otherwise it was usually sufficient.

There was another sort of wizard called Yūcpakāma or juggler, whose specialty was sleight-of-hand performances. Jugglers and conjurers were alike afraid of the true wizards; doctors were the only persons who were not. Doctors claimed that they continually took some sort of medicine which prevented the devices of the wizards from having any effect upon them.

At times a person who had a grudge against another would go to a wizard and pay him a good price to injure his enemy. Certain persons claimed to be wizards, but were not. That caused much trouble among the Indians, for the object was usually to extort money, and if such an one were found out he was killed. Some claimed that they could do things in violation of the law and escape punishment by the use of medicines. My interpreter once met such a man, who gave him a little piece of the root which he chewed for this purpose. When chewed in a court room, for instance, the scent would penetrate all parts of it like a perfume and alter the mind of judge and jury toward the prisoners.

These wizards, conjurers, doctors, etc., were watched closely all the time, and if they did not boast overmuch they were left alone; but if they became too boastful they were killed, but not until people felt sure that they were doing wrong.

Wizards would not disclose the specific things they could do, for they claimed that this would cause them to lose their power. It was easier to bewitch human beings than cattle and easier to work upon the aged and children than upon others.

It was claimed that wizards shot people with salt, sugar, or hair, and when a doctor was called in he professed to be afraid of the wizards and would not help unless he received a considerable reward, fixed in accordance with the known resources of the patient. At that time the people were not civilized, and when they became civilized they did away with most of these practices, finding that they were all superstitions, yet many still believe in and practice them.

In ancient times the Indians thought more of their children than of the adults, and when they fell ill would do almost anything to effect their cure.

They would have a doctor for three days and hold a Pishofa dance. If the first treatment proved ineffective, they would try a second; and, if the case proved obstinate, a third; but they stopped there. The third time, owl, buzzard, or eagle feathers were hung on sticks near the fire, each doctor making use of but one kind of bird, and it is claimed that he would put a little piece of the flesh of that bird into the Pishofa food and that whoever ate that would take the sick person's disease in his stead.<sup>45</sup>

Even in olden times some people did not believe in wizards. One such person was so worked upon by them with salt and sugar as to be entirely converted. If one discovered that a wizard had been operating against him and consulted a doctor before the salt and sugar had melted, the doctor could remove it and effect a cure; but if it had had time to melt into his system he would be in danger of death.

When anyone died and it was thought a certain wizard had killed him, the relatives of the deceased were sure to destroy that person. Knowing this the Indian doctor frequently refused to tell who was causing the sickness. But, as in the case of wizards, there were some doctors who were only quacks, and these caused the death of many innocent people by falsely accusing them of witchcraft. Most Indians believed in witchcraft, but some did not, and these saved many persons from punishment. Sometimes they interfered to prevent them from being burned to death, an ancient means of punishing wizards.

In early times the Chickasaw were of one mind and purpose, and hence other tribes could not make head against them, but when they began to practice abuses such as witchcraft it was the beginning of their downfall.

When I [i. e., McCurtain] was about 14 or 15 a woman died of some sickness and a man named John Brown, generally believed to be a wizard, was thought to have caused her death. So 8 or 10 people went to his house, set his chimney on fire,<sup>46</sup> so as to induce him to come out, and then shot him.

One evening an Indian named Wall Cass, on his way home from a hunting trip, saw a bear standing beside the road, in a region where no bears were supposed to live. He shot at the animal and the latter grunted and ran off into the woods. Next morning news came that a woman who had gone to bed perfectly well the night before had been found dead. Now, it was believed that however badly a witch or wizard had been wounded she or he would return home before dying. The man who had shot the bear therefore resolved to go to look at the woman, and when he returned he said, "I told you I thought it was that woman. She had been shot through the side, and I believe she was the bear at which I fired." This is a "true story," and the events happened when I was a boy.

Sometimes a light was seen floating through the air toward a house until it got within 150 or 200 yards of the place, when it disappeared. It was thought that a wizard was the cause of it.

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<sup>45</sup> See pp. 258-261.

<sup>46</sup> A chimney made of crossed sticks and daubed with clay on the inside. The outside of such a chimney was inflammable.



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USES OF PLANTS BY THE  
CHIPPEWA INDIANS

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By FRANCES DENSMORE



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## FOREWORD

The varied uses of plants by the Chippewa indicate the large extent to which they understood and utilized the natural resources of their environment. The present study is related, in two of its phases, to the study of Chippewa music which preceded it.<sup>1</sup> Herbs were used in the treatment of the sick and in the working of charms, and songs were sung to make the treatment and the charms effective. Songs of these classes having been recorded, the Indians were willing to bring specimens of the herbs and to explain the manner of their use. A majority of the informants on this subject were women and they became interested in describing the former methods of preparing vegetable foods. Both men and women related the uses of plants in medicine, economic life, and the useful and decorative arts. Plants and data were obtained on the White Earth, Red Lake, Cass Lake, Leech Lake, and Mille Lac Reservations in Minnesota, the Lac Court Oreilles Reservation in Wisconsin, and the Manitou Rapids Reserve in Ontario, Canada, the work continuing until 1925.

The writer gratefully acknowledges the assistance of those who have contributed to the result of the present undertaking. The specimens of plants were identified and their common names supplied by Mr. Paul C. Standley, of the United States National Museum. The reports on the recognized medicinal properties of the plants used by the Chippewa and on their active medical constituents were prepared by Dr. W. W. Stockberger, physiologist in charge of drug, poisonous, and oil plant investigations, Bureau of Plant Industry, United States Department of Agriculture, and valuable assistance in the classification of diseases and injuries treated by the Chippewa was given by Dr. D. S. Lamb, who at the time was pathologist at the Army Medical Museum, Washington, D. C. Assistance has also been received from members of the staff of the Bureau of American Ethnology and the United States National Museum in their special fields of research.

The work on the Manitou Rapids Reserve in Ontario was made possible by the courtesy of John P. Wright, Indian agent of the Canadian Government at Fort Frances, Ontario.

The collection of the material herewith presented would have been impossible without the cooperation of members of the Chippewa tribe. Their assistance is gratefully acknowledged, especially that of the principal interpreter, Mrs. Mary Warren English, of White Earth, Minn., which began in 1907 and continued about 15 years.

FRANCES DENSMORE.

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<sup>1</sup> Chippewa Music, Bull. 45, 1910, and Chippewa Music II, Bull. 53, Bur. Amer. Ethn., 1913.

## INFORMANTS<sup>1</sup>

WHITE EARTH, MINN.

Mrs. Mary Razer.....	Papa'gine'. (Grasshopper.)
Mrs. Louisa Martin.....	A'jawac'. (Wafted across.)
No'diněns'.....	Little wind.
Gage'wIn <sup>2</sup> .....	Everlasting mist.
Mrs. Gage'wIn.....	Nisěd'nagan'ob. (Nised, corruption of the French Lizett, or Elizabeth; Naganob, name of her father, who was chief at Fond du Lac, Minn.)
Mrs. Wa'wiěkũm'İg <sup>3</sup> .....	Na'waji'bigokwe. (Central rock woman.)
Mrs. Star Bad Boy.....	Nenaka'wũbi'kwe. (Woman who is sitting with every other one.)
Wase'ya <sup>4</sup> .....	Light.
Mrs. Brunett <sup>5</sup> .....	Caı'yagose'. (Shaken loose.)
Mrs. Annie Davis.....	Ca'yabwũb'. (Sitting through.)
Mrs. Sharrett <sup>6</sup> .....	Ca'noděns. (Diminutive of Charlotte by slightly changing word and adding <i>ens</i> .)
Mrs. Sophia Agness.....	Memacka'wanamo'kwe. (Woman with a powerful respiration.)
Mrs. Margaret White.	
Mrs. Roy.	
Mrs. Mary Warren English. <sup>7</sup>	
Mrs. Julia Warren Spears. <sup>8</sup>	
Mrs. Sophia Warren.	
Mrs. Charles Mee.	
Albert Little Wolf <sup>9</sup> .....	Maıŋ'gans.
O'dĩni'gũn.....	Shoulder.
Ĕn'dũsogi'jİg <sup>10</sup> .....	Every day.
Rev. Clement H. Beaulieu <sup>11</sup> .....	Ka'waěns (diminutive of his father's name Ka wa, which was the Chippewa mispronunciation of Clement).

PONSFORD, MINN. (WHITE EARTH RESERVATION)

Mrs. Fineday.	
Mr. Rock <sup>12</sup> .....	A'sInı'okũm'İg. (Stony ground.)
Ne'yaji.....	Point of land.
Dı'kěns.....	Diminutive of English "Dick."
Weza'wange.....	Yellow wing.

<sup>1</sup> The purpose of this list is to identify the persons who chiefly contributed to the material herewith presented. The name given first is therefore the name by which the person is generally known.

<sup>2</sup> Died October 23, 1919.

<sup>3</sup> Died September 16, 1923.

<sup>4</sup> Died April 4, 1921.

<sup>5</sup> Died April 29, 1926.

<sup>6</sup> Died April 14, 1925.

<sup>7</sup> Died August 15, 1925.

<sup>8</sup> Died June 21, 1925.

<sup>9</sup> Died April 6, 1927.

<sup>10</sup> Died October 24, 1926.

<sup>11</sup> Died July 4, 1926.

<sup>12</sup> Died January 21, 1920.

## RED LAKE, MINN.

Mrs. Defoe.....	Meya'wigobiwik'.	(Standing strongly.)
Mrs. Ward.....	Ni'gida'wanank'.	
Mrs. Joker.....	Bewa'becodenisik'.	
Mrs. Roy.....	Zo'zëd	(corruption of Josette).
Mrs. Roy (daughter of above) ..	Ma'gidïns	(diminutive of Margaret).
Mrs. Lawrence.		
Mrs. Gurneau.		
Mrs. John English.		
Mrs. Ca'wanokûm'igiskûn'.....	Gi'wita'wisëk'.	(Walking around.)

## MILLE LAC, MINN.

Tom Skinaway.....	Manido'bijiki.	(Spirit buffalo, or cattle.)
Mrs. Tom Skinaway.....	Na'cine'kwe.	

## CASS LAKE, MINN.

William M. Rogers.....	Bïn'digegi'jig.	(In the sky.)
Mrs. William M. Rogers.....	Bïn'dige'ose'kwe.	(Walking woman.)

## LAC COURT OREILLES, WIS.

Mrs. John Quaderer.....	Ogima'bïnësi'kwe.	(Chief bird woman.)
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## MANITOU RAPIDS RESERVE, ONTARIO, CANADA

Mrs. Wilson.		
Mrs. Lewis.		

## PHONETICS

### ALPHABET

The vowels and consonants employed in this work do not represent every sound that occurs in the Chippewa language. Thus an obscure sound resembling *h* in the English alphabet sometimes occurs in the middle of a word and is not indicated. No attempt has been made to indicate a slight nasal sound that frequently occurs at the end of a word. Prolonged vowels are also not indicated. The following letters are used:

*Vowels*.—*a*, pronounced as in *father*; *e*, as in *they*; *ě* as in *met*; *i* as in *marine*; *ĩ*, as in *mint*; *o*, as in *note*; *u*, as in *rule*; *ú*, as in *but*; *w*, as in *wan*; *y*, as in *yet*. If two consecutive vowels are pronounced separately, two dots are placed above the second vowel.

*Diphthong*.—*ai* pronounced as in *aisle*.

*Consonants*.—*b*, *d*, *f*, *k*, *m*, *n*, *p*, *s*, *t*, *v*, have the ordinary English sounds. *s* is always pronounced as in *sense*, *ġ* as in *get*, and *z* as in *zinc*. *c* represents the sound of *sh*, *j* the sound of *zh*, *tc* the sound of *te* in *watch*, and *dj* the sound of *j* in *judge*.



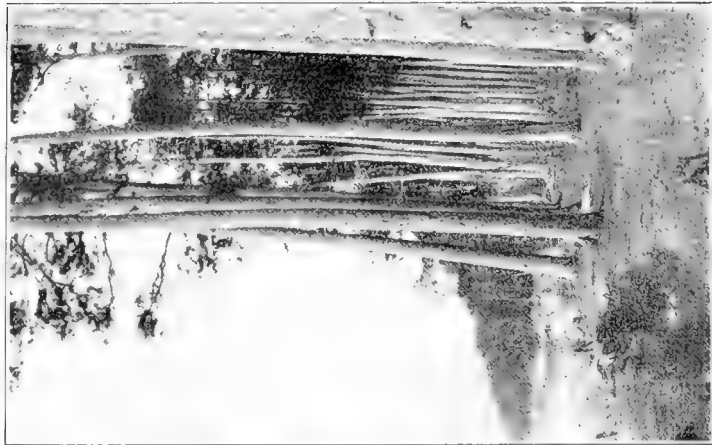
GROUP OF BIRCH TREES, WHITE EARTH, MINN.



a. PINE AND BALSAM TREES, WHITE EARTH, MINN.



b. TREES AT CASS LAKE



c. NORWAY PINES AT CASS LAKE

## USES OF PLANTS BY THE CHIPPEWA INDIANS

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By FRANCES DENSMORE

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### INTRODUCTION

A majority of the plants to be described in this paper were obtained on the White Earth Reservation in Minnesota. Specimens were also collected on the Red Lake, Cass Lake, Leech Lake, and Mille Lac Reservations in Minnesota, the Lac Court Oreilles Reservation in Wisconsin, and the Manitou Rapids Reserve in Ontario, Canada. Many of these were duplicates of plants obtained at White Earth but others were peculiar to the locality in which they were obtained.

The White Earth Reservation is located somewhat west of north-central Minnesota, on the border of the prairie that extends westward and forms part of the Great Plains. It also contains the lakes and pine forests that characterize northern Minnesota and extend into Canada. This produces an unusual variety of vegetation, so that the Chippewa living on other reservations are accustomed to go or send to White Earth for many of their medicinal herbs. Birch trees are found in abundance, either standing in groups (pl. 28), covering a hillside, or bordering a quiet lake. There are large tracts of sugar maples and forests of pine, cedar, balsam, and spruce. (Pl. 29.) Many of the lakes contain rice fields, and there are pretty, pebbly streams winding their way among overhanging trees. (Pl. 30.) Toward the west the prairie is dotted with little lakes or ponds, shining like mirrors. In June the air is sweet with wild roses and in midsummer the fields are beautiful with red lilies, bluebells, and a marvelous variety of color. In autumn the sumac flings its scarlet across the landscape and in winter there are miles of white, untrodden snow. The northern woodland is a beautiful country, and knowing it in all its changing seasons, one can not wonder at the poetry that is so inherent a part of Chippewa thought.

## LIST OF PLANTS ARRANGED ACCORDING TO BOTANICAL NAME

Botanical name	Common name	Native name	Meaning	Use	Reference to use by other tribes <sup>1</sup>
<i>Abies balsamea</i> (L.) Mill.	balsam fir	a'nmandak'		medicine (headache)	
<i>Acer saccharum</i> Marsh.	sugar maple	a'nina'tig		food, utility	
<i>Achillea millefolium</i> L.	yarrow	a'jdjdamo'wano	squirrel tail	medicine (headache)	swelling, etc., Winnebago, 33d Rept. B. A. E., p. 134.
<i>Acorus calamus</i> L.	calamus	wikér' na'bugúck	something flat	medicine (cold, etc.)	fever, cough, etc., 33d Rept. B. A. E., p. 69.
<i>Actaea rubra</i> (Ait.) Willd.	red baneberry	múckosija'bosigún	hay purgative	charm	
<i>Agastache anethodora</i> (Nutt.) Britton.	giant hyssop	wi'cosidji'bík weza'wúnúckwúk'	drawing root or plant yellow plant	medicine (diseases of women), medicine (cough and pain in chest).	food, 33d Rept. B. A. E., p. 113.
<i>Allionia nictaginea</i> Michx.	umbrella-plant	be'útkadak'igisín	"it sticks up,"	medicine (sprain)	fever, etc., 33d Rept. B. A. E., p. 78; fracture, Sioux, Bull. 61, p. 261.
<i>Allium stellatum</i> Ker.	wild onion	múckode'cigaga'wúnj	prairie skunk plant	medicine (colds)	
<i>Allium tricoccum</i> Ait.	wild leek	siga'gawúnj'	onion	medicine (emetic)	
<i>Alnus incana</i> (L.) Moench.	alder	wadib'		medicine (diseases of women), dye.	
<i>Amelanchier canadensis</i> (L.) Medic.	shadbush	guzigwa'kominaga'wúnj	thorny wood	medicine (dysentery, diseases of women), food.	
<i>Anaphalis margaritacea</i> (L.) B. & H.	pearly everlasting	wa'bigwún	flowers	medicine (paralysis)	
<i>Andropogon furcatus</i> Muhl.	bluestem	múckode'kanés	small prairie	medicine (indigestion)	fever, etc., Omaha-Fonca, 33d Rept. B. A. E., p. 68.
<i>Apocynum</i> sp.	dogbane	beha'mokodjibika'gisiin	"bearroot, it is found here and there."	medicine (cough)	
<i>Apocynum androsaemifolium</i> L.	do	sasa'bíkwán ma'kwona'gic odji'bík	bear entrails root.	medicine (heart palpitation, earache, headache; a baby's cold; also for charm).	
<i>Aralia nudicaulis</i> L.	wild sarsaparilla	wabos'odji'bík	rabbit root	medicine (remedy for the blood, also applied to a sore), charm.	



<i>Aralia racemosa</i> L.....	spikenard.....	o'kadak' aya'bidjidi' bikugi'sin.....	(word implies adhesive- ness).	medicine (cough), utility.....
<i>Arisaema triphyllum</i> (L.) Torr.....	Jack-in-the-pulpit.....			medicine (sore eyes).....
<i>Arctium minus</i> Bernh.....	burdock.....	wi'sugibug'	bitter leaf.....	medicine (cough), utility.....
<i>Arctostaphylos uva-ursi</i> (L.) Spreng.....	bearberry.....	saga'kominaginul'	berry with spikes.....	medicine (headache), food, utility, charin.....
<i>Artemisia absinthium</i> L.....	wormwood.....	muse'odji' blk bi' giso' win.....	worm root.....	medicine (sprain).....
<i>Artemisia dracunculoides</i> Pursh.....	mugwort.....	ba'simukuk' jin' gwakwan dug.....	swimming (bath).....	medicine (dysentery, etc.).....
		Y'ckode' bug.....	pine.....	
		ba'sibuguk'	fire leaf.....	
		o'gima' wuek.....	small leaf.....	
<i>Artemisia frigida</i> Willd.....	prairie sage.....	bi'jikiwin'gack.....	chief medicine. cattle herb.....	medicine (convulsions, hem- orrhage, tonic, and "anti- dote").
<i>Artemisia gnapthalodes</i> Nutt.....	white mugwort.....			
<i>Asarum canadense</i> L.....	wild ginger.....	nokwe' jigun.....	something soft.....	antidote, charm.....
<i>Asclepias incarnata</i> L.....	swamp milkweed.....	name' pin.....	sturgeon plant.....	medicine (indigestion), food, utility.....
<i>Asclepias syriaca</i> L.....	common milkweed.....	bi' giso' win.....	swimming.....	medicine.....
		in' niwin.....	"man-like".....	medicine (diseases of women), food, charm.....
<i>Aster</i> (species doubtful).....	aster.....	name' g osibug'	sturgeon leaf.....	food.....
<i>Aster nemoralis</i> Ait.....	do.....	wi'n' sikens.....	dirty, little.....	medicine (disease of ear).....
<i>Aster novae-angliae</i> L.....	do.....	do.....	do.....	charm.....
<i>Aster puniceus</i> L.....	do.....	do.....	do.....	do.....
<i>Astragalus canadensis</i> Nutt.....	ground-plum.....	bi'jikiwi'bugesan'	cattle plum.....	medicine (convulsions and hemorrhages from wounds). medicine (stoppage of urine)
<i>Athyrium filix-foemina</i> (L.) Roth.....	lady fern.....	a'sawan.....		medicine (pain in stomach)
<i>Betula nigra</i> L.....	black birch.....			

<sup>1</sup> Reference is made to the following works: Gilmore, Melvin Randolph, Uses of Plants by the Indians of the Missouri River Region, Thirty-third Ann. Rept. Bur. Amer. Ethn.; Robbins, Harrington, and Friere-Marreco, Ethnobotany of the Tewa Indians, Bull. 55, Bur. Amer. Ethn.; Swanton, John R., Religious Beliefs and Medical Practices of the Creek Indians, Forty-second Ann. Rept. Bur. Amer. Ethn., pp. 655-670; and Bulls. 53 and 61, Bur. Amer. Ethn., by the present writer.

## LIST OF PLANTS ARRANGED ACCORDING TO BOTANICAL NAME—Continued

Botanical name	Common name	Native name	Meaning	Use	Reference to use by other tribes
<i>Betula papyrifera</i> Marsh.	white birch	wi'gwasa'tig		medicine (pain in stomach), utility.	utility, Sioux, 33d Rept. B. A. E., p. 75.
<i>Botrychium virginianum</i> (L.) Sw.	rattlesnake fern			medicine (bites)	
<i>Bovista pila</i> B. C. C.				charm	
<i>Bursa bursa-pastoris</i> (L.) Britton	shepherd's-purse	i'ckode'wadij'bk	fire root	medicine (dysentery)	
<i>Caltha palustris</i> L.	cowslip	o'gite'hug		medicine (scrofulous sores)	
<i>Calvatia craniiformis</i> Schw	puffball			medicine (nosebleed)	
<i>Campanula rotundifolia</i> L.	harebell (Scotch blue-bell)	zi'ginl'ee	(zigin implies pouring)	medicine (disease of ear)	
<i>Castalia odorata</i> (Ait.) Woodv. & Wood.	white waterlily		root	medicine (sore mouth)	
<i>Castilleja coccinea</i> (L.) Spreng	painted-cup	Winabojo' noko'mis wi'nizisin'	Winabojo's grandmother's hair.	medicine (rheumatism and diseases of women).	
<i>Caulophyllum thalictroides</i> (L.) Michx.	blue cohosh	be'cigodji'biguk	one root	medicine (lung trouble and cramps).	fever, Omaha, 33d Rept. B. A. E., p. 83.
<i>Ceanothus ovatus</i> Desf.	New Jersey tea	odiga'dimandio'		medicine (lung trouble and emetic).	
<i>Celastrus scandens</i> L.	bittersweet	hima'kwud	twisting around	medicine (physic and eruptions).	poisonous, Sioux, 33d Rept. B. A. E., p. 102.
<i>Chimaphila umbellata</i> (L.) Nutt.	pipissewa	ga'gine'hug	everlasting leaf	medicine (disease of eye)	
<i>Chioene hispidula</i> (L.) T. & G.	creeping snowberry	wabos'obugons'	small rabbit-leaf	food	
<i>Cicuta maculata</i> L.	poison hemlock	wanukons'		smoked	
<i>Cirsium</i> species	thistle	ma'zana'tig		medicine (diseases of women)	
<i>Cimtonia borealis</i> (Ait.) Raf	clintonia			medicine (sore and burn), amusement.	
<i>Coptis trifolia</i> (L.) Salisb	goldthread	oza'w'dij'bk	yellow root	dye	
<i>Cornus alternifolia</i> L. f.	dogwood	mufornij'	moose plant	medicine (disease of eye), utility, charm.	
<i>Cornus canadensis</i> L.	hunchberry	caca'gormin		food	
<i>Cornus rugosa</i> Lam	dogwood			smoked	
<i>Cornus stolonifera</i> Michx.	red-osier dogwood	mis'kwabi'nic	reddish	medicine (eyes), utility, dye	smoked in pipe, 33d Rept. B. A. E., p. 108.

<i>Corylus americana</i> Walt.	hazel.....	bagan'.....	nut, bark, burs, and wood.	food, dye, and utility.	food, 33d Rept. B. A. E., p. 74.
<i>Corylus rostrata</i> Ait.	do.....	mine'saga'wünj.	having fruit and also spikes.	utility and medicine (lungs)	food, utility, medicine (diseases of women).
<i>Crataegus</i> species	thornapple.....	na'bügogwis'simain	flat pumpkin.	food.	do.
<i>Cucurbita maxima</i> Duchesne.	squash.....	ogwis'simain.	word refers to sewing.	medicine (toothache).	do.
<i>Cucurbita pepo</i> L.	pumpkin.....	ago'biso'win.	first two syllables mean ghost or spirit.	utility.	medicine (stomach trouble)
<i>Cypripedium hirsutum</i> Mill.	lady'slipper.....	djibe'güb.	big heart-berry root	medicine (physisic)	do.
<i>Dicranum bonjeanii</i> De Not.	woodmoss.....	g't'ciöde'imindji'blk.	slippery root.	medicine (headache)	do.
<i>Diervilla lonicera</i> Mill.	bush honeysuckle.....	oja'cüjij'blk.	"It is round"	utility.	do.
<i>Dicra palustris</i> L.	moosewood.....	gijib'iniskon'	do.	do.	do.
<i>Dryocalis arguta</i> (Pursh) Rydb.	five-finger.....	gababi'kwüna'tig.	knotted tree	medicine (pain in stomach, diseases of women).	do.
<i>Epilobium angustifolium</i> L.	fireweed.....	o'zawa'bigwün.	yellow flower.	medicine (eruptions)	do.
<i>Equisetum hiemale</i> L.	scouring-rush.....	me'skwane'küik bü'giso'-win.	swimming.	medicine (strengthening baths)	do.
<i>Equisetum praealtum</i> Raf.	do.....	niya'wribükük'	unusual, reddish bean.	charm.	do.
<i>Erigeron canadensis</i> L.	horseweed.....	bügwüdj'miskodi'simin.	heart berry root	medicine (cholera-infantum)	do.
<i>Erysimum cheiranthoides</i> L.	wormseed mustard.....	ode'imindji'blk.	snowshoe wood.	utility.	do.
<i>Eupatorium maculatum</i> L.	Joe-Pye-weed.....	a'gimak'	dirty leaf.	food.	do.
<i>Eupatorium perfoliatum</i> L.	boneset.....	wini'sbügons'	one root.	medicine (sore mouth, food)	do.
<i>Euthamia graminifolia</i> (L.) Nutt.	goldenrod.....	be'cügodj'bügük.	smooth berry.	medicine (diseases of women).	do.
<i>Falcata comosa</i> (L.) Kuntze	hog peanut.....	cabo'minaaga'wünj.	raw thing.	food.	do.
<i>Fomes applanatus</i>	shelf fungus.....	a'skibwan'	sun, small leaf	medicine (tonic)	do.
<i>Fragaria virginiana</i> Duchesne.	wild strawberry.....	gi'ziso'bügons'	"It is silent"	medicine (convulsions).	do.
<i>Fraxinus</i> species	ash.....	gabisan'keag'	flute-reed	charm.	do.
<i>Fraxinus nigra</i> Marsh.	black ash.....	animu'sid.	sour leaf.	medicine (indigestion, boils, and sore throat).	do.
<i>Gaultheria procumbens</i> L.	wintergreen.....	bi'bigwe'wünük.	do.	medicine (sore mouth)	do.
<i>Geranium maculatum</i> L.	wild geranium.....	ciwade'imini'büg.	do.	medicine (sore mouth)	do.
<i>Geum canadense</i> Jacq.	avens.....				
<i>Grossularia oxyacanthoides</i> (L.) Mill.	gooseberry.....				
<i>Helianthus tuberosus</i> L.	Jerusalem artichoke.....				
<i>Helopsis scabra</i> Dunal.	ox-eye.....				
<i>Hepatica americana</i> Ker.	hepatica.....				
<i>Hepatica triloba</i> L.	do.....				
<i>Heracleum lanatum</i> Michx.	cow parsnip.....				
<i>Heuchera</i> (species doubtful)	alum-root.....				

## LIST OF PLANTS ARRANGED ACCORDING TO BOTANICAL NAME—Continued

Botanical name	Common name	Native name	Meaning	Use	Reference to use by other tribes
<i>Heuchera hispida</i> Pursh	alum-root	ciwade'imnaga'wunj	sour fruit	medicine (indigestion and dis-eases of eye).	dysentery, Sioux, Bull. 61, p. 269.
<i>Hicoria alba</i> (L.) Britton	hickory	mi'tigwabak'	bow-wood	utility and medicine (bead-ache).	
<i>Hordeum jubatum</i> L.	squirrel-tail	a'djidamo'wano	squirrel-tail	medicine (sty on eye)	
<i>Iris versicolor</i> L.	blueflag			medicine (poultice)	
<i>Juglans cinerea</i> L.	butternut			dye	
<i>Juniperus communis</i> L.	juniper	ga'gawan'digisid	deceptive	utility	
<i>Juniperus virginiana</i> L.*	red cedar	miskwa'wak	red wood	medicine, utility	
<i>Koelia virginiana</i> (L.) MacM.	mountain mint	name'w'uckons'	little sturgeon plant	medicine (fevers and diseases of women), food.	
<i>Lachnaria scariosa</i> (L.) Kuntze	blazing-star	o'mucko'zowa'no	elk tail	medicine (diseases of the horse).	dysentery, 33d Rept. B. A. E., p. 133.
<i>Lactuca canadensis</i> L.	wild lettuce	odjici'gomin		medicine (warts)	
<i>Larix laricina</i> (Du Roi) Koch	tamarack	mi'okigwa'tig	swamp tree	medicine (burns), utility	
<i>Lathyrus venosus</i> Muhl	wild pea	mi'nisino'w'ick	island medicine	medicine (convulsions and hemorrhage from wounds), food, charm.	
<i>Ledum groenlandicum</i> Oeder	Labrador tea	muckig'obug	swamp leaf	medicine (ulcers), food	
<i>Leptandra virginica</i> (L.) Nutt.	culver's-root	wi'sagidji'blk	bitter root	medicine (physis)	
<i>Lilium canadense</i> L.	lily	Winabojo'blk'wuk'	Winabojo's arrow	medicine (snake bite)	
<i>Lithospermum carolinense</i> (Walt.) MacM.	puccoon	odji'bknamun'		dye	
<i>Lonicera</i> sp.	honeysuckle			medicine (lung trouble)	
<i>Lycopodium obscurum</i> L.	ground-pine			medicine (stiff joints)	
<i>Lycopus asper</i> Greene	bugweed	ande'gopin	crow plant	food	
<i>Monarda mollis</i> L.	horsemint	bibi'gwimukuk' wabino'w'uck	resembling a flute, eastern medicine.	medicine (eruptions, burns, and worms).	
<i>Nepeta cataria</i> L.	catnip	gajugens'fbug	little-cat leaf	medicine (fevers)	
<i>Onosmodium hispissimum</i> Mackenzie	false groundwell	mi'gisens'fbug	little-shell leaf	charm	
<i>Osmorhiza claytoni</i> Michx.	sweet cicely	osaga'tigom'	tangled branches	medicine (ulcers and sore throat).	

<i>Ostrya virginiana</i> (Mill.) Koch.....	hop hornbeam, iron-wood.	ma'nanon's	medicine (kidney trouble).
<i>Oxyccocus macrocarpus</i> (Ait.) Pers.*	cranberry.....	a'nubimim'	food.....
<i>Parthenocissus quinquefolia</i> (L.) Greene.	woodbine.....	manido'bima'kwaid	do.....
<i>Petalostemon purpureus</i> (Vent.) Rydb.	prairie-clover.....	ba'sibügök'	medicine (heart trouble).
<i>Phragmites communis</i> Trin.....	reed.....	abo'djigün	utility.....
<i>Phryma leptostachya</i> L.....	lopsed		
<i>Picea canadensis</i> (Mill.) B. S. P.	white spruce		medicine (sore throat).
<i>Picea rubra</i> (DuRoi) Dietr.	spruce.....	cingob'	medicine (stiff joints).
<i>Pinus resinosa</i> Ait.	red pine.....	jigwak	utility.....
<i>Pinus strobus</i> L.	white pine.....	do	do.....
<i>Plantago major</i> L.....	plantain.....	gine'hwöck	medicine (inflammation).
<i>Polygala senega</i> L.....	Seneca snakeroot	o'mükikr'bug	charm.....
<i>Polygonatum commutatum</i> (R. & S.) Dietr.	Solomonseal.....	h'jikiwöck'	medicine (tonic), charm.
<i>Polygonum persicaria</i> L.....	smartweed		medicine (headache)
<i>Polygonum punctatum</i> Eil.	do.....	ojig'imün	medicine (pain in stomach)
<i>Populus balsamifera</i> L.	balsam poplar.....	man'asa'di	do.....
<i>Populus tremuloides</i> Michx.	aspen.....	asa'di	medicine (heart trouble), charm.
<i>Potentilla palustris</i> (L.) Scop.....	marshlocks		medicine (diseases of women), food.
<i>Potentilla monspeliensis</i> L.	cinquefoil.....	bime'bug	medicine (dysentery).
<i>Prenanthes alba</i> L.	rattlesnake-root		medicine (sore throat).
<i>Prunella vulgaris</i> L.	selfheal.....	dado'cabodj'fik	medicine (diseases of women)
<i>Prunus</i> (species doubtful)		name'wüskons'	do.....
<i>Prunus americana</i> Marsh.	wild plum.....	bü'gesana'tüg	do.....
<i>Prunus serotina</i> Ehrh.	wild cherry.....	ikwe'mic	medicine (disinfectant), food.
<i>Prunus virginiana</i> L.....	chokecherry	a'sisüwe'minaga'wünj	medicine (digestive troubles, etc.), food.

\* Plants are marked with an asterisk if specimens were not submitted.

used as an application to draw out splinter, Omaha-Ponca, 33d Rept. B. A. E., p. 115.  
 tonic, Chippewa, Bull. 53, p. 64.

urinary system, Tewa, Bull. 55, p. 42.

food, medicine, and utility, 33d Rept. B. A. E., p. 87.

## LIST OF PLANTS ARRANGED ACCORDING TO BOTANICAL NAME—Continued

Botanical name	Common name	Native name	Meaning	Use	Reference to use by other tribes
<i>Psoralea argophylla</i> Pursh.	psoralea	gi'ziso'bugons'	sun, little leaf	medicine (diseases of the horse).	
<i>Pulsatilla hirsutissima</i> (Pursh) Britton.	pasque-flower	gogeda d'ib'og		medicine (headache, etc.)	
<i>Quereus</i> species.	oak	mitigo'mizine		utility	
<i>Quereus macrocarpa</i> Muhl.	bur oak	ni't'igo'mic		medicine (wounds), food	food, 33d Rept. B. A. E., p. 75.
<i>Quereus rubra</i> L.	red oak	wi'sugi'mitgo'mic	bitter oak	medicine (heart), food	food, Tewa, Bull. 55, p. 107 (footnote).
<i>Rhus glabra</i> L.	sumac	maki'bug		medicine (dysentery)	medicine, etc., also dye, 33d Rept. B. A. E., p. 99.
<i>Rhus hirta</i> (L.) Sudw.	staghorn sumac			utility, dye, medicine (pain in stomach).	
<i>Ribes glandulosum</i> Gauer.	wild currant	wabos'odji'bak	rabbit leaf	medicine (diseases of women).	
<i>Ribes triste</i> Pall.	red currant	ciqagwa'tigon	skunk-like	medicine (gravel), food	
<i>Ribes</i> species.	wild currant	miedji'minaga'wunj	fuzzy fruit	medicine (urinary trouble), food.	
<i>Rosa arkansana</i> Porter.	wild rose	bi'jikiwi'ginig	cattle rose	medicine (tonic, etc.)	
<i>Rosa</i> species.	rose	ogini'minaga'wunj	rose berries	medicine (diseases of eye), food.	
<i>Rubus occidentalis</i> L.	black raspberry	oda'tagag'minaga'wunj		medicine (diseases of women).	
<i>Rubus frondosus</i> Bigel. (?)	blackberry	do		medicine (lung trouble), food.	
<i>Rubus strigosus</i> Michx.	red raspberry	mis'kominaga'wunj	having reddish berries	medicine (diseases of eye, diseases of women; also dysentery).	
<i>Rudbeckia laciniata</i> L.	cone-flower	gi'zúswe'bigwa'is	"it is scattering"	medicine (indigestion and burn).	
<i>Rumex obtusifolius</i> L.	bitter dock	gi'ziso'bugons'	sun, little leaf	medicine (cuts, ulcers)	
<i>Rumex crispus</i> L.	yellow dock	oza'widji'bak	yellow root	medicine (eruptions)	
		gimoje'wakun	pike plant		
		oza'widji'bak	yellow root		
<i>Sagittaria latifolia</i> Willd.	arrowhead	muj'ota'bak	moose leaf	medicine (indigestion), food	
<i>Salix</i> species.	willow	ozi'sigo'bitmic		medicine (indigestion), utility	utility, 33d Rept. B. A. E., p. 73.

<i>Sanguinaria canadensis</i> L.	bloodroot	mis'kodji'biik	red root	dye, medicine	dye and charm, 33d Rept. B. A. E., p. 83.
<i>Sanicula canadensis</i> L.	bur snakeroot	mukóde'widji'biik	black root	medicine (diseases of women)	
<i>Sarracenia purpurea</i> L.	pitcher-plant	o'múkiki'wida'sun	frog leggings	amusement	
<i>Scirpus validus</i> Vahl	bulrush	ana'kun	"it is one-sided"	utility, food	food, 33d Rept. B. A. E., p. 69.
<i>Sieversia ciliata</i> (Pursh) Rydb	prairie-smoke	ne'baeyá'nekweäg'	watcher, or spy	medicine (tonic and stimulant)	
<i>Silphium perfoliatum</i> L.	cup-plant	akun'damo	bear root	medicine (hemorrhages)	rheumatism, 33d Rept. B. A. E., p. 132.
<i>Smilax herbacea</i> L.	carrion-flower	ma'kodji'biik	sun medicine	medicine (physic and urinary system)	food and remedy for hoarseness, 33d Rept. B. A. E., p. 71.
<i>Solidago species</i>	goldenrod	gi'ziso'múk'ki	squirrel tail	medicine (fever, ulcers and boils)	calendar flower, 33d Rept. B. A. E., p. 133.
<i>Solidago altissima</i> L.	do	a'djidamo'wano	do	medicine (cramps)	ceremonial, Tewa, Bull. 55, p. 49 (footnote).
<i>Solidago flexicaulis</i> L.	do	do	do	medicine (diseases of women)	
<i>Solidago juncea</i> Ait	do	do	do	medicine (convulsions and diseases of women)	
<i>Solidago rigida</i> L.	do	o'zawa'bigwün	yellow flower	medicine (urinary trouble)	
<i>Solidago rigidiuscula</i> Porter	sphagnum	asa'kümig	crow leaf	utility	
<i>Stachys palustris</i> L.	hedge-nettle	andé'gobüg	toothplant	medicine (colic)	
<i>Stellaria media</i> (L.) Cyrill	chickweed	w'i'ribidja'hibaga'no	ground-squirrel leaf	medicine (sore eyes)	
<i>Streptopus roseus</i> Michx	twisted-stalk	agwin'güshüg'	wolf wood	medicine (sty on eye)	
<i>Symphoricarpos albus</i> (L.) Blake	snowberry	malj'gamüma'tig	young woman's leaf	medicine (physic)	
<i>Tanacetum vulgare</i> L.	fansy	o'ekinigt'kweant'bic	cedar-like	medicine (sore throat, diseases of women, fevers, and for soreness of ear)	
<i>Taraxacum officinale</i> Weber	dandelion	dado'cabodji'biik	milk root	medicine (diseases of women)	
<i>Taxis canadensis</i> Marsh	yew	ne'bagandag'	"it is one-sided"	medicine (rheumatism)	
<i>Thaspium barbinode</i> (Michx) Nutt.	meadow parsnip	baisidji'biikügük	plump root	medicine (colic)	
<i>Thuja occidentalis</i> L.	arborvitae (white cedar)	gi'jikan'düg	cedar-like	medicine (cough)	
<i>Tilia americana</i> L.	basswood	wigub'imj	utility	utility	utility, 33d Rept. B. A. E., p. 102.

## LIST OF PLANTS ARRANGED ACCORDING TO BOTANICAL NAME—Continued

Botanical name	Common name	Native name	Meaning	Use	Reference to use by other tribes
<i>Torresia odorata</i> (L.) Hitchc.	sweetgrass.	wicko'bimicko'si	sweet grass.	ceremonial, pleasure, utility	
<i>Trillium grandiflorum</i> (Michx.) Salisb.	wake-robin.	in'otwin'dbig'e'gin		medicine (rheumatism, cramps, and soreness of ear).	
<i>Tsuga canadensis</i> (L.) Carr.	hemlock.	gags'gimic.		medicine (hemorrhage from wounds), food, dye.	
<i>Typha latifolia</i> L.	cat-tail.	apuk'we.		utility.	
<i>Ulmus fulva</i> Michx.	slippery elm.	gawa'konic		medicine (sore throat), utility.	
<i>Urtica gracilis</i> Ait.	nettle.	ma'zana'tig, bepadji'c.	a prickly nettle.	medicine (urinary system and dysentery).	utility, 33d Rept. B. A. E., p. 64; Tewa, Bull. 55, p. 66.
<i>Urticastrum divaricatum</i> (L.) Kuntze.	false nettle.	ekanakizit ma'zana'tig. ze'sub		utility.	Rept. B. A. E., p. 76.
<i>Vaccinium angustifolium</i> Ait.	blueberry.	min'aga'wunj		medicine ("craziness"), food	
<i>Vagnera racemosa</i> (L.) Morong	false Solomonseal.	agong'osiminnu'		medicine (diseases of women)	
<i>Verbena hastata</i> L.	vervain.			medicine (nose-bleed).	
<i>Veronica virginica</i> L.	arrowwood.	wi'sugudj'bak	bitter root.	medicine (nose-bleed, scrofula)	
<i>Viburnum acerifolium</i> L.	highland cranberry.	anib'		medicine (emetic).	
<i>Viburnum pauciflorum</i> Pylaie	grape.	jo'minaga'wunj		food.	
<i>Vitis cordifolia</i> Michx.	prickly ash.	gawa'konic		medicine, food.	
<i>Zanthoxylum americanum</i> Mill.	corn.	manda'min		medicine (sore throat).	
<i>Zea mays</i> L.	wild rice.	mano'min		food.	
<i>Zizania palustris</i> L.				do	

<sup>1</sup> *Zizania aquatica*, a variety of wild rice having smaller heads and slightly smaller grains than *Zizania palustris* is also found in northern Minnesota.



## LIST OF PLANTS ARRANGED ACCORDING TO COMMON NAME

Common name <sup>1</sup>	Botanical name	Common name	Botanical name
Alder.....	<i>Alnus incana</i> (L.) Moench.	Cranberry, highland.....	<i>Viburnum pauciflorum</i> Pylaë.
Alum-root.....	<i>Heuchera</i> (species doubtful).	Culver's-root.....	<i>Leptandra virginica</i> (L.) Nutt.
Alum-root.....	<i>Heuchera hispida</i> Pursh.	Cup-plant.....	<i>Silphium perfoliatum</i> L.
Arborvitæ (white cedar).	<i>Thuja occidentalis</i> L.	Currant, red.....	<i>Ribes triste</i> Pall.
Artichoke, Jerusalem	<i>Helianthus tuberosus</i> L.	Currant, wild.....	<i>Ribes</i> species.
Arrowhead.....	<i>Sagittaria latifolia</i> Willd.	Currant, wild.....	<i>Ribes glandulosum</i> Gauer.
Arrowwood.....	<i>Viburnum acerifolium</i> L.	Dandelion.....	<i>Taraxacum officinale</i> Weber.
Ash.....	<i>Fraxinus</i> species.	Dock, bitter.....	<i>Rumex obtusifolius</i> L.
Ash, black.....	<i>Fraxinus nigra</i> Marsh.	Dock, yellow.....	<i>Rumex crispus</i> L.
Ash, prickly.....	<i>Zanthoxylum americanum</i> Mill.	Dogbane.....	<i>Apocynum</i> species.
Aspen.....	<i>Populus tremuloides</i> Michx.	Dogbane.....	<i>Apocynum androsaemifolium</i> L.
Aster.....	<i>Aster</i> (species doubtful).	Dogwood.....	<i>Cornus alternifolia</i> L. f.
Aster.....	<i>Aster nemoralis</i> Ait.	Dogwood.....	<i>Cornus rugosa</i> Lam.
Aster.....	<i>Aster novae-angliae</i> L.	Dogwood, red-osier.....	<i>Cornus stolonifera</i> Michx.
Aster.....	<i>Aster puniceus</i> L.	Elm, slippery.....	<i>Ulmus fulva</i> Michx.
Avens.....	<i>Geum canadense</i> Jacq.	False Solomonseal.....	<i>Vagnera racemosa</i> (L.) Mo-rong.
Baneberry, red.....	<i>Actaea rubra</i> (Ait.) Willd.	Fern, lady.....	<i>Athyrium filix-foemina</i> (L.) Roth.
Basswood.....	<i>Tilia americana</i> L.	Fern, rattlesnake.....	<i>Botrychium virginianum</i> (L.) Sw.
Bearberry.....	<i>Arctostaphylos uva-ursi</i> (L.) Spreng.	Fir, balsam.....	<i>Abies balsamea</i> (L.) Mill.
Birch, black.....	<i>Betula nigra</i> L.	Fireweed.....	<i>Epilobium angustifolium</i> L.
Birch, white.....	<i>Betula papyrifera</i> Marsh.	Five-finger.....	<i>Drymocallis arguta</i> (Pursh) Rydb.
Bittersweet.....	<i>Celastrus scandens</i> L.	Fungus, shelf.....	<i>Fomes applanatus</i> .
Blackberry.....	<i>Rubus frondosus</i> Bigel. (?)	Geranium, wild.....	<i>Geranium maculatum</i> L.
Blazing-star.....	<i>Lacinaria scariosa</i> (L.) Kuntze.	Ginger, wild.....	<i>Asarum canadense</i> L.
Bloodroot.....	<i>Sanguinaria canadensis</i> L.	Goldenrod.....	<i>Euthamia graminifolia</i> (L.) Nutt.
Bluebell, (Scotch harebell).	<i>Campanula rotundifolia</i> L.	Goldenrod.....	<i>Solidago altissima</i> L.
Blueberry.....	<i>Vaccinium angustifolium</i> Ait.	Goldenrod.....	<i>Solidago flexicaulis</i> L.
Blueflag.....	<i>Iris versicolor</i> L.	Goldenrod.....	<i>Solidago juncea</i> Ait.
Bluestem.....	<i>Andropogon furcatus</i> Muhl.	Goldenrod.....	<i>Solidago rigida</i> L.
Boneset.....	<i>Eupatorium perfoliatum</i> L.	Goldenrod.....	<i>Solidago rigidiuscula</i> Porter.
Bugle-weed.....	<i>Lycopus asper</i> Greene.	Goldenrod.....	<i>Solidago</i> species.
Burlush.....	<i>Scirpus validus</i> Vahl.	Goldthread.....	<i>Coptis trifolia</i> (L.) Salisb.
Bunchberry.....	<i>Cornus canadensis</i> L.	Gooseberry.....	<i>Grossularia oxycanthoides</i> (L.) Mill.
Burdock.....	<i>Arctium minus</i> Bernh.	Grape.....	<i>Vitis cordifolia</i> Michx.
Butternut.....	<i>Juglans cinerea</i> L.	Gromwell, false.....	<i>Onosmodium hispidissimum</i> Mackenzie.
Calamus.....	<i>Acorus calamus</i> L.	Ground-pine.....	<i>Lycopodium obscurum</i> L.
Carrion-flower.....	<i>Smilax herbacea</i> L.	Ground-plum.....	<i>Astragalus crassicaarpus</i> Nutt.
Catnip.....	<i>Nepeta cataria</i> L.	Harebell (Scotch bluebell).	<i>Campanula rotundifolia</i> L.
Cat-tail.....	<i>Typha latifolia</i> L.	Hazel.....	<i>Corylus americana</i> Walt.
Cedar, red.....	<i>Juniperus virginiana</i> L.*	Hazel.....	<i>Corylus rostrata</i> Ait.
Cedar, white (arborvitæ).	<i>Thuja occidentalis</i> L.	Hedge-nettle.....	<i>Stachys palustris</i> L.
Cherry, wild.....	<i>Prunus serotina</i> Ehrh.	Hemlock.....	<i>Tsuga canadensis</i> (L.) Carr.
Chickweed.....	<i>Stellaria media</i> (L.) Cyrill.	Hemlock, poison.....	<i>Cicuta maculata</i> L.
Chokecherry.....	<i>Prunus virginiana</i> L.	Hepatica.....	<i>Hepatica americana</i> Ker.
Cicely, sweet.....	<i>Osmorrhiza claytoni</i> Michx.	Hepatica.....	<i>Hepatica triloba</i> L.
Cinquefoil.....	<i>Potentilla monspeliensis</i> L.	Hickory.....	<i>Hicoria alba</i> (L.) Britton.
Clintonia.....	<i>Clintonia borealis</i> Ait. (Canadian specimen).	Honeysuckle.....	<i>Lonicera</i> species.
Cohosh, blue.....	<i>Caulophyllum thalictroides</i> (L.) Michx.	Honeysuckle, bush.....	<i>Diervilla lonicera</i> Mill.
Cone-flower.....	<i>Rudbeckia laciniata</i> L.		
Corn.....	<i>Zea mays</i> L.		
Cowslip.....	<i>Caltha palustris</i> L.		
Cranberry.....	<i>Oxycoccus macrocarpus</i> (Ait.) Pers.*		

<sup>1</sup> Attention is directed to the fact that the common name of a plant frequently differs in different localities and that, in some instances, a plant is known by more than one common name. The list herewith presented contains the names by which the plants are most widely known.

\* Plants are marked with an asterisk if specimens were not submitted.

## LIST OF PLANTS ARRANGED ACCORDING TO COMMON NAME—Continued

Common name	Botanical name	Common name	Botanical name
Hornbeam, hop (ironwood).	<i>Ostrya virginiana</i> (Mill.) Koch.	Puceon.....	<i>Lithospermum carolinense</i> (Walt.) MacM.
Horsemint.....	<i>Monarda mollis</i> L.	Puffball.....	<i>Calvatia craniformis</i> Schw.
Horseweed.....	<i>Erigeron canadensis</i> L.	Pumpkin.....	<i>Cucurbita pepo</i> L.
Hyssop, giant.....	<i>Agastache anethiodora</i> (Nutt.) Britton.	Raspberry, black.....	<i>Rubus occidentalis</i> L.
Ironwood (hop hornbeam).	<i>Ostrya virginiana</i> (Mill.) Koch.	Raspberry, red.....	<i>Rubus strigosus</i> Michx.
Jack-in-the-pulpit.....	<i>Arisaema triphyllum</i> (L.) Torr.	Rattlesnake-root.....	<i>Prenanthes alba</i> L.
Joe Pye weed.....	<i>Eupatorium maculatum</i> L.	Reed.....	<i>Phragmites communis</i> Trin.
June berry (shad-bush).	<i>Amelanchier canadensis</i> (L.) Medic.	Rice, wild.....	<i>Zizania palustris</i> L.
Juniper.....	<i>Juniperus communis</i> L.	Rose.....	<i>Rosa</i> species.
Ladyslipper.....	<i>Cypripedium hirsutum</i> Mill.	Rose, wild.....	<i>Rosa arkansana</i> Porter.
Leek, wild.....	<i>Allium tricoccum</i> Ait.	Sage, prairie.....	<i>Artemisia frigida</i> Willd.
Lettuce, wild.....	<i>Lactuca canadensis</i> L.	Sarsaparilla, wild.....	<i>Aralia nudicaulis</i> L.
Lily.....	<i>Lilium canadense</i> L.	Scouring-rush.....	<i>Equisetum hiemale</i> L.
Lily, white water.....	<i>Castalia odorata</i> (Ait.) Woodv. & Wood.	Scouring-rush.....	<i>Equisetum praealtum</i> Raf.
Lopseed.....	<i>Phryma leptostachya</i> L.	Selfheal.....	<i>Prunella vulgaris</i> L.
Maple, sugar.....	<i>Acer saccharum</i> Marsh.	Shadbush.....	<i>Amelanchier canadensis</i> (L.) Medic.
Marshlocks.....	<i>Potentillapalustris</i> (L.) Scop.	Shepherd's-purse.....	<i>Bursa bursa-pastoris</i> (L.) Britton.
Milkweed, common.....	<i>Asclepias syriaca</i> L.	Smartweed.....	<i>Polygonum persicaria</i> L.
Milkweed, swamp.....	<i>Asclepias incarnata</i> L.	Smartweed.....	<i>Polygonum punctatum</i> Ell.
Mint, mountain.....	<i>Koelia virginiana</i> (L.) MacM.	Snakeroot, bur.....	<i>Sanicula canadensis</i> L.
Moosewood.....	<i>Dirca palustris</i> L.	Snakeroot, Seneca.....	<i>Polygala senega</i> L.
Mugwort.....	<i>Artemisia dracunculoides</i> Pursh.	Snowberry.....	<i>Symphoricarpos albus</i> (L.) Blake.
Mugwort.....	<i>Artemisia gnaphalodes</i> Nutt.	Snowberry, creeping.....	<i>Chiogenes hispidula</i> (L.) T. & G.
Mustard, wormseed.....	<i>Erysimum cheiranthoides</i> L.	Solomonseal.....	<i>Polygonatum commutatum</i> .
Nettle.....	<i>Urtica gracilis</i> Ait.	Sphagnum.....	<i>Sphagnum</i> species.
Nettle, false.....	<i>Urticastrum divaricatum</i> (L.) Kuntze.	Spikenard.....	<i>Aralia racemosa</i> L.
Oak.....	<i>Quercus</i> species.	Spruce.....	<i>Picea rubra</i> (Du Roi) Dietr.
Oak, bur.....	<i>Quercus macrocarpa</i> Muhl.	Spruce, white.....	<i>Picea canadensis</i> (Mill.) B. S. P.
Oak, red.....	<i>Quercus rubra</i> L.	Squash.....	<i>Cucurbita maxima</i> Duchesne.
Onion, wild.....	<i>Allium stellatum</i> Ker.	Squirrel-tail.....	<i>Hordeum jubatum</i> L.
Ox-eye.....	<i>Heliopsis scabra</i> Dunal.	Strawberry, wild.....	<i>Fragaria virginiana</i> Duchesne.
Painted-cup.....	<i>Castilleja coccinea</i> (L.) Spreng.	Sumac.....	<i>Rhus glabra</i> L.
Parsnip, cow.....	<i>Heracleum lanatum</i> Michx.	Sumac, staghorn.....	<i>Rhus hirta</i> (L.) Sudw.
Parsnip, meadow.....	<i>Thaspium barbinode</i> (Michx.) Nutt.	Sweetgrass.....	<i>Torresia odorata</i> (L.) Hitchc.
Pasque-flower.....	<i>Pulsatilla hirsutissima</i> (Pursh.) Britton.	Tamarack.....	<i>Larix laricina</i> (Du Roi) Koch.
Pea, wild.....	<i>Lathyrus venosus</i> Muhl.	Tansy.....	<i>Tanacetum vulgare</i> L.
Peanut, hog.....	<i>Falcatia comosa</i> (L.) Kuntze.	Tea, Labrador.....	<i>Ledum groenlandicum</i> Oeder.
Pearly everlasting.....	<i>Anaphalis margaritacea</i> (L.) B. & H.	Tea, New Jersey.....	<i>Ceanothus ovatus</i> Desf.
Pine, red.....	<i>Pinus resinosa</i> Ait.	Thistle.....	<i>Cirsium</i> species.
Pine, white.....	<i>Pinus strobus</i> L.	Thornapple.....	<i>Crataegus</i> species.
Pipsissewa.....	<i>Chimaphila umbellata</i> (L.) Nutt.	Twisted-stalk.....	<i>Streptopus roseus</i> Michx.
Pitcher-plant.....	<i>Sarracenia purpurea</i> L.	Umbrella-plant.....	<i>Allionia nyctaginea</i> Michx.
Plantain.....	<i>Plantago major</i> L.	Vervain.....	<i>Verbena hastata</i> L.
Plum, wild.....	<i>Prunus americana</i> Marsh.	Wake-robin.....	<i>Trillium grandiflorum</i> (Michx.) Salisb.
Poplar, balsam.....	<i>Populus balsamifera</i> L.	Willow.....	<i>Salix</i> species.
Prairie-clover.....	<i>Petalostemon purpureus</i> (Vent.) Rydb.	Willow, spotted.....	<i>Salix</i> species.
Prairie smoke.....	<i>Sieversia ciliata</i> (Pursh) Rydb.	Wintergreen.....	<i>Gaultheria procumbens</i> L.
Psoralea.....	<i>Psoralea argophylla</i> Pursh.	Woodbine.....	<i>Parthenocissus quinquefolia</i> (L.) Greene.
		Woodmoss.....	<i>Dicranum bonjeanii</i> De Not.
		Wormwood.....	<i>Artemisia absinthium</i> L.
		Yarrow.....	<i>Achillea millefolium</i> L.
		Yew.....	<i>Taxus canadensis</i> Marsh.

There is no exact terminology of Chippewa plants, although there are some generally accepted designations of common plants and trees. In obtaining the names of plants it was found that the same name is often given to several plants, and that one plant may have several names. Individuals often had their own names for the plants which they used as remedies. It was also customary for a medicine man, when teaching the use of a plant, to show a specimen of the plant without giving it any name. Thus the identity of the plant was transmitted with more secrecy than would have been possible if a name had been assigned to it. The names by which plants are designated by the Chippewa are usually compound nouns indicating the appearance of the plant, the place where it grows, a characteristic property of the plant, or its principal use. To this is often added a termination indicating the part of the plant which is utilized, as root or leaf.

Examples of these classes of plant names are as follows:

Name indicating appearance of the plant: *Be'eigodji'bigük* (blue cohosh), *becig*, one; *djibiguk*, root; the plant having a tap root.

Name indicating place where the plant grows: *Mü'ckigwa'tig* (tamarack), *muckig*, swamp; *atig*, termination indicating wood.

Name indicating a characteristic property of the plant: *Dado'eabodji'bik* (dandelion), *dadocabo*, liquid, or milk; *odjibik*, root.

Name indicating characteristic use of plant: *A'gimak'* (ash), *agim*, snowshoe; *ak*, termination signifying wood.

LIST OF PLANTS<sup>1</sup> ARRANGED ACCORDING TO NATIVE NAME

Native name	Common name	Native name	Common name
Abo'djigün.....	Reed.	A'sisüwe'mInaga'wünj..	Chokecherry.
A'djidamo'wano.....	Yarrow, squirrel-tail, goldenrod. <sup>1</sup>	Aya'bidjidji'bikü'g'sin..	Spikenard.
A'gimak'.....	Ash.	Bagan'.....	
Agö'bisowin.....	Ladyslipper.	Ba'sibügük'.....	Mugwort, prairie clover.
Agog'osimInün'.....	False Solomonseal.	Ba'sünükük'.....	Mugwort.
Agwin'güsbüg'.....	Twisted-stalk.	Beba'mokodjibika'gisin..	Dogbane.
Akün'damo.....	Cup-plant.	Be'eigodji'bigük.....	Blue cohosh, wild geranium.
Ana'kün.....	Bulrush.	Be'dukadak'igisin.....	Umbrella plant.
Ande'gobüg.....	Hedge-nettle.	Bepadji'ckanakiz't ma'- zana'tig.	Nettle.
Ande'gopin.....	Honeysuckle, bugle- weed.	Bi'bigwe'wünük.....	Cow parsnip.
Anib'.....	Arrowwood.	Bibi'gwünükük'.....	Horsemint.
Anb'icëns'.....	Goldenrod.	Bi'jikiwi'bügesan'.....	Ground-plum.
A'nibimín'.....	Cranberry.	Bi'jikiwi'ginlg.....	Wild rose.
Anib'imínüga'wünj.....		Bi'jikiwin'gück.....	Prairie sage.
Anidji'minbüg'.....		Bi'jikiwüek'.....	Seneca snakeroot.
A'ninandak'.....	Balsam fir.	Bima'kwüd.....	Bittersweet.
A'nina'tig.....	Sugar maple.	Bine'büg.....	Marsh locks.
A'nimu'sld.....	Hepatica.	Bü'gesana'tig.....	Wild plum.
Apük'we.....	Cat-tail.	Bü'giso'win.....	Mugwort, swamp milk- weed, Joe Pye weed.
Asa'df.....	Aspen.	Bügwüd'j'miskodi'simin..	Hog peanut.
Asa'dümig.....	Wood-moss, sphagnum.	Büsidji'bikügük.....	Meadow parsnip.
A'sawan.....	Lady fern.	Cabo'minaga'wünj.....	Gooseberry.
As'kibwan'.....	Jerusalem artichoke.		

<sup>1</sup> It will be noted that one name is frequently given to several plants and that one plant is frequently called by several names.

## LIST OF PLANTS ARRANGED ACCORDING TO NATIVE NAME—Continued

Native name	Common name	Native name	Common name
Caca'gomin	Bunch berry.	Mückode'cigaga'wünj	Wild onion.
Cigagwa'tigon	Red currant.	Mückode'kanès	Bluestem.
C'Ingob'	Spruce.	Mü'ckosija'bosigün	Calamus.
Ciwade'imín'lbüg	Alum-root.	Müj'omij	Dogwood.
Ciwade'imínaga'wünj	Alum-root.	Müj'ota'bük	Arrowhead.
Dado'cabodji'bik	Rattlesnake-root, dandelion.	Müküde'widji'bik	Bur snake root.
Djibe'güb	Moosewood.	Muse'odji'blk	Wormwood.
Gababi'kwüna'tig	Horseweed.	Ne'bagandag'	Yew.
Gabisan'ikeag'	Hepatica.	Na'bügogwis'simaün'	Squash.
Gaga'gimic	Hemlock.	Na'bugüek'	Calamus.
Ga'gawan'dagisid	Juniper.	Name'gosibüg'	Aster.
Ga'gige'büg	Pipsissewa.	Name'pin	Wild ginger.
Ga'jugëns'ibüg	Catnip.	Name'wückons	Mountain mint (also selfheal).
Gawa'komic	Slippery elm, prickly ash.	Ne'baneya'nekweäg'	Prairie smoke.
Gijih'inüskon'	Scouring rush.	Niya'wibükük'	Boneset.
Gi'jkan'düg	Arbor vitæ.	Nokwe'jigün	White mugwort.
Gine'bigwüek	Plantain.	O'ckinig'kweäni'bie	Tansy.
Ginoje'wükün	Yellow dock.	Oda'tagago'minaga'wünj	Blackberry (also black raspberry).
Gi'teode'imindji'bik	Five-finger.	Ode'imindji'bik	Wild strawberry.
Gi'ziso'bügons'	Ox-eye, psoralea, cone flower.	Odiga'dimanido'	New Jersey tea.
Gi'ziso'müeki'ki	Goldenrod.	Odji'bikëns	Goldenrod.
Gi'züswe'bigwa'nis	Cone flower.	Odji'biknamün'	Puccoon.
Gogeda'djibüg	Pasque flower.	Odjic'gomün	Wild lettuce.
Güzigwa'kominaga'wünj	Shadbush.	O'gima'wüek	Mugwort.
İ'ckode'büg	Mugwort.	Ogini'minaga'wünj	Rose (term refers to the rose-berry).
İ'ckode'wadji'bik	Shepherd's purse.	O'gite'büg	Cowslip.
Ikwe'mic	Wild cherry.	Ogwis'simaün'	Pumpkin.
In'niwünj	Common milkweed.	Oja'cidji'bik	Fireweed.
In'niwin'dibige'gün	Wake-robin.	Ojig'imín'	Smartweed.
Ijigwak'	Red pine, white pine.	O'mükiki'büg	Plantain.
Ijigwakwan'düg	Mugwort.	O'mükiki'wida'sün	Pitcher-plant.
Jo'mnaga'wünj	Grape.	O'mücko'zowa'no	Elk tail.
Mañ'gamüna'tig	Snowberry.	O'saga'tigom	Sweet cicely.
Ma'kibüg	Sumac.	O'zawa'bigwün	Wormseed, mustard, goldenrod.
Ma'kodji'bik	Carrian flower.	Oza'widji'bik	Goldthread, bitter dock, yellow dock.
Ma'kwona'gic obji'bik	Dogbane.	Ozi'sigo'bimic	Willow.
Ma'nanons'	Hop hornbeam.	Saga'komin'agünj'	Bearberry.
Man'asu'di	Balsam poplar.	Sasa'bikwan	Dogbane.
Manda'min	Corn.	Siga'gawünj'	Wild leek.
Manido'bima'kwüd	Woodbine.	Wadüb'	Alder.
Mano'min	Wild rice.	Wa'bigwün'	Pearly everlasting (and other plants).
Ma'zana'tig	Nettle, thistle.	Wabino'wüek	Horsemint.
Me'skwana'küü	Joe-Pye-weed.	Wabos'odji'bik	Wild sarsaparilla (also wild currant).
Micidji'minaga'wünj	Wild currant.	Wabos'obügons'	Creeping snowberry.
Mi'gisëns'lbüg	False gromwell.	Weza'wünüekwük'	Giant hyssop.
Mnaga'wünj	Blueberry.	Wicko'bimücko'si	Sweetgrass.
Mine'saga'wünj	Thornapple.	Wi'cosidji'bik	Red baneberry.
Mi'nisino'wüek	Wild pea.	Wigub'imlj	Basswood.
Mis'kodji'bik	Bloodroot.	Wi'gwasa'tig	White birch.
Mis'kwabi'mic	Red-osier dogwood.	Wikën'	Calamus.
Mis'kominaga'wünj	Red raspberry.	Winabojo'bikwük'	Lily.
Miskwa'wak	Red cedar.		
Mitigo'mic	Bur oak.		
Mitigo'mizinc	Oak.		
Mitigwabak'	Hickory.		
Müekie'obüg	Labrador tea.		
Mü'ekigwa'tig	Tamarack.		

## LIST OF PLANTS ARRANGED ACCORDING TO NATIVE NAME—Continued

Native name	Common name	Native name	Common name
Wĩnabojo' noko'mĩs	Painted-cup.	Wĩ'sũgibũg'.....	Burdock.
wĩ'nizisũn'.		Wĩ'sũgi'mitigo'mic.....	Bitter oak.
Wĩ'nibidja'bibaga'no....	Chickweed.	Wĩ'sũgidji'blk.....	Culver's root.
Wĩnĩ'sibũgons'.....	Wintergreen.	Ze'sũb.....	False nettle.
Wĩnĩ'sikẽns.....	Aster.	Zĩ'gĩnĩ'ce.....	Harebell.

An investigation was made to determine whether the plants used medicinally by the Chippewa have a recognized use by the white race. Two reports on this subject were courteously prepared by Dr. W. W. Stockberger, physiologist in charge of drug, poisonous and oil plant investigations, Bureau of Plant Industry, United States Department of Agriculture. The first report shows the medicinal properties of such plants and the second report shows the principal active medicinal constituents of these plants.

### MEDICINAL PROPERTIES OF PLANTS USED BY THE CHIPPEWA

The following 69 plants used by the Chippewa are regarded as medicinal by white people, although opinion as to their therapeutic value varies greatly. The few species now officially recognized in the latest editions of the United States Pharmacopoeia and the National Formulary are designated in the text by the abbreviations U. S. P. IX and N. F. 4, respectively. Species recognized in the eighth revision of the United States Pharmacopoeia but no longer official are indicated by U. S. P. VIII.

The remaining species, some of which were recognized in the earlier Pharmacopoeias, have long been used either in medicine as practiced by certain physicians or as domestic remedies.

*Abies balsamea* (L.) Mill. Balsam. PINACEAE. Pine family.

Canada balsam, a liquid oleoresin obtained from this tree, is stimulant, diuretic, occasionally diaphoretic and externally rubefacient. U. S. P. VIII.

*Achillea millefolium* L. Yarrow, Milfoil. COMPOSITAE. Composite family.

The plant is slightly astringent and has been used as an alterative, diuretic, and as a stimulant tonic.

*Acorus calamus* L. Sweetflag, calamus. ARACEAE. Arum family.

The rhizome has been employed as an aromatic stimulant and tonic. U. S. P. VIII.

*Actaea rubra* (Ait.) Willd. Red baneberry. RANUNCULACEAE. Crowfoot family.

The rhizome is said to be emeto-purgative and parasiticide.

*Alnus incana* (L.) Moench. Speckled alder. FAGACEAE. Beech family.

The bark is alterative, astringent, and emetic.

*Apocynum androsacmifolium* L. Spreading dogbane. APOCYNACEAE. Dogbane family.

The root is diuretic, sudorific, emetic, cathartic, and anthelmintic. U. S. P. VIII.

*Aralia nudicaulis* L. Wild sarsaparilla. ARALIACEAE. Ginseng family.

The roots have been used for their gently stimulant, diaphoretic, and alterative action.

*Aralia racemosa* L. Spikenard. ARALIACEAE. Ginseng family.

The root is alterative, stimulant, and diaphoretic.

*Arctium minus* Bernh. Burdock. COMPOSITAE. Composite family.

The root is diuretic, diaphoretic, and alterative. U. S. P. VIII.

*Arctostaphylos uva-ursi* (L.) Spreng. Bearberry. ERICACEAE. Heath family.

The leaves have mild and slightly antiseptic diuretic properties. U. S. P. IX.

*Arisaema triphyllum* (L.) Torr. Jack-in-the-pulpit. ARACEAE. Arum family. Mentioned in unofficial part of United States and King's Dispensatories.

*Artemisia absinthium* L. Wormwood. COMPOSITAE. Composite family.

The leaves and flowering tops are tonic, stomachic, stimulant, febrifuge, and anthelmintic.

*Artemisia dracunculoides* Pursh. Fuzzy-weed. COMPOSITAE. Composite family.

The plant acts as a topical irritant and diaphoretic.

*Asarum canadense* L. Wild ginger. ARISTOLOCHIACEAE. Birthwort family.

The rhizome and roots are used as a carminative agent and flavor. N. F. 4.

*Asclepias incarnata* L. Swamp milkweed. ASCLEPIADACEAE. Milkweed family.

The root is alterative, anthelmintic, cathartic, and emetic.

*Asclepias syriaca* L. Milkweed. ASCLEPIADACEAE. Milkweed family.

The root is tonic, diuretic, alterative, emmenagogue, purgative, and emetic.

*Athyrium filix-femina* (L.) Roth. Lady fern. POLYPODIACEAE. Fern family.

Reputed taenicide and formerly so used.

*Bursa bursa-pastoris* (L.) Britton. Shepherd's Purse. CRUCIFERAE. Mustard family.

This plant was formerly thought to be antiscorbutic.

*Caltha palustris* L. Marsh marigold. RANUNCULACEAE. Crowfoot family.

The plant has been popularly used in the treatment of coughs.

*Caulophyllum thalictroides* (L.) Michx. Blue Cohosh. BERBERIDACEAE. Barberry family.

The rhizome and roots are said to be sedative, diuretic, and emmenagogue. N. F. 4.

*Celastrus scandens* L. Bittersweet. CELASTRACEAE. Staff tree family.

The bark is said to be emetic, diaphoretic, and alterative.

*Cirsium* sp. COMPOSITAE. Composite family.

The related species *Cirsium arvense* is said to be tonic, diuretic, and astringent.

*Cornus alternifolia* L. f. Blue or purple dogwood. CORNACEAE. Dogwood family.

The bark of the root of the related species, *Cornus florida*, is a feeble, astringent tonic.

*Cypripedium hirsutum* Mill. Showy ladyslipper. ORCHIDACEAE. Orchis family.

The rhizome and roots have been described as tonic, stimulant, and diaphoretic. N. F. 4.

*Dirca palustris* L. Wicopy. THYMELAEACEAE. Mezereum family.

The berries are said to be narcotic and poisonous. The bark is purgative and emetic and when fresh vesicant.

*Epilobium angustifolium* L. Great willow-herb. ONAGRACEAE. Evening primrose family.

The plant is tonic, astringent, demulcent, and emollient.

*Erigeron canadensis* L. Horseweed. COMPOSITAE. Composite family.

The plant is diuretic, tonic, and astringent.

*Eupatorium maculatum* L. Spotted boneset. COMPOSITAE. Composite family.

The dried leaves and flowering tops are used to prepare a domestic diaphoretic tea. N. F. 4.

*Fragaria virginiana* Duchesne. Wild strawberry. ROSACEAE. Rose family.

The leaves are slightly astringent; the roots diuretic.

*Gaultheria procumbens* L. Wintergreen, Checkerberry. ERICACEAE. Heath family.

The leaves are aromatic and astringent.

*Geranium maculatum* L. Cranesbill. GERANIACEAE. Geranium family.

The rhizome is an absolute intestinal astringent. N. F. 4.

*Heracleum lanatum* Michx. Cow parsnip, beaver root. UMBELLIFERAE. Parsley family.

The leaves and roots are rubefacient; the root is said to be carminative and stimulant.

*Koelia virginiana* (L.) MacM. Virginia thyme. LABIATAE. Mint family.

The plant is diaphoretic, carminative, and tonic.

*Lactuca canadensis* L. Wild lettuce. COMPOSITAE. Composite family.

The juice of the plant is said to be mildly narcotic.

*Larix laricina* (DuRoi) Koch. Tamarack. PINACEAE. Pine family.

The bark is said to be laxative, tonic, diuretic, and alterative.

*Ledum groenlandicum* Oeder. Labrador tea. ERICACEAE. Heath family.

The leaves are expectorant and tonic. They are said to have been employed instead of tea leaves during the Revolutionary War.

*Leptandra virginica* (L.) Nutt. Culver's-root. SCHROPHULARIACEAE. Figwort family.

The rhizome and roots are alterative, cholagogue, and cathartic. N. F. 4.

*Nepeta cataria* L. Catnip. LABIATAE. Mint family.

The leaves and flowering tops have long had a domestic use as a mild stimulant and tonic and as an emmenagogue.

*Nymphaea americana* (Prov.) Miller & Standley. Pondlily. NYMPHAEACEAE.

Waterlily family.

The rhizome of the closely related species *Nymphaea advena* is astringent and demulcent.

*Osmorrhiza claytoni* (Michx.) Clarke. Sweet cicely. UMBELLIFERAE. Parsley family.

The root of the closely related *Osmorrhiza longistylis* is aromatic, carminative, and stomachic.

*Ostrya virginiana* (Mill.) Koch. American hop hornbeam. BETULACEAE. Birch family.

The bark and inner wood are antiperiodic, tonic, and alterative.

- Plantago major* L. Large plantain. PLANTAGINACEAE. Plantain family.  
The roots and leaves are alterative, diuretic, and antiseptic.
- Populus balsamifera* L. Balsam poplar. SALICACEAE. Willow family.  
The leaf buds are resinous, aromatic, and expectorant.
- Populus tremuloides* Michx. American aspen. SALICACEAE. Willow family.  
The bark is tonic and febrifuge.
- Potentilla palustris* (L.) Scop. Marsh five-finger. ROSACEAE. Rose family.  
The roots are bitter and astringent, but do not appear to have been used in medicine.
- Prunus serotina* Ehrh. Wild black cherry. ROSACEAE. Rose family.  
The dried bark is tonic, sedative, pectoral, and astringent. U. S. P. IX.
- Prunus virginiana* L. Chokecherry. ROSACEAE. Rose family.  
The fruit is very astringent.
- Psoralea argophylla* Pursh. LEGUMINOSAE. Pea family.  
The root and leaves of several species of *Psoralea* appear to possess the properties of a mild, stimulating, bitter tonic.
- Pulsatilla hirsutissima* (Pursh) Britton. Pasque flower. RANUNCULACEAE. Crowfoot family.  
The plant has been recommended as an alterative, sedative, and antispasmodic. N. F. 4.
- Quercus rubra* L. Red oak. FAGACEAE. Beech family.  
Oak bark is slightly tonic, powerfully astringent and antiseptic.
- Rhus glabra* L. Smooth sumac. ANACARDIACEAE. Cashew family.  
The dried ripe fruits are astringent and refrigerant. N. F. 4.
- Rubus strigosus* Michx. Wild red raspberry. ROSACEAE. Rose family.  
The juice of the ripe fruits is used for flavoring. N. F. 4.
- Rudbeckia laciniata* L. COMPOSITAE. Composite family.  
The herb is said to be diuretic, tonic, and balsamic.
- Rumex crispus* L. Yellow dock. POLYGONACEAE. Buckwheat family.  
The root is astringent, slightly tonic and has been supposed to have alterative properties. N. F. 4.
- Sanguinaria canadensis* L. Bloodroot. PAPAVERACEAE. Poppy family.  
The rhizome and roots are irritant and narcotic, expectorant in small doses, but in large doses nauseant and emetic. U. S. P. IX.
- Sanicula canadensis* L. Black snakeroot. UMBELLIFERAE. Parsley family.  
The root is said to be astringent, antispasmodic, and antiperiodic.
- Silphium perfoliatum* L. Cup-plant. COMPOSITAE. Composite family.  
The plant is tonic, diaphoretic, and diuretic.
- Solidago rigida* L. Goldenrod. COMPOSITAE. Composite family.  
The herb is astringent and styptic.
- Solidago rigidiuscula* Porter. Goldenrod. COMPOSITAE. Composite family.  
Supposed to have properties similar to the preceding species.
- Stachys palustris* L. Woundwort. LABIATAE. Mint family.  
The herb is said to be expectorant and vulnerary.
- Stellaria media* (L.) Cyrill. Common chickweed. CARYOPHYLLACEAE. Pink family.  
The leaves appear to be a cooling demulcent.



*Symphoricarpos albus* (L.) Blake. Snowberry. CAPRIFOLIACEAE. Honeysuckle family.

The root is alterative and tonic.

*Tanacetum vulgare* L. Tansy. COMPOSITAE. Composite family.

The leaves and tops are tonic, emmenagogue and diaphoretic.

*Taraxacum officinale* Weber. Dandelion. COMPOSITAE. Composite family.

The rhizome and roots are used as a bitter tonic and as a mild laxative. U. S. P. IX.

*Thuja occidentalis* L. Arborvitae. PINACEAE. Pine family.

An extract prepared from the leafy young twigs has been recommended as a febrifuge, expectorant, and anthelmintic. N. F. 4.

*Trillium grandiflorum* (Michx.) Salisb. LILIACEAE. Lily family.

The rhizome has been used as an astringent and tonic expectorant.

*Tsuga canadensis* (L.) Carr. Hemlock. PINACEAE. Pine family.

Canada pitch obtained from this tree is a gentle rubefacient.

*Urtica gracilis* Ait. Nettle. URTICACEAE. Nettle family.

Several related species of nettle have been used in medicine as local irritants and as diuretics.

*Viburnum acerifolium* L. Arrow-wood. CAPRIFOLIACEAE. Honeysuckle family.

The bark was formerly used as an astringent.

*Zanthoxylum americanum* Mill. Prickly ash. RUTACEAE. Rue family.

The bark is sialagogue, stimulant, alterative, and emetic. U. S. P. IX.

#### PRINCIPAL ACTIVE MEDICINAL CONSTITUENTS OF PLANTS USED BY THE CHIPPEWA

*Abies balsamea*. Constituents: A true turpentine consisting of 24 parts essential oil and 60 parts resin. By fractional distillation the oil has been resolved into bornyl or terpinyl acetate, pinene, and a fragrant oil resembling oil of lemon.

*Achillea millefolium*. Constituents: A blue volatile oil containing cineol and a bitter principle, achillein.

*Acorus calamus*. Constituents: The rhizome yields a volatile oil which has the composition of a terpene.

*Actaea rubra*. Constituents: Two resins which have a physiological action resembling that of the active principles of *Cimicifuga* and *Helleborus*.

*Alnus incana*. Constituents: Tannin, volatile oil, and resins.

*Apocynum androsaemifolium*. Constituents: Resins, caoutchouc, a volatile oil, and a bitter principle consisting of the glucosides apocynamarin, apocynein, androsin, and the glyceride androsterin.

*Aralia nudicaulis*. Constituents: An acrid resin, and aralin, a yellowish glucoside.

*Aralia racemosa*. Constituents: Same as *A. nudicaulis*.

*Arctium minus*. Constituents: Inulin, sugar, volatile oil, and a bitter glucoside.

*Arctostaphylos uva-ursi*. Constituents: Tannic acid, gallic acid, gum, resin, urson, arbutin, and ericolin.

*Artemisia absinthium*. Constituents: A volatile oil and absinthin, a bitter principle.

*Artemisia dracunculoides*. Constituents: (?)

*Asarum canadense*. Constituents: A phenol  $C_6H_2O_2$ , pinene, a blue oil, a lactone, palmitic acid, acetic acid, and a mixture of fatty acids and oleoresin.

- Asclepias incarnata*. Constituents: A volatile oil, resins, and the glucoside asclepiadin.
- Asclepias syriaca*. Constituents: Similar to those of *A. incarnata* and in addition asclepiion.
- Athyrium filix-foemina*. Constituents: The active principle resembles filicic acid.
- Bursa bursa-pastoris*. Constituents: A volatile oil identical with that of mustard, and the alkaloid bursine.
- Caltha palustris*. Constituents: Berberin and an alkaloid similar to nicotine.
- Caulophyllum thalictroides*. Constituents: Resins, a substance similar to saponin, and the glucoside leontin.
- Celastrus scandens*. Constituents: A volatile oil and celastrin.
- Cirsium arvense*. Constituents: A volatile alkaloid and the glucoside cnicin.
- Cornus alternifolia*. Constituents: Cornine.
- Cypripedium hirsutum*. Constituents: A volatile oil and the glucosidal resinoid, cypripedin.
- Diervilla lonicera*. Constituents: Alkaloid believed to be narceine; a glucoside similar to fraxina in *D. lutea*.
- Dirca palustris*. Constituents: Undetermined.
- Epilobium angustifolium*. Constituents: Undetermined.
- Erigeron canadensis*. Constituents: A volatile oil.
- Eupatorium maculatum*. Constituents: Undetermined.
- Fragaria virginiana*. Constituents: The glucoside fragarianin.
- Gaultheria procumbens*. Constituents: A volatile oil containing the terpene gaultherilene and methyl salicylate.
- Geranium maculatum*. Constituents: Tannin.
- Heracleum lanatum*. Constituents: A volatile oil.
- Kocllia virginiana*. Constituents: (?)
- Lactuca canadensis*. Constituents: The bitter principle lactucin, lactucic acid, lactucopicrin, lactucerin, and a volatile oil.
- Larix laricina*. Constituents: A volatile oil which contains pinene, larixine, and the ester bornylacetate.
- Ledum groenlandicum*. Constituents: The glucoside ericolin.
- Leptandra virginica*. Constituents: The glucoside leptandrin.
- Nepeta cataria*. Constituents: A volatile oil.
- Nymphaea americana*. Constituents: Undetermined.
- Osmorrhiza claytoni*. The related species *O. longistylis* yields a volatile oil composed chiefly of anethol.
- Ostrya virginiana*. Constituents: Undetermined.
- Plantago major*. Constituents: Not well known.
- Populus balsamifera*. Constituents: Chrysin, tetrochrysin, salicin, populin, resin and a volatile oil.
- Populus tremuloides*. Constituents: See *P. balsamifera*.
- Potentilla palustris*. Constituents: A bitter principle, mucilage and tannins.
- Prunus serotina*. Constituents: A glucoside.
- Prunus virginiana*. Constituents: A glucoside.
- Psoralea argophylla*. Constituents: (?)
- Pulsatilla hirsutissima*. Constituents: A volatile oil containing a camphor.
- Quercus rubra*. Constituents: Tannic acid, a terpene, resin and quercitrin.
- Rhus glabra*. Constituents: Tannic acid and gallic acid.
- Rubus strigosus*. Constituents of fruit: Citric and malic acids.
- Rudbeckia laciniata*. Constituents: (?)

- Rumex crispus*. Constituents: Tannin, albumen and iron.
- Sanguinaria canadensis*. Constituents: The alkaloid chelerythrine, sanguinarine, gamma-homochelidonine and protopine.
- Sanicula canadensis*. Constituents: A resin and an essential oil.
- Silphium perfoliatum*. Constituents: Undetermined.
- Solidago rigida*. Constituents: A volatile oil.
- Solidago rigidiuscula*. Constituents: A volatile oil.
- Stachys palustris*. Constituents: An aromatic substance and an alkaloid.
- Stellaria media*. Constituents: Saponin.
- Symphoricarpos albus*. Constituents: Invertin, a glucoside and emulsin.
- Tanacetum vulgare*. Constituents: The bitter principle tanacetin and a volatile oil.
- Taraxacum officinale*. Constituents: The bitter principles taraxicin taraxacerin.
- Thuja occidentalis*. Constituents: The coloring matter thujin, the glucoside, penipicrin, and a volatile oil containing duto-pinene, laevo-fenchone and dextro-thujone.
- Trillium grandiflorum*. Constituents: Undetermined.
- Tsuga canadensis*. Constituents: Resin and a volatile oil which contains laevopinene and laevo-bornylacetate.
- Urtica gracilis*. Constituents: A volatile oil.
- Viburnum acerifolium*. Constituents: Probably viburnin and valerianic acid.
- Zanthoxylum americanum*. Constituents: Zanthoxylin and an alkaloid resembling berberine.

## PLANTS AS FOOD

The strength of the Chippewa in conquering the Sioux and establishing themselves in new territory indicates that they were well nourished, that suitable food was available, and that it was prepared in a proper manner. This was the work of the women, who were very industrious and bestowed much care on the provisioning of their households. A staple article of food was wild rice, which was seasoned with maple sugar or combined with broth made from ducks or venison. An important food value was obtained from maple sugar. Fish were extensively used, as the Chippewa, lacking horses, lived along the lakes and watercourses as much as possible. It is said that they had squash and pumpkins before the coming of the white man, and the country abounded in berries and wild fruit of many varieties. Thus it is seen that the Chippewa were a people subsisting chiefly on vegetable products and fish, though they secured deer and other animals by hunting. The making of gardens was an important phase of the industrial year, and a portion of the food thus obtained was stored in caches for winter use.

