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Most of the volumes of the annual reports and all of the volumes of the "Contributions to North American Ethnology" are out of print.

Exchanges and other contributions to the Bureau should be addressed,

Bureau of American Ethnology,
Washington, D. C.,
U. S. A.

FIFTEENTH ANNUAL REPORT

OF THE

BUREAU OF ETHNOLOGY

TO THE

SECRETARY OF THE SMITHSONIAN INSTITUTION

1893-'94

BY

J. W. POWELL
DIRECTOR

WASHINGTON
GOVERNMENT PRINTING OFFICE
1897

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LETTER OF TRANSMITTAL

SMITHSONIAN INSTITUTION, BUREAU OF ETHNOLOGY,
Washington, D. C., July 1, 1894.

SIR: I have the honor to submit my fifteenth annual report as Director of the Bureau of Ethnology.

The first part consists of an explanation of the plan of the Bureau and its operations during the fiscal year 1893–'94; the second part comprises a series of special papers setting forth certain results of the work of the Bureau relating to archeology and the social organization of the American Indians.

I desire to express my thanks for your earnest support and your wise counsel relating to the work under my charge.

I am, with respect, your obedient servant,

Director.

Honorable S. P. LANGLEY,
Secretary of the Smithsonian Institution.

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REPORT OF THE DIRECTOR

FIFTEENTH ANNUAL REPORT

OF THE

BUREAU OF ETHNOLOGY

By J. W. Powell, Director

INTRODUCTION

Researches relating to the American Indians were continued throughout the fiscal year ending June 30, 1894, in conformity with act of Congress.

As set forth in previous reports, ethnic relations, or the relations existing among races, peoples, and tribes, are measureably unlike those recognized by naturalists in the classification of orders, genera, and species of animals and plants. In biology the primary unit recognized by investigators is an individual organism, and the secondary unit is a norm or type (perhaps represented by an individual organism of average characteristics) standing for the species, genus, or order; hence biology is the science of organic things, considered as individuals and types of individuals. From one point of view, mankind, like other living things, may be regarded as an assemblage of individual organisms conforming to certain types, and from this standpoint the races of men may be regarded as species of the genus *Homo*, or as varieties of the species *Homo sapiens;* but from a more elevated point of view mankind may be seen to display distinctive characteristics of great importance by which the class is clearly set off from that including the plants and the beasts. Viewed from this higher standpoint, the races and peoples and tribes of the earth are assemblages of interrelated

and more or less intelligent groups; the primary unit of the investigator of mankind from this standpoint is not the individual, but the group—the pair, family, clan, gens, tribe, or confederacy among primitive men, the family, body-corporate, municipality, body-politic, state, nation, or alliance among civilized peoples—while the secondary units are not biotic norms or types, but the normal products of collective activity in the various groups, comprising languages, arts of welfare and pleasure, institutions, and opinions. Accordingly the science of man, defined from this standpoint, is primarily and in every essential respect superorganic, and is clearly set apart from biology as from all other sciences.

There are thus two essentially distinct points of view from which the science of man may be regarded: From one standpoint man is an animal, and his kind is an assemblage of individual organisms susceptible of arrangement by type into varieties, and the science of man, regarded from this standpoint, is closely akin to biology; while, from the higher standpoint, mankind must be regarded as an assemblage of superorganic and essentially collective groups, and may be classified by the products of collective activity; and from this standpoint the science of man is fundamentally distinct. For certain purposes it is desirable, and indeed necessary, to regard man alternatively from the two points of view, and to connect the two widely diverse branches of the science of man, and this is commonly done under the general term Anthropology. Sometimes it is desirable to study mankind with special reference to racial and tribal characteristics, and in such manner as to weigh the varietal features of the genus and species, and such studies are combined under Ethnology; but it has been found that, after the primary division into three, four, or five races, the varietal features afford little or no aid in defining and classifying tribes, so that ethnologic researches on any given continent are necessarily carried forward in accordance with the superorganic science of man. For most purposes it is found best to study both primitive and civilized peoples as superorganic groups, in which each individual reflects and is molded by the characteristics of his associates, and this is the function of Demology

or Demonomy (*δῆμος*, people; *λογος*, discourse; *νόμος*, law). Accordingly, demonomy may be considered as the science of humanity, or the science of those attributes which distinguish mankind from the lower organisms; and these attributes may be classed as *demotic*, in contradistinction from the *biotic* characteristics of animals and plants.

Thus far in the researches relating to the American Indians it has not been found necessary to consider in detail the essentially biotic features which have led systematists to regard the American aborigines as a distinct race, since these features are in large measure common to all of the aborigines of both American continents; but it has been found necessary to consider in detail many of the essentially demotic features displayed by the various tribes. Proceeding with the study of demotic characteristics, it was ascertained that all of the native tribes, so far as known, are grouped or regimented in similar fashion, so that it is inexpedient to discriminate and classify the Indians on the basis of their mode of grouping; for classified in this way all the known tribes are essentially alike, and collectively form but a single category. Further research showed that, while the primary demotic units are essentially alike, the secondary units, representing the products of collective activity, are diverse; and accordingly the researches concerning the relations of the Indian tribes were directed chiefly toward the products of intellectual activity among the tribes. In this way the researches were gradually divided into five principal lines, with their various subdivisions and ramifications, viz: (1) arts, or esthetology; (2) industries, or technology; (3) institutions, or sociology; (4) language, or linguistics; (5) opinions and beliefs, or sophiology. Practical considerations from time to time have led to special activity in certain lines or branches and to temporary inactivity in other lines and branches; yet, so far as seemed feasible, the work of the Bureau has been so conducted as to develop alike the five categories of secondary demotic characteristics.

The plans and personnel of the Bureau have remained practically unchanged, except that, at the beginning of the fiscal year, Mr W J McGee was added to the corps and appointed

Ethnologist in Charge, and entrusted with many administrative details.

With the beginning of the fiscal year the method of preparing administrative reports was modified. In lieu of oral monthly reports of progress, with more extended annual reports, formal monthly reports have been required, and these have been summarized periodically for transmittal to the Secretary of the Smithsonian Institution. The current operations of the Bureau are set forth fully in these reports; and the periodical summaries are incorporated herein as a detailed exhibit of work and progress.

MONTHLY REPORTS

OPERATIONS DURING JULY

Work in sign language and pictography—Colonel Garrick Mallery was occupied throughout the month in correcting and revising the proofs of a memoir on the "Picture-writing of the American Indians," which forms the greater part of the Tenth Annual Report of the Bureau. This memoir, which will occupy about 800 octavo pages and will contain about 1,500 figures in the text, besides 54 full-page plates, is at this date all in type, and the correction, as well as the preparation of lists of contents and illustrations, index, etc, is well advanced.

Work in mounds and earthworks—During the first part of the month Professor Cyrus Thomas was engaged in preparing the index to his "Report on Mound Explorations," which accompanies the Twelfth Annual Report of the Bureau. The greater part of the proofs of this volume have been revised, but some time was devoted to final proof correction.

During the month Professor Thomas gave some time to the study of the Maya codices, with the view of settling, if possible, the question of the phoneticism of the writing therein, the settlement of this question being of great importance to American archeology. In the course of the work the investigation on the "Time Periods of the Mayas" was continued; and it was shown from the Dresden codex that the civil year used therein comprised 365 days, divided into 18 months of 20 days each,

with 5 supplemental days, this usage coinciding with the calendar found in vogue at the time of the Spanish conquest. Other collateral results of interest were obtained.

Eastern archeology—Professor W. H. Holmes spent the earlier part of the month in organizing the work for the year. Later he proceeded to different points in Delaware valley for the purpose of continuing studies of ancient quarries and quarry-shop rejects in that highly interesting archeologic region. A new quarry-shop was discovered within 15 miles of Trenton, yielding abundant rejects corresponding precisely with the supposed paleolithic objects found in that locality. Subsequently Professor Holmes proceeded to Chicago for duty in connection with the final arrangement of certain groups in the World's Columbian Exposition under the immediate supervision of the Director. In the closing days of the month he visited a number of interesting archeologic localities in Ohio, extending in particular his detailed observations of the Newcomerstown gravels—the only case now strongly held to indicate the existence of man during the glacial period in this country.

Mr Gerard Fowke, under Professor Holmes' general supervision and under the immediate direction of the Ethnologist in Charge, proceeded to the valley of the Tennessee for the purpose of making collections from the little known but highly interesting interior shell mounds found in that region. His work has been successful, several cases of materials have been obtained, and Mr Henry Walther is now engaged in preparing and marking them for deposit in the National Museum for purposes of ethnologic study.

Mr William Dinwiddie, under Professor Holmes' immediate direction, spent the greater part of the month in collecting materials representing the arts and customs of the Indians along the shores of Chesapeake bay. While the results of his work hardly equal expectations in point of quantity, much of the material is of exceptional interest, and his negative determinations are of value to the Bureau.

Western archeology—Mr Cosmos Mindeleff was occupied during the earlier part of the month in outfitting for several months' work in the Pueblo country; afterward he proceeded

to Holbrook, Arizona, and preliminary reports indicate that his work is now organized and beginning to yield valuable results in the form of material for reports, as well as in the form of valuable and sometimes unique collections.

Work in synonymy—Mr James Mooney spent the earlier portion of the month partly in collecting and revising material for the Synonymy, partly in preparing for a trip to Oklahoma for the purpose of collecting additional material from various Indian tribes, notably the Kiowa. Subsequently Mr Mooney enjoyed a short vacation.

Mr F. W. Hodge continued work on the Synonymy, making a careful examination of Bandelier's monographs of southwestern history and archeology, by which considerable progress was made in the location of Pueblo settlements not previously identified. Final descriptions of the Tiwa and Piro tribes (including their history from 1540) were prepared, and several minor and collateral subjects were elaborated.

Work in mythology—During the earlier part of the month Mrs Matilda C. Stevenson continued the elaboration of material relating to the Zuñi for early publication. During the later half she began revision of the proofs of a memoir on the Sia Indians, which constitutes the leading "accompanying paper" of the Twelfth Annual Report of the Bureau. The illustrations of this memoir are completed, and a third of the text has been composed.

Throughout the month Mr Frank Hamilton Cushing has been occupied in the arrangement of exhibits for the World's Columbian Exposition, under the immediate supervision of the Director.

Work in linguistics—Mr J. Owen Dorsey continued the arrangement of Biloxi texts, with interlinear and free English translations and notes, adding many pages of Biloxi phrases, making a total of 245 typewritten foolscap pages, which are substantially ready for the printer. Progress was also made in the preparation of slips for the Biloxi-English dictionary. In addition, Mr Dorsey corrected considerable portions of the galley-proof and second-page revise of Riggs' "Dakota Grammar, Texts and Ethnography," forming volume IX of Contributions to North American Ethnology.

Dr Albert S. Gatschet spent the month in the elaboration of field materials pertaining to the Peoria language. About 2,000 words were extracted from the notes and placed on slips. Progress was made also in extracting the grammatic elements and in analyzing prefixes, suffixes, and alterations and permutations of consonants and vowels within the same word, classifiers of the adjective, reduplication of the root, etc. All of the grammatic matter also was recorded on slips and in books for use in the preparation of a Peoria dictionary and grammar. On the whole, satisfactory progress has been made in determining the structure of the Peoria language.

Mr J. N. B. Hewitt temporarily discontinued his work on the lexicography and grammar of the Tuskarora-Iroquoian dialect during June, and throughout the last month has been occupied in preparing a special description of the sociology of the Iroquoian peoples. This study has already led to valuable results, not only directly, but indirectly through the elucidation of the meaning of terms determined or modified by social relations. Mr Hewitt's kinship with the Iroquoian peoples gives him special advantages in the work. He has been able to formulate the rights, duties, privileges, and obligations of the two phases of the family group, as well as that pertaining to the gens. Collateral results of importance have flowed from Mr Hewitt's studies.

Work in bibliography—The bibliographic work of Mr James C. Pilling has been seriously interrupted by ill health; but a part of the month was occupied in a careful examination of the Bibliography of the Chinookan Languages recently issued from the press, with the purpose of providing for the correction of supposed errors due to the illness of the author at the time of proof revision. It was found, however, that the condition of the publication is satisfactory, and it will at once be distributed.

Work in sociology—During the earlier part of the month Dr W. J. Hoffman was occupied in arranging and classifying data and material relating to the Menomini Indians of Wisconsin. Subsequently, under instructions of July 15, he set out on a trip for research and collection among these Indians.

The time of the Ethnologist in Charge has been occupied chiefly in administrative work and in examining sociologic material in the archives of the Bureau and in organizing study thereof.

Publication—The Eighth Annual Report was received from the bindery during the month, and other reports are advancing satisfactorily.

Columbian Exposition—The Director, with Professor Holmes, Mr Cushing, and Mrs Stevenson, has been engaged during part of the month in arranging the Bureau exhibit in the World's Columbian Exposition at Chicago.

OPERATIONS DURING AUGUST

Work in sign language and pictography—Colonel Garrick Mallery has continued, and during the month completed, the revision of proofs of his memoir on the "Picture-writing of the American Indians." He has also completed the preparation of table of contents, bibliography, and general index, and these have been composed, and he has revised the proofs thereof. The stereotype plates were also examined and corrected. This work is now on the press as the body of the Tenth Annual Report of the Bureau.

Work in mounds and earthworks—Professor Cyrus Thomas has continued the revision of proofs of the closing portions of his "Report on the Mound Explorations of the Bureau of Ethnology." During the month the lists of contents and illustrations, and also the general index, have been revised in proof, and all are now stereotyped. The monograph, which is the most voluminous ever prepared on this subject, considerably exceeding in this respect the classic work of Squier and Davis, comprises 730 pages, including 344 cuts in text and 42 plates. It forms the body of the Twelfth Annual Report, the introductory matter of which will shortly be printed.

A part of the month was spent by Professor Thomas in continuing his researches concerning the Maya codices. He also completed the preparation of a paper relating to certain objects found in mounds, designed for publication as a bulletin and to supplement the above-described report.

Eastern archeology—Professor W. H. Holmes, together with his assistants and collaborators, continued work in eastern archeology. Mr William Dinwiddie made an extended collecting trip over the country about the head of Chesapeake bay, procuring considerable new material and obtaining valuable information concerning the distribution of aboriginal art products with respect to waterways and other geographic features. Mr Gerard Fowke continued the collection of material from the interior shell mounds of Tennessee and forwarded considerable quantities of interesting material, which is now being cleaned and labeled by Mr Henry Walther. Professor Holmes himself spent a part of the month in special studies concerning the development of the shaping arts. His ideas were formulated in a preliminary paper, and it is expected that the matter will be expanded and suitably illustrated, and that it will then be incorporated in a final report on the aboriginal stone art of the territory now forming eastern United States.

Western archeology—Mr Cosmos Mindeleff remains in the field engaged in surveys of the Pueblo country of northern Arizona, and his reports indicate satisfactory progress in the surveys as well as in the collection of material.

Work in synonymy—In the absence of Mr James Mooney on field duty, and in the absence of Mr F. W. Hodge on leave, little progress was made in this work during the month.

Work in mythology—Mrs Matilda Coxe Stevenson has been occupied in revising proofs of her memoir on "The Sia," which forms the leading paper accompanying the Eleventh Annual Report of the Bureau. The revision of galley proofs was completed, and most of the page proofs, together with the proofs of illustrations, have now been revised.

Work in linguistics—Reverend J. Owen Dorsey continued the correction of the proofs of Riggs' "Dakota Grammar, Texts and Ethnography," forming volume IX of the Contributions to North American Ethnology. The page proofs of the body of this work have now all been revised, and proofs of the list of illustrations, index, etc, are in hand. In view of the time which has elapsed since the commencement and even since the completion of the original compilation, it has seemed wise

to supplement the work by a brief chapter setting forth the results of recent investigations concerning the Dakota languages, and Mr Dorsey has begun the preparation of this chapter. He spent a part of the month in an examination of the dictionary slips of the various Siouan languages, for the purpose of formulating a series of characters absolutely necessary for recording the words of Indian languages.

Dr A. S. Gatschet has continued researches on the Peoria language, chiefly in extracting grammatic elements and in studying the permutations of vowels and consonants, in which direction interesting results have been obtained. Certain terms in the vocabulary have also been found of exceptional interest as suggesting, and in some cases explaining, steps in the development of mythic concepts.

Mr J. N. B. Hewitt has continued work on the Iroquoian-English dictionary, making satisfactory progress therein.

Work in bibliography—Mr James C. Pilling was occupied throughout the month in preparing cards taken from the Chinookan and Salishan bibliographies for incorporation in the final works on those subjects. In addition, he has critically examined plate proofs of the Salishan bibliography for the purpose of eliminating minor errors; and some progress has been made in the preparation of manuscript for the next number of the bibliographic series.

Work in sociology—Dr W. J. Hoffman reports from Keshena, Wisconsin, the successful commencement of the season's researches into the ceremonials of the Menomini, Ottawa, and Ojibwa Indians; he has in addition already sent in certain collections of importance representing the aboriginal arts of the Indians of the Lake Superior region. One of these, a birchbark canoe, typical for that region, has been transmitted to the National Museum.

The Ethnologist in Charge has been occupied chiefly in administrative work, in examining matter designed for publication, and in continuing the arrangement of sociologic material in the archives of the Bureau.

Miscellaneous—As incidentally set forth above, publication is proceeding satisfactorily. The distribution of the Eighth

Annual Report and the Bibliography of the Salishan Languages has been commenced. The stereotyping of the Tenth Annual Report has been completed, and the plates are on the press. The body of the Twelfth Annual Report has been stereotyped, and the Eleventh Annual Report is rapidly passing through the printer's hands, the first of the three papers being now in page proof, the second well advanced in galleys, and the third just coming in.

Work in the preparation of illustrations has been continued, and a number of remarkably fine plates designed to illustrate reports by Mrs Stevenson on Zuñi ceremonials, and by Mr James Mooney on the Ghost dance, have been completed.

The Bureau has assumed possession of its new quarters in the Adams building, but the transfer of persons and property has been unexpectedly delayed and is not yet completed.

The Director has continued the installation and arrangement of the Bureau exhibit at the World's Columbian Exposition, and has been aided therein by Mr Cushing, and for a part of the month by Professor Holmes and Mrs Stevenson.

OPERATIONS DURING SEPTEMBER

Work in mounds and other antiquities—Dr Cyrus Thomas was occupied during a part of the month in final critical examination of proofs of texts and illustrations of his monograph on the Indian mounds of eastern United States. The remaining portion of the month was spent in carrying forward the researches concerning the Maya codices and in work relating thereto. The investigation is laborious and slow by reason of the large number of historic, linguistic, and other comparisons required at every step. Some time has been occupied in examining the literature relating to Central American deities and mythology, with special reference to the Maya Pantheon, with the object of identifying the glyphs describing such deities. A new study has also been made of the symbols representing days and months, in order to utilize these names in the interpretation of other characters. The recent work indicates that the Maya writing is in some measure phonetic, but also comprises the use of the rebus, or what Brinton characterizes as the ikonographic method of writing.