While the present chapter concerns the use of vegetable foods it may be added that fish were stored by drying and by freezing; and that meat was dried, after which it usually was pounded and mixed with tallow for storage. The Chippewa cooked and ate all trapped animals except the marten. Rabbits were caught in snares and formed a valuable food during the winter months. Deer and moose were available, and bear meat was liked because it was so fat. The bear was an especially useful animal, as all parts of it were either eaten or utilized.

## LIST OF PLANTS USED AS FOOD

Botanical name	Common name	Part of plant used
<i>Acer saccharum</i> Marsh	Maple	Sap.
<i>Amelanchier canadensis</i> (L.) Medic	Juneberry	Fruit.
<i>Arctostaphylos uva-ursi</i> (L.) Spreng	Bearberry	Fruit.
<i>Asarum canadense</i> L	Wild ginger	Root.
<i>Asclepias syriaca</i> L	Common milkweed	Flowers.
<i>Aster</i> species	Aster	Leaves.
<i>Chiogenes hispidula</i> (L.) T. & G	Creeping snowberry	Leaves.
<i>Cornus canadensis</i> L		Fruit.
<i>Corylus americana</i> Walt	Hazel	Nut.
<i>Crataegus</i> species	Thornapple	Fruit.
<i>Cucurbita maxima</i> Duchesne	Squash	Fruit.
<i>Cucurbita pepo</i> L	Pumpkin	Fruit.
<i>Falcata comosa</i> (L.) Kuntze	Wild bean or "Hog peanut."	Root.
<i>Fragaria virginiana</i> Duchesne	Strawberry	Fruit.
<i>Gaultheria procumbens</i> L	Wintergreen	Leaves.
<i>Helianthus tuberosus</i> L	Jerusalem artichoke	Root.
<i>Koellia virginiana</i> (L.) MacM	Mountain mint	Flowers and buds.
<i>Ledum groenlandicum</i> Oeder	Labrador tea	Leaves.
<i>Lycopus asper</i> Greene	Bugleweed	Root.
<i>Oxycoccus macrocarpus</i> (Ait.) Pers	Cranberry	Fruit.
<i>Parthenocissus quinquefolia</i> (L.) Greene.	Woodbine (Virginia creeper).	Stalk and sap next the bark.
<i>Populus tremuloides</i> Michx	Poplar	Sap.
<i>Prunus americana</i> Marsh	Chokecherry	Twigs.
<i>Prunus serotina</i> Ehrh	Wild cherry	Twigs.
<i>Prunus virginiana</i> L	Chokecherry	Twigs.
<i>Quercus macrocarpa</i> Muhl	Bur oak	Fruit (acorns).
<i>Ribes triste</i> Pall	Red currant	Fruit.
<i>Ribes</i> species	Wild currant	Fruit.
<i>Rubus frondosus</i> Bigel. (?)	Blackberry	Fruit.
<i>Rubus strigosus</i> Michx	Red raspberry	Fruit.
<i>Sagittaria latifolia</i> Vahl	Arrowhead	Root.
<i>Scirpus validus</i> Vahl	Bulrush	Root.
<i>Tilia americana</i> L	Basswood	Sap next the bark.
<i>Tsuga canadensis</i> (L.) Carr	Hemlock	Leaves.
<i>Vaccinium angustifolium</i> Ait	Blueberry	Fruit.
<i>Viburnum pauciflorum</i> Pylaie	Highland cranberry	Fruit.
<i>Vitis cordifolia</i> Michx	Grape	Fruit.
<i>Zea mays</i> L	Corn	Fruit.
<i>Zizania palustris</i> L	Indian rice	Fruit.

MAKING MAPLE SUGAR<sup>2</sup>

The two most important vegetable foods were maple sugar and wild rice. The obtaining of these commodities was attended with much pleasure, though the temporary camps were busy and there was work for young and old. Each family or group of two or three families had its own sugar bush, as it also had its own part of the rice field, and the people went there in the early spring to make the year's supply of sugar. Two structures remained in the sugar camp from year to year. These were the birch-bark lodge in which the utensils were stored, and the frame of the lodge in which the sugar was made. (Pl. 31.) The former was generally round in shape, but the one visited by the writer was constructed with a "ridge pole" to give more room at the top. The latter was made in a substantial manner and consisted of a stout framework of poles covered with sheets of elm or cedar bark. Rolls of birch bark might, if desired, be substituted for the heavier bark on the roof. The size of the lodge varied with the number of families in the camp. The lodge visited by the writer was of average size, the length being 18½ feet, the width 19 feet 3 inches, and the height at the eaves 10 feet. There was an entrance at each end and a platform extended the entire length at each side. These platforms were about 5 feet wide, 12 to 18 inches high, and might be on one or both sides of the lodge. They were intended primarily for sleeping, but the edge next the fire was used for sitting and eating, after the bedding had been rolled and placed next to the walls of the lodge. If possible, the platform on one side was reserved for the sugar-making utensils. In a small lodge the platform might be on only one side, the utensils being placed on the ground at the opposite side of the lodge.

The fire space extended the length of the lodge beneath the ridge of the roof, and a large log of green wood was placed at each side of it. A structure for holding the kettles was erected above the fire space. This structure consisted of four heavy corner posts, 6 or 7 feet high, with crotches at the top. Between the crotches of the posts, crosswise of the lodge, were laid stout poles, upon which were poles laid lengthwise, and between these, over the fire, were placed the horizontal bars from which the kettles were suspended. Thus it was possible by moving the horizontal bars to place a kettle over any part of the fire. The largest kettles were hung in the center

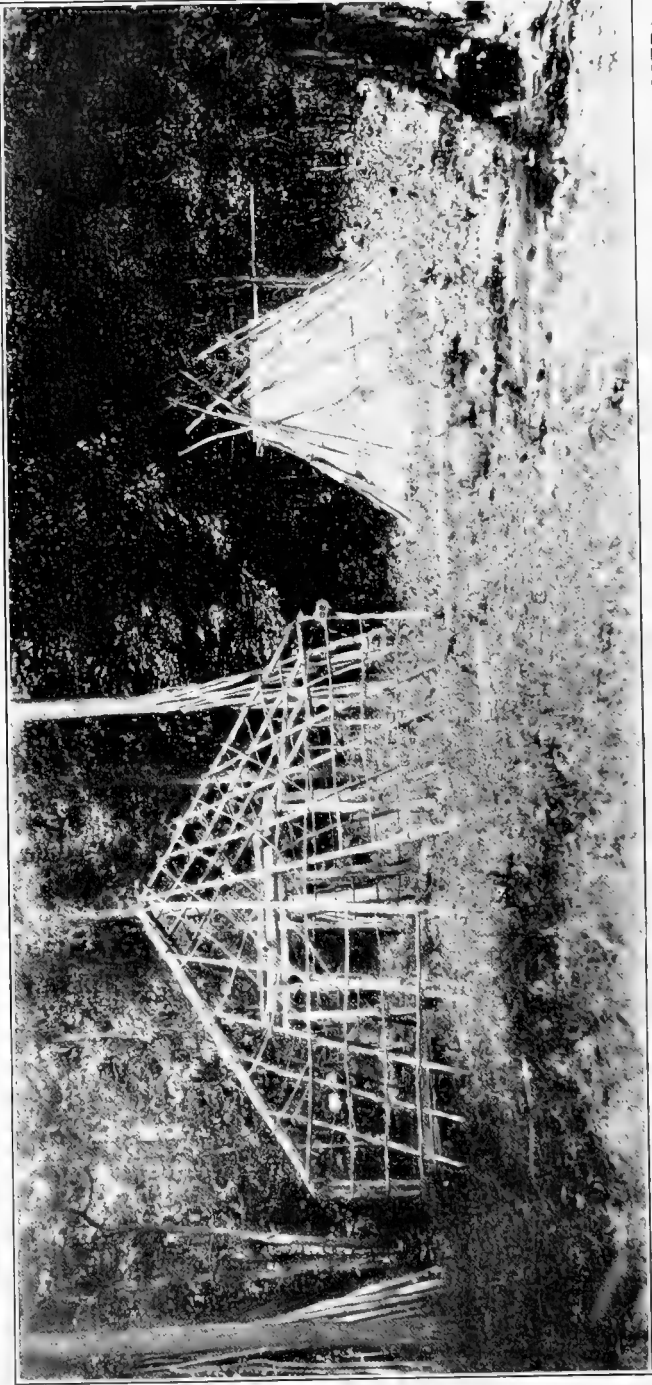
<sup>2</sup> It is said that "the primitive Indian method of making sugar before the introduction of metal kettles was to throw red-hot stones in vessels of bark or wood, or again, to freeze the syrup repeatedly in shallow basins and throw off the ice." Dr. V. Havard, U. S. A., "Drink plants of the North American Indians," Bulletin of the Torrey Botanical Club, Lancaster, Pa., 1896, vol. 23, no. 2, pp. 42-43.



*a*, CASS LAKE, MINN.



*b*, STREAM, WHITE EARTH, MINN.

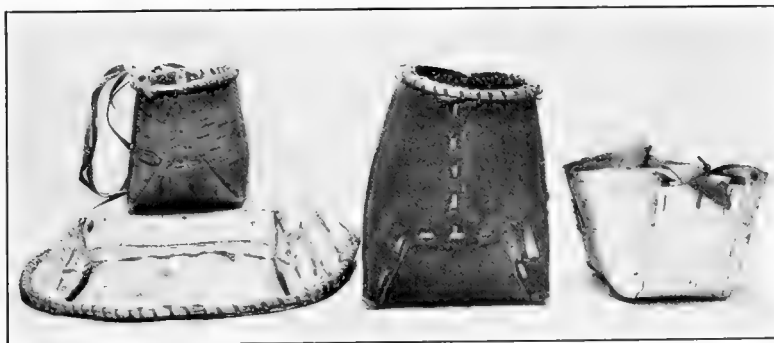


FRAME OF LODGE IN WHICH MAPLE SAP WAS BOILED, AND STORAGE LODGE FOR UTENSILS (CLOSED)

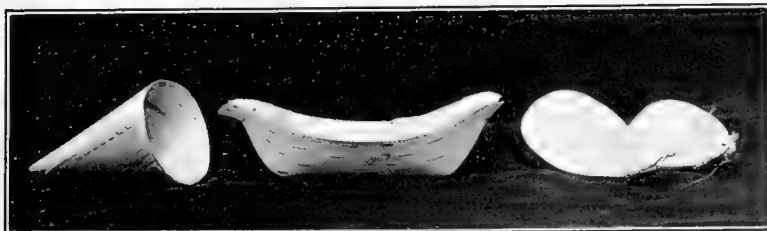




a, STORAGE LODGE (OPEN)



b, BIRCH-BARK CONTAINERS



c, BIRCH-BARK CONE, DISH, AND SPOONS



a. BOILING MAPLE SAP



b. MAPLE TREES TAPPED

of the lodge. They were suspended by strips of green bark, later by chains and iron hooks made by blacksmiths. The smaller kettles were placed over the ends of the fire, and usually were hung on wooden hooks made of tree crotches, ironwood being frequently used for this purpose.

To add to the comfort of the lodge, a double shelf was fastened to the side of the framework for holding small articles. This was placed near the door, where it could conveniently be reached by the mistress of the lodge.

The capacity or size of a sugar bush was not estimated by the number of maple trees but by the number of "taps," as it was not unusual to make two or three taps in a large tree. Nine hundred taps was an average size. The number of taps was reckoned by hundreds, the larger camps being mentioned as having 1,200 or 2,000 taps.

The season of sugar making began about the middle of March and lasted about a month. It is said that the best sugar was made when the early part of the winter had been open, allowing the ground to freeze deeper than usual, this being followed by deep snow. The first run of sap was considered the best. A storm usually followed the first warm weather, and afterwards the sap began to flow again. This sap, however, grained less easily than the first and had a slightly different flavor. Rain produced a change in the taste and a thunder-storm is said to have destroyed the characteristic flavor of the sugar.

The procedure of moving to the sugar camp depended somewhat upon the condition of the lodge. If repairs with sheets of heavy bark were needed, it was customary for the men to go early to the camp. The following account presupposes a lodge with birch-bark rolls as its roof covering. If such a lodge were in use the women went first to the camp, making their way on snowshoes through the forest. On their backs they carried the rolls of birch bark for the roof covering. These rolls were carried perpendicularly by a pack strap across the forehead. They were not heavy, but towered high above a woman's head.

Arriving at the camp, the women shoveled the snow away from the sugar lodge and soon made themselves comfortable. A ladder of tree branches was among the articles stored during the winter, and placing this against the framework of the lodge they ascended and spread their rolls of birch bark on the roof. On the platforms in the interior of the lodge they spread cedar boughs, if such were available, and on these were laid rush mats, over which were spread blankets and warm furs. The storehouse was opened, the great rolls of birch bark being turned back, one at a time, until beneath the weather-worn coverings were seen the heaps of bark dishes, makuks, and buckets, white outside and warm yellow within, others a soft gray or dulled by age to a rich mahogany color. (Pl. 32, *a.*) The

odor of balsam and dry sweet birch bark came from the lodge. There was also a supply of birch bark for making new utensils (pl. 32, *b*, *c*), if such were necessary. The material which the women brought with them from the winter camps depended, of course, on their knowledge of what had been left in the storing lodge the previous season.

Having opened this lodge, the women examined the utensils. The bark dishes for gathering sap were tied in bundles of 10 and placed upside down when stored. They were about 12 inches long. There were the makuks in which the sugar was stored, and utensils somewhat similar in shape, but provided with handles, thus resembling buckets. In these the sap was carried to the sugar lodge. The makuk varied in size from those holding a small quantity of sugar to those holding 100 pounds or more. Although birch bark was plentiful it was not wasted. Bark utensils were washed and dried at the close of each sugar making, and with this care could be used 5 or even 10 years. The women looked them over and mended with balsam gum any that needed repairing. The color of the sugar depended on the whiteness and cleanness of the utensils. They also made new utensils if necessary, using the supply of bark left in the lodge for that purpose. In addition to the birch-bark utensils there were troughs made of logs, basswood being commonly used for that purpose. Outside one or both entrances to the sugar lodge there was such a trough, into which the sap was poured from buckets. Some of these troughs would hold several barrels of sap. They were covered with sheets of birch bark to keep out twigs and bits of moss. A trough was also used in the process of granulating the sugar. Certain utensils were commonly made of maple, among these being the large wooden spoons used in dipping the sap, the paddles with which the sirup was stirred, and the granulating ladles with the back of which the heavy sirup was worked into sugar.

When all arrangements were completed the women returned to the camp and prepared for the removal of their families and household equipment. These were carried on either toboggans or sleds, drawn usually by dogs. Among the articles that were not stored but carried each year to the camps were the large brass kettles for boiling the sap. Small children or members of the family too feeble to walk were placed comfortably on the sledges among the packs. The women carried the smallest children on their backs, and the party started for the annual sugar making.

On arriving at the sugar camp it was sometimes necessary to erect a tipi for temporary use, while the men repaired the structure for holding the kettles. Great care was taken to have this in perfect condition, as the fall of a kettle would be a serious accident in a lodge. The tapping of the trees was begun as soon as the people took up their abode in the sugar lodge, provided the sap was running at that

time. Tapping was done only by those who were expert in the use of an ax, though women as well as men engaged in the task. (Pl. 33, *b.*) The trees were arranged in paths so that the collecting of the sap could be conveniently done. A good worker could make 300 tappings in a day. The tapping consisted in making a diagonal cut in a tree about  $3\frac{1}{2}$  inches long and about 3 feet from the ground. Below the lower end of this cut the bark was removed in a perpendicular line for a distance of about 4 inches. A wooden spile was inserted below this point. The wooden spiles were commonly made of slippery elm and were about 6 inches long, 2 inches wide, and curved on the under surface. The distance of a spile below the cut in a maple tree depended on the grain and hardness of the wood. If it were inserted too near the cut there was danger that the wood might split. The cut in which the spile was inserted could be made with an ax, or with a tool resembling a curved chisel, which was pounded into the tree and removed for the insertion of the wooden spile.

The sap dishes were distributed in the early morning, being placed on the ground or the snow beneath the taps. If the weather were cold the sap did not run during the night, and accordingly in the late afternoon when it stopped running the people began to gather it, pouring from the dishes into bark pails carried by the women, or large buckets carried by the men. In the very large camps it was sometimes necessary to have barrels stationed at a distance from the sugar lodge, and to fill them and haul them on sleds. A shoulder yoke enabling a man to carry two buckets was used among the Chippewa to some extent, but it is said that the use of the yoke was learned from the French, and did not represent a native custom.

When the sap was taken to the camp it was put into the kettles or poured into the troughs at the doors. The large kettles were at first filled only partially, the sap being heated in the smaller kettles near the ends of the fire and emptied from these into the large kettles, in which the actual boiling was done. By this means the entire quantity of sap was heated gradually. (Pl. 33, *a.*)

All night the fires were kept burning and the kettles boiling, certain people taking turns in watching them. If a kettle boiled too rapidly a branch of spruce attached to a stick was dipped into the froth. The motion was little more than a brushing of the froth with the spruce, but the bubbling at once subsided. By early morning the sirup was slightly thickened and ready to strain. In the old days a mat woven of narrow strips of basswood bark was placed over an extra kettle, and the sirup was strained through this mat, being dipped from the kettle with large wooden spoons. In more recent times the sirup is slowly strained through a burlap, and it is said that a clean threadbare white blanket was occasionally used for this

purpose. Straining completed this stage of the process of sugar making.

The "sugaring off" was postponed until a day when there was a storm, or when the sap boiling was discontinued.

Before replacing the sap in the kettles they were thoroughly cleaned, bunches of stiff rushes which commonly grow near sugar bush being used, and the kettles polished with them. All the utensils were washed and everything made ready for the final process, which required special care. The sirup was replaced in the kettles and slowly heated. When it became thick, small pieces of deer tallow were put in it. This was said to make the sugar soft and not brittle. A maple-wood paddle was used in stirring the sirup, and when it had thickened to the proper consistency it was quickly transferred to the granulating trough, where it was again stirred with a paddle, and at the proper time "rubbed or worked" with the back of the granulating ladle, or in some instances pulverized by hand. This had to be done very rapidly before the sugar cooled too much. The stirring of the thick sirup and the granulating was a heavy task, and it was not unusual for men to assist in the work. From the granulating trough the warm sugar was poured into makuks. (Pl. 34.)

Granulated sugar, however, was not the only form into which maple sap was converted. When the reboiling for sugar was begun it was customary to pour some of the thick sirup into small containers where it hardened solidly. (Pl. 35.) Little cones were made of birch bark and fastened together with strips of basswood bark so that the group resembled a cluster of berries. These cones filled with sugar were a favorite delicacy among the children. The upper mandible of a duckbill was similarly filled, several of these being fastened together in a row by a little stick. Little birch-bark dishes of the shape commonly used for all purposes were also filled, and sugar cakes were made in fancy shapes, the molds being cut from soft wood and greased before the sirup was put into them so that it could easily be taken out. These molds were in shape of various animals, also of men, and of the moon and stars, originality of design being sought. A product called gum sugar was highly prized. This was a sticky substance and was kept in packets of birch bark tied with basswood bark. In making the latter delicacy the sirup was taken from the kettle just before it was ready to grain. It was then poured on snow and not stirred. When cold it was placed in the birch-bark wrapping.

As already stated, the last run of sap had a different taste than the first and grained less easily. This was boiled as thickly as possible and placed in makuks. Sometimes these makuks were buried in the ground and covered with bark and boughs to keep the contents

cool during the summer so that it would neither become sour nor freeze. Makuks of this substance were often placed in the storing lodge of a sugar camp where the women could get them at any time. If left an entire year, the women, on returning to the sugar camp, found it as fresh as when placed in storage.

The uses of maple sugar were many and varied. It was used in seasoning fruits, vegetables, cereals, and fish. It was dissolved in water as a cooling summer drink and sometimes made into sirup in which medicine was boiled for children. The granulated sugar and the sugar cakes were commonly used as gifts, and a woman with a goodly supply of maple sugar in its various forms was regarded as a thrifty woman providing for the wants of her family.

A pleasing diversion of the young people was the making of birch-bark transparencies, described on pages 390-396.

A Chippewa living in Canada where there are few maple trees said that his people tap the white birch trees and boil the sap into sirup. He said that the sap of these trees does not run as long as maple sap.

#### GATHERING WILD RICE

Wild rice constitutes the chief cereal food of the Chippewa. It abounds in certain lakes, ripening earliest in the shallow lakes fed by streams and later in the lakes fed by springs. The soil of some lakes seems to produce more rice and larger kernels than that of other lakes. By a wise provision of nature the seed of the rice is carried by wild ducks, which also afford food for the people at the season when the rice is ripe.

In the old days each family or small group of families had a portion of a rice field, as it had a "sugar bush" for making its maple sugar. The portion of a rice field was outlined by stakes, and a woman established her claim to it by going to the field about 10 days before the rice was ripe and tying portions of it in small sheaves. Basswood fiber is used without twisting for the tying of rice. One length is tied to another, making a large hard ball that unwinds from the middle. The ball is placed in a tray behind the woman as she sits in the canoe. For this work she wears a special waist (pl. 36, *a*), which, with the care of Chippewa women, is reenforced on the shoulder where the basswood fiber passes through a little birch-bark ring. This method of carrying the "twine" keeps it ready to her hand and free from becoming tangled. (Pl. 36, *b*.) She draws a little group of rice stalks toward her with the "rice hoop" (pl. 37) and winds the fiber around them, bending the tip of the sheaf or bundle down to the stalks. The process in detail is shown in Plate 38. The rice is left standing until ripe, when the sheaf is untied, the rice shaken out,

and kept separate from the rest of the crop. (Pl. 39.) It has a slightly different flavor than other rice and the kernels are said to be heavier, requiring longer boiling.

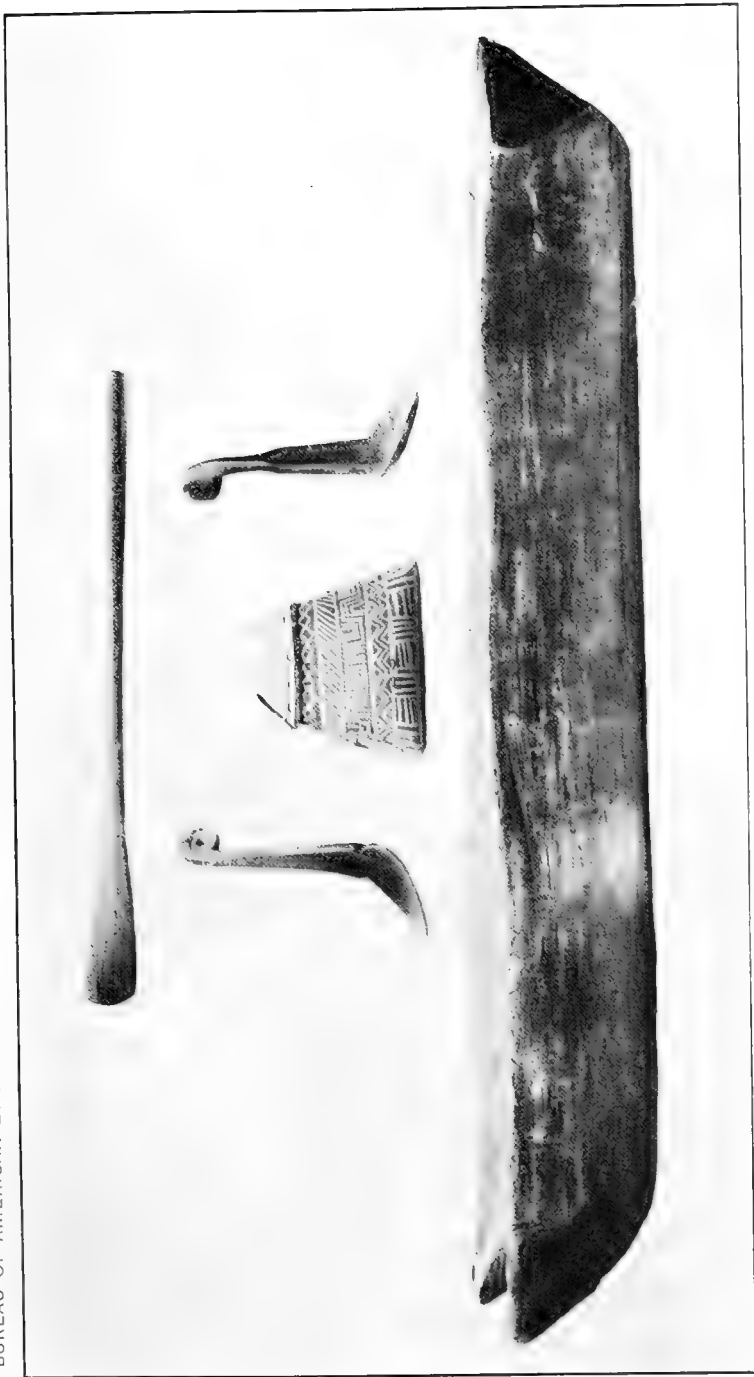
When the time came for harvesting the rice a camp was established on the shore of a lake where rice was abundant. (Pl. 40, *a.*)

In this, as in the making of maple sugar, the unit was the family or group of immediate relatives, all of whom assisted in the process. Three rice camps were visited and photographed by the author during the harvest season. The equipment for "rice-making" comprised a canoe or boat with a propelling pole and two rice-beating sticks, one or more birch-bark rolls, the same size as for a wigwam cover, a kettle or tub for parching rice, and a peculiar paddle used for stirring the rice in the kettle; also a barrel sunk in the ground for the first pounding of the rice, and several pestles used for that purpose, several "winnowing trays" made of birch bark, and a small barrel sunk in the ground and having two bars beside it, this portion of the equipment being for "treading out" the final chaff from the rice. Receptacles for storing the rice were also provided, these in the older days being bags woven of cedar or basswood bark.

The manner of going through the rice field was by means of a canoe or boat pushed along by a pole forked at the end. (Pl. 40, *b.*) This was a heavy task and was usually performed by a man while a woman sat in the stern of the boat and harvested the rice.

In the early morning the canoes started for the rice field and did not return until about the middle of the afternoon, the time depending on the distance to be traveled. Sometimes the rice to be harvested was at the farther side of a lake, requiring considerable time to reach the spot. A canoeful of rice was considered a day's gathering. The harvesting of the "free rice" (that which had not been tied) was done by knocking the kernels off the stalk and allowing them to fall into the canoe. Two "rice-sticks" were used for this purpose. The stalks were bent down with one of them, and a sweeping but gentle stroke with the other stick liberated the kernels. (Pl. 40, *c.*) The rice at the right as well as the left of the boat was harvested in this manner, a woman using one hand as easily as the other in knocking off the kernels. It was considered a test of a good rice gatherer to free the ripe rice kernels without dislodging those which were unripe. Thus it was possible to go over the same part of a rice field several times at intervals of a few days, allowing time for more rice to ripen. It was not the intention, however, to harvest all the rice, a portion being allowed to fall into the water, or being sowed on the water as seed. The ideal weather for rice gathering was warm and still, as wind or rain dislodged the kernels.





GRANULATING TROUGH, STIRRING PADDLE, GRANULATING LADLES, AND MAKUK OF GRANULATED MAPLE SUGAR



*a*, CAKES OF MAPLE SUGAR AND MAKUK FILLED WITH SAME



*b*, STACKED DISHES AND EMPTY CONES, THE LATTER TO BE FILLED WITH SUGAR



a, WAIST WORN WHEN TYING RICE (BACK VIEW)



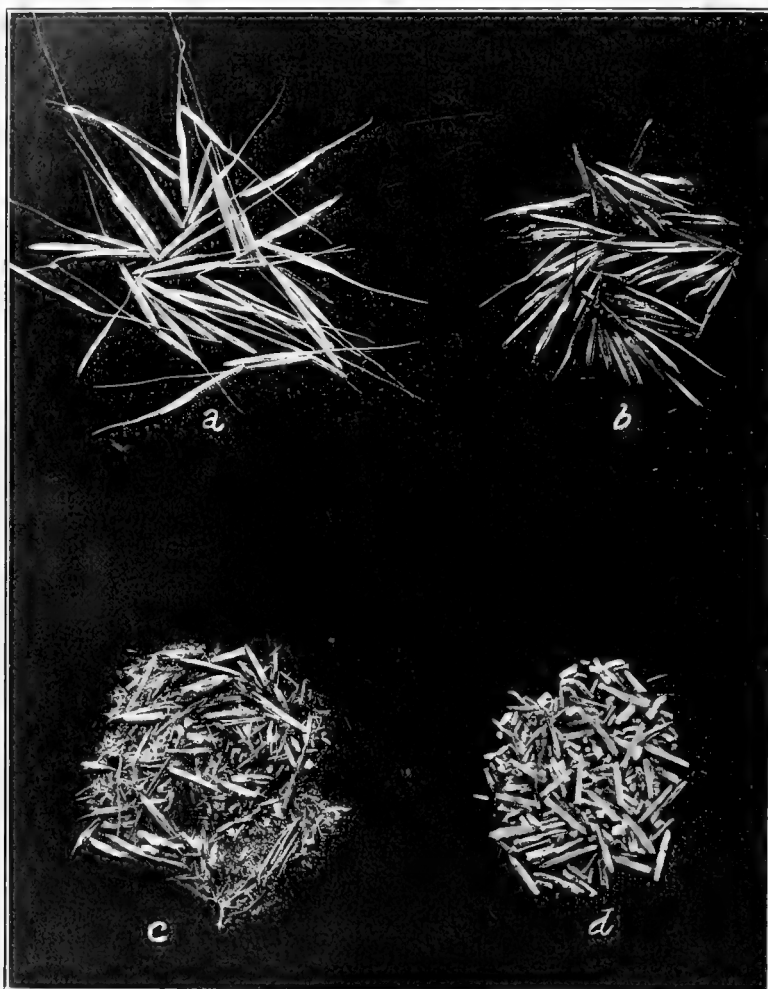
b, WOMAN IN BOAT, TYING RICE



TIED RICE AND RICE HOOP



PROCESS OF TYING RICE



TIED RICE, SHOWING STAGES OF PREPARATION



a, RICE FIELD



b, POLING BOAT THROUGH RICE



c, HARVESTING RICE



a. RICE SPREAD TO DRY



b. PARCHING RICE



c. MORTAR FORMERLY USED IN POUNDING RICE

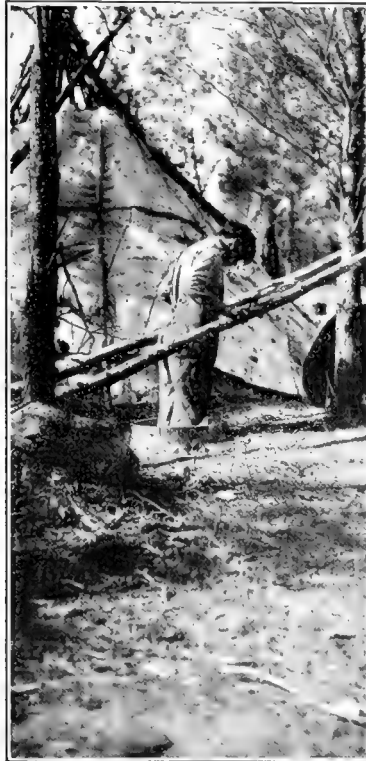




a, WINNOWING RICE



b, POUNDING RICE



c, TREADING RICE



a, PREPARED MEDICINAL  
SUBSTANCES TIED IN  
CLOTH



b, PACKET WRAPPED IN  
THIN BIRCH BARK



c, PACKETS OF LEAVES AND  
TWIGS READY FOR USE



d, PACKETS OF BARK  
READY FOR USE

In some camps the parching and threshing of the rice was done in the late afternoon and evening, and those who gathered the rice assisted in this portion of the work, but in a large camp this part of the process was carried on simultaneously with the gathering, those who remained in the camp parching and threshing while the rest were gathering.

When the canoes arrived the loads of rice were carried to the camp and spread on sheets of birch bark. (Pl. 41, *a*.) These had been placed where the sun would shine upon them, but not with such directness as to heat the rice, which was frequently stirred so it would be evenly dried. This was important, as at the season of rice gathering the nights are frequently cold with very hot sun in the middle of the day. About 24 hours was usually allowed for this preliminary drying, after which the rice was either parched in a kettle or dried over a slow fire. The first was the more common process, the rice being placed in a large kettle, or a metal tub, which was propped in a slanting position over the fire so that a woman seated beside it could stir the rice with a paddle. (Pl. 41, *b*.) The fire was carefully regulated and considerable skill was required to parch the rice without burning it. The quantity parched at a time was usually about a peck, and the required time about an hour. This parching loosened the husk and also imparted a flavor to the rice. The stirring paddle was slender and different in shape from that used with a canoe. The second is undoubtedly the oldest process, and produced what was known as "hard rice." This was greenish black in color, much darker than parched rice and requiring longer to cook. This rice could be kept indefinitely, and could be used for seed. In preparing "hard rice," a frame was made similar to that on which berries were dried. It was covered by a layer of hay on which the rice, either on stalks or in the husk, was spread to a depth of about 3 inches. A slow fire was kept burning beneath the frame. In this manner the rice was dried as vegetables or berries are dried.

The next process was the "pounding" of the rice. For this process the rice is frequently put into a barrel, but the best container for the purpose is a wooden mortar with sloping sides. (Pl. 41, *c*.) This was about the size of an ordinary barrel, and was made by the Indians and kept for this purpose. With this were used wooden pestles somewhat pointed at the end. In pounding the rice these moved up and down near the edge of the mortar, the pointed ends being adapted for this purpose. It is said these disturbed the kernels with the least breaking of the kernels. (Pl. 42, *b*.) Another form of a pestle was blunt at the end, nearly resembling a mallet. Both varieties were about 5½ feet long and in the correct pounding of the rice they were not heavily forced downward but allowed to drop

of their own weight. This process was supposed to loosen the husk entirely without breaking the kernel. If the work was done carefully, the rice kernel was entirely freed from the husk.

The rice was then winnowed, either by tossing it in a tray or by pouring it slowly from a tray to birch bark put on the ground. The place chosen for this work was a place where the breeze would assist the process by blowing away the chaff. (Pl. 42, *a.*)

The final step in the process was the treading of the rice to dislodge the last fragments of the husk. For this purpose a small wooden receptacle, holding about a bushel, was partially sunk in the ground, and on either side of it was placed a stout pole, one end of which was fastened to a tree about 4 feet above the ground, the other end resting on the ground. The treading was done by a man wearing clean moccasins, and the poles were for him to rest his arms upon during the process. (Pl. 42, *c.*) The sole of the foot was peculiarly adapted to this work, as the husks having been removed, the kernels would have been easily broken by wooden instruments. In treading rice the action resembles that of dancing, the entire body being in action, with the weight not heavily placed on the feet. Leaning on the poles, straightening to full height, or moving his body with undulating, sinuous grace, the treader accomplished his part of the task. It is said that in old times a hole was dug in the ground and lined with deerskin, the rice being placed in this instead of a barrel. The chaff from this treading was usually kept and cooked similarly to the rice, having much the flavor of the rice, and being considered somewhat of a delicacy.

The stored rice was sewn in bags of various sizes, which were somewhat similar in use to the makuks in which maple sugar was stored. On top of the rice was laid straw, and the bags, like the makuks, were sewed across the top with basswood twine.

While rice making was an industry essential to the food supply, it had, like the sugar camp, a pleasant social phase, which was appreciated by old and young. Thus the writer in driving through the rice country late one afternoon came upon a camp of three or four tipis. The rice gatherers had returned from the fields, and the men were sitting on rush mats and smoking while the younger women stirred two parching kettles and an older woman tossed a winnowing tray. At a fire one woman was preparing the evening meal and at a distance another was seen chopping wood. Dogs and little children were running about, and the scene with its background of pines and shining lake was one of pleasure and activity.

An important part of the camp was its provisioning. Indians did not carry many supplies with them, and it is probable that in the old days many carried no provisions to a rice camp except maple

sugar, which was used for seasoning all foods. At night the women set their fish nets and in the morning they drew them in, thus securing fish, some of which they dried. In one of the camps visited by the writer the top branches of a young Norway pine had been broken, and it was said that fish had been dried on these branches, the splinters forming a convenient frame. If ducks were available the hunters went out in the morning, and occasionally a deer was secured for the camp. The principal food, however, was the fresh rice, which was eaten either parched or boiled.

#### BEVERAGES

It is interesting to note that the Chippewa did not commonly drink water encountered in traveling but boiled it, making some of the following beverages from vegetable substances that were easily available. Fresh leaves were tied in a packet with a thin strip of basswood bark before being put in the water. (Pl. 43, *c*, at left.) Dried leaves could be used if fresh leaves were not available. The quantity was usually about a heaping handful to a quart of water. Beverages were usually sweetened with maple sugar and drunk while hot. The botanical name, common name, and portion of plant used are shown in the following list:

- Ledum groenlandicum* Oeder. Labrador tea. Leaves.
- Chiogenes hispidula* (L.) T. C. G. Creeping snowberry. Leaves.
- Gaultheria procumbens* L. Wintergreen. Leaves.
- Tsuga canadensis* (L.) Carr. Hemlock. Leaves.
- Picea rubra* (Du Roi) Dietr. Spruce. Leaves.
- Rubus strigosus* Michx. Red raspberry. Twigs.
- Prunus virginiana* L. Chokecherry. Twigs.
- Prunus serotina* Ehrh. Wild cherry. Twigs.

In preparing this last beverage the twigs of the chokecherry and wild cherry were tied in a little bundle by a strip of bark long enough to permit the lifting of the bundle and dropping it into hot water without burning the hand. The bundle of twigs for one infusion was about 4 inches long and each packet was perhaps 1 inch in diameter. (Pl. 43, *c*, at right.)

Maple sugar was dissolved in cold water and served as a drink in hot weather. This was offered to the writer and found to be pleasantly refreshing.

A Cass Lake informant said that his wife gathered all kinds of flowers and dried them in a wire basket, beginning with the first flowers in the spring and putting in a few of each variety as it appeared. He said that by the first of July she had more than twenty varieties. In the fall she pulverized them and stored them. A winter drink was made in the following manner: A quart of water was allowed to come to a boil and in it were placed a spoonful of

the powdered flowers and a tiny bit of red pepper. The water was then removed from the stove and the mixture allowed to steep a short time.

#### SEASONINGS

*Koellia virginiana* (L.) MacM. Mountain mint.

The flowers and buds were used to season either meat or broth.

*Arctostaphylos uva-ursi* (L.) Spreng. Bearberry.

The red berries of this plant were cooked with meat as a seasoning for the broth. The leaves were smoked (see p. 337).

*Asarum canadense* L. Wild ginger.

The root of this plant was regarded as an "appetizer," being put in any food as it was being cooked. It was also used for indigestion (see p. 342).

The silk of corn (called "corn hair") was dried before the fire and put in broth to season it. The corn silk was said to thicken the broth slightly as well as to impart a pleasing flavor.

Pumpkin blossoms were dried and used to thicken broth.

A Canadian Chippewa said that in old times his people had no salt and that more maple sugar was used as seasoning than the quantity of salt now used by white people. In the early days the Minnesota Chippewa had no salt and some of the older Indians have not yet acquired a taste for it. In a treaty known as the "Salt Treaty,"<sup>3</sup> concluded at Leech Lake, August 21, 1847, with the Pillager Band of Chippewa, there was a stipulation that the Indians should receive 5 barrels of salt annually for five years.

A sirup was sometimes made from the sap of the woodbine and wild rice was boiled in it to give an agreeable flavor.

#### CEREALS

*Zizania palustris* L. Indian rice.

Wild rice was the principal cereal food of the Chippewa, being cooked alone and also with meat or game. The manner of procuring it and the first processes of its preparation have already been described. The following are among the ways in which rice was cooked:

(a) Boiled in water and eaten with or without maple sugar.

(b) Boiled with meat.

(c) Grease was put in a kettle and the rice parched in the grease, after which it was seasoned with maple sugar. Dried blueberries were often combined with this, and the rice and berries stored for use on journeys.

(d) Rice (not parched) was stored with dried blueberries during the winter and the two were cooked together in the spring.

<sup>3</sup> A compilation of all the treaties between the United States and the Indian tribes, now in force as laws. Washington, 1873, p. 212.

(e) Rice (parched when gathered) was prepared as follows: Boiling broth, either of meat or fish, was poured over parched rice, which was then covered and allowed to "steam" for a time until softened.

(f) The chaff from the treading of the rice was cooked similarly to the rice and was considered a delicacy.

*Zea mays* L. Corn.

Corn was cultivated in gardens by the Chippewa and prepared for use as follows:

(a) Fresh ears were roasted in the husks.

(b) The corn was cut before it was fully ripe. It was then shelled and dried by spreading it on sheets of birch bark. This was boiled and seasoned with maple sugar.

(c) The husks were turned back and the corn dried by suspending the ears by the husks from the ceiling.

(d) Corn was parched in a hot kettle, some of the kernels popping open and others drying. The corn was then put in a leather bag, laid on a flat stone, and pounded with another stone until it was like meal. This was made into "parched corn soup," to which deer tallow or deer meat, either fresh or dried, was added.

(e) Corn was made into "hominy." A lye was first made from hardwood ashes. The corn was boiled in this, rinsed, and boiled in clear water. Bones were sometimes boiled with it, and grease was added as seasoning. In addition to using the corn, the water in which it was boiled was considered very palatable.

#### VEGETABLES

Pumpkins and squashes were cultivated in gardens and either eaten fresh or cut in pieces or in strips for drying. These were laid on frames or were strung on long pieces of basswood cord and hung above the fire where the drying was slowly accomplished. They were stored in bags and sometimes kept for two years. Dried squash and pumpkin were boiled with game, or boiled alone and seasoned with maple sugar. The flowers of the latter were dried and used in broth for seasoning and also for thickening.

Other vegetable foods were obtained without cultivation, among them being the following:

*Helianthus tuberosus* L. (The original of the cultivated Jerusalem artichoke.)

The root of this plant was eaten raw like a radish.

*Sagittaria latifolia* Willd. Arrowhead.

This is commonly called the "wild potato," and grows in deep mud. At the end of the tubular roots are the "potatoes" which are

gathered in the fall, strung, and hung overhead in the wigwam to dry. Later they are boiled for use.

*Lycopus asper* Greene. Bugleweed.

These were called "crow potatoes" and were dried and boiled.

Moss growing on white pine.

The moss was dried and stored. When used it was "put in water to freshen it up," and it was then boiled and put in fish or meat broth. It was said to be very nourishing.

*Asclepias syriaca* L. Common milkweed.

The flowers were cut up and stewed, being eaten like preserves. It is said that this plant was sometimes eaten before a feast, so that a man could consume more food.

*Parthenocissus quinquefolia* (L.) Greene. Woodbine.

The stalk was cut in short lengths and boiled, then peeled. Between the outer bark and the wood there was a sweetish substance which was eaten somewhat after the manner of eating corn from the cob. The water in which the woodbine had been boiled was then boiled down to a sirup. If sugar were lacking, wild rice was boiled in this sirup to season it.

*Falcata comosa* (L.) Kuntze. Wild bean and hog peanut.

The root of this plant was boiled and eaten. It also had a medicinal value (see p. 289).

*Scirpus validus* Vahl. Bulrush.

On the root of these rushes there is a small bulb occurring at the turn of the root. If the rushes are pulled in midsummer this bulb has a sweetish taste and may be eaten raw.

*Aster* (species doubtful). Aster.

This plant grows near Lake Superior. The leaves are boiled with fish and eaten with the fish.

*Populus tremuloides* Michx. Aspen.

If the bark of the poplar is cut and turned back from the tree in the early summer there is found between the bark and the wood a sweetish sirup which can be put in birch bark and kept for a short time. This is especially liked by children and young people.

*Quercus macrocarpa* Muhl. Bur oak.

Sweet acorns (mĩtĩgo' mĩnũm) were frequently gathered in the late fall and buried for use in the winter or spring, or they could be used as soon as they were gathered. They were cooked in three ways: (1) They were boiled, split open, and eaten like a vegetable; (2) roasted in the ashes; (3) boiled, mashed, and eaten with grease. They were said to be especially good with duck broth.



*Tilia americana* L. Basswood.

The sap next the bark was used similarly to the woodbine sirup.

A Canadian Chippewa said that he peeled the outside bark from the poplar and also the white birch, and scraped the inner bark, obtaining a little sap which they put in a small makuk. He said that it had a sweetish taste and "would keep quite a while."

#### FRUITS AND BERRIES

*Crataegus* (species doubtful). Thornapple.

These were prepared by squeezing them in the hands, after which they were made into little cakes without cooking, dried on birch-bark and stored to be cooked in winter.

*Prunus virginiana* L. Chokecherry.

These were pounded, stones and all, between two stones, and dried similarly to the thornapples.

*Vitis cordifolia* Michx. Grape.

Eaten raw.

*Cornus canadensis* L. Bunchberry.

Berries eaten raw.

*Fragaria virginiana* Duchesne. Strawberry.

Berries eaten raw.

All the following berries were eaten raw as well as dried for winter use.

*Prunus serotina* Ehrh. Wild cherry.

*Ribes triste* Pall. Red currant.

*Ribes* species. Wild currant.

*Prunus americana* Marsh. Chokecherry.

*Rubus frondosus* Bigel (?). Blackberry.

*Rubus strigosus* Michx. Red raspberry.

The berries were cooked without sugar, spread on birch bark in little cakes and dried, the cakes then stored in a birch-bark makuk for winter use.

*Amelanchier canadensis* (L.) Medic. Shadbush.

These are called "Juneberries" by the Chippewa and are found abundantly in their country. They are considered the simplest form of refreshment. "Take some Juneberries with you," is a common saying among the Chippewa. A certain song contains the words "Juneberries I would take to eat on my journey if I were a son-in-law."<sup>4</sup>

*Oxycoccus macrocarpus* (Ait.) Pers. Cranberry. Cooked, probably with sugar.

*Vaccinium angustifolium* Ait. Blueberry.

<sup>4</sup> Bull. 53, Bur. Amer. Ethn., song No. 169.

A Canadian Chippewa said that his people combined dried blueberries with moose fat and deer tallow.

All dried berries were boiled when used, and either seasoned with maple sugar or combined with other foods.

## PLANTS AS MEDICINE

### TREATMENT BY MEANS OF PLANTS

It must be conceded that the use of plants by the Indians was based upon experiment and study. The Indians say that they "received this knowledge in dreams," but the response of the physical organism was the test of a plant as a remedy. As the physical organism is the same in both races it should not be a matter of surprise that some of the remedies used by the Indians are found in the pharmacopœia of the white race. An observer of the Cree Indians writes: "Although the list of materia medica is a small one there is remarkable judgment shown in the choice of remedies. Thus . . . the bark of the juniper and Canada balsam tree are doubtless as good an application to wounds as a people unversed in antiseptic application and ignorant of the existence of bacteria could devise. The use of *Lobelia* as an emetic and of *Iris versicolor* as a cholagogue and purgative approaches closely to the practice of more civilized nations."<sup>5</sup>

Health and long life represented the highest good to the mind of the Chippewa, and he who had knowledge conducive to that end was most highly esteemed among them. He who treated the sick, by whatever means, claimed that his knowledge came from *manido* (spirits), and those who saw a sick man restored to health by that knowledge readily accepted its origin as supernatural.

Two methods of treating the sick were in use among the Chippewa.<sup>6</sup> Both methods depended upon what was termed "supernatural aid," but material remedies were used in one and not in the other. The "doctors" who used material remedies were usually members of the Midewiwin, and their remedies were among the secrets of that organization. He who treated the sick without material means was called a *djasakid* (commonly translated "juggler")<sup>7</sup> His procedure included the apparent swallowing and regurgitating of short tubular bones. (Pl. 46, *g.*)

It is a teaching of the Midewiwin that every tree, bush, and plant has a use. A country of such bountiful vegetation as that of the Chippewa presents a great amount of this material. Although the

<sup>5</sup> Holmes, E. M. (F. L. S.), "Medicinal plants used by the Cree Indians, Hudson's Bay Territory," *The Pharmaceutical Journal and Transactions*, 3d ser. vol. 15, pp. 303-304. London, 1884-85. See also *Bur. Amer. Ethn. Bull.* 61, p. 271.

<sup>6</sup> Cf. *Bur. Amer. Ethn. Bull.* 45, pp. 92-125; *Bull.* 61, pp. 244-278; *Bull.* 75, pp. 127-141.

<sup>7</sup> See *Bur. Amer. Ethn. Bull.* 45, pp. 119-125.

Midewiwin was a repository of knowledge of herbs it did not have a pharmacopœia accessible to every member. The remedies are individual, not general, and an individual when questioned invariably replies, "I can tell you about my own medicines. I do not know about other peoples' medicines nor their uses of the same plants." Thus it is frequently found that different people have different names and uses for the same plant. Members of the Midewiwin were not taught many remedies at once, except at the time of their initiation. Their instruction at that time comprised what might be termed a "ground work in the practice of medicine," with the identification and use of a number of plants. The same sort of instruction accompanied their advancement from one degree to another, and was made more extensive as they went into the higher degrees. Aside from these times of special instruction a man learned one or two remedies at a time as he felt inclined to go to the old men and buy the knowledge. Among the Chippewa, as among other tribes studied by the writer, it is not common for one man to treat a large number of diseases. A Sioux said:

"In the old days the Indians had few diseases, and so there was not a demand for a large variety of medicines. A medicine man usually treated one special disease and treated it successfully. He did this in accordance with his dream. A medicine man would not try to dream of all herbs and treat all diseases, for then he could not expect to succeed in all nor to fulfill properly the dream of any one herb or animal. He would depend on too many and fail in all. That is one reason why our medicine men lost their power when so many diseases came among us with the advent of the white man."<sup>7a</sup>

While many remarkable cures were said to have been wrought by the Mide remedies, it was said that if no improvement were seen in a reasonable time the treatment was usually discontinued, it being said that the medicine evidently would not "take hold" in that particular case. From this it seems possible that they recognized a self-limited, and also an incurable disease, and in such cases did not wish to raise the hopes of the patient.

The men and women who at the present time (1918) treat the sick by Mide remedies are well poised and keen eyed, with a manner which indicates confidence in themselves, and which would inspire confidence in the sick persons to whom they minister.

As already indicated, the medicinal use of herbs has been handed down for many generations in the Midewiwin. It is said that members of the Midewiwin "follow the bear path" in proceeding from a lower to a higher degree in the society and that some of the best Mide remedies were received from the bear. Thus one of the

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<sup>7a</sup> Bull. 61, Bur. Amer. Ethn., pp. 244-245.

strongest medicines in the accompanying series (*Apocynum sp.*) is known as a "bear medicine." The roots of the "bear medicine" were cut in pieces about 2 inches long and strung on a cord when stored for use. Such a string of roots bore some resemblance to a necklace of bear claws. In this connection we note that the bear was highly esteemed by the Sioux medicine men, two of whom made the following statements:

Two Shields said:

"The bear is the only animal which is dreamed of as offering to give herbs for the healing of man. The bear is not afraid of either animals or men and it is considered ill-tempered, and yet it is the only animal which has shown us this kindness; therefore the medicines received from the bear are supposed to be especially effective."

In somewhat similar manner Siyaka said:

"The bear is quick-tempered and is fierce in many ways, and yet he pays attention to herbs which no other animal notices at all. The bear digs these for his own use. The bear is the only animal which eats roots from the earth and is also especially fond of acorns, June berries, and cherries. These three are frequently compounded with other herbs in making medicine, and if a person is fond of cherries we say he is like a bear. We consider the bear as chief of all animals in regard to herb medicine, and therefore it is understood that if a man dreams of a bear he will be expert in the use of herbs for curing illness. The bear is regarded as an animal well acquainted with herbs because no other animal has such good claws for digging roots."<sup>8</sup>

The material in the following chapter was obtained from three classes of informants: (1) Those who are active adherents of the Mide but were willing to tell of its remedies in order that a record of them might be preserved for posterity; (2) those who have renounced the Mide but continue to use its remedies either personally or in treating sick persons; and (3) those who have never been members of the Mide but have received a knowledge of its remedies from relatives who were members of the society. Among the principal informants on this subject at White Earth were Mrs. Brunett, Mrs. Gagewin, and Mrs. Louisa Martin. (Pl. 44.)

In the old days a person would not transmit any facts concerning medicines to even a member of his own family without compensation, one reason for this restriction seeming to be a fear that the information would not be treated with proper respect. So great was the secrecy surrounding these remedies that names were seldom given to plants, the person imparting the information showing the fresh plant. It was difficult, if not impossible, to recognize a root after it had been dried and rubbed into shreds, but medicine men frequently

<sup>8</sup> Bull. 61, Bur. Amer. Ethn., p. 195.



a, MRS. BRUNETT



b, MRS. GAGEWIN



c, MRS. LOUISA MARTIN



BAG IN WHICH MEDICINES HAVE BEEN KEPT

combined an aromatic herb with their medicines as a precaution against their identification. The fact that persons were willing to impart their knowledge of these ancient remedies for publication indicates that the attitude of the Chippewa toward their old customs is passing away.

There seems to have been something symbolic in the appearance of certain medicinal roots. The writer showed a certain root to a medicine woman and asked her if she knew what it was. She replied that its use was familiar to her, but that she would have known it was a medicinal root if she had never seen it before. On being questioned further she said it was evidently an old root which had sent up a new stalk each year and had long roots extending downward. The stalk and the small roots were gone, but the life remained in the root itself, and this would be the part used for medicine. A class of plants highly valued as medicines are those having a divided tap root supposed to resemble the legs of a man. An example of this is spikenard. The medicine woman already quoted brought the writer a plant which she said she had hesitated a long time before showing. Her affection and admiration for the plant itself were evident as she caressed its straight stalk, delicate leaves, and fine white roots, reluctant at the last to part with it.

In some instances the fertile and sterile plants were considered separately. It will be noted that a remedy for dysentery stipulates that the flowering plant of *Artemisia dracunculoides* (mugwort) be used, and that in a decoction for strengthening the hair it is stated that a sterile plant of the same be used. The writer was informed of a remedy in which both sorts of "rattlesnake root" were used, but it was impossible at the time to secure specimens for identification.

Vegetable remedies were usually gathered in the late summer or early fall, when the plants are fully developed. At that season it was customary for the Chippewa to take journeys or to send to other localities to obtain plants which grew in various soils.

An unfailling custom of the Mide in gathering plants for medicinal use is to dig a little hole in the ground beside the plant and put tobacco in the hole, speaking meanwhile to the plant. Gagewin, who is a member of the Mide, said that when he dug a plant he spoke somewhat thus: "You were allowed to grow here for the benefit of mankind, and I give you this tobacco to remind you of this, so that you will do the best you can for me." This, of course, is only representative of part of such a speech. On one occasion the writer saw the tobacco put beside a tree whose bark was to be used. The medicine man was a member of the Otter Tail Band of Chippewa. He said this was commanded by the *manido*, who gave all knowledge of plants to the Chippewa. He seemed to require no other authority or reason.

The part of the plant most commonly used was the root. In a majority of instances the whole root was used, but in some plants the healing power was supposed to be strongest in a certain portion of the root. Thus in dogbane the part preferred was the elbow of the root, the plant having a root which descends straight downward for 15 to 18 inches and then turns sharply to one side. In other instances the part used was the fine white roots depending from the larger root.

If stalks, leaves, or flowers were to be used as remedies they were dried by hanging them with the top downward and kept as clean as possible. After being dried, each variety was tied or wrapped separately for storage. Bark was gathered when the sap was in the tree but roots intended for future medicinal use were gathered before the sap started in the spring or after it had gone down in the fall. An informant at Cass Lake said that roots were not washed, the dirt being carefully shaken from them, but informants at White Earth said the roots were washed. After drying, they were tied in packets and stored in bags unless it was desired to have some special root ready for immediate use. Such a root was pulverized and stored in that form. Certain roots, when used, were broken in short pieces and boiled or steeped, but a majority were prepared for use either by pounding until they were in shreds or by pulverizing them in the hands, the latter being always done if the roots were small. The most common method of pulverizing roots was to place them in the palm of the left hand and then to rub them either with the thick portion of the right hand below the thumb or with the fingers of the right hand. Some Chippewa used a small round stone for this purpose, the stone having a shallow depression in which the medicine was mixed by rubbing with the thumb. If several sorts of roots were to be used in combination they were usually "pounded together" before they were stored, in order that they might be fully blended. Mrs. English said that she was once in a lodge where the medicine men were pounding their medicines on a stone and putting them in little bags. A stuffed owl was placed beside them. After leaving the lodge she asked about the owl and the reply was, "They always have to have someone watch to see that they do it right."<sup>9</sup>

The detailed instructions given concerning medicines is shown by the following example. An informant at Red Lake said that her great-grandmother taught her the use of herbs. This informant described one remedy for a certain injury and said that if it were not effective she would use another plant which was about a foot high and had no flowers. (A specimen was obtained but it was not perfect

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<sup>9</sup>At a remote point north of Vermillion Lake, Minnesota, the writer visited the house of a medicine man and saw two owls (or owlskins) swinging from the branches of trees, suspended by a cord around their necks and drying. Several small animals were drying in other trees.



enough for identification.) She said, "The plant has a very long root and the leaves come up from joints of the root, not from the knuckle of the root which projects above the ground and is bare. I look for the knuckle or knob of the root and then look about 3 or 4 inches away for the leaves. The plant grows in soft ground, like that near a lake."

Medicinal barks were so generally available that they were usually gathered when they were needed. The barks of chokecherry and wild cherry, in quantity for one decoction, are shown in Plate 43, *d*, as they would be prepared for a patient.

As already stated, the roots and herbs were usually stored in bags. Some men used the square bags woven of yarn; others preferred bags woven of the inner bark of cedar. One old medicine man had a bag peculiarly adapted for holding medicinal roots. It was made of leather and was smaller at the top than at the bottom to preclude the possibility of dampness. The prepared pulverized roots could be kept in either birch bark or leather, the latter being preferred. A bag used for this purpose is shown in Plate 45. A packet of medicine tied in cloth ready to be delivered to a sick person is shown in Plate 43, *a*. This contains four vegetable substances pounded together and was said to be a sufficient quantity to make four liquid preparations of the remedy. This has no distinguishing mark, the ingredients being known only to the medicine man who prescribed the remedy. A medicine man, however, has various means of marking his herbs. One man identifies his prepared herbs by the knot in the string with which the packet is tied, the identification and use of the herbs being known only to himself.<sup>9a</sup>

The storing of roots in bags has already been noted and refers to a man's supply of roots and herbs for an entire season. Apart from this stored supply a member of the Mide usually carried a large number of medicines in his Mide bag. Sometimes he carried a small quantity of some particularly strong medicine in a buckskin bag, which was placed in the skull of the animal which formed his Mide bag. Poisons were not infrequently carried by the Mide, and they were instructed in their use. An instance was related of an aged man, a member of the Mide, who came to a lodge one winter night tired and cold. He said, "Never mind, I have some medicine which will soon warm me." He then took a packet from the skull of his Mide bag, put a little of the contents in water and drank it. A few moments later he said, "I have taken the wrong medicine; I shall die." And in a few hours he was dead.

In addition to the vegetable substances believed to have an effect when administered internally or externally there were herbs and roots believed to act by their presence independent of actual contact.

<sup>9a</sup> See Bull. 86, Bur. Amer. Ethn., Pl. 78, *b*.

These comprised substances which attracted (as love charms and the hunting or fishing charms); also those which repelled (as those which, carried on the person, were said to keep reptiles away); and those which acted as an antidote to "bad medicine" carried by another person. Among the latter is a certain plant the smoke of which was supposed to counteract the effect of poison placed where a person would step on it; also a combination of plants rubbed on the limbs of a dancer to counteract the effect of medicine worn by others with the intention of "tiring him out." Certain roots were also chewed for the same purpose. In some instances it was said that plants acted in both these ways, being worn as a protection, and taken internally as a healing agency. Such were some of the medicines carried by warriors. Certain remedies were used exclusively for horses, and some were used for both men and horses.

In addition to the special knowledge of plants held by the Mide, there was a general knowledge of the simpler remedies, each household having a supply of such herbs for common ailments. If these failed and the illness appeared to be serious, they sent for the man whom they believed to have the proper remedy.

The names of plants are of several sorts. Thus we note (1) names which indicate the place where the plant grows, as "prairie sturgeon plant"; (2) names which describe the appearance of the plant, as "squirrel tail" or "plump root"; (3) names which describe their taste, as "bitter root"; and (4) names indicating the part of the plant to be used, as "crow leaf." The names of the uses of a plant, or a designation of the remedy is sometimes given as the name of the plant itself, as (1) names indicating the use, as "head medicine"; (2) names indicating the origin of the remedy, as "Wina-bojo remedy"; and (3) names denoting the power of the remedy, as "chief medicine," which is applied to several highly esteemed plants. With such a system of nomenclature it is evident that plants of different species will have the same name and that in many instances a plant may be called by several different names. Thus the purple mint was given three names by as many people.

The manner of preparing roots has already been described. Stalks, leaves, and flowers were usually pulverized in a similar manner, though in one remedy it was prescribed that eight stems be used in 1 quart of water. If bark were to be used the outer skin was removed and the "inner bark" scraped or removed in long thin strips which were boiled, either with or without pulverizing. An informant said that the only regulation concerning the scraping was that the root of alder must be scraped toward the plant.

Vegetable substances were further prepared for use by combining them with water. Some were boiled a few moments, others were allowed to come to a boil, then removed from the fire, and others

were scalded or steeped. Some roots were boiled in a thin sirup made of maple sugar, to give a pleasant flavor. Poultices and compresses were made by moistening the pounded fresh or dry roots or herbs. The strength of a decoction varied with the nature of the root and the age of the patient. A common proportion was a "hand-hollow-ful" of pulverized root to about a quart of water, but some roots were exceedingly strong and required special direction. Thus one root (*calamus*), although only about one-eighth of an inch in diameter, was so strong that the quantity used was measured by the length of the patient's index finger, whether an infant or an adult.

It was the author's intention to collect herbs which have medicinal use when administered singly. This presented some difficulties, as the Chippewa use combinations of herbs, sometimes as many as 20 vegetable substances being combined in one remedy. One medicine woman who practices medicine widely for money at the present time called special attention to the value of herbs in combinations. She appeared to attach more importance to combinations than to specifics, except in instances of simple definite value. While the tabulated lists (pp. 336-367) contain some combinations it will be noted that almost without exception each herb is considered efficacious if used alone. In some instances the combination of the herbs shows an interesting and intelligent purpose.

The quantity for a decoction and the size of a dose were difficult to determine with any degree of accuracy. One medicine woman who was particularly careful in her statements brought the pail in which she usually prepared her remedies, and it was found to hold about a pint. It appeared that she prepared smaller quantities than other persons, as a majority said they prepared their medicines in a lard pail, filling it to within  $1\frac{1}{2}$  or 2 inches of the top. In the tabulated list of remedies the quantity of water is given as a quart, except in remedies prepared by the above-mentioned woman, for whose preparations a smaller amount is designated. Decoctions were usually boiled five or ten minutes. In only two instances (see pp. 339, 365) was there anything partaking of a ceremonial character in the preparing of liquid medicines, it being said that "the talking was all done when the roots were dug." In one of these instances there was something resembling a divination, the doctor watching the manner in which the powdered roots lay in the water and deciding thereby whether the medicine would be effective. The person who described this remedy was well versed in the ways of the Mide and said she had never heard of this being done in the preparation of any other remedy.

Liquid medicine was not measured when taken. A "large swallow" constituted an average dose, but a cupful was occasionally

taken. The interval between the doses varied, as might be expected among a people who in old times were without timepieces. If the patient were in great suffering he was told to take the medicine "at short intervals," understood to be about half an hour. In what was probably a majority of cases the patient took the medicine "at frequent intervals," or whenever he felt inclined. Sometimes he was instructed to "drink it freely," or drink some after an attack of coughing. These directions were given by the person who prepared the medicine, and who gave various other instructions, such as rest after taking the medicine, or abstinence from food. In a majority of cases it was expected that improvement, though perhaps slight, would be evident after three or four doses had been taken.

Remedies were administered externally in the following manner:

- (1) Fresh roots or leaves were macerated and applied.
- (2) Dried roots or leaves were pulverized, prepared in the form of a decoction, and applied.
- (3) Dried roots or leaves were pulverized, moistened, and applied like a poultice.
- (4) Dried roots or leaves were pulverized and strewn on hot stones, the treatment being by the fumes.
- (5) A decoction was sprinkled on hot stones, the treatment being by steam.
- (6) Herbs were boiled with grease for a salve.
- (7) Dried and powdered roots were mixed with grease and used as an emollient.

Remedies were administered internally in the following manner:

- (1) Dried powdered roots or leaves were either boiled or steeped in water.
- (2) Dried powdered roots were used as snuff, or prepared with lukewarm water.
- (3) Fresh roots or herbs were chewed.
- (4) Slight incisions were made with a bit of sharp glass or flint, and dried, powdered roots placed over the incisions.
- (5) Remedies were "pricked into the skin" with a set of needles used for that purpose.
- (6) Pulverized roots were mixed with "red willow" or tobacco and smoked in a pipe.
- (7) A decoction of herbs was administered as an enema.

#### SUBSTANCES OTHER THAN VEGETABLE USED AS REMEDIES

- (1) Deer tallow and bear grease were used as emollients, either alone or mixed with vegetable substances.
- (2) Bear's gall, dried, was used in connection with cedar charcoal, being "pricked into the skin" with needles. (See p. 333.)

(3) Bumblebees, dried, were used with the root of alder. (See p. 359.)

(4) Red pipestone was used as a remedy for scrofulous neck and was said to cause the swelling to go down gradually without breaking into an open sore. The directions were: "Grate red pipestone to a powder, take a teaspoonful dry, then drink water. Take it once a day, two or three times a week."

(5) Clamshell was used as a remedy for ulcer, the directions being as follows: "Burn a clamshell, powder it finely in the hand, mix it with bear's grease or any soft grease, using only enough to hold it together. The mixing is usually done in a clamshell. Apply to the sore or ulcer."

#### MEDICAL APPLIANCES

(1) The lodge in which a sweat bath was taken has been described in connection with customs of the Midewiwin.<sup>9b</sup> The same procedure was used if a person were suffering from a very bad cold and was feverish. No medicine was put in the water which was sprinkled on the stones. After the bath the person was thoroughly rubbed, warmly wrapped, and put to bed. This bath was taken by hunters when they returned weary, or by anyone who wished to be refreshed; also by those inclined to rheumatism.

(2) Another method of steaming was used chiefly for rheumatic limbs, and with the water they put any sort of medicine which was supposed to be good for that ailment. In giving this treatment a hole was dug in the ground the size of the kettle containing the hot decoction. They put the kettle into this hole and the person sat beside it, covering his limbs closely with a blanket. A medicine frequently used in this connection was identified as willow (species doubtful). The prepared root was put in hot water and allowed to boil a short time. It was usually cooled before using.

(3) Dry herbs were also placed on heated stones and the fumes were inhaled, this treatment being used chiefly for headache. The stones were somewhat smaller than those used in the sweat lodge, being "about the size of a small bowl." The patient covered his head and shoulders with a blanket, inclosing the stones and inhaling the fumes. A mixture of many varieties of flowers was said to be an agreeable preparation for this use.

(4) A simple appliance was a strip of slippery elm bark which was often used in place of an emetic, the soft inner bark being used and inserted in the throat.

(5) Apparatus for enema. It is said that the early Chippewa understood the administering of both nourishment and medicine by means of enema. The apparatus for this consisted of a syringe, a small birch-bark tray on which the syringe was laid, and two meas-

<sup>9b</sup> See Bull. 86, Bur. Amer. Ethn., p. 94.

ures for the medicine, a larger one for adults and a smaller one for children. The syringe was composed of the bladder of the deer. The proper amount of medicine was put into this bladder, then a short piece of clean hollow rush was tied in the opening by means of a strip of wet slippery elm, the rush projecting about an inch. This was used only once and then burned. The principal medicines administered in this manner were (a) the inner bark of the common white birch. This was scraped and about a hand-hollow steeped in water; (b) the wood of a tree identified as *Fraxinus*. A hand-hollow of this was steeped in water. A small spatula for powdered herbs and a measure for liquid medicine are shown in Plate 46, a and h.

#### SURGICAL TREATMENT AND APPLIANCES

(1) The letting of blood was a remedial measure frequently used among the Chippewa and was resorted to for numerous causes. The principal instrument used in this treatment was a small pointed blade set in a handle about 3 or 4 inches long. (Pl. 46.) By means of this instrument blood was taken from the forearm or from the ankle. In using this instrument the part to be cut was firmly stroked downward, forcing the blood to the extremity; a bandage was then applied above the point at which the incision was to be made. In making the incision the instrument was held close to the flesh and lightly snapped with the thumb and finger of the right hand, thus inflicting a slight incision of the vein. If too much force were applied, the result might be fatal; thus an instance was related in which the vein was entirely severed and the man died. It is said that about "half a basin" of blood was usually taken. A medicine to check the bleeding was then applied and the upper bandage removed. The root commonly used for this purpose was identified as *Drymocallis arguta* (Pursh.) Rydb. The prepared root was either used dry or was moistened with warm water, placed on soft duck down, and laid over the incision. It was said by three informants that this treatment was used especially for persons who had met with an accident, as a fall or an injury to the back, and that the medicine "prevented the blood from settling in one place." This treatment was also used for "persons who seemed to have too much blood."

(2) A surgical treatment in common use consisted in cutting small gashes from which a small amount of blood was removed. These gashes were formerly made with a piece of sharp flint, but in later times a piece of thick glass is carefully broken so as to leave a sharp splinter, which is used for this purpose. This is kept in a leather shield or covering (pl. 46, c, d), and is used as a lancet according to the general use of that instrument. These cuts might be made in various parts of the body. The writer saw a woman whose elbow had



SURGICAL APPLIANCES

4, Small spatula for powdered herbs; B, Lance; C, D, Flint used as lance and its leather case; E, Horn used in drawing blood to the skin; F, Instrument for applying medicine beneath the skin; G, Bone apparently swallowed by djassakid; H, Birch-bark measure for liquid medicine





been cut with 15 or 20 gashes about a quarter of an inch long. This treatment was given for a sprain, her elbow having swollen to twice its natural size. The most common use of this treatment was for headache, as described below, but it was used for any inflammation. A remedy for the bite of a snake was administered in this manner, the plant being identified as *Plantago major* L.

(3) In connection with the incisions above described there was a small horn (pl. 46, *e*) if the treatment was for headache. In this treatment about six very short, deep incisions were made on the temples with the flint or glass, after which the doctor placed the larger end of the horn over the incisions and applied his mouth to the smaller end, sucking until the blood came to the surface. He then quickly removed his lips from the horn, placed his finger over the small end of the horn and lowered it so that the blood would run into it. When enough had been removed he wiped the skin and applied a healing medicine, as noted above, or some remedy for headache, or he might place a moist compress or "grease" over the cuts. This cutting of the temples was also used for inflammation of the eyes.

(4) An instrument for applying medicine beneath the skin consisted of several needles fastened at the end of a wooden handle (pl. 46, *f*). This was used in treating "dizzy headache," neuralgia, or rheumatism in any part of the body. In giving the treatment the medicine was "worked in" with the needles. If only a small part were to be "gone over" it was customary to hold a knife in the left hand and to use the blade as a guide for the needles. These were "worked up and down" close to the blade, "which kept the medicine from spreading." The remedy used most often in this manner was made as follows: Hazel stalks or cedar wood was burned to a charcoal and a small quantity of the charcoal (or ash) was mixed with an equal quantity of the dried gall of a bear. It was mixed well and placed in a birch-bark dish. When used it was moistened a little with water and stirred, after which a little was taken on the blade at the end of the wooden instrument and laid on the affected part. It was then "worked in" with the needles. The dark spots seen on the temples of many Indians are left by the charcoal in this medicine. A remedy for rheumatism was applied in a similar manner. The plant was identified as *Trillium grandiflorum* (Michx.) Salisb., and it was used in the form of a decoction.

(5) The use of a knife in amputation was mentioned by Maïñ'gans, whose limbs were amputated below the knee, the only instrument used being a common knife. When he was a boy his feet and limbs were badly frozen and in a hopeless condition. The pain was so intense that he begged a man to amputate them in this manner, and

he did so. This was followed by a dressing of pounded bark (*Prunus serotina* Ehrh.) applied dry and renewed as often as it became damp—usually twice a day. Nothing else was used and the healing was perfect.

(6) Another use of the knife in surgery was described by Wezawange, who said he had treated a case in which this became necessary. It was a gangrenous wound, and he used the knife, not to remove, but to “loosen” the affected flesh, which was taken out by the medicine he applied. He said that in a case of this sort everything must be very clean, care being taken especially that the knife or remedies did not come in contact with rust. In this treatment he said that he used a medicine which had been handed down by the Mide and was particularly valued. It consisted of the inner bark of the white pine, the wild plum, and the wild cherry, it being necessary to take the first two from young trees. The writer saw him cut a young pine tree for this purpose and place tobacco in the ground close to the root before doing so. In preparing the medicine he said that the stalk of the pine was cut in short sections and boiled with the green inner bark of the other two trees until all the bark was soft. The water should be renewed when necessary, and the last water saved for later use. The bark was then removed from the pine stems and all the bark mashed with a heavy hammer until it was a pulp. It was then dried, and when needed it was moistened with the water which had been kept for that purpose. He said this medicine was usually prepared when needed, as the materials were so readily at hand. This wet pulp was applied to any wound or to a fresh cut and was a healing remedy, but was especially used for neglected wounds which had become gangrenous.

(7) Splints were placed on fractured limbs. The splints were best when made of very thick birch bark similar to that used for canoes. The birch bark was heated and bent to the proper shape, after which it was as rigid as plaster of Paris. Splints were also made of thin cedar. Tying the splint with basswood twine added greatly to its rigidity.

The treatment of a fractured arm was described as follows: “Wash the arm with warm water and apply grease. Then apply a warm poultice, cover with a cloth and bind with a thin cedar splint.” The roots used for the poultice were *Asarum canadense* L. (wild ginger) and *Aralia racemosa* L. (spikenard).

These two were dried and mashed together in equal parts. The directions added “when poultice becomes dry it should be renewed, or, if the arm is very tender, the poultice may be moistened with warm water without removing it.”

(8) Old women whose limbs or knees were weak often made supports by taking wide strips of fresh basswood bark and binding it

around their limbs in a kind of splint. When dried it was very hard and supported their limbs so that they could travel.

(9) The splinters from a tree struck by lightning were always carried by medicine men and used as lances, especially for lancing the gums. If a man were suffering from toothache they cut the gum with these splinters "so that the blood ran."

#### DENTAL SURGERY

If a tooth were hollow the Chippewa sometimes heated an awl or other metal instrument almost red hot and put it into the hollow of the tooth.

If it were considered necessary to pull a tooth they struck it forcibly to loosen it.

If a tooth were partly loosened they tied a sinew around the tooth, close to the root, attached it to something solid and pulled the tooth by jerking backward.

#### CLASSIFICATION OF DISEASES AND INJURIES<sup>10</sup>

- |                        |                                       |
|------------------------|---------------------------------------|
| 1. Nervous system:     | 6. Skin:                              |
| Convulsions.           | Inflammation.                         |
| Headache.              | Boils.                                |
| "Craziness."           | Sores.                                |
| 2. Circulatory system: | Eruptions.                            |
| Heart.                 | Warts.                                |
| In the blood.          | Hair.                                 |
| 3. Respiratory system: | 7. Wounds:                            |
| Cold.                  | Incised.                              |
| Cough.                 | Internal.                             |
| Lung trouble.          | Bites of poisonous reptiles.          |
| Hemorrhage from lungs. | 8. Bruises.                           |
| 4. Digestive system:   | 9. Burns.                             |
| Sore mouth.            | 10. Ulcers.                           |
| Toothache.             | 11. Fevers.                           |
| Sore throat.           | 12. Scrofula.                         |
| Indigestion.           | 13. Hemorrhages.                      |
| Pain.                  | 14. Diseases of women.                |
| Colic.                 | 15. Diseases of the eye.              |
| Cramps.                | 16. Diseases of the ear.              |
| Dysentery.             | 17. Diseases of the joints, including |
| Physic (use of).       | rheumatism and sprains.               |
| Emetics (use of).      | 18. Baths.                            |
| Worms.                 | 19. Tonics and stimulants.            |
| Cholera infantum.      | 20. Enemas.                           |
| 5. Urinary system:     | 21. General remedies.                 |
| Kidney trouble.        | 22. Diseases of the horse.            |
| Stoppage of urine.     |                                       |
| Gravel.                |                                       |

<sup>10</sup> In determining this basis of classification the author received the valued assistance of Dr. D. S. Lamb, who at the time was pathologist at the Army Medical Museum, Washington, D. C.

System or part affected	Symptoms	Botanical name	Part of plant used
Nervous system.....	Convulsions.....	<i>Lathyrus venosus</i> Muhl. (Wild pea.)	Root <sup>1</sup> .....
Do.....	do.....	<i>Lathyrus venosus</i> Muhl.	do.....
		<i>Apocynum androsaemifolium</i> L.† (Dogbane.)	do.....
Do.....	do.....	<i>Hepatica americana</i> Ker. (Hepatica.)	do.....
Do.....	do.....	<i>Solidago juncea</i> Ait. (Goldenrod)	do.....
Do.....	do.....	<i>Polygala senega</i> L. (Seneca snake-root.)	do.....
		<i>Artemisia frigida</i> Willd. (Prairie sage.)	do.....
		<i>Astragalus crassicaarpus</i> Nutt. (Ground plum.)	do.....
		<i>Rosa arkansana</i> Porter, (Wild rose)	do.....
Do.....	Headache.....	<i>Apocynum androsaemifolium</i> L.† (Dogbane.)	do. <sup>2</sup> .....
Do.....	do.....	<i>Achillea millefolium</i> L.† (Yarrow.)	Leaves.....
Do.....	do.....	<i>Arctostaphylos uva-ursi</i> (L.) Spreng.† (Bearberry.)	do.....
Do.....	do.....	<i>Polygonatum commutatum</i> . (R. & S.) Dietr. (Solomonseal.)	Root.....
Do.....	do.....	<i>Pulsatilla hirsutissima</i> (Pursh) Britton.† (Pasque flower.)	Leaves.....

<sup>1</sup> Unless otherwise stated, it is understood that roots, leaves, flowers, and stalks are dried and rubbed into powder or shreds before using. (See p. 326.)

<sup>2</sup> A decoction was boiled. Concerning the manner of making decoctions and the dosage see p. 329. Certain remedies were steeped instead of boiled, a distinction being made between the two modes of preparation.

How prepared	How administered	Remarks and references
Decoction <sup>2</sup> .....	Internally.....	
Decoction; the first-named root was so strong that the amount used was measured from the last joint to the tip of the little finger. The amount of the second was about 1 foot of the root.	If the convulsions were so severe that only a little of the decoction could be forced into the patient's mouth the decoction was sprinkled on the chest and applied to the palms of the hands and soles of the feet.	There were said to be 8 varieties of the first plant which were equally good. See hemorrhages and tonics.
Decoction; 1 root to 1 quart of water.	Internally.....	Used chiefly for children.
do.....	do.....	
Decoction.....	do.....	See Hemorrhages; tonics and charms (for the latter use the first-named plant is used alone).
(1) Dried and pulverized.....	4 pieces of dried root about the size of a pea were pulverized and the dry powder snuffed up the nostrils.	This herb was used not simply for a pain in the head but for a serious affection of the nerves of which the headache was the symptom. It was given for "excessive nervousness as when the mouth twitched, for dizziness, and with one herb added for insanity." As an instance of its successful use Gagawin said that a certain woman said someone had threatened to poison her. Gagawin told her to steep this root, keep it in a bottle and drink some occasionally, and if this did not have the desired effect, he would give her something else to take with it. This remedy, however, was sufficient, and she did not return.
(2) do.....	The powdered root was put on hot stones. Patient covered his head and inhaled the fumes.	See Nosebleed and charms.
(3) do.....	The powdered root was moistened with lukewarm water and applied to incisions on the temples by means of soft duck down. (See p. 332.)	See Eruptions, tonics, and remedies for the horse.
(4) Dried.....	Chewed.....	See also Charms.
(5) Decoction.....	Internally.....	
Decoction.....	Sprinkled on hot stones and fumes inhaled.	See Lung trouble.
Dried and pulverized.....	Combined with tobacco or red willow, smoked in a pipe, and the smoke inhaled.	
Decoction.....	Sprinkled on hot stones and the smoke inhaled.	
Dried and pulverized.....	"Smelled".....	

<sup>2</sup> This root grows straight downward and then turns sharply. The strongest medicinal value is at the elbow where the root turns.

† Plants thus marked are mentioned in the United States Pharmacopœia. (See p. 299.)

System or part affected	Symptoms	Botanical name	Part of plant used
Nervous system	Convulsions	<i>Hicoria alba</i> . (Hickory.)	Small shoots
Do.	do.	<i>Thuja occidentalis</i> L.† (Arbor vitae.)	Wood
Do.	do.	<i>Corylus americana</i> Walt. (Hazel.)	Stalk
Do.	do.	<i>Abies balsamea</i> (L.) Mill.† (Balsam fir.)	Gum
Do.	do.	<i>Dryocallis arguta</i> (Pursh) Rydb. (Five-finger.)	Root
Do.	"Craziness"	<i>Vaccinium angustifolium</i> Ait. (Blueberry.)	Flowers
Circulatory system	Heart	<i>Petalostemon purpureus</i> (Vent) Rydb. (Prairie clover.)	Leaves and flowers.
Do.	do.	<i>Quercus macrocarpa</i> Muhl. (Bur oak.)	Inner bark
		<i>Quercus rubra</i> L.† (Red oak)	do.
		<i>Populus tremuloides</i> Michx. (Aspen.)	do.
		<i>Populus balsamifera</i> L.† (Balsam poplar.)	Equal amounts of root, bud and blossom.
		<i>Polygala senega</i> L. (Seneca snakeroot.)	Root
Do.	Heart palpitation	<i>Apocynum androsaemilifolium</i> L. (Dogbane.)	
Do.	do.	<i>Artemisia dracunculoides</i> † Pursh. (flowering plant). (Mugwort.)	(1) Leaves and flowers.
			(2) Leaves

† Plants thus marked are mentioned in the United States Pharmacopœia. (See p. 299.)

How prepared	How administered	Remarks and references
Fresh .....	Placed on hot stones and fumes inhaled.	The shoots thus used were the very small shoots that grow beside the leaves.
Burned and charcoal used .....	Combined with bear's gall, pricked into the temples with needles.	The manner of administering this is described on p. 333.
.....do.....	Administered as above.....	
No preparation necessary.....	Placed on warm stone until it melts; fumes inhaled.	See Hair.
Dried and pulverized.....	(1) Applied on incisions in the temples (see p. 332). (2) Moistened root inserted in nostrils.	See Dysentery and hemorrhage.
Dried.....	Placed on hot stones and fumes inhaled.	This was said to be one of the remedies given by Winabojo. These remedies are the most highly regarded.
Decoction; handful of leaves and flowers in 1½ pints water. Scraped and dried; equal parts of this and two next following were powdered in the hands. This medicine was prepared ceremonially. (See tonic remedy similarly prepared, Bull. 63, p. 65.) A pail was made ready containing about a pint of water. A little of the mixed bark was placed on the water at the eastern side, the medicine man saying "Wa' būn-ong" (eastward); the same was repeated at the south, west, and north with similar words. He then placed on the top of these piles a smaller portion of the powdered Polygala Senegala root, saying the same words. The medicine was then allowed to steep. It was said to be very powerful so that care must be used not to take too much of it. The dose was measured in a small receptacle made of birch bark (pl. 46, h) and marked with a symbol of the remedy, or "one swallow" was taken, the dose being repeated in an hour.	Dose, ½ cup; repeat in half hour if necessary. Internally.....	
"Take 4 pieces of the dried root, about 2 inches long. Put in 1 quart of water. Let it come to a boil, and boil about 2 minutes."	A "good drink" of the decoction was taken as often as desired.	The root of this plant was said to grow to a great length, and usually to be found running north and south. A weaker decoction was used as a remedy for earache, and a very weak decoction was said to be good for a baby's cold.
Dried; a handful steeped in 1½ pints of water.	Administered when partly cooled; dose, ½ cup, after which the patient reclined; dose repeated every half hour until patient was relieved.	See Diseases of women, hemorrhages, dysentery, tonics and remedies for the hair.
Fresh.....	Chewed.....	

System or part affected	Symptoms	Botanical name	Part of plant used
Circulatory system	"Humor in the blood"	<i>Aralia nudicaulis</i> L.† (Wild sarsaparilla.)	Root.....
Respiratory system	Colds	<i>Acorus calamus</i> L.† (Calamus.)	.....do.....
Do.....	.. do.....	<i>Allium stellatum</i> Ker. (Wild onion.)	.....do.....
Do.....	. do.....	<i>Caltha palustris</i> L.† (Cowslip)	.....do.....
Do.....	.....do.....	<i>Apocynum androsaemifolium</i> L. (Dogbane.)	.....do.....
Do.....	Cough.....	<i>Agastache anethiodora</i> (Nutt.) Britton.† (Giant hyssop.)	.....do.....
Do.....	.....do.....	<i>Apocynum</i> sp. (Dogbane)	.....do.....
Do.....	.....do.....	<i>Aralia racemosa</i> L.† (Spikenard)	.....do.....
Do.....	.....do.....	<i>Aretium minus</i> Bernh.† (Burdock.)	Leaves.....
Do.....	.....do.....	<i>Ceanothus ovatus</i> Desf. (New Jersey tea.)	Root.....
Do.....	.....do.....	<i>Ostrya virginiana</i> (Mill.) Koch.† (Hop hornbeam (ironwood).)	Wood.....
Do.....	.....do.....	<i>Thuja occidentalis</i> L.† (Arbor vitae.)	Leaves.....
Do.....	Lung trouble.....	<i>Caulophyllum thalictroides</i> (L.) Michx.† (Blue cohosh.)	Root.....
Do.....	.....do.....	<i>Euthamia graminifolia</i> (L.) Nutt. (Goldenrod.)	.....do.....
Do.....	.....do.....	<i>Lonicera</i> sp. (Honeysuckle)	.....do.....
Do.....	.....do.....	<i>Rubus frondosus</i> Bigel.(?) (Blackberry.)	.....do.....
Do.....	.....do.....	<i>Quercus macrocarpa</i> Muhl. (Bur oak.)	Inner bark.....
Do.....	.....do.....	<i>Silphium perfoliatum</i> L.† (Cupplant.)	Root.....
Do.....	.....do.....	<i>Solidago rigidiuscula</i> Porter.† (Goldenrod.)	.....do.....
Do.....	.....do.....	<i>Pulsatilla hirsutissima</i> (Pursh) Britton.† (Pasque-flower.)	.....do.....
Do.....	Hemorrhages from lungs.	<i>Solidago rigidiuscula</i> Porter.† (Goldenrod.)	.....do.....
Do.....	.....do.....	<i>Prunus virginiana</i> L. (Chokecherry.)	Inner bark.....
Do.....	.....do.....	<i>Corylus</i> sp. (Hazel)	Root.....
Do.....	.....do.....	White oak (specimen not obtained).	.....do.....
Do.....	.....do.....	<i>Ostrya virginiana</i> (Mill.) Koch. (Ironwood.)	Heart of the wood.

† Plants thus marked are mentioned in the United States Pharmacopœia. (See p. 299.)



How prepared	How administered	Remarks and references
Decoction.....	Internally.....	See Diseases of women and nosebleed.
(1) Pulverized.....	Snuffed up nostrils.....	} See Toothache, sore throat, and physis.
(2) Decoction.....	Internally.....	
Decoction, sweetened.....	do.....	Used chiefly for children.
"Chop 2 roots, boil in scant teacup of water; remove from fire when it boils; strain and cool."	Drink entire amount at once. This was said to produce perspiration, loosen phlegm, and act as an emetic. Drink warm water after medicine has acted; repeat five days later. This is usually sufficient; it was said that too much was an injury.	This use of the herb was said to be a great secret. See also Scrofula and diseases of women.
Very weak decoction of root.....	Internally.....	Used only for infants.
Steeped.....	do.....	This was used for an internal cold with tendency to pneumonia, also for pain in chest.
Dried and pulverized.....	Snuffed up nostrils.....	This was used for a heavy cold in the head, and was said to cause sneezing and relieve the head.
Decoction.....	Internally.....	See Boils and fracture.
Infusion; made from a handful of leaves and a teacup of boiling water.	do.....	This was used for a hard dry cough and taken after a coughing spell.
Decoction; made from 5 inches of root, grated, and 1 quart of water.	Internally. Dose is 1 swallow.	
} These were used with other ingredients in making a cough sirup.	} Internally.....	See Kidney trouble.
Decoction; made from 2 roots and 1 quart water.	Internally. Dose is 1 swallow.	See Emetics.
Decoction.....	Internally.....	This was said to be particularly good for pain in the chest.
Decoction; with other ingredients not designated.	do.....	
Decoction.....	do.....	The second named was used for cramps.
do.....	do.....	This was used for hemorrhage from the lungs, also for pain in the back and chest with tendency to consumption.
Decoction; made from a double handful of the pulverized roots to 2 quarts of water.	do.....	
Decoction; made from 1 root and a quart of water.	"Take it cold".....	This remedy was used to check a sudden hemorrhage from the lungs. See Pain in back, sprain, diseases of women, and remedies for the hair.
Steeped together.....	Internally.....	

System or part affected	Symptoms	Botanical name	Part of plant used
Digestive system.....	Sore mouth.....	Heuchera (species doubtful). (Alum-root.)	Root..... Blossom cut when white bloom is on.
		Rhus glabra L.† (Sumac).....	
Do.....	do.....	Castalia odorata (Ait.) Woodv. & Wood. (White waterlily.)	Root.....
Do.....	do.....	Geranium maculatum L.† (Wild geranium.)	do.....
Do.....	Toothache.....	Acorus calamus L.† (Calamus).....	do.....
Do.....	do.....	Cypripedium hirsutum Mill.† (Ladyslipper.)	do.....
Do.....	do.....		Fungus; it is gathered about middle of August.
Do.....	Sore throat.....	Tanacetum vulgare L.† (Tansy).....	Root.....
Do.....	do.....	Heracleum lanatum Michx.† (Cow parsnip.)	do.....
Do.....	do.....	Solidago flexicaulis L. (Goldenrod)	do.....
Do.....	do.....	Osmorrhiza claytoni Michx. (Sweet cicely.)	do.....
Do.....	do.....	Acorus calamus L.(†) (Calamus).....	do.....
Do.....	do.....	Phryma leptostachya L. (Lopseed.)	do.....
Do.....	do.....	Potentilla monspeliensis L. (Cin- quefoil.)	Root and stalk.....
Do.....	do.....	Prunus virginiana L.† (Choke- cherry.)	Inner bark.....
Do.....	do.....	Zanthoxylum americanum Mill.† (Prickly ash.)	Root.....
Do.....	do.....	Ulmus fulva Michx. (Slippery elm.)	(1) Bark..... (2) Root.....
Do.....	Indigestion.....	Asarum canadense L.† (Wild ginger.)	do.....
Do.....	do.....	Sieversia ciliata (Pursh) Rydb. (Prairie smoke.)	do.....
Do.....	do.....	Heuchera (species doubtful). (Alum-root.)	do.....
Do.....	do.....	Caulophyllum thalictroides (L.) Michx.† (Blue cohosh.)	do.....
Do.....	do.....	Rudbeckia laciniata L.† (Cone- flower.)	do.....
Do.....	do.....	Sagittaria latifolia Willd. (Ar- rowhead.)	do.....
Do.....	do.....	Cypripedium hirsutum Mill.† (Ladyslipper.)	do.....
Do.....	do.....	Salix (species doubtful). (Wil- low.)	Inner bark.....
Do.....	Pain in stomach.....	Andropogon furcatus Muhl. (Bluestem.)	Root.....
Do.....	do.....	Betula nigra. (Black birch).....	Bark.....
Do.....	do.....	Diervilla lonicera Mill. (Bush honeysuckle.)	Leaves.....
Do.....	do.....	Erigeron canadensis L.† (Horse- weed.)	Root and leaves.....

† Plants thus marked are mentioned in the United States Pharmacopœia. (See p. 299.)

How prepared	How administered	Remarks and references
Decoction; made from one root and one blossom in a teacup of water, strained and cooled.	"Put it on something soft and wash the child's mouth."	This was used for the sore mouth of a child when teething, and was said to heal the gums quickly. The first named was used for dysentery. A fungus growing on the latter plant was also used for dysentery.
Dried and finely powdered.....	Put in the mouth.....	
Dried and powdered.....	do.....	Used especially for children.
(1) Dried.....	Chewed.....	{See Cold; phisic and sore throat. This was used for children. See stomach trouble and inflammation of the skin.
(2) Decoction.....	Internally.....	
Dried, powdered, and moistened.	Put on decayed teeth.....	
The top is removed and the soft interior substance dampened and used as a poultice.	Used for toothache or put inside a decayed tooth.	It is said to be so strong that it sometimes draws out the nerve.
(1) Decoction.....	Gargle.....	{Also used for fevers and for diseases of women.
(2) Dried.....	Chewed.....	
(1) Decoction.....	Gargle.....	{This was used for ulcerated sore throat. See Boils.
(2) Dried.....	Chewed.....	
do.....	do.....	
Decoction, or chewed.....	do.....	See ulcers.
Decoction for children; chewed root used by adults.	Gargle.....	
Decoction, or chewed.....	do.....	
Decoction.....	Gargle.....	This is said to be very astringent. See Cramps and disinfectants.
do.....	Internally, also as a gargle.....	This was used for quinzy and swelled or ulcerated throat. See Tonics.
do.....	Gargle.....	
Dried.....	Chewed.....	
Combined with many other herbs to increase their action.	Internally.....	If food does not agree with a person, put about an inch of this root in whatever food is being cooked for him. See tonics and inflammation.
A decoction was made from 4 roots of first named, 1 root of second, and 1 quart of water. The first-named root was also used alone in decoction.	do.....	This remedy was said to be very strong, so it was taken only occasionally. One preparation was enough to last 2 or 3 days. See Diseases of the horse.
Equal parts of these 2 roots were steeped in water.	do.....	Diseases of the horse. Used also for burns.
Steeped.....	do.....	This was used if a "person's food did not agree with them."
do.....	Internally, given in small doses.	See Toothache and inflammation of skin.
Combined with bark of other trees in decoction.	Internally.....	Do.
Decoction made from 1 root and 1 quart of water.	do.....	See Burns and retention of urine.
Decoction.....	do.....	
do.....	do.....	Used only in combinations.
Decoction made from 2 roots and some leaves in 1 quart of water.	do.....	

System or part affected	Symptoms	Botanical name	Part of plant used
Digestive system	Pain in stomach	<i>Heuchera hispida</i> Pursh. (Alum-root).	Root
Do.	do.	<i>Polygonum persicaria</i> L. (Smart-weed.)	Flowers, leaves
Do.	do.	<i>Polygonum punctatum</i> Ell. (Smart-weed.)	do.
Do.	do.	<i>Rhus hirta</i> (L.) Sudw. (Staghorn sumac.)	Flowers
Do.	Colic	<i>Stachys palustris</i> L.† (Hedgenettle.)	Leaves fresh or dry.
Do.	do.	<i>Thaspium barbinode</i> (Michx.) Nutt. (Meadow parsnip.)	Root
Do.	Cramps	<i>Quercus macrocarpa</i> Muhl. (Bur oak.)	do
Do.	do.	<i>Viburnum acerifolium</i> L.† (white oak). (Arrowwood.)	Inner bark
Do.	do.	<i>Prunus virginiana</i> L.† (Choke-cherry.)	do.
Do.	do.	<i>Solidago</i> . (Goldenrod)	Root
Do.	do.	<i>Caulophyllum thalictroides</i> (L.) Michx. (Blue cohosh.)	do.
		<i>Sanguinaria canadensis</i> L. (Blood-root.)	do.
Do.	Dysentery	<i>Artemisia dracunculoides</i> Pursh † (flowering plant). (Mugwort.)	Leaves and top.
Do.	do.	<i>Bursa bursa-pastoris</i> (L.) Britton.† (Shepherd's purse.)	Entire plant
Do.	do.	<i>Urtica gracilis</i> Ait.† (Nettle)	Root
Do.	do.	<i>Salix</i> (species doubtful). (Willow.)	do.
Do.	do.	<i>Dryocallis arguta</i> (Pursh) Rydb. (Five-finger.)	do.
		<i>Heuchera</i> (species doubtful). (Alum-root.)	do.
Do.	do.	<i>Amelanchier canadensis</i> (L.) Medic. (Shadbush.)	do.
Do.	do.	<i>Potentilla palustris</i> (L.) Scop.† (Marshlocks.)	do.
Do.	do.	<i>Rhus glabra</i> L.† (Sumac)	The portion used is a growth which sometimes appears on the tree.
Do.	do.	<i>Rubus strigosus</i> Michx. (Red raspberry.)	Root
Do.	Physic (use of)	<i>Acorus calamus</i> L.† (Calamus)	do.
Do.	do.	<i>Celastrus scandens</i> L. (Bittersweet.)	do.

† Plants thus marked are mentioned in the United States Pharmacopœia. (See p. 299.)

How prepared	How administered	Remarks and references
Dried.....	"Chew the root and swallow the juice."	See Diseases of the eye.
Decoction, strong medicine, yet 1 sprig not enough for a treatment.	Internally.....	Used alone and also in combinations.
Decoction.....	.do.....	Used only in combinations.
.do.....	.do.....	
"Put leaves in hot water and drink it."	.do.....	This is used for sudden colic.
Decoction.....	.do.....	This is a child's remedy.
.do.....	.do.....	See Lung trouble.
.do.....	.do.....	See Emetic.
.do.....	.do.....	See Sore throat and disinfectant.
Decoction made from 1 root and 1 quart of water.	Externally, applied hot.....	Do.
Decoction made from equal amounts of the two roots.	Internally.....	See Lung trouble.
.do.....	.do.....	Do.
Dried and steeped.....	.do.....	This was used for chronic dysentery. See Diseases of women, hemorrhages, and remedies for the hair.
Decoction.....	.do.....	This remedy was used for cramps.
Steeped.....	.do.....	See Stoppage of urine.
Used alone and also in combination with other roots.	.do.....	See Indigestion and sweat lodge customs.
Decoction; the first named root was also used alone in decoction.	.do.....	For other uses of first-named root, see Headache and hemorrhages.
Decoction made from this combined with roots of cherry and young oak.	.do.....	See Diseases of women.
Decoction made of 1/2 root and 1 quart water.	.do.....	
Dried and pulverized; decoction.....	.do.....	This remedy was used for obstinate dysentery. The blossom of same plant was combined with alum root and used as a remedy for the sore mouth of a child when teething. See p. 343.
Decoction.....	.do.....	
The measure for preparing this root was according to the age of the patient, the measure being the length of the index finger, whether an infant or an adult. This quantity of the root was scalded (not boiled), and taken warm. Dose about a half cupful. Same dosage for all physics.	.do.....	See Cold, toothache and sore throat.
Decoction. Used especially for babies.	.do.....	See Eruptions.

System or part affected	Symptoms	Botanical name	Part of plant used
Digestive system....	Physic (use of).....	<i>Dirca palustris</i> L.† (Moosewood)..	Stalk.....
Do.....	do.....	<i>Leptandra virginica</i> (L.) Nutt.† (Culver's-root.)	Root.....
Do.....	do.....	<i>Falcata comosa</i> (L.) Kuntze. (Hog peanut.)	do.....
Do.....	do.....	<i>Prunella vulgaris</i> L. (Selfheal).....	do.....
Do.....	do.....	<i>Smilax herbacea</i> L. (Carrion- flower.)	do.....
Do.....	do.....	<i>Symphoricarpos</i> (Snowberry).....	do.....
Do.....	Emetic (use of)....	<i>Allium tricoccum</i> Ait. (Wild leek)	do.....
		<i>Caulophyllum thalictroides</i> (L.) Michx.† (Blue cohosh.)	do.....
Do.....	do.....	<i>Viburnum acerifolium</i> L.† (Ar- row wood.)	Inner bark.....
		<i>Alnus incana</i> (L.) Moench.† (Alder.)	do.....
Do.....	do.....	<i>Viburnum acerifolium</i> L.† (Ar- rowwood.)	do.....
Do.....	Worms.....	<i>Prunus americana</i> Marsh. (Wild plum.)	Root.....
		<i>Prunus serotina</i> Ehrh.† (Wild cherry.)	do.....
Do.....	do.....	<i>Monarda mollis</i> L. (Horsemint)..	Root and flowers..
Do.....	Cholera infantum ..	<i>Prunus serotina</i> Ehrh.† (Wild cherry.)	Root.....
Do.....	do.....	<i>Fragaria virginiana</i> Duchesne.† (Wild strawberry.)	Roots.....
Urinary system.....	Kidney trouble....	<i>Smilax herbacea</i> L. (Carrion- flower.)	Root.....
Do.....	do.....	<i>Ostrya virginiana</i> (Mill.)† Koch. (Hop hornbeam.)	Wood.....
Do.....	Stoppage of urine....	<i>Urtica gracilis</i> Ait.† (Nettle).....	Root.....

† Plants thus marked are mentioned in the United States Pharmacopœia. (See p. 299.)

How prepared	How administered	Remarks and references
"Cut up the stalk and dry it, pulverize, put about a table-spoon in warm water, steep but do not let it boil. Do not eat after taking it. Green stalk may be chewed."	Internally.....	See use of root as a hair wash.
Decoction made of 5 roots and 1 quart of water.	.....do.....	It was said that this physic also "cleansed the blood."
Decoction made of this combined with other roots.	.....do.....	
Decoction, combined with catnip	.....do.....	
Decoction, combined with other roots.	.....do.....	See Kidney trouble.
Decoction made of 2 inches of dried root in a little water.	.....do.....	This was said to be a very strong remedy. See Stoppage of urine.
Decoction, 1 root proper amount for a dose; quick in its effect.	.....do.....	
"Scrape the root fine. Tie a small quantity in a white cloth and squeeze it in warm water."	.....do.....	This is also used as a remedy for biliousness and for hemorrhages from the lungs.
"In preparing these, scrape the stalks carefully, removing only the thin outer covering and using the green part underneath. Put the scrapings of this green bark from both trees in boiling water to make decoction."	.....do.....	
"Break up the bark, put it in a cloth and put the cloth in hot water, squeeze it until the water is green. Let it cool and take it with plenty of water."	.....do.....	See Cramps.
Decoction.....	.....do.....	The first named was also used as a disinfectant wash. The second named was used for ulcers, cholera infantum, and scrofulous neck.
.....do.....	.....do.....	See uses of flowers and leaves for eruptions and burns.
"Boil a handful of the prepared roots in about 1 pint of water."	.....do.....	See Worms, ulcers, and scrofula; also disinfectant wash.
"Steep 2 or 3 roots in 1 quart boiling water. Let the child drink freely until the effect is evident."	.....do.....	
Decoction.....	.....do.....	This remedy was used also for pain in the back. It is an old Mide remedy and the root was always carried in a bag made of bear paws. Such a bag was used only by men holding a high degree in the Midewiwin. The native name means "Bear root."
The wood at the "heart of the branches" was cut in small bits and boiled, making a decoction.	.....do.....	See Cough.
Decoction.....	.....do.....	See Dysentery.

System or part affected	Symptoms	Botanical name	Part of plant used
Urinary system.....	Stoppage of urine...	Athyrium filix-foemina (L.) Roth. † (Lady fern.)	Root.....
		Urtica gracilis Ait. (Nettle).....	do.....
		Do.....	do.....
Do.....	do.....	Celastrus scandens L.† (Bittersweet.)	do.....
Do.....	do.....	Solidago rigida L.† (Goldenrod)	do.....
Do.....	do.....	Andropogon furcatus Muhl. (Bluestem.)	do.....
Do.....	do.....	Symphoricarpos albus (L.) Blake.† (Snowberry.)	do.....
		Caltha palustris L.† (Cowslip).. Ribes sp. (Wild currant).....	Leaves and stalks. do.....
Do.....	Gravel.....	Ribes triste Pall. (Red currant)	Root and stalk.....
Skin.....	Inflammation.....	Plantago major L. † (Plantain)..  	(1) Leaves.....
			(2) Root.....
Do.....	do.....	Plantago major L.†..... Asarum canadense L.† (Wild ginger.)	Root..... do.....
Do.....	do.....	Eupatorium maculatum L.† (Joe-Pye-weed.)	do.....
Do.....	do.....	Cypripedium hirsutum Mill.† (Ladyslipper.)	do.....
Do.....	Boils.....	Solidago altissima L. (Goldenrod.)	do.....

† Plants thus marked are mentioned in the United States Pharmacopœia. (See p. 299.)



How prepared	How administered	Remarks and references
"Cut the first-named root into bits and take a small handful. The root of the second named has lobes on it. Take 4 of these lobes with the first-named root and boil them up quickly. Use as soon as cool enough to drink."	Internally.....	This is known as a "Winabojo remedy," as it is supposed to have been received from him.
Decoction.....	.....do.....	This, like the preceding, is one of the Winabojo remedies, the native name being Winabojo onagic, meaning "Winabojo's intestines." The legend is that Winabojo was once walking on the ice when he heard something rattling behind him. He looked back and saw that his intestines were dragging behind him and part had become frozen to the ice. He broke off part and threw them over a tree, saying, "This shall be for the good of my future relatives."
1 root was steeped with ½-pint of water. Dose was "a swallow occasionally."	.....do.....	
Decoction; the first-named could be also used alone.	.....do.....	The first-named was also used for pain in the stomach and burns.
Decoction.....	.....do.....	The root of the first-named was also used for colds, scrofula, and diseases of women.
Decoction made from 4 plants to 1 quart of water. "Boiled quite a while."	.....do.....	
Fresh leaves are best. Spread any grease (bear's grease is best) on the surface of the fresh leaves, apply to the inflamed part and as soon as the leaves become dry or heated renew them. If desired for winter use the leaves should be greased, packed in a pile, and wrapped tightly.	Externally.....	See use as a charm, also rheumatism and bites.
Chop fresh roots, spread on a fresh leaf, and apply as a poultice.	.....do.....	
Chop fresh roots, spread on fresh plantain leaf, and apply as a poultice.	.....do.....	These two were often chopped together and kept in a wrapping of leather.
Decoction used luke warm as a wash for inflammation of the joints.	.....do.....	
Chop dried root or in emergency use fresh root. Do not cook but moisten it and apply as a poultice to any inflammation.	.....do.....	See stomach trouble and toothache.
Pulverized root was moistened (not cooked), and applied as a poultice.	.....do.....	The flowers of this plant were used for burns.

System or part affected	Symptoms	Botanical name	Part of plant used
Skin	Boils	<i>Heracleum lanatum</i> Michx.† (Cow parsnip.)	(1) Root
			(2) Root and flowers.
Do.	do.	<i>Aralia racemosa</i> L.† (Spikenard.)	Root
Do.	Sores	<i>Aralia nudicaulis</i> L. (Wild sarsaparilla.)	do.
Do.	Eruptions	<i>Celastrus scandens</i> L.† (Bittersweet.)	Stalk
Do.	do.	<i>Rumex obtusifolius</i> L. (Bitter dock.)	Root
Do.	do.	<i>Erysimum cheiranthoides</i> L. (Wormseed mustard.)	do.
Do.	do.	<i>Achillea millefolium</i> L.† (Yarrow.)	do.
Do.	do.	<i>Monarda mollis</i> L. (Horsemint.)	Flowers and leaves.
Do.	do.	<i>Rumex crispus</i> L.† (Yellow dock.)	Root
Do.	do.	<i>Erysimum cheiranthoides</i> L. (Wormseed mustard.)	do.
Do.	Warts	<i>Lactuca canadensis</i> L.† (Wild lettuce.)	Juice
Do.	Hair	<i>Solidago rigidiuscula</i> Porter.† (Goldenrod.)	Either root or stalk.
Do.	do.	<i>Abies balsamea</i> (L.) Mill.† (Balsam fir.)	Gum
Do.	do.	<i>Artemisia dracunculoides</i> Pursh† (sterile plant). (Mugwort.)	Root
		<i>Dirca palustris</i> L.† (Moosewood.)	do.
Do.	do.	<i>Prunus virginiana</i> L. (Chokecherry.)	Bark
Wounds	Cuts	<i>Populus tremuloides</i> Michx.† (Aspen.)	do.
Do.	do.	<i>Drymocallis arguta</i> (Pursh) Rydb. (Five-finger.)	Root
Do.	do.	<i>Rumex crispus</i> L.† (Yellow dock.)	do.

† Plants thus marked are mentioned in the United States Pharmacopœia. (See p. 299.)

How prepared	How administered	Remarks and references
Boil root and use as a drawing poultice.	Externally.....	It was said that dried root could be used without cooking. See Sore throat.
Dried root and flowers were pounded together and made into a poultice without boiling.	do.....	
Pounded in a cloth and applied as a poultice.	do.....	This poultice was said to be healing as well as "drawing." See Cough and fracture.
The fresh root was mashed and applied as a poultice.	do.....	Used internally as a remedy for the blood.
Decoction.....	do.....	The root of this plant was used for stoppage of urine.
Steeped.....	do.....	Used especially for children.
Decoction made from one root to 1 quart of water.	do.....	3 or 4 roots may be used.
Decoction.....	do.....	See stimulants, headache and diseases of the horse.
Steeped. "Bathe child with the tea and then rub it with tallow, venison tallow if possible."	do.....	Used especially for children. See Worms, and burns.
Dried and powdered root is moistened, spread on a cloth and applied as a poultice in cases of great itching of the skin and eruptions.	do.....	Used especially for children. See Cuts.
Decoction made from 1 root and 1 quart of water; 3 or 4 roots may be used.	do.....	
"Gather the white liquid which oozes out when the stalk is broken and rub this on the wart."	do.....	This remedy is used only from the fresh plant.
Combined with bear's grease as an ointment.	do.....	See Lung trouble, sprain and diseases of women.
do.....	do.....	See Headache.
Decoction.....	{ Used as wash to strengthen the hair and make it grow.	{ Concerning the first plant, see Heart stimulant, dysentery, hemorrhages from wounds, tonics and diseases of women. The second plant was also used as a physic.
do.....	do.....	
"Spit on the cut and draw the edges together, then chew this bark and apply thickly like a poultice as soon as possible. Dried root may be used in the same manner."	Externally.....	See Diseases of women.
Moisten the dried and pulverized root.	do.....	See Dysentery and headache.
Dried and pounded.....	do.....	This was used for a "clean cut." See Eruptions and ulcers.

System or part affected	Symptoms	Botanical name	Part of plant used
Wounds.....	Cuts.....	<i>Pinus strobus</i> L. (White pine)..	Trunk of young tree.
		<i>Prunus serotina</i> Ehrh.† (Wild cherry.)	Inner bark.....
		<i>Prunus americana</i> Marsh. (Wild plum.)	Inner bark of young tree.
Do.....	do.....	<i>Solidago rigidiuscula</i> Porter.† (Goldenrod.)	Root.....
Do.....	Bites of poisonous reptiles.	<i>Lilium canadense</i> L. (Lily).....	do.....
Do.....	do.....	<i>Plantago major</i> L.† (Plantain)...	Leaves and root..
Do.....	do.....	<i>Botrychium virginianum</i> (L) Sw. (Rattlesnake fern.)	Root.....
Bruise.....	.....	<i>Epilobium angustifolium</i> L. † (Fireweed.)	Leaves.....
Burns.....	.....	<i>Agastache anethiodora</i> (Nutt.) Britton. (Giant hyssop.)	(1) Leaves.....
Do.....	.....	<i>Solidago altissima</i> L. (Goldenrod.)	(2) Leaves and stalk. Flowers.....
		<i>Rudbeckia laciniata</i> L.† (Coneflower.)	do.....
		<i>Agastache anethiodora</i> (Nutt.) Britton. (Giant hyssop.)	do.....
Do.....	.....	<i>Larix laricina</i> (Du Roi) Koch.† (Tamarack.)	Inner bark.....

† Plants thus marked are mentioned in the United States Pharmacopœia. (See p. 299.)

How prepared	How administered	Remarks and references
"Cut the first named into sections and boil with the barks until soft, strain, keeping the decoction, pound the woody material into a mash and dry; when needed, soak the mash thoroughly in the decoction and apply; care should be taken that the barks after boiling do not come in contact with rust or dirt."		The informant stated that he used this successfully on a gunshot wound after gangrene had set in. This could be applied to any form of "rotten flesh," after which a knife was used to cleanse the wound.
Decoction made from 1 root and 1 quart of water. Taken cold.	Internal.....	This remedy is used to check the hemorrhage when a person has been wounded and blood comes from the mouth. See Lung trouble, and diseases of women.
Root used in decoction.....	Externally.....	This was also used "when a snake blows on a person and causes a swelling."
Fresh, chopped fine, and applied to bite. This was sometimes spread on a fresh leaf of the plant.	do.....	An incident of the use of this plant was related. Mrs. Razer had a relative who was bitten by a poisonous snake while picking berries. Her husband put a tight bandage around the arm above the bite; then searched for the plant. Before he could find it the woman's arm was badly swollen. He cut little gashes in the arm, moistened this root, applied it, and the woman's life was saved. See Rheumatism and inflammation.
A poultice of the fresh root, mashed, was applied to a snake bite.	do.....	"If a snake got into the wigwam a decoction of this root was sprinkled around and the snake did not return."
Fresh or dried leaves were moistened and made in a poultice.	do.....	The same poultice might be used to remove a sliver.
Dried and powdered leaves moistened with water and applied.	do.....	This was said to prevent blister and take out the fire. See Colds and charms.
Chew the fresh leaves and stalk. Apply as a poultice.		
A "small sunflower" was combined with these, the flowers being dried and used as a poultice. When needed the flowers were moistened, applied, and covered with a bandage; when this became dry it was not removed but was moistened with cold water.	Externally.....	The leaves of the last named were used alone for a burn, being dried, powdered, and applied as a poultice. This combination of medicine was very strong and was called Wabunowuck (eastern medicine). It is said that if a small handful of flowers of the plants were steeped in a quart of water and a person "washed their hands" in this decoction they could thrust their hands in boiling water and not be scalded. The root of the second plant was used for indigestion. (Cf. Bull. 45, p. 103.)
Fresh or dried, chop fine and apply to burn. Apply in morning, wash off partially at night, and renew.	do.....	

System or part affected	Symptoms	Botanical name	Part of plant used
Burns .....	.....	<i>Clintonia borealis</i> (Ait.) Raf. (Clintonia.)	Leaf.....
Do.....	.....	<i>Monarda mollis</i> L. (Horsemint)	Flowers and leaves
Ulcers.....	.....	<i>Solidago altissima</i> L. (Goldenrod.)	Flowers.....
Do.....	.....	<i>Prunus serotina</i> Ehrh.† (Wild cherry.)	Root.....
Do.....	.....	<i>Ledum groenlandicum</i> Oeder.† (Labrador tea.)	do.....
Do.....	.....	<i>Prunus</i> (species doubtful)	do.....
Do.....	.....	<i>Rumex crispus</i> L. (Yellow dock)	do.....
Do.....	.....	<i>Osmorrhiza claytoni</i> (Michx.) Britton. (Sweet cicely.)	do.....
Fevers.....	.....	<i>Nepeta cataria</i> L.† (Catnip)	Leaves.....
Do.....	.....	<i>Koellia virginiana</i> (L.) Mac M.† (Mountain mint.)	do.....
Do.....	.....	<i>Nepeta cataria</i> L. (Catnip)	do.....
Do.....	.....	<i>Tanacetum vulgare</i> L.† (Tansy)	do.....
Do.....	.....	<i>Nepeta cataria</i> L.† (Catnip)	do.....
Do.....	.....	<i>Solidago</i> (species doubtful). (Goldenrod.)	do.....
Scrofula.....	Sores.....	<i>Leptandra virginica</i> (L.) Nutt.† (Culver's-root.)	Root.....
Do.....	do.....	<i>Prunus virginiana</i> L.† (Choke-cherry.)	Inner bark.....
Do.....	do.....	<i>Prunus serotina</i> Ehrh.† (Wild cherry.)	Root or bark.....
Do.....	do.....	<i>Caltha palustris</i> L.† (Cowslip)	Root.....
Do.....	do.....	<i>Clintonia borealis</i> Ait. (Clintonia)	Leaves.....

† Plants thus marked are mentioned in the United States Pharmacopœia. (See p. 299.)

How prepared	How administered	Remarks and references
Fresh.....	Externally.....	
Dried, powdered in the hand, moistened with water and applied to burn.	.....do.....	Especially good for a scald.
Dried, moistened with cold water.	.....do.....	See Boils.
Dried, powdered and mixed, but not cooked. After this powder has been on the flesh for a time it becomes damp. It is then removed, the sore washed, and a fresh application made.	.....do.....	Applied to a severe burn or ulcer or any condition in which the flesh is exposed. Concerning the first-named plant see Cholera infantum, and scrofula.
Decoction of dried root or scraped and mashed fresh root.	.....do.....	See Diseases of women.
Dried and pounded.....	.....do.....	See Cuts and eruptions.
Dried and pounded, moistened with warm water.	.....do.....	Used especially for a running sore.
Decoction	Internally.....	
Decoction made from equal parts of leaves of 2 plants. Directions are as follows: "If a person feels chilly he should take 1 cup of this medicine as hot as possible, repeating the dose after a short time. He should also wrap up and go to bed; when the fever comes on he should take the same decoction, but cold and whenever desired."	.....do.....	
Equal quantities of the leaves of these plants were steeped together.	.....do.....	This remedy was used to produce a profuse perspiration and break up a fever. The first root was used also for sore throat and for diseases of women.
Dried and a decoction made.....	.....do.....	
Decoction made from 4 roots of first, a large handful of bark of second, and 1 pint of water. Dose, 1 swallow taken before breakfast and at frequent intervals, usually before eating.	Internally (used with the external remedy which follows).	The action of this remedy is a mild cathartic intended to cleanse the blood.
Use fresh roots mashed as a poultice; or scrape the inner bark, boil, and use water as a wash.	Externally.....	This remedy is especially for scrofulus neck. See Ulcers and cholera infantum.
Dried, powdered and moistened, or fresh root mashed. "Renew the application night and morning."	.....do.....	See Colds and diseases of women.
Decoction.....	.....do.....	

System or part affected	Symptoms	Botanical name	Part of plant used
Hemorrhage.....	From the nose.....	<i>Calvatia craniiformis</i> Schw. (Puffball.)	.....
Do.....	do.....	<i>Aralia nudicaulis</i> L.† (Wild sarsaparilla.)	Root.....
Do.....	do.....	<i>Verbena hastata</i> (L.) Morong. (Vervain.)	Flowers.....
Do.....	do.....	<i>Apocynum androsaemifolium</i> L.† (Dogbane.)	Root.....
Do.....	From wounds.....	<i>Tsuga canadensis</i> (L.) Carr.† (Hemlock.)	Inner bark.....
Do.....	do.....	<i>Lathyrus venosus</i> Muhl. (Wild pea.)	Root.....
Do.....	do.....	<i>Quercus</i> (species doubtful). (Oak.)	do.....
Do.....	do.....	<i>Artemisia dracunculoides</i> Pursh. † (Mugwort.)	Leaves and flowers.
Do.....	do.....	<i>Rosa arkansana</i> Porter. (Wild rose.)	Root.....
Do.....	do.....	<i>Artemisia frigida</i> Willd. (Prairie sage.)	do.....
Do.....	do.....	<i>Astragalus crassicaarpus</i> Nutt. (Ground-plum.)	do.....
Do.....	do.....	<i>Silphium perfoliatum</i> L. (Cupplant.)	Large part of root.
Diseases of women.....	Female weakness.....	<i>Amelanchier canadensis</i> (L.) Medic. (Shadbush.)	Bark.....
Do.....	do.....	<i>Erigeron canadensis</i> L. (Horseweed.)	Entire plant.....
Do.....	do.....	<i>Geum canadense</i> Jacq. (Avens.)	Root.....
Do.....	Pain in back and female weakness.	<i>Cirsium</i> sp.† (Thistle).....	do.....
Do.....	do.....	<i>Populus balsamifera</i> L.† (Balsam poplar.)	do.....
Do.....	do.....	<i>Crataegus</i> sp. (Thornapple).....	do.....
Do.....	do.....	<i>Grossularia oxycanthoides</i> . (Gooseberry.)	Berry.....
Do.....	do.....	<i>Ribes glandulosum</i> . (Wild currant.)	Root.....
Do.....	do.....	<i>Rubus occidentalis</i> L. (Blackraspberry.)	do.....
Do.....	do.....	<i>Vagnera racemosa</i> (L.) Morong. (False Solomonseal.)	do.....
Do.....	Stoppage of periods.....	<i>Artemesia dracunculoids</i> Pursh † (sterile plant). (Mugwort.)	(1) Root.....
Do.....	do.....	do.....	Root.....
Do.....	do.....	<i>Artemesia dracunculoides</i> Pursh†	(2) Leaves and stalk.
Do.....	Difficult labor.....	do.....	(3) Leaves, stalk, and root.

† Plants thus marked are mentioned in the United States Pharmacopœia. (See p. 299.)



How prepared	How administered	Remarks and references
Use soft inner part to plug the nostril, or apply it externally. Dried and powdered, or fresh root chewed and inserted in nostril. Dried and "snuffed"	Externally..... .....do..... .....do.....	See Diseases of women and humor in the blood.
Decoction made from 1 arm length and a very little boiling water.	Stuff nostril with cotton moistened with decoction or in severe cases use the mashed root as a plug.	See Headache.
Pulverized and applied dry. This is also used in many combinations.	Externally.....	
Boiled and used as a poultice. Also in a decoction taken internally.	Externally and internally..	This decoction was said to act as an emetic if blood from a wound had accumulated inside patient.
Fresh root chewed, or poultice made from dried root.	Externally.....	For a fresh wound, let it bleed a little before applying poultice.
Fresh or dried, chewed and used as poultice.	.....do.....	See Tonics and diseases of women.
These three were combined with the root of Polygala senega L. in a decoction.	.....do.....	See Fits and tonics.
Dried; cut up and pounded; used as a moist compress.	.....do.....	See Lung trouble and diseases of women.
Decoction, in combination with pin cherry, choke cherry, and wild cherry.	Internally.....	
Steeped.....	.....do.....	
Manner of preparation not stated.	.....do.....	
Decoction made from equal portions of 2 roots, a handful of the roots being used with 1 quart of water; boiled thoroughly. "Take often and freely, about a quart a day."	Internally.....	The buds of second named were used for sprains.
Decoction, in combination.....	.....do.....	
.....do.....	.....do.....	
.....do.....	.....do.....	
.....do.....	.....do.....	
Decoction made from 8 roots to 1 quart water, all of which could be taken in a day.	.....do.....	Same remedy was used for excessive flowing. This root must be pulled up, not dug. The informant stated this was the only root which must be pulled, not dug.
Another informant stated that she used 4 dried chopped roots in about 3/4 cup of water. These were not boiled but steeped thoroughly, and the tea taken at frequent intervals.	.....do.....	This remedy was considered so important that its native name is Ogima wuck, meaning "chief medicine."
Decoction, varying in strength according to cases.	.....do.....	
Decoction.....	.....do.....	

System or part affected	Symptoms	Botanical name	Part of plant used
Diseases of women.....	Stoppage of periods.....	<i>Koellia virginiana</i> (L.) MacM. † (Mountain mint.)	Root.....
Do.....	do.....	<i>Sanicula canadensis</i> L. † (Bur snakeroot.)	do.....
Do.....	do.....	<i>Ribes triste</i> Pall. (Red currant). <i>Aralia racemosa</i> L. † (Spikenard). <i>Aralia nudicaulis</i> L. † (Wild sar- saparilla.)	Stalk..... Root..... do.....
Do.....	do.....	<i>Tanacetum vulgare</i> L. † (Tansy).	Leaves.....
Do.....	do.....	<i>Rubus frondosus</i> Bigel. (Black- berry.)	Root.....
Do.....	do.....	<i>Silphium perfoliatum</i> L. † (Cup- plant.)	do.....
Do.....	Excessive flowing.....	<i>Actaea rubra</i> (Ait.) Willd. † (Red baneberry.)	Root of plant which has white berries.
Do.....	do.....	<i>Amelanchier canadensis</i> (L.) Medic. (Shadbush.)	Root.....
Do.....	do.....	<i>Populus tremuloides</i> Michx. † (Aspen.)	do.....
Do.....	do.....	<i>Populus balsamifera</i> L. † (Bal- sam poplar.)	do.....
Do.....	Difficult labor.....	<i>Solidago rigidiuscula</i> Porter. † (Goldenrod.)	do.....
Do.....	do.....	<i>Alnus incana</i> (L.) Moench. (Alder.)	do.....

† Plants thus marked are mentioned in the United States Pharmacopœia. (See p. 299.)

How prepared	How administered	Remarks and references
Decoction made from a handful of the powdered root and 1 quart of water.	Internally .....	See Tonics and fevers.
Decoction made from a handful of the powdered root and 1 quart of water.	...do.....	
Decoction; the third named was sometimes omitted from this combination. It could also be used alone.	...do.....	This remedy was used if the difficulty threatened to lead to consumption. Concerning the first, see Stoppage of urine, the second, see Boils, cough, and fracture, and the third, "Humors in the blood."
Decoction .....	...do.....	The native name of this plant means young women's drink. In old times the medicines given to maidens were different from those given to married women. This was said to be a rare remedy, and was used as a regulator for young girls. See Fevers and diseases of the ear and throat.
...do.....	...do.....	See Lung trouble.
Decoction; this root was used alone and also as an ingredient in many other remedies of this sort.	...do.....	See Hemorrhages and lung trouble.
Decoction .....	...do.....	There was said to be another variety of this plant which had red berries and was used for diseases of men.
Steeped .....	...do.....	This was given to a pregnant woman who had been injured, to prevent miscarriage.
1 root of each is put in 1 quart of water and is steeped, not boiled. Drink about every hour.	...do.....	This is used for excessive flowing during confinement or to prevent premature birth. The bark of the first named was used for cuts and the buds of the second for sprains.
1 root was steeped in 1 pint of water and taken in 3 doses about 2 hours apart.	...do.....	See Pain in the back, lung trouble, sprain, and remedies for the hair.
In preparing this remedy the root must be scraped upward. A weak decoction is made from a few inches of the root and a pint of water. The following ingredients are added to this: 4 bumblebees are caught and put in a box to die of themselves. In catching the bees they must be stunned but not injured. It destroys the efficacy if the bees are treated otherwise. The bees are dried, ground to a powder, and put in a leather packet until needed. When the medicine is to be used, a pinch of this powder is put in a small half teacup of the above decoction. The dose is about a tablespoonful. Two doses are usually sufficient. A specimen of the bee was obtained and identified as a common bumblebee.	...do.....	The plant is also used for diseases of the eye.

System or part affected	Symptoms	Botanical name	Part of plant used	
Diseases of women.....	Confinement <sup>1</sup> .....	<i>Caltha palustris</i> L.† (Cowslip)...	Root.....	
		<i>Sanicula canadensis</i> L.† (Bur snakeroot.)	do.....	
	Do.....	do.....	<i>Asclepias syriaca</i> L.† (Common milkweed.)	do.....
	Do.....	do.....	<i>Prenanthes alba</i> L. (Rattlesnake root.)	do.....
	Do.....	do.....	<i>Cirsium</i> (species doubtful).† (Thistle.)	do.....
Do.....	Broken breast.....	<i>Taraxacum officinale</i> Weber.† (Dandelion.)	do.....	
		<i>Prunus</i> (species doubtful). (Plum.)	do.....	
Disease of eye.....	Soreness.....	<i>Arisaema triphyllum</i> (L.) Torr. (Jack-in-the-pulpit.)	do.....	
		<i>Chimaphila umbellata</i> (L.) Nutt. (Pipsissiwa.)	do.....	
		<i>Cornus alternifolia</i> L.f. † (Dog- wood.)	do.....	
	Do.....		<i>Cornus alternifera</i> L. f.†.....	do.....
	Do.....		<i>Cornus stolonifera</i> Michx. (Red- osier dogwood.)	do.....
	Do.....		<i>Alnus incana</i> (L.) Moench. (Alder.)	do.....
	Do.....		<i>Heuchera hispida</i> Pursh. (Alum- root.)	do.....
	Do.....	Soreness.....	<i>Stellaria media</i> (L.) Cyrill. †.....	Leaves.....
	Do.....	Cataract.....	<i>Rosa</i> (species doubtful). (Rose)...	Inner bark of root.
			<i>Rubus strigosus</i> Michx. (Red raspberry.)	do.....
Do.....	Sty or inflammation of lid.	<i>Hordeum jubatum</i> L. (Squirrel- tail.)	Root.....	
Do.....	Sty.....	<i>Streptopus roseus</i> Michx. (Twist- ed-stalk.)	do.....	
Disease of ear.....	Soreness.....	<i>Apocynum androsaemifolium</i> L. (Dogbane).	do.....	
		<i>Aster nemoralis</i> Ait. (Aster).....	do.....	

<sup>1</sup> A young Chippewa woman whose husband was unable to support a large family said that her mother told her of an herb to prevent childbearing and that she took it. In this connection it is interesting to note that a physician of more than 20 years' experience in the Indian Service told the writer that on all the reservations where he had been stationed he was aware that the Indian women used such an herb and that he had not seen any injurious results from its use.

† Plants thus marked are mentioned in the United States Pharmacopœia. (See p. 299.)

How prepared	How administered	Remarks and references
} Decoction.....	Internally.....	{ The first-named root was used also for colds and scrofula and the leaves and stalk for stoppage of urine.
Take ½ a root, break it up and put it in a pint of boiling water, let it stand and get cold. Whenever the woman takes any liquid food, put a tablespoon of this medicine in the food.	.....do.....	This remedy was used to produce a flow of milk.
Dried and powdered. Was put in the broth a woman drank.	.....	Do.
} Take 4 roots of each to one quart of water, steep and use as a drink.	Internally.....	Do.
The dried roots were used in decoction or fresh roots were scraped and mashed.	Externally.....	See Ulcers.
Decoction.....	.....do.....	
.....do.....	Drop in the eye.....	
Scrape and steep the root, using a handful to about a pint and a half of water. Let it cool and strain well.	Bathe the eye and let some of the liquid get into the eye, or use it on a compress.	See Charms.
} Decoction made from equal parts of these roots.	{ As a wash or compress.....	{ The last named is used also for diseases of women.
Decoction made from whole root.	Externally.....	See Pain in stomach.
Put a handful of the leaves in hot water, do not let it boil long, let it stand and strain it.	Externally (wash).....	
} These two remedies are used successively, the first for removing inflammation, and the second for healing the eye. They are prepared in the same way, the second layer of the root being scraped and put in a bit of cloth. This is soaked in warm water and squeezed over the eye, letting some of the liquid run into the eye. This is done 3 times a day.		It was said that these would cure cataract unless too far advanced, and that improvement would be shown quickly if the case could be materially helped.
Dried, pounded, put in a cloth which was moistened with warm water and sopped on the eye.	Externally.....	This remedy was so strong that one root would have an effect.
Steeped root was used as a poultice.	.....do.....	
Decoction made with about 1 inch of the root	Poured into ear from a spoon.	See remedies for headache.
Decoction.....	Drop in ear or apply on cloth; use lukewarm water.	

System or part affected	Symptoms	Botanical name	Part of plant used
Disease of ear.....	Soreness.....	<i>Campanula rotundifolia</i> L. (Harebell.)	Root.....
Do.....	do.....	<i>Tanacetum vulgare</i> L. † (Tansy)	do.....
Do.....	do.....	<i>Trillium grandiflorum</i> (Michx.) Salisb. † (Wake-robin.)	Inner bark of root.
Diseases of joints.....	Rheumatism.....	<i>Abies balsamea</i> (L.) Mill. † (Bal- sam fir.)	Root.....
Do.....	do.....	<i>Anaphalis margaritacea</i> (L.) B. & H. (Pearly everlasting.)	Flowers.....
Do.....	do.....	<i>Castilleja coccinea</i> (L.) Spreng. (Painted-cup.)	do.....
Do.....	do.....	<i>Juniperus virginiana</i> L. (Red cedar.)	Little twigs.....
Do.....	do.....	<i>Taxus canadensis</i> Marsh. (Yew)	do.....
Do.....	do.....	<i>Vitis cordifolia</i> Michx. (Grape)	Root.....
Do.....	do.....	<i>Trillium grandiflorum</i> (Michx.) Salisb. † (Wake-robin.)	do.....
Do.....	do.....	<i>Plantago major</i> L. † (Plantain)	Leaves.....
Do.....	do.....	Any variety of evergreen.....	Twigs.....
Do.....	do.....	<i>Lycopodium obscurum</i> L. (Ground-pine.)	Moss.....
		<i>Picea canadensis</i> (Mill.) B. S. P. (White spruce.)	Twigs.....
		<i>Ostrya virginiana</i> (Mill.) Koch. (Ironwood.)	Chips cut from "heart" of the wood.
Do.....	Sprain or strained muscles.	<i>Artemisia absinthium</i> L. † (Worm- wood.)	Entire top of plant.
Do.....	do.....	<i>Solidago rigidiuscula</i> Porter. † (Goldenrod.)	Either stalk or root.
Do.....	do.....	<i>Populus balsamifera</i> L. † (Balsam poplar.)	Buds before they open.
Do.....	do.....	<i>Allionia nictaginea</i> Michx. (Umbrella-plant.)	Root.....
Do.....	do.....	<i>Aralia racemosa</i> L. †	do.....
Baths.....		<i>Artemisia dracunculoides</i> Pursh. † (Mugwort.)	Root, the best part was the fine fi- bers.

† Plants thus marked are mentioned in the United States Pharmacopœia. (See p. 299.)

How prepared	How administered	Remarks and references
Take 1 root to one half cup of water; steep and strain.	Use lukewarm water and drop a very little in the ear.	See Remedies for headache.
Weak decoction.....	Dropped in ear lukewarm.....	See Throat, fever and diseases of women.
Scrape the second layer of the bark of the root, put in hot water and boil.	Dropped in the ear.....	See Rheumatism.
Decoction.....	Sprinkled on hot stones, the decoction being very hot. This was used to "steam" rheumatic joints, especially of the knees, the patient being covered closely and letting steam warm the knees. See Headache and remedies for the hair.	
Decoction (steeped).....	Used in combination with wild mint, sprinkled on hot stones, said to be good for paralysis.	
do.....	Used singly or in combination, said to be good for paralysis; also good for a cold.	
These were boiled together.....	Decoction sprinkled on hot stones or taken internally.	The informant, a woman of advanced age, said this remedy came from her great-grandmother.
Steeped.....	Internally.....	See Diabetes in general remedies.
Decoction.....	"Pricked in with needles." (See p. 343.)	See Diseases of the ear.
Prepared and applied as for inflammation.	Externally.....	See Inflammation and bites.
Placed on hot stones.....	Used for steaming rheumatic joints.	
Decoction made from these three.....	Used for steaming stiff joints.	
Boiled.....	As a warm compress.....	
do.....	do.....	This was used especially when a sprain was followed by swelling. See Tonics and remedies for the hair.
(1) Steeped and used as a poultice. (2) Boiled in grease (about a handful of buds to a cup of grease), strained and kept for use when needed. Deer tallow is not good for this purpose, but bear's grease is excellent.	Externally.....	The root of this plant was used for the diseases of women.
Dried root in decoction or fresh root pounded and applied as a poultice.	do.....	
do.....		
Strong decoction.....	Strengthening bath for a child, also used for "steaming old people to make them stronger."	Various parts of this plant were used for diseases of women, hemorrhages from wounds, and dysentery; also in tonics and a remedy for the hair.

System or part affected	Symptoms	Botanical name	Part of plant used
Baths.....		<i>Asclepias incarnata</i> L.† (Swamp milkweed.)	Root.....
Do.....		<i>Eupatorium maculatum</i> L.† (Joe-Pye-weed.)	.....do.....
Do.....		<i>Zanthoxylum americanum</i> Mill.†	.....do.....
Tonics and stimulants.....		<i>Heliopsis scabra</i> Dunal. (Ox-eye)	.....do.....
Do.....		<i>Sieversia ciliata</i> (Pursh) Rydb. (Prairie-smoke.)	.....do.....
Do.....		<i>Polygala senega</i> L. (Seneca snake-root.)	.....do.....
Do.....		<i>Artemisia frigida</i> Willd. (Prairie sage.)	.....do.....
Do.....		<i>Astragalus crassicaarpus</i> Nutt. (Ground-plum.)	.....do.....
Do.....		<i>Rosa arkansana</i> Porter. (Wild rose.)	.....do.....
Do.....		<i>Lathyrus venosus</i> Muhl. (Wild pea.)	.....do.....
Do.....		<i>Fraxinus</i> (species doubtful). (Ash.)	Inner bark.....
Do.....		<i>Solidago rigidiuscula</i> Porter.† (Goldenrod.)	Roots and stalks..
Do.....		<i>Achillea millefolium</i> L.† (Yarrow.)	Root.....
Enemas.....		<i>Solidago rigida</i> L.† (Goldenrod)	.....do.....
Do.....		<i>Fraxinus</i> (species doubtful). (Ash.)	.....do.....
Do.....		<i>Betula papyrifera</i> Marsh. (White birch.)	Inner bark.....
General remedies.....	Biliousness.....	<i>Artemisia frigida</i> Willd. (Prairie sage.)	Leaves.....
Do.....	Diabetes.....	<i>Vitis cordifolia</i> Michx. (Grape)..	Root.....

†Plants thus marked are mentioned in the United States Pharmacopœia. (See p. 299.)



How prepared	How administered	Remarks and references
Put 1 root whole in 1 quart of water, steep, strain, and when cool bathe the child in it. Also good for grown people when sick or tired. Soak feet in it and lie down.	Externally.....	
Decoction; some of which was put in child's bath.	.....do.....	If a child is fretful this will make it go to sleep.
Decoction.....	.....do.....	This bath was used to strengthen legs and feet of a weakly child, especially if the limbs were partly paralyzed. See Tonics and sore throat.
Decoction of dried root or the fresh root chewed and spit on the limbs.	.....do.....	This was used to strengthen the limbs.
Dried and chewed.....	Internally.....	These roots were chewed before feets of endurance, acting as a strong stimulant. See Indigestion and diseases of the horse.
Dried; the first named is pounded and kept separately. Equal parts of the last three are pounded together until powdered. This medicine is prepared similiarly to that described on page 339. A quart of water is heated and about 1/8 of a teaspoon of the mixed ingredients is placed on the surface of the water at the 4 sides of the pail. A very little of the first (principal ingredient) is placed on top of each. The ingredients soon dissolve. A stronger decoction was secured by boiling. The medicine was taken 4 times a day, the dose being small at first, and gradually increased to about a tablespoonful. A measure made from birch bark was used for this remedy.		
		The first-named herb could also be taken dry as a tonic. (See Bull. 53, p. 64.)
Decoction.....	Internally.....	One dose of this had no effect, results being obtained only by considerable quantity of the remedy.
.....do.....	.....do.....	See Enema.
.....do.....	.....do.....	See Lung trouble, sprains, diseases of women, pain in back, and remedies for the hair.
Dried, chewed, and spit on the limbs.	Externally.....	See Headache, eruptions, and diseases of the horse.
Decoction made from a handful of the root.	.....	See Stoppage of urine.
.....do.....	.....	See Tonics.
Steeped.....	.....	
(1) Burned and vapors inhaled.....	.....	
(2) Decoction.....	Internally.....	
Steeped.....	.....do.....	See Rheumatism.

System or part affected	Symptoms	Botanical name	Part of plant used
General remedies	Fracture	Asarum canadense L.† (Wild ginger.)	Root
		Aralia racemosa L.† (Spikenard)	do
Do	do	Aralia racemosa L.†	do
Do	Swelling	Iris versicolor. (Blueflag)	do
Do		Rumex crispus L. (Yellow dock)	do
Do	Disinfectant	Equisetum hiemale L. (Scouring-rush.)	Leaves
Do		do	Prunus americana Marsh. (Wild plum.)
Do	do	Artemisia frigida Willd. (Sage)	Leaves
Do	do	Prunus virginiana L.† (Choke-cherry?)	Inner bark
		Amelanchier canadensis (L.) Medic. (Shadbush.)	do
		Prunus americana Marsh. (Wild plum.)	do
		Prunus serotina Ehrh.† (Wild cherry.)	do
Do	Antidote for "Bad medicine."	Artemisia gnaphalodes Nutt. (White mugwort.)	Flowers
Diseases of the horse			Psoralea argophylla Pursh.† (Psoralea.)
		Aralia nudicaulis L.† (Wild sarsaparilla.)	do
Do		Rudbeckia laciniata L.† (Coneflower.)	do
Do		Achillea millefolium L.† (Yarrow.)	Leaves and stalk
Do		Laciniaria scariosa (L.) Kuntze. (Blazing-star.)	Root
Do		Sieversia ciliata (Pursh) Rydb. (Prairie-smoke.)	do

How prepared	How administered	Remarks and references
Dried and equal parts used; mashed and applied as a poultice. If the arm is very sore and the poultice has become dry the poultice may be moistened with warm water before removing. Decoction .....do..... Poultice; said to be very strong.....do..... Poultice, less strong than preceding, but would cure a swelling in one day if there were no suppuration. Burned.....do.....	Externally.....do..... .....do..... .....do.....	The first named used also for indigestion, inflammation, and for tonic and food. The second named used for boils, cough, and diseases of women.
Decoction .....do..... (1) Dried, crumbled, and placed on a hot stone. (2) Fresh leaves.....do..... Decoction .....do..... Dried and placed on coals.....do.....	Wash.....do..... Hold the hands and head over it so the fumes get thoroughly into the clothing. Stuffed in nostrils and held in the mouth. Wash.....do.....	The necessary quantity was said to be "about as much as 4 willow leaves." This was used frequently in cases of contagious disease, the smoke filling the room. This herb was thus used as a protection by a person "working over the dead." The first was used for gargle and cramps; second, for dysentery and diseases of women, the third for worms, and the fourth for ulcers, cholera infantum, scrofula, and worms. Fumes acted as antidote.
Chopped and steeped with other herbs. .....do.....	Externally.....do..... .....do.....	When a horse gives out and is ready to drop, apply this decoction liberally to chest and legs; the second-named plant is used also for nosebleed, humors in the blood and diseases of women. Do. (See Indigestion.)
Decoction .....do.....	.....do.....	Used as a stimulant. See Headache, eruptions, and tonics.
Decoction made from 1 root and 1 pint of water.	Externally and internally...	This was given to a horse before a race, and also sprinkled on his chest and legs.
Dried and powdered.....do.....	Put in a horse's feed.....do.....	This was used before a race so the horse would not get winded. See Indigestion and tonics.

### WORKS CONTAINING LISTS OF PLANTS USED MEDICINALLY

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## PLANTS USED IN DYES

### PROCESS OF DYEING

The general process of dyeing among the Chippewa consisted in the use of a vegetable substance to secure a color and of a mineral substance to "set" it. Porcupine quills were the articles most easily dyed, and they retain their color longest. Rushes are the hardest material to dye and often require several "dippings" before the desired shade can be procured. Yarn and ravelings of blankets were among the materials most frequently colored by the Chippewa women. Wooden implements were colored by rubbing them with the fresh root of the blood-root, producing an orange shade.

Both plants and tree products were used in dyes. The latter could be obtained at any season of the year, and the trees used were common trees, so they were usually obtained when needed. An exception is the butternut tree, which does not grow in all parts of the Chippewa country. The inner bark of this is used for black dye, and packets of it are taken from one locality to another and kept as carefully as medicinal roots. Whenever a woman sees a plant that she may at some time need in making dye she gathers it, dries it, and stores it for use.

### LIST OF PLANTS USED IN DYES

Botanical name	Common name	Part of plant used
<i>Alnus incana</i> (L.) Moench	Alder	Inner bark.
<i>Betula papyrifera</i> Marsh	White birch	Do.
<i>Coptis trifolia</i> (L.) Salisb	Goldthread	Root.
<i>Cornus stolonifera</i> Michx	Red-osier dogwood	Inner bark.
<i>Corylus americana</i> Walt	Hazel	Green bur.
<i>Juglans cinerea</i> L	Butternut	Bark and root.
<i>Acer</i>	Maple (any variety)	Rotted wood.
<i>Juniperus virginiana</i> L	Cedar	Inner bark.
<i>Lithospermum carolinense</i> (Walt) MacM.	Puceoon	Dried root.
<i>Prunus americana</i> Marsh	Chokecherry	Inner bark.
<i>Quercus macrocarpa</i> Muhl	Bur oak	Do.
<i>Rhus glabra</i> L	Sumac	Pulp of stalk, also inner bark.
<i>Sanguinaria canadensis</i> L	Bloodroot	Inner bark.
<i>Tsuga canadensis</i> (L.) Carr	Hemlock	Do.

## MINERAL SUBSTANCES USED IN DYES

The reddish substance that rose to the surface of certain springs was collected, dried, and baked in the fire. It then "became hard like stone." This was powdered and the fine red powder kept in buckskin. When mixed with grease it made a paint that was reddish but not vermilion and was used on arrows and for painting faces and bodies. The "scum" contained iron oxide, and the powder is referred to as ochre in the following formulae.

A black earth which "bubbled up in certain springs" was used in black dyes. The writer visited such a spring on the Manitou Rapids Reserve in Ontario and was told that the Chippewa women buried their rushes in the black earth for a few days and thus secured a satisfactory black color. A specimen of this mud was obtained and submitted to a chemist in Washington who stated that "it is full of compounds of iron with organic acids." He suggested that the method of staining is the action of these irons on the tannin in the wood, producing an ink.

It is said that the material used in earliest times to "set a color" was obtained by putting a piece of "black oak" in "dead water" and allowing it to remain for about two years. Thus it became so hard that it could be used as a whetstone, and the dust from this whetstone was combined with vegetable matter in dyes. At the present time the substance commonly used to "set the color" is the dust from an ordinary grindstone. A specimen of this dust was submitted to Dr. G. P. Merrill, of the United States National Museum at Washington, who pronounced it silt. On testing it with hydrochloric acid a greenish color was produced, showing the presence of iron.

FORMULAE FOR DYES<sup>1</sup>

## RED DYE

## FIRST FORMULA

*Betula papyrifera* Marsh. White birch.

*Cornus stolonifera* Michx. Red-osier dogwood. Outer and inner bark.

*Quercus* species. Oak.

Ashes from cedar bark.

Hot water.

*Directions.*—Boil the barks in the hot water. Prepare the ashes by burning about an armful of scraps of cedar bark. This should make about 2 cups of ashes, which is the correct quantity for about 2 gallons of dye. Sift the ashes through a piece of cheesecloth. Put them into the dye after it has boiled a while, then let it boil up again, and then put in the material to be colored. Do not let a man or any outsider look into the dye.

<sup>1</sup> Unless otherwise stated, the portion of the tree used in dye was the inner bark.

## SECOND FORMULA

*Lithospermum carolinense* (Walt) MacM. Puccoon. Nine inches of the dried root or an equivalent amount of the pulverized root.

Hot water, 1 quart.

Ochre, 1 teaspoonful.

*Directions.*—If this is being used for dyeing porcupine quills, let it boil up a little, then put in the quills, which have previously stood for a while in hot water. Let the quills boil half an hour to an hour, keeping the kettle covered, then remove from the fire and let the quills stand in the dye for several hours. If they are not bright enough they may be redyed, letting them stand in the dye as before. The process is substantially the same in dyeing other materials.

## THIRD FORMULA

This formula was used by Mrs. Razer in dyeing porcupine quills for the writer, the result being a brilliant scarlet which closely resembled aniline dye. The quills were seen in the dye.

*Sanguinaria canadensis* L. Bloodroot. 2 handfuls. Root.

*Prunus americana* Marsh. Wild plum. 1 handful.

*Cornus stolonifera* Michx. Red-osier dogwood. 1 handful.

*Alnus incana* (L.) Moench. Alder. 1 handful.

Hot water, 1 quart.

The inner bark of the trees and the root of the bloodroot were used, all being boiled before the quills were put in the dye.

## FOURTH FORMULA (DARK RED)

*Sanguinaria canadensis* L. Bloodroot. 1 handful. Root.

*Prunus americana* Marsh. Wild plum. 1 handful.

Hot water, 1 quart.

## FIFTH FORMULA (MAHOGANY COLOR)

*Tsuga canadensis* (L.) Carr. Hemlock. Bark.

A little grindstone dust.

Hot water.

## SIXTH FORMULA (MAHOGANY COLOR)

*Juniperus virginiana* L. Red cedar.

The bark of this tree was used by Chippewa women in Ontario for coloring the strips of cedar used in their mats. A decoction was made of the dark red inner bark and the strips were boiled in it.

## SEVENTH FORMULA

The following formula was used by Mrs. Razer in coloring pieces of white blanket for the writer. The resultant color was a pretty

light red. The piece of blanket was exposed to the weather for several weeks and showed slight change of color.

*Cornus stolonifera* Michx. Red-osier dogwood.

*Alnus incana* (L.) Moench. Alder.

Hot water.

The bark of these trees was used in equal parts.

#### BLACK DYE

The black rushes in the mat illustrated in Plate 48, *a*, were colored with the first of these formulae. It was necessary to dip rushes every day for about two weeks, boiling them a short time and then hanging them up to dry. These rushes are a clear, heavy black. When the process was completed and the black rushes were dry they were rubbed thoroughly with a little lard "to make them shiny and limber."

#### FIRST FORMULA

*Juglans cinerea* L. Butternut.

*Corylus americana* Walt. Hazel, green.

These two were boiled together.

#### SECOND FORMULA

*Quercus macrocarpa* Muhl. Bur oak.

*Juglans cinerea* L. Butternut. Inner bark and a little of the root.

Black earth.

Ochre.

Hot water.

*Directions.*—Boil the barks and root; after a while put in the black earth and later add the ochre. The more it is "boiled down" the blacker will be the dye. It can be kept in a kettle and heated when used.

#### THIRD FORMULA

*Alnus incana* (L.) Moench. Alder.

*Cornus stolonifera* Michx. Red-osier dogwood.

*Quercus* species. Oak.

Either grindstone dust or black earth.

Hot water.

#### FOURTH FORMULA

*Quercus macrocarpa* Muhl. Bur oak.

*Corylus americana* Walt. Hazel. Green-burs.

*Juglans cinerea* L. Butternut.

Black earth.

Hot water.

*Directions.*—Put the inner bark of the oak and the green hazel burs in hot water and boil; add other ingredients later. Let it stand a long time before using.



## FIFTH FORMULA

*Juglans cinerea* L. Butternut.  
Grindstone dust.  
Hot water.

## SIXTH FORMULA

Black earth.  
Grindstone dust.

## SEVENTH FORMULA

The following formula was used in dyeing a piece of white blanket for the writer. The result was not a heavy black, but this was said to be due to the insufficient quantity of the dye.

Inner bark of oak.  
Green hazel burs.  
Grindstone dust.  
A little ochre dust.  
Hot water.

## YELLOW DYE

The simplest Chippewa dye is in shades of yellow, as the materials for these shades are easily available and often one substance is sufficient.

## FIRST FORMULA

Used in coloring yarn a light yellow, the process being seen by the writer.

*Alnus incana* (L.) Moench. Alder.  
Hot water.

*Directions.*—It is best to use only the inner bark, though both inner and outer bark can be used. Either green or dried bark can be used. Pound the bark until it is in shreds and steep it, putting in the material while the dye is hot and letting it boil up. Nothing is needed to set the color.

## SECOND FORMULA (LIGHT YELLOW)

*Rhus glabra* L. Sumac. Pulp of the stalk.  
Ochre dust (this may be omitted).  
Hot water.

## THIRD FORMULA (DARK YELLOW)

*Sanguinaria canadensis* L. Bloodroot. Root.  
Hot water.

Either the green or dried root is pounded and steeped. Nothing is needed to set the color.

## FOURTH FORMULA (DARK YELLOW)

*Sanguinaria canadensis* L. Bloodroot. Double handful of shredded root.  
*Prunus americana* Marsh. Wild plum. Single handful of shredded root.  
 Hot water.

Boil these together.

## FIFTH FORMULA (BRIGHT YELLOW)

*Coptis trifolia* (L) Salisb. Goldthread. Roots.  
 Hot water.

This plant has long slender roots and a great many were required. As in other formulæ, the material was boiled in the dye.

## SIXTH FORMULA

*Rhus glabra* L. Sumac. Inner bark.  
*Sanguinaria canadensis* L. Bloodroot. Root.  
*Prunus americana* Marsh. Wild plum. Inner bark.  
 Hot water.

The inner bark of the plum was scraped, and it was said that this was used "to set the color."

## SEVENTH FORMULA

The formula next following was used in coloring a piece of white blanket for the writer, and produced an ecru or "khaki" color. The piece of blanket was exposed to the weather for several weeks and showed no change in color.

*Sanguinaria canadensis* L. Bloodroot.  
*Prunus americana* Marsh. Wild plum.  
*Cornus stolonifera* Michx. Alder.  
 Hot water.

## PURPLE DYE

The material used to secure this color is rotten maple wood. It is difficult to obtain, as the wood must be very old.

Rotten maple, double handful.  
 Grindstone dust, single handful.  
 Hot water.

The material is boiled in the dye, as in other colors.

## GREEN DYE

The Chippewa in Minnesota do not color green with native dyes but a birch-bark basket decorated with dried grass in a bright green color was obtained in Ontario. The Chippewa woman who colored it said that she used green dye, one plant ingredient in the dye being obtained. It was impossible at that season of the year to obtain the principal ingredient.

## PLANTS USED AS CHARMS

It was the belief of the Chippewa that many herbs, as well as other substances, possessed the power to act without material contact, affecting the actions or conditions of human beings and animals. In order to make these substances effective it was considered necessary to "talk and pray" over them when they were used, and, in the case of an herb, to "talk and pray" when it was gathered. The Chippewa refer to all such substances or combinations of substances as "medicine," indicating a belief in their extraordinary power. Thus it is said that a man "carries a great many medicines," or "uses medicine all the time," meaning that he has in his possession a large number of materials, probably in little buckskin packets, with which he can produce such effects as safety on a journey, the loss or winning of a race, or the finding of lost articles; or he can cause starvation in a certain lodge, insanity in an individual, or enable a man to bewitch another man's wife. It is said that "the Chippewa were greater medicine people than most of the Indians," the knowledge and use of such substances being transmitted in the Midewiwin together with remedies for treating the sick.

The term "charm" used in this chapter has no Chippewa equivalent. Songs were not used with the working of these charms, the efficacy being secured, as indicated, by "talking and praying." With the "Song of the fire charm" (Bull. 45, Bur. Amer. Ethn., No. 86) a decoction of herbs was applied to the feet, enabling a man to walk in fire without harm. A similar use of herbs, in the present work, is classified as a remedy for burns on page 353.

Charms are considered in the following classes: Love charms, charms to attract worldly goods, charms to insure safety and success, charms to influence or attract animals, charms to work evil, and protective charms. In some instances the charm was carried by the individual working the magic, and in other instances the material was applied to articles belonging to the person who was to be affected by the charm. Herbs were used alone or together with substances believed to increase their power.

Attention is directed to the use of certain plants as charms and also as medicines. A large proportion of the plants used as charms had some value as either medicines or food, but the following are of special interest as the condition supposed to be affected by the charm, and the ailment for which the plant was administered, are alike connected with a disturbance of the nervous system.

Dogbane was used as a protective charm against evil influence or "bad medicine," and also as a remedy for headache.

Wild pea was used as a charm to insure success, especially when the person was in extreme anxiety concerning the outcome of circumstances. It was also used as a remedy for convulsions.

Seneca snakeroot was used as a charm for safety on a journey, which in the minds of the old Indians was attended with some anxiety. It was also used as a stimulating tonic.

## LIST OF PLANTS USED IN CHARMS

Botanical name	Part of plant used	Manner of use
<i>Acorus calamus</i> L.....	Root combined with <i>Aralia nudicaulis</i> L.	(1) Decoction made from roots put on fish nets. (2) Decoction used "to rattle snakes away."
<i>Agastache anethiodora</i> (Nutt.) Britton.	Whole plant.....	Protection.
<i>Apocynum androsaemifolium</i> L.	Root.....	Chewed to counteract evil charms.
<i>Aralia nudicaulis</i> L.....	Root combined with <i>Acorus calamus</i> .	
<i>Arctostaphylos uva-ursi</i> (L.) Spreng.	Root.....	Smoked in pipe to attract game.
<i>Artemisia gnaphalodes</i> Nutt.	Flowers dried.....	Placed on coals; fumes as antidote to bad medicine.
<i>Asclepias syriaca</i> L.....	Root combined with root fibers of <i>Eupatorium perfoliatum</i> L.	Applied to whistle for calling deer.
<i>Aster novae-angliae</i> L.....	Root.....	Smoked in pipe to attract game.
<i>Aster puniceus</i> L.....	Fine tendrils of root.....	Smoked with tobacco to attract game.
<i>Cornus alternifolia</i> L. f.....	Root.....	Put on muskrat trap.
<i>Eupatorium perfoliatum</i> L.....	Root fibers combined with <i>Asclepias syriaca</i> L.	Applied to whistle for calling deer.
<i>Hepatica triloba</i> L.....	Root.....	Put on traps for fur-bearing animals.
<i>Lathyrus venosus</i> Muhl.....	Root dried.....	Carried on the person to insure successful outcome of difficulties.
<i>Onosmodium hispidissimum</i> Mackenzie.	Seeds.....	Love charm; also to attract money or worldly goods.
<i>Plantago major</i> L.....	Root powdered.....	Carried on the person as protection against snake bites.
<i>Polygala senega</i> L.....	Root.....	Carried on person for general health and for safety on a journey.

## PLANTS IN USEFUL AND DECORATIVE ARTS

The collection of every tree and plant that entered into the economic life of the Chippewa is not necessary to the present undertaking. The following list is representative, and the familiar quality of many materials is suggestive of their use. Thus, the maple, oak, ash, basswood, ironwood, and pine are so manifestly adapted for the making of household articles, snowshoe frames, sleds, etc., that a detailed account of their use is unnecessary. Brief notations are therefore given concerning the more familiar trees and plants, especially noting the uses which are peculiar to the Indians.

## LIST OF PLANTS IN USEFUL AND DECORATIVE ARTS

Botanical name	Common name	Use
<i>Acer saccharum</i> Marsh.	Maple	Paddles for stirring maple sap, etc.
<i>Allium stellatum</i> Ker.	Wild onion	Toys.
<i>Arctium minus</i> Bernh.	Burdock	Leaves for head covering.
<i>Arctostaphylos uva-ursi</i> (L.) Spreng.	Bearberry	Smoking.
<i>Betula papyrifera</i> Marsh.	White birch	Utensils, coverings for dwellings, patterns for work in decorative art.
<i>Bovista pila</i> B. and C.		Paint for the dead.
<i>Cicuta maculata</i> L.	Poison hemlock	Seeds mixed with tobacco and smoked.
<i>Clintonia borealis</i> Ait.	Clintonia	Patterns bitten in leaves for entertainment.
<i>Cornus rugosa</i> Lam.	Dogwood	Smoking.
<i>Cornus stolonifera</i> Michx.	Red-osier dogwood	Do.
<i>Corylus americana</i> Walt.	Hazel	Drumming sticks, etc.
<i>Corylus rostrata</i> Ait.	do.	Do.
<i>Crataegus</i> sp.	Thornapple	Thorns used as awls.
<i>Dieranum bonjeanii</i> De Not.	Woodmoss	Absorbent.
<i>Equisetum hiemale</i> L.	Scouring rush	Scouring.
<i>Fraxinus</i> sp.	Ash	Making of snowshoe frames, sleds, etc.
<i>Fraxinus nigra</i> Marsh.	Black ash	Bark used in covering wigwams.
<i>Hicoria alba</i> (L.) Britton	Hickory	Bows, etc.
<i>Juniperus virginiana</i> L.	Red cedar	Mats, etc.
<i>Larix laricina</i> (Du Roi) Koch.	Tamarack	Roots in weaving bags, etc.
<i>Lithospermum carolinense</i> (Walt) MacM.	Puceoon	Face paint.
<i>Ostrya virginiana</i> (Mill.) Koch.	Ironwood	Frames for dwelling, etc.
<i>Picea rubra</i> (Du Roi) Dietr.	Spruce	Gum used in making pitch, roots in sewing canoes, etc.

## LIST OF PLANTS IN USEFUL AND DECORATIVE ARTS—Continued

Botanical name	Common name	Use
<i>Phragmites communis</i> Trin.	Reed.....	Woven frames for drying berries.
<i>Pinus</i> sp.....	Pine.....	General utility.
<i>Pinus resinosa</i> Ait.....	Red pine.....	General utility and toys.
<i>Quercus</i> sp.....	Oak.....	Awls, etc.
<i>Salix</i> sp.....	Willow.....	Smoking and general utility.
<i>Sarracenia purpurea</i> L.....	Pitcher plant.....	Toys.
<i>Scirpus validus</i> Vahl.....	Bulrush.....	Mats and toys.
<i>Sphagnum</i> .....	Moss.....	Absorbent.
<i>Tilia americana</i> L.....	Basswood.....	Twine and general utility.
<i>Torresia odorata</i> (L.) Hitchc.	Sweet grass.....	Ceremonial, economic and pleasurable.
<i>Typha latifolia</i> L.....	Cat-tail.....	Mats, baskets, etc.
<i>Ulmus fulva</i> Michx.....	Slippery elm.....	General utility.
<i>Urticastrum divaricatum</i> (L.) Kuntze.	False nettle.....	Twine.
	Grass.....	Toys.

## MANNER OF USE

Twine was one of the most important articles in the economic life of the Chippewa. It was made chiefly from the inner bark (fiber) of the basswood, though slippery elm bark was also used for this purpose. The twine was used in the weaving of mats and the tying of large and small packets. For some purposes the fiber was used without twisting, the width of the fiber depending on the strength required; thus a strip of fiber as soft and fine as cotton string could be obtained, or a heavy fiber that would hold a considerable weight. The fiber was boiled to give additional toughness if this was especially desired. In preparing the fiber it was customary to cut the bark from the basswood tree in long strips, put it in the water at the edge of a lake, among the rushes, for a few days, after which the soft inner bark could be separated from the outer bark. (Pl. 47.) The fiber thus obtained was separated into strips less than an inch wide and stored in large coils until needed. The twisting of the fiber into twine could be done at any time. Twine was also made from the dry stalks of the false nettle. This was used in sewing and, in two grades of fineness, was used in making fish nets. It is said that a cloth was once made of this fiber and used for women's dresses.

The thorns of the thorn-apple tree were gathered by the women and used as awls in their sewing. Awls were also made of oak.

Bulrush mats for the floor were woven on frames, the basswood twine being passed "over and under" the rushes. (Pl. 48, *a*.) Reeds

were used in making the frames on which berries were dried, the stiff, clean *Phragmites communis* being used for this purpose. It was desirable that rushes, bark and similar materials be kept somewhat moist, and a dark, cool shed was adapted to this purpose. (Pl. 48, c.)

The leaves of the bearberry and the inner bark of red-osier dogwood were smoked for pleasure. (Pl. 49.) The plants smoked as charms are noted in the section on that subject.

Coverings for dwellings were made of sheets of birch bark sewed together with basswood twine, these being used on the dome-shaped wigwam. Sheets of jack pine or of elm were used on the dwellings shaped like the white man's cabin. Cedar boughs were used for bedding. The leaves of the burdock were sewed together or sewed on a strip of birch bark as a head covering for those obliged to work in the hot sun. (Pl. 50, a.) The juice of puceon was used as a paint for reddening the cheeks. A brown fungus (*Bovista pila* B. and C.) was used in painting the faces and garments of the dead, preparatory to their joining the dance of the spirits where the Northern Lights are shining. The flaring lights in the north were said to be the motion of the spirits in their dance, and a woman in a trance saw the spirits paint their faces with this material.

Spruce gum was considered best for use in calking canoes and birch-bark pails. It was prepared by boiling the gum in a wide-meshed bag which retained the bits of wood and bark, allowing the gum to pass into the water. It was skimmed from the surface and stored until a convenient time when it was mixed with charcoal made from cedar. Slippery elm bark was chewed and used occasionally to calk small containers made of birch bark.

Tamarack roots were used in sewing the edges of canoes and in making woven bags.

Rushes were tied in small bundles and used for scouring utensils, the two varieties thus used being *Equisetum hiemale* L. and *Equisetum praealtum* Raf.

Toys were made for children from many sorts of plants. The children themselves cut the stems of the wild onion and made little whistles. The stem, or "top," was allowed to dry a little and a sound hole was cut in the side, after which a sound was produced by blowing across the end. The leaves of the pitcher plant were called "frog-leggings" and used as toys, or filled with ripe berries. Red berries were strung and used as necklaces. Dolls were made from the broad leaves of trees, the leaves being fastened in place with little wooden splints and sometimes a collar of birchbark added. (Pl. 50, b.) Flat dolls were cut from the stiff inner bark of slippery elm, or formed of twigs covered with the same sort of willow used for baskets. Dolls were also made of grass. It is interesting to note

the lengthened proportions of these dolls and the small bodies which were well adapted to the grasp of a little hand. This was the more advantageous among a people who moved frequently from one camp to another. In these migrations it was necessary for a child to keep possession of its own toys.

The outer covering of cat-tail rushes was formed into toys representing human beings and ducks. (Pl. 51, *a*.) The latter were usually made in groups of five. They were placed on the surface of smooth water, and the child agitated the water by blowing across it, which caused the ducks to move in a lifelike manner.

Little figures were made of tufts of the needles of the red pine or "Norway pine," by cutting across the needles at different lengths to represent the arms and the hem of the dress. (Pl. 51, *b*.) These little figures were placed upright on a sheet of birchbark or, better, on a piece of tin, which was gently agitated in such a manner that the figures appeared to dance. Considerable skill could be shown in producing a motion of the figures.

Grass was used in the making of dolls, as noted, and also in the making of a game implement. The purpose of the game was to toss up the little bundle of grass and catch it on the pointed stick. In the "ring and awl" game the ring was of wood. Numerous other toys and game implements were made of wood.

A "coaster" was made of slippery elm bark (pl. 52, *a*), a stiff piece of bark being selected, turned up at the end, and a piece of stout twine attached to this portion. A child stood on this with one foot, held the twine in its hand, and coasted down hills in winter.

The down of the cat-tail rushes was put around an infant in its cradle board, and sometimes put inside a child's moccasins for additional warmth in winter. Sometimes it was mixed with moss for added warmth.

Three types of uses of sweet grass were noted among the Chippewa—i. e., ceremonial, economic, and pleasurable.

An instance of the first use occurs in the narrative of a hunting incident in which a party of men placed sweet grass on the fire when the camp was in danger of starving and they were going again to hunt. The use of incense is more characteristic of the Plains Indians than of Algonquian tribes.<sup>10</sup>

Medicine men kept sweet grass in the bag with their medicinal roots and herbs.

Strands of sweet grass were made into "coiled basketry" by means of cotton thread. This took the form of bowls, oval and round, and of flat mats. Birch bark was sometimes used as the center of such articles, the coils of sweet grass being sewed around it.

<sup>10</sup> See Handbook of American Indians, Bull. 30, Bur. Amer. Ethn., pt. 1, p. 604.