Eastern archeology—Professor W. H. Holmes has continued his researches concerning the aboriginal arts of eastern United States, interrupted only by duty in Chicago installing exhibits of the Bureau at the World's Fair, from the 1st to the 19th of the month. During the closing part of the month substantial progress was made in the digestion of field notes and preparation of reports for the press. A monograph on aboriginal pottery, begun a year or two since and temporarily laid aside, has been again taken up with a view to completion for publication as volume VIII of Contributions to North American Ethnology. Satisfactory progress has been made in the rearrangement of text and in the preparation of the drawings and photographs, which the text is designed to elucidate.

Mr William Dinwiddie, under Professor Holmes' supervision, was occupied during the greater part of the month in collecting trips along the shores and tributaries of Chesapeake bay, with the object of demarking more exactly, by means of art products, the territory belonging respectively to the different aboriginal peoples; while Mr Gerard Fowke continued collection of material from the interior shell mounds of Tennessee and Kentucky. This material, together with that sent in by Mr Dinwiddie, is now being cleaned and labeled by Mr Henry Walther preparatory to transfer to the National Museum.

Western archeology—Mr Cosmos Mindeleff has continued operations in the Pueblo country. On August 28 he left Winslow for the Rio Verde by way of Sunset and Chaves passes, Stoneman lake, and Rattlesnake tanks. The road was difficult, but was traversed without loss. On reaching the Verde he withdrew his field outfit, which had been stored for two years. Progress southward was delayed by mishaps, and at Flagstaff for repairs. He left Flagstaff on September 15, soon reaching the Little Colorado at the mouth of San Francisco wash, where the condition of the roads was such as to delay progress, so that he reached Winslow only on the 20th and Holbrook on the 24th. While this journey, necessary to obtain the outfit, was tedious, no time was lost, for the course pursued described a great circle, and Mr Mindeleff was able to examine the country on both sides of the Little Colorado from

the mouth of the Puerco, and in two lines across the Mogollon mountains. The closing days of the month were spent at Holbrook, outfitting for further work; but progress in this direction was slow by reason of exceptional rain storms and floods.

Work in sign language and pictography—Having practically completed the proof revision of his memoir on the Picture-writing of the American Indians, Colonel Garrick Mallery has taken up the material relating to sign language, gesture speech, pantomime, etc, with a view of monographing this subject also, and satisfactory progress has been made in the arrangement of the matter. A part of the month was, however, spent in field work in the Lake Superior region for the purpose of obtaining more precise information concerning certain points on which the data at hand are obscure.

His memoir on Picture-writing, forming the body of the Tenth Annual Report, is stereotyped; and it is reported to be on the press.

Work on the Synonymy of Indian tribes—Mr F. W. Hodge continued the preparation of material for the Synonymy. During the month the Jumanos (a formerly important tribe occupying an extensive area in what are now the states of Chihuahua, in Mexico, and New Mexico, in the United States) were described as completely as the material obtainable will permit, the work leading to a tentative identification of this little-known tribe of the sixteenth and seventeenth centuries with the Comanche of a later period. Work was carried forward also on the Pueblos and on the synonymy of the tribes of the Piman stock, much valuable information relating to the population, mission names, etymology, etc, of the latter tribe being obtained from rare publications. Extended correspondence in relation to the Pima and other peoples was also conducted.

Mr James Mooney remains in the field. During the month of September he was occupied on the Kiowa reservation in Oklahoma, making additions to Kiowa linguistics and ethnologic materials, particularly in collecting mystic songs, which were recorded by means of the graphophone. Some material for synonymy was obtained.

Work in mythology—Mrs Matilda Coxe Stevenson was occupied in part throughout the month in revising the page proofs and illustrations of her memoir on "The Sia," forming part of the Eleventh Annual Report. In addition, she was engaged in the examination of anthropologic material at the World's Fair in Chicago, serving for a time as an honorary judge of exhibits.

Having completed his work in arranging the exhibits of the Bureau of Ethnology at the World's Fair, Mr Frank Hamilton Cushing returned to Washington and resumed researches in mythology about the middle of September. Since that time he has carried forward a study of the origin of aboriginal games, which are largely divinatory. The arrows, dice, and other objects used in the games, and the symbolism (often highly esoteric and significant) employed therein have received special attention. Curious coincidences or identities between certain divinatory games of this country and those of the Orient have been brought to light. With the collaboration of Mr Stewart Culin, of the University of Pennsylvania, Mr Cushing has made good progress in the preparation of a bulletin on this subject. In addition, Mr Cushing has made researches concerning the significance of the Swastika or Fylfot cross, long known in the Orient, though its meaning was not interpreted; and by study of various forms of this object from different American localities, in connection with legend and myth, he has ascertained that the American swastika is a widespread wind symbol, and plays an important part in occidental mythology. Finally Mr Cushing has prepared an elaborate report on the collections of the Bureau at the World's Columbian Exposition, particularly those connected with aboriginal mythology.

Work in linguistics—Mr J. Owen Dorsey has continued and completed the revision of page proofs, illustrations, etc, for Riggs' "Dakota Grammar, Texts, and Ethnography." He has also prepared a supplement thereto in the form of an introductory chapter, and of this also the proofs have been revised. In addition to this literary work, Mr Dorsey has continued the elaboration of linguistic material, especially that of the Biloxi Indians of Louisiana. He has given attention also to Indian

phonetics, with the view of devising a complete alphabet adapted to the representation of the various obscure and decadent vocatives of primitive languages.

Dr A. S. Gatschet continued his researches concerning the Peoria language along lines already laid down. Over two thousand Peoria words are now recorded on cards. In addition, he made during the month a careful examination of an elaborate English-Nez Percé dictionary and Nez Percé grammar, representing the work of the late Miss S. L. McBeth, who was for many years a missionary teacher among the Nez Percé Indians of Idaho. This voluminous manuscript work was conveyed to the Bureau early in the month by Miss Kate C. McBeth.

Mr Hewitt continued the preparation of linguistic material already described, and was engaged also for a considerable part of the month in the elaboration of the system of government of the Iroquois, the modes of acquiring and conveying information of a political character, and also the primitive methods of agriculture.

Work in bibliography—Mr James C. Pilling continued bibliographic work, completing the portion of his catalog pertaining to the Chinookan and Salishan languages, by preparing cards taken from the bibliographies of these stocks.

Work in sociology—Dr W. J. Hoffman continued field work, spending the greater part of the month among the Menomini Indians of Wisconsin, with a view to completing a report on aboriginal cult societies, mythology, ancient customs, and linguistics. Satisfactory progress was made in this work. In addition, he continued the collection of valuable material representing the pristine habits and domestic life of the Lake Superior Indians, sending in a typical dug-out canoe and also a very old mortar and pestle used originally for the grinding of grain and latterly for the preparation of medicinal and magic compounds. This objective material has been received, and will shortly be transferred to the National Museum.

The Ethnologist in Charge has been occupied chiefly in administrative work. In addition, a definite arrangement was effected with Señor Manuel Antonio Muñiz, M. D., surgeon-

general of the Peruvian army, for the publication of a memoir on prehistoric trephining, the memoir being based on the finest collection of trephined crania (numbering nineteen examples) ever brought together. The condition of the material and the nature of Doctor Muñiz's work were such as to require considerable study.

Publication—An advance copy of the Ninth Annual Report was received during the month, and the edition of the report is now in the bindery. The Tenth Annual Report is still on the press. All galley proofs and most of the page proofs of the body of the Eleventh Annual Report have been revised, while the Twelfth Annual Report is practically ready to be put on the press. A concurrent resolution authorizing the publication of the Thirteenth Annual Report has been introduced in the House of Representatives, and, as already stated incidentally, volume IX of the Contributions to North American Ethnology has been completed during the month, and is now stereotyped.

Removal of office—During the month the Bureau was transferred to its new quarters on the sixth floor of the Adams building, 1333 and 1335 F street.

Exposition work—The Director remained in Chicago completing the final details of arrangement of the Bureau collection at the World's Columbian Exposition.

OPERATIONS DURING OCTOBER

Work in sign language—Colonel Garrick Mallery has continued the work of assembling, collecting, and arranging the voluminous materials on sign language which he has gathered in connection with other work from time to time during several years. The work has progressed satisfactorily and the preparation of the final report on the subject is under way.

Work in mounds and other antiquities—Dr Cyrus Thomas has continued researches concerning the Maya codices, together with collateral studies relating to this special investigation as well as to the investigation of mounds and other earthworks. Certain results of special interest in the Maya research were reached about the end of the month, and will be reported later.

Work in eastern archeology—Professor W. H. Holmes has continued his researches concerning art in stone and the art of pottery making, particularly in eastern United States. In addition, he made during the month a field trip to an island in Potomac river near Point of Rocks, recently invaded by a freshet in such manner as to lay bare an ancient village site and aboriginal workshop. The association of objects in the workshop proved of special significance, and Professor Holmes calls attention to the fact that here for the first time indications were found that blocks of stone were used as anvils in the production of certain classes of stone implements and weapons. This indication will be followed sedulously with the view of comparing methods of manufacture in different sections and among different peoples, and possibly of correcting earlier inferences concerning these methods. Professor Holmes' office work has yielded satisfactory results in the preparation of manuscript and illustrations for reports of the nature already indicated.

The collections made by Messrs Fowke and Dinwiddie continue to come in, and are proving of interest and importance. Mr Fowke's connection with the Bureau has now been severed; and, with the completion of Mr Dinwiddie's field work during the month, he was transferred to work in connection with the Synonymy, under the direction of Mr Hodge.

Work in western archeology—Mr Cosmos Mindeleff remained in the field. His formal report of the month's operations has not yet been received, but correspondence during the month indicates fairly satisfactory progress in surveys and in making collections, though especially bad weather, including heavy rains and destructive freshets, has interfered with his movements.

Work in synonymy—Mr James Mooney remained in the field collecting information among the Kiowa, Arapaho, Caddo, and associated tribes of Oklahoma. In the early part of the month he had an opportunity of witnessing the great tribal ceremony of the Arapaho, the Sun dance, and succeeded in making a number of photographs illustrating it. Mr Mooney was also so fortunate as to observe other primitive ceremonials

now dropping into disuse. Extended data connected with the Ghost dance were collected, together with songs and myths bearing thereon, as well a vocabularies and notes on the tribal organization of the Caddo and other tribes.

Mr F. W. Hodge, who has been placed in charge of the library, in addition to his work on the Tribal Synonymy, has been occupied chiefly in the transfer and arrangement of books and pamphlets from the old quarters of the Bureau to its present domicile. In addition, he prepared a catalog of and general index to publications of the Bureau, which has been sent to the printer as a bulletin. Also, he completed the Piman synonymy and described the Concho tribe or division with its various settlements formerly in the Concho valley of eastern Chihuahua. The relations of this people are obscure; of their language nothing is known to literature; and it is uncertain whether they were connected linguistically with the Piman or neighboring tribes, or whether their relations were with the peoples of Texas and the interior.

Work in mythology—Mrs Matilda Coxe Stevenson has continued the work of preparing a report on certain myths and ceremonials of the Zuñi, and has made satisfactory progress.

Mr Frank Hamilton Cushing has been occupied chiefly in the study of gaming apparatus from Mexico and Indian Territory, and in comparing these occidental games with certain analogous games of the Orient, as well as various other games of divinatory origin or character from different sources. Satisfactory progress was made in the preparation, by Mr Cushing jointly with Mr Stewart Culin, of a memoir on "Arrow Games and their Variants in America and the Orient." Many significant facts and relations bearing on the concepts have been brought to light in the course of Mr Cushing's investigations. Collateral lines of study have been pursued by Mr Cushing with success.

Work in linguistics.—Mr J. Owen Dorsey continued the revision of proofs of his "Study of Siouan Cults," forming part of the Eleventh Annual Report of the Bureau, and also revised the galley proofs of Riggs' "Dakota Grammar, Texts and Ethnography," forming volume IX of the Contributions to

North American Ethnology. In addition, he has been occupied largely in the rearrangement of the linguistic material of the Bureau, cataloguing the manuscripts and storing them in fireproof vaults in the Bureau office. During the later half of the month he was occupied in part in collecting Winnebago texts as dictated by Philip Longtail, an intelligent representative of that tribe, and in this way has been able to close a serious hiatus in knowledge concerning the Siouan tribes.

Dr A. S. Gatschet has continued his work on the Peoria language. He now has more than three thousand Peoria words arranged on slips. In addition, he has a large body of information relating to the grammatic structure of the language under not fewer than forty captions, the whole being systematically arranged with a view first to reference and later to publication.

Mr J. N. B. Hewitt has been steadily employed in the office, chiefly in describing little-known customs of the Iroquoian people, special attention being given to food products, notably maize. The etymologic elements of certain geographic terms were also investigated. Toward the close of the month Mr Hewitt was employed, under the supervision of Mr Dorsey, in arranging the linguistic and other manuscripts of the Bureau in fireproof vaults, and in preparing a card catalog to these archives

Work in bibliography—Mr Pilling has been actively engaged in bibliographic work. An opportunity for comparing his elaborate collections with those of other students has just been afforded through the publication of a "Bibliografía Española de Lenguas Indígenas de América" by Count Viñaza. The result of the comparison tends to establish the substantial completeness of the Pilling collection. After making this comparison, Mr Pilling continued the preparation of the main bibliographic catalog, adding titles taken from the Chinookan and Salishan bibliographies, and has introduced certain modifications in the arrangement of the catalog with the view of facilitating reference.

Work in sociology—The Ethnologist in Charge has been occupied largely in administrative work and in the editing and proof revision of the publications of the Bureau.

Dr W. J. Hoffman was occupied throughout the month in the elaboration of the material gathered among the Menomini Indians during the last four years, and especially during the last season, and satisfactory progress has been made in the preparation of this material as a monograph of that tribe among reports of the Bureau.

Publication—The Ninth Annual Report has been received and the distribution has been commenced. The Tenth Annual Report is leaving the press. The greater part of the Eleventh Annual Report has been stereotyped, and the remaining portion is passing rapidly through the printer's hands. The Twelfth Annual Report will be put on the press so soon as conditions in the printing office permit. Volume IX of the Contributions to North American Ethnology also is practically ready for printing. A bulletin devoted to the Pamunkey Indians of Virginia, by Mr J. Garland Pollard, has been edited during the month, and is just going to the printer.

Removal of office—While the transfer of the office was practically completed during September, the removal and rearrangement of the library have occupied attention during the present month.

OPERATIONS DURING NOVEMBER

Work in sign language—Colonel Garrick Mallery has continued the preparation of a monograph on gesture signs and signals, which will embrace the material gathered since the publication of the preliminary essay on this subject in 1881 in the First Annual Report of the Bureau. In addition, some time was spent in work on the administrative portion of the Eleventh and Twelfth annual reports, now in press.

Work in mounds and other antiquities—Dr Cyrus Thomas has been occupied chiefly in researches concerning the Maya hieroglyphs and calendars, and a paper designed for publication as a bulletin was prepared. This essay deals with the time series recorded in the Dresden codex. In it Dr Thomas is able to give what would appear to be the first positive evidence that the year used in the Maya codices consisted of 365 days and that a four-year series was recognized. The Maya year was

made up of 18 months of 20 days each, but these days were used in series or groups of 13, thus forming a highly complex calendar system, involving many interesting relations.

Work in eastern archeology—Professor W. H. Holmes has remained in the office, busily employed in the preparation of papers relating to stone implements and ceramics. Among the special subjects dealt with during the month are (1) an examination and comparative study of the use of animal forms and symbols in the development of pottery ornamentation; (2) a study of certain aberrant forms of ornamentation of pottery in southeastern United States, by which a prehistoric invasion of the Caribs may be demonstrated; and (3) a study of mortuary utensils, including pots, etc, which, after breaking, were buried with the dead, as well as similar utensils manufactured either as fragments or as pierced kettles, etc, made in similitude of the utensils destroyed by piercing before burial. The last-named study is of especial significance, in that it would indicate unexpected recency of many arts and structures hitherto regarded as prehistoric, if not of remote antiquity.

Work in western archeology—The report of Mr Cosmos Mindeleff, covering the period from October 20 to November 25, indicates that he has actively continued surveys and collections among the cliff ruins of Arizona. Thirty-five ruins were visited, ground plans procured of all but two or three, and photographs and notes were freely taken. The work is yielding results beyond anticipation, and Mr Mindeleff is now of opinion that it will be possible to classify the ruins and establish a chronologic sequence throughout a series commencing perhaps in pre-Columbian time, certainly in pre-Spanish time, in this region, and extending thence well into the time of definite history. One of the ruins seemed to record in its structure and characteristics a transition between measurably distinct culture stages. Again the work was somewhat retarded, though less seriously than earlier in the season, by bad weather.

Work in synonymy—Mr James Mooney continued field work throughout the month. The early days were spent with the Caddo and affiliated tribes north of the Washita in Oklahoma,

investigating the Ghost dance and collecting the songs used therein by means of a graphophone. Ghost-dance songs, together with songs of war and games, were obtained also from the Kiowa and Wichita Indians, and from all of the tribes other songs were collected by means of the graphophone, both in single voice and chorus effects. The mescal ceremony of the Comanche was studied, and a large quantity of the interesting drug used therein was procured for chemical analysis and physiologic experiment, the mescal acting apparently as a stimulant or paratriptic of remarkable potency. A number of photographs illustrating ceremonials, as well as individual characteristics, customs, costumery, etc. were procured, and Mr Mooney was able to obtain a considerable and highly interesting collection of objective material for office study and preservation in the National Museum. Some data for the Tribal Synonymy were also gathered.

Mr F. W. Hodge has been able to give a portion only of his time during the month to work on the Synonymy, his energies being expended chiefly in the arrangement of the library and in enlarging the scientific exchange list of the Bureau. The work in the latter direction has met with gratifying success, the regular accessions of the library being largely increased. Mr Dinwiddie has aided in the work pertaining to the library.

Work in mythology—Mr F. H. Cushing has continued the study of primitive games, divinatory and ceremonial, and his report on the subject, prepared in conjunction with Mr Stewart Culin, is nearly ready for publication. Meantime he has carried forward his more general studies in mythology, giving special attention to the origin and primitive use of fire. Fire myths are nearly universal and fire worship common among primitive peoples; and it is the possession of the art of fire making which, perhaps more than any other characteristic, distinguishes mankind from the lower animals. The beginning of human conquest of fire has not yet been traced clearly, but Mr Cushing's researches are contributing materially to knowledge of the subject.

During the earlier part of the month Mrs Matilda Coxe Stevenson continued the preparation of an important paper

on Zuñi ceremonials, making satisfactory progress therein. Throughout the later portion of the month her work was unfortunately interrupted by serious illness.