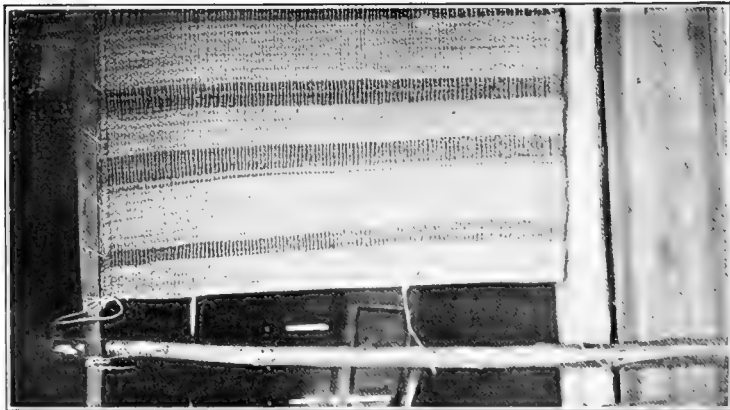




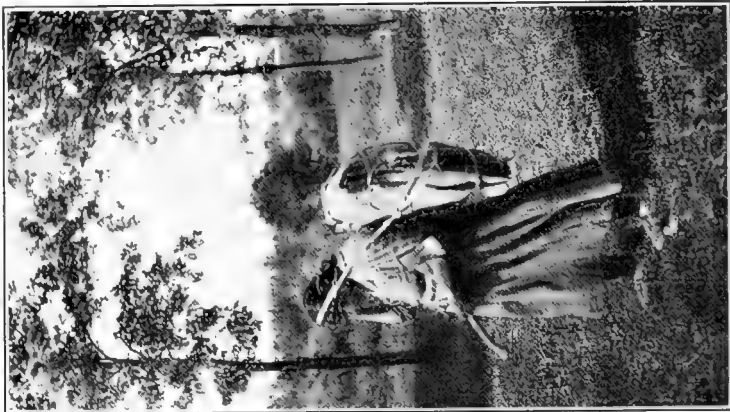
a, TAKING BASSWOOD BARK FROM WATER



b, COILS OF BASSWOOD FIBER



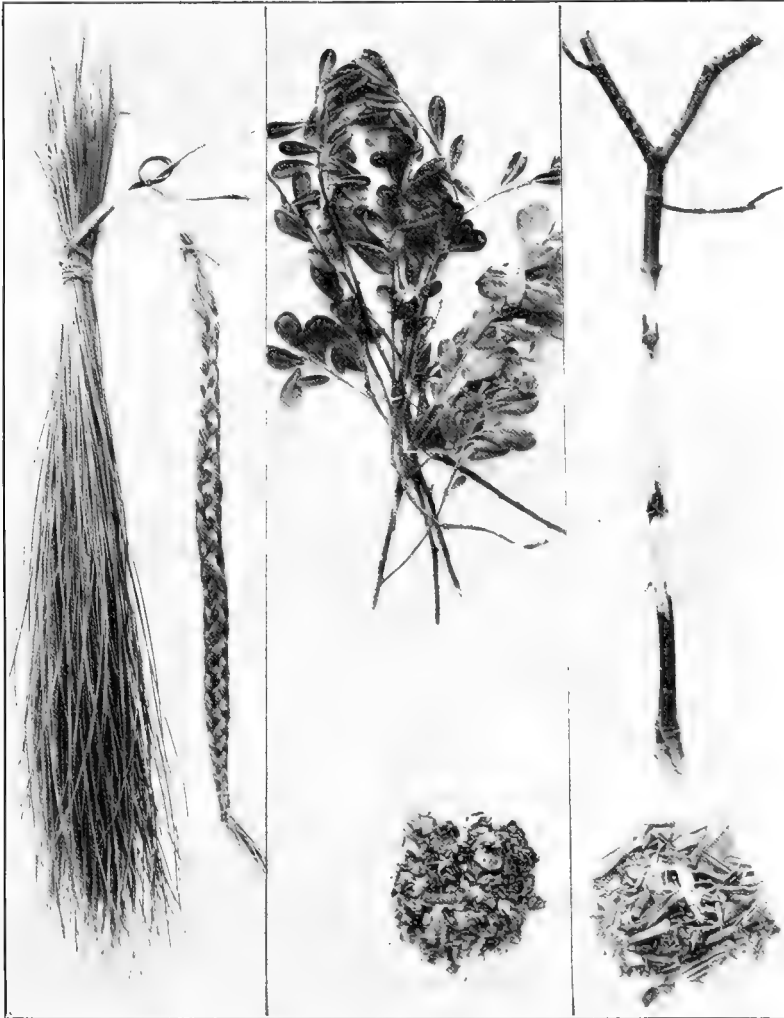
a, RUSH MAT IN FRAME



b, WOMAN CARRYING PACK OF  
BIRCH BARK



c, STORAGE SHED (OPEN)



SWEET GRASS AND MATERIALS SMOKED IN PIPE, IN NATURAL AND PREPARED FORMS



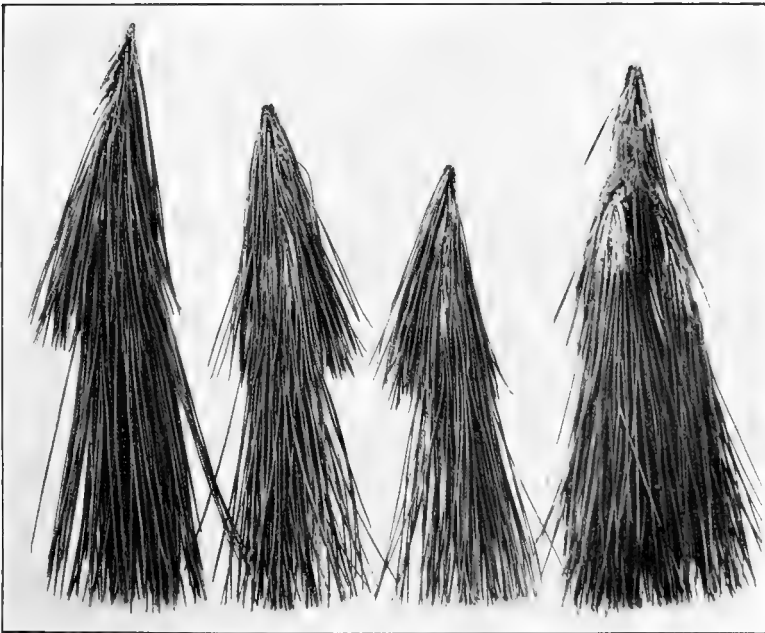
a. HEADBAND OF LEAVES AND BIRCH BARK



b. DOLL MADE OF LEAVES



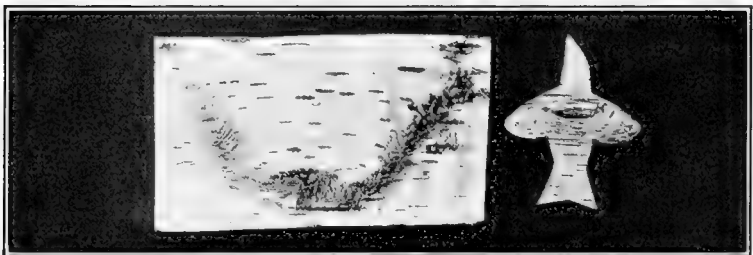
a, TOYS MADE OF CAT-TAILS



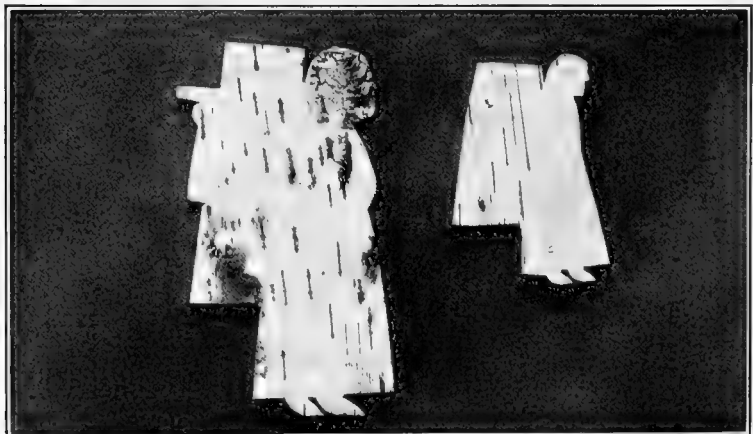
b, DOLLS MADE OF PINE NEEDLES



a, "COASTER" MADE OF SLIPPERY ELM BARK



b, BIRCH BARK SHOWING "PICTURE OF THUNDERBIRD"



c, FIGURES CUT FROM BIRCH BARK

Young people, chiefly young men, carried a braid of sweet grass and cut off 2 or 3 inches of it and burned it for perfume. (Pl. 49.) Young men braided sweet grass with their hair for the perfume. Young men wore two braids of sweet grass around their necks, the braids being joined in the back and falling on either side of the neck like braids of hair.

The birch and the cedar were regarded as "sacred" by the Chippewa. The two reasons for this "sacredness" are closely connected. One is the great usefulness of these trees to the Chippewa and the other is their connection with Winabojo, yet these two reasons are really one, for everything that is a benefit to the tribe is traced to Winabojo, the mythical character who, it is said, taught the Chippewa to live in their natural environment and yet, by his apparently witless actions, gave them an endless supply of humor. The amusing stories of Winabojo are told and retold by the old people around the winter fire. A misunderstanding of these humorous stories has given to some students an impression that Winabojo was a fantastic deity, but the old, thoughtful Indians understood him to be the source and impersonation of the lives of all sentient things, human, faunal, and floral. He endowed these sentient things with life, and taught to each its peculiar ruse for deceiving its enemies and prolonging its life. His "tricks" were chiefly exhibitions of his ability to outwit the enemies of life. He was thus regarded as the master of ruses, but he also possessed great wisdom in the prolonging of life. It was he who gave the Indians their best remedies for treating the sick, and who taught the animals the varied forms of protective disguise by which their lives can be extended. His own inherent life was so strong that, when apparently put to death, he reappeared in the same or a different form. This character, under slightly different names, appears in many Algonquian tribes, among the spellings of his name being Nanabush, Minabozho, and Nenabozho.<sup>11</sup>

The stories of Winabojo and the birch and cedar trees were told by Mrs. Razer, whose ceremonial felling of a birch tree is described on pages 386 and 387.

#### LEGEND OF WINABOJO AND THE BIRCH TREE

There was once an old woman living all alone on the shore of Lake Superior. She had a little girl living with her whom she called her daughter, though she did not know exactly where the child came from. They were very poor and the little girl went into the woods and dug wild potatoes or gathered rose berries for them to eat. The little girl grew up to be a woman, but she kept on doing the same work, getting potatoes and berries and picking up fish that were

<sup>11</sup> See Handbook of American Indians, Bull. 30, Bur. Amer. Ethn., pt. 2, pp. 19-23.

washed ashore. One day when doing this she had a strange feeling as though the wind were blowing underneath her clothing. She looked around her but saw no signs of anyone. After a while she went home.

As soon as she entered the house her mother saw that she looked troubled and bewildered. Her mother asked, "Did you see anyone? Did anyone speak to you?" The girl replied, "I saw no one and heard no one speak to me." After a time the mother noticed that the girl was pregnant and questioned her again but the girl replied as before, that she had seen no one. The only thing strange to her was the sensation of the wind blowing about her which she had described to her mother. When the time came for her to be delivered there was a sound as of an explosion and the girl disappeared, leaving absolutely no trace. The old woman threw herself on the ground and wailed because her daughter had disappeared. She searched everywhere but could find no trace of her. Finally, in looking among the leaves, she saw a drop of blood on a leaf. She picked it up carefully and put it beside her pillow. After a while, as she lay there, she thought she heard some one shivering and breathing near her head. She lay still, not knowing what to do. She heard the breathing near her head constantly. As she lay there wondering what it could be she heard a sound like that of a human being. She said, "I guess I am going to be blessed."<sup>12</sup> As she lay there a voice spoke and said, "Grandmother, get up and build a fire. I am freezing." The old woman arose and looked around, and there beside her lay a little boy. She took him up and caressed him. She got up and made a fire to warm him, and behold the child was Winabojo. All the spirits that roam the earth were frightened at the birth of Winabojo, for they knew his power. Throughout his human life he was a mysterious being with miraculous powers. He grew rapidly in strength and soon began to help his grandmother. He dug potatoes and brought fish and berries for her.

One day, when he had grown to be almost a man, he asked his grandmother what was the largest fish in the lake. She replied, "Why do you ask? It is not good for you to know. There is a large fish that lives over by that ledge of rock, but it is very powerful and would do great harm to you." Winabojo asked, "Could the great fish be killed?" His grandmother replied, "No; for he lives below the rocks and no one could get down there to kill him."

Winabojo began to think about this and he made up his mind that he would learn to fight so that he could kill the great fish. He got some wood and began to make bows and arrows. Then he asked his

<sup>12</sup> This phrase is commonly used to designate a supernatural visitation or other direct evidence of supernatural favor.



grandmother if she knew of any bird whose feathers he could put on the arrows to make them effective. The old woman replied "No. The only bird whose feathers would make the arrows effective is a bird that lives in the sky, at the opening of the clouds. One would have to go up there to get the feathers." Winabojo began to think how he could go up there and get the feathers that he was determined to have. At last he said to himself, "There is a high cliff on the edge of the lake. I will go up there and stay a while."

When he reached the high cliff he wished that he might change into a little rabbit. So he became a little rabbit and lived there. One day he went on a very high part of the cliff and called to a big bird, saying, "Eagle, come here. I am a cunning little animal. I would be a nice plaything for your children." The bird flew down and saw the little rabbit playing there. The rabbit was the cunningest thing he had ever seen. The big bird was the thunderbird and he alighted on the top of the high cliff, near the little rabbit. Finally he took the little rabbit and flew up, up toward the opening in the sky.

When the thunderbird came to his nest he called to his children, "I have brought you something very cunning to play with." His wife spoke to him very crossly and said, "Why did you bring that rabbit up here? Have you not heard that Winabojo is on the earth? There is no knowing what you have picked up." But the little rabbit was very meek and quiet, letting the children play with him as they liked. The big birds were seldom at home as they went away to get food for their children.

All at once, one day, Winabojo began to talk to himself and he said, "These children throw me around as though I was nothing. Don't they know I came here to get some of their feathers?" The next time the old birds went away he changed into his human form, took a club, killed the little thunderbirds and pulled off their feathers. He hurried around and tied the feathers up in bundles for he was sure the old birds would soon be home. When all was ready he jumped off. He was not killed because he was a *manido* (spirit) and nothing could hurt him. He was unconscious for a time after he fell on the earth but he was not hurt. Soon there was a great roaring in the sky with flashes of lightning. The thunderbirds were coming after him. Winabojo jumped up when he saw the flashes of lightning and heard the thunder. The lightning was the flash of the thunderbirds' eyes and the roaring was their terrible voices. He snatched up the bundles of feathers and ran for his life. Wherever he went the flashes and the roaring followed him, but he held on to the feathers. He had gotten what he wanted and he did not intend to lose them. The thunderbirds kept after him and at last he felt

that they were tiring him out. He began to fear that he would be killed after all. The thunderbirds came so close that they almost grasped him with their claws. He was getting bewildered. They were almost upon him when he saw an old, fallen birch tree that was hollow. He crept into the hollow just in time to save his life. As he got in the thunderbirds almost had their claws on him.

The thunderbirds said, "Winabojo, you have chosen the right protection. You have fled to a king-child." There they stopped. They could not touch him for the birch tree was their own child and he had fled to it for protection. There he lay while the thunder rolled away and the flashes of the thunderbirds' eyes grew less bright. He was safe.

When the thunderbirds had gone away Winabojo came out of the hollow birch tree and said, "As long as the world stands this tree will be a protection and benefit to the human race. If they want to preserve anything they must wrap it in birch bark and it will not decay. The bark of this tree will be useful in many ways, and when people want to take the bark from the tree they must offer tobacco to express their gratitude." So Winabojo blessed the birch tree to the good of the human race. Then he went home, fixed his arrows with the feathers of the little thunderbirds and killed the great fish.

Because of all this a birch tree is never struck by lightning and people can safely stand under its branches during a storm. The bark is the last part of the tree to decay, keeping its form after the wood has disintegrated, as it did in the tree that sheltered Winabojo.

The little short marks on birch bark were made by Winabojo but the "pictures" on the bark are pictures of little thunderbirds. (Pl. 52, *b.*) It was said that the bark in some localities contains more distinct pictures of the little thunderbirds than in others.<sup>13</sup>

#### LEGEND OF WINABOJO AND THE CEDAR TREE

Many generations ago after Winabojo disappeared from the earth he lived on an island toward the sunrise. The direction of the sunset indicates death, but Winabojo was still alive and he lived in the east toward the sunrise. He could not be destroyed because he was *manido*, neither could he be permitted to roam at will as he had done, so he was placed on this island to stay there as long as the earth endures.

At that time there was a man who had only one daughter and she died. He felt that he could not live without her and kept telling his friends that he wanted to go to the spirit land and get his daughter.

<sup>13</sup> A collection of stories regarding this hero may be found in Jones's *Ojibwa Texts*, ed. Truman Michelson, vol. VII, Publications of the American Ethnological Society. The works of Schoolcraft, Radin, De Jong, Skinner, and George E. Laidlaw should be mentioned in this connection.

He was told that if he could find Winabojo he would learn the way to the spirit land, for Winabojo was the only one who could tell him. So he talked it over with the other Grand Medicine man, and five of them said they would go to the spirit land with him if they could first find the way to Winabojo. They went to the graves of their friends and called to their spirits. Finally they got a response. They asked, "Can we find Winabojo?" And the spirits of their friends answered, "Yes, for he is still on the earth." Then the spirits told them how to find him. They went until they came to this island, far in the great lake (Superior). There they found Winabojo. He was too old to travel, and on his head was a beautiful cedar tree. Winabojo wore the cedar tree as an ornament and its roots were all around him. Beside him was a great round stone. One of the men asked if he could live always, as Winabojo was doing. Winabojo replied, "No. You can only live your allotted years. The only way you can become perpetual is by becoming a stone." The man said, "Yes. I will do so." Then the man became a stone and remained with Winabojo. The others wanted to go to the spirit land. Winabojo gave each of them a "snake chain"<sup>13a</sup> and told them to be sure not to untie these chains from around their waists. He said, "You must stay only four days and four nights. You will not see the spirits by day, but at night they have a dance in the long wigwam.<sup>14</sup> Go in quietly and sit down." To the father he said, "Your daughter is there. Watch for her at the dance of the spirits in the long wigwam. Perhaps she will come and you will see her. Carry a bag with you. Put her in the bag and hold her tight. This is the only way in which you can get her."

The Grand Medicine men did as Winabojo told them to do. There were only five remaining, as one had been turned into a stone. They went to the land of the spirits and sat quietly, watching the dance of the spirits in the long wigwam. All went well until the second day when one of the men wanted to untie his "snake chain" and see what would happen. He did this, and in a moment he became a spirit and his friends never saw him again. The remaining four men went to the dance every night and the father watched for his daughter. On the fourth night toward morning he saw her come into the wigwam. Her head was covered by her blanket but he recognized her, and when she came near he grasped her in his arms. She struggled, but by the help of his friends he got her into the bag. Then they all returned to Winabojo, and he told them how they could get her back to the earth. He told them to start on their way, and when night came they were to tie the bag in a safe place, then retrace

<sup>13a</sup> This is a plaited chain worn as a protection against reptiles or other harm.

<sup>14</sup> This refers to the long dome-roofed structure in which the Midewiwin held its meetings. Cf. beliefs concerning the northern lights, p. 379.

their steps as far as a person's voice could be heard and make their camp. They were told to do this every night until they reached home. They did as Winabojo had instructed them and reached home safely. Winabojo had told them to make a sweat lodge and they made it. He also said there must be no crying nor wailing. Inside the sweat lodge he made a bed of cedar boughs and on it he laid the bag that he had brought from the spirit land. He did everything as Winabojo had commanded and sat down outside the lodge. After a while he heard his daughter say, "Come and let me out." He went into the lodge, untied the bag, and his daughter came out. He greeted her, but there was no outcry, as Winabojo had commanded. Then his daughter was the same as before she went to the spirit land.

#### GATHERING BIRCH BARK AND CEDAR BARK

It was customary to gather as much bark as possible in June or early in July as the bark is more easily removed at that season. The gathering of birch and cedar bark was attended with a simple ceremony, as both these trees are believed to be connected with Winabojo. The foregoing legends concerning these trees have stated that the birch is so powerful that Winabojo went to it for protection, and the cedar is so beautiful that he wears it as an ornament. Many sorts of birch bark were cut, the heaviest being used for canoes or similar purposes, and the lighter for utensils and various containers, or for roof coverings. Cedar was needed for parts of canoes and for numerous other uses. In old times the procuring of birch and cedar bark was an event in which all participated. A number of families went to the vicinity of these trees and made a camp. A gathering was held, at which a venerable man, speaking for the entire company, expressed gratitude to the spirit of the trees and of the woods, saying they had come to gather a supply which they needed, and asking permission to do this together with protection and strength for their work. He also asked the protection and good will of the thunderbirds so that no harm would come from them. The reason he asked the protection of the spirit of the woods was that sometimes people were careless and cut trees thoughtlessly, and the trees fell and hurt them. The speaker then offered tobacco to the cardinal points, the sky, and the earth, murmuring petitions as he did so. He then put the tobacco in the ground at the foot of the tree. Filling a pipe, he offered it as he had offered the tobacco, again murmuring petitions. He then lit and smoked the pipe while tobacco was distributed among the company, who smoked for a time. This simple ceremony was followed by a feast. The next day the company divided into small groups and proceeded to cut the trees and remove the bark.

In order to observe the felling of a birch tree the writer asked Mrs. Razer to cut down a tree. This she and her husband consented

to do. Mrs. Razer habitually follows the old custom of placing tobacco in the ground when gathering any of the products of nature, so the old ceremony was performed in all sincerity. Considerable care was bestowed on the selection of a suitable tree, and one was at last found in the center of a large grove. It was a straight tree with smooth bark, and, after felling, was found to be 38 feet long, 27 inches in circumference next the ground, and 18 inches in circumference at the top of the stump. Birch trees grow slowly, and it was said this tree was probably 25 years old. Mrs. Razer offered tobacco to the cardinal points and the zenith, murmuring petitions, and buried it at the foot of the tree. She then wielded the ax and cut the tree, the cut being 28 inches above the ground, after which her husband completed the felling. It is the rule that all the chopping of a birch tree shall be on one side so that the tree after felling will rest on the stump. This prevents the bark being soiled by falling on the ground.

In removing the bark a vertical cut is made, the bark is turned back with the left hand, passed under the trunk of the tree and removed by the right hand. (Pl. 53, *a, b*.) The width of the strips depends on the intended use of the bark. An average width is about 24 inches. The uppermost branches of a tree are observed with special care as the bark on the upper branches is often clear and smooth, though the trunk of the tree has been scarred, or has had its bark removed at some previous time. The tree is permitted to remain as it falls, and when thoroughly dry is used for fuel.

Utensils are often made as soon as a tree is cut. (Pl. 53, *c*.) The sheets of bark for future use are tied in thick packs by means of strips of freshly cut basswood trees that usually grow among the birches. One hundred sheets usually constitute one of these packs. A pack is carried on a woman's back by a strap. (Pl. 48, *b*.) This is stored at her home in the village, a larger supply being in a birch-bark storehouse at her maple sugar camp. The uses of birch bark are many and various.

In the southern part of the White Earth Reservation the writer witnessed the offering and burying of tobacco by a medicine man who wished to cut pine bark for medicinal use. The remedy was his own and he described several instances of its successful use.

#### ARTICLES MADE OF BIRCH BARK

Before entering upon a partial enumeration of articles made of birch bark it seems fitting to note some of the properties of this substance, which formed so large a factor in the economic life of the Chippewa. First, and most important, is its varied thickness.

The heaviest bark, from large trees, comprises six to nine distinct layers and is so strong that it could be made into canoes carrying many persons. The thinnest birch bark is like tissue paper but so tough that it was used in wrapping small packets tied with a thin strand of basswood fiber. (Pl. 43, *b*.) Between these extremes were many grades of thickness into which the bark of moderate sized trees could be split. A proficient woman worker could usually obtain the quality she desired either from her supply in storage or by felling a tree of suitable size. A peculiarity of birch bark is that it keeps from decay whatever is stored in it. Edibles were stored in makuks, even a gummy maple sirup being safely stored for a year in this manner. Heavy birch bark was wrapped around the bodies of the dead. Two contradictory qualities are interesting to observe. The bark was highly inflammable, being used as tinder and for torches, and yet it was possible to use freshly cut bark as a cooking utensil, the inner surface being exposed to the fire.

Birch bark was commonly available and was used for hastily made containers of various sorts. Thus a person gathering spruce gum or a few berries would cut a piece of birch bark, fold it into a "scoop" and use it temporarily. If birch bark articles split they were mended with balsam gum. With this care a makuk or tray might be used for 10 years.

It was said that when a woman was cutting birch bark she often "sharpened her knife" by drawing it across her hair.

Birch bark can be unrolled only by exposing it to the heat of a fire. When heated it becomes pliable, and retains any form in which it is placed when thus softened.

*Makuks*.—These were of various sorts, according to their use. The most common makuk was that used for storing maple sugar. (Pl. 34.) These makuks were sewed with split roots, and had a thin piece of basswood bark around the top, sewed over and over with split roots, like the top of a canoe. They ranged in size from makuks holding about 1 pound of sugar to those holding 20 or 30 pounds. A cover with slanting sides was sewed over the top. A similar makuk of medium or rather large size was used as a bucket, the seams being covered with pitch and a handle attached.

The makuks used for gathering and storing berries had straight sides, and the storage makuks were frequently made with the rough outer surface of the bark on the outside. A berry gathering makuk had a loop of fiber attached to one side so it could be hung from a woman's belt as she worked. (Pl. 32, *b*.) These small makuks for gathering fruit held about a quart, and the storage makuks or those for carrying the berries frequently held 12 quarts or more. The storage makuks had no binding around the top, and were frequently made with one side higher than the other so it could be lapped over

and tied. This sort of makuk was used for storing fish, over which maple sugar was sprinkled. This preserved the dried berries or fish, and it was easier to get at the contents in this type of makuk than in the sort used for maple sugar.

*Funnels or cones.*—These varied in size from the tiny cones filled with hard sugar and hung on a baby's cradle board and the somewhat larger cones similarly filled for the delectation of children to the large funnels made of heavy bark and sewed with split roots that were used chiefly for pouring hot fat into bladders for storage. Spoons made of bark were also used. (Pl. 32, *c.*)

*Dishes and trays.*—For temporary and household use the birch-bark dishes were not always stiffened and bound at the top. The dishes for common use were made of birch bark folded and fastened with one or two stitches at each end. (Pl. 32, *b*, at right-hand end.) These were tied in bunches of 10 for packing or storage. The common size was about 10 inches long and 5 inches deep, though smaller and larger ones were frequently made. The shallow trays are more often seen with better finish, the superfluous bark being cut away at the ends, the overlapping edges sewed with split roots and the top finished with a stiff piece of bark, firmly sewed in place. Slippery elm bark was sometimes chewed and applied like gum to the inside of the seams on birch-bark containers to make them watertight. The largest trays were those used for winnowing wild rice. Somewhat smaller trays were used for various household purposes, including the carrying of coils of basswood fiber for making into twine. An old and rarely seen form of birch-bark dish was round, about 9 inches in diameter and 3 inches deep. The bark was adjusted in folds around the sides and the dish or tray was finished at the upper edge with two rows of sweet grass.

*Cooking utensils.*—It was possible to make a cooking utensil from green bark in which meat could be cooked. A Canadian Chippewa said that he had done this himself, making the container with either side of the bark outward. He said that he filled it with water and "put it right on the fire," that the part above the water might burn but the part below the water would last so long that the meat would be cooked. He said that he had heard of the putting of hot stones in the water in such a dish to heat the water, but he had not done this himself.

*Coverings for dwellings.*—Sheets of bark were sewn together with basswood fiber (not twisted) and made into the "birch-bark rolls" used as covers for dwellings, the sheets of bark being placed horizontally. Sticks across the ends of the roll kept it from tearing. These rolls were used most frequently on the tops of the wigwams, or lodges with frames of bent poles, but were also used on the conical

tipis, and sometimes on the roof of the lodge in which maple sugar was made, this lodge having a frame like that of a house.

*Meat bag.*—This was commonly made of birch bark covered with soft tanned leather (pl. 54), but was also made of rawhide. It was carried on a pack strap and was used for carrying dried meat or other provisions needed on a journey. It was customary to open the bag and allow the flap to become a sort of table, from which the fragments of food were easily returned to the bag, a custom which illustrates the lack of wastefulness among these people.

*Fans.*—These were made in the woods whenever needed, two pieces of bark being sewed together and slipped into a cleft stick, which served as a handle. (Pl. 55, *b.*) A man might carry a fan ornamented with feathers, one specimen having the bark cut off squarely and a row of stiff feathers forming the upper portion of the fan. (Pl. 55, *c.*) Plate 55, *a.*, shows an owl-feather fan with handle of birch bark. A woman never used an ornamented fan.

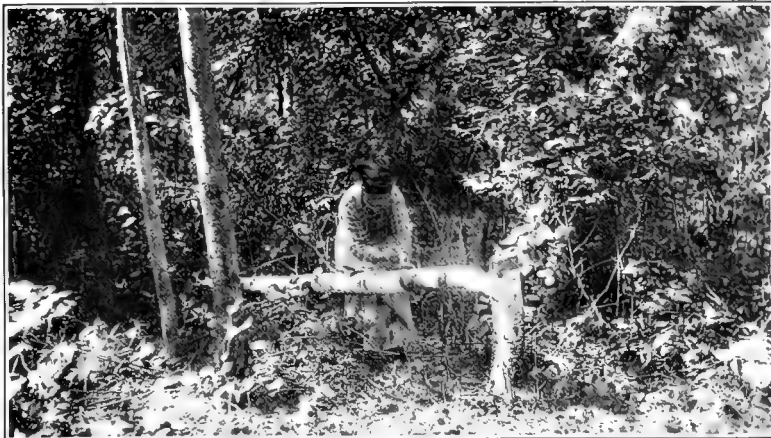
*Torches and tinder.*—Various forms of torches were made by twisting birch bark into cylinders, some of which would last an entire night, and were used by travellers. Slender torches, which could be stuck on the end of a stick that was upright in the ground, were used by women when working around the camp. A woman kept a supply of scraps of thin birch bark for use in kindling fires.

*Figures.*—A variety of figures were cut from birch bark. (Pls. 52, *c.*; 56.) Some appear to have been for pleasure, while others represent dream symbols and totem marks (clan symbols).

*Patterns.*—Every woman who did beadwork had patterns cut from stiff birch bark which she laid on the material to be decorated. Mrs. English said that she remembered when patterns were pricked with a stiff fishbone around the outline and then cut with scissors. In this way the pattern was evident to the eye before the cutting was begun. With very few exceptions the cut patterns collected by the writer show no trace of a marking implement, the appearance being that the patterns are cut without tracing. (Pl. 57.)

*Transparencies.*—The most primitive form of Chippewa art is that in which the only material is a broad leaf or thin piece of birch bark and the only tools are human teeth and deft fingers. The leaf or birch bark is folded and indented with the teeth, this process being repeated according to the elaborateness of the design. The result is a transparency, the surface of the leaf or bark forming the background and the tooth marks forming the pattern. The native word for this is composed of two words, one meaning picture, and the other *he bites*, or *gnaws*. The leaf and bark are not wholly opaque and the tooth marks do not cut entirely through them, so the finished work shows a heavier and a lighter density of material which is





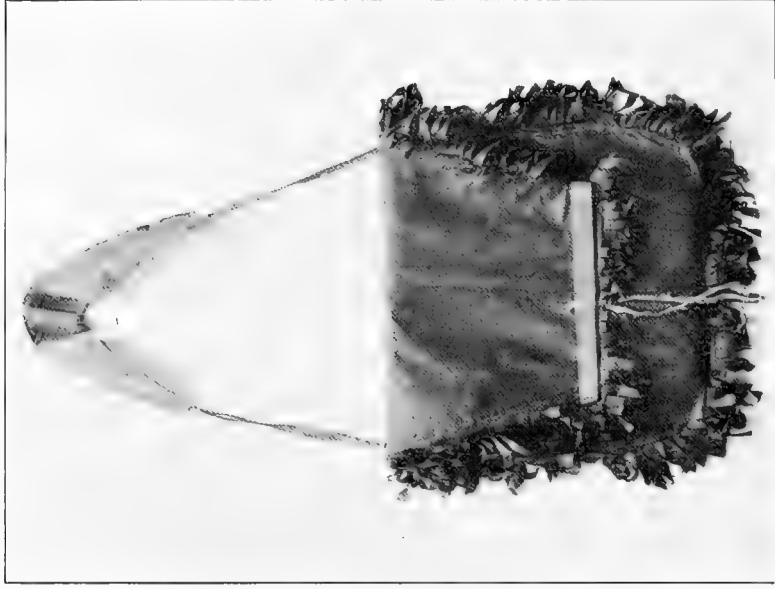
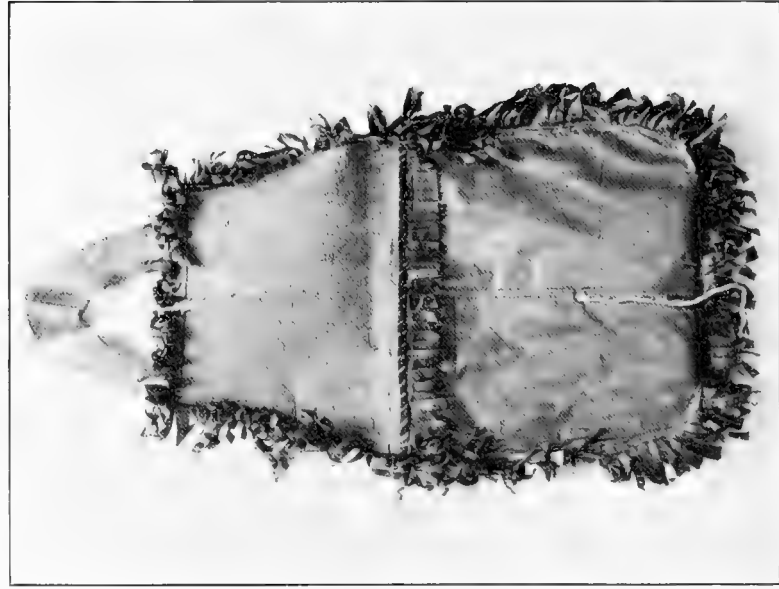
*a*, CUTTING BIRCH BARK PREPARATORY TO REMOVING



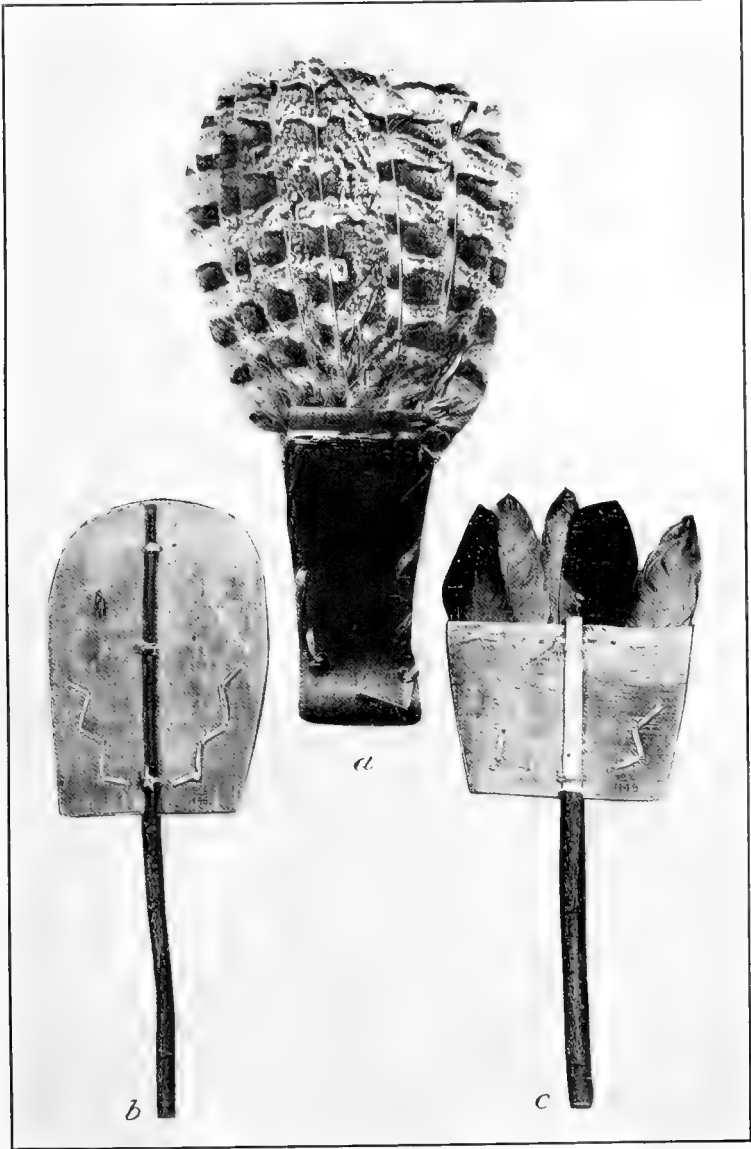
*b*, REMOVING BIRCH BARK FROM TREE



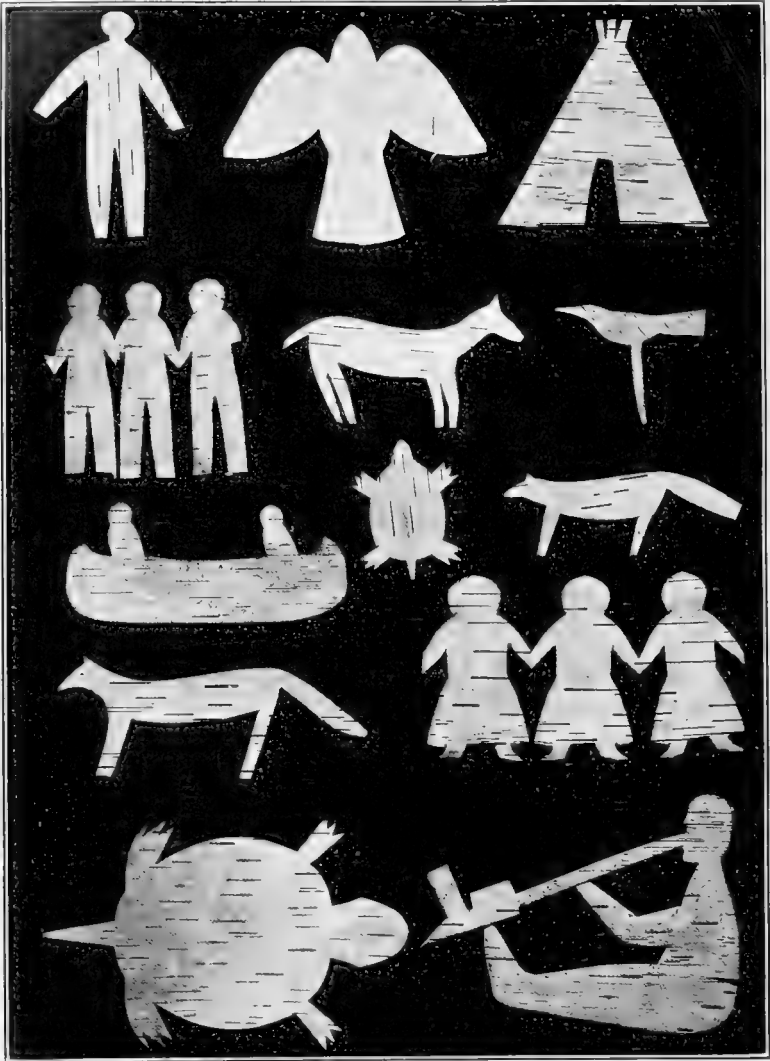
*c*, MAKING CONTAINER FROM BIRCH BARK



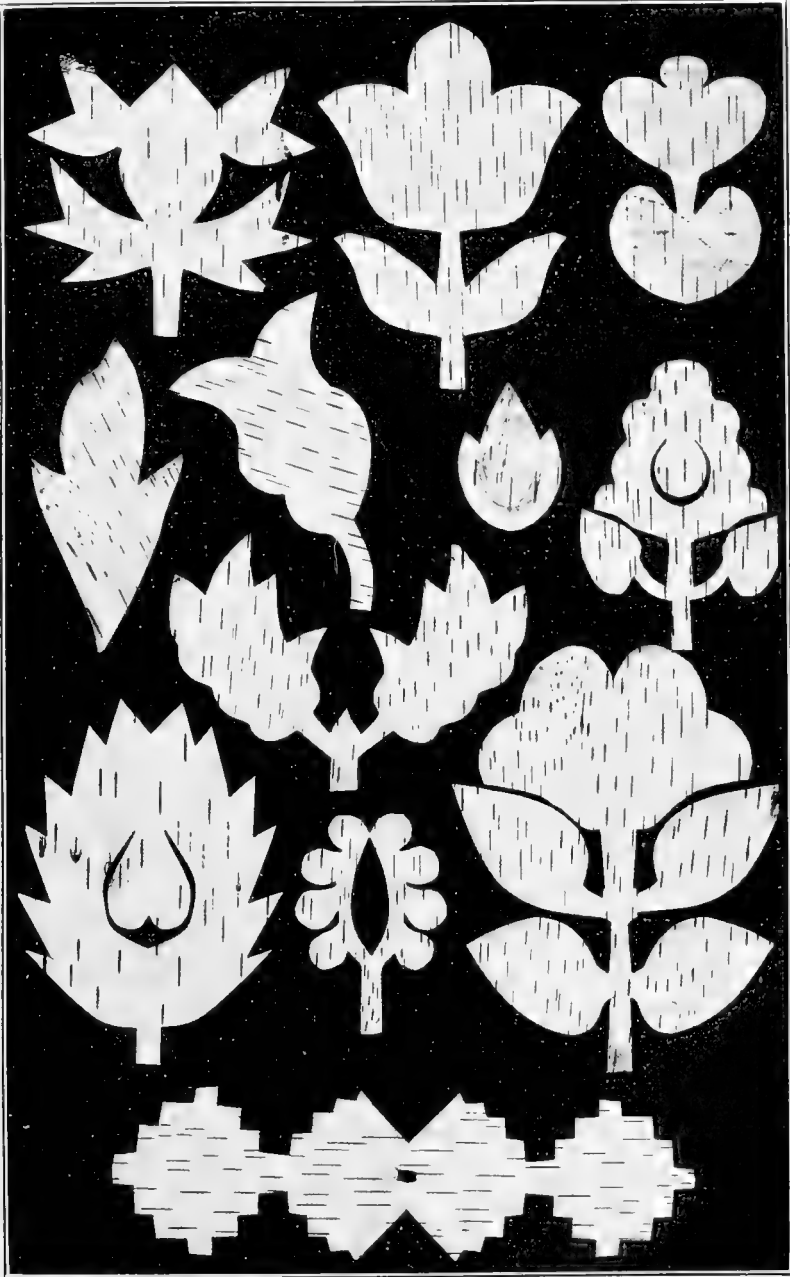
MEAT BAG, OPEN AND CLOSED



FANS MADE OF BIRCH BARK AND FEATHERS



FIGURES CUT FROM BIRCH BARK



PATTERNS CUT FROM BIRCH BARK



LEAVES IN WHICH PATTERNS HAVE BEEN BITTEN

soft and pleasing to the eye. The teeth used in making the impression were the eyeteeth and "side teeth," the folded material being indented in a variety of ways, ranging from a sharp prick, like the prick of an awl, to a broad mark produced by slightly twisting the bark between the teeth. More than 200 birch-bark transparencies have been collected by the writer, and some of the best patterns were made by a woman who had only one upper tooth. The bark used was the soft, fine inner layers of the white birch, and it was slightly warmed to render it more pliable.

The origin of this art is obscure, but it seems probable that it arose in a somewhat casual manner. A woman seated on the ground or in the wigwam might take a broad leaf or bit of thin birch bark, fold it, bite a few lines in it, unfold it and hold it up to look at it. As the result was pleasurable she might seek to improve upon her first work and others might seek to copy or emulate it. Leaves best adapted to the purpose would be selected, it would naturally be found that the birch bark could be folded and indented better if it was first warmed before the fire, and gradually a more elaborate folding of the bark would produce more interesting patterns. The information obtained from aged members of the tribe and the specimens of the art which they have been able to execute give no evidence of the influence of the white race nor of any connection with textile or ceramic art except that some of the patterns were copied in beadwork. It had no connection with a ceremony, and no symbolism, except that dream symbols might be indented and used as patterns for beadwork in the same manner that the symbol of a man's dream might be outlined in paint. It was an art with a recognized technique, producing results of a wide variety in the form of articles that were kept, exchanged, and compared, and in which the workers felt a personal pride. It was peculiar to the Algonquian tribes and was a phase of the tribal life that has passed away, and with the passing of that life the art has become almost extinct. It formed a pastime of the winter evenings, when the young people were seated in the wigwam with no other light than the fire, and it was especially practiced during the sugar camp, in early spring, when there was an abundance of birch bark at hand, and it was softer than later in the season, thus being better adapted to the making of transparencies. A few women of the younger generation (30 to 40 years of age) can indent the bark, but their patterns, as will be shown, have lost the artistic value of the earlier period.

The art had two branches, one of which appears to have been an outgrowth of the other and to have been practiced less extensively. The principal, and apparently the first, phase of the art was intended chiefly for pleasure and had a secondary use in sug-

gesting patterns for woven beadwork. In this phase the indentations were of varying sorts, producing an agreeable art object. The patterns that appear in such transparencies are geometrical and conventional, but include life forms and some representations of tipis and houses. Such are the "pictures" that were admired, kept, or exchanged among members of the tribe. Those intended as suggestions for patterns in woven beadwork were purposely adapted for their special use as knee bands, headbands, etc. The second branch of the art is clearly related to the period in which the delicacy of the old perception was passing away. (See p. 395.) Thicker bark was used, the outline of a leaf or flower was sharply indented and the pattern cut out, after which it was fastened to cloth and outlined in beads. Mrs. Julia Warren Spears, 89 years of age, said that she saw the Chippewa girls using these patterns for beadwork when she was matron of the school at Leech Lake, about the year 1865. At that period the present floral patterns were either coming into use or were at a height of popularity, and the rather clumsy patterns made of bitten bark may in part account for the lack of artistic value in these patterns. Mrs. Spears said that they "took a leaf or flower to go by" when biting the pattern, which marks it clearly as belonging to the imitative, not the interpretative, period of culture. The influence of Government schools had taken the place of that admiration of nature and appreciation of its mysteries which underlies all effort at interpretation. The Chippewa were being taught to become copyists, and the essentials of art were lost forever.

Only two mentions of this art have been found in writings on the subject. The earliest refers to the old form and the later to the modern application of the art. Schoolcraft states that "amongst the Chippewas of Lake Superior there exists a very ingenious art of dental pictography, or a mode of biting figures on the soft and fine inner layers of the bark of the *betula papyracea*, specimens of which are herewith exhibited. This pretty art appears to be confined chiefly to young females. The designs presented are imitations of flowers, fancy baskets, and human figures. There are so many abatements to the amenities of social life in the forest that it is pleasing to detect the first dawnings of the imitative and aesthetic arts."<sup>15</sup> This paragraph is accompanied by an illustration "from the originals," with the title "Chippewa toothwork, dental pictorial figures on the inner bark of the *Betula papyracea*." The reproduction by drawing and engraving does not represent the method with any degree of accuracy, but the work itself is clearly the same as that described to the writer and illustrated in Plates 58-63.

<sup>15</sup> Schoolcraft, Henry Rowe. History of the Indian Tribes in the United States, vol. 6, p. 631. Philadelphia, 1857.



The modern application of the art is mentioned by Speck, who says that among the Montagnais "the patterns for decorating birch bark consist of thin paper-bark stencils made by folding and biting designs in them with the teeth." Also, "The bitten paper-bark copy patterns supply practically all of the motives of these people."<sup>16</sup>

The Mille Lac Chippewa made little or no mention of the biting of patterns in a broad leaf, but Mrs. English said she remembered seeing it done by the Chippewa at La Pointe, on Lake Superior, and the writer was informed that it was commonly done on the Manitou Rapids Reserve in Ontario. A specimen of the leaf was obtained there, and was identified as *Clintonia borealis*. This leaf with a simple pattern bitten in it is shown in Plate 58.

The technique of biting birch bark is impossible to describe beyond the statement that the bark is placed between the upper and lower teeth, usually the eyeteeth, and that the teeth are brought together, either sharply or with a slightly grinding motion. One informant said that the bark was slightly twisted between the teeth. The simplest technique is shown in the patterns used for beginners in beadwork, the intention being to use one bead for each prick. The manner of folding and refolding the bark is also an important part of the technique. The pattern is in the mind of the worker and she does not hesitate or unfold the bark during the process of biting the pattern. In reply to an inquiry, a woman said that when she unfolded the bark she found the design to be what she expected because she "had the pattern in her mind before she began to bite it." One transparency is never copied from another, but an attempt to vary a pattern is suggested by Plate 59, *a* and *k*, made by the same woman. In one pattern it was found that 24 thicknesses of bark had been indented at the same time, yet the pattern was clear and the marks were uniform. It was not unusual for 12 thicknesses of bark to be indented at the same time.

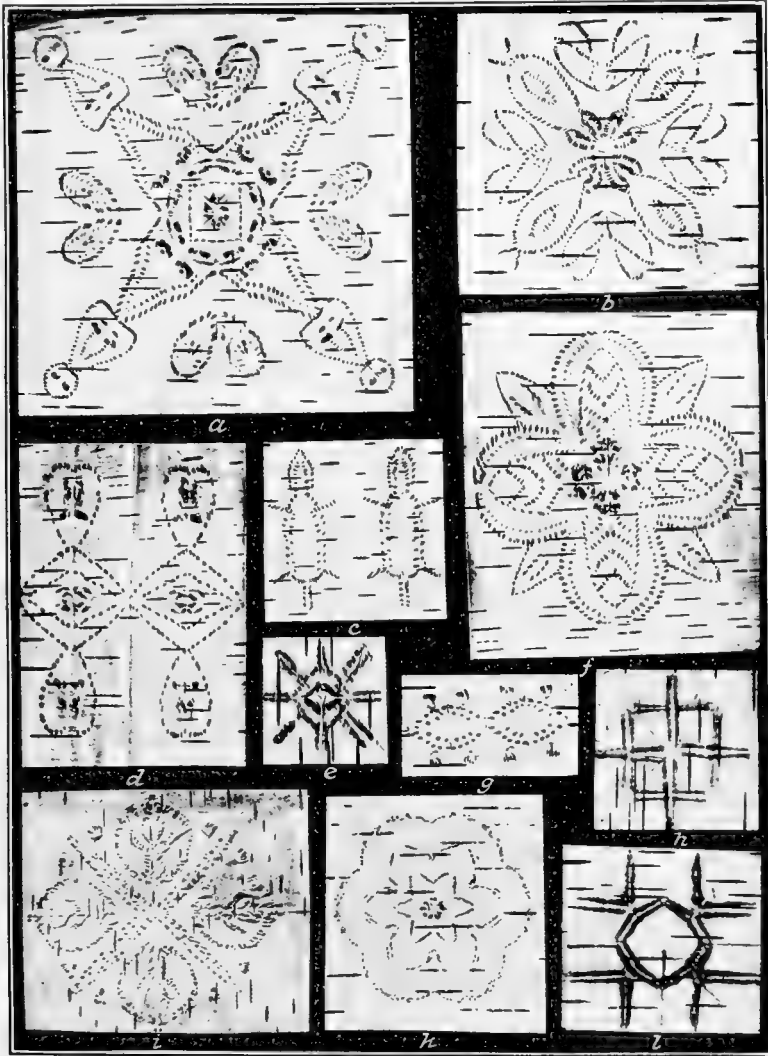
The range of subjects is wide and includes geometric designs, flowers, leaves, and stars, men and women, tipis and houses, animals and insects. The vegetable and life forms are natural and also conventionalized. The patterns comprise borders or "running patterns," and units based upon the circle, square, pentagon, hexagon, and octagon, and the trefoil and quatrefoil. The simplest patterns require only one folding of the bark, after which a pattern is indented along this fold. These are what may be termed "running patterns." An example of such a pattern is Plate 59, *c*. A strip of bark is folded across and the fold placed between the teeth, the pattern being "bitten" along the fold. When the bark is unfolded the pattern is

<sup>16</sup> Speck, Frank G. The Double-curve Motive in Northeastern Algonkian Art. Department of Mines, Memoir 42, No. 1, Anthropological Series, pp. 11, 12. Ottawa, Government Printing Office, 1914.

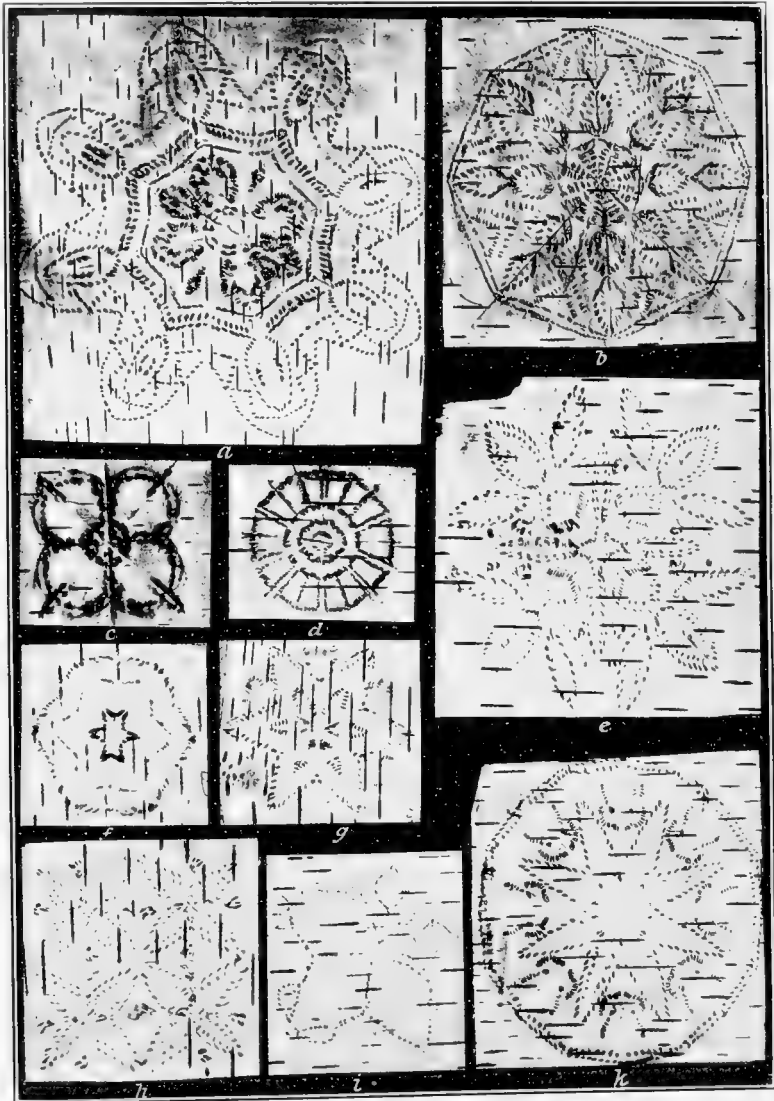
seen, its opposite sides, of course, being alike. Other patterns produced by one folding of the bark are Plates 59, *d, g*; 61, *b, h*; 62, *g*. Sometimes a "running pattern" was made by folding the bark twice, one fold being crosswise and the other the length of the strip. Examples of such patterns are Plate 62, *i* and *k*. More elaborate patterns of this sort were made by folding the strip of bark crosswise and also diagonally, producing such patterns as Plates 61, *f*, and 62, *f*. Such patterns as these were copied in long strips of beadwork used as chains for the neck or as narrow headbands. The manner of folding the bark for patterns Plate 59, *e, h*, and *l* is clearly shown. Several units were indented at the same time, forming a sort of "running pattern," but without an actual connection between the units. The most elaborate pattern of this type is Plate 61, *c*, in which five figures were indented at the same time, representing a row of dancers.

The Indians seemed to prefer to indent two units at a time, in the simpler unit patterns, while the larger and more elaborate unit patterns were indented singly, thus securing fineness of detail. The patterns shown in Plates 60, *c, f*, and *g*, and 62, *c*, were made double; that is, two units were indented at the same time, the photograph showing the clearer of the two. Distinct from these were the patterns made singly which required several foldings and refoldings of the bark. Such patterns were regarded somewhat as an artist regards his sketches. They were exhibited and compared, and even exchanged among persons proficient in this craft.

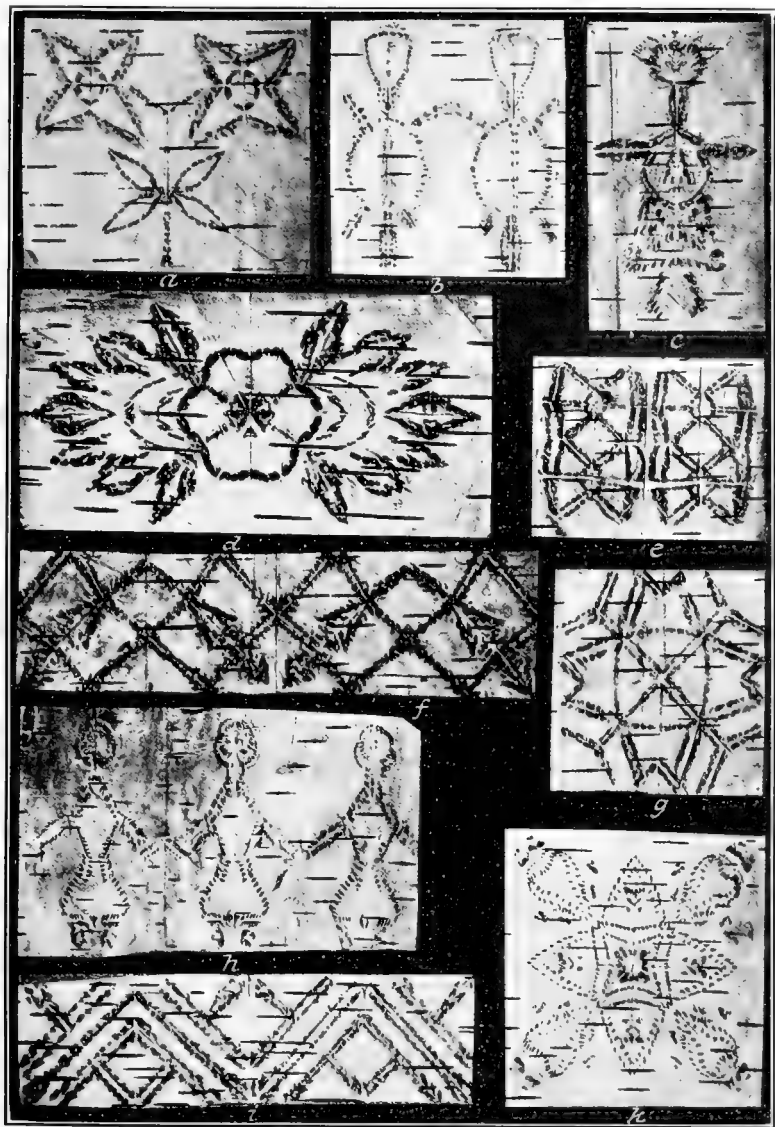
Patterns which require only folds that are equally spaced and radiate from a common center are Plates 59, *a, b, f, i, k*; 60, *a, e*; and 61, *g, k*. Such a pattern may be inclosed in a line which is folded and indented after the rest of the pattern is finished, as in Plate 60, *b* and *k*. A close inspection of the specimen shown in Plate 60, *d*, suggests that the border was indented with the rest of the pattern. The folding in Plate 60, *h*, is shown in detail and includes a diagonal fold intersecting the diagonals that radiate from the center. A pentagonal form is shown in Plate 60, *i*. A somewhat complicated folding was required for Plate 60, *e*, the bark being folded crosswise, lengthwise, and diagonally, the pattern being smoothed out between the several foldings and then creased for the next part of the design. In Plate 61, *a*, we find a crease with indentations along only a part of its length, beyond which the line divides into two diagonals. These lines form the framework of the pattern, like the stems of a cluster of flowers, which, with leaves, are produced by additional foldings of the bark. The pattern appears to represent two conventionalized flowers, with leaves below them. This pattern was made at White Earth. The design Plate 62, *a*, bears a resemblance to it, and was made on the Manitou Rapids



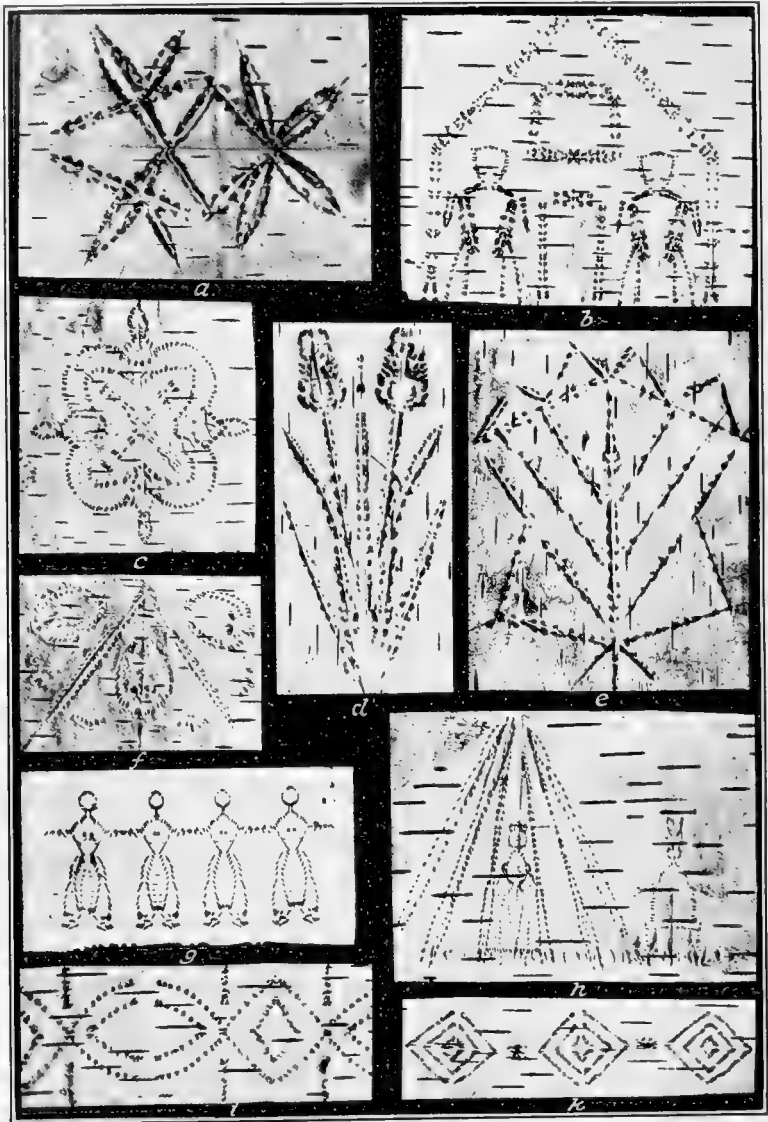
BIRCH-BARK TRANSPARENCIES



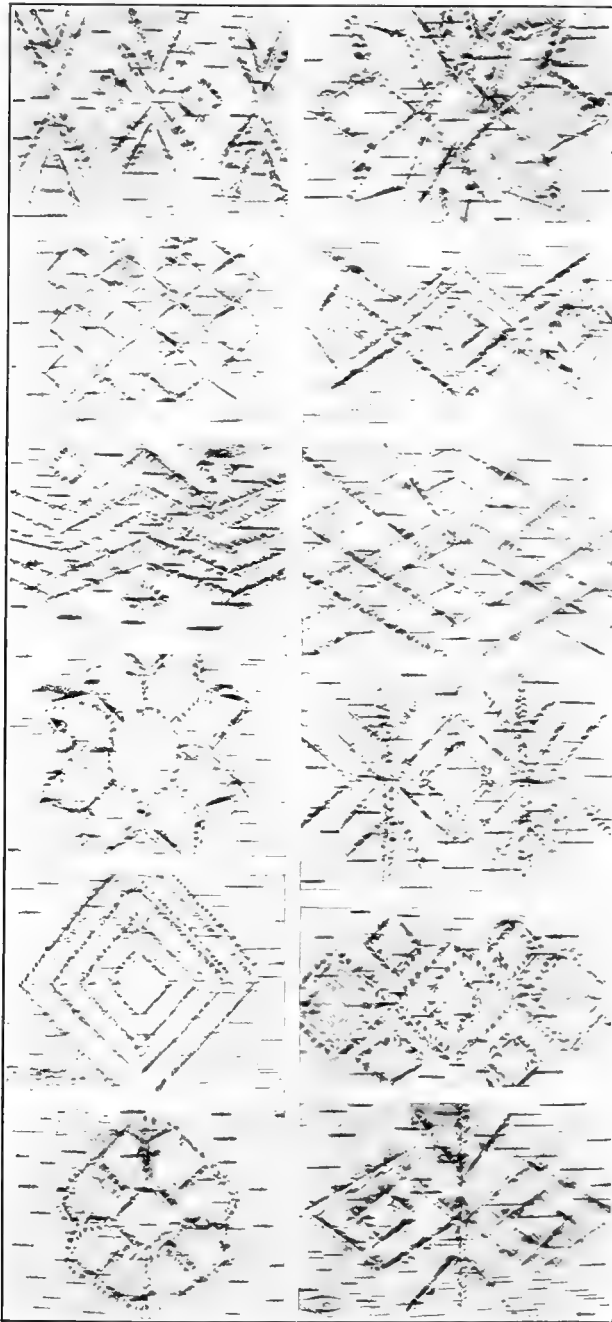
BIRCH-BARK TRANSPARENCIES



BIRCH-BARK TRANSPARENCIES



BIRCH-BARK TRANSPARENCIES



BIRCH-BARK TRANSPARENCIES





Reserve in Canada. Other interesting designs from that reserve are Plate 62, *d* and *e*, the former showing curved lines (or creases) which are unusual in birch-bark transparencies. The bark available by the Canadian Chippewa women was too stiff and heavy for delicate work. The season was July, and the bark is less pliable than in early spring if freshly gathered, and the Canadian women had not stored so generous a supply of bark as the Minnesota Chippewa. As already noted, the bark needed for use during the summer was gathered in the spring and stored in a dark, cool shed, which preserved its soft texture, and this storage of bark was being carried on by the women at White Earth when the present research was in progress. The pattern Plate 62, *e*, is different from any collected in Minnesota and required twelve foldings for its production.

Both straight and diagonal folds were required for the patterns Plate 62, *b* and *h*, the latter showing the features of the woman in the tipi with as much clearness as those of the dancer in Plate 61, *c*. Attention is directed to the difference in the shape of the faces in these two patterns, also to the variety in the markings on Plate 62, *b*, showing a distinct technique. These are from White Earth.

The patterns here illustrated were selected from a collection of more than 200, obtained from the older women at White Earth and Red Lake in Minnesota, and the Manitou Rapids Reserve in Canada. The decline of this interesting craft is seen in the work of Indian women of the younger generation, one example being shown as Plate 61, *d*. It will be noted that the outlines are blurred by a process that approaches a nibbling of the bark, while the design lacks the grace and repose of the older examples. The clear thinking of the old days has passed away, and in its place has come a belief that by doing a thing uncertainly, over and over, one can accomplish as good results as by a carefully planned, definite procedure.

The designs shown in Plate 63 were made on the Manitou Rapids Reserve in Ontario, Canada, and show a somewhat different type than those in the previous illustrations. As stated, they were made when the bark was rather heavy, which can be seen in the texture of the pieces. The creases are more apparent and the marks less sharp than in thinner bark. Some of the designs would form "running patterns" while others are single units which could readily be placed side by side to form extended decorations.

The following story is related concerning the custom of making birch-bark transparencies:

There was once a man who lived with his parents. At sugar-making time he noticed that they were getting old and the work was hard for them, so he brought home a wife to help them. The

family were in the sugar camp and he sent his wife to get some birch bark for making dishes as the other women did. She took an ax and was gone all day. When she came home at night she had a great bundle of bark on her back. This made him glad, for he thought she had been very industrious. She opened her bundle and said, "See what I have been doing all day." Then she showed him quantities of patterns and pictures bitten in birch bark. Her bundle was full of them. She had been biting patterns all day instead of making dishes.

The man was so ashamed that he hung his head and died. He could not bear to have people know that he had brought home such a good-for-nothing wife.

*Etching and self-patterns on birch bark.*—Bark taken from birches in the early spring has the tender "sap-bark" of the previous year next to the outer bark. If the bark gathered at this time is put in hot water the "sap-bark" turns dark brown while the outer layers of bark remain light in color. This renders possible a wide variety of decoration in contrasting colors. Dishes are made with this dark color as a foundation and the decoration is supplied with a sharp implement, the lines showing the light color of the under layer of bark and the contrast remaining after the bark has dried. The implement used for this purpose was a pointed stick or the "splint-bone" from the heel of a deer, preferably a young doe. The bark is in the right stage for this work at the season of sugar making, and many sugar makuks are made with the dark surface of the bark on the outside, etched with simple decorations. A typical example is the sugar makuk in Plate 34, which is etched with parallel horizontal lines between which are vertical, diagonal, or zigzag lines arranged in simple groupings. The fresh sugar was often stored in them and used as a gift, the decoration making the gift more attractive. At the present time this work is frequently done in a freehand drawing of leaves and flowers, the designs being without artistic value.

Another type of decoration made possible by the condition of the bark at this season may be called "self-patterns" in birch bark. Sometimes the pattern appears in the light color on a dark background and sometimes the colors are reversed, the design being in the light shade. In a typical example of this work a rather large, conventional pattern cut from birch bark or paper is laid on the bark and a line is drawn around it. This is still done at Grand Portage, where old methods of work are continued. The design is etched on the inner surface of the freshly cut bark, cutting through the "sap-bark," after which, if desired, the work may be laid aside. When it is to be finished the bark is moistened with hot water, and on the portion which is to be in light color the thin tissue of bark is removed in small particles or shreds with a sharp knife. Thus if

the makuk is to be dark in color with light-colored leaves the surface within the etching of the leaves is carefully removed. If the colors are to be reversed it is necessary to remove all the surface except that within the etching. As indicated, if the makuk is to be filled with fresh sugar it is finished at the camp, but if the article is to be for some general purpose, the woman does the part of the work which must be done while the bark is fresh and takes the article with her, to finish at leisure. The completion can not, however, be deferred too long or the dark surface of bark can not be removed with neatness.



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ARCHEOLOGICAL INVESTIGATIONS—II

By GERARD FOWKE



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## ARCHEOLOGICAL INVESTIGATIONS—II

BY GERARD FOWKE

### EXPLORATIONS IN THE RED RIVER VALLEY IN LOUISIANA

It is a matter of actual knowledge that the Natchez Indians built many large mounds along the bluffs bordering the Mississippi River on the east, and that this practice continued, though perhaps in a diminishing degree, until the period of French occupation of the territory. But it is not of record that this tribe, or a colony from it, moved permanently to the west of the river until within historic times.

Also, it is now an established fact that the small mounds so numerous over much of Texas, Louisiana, and Arkansas, extending in great numbers down the Red River to Alexandria, and sparsely even beyond that point, are the work of the Caddoans. The latter tribes, so far as we know, did not erect the quadrilateral or flat-topped mounds such as are prevalent to the eastward. This leaves unexplained, as yet, the comparatively few such structures found along the Red River, always near the stream, reaching up the valley nearly or quite to Texarkana. These may be due to Natchez, or others, who once lived here for a time but left no further traces.

Between the known territory of the Natchez and that of the Caddoans, that is, between the Mississippi and the vicinity of Alexandria, is a strip of country which, so far as its ancient remains suggest, did not belong to either of these people, and yet there is some resemblance to both. Whether these works indicate a mingling of the two, or an overlapping of boundary lines at different periods, or whether there may have been another people in between them who borrowed somewhat from the customs of both, is not determined.

The lowlands subject to overflow from the two rivers are, of course, extremely fertile; but, as a rule, the soil on the uplands is not productive, is so flat as to be swampy much of the time where not artificially drained, and apparently not of a nature to invite a primitive people whose sustenance must depend in large measure upon agriculture. That there were, nevertheless, settlements of Indians here and there is shown by the tumuli, sometimes more than 20 feet high,

but these are few and far between, and point only to small settlements with much open territory between them. It was a matter of some surprise, then, to find a mile east of Marksville, La., a group of earthworks of such extent and character that they would be noticeable even in a region where similar structures are abundant—in Ohio or Georgia, for example. They extend for more than a mile along a bayou known as “Old River,” which opens at either end into Red River, and, as its name indicates, is recognized by the present population as having once been the channel followed by that stream. There is little doubt that it flowed here at the time these earthworks were constructed, although at present it is several miles away. This fact, however, has no bearing on the age of the remains; such changes are frequent and extensive.

#### VICINITY OF SHREVEPORT

Rev. James M. Owen, of Shreveport, La., has spent much time in examining such archeological remains as exist within driving distance of that city, not only in the alluvial plains of the Red River Valley but out into the higher lands on either side of that stream. Through his generous cooperation it was possible to visit every known site from Belcher, 20 miles north of Shreveport, to Gahagen, 40 miles south, and as far as 15 miles from the river on both sides.

Nothing was found that would appear to be worth excavating; meaning thereby that the historical, scientific, or museum value of any discoveries that might result from digging out the mounds would not be sufficient to justify the time and expense involved in such work.

By reason of the accumulation of sediment from river floods, any village sites or burial places that may occur in the valley are forever hidden from sight except as they may be accidentally revealed by excavation or erosion; consequently it is possible to record here only those mounds which are not entirely covered by such deposits. All of these found within the limits above set forth, with the exception of four, are of the flat-topped variety named “domiciliary mounds” by Clarence B. Moore; the purpose of their erection being to provide an elevated site for buildings used as dwellings, council houses, storage rooms, or for any use required, and perhaps also for public gatherings, or as a refuge from high waters when streams spread beyond their customary limits.

A group of these, seven in number, 10 miles north of Shreveport, gives the name of “Mounds Plantation” to the estate on which they stand. Six of them have farm buildings on them, the seventh being cultivated as a garden or truck patch. It is unknown how far below the present surface their foundations may be; the ground has filled

in several feet since the country was settled. This sedimentation no longer takes place, as floods are now confined by levees.

At Belcher is a mound built on a spur between two ravines which appear to be of recent origin. Owing to undercutting by these, and to much digging in the upper part by fortune seekers, the elevation, the diameter, and the outline of the base can not be estimated; but apparently it was a small flat-topped structure. The owner is unwilling that it should be further disturbed.

On the land of John Scott, on the east (left) side of Red River, 4 miles northeast of Shreveport, is a flat-topped mound, quadrilateral but not rectangular, 16 feet high and about 100 feet across at the base.

In section 29, township 15, range 12, on land belonging to Arch Thigpen, is a mound near the extreme outward end of a hill rising some 40 feet above the river bottom land. When intact it was about 12 feet high and 65 or 70 feet across. A shaft 10 or 12 feet in diameter was sunk from the top to the bottom, but no one could be found who knows when or by whom it was dug, or whether anything was found. On the nearly level hilltop beyond the mound evidences of aboriginal occupation are scattered over several acres.

Ten or twelve miles easterly from Mansfield, on the Jack Dillard farm, in section 10, township 13, range 12, is a mound now 4 feet high above the general level of the field; but as it is built on the east end of a narrow spur and extends down the three slopes, it looks much more elevated when viewed from other directions. It is said the top has been lowered 2 feet by farming operations. A bayou extends along the foot of the hill. The structure is on poor ground, remote from any road or house, and has an unpromising look, hence no research was attempted.

On Willis Williams's plantation, in De Soto Parish, 12 miles northeast of Mansfield, in section 29, township 13, range 11, is a mound 9 feet high and 90 feet in diameter. A hole, apparently 8 or 10 feet across—the sides have fallen in, so its breadth is now considerably more than that—was dug to the bottom some years ago. It is reported that bones were found but no one can recall that there was anything else.

In addition to these three burial mounds, there was one near Gahagen, which was excavated by Moore.

On the Curtis plantation, 9 miles south of Shreveport, is a small flat-topped mound with a ramp or incline at one corner, from the top to the ground. There has been considerable deposit from floods around this mound, so that no evidence of a village site can be found.

A similar but larger mound is reported to stand near the east bank of Red River a short distance south of the Arkansas line.

This ends the record of discoveries in the area covered in this territory. Nearly every place was visited at which mounds were reported by anyone.

What has led to the belief that the Red River region is a fertile field for archeological research is the vast number—thousands upon thousands—of “house mounds” marking the former dwelling sites of Caddoan tribes. Few are found on low ground; but in “the hills,” as the rolling upland is called, groups of them exist at such short intervals that in driving around the country one is never out of sight of them for more than a few minutes. Among them, no doubt, are some burial mounds; but as they all look exactly alike, it would be a matter of mere chance to discover a tumulus.

#### VICINITY OF NATCHITOCHES

The village of Creston, 20 miles north of Natchitoches, is a mile north of Black Lake. For more than a mile to the east, north, and west of Creston house mounds are numerous. It is said that they continue in these directions beyond this distance, but they were not followed farther.

At Salt Lick, north of Creston, is a low place where “salt comes up out of the ground” and is deposited on the surface by evaporation of the soil water; the earth has a decidedly saltish taste. Mounds are especially numerous around this lick, extending from the level land on every side down the slopes and even out on the low flat bordering the lick, where the ground is seldom dry. They vary in elevation from a foot to 4 feet, a few even exceeding the last figure. The largest are close to the marsh on the lowest level of the land, or are distributed along the foot of the slope and may owe their greater height to the construction of an earthen platform as a foundation for a house which was covered with earth when completed. If houses in such situation were built on the natural ground they would be surrounded by water or mud most of the year. Although the limit of the group was not reached in any direction, fully 500 were seen in the area examined; but there are very few between Creston and Black Lake.

It is quite probable that changes in elevation have occurred in this region since the mounds were built, as was the case in Arkansas and Missouri in 1811.

Shamrock Mills is 18 miles west of Natchitoches. Three miles north of Shamrock, on the farm of Calvin Freeman, is a salt lick similar to that at Creston. There are many house mounds on the south side of this lick, extending from the edge of the marsh indefinitely southward. Some of them are unusually large. On the north side of the lick is a village site, where many fragments of flint and pottery are strewn over the ground. Some well-made objects of

stone have been found, as well as mortars, pitted stones, and other articles common to village sites. Mr. Freeman has also unearthed a few skeletons when plowing deeper than customary; the bones are well preserved. In the scapula of one body was a round hole, apparently made by a bullet. Freeman has found many bullets on this field, some "round," others "long." The latter may belong to the Civil War period. There are no mounds on the north side of the lick, so the remains found in this vicinity may pertain to different peoples or different periods. No burial mound was found, nor was there any report of what might be one.

#### VICINITY OF ALEXANDRIA

No house mounds were observed on the south side of Red River in this vicinity, but examination on this side was almost entirely confined to the alluvial lands subject to occasional overflow in search of possible burial mounds. Only two of these could be located. They are 14 miles south of Alexandria, on the right bank of Bayou Boeuf, one-fourth of a mile from the stream. One of them, on the farm of Mrs. Henry Rougeau, is 8 feet high and 75 feet across. It is at the edge of the higher ground, on a projecting knoll or ridge whose base is reached by flood water. Some digging has been done in the upper portion and a small hole carried to the bottom at the center. At a depth of 4 feet six vases were found, standing close together; they are in perfect condition, with rounded bodies and large upright necks; each would hold about a quart. With them was a small pot, half a pint in capacity, of triangular outline, with flat bottom, rounded corners, and a round opening 2 inches across in the top. There were also two pipes—one small, a rude effigy of some mammal, the other apparently intended to represent a bird's head, the beak being well carved. All the pots had plain, straight-line decoration, many of the lines meeting at almost a right angle. Nothing was found in the slight digging below this level.

The other mound, of about the same size, is only a few rods away, on the same little elevation, on the land of John Woodward. A barn stood on its top, and the surface was consequently much worn by stock trampling over it. Bones, soft and decayed, lay almost at the surface. No deep excavations have been made; but Woodward has found abundance of broken pottery within a foot or two of the top, and also a globular pot of less than a pint capacity, the entire outer surface ornately decorated with scrolls and reversed curves rather deeply impressed. Another small pot contained a quantity of minute blue glass beads. Woodward also found "a small brass, gourd-

shaped object," containing "something which rattled when you shook it, like a baby's rattle"; probably a sleigh bell or hawk bell.

All of these finds were made at or near the surface.

Both these mounds are of two periods of construction. The upper half of each is yellowish, sandy soil like that in the level field near by; the lower half is reddish material containing more clay, like the upland soil. Woodward dug only a small hole on the side of his mound, near the top. He says the two strata were separated by "a layer of soft black stuff." Both parties state that the lower half was "mixed earth like that above, only of a different kind." This may mean that the mounds were originally only about 4 feet high and as much was afterwards added to them; the "soft black stuff" being charred or decayed remains of vegetation that had sprung up on top of the part first constructed and either burned before the second deposit was piled on it or covered by it and allowed to decay.

North of Pineville, which lies on the opposite side of the river from Alexandria, house mounds may be seen for a distance of 2 miles on both sides of the road leading to Camp Beauregard. They are in uncleared land, so the number can not be estimated; but there are certainly several hundred of them.

#### VICINITY OF MARKSVILLE

This region is so far to the eastward that, although it is in the Red River drainage area, the low lands are inundated when the Mississippi is at flood stage.

There is a small group of house mounds 3 or 4 miles from Echo, on the Marksville road; and another near Belledeau, on the road to Echo. Only a few can now be seen; but it is said that many in each group have been destroyed by cultivation. These are the only mounds of this class to be found here, and they seem to mark the eastern limit of such remains.

Four miles northeast of Marksville, on land belonging to a Negro church, is a mound fully 20 feet high from the most elevated point at its base, but much higher from other directions as it is built on a narrow point between two ravines. One slope runs down to a bayou in which there is water all the year. It is on cemetery ground, although no one is buried on it except the first white owner, and it has never been defaced. A short distance from it is a conical burial mound now reduced by cultivation to a height of 2 feet.

On Saline Point, 13 miles east of north from Marksville, near Red River, are two mounds, one on Louis Clavrie's land, the other a mile east of it. Both were excavated by Moore.

On N. A. Couvillion's land, 9 miles north of Marksville, outside of the levee, and less than a fourth of a mile from the present bank of



Red River, are three flat-topped mounds. One is 5 feet high, one 8 feet, the third only 18 inches. Since the country was settled the natural surface here has been raised several feet by deposits from overflow of the river, so the actual height of the mounds must be considerably greater than it now appears. They are so covered with brush, vines, and weeds that the size can not be ascertained; but they are not far from 75 feet across the top.

On the Edward and Leach timber tract, on Lake Long, 24 miles northeast of Marksville, are three "squared" flat-topped mounds. One is 7 feet high by about 100 feet across on top; one 5 feet high, 50 feet across; one 4 feet high and 25 by 60 feet across. There is also a round flat-topped mound 4 feet high and 60 feet across. The ground has been built up several feet around them in the last hundred years.

A mound near Belledeau was explored by Moore, who found a number of skeletons.

Thus it appears that the Caddo or house-mound type extends to the overflow lands of the Mississippi, from north of Vicksburg to south of Alexandria; and that the flat-topped or domiciliary mounds so common east of the Mississippi reach beyond that stream to the highlands on the west; but so far as present observation shows they do not reach far inland except along the Red River and perhaps some other tributaries.

The largest and most complicated group of ancient remains in the State is located from a mile to 2 miles eastwardly from Marksville. The arrangement and extent of these works is shown in the map. (Pl. 64.) They reach for more than a mile along Old River, a bayou which is connected at both ends with Red River and spreads over the lowlands on each side whenever the water is high in that stream. The inclosures or embankments, the lodge sites, and some of the mounds are on the bluff; other mounds are on ground subject to floods. At the time they were built Old River was probably an open stream, flowing against the foot of the bluff all the year; now, except when Red River sends a part of its waters this way, raising it to its old level, the bayou is a sluggish pool, with a flat shore reaching several hundred feet from the bluff to the water. This shore is made up of earth carried down from the bordering land through wide, deep gulleys that have formed since the mounds were erected. Erosion is peculiar, almost erratic, here; aside from a few shallow valleys the surface a short distance away from the running streams is so flat that much of the rain water stands until it evaporates; it can not run off, and a clay stratum underneath is so compact that water percolates through it with extreme slowness. Beneath this clay is a much looser material, easily removed by such water as may

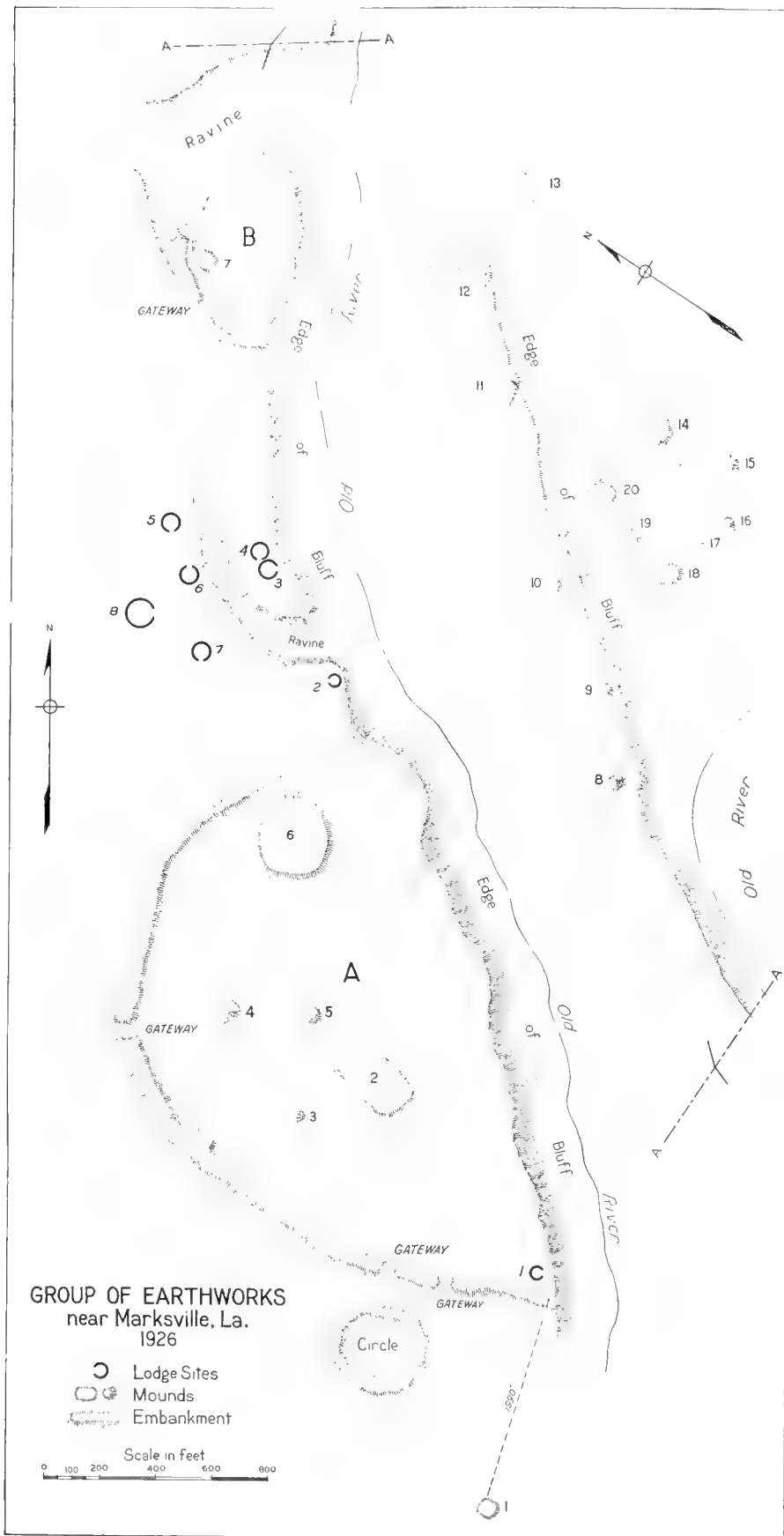
penetrate to it. When a seepage vein emerges at the foot of a bank it cuts away the sand; the clay having its support thus removed, falls; and when water from the surface runs over at a place where this happens, the clay is carried away and a deep ravine with vertical sides cuts back rapidly into the land. As an instance: A farmer, desiring to drain a slight depression on his land, cut a narrow, shallow ditch, using only a spade, to a ravine. Within two months, following several heavy rains, this small ditch was enlarged to a ravine 10 to 20 feet deep, 20 to 30 feet wide, cutting back more than 100 feet from its former outlet.

The most conspicuous feature of the group is the large inclosure marked A on the map (pl. 64), on the farms of Greenhouse, Schaub, and Du Pre. It forms an irregular curve, the ends resting on the bayou bluff. The south end is shown in Plate 65, *a*. Its total length is almost 3,300 feet; the height ranges from less than 3 to nearly 7 feet for most of its length; but there is a space of more than 400 feet at the northern end where it is almost obliterated by cultivation. The breadth increases and extends proportionately. These variations raise a question as to whether the work was ever fully completed to the extent that it was planned. There are two openings or passage-ways toward the south and one toward the west (pl. 64); no doubt there was also one toward the north. South of the west opening is an extension on the inner side of the embankment, continuous with it, which forms a platform 30 feet across; it appears as if intended for the foundation of a building (see pl. 65, *b*).

An outside moat, shown in Plate 66, *a*, now filled by wash and decayed vegetation until it is swampy for most of its length, borders the outside of the wall for its entire extent.

On Tassig's farm, one-third of a mile to the north of inclosure A, is another, marked B on the map. It is from 3 to 5 feet high, but has been much lowered by erosion; the encircling moat, now 2 to 3 feet deep, has been partially filled for most of its length, though cut much deeper at each end, by the same agency. As constructed, the top of the wall was at least 10 feet above the bottom of the ditch (pl. 65, *c*). It forms, roughly, nearly one-fourth of a circle, beginning at the bluff above Old River and terminating at a large tributary ravine. The length at present is 510 feet, but it was once somewhat longer, as both ends have been cut off by the caving of the banks. There is a gateway to the south and one to the west. The area enclosed by the bayou bluff, the edge of the ravine, and the wall, is about 4 acres.

Another inclosure of a different nature lies south of the large inclosure, A. From the second gateway here is built up a crooked causeway 5 or 6 feet wide at the base and only a few inches higher



GROUP OF EARTHWORKS  
near Marksville, La.  
1926

- Lodge Sites
- ⊙ Mounds
- ⋯ Embankment

Scale in feet

0 100 200 400 600 800

PLAN OF THE MARKSVILLE WORKS



a, SOUTH END OF ENCLOSURE A. MAN IS STANDING IN CENTER OF LODGE SITE I



b, INTERIOR PLATFORM OF ENCLOSURE A. MAN IS STANDING AT ITS MARGIN



c, EXTERIOR MOAT OF ENCLOSURE B



a, EXTERIOR MOAT OF ENCLOSURE A, AT GATEWAY 2.  
MOUND 2 IN BACKGROUND



b, STONE IN FIRE-PIT, MOUND 2, TOWN CREEK, ALA.



c, MOUND 2, MARKSVILLE, LA.



a. TRENCH PARTLY EXCAVATED, MOUND 4, MARKSVILLE. LA.



b. MOUND 8, SHOWING STRUCTURE, MARKSVILLE. LA.

than the water and mud on either side of it. Its general direction is south 20 west. At 170 feet from the center of the gateway it connects with an embankment which is practically circular except on the side toward A, where it extends in a straight line for several rods along the outer edge of the moat. This part, which is still covered with timber, is 20 feet wide at the base and 2 feet high, which figure would probably apply to the entire embankment as it was when completed. Most of it, however, is now entirely leveled and can be traced only by the color of the earth where it stood. The diameter is about 320 feet; the causeway joins it at the western end of the straight side, almost exactly north of the center of the circle.

Besides these three inclosed areas, there are eight lodge sites which will be again mentioned on a future page.

There are also twenty mounds, which will now be described, beginning with the one farthest to the south, which will be designated as Mound 1. The others will be numbered consecutively, as they occur.

**MOUND 1.**—This lies 2,000 feet west of south from the southern extremity of inclosure A. A view, not very distinct, is given in Plate 69, *a*. It is 600 feet west of the river bluff and the same distance north of an extensive bayou which can not be crossed on foot except over a bar at its outlet when the water is low. Beyond the bayou, to the south, there is no other mound for at least 2 miles; so Mound 1 may be regarded as the initial structure of this entire group. Numerous ravines have cut their way back from the streams into the upland, both from Old River and from the bayou, the longest having its head within 100 feet of the mound. It is clear that at one time there was much more land in both these directions than is the case at present.

The mound is remarkably symmetrical; the measurements of the four sides, at the base, are 82, 92, 83, and 95 feet; at the top, 46, 47, 46, and 51 feet. These distances are between the points where straight lines along the edges would intersect; but they vary a little from the original dimensions as there has been some alteration of form from superficial erosion. The elevation at the highest point is 17½ feet. The top is not quite flat, there being a slight slope from the summit toward every side. Probably this was intentional on the part of the builders to secure good drainage.

**MOUND 2.**—For a time it was difficult to decide whether this structure is a natural formation or an artificial creation. The outline of the base is so irregular and the elevation of the entire structure so uneven that it seemed to be only an outlier left from a general lowering of the surrounding area. (Pl. 66, *c*.) On the other hand, there is no other such hillock in the region; it contains a great pro-

portion of small gravel, or "buckshot," found at varying depths in ravines and the river bank, but not on the natural surface; and finally old persons who have known the place for many years say that it was once level on top, with sides so steep that a horse had trouble in climbing them, and with a definite shape like that of the other flat-topped mounds; so it must be admitted into the category of aboriginal constructions. One reason, perhaps, for its present shape is a peculiar form of movement in wet weather of such earth when piled up; instead of only washing down from the top, it also oozes out at the bottom. This is especially noticeable in vertical banks; after a season of unusual rainfall, soft mud will squeeze out in a continuous stream or sheet at some lower level and creep perhaps 30 or 40 feet before its motion is checked. The superincumbent earth cracks in various directions and settles unevenly; and then erosion wears it into all manner of fantastic shapes. Something of this sort happened with Mound 2. The bottom had crawled out here and there; and many years of cultivation, with resultant erosion of the loosened earth, had altered the upper portion out of all resemblance to the form which its builders gave it. Its present dimensions, between extreme edges, are 290 feet on a line running north 70 west, and 236 feet on a line north 20 east. The highest remaining part is 12 feet above the base. In the map an attempt is made to show it in the shape it seems to have had when completed.

**MOUND 3.**—This has been cultivated until much lowered. At present its dimensions are  $3\frac{1}{2}$  by 60 feet. A circle 20 feet in diameter was laid off on the highest part, and all the included earth removed, into the undisturbed soil below. On the natural surface, a few feet to one side of the (apparent) center, were some ashes and charcoal, remains of a small fire which does not seem to be in any manner connected with the mound. There was nothing else; not the slightest indication as to the purpose for which the mound was built.

**MOUND 4.**—With the exception of the structure 4 miles northeast of Marksville, which is similar in form but somewhat greater in all its dimensions, Mound 4 was the largest dome-shaped or "conical" mound in this part of the State. It is in uncleared land, consequently its shape was that in which its builders left it except as it had been changed by action of weather. The symmetrical outline and nearly uniform slope from top to bottom showed that alteration from any cause had been but slight. The elevation was almost exactly 20 feet and the diameter at base 100 feet, giving its surface a sharp inclination. The owner, Mr. A. Schaub, of Marksville, was at first unwilling to have it disturbed, properly appreciating the sentiment that a work of such striking appearance should be preserved as a monument to its builders. Realizing, however, that some future owner might not have



a sensible regard for antiquities, and that this mound would eventually meet the same fate from cultivation, the trampling of stock, and vandalism, that is fast destroying all other aboriginal remains in the vicinity, he finally gave permission for any kind and amount of exploration that might prove desirable.

A trench 25 feet wide was started in from the southern margin (pl. 67, *a*), and carried to a distance of 10 feet beyond the center, or 60 feet in all. During the entire work the bottom of the trench was kept several inches below the original surface, well within the natural soil, which was here uniformly dark in color and had no appearance of having been previously disturbed. The base of the mound rested directly on this.

The upper portion of the structure was composed mostly of the reddish-brown earth which forms the surface in much of the surrounding area and weathers into a productive soil; mingled with it were small masses of tough, mottled clay. On the west margin of the trench this averaged only about 2 feet thick, but on the east side it was much heavier, extending to the bottom for the first 20 feet in, then diminishing to a depth of about 4 feet at the top. Beneath this, along the west wall, was a fine white clayey sand or silt which was so compacted that water had apparently never penetrated it, and vigorous work with the picks was necessary to loosen it for shoveling; dust would blow off of it as it was thrown out. On the west side, and in the central part of the trench, this rose toward the apex more rapidly than along the east side. It was soon apparent that two periods of construction were involved. (Pl. 68, *b*.)

As the digging proceeded it was found that the silt rested, with varying thickness, upon a core or bottom deposit of mingled constituents. Mostly, it was a tough red or mottled clay, such as may be found at depths of 2 to 6 feet in the surrounding fields and is exposed in the banks of all ravines and streams. Mixed with this were various other materials, as silt, white or "crawfish" clay, brown earth, black surface soil; all scattered promiscuously, from a single basketful to more than a wagonload in a place, indicating that the carriers worked when, and as, they felt in the mood for it.

There was a notable scarcity of refuse or *débris* loose in the earth, such as is found in most mounds; probably this was because not much of the material was gathered up from the surface or near the sites of dwellings. Some fragments of pottery, plain or decorated, were found at intervals, but not many, and none that could be fitted together until at about 20 feet from the beginning and several feet from the bottom were parts of a flat-bottomed vase with impressed curved lines; it had not been entire when thrown here. At the same distance, 6 feet up, in the east wall of the trench, were fragments

of two pots; one was globular, with flanging top, of about a pint capacity, decorated with curves and figures impressed with a blunt point. The other, of which there was only a part, was differently decorated.

At 25 feet in was a shallow depression which had been dug from the top when the mound had reached an elevation of 10 feet. It contained human bones in the last stage of decay, but obviously there had been either an interment of folded bodies or a deposit of skeletal remains; no method or system of burial could be made out. Among the bones was a small monitor pipe and another pipe made of soft sandstone. The latter was smashed into small fragments by a blow of the pick, so its shape could not be ascertained.

A foot north of this grave, at a level only a few inches higher, was more rotten bone, in a very thin stratum, less than 2 feet across. The bones only of a skeleton had been placed here, in a pile. With them was part of a monitor pipe, the front portion of the stem and most of the bowl being gone; the break was old and no other pieces could be found.

A foot east of this was more bone substance in which were the caps of the teeth of a child 3 or 4 years old. These fell to pieces when handled.

The last two deposits were not in graves but had been laid on the surface and covered while this part of the mound was in course of erection.

Owing to the difficulty of removing excavated earth in a trench of this depth, the face of the bank was marked off in two sections when a distance of 22 feet from the center was reached. The division plane was at 5 feet from the bottom of the mound. It was deemed that this amount would not be too great for easy removal in case a grave-pit or other cavity should be found at or near the center. As the subsequent work was carried along on top of this 5-foot bench until the end of the trench was reached, it will, for the present, be called "bottom" in relation to the part above it, and the description next following will apply only to the upper portion.

At 12 to 15 feet from the center the earth in the lower, central part of the trench took on a checkered aspect in all directions, being broken into angular clods and chunks of varying sizes. Its appearance was that of a hard-packed material which had slowly settled into a cavity beneath it, giving away a little at a time, beginning at the lower part. Water had penetrated these cracks, leaving in them a very thin sedimentary deposit of white silt, impalpable as flour; this filled cracks running in any direction, but was most apparent in those which were somewhat horizontal.

At 12 feet out, 5 feet up, were fragments of a small pot, broken when placed or thrown here, as some of it was gone.

About 10 feet out several vertical holes were discovered, which seemed due to posts 3 or 4 inches in diameter, set in the ground. They were first observed as a row running across the trench, projecting only a few inches into the earth above the lower 5-foot section.

Near the center, when the mound had been carried by its builders to an elevation of 15 feet above the natural surface, a grave had been dug to a depth of 3 feet, with a diameter of 5 feet. These measures are only approximate, as the sides and bottom were very rough and irregular, the imprints still being visible, showing that it had been gouged out with pointed sticks or some such tools. As this tough clay is difficult to remove with good steel picks, excavation by such primitive means was a laborious task. Probably these early undertakers kept the clay wet while they were digging it. The sides, corners, and bottom were rounded, giving the cavity, roughly, a tank or kettle shape. The bottom had been smoothed and leveled by spreading on it earth carried in from outside, and this was covered with wood or bark which also extended up the sides nearly to the top. On this bark were the remains of at least four adults, as indicated by four skulls, which lay approximately at the cardinal points. Between and around them was bone material in a condition of such extreme decay that it was impossible to ascertain anything regarding the position in which the bodies had been placed, or indeed whether there may not have been more than four. Some fragments of teeth found were much worn, one molar down to the neck. From the small dimensions of the grave, it is certain that the bodies had been folded; and they seemed to have been laid with the feet and hips toward the center. Water soaking in from above had softened the earth around the bones until it would run off the shovels, and it could be examined only by gathering it up in handfuls and squeezing it through the fingers. It seems that the bodies, or bones, had been covered with wood or bark similar to that beneath them. On this, a foot of earth had been deposited; and over this, in turn, was placed a layer of charcoal from one-half to 1 inch thick. The grave was then filled with a sticky blackish mud, mixed with white clay, as if taken from a swampy place, where a thin layer of muck had rested on hardpan. Later, the building of the mound was resumed.

This is one of the very few instances known, or at least recorded, in which an intrusive burial was made by the Mound Builders themselves.

To the east and also to the west of this grave were traces of earlier burials; in each case a folded or bundled body had been placed on top of the mound when it was somewhat higher than the bottom of the grave just described—that is, before the latter had been dug—and covered with earth as the building proceeded. Both these burials were of young persons, as shown by the teeth; and there were traces of wood and bark above and below them.

But these Mound Builders were not content with one intrusive burial. To the northwest of the first grave, with the margins almost in contact, and almost on the same level, was another dug in a basin or kettle shape, with a diameter of 5 feet at the top and a depth of 3 feet. The sides and bottom were lined with white ashes in which some charcoal was mingled, a feature which was observed at many other places in the mound where the presence of such material seemed accidental rather than intentional. In this grave it was carefully spread as a thin layer over the entire interior surface, with a streak of decayed bone resting directly on it at the bottom. The few pieces of enamel remaining denoted maturity. The grave was filled with the same bluish-black sticky mud found in the first grave; so it is probable that they were both dug at about the same period, and the upper portion of the mound piled over them by the same people or tribe to whom the mound owed its beginning.

It is stated above that early in the work it was observed that the mound seems to have had two periods of construction, as denoted by the arrangement of the materials composing it. (Pl. 68, *b*.) The most of this, omitting the silt and the brown earth, was a very hard, tough, mottled, streaked clay, known in some localities as “buckshot” on account of the large proportion in it of small particles of what is usually called “gravel,” but which seems due to segregation of some mineral ingredient originally diffused through the mass. The first grave was dug at the summit of this “buckshot” mound; the other, also, was practically at its top, as proven by the slope of deposited material in all directions from the graves. Then the mound was added to on all sides, but mostly on the east, until it had an additional height of 5 feet. This eastward extension brought the summit of the completed mound fully 5 feet to the east of the top of the first structure. The amount of labor required for this extension is evidence that it was not due to an interment by later Indians who so often buried their dead in the top of a mound in the construction of which they had no part. These merely dug a grave of the desired size and filled it, usually, with the earth which came out of it. Nor is there evidence that this region was occupied, at different times, by two or more unrelated tribes of Mound Builders. More-

over, had any excavation been made in the topmost layer after it had settled firmly the marks would still be visible.

Nothing more was found in the upper portion of the trench. All the loose earth was dragged to the outside with scrapers and the removal of the 5-foot stratum at the bottom was begun.

The face of this, at the base, was a little more than 22 feet south from the center, which was assumed to be directly under the highest point of the mound as it stood when the excavation was started. All the material in this block was exceedingly diversified in composition and color.

Within a few inches, west of the center line, was the edge of a shallow, saucer-like depression nearly 4 feet across and less than 6 inches deep, its bottom within 6 inches of the base of the mound. It was lined with decayed bark on which were soft fragments of bones, the teeth showing them to be those of an infant. At the head was a small vase, apparently of "flowerpot" shape, in many pieces. The body had been covered with a mass of clay which was 6 inches thick at the center and thinned to an edge around the margin. Over this was more bark, the two layers uniting beyond the clay.

A foot above this, extending for several feet north and a little to the east, was a similar but much larger grave. In this, also, were some pieces of bone too decayed to identify; with them were fragments of a small pot, apparently of globular form.

Near the center line, 3 feet up, was another grave, as indicated by two layers of bark separated by 6 inches of earth. There was nothing in this grave, not even a trace of bone.

West of the center line, 2½ feet up, was a grave with traces of an infant's bones, and pieces of a small pot so soft and crushed they could not be saved.

Toward the east side was a grave, with a pot crushed flat.

These five graves lay within the zone from 15 to 22 feet out from the center; all the bodies were buried, or placed, in the mound while the work of construction was going on.

Near the center line was an irregular hole 2 feet deep, of several bushels capacity, which was filled with material washed into it from a limited space close around it; successive laminae of silt and coarser earth showed that they were the result of many rainfalls. Yet there was no trace of vegetable growth around it; nor was there in any part of the mound so far as it was examined. Apparently the process of construction was sufficiently continuous that not even weeds gained a footing. There was nothing to indicate the purpose of this hole.

At the east edge of the trench, 12 feet out, 3 feet up, was a grave in which were traces of bone of two young children; with them were fragments of a small pot.

At 12 feet out, 2 feet from west side of trench, was a posthole 6 inches across, which reached to the bottom of the mound; the timber had been set here and the earth piled around it, as the sides of the hole showed no marks of a digging tool. Extending in a straight row across the trench from this were smaller holes, 3 to 4 inches in diameter, a little more than 5 feet apart; all of them stopped a foot to 2 feet above the bottom of the mound, the earth being solid below them. A few similar small holes were found, but in no regular order; there may be more in the undug parts.

In the east wall of the trench, 10 feet out, 2 feet up, was an infant burial; with it was a "flowerpot" vase less than 2 inches high, with two small holes near the top for suspension; probably a child's toy.

Along the center line in the 5-10-foot zone was an elliptical hole 5 by 3½ feet and a little more than 3 feet deep, dug when the mound had reached that height, down to the original surface. The sides were rather regular; the earth with which it was filled breaking away from the sides easily in some places. There was nothing in it.

Along the east wall in the 5-15-foot zone was a depression filled with downward curved layers, giving the impression that the mound had caved here into a basin-shaped hole; but it was due to material having been dumped in two small heaps or ridges and the space between them filled by throwing earth over the tops and allowing it to roll or slide down the adjacent slopes of each pile. (Pl. 68, *a*.)

Mention is made above of the lumpy or cloddy condition of the earth in the central part of the mound, over the 5-foot stratum. This gave rise to the hope that a large grave or cavity of some description had been dug in the ground beneath the mound; and much of the work done, after this was observed, had been directed toward having ample room when the time came to clean it out. This loosened condition abruptly ceased about 20 inches above the bottom; and except for an ash pit, to be described later, the clay below this level was as solid as in any other part of the mound, and it rested on undisturbed soil. On this level, however—20 inches above the bottom—over a space 10 or 12 feet across around the central part of the first, or "buckshot" mound, were the decayed bones of a number of bodies. How many it is impossible to state; from the area over which they reached there could not have been fewer than five or six, and there may have been four times that many. Infants' teeth, and teeth much worn, occurred. One adult body had been laid between two small logs. Among the remains was one decorated pot 2 inches high containing minute desiccated fragments of

corn, squash, and perhaps other forms of food. A leaf, apparently a corn blade, had been placed over the top. Earth settling into the vase and hardening had preserved the form of these substances. Fragments of four other small pots were found. Wood or bark was above and below the remains. They lay partly on the dumped clay and partly on earth filling a depression which had been dug into and through this at the center of the old mound. It was clear that, so far from there having been a grave beneath the mound, the crumbly condition of the clay above the bodies had ensued from the destruction of some protective structure placed over them; the postholes noted may have belonged to such a shelter. The bones lay on a level surface; the material beneath them had not been affected by the settling. It was apparent that the platform on which they lay was in use, it may be, as the site of a house long before the interments had been made.

The hole, or ash pit, under them measured  $3\frac{1}{2}$  feet across and extended a foot into the black soil below. Successive fires had been made in it, and from time to time some earth had fallen in or been thrown in, as ashes, charcoal, and soil, some of it slightly burned, were intermingled. The soil may have been used to smother the fire when it was no longer needed; or it may have fallen in while the pit was in service as a barbecue hole. It must be that the site was abandoned while the pit was only partially filled; for above the ashes it was filled almost to the top with many thin layers of silt, proof that it had been exposed to numerous rains.

The loose condition of the clay above these bones continued as far as the trench was carried; in fact, it was so disintegrated that, at the wall face, where work ceased, parts of it could be spaded. There may be other burials beyond this point. Fragments of four pots, crushed flat, occurred in as many different places; but as all of them were imperfect they had probably been thrown away and not buried with bodies.

At the face, west of the center line, was an excellent impression of a small, well-made basket of split cane or oak strips.

In the east wall, 2 feet north of center, 4 feet up, were fragments of a child's bones, soft as ashes. Bark or wood had been placed above and below the body. This was the seventeenth and last burial place found; it is impossible to say how many bodies had been interred, even in the space cleared out, which was not more than one-fourth of the entire mound. But the great difficulty of removing the compact clay, the frequent storms, the excessive rainfall during the three months these explorations were under way, amounting to 21 inches above the normal average, and particularly the almost total lack of results were sufficient reasons for ceasing operations. Plate 68, *b*, shows the trench at the close of the work.

To sum up: It seems that a platform of clay was erected to a height of about 20 inches. Although there were none of the usual indications that people had ever lived on it, the pit or barbecue hole at the old center, under the grave, points to such occupancy. Perhaps the first deep hole found was also a fire pit, although it contained no ashes or burned earth. Then the site was abandoned until after these holes were filled with silt that washed in, a little at a time. After that, the central burial was made, and the building of the first mound was begun over this grave. As the work progressed, other bodies or skeletons were placed here and there, either directly on the ground as it was at the time or in shallow holes dug to receive them. Finally, the "buckshot" mound was completed. At some subsequent time the two intrusive burial pits were dug in the top of this mound, bodies placed in them, and when these graves were filled up the mound was added to until it reached its present dimensions.

Any indication as to the time that elapsed from the inception of the work to its completion, or as to the length of time between successive burials, or between the successive periods of building, or the date of any part of this work, is entirely lacking.

**MOUND 5.**—This mound, 300 feet east of Mound 4, is circular in outline,  $3\frac{1}{2}$  feet high and 70 feet in diameter. It is almost flat on top, and may be either a platform or domiciliary mound, or an unfinished burial mound. As it is surrounded by low ground which is boggy much of the time, and is built up of sticky black earth, no examination was attempted. Nothing less resistant than stone could retain its shape or substance if buried under such conditions.

**MOUND 6.**—In point of cubic contents this is the largest mound observed or reported in the Red River Valley, and is perhaps the largest in the State. The outline conveys the impression that the structure had a pentagonal or hexagonal base, but this must not be taken as a fact. Owing to surface erosion, to farming operations for many years, and to the "creep" mentioned in the description of Mound 2, the form of Mound 6 has undergone extensive alteration. No doubt it was what is usually called a "square" mound, though this term must not be accepted literally. It merely means that a structure thus named has four approximately straight sides; seldom are any two of the sides of the same length or any two angles equal.

The lines of the survey were run from one prominent salient to the next, and so continued around to the starting point; they do not take into account the large amount of earth which has drifted from the mound into the field beyond the limits so marked. It is shown in Plates 68, *c*, and 69, *b*.

The present height is 13 feet, and it was never much, if any, greater; there is a gentle slope from the summit to the margin on every side, but this was given to it by the builders and does not result



from erosive lowering. It would be desirable to have a heavy rainfall drain off quickly.

**MOUND 7.**—This is the only mound within Inclosure B. It is "square," flat-topped, 6 feet high, the sides much worn down, although the height has not been reduced. The base now covers a space 100 feet across each way, but this includes the earth that has washed down. The nearly level top is 40 feet across. Though much smaller, it is similar in form to Mound 6.

**MOUND 8.**—A ravine 1,100 feet wide at its mouth enters Old River at Inclosure B. On the far side of this ravine, at a distance from it of about 2,000 feet, is the next mound in order. It is nearly 2 miles north of east from Marksville, on the edge of the bluff. The owner, Alfred Greenhouse, states that it was once 15 or 16 feet high, with a basal diameter of 75 or 80 feet. A trench was made some years ago through the central part; and earth had also been removed from the sides to fill slight depressions around it from which material had been taken to use in its construction. None of these former excavations had been carried to the bottom of the mound.

A trench 15 feet wide was started near the margin on the southeast side, extending into the subsoil. This widened as it progressed until at the central portion it was 20 feet across from side to side. For the first foot below the surface the earth was soft; below that it was so firmly packed as to be difficult to loosen with a pick.

At the beginning of the trench there was a deposit of white silt which dried into an impalpable dust. This disappeared at 14 feet from where it was first reached. All the material above this was a gray and yellow sandy clay, showing irregular stratification as if each load had been thrown or scattered instead of being dumped in a pile. (Pl. 67, *b*.) After passing the silt, the clay lay on the natural surface. It was of the same character as the subsoil, and was probably brought, in part, from the face of the bluff near by. A few fragments of charcoal, flint, and pottery, a small, much used quartzite hammer or flint flaker approaching a discoidal in form, with an occasional arrowhead, were found loose in the earth; but nothing of any consequence.

The roughly stratified arrangement, rising as the trench progressed, showed that the mound had been built up from the center. In several places, at various depths, were found fragments of plaited stuff, apparently pieces of baskets. They were made of very thin strips of cane or of white oak one-fourth of an inch wide, laid close together side by side with interwoven cross strips an inch apart. Usually the cross strips lay at a right angle to the others, though some were placed bias. They were thoroughly carbonized and fell apart with the dirt. It is said by old residents that the Tunica Indians, living

on a reservation a few miles from here, "made baskets just like these" until a few years ago. They sold them to farmers and to any one else who would buy.

At intervals, near the center, were casts of carbonized twigs and small sticks which seemed to have been set leaning outwardly at an angle of 45 degrees. They were not continuous, yet seemed to be purposely placed as if to enclose or protect something.

At what was assumed to be the center—difficult to determine exactly by reason of the former excavations—was a long grave containing a few soft and decayed pieces of bones of a child which had been extended at full length. On the bottom of the grave, near the middle, was a space about a foot across covered with minute fragments of shells which, from the few pieces remaining, seemed to be disintegrated snail or periwinkle shells. If they were, there had been several hundred of them, as they formed a distinct layer in the earth.

East of this grave was another a little more than 6 feet long. There was no trace of bone or of anything else in it, except two small pots, one at each end, both of them broken by the pressure of the earth. One was shaped like a common flowerpot and contained one valve of a mussel shell; the other seems to be globular.

West of the center were two circular graves, near together, each measuring close to 2 feet in diameter. In one was a pot ornately decorated; in the other was a pot with a plain surface. Both were broken into many pieces. No trace of bone remained in either grave.

Six feet southwest of the center was a circular grave, in the bottom of which were scraps of bone burned almost to a cinder; not enough of them was left to determine their character.

Two other circular graves were uncovered, one west from the center, near the edge of the trench, one northeast of the center; nothing, not even a trace of bone, was found in either.

All of these graves were sunk through the original soil into the hard subsoil. The clay filling them was tough and moist, somewhat looser than that in the body of the mound on account of having fallen in, but still breaking off in clods under the pick. Bone will soon disappear under such conditions. In all of them the sides and bottom were covered with wood or bark, now completely carbonized and flattened like paper. The few soft decayed bones found were those of children; there were none left of adults. Bones of children, even of infants, often outlast those of persons of mature age buried in the same grave.

Over much of the original surface immediately around the center of the mound were traces of woven or "plaited" slivers of cane and white oak, apparently remains of matting which had been placed on the graves.

At each corner of the trench, a foot above bottom, were fragmentary bones of a young child with wood or bark around them as if they had been inclosed in it.

Possibly other graves may exist beyond the area excavated, which extended 3 feet past the center; but the lack of discoveries in those cleared out and the difficulty of removing the overlying clay, which was nearly 13 feet deep where the work ceased, made further examination undesirable.

**MOUND 9.**—This is a small affair on the extreme edge of the bluff, 250 feet southwest of Mound 8, and in the same field. So much digging has been done in it that no estimate could be made as to its size. Some years ago a small coin was found on the mound, and since then many persons have spent much time in the endeavor to secure the remainder of the "treasure."

It is reported that "a small clay pot and some bones" were unearthed several feet from the center.

**MOUND 10.**—On the edge of the bluff, 200 yards nearly east from Mound 8, was a mound which after much cultivation measured 4 feet high and 60 feet across. A circle 20 feet in diameter was laid off on the top, as near the middle as could be determined, and all the earth within this was removed. It was uniform in character, containing only surface soil like that in the field around; no material from a greater depth was used. The usual pieces of pottery, charcoal, and flint were found. There were also two small pieces of grooved burned clay similar to those occurring so abundantly north of Delhi; a small, much used hammer or flint chipper of yellowish quartz, and a symmetrical, highly polished plummet made of magnetic iron ore. There was no evidence of a burial; the component earth merged so gradually into the underlying soil that no line of demarcation could be traced. There was no fire bed and no indication that a grave had been dug, although the excavation was carried well down into the subsoil. At no place was there any difference in the appearance of the earth from that at the same level elsewhere, except in one spot near the northern edge of the excavation, where there was an irregular depression 18 or 20 inches across and a little less than a foot deep, filled with bluish clay in which were small fragments of charcoal and burned earth.

**MOUND 11.**—This seems to have been erected as a "square," flat-topped domiciliary pile; but it has been cultivated for many years, and its exact size or shape can not be ascertained. Its elevation now, at the highest point, is  $3\frac{1}{2}$  feet, the surface being quite uneven. Measuring to the present edge of the slopes, the longest diameter is 120 feet on a line north of west, the shortest 90 feet nearly northeast.

MOUND 12.—This mound, the most eastern and northern of those on the bluff, stood at the extreme end of a spur which projected toward the east from the upper flat. The crest of the ridge was level along the top, but so narrow that it had the appearance of a causeway artificially constructed; this was due entirely to erosive influences acting from each side.

The summit of the mound, after much cultivation, was a little less than 4 feet above the base, on the western side; in other directions it had washed down the slopes and its original boundary could not be traced. The owner had dug a small hole in the top to a depth of 7 or 8 feet, or to 3 or 4 feet below the level of the ridge on which it was built, and, as he said, "found a brick wall," at which point he stopped digging. As this hole, partially filled, was still about 6 feet deep, the inference was natural that he had found a large or at least a deep grave in or around which was burned earth, and that it would be worth investigating.

A circle 25 feet in diameter, to allow for any alteration in the mound from destructive influences, was marked off around the highest part, with the intention of digging a narrow trench around the circumference to the original surface and then clearing out the earth from every side toward the center.

The earth first encountered was mostly black, closely packed, and sticky, resembling mud from a swamp which had gradually filled with decaying vegetation. This was about 2 feet thick at the east margin of the excavation, but less than a foot at the west side. As it was practically horizontal at the bottom this difference may be due to changes produced by plowing and weathering. Below it was a rapid alternation of different sorts of material, whitish, gray, bluish, yellow, red, brown, and black, which had been deposited in various manners. There were strata several feet across and a few inches thick of a single kind; irregular patches, either mingled or uniform in their nature; small masses, apparently only a single basketful. The conditions in which the deposits occurred are such as would result from the labors of several parties or individuals, each procuring material at any available place and throwing it where most convenient or where it was desired; some of it in fairly regular layers; some in a pile; some at random as they ascended the slopes.

On the north side, a foot under the top, was a mass of burned earth, irregular in outline, about 10 feet across, and from an inch to 4 inches in thickness, resulting from fires made on the spot.

Instead of reaching the bottom within 4 feet or less, as expected, the excavation was carried through the same mixed deposits, still wet and sticky, for 5 or 6 feet. At this level the effort of throwing it over the wall around the margin became too great, and it was necessary to make another start, this time from the outside.

A trench 14 feet wide was begun on the south slope at a level 7 feet below the top of the mound. It was reasonable to suppose that at this distance the only earth to be moved, in order to reach the natural surface, would be a small amount that had washed down the slope. But there proved to be a depth of  $5\frac{1}{2}$  feet of deposited material similar to that in the upper part of the mound, making the entire elevation as measured from here between 12 and 13 feet. The different dumps of gray, yellow, black, and brown, thrown in from baskets, were as easily discernible as if they had been lined out with paint. They began directly on the original soil, a dark loam, which merged indistinguishably with the yellow clay subsoil. From the beginning of the outside trench, during the entire examination, the bottom of the excavation was kept down in the subsoil.

Some mussel shells, fragments of pottery and flint, and broken animal bones, including those of deer and bear, occurred sparsely in the earth; and there was also the right half of a human lower jaw, all the teeth from the canine to the third molar being in place, sound, white, and worn level on the crowns; the ramus was decayed, and the fracture, at the chin, an old one.

A few feet from the beginning of the lateral trench was a cavity having the size and shape of a bushel basket and partially filled with loose dark earth. This had not been dug after the mound was built, but resulted from the decay of something deposited here, as the surrounding dirt was fairly hard and showed by its appearance that the object, whatever it was, had been intentionally placed and the earth piled around it. Scattered at random throughout the material removed were masses of hard-burned earth, from small lumps to large blocks, some of them coming from outside sources, others being fire beds in place. Many of the pieces were honey-combed with minute holes, apparently due to the burning of grass roots over which fires had been maintained, but none had such cavities or impressions as would result from the burning of canes or twigs over which they might have been plastered; consequently they could not belong to the walls or roof of a building.

The natural earth upon which the mound was built gradually rose as the work proceeded, and it was finally ascertained that the mound was not built on top of the ridge, but at its extreme end, on the incline between the top and the bottom. The depth at the assumed or apparent center of the mound was 9 feet; the encircling trench was 3 feet deeper at the eastern (downhill) margin than at the western side; and from the central portion the original surface sloped to north and south.

It also became evident that the mound was built in three stages or at three periods. A section across the center showed that at the

bottom was a deposit of black surface soil or muck in which were small dumps of gray clay and yellow subsoil. The gray was more abundant toward the western, the yellow toward the eastern side. In this deposit were occasional fragments of animal bones, pottery, and sometimes a pebble or spall of chert, jasper, or other stone. This layer was 2 feet thick at the center, thinner uphill, and thicker downhill, to compensate the natural slope and bring its upper surface to a level. It was strewn with a thin deposit of kitchen refuse, as if lived on for a time. Next above it was 3 feet of reddish or yellow-brown clay. This, in turn, had on its upper surface a layer from 2 to 3½ inches thick of rotted sod, the stems and roots of grass; lying on which was a layer of gray clay of the same thickness. Above this was 3½ feet of material similar to that in the stratum at the bottom.

It is clear from this arrangement that the first step in building the mound was to make a level floor with the mingled earth, mostly black, on the sloping end of the spur. On this, it seems, people lived. Afterwards it was covered with yellow-brown clay, which was not disturbed for a number of years, as is shown by the thickness of the old sod line. This was finally covered with a thin layer of the gray clay; and then the mound was completed with a thick deposit of black earth. There was nothing to indicate the reason for, or the purpose of, all or any of this later labor.

After passing the assumed center, the black earth of the lowest stratum decreased progressively, with a corresponding increase in the amount of the gray, until toward the west side of the circular excavation the gray predominated, while at the northern and eastern limits the black had entirely run out and only the gray appeared. East of the center, and near it, a fire had been long maintained on top of this stratum, additional proof that it was a residence site. At first, a shallow depression was made and a fire kept in it, or perhaps many fires in succession; the earth below the bottom was burned red to a depth of 6 inches, the ashes of the last fires remaining in the pit. Sufficient earth had then been spread in the fireplace to bring it to a level with the surrounding surface. All this earth was also burned red and a bed of ashes 2 inches thick lay over and around it. From the general level to the lowest part of the heat-colored earth was about a foot. So it appears certain that the lowermost stratum of black and gray earth was piled up to make a level space to live on, although there were no postholes and indication that timber had been used. No surmise will be attempted as to the reason why all this trouble should be taken to make a foundation when there is level ground on every side, in the bottom land as well as on the bluff. For some equally occult reason, the site was coated with brown clay and the spot abandoned or neglected until much grass had grown on it;

then overspread with a thin layer of gray clay, and finally black earth piled over it all.

In five or six places, in a nearly straight row, along the east side of the excavation were holes left by the decay of posts or poles 3 or 4 inches in diameter, extending well into or nearly through the middle stratum of red earth; but as no similar cavities were found elsewhere these can not be considered as evidence of a structure of any kind.

There was no trace of burial in any part of the mound; nor had the soil on which it stood ever been disturbed prior to the present excavation. The only human bone found was the fragment of jaw noted above; and this had been carried in with a basketload of earth.

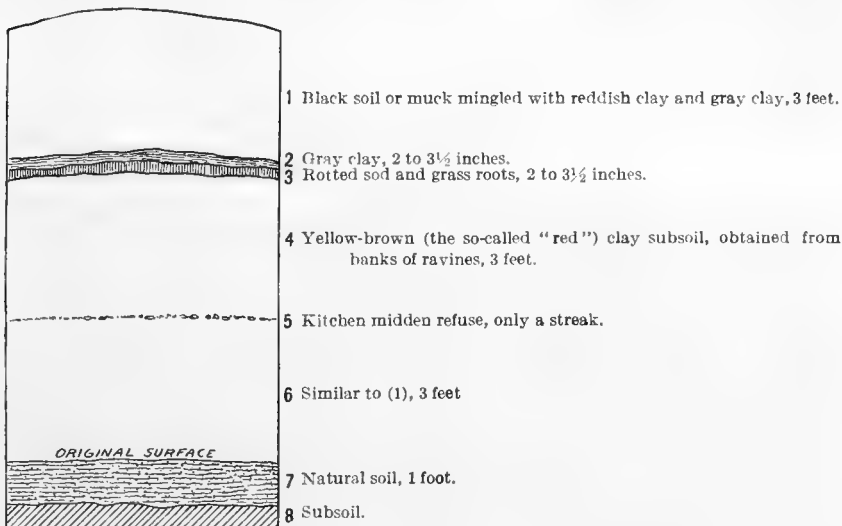


FIG. 4.—Section of Mound 12,  
Plate 1

**MOUND 13.**—The level area along the foot of the bluff to the eastward and southward of the spur on which Mound 12 is built is strewn over an area of nearly 2 acres, with the débris incident to an Indian settlement. At the outer extremity of this space, 300 feet south of east from Mound 12, once stood a mound about 4 feet high. It was scraped down "to get it out of the way." It is probable this was the site of a house, as refuse is more abundant on and around it than elsewhere. It was not a burial mound, for although one skeleton was dragged out, it lay several feet from the center.

Nothing could be learned by excavating here.

South of Mounds 10 and 11, in the lowland bordering Old River, are the remaining mounds of this group. They are seven in number, four large flat-topped and three small rounded ones. Their arrangement is shown on the map. They inclose a rudely square area of

about 2 acres and form a subgroup of themselves. All elevations given here are from the level of this inclosed space.

**MOUND 14.**—This, the largest, is in the form of a trapezium. The longest side, facing the interior area, measures about 150 feet. The sides are as steep as the earth will lie; the top has an elevation of  $13\frac{1}{2}$  feet. (Pl. 69, *c.*)

From Mound 14 to Mound 15 there is an artificial road or causeway 3 feet high and 42 feet across at the base.

**MOUND 15.**—The next two mounds, both undisturbed, were the only ones in this subgroup which had the appearance of burial places. The larger was selected for examination.

It is at present  $5\frac{1}{2}$  feet high; but as it stands at the top of a slope bordering a slough, the height from the apparent margin on that side was about 9 feet.

A trench 12 feet wide was started at the latter level, 25 feet east of the highest part. It was expected that the original margin of the mound would be reached at this point, allowance being made for floods which have raised the altitude of all the lowlands; but the initial excavation had to be carried down nearly 3 feet below the general surface, through dumped and washed-in material containing much kitchen refuse, before the natural ground was reached; and at this level water was encountered which had seeped in from the slough. All the earth in the mound was saturated and very tenacious.

A foot above bottom, near the south wall, 15 feet from center, were eight metacarpal bones of deer, in a bunch, standing on end, as if they had been wrapped or tied together and cached here, to be converted into skivers later. Other deer bones, including a skull, all of them broken; mussel shells; and broken pottery with various designs incised or impressed, were profusely scattered loose in the earth. One small potsherd had a decoration in red resembling those of Arkansas. Diligent search was made for other pieces like it, but none could be found. It was almost useless to hunt for anything in the mud.

The mound was never intended for a burial place, but marked a house site. The construction was quite similar to that of Mound 13.

On the white "crawfish" clay, in place, at the bottom, almost at ordinary water level, was a deposit of black, mucky mud from 3 to  $3\frac{1}{2}$  feet thick; much burned earth, carried in as a part of the deposit, was scattered through it. On this was a layer of red clay and burned earth, mixed, having a depth of 9 to 12 inches. At this stage work on the mound was suspended by the builders, and a hole dug almost to the bottom, to serve as a fire-pit or barbecue hole. This measured, roughly,  $7\frac{1}{2}$  feet across; it was exposed for nearly this distance along the north wall and extended for five feet into the trench. As



the portion excavated had a practically uniform curve, it is fair to assume that it reached  $2\frac{1}{2}$  feet into the undug part. The sides were laminated and hardened to such a degree, through heat of the fires which had been maintained in it, that large thin flakes as hard as a brick or a tile could be split off. This may mean that the sides were occasionally smoothed or plastered with fresh clay.

In the bottom of the pit was a layer of clean ashes 5 inches thick; above this was a mixture, some of it in rather regular strata, of ashes, charcoal, burned earth, and ordinary earth, extending to the top. It looked as though the pit had been kept clear of débris until the ashes at the bottom had accumulated, and that afterwards other fires had been smothered with earth; or that earth had fallen into the pit between the timbers laid over the hole, on which it had been piled to confine the heat in roasting or barbecuing meat placed within.

Covering the red clay and extending unbroken across the top of the fire pit was a layer of gray sand or silt 3 to  $4\frac{1}{2}$  inches thick; the upper surface of this was as level as it could be made. Above it was 7 to 12 inches of muck and black dirt similar to that in the bottom layer and containing much kitchen refuse, and on this was surface earth whose greatest thickness at the highest part of the mound was  $3\frac{1}{2}$  feet. Thus the mound whose summit was only  $5\frac{1}{2}$  feet higher than the area enclosed by the subgroup was  $8\frac{1}{2}$  feet deep to the earth on which it was built. The difference of 3 feet represents the amount of sediment from flood waters since the building of the structure was commenced. The trench was carried to 10 feet past the center, or 35 feet in all.

In recent years freshets have covered all the mounds except mound 14, the highest one; but there is no reason to believe that such conditions existed in prehistoric days. Since the "rafts" and much of the standing timber which formerly obstructed the current have been removed, the current is more rapid than before, and consequently a greater volume of water comes down the river in a given time. In addition to this, numerous swamps have had large ditches cut through them and many tortuous minor streams have been straightened, with the result that inland waters which once required weeks to reach the main stream now enter it in as many days, bringing it to a much higher level than it formerly attained. For these reasons it is probable that the Indian suffered less from high waters than his successors have done. They would not have made permanent settlements on lands from which they were compelled to flee two or three times a year. Moore speaks in several places in his report of going down 6 or 7 feet below the general level before reaching the bottom of a grave in or under a mound; but in most cases it would be impossible to determine now just

where the surface was at the time the burial was made. Besides, floods never reached the height in early days that they attain since levees were built. When a levee breaks, as it generally does at a dangerous juncture, water rises over ground which it never reached when it had a chance to spread. But, aside from this, the situation of many mounds in the Red River Valley, in swamps or overflow land, as in the case of those in the sunken lands of Arkansas and Missouri, points to a change in the relative level of land and streams, either a lowering of the former by earthquake action or by local alterations in topography, or an elevation of the latter by changes in drainage systems, whether from the silting up of outlets or from the creation of new channels. Whatever the cause, mounds stand where they would not be built under present conditions.

Old River passes near this subgroup on the south, and on the north there is a depression which has filled several feet in the past 50 years; so the area upon which these mounds stand may have been an island when they were erected.

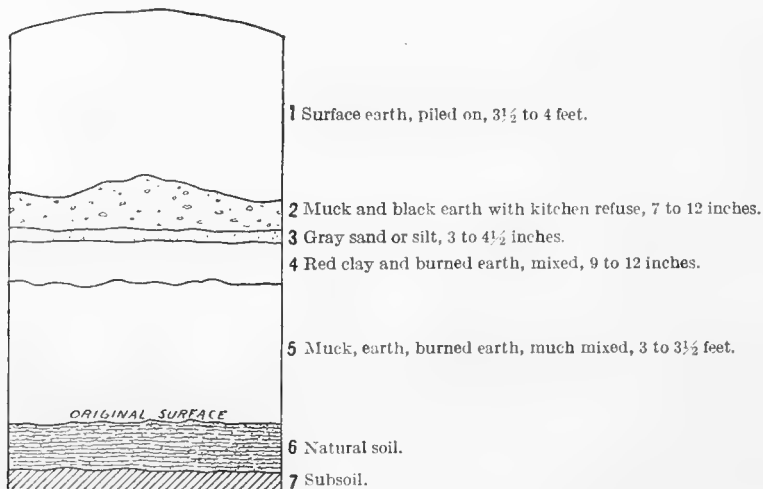


FIG. 5.—Section of Mound  
15, Plate 1

**MOUND 16.**—This is a small rounded elevation; although it has not been cultivated, it is only a foot high and 25 feet across. It is overgrown and was not examined.

**MOUND 17.**—This is plowed level, but was probably no larger than Mound 16. It appears to have been the site of a dwelling.

**MOUND 18.**—This is an irregular pentagon in form. The longest side, that on the west, measures 130 feet; the north and south ends are nearly parallel, each 100 feet; the two sides on the east are 70 feet each. The level top has an elevation of 11½ feet.

**MOUND 19.**—This has been plowed over so often that the top is rounded, giving it a dome shape. It was flat-topped when built. It is somewhat diamond-shaped in outline, the two axes measuring 150 feet north and south by 135 feet east and west. The present elevation is 7 feet.

**MOUND 20.**—This mound is practically square, the sides measuring 100 feet each. The level area on the top is 7 feet above the base. The slopes from top to bottom are not uniform on the north and south sides, so that on those sides the margins of the top are not parallel with the margins of the base.

#### LODGE SITES

By the term "lodge site" is meant a small embankment, usually circular or nearly so, though sometimes rectangular, perhaps square, with a break or passageway at some point in the wall. Each marks the site of a dwelling for a single family; of a communal house which serves as a home for several families; of a council house; of an edifice for the performance of religious rites or ceremonies; or of any other sort of building of a somewhat permanent nature which might be needed or desired. Usually the embankment is formed by excavating a trench to a depth varying with the purpose for which it is intended and piling the earth around the margin. It may form a reinforcement for posts or palisades, which make the walls; or it may be piled against the bottom of a slighter structure as a protection against wind or surface water from heavy rainfall.

With the Marksville mound group there are eight of these lodge sites. The three measurements given with each in the following notes refer, first, to the height of the wall; secondly, to the width of the wall at its base; thirdly, the measure across the center from top to top of the wall. All measures are given to the nearest foot.

No. 1.—This is close to the river bluff, within Inclosure A, less than 100 feet from the southern end of the wall. It has been plowed until its outline is uncertain, but it seems a little longer from east to west than from north to south. The opening, or entrance, is toward the stream. Its dimensions are  $2\frac{1}{2}$ ; 20; 45 by 50.

No. 2.—This is 200 feet north from the north end of Inclosure A. At first glance the wall seems to be heavier and the central depression deeper than is the case with the other sites; but this appearance is due to its smaller diameter. The present bottom, at the center, is 3 feet lower than the top of the wall; but owing to the filling of the former and erosion of the latter, the original difference of level was at least 4 feet, perhaps more. There is now less than 20 feet of space between the wall and the river bluff.

On the opposite side, where the entrance was placed, a third of the structure has been destroyed by an encroaching ravine. The part of the wall remaining is 2; 20; 33.

No. 3.—The wall is now  $2\frac{1}{2}$ ; 27; 48. A minor ravine is wearing away the south side. The opening is at the east, facing the river bluff, which is only 10 feet away.

No. 4.—The walls of this site measure 3; 27; and 43 feet. It has lost several feet from the west side by the encroachment of a ravine; another ravine has reached the southern margin. The opening is at the south, or facing No. 3.

No. 5.—This is almost surrounded by deep ravines which have left very little space around the outside of the wall except a narrow ridge toward the west. The opening is on the south side. The wall measures 3; 22; 54.

No. 6.—The wall is 2; 20; 54. The entrance is at the north. Parallel ravines are encroaching on the east and west sides.

No. 7.—The west half of this has fallen into a ravine, and what remains is reduced by surface erosion. The entrance is at the south. The portion of the wall still left is  $1\frac{1}{2}$ ; 20; 53.

No. 8.—This has been entirely leveled with plow and scraper, but it can still be partially traced by the color. It is said to have been the largest of the group, and that the doorway was to the east, facing those nearest to it.

A ravine 40 feet deep joins Old River near No. 2, cutting it off from Nos. 3 and 4, these three being near the river bluff. The same ravine, curving in behind the latter two, separates them from the others.

All the ravines between the bayou south of Mound 1 and the point on which Mounds 12 and 13 stand have mostly or entirely formed since the earthworks were constructed. There is little question that at the time this site was occupied by aborigines the entire area around the curve of Old River from Mound 1 to Mound 13 was a continuous plain over which communication was easy between all parts of the settlement.

#### MOUNDS IN WEST CARROLL AND RICHLAND PARISHES, LA.

Bayou Maçon (May-son) forms the western boundary of the parishes which border the Mississippi in the northeastern part of Louisiana, opposite Vicksburg. All the land on the east side of it and some on the west is subject to overflow during extreme floods.

Two very large mounds, "about a hundred feet high," were reported as standing near the bayou, 17 miles north of Delhi, on

alluvial land belonging to the Marston plantation. The very positive statements as to their magnitude, form, and situation made them worth a visit.

They were found to be of natural origin, solitary outliers, the only ones for many miles in any direction, of the geological formations found in the bluffs to the east and the west of the river; islands left by the drainage which cut the present river valley. Their appearance would easily deceive anyone who was not somewhat familiar with such deposits.

Half a mile south of them, on Neil's land, is a mound 10 feet high by 60 feet base. The sides are very steep, although it has been much cultivated. The form has been so changed that it is impossible to state whether it had a level top which has been rounded, or whether it was a dome-shaped structure whose top has been lowered and flattened. Permission to excavate could not be had on account of the growing crop.

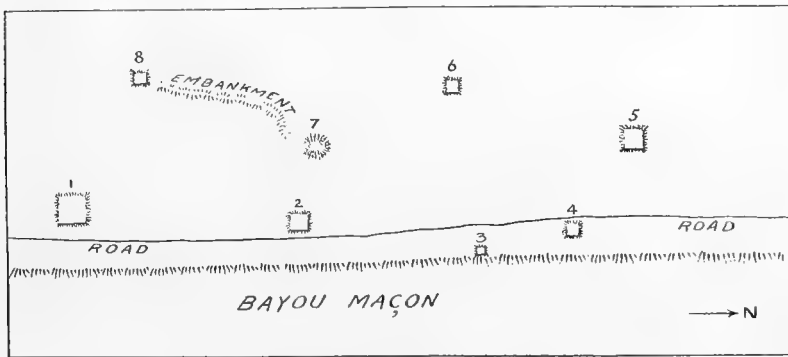


FIG. 6.—Mound group north of Delhi, La.

Half a mile south of the last mound, still on the Neil farm, is a group of eight mounds. Seven of them are flat-topped; the eighth, now reduced by plowing, is low and rounded, though probably built flat like the others. It stands on the space enclosed by the other seven and is connected by a low embankment with the mound southwest of it. The arrangement of the group is shown approximately in the following diagram, which is not made to scale, the height, width of base, and distances being estimated.

In every direction from these mounds, and in the adjoining fields, many flints and fragments of pottery have been found. Small nodules of hematite are abundant; a boy, in plowing, turned out a cache or "nest" of them, numbering 51; at least that was the number he gathered from the pile. Many others have been picked up. They are small, very few of them weighing over 4 ounces; most of them are only slightly if at all worked; some are rubbed to varying degrees of smoothness or symmetry; rarely, one is a fairly finished

plummet; occasionally one has a slight groove or a small perforation near the smaller end. If used as sinkers they must have been enclosed in a net or sack. In the same field where these were found a steatite pot was struck by a plow; the fragments were gathered up and found to weigh 16 pounds. The finder broke it into many pieces, and generously distributed them to every person who wanted a "sample." There are also hundreds, or thousands, of small pieces of hard-burned clay, usually shapeless, though sometimes an attempt seems to have been made to make them resemble something. Doctor Hough, of the National Museum, says they are in the nature of fetiches or charms, placed in the fields when seeds are planted to inform the gods what crop is desired at that spot and to remind them that their good offices are invoked to insure a bountiful yield. As new offerings would be made every year, we have an explanation of their abundance.

Between this mound group and Delhi are three groups of house mounds. One is north and one south of Epps station; in each of these only a few are visible from the road, and all of them are small; there may be more in the woods. The third group, a mile from the flat mounds, numbers probably 100, and some of them are large.

On another Marston plantation, a mile and a half north of Delhi, is an embankment, now partly obliterated by cultivation, forming an arc of a circle and terminating at each end on the bank of the bayou. This connects four mounds, situated at intervals. First, at the north, is a flat-topped mound 6 feet high and 150 feet across; next, a round mound, nearly destroyed; third, a flat-topped mound 9 by 200 feet, with a small conical mound built on one corner of it; finally, another nearly obliterated structure; this and the other reduced mound may have been flat-topped. There are a few elevations in this field, now scarcely visible, which may be artificial.

From 3 to 7 miles south of Delhi are three or four small groups of house mounds; also a few in the south edge of the town.

Four or 5 miles south of Delhi are two flat-topped mounds, one of which has been partially destroyed by caving of the bank of the bayou on which it is built; the other, a fourth of a mile from this, is a few rods from the stream.

#### MOUNDS IN COLBERT COUNTY, ALA., AT THE MOUTH OF TOWN CREEK

Town Creek, flowing in a general northerly direction, forms the line between Colbert and Lawrence Counties, Ala. A few rods above the mouth of the creek, on the lower side, is the beginning of a depression or slough which winds across the overflow land, then follows the foot of the bluff facing the river, and finally joins the main stream about 2 miles below the point where it begins.

The area thus cut off is known as Hog Island. Most of it is high enough to escape any flood and over nearly all the higher land are abundant indications of aboriginal occupancy in the way of broken stones and shells from the stream.

On this island, and on the adjacent area, are several mounds, all of which would be submerged when the Wilson Dam was completed and the water above it impounded. The Tennessee Valley Historical Society, desirous of investigating the structures before they were lost, requested the Bureau of American Ethnology to carry on this work.

Every assistance possible was given by the Government engineers in charge of the public work, and also by the above mentioned society, as well as by various parties interested in whatever discoveries might be made. Among so many it is impossible to mention all; but especial obligations are due to the officers of the Foster Hunting and Fishing Club, who tendered their hospitality and allowed the free use of their lodge during the work; to Messrs. S. S. Pippin, F. R. King, J. G. Sanderson, and P. E. Simms, who gave valuable aid in many ways. To make further acknowledgments would be practically equivalent to naming every one who had a chance to help in any manner.

#### THE SHELL HEAP

At the junction of the creek with the river, in the extreme northeast corner of Colbert County, is a large shell heap or kitchen midden composed almost entirely of mussel and periwinkle shells of several varieties, but all of them such as are now to be found in the river.

The area covered by the base is somewhat irregular, being between an ellipse and a rectangle in outline; it measures 250 by 135 feet, the longer axis north and south, parallel to the direction of the creek. The northern and eastern sides of the mound extend down the slopes of the banks toward the river and the creek respectively. When either stream is at a high stage water overflows the land around the mound, but has never covered it since the country has been settled by the whites. The effect of such floods has been to raise the general level around it, so that while the top of the shell pile is from 6 to 7 feet high, the greatest depth, as ascertained in the course of the work, is approximately  $9\frac{1}{2}$  feet.

Excavation was begun at the north end, near the bottom of the slope and about 15 feet within the margin of the mound. A space 25 feet wide was marked off, the east line on the side of the slope toward the creek, the west line along the top of the mound, which was nearly level about the central part. All the material within these limits was removed down to the natural soil and for a distance of 120 feet, which carried it somewhat beyond the middle of the pile.

At once the structure was ascertained to be composed almost entirely of shells, interspersed with the ordinary *débris* of an Indian village. Such earth as occurred filling the interstices between the shells was due to accumulations from floods; from mud brought in on the feet of those using the place; and from dust carried in by winds. It comprised probably 10 per cent of the mass, being somewhat greater at the bottom of the heap and becoming progressively less toward the top as the mound grew to such proportions that it was less frequently submerged.

Deposits of earth, considerable in number but small in amount, seem to have been carried in purposely to furnish a better foundation for fires than was offered by the loose shells; such "fireplaces," more or less hardened and discolored by heat, occurred at various levels in all parts of the excavation.

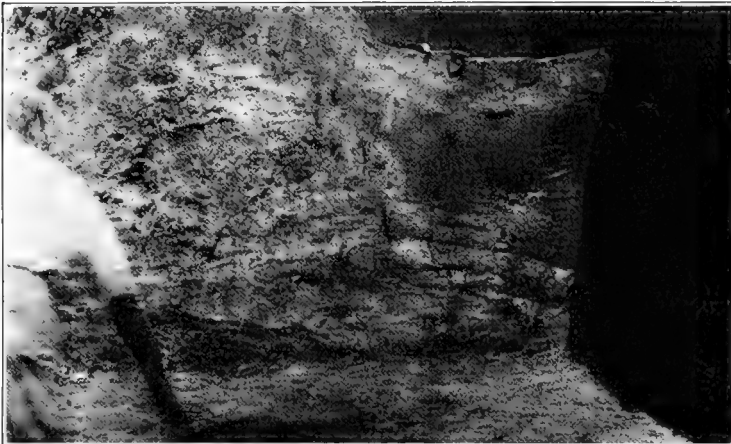
There was no evidence of such stratification or of any such difference of character in the material found as to denote that the site had been used by peoples of diverse cultures, either at the same or at different times; or that it had been abandoned for long periods and occupancy resumed later. True, the shells at the bottom were softer and more decayed than those higher up; but not to a greater extent than would naturally result from the fact that they had not only been there much longer but had all the time been exposed to a greater degree of moisture. There was a sort of stratification in places, as if the shells had been carried to the edge of a refuse pile and thrown along the margin in order to keep the surface level for the greater convenience of those living on it; but there was an equal or greater amount of material thrown carelessly in any available spot.

Scattered promiscuously among the *débris* were the usual objects found on Indian village sites: A large number of flint implements, more than a bushel, mostly knives or spearheads, the majority of them broken; cooking stones in abundance, usually cracked or shattered, but some showing only slight traces of heat; cupstones, none with more than five or six depressions; a few mortars; quantities of stones showing marks of use as hammers, others apparently pestles or rubbing stones, nearly all used in their natural shape or showing but slight marks of a dressing tool; hundreds of pointed bone implements, such as are usually called "needles," "awls," or "perforators," among them many spines from the dorsal fins of large catfish and drumfish; numerous flaking tools and other implements made of antler, some with holes drilled in the ends for inserting flint or bone points; only a few fragments of pottery; mammal and bird bones, with a large preponderance of those from deer, broken in small pieces, and of various species of fish. Some of these are shown in Plates 70 to 74.





a, DETAIL OF CONSTRUCTION IN MOUND 4



b, SHOWING TWO PERIODS OF CONSTRUCTION OF MOUND 4,  
AND GRAVE AT CENTER



c, MOUND 6, FROM TOP OF MOUND 4



a, MOUND 1, MARKSVILLE, LA.



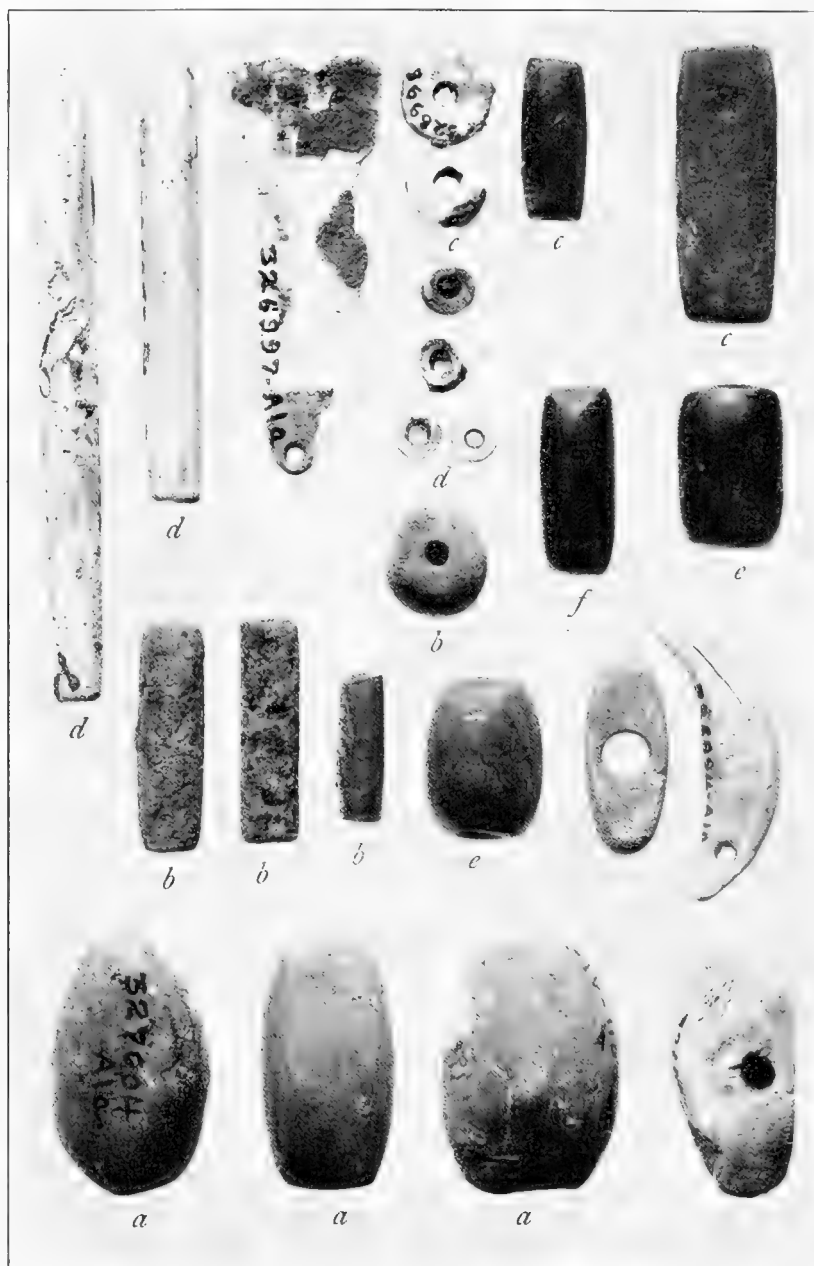
b, MOUND 6, MARKSVILLE, LA., FROM THE WEST



c, MOUND 14, MARKSVILLE, LA.



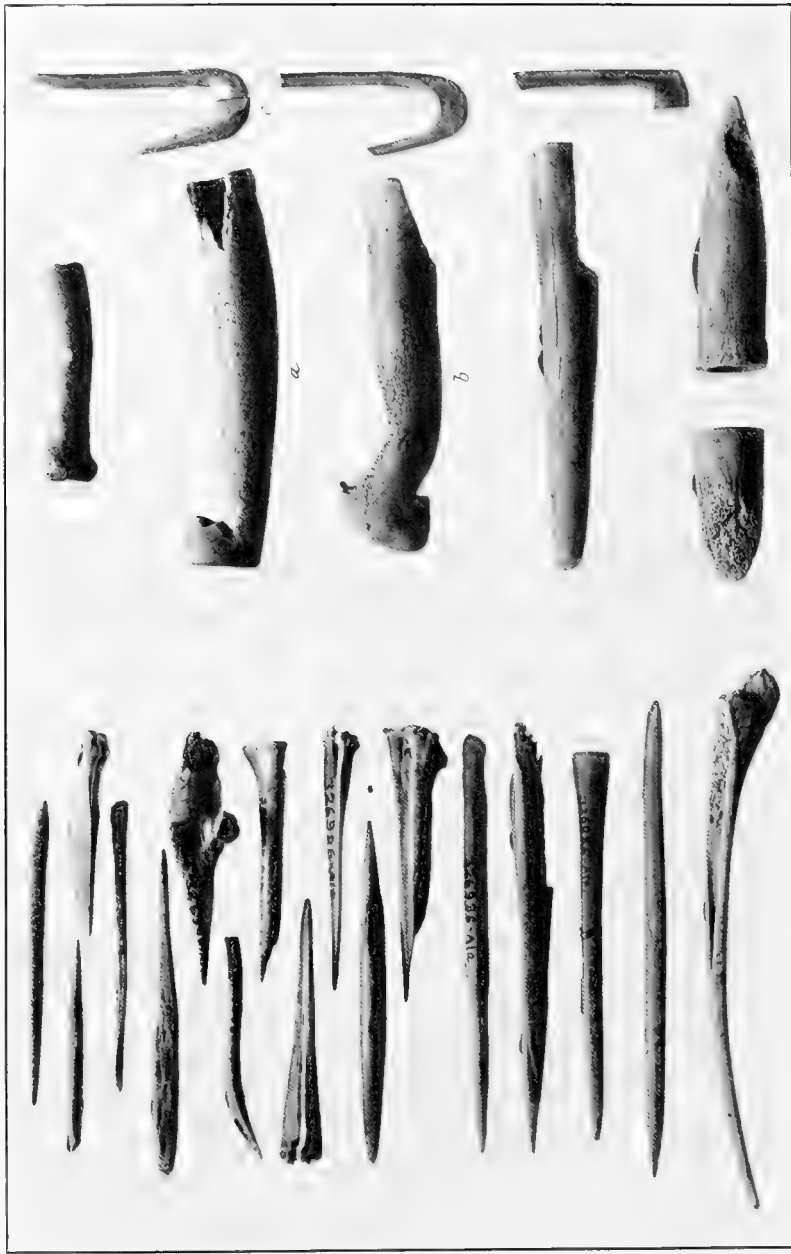
STONE IMPLEMENTS FROM SHELL HEAP, MOUTH OF TOWN CREEK, ALA.



BEADS AND ORNAMENTS FROM SHELL HEAP, MOUTH OF TOWN CREEK, ALA.



FLAKING TOOLS FROM SHELL HEAP, TOWN CREEK, ALA.



BONE IMPLEMENTS FROM SHELL HEAP, TOWN CREEK, ALA.

None of these objects were distinctive; that is, there was no peculiarity of shape or finish to any of them which would make it possible to attribute them to any particular tribe. Scarcely any of them were well finished, and they could have been made by any primitive people. The pottery was shell tempered, with no decorative markings; scarcely a piece had a handle. The flints were rough and poorly chipped; but this may be due in large part to the nature of the stone, which is coarse, of uneven texture, containing cavities, and refractory to either hammer or flaking tool. A few finely wrought drills and other specimens of a superior grade of stone (pl. 70, *f*) may have been imported. A number of the unstemmed flints have the base convexly curved, with expanding corners at the sides, making them somewhat bell-shaped. It is probable that the large proportion of fragmentary specimens were broken by prying or twisting in the effort to open mussel shells with them. Hammerstones may have been used to break the edges of the shells so that the knife could be more easily inserted; however, no shells were observed which showed marks of such operation. This fact may not be conclusive, as the edges of nearly all mussel shells were blunt and ragged from decay. The bone "perforators" (pl. 73) would seem to be of no other use in such quantities than to extract the flesh of periwinkles from their shells, whether they had been cooked by boiling or by roasting; and fin bones of large fishes were probably used for the same purpose.

There was more earth at the northern end of the mound than toward the center; some of it was in level, rather uniform layers, apparently deposited in still water, and some of it in small masses as if due to swirling or eddying currents. This may be explained by the fact that this end was more exposed to freshets in both the river and the creek when these were high.

Wherever these unburned, apparently water-laid, deposits were found they contained some shells scattered through them as if carried there by the current or by rain washing them in from the top of the mound as it stood at that time.

Earth dark from admixture with decayed charcoal and fire beds burned red sometimes to a depth of 5 or 6 inches occurred at every level from bottom to top and in every part of the trench.

Every worked object found, except those in graves, to be noted later, seemed to be of accidental origin; that is, not deposited intentionally but thrown away or lost in the refuse.

Two explanations are available to account for the peculiar conditions existing here. First, there may have been people from the numerous village sites away from the river, coming here to fish and to gather the mollusks, who brought with them only what they needed in their camp, or who made their crude and simple imple-

ments after they got here, and in either case left them as not worth carrying away when they returned to their homes; or, secondly, it may have been permanently occupied by aborigines of a low grade who had not the skill to fabricate more artistic articles. In support of either supposition is the absence of almost everything that is not crude or roughly finished. The second theory seems plausible by reason of the number of burials. Unless the supposed sojourners from the inland villages lived at a considerable distance they would probably carry their dead back to the places where they had formerly resided. The young children whose remains were found would also indicate a somewhat permanent residence.

But whoever lived here, and in whatever condition, the accumulation of the shells must of necessity have been confined to certain periods of the year. When the water was high, muddy, or uncomfortably cold, the mollusks would be practically inaccessible.

Before the backwater from the great dam had covered the shoals, immense flocks of wild geese stopped here during their migratory flights, to eat the snails. As no bones of these fowls were found in the shellheap, it is clear that from some cause the Indians did not catch them.

The numerous worked objects scattered throughout that portion of the mound which was excavated, and presumably in all other parts of it as well, being merely derelicts, so to speak, not distinctive in material, form, or in any other respect, cast no light upon the identity of the tribe who may have made them or the time at which the users may have left them here. Consequently no necessity exists for entering into particulars regarding the depth or the part of the mound where they were discovered. Only unusual features will be herein recorded; burials, of course, will be somewhat fully described.

All distances given are from the beginning of the trench and from its western wall or side.

At the middle of the trench, at 40 feet, 4 feet above the bottom was found the first "barbecue hole," filled with earth and shells, mainly the latter. It may be explained that a "barbecue hole" is one dug in the earth, of a size and depth determined by what is to be cooked in it, whether fish, flesh, or fowl; and in this case by shellfish as well. Sometimes the pit is large enough to contain several animals; again there may be a hole of a size not to exceed that of a large dishpan. A fire is maintained in it until the earth is well heated and a mass of live coals has accumulated in the bottom. The article to be cooked, whatever it may be, is placed in this, properly supported, closely covered, and allowed to remain as long as need be; experience in the art is needed to enable the purveyor of the feast to know the proper length of time. The pit



in question was dug when the mound was at this stage of construction, as the layers of shell above it were undisturbed. Similar cooking places were found in other parts of the trench.

On the east side of the trench, from 50 to 60 feet in, 4 feet up, was a beech log 10 feet long and seemingly about 10 inches in diameter when placed here; it was burned to charcoal. It had evidently been used as a "back log" to build fires against.

At 78 feet, on west side, were potsherds, apparently of a pot broken here; two peculiarly worked bones of unknown use (pl. 73, *a, b*); and two bone fishhooks with a fragment of another (pl. 73, *c*).

At 90 feet, near center of trench, 5 or 6 feet above bottom, were some small fragments of adobe-like hard-burned clay which had been plastered over split canes, the ridges being convex instead of concave as they would be if formed by the rounded surface of a natural growth. These were carried in from some other place.

At 102 feet, near east side of trench, a few inches above bottom, were three smooth pebbles of very hard red stone (not jasper), much rubbed (pl. 71, *a*). The intent was probably to make beads of them, but the workman became discouraged at his slow progress and threw them away.

Two small, flat, waterworn pebbles of coal were found. Each had been chipped on the edge. They were probably picked up in the river by some one who did not know what they were and who tested them to see what could be done with or made of them. The prospect not being satisfactory, they were discarded.

At 103 feet, 5 feet from bottom, was a small side-notched hoe, which might easily be mistaken for a much-used grooved ax (pl. 70, *e*).

At 104 to 110 feet, near the east wall, was a hole or depression less than a foot deep, filled with the same sort of material as that surrounding and covering it. In the débris were bones of a young bear, a large stag, a fowl the size of a chicken, fish, and turtle.

At 107 to 111 feet, in the east wall, was a mass mainly of mussel shells, though containing many periwinkles, in what appeared to be a pit dug into the mound when it had reached a height of nearly 4 feet (pl. 75, *a*). They had seemingly been poured in, all at one time, and the hole covered over as the building of the mound was continued. They were clean and fresh looking, with no admixture of earth, and the deposited shells above them showed no sign of disturbance. They rested on a thin, irregular layer of earth which extended beyond the limits of the pit on every side. In the mass were a few cooking stones and near the center was a rough block of limestone weighing about 20 pounds. The rocks seemed to have no connection with the shells. There were no marks of fire about

the pits; the shells were empty when placed in it; so it was nothing in the nature of a "clam bake."

Views of sections in different parts of the mound are presented in Plate 76, *a*, showing the stump of a large tree which was dug out; Plate 75, *b*, along the west bank; Plate 76, *b*, the end of the trench, the worked over material, and the ditch cut through this to expose the west bank.

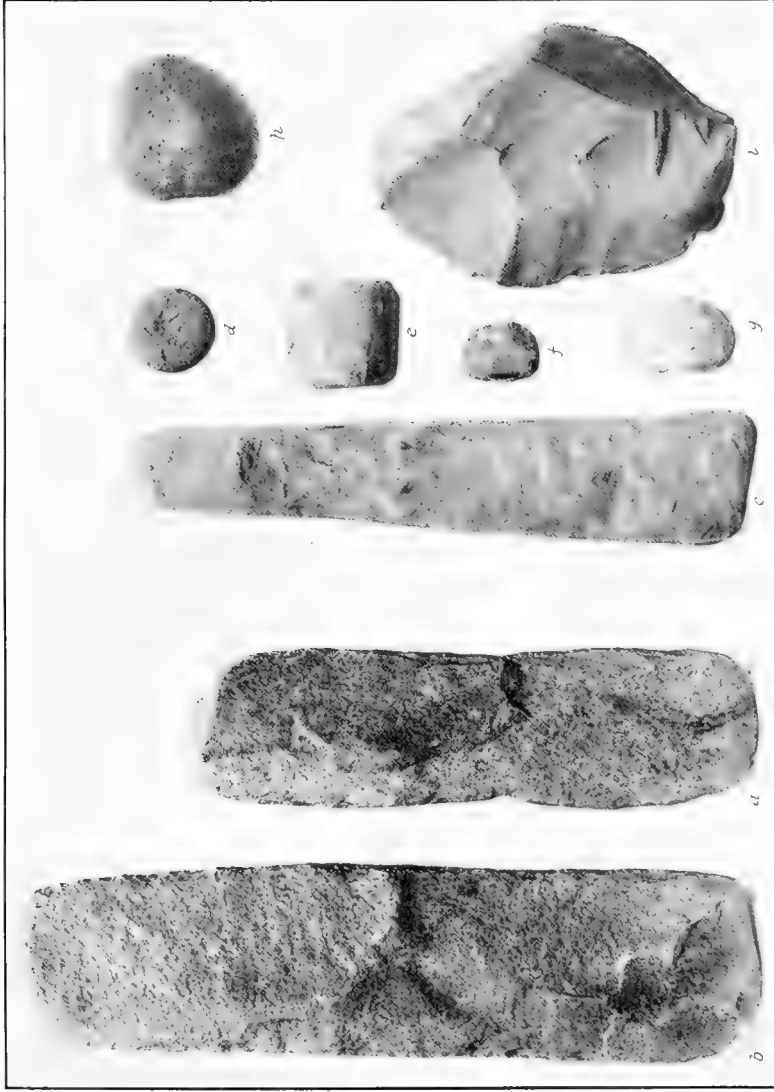
The first human bones were found at 55 feet, on the eastern side of the trench. They belonged to a youth of 13 or 14 years. There were parts of skull, vertebrae, and limbs, all broken into small pieces. Among them were scraps of pottery. South of these, and continuous with them, in a small pile, were some broken bones of an adult. It is difficult to avoid the conviction that these fragmentary bones were the remnants of a cannibal feast.

At several other places in the trench were discovered human bones similarly broken or scattered, and pointing to the same conclusion. A few of them may have been dragged from their original resting place by groundhogs or other burrowing animals which had tunneled into the mound; but there were very few runways made by these animals; besides, most of the fragmentary bones thus found were packed in among shells which had not been disturbed since they were deposited. Moreover, although rodents would gnaw bones, they could not break them in such way as to leave sharp edges; and the few runways that existed were smoothly worn and free from débris, as the shells will not settle into small cavities.

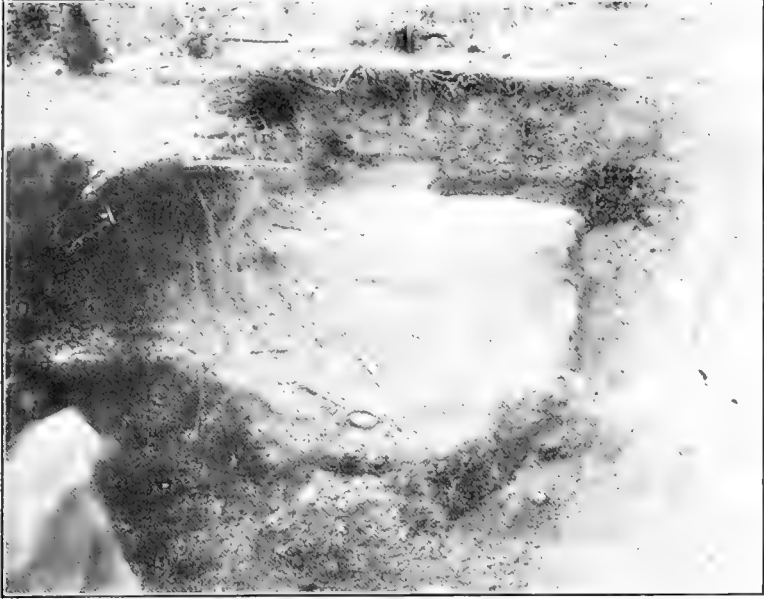
The first burial found was at 65 feet, in the west face of the trench, 3 feet above the bottom. The body had been closely folded and laid with the head toward the southeast. The bones were soft and crushed; the teeth much worn.

A foot to the south of this skeleton, 6 feet east and 3 feet higher, was another closely folded skeleton with the head north. This, also, was of an old person; the bones were crushed, so that only the humerus could be measured. It was 13 inches long.

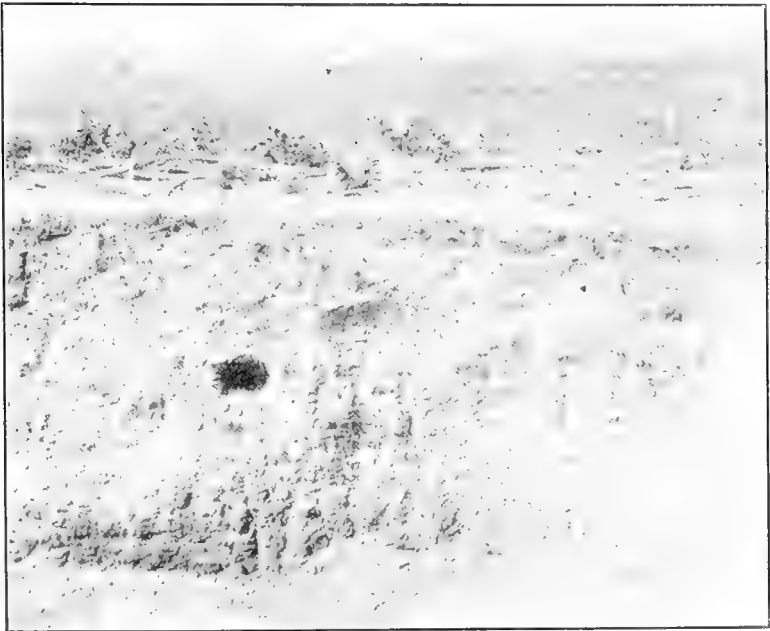
A singular feature in connection with these skeletons was that on or against the pelvis of each was another pelvis from which the leg bones belonging to it extended in a straight line with the back or body of the individual by whom it was placed. This gave to the bones, as they lay in the shells, the appearance of belonging to a person with two sets of legs, one set drawn up against the front of the body, the other set projecting horizontally. No trace of any upper parts of the bodies belonging to these extended limbs could be discovered; and that only the bones themselves, denuded of flesh, had been placed here was further indicated by the fact that they were not quite in their proper order, one fibula, especially, being exactly



a, b, SPADES FROM HOG ISLAND MOUND; c, PESTLE; d-i, STONE IMPLEMENTS FROM SHELL HEAP, TOWN CREEK, ALA.



a, MASS OF SHELLS FILLING A PIT IN SHELL HEAP



b, WEST BANK OF TRENCH IN SHELL HEAP



*a*, EXCAVATION IN SHELL HEAP



*b*, END OF TRENCH IN SHELL HEAP



*a*, FRACTURED FIBULA FROM SHELL HEAP. *b*, CURVED TIBIA FROM ALEXANDER MOUND. *c*, CURVED TIBIAE FROM HOG ISLAND MOUND

reversed. Nothing of an artificial character was found in either grave. Although the amount of shells separating the two denoted a long interval between the interments, the method of burial in both cases, as shown by the position of the bones, was practically identical.

At 69 feet, in west wall, were the lower left leg and foot bones of one person. These were not broken before being deposited, as was usually the case with segregated bones; the latter condition indicates cannibalism, while the former may be due to all other bones of the corpse disintegrating and dissolving; instances of such disappearance being frequent.

At 75 feet, 16 feet from west wall,  $4\frac{1}{2}$  feet from bottom, was a skeleton extended, on back, head northeast. The bones were too fragile to pick up; the ulna was  $13\frac{1}{4}$  inches long. The skull was in numerous fragments, but most of these were secured. Under this skeleton, but separated from it by 3 to 4 inches of clean, unburned shells, was a fire-bed burned to a bright red to a depth of 2 to 4 inches. It had no apparent connection with the interment.

At 80 feet, under the west bank of the trench, in a hole dug only 5 or 6 inches into the subsoil, was the closely folded skeleton of a young person; the teeth were but little worn, some of them not at all. It lay on the left side, head northeast. At the neck were four beads; two cylindrical and one of ordinary form, apparently of burned clay; the fourth of a stone resembling compact steatite. (Pl. 71, *b*.)

Five feet east from the last skeleton was another, closely folded, head nearly east. The bones were in small pieces and very soft; the teeth not much worn. The femur measured 16 inches. The skull lay on a flat rough slab of limestone about a foot across.

At 83 feet, on west side of trench, was a skeleton folded into the smallest compass and pushed down in a squatting position into a hole which seemed too small to hold an ordinary body. The legs were to each side of the ribs. While the larger bones, especially toward the bottom of the grave, were tolerably solid, the upper bones were much decayed. The scapulae and two or three of the cervical vertebrae were still remaining, but there was nothing left of the skull or even of the teeth. As the vertex of the skull would have reached the surface of the mound, and the place it should have occupied was filled with a mass of roots, it had probably entirely decayed. Among the bones were two finely chipped flints with long barbs, part of the lower jaw of a small dog, a staghorn flaking tool, and a sharply pointed sliver of bone. Had the skeleton only been buried, especially without the cranium, it is not probable that these things would have been placed in the grave. As the flints were of different pattern and finer finish than any others found in the mound, and the form of burial was so unlike any other, this was no doubt an intrusive burial.

At 85 feet, 19 feet from wall, a foot above bottom, was the skeleton, in small fragments, of a child 7 or 8 years old. At the neck were a burned clay bead  $1\frac{3}{4}$  inches long, a jasper bead 1 inch long, and 47 small disk-shell beads; there may have been more of the latter, as it is easy to overlook shell objects, unless large, in such conditions. (Pl. 71, *c.*)

At 95 feet, 18 feet from west wall, were fragments of bones of an infant. The head was entirely enclosed in a mass of small mussel shells. With it were 2 long cylindrical, 1 barrel-shaped and 4 disk-form shell beads. (Pl. 71, *d.*)

At 99 feet, in the west bank, 4 feet from the top of the mound, were fragmentary pelvic and leg bones scattered among the shells as if thrown in at random. This also probably indicates a feast on human flesh.

At 100 feet, 15 feet from west bank, in a shallow hole in the natural soil barely large enough to contain it, was the closely folded skeleton of an old person; the few teeth remaining were worn down to the gums. It lay on the right side, head north. The skull was saved, in small pieces; the other bones were too decayed to bear handling.

It is scarcely necessary to state that all burials in the earth below the shells antedate the beginning of the construction of the mound.

Near the grave just described was a hole of irregular form, about 2 by 3 feet, longest east and west, and 18 inches deep. It was filled with shells and earth which had apparently settled in from the mound above it. There was no indication of fire in or around it, no trace of bone, no artificial object of any kind. It had every appearance of a grave, but if a body had ever been put here every vestige of it had disappeared.

At 103 feet, in the middle of the trench, 18 inches above the bottom, was the closely folded skeleton of an old person, on left side, head east. The bones were very fragile, but the skull was almost intact, though only some fragments of the lower jaw remained.

Close to the last grave was a hole 2 feet across, extending 18 inches into the natural earth. There was nothing in it except five flints, all of which were broken before being deposited.

At 110 feet, 3 feet from west wall, 18 inches below the top of the mound, were fragments of arm and leg bones, a skull, and a few other pieces of a skeleton. None of it except the parts found had been placed here.

At 113 feet, in the center of the trench, 2 feet beneath the mound surface, were small pieces of skull, parts of the upper and the lower jaw, with teeth much worn, and pieces of arm bones. The last two items can only mean cannibalism.