Work in linguistics—During the earlier half of the month Mr J. Owen Dorsey was occupied chiefly in recording the Winnebago myths dictated by Philip Longtail, who has been found to possess a wealth of information relating to the language, beliefs, and customs of his tribe. Eight important texts and many explanatory notes were acquired through his aid. During the later portion of the month Mr Dorsey completed proof revision of his "Study of Siouan Cults," forming part of the Eleventh Annual Report, and began the preparation of the index. He also completed the correction of the final proof of the preface to volume IX of the Contributions to North American Ethnology, and brought to substantial completion the index to this volume. Meantime he continued arranging and supervising the arrangement of linguistic and other manuscripts in the fireproof vaults in the office. More than half of these manuscripts, most of which are unique and invaluable to ethnologic students, are now arranged in the vaults and a systematic catalog thereof prepared with a view of future publication.

Dr Albert S. Gatschet continued work on the Peoria language, giving special attention to its grammar. A large amount of material has been extracted from manuscript notes and arranged in categories based on the animate and inanimate forms of adjective and verb; on the modes of forming plurals in the substantive, adjective, and pronoun; on the differences in inflection of transitive verbs without object, with object in the singular, and with object in the plural; on comparisons of Peoria inflection with parallel forms in other Algonquian languages, etc. During the last fiscal year Dr Gatschet began the compilation of a comprehensive table of Algonquian dialects, embracing a series of terms in twenty-five tribal branches of that stock. Important contributions to this comparative list have been made during the last two months. These comprise names for parts of the human and animal body, for a number of animals, plants, and implements, for meteoric phenomena and

elementary concepts, for color adjectives, and for divisions of time. With great zeal Dr Gatschet also continued at home the preparation of vocabularies of the Natchez language of Mississippi, being efficiently aided by Mrs Gatschet. His Natchez vocabulary, combined with that of the late Albert Pike (which is in need of correction as to phonetics), comprises about 4,000 vocables.

Mr J. N. B. Hewitt was engaged during the earlier part of the month with Mr Dorsey in the classification of linguistic manuscripts with a view to arrangement in the vaults. The later portion of the month was occupied largely in transcribing on cards the Cayuse (Umatilla) vocabulary of Reverend J. B. Brouillet. At the same time a comparative study of this language with that of the Nez Percé was carried forward with interesting results. Among other relations, it was found that at least six of the numeral digits are formed from apparently common bases.

Work in bibliography—Mr James C. Pilling carried forward with energy his work on linguistic bibliography. Finding it necessary to consult rare works not to be found elsewhere, he visited the Lenox and Astor libraries during the month, thereby verifying references relating to different numbers of the series and enabling him to complete the Wakashan bibliography, which is now practically ready for the press. After his return he was engaged continuously in completing this bulletin and in preliminary work on other numbers of the series.

Work in sociology—The chief sociologic work during the month was that conducted by Dr W. J. Hoffman, who has been engaged on the ethnography of the Menomini Indians. He has completed a detailed description of the ritual and dramatized ceremonials of the several cult societies of this tribe, and he has also arranged in form for publication a number of myths and folk-tales.

Publication—The publications in press in various stages and for the greater part nearly ready for issue are the following: The Tenth, Eleventh, and Twelfth Annual reports, volume IX of the Contributions to North American Ethnology, and the bulletin, by J. Garland Pollard, on the Pamunkey Indians of Virginia.

There are in hand and nearly or quite ready for the press the Thirteenth Annual Report and material for the Fourteenth Annual; Mr Pilling's Bibliography of the Wakashan Languages; a monograph on Aboriginal Pottery of Eastern United States, by Professor Holmes; and a paper on Prehistoric Trephining in Peru, by Dr Manuel Antonio Muñiz; a bulletin on the Maya Calendar System deduced from the Dresden Codex, by Dr Cyrus Thomas; and a bulletin on Primitive Gaming, by Mr F. H. Cushing and Mr Stewart Culin. In addition, various other reports are approaching completion.

Résumé of field work—Field work was continued during the month in Oklahoma and Arizona; in the former Mr Mooney was engaged in studies and collections pertaining to the Kiowa, Comanche, and Caddo Indians; in the latter Mr Cosmos Mindeleff made important surveys and researches among the Pueblos.

Résumé of office work—A large part of the energies of the Bureau have been devoted to work in linguistics and sign language. Colonel Mallery has continued the preparation of the report on the latter subject; Mr Dorsey, Dr Gatschet, and Mr Hewitt have been engaged in linguistics and have made progress in recording vocabularies and grammars of the rapidly passing peoples native to this country. Contributions to the same subject have been made by Mr Mooney and Dr Hoffman. Mr Pilling's bibliographies of Indian linguistics have already come to be recognized as the standard throughout the world, and his work thereon has been continued with increased energy.

The arts of our aborigines continue to receive attention. Professor Holmes has continued researches and the preparation of reports on the arts of eastern United States, while Dr Thomas has been occupied with reports relating to various arts of the interior and the southwest. Mr Cushing, Mr Dinwiddie, and others have contributed to this subject.

The beliefs of the aborigines remain under investigation, from which fruitful results have already flowed, though the richest product has yet to be garnered. Mrs Stevenson, Mr Cushing, Mr Mooney, and Dr Hoffman have all contributed to the stock of knowledge concerning these primitive beliefs.

The institutions of the Indians, including tribal organizations, etc, have received some attention. The chief work on this subject has been that relating to the synonymy or cyclopedia of tribal names, which must form one of the bases for the researches in sociology. Mr Hodge has given much energy, and Dr Hoffman a part of his time to researches relating to primitive institutions.

The administrative work of the Bureau has been carried forward in such manner as to minimize expenditure of time and energy on the part of the scientific collaborators.

OPERATIONS DURING DECEMBER

Work in sign language—Colonel Garrick Mallery has continued the arrangement for publication of material collected during several years past relating to gesture signs and signals. His progress in the preparation of text and illustrations for the monograph on this subject has been highly satisfactory.

Work in mounds and related antiquities—Dr Cyrus Thomas early in the month critically read the introductory characterization of his monograph on mounds, which was prepared by the Director. The greater part of the month was occupied in examining the various calendar systems of Central America and in making comparative studies of these calendars in connection with those of Polynesia, and especially of Hawaii. His recent work has enabled him to revise and make important additions to his memoir on "The Maya Year," just going to press as a bulletin.

Work in eastern archeology—Professor W. H. Holmes has continued work in the office on his monograph relating to aboriginal ceramics, and satisfactory progress has been made in preparing the text and illustrations for the press. His researches are conducted in a comprehensive manner and serve to indicate significant relations between the development and ethnic relations of different peoples and arts, both indigenous and derived from neighboring tribes. His previous discovery of the influence of Carib art on the natives of the southeastern portion of the country proves only a forerunner of a series of discoveries in ethno-technic relations. This important subject will be discussed at length in Professor Holmes' report.

Work in western archeology—Writing under date of December 24, Mr Cosmos Mindeleff reports satisfactory progress in the investigations of the cliff ruins of Canyon de Chelly and Canyon del Muerto. During the month a number of ruins were visited and examined, and several new points were developed. Special attention was given to the tillable lands in the canyon, and Mr Mindeleff believes that the data thus obtained will throw light on the character, mode of life, and developmental history of the cliff-house peoples.

Although the operations in this region have been retarded by snow storms, sand storms, and the partly-frozen condition of the streams, rendering them impassable to animals, the progress of these researches has been satisfactory. Mr Mindeleff has now so planned his work that during the worst weather he remains in camp engaged in mapping and in the elaboration of his notes, with a view to their publication on his return.

Work in synonymy—Mr James Mooney, having returned from the field, was occupied throughout the month in office work in the process of digesting field records relating especially to the Ghost dance and the Messiah religion. He has constantly borne in mind the needs of the work on synonymy and has taken out and carded tribal names, definitions, etc. In this way material progress has been made in this branch of work. At the same time substantial progress has been made in the preparation of the memoir on the Ghost dance.

Mr F. W. Hodge has remained at work in the office, dividing his energies between the library and the synonymy. Through his efforts the exchange list of the library continues to increase; the regular accessions have been augmented nearly 50 per cent; the additions to the library since installation in the present quarters fill three large cases. Mr Dinwiddie aided in the library work during a part of the month, a part being occupied in photographing ceramics for Professor Holmes. Mr Hodge was able to carry forward to some extent the preparation of material for the Synonymy; and some progress in the same direction was made also by Mr Dorsey and Dr Gatschet.

Work in mythology—Mr Frank Hamilton Cushing was engaged in the office continuing the preparation of his paper on

"Arrow Games and their Variants in America and the Orient." Many curious and presumptively significant relations are brought to light by means of this study. Mr Stewart Culin, who is engaged jointly with Mr Cushing in this work, has obtained additional data relative to early Chinese games of similar character. Mr Cushing says: "A study of these games reveals the fact that they were actually played with arrows or were still recognized as arrow games by the players themselves as late as during the eleventh and twelfth centuries B. C., and thus a historic evidence of the arrow origin of lot and dice games in the Orient, confirming conclusively, in Mr Culin's estimation, my hypothesis, founded on a study of specimens only, as to the identical origin of such games in America and as to their extremely archaic character, has been secured." Just before the end of the month Mr Cushing was so fortunate as to come in contact with an educated young Aztec-Spanish Mexican, Louis O. Moctezuma, from whom he will doubtless be able to obtain much additional information in relation to the primitive games of southwestern United States and Mexico. This study by Messrs Cushing and Culin is yielding results of unexpected, and it would appear remarkably high, ethnic value.

Mrs M. C. Stevenson's work has unfortunately suffered interference through serious illness, but progress has been made in the arrangement of illustrative material and text for a report on Zuñi ceremonials.

Work in linguistics—During the earlier part of the month Mr Dorsey continued the arrangement of manuscripts in the fireproof vault. He also made progress in the preparation of the index to volume IX of the Contributions to North American Ethnology, and was occupied for some time in transcribing Kwapa material for use in the field in January and February. Some time was spent also in indexing his memoir on "A Study of Siouan Cults," now in press in the Eleventh Annual Report. Some days were spent also in preparing for a field trip.

Dr Albert S. Gatschet continued work on his notes relating to the Peoria language, and practically completed the extraction of terms for the vocabulary, and nearly completed the extraction of grammatic elements. His work on this language

will, it is thought, form a standard treatise on aboriginal American linguistics.

Mr J. N. B Hewitt was occupied a part of the month in arranging manuscripts in the fireproof vault, under the direction of Mr Dorsey. The later part of the month was spent in the study of the "Old Cayuse" language, the affinities of which have not hitherto been understood The results of his study tend to indicate that the Waiilatpuan family is really a branch of the Shahaptian. Should further research indicate this to be true, it will be an important addition to knowledge of the distribution of linguistic stocks in northwestern United States.

Work in bibliography—During the earlier part of December Mr Pilling was engaged in completing for the press the manuscript of his Bibliography of the Wakashan Languages. This treatise was transmitted for publication on the 8th and is now in press, and proofs of the earlier portion have been received. The remainder of the month was occupied in correspondence and in researches relating to the literature of several linguistic families not yet completed, and progress was made in the preparation for the press of the manuscript of the Bibliography of the Shahaptian Languages.

Work in sociology—The chief work in this direction during the month was that of Dr W. J. Hoffman, who has continued the preparation of his report on the Menomini Indians. During the month the chapters relating to the cult ceremonials and mythology have been prepared, and illustrative material has been brought together.

Résumé of field work—Field work was continued in only one region, namely, in the Pueblo country of the southwest, where Mr Cosmos Mindeleff has been engaged in surveys and researches pertaining to the cliff ruins.

Résumé of office work—The researches in the office have pertained chiefly to linguistics, including gesture language. A monograph on gesture speech among the Indians is approaching completion; three linguists have made substantial progress in researches relating to the languages of tribes in different parts of the country, and two other students, engaged in related work, have elaborated the linguistic material of other tribes;

and Mr Pilling has carried forward his researches relating to the bibliography of aboriginal linguistics and has sent another memoir to press.

The arts of the American Indians have remained under investigation by Professor Holmes and Dr Thomas, and incidentally by other collaborators of the Bureau, and a large number of facts have been arranged and systemized for publication.

The beliefs of the aborigines have been studied by Mrs Stevenson, Mr Cushing, Mr Mooney, and Dr Hoffman, and thereby knowledge concerning this interesting subject has been extended and classified.

The institutions of the American Indians have continued to receive attention chiefly by the Ethnologist in Charge, and the synonymy of Indian tribes, which must form a basis of definite research relating to this subject, has been advanced and is in part practically ready for publication.

The administrative work of the Bureau has been conducted, as heretofore, with the aim of facilitating to the fullest extent the scientific researches. The library is arranged in such manner that the books, pamphlets, and manuscripts are readily accessible. All the linguistic manuscripts and a part of the other manuscript documents are systematically arranged in fireproof vaults and a reference catalog is in preparation, and a simple and definite system of time records has been introduced.

Publications—No reports have been issued during the month, though the printing of the Tenth Annual was advanced and the administrative portions of the Eleventh and Twelfth were composed. The bulletin on the "Pamunkey Indians," by J. Garland Pollard, is in proof, and Mr Pilling's Bibliography of the Wakashan Languages was sent to the printer and a batch of galley proofs has been received. Two bulletins were prepared for the press during the month, viz, "Chinook Texts," by Dr Franz Boas, and "The Maya Year," by Dr Cyrus Thomas.

OPERATIONS DURING JANUARY

Work in sign language—Colonel Garrick Mallery has continued the collation of material relating to gesture signs and signals collected by him and other officers of the Bureau during the last decade. The arrangement of this matter is now

so far completed as to render definite the plan for the monograph on the subject, and the writing daily produced will serve as copy for the printer. Meantime progress has been made in the preparation of the drawings required to illustrate the text, for from the nature of the case graphic illustration must constitute a large and essential part of the work. The discussion of the subject includes comparison with gestures and pantomimes of other peoples in different parts of the world, including instructed and noninstructed deaf mutes.

Work in Indian hieroglyphs—Dr Cyrus Thomas was employed throughout the month in examining and comparing the various Central American and Mexican calendars and calendaric inscriptions, and in studying the relations of these to the Polynesian calendars. This comparative work is yielding results of interest and suggestiveness. A part of the work included the preparation of supplementary matter for and revision of proofs of a memoir on "The Maya Year," now in press as a bulletin. The linguistic data bearing on the subject have been placed in the hands of Dr Gatschet for critical examination.

Work in eastern archeology—Professor W. H. Holmes has continued the preparation of texts and illustrations for his monographs on ceramics and stone art, and has made satisfactory progress. As collateral to the last-named research he has during the month arranged for publication a bulletin relating to an aboriginal quarry, the product of which was used for the manufacture of stone implements, on the Peoria reservation, Indian Territory.

Work in western archeology—Mr Cosmos Mindeleff remains in the field continuing researches relating to the cliff ruins of Arizona. Progress in exploration was in some measure retarded, but the plan of work was such that no time was lost, the hours and days of storm being occupied in arrangement of notes, execution of plans, and other office work in camp.

Work in synonymy—Mr James Mooney was occupied in the office in the preparation of his final report on the Ghost dance and, in connection therewith, in the accumulation of material relating to the tribal synonymy of the eastern division of the Siouan stock.

Mr F. W. Hodge has continued to divide his attention between work on the Synonymy and the arrangement of the contents of the library. A considerable amount of manuscript of the Synonymy has been made ready for publication. The accessions to the library continue to increase at a highly satisfactory rate.

Work in mythology—Mr Frank Hamilton Cushing has continued the preparation of his monograph on "Arrow Games and their Variants in America and the Orient," in the preparation of which he has had the collaboration of Mr Stewart Culin. Mr Cushing has received great benefit from information relating to Mexican games derived from Mr Louis O. Moctezuma, a well-educated young Aztec-Spanish Mexican, well acquainted with the native Indian games of his country. The importance of this study of games becomes more apparent as the work progresses, for among the aborigines games were played not for amusement, as among civilized people, but chiefly for divination, which was practiced in connection with industries and enterprises of all sorts; so that divinatory games occupied a large place in the thought and exercised an important influence in the daily life of these people.

Mrs M. C. Stevenson, though not completely restored to health, has continued work on her monograph on the Zuñi, and good progress has been made in the preparation of both text and illustrations.

Work in linguistics—The month was spent by Reverend J. Owen Dorsey in the field, chiefly at the Kwapa Mission in Indian Territory. The trip, which was a hasty one, ending with Mr Dorsey's return about the end of the month, yielded important results, including (1) the revision of Kwapa linguistics previously recorded; (2) partial revision of the list of Kwapa gentes; (3) an important list of local geographic names; (4) a list of 254 personal names; (5) detailed information respecting the wapina^n, or chief deity of the Kwapa tribe; (6) a list of Kwapa dances; (7) a revision of the Kwapa words and phrases recorded by Lewis F. Hadley; (8) ten Kwapa texts, accompanied by explanatory notes; (9) a series of distinctions in pronunciation not previously known;

and (10) a good series of photographs of the survivors of the Kwapa tribe.

Dr Albert S. Gatschet pushed forward practically to completion, so far as present data will permit, his work on the Peoria language, and after comparison with certain rare or unique vocabularies and grammars of related languages the matter will be ready for the press. In the later portion of the month he utilized an opportunity for collecting additional material pertaining to the Algonquian languages among the youth of the Indian school in Philadelphia.

Mr J. N. B. Hewitt was occupied during the greater part of the month in the preparation of a report on the linguistic relations of the Shahaptian and Waiilatpuan families and in examining the affinities of these groups with the Lutuamian. This study was undertaken for the especial use of the Director in determining fundamental relations among linguistic stocks of the northwest, and the research was conducted in an eminently satisfactory manner.

Work in bibliography—During the month Mr James C. Pilling's energy was divided between the collection of material for the Shahaptian bibliography and the revision of proofs of the Bibliography of the Wakashan Languages. The proof revision of bibliographic matter is especially laborious and necessarily proceeds slowly. Galley proofs of nearly all of the matter, with page proofs of a considerable portion and page revises of a quarter of the volume, were examined, corrected, and returned to the printing office during the month.

Publications—The printing of the Tenth Annual Report is announced to be substantially completed and the sheets practically ready for the binder. The Twelfth Annual Report is ready to go on the press immediately, and the Eleventh is ready, except the index, which will be completed within a few days. The revision of proofs of the bulletin on the Pamunkey Indians, by J. Garland Pollard, was completed during the month, and the document has been directed to go on the press. The bulletin comprising Mr Pilling's Bibliography of the Wakashan Languages is well advanced in composition. All of the bulletin on "The Maya Year," by Dr Thomas, is in type, and most of

the galley proofs and a part of the page proofs have been revised. The bulletin on Chinook Texts, by Dr Franz Boas, is partly composed, and the earlier galley proofs have been revised. The text and illustrations for the Thirteenth Annual Report were examined and in great part "prepared" during the month, and the bulletin on "An Aboriginal Quarry in Indian Territory" was also made ready for transmittal to the printer.

OPERATIONS DURING FEBRUARY

The field operations for the month were limited to the work of two parties, viz, that of Mr Cosmos Mindeleff in the Pueblo country and that of Mr William Dinwiddie, under the direction of Professor Holmes, in Virginia, the work of the former being part of a systematic exploration and that of the latter being of a special character designed chiefly to yield material for addition to the collections in the National Museum.

Work in sign language—Colonel Garrick Mallery has continued the preparation of a monograph on this subject. During the month substantial progress was made not only in the preparation of copy for the text, but also in the execution of drawings required to illustrate the text, the subject being one which can be presented in satisfactory manner only by the free employment of the graphic method.

Work in Indian hieroglyphs—Dr Cyrus Thomas has continued researches relating to the Maya codices. During the month especial attention was given to the symbols and names for days and months of the Maya calendar, with the view of preparing a bulletin on the subject, and during the later portion of the month satisfactory progress was made in the preparation of this bulletin. Meantime the proofs of the bulletin on "The Maya Year" were revised. Hitherto there has been some discrepancy between the aboriginal Maya codices on the one hand, and the post-Columbian Maya books and the Spanish chronicles on the other, as to the duration of the year in the calendar of these people and concerning certain other matters; but Dr Thomas' researches are resulting in the explanation and clearing away of these discrepancies and thus in establishing

more clearly than ever before the authenticity and trustworthy character of the codices.

Work in eastern archeology—Professor W. H. Holmes has been fully occupied in the preparation of reports embodying the results of his researches in the field and museum extending over several years. In seeking to discover the methods employed in aboriginal manufacture he has not been content with inferences from the form, structure, and markings of the art products, but has tested these inferences by repeating the process and with his own hands manufacturing utensils and implements in imitation of aboriginal objects, and in this way he has in many cases obtained more exact knowledge of the methods employed than would be possible by other means. The general tendency of this study is toward simplification of the processes represented in the products—e. g., he has shown that pottery, formerly supposed to have been molded in baskets or bags, was really wrought in much simpler fashion, the markings supposed to indicate the texture of baskets or bags being produced by beating or pressing with simple sticks or paddles wrapped with cord, and he finds that this beating or pressing greatly improves the texture of the clay and was thus a useful adjunct to pottery making. This discovery suggests that the supposed ornamentation was really incidental rather than primary in the minds of the potters. During the month the bulletin by Professor Holmes on "An Aboriginal Quarry in Indian Territory," with the requisite illustrations, was completed and transmitted to the Public Printer.

Early in the month intelligence came to this office to the effect that an aboriginal soapstone quarry of remarkable extent had been discovered at Clifton, Virginia, and that the owners of the quarry were willing to have the site examined and the material found therein conveyed to the National Museum. Mr William Dinwiddie was immediately dispatched to the locality, under the direction of the Ethnologist in Charge and, being impressed with the promise of a rich reward in relics of the soapstone implement makers, promptly made an arrangement with the owners, Messrs Hunter Brothers, for detailed examination and for the removal of specimens. The contract

proved timely, for within an hour representatives from another institution appeared on the ground, prepared to arrange for the removal of the material. Work was at once begun and was continued throughout the month. The quarry has been largely cleared of débris and refuse and has been found to be the finest example of aboriginal soapstone quarry known in eastern United States. A large amount of material, including some eighty partly complete soapstone pots, a number of implements used in the work, and many of the pits or depressions from which pots have been removed have already been collected, and a good series of photographs and drawings representing the quarry and the mode of operation has been made. The work is still under way. The indications are that the Clifton soapstone quarry will come to form the type for eastern United States, and that the collection therefrom in the National Museum will become the standard for that class of aboriginal industry.

Work in western archeology—Mr Cosmos Mindeleff remains in the field and reports satisfactory progress in working up the results of explorations and surveys. Inclement weather during most of the month prevented field operations, so that the explorer's time was spent chiefly in camp, arranging notes, executing plans, etc.

Work in synonymy—Mr James Mooney spent the month in elaborating the material for the synonymy of the eastern Siouan peoples and in arranging copy for text and illustrations of his report on the Ghost-dance religion of the plains tribes In connection with the work on synonymy he brought together a considerable amount of collateral material unsuitable for introduction in the condensed work, and this was put in the form of a paper on the Siouan Tribes of the East, which was partially completed.

Mr F. W. Hodge continued to divide his energies between the work on synonymy and his duties as librarian. He, too, in his researches for the synonymy, found collateral material which he brought together in the form of a separate paper on the Jumano Indians, which was nearly completed during the month.

The growth of the library during the month has been quite satisfactory, and a large number of publications of standard character, including several complete series, have been obtained.

Work in mythology—Mrs Matilda C. Stevenson has, so far as the state of her health permitted, continued the preparation of her report on the Zuñi. Most of the illustrations for this monograph are now completed, and the final revision of the copy for text is well advanced.

Mr Frank Hamilton Cushing has continued the preparation of text and illustrations relating to the arrow games of America; and Mr Stewart Culin, who is writing on the arrow games of the Orient with the view to joint publication, has also made satisfactory progress. Mr Cushing has not allowed his researches relating to divinatory games completely to interrupt his more general studies relating to Zuñi mythology; his work in this direction, being stimulated anew by the appearance of Nordenskiöld's magnificent work on the Cliff-dwellers of Mesa Verde, is yielding valuable results, which will be set forth in subsequent reports.

Work in linguistics—During the greater part of the month Mr J. Owen Dorsey was engaged in arranging the Kwapa texts collected in January and in writing the interlinear translations therefor. The material proves quite rich and is sufficiently complete for publication in case it be found inexpedient to collect additional data: the texts, with interlinear and free translations, would form a volume of fair size. Some days were spent by Mr Dorsey in the arrangement of the Winnebago texts collected earlier in the winter.

Dr A. S. Gatschet during the first half of the month remained in Philadelphia, and during this period, as well as during the later portion of the month, he was occupied in constructing a vocabulary of the Shawnee language. At the same time the grammatic elements were extracted and arranged. About 2,500 terms have already been extracted for the Shawnee vocabulary.

Mr J. N. B. Hewitt was occupied during the greater part of the month in studying the relations between the Shahaptian and Waiilatpuan groups of languages, as well as the relations

between these and the Lutuamian group. These studies, made under immediate instructions from the Director, have an important bearing on the classification of the linguistic stocks, and have already materially clarified knowledge concerning the relations of a number of tribes of northwestern United States.

Work in bibliography—Mr James C. Pilling was occupied mainly in reading and correcting proof of the Bibliography of the Wakashan Languages—now nearly finished—and in preparing a chronologic index of the same. Some time was given also to the collection of material for the Shahaptian bibliography.

Publications—The printing of the Tenth Annual Report is completed, and the sheets are in the bindery; the Twelfth Annual Report is on the press, while the Eleventh is practically ready to follow. On February 16 the Thirteenth Annual Report was transmitted through the Secretary to the Public Printer, and work thereon has already been commenced.

The bulletin on the Pamunkey Indians, by John Garland Pollard, is completed, and the edition has been delivered and distribution commenced. Mr Pilling's Bibliography of the Wakashan Languages is all in pages, and the revision of the proofs is nearly completed. Dr Thomas' bulletin on The Maya Year has also reached the stage of page proofs, and all of the first and part of the second page proofs have been revised. The bulletin on Chinook Texts, by Dr Franz Boas, is mainly in type, and about half of the proofs have been revised. A bulletin by Professor Holmes on "An Ancient Quarry in Indian Territory," alluded to in previous reports, was sent to press during the month.

OPERATIONS DURING MARCH

The chief work of the month has been in the office. Field operations have been carried forward only by Mr Cosmos Mindeleff in the Pueblo country of Arizona, and by Mr William Dinwiddie, under the direction of Professor Holmes, in Virginia.

Work in sign language—Colonel Garrick Mallery has continued the preparation of a monograph on Gesture Signs and

Signals, and satisfactory progress has been made in the completion of the text of this monograph, and the execution of illustrations has been forwarded with energy, over fifty important drawings having been made.

During the month the printed sheets of the monograph on pictography were received from the printing office for the purpose of placing the plates.

Work in Indian hieroglyphs—Early in the month Dr Cyrus Thomas finished the revision of proofs of the bulletin on the Maya year. The remainder of the month was occupied in the preparation of a memoir on the signification of the symbols and names of days and months in the Central American calendar. The task has proved of unexpected magnitude, and extended comparisons and studies have been found necessary. This work is approaching completion.

Work in eastern archeology—Professor W. H. Holmes has continued the preparation of monographs on the fictile ware and stone art of eastern United States, and both works are approaching completion, a large number of illustrations, both photographic and drawn in pen and ink, having been prepared and arranged. In addition, some time has been devoted to the arrangement of material in the National Museum, such material being in part newly collected and in part that returned from the World's Columbian Exposition at Chicago. Also he revised and prepared an introduction for a bulletin by Gerard Fowke on "Archeologic Investigations in James and Potomac Valleys." Furthermore, some days were spent in the field at the Clifton soapstone quarry.

Mr Dinwiddie was occupied throughout the month in clearing the Clifton soapstone quarry noted in the last report, in studying the methods employed by the aboriginal quarrymen, in making photographs of the quarry, etc. The locality proves to be of great interest. By reason of the abundance of material in the form of implements, partially completed or imperfect vessels, together with pitted surfaces from which the blanks were taken, the quarry may be regarded as a type. The remarkably rich collection of objects will greatly enhance the material relating to aboriginal industry already in the National Museum.

Work in western archeology—Mr Cosmos Mindeleff remains in the field, engaged chiefly in the elaboration of maps and notes relating to ruins examined during the preceding months of the fiscal year.

Work in synonymy—In the course of his work relating to the synonymy of the eastern Siouan peoples, Mr Mooney brought together a large amount of information relating to these tribes, a part of which is new, while another part is recorded only in rare literature and finds its explanation in the newer information. He has been able to identify several tribes whose habitations were recorded by earlier explorers and to trace the migrations of each. This information, which is too elaborate for introduction in the Synonymy, but which nevertheless elucidates that work, has been brought together in a paper on the "Siouan Tribes of the East," which will shortly be transmitted for publication as a bulletin. Meantime Mr Mooney has continued his general work on the synonymy and has at the same time carried forward the preparation of his work on the Ghost dance.

Mr Hodge continued work on the synonymy of the southwestern tribes, and also kept charge of the library. In addition, he made during the month a journey to New York for the purpose of examining a collection of manuscript documents relating to equatorial America in possession of Professor Le Metayer de Guichainville. The accounts and samples of these documents which had reached Washington indicated that they might prove of great value to students of the early history of the Spanish conquerors and their relations to the aborigines. Considerable information of importance was obtained from the examination of the collection.

The accessions to the library continue numerous and valuable, the current literature of anthropology in the different countries being especially well represented.

Work in mythology—Mr Frank Hamilton Cushing has continued his study on the arrow games of America, and satisfactory progress has been made in the preparation of text and illustrations.

Mrs Matilda C. Stevenson is still engaged in the preparation of her report on the Zuñi, though progress has been hindered

by ill health. The myths of the aborigines of the southwest are of exceptional interest, since they exemplify in many cases the influence of environment on the minds of the devotees, and in some cases, moreover, they indicate the migrations of the peoples among whom they are found. Accordingly, the studies seem of exceptional importance in American anthropology.

Work in linguistics—Dr A. S. Gatschet continued the extraction of vocables and grammatic elements of the Shawnee language from the material collected by him in 1892 and 1893. The systematically arranged material is now inscribed on somewhat over two thousand cards, in condition for ready examination or publication. Several vocabularies and grammars submitted to the Bureau during the month were also examined.

Mr J. Owen Dorsey completed the arrangement of the Winnebago texts with interlinear translations early in the month. These texts, collected during the present fiscal year from Philip Longtail, have proved a rich source of information relating to language, customs, and beliefs of the tribe to which they pertain. The later portion of the month was spent in preparing an introduction to the synonymy of the Siouan family and to the study of the connection between onomatology and mythology as exemplified in the Siouan languages. In both these directions satisfactory progress was made.

Mr J. N. B. Hewitt spent a considerable part of the month in the study of the relations of the Lutuamian language for the immediate use of the Director. This study affords an important basis for the classification of linguistic stocks of northwestern United States. It has been conducted with zeal and success.

Work in bibliography—Mr James C. Pilling has continued the revision of the proofs of the Wakashan bibliography, which is now substantially completed. Meantime he has gone on with the preparation of material for the Shahaptian bibliography, now nearly ready for the press. The completion of this work is delayed by some uncertainty concerning the relations of certain northwestern languages, upon which Mr Hewitt has been at work; but while this delay affects the issue of the

Shahaptian bibliography it does not retard the bibliographic work in general, for the study of literature and the collection of titles relating to other western stocks receive constant attention. A large number of titles relating to the languages of Mexico have recently been brought together.

Publications—The Tenth Annual Report has passed through the folding room and the Twelfth is going through the press, while the Eleventh will at once follow. The Thirteenth Report is in the printer's hands and proofs are daily expected. The bulletin on the Pamunkey Indians by John Garland Pollard has been distributed. The revision of the proofs of Dr Thomas' bulletin on The Maya Year has been completed and the work has been ordered stereotyped. Mr Pilling's Bibliography of the Wakashan Languages has been revised, and most of the matter is stereotyped. Three signatures of the bulletin on Chinook Texts by Dr Franz Boas are in pages, and both page and galley proofs are passing rapidly through the hands of the author and through this office. Proofs of the bulletin by Professor Holmes on "An Aboriginal Quarry in Indian Territory" are daily expected. Two bulletins, respectively by Mr James Mooney on "Siouan Tribes of the East" and Mr Gerard Fowke on "Archeologic Investigations in James and Potomac Valleys," have been prepared during the month and will be transmitted for printing so soon as the illustrations have been completed.

OPERATIONS DURING APRIL

The field work of the month has been limited to that carried forward by Mr Cosmos Mindeleff in the Pueblo country, and restricted operations in Virginia by the Ethnologist in Charge, Professor W. H. Holmes, and Mr William Dinwiddie; with these exceptions, the operations represent work conducted in the office.

Work in sign language—Colonel Garrick Mallery has made satisfactory progress in the preparation of his monograph on gesture signs and signals. A number of the requisite drawings have been executed and a portion of the text has been made ready for the printer.

Work in Indian hieroglyphs—Dr Cyrus Thomas has continued his researches relating to the Maya hieroglyphs. During the month he brought to substantial completion the text of the bulletin relating to the day names and symbols of the Maya calendar; at the same time he supervised the execution of the requisite illustrations. Among the interesting questions connected with the Maya calendar is the origin and significance of the hieroglyphs used as symbols for days. Some of these have already been interpreted by Brinton, Seler, and others, and it has been inferred from these interpretations that the entire system of symbols represents a system of mythologic concepts; so that the calendric inscriptions not only comprise chronologies akin to those of the plains Indians, but also embody records of the beliefs of the writers. Dr Thomas has been able to confirm some of the conclusions reached by other investigators and to correct others.

Work in eastern archeology—Professor W. H. Holmes has completed the preparation of his monographs on fictile ware and stone art. Both of these works are substantially completed as to text and illustrations. During the month a large number of objects previously collected have been examined, and the results of the examination are incorporated in the report. A few additional trips by Professor Holmes and Mr Dinwiddie were made to the Clifton soapstone quarry for the purpose of completing the collections of material from this point, and some of this material has been used as subjects of discussion and illustration in Professor Holmes' monographs. In addition, the Ethnologist in Charge and Professor Holmes repaired to the Pass creek site, near Luray, Virginia, for the purpose of collecting additional data relating to the stone art products in the large mound on this site. A considerable additional collection of stone work was found in the mound and vicinity; also an aboriginal cemetery was discovered in the plowed field, and a typical collection of mortuary pottery was made. The stone implements are of exceptional interest in that the turtleback forms are rejects from the manufacture of celts—the rejects hitherto studied by Professor Holmes represent predominantly or exclusively the manufacture of narrow,

pointed objects, such as spearpoints or arrowheads. The collections at Pass creek prove rich, and several of the objects have already been drawn for incorporation in Professor Holmes' report. The geologic relations of the material used in the manufacture of the implements are also of exceptional interest, and were worked out in detail.

Work in western archeology—Mr Cosmos Mindeleff has continued operations in New Mexico. By reason of the approaching exhaustion of his allotment, the exploratory operations were somewhat curtailed and the elaboration of notes and diagrams proportionately extended.

Mr Mindeleff finds the Pueblo country overrun by speculators in primitive pottery and other relics, which are collected and sold as products of Aztec art. The operations of these speculators are ruinous; the material is collected without adequate study of association, so that its value as a record of aboriginal conditions is largely lost; and in addition the methods employed are destructive of all material except that of portable character and commercial value. Mr Mindeleff is making every attempt to forestall these destructive operations; and to enable him to do so advantageously he is continued in the field at some sacrifice in efficiency of work on reports and illustrations.

Work in synonymy—Mr F. W. Hodge has continued work on the synonymy of the southwestern families and tribes in addition to the routine work of the library, and in both directions his work has been eminently satisfactory. The preparation of the synonymy involves extended literary research, and progress is necessarily slow; but the collection of data has now reached such a condition as easily to permit preparation for the press, and it is planned to begin publication as soon as practicable in bulletin form by linguistic stocks.

Mr James Mooney completed the preparation of his bulletin on the "Siouan Tribes of the East," and this work will be forwarded for publication so soon as the map required for its illustration is completed. Since the completion of this manuscript, Mr Mooney has been engaged on the final chapters of his report on the "Ghost-dance Religion," which is approaching completion.

Work in mythology—Mr Frank Hamilton Cushing has continued the preparation of a memoir on the arrow games of America, and Mr Stewart Culin, who has shared and supplemented Mr Cushing's work by researches relating chiefly to divinatory games in other countries and comparative studies in primitive gaming in all countries, has completed his contribution to the subject. The researches of Messrs Cushing and Culin have brought to light many significant facts bearing on the usages, beliefs, and ethnic relations of early peoples.

Mrs Matilda C. Stevenson has continued the preparation of her report on the Zuñi.

Work in linguistics—Mr J. Owen Dorsey divided the month between (1) recording on dictionary slips the words of the Winnebago texts recorded last year, and (2) the extension of the phonetic alphabet required for the utterance of primitive languages. In the former work good progress was made; and in the latter, thanks to the aid furnished by the venerable Archdeacon John Joseph Nouri, of the Eastern Church under the Chaldean Patriarch of Babylon, excellent progress also was made.

Dr A. S. Gatschet continued the extraction of Shawnee vocables and grammatic elements; in addition, he gave some time to perfecting the Peoria, to making additions to the comparative vocabulary of the Algonquian languages, and to the study of the Mexican material recently collected by Dr Carl Lumholtz.