Also at 113 feet, near the last-named bones, was a closely folded skeleton on left side, head south, in the usual fragmentary state. The bones were small; the teeth were much worn, and some of them decayed. One tibia had suffered a diagonal fracture about  $3\frac{1}{2}$  inches long near the ankle; there was perfect union and complete healing. (Pl. 77, *a*.)

At 114 feet, in the east bank, a foot above bottom, were the fragmentary bones of two infants, nearly of the same size and neither apparently over two years of age, possibly less; the bodies were closely folded, heads in contact, and bones intermingled.

At the same distance, in the center of the trench, was a hole 3 feet in diameter, dug a foot into the soil. On the bottom lay some rough flat rocks on which was the closely folded skeleton of a man much above the average size. It lay on the right side, head south. The teeth were worn down into the gums; on some, the entire enamel was gone. The bones fell to pieces at a touch. At the breast were a tubular shell bead 3 inches long, bored from each end with a conical hole, the perforations meeting at the center in a hole the size of a large pin; also, two very symmetrical and highly polished cylindrical beads an inch long made of red jasper streaked with black. (Pl. 71, *e*.) Among the bones were several broken flints and two unfinished ones. Lining the margin of the depression were waterworn bowlders of quartzite from 5 to 50 pounds in weight. Altogether, on the bottom and around the side of the grave were 13 of these large stones.

At 115 feet, 6 feet from west wall, was a grave 3 by 2 feet, dug 14 inches into the earth. A folded skeleton lay on the bottom, on right side, head east. Placed over it were four stones from 20 to 35 pounds weight. It could not be determined whether these had been supported in some way or were placed directly on the body. At the bottom of the hole, in the center, was a flat limestone slab on which the hips rested. The bones were large; the femur was  $18\frac{1}{4}$  inches long. The teeth were quite solid, though worn to the roots. A single jasper bead (pl. 71, *f*) lay at the neck. Under the slab at the bottom were a human tooth and two finger bones, probably dragged there by mice. In the grave were a broken and a large, roughly worked flint; these were probably accidental.

At 118 feet, near the east side of the trench, 18 inches below the top of the mound, were portions of the skeleton of a youth; the bones were not "knit." There were parts of a femur; of the two tibiae; fragments of skull, of ribs, of the pelvis; some vertebrae; two bones from the foot. These were scattered in confusion, as if thrown from a basket. There can be no doubt that this individual appeased the longings of some persons who were desirous of a change of diet.

At 120 feet, 3 feet from west face, was a folded skeleton on left side, head northeast. The teeth were large and much worn. With these bones were intermingled some bones of a smaller person; probably there was a double burial.

As most of the skeletons found thus far were near the west side of the trench, it was decided not to go farther southward, but to carry the excavations westward. The results were disappointing; less was found than had been uncovered near the wall which had so far marked the boundary of the work.

At 70 feet, 3 feet west of the former wall, 2 feet below the surface of the mound, was a folded skeleton, on right side, head north. The face lay upward, but the skull may have rolled to this position. Only three teeth remained in the lower jaw; all the others had been lost so long before death that the bone had become solid, obliterating the cavities in which they had grown. (Pl. 88, *b*.) There were a few teeth from the upper jaw lying among the bones of the head; the roots of these were swollen and deformed from disease. Not all of the bones were found; those still present were too fragile for removal. They were of medium size, and there was a pronounced anterior curve to the tibiae, like those shown in Plate 77.

At 100 feet, a foot west, were several fragments of skull, with part of a lower jaw; no other bones had been placed with them.

At 110 feet, 4 feet west, a foot above bottom, were some parts of a small, aged person; the bones were no larger than those of a child 12 or 13 years old, but most of the teeth had been lost before death and those remaining were much worn. The forehead was narrow and sharply receding, with heavy ridges above and especially to each side of the eyes; the skull was quite thick; the nose was prominent. (Pl. 89, *a*.) The bones lay in a bed of charcoal and ashes, but they were not in the least burned. Only the skull, some vertebrae, and fragments of arms, ribs, and pelvis, were in the grave; not a fragment of the leg bones remained, if they were ever there.

Some further search was made in this direction, but as there seemed to be nothing to justify continued effort the work was abandoned.

The total number of skeletons, or rather of osseous deposits indicating intentional burial, was 19. The fragmentary bones indicating cannibalism, or scattered among the shells as if carelessly thrown in, are not included in this count.

#### THE HOG ISLAND MOUND

On the bank of the river, a mile below the shell heap just described, is an earth mound about 50 by 60 feet, longest north and south. As the ground has long been cultivated, it is probable the shape has

been somewhat changed; it was no doubt practically circular when built. The ground on which it stands is slightly elevated above that immediately around it; the top of the mound is about 4 feet higher than the general level of the field. A space 25 by 40 feet was marked off on the surface of the mound, making allowance for the original margin and for the earth which had washed or been plowed down toward it. A narrow trench was cut around the mound, its outer side corresponding with the limits mentioned.

On the east side, at the outer edge of the trench, just under the sod, were portions of a skeleton. The bones were of ordinary adult size, but the ends of the larger bones were not "knit," showing that the individual had not attained maturity.

On the west side, opposite this, just under the grass roots, were portions of a skeleton; the bones were of ordinary adult size. These may have been intrusive burials.

On the southeast side, about 3 feet above bottom, were three pieces of a double crescent or reel-form object of beaten copper; it seems to be made of several very thin sheets hammered together. There were two small perforations in it. It was either broken before being deposited or had been corroded after; not all of it was found. The missing portions—only a small part of it—had been lost or had weathered away. There was nothing with or around it, and it seemed to have been lost or hidden; but as it was later discovered that it was directly over the large grave to be described later, it was possibly a votive offering or in some way connected with the burial below, as it was of the same pattern as those found in the grave. This specimen is shown in Plate 78, *b*.

The trench was made 3 feet wide, within the limit of 40 by 25 feet marked off, but should have extended farther toward the margin, as nine skeletons were found in it at various points above the natural surface. They pertained to individuals aged from about 14 to about 40; not one of them had anything buried with it. They were in various positions, flexed or extended, on either side, with heads in any direction.

The ground in the vicinity is strewn with flints, mostly rough, unfinished, or broken, and with periwinkle shells. Very many of these objects were scattered promiscuously through the structure, being gathered up with the earth. Near the south end was a mass of shells nearly a foot thick with scarcely any earth among them; evidently they were gathered up from a refuse heap.

A skull of an adult was collected in many pieces.

Loose in the earth, near the top of the mound, was a spade of amphibole schist, commonly known here as "granite"; it was similar to but smaller than those found deeper in the mound. Such "spades" are rather common in this region.

In the lower jaw of one skeleton all the molars and much of the bone had disappeared from pyorrhea or similar disease; lying on the bone remaining was a single copper bead which must have been placed in the mouth after death, as it could not well have fallen to the spot where found; the bone with which it was in contact was much stained.

On the east side, mostly in the trench but extending a short distance under the outside wall, was a grave  $8\frac{1}{2}$  feet long, 4 feet wide, and dug 2 feet deep into the natural soil. In this were four skeletons, two lying side by side on the bottom, the other two directly on these. The bodies were extended, heads to the northeast. One of those on the bottom was about 6 feet 4 inches long, the bones very large; the tibiæ had a very pronounced anterior curvature (pl. 77, *c*), while the processes for attachment of muscles on the femurs were large and rugged. With this skeleton, near the neck or femurs, were several copper beads (pl. 78, *e*); on the right side of the pelvis was a double-crescent of sheet copper. (Pl. 78, *d*.) The skeleton immediately under it had a similar object of the same pattern, similarly placed. (Pl. 78, *a*.)

There was a coating on each of these plates which it was thought might be remains of fabric or skin. A careful microscopic examination was made by Mr. Gerrit S. Miller, jr., and Mr. Frederick L. Lewton, curators in the United States National Museum, both of whom report that they can find no trace of fabric, hair, or hide; but that there are faint impressions which may be due to feathers, although these traces are too indistinct for a definite statement to be made.

Between this grave and the central portion of the mound was another grave, a foot deep, containing a single skeleton of ordinary size, extended, head northeast. Under the head lay a large spade, showing evidence of much use; it was 14 inches long and 4 inches wide (pl. 74, *a*); under the head was another  $14\frac{1}{2}$  by  $5\frac{1}{2}$  inches; while under the pelvis lay one 18 by 5 inches, the thinnest and most carefully finished large "agricultural implement" of this character ever found about here (pl. 74, *b*). On the breast were a few disk shell beads and three made from a large shell; the last were convex on one side, concave on the other, and drilled lengthwise. The femur of this skeleton measured  $17\frac{1}{2}$  inches. The skull was much flattened front and back, apparently by being deformed in childhood. It is shown in Plate 87, *a*, *b*, *c*.

On the south side, 2 feet from bottom, was the skeleton of a young person, the bones not yet "knit"; with it were one cylindrical bead, and two short beads, of copper.

At center, a foot above bottom, was the skeleton of an infant, the teeth not through the gums, unless perhaps the front ones.

Across the hips, mashing the soft bones to the thickness of blotting paper, was a spade 17½ by 6 inches; this was unfortunately nicked in two places by the pick before its character was ascertained. There were also a few disk shell beads.

The surface on which the mound was built was slightly undulating; the greatest depth at any point was 4 feet, though it was probably higher when constructed.

Burials were in four tiers; the graves, about a foot to 2 feet deep; on the surface of the earth; about 2 feet above the bottom; and near the surface. The last were probably deeper originally, the surface of the mound being now lowered by erosion. The infant at the center was the only burial at that level.

In all, 20 skeletons were discovered; there may have been more burials, as scattered bones here and there might have belonged with those counted, or may have been all that remained of still others.

#### THE FLAT-TOPPED MOUND

On the left (west) bank of Town Creek, nearly 2 miles above its mouth, stands a mound of the type variously designated as "sacred," "temple," "royal," "domiciliary," "residence," "residential," "assembly," "priestly," "religious," "community," "refuge," and perhaps other names, according to the idea of the writer as to what the builders may have had in their minds that induced them to erect it. Such structures may have served for any or all of the purposes which have been supposed to explain the cause of their existence.

It seems scarcely reasonable to believe that people who had to carry earth in skins and baskets would feel inclined to erect a special mound on which to perform each particular ceremony that seemed to them to be necessary for the expression of their sentiments or duty. Having one satisfactory gathering place, they would make use of it whenever the occasion required, for whatever purpose they might have needed it.

The structure was approximately rectangular in form, the longer axis northeast and southwest; there was nothing in the topography or the surroundings which required this deviation from cardinal lines. Owing to a dense growth of brush and weeds on the surface and slopes, and to former cultivation of the lower portions, the dimensions could not be accurately estimated. A survey, as exact as the nature of the case would permit, gave the following dimensions at the base: Southwest end, 103 feet; southeast side, 167 feet; northeast end, 84 feet; northwest side, 188 feet.

The corresponding measurements of the flat top were 58 feet; 130 feet; 47 feet; and 135 feet. The angles varied from 77 degrees to 109 degrees (fractions omitted). A plan is shown in Figure 7.

The top is not level, having a slight slope in the direction of the creek. The summit is about 9 feet above the general level of the field around it. To the west, on somewhat higher ground, there was an aboriginal village.

A trench 10 feet wide was cut entirely through the shortest diameter of the mound, near the center, and carried into the undisturbed earth below. The original top soil was completely removed for a distance of 65 feet, which figure practically corresponds with the breadth of the structure across the top; the slopes on the sides accounting for the remaining width at the base. It was not deemed

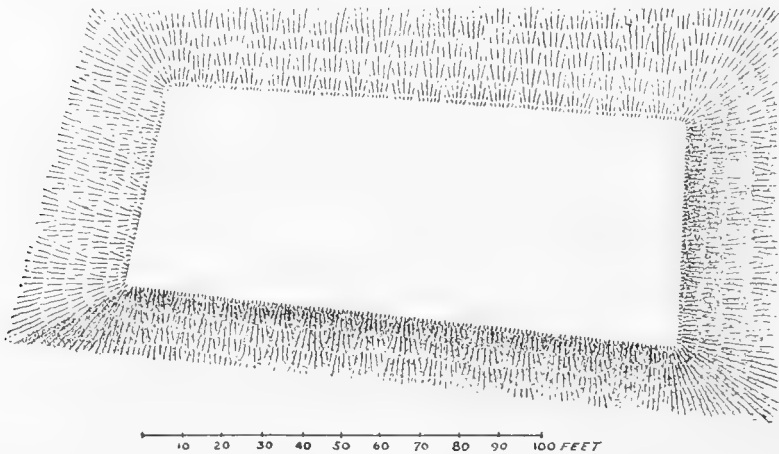


FIG. 7.—The flat-topped mound at mouth of Town Creek, Ala.

worth while to excavate the sides to a greater extent than would serve for the easy removal of the loosened material to the outside.

For the entire depth the earth was mottled or mixed, showing that it had been obtained at various places in the vicinity. Occasionally there were distinct horizontal seams or divisions, as if the structure had been carried to a certain height and work then suspended for a time, but in no case did one of these level areas extend entirely across the mound. Invariably they merged at one end or at both ends into earth which seemed to have been deposited continuously. If any such cessation of labor took place it did not continue a sufficient time for vegetation to acquire a foothold—assuming that plants or grass might have been allowed to grow. At the bottom the original surface was very plainly marked by such decayed growth, the earth being quite dark for a depth of several inches.

On the bottom, where they had originally lain, and in the body of the mound where they had been carried in with the earth, were occasional fragments of pottery, pieces of flint, and burned rocks, but such objects were very rare; much fewer than is usual in such structures. This is the more remarkable by reason of the surface in the vicinity being strewn with such evidences of former occupation. Possibly the explanation is that the mound is older than this particular village, but there is no other place near which bears any evidence that the builders lived there.

In the north wall of the trench, 5 feet within the line from which the west side of the mound begins to slope toward the bottom, was the outer edge of a hole 4 feet across, which had been dug 2 feet into the earth prior to the beginning of the mound. The sides and bottom were irregular and rough. It was filled with loose black earth; and the material composing the mound, for a distance of 5 feet above it, was also looser than the material surrounding it, as if the decay of some perishable substance had allowed it to settle.

A similar but somewhat smaller hole was in the trench, 6 feet to the southeast of this one; but the earth above it seemed in nowise different from that around it.

There was nothing artificially worked in either hole that had been intentionally deposited. A large post may have stood in each, but if so, no traces of wood, either burned or decayed, remained, though the dark color and loose texture could well have been produced by wood which had so thoroughly rotted that no marks of it remained. If they were graves, which is improbable, there was nothing in them to indicate such fact.

#### MOUNDS NEAR THE FLAT-TOPPED STRUCTURE

*No. 1.*—About 100 feet south of the large mound was a mound 3 feet high and 30 feet across at the base. Town Creek had undermined and cut away 4 feet of the eastern side.

At 2 feet south from the apex of the mound was a mass of burned earth and ashes, apparently from a fire made in a hole dug into the mound after its completion. At the bottom of this hole, if such it was, lay an irregular limestone slab measuring 22 by 25 inches across and from 3 to 5 inches thick, brought from the bed of the creek. Although this showed no evidence of having been exposed to heat, it was covered with a layer of ashes 3 to 4 inches deep. Above the ashes was a mass of burned earth; above this, mixed burned and unburned earth; then hard-burned earth again. The entire mass was 3 feet across and 2 feet high. The earth surrounding this filled-in material was burned to a brick-like hardness for 2 or 3 inches into the undisturbed part. Possibly a body had been cremated, but if so,

no trace of bone was left nor any object which might have accompanied the ceremony. It is difficult to understand how a fire as hot as this evidently was had left no marks on the stone; the ashes lay directly on it. The stone itself was a foot above the bottom of the mound, there being below it that thickness of dumped earth in which were a few water shells and scraps of charcoal. That the fire was made in the hole is proven by the condition of the sides; the ashes resulted from it. The burned earth filling it may, however, have been thrown in later.

Plate 66, *b*, shows the stone as it appears after the earth had been removed from over and around it.

The mound was cleared out down to the subsoil over a space 18 feet across. There was nothing else in it.

*No. 2.*—A hundred yards south of the large mound, near the bank of the creek, was a mound which after long cultivation was about 2 feet high. Its base merged so imperceptibly with the level field that the breadth could not be determined. A circle 25 feet in diameter was marked off around the center, as near as this could be guessed at, and the earth within this line removed to the subsoil.

On the west side, 12 to 18 inches above the bottom, was a mass of ashes, charcoal, and burned earth, which extended over fully one-half of that side and had resulted from a fire or fires made when the mound had reached that height. It was not regular in level, outline, or thickness; most of the fuel had been entirely consumed, though there was some charcoal left, the pieces varying in size from small twigs to chunks or branches 4 inches thick. On the north edge of this fire bed was a deposit of ashes, fully a bushel in quantity, which had been raked from the bed and piled here; a layer of charcoal, continuous with the main deposit, extended unbroken over them and for 3 or 4 feet beyond.

At the assumed center was a hemispherical depression of a gallon capacity filled with clean ashes. The earth around it was slightly reddened by heat.

Loose in the earth were the usual pottery fragments, pieces of flint, and similar refuse gathered up in the earth used for building. Among the pottery was a piece with a handle of unusual form (pl. 79, *a*) and another showing a typical southern form of stamped impression. There was also a discoidal made of a siliceous stone, with a deep pit on each face. (Pl. 79, *b*.)

There was no indication of a burial and no worked object of any sort that had been intentionally deposited.

#### THE ALEXANDER MOUND

On the farm of J. S. Alexander, 8 miles southeast of Moulton, in Lawrence County, was a mound 6½ feet high and a little more



than 50 feet in diameter. Although it had been plowed across several times its symmetry was not thereby impaired, and it remained a typical example of the so-called "conical" form of burial mound. Standing on the highest part of the field, near the bank of a swamp, its conspicuous position produced an impression that it was much larger than its actual dimensions.

The surface of the ground around it was strewn, over an area of more than an acre, with the usual *débris* of an ordinary village site. Small flint implements were especially abundant. There were also many mortars, pestles, and cooking-stones, denoting that the site was occupied by a people who derived their subsistence partly from hunting and partly from farming.

The general situation was such as to lead to the belief that the mound was worth investigating.

The lower portion of the structure had been subjected to cultivation for many years, with the result that the superficial earth for a few feet above its base had been dragged out upon the general level of the field. As it was not necessary to remove any of this, a line, which it was thought would fall slightly within the original margin, was marked out on the plowed ground. This approximately circular perimeter measured 135 feet, thus inclosing an area almost exactly 43 feet in average diameter.

A trench 2 feet wide, with this line as the outer limit, was carried entirely around the mound as a preliminary to beginning a complete investigation. The object of digging this was twofold: First, to ascertain whether the line was at a sufficient distance from the center of the mound; secondly, to afford a convenient way of disposing of the earth to be removed, by throwing it continually toward the foot of the slope on the outside. The trench was carried down into the undisturbed earth upon which the mound was built. Almost at once it became apparent that the limit should have been placed farther out. At the end of the first day's work, before the encircling ditch was carried entirely around, the fragmentary remains of fifteen skeletons had been exhumed. None of the bones could be preserved except a few from the hands and feet; they would not hold together when the earth was removed from around them.

On the west side, close to the outer margin of the trench, were the remnants of at least two skeletons; they seemed to have been extended, with the heads north, but not enough of them was left to make certain that such was the fact. There may have been more than two. They were encased in earth which had been burned hard, although the bones showed no marks of burning, not even being discolored by the heat.

In that portion of the trench which bordered the southeast quarter of the mound were nine skeletons. Most of them were folded,<sup>1</sup> though some may have been bundled. In nearly every case many of the bones had entirely disappeared and those remaining were soft, crushed, mostly resembling ashes, or having the consistency and appearance of coarse, unbolted corn meal. All ages were represented, from infancy to advanced maturity, as denoted by the condition of the teeth, some being only slightly worn, others very much so. Various stages of dental decay were observed, ranging from slight discoloration to almost complete destruction of the teeth, even the bony structure being sometimes involved.

With one skeleton was a single flat-cylindrical shell bead an inch long, drilled lengthwise. With another were three similar beads. Under the skull of a third, which was extended and lay nearly east and west, was a spade 5 by 11¼ inches, placed at right angles to the direction of the body. Below this skeleton was another, folded, head nearly east, in a shallow grave; on its right arm was a spade also 5 by 11¼ inches. On the east side of the mound was a large skeleton, folded, head east, packed in hard unburned clay. Near it was another, which had with it a hatchet of a dioritic rock commonly called "greenstone," 13½ inches long. (Pl. 80, *g.*) It had been purposely broken in two pieces and laid by the body, the edge by the point, as if carefully placed. Near this broken hatchet was a smaller perfect one at the back of the skull of an adult skeleton, covered with burned clay, which was extended, on the back, head north. A large limestone rock lay over the head.

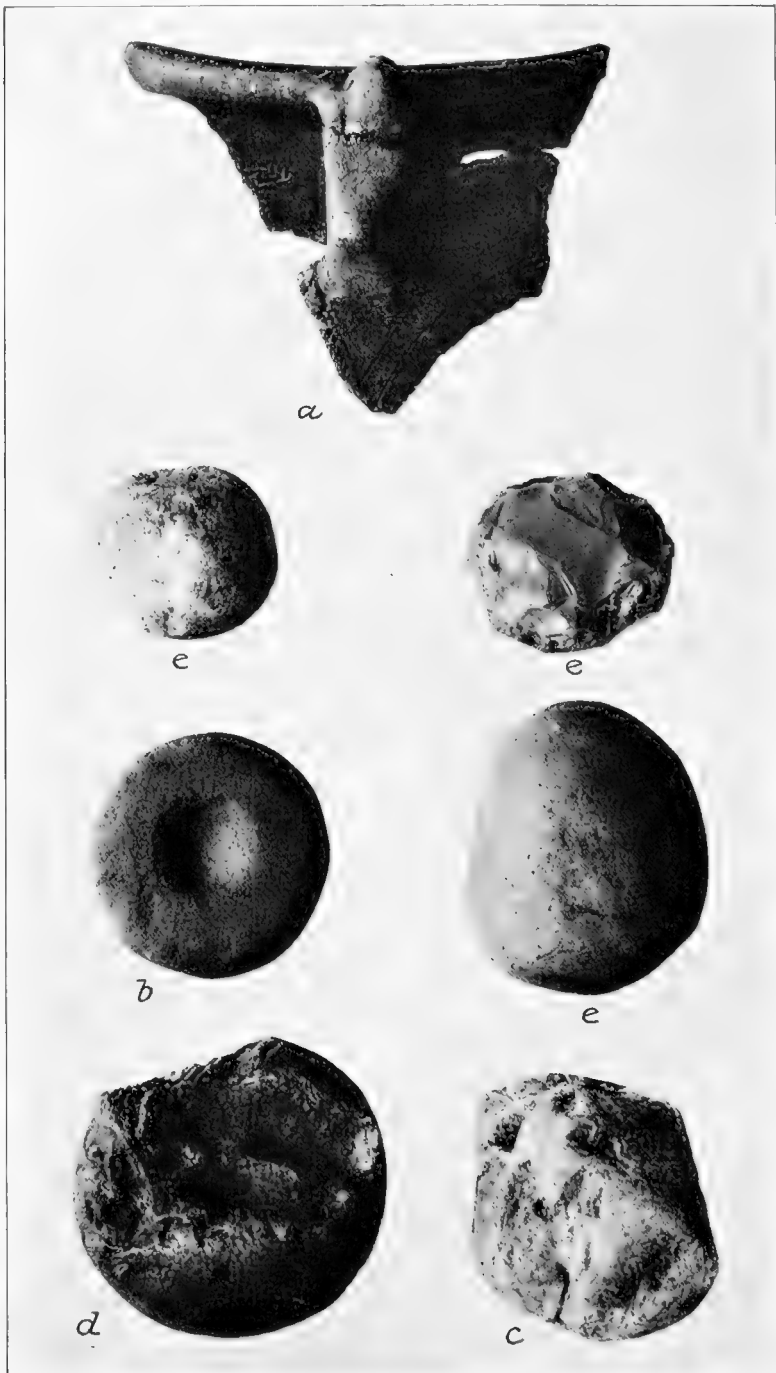
On the east side, a few inches under the surface of the mound, loose in the earth as if dropped or carelessly thrown in, was a spade which was struck with the pick and badly broken. Three feet north of this, at a slightly lower level, was another, under similar conditions; it also was "found" by being struck with the pick.

<sup>1</sup>As applied to skeletal remains, "folded" means that the body, soon after death, was drawn up into a small compass, the knees at the chin, feet against the hips, hands usually at the breast or shoulders. "Bundled" means that the bones, denuded of flesh, were placed in their proper positions in the grave, or at least an attempt was made so to place them. Frequently the builders, in their ignorance of anatomy in its details, misplaced one or more bones. Sometimes this furnishes the only clue as to whether a skeleton is "folded" or "bundled." The bared bones may have been brought from a "house of the dead," which is a structure or place having a purpose similar to that of a receiving vault in a modern cemetery; or they may have been previously interred and removed; or "bone pickers" may have stripped the flesh from the bones soon after death. "Bunched" means that the disarticulated bones had been carried from some other place, thrown out of the basket or other carrier, and allowed to remain as they fell, except that the skull was sometimes placed on top of the pile.

In giving the position of objects found, "bottom," "bottom of the mound," "general level," "natural level," "soil," "top soil," "top of ground," "natural surface," "surrounding level," "surrounding surface," "original level," "original surface," are terms used to avoid continued repetition of the phrase "original or natural level of the earth on which the mound was erected." "In" means the horizontal distance from the encircling line at which the excavation was commenced. "Up" means the vertical distance from the bottom.



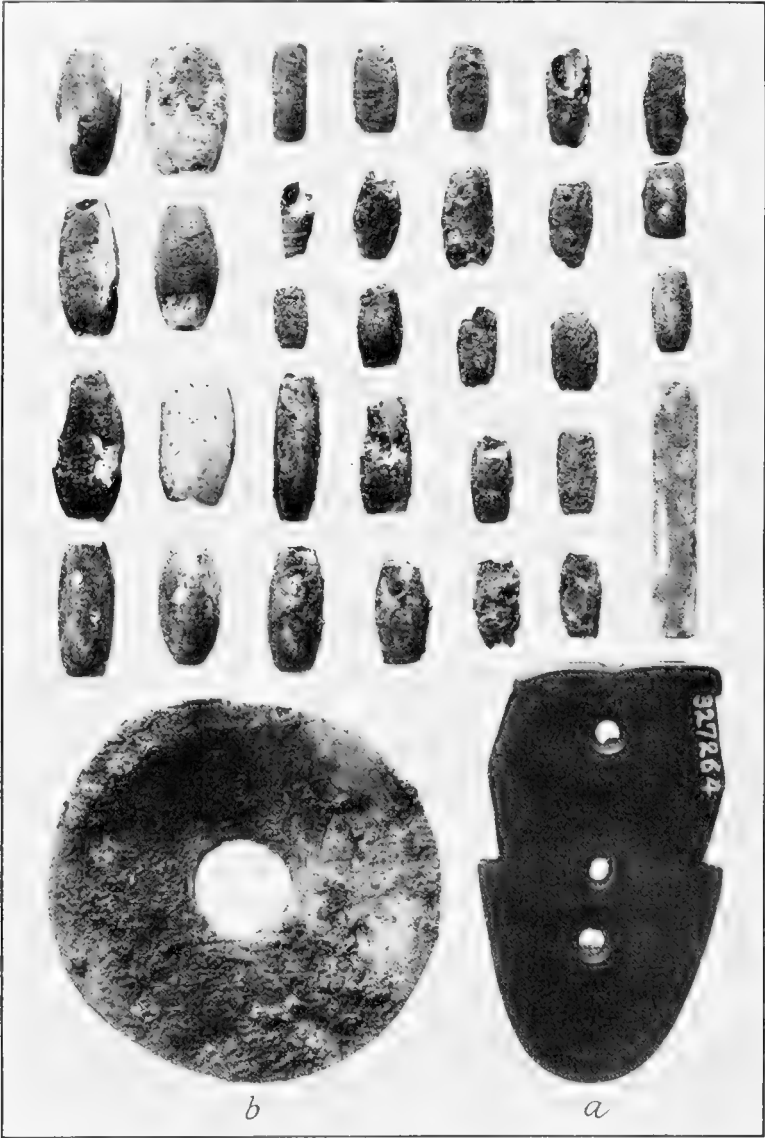
COPPER OBJECTS. a, b, c, d, FROM HOG ISLAND MOUND. e, f, FROM ALEXANDER MOUND



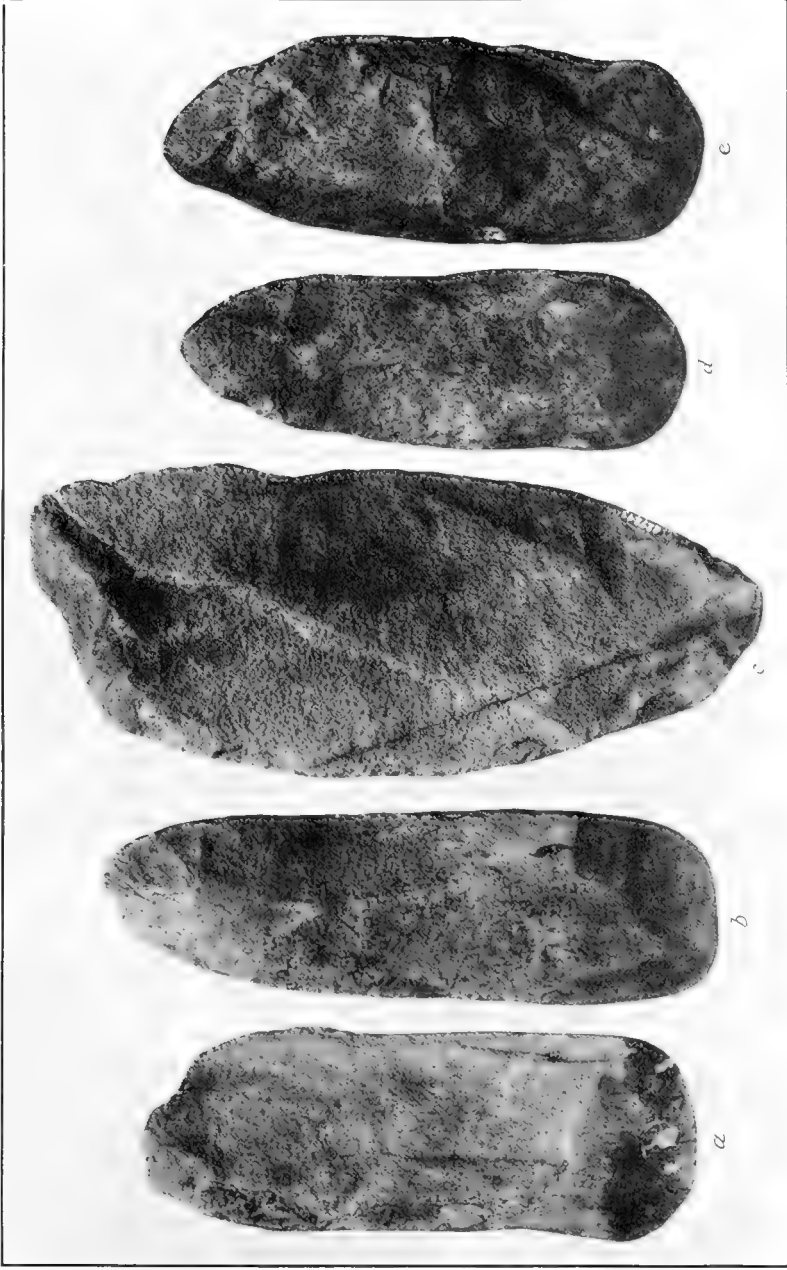
*a, b*, OBJECTS FROM MOUND 2, MOUTH OF TOWN CREEK, ALA.  
*c, d, e*, OBJECTS FROM ALEXANDER MOUND



HATCHETS FROM ALEXANDER MOUND



ORNAMENTS FROM ALEXANDER MOUND



SPADES FROM ALEXANDER MOUND



*a*, CONCH SHELL; *b*, STEATITE PIPE; *c*, MARBLE PIPE; *d*, *e*, CUP-STONES. FROM ALEXANDER MOUND



It may be stated that all "spades" mentioned herein are made of amphibole or amphibolic schist. The implements have considerable range in length and width, but there is not much variation in thickness.

On the west side, 4 feet apart, were two infants lying on the natural surface. One was only a few weeks old; the other about 2 years.

In a burial case of burned earth, in the southwest quarter of the mound, were the bones of an infant whose clavicle was less than  $1\frac{1}{2}$  inches long. Fragments of a large, thick conch shell lay with it.

On the south side at the original level were three skeletons lying close together, two adults, and a youth of about 15 or 16. One head lay east, one west, one north. All were folded and encased in burned clay. The bones of the youngest were somewhat charred; it would appear that the heat had been sufficient to burn them through the clay. With the head, which was directed toward the north, were the outer whorl of a conch shell, a piece of galena weighing nearly 2 pounds, and the central portion of a flat gorget of steatite, both ends of which had been broken off across the perforations.

These three skeletons lay directly on the earth which filled a grave about 4 by 5 feet, dug 18 inches into the earth. This grave, which extended beyond the outer limit of the trench, contained the remains of eight individuals whose bones only had been interred, or at least only the bones of some of them, as it would not have been possible to place eight bodies in so small a space. All ages were represented. There had been a very young infant, of whom only the teeth remained, all other parts having disappeared; a child whose permanent teeth had not yet come through the gums; a person whose teeth were worn down to the roots; and various ages between these. The bones were so decayed and in such confusion that nothing definite could be ascertained as to their arrangement or the manner of interment.

The trench being now completed, it was reasonably certain, from the number of skeletons found in it, and especially from the large grave reaching out beyond it on the south, that other burial places would be found in the undug portions of the mound on the outside. To go farther in this direction, however, would have required the second removal of all the earth thrown out; and as the season had already extended beyond the period at which the fall rains usually set in, it was deemed best to disregard this outlying portion and proceed at once with the excavation of the main structure, which now seemed larger when viewed from the trench than the intact mound had looked when seen from a little distance away.

For convenience of description, the area examined inside of the trench will be divided into eight sectors, directed toward the cardinal

and intercardinal points. Horizontal distances, until near the center, will be measured from the outer limit of the trench; vertical distances from the original level of the natural surface.

#### NORTH SECTOR

Remains, of whatever character, were less frequent in the north sector than in any other.

At 3 feet in, on bottom, was a pile of bones indicating a bundled or bunched burial.

Four feet in, 3 feet up, was a spade by some teeth and fragments of skull; there were no other bones.

Eight feet in, a foot up, loose in the earth, was a broken hematite gorget. It had apparently been elliptical in form, with two perforations, but had been broken across one of these. The fractured end had been ground smooth and another hole drilled nearer the center. (Pl. 81, *a*.)

At the bottom, 8 feet in, was the skeleton of a slender person, extended, on back, head east. The body had been covered with fine yellow sand, with a deposit of red clay at either end. The teeth were considerably worn, indicating at least middle age. It may have been the skeleton of a woman.

A few inches east of the skull of this skeleton was another skull, apparently belonging to a body which extended eastward. Most of the bones of these two burials were disintegrated until they resembled coarse yellow corn meal.

Ten feet in, on bottom, was a folded skeleton, head southeast. One femur of this was the only large bone so far found which could be taken out entire; it measured 15 inches in length.

On the bottom, 12 feet in, was a folded skeleton, the head toward the east, with some lumps of clay laid against it.

#### NORTHEAST SECTOR

Six feet in, 2 feet up, was a skull, crushed flat. There were no other bones.

Loose in the earth, 10 feet in, near the surface of the mound, was a spade  $5\frac{1}{2}$  by 15 inches. (Pl. 82, *a*.)

#### NORTHWEST SECTOR

Twelve feet in, 18 inches up, was the folded skeleton of a young adult, the femur measuring  $14\frac{1}{2}$  inches. It lay on right side, head northeast. In front of the face was a spade 4 by 13 inches, whose smoothly worn surface proved that it had long been in use.

## EAST SECTOR

On the bottom, 2 feet in, was a folded skeleton, on left side, head south. The skull, which was crushed flat, lay upon a spade. The body had been covered and surrounded with very tough clay which came away in small flakes.

Five feet in, 3 feet up, was a roughly finished but much used spade,  $17\frac{1}{4}$  by  $5\frac{3}{4}$  inches. A foot lower and 2 feet north of this was a thin slab of stone  $21\frac{3}{4}$  by  $9\frac{1}{4}$  inches; it had been slightly worked around the edges, evidently with the intention of being converted into a spade, but showed no indications of having been used as such. (Pl. 82, *c*.) Both of these were loose in the earth.

Three feet in, 12 feet up, were fragmentary remains of two skeletons, too much decayed for their position to be determined.

Four feet up, 14 feet in, was a layer, not horizontal, of crushed and decayed bones which seemed to be the remains of at least two bodies; but nothing certain could be made out in regard to their position.

Near the center, 2 feet up, were soft and broken bones of three, perhaps four, children: 8 or 10 years old. They were in such small space that if buried with the flesh on they must have been closely folded and laid in a pile. Near them were fragments of an adult, with teeth only slightly worn. The skull was incased in very tough yellow clay.

## WEST SECTOR

Five feet in, 3 feet up, was a skull encased in red clay, the forehead much flattened. The appearance of the earth indicated the burial of a body, but no other bones could be found.

Under this skull, a foot above bottom, was a folded skeleton, on left side, head north. The ends of the bones were not knit. The right hand lay toward the head; the left arm was straight toward the knee. Between the body and the left forearm was a slender, symmetrical hatchet 11 inches long. Under the head was another hatchet 8 inches long (pl. 80, *a*), highly polished, with ogee edge. It lay on what had been a solid stone that had disintegrated into fine yellow sand. There was a string of disk shell beads around the neck, 32 of which were recovered. All the bones were in fragments, crushed flat.

Six feet in, 3 feet up, was a bunched skeleton. The skull was broken and crushed by the pressure of the earth. Both knees were under the skull, all these bones being in contact; other bones lay on, under, and around them, though the skull seemed to have been placed on top of the others when the interment was made.

Two feet north of this, in a shallow grave, was a folded skeleton, on left side, head north. The femur measured 17 inches; the tibiae

had a pronounced anterior curve. (Pl. 77, *b*.) On the skull was a piece of galena 5 or 6 ounces in weight, which had been rubbed to a somewhat cubical form, with one face rounded. (Pl. 79, *c*.) At the top of the head was a tomahawk  $8\frac{1}{2}$  inches long. The teeth were only slightly worn, the last molars not at all so. Some of the teeth were overlapping.

A foot above the last was a folded skeleton, head northeast, of a young person of large stature. At the side of the skull lay a spade 11 inches long.

Two feet up, 12 feet in, was an infant a year old, folded, on right side, head north.

Six feet to the southeast of this, a foot lower, was another infant, the bones too crushed and decayed for the position to be made out.

From  $8\frac{1}{2}$  to 12 feet in was a grave nearly 3 by 4 feet, longest from east to west, dug 22 inches into the natural earth. On the bottom was the folded skeleton of an infant a year old, on left side, with head west. By the neck were a number of thick disk shell beads; on the skull, fitting it closely, was part of a conch shell; two other pieces of the same shell were placed on the hips, which lay in a small bed of ashes. A broken hatchet  $7\frac{1}{4}$  inches long (pl. 80, *b*) lay on the bottom of the grave.

On the bottom, 14 feet in, was an extended skeleton, on back, head east. A hatchet 13 inches long lay between the femurs, with the sharp end between the knees; the upper end was slightly broken. (Pl. 80, *f*.) The bones were of medium size; the teeth somewhat worn.

Almost exactly above the last, with a foot of earth intervening, was another skeleton in the same position. A spade 5 by 12 inches lay under the head. At the neck was a fragment of conch shell and one shell bead, both almost disintegrated; there had probably been other beads. With these bones were some bones of a small child.

Three feet in, 16 feet up, were the mingled bones of a baby and of a young person whose teeth were not worn. Among the bones were some barrel-shaped and some disk beads of shell, so soft that only a few of them could be saved.

Four feet north of the last, a foot higher, was a folded skeleton, head east; the bones were so decayed as to render it uncertain on which side the body was laid.

#### SOUTHWEST SECTOR

Four feet in, on the original surface, was a folded skeleton, on right side, head south. The teeth were much worn. Under the skull was a spade  $4\frac{1}{4}$  by 10 inches; under the spade, a pipe of white crystalline limestone, probably marble (pl. 83, *c*), the bowl  $2\frac{3}{4}$  inches high, the stem 2 inches long.

Five feet in, 18 inches up, was the folded skeleton of an infant a few months old.

On the natural surface, 13 feet in, was an extended skeleton, on back, head northeast. The femur measured  $16\frac{3}{4}$  inches. In the pelvis, resting on the lumbar vertebrae, was a reel-shaped, unperforated, copper gorget (pl. 78, *f*), the extreme measurements of which are  $3\frac{3}{4}$  and  $2\frac{1}{4}$  inches. At the left shoulder was a hatchet  $11\frac{1}{2}$  inches long. (Pl. 80, *d*.) Under the pelvis was a piece of galena about 24 ounces in weight, one face rubbed smooth and nearly flat, the angles ground off. A smaller piece, also rubbed, lay near it; and seven other pieces, all of them small, angular fragments, were scattered irregularly from the pelvis nearly to the left shoulder. The skull lay, with the face down, to the south of its proper position. No teeth could be found, nor any trace of either the upper or the lower jaw. A groundhog burrow which passed by the skull probably accounts for their absence and for the displacement of the skull.

Thirteen feet in,  $3\frac{1}{2}$  feet up, was a skeleton so decayed that its exact position could not be determined, except that it was folded, with head northeast. The teeth were much worn, crowded, overlapping, and several of them were badly decayed. At the shoulder was a large pipe of compact steatite (pl. 83, *b*), the stem 4 inches long, the diameter of the bowl  $2\frac{1}{8}$  inches at the top. Loose in the earth, within a few inches of the pipe, were fragments of a large conch shell, and a very small, much corroded, entire one.

Three feet up, 14 feet in, were bones of a very young child, which had been laid on the side, with the head south. Some barrel-shaped beads, a number of small ocean-shell beads, and a hatchet  $5\frac{3}{4}$  inches long (pl. 80, *c*) were at the head and neck.

It is remarkable that hatchets such as this and the broken one mentioned above should be buried with infants. They certainly could not have been used as implements, and would scarcely have been regarded as toys by very young children. They may have been placed with the bodies as a sacrifice, or as an expression of grief.

From 3 to 11 feet in was a grave dug into the subsoil to a total depth of about 2 feet. On the bottom of this, extended, on the back, was the skeleton of a middle-aged person about 6 feet high, of large, even massive frame. The head was to the northeast, or toward the center of the mound. At the neck were many shell beads of two different types, disk and short cylindrical. On the bottom, on either side, toward the lower end of the grave, were all the parts of two large spades which had been purposely broken before being deposited.

#### SOUTHEAST SECTOR

Three feet in, a foot from bottom, was a folded adult skeleton, head northeast.

Three feet east of this, 2 feet up, was the folded skeleton of a child about 8 years old. Most of the first teeth were still present, though some of the second set had been cut.

Four feet in, 2 feet up, were the remains of two individuals. The bones were piled in promiscuously, in such a way as to show they were entirely disarticulated before being placed there. A foot east of these, on the same level, similarly thrown in, were the bones of one individual.

Three feet east from these, a foot lower, was a similar pile; and beneath this, another. The last two each contained the bones of only one person.

Four feet in, 2 feet up, were the bunched bones of two skeletons, as shown by the fragments of two skulls, with the teeth. They had been laid or thrown on the ground when the mound had attained this height, and the building-up continued over them. Just to the north of this deposit, a foot up, were the similarly bunched bones of a young person. Although all the other bones remaining were in confusion—one femur being exactly reversed yet with the head placed in the socket where it belonged—the bones of one foot were in their proper order as if that member had still retained the flesh when it was placed here. Such conditions probably mean that “bone pickers” had been employed.

Just above the last was another pile of bunched bones; and continuous with these, extending to the west, on the same level, were parts of two other skeletons.

Ten feet in, 3 feet up, were pieces of skull with traces of other bones of a folded skeleton, on left side, head south.

Fourteen feet in, some bones of a child fell out of a large clod which came down when the bank caved. No other bones could be found in the bank or in the loose earth that had fallen.

#### SOUTH SECTOR

On the bottom, 4 feet in, was a mass of much broken, burned human bones, lying in confusion as if dumped from a basket. That they were carried in from outside, and were not burned and raked together where they lay, is proven by the fact that the earth about them showed no signs of fire. Among them was part of the bowl of a large pottery pipe. By the skull was a piece of galena weighing about half a pound. The teeth were worn to the roots. A tubular bead of copper three-fourths of an inch long was probably in the mouth, as the teeth and jawbone were stained on the inner as well as on the outer surfaces.

Three feet west of the last, 18 inches up, was the skeleton of an old person. The position could not be ascertained, except that it

was not extended and that the head was east. The lower jaw contained only the five front teeth, all the others having been destroyed by disease, which had also wasted the bone to half its normal size. (Pl. 88, *a*.) Apparently the individual had recovered, such of the bone as was left being solid and smooth. The sockets of the missing teeth were entirely obliterated.

Eight feet in was a grave dug about a foot into the red clay subsoil. The bottom was irregular, as if it had been dug with stone spades; the margin was fairly smooth. At the south end was a skull, crushed into small pieces which held together in a mass as if they had been cemented. The few remaining pieces of the upper body, as well as the pelvis and lower extremities, were corroded as if they had been subjected to treatment with acids, and appeared to be petrified. All these remains were covered with a few inches of mixed earth, on which lay the closely folded skeleton of a large adult; the femur was  $17\frac{1}{2}$  inches long. Only the lower limbs of this superposed body lay in the grave; the pelvis was near the center, the knees against the north end. No bones of the body were found. The skull was beyond, outside of, the north end of the grave. Where the cervical vertebrae should have been were found 24 shell beads, drilled lengthwise. As these were almost crumbling there may have been more originally. There was also a hatchet 6 inches long, with the top broken off perhaps another inch. On each side of the skull was a spade, one  $11\frac{1}{4}$  by 4 inches (pl. 82, *d*), the other  $16\frac{1}{4}$  by 5 inches (pl. 82, *b*).

Loose in the earth, 3 feet above the last skeleton, were many small fragments of conch shell.

Less than 3 feet east of the grave just mentioned was an extended skeleton, on back, head east. Some of the bones were in fair condition except for the disintegrated joints. A few of those belonging to the upper part of the body seemed to have been burned, though this appearance may be due to other causes. With these exceptions, all the bones were in their natural condition. Near the pelvis were 24 shell beads, half cylindrical, drilled lengthwise. At the neck were 40 or 50 copper beads, still retaining portions of the string which had held them; it was made from the fiber of some stringybarked plant. (Pl. 78, *e*.) These beads were of rolled sheet copper, most of them very short, though some were nearly an inch long. By them was a shell disk 3 inches across with a central perforation three-fourths inch diameter. (Pl. 81, *b*.) With the shell beads was a piece of galena about a pound in weight, which had been ground and rubbed smooth over almost its entire surface.

Two feet up, 12 feet in, was a trace of a baby's skull. Two cylindrical shell beads were with it; probably others had decayed.

Fourteen feet in, near the surface of the mound, loose in the earth, was a spade 15 by 5 inches.

At the same distance in, a few inches beneath the surface of the mound, on a thin layer of clean sand, were some fragments of bones of a very small infant.

#### CENTER

As the center was approached the space to be excavated narrowed until objects found could not be assigned to any particular sector, so this method of locating them can not be followed.

Near the center, 3 to 4 feet up, were bones of an adult, scattered about by a groundhog which had made its burrow among them.

Occasionally an investigator becomes unduly excited over a discovery which might be considered as somewhat in the nature of a practical joke unconsciously or unintentionally perpetrated. Just east of the center, a foot above bottom, the shovels uncovered the feet of a youth of small size. The work of exhumation was carried forward toward the head, which lay to the south. Among the remains were found screws with square ends, handmade nails, and a brass pin. Visions of mound-building Indians of a date so recent that they had the opportunity of procuring articles from white traders at a date preceding the beginning of a mound thrilled the workers. When the skull was reached, it proved to be that of a Negro boy 7 or 8 years old, and a little more digging revealed the walls of his grave.

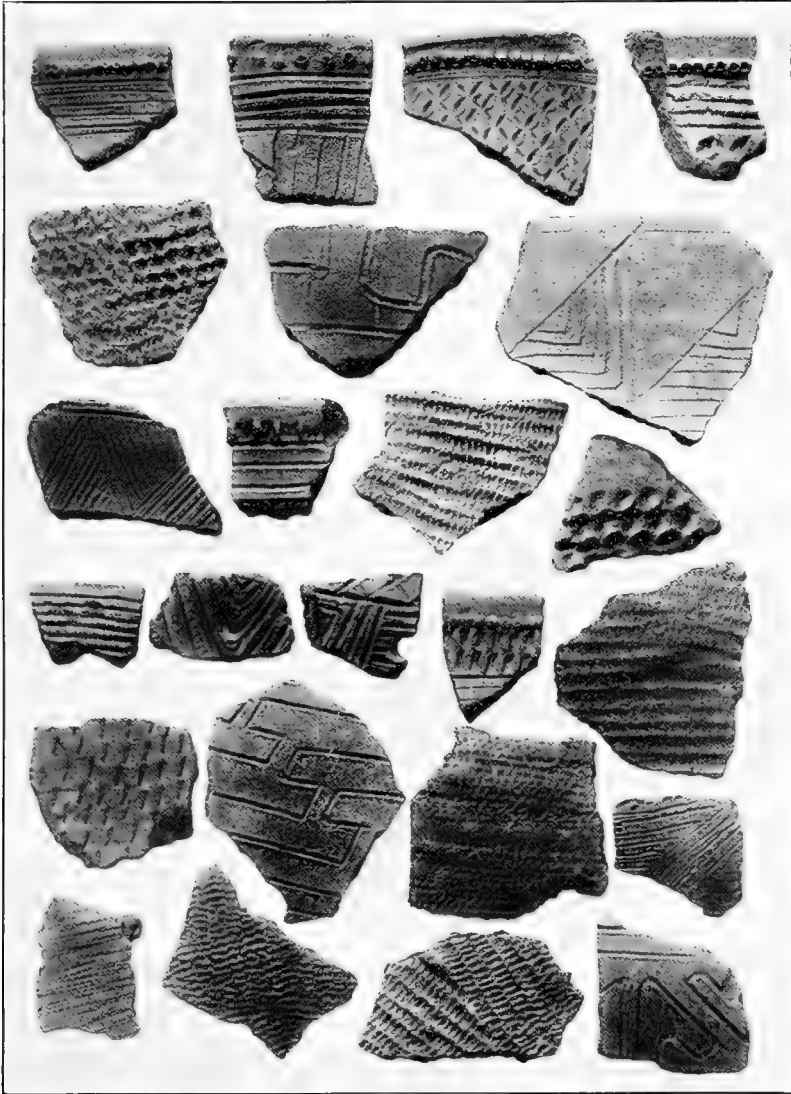
At the center, or directly under the apex of the mound, was the skull of a skeleton which lay in a shallow grave, extended, on the back, with head northeast. It was of medium size, the teeth not much worn. At the pelvis was a hatchet 8 inches long.

Directly above the last skeleton was another, extended, on back, head southeast. The frame was massive; the teeth indicated middle age. It lay on a thin streak of wood or bark so decayed as to resemble ashes. The pelvis rested on the skull in the grave below, with only the thin layer of woody material separating them. At the left side of the skull was a large conch shell (pl. 83, *a*); the whorl and the apex were separate, but whether this was due to intentional breaking before burial, or happened afterwards, is uncertain. At the neck was a string of copper beads. Between the femurs, with the point resting against the pelvis, was an unfinished hatchet 17½ inches long. (Pl. 80, *e*.)

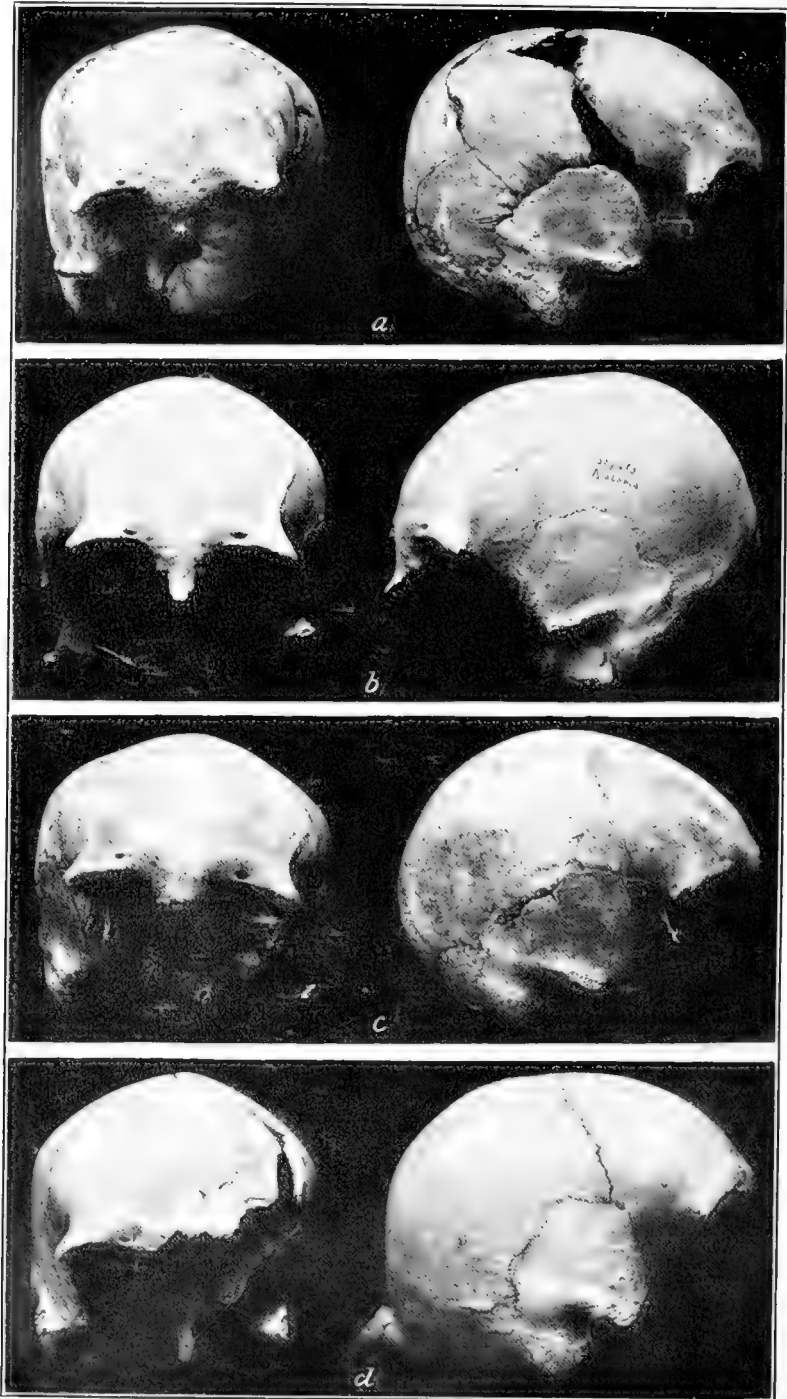
There was no entire pottery in this mound, and none that seems to have been deposited intentionally. Scattered throughout the earth, however, were quantities of fragments carried in with the earth. They presented a great diversity of markings and decorations.

Some of them are shown in Plate 84.

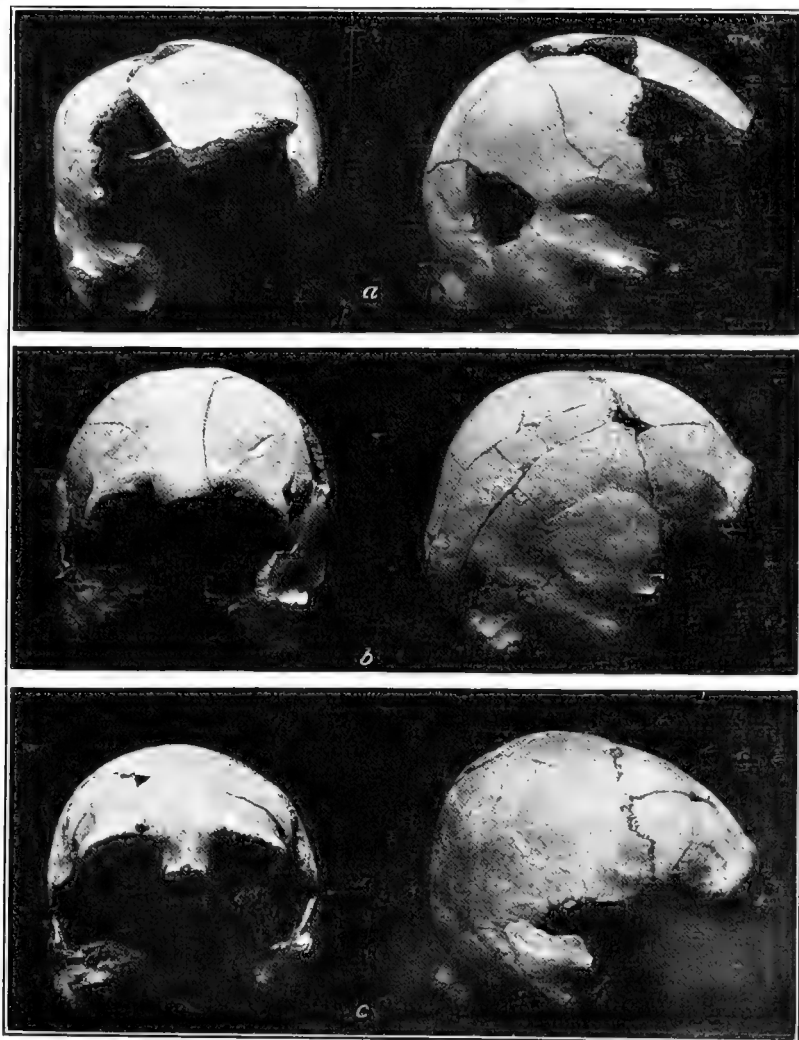




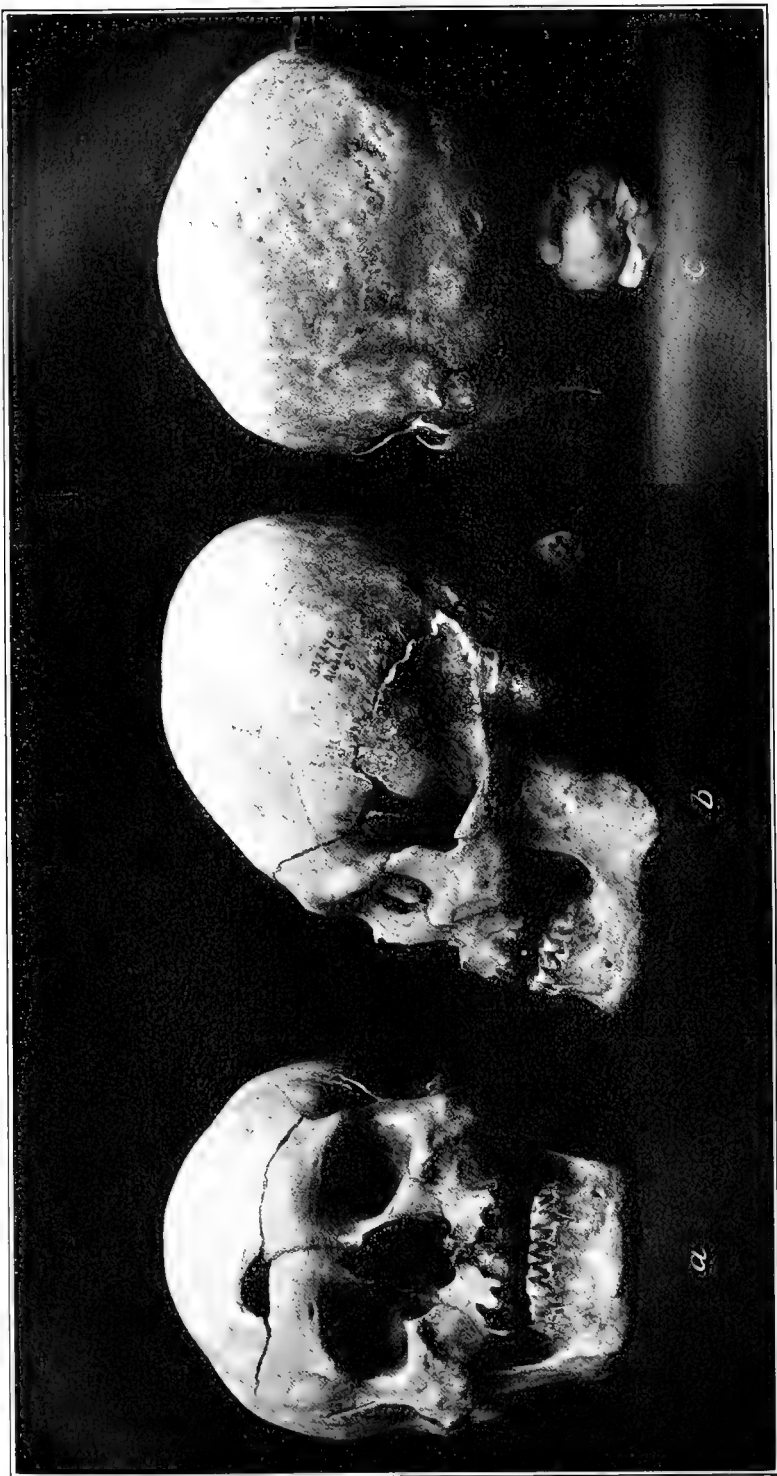
POTTERY FRAGMENTS FROM ALEXANDER MOUND



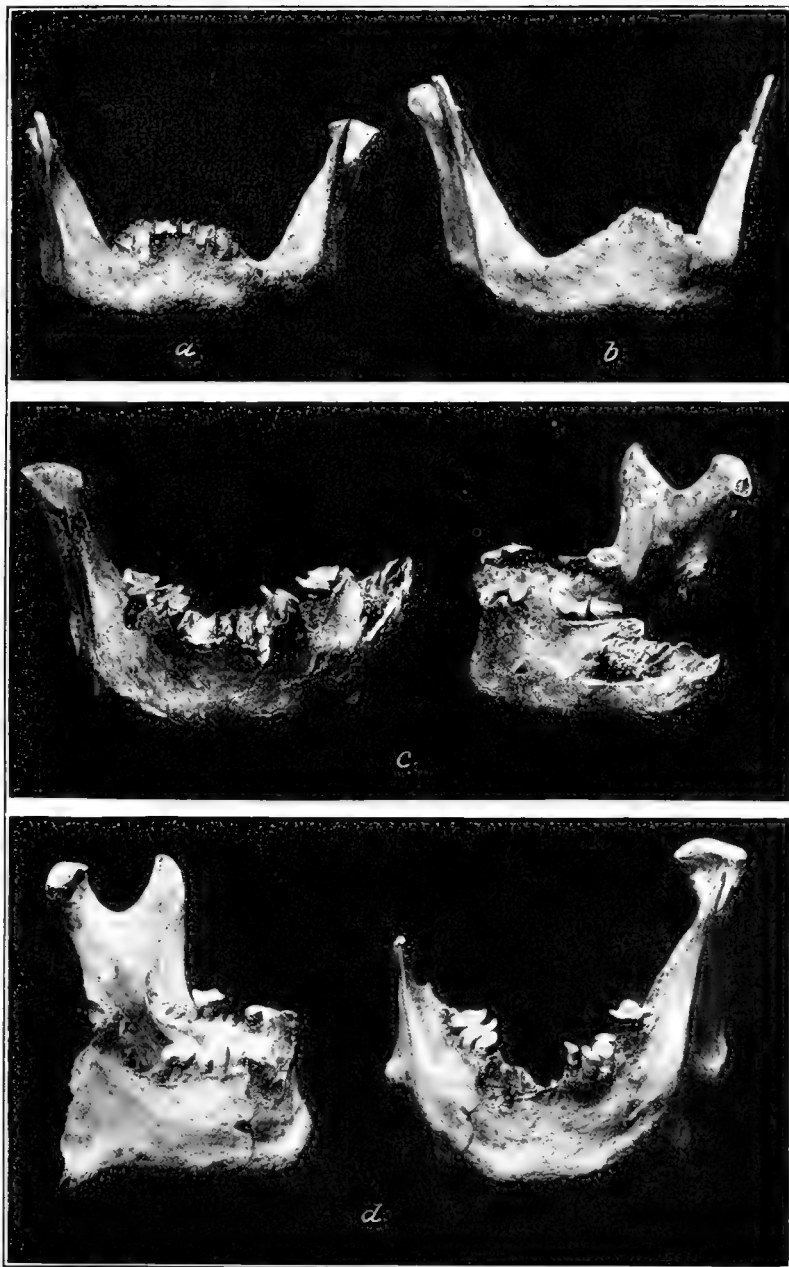
SKULLS FROM THE SHELL HEAP



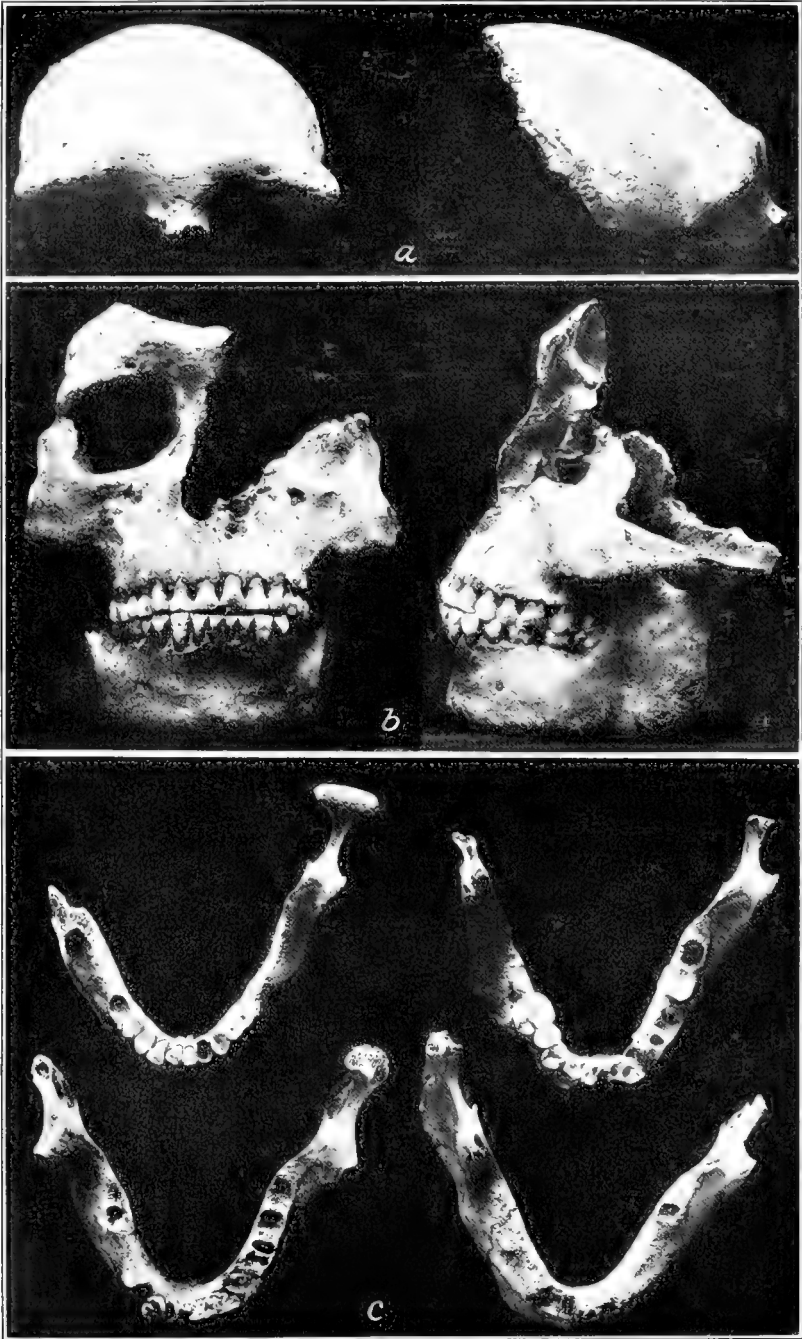
SKULLS. *a*, *b*, FROM SHELL HEAP. *c*, FROM ALEXANDER MOUND



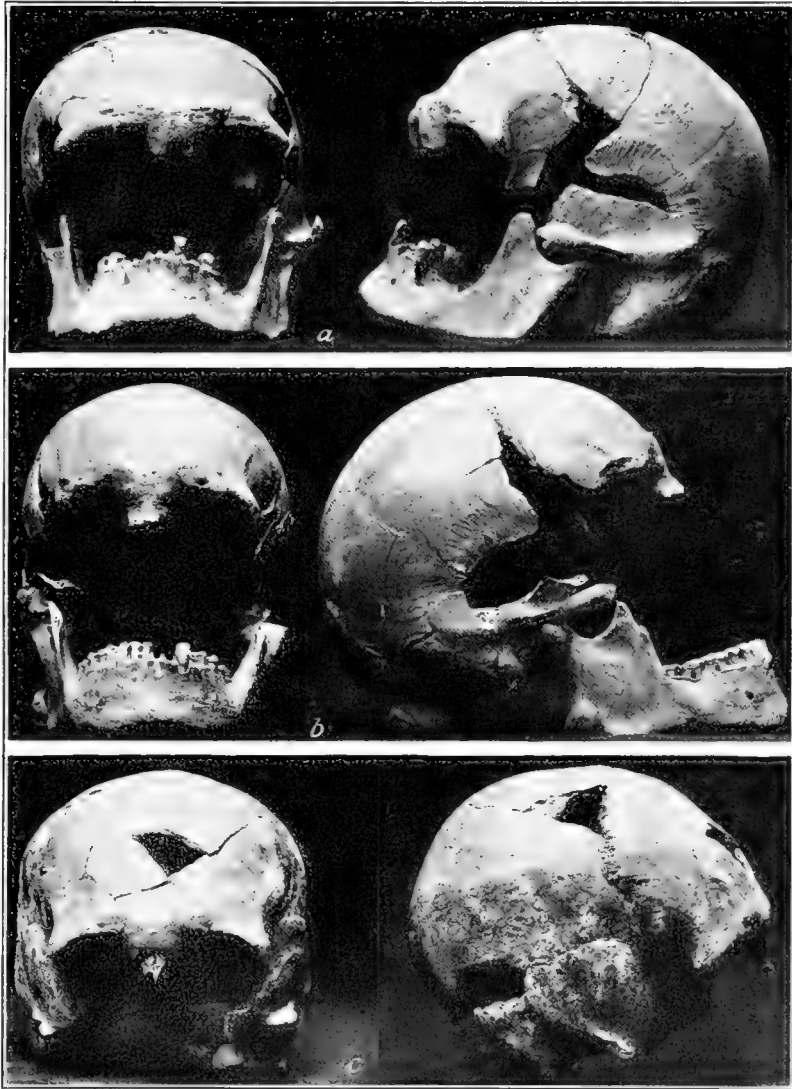
FLATTENED SKULL FROM HOG ISLAND MOUND



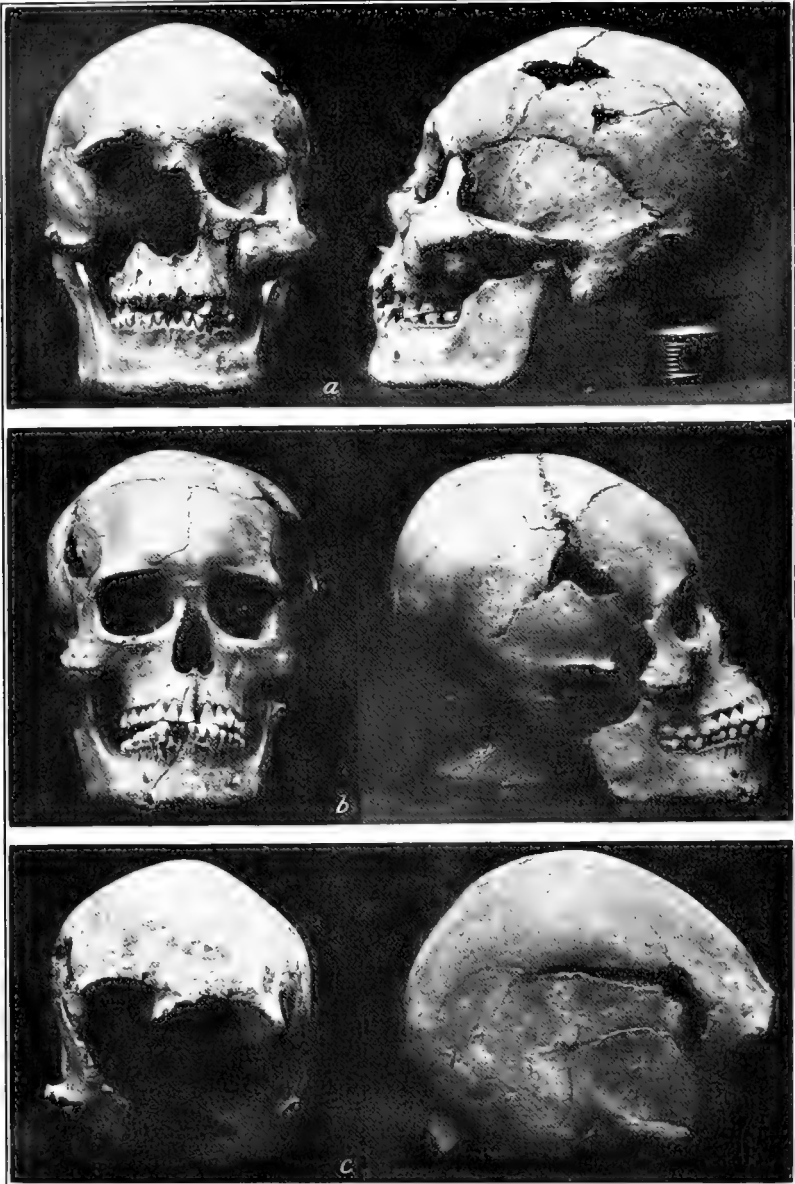
JAWS AND TEETH. *a, c, d*, ALEXANDER MOUND. *b*, SHELL HEAP,  
MOUTH OF TOWN CREEK, ALA.



*a*, FRAGMENT OF SKULL FROM SHELL HEAP. *b*, *c*, JAWS AND TEETH FROM ALEXANDER MOUND



SKULLS. *a, b*, FROM SHELL HEAP. *c*, FROM ALEXANDER MOUND



SKULLS. *a*, *b*, HOG ISLAND MOUND. *c*, ALEXANDER MOUND



The stratification of this mound was so unusual in its slopes and curvatures as to make it almost a certainty that it was of three different ages or periods of construction. There was a small mound, of which the grave at the south side, containing the eight skeletons, was the center. This held a large number of bodies. There was another burial place to the northwest of this, similarly piled up but without any distinctive central feature; the margins of these two coalesced or overlapped. Which of these two may have been constructed first could not be learned. Later, the three burials noted as in the graves near the center were made at the junction of the two little mounds, on their north side. Earth was piled over these and over successive burials above them and extended on every side until the result was the apparently single, simple conical mound as it stood before the excavation began.

In Plates 85 to 91, inclusive, are to be seen such skulls as could be partially restored, along with jaws and teeth that show effects of disease and wear. They are from the Shell Heap, the Hog Island Mound, and the Alexander Mound.

The similarity of burial methods and of the material discovered in the Hog Island and the Alexander mounds indicate that they are due to the same tribe and period. The shell heap seems to be the work of an unrelated people. The relics found on some village sites in the two counties denote that the dwellers supported themselves principally by agriculture. The remains at other village sites seem due to a people whose chief support was from the chase. When all the facts are considered, it seems clear that this region has been occupied by at least two different "nations."

#### OTHER MOUNDS IN COLBERT AND LAWRENCE COUNTIES

At Oakville, 8 miles southeast of Moulton, rectangular flat-top mound, 18 to 20 feet high, about 200 feet across at base.

Close by, a small mound plowed nearly level.

A fourth of a mile north, conical mound 11 feet high, 75 feet across. Modern cemetery.

Small mound on west side of Oakville Lake; also one on east side.

Mound 6 feet high, 50 feet across, on Buck Kitchen farm, 2 miles southeast of flat mound. Modern cemetery.

Two small mounds 6 feet high on Pullen farm, on bank of Town Creek, near Iron Bridge.

Du Bose mound, 2 miles south of Courtland, 15 feet high. Much dug, but center apparently intact.

Harris mound, 3 miles north of Courtland, 11 feet high, 50 feet across. Has been tunneled and shafted, but apparently bottom was not reached.

Gilchrist mound, 4 feet high, 20 feet across, 7 miles east of north from Courtland; in a large depression or sink hole. Artificial, but may not be aboriginal.

Two small flat-top mounds, 4 feet high, 50 feet across, on river bank opposite lower end of Gilchrist Island.

Small mound, with a barn on it, on Gilchrist Island.

Large mound, about one-third shell, on Gilchrist Island. There is an immense amount of village-site débris on this island.

Very large shell heap on Wheeler land, near Lock 2.

Mound reported on Hampton farm, 3 miles east of Alexander's.

Village sites are numerous, especially along streams.

#### ARCHEOLOGICAL REMAINS IN SCOTT COUNTY, ARK.

A report came to the Bureau of American Ethnology that—

In Scott County [Arkansas], about  $2\frac{1}{2}$  miles northwest of the county site, Waldron, appears to have been an old Indian village of great extent. The ground for acres is strewn with stone implements of various forms and materials. There is some broken earthenware mixed with shells. There are some mounds (low, 2 to 10 feet). There are wagonloads of stone mullers worked, principally rectangular or round; these are vast in number and varied in form; there are bones, some apparently implements or ornaments. Also many bits of crystal and glazed pottery.

Such a site would offer a highly desirable field for investigation.

The informant did not exaggerate in the least; the conditions are as he states them. But being unfamiliar with archeological evidences he did not interpret correctly.

There are several places on Poteau Creek where Indian villages of considerable size existed; but they have been searched so often and to such good purpose that very little remains on the surface. Since the settlement of the region by whites floods are more frequent and much higher than formerly; some old sites are washed away and others are hidden by sediment. Sometimes a skeleton or a pot is struck by a plow; at once, in such cases, there is great haste on the part of collectors and curiosity hunters, many of whom have built up a good trade in such things, to dig up all that may be found. It is useless to search for burial places, as there are no surface indications of them; only the plow or a freset reveals what may be under the ground.

There are, as stated, great numbers of mullers, pestles, grinders, polishers, and flat mortars, but these are invariably the natural, water-worn forms of the stones, whether square, rectangular, or circular.

The only alteration on any of them is that resulting from use. The Indians could find any quantity of such rocks of the character they desired, without the trouble of working them into shape. Crystals large enough to make arrowheads may be found in the adjacent mountains; flint—generic term here for chalcedony, quartzes, quartzites, chert, and a compact, granular, siliceous stone easily chipped to a sharp edge or point—occurs at many places within a few miles. The “glazed” pottery is not aboriginal, being merely fragments of jugs in which farmers carried water to the fields. The low mounds (2 to 4 feet) are house mounds. The “mounds” higher than these are the product of erosion; their surfaces were often utilized for camp sites and much débris is scattered over them. Nothing is found in them except now and then a shallow grave; and when one of these does occur it clearly pertains to an intrusive burial, and, as stated before, there is never anything on the undisturbed surface to give a hint of what may be underneath. These higher elevations are usually called mounds by residents, and many persons believe them to be artificial.

House mounds exist in great numbers. Doctor Bevill, of Waldron, made a careful count of those in township 3, range 30, being the township, 6 miles square, lying from 3 to 9 miles west of Waldron; he found 7,560, which is an average of exactly 210 to the square mile. They appear to be as abundant in other groups, although there are many areas of a square mile or more where none appear.

Doctor Bevill has excavated “at least 75 or 80, perhaps more,” of these house mounds in various parts of Scott County. In all cases he found charcoal on the natural surface on which they were built. There were no human bones in any of the mounds he opened, or on the natural level beneath them, although under each of three mounds was a grave dug in the original soil or earth to a depth of 16 or 18 inches. Some charcoal was found in all these graves, but nothing else; and as there was no evidence of burning or heat, the charcoal must have been carried from somewhere else.

S. R. Sherrell, of Waldron, has excavated 53 of the house mounds. He found charcoal at the base of most of them. As his digging was done principally from the top, in the central part, he may have missed old fire beds which were to one side instead of in the center of the house.

Sherrell found evidence of burial in six or seven of those he opened, but the human bones thus uncovered were invariably in the body of the mound, a foot or so above the bottom; which is sufficient proof that they were intrusive. The most striking of these cases was on the Taylor farm, 3 miles north of Waldron, where a farmer plowed out a clay vessel. A school-teacher, hearing of this, enlisted the services of his pupils and “tore the mound all to pieces.” They

found "several skeletons" and "a good many pots," but in their eagerness "smashed up everything," and could give no intelligible account of anything they saw or did, further than to recount that there were "skeletons, bowls, pots, some of them with necks, and some rock things." Sherrell arrived on the scene in time to examine a small portion which the teacher had not yet attacked. In this he found a skeleton which "by measure, was 8 feet long. There was a large stone pipe near the head, two pots at the feet, and some other things." As there was at least a foot of the original body of the mound undisturbed between the remains and the natural surface, there is little doubt that all these things were of a period later than the construction of the mound.

Doctor Bevill and Mr. Sherrell are men who know what they are doing and what they are saying; and their statements of what they did and what they saw are beyond question. Both assert that if they were in quest of graves they would have no idea where to look; there is no surface mark of any kind to serve as a guide. So with the few mounds in which later interments were made; there was not the slightest indication that anything might be found in them until the plow turned out bones or relics.

Doctor Bevill, in a few instances, found bones or worked objects at the bottom of a house mound; but never any human bones. From his description of the position and appearance of these few finds it is manifest that they merely happened to be there when the roof fell in.

From the excavations in the vicinity of Waldron, from investigations in similar mounds in other parts of the country, and particularly as a result of Harriman's work in the Washita Valley, it may be considered as a settled fact that, with possibly a few exceptions, all the low flat mounds so abundant in the old Caddo territory, extending east to the Mississippi, north to the Missouri, and west to their limits, owe their existence to the decay of timbers in the roof of an earth-covered Caddo dwelling place.

#### THE STRATMAN CAVE IN MARIES COUNTY, MO.

A little more than 2 miles south of Gascondy, the point at which the Chicago, Rock Island & Pacific Railway crosses Gasconade River, is a cave on the farm of Henry F. Stratman. Its opening is 100 feet above the river, on the side of a hill 150 feet high. The slope to the stream, which flows immediately in front, is as steep as tough clay and angular rock will stand; the approach to one side from the top of the hill is less difficult.

The appearance of the reentrant cliff walls on either side, and the amount of talus and débris between them, suggested that the material

accumulated within the cave must be of considerable depth, perhaps as much as 30 feet. There was no moisture in or about the entrance, although the floor was damp and drops of water hung to the roof at 40 or 50 feet within.

Altogether, conditions seemed quite favorable for the preservation of traces of any human occupancy which may have existed here at any time in the past.

The slope in front was covered with weeds and brush; but at places where the earth was exposed could be seen fragments of pottery and flints and many mussel shells. Within the cave itself, however, very little of such refuse was observable, owing to dust which had collected.

Across the entrance was a ridge of débris washed down by rains from the hill above; the crest of this was 2 to 3 feet higher than the level floor farther in.

A view of the front of the cavern is given in Plate 92, *a*. A close-up view, after the loose material had been removed, is given in Plate 92, *b*.

In order to find rock bottom, a trench was started on the outside slope at a point 30 feet from the entrance and 16 feet lower than the floor level. The earth was dark, almost black where wet, and very tenacious, resembling Missouri River "gumbo" soil. Kitchen refuse was sparsely distributed through it. This depth was chosen merely for convenience; had it proven insufficient, additional excavation would have been made. But it was actually a little greater than necessary. Solid rock was reached at a level 14 feet below the floor, and at a distance of 13 feet out from the present edge of the cavern roof. Both the bottom and the roof once extended farther out than at present, as shown by the large broken rocks encountered in the work. Being less exposed to destructive influences, the floor had receded less than the roof; erosion of the former ceased when it became covered with débris, while the wearing away of the latter has been continuous.

But evidently the bottom was for a long time exposed to the air; for it is worn so smooth that the shovels slipped over it as over a wooden floor.

The rock layers along this level had been laid down in shallow water, near a shore line; for not only were there no traces of fossils but sand was intermixed with the lime to such an extent that in places, after nearly all the lime had leached out, it held the original form of the stratum. Moreover, the stratum next beneath the upper one had the tessellate or mosaic structure seen in mud deposits where cracks, formed in drying, have been filled later and the entire mass hardened together.

Above the rock bottom, near the front, were three distinct formations. First, lying on the bottom, a thinly laminated, still-water deposit of mingled sand and clay of varying colors—red, gray, purple, green, and others—and spread quite evenly from side to side. Beneath the ridge of talus under the drip of the roof—which line is assumed as the entrance—it was about 2 feet thick.

Next above this stratified material was a mass 8 to 11 feet thick, of angular rocks ranging in size from small gravel to blocks weighing 4 or 5 tons, the interstices so closely filled with tough yellow clay that the whole mixture formed a solid mass which effectually resisted all attacks with pick and crowbar until loosened with dynamite. As much of the latter was required as would have been sufficient to break up an equal volume of solid stone. Its upper surface was very irregular.

The large stones in this deposit had fallen from roof and walls; the smaller were partly derived from this source, and partly had been carried in by a stream from the rear of the cave, which had also brought in the clay. Some of these are shown in Plate 93, *a* and *b*.

Above the last-mentioned deposit, filling the inequalities and leveling itself up to make the entire thickness of about 14 feet behind the talus ridge, was a mass of very dark earth, such as had formed the upper surface from the outer end of the trench. Some of it was loose as garden earth; some of it like tough clay; and all of it waxy when wet. Rocks of all sizes were thickly dispersed through this, as through the mass below; but it could all be removed with pick and shovel and wheelbarrow, no dynamite being needed except to break up the large blocks.

These various features are shown in Plates 93 and 94.

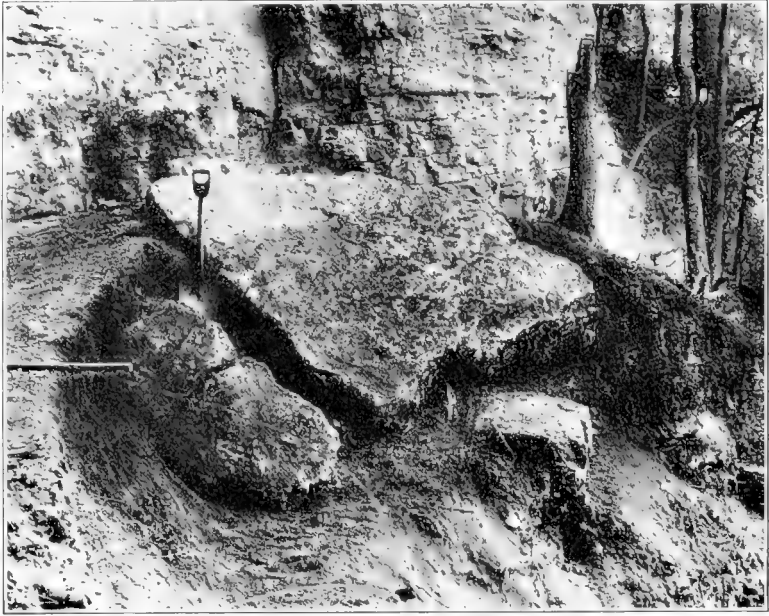
Scattered through the black earth, from bottom to top, were fragments of pottery, parts of vessels of varying capacity and thickness; chert knives or spearheads, none highly finished; hundreds or thousands of mussel shells, more or less decayed. They were duplicates of similar objects found so abundantly on the numerous camp sites and village sites along the Gasconade. The worked objects were few, and scattered throughout the mass—nowhere more than a few pieces in a cubic foot of earth, sometimes not a scrap being found within an area 3 or 4 feet across. This denotes temporary occupation, at irregular intervals, over a long period of time. Yet the cave was not altogether merely a resort for hunters or war parties; in addition to the pottery, which shows at least occasional sojourning, there were fragmentary bones, too fragile to secure, of a child 2 or 3 years old; of another, somewhat older; and of a small adult, possibly a woman.



a, ENTRANCE TO STRATMAN CAVE



b, EXCAVATED AREA INSIDE OF STRATMAN CAVE



*a*



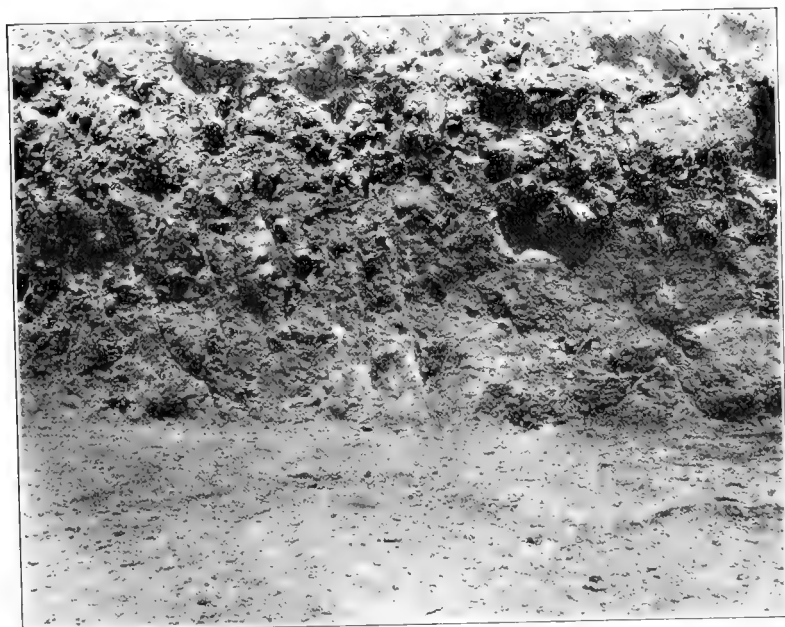
*b*

LOOSE ROCKS IN STRATMAN CAVE DEPOSITS

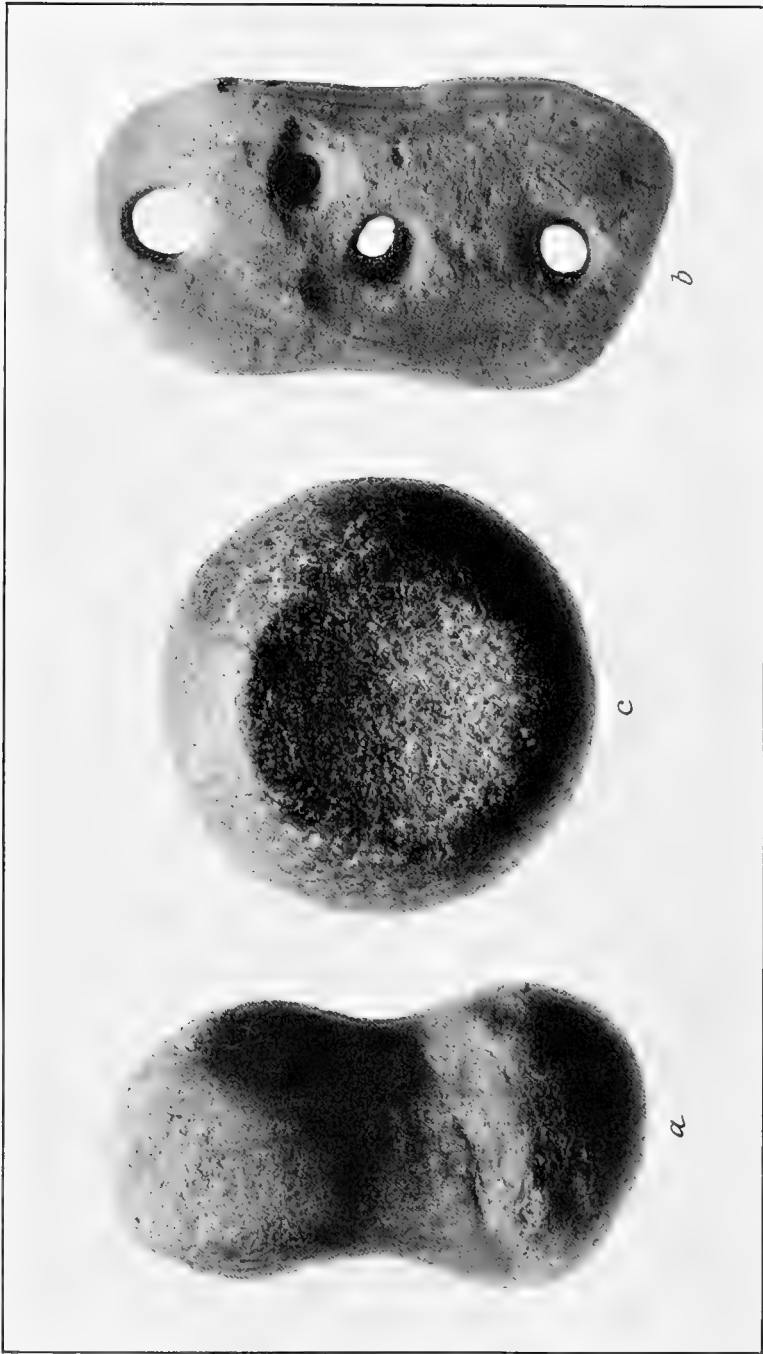




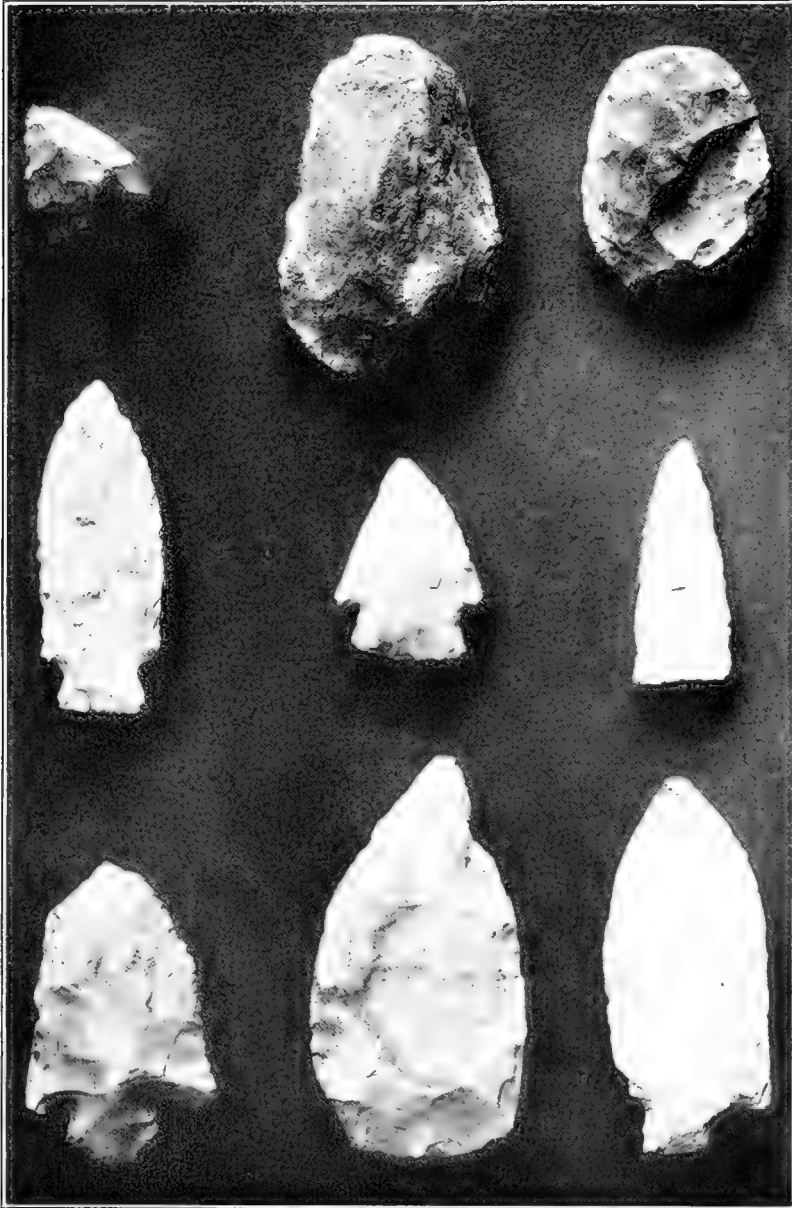
a, ROCK BOTTOM AND PROJECTING SIDE WALL



b, ROCK BOTTOM AND STRATIFIED SILT NEXT ABOVE IT



OBJECTS FROM STRATMAN CAVE. *a*, CHERT CONCRETION, USED AS A HAMMERSTONE. *b*, PERFORATED SMOOTHING STONE. *c*, BICONCAVE DISCOIDAL WITH V-SHAPED MARGIN



TYPICAL FLINTS FROM STRATMAN CAVE



*a*, CHERT SCRAPERS, SIDE VIEW



*b*, BONE, CLOSELY RESEMBLING A CHERT CORE  
OBJECTS FROM STRATMAN CAVE

These bones were in different places, but all were near the present surface; and there were no other indications of burials.

The only specimens found worthy of note were a small hammer made of a chert twin-concretion, both ends bearing evidence of long service; a sandstone pebble with one unfinished and three completed perforations apparently for smoothing leather or rawhide strings and a narrow deep groove on one edge for sharpening small bone needles or similar objects; and a double-concave discoidal stone of syenite with V-shaped margin. These are illustrated in Plate 95. Typical flints are represented in Plate 96. Side views of the three scrapers are given in Plate 97, *a*, the larger having a finely chipped regular edge, one of the others being a broken implement originally approximately hemispherical in shape.

Fragments of bones were found here and there in it, apparently of deer for the most part, though some of the teeth were large enough for an elk. There were also bones of smaller mammals. Some of the pieces had been gnawed by small rodents.

In the lower few inches, mostly at the extreme bottom, was a small quantity, probably a large cartload, of waterworn chert pebbles. Originally these had been inclusions in the limestone; released by weathering, they had been smoothed and rounded by rolling along in the sandy bed of a running stream, scoured by the fine silt in which they came to rest, and finally, by the latter means, so highly polished that many of them have a vitreous or glazed surface.

The most probable explanation of this deposit is that a pile of débris, of which no part now remains, formerly extended from wall to wall some distance in front of the present entrance and held back water coming from the interior, thereby allowing the transported sand and clay to settle. A swirling motion in the water, due to a projecting ledge or other obstacle, would account for the polish on the pebbles. It is certainly not in any manner artificial. That the pond was, at least sometimes, deeper than the thickness of this sediment is shown by the fact that this is somewhat higher on each side where it extends over projections from the lower part of the side walls.

In the finely laminated silt near the center of the cave was found the object shown in Plate 97, *b*, enlarged two diameters. Whether it is of natural or artificial origin was a moot question. It closely resembles a core or nucleus of chert from which flakes have been struck off; but after a microscopic examination Dr. J. W. Gidley, of the United States Geological Survey, pronounces it "fossil bone." E. V. Shannon, of the United States Geological Survey, says "it reacts strongly for phosphoric acid with some carbonate and is completely soluble in dilute acid and has the structure of bone."

There are no marks of teeth to indicate that it was gnawed by rodents, and it is hard to imagine that any animal could cut it so symmetrically. On the other hand, it is equally difficult to understand how such, and so many, narrow flakes could be struck off from so small a piece of bone, by either pressure or percussion, or why bone should be worked thus even if it were feasible to do so. The irregular distribution and arrangement of the facets is evidence that the object has not been artificially produced. This view is held also by Mr. W. H. Holmes. To assert that it is of human origin is to claim that man existed in this region at a time many thousands of years earlier than is denoted by anything else yet found in America. Considerable topographical changes have taken place while this specimen has been quietly reposing in its bed of silt.

It is remarkable that while the upper, or dark, stratum contained very many rocks, and the stratum next below this was composed principally of rocks cemented with tough clay, the bottom layer was almost free from them. The few found were small, none of them weighing more than 5 or 6 pounds. There was even a scarcity of small gravel, except the chert pebbles as noted above.

The general appearance of the excavation, including the rock bottom (in the foreground), the underlying clay and rock, the dark upper stratum, and the rock walls, is well shown in Plate 93, *b*.

A small trickle of water, first observed at the foot of the east wall near the entrance, where it disappeared in a crevice, was traced back nearly to the center of the cave where it emerged from a small opening. It was easily controlled by a little dam of clay in which a pipe was set. A few feet beyond this, water suddenly issued from the face of the excavation in four places, the combined streams being sufficient to fill a 2-inch pipe. In a few minutes it covered the floor and began to saturate the earth that had been thrown toward the front.

The base, or bottom, of the excavation was then transferred to a plane just above these streams, or about 4 feet above the rock bottom at that point. The side walls were rapidly converging here, and at 29 feet within the entrance they were only 6½ feet apart at 9 feet below the level of the cave floor; 1½ feet lower than this, they were only 6 feet apart. The laminated material, which had been left below when the excavation level was raised, reappeared here; it may have been continuous, with a downward slope. The earth now became too soft to shovel out; a bar forced down into it reached rock bottom within 2 feet, or 12½ feet below the cave-floor level, showing a rise of the rock. When the bar was withdrawn water rose nearly to the top of the hole. This put an end to the work. The character of the deposits at this stage is presented in Plate 92, *b*.

A plan of the cave is given in Figure 8.

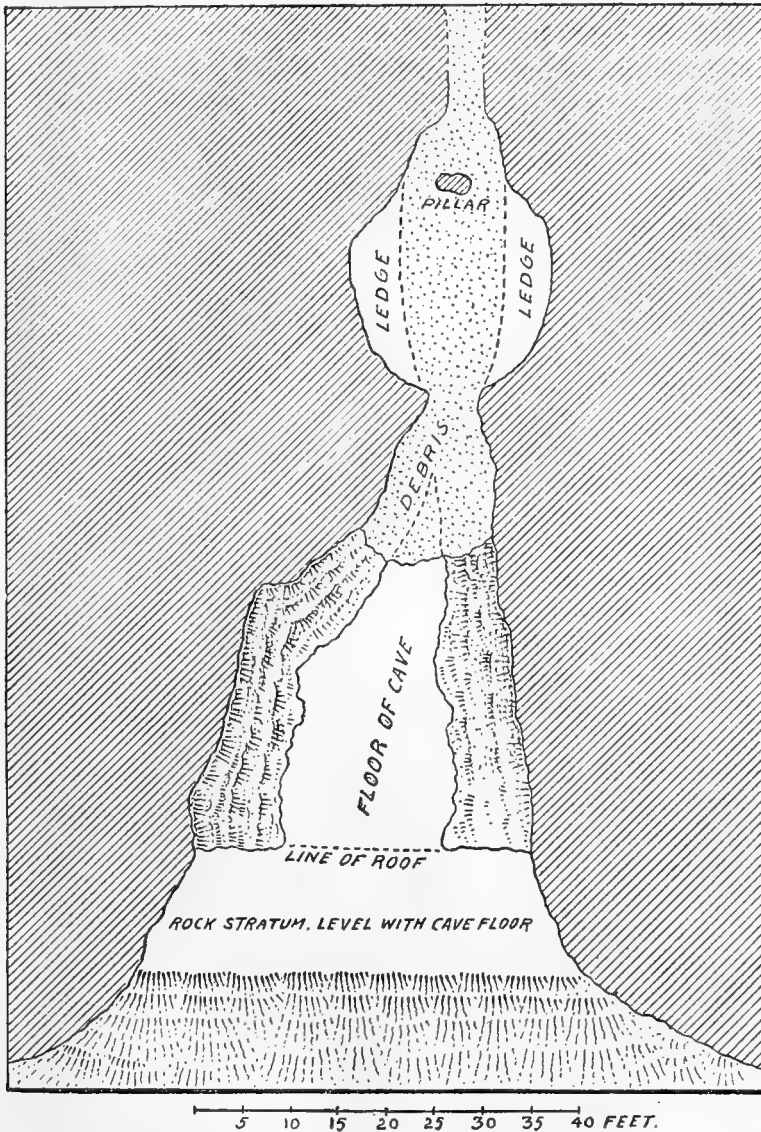


FIG. 8.—Plan of the Stratman Cave

THE LANSING SKELETON

Following the report, in 1902, that a human skeleton had been found deeply imbedded in the bluff formation facing the Missouri River, 20 miles above Kansas City, many geologists and archeologists visited the site of the discovery.

For several years there had been active and widespread discussion among students along these lines, in regard to the antiquity

of man in America. Various objects which were undeniably of artificial character, that is, bearing clear evidence of fabrication or manipulation by human hands, had been unearthed from gravel beds or found at great depths in alluvial deposits, under conditions which placed it apparently beyond dispute that they were a part of the formation in which they were found and that the material above them had not been disturbed at any time since it was originally laid down. These discoveries seemed conclusive; the claim was made, and apparently was in a fair way to be substantiated, that the human race in America dated back to the closing, if not to the intermediate stages, of the glacial epoch; that it roamed to the very foot of the ice-sheet in its later advance as well as during its retreat. A few, unwilling to accept this view until its certainty should be proven beyond question, took the position that the objects might not be so old as was claimed; that comparatively recent specimens could be as deeply covered through the agencies of floods, landslides, or even ordinary erosion. So the whole argument as to "very ancient or relatively modern" resolved itself into the query, "What is the nature of the material—sand, gravel, soil, or whatever it might be—in which this implement was found? Is it part of the original glacial deposit, or has it been redistributed, perhaps several times, by later erosive agencies?" Upon the determination of this question depended the solution of the problem.

Earlier arguments were based less upon actual knowledge of conditions than upon enthusiasm, hope, or perhaps to some extent upon "the prejudice of preconceived opinion."

As there was no possibility that the remains of this primitive Kansas settler could have been placed where they were found after the superincumbent earth was laid down, it was hoped and expected that a careful study of the situation would furnish new data from which there could be developed a more definite knowledge of the geological position of America's first inhabitants.

Unfortunately, such investigation as it was possible to make at the time was not sufficient to accomplish the desired result. Ardent advocates on either side of the controversy found, or thought they found, ample evidence to justify their respective positions. One was satisfied that the deposit was the original loess; the other was no less positive that certain indications pointed unmistakably to later modifications. Those more cautious or conservative were unwilling to make a decisive pronouncement either way. There the matter rested.

In order to gain additional information for further study, a series of excavations was undertaken in various directions from the point at which the skeleton was found. A detailed account of this work



will now be given. A brief description of the locality and of the manner in which the remains were brought to light will make the particulars more intelligible.

Owing to the peculiar composition and structure of the loess forming the Missouri River bluffs it can easily be removed with pick and shovel, and yet resists erosion almost like masonry. A vertical wall of it, as a railway cut or a river bank, will stand indefinitely if not undermined; even a deep well, if protected as high as the water rises in it, needs no further attention. Farmers take advantage of this property to run tunnels in from the face of a bluff to any desired depth to make storage rooms for fruit or vegetables.

Four miles from Lansing, the Missouri River, the course of which at this point is almost due south, is joined by a small stream which flows nearly east in a wide, deep valley. Near its mouth the south bank of this creek is a vertical rock ledge several feet high, which extends without a break to the cliff that faces the river. At the west, a hundred yards up the creek, this ledge ends at a minor ravine or "wash" coming from the south. Thus is formed a long narrow sloping point of land coming down from the upland at the south and bounded on its three sides by the river, the creek, and the tributary ravine.

Using the surface of the ledge as a floor, the Concannons, owners of the land and extensive apple growers, dug a tunnel into this spur from the north to provide the equivalent of a cold-storage warehouse for their fruit. For strength and safety this excavation was in the form of an arch, the walls 10 feet apart at the bottom and the top 8 feet high at the center. With these dimensions, the vault, if kept dry, would remain intact for many years. Their entire excavation was in the bluff deposit until it had reached a distance of about 60 feet; here limestone and shale appeared at the bottom of the wall on the east side. As the work progressed this rock formation extended continuously farther into the tunnel, sloping like a hillside. At 66 feet from the entrance or beginning of the digging a large slab was encountered, lying against the shale as if it had slipped down from above. When this was removed it was found to cover human bones. As described by the finders it looked as if a body had been doubled up into as small compass as possible and either shoved in behind the rock or placed against the wall and the stone laid over it. "There were all sorts of bones; legs, ribs, arms, and other bones." The skull was unbroken when found and was laid aside; all the other bones were shoveled unceremoniously into a wheelbarrow and thrown out into the dump beyond the end of the tunnel. Some search was made for them afterwards, but without result; the workmen had no idea where they might be, except that "they are out there somewhere."

The skull lay around in the tunnel for several months, and then by some mischance was broken into many pieces. About this time Mr. M. C. Long, of Kansas City, heard of the discovery and hastened to the scene. He recovered most of the fragments, which were pieced together, and the restored skull is now in the National Museum.

This was the sum of knowledge on the subject when the later investigation was begun.

At the time the bones were discovered the Concannons had carried the tunnel about as far as they had intended. No further digging was done at the time than was required to straighten and smooth the walls. The position of the skeleton was thus about a foot from the angle or corner formed by the east wall and the south wall, or end, of the tunnel.

In order to examine the formation more carefully, with a view to determining its geological character, and to procure sections along the various lines for the purpose of comparing different portions of the deposit, additional chambers and trenches were excavated, as indicated by the letters *A* to *F* in Figure 9.

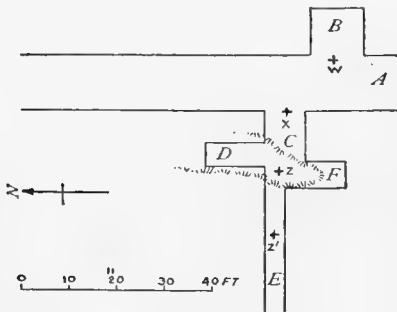


Fig. 9.—Diagram of excavations, Lansing, Kans.

The upper surface of this was somewhat uneven, varying within a space of a few feet from 2 to 3 inches above or below a uniform plane.

Fourth. Laminated or thinly stratified shale, the contour of its surface being quite irregular, apparently from subaerial erosion which had taken place before it was covered by the next deposit.

Fifth. Blue clay or disintegrated shale filled with fragments of limestone ranging in size from small pebbles to angular and sub-angular blocks and slabs weighing several hundred pounds.

Sixth. Loess, to the present surface.

All work, both in the tunnel and in the subsequent excavations, was carried along on top of the thin stratum of limestone marked third in the above list.

The blue clay with included limestone fragments (fifth in the section) was thickest near the point at which the skeleton was found and sloped away in every direction in which it was exposed during this work. This slope, or dip, was rudely stratified, the

So much of the earth and rock as was examined shows this arrangement:

First. A stratum of solid limestone of unknown thickness.

Second. About 1 foot of laminated or thinly stratified shale.

Third. A stratum of limestone averaging 4 inches in thickness.

different layers being approximately parallel with the surface of the mass. It seemed to be due partly to talus from the cliff and partly to detritus carried down through a ravine from the hill to the south and deposited where the force of the water was checked on the comparatively level floor of limestone and shale, which is marked third and fourth on the list.

The first chamber excavated (A) was a continuation toward the south of the original tunnel. The apparent difference in length of the two sides, as shown in the sections, Figures 10 and 13, arises from the fact that the end wall of the tunnel was not at a right angle to its direction, this obliquity being rectified in the extension.

It was found more convenient to remove the material here in two sections. The first had a width of 7 feet, beginning at the west wall of the tunnel and extending a foot east of the central line. This cut

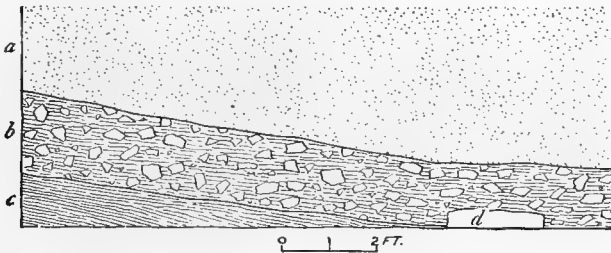


FIG. 10.—Section of west side of chamber A

was carried to the end before the remaining 5 feet was touched. At the east side of the section the stratified shale, next above the bed rock, had a thickness of 20 inches, while the stratum of mingled blue clay and stones overlying it measured about 25 inches. Both thinned toward the west; the shale to such a degree that it entirely disappeared, allowing the clay, reduced to 16 inches at the west wall, to rest directly on the bedrock.

As the digging progressed the line of contact between the shale and the rock floor bore quite regularly toward the west side of the excavation, which it reached at  $3\frac{1}{2}$  feet from the face. A slab 2 feet long and 5 inches thick, belonging in the blue clay, lay upon the bed rock, its straight margin almost coincident with the line of the wall; the shale began in a feather edge at the inner side of this slab and rose gradually and evenly to the end of the cut, a distance of 9 feet, where it attained a thickness of 13 inches. The clay also became somewhat heavier, measuring 22 inches. The rocks included in the clay increased in numbers; at first they did not seriously interfere with the work, while at the end of the excavation it was difficult to find an opening for a pick; the quantity of stone being greatly in excess of the amount of clay.

A section of the west side is presented in Figure 10.

Along the east wall of this 7-foot cut the shale and clay held practically the same thickness for about 6 feet, from which line they thinned somewhat toward the south. A slab slightly more than 4 feet long and varying from 2 to 5 inches thick was reached at 8 inches from the face at which the work was begun. It was in the blue clay, near the bottom; the presence of two small masses of clay under it and a depression or displacement of the shale beneath can best be explained by the supposition that in some manner it found lodgment in soft yielding mud lying on wet shale. This feature is shown in Figure 11, in which the depression in the shale is slightly exaggerated and all stones except the slab are omitted. An angular block containing about 6 cubic feet rested on the slab in such close contact that until loosened and forced apart they were supposed to be one rock. No other slab as large as this was found; but from the description given of the one which partially covered the skeleton, these two were very similar in size and shape.

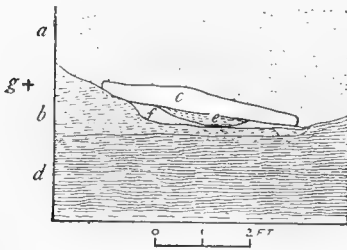


FIG. 11.—c. Large stone lying between the loess and the shale

These data regarding the arrangement and character of shale and clay in chamber A will apply to the entire space between the sections shown in Figures 10 and 13.

At 4 feet from the initial line of the work several large blocks which reached nearly across the cut had settled so compactly together that they seemed to form the face of a ledge or minor cliff; but when uncovered they proved to be only detached fragments imbedded in the clay and resting on the shale.

The removal of the 5-foot section on the eastern side brought to view somewhat different conditions. The surface of the shale inclined toward the southeast to such an extent that it was only 5 inches thick at the corner; the clay resting on it likewise became thinner in that direction, thus giving a considerable slope to its upper surface. The large slab above mentioned, as well as all other flat rocks except a few small ones, showed the same dip; also, they became less numerous until in the last 3 or 4 feet scarcely any were found.

This dip of the shale toward the southeast seems to result from the action of running water which eroded the mass unequally. The thinning out toward the west, observed at the beginning of the excavation, on the opposite side of the tunnel, adds to the probability of this conjecture. The principal drainage line before the clay and loose rocks covered the shale was a few feet to the west of the present

tunnel, as will appear later. It is quite possible that, in spreading out near the mouth of the ancient ravine, storm water would so distribute its force as to build up a small mound like this deposit. The regularity of the lamination and the absence of any appearance of crumpling or squeezing in the shale are opposed to the theory that it may have slipped from the cliff behind it; and so are the stratification, imperfect though it be, of the overlying clay, and the uniformity of inclination of the flat rocks included in the latter.

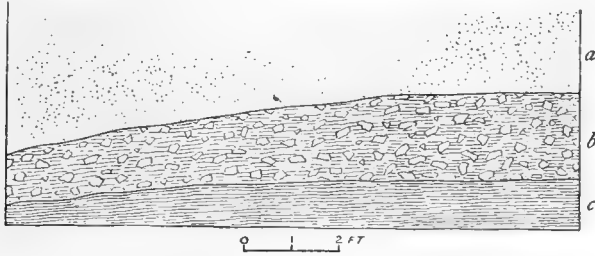


FIG. 12.—Section of south end of chamber A

Across the south end of this chamber—the wall which bounds the farthest extension of the tunnel—the shale for a space of  $8\frac{1}{2}$  feet held about the same thickness of 13 inches as at the southwest corner; it then diminished to 5 inches at the southeast corner. Similarly, the stratum of blue clay and rocks maintained its measure of 22 inches for about 5 feet, from which point it dropped to 13 inches. The

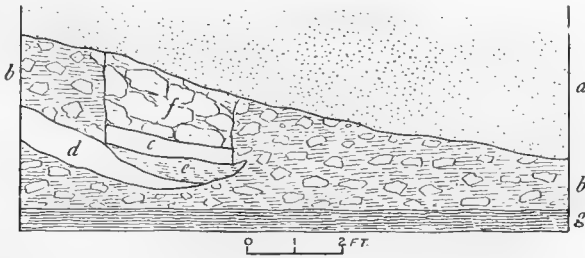


FIG. 13.—Section of east wall in chamber A

bedrock also dipped in the same direction, being 5 inches lower at the east wall than at the middle line of the cut. It was not entirely smooth and level over any part uncovered, having everywhere the slightly uneven surface characteristic of thin-bedded limestone.

Figure 12 shows this end wall in its proper proportions, though the surface of the bedrock is not represented.

A section of the east wall is shown in Figure 13. There are omitted from the illustration some tortuous thin streaks of lime-like matter, apparently segregations from the blue clay in which they occur.

These exist to some extent in the south wall, disappearing within a few feet. Neither is there shown an irregular streak, broken in places, of reddish or brownish clay, nowhere more than an inch thick, which lies between the blue clay and the loess. It belongs entirely to the latter formation; in some places it is divided into two or more thinner bands, enclosing loess material and soon coming together again.

Among those who have made a study of the earth which lies next above the clay there is some lack of agreement as to its origin. It is principally composed of the fine-grained, yellow, silt-like mixture of silt, sand, and clay, so firmly compacted that it might almost be called microscopic concrete, which forms the bluffs along this part of the Missouri River. Whether it be true loess or not, it is so called in this paper for the reason that the term conveys a definite idea of its appearance.

A ventilating shaft at the end of the tunnel showed that the loess measured 28 feet in thickness from the rock floor to the surface of the ground above: it was the same in character from top to bottom. It was equally uniform in all parts of the extension, A, to such height as it could be conveniently reached with picks—an elevation of about 8 feet above the floor. Lines, apparently of lamination or deposition, were visible in several places at different levels, but invariably ran out within a few feet and may have been only in the nature of pressure-joints.

Snail shells were numerous, occurring one in a place in every part of the loess excavated; with very few exceptions they seemed to be of one species. Fragments of charcoal, perhaps 50 in all, varying from small specks to pieces more than 2 inches across, were also discovered here and there throughout the loess. In one fragment the grain was sufficiently preserved to show that it was burned from oak; another was willow or cottonwood; no others could be determined with certainty. A dozen or more fragments of limestone were scattered at various levels from near the bottom of the loess to the roof of the tunnel, some of them 2 or 3 feet from any other piece of stone. The largest observed weighed about 3 ounces. None of them appeared waterworn; in fact, some of the angles were as sharp-cut as if freshly fractured. They could not have been carried in by winds; while from their small size and infrequency it is quite improbable that they worked down from rock strata in the vicinity. At present, the most reasonable explanation of their presence seems to be that they dropped from ice or the roots of trees, floating over the place where they lay.

At one point, within a space a few inches in diameter, was a handful of calcareous globular objects closely resembling the seeds of a hackberry, probably concretionary in their nature.

As there seemed no prospect of profitable results from further investigation in this direction, work in chamber A was brought to an end. The portion next examined is that marked B in the diagram.

From a point on the east wall of the tunnel immediately opposite the position of the skeleton a space of 5 feet each way, north and south, was marked off. Within these lines a drift was carried in as nearly at a right angle as the nature of the material to be removed would permit. The southern half of this block—that is, the 5 feet south from the skeleton—was first dug out for a distance of 5 feet, thus cutting out a square of these dimensions.

The lower portion of the clay, next to the shale, was closely filled with rocks of various sizes up to 100 pounds in weight; they were mostly brownish or yellowish on the outside, as if from weathering, and had given the clay a distinct tinge of their color. At about a foot above the shale the stones began to thin out, the clay in consequence assuming its natural blue color. Within less than 2 feet more the stones almost disappeared and the clay took on a decidedly lighter tinge; so much so, that the men spoke of it as "white."

Figure 14 represents a section of the north wall of this cut—the first 5 feet east and west directly east from the place of the skeleton. A faint brownish streak running diagonally across the upper portion, to the east side of a large rock between the clay and the loess, is not shown. There is also omitted a thin streak of limelike matter of the same character as that observed in the east wall of chamber A; it follows a devious way through the blue clay about where the change of color begins, with a branch reaching diagonally upward to the west end of the large rock above.

There was a decided dip to the southeast in this block; so much so that the rock-bearing blue clay ran out within a short distance and the lighter colored uppermost clay came down to the shale just at the corner.

The 5-foot block lying north of the part last figured was next removed. Along the front (west) face of this the clay seemed to reach its greatest elevation above the rock floor, though very little higher anywhere than in the section just shown. No examination was possible north from here; the strata dipped to the east, though not so much as toward the southeast. A north and south section at the rear of the 5 feet now removed, or midway between the east

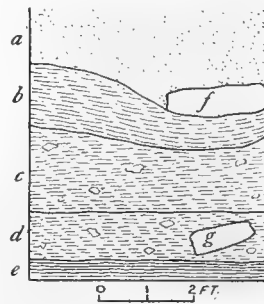


FIG. 14.—Section in chamber B

and west sides of chamber B, is shown in Figure 15. The bedrock is somewhat higher near the middle of this section than toward either side; the shale, with practically a uniform thickness of 5 inches, has a corresponding slope of its upper surface.

From this middle line the dip to the eastward continued. At 10 feet it became apparent that the clay would soon run out, allowing the loess to rest upon the shale, or perhaps upon the bedrock, and it was deemed not worth while to go any farther.

The loess in chamber B was more compact and tenacious than any previously excavated; so much so that the upper portion was almost as hard to remove with picks as the surface of a much-traveled dirt road would be. No fragments of stone were found in it; only two or three pieces of charcoal, and very few snail shells.

A fragment of human jaw had been found by the Concannons a few inches above the rock floor in the west wall of the tunnel some 15 feet northwest of the skeleton, and at first was supposed to belong with it. More careful examination and comparison revealed the fact that it was part of a different individual, indicating, perhaps, another burial.

This was a matter of sufficient importance to call for a thorough investigation. A cut 8 feet wide, 4 feet in each direction from the point at which the jaw was unearthed, was carried westward  $11\frac{1}{2}$  feet. No trace of the shale or the blue clay was discovered in this chamber (C in the diagram). Some loose

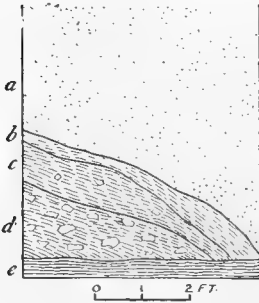


FIG. 15.—Section in chamber B

stones were strewn here and there on the floor, but except for these nothing intervened between the loess and the bedrock. Various sandy streaks, as of lamination, appeared in the upper part of the excavation, but so slightly marked that they were difficult to trace. Those most plainly shown had a slight dip toward the south, being 3 or 4 inches higher at the north wall than on the other side of the cut. They became fainter until they disappeared within a short distance; but toward the end of the chamber a few others came in, quite distinct, though limited to a width of 3 or 4 feet.

As noted in several reports made previously by visiting investigators, a clay streak about an inch thick extends along the west side of the tunnel from the doorway to the extreme end and apparently continues indefinitely in the same direction. This streak gradually rose toward the west, growing continually thinner, until, at about 8 feet within the chamber (C) and some 2 feet above its level in the tunnel, it could no longer be discerned.



Several angular fragments of limestone rock, none of them over 3 or 4 ounces in weight, occurred at various levels in the loess, from the floor to the roof; snail shells were not rare; some charcoal; but no trace of bone, human or other, was discovered, nor anything of an artificial character. As forest fires frequently originate independently of human agency, charcoal in such situations may be disregarded. Some of the pieces found here showed granular surfaces and clean, sharp-cut edges, as though they had never been subjected to the wear and tear of either atmospheric or aqueous erosion.

Near the end of chamber C the bedrock abruptly ended and its place was taken by a confused mass of broken rocks, shale, and clay, with no definite line of separation between it and the superimposed loess. This proved to rest, at a depth of 16 inches, on another stratum of solid rock. When the part within the chamber was cleared out it was plain that this material filled an old watercourse. The bedrock, which had formed the floor thus far, was about 4 inches thick; under it was a foot of undisturbed stratified shale, resting on another, much heavier, stratum of limestone. The margin, or bank, was irregular, as in any small stream. The farther side was not reached in this chamber. An effort was made to ascertain its course toward the north by running a tunnel, D, in that direction, but after wheeling out the overlying loess (all excavated material had to be transported to a considerable distance outside of the entrance to the main tunnel) and then digging through 13 feet of conglomerate almost as solid as masonry, without finding anything else, the attempt was abandoned.

So far, the work had been altogether underground. The roof of the excavations was nowhere less than 12 feet, vertically, below the surface. The loess had been of the same general nature wherever exposed; but this fact could not be relied on as a sure indication that it was homogeneous throughout. For the purpose of obtaining satisfactory evidence as to its character from top to bottom, a trench 4 feet in width was begun at the roadway in the ravine west of the tunnel and extended, on the bedrock as a base, to connect with the west end of chamber C, as indicated by the letter E in the diagram.

There was no mark on either wall of this trench, of slipping, sliding, caving, or surface wash from a higher level; no lines of lamination or stratification; no indication of interrupted deposition of the loess; in short, no evidence whatever that the whole formation as here exposed was due to any other cause than a slow, steady, continuous sedimentation in quiet water. The loess rested on the bedrock throughout, except for a few loose stones here and there on the bottom. Among these, near the middle point of the trench, was

a small boulder of quartzite identical in appearance with those found on the surface in the vicinity which were carried as a part of the glacial drift from Sioux Falls in South Dakota.

A short distance eastward from this, and about 3 feet higher, in the loess, was an angular fragment of stone weighing about 6 ounces, which looked like a metamorphosed sandstone, but effervesced with acid. It was highly colored, pink and red at one end and deepening to a purplish tinge at the other. Several smaller pieces of the same material were found near by, also some red and yellow ochre which results from the decay of hematite or limonite pebbles.

Scattered at random in the loess, at any level and at any point within the limits of the trench, were other ochreous deposits, some of them barely sufficient in amount to color the earth; angular fragments of limestone up to 6 or 7 ounces in weight; snail shells; charcoal; and streaks of gravel containing yellow ochre, rotten limestone, shale, quartz, quartzite, and jasper pebbles, singly or in combination. As in chamber C, some pieces of the charcoal showed clean-cut fractures, with no trace of wear or erosion, as if they had just been broken from a large fragment. With one exception the streaks of gravel were very limited in extent and thickness, ranging from a handful to perhaps half a peck. The exception was a deposit which was reached about 8 feet from the inner end of the trench and lay 4 feet above the bedrock. It extended beyond the trench in both directions, being 2 inches thick at the north wall and gradually increasing until it measured 11 inches at the south wall, under which it disappeared. It was composed almost entirely of limestone pebbles, quite rotten, which, in conjunction with some fine fragments of shale, were mingled with the loess. In all these gravel deposits the pebbles composing them were very small, few being larger than a pea.

Five pieces of bone were found in this trench. The first was about 3 feet above bedrock, 18 feet from the inner end of the trench. It appeared to be part of the leg bone of an animal about the size of an elk. There was a joint, with a portion of the shaft on each side; but it was in such fragmentary condition that it could not be readily identified.

Three feet south of this, and 6 inches higher, was a fragment of bone  $1\frac{1}{2}$  inches long and half an inch in diameter, which had been much gnawed by some rodent. The ends were cut off rather smoothly, giving it somewhat the appearance of an aboriginal bead.

A bone as large as that from a quail's leg was in the earth 13 feet from the inner end of the trench and  $2\frac{1}{2}$  feet above the bottom.

At the same level, 2½ feet from the end, was a fragment of rib. Only a short piece remained; but the imprint, filled with fine earth and minute particles of bony matter, could be traced for 5 inches.

Finally, near the end, about 8 feet above the bottom, was a part of a jaw from an elk or a large deer. Four teeth were remaining in it.

Nothing of human origin was anywhere discovered.

Near the end of the trench the bedrock abruptly terminated, to be replaced by débris as noted in chamber C. When an opening was made between the two excavations the width of this old channel at the line of the north walls was found to be 8½ feet. It narrowed toward the south; and at 4½ feet from that side of the trench the bedrock formed a curve around the end of the depression.

From the completed trench a side cut (F) was started. The only thing of importance discovered in it was a piece of limestone weighing about 3 pounds, which was imbedded in the loess 4 feet above the floor. No other stone was near it.

It had been intended to carry this cut 20 feet or more to the south and connect it by another tunnel with chamber A; but at 8 feet the earth became soft and damp—evidence that a vein of water was not far away. Under such conditions there would be danger of sliding or caving in; and the tunnel would be worthless for storage purposes if water were allowed access to it. Consequently the work was brought to a close.

#### CONCLUSIONS

There is no reason whatever for calling into question the essential correctness of the statement made by the Concannons in regard to the finding of this skeleton. The indifference which they displayed in throwing the bones out with the earth, and the further fact that several months elapsed before the outside world became aware of the event, is ample evidence that they did not appreciate the value of their discovery. Had there been any intention or disposition on their part to exploit a fake or to "play a joke" on collectors or anthropologists they would assuredly not have treated the matter in the way they did. Moreover, they are men who would not find either pleasure or amusement in perpetrating such deception. The great depth of earth, 28 feet, showing no trace of disturbance, above this skeleton proves beyond all cavil that no grave was ever dug here. The overlying material has accumulated since the body to which it belonged found a resting place. Consequently, at that time the projecting point from the ridge and the narrow bench or platform extending along its western side were bare rock and shale, which was sometimes exposed to the air and at other times flooded more or less deeply when the river was swollen. At some time prior

to this the entire area had probably been covered with post-glacial loess deposits that were removed later by erosion. As the ridge is very narrow there could not have been any considerable thickness of it even when it was heaviest. Had such not been the conditions the body could not have been placed where it was found—against the shale bank and covered with a large slab which had loose earth above and around but not beneath it.

The nature and origin of the present deposit has not been fully determined. It is certainly not loess in the original stage, but seems to be made up of loess which has been carried in by wind and running water from the place where it was first laid down, mingled or mixed more or less with other material, and redeposited in quiet or slightly moving water.

A hypothetical explanation will be attempted.

With its swift current, the Missouri River is imperceptibly but steadily lowering the level of its bottom; consequently, in the far past its average elevation was much greater than it is at present, with a corresponding velocity of its current. This removed the loess from the point at the mouth of the little creek and kept the rock clean. While this higher general level prevailed the rock platform was occasionally exposed during low water, and it was at one such period that the burial occurred. In flood times the stream reached high up on the bluffs. With a shift in the current, such as is constantly happening in this river, slack water would then prevail on this side, mud would settle from the backwater, and the soil from the upland would accumulate instead of being carried away. Thus, in time, the present formation was built up to a height of possibly 35 to 40 feet; the ridge is so narrow that it could not attain a greater elevation.

There are as yet no data from which can be accurately calculated the rate at which the Missouri is cutting downward. If this can be known, it will be easy to estimate the length of time that has elapsed since low-water mark was at the level of the rock platform, inasmuch as the crest of the great flood of 1884 barely reached its top. Making abundant allowance for erosion, it is not probable that the highest part of the spur was greater than the estimate just given.

If, as some geologists believe, a foot in a century may fairly represent the rate of lowering, then the age of the Lansing skeleton may be placed at somewhere between thirty-five and forty centuries.

#### THE ELEPHANT BED AT KIMMSWICK, MO.

Some years ago an extensive deposit of mastodon bones was discovered in the valley of Rock Creek near the town of Kimmswick, Mo. One collection made at the site was estimated to contain remains of not less than a hundred different animals. They occurred

at various places; in talus, in the banks of the creek and of tributary ravines, in the earth around saline springs. They were most abundant along the foot of a cliff which projected from the foot of a hill in an angle or sharp curve, facing the west. A bone found among these last bore so close a resemblance to a human fibula that extended and close comparison was required to establish its identity. While this matter was still in doubt a further examination of the locality was made to gain, if possible, additional information.

It may be stated here that the bone in question, after careful study by anatomists, proved not to be that of a human; and it may also be said that nothing whatever was found, or has ever since been found, at this site or anywhere else in the region, which tends to show that man existed here as a contemporary of the mastodon.

It may be well, however, to preserve a record of the work done here.

A trench was started at the bottom of the hill, which was 60 feet from the bottom of the bluff. After passing down through soil and detritus a mass of soft black substance was encountered, which resembled macerated charcoal or the dead leaves and trash that have been buried beneath soft mud until completely carbonized. Under this lay what seemed to be a rocky beach which had long been subjected to wave action, the surface being smooth and the broken rock cemented by infiltrating lime into a breccia. Where this was first uncovered it had a thickness of about 5 feet above bedrock; it was not penetrated elsewhere. All the material lying above it was removed. Its upward slope was somewhat less than that of the overlying talus, so that at 40 feet from the beginning the trench was 12 feet deep. It so happened that the excavation coincided with the crest of a spur extending from the high cliff, the rock forming its bottom sloping to the northward and the southward as well as toward the creek. The north side, so far as exposed, was practically the same from top to bottom, a reddish, clayey earth, filled with angular fragments of limestone that had broken away from the cliff. It contained no rounded gravel, though patches of this lay on the conglomerate within the trench, while at the bottom of the south wall it was from a foot to 2 feet thick.

At a distance of 40 feet from the beginning of the trench a vertical wall of solid rock 2 to 3 feet high was reached. It was either an old shore line or due to a break or slip in the strata. Both the breccia and the black deposit overlying it came to a stop against this rock face, the black being as thick here as at any other place where it occurred, but not extending beyond this point. Between the two, against the rock wall, was a narrow strip about 3 inches thick of loose, uncemented chert fragments, most of them

not at all worn on the edges, but all presenting the appearance of having been washed clean by running water or little waves. Lying on the bedrock, of which this minor wall was the lower margin, was a deposit of breccia similar to that below, but nowhere more than 2 feet thick; it extended to the foot of the high cliff. It was covered with bluish-gray clayey earth containing many small stones, and merging into the soil above, there being no distinct line of demarcation; it was very tough and difficult to pick down. Scattered through it were large masses of *débris* from the cliff. No gravel appeared in this part of the trench.

In the black deposit, and to a less extent in the clay and rocks above it, fragments of mastodon bones were abundant. All of them, with one exception, were so broken and scattered it seemed impossible that they could ever have been entire at or near the spot where they lay. The exception was a femur, in many pieces, which might at one time have been intact where it was uncovered. As this was near the present surface, it may have been broken by falling or rolling stones.

No satisfactory explanation can be given for the presence of such a vast number of these remains in so small an area, or as to why any at all should occur under such conditions when they are rarely found elsewhere in the vicinity.

A theory has been offered that, like the modern elephant, the animals came to this place when they felt death approaching. But the gravel and the conglomerate prove that the site was then under water. Another theory is that a great herd was driven by a savage people or by carnivorous animals to the edge of the cliff where, being hard pressed, they plunged over to destruction. But they could easily have made their way to the bottom on either side of the cliff within a short distance. Another hypothesis, plausible but not convincing, is that after they had died somewhere else the bodies floated to this spot and were stranded. There is abundant evidence that at the height of the glacial floods this valley was filled with water which covered to a depth of many feet all the space between the hills. Due to the surface drainage around this lake it would have a gentle outflow to the Mississippi. The point on which most of these bones are found, projecting into this lake, would cause an eddy to form on its lower side. Carcasses floating near the shore would lodge against the upper part of this point; those a little farther out would swing into the eddy and stay there. When they decayed, the bones would settle to the bottom. Sediment from the water and talus from the cliff would cover them. Drift, also, would wash ashore; as the water receded vegetation would follow its margin. These would decay and form a mold over and among the bones, accounting for the black deposit.

The question of "how" and "when" is still a subject for discussion; and in the present state of knowledge "discussion" will be as far as it can go.

#### MOUND NEAR KIMMSWICK, MO.

A mile north of Kimmswick, in Jefferson County, Mo., on land belonging to David White, is a remnant of terrace now reduced to an area of 3 or 4 acres. Rock Creek and a tributary ravine surround it on three sides. On the level top is the site of an aboriginal village. Casual digging at various places has resulted in the discovery of a number of graves, and the usual débris characteristic of a settlement appears wherever the soil is disturbed in farming or by relic hunters. In this field stood a mound which could never have measured more than 5 or 6 feet in height, being now reduced by cultivation to less than 2 feet. All of the structure that lay within an elliptical space of 32 by 45 feet was removed, to the subsoil.

Near the south margin of this excavation was a salt pan having the shape of a bread bowl; it was 22 inches in diameter and 8 inches deep. Although broken to pieces by pressure of the earth, the form was still preserved. It had been made on the spot; a basin of the proper form was dug and lined with tough blue clay to a thickness of an inch to an inch and a half, every part accurately shaped and smoothed, to serve as a mold. The pot was built up an inch thick inside of this, allowed to dry, and hardened by burning light fuel in it or by keeping it filled with live coals. Its rim was on a level with the natural surface of the ground. This vessel had no connection with the mound; others, similarly constructed, have been found at several places in the field around. They were used for producing salt from the water of a strong saline spring at the foot of the hill, through ordinary evaporation, as there was no way to heat the water in the pans unless by the use of hot stones.

Scattered throughout the space dug were many hundreds of pottery fragments, most of them apparently thrown in with the earth, others on and around patches of burned earth which occurred at all levels. With some of these burned masses bones of animals were found in such relation to the sherds as to indicate that cooking had been done; in other cases the fragments seemed to be parts of vessels that had broken in the process of firing. Some of the pieces were distinctly glazed, a condition due to the action of the salt made in them. Many mussel shells, some bone needles, flint knives, polishers for smoothing pottery, stone hammers, and two finely chipped unused hoes or hatchets of translucent bluish chert were found loose in the earth. At what was probably the original center was a hole 18 inches across and 8 inches deep, quite symmetrical in form, and lined with

half an inch to an inch of pinkish substance resembling ochre or powdered hematite ore. This was filled with compact grayish clay like that deposited in backwater from the river. A foot above this, 2 feet to one side of it was part of a human skull. It was quite firm; but as there was no other indication of a burial, this fragment may have been accidental.

No trace of a grave or of other form of interment was found.

#### MOUNDS AND GRAVES IN ALLEN COUNTY, KY.

A letter was received at the office of the Bureau of American Ethnology concerning certain Indian burial places in Allen County, Ky. From the description given they appeared to be similar in character to the stone cists or box graves of Middle Tennessee. But according to this report the stones of which they were constructed were much larger than those used in graves elsewhere, being "mostly as large as 4 by 5 feet." The bones found in them were of a size to correspond with the receptacle; pieces of skull "near half an inch thick" and "shin bones nearly 2½ feet long" were exhumed. These "tall giants . . . have red bones; they are as red as a fox squirrel bones."

Mounds also were reported, some of which were described as being about 40 feet across, 3 feet high, with a flat raised border about 10 feet wide around the top, within which is a depression. One mound was said to be "8 or 9 feet high and in diameter 20 or 30 feet."

Archeologists have learned to discount stories of marvelous things, but this communication was written in a convincing manner that made it seem worthy of investigation. The region was visited and a careful examination made of the country for several miles around Petroleum, from which place the information was sent.

It was found that along Big Trammel Creek and many of its tributaries, on ridges and hills of varying elevations above the stream levels, are numerous cist graves, such as are described by Thruston and others. Many of these have been examined in a desultory way by residents of the region, sometimes merely out of curiosity, but usually with the idea that "treasure" is concealed in them. Very few were thoroughly cleared out by these excavators, but sufficient work was done in many of them to give a correct knowledge of their structure and contents. The method of construction was the same in all. A grave was dug, the size and depth depending somewhat upon the nature of the earth; they are seldom as much as 2 feet in depth or more than 5 feet in length. The usual depth is from 16 to 18 inches; the average length about 4 feet. Slabs of limestone or of shale ("slate") were placed on edge around the sides and ends of the pit; sometimes similar slabs were laid on the bottom, but in a majority



of cases this was not done. The body, usually folded or doubled in order to fit the restricted length of the excavation, was placed on the bottom; occasionally a cavity was dug long enough to contain the body fully extended. The grave appears then to have been filled with earth, though it is possible that in some cases earth may have worked its way in between the stones. Sometimes, though not often, flat rocks were laid across the top as a covering. The upper edges of the vertical slabs were usually left projecting above the present surface, but now many of them are entirely concealed by earth carried from higher ground by superficial drainage, and are revealed only when struck by a plow. No bones were ever recovered entire; sometimes, though very seldom, they were intact when first uncovered but fell to pieces when an attempt was made to remove them. Often the whole skeleton had disintegrated into a thin layer of chalky or limy substance, as if pulverized. In no tomb opened were any artificial objects discovered except a few fragments of shell which, from the descriptions given by the finders, may have been decayed beads.

The stones "as large as 4 by 5 feet" and the "shin bones nearly 2½ feet long" showed no such dimensions when a rule was applied to them. The largest stone taken from any grave was 32 by 48 inches. None of them were thick, and scarcely one was too heavy to be carried easily by one man. None of the fragmentary bones that were still to be seen belonged to persons of more than ordinary stature.

There seemed to be no reason why any further investigation should be attempted.

Reports of "Indian settlements" along Big Trammel and other creeks are not based upon actual discovery of such sites but upon the undeniable fact that "all the Indians who are buried here must have lived *somewhere* close around." Only one village site has been located; it is at the foot of a hill, covered by earth washed down, and was revealed by a cut for a roadway. Excavation was not practicable. Other inhabited sites exist, of course, and there are probably a number of them; but they do not show.

The mound "8 or 9 feet high" was not more than 3 feet. It stood on a hillside, and the reporter looking at it from below estimated it as "3 feet higher than a man's head." Had he gone farther down the slope it could easily have appeared as 30 feet higher. The owner gave full permission for any investigation desired; but as there were three large trees and the green stump of a fourth on the mound, while he stipulated that he was to have everything that might be found in it, advantage was not taken of his generosity.

On the north or east side of Big Trammel, 3 miles north of Petroleum, on land belonging to H. Russell Miller, are three small mounds.

Two of them are on the brink of a low cliff overlooking the stream, the margins not more than 5 or 6 feet apart. These two are in the form of a circular ridge of earth, like a miniature circus ring, with the interior space partially filled. The larger measured 30 feet across to the outer margin on each side and 22 feet across the center between the highest points of the ridge. The earth within varied from 12 to 16 inches deep, according to its distance from the rim, being shallowest at the middle; the average was about 14 inches. The average inside level was 10 inches below the top of the encircling wall. It could not be determined whether this saucer-shaped floor was made so intentionally or whether it had been level and earth from the wall had washed down on it; probably the latter was the case. At first view it appeared to be such a heap as would be produced by an earth-covered lodge with earth piled around the base outside as a protection against the weather; the material inside being due to the roof falling in when the timbers decayed. The entire mass was removed to the outer margin and to the subsoil. There was no sign of a posthole, no fire bed, no hard-tramped earth, nor any other indication that the site had ever been lived on, although in the body of the structure was found a considerable number of flint chips, spalls, and fragments indicating the manufacture of implements; mussel shells; pieces of charcoal; burned earth and ashes; pottery sherds, some of them having a curvature indicating that they were from vessels a foot or more in diameter. There were three distinct types of pottery—a coarse, rude make, poorly burned, easily crumbled, mixed with mussel shell coarsely broken, and burned to a bright red; a similar coarse quality with very little shell, burned harder but still not sufficiently solid to endure careless handling; and a more compact variety with finely beaten shell admixture, burned until hard and strong. Some of the pieces were smooth, as if the exterior had been rubbed and polished; some were from vessels that had been molded in baskets, and among these were impressions showing three distinct methods of weaving. There were also "cooking stones" and broken bones of animals, and a perforator  $4\frac{1}{2}$  inches long made from the leg bone of a small mammal, one end having the joint surface intact. None of these objects were intentionally deposited, but were carried in with the earth, proving that a village site existed near by. But the surrounding area is now in woods, so that the surface of the ground is covered with leaves and vegetation, and can not be seen.

As it was not a house mound, that is, the site of a wooden structure covered with earth, nor the site of a house whose base was protected with earth—in fact, built upon a spot which had not been occupied at all—the only plausible explanation is that the "ridge"

or ring of earth had formed the foundation of a temporary structure in which was a raised earthen floor, and that it was resorted to only upon special occasions, as for the performance of a ceremony or incantation whose proceedings must be carried on in secret, or at least shut off from the gaze of those who might be near.

The second mound was similar to the first but smaller, being 27 feet between opposite outside margins and 19 feet across the highest points of the ridge; the latter was 18 inches high and the depth or thickness of the interior deposit 10 inches. Scattered through the material composing it were fragmentary remains of the same character as those found in the other, but much less in amount. There was no sign of posts or fire bed and no trampled soil. Its purpose was no doubt the same as that of the other, whatever that may have been.

The third mound resembled the other two, except that the central depression was very slight and only a few feet across; as if a circular embankment had been made and the enclosed space filled level except a small area at the middle part. This mound was 27 feet between the margins, 15 or 16 feet across the top, and 30 inches high. The central portion was cleared out over a space 20 feet across, thus leaving undisturbed only a narrow ring around the base. A very few fragments of flint and pottery and some pieces of charcoal, none larger than a hen's egg, were found loose in the earth. As in the case of the two others, there was nothing whatever to form the basis of a guess as to the purpose of this mound.

Scattered through the forest in which these mounds are located are some stone box graves; but results were so discouraging that no further search was made.

## PREHISTORIC EARTHWORKS ABOUT SOUTH PORTSMOUTH, KY.

The aboriginal remains along the Ohio River in Greenup County, Ky., opposite Portsmouth, Ohio, as shown in the maps of Squier and Davis<sup>2</sup> and T. H. Lewis,<sup>3</sup> were carefully examined from Siloam Station, opposite Sciotoville, to the Government dam, a distance of about 9 miles. Many of the works shown by the two surveys are now entirely obliterated; on the other hand, there are evidences of prehistoric industry not indicated on any of the maps, such as small mounds, camp sites, piles of stones, pavements or platforms of flat rocks buried under accumulated soil, small spaces or narrow passage-

<sup>2</sup> Squier and Davis, *Ancient Monuments of the Mississippi Valley*. (Smithson. Cont. to Knowledge, vol. I, Washington, 1848.)

<sup>3</sup> T. H. Lewis, *The "old fort" earthworks of Greenup County, Ky.* (*Am. Journ. Archaeol.*, vol. III, pp. 375-382, Baltimore, 1887.)

ways covered with river pebbles, mostly white quartz, and traces of ramps or graded ways from one terrace to another.

At Siloam is the large mound surrounded by four concentric circles, with the parallel walls extending to the river, as shown by Squier and Davis in their Plate XXVIII, page 81. The mound was not erected by human labor, but is a geological formation, cut off by the little stream from the high alluvial terrace to the west; though it has been somewhat modified in form, artificially, as these authors suggest. The "graded way" to the top is largely or entirely natural. However, the entire structure is so altered by cultivation that no certainty exists as to its original form. It will be observed that Plates XXVII and XXVIII differ slightly in detail.

The mound with encircling ditch, figured by Squier and Davis on page 82, is not at all like the illustration, a fact quite apparent from the description of it given just above their cut. The work is on a level plain, the embankment being formed of earth taken from the interior ditch, and only a slight mound built on the area within the ditch; the earth does not drop away from the outside base of the wall, as shown. The whole work is now covered with a dense growth. Relic hunters have made several attempts at excavating the mound, but it is reported that they have never found anything.

The elliptical embankment and ditch, shown at N in Plate XXVIII A of Squier and Davis, has entirely disappeared, if, indeed, it ever existed. There is no indication that any such work stood at this place. On the opposite side of the ravine, however, in a corresponding position, is a similar structure not shown by Squier and Davis, which is no doubt the one intended, shifted on the map by an oversight. It appears on the map by Lewis. The ditch is now about 3 feet deep and the wall will average the same in height, as compared with the surrounding level. There is no mound within the circle; what appears to be such is due to weathering down of the margin of the originally level interior; it now measures about 50 by 100 feet. In the field about this structure is abundant evidence of an aboriginal village site, but the material is all superficial and is probably due to historic tribes; it is known that the Shawnees and Delawares had settlements somewhere in this vicinity. Near the west side of the gateway where the wall is now highest a cut 15 feet wide was made through the embankment, reaching from the interior ditch to the open ground outside, thus extending well beyond both margins of the wall, and carried into the subsoil the entire length. Nothing was found except solid uniform earth, with no stratification or change of color, thus proving that its construction was continuous. The excavation crossed a shallow depression, which was a natural swale existing before the wall was begun. This made more work for the builders than if they had gone on either side of it; but they appar-

ently wanted the wall along that line. No trace of palisades or structure of any sort appeared. Beneath the center of the embankment was a barbecue hole 3 feet across and a foot deeper than the natural surface, filled with burned earth and stones. It had been abandoned before the wall was begun. At present the inclosure forms three sides of a rectangle, open toward the river, with the two angles rounded. Lewis shows a fourth wall along the margin of the terrace, but it can not now be seen. The length of the three sides, altogether, is about 700 feet.

Between the "Old Fort" and the river Squier and Davis show three small mounds; Lewis notes only two. The one he omits has been leveled and a dwelling stands on the site. The others are much reduced by plowing, the larger being 2 feet high with indeterminate outline. A circle 15 feet across was laid off around its highest part and all the earth within this removed into the subsoil. At the bottom was soft mud on hardpan. A shallow depression at the middle, filled with grayish earth, seemed to be a grave but there was no trace of bone nor any object which would indicate that a body had been placed here. Some burned earth and rocks were on the surface.

Several mounds are on the high terrace below the "Old Fort." Permission could be obtained for opening only one of these. It is the most western of the group, on the line between Greenup and Lewis Counties, and was about 3 feet high, though much worked down. The owner had plowed out two skeletons, of medium-sized individuals with very thick skulls. A circle with a radius of 10 feet was laid out on top and all the included earth removed. On the east side, a foot from the bottom, was a skeleton, and at the original surface, on the west side, another, both with heads toward the east; the bones were decayed and had partly disappeared. Fully two wagonloads of rough stones weighing from 10 to 50 pounds, carried from the hills half a mile away, were in the excavated area, apparently thrown in at random. Three implements were found loose in the earth, all of them but little altered from their natural form of fine-grained, waterworn sandstone, river gravel. One was an angular fragment with several deep, curved grooves from use as a grinder and polisher; one was rudely triangular in form with the small end polished by use and a deep groove cut diagonally across one face for holding a handle; the third, a thin flat slab with a polished sharp edge, used as a hide dresser. At the center was a grave dug 6 or 8 inches into the yellow clay. No trace of bone remained in it or worked object of any sort.

All the small mounds in this territory have been examined more or less by local collectors; they yielded nothing of any moment.

## THE SO-CALLED "BEAR" OR "EFFIGY"

Neither the map by Squier and Davis nor that by Lewis shows correctly the parallel walls extending southwestward from the "Old Fort." Both represent the walls as ending at the bank of the ravine near their actual termination at the west. The northern parallel has been destroyed at this end by the railroad; the southern wall descends the slope of the ravine, crosses the level space between the two little streams which unite just below, and ascends the opposite bank. As constructed, the two walls were joined at their western extremity by a loop which extended beyond them toward the north, and on a sketch somewhat resembles the handle or butt of a pistol. These portions are still very distinct and it is singular that they should have been overlooked or omitted from the maps. Squier and Davis show the walls as terminating several feet from the eastern brink of the ravine, although they say in the text that the walls follow the inequalities of the surface; and on page 79 say traces of the walls can be seen on the declivities of the ravine. Squier and Davis make no reference to the "Effigy" within the curve at the junction of the walls, nor is there any indication of it in their illustration. No doubt it originally had some such shape as that ascribed to it by Lewis; although persons now living in Portsmouth, who were with Lewis at the time he made his survey, were unable to see it exactly as it appeared to him. It has been plowed over so often that it is now only a slight rise without any definite outline, and would be regarded as only an ordinary mound of elliptical outline. However, as portrayed, its close resemblance to the Tremper mound, 5 miles north of Portsmouth, in which such extraordinary discoveries were made by Mills, led to the hope that somewhat similar results would reward its excavation.

A fence crosses at the "flank"—to continue the use of the "Bear" simile—diagonally toward the rear, in such manner as to cut off the "hind leg" and a small portion of the "body." The small part beyond the fence is densely overgrown and could not be followed; all from the "flank" forward to the extreme end was thoroughly excavated, the area removed being 57 feet long by 35 feet at its greatest width, which included the "fore leg." There was not the slightest line of demarcation at any place between the artificial portion of the mound and the earth upon which it was built. Only an occasional fragment of charcoal, a flint chip, a scrap of pottery, or a dump containing enough burned earth, bone, or rock to be distinguishable, furnished any evidence of human handiwork in its construction. Test holes were dug at several places in the encircling ditch and in the field around, reaching in every instance the same yellowish sandy subsoil that was found under the mound. The excavation

was kept well down into this, and at every point was fully 18 inches below the deepest artificial object found. At about the center of the mound was a depression 7 by 2 feet, the bottom a few inches below the general level of the floor of the excavation. It was clearly a grave, but there was no trace of bone in it. Loose in the earth was a small piece of very coarse pottery; a thin flat piece of sandstone with a double-bevel edge, used as a hide dresser; and a piece of hollow clay-ironstone, resembling fossilized wood, which had one side broken away to give access to the hollow interior, probably a receptacle for some sort of charm.

There was absolutely nothing else in the mound, and no apparent reason for its construction.

## MOUNDS IN PIKE COUNTY, OHIO

### NEAR PIKETON

The numbers refer to the order in which the mounds were excavated.

A mile south of Piketon, on the Vanmeter farm, is the town cemetery. In this is a large mound having three small ones connected with its base. These are figured by Squier and Davis as being at the end of a long embankment, now obliterated, running southward from the so-called Graded Way.

In the same field as the cemetery are three other mounds. All were explored.

**MOUND 1.**—This is 75 feet in diameter, not including 4 or 5 feet of wash on every side, the summit being 15 feet above the surrounding level. When the center was reached the bottom of the trench was 16 feet lower than the top. In all large mounds the lowest point is below the outside surface of the ground, for two reasons; there is an accumulation of soil around, and a subsidence under the structure due to the weight of the material.

There was a core of black earth such as is found in all low or overflow bottom lands in the vicinity. This was about 10 feet high at the center of the mound. It was closely packed, requiring almost constant use of a pick. Scattered through it at irregular intervals were small masses of muck; ashes, charcoal, and earth, mingled; fragments of bone, burned or unburned; pieces of chipped flint or broken rocks; all of which had been dumped in at random in the course of the work. Little masses of earth, each as large as a man could easily carry, were often easily traceable.

Over this core of dark earth had been placed a capping of yellow clay, the subsoil of the fields. This was 6 feet thick at the top and 8 feet on the sides. Apparently it had been spread to the latter thick-

ness over the entire mound and had worn down at the top. The line of demarcation between the two earths was very feebly marked, there being a space from 1 to 2 feet thick in which they were mingled, sometimes one being in excess, sometimes the other.

From 2 to 3 feet under the surface, at the top of the mound, were traces of five skeletons. Four were adults, one a child of 12 or 13 years. The last had been buried in a folded position; the others were so decayed that the method of interment was uncertain. These were, of course, intrusive.

An arrow point made of antler and the end of a bone perforator were found in the black earth.

At 15 feet from the center, between the clay and the black earth, were traces of a skeleton, extended, head west. Four feet under this, or 3 feet above the bottom, was the solid and heavy shaft of a human femur; both ends were gone, apparently from decay, although the fragment had a remarkably fresh appearance. Near it were two small pieces of skull and a bone from a hand or foot. Five feet west, on the same level, was a large fragment of skull. A layer of wood, with some ashes, lay below these scattered bones, and another layer of wood above them; it could be traced for several feet each way, gradually running out. The earth around it had not been disturbed in any way; there were woodchuck burrows in the upper part of the mound, but none of them reached down this far. Above the last piece of skull three small logs had been laid. They reached to the east limit of the bones and extended into the west side of the trench, one of them 4 or 5 feet, the others only about a foot. The indications were that a layer of ashes had been sprinkled, wood or bark placed on this, then the bones, and above them another layer of wood or bark, which was upheld by the poles.

At the bottom of the mound, in the middle of the trench, was a layer of ashes 4 feet across, and above it a layer of charcoal, both not more than an inch thick. They had not been burned where found, but were carefully spread here. Resting on them was decayed wood, including oak, mulberry, walnut, and perhaps other kinds. Toward the north and west this deposit extended beyond the limits of the trench; on the east it merged with the remains of a large fire. The ground was burned 4 inches deep, under an ash bed of the same thickness, which was from 6 to 7 feet across. There was no charcoal among the ashes; but they contained a great many small fragments of bone and mussel shell, much burned. On the northeast edge of the ashes was charcoal, reaching north; it led to the remains of an oak log 10 inches in diameter and 6 feet long, both ends of which were charred, the intermediate portion being decayed. It reached to a fire bed similar to the first, as if it had been used to feed both



fires at the same time. From here, a layer of decayed wood and bark, 4 inches thick in some parts, reached west and north beyond the limit of the excavation. In places it showed a thin layer of bone, entirely decayed and as soft as ashes, undoubtedly all that was left of a body or bodies.

At varying levels around the central part of the mound, reaching to 6 feet above the bottom, were similar but much smaller deposits of wood and bark, some of them containing fragments of bones denoting burials.

On the west side of the trench was a bed of ashes and charcoal, apparently scraped away from a fire bed to the north. The latter was 3 feet across and 3 inches thick; it was full of broken bones, some of them burned, others not. Among the latter were pieces as hard, white, and solid as if quite lately put in; with these was part of a human femur which had been partially cut, then broken off, as one would cut a hard stick until able to break it in two. The break was an old one, that is, it had been made long enough to show marks of wear before being placed here. It was the only human bone recognizable.

The most interesting discovery in these ashes, aside from the cut femur, were three little packages of spherical copper beads. These had been thrown into the ashes after the fire had died down. They were wrapped in successive layers of cloth, bark, and skin, which showed no marks of fire; the string was still in them. Entirely covering this ash bed was a thin coating of some bright red substance, probably ochre or hematite.

Below the 6-foot level were more than a dozen small logs from 5 to 15 feet long.

MOUND 2.—This, composed of yellow clay, was 28 feet across and 2 feet high, after many years of cultivation. Near the apparent center was a small hole filled with black earth, as if a pole had been placed there and allowed to decay.

In the construction a pit had been dug through the soil and subsoil, into the underlying gravel. In this had been placed a body, the skeleton measuring 6 feet 4 inches in length. The bones were very large, even for a person of this height, and the processes for muscle attachment were rugged and prominent. It was extended, on the back, head northeast, the right hand resting on the neck, the left hand across the pelvis. By the right elbow was one valve of a very large mussel shell; at the side of the left foot were two valves of a much smaller shell, both perforated. On the breast were two bear's tusks with the roots ground off at an acute angle. Among the lumbar vertebrae were four perforated pearls; a number of molars of some carnivore, with the roots more or less ground off; and the teeth of some small mammal. At the left side of the skeleton

were the remains of a child not more than 2 or 3 years old. On its breast was a slate gorget with two perforations.

The bodies were covered with clay, on which was a layer of gravel, both probably that which was removed in digging the grave, but with their relative positions reversed in putting them back. The gravel extended beyond the margin of the pit, reaching a diameter of 12 to 14 feet. Over all, clay from the field was piled.

**MOUND 3.**—After long cultivation this measured 4 feet high and 45 feet in diameter. It was composed principally of yellow clay, mixed at one side with a little sand. Six feet east of the center, 2 to 3 feet down, was a large mass of burnt bone. Two feet west of center, 18 inches down, was a similar mass, in which were found two pieces of hammered copper half the size of a slate pencil, one of them 2, the other 4 inches long. There were also two gorgets, one of shale, unperforated, the other of banded slate with one perforation. Four feet west of center, 2 feet down, were traces of an adult skeleton, extended, head north; there was nothing with it.

#### NEAR JASPER

**MOUND 4.**—On top of a hill 250 feet high, the first one north of Jasper, is a mound 50 feet across and 4 feet high. A trench was run in from the northwest. Almost at once charcoal appeared; the layer varied from half an inch to 3 inches thick, extended beyond both sides of the trench, and ran out near the center of the mound. In this charcoal were several pieces of charred cloth, between flakes of shellbark hickory bark, all being protected by flat stones lying above it. It did not appear to be an intentional deposit. In the central part of the mound there was more rock than earth; the stones were not arranged in any sort of order, but were thrown in as a part of the structure. Most of the earth was a very tough and compact clay, extremely hard to remove. The top of the mound was covered with soil. The ground beneath was burned red to a depth of 2 or 3 inches in places. Except the cloth, nothing was found that bore evidence of handiwork.

The construction was apparently as follows: A large fire had been made where the northern half of the mound stands. While this was still burning, rocks, some of them weighing 150 pounds, and clay had been thrown on. The mound was then extended toward the south with earth, rocks piled over this, and the mound then completed with surface soil.

**MOUND 5.**—This is on the same hill as the last. It is on slightly sloping ground, the summit being on the same level as the surface 50 feet to the south. On this side is a "causeway" or raised path

30 feet long, formed by throwing in a pile of large stones at random and covering them more carefully with a layer of smaller stones. It is 20 feet wide at the base and 3 feet high.

A 10-foot trench was carried into the mound from the north side. At 25 feet from center, the mound being 65 feet in diameter, large rocks appeared on the bottom, and increased in numbers until at 8 feet north of the center they were 4 feet deep. At this point began a layer of rotten wood and ashes. Two feet within this was a skeleton, folded. At the center was another, extended, on the back, head south-east. All the space between these two and for 4 feet beyond the last was filled with a mass of decayed bone from 6 to 7 feet wide. These were the remains of skeleton burials; the water soaking into them and the weight of the rock resting on them had reduced the whole to the consistency of mud or wet ashes, so it was impossible to tell how many had been placed here; but it was evidently a communal burial, made in this manner: Over a space 16 feet long and more than 10 feet wide was spread a layer of wood or bark; ashes had been sprinkled on this and a pile or layer of skeletons placed on the ashes, with a body at the north edge and one at the center of the mass. This was covered with earth, about which was placed a shelter or protection of wood. A mound of rocks was next built over the remains to a height of 4 feet and a diameter of 40 feet. On top of these 4 or 5 feet of earth had been piled; as the mound had been plowed a number of times its exact altitude is uncertain.

On top of the hill on which Mounds 4 and 5 are located cup stones are numerous; 40 or 50 were found. Several had been thrown in with the stone pile in Mound 5; so they could not have been highly valued.

#### NEAR WAVERLY

**MOUND 6.**—This is a mile and a half south of Waverly, on the Piketon road. It has been plowed over for three generations, leaving it less than 4 feet high and 90 feet across; the original diameter was about 50 feet. It seems to have been built by several parties working from different places at the same time; for the dark sand, reddish sand, clay, and black muck entering into its composition are mingled in confusion in some places and form irregular masses in others. At 14 feet out, 30 inches up, were traces of a skeleton, extended, head east. At  $5\frac{1}{2}$  feet out, in a very hard black sandy muck, was a skeleton, extended, head west. It was not more than 5 feet long, but the bones were unusually large and solid. A third skeleton was lying near the center. All these bones were so decayed that they could not be removed. Near the center was an ash bed  $4\frac{1}{2}$  feet across; the earth under part of it was burned red and hard. Unconsumed ends of poles and logs were in the earth around it.

**MOUND 7.**—This is near the one last described. It is now 10 feet high and 100 feet across the base. It was formerly nearly twice as high, but has been scraped down so that it might be plowed over. A trench from 6 to 10 feet wide was carried in from the southeast side to 4 feet beyond the center. In this limited space were nine holes each 8 inches across and extending downward from 22 to 36 inches. In all of these was fine earth, with some ashes, and a few of them contained some fragments of bone, pottery, and shells. These contents rendered it improbable that they were postholes, though no other purpose for them can be imagined. The first one was 19 feet from the center; at the same place began a streak of mingled ashes, burned earth, and charcoal, nowhere more than an inch thick. They had not been burned here, but were scattered, no doubt, from a fire bed around the center, where the earth was burned to a bright red to a depth of 4 inches; as the ashes accumulated they had been raked away to every side, forming a bed 13 feet long and up to 4 feet wide. Above them, generally with a few inches of earth intervening, was a very thin layer of bark or wood. Above this, around the center, was a mass a foot thick in places of decayed wood, apparently logs or large poles. Cottonwood and white walnut were recognized among them. Only one skeleton was found in the mound; it was that of a young adult over 6 feet high. The weight of the earth resting on it had crushed all the bones, only the central portions of the limbs retaining their shape. It lay on the original surface and was covered with three or four layers of bark. Nothing had been buried with it. At the time of his death he had only 22 teeth remaining, and of these 13 were more or less touched with decay. It is a matter of common belief that all Indians were, and are, blessed with full sets of sound, solid teeth. So far as the Mound Builders are concerned, this is not true of 1 per cent of all that have ever been exhumed.

**MOUND 8.**—On the Clough farm, north of Waverly, are three mounds, two of which were opened. The first, after long cultivation, was 4 feet high and 75 feet across. A trench 7 feet wide was run in from the southwest side and carried past the center. A number of holes were found, reaching to various depths; some of them had been dug, others resulted from the decay of stumps which were here when the mound was begun, or shortly before that time. At 10 feet a layer of charcoal was reached; it contained numerous fragments of small sticks, a few pieces of pottery, and two valves of mussel shells. The charcoal arched upward slightly so that at 4 feet it was a foot above the natural level; the interval filled with dark soil or loam burned hard on top, no doubt from the fire that produced the charcoal. Near the south edge of it, on the natural surface, was a thin deposit a foot wide and 2 feet long, burned until cemented

together as hard as mortar. Resting on the northern edge of this was the left arm of a skeleton, extended, head east. A foot north of this skeleton lay another, parallel with it; and 2 feet farther north a third, both of the latter much decayed. Near the skull of the last was the skeleton of an infant. A fire bed was at the heads and one at the feet of these skeletons. North of them was another over 6 feet across, the ashes and burned earth each nearly 4 inches thick. The charcoal layer came to the natural surface again at 14 feet from where it was first encountered.

MOUND 9.—This mound was 13 feet high and somewhat more than 100 feet across at the base; but as it had been much plowed down its real diameter was probably 75 or 80 feet. A trench 10 feet wide was begun at 35 feet out from center, on the south side; the bottom of the slope was 18 or 20 feet farther out. The material composing most of the mound was sand from the ridge of glacial material lying near by, on the north; there was some clay in it, but no gravel. For the first 2 feet it was easy to remove; below that, it was extremely compact, requiring constant use of the pick. It was like working in sandstone; with two days of steady use, the steel point would be worn off of the pick down to the iron.

At 20 feet out from center were five holes nearly in a straight line across the trench. Measuring from the western one, which was just in the corner, being partly under the west wall and the face, the distances to the centers of the others were  $3\frac{1}{2}$ , 5, 8, and  $9\frac{1}{2}$  feet. They were about 8 inches across and from  $2\frac{1}{2}$  to 3 feet deep. A few fragments of bones were in the west one, a little charcoal in the east and middle ones, nothing in the others but very loose, light, dry, dark earth.

A peculiar feature about this mound was a streaked appearance of the sand which was first noticed about 30 feet out. The streaks were darker in color and harder than the rest of the sand, and very tortuous, though the general direction was practically horizontal. None were over an inch thick and they were apparently due to segregation of some constituent after the sand had settled. In many cases they inclosed or surrounded the lenticular masses of dumped material. At 20 feet out they were about  $5\frac{1}{2}$  feet below the top of the mound; toward the center they were a little nearer the top; and they gradually increased in number and distinctness down to the original surface.

At 24 feet out was a trench which extended to the depth of a foot into the yellow subsoil. This was dug before the mound was built, as the sand goes to the bottom of it, although none of it has settled into the holes mentioned above. This would indicate that the latter were for posts and that the ditch or trench was made to carry away

the water from a roof which they supported. If this be the case, the fact that the holes were filled with loose earth and that the sand above them was packed hard shows that the posts had been cut or burned off level with the ground before the sand was deposited. It is quite likely that if the work had been extended the outlines of a building could have been traced.

At 18 feet out, 3 feet below the top of the mound, was a hole with other holes either empty or with loose dirt in them branching out from it, the largest going toward the west and nearly parallel with the top of the mound. There was no trace of wood in any of these holes except the small roots from trees or bushes growing on the mound; but the cavities are exactly such as would result from the entire decay and disappearance of a stump and its roots. If so, it proves that the work of construction was not continuous, but that the mound had been built to this point and then left for several years, as indicated by the size of the hole. Evidently the tree had been cut off, as there was no mark of it in the hard-packed earth above.

At 16 feet out were two extended skeletons, with heads to the west of south, lying in contact. Most of the larger bones, so far as they could be examined, were covered with a dull red substance, apparently ochre; when laid on a hard surface and worked with a knife blade it assumed a waxy consistency. This may have been sprinkled over the bodies and settled down on the bones after the flesh had decayed; but as very little of it was in the earth around them it would appear that only the skeletons had been buried. They lay on a very thin deposit of ashes, directly on the original surface; one was a little more, the other a little less than 6 feet long.

The tortuous streaks became more and more of lenticular form as the trench was carried in, and at 10 feet out were nearly all of such outline.

At 15 feet out, on the west side, began a streak of mixed earth, ashes, and charcoal, which was very plainly on the natural surface. Except under the skeletons just mentioned this was the first place where it could be identified with certainty. Elsewhere the sand and the surface earth being practically identical no line of demarcation could be made out.

At 12 feet out, on the west wall, was a hole beginning at the original level and going down 5 feet. It was filled with loose, dark earth and was of almost uniform diameter, about 7 inches, to the bottom, terminating in a rounded point as if made by a post that had been burned or roughly cut off. There was nothing in it; the surrounding earth was so hard that a pick could not be sunk into it more than 3 inches, so those who dug it could have done so only by keeping the ground wet while they were working.

At 11 feet out, in the mixed streak, began a layer of yellow sand like the subsoil, which within a foot was 5 inches thick. It extended with a thickness of 3 to 5 inches across the 10-foot face of the excavation to within 2 feet of the east wall, where it began to taper out, and disappeared just at the other corner. The streak on the bottom extended across into the east wall. How far it may have reached under either wall was not ascertained; it extended 13 feet in the line of the trench. There was no charcoal in it on the east side, though it was darker than the material above or below.