Mr J. N. B. Hewitt continued general linguistic studies relating to the northwestern families, and in addition made, in connection with Dr Gatschet, critical examination of the Lumholtz Mexican material and transcribed a considerable part of the Tarahumari vocabulary, with a view to publication. The material collected by Lumholtz is of great interest, since several of the tribes examined yet retain the primitive condition in many respects, the language in particular being hardly modified through the advent of white men. In one case his linguistic material represents a decadent dialect, only three or four individuals remaining who are familiar with it.

Work in bibliography—Mr James C. Pilling has continued the preparation of material for the Shahaptian bibliography,

which would be ready for the press were it not deemed well to withhold it for possible modification, growing out of a change in classification of the northwestern families. Meantime he has made good progress in the collection and arrangement of the elaborate material for bibliographies of the Mexican families. During the month the revision of page proofs of the Wakashan bibliography was completed, and that document has been stereotyped and sent to the press.

Publications—The Tenth Annual Report is in the bindery; the Twelfth, including its illustrations, has been printed and is now in the folding room; the Eleventh is on the press. Proofs of the process illustrations of the Thirteenth Report have been received and galley proofs of the text are daily expected. The bulletin on "The Maya Year" by Dr Cyrus Thomas has been delivered and the distribution is under way. Mr Pilling's Bibliography of the Wakashan Languages has been ordered on the press. The bulletin on "Chinook Texts" by Dr Franz Boas is passing through the printer's hands somewhat slowly by reason of the highly technical character of the composition and the limited type available for it, and by reason of the fact that the author finds it necessary to revise two proofs at his present residence in Chicago. Proofs of the illustrations of Professor Holmes' bulletin on "An Aboriginal Quarry in Indian Territory" have been received, and the text will doubtless follow in a few days. The bulletins by Messrs Mooney and Fowke are in the hands of the artist for the final arrangement of illustrations.

OPERATIONS DURING MAY

As during preceding months the chief work has been confined to the office, field operations being limited to the surveys by Mr Cosmos Mindeleff in the Pueblo country, together with a single field trip by the Ethnologist in Charge.

Work in sign language—Colonel Garrick Mallery has continued the preparation of his monograph on "Gesture Signs and Signals," which is now well advanced. In the progress of the work various significant points are brought out, which will be duly elaborated in the final report. Among recent results may

be mentioned a body of evidence tending to explain the supposed community of sign language not only among very distinct tribes, but among primitive peoples of widely diverse nationalities. The recent comparison of facts indicates that the ready interchange of ideas by gestures among primitive peoples is simply the outcome of sense training in a certain direction, and that the apparent mystery in the interchange is due only to the fact that the cultured observers to whom it appeals lack this particular sense training. This and other problems connected with sign language are receiving close attention from Colonel Mallery.

Work in Indian hieroglyphs—Dr Thomas continued his researches relating to the Maya symbols and other Mexican and Central American hieroglyphs. His bulletin on this subject is completed in accordance with the initial plan, but is withheld pending the settlement of certain philologic questions suggested in the course of the inquiry. The researches in hieroglyphs are of peculiar difficulty, but Dr Thomas has made satisfactory progress during the month.

Work in eastern archeology—During the month Professor W. H. Holmes terminated his work in this Bureau and repaired to Chicago to assume charge of the department of anthropology in the Field Columbian Museum, his resignation taking effect with the close of the month. Before departing he turned in the manuscripts and illustrations for two monographs—one on fictile ware, the other on stone art.

Work in western archeology—Mr Cosmos Mindeleff has continued operations in New Mexico, though by reason of the exhaustion of his allotment the work has been less extensive than during the earlier months. Satisfactory progress has been made in the preparation of maps, plans, and other manuscripts.

Work in synonymy—Mr F. W. Hodge has continued the preparation of manuscript for the synonymy of the southwestern tribes. During the month advantage was taken of the presence in Washington of Dr Carl Lumholtz, who has spent some seasons among the tribes of Chihuahua, Mexico, and much valuable information regarding the Tarahumari and

Tepehuani Indians and their settlements was obtained from him for use in the synonymy of the Piman stock. Meantime Mr Hodge continued the administration of the library, and reports valuable additions by gift and exchange.

Mr James Mooney has continued work on the synonymy, and has also nearly brought to completion his memoir on the Messiah religion and the Ghost dance, which it is proposed to incorporate in the Fourteenth Annual Report. During the month the map required to illustrate his bulletin on the eastern Siouan tribes has been completed, and the data will be forwarded for publication within a few days.

Work in mythology—Mr Frank Hamilton Cushing has been employed on his memoir relating to primitive arrow games. Some time was spent also by him, with the assistance of Mr William Dinwiddie, in arranging figures and groups and other materials in the National Museum, and in making photographs of the most significant of these for the Museum collection.

Mrs Matilda C. Stevenson has made satisfactory progress on her memoir relating to the Zuñi, and it is expected that this elaborate report will within a few months be ready for the press.

Work in linguistics—Mr J. Owen Dorsey completed the preparation of the index to volume IX of the Contributions to North American Ethnology, and also made a critical examination of a paper by Dr Thomas concerning supposed loan words from Polynesian languages, found among the Indians of Mexico and southwestern United States. His chief work, however, was that on the Winnebago dictionary, already noted. A large number of dictionary slips, with notes, grammatic elements, and free English translations, were prepared.

Dr A. S. Gatschet was employed chiefly in the extension of his Shawnee dictionary and in extracting grammatic elements from the 750 manuscript pages of text and other material relating to this language. Meantime material additions were made to his comparative Algonquian vocabulary. He, too, made an examination of the linguistic material sent in by Dr Thomas.

Mr J. N. B. Hewitt spent the first half of the month in transliterating the Tarahumari material collected by Dr Carl Lumholtz, part of the time with the assistance of the collector.

Although satisfactory progress was made, this body of linguistic material is not yet ready for the press. The later portion of the month was spent in critical study of the comparative list of Maya and Polynesian words sent in by Dr Thomas. The results of the examination were put together in an elaborate report, which, though not designed for publication, will greatly facilitate dealing with related questions by the collaborators of the Bureau in the future.

Work in bibliography—Mr James C. Pilling practically brought to completion his Shahaptian bibliograpl y and spent a portion of the month in the extraction of title cards from the recently published Wakashan bibliography. The greater part of the month, however, was spent in collecting titles relating to the languages of extreme southwestern United States and Mexico.

Publications—During the month the Tenth Annual Report has been delivered from the Government bindery and the distribution is well under way. The Eleventh and Twelfth reports are in the bindery; galley proofs of nearly half of the Thirteenth Annual Report have been received and revised. The Bibliography of the Wakashan Languages has been delivered and distribution is in progress. The bulletin on "Chinook Texts" by Dr Boas is still passing through the printer's hands. Galley proofs of Professor Holmes' bulletin on "An Aboriginal Quarry in Indian Territory" have been received and are undergoing revision. The illustrations for the bulletins by Messrs Mooney and Fowke have been completed and they will shortly be sent forward for publication. Provision has been made for publishing a bulletin by Dr Boas on the physical characteristics of the Siouan peoples, the text of which, however, has not yet been received.

OPERATIONS DURING JUNE

The work has been confined chiefly to the office, field operations being limited to the surveys by Mr Cosmos Mindeleff in the Pueblo country.

Work in sign language—Colonel Garrick Mallery has been occupied throughout the month in comparative study and writing on gesture signs and signals.

The recent publication of Colonel Mallery's monograph on pictography in the Tenth Annual Report has stimulated interest in the general subject of picture writing and sign language, and many inquiries and suggestions in regard to the subject are received through correspondence. This fact is at once a gratifying indication of the interest felt in the subject by the people of the country and an incentive to the author to complete at the earliest possible date the monograph on which he is now engaged.

Work in Indian hieroglyphs—Dr Cyrus Thomas has continued researches relating to the symbols used in the codices and other inscriptions of the Maya and related peoples. The month was occupied in comparative studies of calendric and other terms of southwestern America, a bulletin on this subject being practically ready for publication and withheld only for the purpose of verifying certain provisional conclusions.

Work in eastern archeology—The work on this subject during the month was limited to the preparation of illustrations for some of Professor Holmes' reports by photographing groups at Piny branch, which work Mr F. H. Cushing kindly supervised, Mr William Dinwiddie assisting.

Work in western archeology—Mr Cosmos Mindeleff has continued surveys and the collection of objective material in the Pueblo country. During the month he examined a number of ruins in the valley of San Juan river, finding all of the types so abundantly represented on the Rio Verde (described in his report on that district in the Thirteenth Annual, and termed "bowlder-marked sites"). Though commonly small, some of the ruins are extensive; all are located with reference to adjacent areas of tillable land, and none are defensive. The ruins are usually found on low, irregular terraces, skirting the river chiefly on the northern side, where the conditions are more favorable to irrigation. Most of the ruins are now marked only by heaps of the water-worn bowlders, sometimes showing wall lines, but generally lying in confused heaps, often disturbed by prospectors and relic hunters. Here and there definite structures remain; in one of these Mr Mindeleff was surprised to find masonry constructed of tabular sandstones, an anomalous phenomenon requiring further study.

Mr Mindeleff concludes from his researches of the year that the first settlements in the region are marked by the bowlder-marked sites; that these were followed by small settlements and easily defended sites, accompanied by cliff dwellings, cavate lodges, etc; and that larger settlements were subsequently formed and valley sites located, not defensible as regards site, though the structures were defensive. These conclusions are in harmony with those deduced from the structures of Canyon de Chelly, where, however, the sequence is more complete. Detailed information concerning the different types of structure is reported by Mr Mindeleff.

Work in synonymy—Mr F. W. Hodge has continued work on the descriptions and synonymy of the southwestern tribes for incorporation in the cyclopedia, the chief work during the present month being the amplification of the Piman synonymy. He has remained in charge of the library, and, in addition, spent a part of the month in revising proofs of the Thirteenth Annual Report and of Professor Holmes' bulletin on "An Ancient Quarry in Indian Territory."

Mr James Mooney has brought to completion his memoir on "The Ghost-dance Religion," which is incorporated in the Fourteenth Annual Report of the Bureau. Meantime he has continued the arrangement of the material for the synonymy of the eastern Siouan tribes. His bulletin on these tribes was reexamined during the month and is forwarded herewith for publication.

Work in mythology—Mr Frank Hamilton Cushing spent a portion of the month in revising his memoir on primitive arrow games, to which reference has been made in previous monthly reports. Some time was spent also in revising and supplementing his paper on "Zuñi Creation Myths" now in press as part of the Thirteenth Annual Report. In addition, he was occupied for some days in the arrangement of figures and groups in the National Museum.

Mrs Matilda C. Stevenson has continued the preparation of her monograph on Zuñi ceremonials, making satisfactory progress therein.

Work in linguistics—Mr J. Owen Dorsey continued work on the Winnebago dictionary, together with the notes to his large

collection of Winnebago texts and the free English translation of the texts, making satisfactory progress. In addition, he prepared a list of ethnologic manuscripts relating to Indian languages, including a considerable part of the linguistic material in the archives of the Bureau.

Dr A. S. Gatschet continued the preparation of the Shawnee dictionary, giving especial attention to comparisons between this dialect and forty or fifty other dialects of the Algonquian. He calls attention to the astonishing multiplicity of the Algonquian dialectal forms and points out that, while the linguistic stock rests on a purely nominal basis morphologically, the dialectic diversification is great. Other interesting features of these languages have received attention.

Mr J. N. B. Hewitt continued the transliteration of Tarahumari and Tubari material collected by Dr Carl Lumholtz, with a view to publication, at least of the latter, in bulletin form.

Work in bibliography—Mr James C. Pilling spent the month in arranging material for bibliographies of the southwestern languages in and contiguous to Mexico. The alphabetic arrangement of the material has now progressed to the end of the letter R, the notes and collations having been made as complete as possible with the information at hand. He expresses acknowledgment to Bishop Hurst, whose rich library contains much material collected by missionaries and others relating to the Indian languages.

Publications—The Eleventh and Twelfth Annual reports are still in the bindery, but well advanced, and the editions are looked for daily; nearly a third of the Thirteenth Annual is in pages; the material for the Fourteenth Annual is ready and only awaits the passage by the Senate of the concurrent resolution authorizing publication, this resolution having already passed the House. Material for the Fifteenth Annual is in hand and practically ready for the press whenever publication is authorized. Dr Boas' voluminous bulletin on "Chinook Texts" is still passing through the printer's hands, 96 pages being stereotyped. The proofs of text and plates of Professor Holmes' bulletin on an aboriginal quarry have been approved and ordered stereotyped and printed. Bulletins by Messrs Mooney and Fowke have been sent forward and recommended for publication. Volume IX of the Contributions to

North American Ethnology, comprising Riggs' "Dakota Grammar, Texts and Ethnography," has been completed by the preparation of the index, and the document is now on the press.

SUMMARY REPORT

CLASSIFICATION OF THE WORK

As set forth on an earlier page, five primary lines of research relating to the collective or demotic characteristics of the American aborigines are pursued in the Bureau. These lines, with the corresponding branches of knowledge, comprise (1) arts, or esthetology; (2) industries, or technology; (3) institutions, or sociology; (4) forms of expression, or linguistics; and (5) opinions and beliefs, or sophiology. In addition, two primary lines of research relating to the aborigines considered as organisms are recognized, viz, somatology and psychology. Each of these seven lines of research is of such extent and importance as to form the basis for a distinct science; and each comprises a number of principal branches, any one of which is sufficiently extended to form an important specialty. Since there are only about a dozen scientific collaborators in the Bureau, it follows that there are more specialties than collaborators; and it has been found necessary to select those special lines of research which seemed of most importance, and to assign them to the collaborators best equipped for carrying them forward. Sometimes, on the other hand, it has been found desirable temporarily to combine two or more primary lines of investigation in the assignment of a single collaborator, for the purpose of utilizing opportunity—e. g., to obtain general information at a minimum cost or to procure data concerning a disappearing tribe. To meet these practical conditions, a somewhat arbitrary classification of the work has been adopted and has varied from time to time. During the year the researches have related chiefly to (1) archeology; (2) descriptive ethnology; (3) sociology; (4) pictography and sign language; (5) general linguistics; (6) mythology, or sophiology; (7) psychology, and (8) bibliography.

Classified by method, the operations of the Bureau comprise (1) field work, including exploration; (2) office researches,

and (3) publication, together with the requisite administrative work and ancillary operations.

EXPLORATION

The most extended exploratory work of the year was that of Mr Cosmos Mindeleff in connection with archeologic surveys in the Pueblo country of New Mexico and Arizona. He left Washington early in July, 1893, and, outfitting at Holbrook, proceeded to the Hopi villages of Tusayan, and toward the end of August to the valley of the Little Colorado, which he explored in some detail. Contrary to expectations, this region was found to be poor in relics of the aborigines; only a few small and unimportant ruins are scattered over the valley, and the sites were apparently occupied for short periods only. It is noteworthy that, according to Hopi tradition, it was along a valley tributary to the Little Colorado that the large timbers used in the construction of the Spanish churches and mission buildings prior to 1680 were transported on the backs of Indians from San Francisco mountains, nearly 100 miles away; and this tradition appears to find corroboration in Mr Mindeleff's observation of a party of Tusayan Indians transporting poles from the foot-hills of the same mountains over the same route by the use of burros. The reason for the dearth of ruins gradually became apparent as the explorations were continued; the topography about the Little Colorado and the character of the stream itself are such that its waters could not be controlled for purposes of irrigation by any means at the command of ancient pueblo builders; even modern engineering skill has thus far failed to control the stream, although many efforts in this direction have been made.

Only at intervals are there floodplain lands suitable for primitive cultivation and within easy reach of irrigation devices, and in such places ruins are usually found. This is notably the case near the old Sunset crossing, where, perched on the hills overlooking the floodplain, can be seen the ruins of ten or more villages, the largest of which would have accommodated a population of 200. The ground plan of this village shows a number of rectangular rooms, the whole bearing

a strong resemblance to the plan of ruins found near the Tusayan villages. Tradition recites that this village (or possibly a neighboring one) was called Homolobi, and was occupied by the Water clan, the last to reach Tusayan. The indications are that the period of occupancy was short.

Mr Mindeleff found the river at Mormon crossing, or "The Crossing of the Fathers," too high for fording, and his party proceeded with difficulty along the northern bank to the old Sunset crossing near Winslow. After fording at this point, the party proceeded to Verde, crossing the Mogollon mountains by way of Sunset and Chaves passes. At Verde an old field outfit was taken up, and the party returned by way of Flagstaff, reaching Little Colorado river at the mouth of San Francisco wash. This region was formerly a favorite hunting ground of the Tusayan, large parties leaving the villages to hunt antelope and other game so recently as ten years ago; but the game has nearly disappeared, and the annual hunting parties of the Tusayan Indians are now but a memory. From San Francisco wash the party followed the southern branch of the river to Winslow, and the northern side thence to Holbrook.

Leaving Holbrook early in October, Mr Mindeleff proceeded northward toward Canyon de Chelly. Advantage was taken of the opportunity to examine the locality of a supposed ruin some 35 miles north of Holbrook, concerning which rumors have been current for several years, and the supposed ruin was found to be a natural dike rising from the summit of a low hill as a wall of black basalt over 100 feet long, generally less than 2 feet thick, and sometimes 18 feet high. Near its western end the remains of a habitation consisting of one or two rooms was found, the ground being strewn with potsherds. So striking is this dike that the Navaho guide insisted, even when standing before it, that it is artificial; yet examination leaves no doubt as to its real character. Canyon de Chelly was reached about the middle of October, and detailed examination of its cliff ruins was begun at once and continued nearly to the end of December. More than sixty ruins were examined, ground plans of many of them were made and a large series of photographs were taken. The results of this interesting survey will be incorporated in the Sixteenth Annual Report.

Leaving Canyon de Chelly in December, the party proceeded by way of Pueblo Colorado, and Fort Defiance to San Juan river, where it was planned to winter. In crossing Tunicha mountains a snowstorm of unprecedented severity for the season was encountered, and the party missed the trail and for a time were lost; among other accidents a wagon was overturned in such manner that Mr Mindeleff was caught beneath it and his shoulder dislocated, whereby he was disabled for some months. Fortunately the expedition was rescued by a party of ranchmen from Fort Defiance, organized for the purpose when the severity of the storm was realized. The success of the expedition and even the preservation of the lives of its members must be ascribed largely to the humanity which inspired the rescue party and the energy with which they pushed into the mountains, rendered almost impassable by the snow and wind. The expedition reached San Juan river a few days later, and soon afterward disbanded.

When able to resume work Mr Mindeleff began a reconnoissance of San Juan valley, not completed at the end of the fiscal year. This district was found rich in ruins, mainly of a type resembling the oldest ruins in Canyon de Chelly. San Juan valley is terraced, and the river itself is a swift mountain stream, and conditions are thus favorable for irrigation by primitive as well as by civilized men. The detailed surveys here were accordingly extended, and resulted in substantial contributions to the archeology of southwestern United States.