Ten feet out, on the bottom, was a small pile of burned bones, with some charcoal; this merged with an ash bed to be described later.

Five feet from center, on the west side of the trench, began a mass of dark soil, which rose to a height of 5 feet so abruptly that it must have been packed or "puddled" while wet. It was too compact to be removed with a shovel. A thin layer of charcoal was spread over the top. The sand streaks curved from every side to a rounded point 2 feet above it. The black mass was about 7 feet across; it did not reach to the east wall of the trench.

The charcoal and bones noticed at the 10-foot face were at the edge of a bed of ashes, which reached to the east wall, and ran 3 feet under the west wall. It was about 5 feet wide at the middle part, and had an elliptical outline, tolerably regular except on the west side, where it widened somewhat. Beneath it, at 7 feet from the center and 4 feet from the west face, was a hole a foot deep and 10 inches across, the sides and bottom rough as though gouged out. It was filled with clean white ashes, mingled with a little charcoal, and packed so hard as to be difficult to remove with a trowel. A foot south and 3 feet east from this was another hole, elliptical in outline, about 8 by 10 inches and 16 inches deep. It was filled with very loose dark earth, in which were two or three bits of charcoal.

Upon removal of the large, compact mass of black earth, which formed the core of the mound, there was disclosed a pit 10 feet from east to west and a little more than 6 feet from north to south, with a depth of 14 inches. The sides were nearly straight, with a slight inward slant; the corners were rounded. The sides and bottom were rough and uneven as if gouged out with rude tools. The entire bottom, which was somewhat depressed at the central portion, was covered with ashes, over which a thin layer of bark had been spread; around the margin of the pit was a lining of wood or bark from 2 to 4 inches thick; this was reduced to a dust as soft as loose flour. In this grave were two skeletons, extended, on the back, heads directly west. One, 5 feet 4 inches long, of a woman, lay along the center. The teeth were very much worn, some of them down to the roots. The middle lower incisors, while showing no trace of decay, were cut nearly off close to the gum as if they had been sawed hori-

zontally with a thread or fine wire. The right arm and hand lay by the side; the left hand was under the pelvic bones of the other skeleton, which lay north of the first, almost against the edge of the grave. This was of a man about 6 feet tall, evidently young, as the teeth were only slightly worn; they were white, smooth, and hard, but five or six of them were beginning to show marks of decay. The left hand was lying on the pelvis; the right arm across the middle of the body.

The man's skull was somewhat damaged by pressure of the earth. The other skull was perfect and very solid. It lay in a mass of ashes 6 inches thick, the western extension of the ash bed noted before the grave was reached. They extended on to the north, around both skulls, the man's lying at their margin. The ashes had been carried here after the bodies were placed; they contained fragments of charred bones. The sand composing the mound dipped into so much of the grave as was not filled with the black earth.

At the center,  $2\frac{1}{2}$  feet higher than the original surface, were fragments of a badly decayed skull; it lay to the east of the feet of the bottom skeletons. Traces of bone, soft from decay, occurred eastward from it to the side of the trench. They were apparently of an adult who had been buried parallel with those below it.

No worked objects of any sort were found with any of the skeletons. At 5 feet north of the center,  $5\frac{1}{2}$  feet above the bottom, lying loose in the earth, was a bracelet, elliptical in shape, made from a copper rod as large as a small lead pencil, the ends being cut or rubbed square and brought into close contact.

It is apparent that a building of some kind stood on the site of this mound, as the holes and the black layer of ashes, earth, and charcoal could not have remained intact unless protected from the weather. A fire had been built and most of the ashes placed in a receptacle until needed. The grave was dug, the earth from it being thrown out over such ashes as were left on the ground. Then ashes were sprinkled very thinly on the bottom of the grave, bark laid down, and the bodies put in. The ashes gathered up were piled along the right side of the body at the center, the greatest thickness being about the head. They were continued to the west end of the grave, north to a point north of the other head, but not touching it, and also spread south to meet those not removed from the fire bed. Next, loose black earth was carried, probably from a swampy place in the creek bottom, and piled over the bodies as high as it could conveniently be lifted. After this the mound was erected. The upper skeleton at the center had been placed there after the black earth was deposited.

Years before this exploration a shaft had been sunk from the top of the mound by relic hunters. They came within 2 inches of



the skull above the bottom near the center and to within 6 inches of the feet of those in the grave. The hole they made had partially filled up, but enough of a depression remained to catch considerable water, which, soaking down, softened such bones as it reached.

### ABORIGINAL FLINT QUARRIES

The siliceous stone commonly called "flint" is found in some of its forms in association with the limestone deposits in geological formations of different epochs.

There is a tendency on the part of geologists to restrict the name "flint" to that variety of the stone which occurs so plentifully in the chalk beds of western Europe, especially in England and France. Before the invention of percussion caps this was used to make a spark for igniting the powder in firearms. In large pieces it appears black, but in thin flakes it more resembles smoked glass. It does not occur—at least it has not yet been discovered—in the Western Hemisphere, and geologists prefer, for distinction, to apply the name "chert" to that which is found here. However, the popular term, derived from the former use of "flints" for guns, has come into such common use that its status now seems to be firmly established.

The European variety owes its origin mainly to spicules of sponges which flourished in the seas of the Cretaceous period; but, in America at least, most flint or chert, using the terms as synonymous, results from the life and activity of microscopic animal and plant life which flourished in shallow basins or depressions near the shore line of the ocean, partially inclosed by projecting land areas that would allow free access of the salt water but would shelter the little bay from disturbing waves and currents. Limestone also forms in these conditions, but is the product of larger forms of life which abstract lime from the sea water and convert it into supporting material, either as skeleton or as shell. The diatoms and animalcules secrete siliceous substance held in solution, in the same manner that mollusks and corals secrete lime, but the former, being infinitely smaller, the resulting stone, when formed in clear water, is so close-grained as to appear homogeneous like glass or agate. The finer product is usually deposited in the deeper portions of the inlet, at some distance from the margin, beyond the line to which currents can transport sediment stirred up by wave action on the beach or the mud and silt carried down by streams flowing in. Nearer land, the chert, owing to the admixture of such foreign elements, becomes granular or porous, forming buhrstone or even assuming a spongy or cellular structure from the inclusion of shells and other mineral substances which are afterwards dissolved by the water and disappear, leaving cavities where they existed. In either case the chert thus formed may be

stratified or massive, like the limestone with which it is connected, or it may be in nodules, concretions, flattened disks, or irregular thin masses which roughly correspond in their position and direction with the stone with which they are interstratified. The principal forms—disks, nodules, or concretions—frequently conform to the stratification of the stone containing them; that is, they are arranged in strata or planes which are practically on the same level or slope as the matrix. Often, however, they are distributed at random, as if they had grown promiscuously. The nodules or concretions may be symmetrically spherical or ellipsoidal, but are usually more or less flattened, even to thin disks or sheets. The outer portion of both the massive flint and the nodules, to a varying depth, is usually grayish or yellowish in color and granular or chalky in appearance as a result of the disintegrating action of air and water which penetrate to them. This destructive influence is more pronounced by far upon the inclosing limestone than it is upon the chert; consequently the former is gradually dissolved and carried away by percolating water, while the chert remains in the clay which was diffused through the limestone; and this being less susceptible to corrosive influences, settles down as space is made for it and remains at the bottom when the stone is carried away.

The coarse varieties of chert usually have a yellowish tinge, due perhaps to oxidation of the included iron. Those of finer grain, whether massive or nodular, are usually gray, ranging from almost white to almost black beneath the weathered exterior; while the very compact forms present a great diversity of coloring through every shade of black, brown, yellow, red, blue, and sometimes purple or green, from minute quantities of included iron, manganese, and other substances entangled in the mass while it was forming or diffused through it after it had hardened. These colors may have definite limitations, may shade into one another, or may mingle indiscriminately, so there will often be several tints within a small space. Occasionally coloring matter is entirely absent, in which case the stone may be pure white if opaque, or clear like chalcedony if translucent. In the last, included carbon or other dark substances may give it the appearance of moss agate.

While silica is the most abundant mineral in the earth's crust so far as this has been penetrated, very little flint or chert, comparatively speaking, is found as a distinctive rock until the limestones of the Devonian era are reached. In these it appears in considerable amount as irregular flattened disks of various sizes, sometimes segregated, sometimes merging with others in layers measuring several feet across; but it never appears in a continuous stratum, and is never more than a few inches thick. It is generally coarse, much seamed

and cracked, easily shattered, breaking in any direction, and soon falling into fragments when the inclosing rock is dissolved. Owing to these defects, it was not adapted to the needs of those who were compelled to use stone implements, though occasionally a piece of it might be found which under stress of necessity could be converted into a serviceable tool or weapon.

Ascending the geological scale, no more chert is found until the rocks of the middle Carboniferous or "Coal Measures" are reached; the strata lying in the upper divisions of the Mississippian and lower portions of the Pennsylvanian, to designate them according to modern geological nomenclature. Here conditions seem to have been especially favorable to the formation of chert; including in that term the varieties classified as "silica"; flinty limestone (a mechanical mixture of lime and silica); buhrstone; flint; jasper; hornstone; basanite, or lydite, either glossy or dull; novaculite; chalcedony; or, in banded or mingled coloration of the last, as "agate." "Silica" is a common name applied to a stratified rock, each layer being practically uniform in thickness, though some beds are heavier than others. As it resembles ordinary limestone deposits in depth and extent, it is supposed to be not always an original formation, but to be due largely if not entirely to a process of substitution or replacement, limestone being dissolved and carried away by percolating water which leaves silica in its place. Chalcedony and novaculite are usually formed under open air by evaporation of water from springs, though the latter is sometimes a precipitate. Agate and allied stone is similarly formed, in crevices and cavities of massive rock. Such of these materials as can be readily converted by aboriginal methods into implements or weapons are grouped in popular parlance under the generic term of "flint." They are found principally in one geological horizon, which in the earlier Ohio surveys is called the "Hanging Rock limestone," from its marked development in the vicinity of that town, formerly an important iron-manufacturing town in Lawrence County on the Ohio River. The equivalent of this formation, bearing various names according to locality, occurs in southeastern Ohio and adjacent parts of West Virginia, reaches across eastern Kentucky and Tennessee, into northern Alabama, and then, on the western flank of the great central limestone and shale region determined by the "Cincinnati uplift," passes across western Tennessee and Kentucky into southwestern Indiana, southern Illinois, and finally, crossing southern Missouri and northern Arkansas, extends into Kansas and Oklahoma. This is the vast "flint area," where siliceous stone under one or another of the names listed above is found in abundance. It is not continuous, nor does any one deposit extend unbroken over an area more than 15 or 20 miles across. The conditions necessary

for its formation existed only in restricted localities, often widely separated. Even with these limitations, only a very small percentage of it could be utilized by primitive man. He needed stone that was extremely hard, homogeneous or nearly so in texture, fairly easy to chip into desired forms, and capable of receiving and retaining a keen edge. A prime requisite was that it should still retain the "quarry water"; when this evaporated the stone became brittle and would shatter under a blow, or fracture in unexpected directions when subjected to pressure. Consequently, "flint" picked up on the surface where it had been exposed for any great length of time to atmospheric influence would not be suitable for the needs of the arrow maker. He must go down into the undisturbed clay or the unaltered stratum to obtain stone possessing this indispensable quality.

Here and there, in all the States above specified, are found places where extensive excavations were made; either pits dug from the surface or quarries carried into the sides of the hills. Several of those reported have been carefully investigated; but no doubt there are many sites as yet unknown or overlooked, where diggings exist.

It may be added here that in other portions of the country, both east and west of the Mississippi Valley, flint—using this term in its ordinary meaning—is not to be found. In such localities recourse was had by the aborigines to other forms of stone; as quartz, quartzite, argillite, rhyolite, in the east; obsidian in the west.

Omitting further mention of such sources, this report will be confined to a description of the sites which have been examined for the Bureau of American Ethnology, beginning at the north and extending toward the south and west.

#### FLINT IN COSHOCTON COUNTY, OHIO

##### NEAR WARSAW

*Metham place.*—Three miles west of Warsaw, on the right (south) side of the Wallhonding River, which here makes a sharp bend to the north, east, and south, is the estate of Col. Pren Metham. His residence stands on a terrace of diluvial or glacial origin rising some 50 feet above the level of the river-bottom lands. A ravine putting into the river at this point has its beginning on the high land a mile south of the house. A few hundred yards to the eastward is a similar ravine, nearly parallel with the first. The ridge between these two ravines, out nearly to its end, carries its crest but very little lower than the level at which the ravines have their origin. At the termination of the ridge the slope on either side and the end facing the river are so steep as to be difficult of ascent. The summit of the ridge is narrow, and level for a sufficient distance back from the point to contain an area of about 5 acres, then it suddenly rises to an elevation 25 or 30 feet higher. Close to the surface was a cap-

rock of chert, which held its place throughout the erosion that took place on either side, thus determining the peculiar form of the hill. The slopes are in timber and brush, growing out of débris in which there is less of earth than of chert, which is in a fragmentary condition. The summit is covered with grass and weeds. Colonel Metham, who made a careful study of conditions when the tract was placed under cultivation, found satisfactory evidence that the aborigines had begun at the outcrop on the western side and dug out all the chert in the 5-acre area, throwing the débris behind them as the work progressed, and thus leaving little pits and hummocks over the entire surface. Owing to farming operations through many years, these inequalities of surface were no longer visible at the time the field was set in grass. There seems to have been much wastage, as many large blocks which are unfit for working are scattered over the top and slopes. Along both sides, facing the ravines, the outcrop is visible in places for some distance back from the worked area; but the dense growth renders it impossible to ascertain whether any quarrying was done.

Most of the flint is gray, ranging from almost white to almost black; but much of it is jet black (basanite), either dull or lustrous. The gray, being uneven or irregular in structure, is much less suitable for chipping than the black, which is very smooth and compact.

A spur projecting westward from the north end of the ridge commands a view of several miles up and down the Wallhonding Valley. On the extreme point of this, almost over Colonel Metham's house, is a stone mound which was fully 10 feet high before being disturbed by relic hunters. They report finding in it the skeleton of a man at least 7 feet tall. A few articles were with it, but nothing beyond the ordinary objects usually found in such tumuli.

*Meredith place.*—Adjoining Colonel Metham's on the south is the farm of Jesse Meredith, better known as the Crist place, having been for three generations in possession of a family of that name. From the main ridge a spur extends in an easterly direction; the residence stands at the extremity of the spur that ends abruptly at a valley through which passes the road from Warsaw to Mohawk village. On the north side of this spur the flint outcrops near the top of the slope. Along the outcrop, for a few rods below it, and up the rounded summit elevation until the overlying earth becomes too thick to be easily removed, are many pits, all large, and dug to a depth necessary to penetrate to the level of the flint. Occasional spaces along the outcrop seem to have been left untouched, but this appearance is probably due to earth having been piled from diggings on either side; in most parts the excavations are in the form of long trenches which extend continuously fully a fourth of a mile. On top

of the spur, near the end, where the depth of overlying earth is less, there are many pits, the largest about 100 feet across and at present 6 feet deep; its original depth has been much lessened by natural accumulation, and especially by having been farmed over for many years. It is reasonable to suppose that this entire portion of the spur has been quarried, though the dense undergrowth prevents this from being learned with certainty. The surface is everywhere covered with *débris*. On the south side of the spur the excavations rival those of the famous Flint Ridge in Licking County. All the flint has been taken out over a space of 5 or 6 acres. The existing pits, which are really not "pits" but merely spaces surrounded by the earth and rock which was thrown in piles over denuded spots as the work was carried on, are at present from 6 to 15 feet deep, according to their position relative to the slope of the hill; in fact, the depth of some of them may be much greater, as water stands in a few throughout the year and the bottom of these has never been brought to view; and all of them contain much muck whose thickness can not be estimated.

*McCullough and Davis farms.*—Separated from the Meredith hill by a deep ravine is a similar ridge to the southward. The western end of this is on the Meredith, formerly the Whittaker, tract; the eastern end of the spur belongs to John W. Davis. On the northern slope of the ridge excavation is continuous for nearly half a mile, along the outcrop as well as above and below it. No indication of work could be found higher up on the ridge, or on the south slope; but such evidence may exist, concealed beneath the dense growth. Very little acreage is now under cultivation on any of these ridges; most of it is still in forest or thickets, or set to grass, so the earth is seldom visible. On every knoll and ridge, wherever the ground is exposed by cultivation, by roads, or by paths made by stock, are signs of extensive workshops. This is especially the case on the Meredith and McCullough farms. Chips and flakes are found wherever the surface is bare on the former place; while on the adjoining spur the ground is thickly strewn with shop refuse over its entire length of about half a mile. Most of the flint on these two farms is gray, of all shades; but there is also much basanite, and a large amount showing varied stages of red, yellow, amber, pink, and white, sometimes fairly uniform but for the most part striped, mottled, and mingled; as well as a small quantity which more nearly resembles the so-called "honey-colored" flint of France than has been found anywhere else in this country.

#### NEAR WALHONDING

*Kelly farm and Lockhard farm.*—Three miles southeast of Walhonding, on the adjoining farms of Kelly and Lockhard, is a narrow

ridge extending in a general northeast and southwest direction for nearly a mile, with several spurs branching off from it at different angles. The crests of the ridge and of the spurs have practically the same elevation, the caprock of massive stratified flint which protects them from further erosion being covered with from 3 to 20 feet of earth. The vertical range of the stone could not be ascertained, but apparently it is not very thick. Beneath it is a sandy shale, which in turn overlies heavy bedded sandstone. The topography is quite broken, the region being a succession of hills and valleys, with very little land that is even approximately level; but there are no bluffs, and few of the hillsides are too steep for easy plowing. Ravines surround the ridge containing the flint on three sides. At various places along the tortuous outcrop, as well as on top of the hill wherever the coating of earth is not so heavy as to render its removal impracticable, comprising about half its area, are pits where the stone was sought. None of them are deep; indeed, the exact location of many of them can be determined only by the different character and appearance of the soil and vegetation and the greater amount of broken flint lying around. It would seem from a desultory inspection that the digging was done at random, as if many holes had been started and abandoned; but careful review discloses that the excavation was continuous over spaces measuring several rods across in any direction on top of the hill; while long trenches yet extend around the margin, the earth and broken rock being thrown in piles. At the outcrop, and in some places for a hundred yards below it, such work is still plainly to be seen. Before cultivation and consequent filling had begun more of this evidence could be found than now exists; and the quarrying seems to have been almost if not quite continuous entirely around the southern part of the ridge, with less of it on the northern side. When the superincumbent limestones were weathered away the flint on the present summit was protected from deterioration by the resultant clay covering, and the Indians dug directly downward for it.

A line closely surrounding the extreme outward limits of the quarrying operations would inclose a space of not less than 20 acres, and probably three-fourths of this was worked over. At this time fully 10 acres in total area is marked with excavations or with scattered refuse where all the desirable stone was taken away. Much of the flint was unfit for use and was left in and around the diggings. Such as could be utilized was carried to various places in the vicinity for working up; especially to knolls and ridges overlooking springs, which are found in several ravines.

In color the stone ranges from light to dark gray, almost black; occasionally there is a fragment of basanitè. There is no diversity of

coloration. Most of it is of coarse grain, uncertain fracture, difficult to flake or chip with accuracy, and consequently can not be wrought into delicate or artistic shapes.

#### FLINT IN LICKING COUNTY, OHIO

*Flint Ridge.*—The quarries at this place are so well known, through the publication of numerous papers relating to them, that no description need be given here.

Complete information regarding the locality will be found in the Report of the Smithsonian Institution for 1884; the Archæological History of Ohio (Fowke); Primitive Man in Ohio (Moorehead); and a special paper by W. C. Mills, published by the Ohio Archæological and Historical Society, Columbus.

#### FLINT IN PERRY COUNTY, OHIO

Within the corporate limits of the town of New Lexington are two small deposits of flint, one of them northwest, the other northeast of the courthouse. The latter has been much quarried for road metal; there were a few small shallow depressions, apparently aboriginal excavations, but these have been obliterated. The flint is from 4 to 6 feet in thickness, the variation being due to the unevenness of the sea bottom on which it was deposited, the top of the flint stratum being almost uniform in level. The stratification is irregular; in places there may be a foot or even more of solid compact stone; while within a short distance it will split into numerous seams.

The deposit to the northwest was quarried to a limited extent by the aborigines. The largest pit is 3 feet in depth and 28 or 30 feet in diameter, both measurements from the encircling ridge of earth thrown out in uncovering the stone. There are but few of these pits, all of them being contained in an area of about one-third of an acre.

To judge from what can be seen of the stone in the various cuts for streets, railroads, and quarry supplies, not more than 1 per cent of it is available for any other implements than arrowheads. It is seldom that a piece can be found free from included earthy matter, seams, cracks, crystals, or fossils, and large enough to be worked into a blade as much as 3 inches long. The unweathered portions of the stone vary greatly in both color and texture. Some of it is blue with clear chalcedony intermixed. Some is a glossy, velvety, smooth black. Some is blue-black with veins of crystal or chalcedony. Some is gray or drab. Much of it is brown, yellow, or grayish-black from oxidation or from carbonate of iron. In most of it iron, fossils, sand, or lime has weathered out, leaving the stone porous or spongy.



In various parts of central and southern Ohio have been found small arrowheads that appear to be made of this flint. They are abundant around the Licking Reservoir, and on some shop sites on the north side of that water flakes and chips of this or exactly similar material are as numerous as those of the "Flint Ridge stone" which occurs much closer at hand.

Excavations are feasible in only a small area; about 5 or 6 acres in the deposit toward the northwest and less than half that extent to the northeast. Beyond these limits the overlying earth is too thick to be penetrated by primitive methods. But the stone seems to have been restricted in amount when laid down, for within a hundred yards to the southward, at the level where it should occur, there is no sign of it. A few bowlders or "chunks" are found to the northward, but no continuous bed. To the east it disappears under the bed of a creek a fourth of a mile from the ancient diggings. The ledge where it is dug is 10 feet above the stream, with a descending slope in every direction. There is a workshop on the east end of the little knoll thus formed. Scraps, spalls, and fragments are numerous, but no flakes, few chips, and no "turtlebacks" or broken specimens in the few places where the sod is sufficiently broken by tramping of cattle to allow examination.

Among the "diggings" on Flint Ridge there are not fewer than 100 pits any one of which required more work in its excavation than all that have ever been found around New Lexington.

#### FLINT IN KANAWHA VALLEY, W. VA.

A stratum of black flint about 4 feet in thickness is continuous over a large portion of the Lower Coal Measures of West Virginia. Along the Kanawha River it extends from Elk Shoals, immediately below the mouth of Elk River, to a short distance east of Hawk's Nest. The shoals are caused by the flint stratum at its lowest level on the surface; but it is not visible here, being covered by the water and by the alluvium on either side. The dip of the rocks in this region is to the northwest at the rate of 35 to 40 feet per mile, which brings the flint to its final outcrop about 25 miles to the eastward. Its extent along the strike is not known; but it can be found in the river hills and in the ravines tributary to the Kanawha wherever it has not been buried by detritus from the weathered shales and sandstones above it. The underlying formation is a soft shale; and wherever a stream, large or small, cuts across it the flint forms a shelf over which the water falls in a clean sheet, the shale being cut back sometimes to a distance of 25 feet. The mountain sides are so steep that excavations from the surface to the stone are impracticable, or to Indians impossible; but all the creeks which cross it have their

beds lined with fragments, some of which will measure at least a cubic yard in volume. In no place does the stratum seem to be solid throughout its entire depth, but is in layers varying from less than an inch to fully 2 feet in thickness. The blocks in the streams are usually so weathered or checked with seams as to be unfit for the manufacture of implements: but much of it is as compact and as readily worked as that mined from a portion protected by soil. Should it be found desirable to secure blocks from the parent ledge, this could easily be done by breaking them off where a stream has uncovered it, digging into the hill if necessary. All traces of such work would be obliterated in a few years.

If any actual quarrying was ever done it was only along the extreme eastern outcrop, where the flint forms the cap rock; nothing of the kind could be found nor was it reported. Owing to the great abundance of suitable material to be had in the creek beds or at the falls where the flint crosses the streams there would be little need for such quarrying.

Near the top of the mountain 2 miles north of Ansted is a spring known as Indian Spring, flowing off of shale underlying the flint. A level bench or terrace at a little lower level and to one side of the spring is said to be covered with flint chips, but the dense vegetation effectually conceals them.

On top of the mountain above Powellsville, 5 miles from Mount Carbon, near a large "bear wallow," is a little knoll on which chips are found.

At the mouth of Kellys Creek, 20 miles above Charleston, and of Hughes Creek, 4 miles farther up, are evidences of much flint manufacturing.

Between the mouth of Kellys Creek and its head where the ledge crosses—about 9 miles—there are thousands of wagonloads of flint blocks in sight; and in places where the bottom is 300 or 400 feet wide the ground is filled with such blocks as deep as any road or stream has cut. The same is also the case along other creeks, the flint resisting erosion and gradually settling to lower levels as the strata above and below are disintegrated and carried away.

Practically all of this Kanawha flint is coarse-grained and objects made from it are mostly rough and rather thick as compared with the other dimensions. Thin or delicate implements can not be chipped from it, though it is well adapted for hatchets, digging tools, and other purposes not requiring keen or smooth edges.

#### FLINT IN CARTER COUNTY, KY.

Carter is the southern of three counties which form the northeast corner of Kentucky, between the Ohio and Big Sandy Rivers.

For rugged and picturesque scenery, and remarkable geological and erosional features, it is not equaled by any other county in the State.

From a point on the Ohio near the mouth of Tygart River a high ridge winds its way southward and westward into Rowan County, forming a divide between streams which flow into Licking, Little Sandy, Tygart, and Kinniconick Rivers. One peak in this range has an elevation of 900 feet above its base. A branch of the Chesapeake & Ohio Railway from Garrison 12 miles west of Portsmouth, passing through a depression in this hill, finds it necessary to use a grade of 212 feet to the mile. The railroad extends a distance of 20 miles to Carter City—customarily shortened to Carter—where the Oligonunk caverns are located.

Four miles to the south and southeast of Carter, within a radius of about a mile, are three natural bridges, each one of them larger in some of its dimensions than the famous "Natural Bridge of Virginia"; four caverns, from one of which the explorer, after scrambling and clambering through mud and over huge rock masses for a distance of 4 miles, is glad to find himself, weary and famished, emerging into daylight through a large opening in the side of a cliff, not more than 200 yards from the place where he started in; a rock arch, narrow and symmetrical, separated by a chasm from the hill behind it, with its highest inside point corresponding to the keystone having an elevation of 115 feet above the débris which has accumulated at the bottom, and 150 feet above the stream which flows a few yards away; a large creek disappearing in a crevice at the foot of a high hill and coming out on the other side nearly a mile from the place where it entered; the gorge of Tygart, where the river flows between vertical walls 350 feet high and at places not much more than that distance apart at the top; slopes rising steeply from the river to the summits of peaks and ridges 600 to 700 feet above the stream, to drop off into deep valleys on the other side; the "falls," really a cascade 19 feet high, but of unusual symmetry; the "loop," where the river after a circuit of 7 miles doubles back to such an extent that a man can throw a stone across the isthmus; the Tygart itself, one of the crookedest rivers in the world. The word "Tygarts" would be more appropriate than "meanders" to express the extreme of divagation or indirection.

The north end of Carter County projects as a broad wedge or triangle between Lewis and Greenup Counties. In this area, within 5 or 6 miles to the west, southwest, and southeast of Carter, are extensive flint deposits. None of the stone is found to the north or east of the railway; at least the residents claim they do not know of any. Inasmuch as many of them possess an almost uncanny knowl-

edge of natural features for miles in every direction, it could be safely taken for granted that their statement is correct, and no examination was made in that direction.

Buffalo Creek flows past Carter from the southwest; Smith Creek, coming from the northwest, joins it at the lower end of the town. Between these two is another creek, Brushy Fork, which joins Buffalo  $1\frac{1}{4}$  miles west of Carter.

*Fannin place.*—The first indications of aboriginal work are to be seen on top of the ridge between Buffalo and Brushy, on the farm of James Fannin,  $3\frac{1}{2}$  miles nearly west from Carter. No flint is in place near here, but on a knoll forming the summit of a narrow place in the ridge the ground is sparsely strewn over a space of half an acre with blocks, spalls, flakes, and chips. The amount of material now to be seen is limited and has probably been scattered from a single arrow maker's seat of industry.

*Thomas place.*—Three-fourths of a mile northwest from Fannin's is a large spring on the land of Thomas T. Thomas; it comes out of the south hillside, 50 feet below the top. The surface above and to either side of the spring is covered with broken and partly worked flint; but there seem to be few flakes or chips, so it may be not an implement factory, but a blocking-out shop.

*McGlone place.*—Opposite Thomas's is the farm of N. A. McGlone. In exposed limestone ledges here are great numbers of nodules, of all sizes from an inch to a foot in diameter, each of which has a nucleus of red or red-orange, translucent, very fine-grained flint which sometimes has only a thin, weathered, grayish exterior coating. There are faint indications of digging on the slope below the ledges, but they may be only natural inequalities of surface.

*Watson place.*—Adjoining McGlone's is George Watson's farm. On the north side of the road, near his house, is a narrow ridge, extending toward Brushy Fork; at its outer end the entire surface is dug over, on top and down the slope on each side. Where workable nodules could be found near the top of the ground the pits are small and shallow; in other parts they are of varying sizes, the largest being of irregular outline, from 75 to 125 feet across from rim to rim of the surrounding wall, which is from 7 to 10 feet above the bottom of the excavation. There was an extensive workshop on this ridge, debris being abundant wherever the ground can be seen.

*Stamper place.*—A fourth of a mile north of Watson's house, on the Stamper farm, is a large spring in a ravine, 200 feet lower than the top of the hill. The ground is mostly overgrown around it, but wherever there is a break in the weeds or grass much workshop refuse appears, and some well-finished implements have been picked up. There are no diggings nearer than those on the Watson farm.

*Cooper place.*—A short distance beyond Watson's is a store belonging to Carver, but usually known as Cooper's, from a previous owner. Across the road from the store, on Hiram Cooper's land, is a gentle slope, facing east, and running out to the north in a narrow ridge. Over a space of 50 by 200 yards the ground is strewn or covered with worked flint in every stage, from broken nodules to flakes and fine chips. There is a strong, never-failing spring on the hillside near the center of the flint refuse. No diggings could be found, but the slope below the workshop is covered and filled with concretions, and abundant material for making desired forms of implements could doubtless be secured without making excavations of sufficient magnitude to maintain their identity as such through a long period of time.

*Carver place.*—On Jeff Carver's farm, east of the Stafford school-house beyond the store, is a mound of such regular form as to be generally considered artificial; but it is entirely a natural feature. The ground surrounding it is commonly known as "the flint field" on account of the great quantity of stone on the surface. There was such a rank growth of grass that none of the flint could be seen when the spot was visited, so it was impossible to learn whether there was a workshop here. In a corner of the field, southeast of the mound, were small pits, now mostly filled up. Some refuse is to be seen around them.

There are no other workings on this ridge; and reported "diggings" at other parts of it result from the attempts of misguided visionaries to find a "vein of silver," or "where Indians buried all their gold," or other forms of "hidden treasure."

*McCormick place.*—Crossing Brushy Fork, to the ridge between that stream and Smith Creek, John McCormick's farm is reached, not far from the railway station of Deep Cut, 5 miles northwest of Carter. At the end of a ridge on this farm were excavations amounting to an acre or perhaps more; most of the pits are now filled by cultivation and natural wash. The ground is covered with broken flint, much of it showing that it has been worked. Nodules lie thick in the earth, and not much excavating was necessary to procure good, unweathered material, consequently they have been gathered for some distance below the outcrop.

*Smith place.*—The next excavations beyond McCormick's are on the farm of John J. Smith, who lives 4 miles west of Carter. Near his house there is a narrowing and lowering of the ridge, due to ravines which have cut their way back from opposite directions. In the depression or "col" thus created the flint horizon is only a few feet beneath the surface, and several large deep pits in the depressed area take up most of the space in which the earth has been

worn away to an extent that makes access to the stone feasible. Some of these pits contain water all the year, even through the driest season. No excavations can be traced on the northern slope, which is abrupt and broken; but over an area of fully 2 acres along the southern slope, mostly below the level of the limestone, the entire space has been dug to a varying depth in quest of nodules imbedded in the residual clay. The *débris* is piled irregularly, so that the pits and little intervening ridges give the impression at first that the excavations were disconnected instead of continuous. Thousands of cubic yards of earth and rock were removed here. On beyond these pits the ground rises to a thickness so great as to exceed the ability of aborigines to get through it; and it so continues for more than half a mile. Then, due to the presence of two ravines, nearly parallel and not far apart, a short spur is formed, from which the earth has been eroded until a practically level area of 3 or 4 acres results, on which only sufficient clay soil remained to protect the flint from weathering. All this spur has been completely dug over and the flint taken out. The excavating did not extend to the south side of the spur for some reason; but on the north side for a short distance along the outcrop and below it they are continuous; then, with short, unequal spaces intervening, pits extend along the north outcrop for a fourth of a mile.

Over an area of at least 10 acres on this farm, around and between the various excavations, the surface of the ground is covered with workshop *débris*. It varies in thickness from point to point, as if there had been certain centers of manufacture at each of which much refuse had piled up around the artisan; it would diminish gradually in all directions, then again increase toward another center. The waste material has been dragged and scattered by cultivation, but in a number of places it is still so deep that the bottom has never been reached by the plow. On every square foot of the space occupied by this old factory worked pieces may be found. Among them are many hammer stones of granite, foreign flint, diorite and similar hard rocks of glacial origin; one of these was a boulder of light-green, unusually hard and tough diorite, weighing about 12 pounds; it was worn round and smooth by action of ice and water, and at two places on its surface it was much battered from breaking up large nodules, a condition which predicated extensive usage. All such hammers had been carried from the shores or banks of the Ohio River where they were deposited by glacial floods; so it is probable that much, or most, of the quarrying and flaking in this vicinity was due to the industry of Indians living along that stream.

The flint is extremely diversified in color, red of various shades, white, gray, yellow, brown, and almost orange. of uniform shading,

mottled, or banded; opaque or translucent; very compact; easily flaked. It is all from nodules of varying sizes, usually red at the center; the weathered crust of different thicknesses, sometimes only a thin coating on the solid flint inside, sometimes so thick as to make the nodule worthless.

No matter what the color may be, most of the flint has a peculiar luster which, like that of the Flint Ridge (Ohio) stone, makes it easy to recognize wherever found. This quality establishes the fact that fully 75 per cent, perhaps more, of the flint implements found along the Ohio between the Guyandotte and the Kentucky Rivers, and possibly to a less extent beyond these limits, are made of the flint from Carter County.

*McGinnis and Oney places.*—There is much chert on the McGinnis and Oney farms, on the ridge extending to the southeast from Smith's; but it does not appear to be adaptable to aboriginal requirements, and there is no evidence that it was sought by Indians.

*John Hignite place.*—On John Hignite's farm, 5 miles south of Carter, is a small area over which is scattered much broken flint, many nodules, and a small quantity of worked pieces. There is some of the red among it, but most of the stone is coarse and unsuited for working. No pits or other signs of digging could be discovered, and the numerous gullies in the vicinity may have provided all the material used.

*Levi Hignite place.*—On the farm of Levi Hignite, 5 miles southeast of Carter, in a rolling tract separated from Tygart River by a narrow range of high hills, mountainous in appearance, is a field so overgrown with weeds and bushes that only in a very few places is it possible to see the ground. There were formerly many pits and other evidences of ancient digging, but before the field was abandoned they were filled and leveled in the process of cultivation. An area estimated by different persons familiar with the locality at about 10 acres is covered with broken nodules and smaller fragments, among which is a very large proportion of pieces more or less worked. Fully 2 acres of this space could never be plowed on account of the great amount of closely packed fragments. On knolls and ridges in the immediate vicinity are workshops where it would seem that much flaking was done. An attempt at a careful examination was made, but it is impossible to present any definite statement until the field may be cleared off again. It could be ascertained, however, that many of the nodules had the usual centers of red or brown, semitranslucent, compact flint; possibly some of this is fossil coral. The interior of other nodules was bluish or grayish. All had the chalky coating in various degrees of thickness. The range and variation in texture and coloration is not so great as in the flint at the Smith diggings and workshops.

## FLINT IN TODD COUNTY, KY.

In the southwest corner of Todd County, Ky., 2 or 3 miles from Trenton, is a field in which the ground is covered with shop refuse derived from hornstone nodules. It is of the same character, in color, texture, and chipping qualities, as the hornstone around Wyandotte Cave in Indiana. It was observed in passing by, and there was no opportunity to make an examination of the site; but there must be quarries, as well as other workshops, in the neighborhood.

## FLINT IN HARDIN AND WAYNE COUNTIES, TENN.

From stone graves along the lower Tennessee and Cumberland Rivers have been taken a number of remarkable chipped objects. None, or at least very few, like them occur elsewhere, and the chert of which they are made differs from that in any quarry so far discovered. The scarcity of the material, as denoted by the relatively few specimens and the limited area in which they are found, indicates a local deposit which has thus far, by its small extent, escaped the notice of prospectors and collectors. Many persons have sought to find it, but as yet unsuccessfully.<sup>1</sup>

A workshop was reported in Hardin County, Tenn., on which, so it was stated, may be found many large broken or unfinished specimens, some of the fragments being thin, slender, and "as long as the blade of a table knife." The place was visited in the hope that a clue might be found which would eventually lead to the wished-for quarry. It is a little more than a mile northwest of Olive Hill, a village 12 miles south of Clifton on the Tennessee River.

In a level creek bottom is the site of an Indian village, marked by dark earth over an area of about 1 acre; a small mound; and a number of stone graves. The ground is strewn with the usual remains found in such places, flint chips being especially noticeable. Among the latter, however, none could be found resembling the material sought; nor has any such come to the notice of those living on the farm, although they have gathered many specimens from the fields and cleaned out several of the stone graves.

A large part of Hardin and Wayne Counties is covered with chert, dingy white, grayish, or yellowish in color, rather close but not uniform in texture, weathering superficially into various shades

<sup>1</sup> After this report was made, and it was too late to visit the place he mentions, Mr. S. W. Denny, of Ashland, Tenn., stated that he had found the site "where the 'Stone Grave' Indian obtained his flint, or in other words the dark-colored stone or chert from which he made his large chisels and arrow points. The quarry is in Stewart County, Tenn. I recently found 10 of those large chisels or axes in one place—evidently buried there to hide them, as there was no quarry. Six vessels were also in the same place."



of yellow and brown, and not susceptible of such delicate chipping as the compact chert of Ohio or the hornstone of southern Indiana. Most of the higher hills to the east and south of Clifton are capped with it, and wherever examined it has the same nature.

Black flint is reported at several places on Eagle Creek from 10 to 15 miles east of Clifton. Also, "balls" or "boulders" of the same color are said to "roll out of the hillside" along a certain ravine. A careful search at various places, especially in the said ravine, disclosed some black flint which plainly came from a stratum having a maximum thickness of about 8 inches; at least this was the measure of the thickest piece found which had a natural surface on both sides. Most of it is in small angular fragments. The owner of this farm, who has lived on it for more than 60 years, has never seen any nodules, or the black flint in place. The cap rock of the ridge is the same whitish chert observed on other hills.

Pits, "like ore diggings," were reported as existing at 6 miles and also at 12 miles eastward of Clifton. They are due to the uprooting of large trees. Similar pits are reported from Lowryville, 28 miles southward; but as these are only a short distance from deposits near Florence, Ala., which are known to be unfit for aboriginal needs, they were not visited.

Almost every strip of bottom land along the Tennessee and its tributaries, in the vicinity of Clifton, yields an abundance of flint chips, spalls, and broken implements. Nearly all larger fragments are of the ordinary chert, but many of the smaller pieces are pink, bluish, or dark stone of finer grain. It has not been ascertained whether the latter material belongs to this locality; if so, there must be very little of it.

The principal workshop investigated is on the farm of Mr. Charles H. Moore, 8 miles south of Clifton, on Hardin Creek. A gentle slope with an elevation of 30 to 40 feet, between the creek and the steeper hill behind it, is divided into three parts by two ravines. On the western part, comprising somewhat more than an acre, much of the surface, especially on the portion toward the creek, is literally covered with workshop débris. A great many well-finished specimens have been carried away from the site. Most of the material is the chert capping all the hills and strewn over the slopes in the neighborhood. From the appearance of the débris it is almost a certainty that none of it was mined or quarried from the hills, but was gathered, perhaps dug out, from the creek bed and from ravines. Nearly all unworked surfaces have the smooth polish and rounded angles belonging to waterworn pebbles. A few specimens were made of flint which does not belong here. All of these are small except the sharpened end of a celt-like implement probably not less than a foot long originally. On the edge and part of the blade is the polish resultant from usage.

The surface has the bluish-gray tint belonging to many similar large pieces from western Kentucky and Tennessee. The fracture, which is quite recent, shows, however, that the outward color is scarcely more than a film, the unweathered interior being almost the color of dark-blue slate. This feature may aid in determining the identity of the quarry when it is discovered.

The middle part of the terrace is the site of a workshop similar to that on the west; but it has more remains of occupancy in the way of hammers, mortars, pestles, anvil or cup stones, and burned rock.

The third part of the terrace, that farthest east, is said to contain remains similar to those on the other two; but dense vegetation prevented examination.

Other workshops examined are much like this, except that none are as well defined or cover as large an area.

#### FLINT IN HARRISON COUNTY, IND.

The Indiana Geological Survey Report for 1878 gives upon the map of Harrison County several localities in which it is said aboriginal flint workers quarried for raw material. So much of the map as is necessary in this connection is reproduced here in Figure 16. Two of the places marked are wrongly described. It is true that flint occurs in considerable quantities, but it is somewhat granular or porous and not fitted for the use of the Indian. A large portion of Harrison County is strewn with chert from the Chester and St. Louis groups of the Subcarboniferous limestone. Most of it is dull yellow or gray in color, porous or fragmental in character, and much of it contains crystals or fossils or the cavities from which these have weathered out. Occasionally a nodule may be found in this chert which is more solid than the general mass; the central part of such sometimes affords good material for implements of small size.

In one part of the St. Louis limestone is a stratum, said by the survey report to be not more than 18 or 20 inches thick, which in places seems to be composed largely or almost entirely of rounded or flattened nodules of very compact blue or gray hornstone, varying in their dimensions from the size of a pea to spheres 6 inches in diameter; spheroids up to 10 or 12 inches across by 3 to 6 inches thick; and ellipsoids with an extreme length of 15 or 16 inches. The outlines of the last are often quite irregular; while a section through either the longest or the shortest diameter will be an ellipse, the median plane may have a more or less tortuous outline. All of these forms have an outer coating of yellowish or grayish chalk-like substance resulting partly from decomposition of the hornstone and partly from contact with the limestone in which it is

imbedded. After prolonged exposure to the atmosphere the entire nodule may be thus altered. Nodules freshly brought out from a considerable depth are very slightly changed in this respect and are easily chipped into any desired form; although hard and tough, the

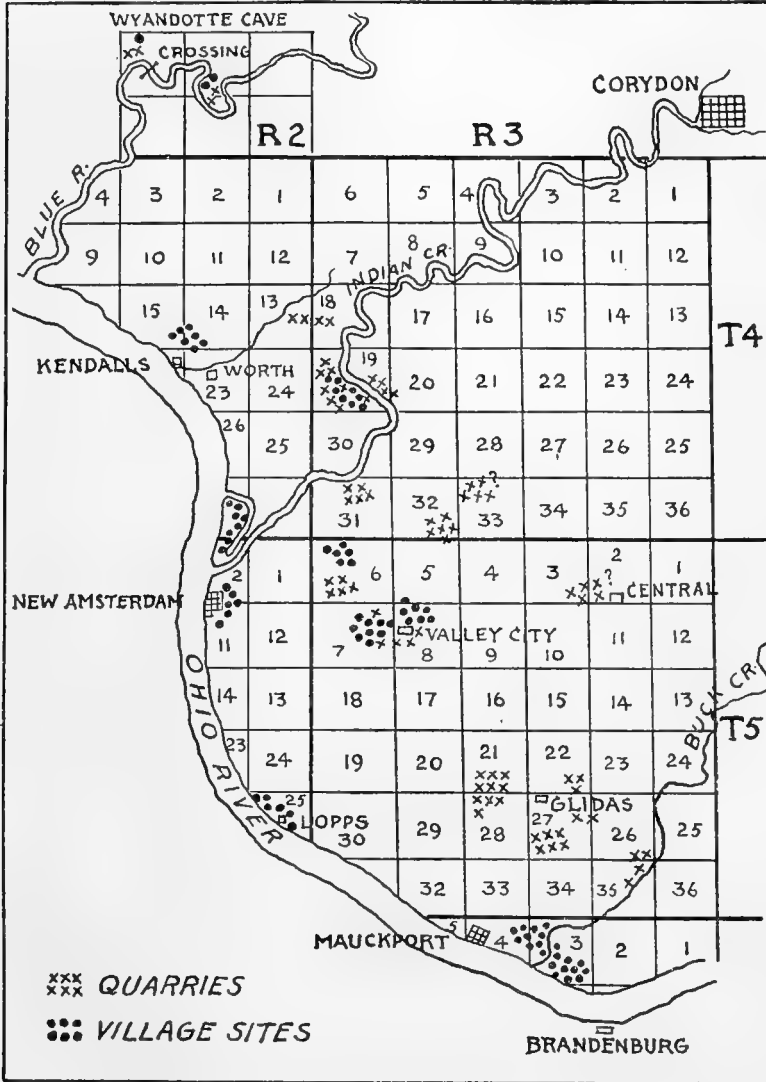


FIG. 16.—Hornstone quarries and workshops in Harrison County, Ind.

flint, under percussion, splits into thin flakes or spalls across the nodule, and these flakes are more readily worked into form than pieces of similar shape derived from any other geological horizon in the Ohio valley.

The bedded stone in this region is highly susceptible to both sub-aerial and subterranean erosion; the topography, in consequence, is very irregular. Sink-holes occur by thousands; in fact, the so-called "valleys" are nothing but depressions from which the entire mass of limestone formerly occupying them has been carried away by underground drainage. One of these sinks, known as "Grass Valley," is an irregular area about 8 miles long by 5 miles across, having an average depression of 100 feet below the surrounding rim. Most of the streams are bordered in portions of their course by vertical cliffs from 50 to 200 feet high, while smaller cliffs are numerous along the slopes, in places where no water is to be seen except in rainy seasons. Some of these cliffs are the borders or side walls of former caverns whose roofs have fallen in.

The workable flint is by no means continuous over the entire space where it comes in view. The overlying rock is a solid, heavy-bedded limestone, and in the hills this made access to the flint strata impossible to the Indians; under such conditions they could only gather up the nodules along the hillsides where they were washed out, or dig slight pits which would soon fill up from the slopes above them. On the other hand, where disintegration and denudation had exposed the nodules to atmospheric influences they would become chalky or split up into angular fragments unfit for flaking.

So it appears that the native flint worker secured his supply in three different ways. He gathered it in ravines as it washed out of the hills; he dug as far back as he could into the slopes where he had thus learned that it was to be found; and he dug shallow pits where the decay of the protecting limestone had left a coating of clay thick enough to preserve the flint in good condition. The pits were shallow because by the time the limestone was all gone there was not much clay left.

The nodule-bearing stratum does not appear east of Buck Creek, unless in the highest hills; from here the dip is to the southwest at the rate of about 40 feet to the mile, which brings it to water level along Blue River. The solid blue variety appears, also, to be confined to an area about 10 miles in length along the strike of the rock and about 5 miles in breadth. It may exist beyond these limits; but if so, it has not been observed.

On the left bank of Indian Creek, in Scott Township (NW.  $\frac{1}{4}$  sec. 19, T. 4 S., R. 36 E.), on the land of S. M. Mauck, nodules have been extensively quarried. An area of 5 or 6 acres is covered with small pits, none of them now more than 3 feet deep; leaves and trash were cleared out of two to a depth of 4 feet before reaching bottom. In one were found, at the bottom, fragments of antlers, so decayed that it could not be determined whether they had been

employed as digging tools. The nodules, when spherical, are occasionally found as large as 6 inches in diameter; above that size most of them are ellipsoidal, though some are spheroidal; some of the former measure more than 12 inches in their greatest diameter. The quarries are on a gentle slope and are carried from the lower edge of the outcrop to a distance of 3 to 5 rods up the hill, the width varying according to the inclination of the ground. A yellowish-white chalky coat covers each one, the thickness of this varying from one-fourth of an inch to 3 inches, thus, in some instances, taking up nearly the entire mass. The flint is a typical hornstone, being dark, almost black, in freshly exposed surfaces of large nodules and weathering to a light gray or bluish gray. Very few of them show concentric rings when broken, but such rings are common on specimens which have been long acted on by the air.

In front of Mauck's house a tract of high level bottom land containing 5 or 6 acres is thickly covered with broken nodules, chips, spalls and fragments.

On John Kintner's land, across the creek from Mauck's, is another quarry, less in extent but with pits somewhat larger and deeper.

On "the Widow Bottle's farm," at Rocky Hollow (sec. 31, T. 4, R. 3),  $1\frac{1}{2}$  miles below Mauck's, are a few small, shallow pits on top of the cliff above the creek; and chips occur on a little knoll near by.

On the farm of David Jacobs, known as "the old Stockslager place," diggings are reported; but no one living in the vicinity knew anything about them. Along the road forming one boundary of the farm the ground is covered with nodules up to 8 inches in diameter. This flint can be chipped out by single blows with a hammer in flakes one-fourth of an inch or less in thickness and 3 or 4 inches across, with a smooth, clean fracture surface. Many chips are scattered about the fields on this farm, and a field across the road from it is called "the flint field," the ground being covered over an area of 3 or 4 acres, in fact almost hidden from sight in spots, with fragments due to aboriginal work. While the nodules now on the surface seem perfectly adapted to such uses, it may be that they have been uncovered by erosion since the Indians resorted to the place; and also, that diggings exist in the woods or have been obliterated by cultivation.

At Valley City the ground over several fields seems to have long been the site of arrowhead factories. On nearly every farm through the low level ground in this vicinity beds of nodules are found, varying from a few rods to 3 or 4 acres in extent; but no digging seems ever to have been carried on. Finished or partially finished implements are abundant, and small workshops exist at various places within a mile or two of the crossroads postoffice of Valley City.

Pits dug in comparatively level ground may be seen on the farm of Harrison Pitman (SE.  $\frac{1}{4}$  sec. 32, R. 3, T. 4). As most of these are in woods it is difficult to ascertain their extent; but they comprise at least 2 or 3 acres. Several are in a cleared field; and among the latter is one now about 4 feet deep and 50 feet across.

It is reported that similar pits, representing about the same amount of work, exist on the farm of David Schaffer "about a mile northeast of Pitman's."

A little work of this nature has been done on the farm of Henry Struble (NE.  $\frac{1}{4}$  sec. 35, R. 3, T. 5); but the stone is of poor quality and the excavation was probably only an experiment.

The most extensive digging discovered is on top of a hill terminating in a high precipice overlooking the Ohio River, halfway between Mauckport and New Amsterdam. The flint stratum outcrops at the top of the precipice, and here the aborigines began their labors, throwing the earth and refuse material behind them as they worked into the hill. The excavated area is semicircular in form, being about 200 feet in length along the brow of the cliff and extending 100 feet back at the farthest point. At this distance the earth was evidently too thick to justify its removal. The depth of the ditch, to the surface of an unknown thickness of accumulation in the bottom, is now 9 feet, consequently the face of the quarry at the time of its abandonment must have been nearly or quite 15 feet. In addition to this, there is a row of small pits extending for more than 100 feet, a few rods from the bluff. The ground thrown back out of the way and that immediately around the margin of the excavations contains such an amount of broken flint as to be almost like a macadamized road.

At the foot of the bluff was an aboriginal village and burial ground which has furnished a great quantity of relics. The river shore is strewn with chips, flakes, spalls, and fragments, which show every process of manufacture from the first blocking-out to the final minute flaking touches.

On the following farms patches of an acre or more in extent are covered with spalls in such quantities that cultivation is difficult on account of them. Pits may have existed before the land was cleared, but there is no evidence of them now.

Henry Blake, SE.  $\frac{1}{4}$  sec. 22; — Richards, NE.  $\frac{1}{4}$  sec. 27; H. E. Trotter, NW.  $\frac{1}{4}$  sec. 8; — Lopp, SW.  $\frac{1}{4}$  sec. 27; — Pittman (reported, but not visited), southern part of sec. 2 or 3; along the New Amsterdam pike for half a mile or more west of Valley City, sec. 7.

On the farms of Alfred Hardshaw, SW.  $\frac{1}{4}$  sec. 6; S. M. Stockslager, SW.  $\frac{1}{4}$  sec. 21; and Harry Hays, NW.  $\frac{1}{4}$  sec. 28, are large

blocking-out shops where the ground is covered with spalls; there are no evidences of quarrying near at hand, but in all the ravines nodules of various sizes are abundant. They may have been gathered from such places, or from small pits along the outcrop, which have now filled to the general level.

All these are in R. 3, T. 5.

A fourth of a mile east of the Hardshaw shop site was a trench 4 or 5 feet deep when first observed, and probably 100 feet long, where nodules were procured. The surface was strewn with spalls and broken concretions, but these have been removed or buried and the trench filled by farming operations.

In sec. 26, T. 3 S., R. 2 E., on the Sibert farm, Blue River makes a long, tortuous loop. The surface of the knoll within the bend is worn down nearly to the level of the flint-bearing stratum. On all sides the hill is strewn for some distance below the top with nodules and fragments, many of them showing artificial cleavage or cracking. Among them are a few small bowlders of glacial origin, bearing marks of much use as hammers. On top of the knoll a space of an acre or more is covered with the refuse of implement making. At every wash, cow path, or other broken place in the sod, chips, flakes, and spalls are abundant.

Half a mile east of this knoll is an outcrop of the flint in a ravine. Some chipping has been done on a gentle slope on one of the hills. There is no evidence that any quarrying was done; the artisans seem to have found all the raw material they needed in the freshly exposed portions of the outcrop.

Another outcrop is reported to the south or southeast of these two, and on the opposite side of Blue River. This site was not visited.

On the Geological Survey map, the word "flints" is printed along the line between secs. 29 and 32. There is an abundance of chert, but none of it fit for use and no aboriginal work was ever done there. The same is true of "Huffman's Hill" in sec. 23.

Many finishing shops are reported, almost invariably on village sites. Only a few were visited. Flakes and chips were found in profusion over at least an acre in each of the following places:

On the hill just back of Kendall's Landing; on a high hill on J. C. Lopp's farm, NW.  $\frac{1}{4}$  sec. 8, R. 3, T. 5; immediately below the mouth of Indian Creek; at Morvin's Landing, opposite Brandenburg, Ky.; at Lopp's Landing, sec. 25; the old village site near the large quarry above described.

On S. P. Cunningham's farm, NW.  $\frac{1}{4}$  sec. 6, R. 3, T. 5, were two mounds, now destroyed. The field around them is reported to be "full of flint chips" when the ground is freshly plowed. Near this

field, on the same farm, is a shelter cave under a bluff of subcarboniferous sandstone. The roof and wall in places still show the effects of heat and smoke. Many chips are in, or on, the dust of the floor; and it is said that when the site was first known one "could not see the ground for the flint." There is a good, never-failing spring at one end of the cave, and the hogs have resorted to the spot ever since the country was settled. The mud they have carried in, added to the sand falling from the roof, has filled the floor to a much higher level than it formerly had.

On Borden's farm, a mile directly east of Leavenworth, much flint occurs in strata or laminae of varying thickness, from a small fraction of an inch up to 6 inches; occasionally it will increase, in a flattened nodular form, to 10 or 12 inches. It weathers out of the limestone in angular fragments which shatter under a blow, consequently was not sought for arrow making. It has a vertical range of 25 or 30 feet. At only one place is there any evidence of work; where a seam crops out in a ravine the flint has been hammered off to a slight extent; and on a little knoll near by are a few spalls and chips.

Opposite Leavenworth, on the Kentucky side of the river, a few nodules occur in the limestone; but they are of different character from the nodules used so abundantly, and do not come out of the matrix entire, shattering from effects of weathering.

A small amount of flint occurs in the limestone at the mouth of Potato Run,  $2\frac{1}{2}$  miles above Leavenworth; the same remarks apply as to the last mentioned.

There is a small workshop on the river bank at the mouth of Potato Run; chips are abundant over one-fourth of an acre, though none of them seem to be of the flint found near by. There is another workshop on the right bank of Big Blue River, about 300 yards above its mouth; flakes show abundantly when the ground is plowed.

In all the river bottoms, and especially on the shores where the banks have caved in and the earth washed away, for several miles up and down the river from Leavenworth, flint chippings are very plentiful.

#### WYANDOTTE CAVE

Much flint, both stratified and nodular, is found in Wyandotte Cave. Owing to pressure of the rock above it, the former fractures naturally at right angles to the stratification, the fragments varying from small thin flakes to pieces as large as a brick. Most of it is about 3 inches thick and its form of fracture gave rise to the belief, so often published, that the Indians dressed it into blocks



before taking it away. The Indians not only did nothing of the sort, but there is no indication whatever that they utilized the blocks which, so to speak, occurred ready-made, or that they used the stratified flint at all. There is one place in the cave, however, where they gathered the nodules and trimmed off the useless surface portion before removing them to the outside, where they completed their labors. This is in a small branch which opens from the main cave a mile from the entrance. Its walls, for a vertical space of 3 feet, are studded with nodules. The floor of this chamber was covered to a depth of 5 or 6 feet with flakes, spalls, and broken nodules, but without a specimen that approached completion. Near the side of the cavern opposite this branch cavity was another pile of fragments, not so great in amount. If the floor extends level under these refuse heaps, as no doubt it does, and they are composed entirely of fragments, as it is reasonable to suppose they are, there are several large wagonloads of scraps, none of which were available for service. The flint found in the cave is somewhat darker than similar fragments found outside, but this is due to different atmospheric conditions.

There can be little or no question that from the flint beds of this county came the material of the disks found in the Hopewell mounds near Chillicothe, Ohio. It is identical in every respect and no other locality at a less distance has stone of this character. It is certainly not found in Ohio.

A thorough and careful search was made for the particular spot or spots where the disks may have been chipped near a quarry site. No such locality could be found; nor is it at all probable that one exists. Spalls and fragments, literally by carloads, may be found in several places where the nodules occur in numbers, but no finished pieces except arrowheads or knives such as may occur anywhere. It is evident that the finishing process took place along the river or creek bottom lands where the villages stood; or in a few instances on level hilltops, which afforded some advantage as a place of abode. It is true that no broken and very few uncompleted disks are found in this region, and that perfect and well-finished ones have never been discovered. This indicates that they were regarded as an article of commerce or trade by a resident population; or were made by others who lived at a distance and who came here to procure raw material. As the disks are made of the most compact, close-grained, and homogeneous flint that was obtainable, a failure to complete one does not mean that the stone would be thrown away; it would be converted into smaller implements on account of its superior quality. This view is supported by the finding of many spalls of large size, some showing the whitish exterior of the nodule on one entire side,

with but little of the solid blue nucleus on the other side; of others showing very little of the "white chalk," as it is locally called, but with several square inches of the blue; and of flakes 2 to 4 inches long by half as wide, of the solid blue interior. From these sizes they range downward to the tiny chips which are the product of the final secondary finishing touches.

For these reasons it is extremely improbable that any particular quarry or spot exists where a special effort was made to shape the disks and nothing else.

The "mound" at the mouth of Indian Creek, mentioned in the Indiana Geological Survey Report of 1878, is a natural elevation, utilized as a village site. The "shell heap" near it now shows a thickness on the face of the falling bank of nearly 2 feet and its top is about the same distance below the present surface of the ground. It is not a "mound," in the sense of being intentionally built up, but a "kitchen midden," resulting from shells thrown here after the Indians had eaten the mussels which they contained.

When this site was occupied by its dusky inhabitants the creek made a long detour through the present slough, putting the village on the upper side of the mouth instead of on the lower side as it now appears to be. This is in accordance with the position of all aboriginal village sites which were established in such situations; they are never on the lower side of the creek unless at some distance from its point of junction with the main stream.

A great amount of flint was worked up on this site; indications are plentiful over several acres.

Near Elkton and Trenton, Todd County, Ky., are quarries and workshops of hornstone practically identical with that of Harrison County, Ind.; and it is reported that large disks of similar material are found "at the mouth of Flat Fork, near Sherbourne, between Flemingsburg and Mount Sterling, Ky.," which is on the other side of the geological divide.

#### FLINT IN UNION COUNTY, ILL.

To the archeologist, Union County, Ill., is classic ground by reason of having within its borders three separate deposits of flint from which the Indians drew their supplies, each of them belonging to a distinct geological formation. The term "flint" is used here in its ordinary, well-understood meaning, although one of these deposits is chert, another is hornstone, while the third is partly chalcedony and partly novaculite.

The famous chert quarries at Mill Creek which furnished such an immense amount of material for large hoes and spades have been

fully described by Phillips<sup>4</sup> and Holmes.<sup>5</sup> The two other deposits have not received the recognition they deserve.

Doctor Snyder<sup>6</sup> has reported the discovery in a mound on the Illinois River of several thousand disks chipped from compact blue-gray nodules or concretions. The similarity in all respects of these objects to those found in the Hopewell Mound near Chillicothe, Ohio, has been cited as evidence that the earthworks in these widely separated localities are of the same age and due to the same people. The assumption seems to be that only one natural deposit of such material can exist; that only one tribe would use it; that this tribe would procure, within a comparatively short time, all that was needed; and that the mine or quarry, once abandoned, would not be resorted to in later times. None of these conclusions necessarily holds true.

Some years since Dr. J. T. Whelpley, of Cobden, who for more than a generation had been making studies and explorations in Union and adjoining counties, found a stratum of nodules which is undoubtedly the source, or at least one of the sources, of the implements recorded by Doctor Snyder. It is on a ridge 1½ miles south and a half a mile west of Cobden, on the Barge farm, at the head of one branch of Clear Creek. The flint, while the highest visible rock in the hill, reaches the surface in its natural position at only three places, none of them more than 5 or 6 rods in linear extent. Elsewhere it is covered with earth, so that the outline or the extent can not be ascertained. Neither Doctor Whelpley, who has made careful search for them, nor the present occupant of the land, has ever found any indication of aboriginal excavations. Nor is it probable that any were ever made; for in the banks of gullies and small ravines leading to the creek itself are great numbers of easily accessible nodules still retaining the original "quarry water," and thus obviating the necessity for mining for material suitable for flaking.

The number and extent of workshops in the vicinity, and the large amount of refuse on them, are evidences that this was once the seat of a great flint-chipping industry.

Two miles west from the nodule deposit is a stratum of siliceous stone different in character and appearance from any that has heretofore been reported. It is located on Graham and Whittaker's land, 1½ miles south and 2½ miles west from Cobden, or half a mile west of the deep cut which replaces a former tunnel on the Mobile and Ohio Railway. The flint, if even this elastic term may include the

<sup>4</sup> W. A. Phillips, *Aboriginal quarries and shops at Mill Creek, Illinois*. (*Amer. Anthropol.*, n. s. vol. II, no. 1, pp. 37-52, New York, 1900.)

<sup>5</sup> W. H. Holmes, *Handbook of aboriginal American antiquities*, *Bur. Amer. Ethn.*, Bull. 60, pt. 1, pp. 187-194, Washington, 1919.)

<sup>6</sup> J. F. Snyder, *A group of Illinois mounds*. (*The Archaeologist*, vol. III, pp. 77-81, 109-112, New York, 1895.)

stone in question, ranges in texture from nearly pure chalcedony and compact novaculite through millstone grit to a cellular condition almost like porous slag from a blast furnace. The color is mostly pure white; the closer grained varieties are sometimes translucent and tendon colored, while any of it may show here and there traces more or less marked of oxidized iron. Within an area of not quite 2 acres the hillside seems to have been quarried in a methodical manner. The vertical range of the digging would indicate that fragments weathered from the outcrop, which had become imbedded in the clay several feet below their normal level, were as much desired as blocks broken directly from the ledge. The pits, trenches, and piles of débris are almost continuous within the given area, but cease abruptly at this limit; and Doctor Whelpley has not been able to find a deposit of this particular material at any other place. Although only a very small percentage of it is sufficiently solid to be wrought into desired forms by any methods used by primitive artisans, many workshops have been located in the neighborhood where spalls and flakes occur in such abundance as to create serious doubt whether this one quarry site could furnish all the material used. The stone is susceptible of a high polish and of very delicate chipping. The finished implements range from ordinary arrows, spears, etc., to slender perforators 6 or 7 inches long; thin, wide blades; highly polished spuds, chisels, and picks, almost or quite a foot in length; and large notched hoes of the Mill Creek pattern. Possibly still other forms have been found.

So far as could be ascertained, three collectors have monopolized and exhausted the output of these factories; namely, Doctor Whelpley, whose extensive and varied museum (it deserves the name) came into possession of his son and forms the basis of the remarkable "Whelpley collection" of St. Louis; Perrine, of Anna, whose entire collection was destroyed by fire; and Farrell, of Cobden, who sold at random wherever he could find a buyer.

The Illinois Geological Survey calls all the siliceous rocks in this county by the comprehensive name of chert, and states that it occurs in all the formations from the Cambrian to the Carboniferous. The dip of the strata is very unequal within small distances, being as much as 30 degrees from the horizontal at one place near the Mississippi River. The geological horizon of the quarries described could not be accurately determined in these researches; but they appear to extend through the Silurian, Devonian, and Lower Carboniferous.

#### FLINT NEAR ALTON, ILL.

At the upper end of Alton, within the corporate limits, the Mississippi River cuts in against the foot of the hill, forming a vertical

bluff more than 100 feet high. This heavy-bedded limestone is being quarried extensively, giving fresh exposures from top to bottom, and thereby bringing into view several seams of grayish chert, variable in thickness from a streak to as much as 8 inches. In places it pinches out entirely, to reappear at the same level farther along, sometimes within a few inches, sometimes with an interval of several feet. Occasionally these changes are so abrupt as to give a nodular or concretionary appearance to parts of the deposit; but such masses, when broken open, present a structure entirely similar to that of the more regular parts of the stratum to which they belong. None of this chert is suitable for chipping, as it is full of minute crevices, crystals, and cavities, which cause it to break in unforeseen places and directions. These defects are less apparent in fragments freshly broken from the quarry face; but the primitive artisan, unable to make his way through the overlying limestone, had access only to such pieces as were released by weathering.

It was on this bluff that the famous "Thunder Bird" was painted.

Three miles above Alton, on an overhanging bluff, are the last faint remains of the aboriginal paintings which once occurred in considerable numbers in this vicinity. At the foot of the cliff is a projecting ledge which furnished a standing place for the early artist. In this ledge, a few feet below the top, is a stratum filled with chert nodules, some of them almost perfect spheres. Their vertical range is not more than 2 feet at any point. They are embedded in solid rock and begin to disintegrate as soon as they are brought to the air by decay of the matrix, breaking into small fragments while still partially inclosed. A little lower is a stratum of chert equally brittle; so that neither deposit was serviceable to the arrow maker.

The dip of the strata here is from the river toward the east, and there is no tributary valley cut deep enough to bring any of this chert to the surface elsewhere than in the face of the bluff.

#### FLINT IN JEFFERSON COUNTY, Mo.

The village of Crescent, Mo., is at the point where the St. Louis-San Francisco Railway crosses the Meramec River, 25 miles west of St. Louis. The next station east of this is Mincke, about 2 miles away. Between these two places a hill nearly 400 feet high, separating ravines which have cut down almost to the water level, terminates abruptly in a steep face abutting upon the river. It extends to the southward as a narrow ridge, from which numerous spurs branch off, all of them winding in various directions and all of them ending steeply within half a mile or less from the main ridge. The summits are capped with white chert, the resistant

qualities of which have withstood the erosion that has worn away the underlying rock between them, until the topography of the region is as rugged as that in any other portion of the State. The map of the Missouri Geological Survey has this section marked as Cambrian, which may be true of all but the chert itself. This belongs to the St. Louis division of the Lower Carboniferous limestone. The space which it occupies is so restricted that it can not be represented on a map.

The flint-capped area, with its windings and spurs, has a general direction toward the southeast. It has been compared to a skeleton, the main ridge representing the "backbone" and the various spurs the "ribs." The slopes are everywhere covered with an immense quantity of *débris*, part of which has rolled down from the outcrop at the top of the hill, but most of it resulting from the accumulated chert which remained when the limestone was dissolved and continued as the surface rock when the general level was lowered. It is practically continuous and unbroken as far to the southward as High Ridge, 7 miles from the Meramec River. Throughout this length the hillsides are scarred with pits, the remains of aboriginal quarries. The upper layers, being porous from the weathering out of fossils, and also much checked and seamed by atmospheric action so that they easily shatter, are less suitable for making implements; consequently most of these depressions are toward the bottom of the deposit. Very few occur along the top of the ridge, and these only in places where erosion has removed most of the upper portion of the stone. The lowest stratum, about a foot in thickness, is a very compact, fine-grained stone, which has the texture, color, and chipping quality of chalcedony, and it was this which was most sought. Judging from the amount of waste in the form of spalls and blocks covering the hillsides below, a vast quantity of the chert was removed and thrown aside in order to reach that which possesses desirable flaking properties. After long exposure most of it has the appearance of chalk, though losing none of its hardness or fineness of grain. As a rule it is quite white, but much of it weathers into various red or yellowish shades.

Most of the quarrying was done on southern exposures, either because the prevailing storms coming from this direction eroded more of the overlying material, thus bringing the flint closer to the surface, or because the work was done in the cool season in order to avoid the various bloodthirsty insects, both flying and crawling, which, in summer, swarm everywhere.

The most remarkable feature about this deposit is its extreme thickness. In at least one place, despite the loss by denudation, it is fully 75 feet vertically from the crest of the ridge to the lowest level

of the flint. At this point, too, is the most extensive quarrying; the digging was done at three different levels. The lowest is directly on the surface of a ledge of limestone whose outcrop is several feet thick. There is one quarry here which, after all the wash from above, would require at least a thousand yards of earth to fill it to the general slope on either side; and there is no easy way of ascertaining how far back it may extend under the talus which has slid down into it.

At the extreme end of the first high ridge east of the Milliken estate is a knoll or peak almost cut off from the remainder of the ridge. It owes its height and form to the cap rock of the flint, which is now at least 50 feet thick. The top of the hill is rounded by erosion, with steep slopes all around reaching to the bottom of the deep ravines except for the very narrow isthmus connecting it with the ridge beyond. On the top of the knoll are many pits of varying sizes; entirely around it is a terrace or bench formed by following inward the outcropping chert a few yards below the summit, while farther down the slope similar platforms have been carried in along a stratum lying near and at the bottom of the deposit. The amount of material removed from this hill probably exceeds the amount taken from any equal area excavated in this vicinity; the pits and drifts, at a very moderate estimate, would amount to 2 acres, from which all the workable stone has been taken away.

The method of quarrying was that usually followed under such conditions. The quarrymen began at the outcrop and threw down the hill all the unsuitable rock they were compelled to remove. When a desirable quality of stone was reached they broke it off with heavy stone hammers and carried it away. But the steepness of the slope prevented them from penetrating the hill to any great distance. Within a few yards in most places, and within a few rods where digging was easiest, the overlying rock and earth became too great for their strength or patience and they moved along to another spot. The wash from above has partially filled the old excavations, making them even less apparent, and for this reason the amount of digging appears much less than it really was. It is safe to say that the flint sought has been reached and removed over an area of not less than 100 acres between the Meramec and High Ridge; and as the chert seems to extend indefinitely to the southward there may be additional evidences of excavation in places not yet examined.

Nearly all the chipped implements found within 50 miles of St. Louis in any direction are made of stone from this deposit; at least, it looks exactly like it, and no other deposit is now known from which it could have been derived. This observation, of course, does not apply to the hoes and spades made from the Union County, Ill.,

chert; nor to a few of the very long, slender implements, or ceremonials, occasionally found, which were brought from some other region.

One feature is reported here that has not been observed at any other flint quarry, though it has been noticed in mines of other material. This is aboriginal tunneling. Some years ago prospectors for lead reported that in sinking a shaft from the top of a flint-capped ridge they struck a drift at a depth of 30 feet. Again, when a macadamized road was under construction near High Ridge, ballast was hauled from the refuse about the old pits. In one of these the workmen, when near the bottom of loose débris, uncovered the mouth of a tunnel leading into the hill. It is possible that these were natural caves or crevices; but in each case the workmen were very positive in their assertion that the drift or tunnel so found was artificial, but that they were afraid to explore it. No one now can point out the exact location of either tunnel, as the entrances are obliterated by talus which has worked downward from the slopes above them.

#### FLINT IN POLK COUNTY, MO.

Mr. George C. Swallow, former State geologist of Missouri, says in the First and Second Annual Reports of the Survey that the limestone at Crescent (Jefferson County), Mo., reappears in Polk County. He also describes some aboriginal chert quarries or "old diggings" on the S.  $\frac{1}{2}$  of the NW.  $\frac{1}{4}$  sec. 34, T. 34, R. 22 W., near the Pomme de Terre River. This would be 6 or 8 miles northeast of Bolivar, the county seat.

While the stratified limestones of the two regions he names may be of the same geological age, the chert deposits are very different in appearance, structure, and manner of occurrence. At Crescent the stone is regularly stratified, of great thickness, with no inter-seams of other rock. It lies entirely above the limestone which forms the bulk of the hill, is an original sea-water deposit, not due to replacement or substitution, and contains no nodules except now and then a small one due to a slight change in the nature of the general structure. At the Pomme de Terre, on the contrary, the chert occurs in nodules or concretions of various sizes, imbedded in the limestone; and with the disintegration, solution, and removal of the latter, is left in the residual clay, unchanged except for weathering. The depth of such alteration on the nodules is governed by several causes, such as the slightly different composition and inclusions of the stone, the character of the soil as regards density, porosity, presence of organic matter and acids, the size of the nodules, and the depth to which they are imbedded in the clay.



The more nearly the material approaches a pure silica, the less will be the alteration in the structure; some of the nodules are weathered throughout, others only very slightly. Those on or near the surface of the ground deteriorate rapidly. Those which lie deeper tend to retain their hardness, density, and their quality of breaking into thin flakes suitable for chipping. The Indian became aware of this fact, and consequently when he discovered a deposit that was suitable he went as deeply into the ground for it as the means at his command would allow him to excavate.

Swallow is in error in placing the "diggings" on sec. 34; they are on sec. 24. The quarry he mentions is on the adjoining farms of Richard Preston and S. W. Gordon. The chert cap rock has protected from erosion a nearly level space of 50 or 60 acres with an irregular outline, the sides sloping toward lower ground in every direction except for a narrow ridge extending toward the northwest. The whole top of this space has been dug over except along the margins where the limestone has been so denuded that it lies near the top of the ground. The surface has the appearance of random or interrupted excavating, being a succession of pits separated by apparently undisturbed ridges; but the latter are merely the material that was thrown back or out as the quarrying proceeded. At least 30 acres have been thoroughly cleared out. There is no great depth to any of the pits, as the solid limestone is usually reached within a few feet. An exception to this character of excavation appears wherever there is a crevice of sufficient width to allow a man to work in it; in such places the digging was carried much deeper. How deep, can not now be determined without clearing the pits of their accumulated débris. In one of these crevices the trench left by thus removing the clay is fully 150 yards long, terminating at a pit now more than 6 feet deep after logs, brush, and rocks have been dumped in, thus adding to the earth that has caved in from the sides. The unsuitable material that was thrown back as the work progressed causes the trench to appear quite shallow for most of its length; but the pit at the end may serve as a measure of the depth that was reached. Lateral trenches from this one show where branching crevices on either side were followed.

The ground where these excavations exist is strewn with fragments and broken nodules, a large proportion of them showing the "bulb of percussion" or the corresponding depression, where they were broken in order that their quality could be determined. Search was made for hammerstones showing marks of continued use, but none could be found. Any nodule could be used for striking any other nodule until one or both yielded to the blows.

At the foot of one slope of this knoll is a spring around which was a blocking-out shop. The ground is covered with spalls, many

of them shaped into large or roughly made specimens which could be used as hatchets or digging tools; but no finished pieces were found which would denote that any implement, large or small, had been completed here. Some of these are seen in Plate 98. With them, at the center of the top row, is a much weathered grooved hammer or broken ax which was found on top of a high hill, a mile from the nearest flint bed.

On Frank Andrews's land, in the NW.  $\frac{1}{4}$  of sec. 23, adjoining the above, similar conditions of clay, chert and limestone formations and arrangement appear; and here also excavations were made in the same manner as those just described. About 30 acres have been dug over on the Andrews farm; so that, altogether, all the workable flint found in the clay comprising an area of fully 60 acres has been dug out, and such of it as could be utilized carried away.

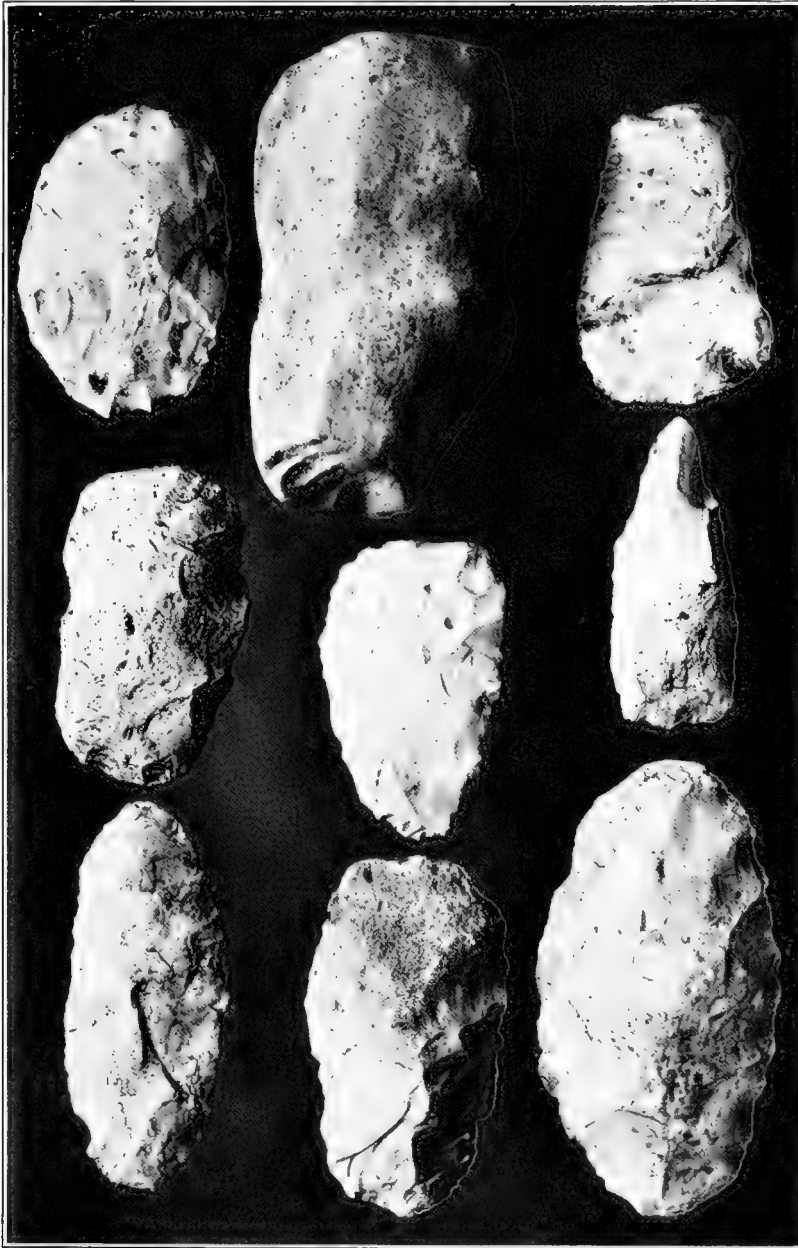
Finely wrought spearheads, knives, and arrowpoints are found in abundance throughout the region, but no workshop was discovered where the final touches had been given them. Such shops exist, of course, but are now hidden by overgrowth. Very little of the ground suitable for camps or village sites is under cultivation.

The chert found in this locality is grayish-white or almost white, extremely hard and fine-grained, difficult to work, but making an implement almost as efficient as steel for cutting or piercing.

The diggings are not confined to the hilltops, but extend down the slopes as far as embedded nodules of the desired quality could be found; in fact, there are indications that much of the work began toward the foot of the slopes, in numerous places, and was carried up the hill, all clay that was thick enough to preserve the nodules from deterioration by weathering being removed down to the underlying limestone and thrown back as the work progressed.

An interesting feature in connection with these quarries is a group of house mounds along a wide, shallow drainage valley extending northward on the western side of the Richard Preston hill. About twenty of these mounds were found, though there may be others hidden by the undergrowth. Whether there is any relation or connection between these mounds and the diggings is not certain, but it is quite probable that all the work is due to the same tribe or people.

In addition to the house mounds noted at the quarries, there are many small groups scattered over the prairie for several miles to the north and east of Bolivar; and still others are said to exist in parts of the county not visited. There seems to have been no extensive settlement, but rather a number of small villages or camps. At one time a considerable population may have lived around here; but it is more probable that these sites are due to a small number



LARGE CHERT IMPLEMENTS AND A GROOVED AX OR HAMMER.  
POLK COUNTY, MO.



of people who moved frequently. With the exception of the one group at the quarries none of them is near any known bed of workable chert.

#### FLINT IN BARTON COUNTY, Mo.

In the southeastern part of Barton County, Mo., is an irregular knoll embracing an area of several square miles. The highest points of its somewhat uneven surface are elevated 50 to 60 feet above the surrounding country. Its existence is due to a thick stratum of chert which withstood the erosive action that lowered the region around it. In this hill, on secs. 9 and 16, T. 31, R. 29 W. of the fifth principal meridian, a mile north and 2 miles west of Golden City, is an aboriginal quarry. The excavated area, nowhere more than 100 feet in width, extends as a series of shallow pits and trenches for about 500 feet along the foot of a gentle slope that terminates at a shallow depression reaching in a southward direction; thus comprising about an acre of stone, very little of which remains undisturbed.

The digging begins at the outcrop of a thin, compact stratum and extends inward, or toward the top of the hill, until the thickness of the overlying earth became too great for the energy or the patience of the laborers. The average height of the face along the devious line at which they suspended their work is about 6 feet; apparently not much of an obstacle, but the material is about equal parts of chert fragments and tough clay. The pits and trenches are now from 2 to 5 feet deep to the trash which has accumulated in them; in other words, they have filled in about a foot since they were abandoned. The surface is so overgrown with weeds and brush that the earth is visible at only a few places; but in these bare spots may be seen numerous blocks and spalls due to testing the fragments quarried. Most of these, as well as the pieces scattered on the surface, are coarse, rough, or cellular, containing many crevices and inclusions, and consequently not adapted to the needs of flint workers; but among them are many flakes and chips of smooth, fine-grained stone, uniform in composition, some of them having much the appearance of chalcedony or crystalline novaculite. The last is, no doubt, the material for which the excavations were made. Such stone, when it occurs with other chert is usually at the bottom of the deposit. Either there was not much of it at this site, or else the labor of procuring it was considered to be too great, for similar excavations in other localities in Missouri far surpass these in extent and magnitude.

While many thousands of flint implements have been gathered up in this vicinity, that is to say within a few miles, nearly all of them are of rather coarse stone not susceptible of fine chipping. Their color is usually the grayish or dirty white hue characteristic of nearly all the chert in the Ozark country. The character of the completed

specimens ranges from small, delicately chipped arrow-points equal in symmetry and finish to those made of agate or chalcedony, through every gradation to rough, unsymmetrical implements suitable only for club-heads or agricultural tools, and not susceptible of further reduction.

This is the quarry of which the following description was sent to the Bureau of American Ethnology:

At Golden Grove, Barton Co., Mo., are workings, attributed to De Soto, which originally covered several hundred acres, with digging of shafts 40 or more feet, and drifts in the hillside. The mining operations appear to have been in very extensive beds of excellent and very refractory flint.

The informant evidently believed what he said, but he was not aware that the "shafts" and "drifts," of which there are several, are the work of foolish white men seeking the "silver" which they are convinced was found here by De Soto who "dug all these old mines." The locality is known as "Golden Grove" from a former owner, Golden, who left the trees forming the "grove" because the land was not worth clearing; but the present inhabitants are satisfied that the name "Golden" means hidden treasure. They have dug deep shafts and long trenches in search of it.

A mile west and 2 miles north of this site is another aboriginal quarry, dug along the foot of a hillside. There are only a few small shallow pits; a hundred cubic yards of earth would fill all of them. Some flakes were found of smooth, semitranslucent chert, which is readily converted into well-finished small points. The site is so densely overgrown that a satisfactory examination could not be made.

Three miles directly south of Lamar are eight house mounds on ground which has never been plowed. They are from 18 inches to 3 feet high. The surface around them is low, swampy, and contains numerous crawfish tubes. Muddy Creek flows near them; and probably there was ample drainage formerly through a little "wet weather stream" which comes down from the low hill near by. The mouth of this is now filled with sediment deposited by floods in the larger creek, so that water which would otherwise have a free outlet is compelled to accumulate and stand until it can soak away. The mounds would not be built under present conditions.

Three miles south of these mounds are three other similar ones on the bank of a little run which is now beginning to encroach on them.

No other mounds of this type are reported north of the Arkansas line in this part of Missouri; but along the St. Louis-San Francisco Railway, between Bolivar and Springfield, were noticed occasionally, from the train, some elevations which seem to be house mounds. It is not safe to assert that they are such until a closer inspection is made.

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