Mr James Mooney spent some months, beginning with July, on the Kiowa reservation in Indian Territory, and subsequently visited the Arapaho and Cheyenne Indians for the purpose of collecting information concerning habits and customs as well as beliefs and languages. He was provided with a graphophone, by means of which he was able to record a number of aboriginal songs, both with and without instrumental accompaniments, and in single voice effects as well as in chorus. Altogether he spent five months in field work, of which part was exploratory.

Colonel Garrick Mallery spent the greater part of the month of September among the Indians of northern Wisconsin and northeastern Minnesota for the purpose of verifying and correcting notes obtained through correspondence.

Dr W. J. Hoffman spent July and August and a portion of September among the Ottawa Indians near Petoskey, Michigan, the Ojibwa Indians at La Pointe reservation, Wisconsin, and the Menomini Indians at Keshena in the same state, and among the several tribes information pertaining to customs and beliefs was obtained.

Mr J. Owen Dorsey spent the month of January, 1894, on the Kwapa reservation in Indian Territory, investigating the social organization of the tribe and recording their myths and traditions.

During the earlier part of the year the Director took advantage of opportunities growing out of work in connection with the Geological Survey on the Pacific Coast to visit several Indian tribes and to continue his researches relating to their habits, myths, and languages.

ARCHEOLOGY

Professor W. H. Holmes was occupied throughout the year in archeologic researches, chiefly in eastern United States The first half of July was spent in organizing the work of the year, and later he proceeded to different points in Delaware valley for the purpose of continuing studies of ancient quarries and quarry shops. A new quarry shop was discovered on Delaware river, 15 miles above Trenton, yielding rejects corresponding precisely with the objects so abundantly found in the gravels on which the city of Trenton is built, and which were formerly classed as paleoliths. Subsequently he visited a number of interesting localities in Ohio, giving especial attention to the gravels at Newcomerstown, in or apparently in which an artificially shaped stone has been found, this being the only case now strongly held to indicate the existence of man during the Glacial period in this country.

In October he visited an island in Potomac river, near Point of Rocks, flooded by a recent freshet in such manner as to lay bare an ancient village and aboriginal workshop. This workshop proved of considerable interest in that here unmistakable indication was found for the first time that blocks of stone were used as anvils in the production of certain classes of stone implements and weapons.

During February Professor Holmes directed the exploration, by Mr William Dinwiddie, of an aboriginal steatite quarry near Clifton, Virginia. This quarry was found especially instructive by reason of its large size, the great number of partly completed utensils found within the opening and in the neighboring dump heap, and the excellence of its preservation.

In April Professor Holmes, accompanied by Mr McGee, Ethnologist in Charge, repaired to an interesting site near the mouth of Pass creek, not far from Luray, Virginia, for the purpose of collecting additional data relating to a noteworthy series of stone art products, to which attention was called during the preceding fiscal year by Mr Gerard Fowke.

A considerable additional collection was made and an aboriginal cemetery, from which a typical collection of mortuary pottery was taken, was discovered in a neighboring field. The stone art products in this locality are of exceptional interest, as the "turtleback" forms are rejects from the manufacture of celts. The rejects hitherto studied by Professor Holmes represent, exclusively or predominantly, narrow-pointed instruments, such as spearpoints or arrowheads, while those found at the mouth of Pass creek represent predominantly the manufacture of broad and thin pointed objects. A sufficiently complete series of rejects and nearly completed forms to illustrate all stages in manufacturing was brought together.

Mr McGee extended the observations from this locality up Pass creek with the purpose of discovering the original source of the pebbles and cobbles used by the primitive artisans, and was rewarded by finding, well toward the headwaters of the stream, a large mass of intrusive rock, from which the pebbles were originally derived. This part of the study also proved of exceptional interest, as it indicated the delicacy with which the Indian manufacturer adjusted himself to his environment; in situ the rock is too massive and obdurate for working by primitive methods; in the upper reaches of the stream the bowlders derived from parent ledges are too large for reduction without the use of metal; below the confluence of Pass creek with the Hawksbill the pebbles are too small and too scant for profitable working; while just above the confluence,

at the site discovered by Mr Fowke, the pebbles are at the same time of suitable size and sufficiently abundant for easy working by primitive methods—in short, the best and, indeed, the only feasible site for the aboriginal factory was that selected for the purpose. The material is a peculiarly tough and strong crystalline rock, which flakes fairly well and is at the same time adapted to battering and grinding.

During the first three months of the year Mr Gerard Fowke was occupied, under Professor Holmes' general instructions, but under the immediate direction of the Ethnologist in Charge, in making collections from the little-known but highly interesting interior shell mounds in the valley of Tennessee river. This work yielded excellent results, particularly in the form of material collected for the enrichment of the National Museum. The collections were duly cleaned, prepared, and tabulated, and transferred to the Museum by Mr Henry Walther.

Mr William Dinwiddie, under Professor Holmes' immediate direction, spent the greater part of the months of July, August, and September in archeologic reconnoissance along the shores and tributaries of Chesapeake bay with the object of demarking more exactly by art products the territory belonging respectively to the different peoples. His work also yielded abundant collections for the enrichment of the department of archeology of the National Museum for the benefit of contemporary and future students.

During February and March, as already noted, Mr Dinwiddie was occupied in investigating the aboriginal steatite quarry at Clifton. The quarry was cleared and its walls and floors were found to yield numerous and characteristic traces of primitive workmanship; a rich collection of broken and partially finished utensils was made; a good series of photographs, showing with unprecedented accuracy the details of the quarrying and manufacturing operations, was taken; a number of the tools used in the work were found, while the entire collection has been brought together for study and preservation in the National Museum. The general results of the investigation of this quarry have been incorporated in the accompanying paper by Professor Holmes.

The results of the work by Mr Cosmos Mindeleff in New Mexico and Arizona are of much importance. The examination of over sixty ruins in Canyon de Chelly verifies the conclusion previously reached by the same investigator that the cliff dwellings here were primarily farming outlooks, and that the home villages were commonly located on wholly indefensible sites on the canyon bottoms. It was found that the ruins are divisible into several groups, apparently representing a chronologic sequence. In the latter ruins highly suggestive details are found illustrating the gradual assimilation of introduced or acultural ideas. Among other results there was obtained a series of drawings and photographs showing the development of chimney structure from the first crude attempts to imitate a form known only from casual observation and description to a more finished structure, though the most finished product was far from perfect, while the first attempts were exceedingly crude. Mr Mindeleff was led to conclude that the foreign ideas exemplified in the chimneys and other structures were introduced in the architecture of Canyon de Chelly at a late period of the occupancy of the territory, probably only a few decades before its abandonment. Other details, such as the constructive use of adobe, were traced through the various stages of development in the same way; and some ruins were found in which the old and the new ideas find expression side by side in such manner as to indicate that the village was occupied before the introduction of the foreign ideas, and that the occupancy continued until after the ideas were definitely crystallized.

One interesting group or series of ancient ruins was found, which had apparently been overlooked by previous visitors. They occur in the upper part of the canyon and are nearly obliterated. The structures were always located on sites determined wholly by agricultural necessity and methods without reference to defensive ends. Mr Mindeleff is of opinion that these are the oldest ruins in the canyon, belonging to the initial period of occupancy, which extended over many decades. Close attention was given also to a number of large ruins situated in the canyon bottom without reference to defense,

also overlooked by previous explorers. These differ from the preceding type and are in some respects the most important ruins of the canyon. They apparently represent the home pueblos occupied contemporaneously with the cliff dwellings, and bore the same relation to the latter that Zuñi bears to Nutria, Pescado, and Ojo Caliente, or that Oraibi bears to Moenkapi. The cliff dwellings were apparently occupied as a rule only during the summer months, the occupants resorting to the pueblos during the winter. Thus the cliff dwellings appear to represent a phase rather than a chronologic epoch in the history of the pueblo builders.

Although the researches are not yet completed, Mr Mindeleff is of opinion that while some of the ruins may be pre-Columbian, others were undoubtedly occupied in the seventeenth century, and that the occupancy was probably continuous as regards the district, though probably not continuous as regards particular tribes or subtribes. A general result of the study was the classification of the various types of ruins, in a chronologic order, in such manner that the history of the canyon from the earliest occupancy up to the recent advent of English-speaking settlers is clearly indicated. In combining the data acquired in Canyon de Chelly with those obtained from Rio Verde during previous years, Mr Mindeleff finds reason for the conclusion that the ruins of the former district represent the first settlements in the San Juan country, and that further developments will be found in the tributary valleys, and also that the large communal buildings on the tributaries of the San Juan, representing the highest architectural art attained by the pueblo builders, will prove to be the ultimate form of the primitive village of this district.

During the year Dr Cyrus Thomas completed the revision of proofs of text and illustrations of his "Report on Mound Explorations," and the work was put through the press as the body of the Twelfth Annual Report. The document comprises much information relating to the Indian mounds of the Mississippi valley and eastern United States, and it seems reasonable to hope that the monograph may come to be regarded as a standard source of information on the subject. Subsequently

Dr Thomas gave special attention to the hieroglyphs and codices of the Maya—the ancient inhabitants of Yucatan. One of the results of the work is the demonstration that the time system recorded in the Dresden codex is precisely the same as that mentioned by the early Spanish authors, except that the years begin with what are considered the last instead of the first of the four-year series. It is also shown that this brings the calendar of the Dresden codex into harmony with the calendars recorded at Palenque, Lorillard, and Tikal. A portion of the results of Dr Thomas' work on this subject is published in one of the bulletins of the Bureau, a brochure of 64 pages, entitled "The Maya Year." Other results are incorporated in a memoir on the origin and significance of the calendric terms, which is not yet completed.

During the year Mr Hilborne T. Cresson, of Philadelphia, was occupied in archeologic researches, chiefly in Guatemala and eastern Mexico, under a provision of the De Lancel fund and under the general supervision of the Director of the Bureau. Some of the results of his interesting researches have been made public through various scientific journals

Specially noteworthy among the results of the archeologic work in the Bureau during the current year are the monographs by Professor Holmes on "Ancient Pottery of Eastern United States" and "Stone Art of Eastern United States." Both embrace the results of researches extending over many years; both are elaborately illustrated from material preserved in the National Museum; both represent the mature conclusions of an able and carefully trained archeologist. The classification and interpretation adopted by Professor Holmes are primarily indigenous, though his comparative studies have extended over the archeologic literature of the world, and it is believed that his conclusions will form a firm basis for those branches of archeology to which his work relates. To him science is indebted for a consistent method of interpreting primitive art products through study of the arts of primitive peoples cognate to those whose relics have come down to us from prehistoric times. It was with great regret that the Director accepted his resignation toward the end of the fiscal year, in order that he might transfer his labors to the Field Columbian Museum.

DESCRIPTIVE ETHNOLOGY

An important line of work in the Bureau for some years past has been the collection and systematic arrangement of tribal names and characteristics, with brief description of the habits, customs, arts, beliefs, and institutions of the aborigines. The information thus collected has been recorded on cards under the head of Tribal Synonymy.

During the last year Mr F. W. Hodge devoted several months to the descriptive ethnology of several southwestern families, the Piman, Tanoan, Keresan, and Zuñian stocks receiving chief attention. Advantage was taken of the presence in Washington of Dr Carl Lumholtz, who has spent several seasons among the tribes of Chihuahua, to obtain valuable information relating to the Tarahumari, Tepehuani, and Tubari Indians for use in the synonymy of the Piman stock. Mr Hodge's literary research during the year will probably enable him to identify the obscurely recorded Jumano of the early Spanish explorers with the Comanche of more recent date. In connection with the condensed descriptions contained in the systematic work, Mr Hodge has made progress in the preparation of a bibliography of the Pueblo Indians, designed to serve as a basis for further research concerning this interesting portion of our aboriginal population.

Mr J. Owen Dorsey made a number of important additions to the portion of the tribal synonymy relating to the Siouan tribes, and Mr James Mooney devoted some time to classifying and extending the material already obtained relating to the Cherokee Indians. Dr Albert S. Gatschet also made contributions to this work.

Although the collection of material for the general descriptive ethnology of the Tribal Synonymy of the American Indians was commenced some years since, and although a large body of information has been collected and arranged on cards for office use, publication has not yet been undertaken, partly by reason of the great volume of material, partly because the work is of such character as not soon to be completed, since each new investigation yields additional information; but

within the last five years the records have been found so useful, and the demand for information contained therein so extensive, that a plan for publication has been formulated.

In accordance with this plan the material will be arranged by linguistic stocks and published in bulletin form in the order of completion, each bulletin comprising a stock. In addition to the usual pagination the bulletins devoted to the subject will be consecutively paged (at the bottom) for the series, and it is proposed to complete the series by a bulletin so arranged as to form at the same time an index to the whole and an abbreviated dictionary of the tribal and other names used by the American Indians. In accordance with this plan the materials pertaining to a number of the stocks have been made ready for the press, with the exception of brief introductions which remain to be written.

During the first half of the fiscal year Dr W. J. Hoffman continued the investigation of the Menomini and related Indians in field and office and prepared an elaborate memoir, entitled "The Menomini Indians," which has been submitted for publication in the Fourteenth Annual Report. This tribe, located in northeastern Wisconsin, has long been known in a general way, but has received little scientific study. Dr Hoffman's memoir embraces a history of the tribe from its discovery by Nicollet in 1634 to the present day, including the several treaties made with the Federal Government; it includes also the genealogies of the two rival lines of hereditary chiefs, together with an exposition of the ceremonials of the several cult societies, and of the mythology, industries, arts, and manufactures of the tribe.

SOCIOLOGY

From time to time during the year the Director found opportunity for collecting additional information relating to the institutions of the American Indians and for the elaboration of material collected during previous years. Mr McGee also made progress in the arrangement of material pertaining to this subject gathered by various collaborators. Mr James Mooney spent several months in the field collecting information relating to the Kiowa, Caddo, Arapaho, and Cheyenne Indians,

of which a large part is sociologic. In addition, he prepared during the year a memoir on the "Siouan Tribes of the East," which has been sent to press as one of the series of bulletins of the Bureau. In this paper the relations and movements of the tribes recorded by early explorers and settlers of eastern United States are analyzed and, after comparative study for the purpose of combining the various consistent records and eliminating the uncertainties due to vague geographic and ethnographic records, grouped as a consistent body of information relating to the aboriginal landholders of cisappalachian United States. The memoir represents much patient research among early maps and throughout the earliest literature of the United States. It is enriched by synonymy of the various tribes of the district, and incidentally considerable information relating to the organization and social institutions of these tribes is incorporated.

PICTOGRAPHY AND SIGN LANGUAGE

The earlier part of the year was spent by Colonel Garrick Mallery in revising the proofs of his monograph on "Picture-writing of the American Indians," which has since been published in the Tenth Annual Report of the Bureau. Some years were devoted by Colonel Mallery to the collection of information on this subject and the subject of sign language and gesture speech among the aborigines, and this monograph represents the product of labors in the interesting line of research to which it appertains. By reason of the invasion of white men, many of the primitive customs of the Indians have been modified and some have been lost; and in few directions is the modification more complete than in that of inscribing records on rocks and other surfaces; and it has been the purpose to render this work as complete an exposition of the crude graphic art of the American Indian as it is possible to make at this time. It is believed that the work will be found practically exhaustive and a standard source of information. During the remaining portion of the year Colonel Mallery has been engaged in the preparation of a companion monograph on the sign language of the American Indians. The material for this

work is even more evanescent than that drawn on in the preparation of the preceding work; but the author's studies have extended over many years and a large part of western America, and he has been favored by rich contributions from correspondents of the office. The work is fully illustrated, as is necessary, since it is only by graphic presentation that definite ideas concerning the multiform gestures and motions used in primitive interchange of thought can be clearly expressed. The monograph is approaching completion.

LINGUISTICS

The languages of the American Indians have received a large share of the attention of the Bureau ever since its institution. It has been the policy to collect texts and vocabularies and material for grammars as rapidly and extensively as possible before the disappearance of the primitive languages. Only a small part of the material so collected has been published; but the vaults of the Bureau are rich in data pertaining to the languages of many tribes representing most of the linguistic stocks of the American Indians. Perhaps on no other continent is the linguistic diversity of the primitive peoples wider than in northern America, and the dialectic variability is eminently striking. The aboriginal languages of this continent accordingly give an admirable opportunity for the study of the facts and causes of linguistic development; and from the beginning it was deemed important to collect the largest possible body of material for examination and discussion in its bearing on the general subject. Carrying out the general policy, only subordinate attention has been given to publication, and publication has been made only in cases in which the material seemed especially typical or exceptionally complete. Thus, while the amount of linguistic material published is not voluminous, the manuscripts constantly accessible for purposes of study are abundant—richer, it is believed, than any other body of linguistic records of a primitive people.

Dr A. S. Gatschet devoted the entire year to linguistic work. Early in the year he was employed in translating texts and in extracting lexic and grammatic elements of the Peoria and

Shawnee languages, recorded by him during the preceding two years. This work gave abundant opportunities for comparing the two tongues with the forty or fifty other dialects of the Algonquian stock, and the interesting results of the comparison were embodied in a comparative vocabulary of the Algonquian languages. By this comparison the intimate relations between the dialects is strikingly shown, and at the same time the multiplicity of forms into which the original tongues have been diversified has been brought out. Morphologically the Algonquian tongue is built on a purely nominal basis, yet in the various dialects a wide variety of ideas are expressed with surprising perfection. In all the Algonquian dialects verbal roots combine with other verbal roots in a single word, giving a peculiar and forcible expression to the verbal form. The compounding of words is further extended by numerous adjectival suffixes descriptive of quality, these suffixes indicating whether the noun qualified by such an adjective is an animate or inanimate subject, and showing whether complexion, size, age, or other qualities are to be determined. This method of adjectival suffixes extends also to the numerals, and in some dialects there are special suffixes to qualify numeral cardinals as determining animate or inanimate objects in the plural. Dr Gatschet's recent studies have brought out the fact that the Algonquian languages of the western group (Arapaho, Cheyenne, and Siksika) differ considerably in their phonetics from the eastern dialects, these differences being especially shown in the nasalization found among the western representatives of the stock.

Mr J. Owen Dorsey spent the earlier part of the year in office work on the Biloxi language, completing its systematic arrangement for preservation and reference. He also revised the proofs of Contributions to North American Ethnology, volume IX (Riggs' "Dakota Grammar, Texts, and Ethnography"), as well as his own memoir, entitled "A Study of Siouan Cults," in the Eleventh Annual Report of the Bureau. Both of these documents have now been published. The month of January was spent on the Kwapa reservation in Indian Territory in investigating the social organization of the tribes and

recording their myths and traditions in the form of texts. After his return from the field these texts were translated literally, but the preparation of explanatory notes and free translations was deferred. Some time was spent in the elaboration of a list of the characters required for recording the various sounds in the Siouan, Athapascan, and other linguistic families; in this work he had for a time the assistance of a skilled oriental linguist, Dr J. J. Nouri, from whom he obtained for comparative purposes many of the peculiar sounds of the Semitic and other Eastern languages. Some time was spent also in the examination of supposed linguistic affinities between the Maya and Malay languages, and during the year he recorded in final form eight Winnebago texts, dictated by Philip Longtail. Subsequently literal translations of these texts were made, and the preparation of explanatory notes and free English translations was begun and the lexic elements were extracted.

Mr J. N. B. Hewitt was occupied during the earlier part of the year in researches concerning the social relations recorded in the Iroquois language and the literature relating to the people. In the course of this work it was shown that the independence of the tribe in local affairs was little, if at all, curtailed by the confederation of the "Five Nations," certain clans and gentes being privileged from the beginning of the historical leagues (for there were undoubtedly several) to nominate lord-chiefs and vice-chiefs to the league councils. Subsequently Mr Hewitt made examination of the data for the classification of the Waiilatpuan and Shahaptian groups of languages. Despite the paucity of the linguistic material, he found that the groups display peculiarities apparently due rather to divergent growth than to original diversity, this being exceptionally true of the position of the attributing or predicating word in the word-sentences or compound stems. In the lexicon the Shahaptian dialects show specific superficial differences from the Waiilatpuan group, but nevertheless a large and important number of stems pertaining to the former, which have the same or cognate significance, accord substantially in sound or form with terms in the latter; there are,

moreover, in many of the dialects striking proofs of the effects of discordant linguistic growth. The general result of the study was to prove that the two groups of languages have had a common history in part; and this conclusion has been provisionally accepted in the classification of linguistic material in the Bureau vaults. Other important studies relating to the affinities of the aboriginal languages of northwestern America were successfully carried forward. Mr Hewitt also aided in the linguistic comparison of the Maya and Malayan terms collected by Dr Thomas. Some time was given also to the arrangement and transliteration of the Tubari material collected by Dr Carl Lumholtz in Mexico, with a view to publication. This collection, although not large, is of a special interest, since it was obtained from the last three surviving representatives of the tribe who alone survive. During the last months of the year Mr Hewitt made a fruitful study of the so-called irregular or anomalous verb in the Tuskarora or Mohawk dialects.

In connection with his memoir on the Menomini Indians, already noted, Dr Hoffman compiled a considerable vocabulary representing the language of this tribe.

In addition to the Tubari material, in part transliterated by Mr Hewitt, Dr Carl Lumholtz turned over to the Bureau the vocabularies collected from the Tarahumari and Tepehuani tribes occupying the mountainous portions of the state of Chihuahua, in the Republic of Mexico. Several other valuable contributions to the linguistic material of the Bureau were made during the year. Among these may be mentioned a manuscript of more than a thousand pages, representing the vocabulary and grammar of the Nez Percé Indians of Idaho, collected by the late Miss S. L. McBeth and kindly transmitted to the Bureau by her sister, Miss Kate C. McBeth.

MYTHOLOGY

The myths and cognate beliefs of the American aborigines are of exceptional interest, since they exemplify in many cases the influence of environment on the minds of the devotees, and in some cases, moreover, the myths indicate the migra-

tions of the peoples among whom they are found. Accordingly, the studies by Mrs Stevenson and Mr Cushing of the mythology of the Pueblo tribes, particularly that of the Zuñi, are of utmost importance in American anthropology.

Having completed his work in arranging the exhibits of the Bureau of Ethnology at the World's Fair, Mr Frank Hamilton Cushing returned to Washington and resumed researches in mythology about the middle of September. Almost continuously since that time he has, in conjunction with Mr Stewart Culin, of the University of Pennsylvania, whose attention has long been devoted to the games of the Orient, carried forward a study of the origin of aboriginal games, based on his intimate acquaintance with the games of the Zuñi and a knowledge gained by his investigations at the Columbian Exposition.

A study of these primitive games reveals the fact that they were not played primarily for amusement, as among civilized peoples, but chiefly for divination, which was practiced in connection with industries and enterprises of all sorts; so that divinatory games occupied a prominent place in the thoughts and exercised an important influence on the daily life of these people. It was found also that in the Orient the games were actually played with arrows and were still recognized as arrow games by the players themselves as late as the eleventh or twelfth centuries B. C., thus giving historic evidence of the arrow origin of lot and dice games in the Orient, and confirming, in Mr Culin's estimation, Mr Cushing's hypothesis as to the identical origin of such games in America. These researches have also brought to light many significant facts bearing on the usages, beliefs, and ethnic relations of early peoples. Mr Cushing was greatly aided in this work by Mr Louis C. Moctezuma, an educated young Mexican, from whom he obtained much information regarding the Indian games of his country.

Mr Cushing has not allowed his researches relating to divinatory games completely to interrupt his more general studies relating to Zuñi mythology, and during the year has given special attention to the origin and primitive use of fire. Fire myths are nearly universal, and fire worship common among primitive peoples; and it is the possession of the fire art which,

perhaps more than any other characteristic, distinguishes mankind from the lower animals. The conquest of fire has not yet been clearly traced, but Mr Cushing's researches are contributing materially to knowledge of the subject.

The manuscript of Mr Cushing's paper bearing the title "Outlines of Zuñi Creation Myths" was brought to completion and at the close of the year was partially in type as one of the accompanying papers of the Thirteenth Annual Report.

Mrs Matilda Coxe Stevenson, although partially disabled by overwork and exposure during her last field season among the Sia Indians of New Mexico, began in July the revision of the proofs of her article on that tribe, which cover pages 3–157 of the Eleventh Annual Report. On the completion of the proof reading, early in September, Mrs Stevenson continued the preparation of a report on certain myths and ceremonials of the Zuñi tribe, among whom she has spent a number of seasons. Notwithstanding ill health, she succeeded in completing the preparation of most of the illustrative material of the monograph and made progress in the final revision of the text.

PSYCHOLOGY

The Director has found opportunity for continuing his investigations in primitive modes of thought, carried on during previous years. The results of these studies were imparted to the members of the Bureau in a series of informal lectures, establishing a firmer and more definite basis for their researches in Indian mythology and sociology.

BIBLIOGRAPHY

The work on the bibliography of native American languages was continued by Mr James C. Pilling. As in previous years much time was consumed in procuring new material for the main catalog, from which are prepared the bibliographies of the various linguistic stocks. This work necessitates a careful review of all the catalog material relating to Americana generally—those of auction sales, of booksellers' catalogs, of the reviews, etc—and these furnish brief titles, which are used as memoranda for further research. In

this manner several hundred new titles have been added to the main catalog during the year. For his painstaking and untiring patience in this tedious task, Mr Pilling is receiving high praise. The press reviews of the stock bibliographies already issued indicate the regard in which they are held, for their incomparable completeness, by students in all parts of the world.

During the last year there was issued a Bibliografía Española de Lenguas Indígenas de América, by the Count of Viñaza, bearing the imprint Madrid, 1892. Although issued years after the appearance of Mr Pilling's "proof sheets," and although the compiler of the Bibliografía had unusual facilities, among them access to the archives of Spain—an advantage enjoyed by few foreigners—but seventy-five titles not already contained in Mr Pilling's catalog were found in the Viñaza work.

The month of August was taken up by Mr Pilling with an examination of the plate proofs of the bibliography of the Salishan language, then ready for press, but little correction worthy of notice was necessary. The bulletin, which comprises 86 pages and 4 facsimiles, was delivered by the Public Printer in the middle of November.

During November work was renewed on the Wakashan bibliography. A trip extending over a few days was made to Lenox and Astor libraries, New York city; some new material was obtained and defective titles were corrected. The work was forwarded to the Public Printer in January, and by the close of March the proof reading was finished. This bibliography, which was ready for distribution early in May, comprises 70 pages and 2 facsimiles. During the proof reading of the Wakashan bibliography the preparation of the bibliography of the Shahaptian languages was begun, and at the close of the fiscal year was in an advanced stage of progress.

PUBLICATION

During no similar period of the Bureau's history have so many pages of ethnologic material been put in type. Since the close of the last fiscal year (1892–93) most of the proof reading of the Tenth Annual Report was completed. The volume

was received from the printer in June, 1894. The monograph accompanying this report, "Picture Writing of the American Indians," by Garrick Mallery, covers 807 pages and is illustrated by 54 plates and 1,290 figures. On July 27, 1893, the Eleventh Annual Report was sent to the Public Printer, and before the close of October all the proofs had been read. Proof reading of the Twelfth Annual Report was in progress at the close of the year 1892–93, and continued until April, 1894. This report, which, in addition to the administrative report of the Director, contains a paper by Dr Cyrus Thomas, entitled "Report on the Mound Explorations of the Bureau of Ethnology," was in the bindery at the close of the year. In February, 1894, the manuscript of the Thirteenth Annual Report was sent to the Public Printer, and in June the first proofs were received. With the close of the fiscal year all the illustrations for this annual had been engraved and proof reading was well advanced

At the close of the year 1892–93 the proof reading of the "Bibliography of the Salishan Languages," by James Constantine Pilling, was almost completed. This bulletin was delivered by the printer in November, 1893. "The Bibliography of the Wakashan Languages," by the same author, was sent to the printer in December, 1893; the first proofs were received in January, 1894; the proof reading was finished in April, and the edition was delivered a month later.

Early in January of the present year the manuscript of a bulletin by Mr John Garland Pollard, on "The Pamunkey Indians of Virginia," was sent to the Public Printer, and by February 6 the final proofs had been revised. This bulletin was delivered in April, 1894.

At the close of the last fiscal year proof reading of Riggs' "Dakota Grammar, Texts, and Ethnography," which forms Contributions to North American Ethnology, volume IX, had been in progress about a month, and by the end of July the volume was in page form.

The first proof of a bulletin entitled "The Maya Year," by Dr Cyrus Thomas, was received early in February, 1894, the

manuscript having been transmitted January 19. This brochure passed through the press and was delivered in May.

In January, 1894, there was also sent to the Public Printer the manuscript of the first of a proposed series of bulletins, entitled "Chinook Texts," by Dr Franz Boas. The first proofs were received in March, and by the 1st of July 176 pages and a number of galleys were in type.

Another bulletin, "An Ancient Quarry in Indian Territory," by William H. Holmes, was sent to the Public Printer on February 17, and by the close of June the paper was in type.

The following publications were received from press during the fiscal year:

Ninth Annual Report, for 1887–88, containing, in addition to the Director's report of 46 pages, the following papers: (1) "Ethnological Results of the Point Barrow Expedition," by John Murdoch; pages 3 to 441, plates I–II, figures 1–428. (2) "The Medicine-men of the Apache," by John G. Bourke; pages 443 to 603, plates III–VIII, figures 429–448.

Tenth Annual Report, for 1888–89, containing, in addition to the Director's report of 30 pages, "Picture-writing of the American Indians," by Garrick Mallery; pages 3 to 807, plates I–LIV, figures 1–1290.

Bibliography of the Salishan Languages, by James Constantine Pilling; XIII, 86 pages (including 4 pages of facsimiles)

The Pamunkey Indians of Virginia, by John Garland Pollard; 19 pages.

The Maya Year, by Cyrus Thomas; 64 pages, 1 plate.

Bibliography of the Wakashan Languages, by James Constantine Pilling; XI, 70 pages (including 2 pages of facsimiles).

This report is accompanied by five papers comprising the results of recent researches, viz, "Stone Implements of the Potomac-Chesapeake Tidewater Province," an elaborately illustrated monograph by W. H. Holmes; "The Siouan Indians," a preliminary sketch by W J McGee; "Siouan Sociology," a posthumous paper by J. Owen Dorsey; "Tusayan Katcinas," by J. Walter Fewkes; and a description of "The Repair of Casa Grande Ruin, Arizona, in 1891," by Cosmos Mindeleff.

MISCELLANEOUS

Classification of manuscripts—In the current appropriation for American Ethnology provison was made for rental of quarters for the use of the Bureau, and in accordance therewith the sixth floor of the Adams building on F street was leased. In addition to increased floor space for the use of its collaborators when not engaged in field work, the Bureau now has two large fireproof vaults, in which has been safely deposited the large body of valuable manuscript material in its possession. This material, comprising over 1,100 specific linguistic papers, 60 miscellaneous linguistic papers, and 236 manuscripts on miscellaneous ethnologic subjects has been tentatively catalogued by subject, linguistic family, and author.

World's Columbian Exposition—The preparation of the exhibit of the Bureau at the World's Columbian Exposition in Chicago was assigned to Professor William H. Holmes, who supervised the collection of material and its arrangement in the National Museum preparatory to shipment. He was assisted in the work by Mr Frank Hamilton Cushing and Mr James Mooney, and it is a pleasure to acknowledge the facilities provided and the aid rendered by the officers of the National Museum, especially Dr G. Brown Goode and Dr Otis T. Mason. The exhibit was installed in the Government building at Chicago by Professor Holmes, aided by Mr Cushing, largely under the supervision of the Director. Mrs Matilda Coxe Stevenson also aided in this work. On completing the installation Mr Holmes returned to Washington, leaving to Mr Cushing the final arrangement of a number of lay figures, which constituted one of the most striking features of the exhibit. Mr Cushing remained in charge of the exhibit until the middle of September, meanwhile continuing the study of primitive games noted above. Much of the work in Chicago was by the Director in person.

It is gratifying to be able to state that the figures and other objects representative of the American aborigines exhibited by the Bureau at Chicago met with high praise from American and foreign students and received the award of a medal and diploma for specific merit.

Library—From the time of the establishment of the Bureau until the autumn of 1893 the books received through gift, exchange, or purchase were temporarily deposited in the library of the Geological Survey. When the Bureau moved into independent quarters, Mr Hodge, in connection with his work on synonymy, was placed in charge of the library, which then numbered about 2,600 volumes. At the close of the year the library had increased to 4,350 volumes, chiefly through exchange.

FINANCIAL STATEMENT

Appropriation by Congress for the fiscal year ending June 30, 1894, "for continuing ethnological researches among the American Indians under the direction of the Smithsonian Institution, including salaries or compensation of all necessary employees" (sundry civil act, approved March 3, 1893)		$40,000.00	
Balance July 1, 1893, as per last annual report		10,509.29	
			$50,509.29
Salaries or compensation		36,958.74	
Traveling and field expenses	$3,702.98		
Transportation and freight	503.39		
Collections purchased	1,300.58		
Field instruments	292.63		
Illustrations for reports	1,884.76		
Publications for library	435.67		
Stationery	185.32		
Office rental	999.96		
Office furniture (purchased, moving, and repair)	600.53		
Miscellaneous current expenses	142.08		
Miscellaneous (temporary services, copying, etc)	204.75		
		10,252.65	
			47,211.39
Balance July 1, 1894			3,297.90

CHARACTERIZATION OF ACCOMPANYING PAPERS

DISTRIBUTION OF SUBJECTS

Of the five papers accompanying this report, two relate to archeology, and thus represent one of the branches of the science of technology; these are Professor Holmes' monograph on the stone implements of the Potomac-Chesapeake province, and Mr Mindeleff's account of the restoration of Casa Grande ruin. Two of the papers are more strictly ethnologic in the limited sense of the term, and treat of one of the great linguistic stocks or families of North America, the Siouan Indians; one of these is general, while the other is devoted primarily to the sociology of this group of Indians, and thus to the third of the sciences of humanity. The remaining paper, on Tusayan Katcinas, is a description and discussion of forms and ceremonies connected with aboriginal belief, and hence represents the science of sophiology. Thus in object-matter and in mode of treatment the memoirs touch a considerable part of the field covered by the science of man.

The geographic range of the subjects is considerable. The first paper relates to the middle Atlantic slope, and especially to the territory about the national capital, where geographic conditions profoundly affected the aborigines as they have less profoundly, but in a parallel way, affected the civilized invaders; the second and third papers deal with the interior area extending from the borders of the Atlantic to the foothills of the Rocky mountains and from the shores of the Gulf northward beyond the international boundary; the scene of the fourth paper is laid in the Pueblo country of southwestern United States, while that of the fifth is in southern Arizona, near the Mexican frontier.

The Indian tribes treated in the papers traverse the entire range in aboriginal culture from that of the hunting and warring Siouan Indians—the typical savages of North America—to that of the peaceful pueblo builders, whose sedentary habits can only be regarded as pointing the way which leads

to civilization; and the prehistoric works described range in like manner from those characteristic of a people primitive as the Siouan to those of castle-building agriculturists akin to the Moctezumas in custom if not in blood.

STONE IMPLEMENTS OF THE POTOMAC-CHESAPEAKE TIDEWATER PROVINCE

In many respects this monograph by Professor Holmes may be regarded as a model in method and a standard in results; and the succinct chapters and well-chosen illustrations speak for themselves. Yet there are certain features of the work summarized in the paper which are worthy of special note.

Now that demonomy (ante, page XIX) is well advanced in the process of organization into a science, the equipment of workers in this, as in other branches of research, has become important. Thus far the sciences of humanity have hardly found their way into the curricula of colleges and universities, so that it is impracticable to rely on collegiate examinations and diplomas as evidence of training in any of the constituent sciences; accordingly the ranks of workers in demotic science are replenished and extended by the enlistment of volunteers trained in other departments of science, but led toward demonomy by choice or circumstance. The qualifications of investigators in demonomy are, therefore, determined by three factors, viz, (1) natural aptitude, (2) training in other lines of scientific work, and (3) experience and success in demotic research. All of these factors are combined in Professor Holmes' equipment. Primarily an artist of such genius and deftness as to see a brilliant career before him, his taste for scientific studies led him first into geology, where again he was notably successful, and later into archeology, in which, from the first, he displayed especial aptitude; his training in geologic work, facilitated as it was by the exact perception and manual dexterity acquired in art work, served to render him familiar with approved scientific methods; and when, in the fullness of his vigor, he entered the field of archeology, his work was eminently successful from the outset. His archeologic researches had already extended over some years when, in 1889, he undertook the systematic study of the Potomac-Chesapeake region. His skill and success are attested

by the reputation achieved in his favorite field; even before the completion of the accompanying memoir he was chosen as the head of the department of anthropology in the Field Columbian Museum, and tendered a professorship in Chicago University. His standing and qualifications may be characterized the more freely because he is no longer connected with the Bureau.

Something of the comprehensive and painstaking methods pursued in the work may be gleaned from Professor Holmes' memoir; yet the breadth and soundness of his foundation are hardly suggested by the details of the superstructure. As a geologist on the Hayden Survey of the Territories and later on the United States Geological Survey, he had occasion to traverse the western plains, the Rocky Mountain region, and the plateau country, nearly all the way from the Canadian boundary on the north to the Mexican frontier on the south, and this in early days while yet the Indians were numerous and retained their aboriginal characteristics. Accordingly he had many opportunities for ethnologic observation, and was led by previous training to give special attention to the manual arts of the tribesmen; indeed, it was chiefly his contact with the Indians in the course of his geologic work that induced him to take up systematic studies of aboriginal arts and handicraft. During this stage of his career he learned to think as the Indian thinks about the simple native arts; he learned to imitate aboriginal methods and manipulations in the manufacture of stone; and he learned to interpret relics of primitive culture as they are interpreted by primitive minds. Thus when he turned to the examination of aboriginal relics in eastern United States his equipment in actual knowledge concerning the details of primitive art was exceptionally—indeed almost singularly—complete.

Taking up the study in a favorably conditioned province, he first acquainted himself with the work of previous investigators of the locality and with the researches and opinions of archeologists generally. He then entered the field and, with a force of laborers always under his eye, made extensive excavations and examined a body of material unprecedented in quantity. The specimens actually examined and studied could be enum-

erated only in thousands, measured in wagon loads, and weighed in tons. Trained by actual contact with Indians, he interpreted the specimens and their associations and the ancient quarries as they would be interpreted by Indians accustomed to such work, and every inference concerning the methods employed in quarrying, selecting material for working, shaping the objects, and manipulating the crude appliances was tested by actual imitation, the imitation itself being guided by actual knowledge of primitive methods. While this is true of all of the lines and localities of work, it is most emphatically true of the ancient quarries of quartzite bowlders and their products on Piny branch. Even here the investigation was not allowed to rest. The distribution of the products of manufacture was traced in the light of actual knowledge of Indian habits in such manner as to ascertain the genealogy and development of the implements and the various by-products, failures, culls, rejects of all sorts, as well as chips, spalls, cores, and bowlders abandoned after one or more test blows. Thus the study of a typical locality and its products was profound and thorough beyond precedent. The relics were studied with respect to individual characteristics, with respect to form and distribution, with respect to the forces expended in their manufacture and utilization, with respect to their genesis and development, individual and collective, and with respect to the motives and designs of the prehistoric manufacturers. The work began with trained observation, passed to generalization based on unprecedented wealth of material, proceeded to inference guided by precise knowledge of primitive modes of thought and action, and went on to verification by imitation and by comparison with known homologues. In extent and thoroughness of study, in wealth of material examined, in thoroughness and scientific character of the investigation, Professor Holmes' work on the quartzite quarries and their products may safely be considered to stand unrivaled, at least so far as the Western Hemisphere is concerned.

The results of the work are set forth too fully in the introductory and concluding divisions of the monograph to require repetition; yet one of the conclusions would seem to be worthy

of special emphasis; the outcome of the study of the quartzite quarries and implements suffices to demonstrate that whatsoever be true of other countries and provinces, the rudely flaked stones of the Potomac-Chesapeake province do not represent a lower or more primitive culture than that of the Indians found in the province by John Smith and other explorers, and do represent the by-products, waste, or rejectage, of stone-working by the the Algonquian and neighboring Indians. Thus, whatsoever be true of other districts, in this district the rudest stonework known to the archeologist and the finest stone carving, pottery, basketry, and woodwork represent a single culture stage. This conclusion is not put forth tentatively or provisionally, but as a final result of the most thorough single piece of archeologic research ever conducted in America.

While the chief subject of the monograph is the description and discussion of the quartzite quarries and implements, there are other features of note. The account of the quarrying and manufacture of steatite depicts with remarkable fullness and clearness a little-understood phase of aboriginal art in eastern United States. The tracing of several materials used in primitive art to their sources in distant mountains is one of the minor triumphs of American archeology, and illustrates well the thoroughness of the methods pursued in the work; and there are other features worthy of careful attention by students of archeology.

THE SIOUAN INDIANS

The summary sketch of the Siouan Indians prepared by Mr McGee, as an introduction and complement to a somewhat technical account of the sociology of the tribes, develops several interesting points.

One of the great linguistic groups of North America is that comprising the Siouan tribes of the interior. Some years ago it was ascertained through linguistic researches, originating with the late Horatio Hale, but continued and perfected in the Bureau, that some of the tribes found near the shores of the Atlantic by white pioneers were closely related with the Siouan tribes of the plains; it was also ascertained that certain archaic

terms and ideas prevailing among the plains tribes bore evidence of derivation from the terms and ideas of the eastern people, thus indicating that the wandering buffalo hunters of the plains were descended from the woodland tribes on the borders of the Atlantic. Then, when the history of the Siouan Indians was wrought out from the records of the white pioneers, it was found that from the time of first observation to the time of settlement most of the tribes moved westward along various routes, and when the traditions of the tribesmen were collected by Dorsey and others they were found to recount westward migrations of some of the groups long before the advent of white men. Thus the linguistic features, the historical records, and the native traditions, coincidentally indicate a westward drift and great expansion of the Siouan tribes and confederacies, certainly from the valley of the Ohio, and probably from the Appalachian mountains, to and across the Mississippi, and thence over the greater part of the great plains stretching from the Arkansas to the Saskatchewan. The Siouan Indians accordingly form a noteworthy example at once of the growth and of the inland extension of a natural group of primitive men. Finally, study of the interaction between the Siouan Indians and their environment seems to give clear and decisive indication as to the reason for the westward migration of the greater part of the stock and for the enormous increase and multiplication of the tribes; it has been discovered that the ancient Siouan habitat slightly overlapped the ancient habitat of the American bison or buffalo, and that it was undoubtedly the quest and conquest of this singularly facile game that gradually led the huntsmen down the tributaries and across the Mississippi and over the plains beyond. The history thus developed is especially significant in its bearing on the general question concerning the growth of peoples on passing from the coasts toward the interior when food supply and other conditions are favorable.

The summary description of the Siouan Indians is of interest, too, in that the partial domestication of animals by these tribes is set forth in some detail. It is shown that the Indians of the plains, like those of several other provinces, had domesticated

the dog, which was used for draft and burden and as a source of food, as well as for protection by night, and that no other animals were completely domesticated, though some were partly tamed and kept for ceremonial purposes. It is shown also that the horse was acquired about the beginning of the present century, partly from the southwestern plains, but partly from the Cayuse country beyond the Rocky mountains. Incidentally it is shown that the domestication of animals is not a simple process, and that there is an important stage antecedent to domestication proper in which the relation between animals and men is collective and one of mutual toleration.

In their mythology the Siouan Indians are typical of the American aborigines, and the principal features of the myths and ceremonials of the tribes are set forth clearly and accurately in the sketch. The description of the Siouan "waka"da" is notably satisfactory, and indicates well the combination of vagueness and comprehensiveness which characterizes primitive belief.

SIOUAN SOCIOLOGY

A few months after the close of the fiscal year dealt with in this report the Bureau and ethnologic science sustained a heavy loss in the death of James Owen Dorsey, a collaborator of the Bureau from its institution and a frequent contributor to the reports. He had just completed a paper on the sociology of the Siouan Indians, and it, with the foregoing sketch of the stock, has been incorporated in the present report.

To superficial observers, primitive peoples often appear to be nothing more than unorganized masses or hordes, and the latter term has been largely used by writers to express the supposed unorganized condition; but more careful students of the American Indians have found that the individuals and groups are arranged in accordance with a remarkably elaborate system—a system often transcending in extent and definiteness that found among civilized people. In the absence of written statutes, there are many devices for adjusting and maintaining the demotic relations. Thus, among most of the Siouan tribes, the clans habitually arrange themselves in a certain order on making camp, and this order expresses the

rank of the clansmen and perpetuates the system of organization; and when several tribes unite and camp together the tribes themselves are arranged in fixed and invariable order, expressing and perpetuating their social and civil law. This subject has been dealt with by Mr Dorsey, and also by the Director, in previous reports; but the various known details concerning the social system of the Siouan Indians are now for the first time brought together in complete form. These details appear in the accompanying paper, while some of the general principles are set forth in the brief treatise on regimentation forming part of this administrative report.

TUSAYAN KATCINAS

As exploration was pushed over the southwestern portion of the country a quarter of a century ago, the Pueblo peoples began to attract attention; and when the early observations indicated that these aborigines of the semideserts are characterized by a more advanced culture than that of the tribes inhabiting the fertile plains and fruitful woodlands, and also by a remarkably elaborate system of belief and ceremonial, profound interest was excited among intelligent people, and many travelers from eastern United States, and even from Europe, sought opportunities for visiting the Pueblos and witnessing the ceremonial dances. Among the earliest scientific students of the Pueblos were the Director and several collaborators, at first of the United States Geographical and Geological Survey of the Rocky Mountain Region, and afterward of the Bureau of Ethnology; and a number of papers on the Pueblo Indians were published in the early reports of the Bureau. These publications still further augmented interest in the Pueblo peoples, and among those thus attracted was Mrs Mary Hemenway, of Boston, a well-known philanthropist and patron of learning. Mrs Hemenway's interest increased as her studies of the subject advanced, and she finally organized, at private cost, a scientific exploration of the Pueblo country for the purpose of investigating the people and studying their antiquities. The first expedition was placed in charge of Mr Frank Hamilton Cushing, and the work was prosecuted with success for two years, when Mr Cushing's health failed,

and Dr J. Walter Fewkes was placed in charge. During the exploration a valuable collection was made and transferred to eastern United States, and at the same time systematic researches were carried forward concerning the beliefs, symbols, and ceremonials of the people. Many of the results of the later researches have been made public by Dr Fewkes in different publications; the matured results of one of the lines of study are incorporated in the accompanying paper.

In some instances the use of aboriginal terms is unavoidable in the description and discussion of aboriginal customs, since the more highly differentiated terms of civilized language fail to express primitive ideas. The word "katcina" is an example. Its primary significance can be grasped only when the mythologic system of its users is understood. Among the mystery-loving and devout Pueblo Indians many deities are venerated or worshiped, and most of these are arranged in grades or ranks; i. e., in a vague thearchy. Among some, at least, of the tribes the deities of first rank are held to be anthropomorphic or zoomorphic at will, though in fundamental conception they seem to personify the greater objects of nature. Subordinate to these there is commonly a series of beast-gods, which are considered zoomorphic, though possessed of mystical powers far transcending those of existing animals; and there are usually still lower orders of deities, both animate and inanimate, corresponding with mystical potencies imputed to various bodies. Primarily the katcinas of the Tusayan people seem to be deities of the second order, or beast gods, which may be symbolized by animals or their representations, but which the believer regards as possessing mystical powers, including the control of natural phenomena and human affairs, either directly or through coalition with other deities. In addition to this primary meaning, a multitude of secondary meanings cluster about the term. It is applied to the priest or dramaturgist who represents the deity in the ceremonial; to the mask symbolizing the deity; to the statuette symbolizing the dramaturgist; to the ceremonial in honor of the deity, and perhaps to the place at which or the time during which the ceremonial is performed. To understand fully these multifarious secondary meanings, it is necessary to realize something of the crude and ill-differentiated ideation of the primitive man

whose vocabulary is limited, whose concepts are few, and whose mental processes are involved with a maze of incongruous associations; but the indefinite and arbitrary modes of thought prevailing among primitive people are incidentally treated in other portions of the volume and need not be further elaborated here. It is needful only to indicate the impossibility of expressing the idea conveyed by the aboriginal term katcina by any word or combination of words in the languages of civilization; the idea is essentially primitive and is not susceptible of direct rendering into the terminology of the higher intellectual plane.

In his introduction Dr Fewkes properly cautions the reader against misapprehension concerning the use of such words as "god," "deity," "worship," etc. This caution demands special emphasis, as must be apparent in view of the foregoing explanation concerning the term katcina. Students of Indian mythology feel compelled to use common language wherever possible without actual violence to primitive meaning, even when the terms are liable to misconstruction. With this caution the concepts of the Indians, imperfectly expressed by these terms, can readily be gathered from the context and the general treatment of the subject.

While the paper does not profess to be a final or complete monograph, and while it acquires value largely from the fact that it is an original record of observation, students will find the systematic arrangement of the material and the introductory and other notes suggestive and useful. To lay readers, the paper may be recommended as a notably faithful account of some of the most interesting ceremonials among the peculiarly cultured Pueblo Indians, the ancient neighbors and perhaps kindred of the Mexican princes eulogized—yet quickly dethroned and often slaughtered—by the European pioneers in Mexico.

THE REPAIR OF CASA GRANDE RUIN

On February 4, 1889, Honorable George F. Hoar laid before the United States Senate a petition from Oliver Ames, governor of Massachusetts; William E. Barrett, speaker of the Massachusetts house of representatives; Mrs Mary Hemenway,

eminent as a benefactress of many institutions of education; William Claflin, Francis Parkman, Dr Edward Everett Hale, Oliver Wendell Holmes, John Fiske, William T. Harris, and John G. Whittier, "calling the attention of Congress to the ancient and celebrated ruin of Casa Grande, an ancient temple of the prehistoric age, of the greatest ethnologic and scientific interest, situate in Pinal county, near Florence, Arizona," and praying "that the Government will take further measures to have the ruin protected from injury by visitors or by landowners in the neighborhood." (Congressional Record, vol. xx, pt. 2, p. 1454). Thus was initiated a movement on the part of the Congress toward the preservation, for the benefit of the people, of one of the remarkable aboriginal antiquities of the United States. The movement resulted in an inquiry concerning the condition of the ruin and a detailed examination by collaborators of the Bureau of Ethnology (the results of which have been published in the Thirteenth Annual Report), and it eventuated in a small appropriation by the Congress for the protection of the ruin, and in the reservation of the site through an Executive order. Accordingly, this impressive record of an ancient culture has been set apart forever for the instruction of the public, and the Federal Government has established a precedent for the protection of its priceless relics.

The history of the works for the preservation of the ruin is set forth in the accompanying paper by Mr Cosmos Mindeleff.

ON REGIMENTATION

The officers of the Bureau have now been engaged for many years in investigating the institutions of savagery, and while these researches are far from complete and many questions are unsettled it seems desirable, for many reasons, that an outline of certain conclusions should be published.

Regimentation in sociology is the analog of organization in biology. The accomplishment of justice in institutions is the analog of function in the biotic realm. Often the terms organ and function are transferred from biology to sociology. This double use of terms is a very general device of speech, and is both legitimate and useful when properly understood; but the terms organ and function are tropes in sociology, and must be so understood lest they should lead astray. By regimentation is meant the grouping of people by institutional bonds, while the accomplishment of justice is the social function or office which a confederation or group of people performs.

Two radically distinct methods of regimentation are found extant in the world and recorded in the history of the past; these may be known as the tribal system and the national system. By the tribal system men are organized on the basis of kinship, real or artificial. By the national system men are organized on the basis of territory. Thus kinship groups are found in tribal society, territorial groups in national society. In history, transitional forms are found, the most important of which are feudal. Thus, feudal society exhibits both methods, and forms a connecting link in the evolution of tribal into national government.

In savagery families are organized into clans, and clans sometimes into tribes, and tribes into confederacies. Sometimes intervening units are discovered, but the family, clan, tribe, or confederacy are always found. In barbarism families, gentes, tribes, and confederacies are organized into a hierarchy of units, and there are sometimes intervening units. The difference between the clan of savagery and the gens of bar-

barism is important and fundamental. The clan is a group of people reckoning kinship in the female line, while the gens is a group of people reckoning kinship in the male line. Tribes reckon kinship in the male or female line together with affinity, and adopted members of the tribe are given artificial kinship. When tribes unite in confederacies, artificial kinship is established as a legal fiction, and the members of one tribe know the members of another tribe and address them by kinship terms. The manner in which this kinship organization is elaborated varies greatly from tribe to tribe. Radical differences exist between the tribes of savagery and the tribes of barbarism. In barbarism patriarchies are found as concomitant with nomadic tribes, but in savagery the patriarchy does not exist, nor are savage peoples properly nomadic, as nomadism begins with the domestication of animals and higher agriculture.

The plan of organizing states into units of different orders so as to form a hierarchy of groups is denominated regimentation, and it can be made clear by explaining primitive regimentation.

With national states, territorial organization obtains. People are divided into bodies or groups by districts. No two nations are organized in precisely the same manner; though the general plan is the same—i. e., by territorial boundaries—the specific manner in which the organization is worked into detail is ever variable. It is impossible here to set forth all these various methods. It will be sufficient to take some one nation and explain its organization as a type, and for this purpose the Government of the United State is chosen.

The grand unit, or the nation, is divided into states and inchoate states, or territories. States are divided into counties, and counties are divided into townships, sometimes called towns. In addition to the hierarchy of units thus enumerated, there are cities and villages, which are again divided into wards, and these again into polling districts, while other districts are sometimes found. The various units thus set forth are established for executive purposes. This regimentation is that which obtains for executive purposes.

There is another system of regimentation for judicative purposes. In part, but only in part, judicial districts coincide

with executive districts, and there are national courts, state courts, county courts, and municipal courts. Again, judicative functions are differentiated, as criminal and civil, and special courts are organized therefor, while other courts are organized, as railroad commissions, warehouse commissions, etc.

A third system of regimentation is used for legislative purposes, and in this system the districts correspond only in small part with those established for executive and judicative purposes.

A fourth system of regimentation is established for operative purposes. The General Government carries on works, states carry on works, counties carry on works, and cities and towns carry on works.

Still a fifth system of regimentation is found, namely, that for school purposes.

By the district system thus briefly and imperfectly elaborated the people are organized or regimented into bodies, and special functions are relegated to the several units. These functions are constitutive, legislative, executive, operative, and judicative. It is by constitutive action that regimentation is accomplished; and it is by regimentation that specialization is accomplished. This specialization is carried on to such an extent in the United States that much of the government is local self-government. Every school district has special functions, every township special functions, every county special functions, every state special functions, and every municipality special functions; while general functions are exercised over all by the Federal Government. Thus, the people of the United States are constituted and regimented into a congeries of hierarchies of units all woven into one complex system as the Government of the United States, and so adjusted in interdependent parts as to secure a high degree of specialization.

In addition to the governmental regimentation, there is a vast congeries of societies or corporations organized for religious, industrial, educational, and other purposes, all of which constitute part of the state or nation.

The regimentation of all people is founded on natural families, for there are husbands and wives, parents and children;

but such families have lineal and collateral lines of kinship involving both parents. A larger group than that composed of parents and children is organized in the crudest society known. For this purpose all of these persons reckoning consanguineal kinship through the female line are regimented or organized in a clan. The term clan should always be used to designate this group, though it is sometimes improperly used to designate other groups. The husband and wife do not belong to the same clan, but the husband belongs to the clan of his mother, while the wife belongs to the clan of her mother. It is thus that the first constitutive unit of organized society is based on kinship reckoned through the female line. The next unit recognizes kinship by affinity, and a number of related clans that intermarry constitute the tribe. The term tribe should always be used in this manner. Curiously enough all of the terms which are used in defining the units of regimentation are often used promiscuously, so that clan, gens, tribe, and confederacy, with many other terms which are synonymous, have a vague meaning in popular estimation; but in science we are compelled to give a definite meaning to fundamental terms. A clan, then, is a union of persons who reckon consanguineal kinship in the female line; a tribe is compounded of clans whose members reckon kinship by consanguinity and affinity, while a confederacy, which is more or less ephemeral, is a union of tribes reckoning kinship as a legal fiction.

In the clan the group is ruled by an elder man. But this elder man may or may not be the oldest living male in the clan; to understand this it becomes necessary to understand the method of kinship naming in vogue in savagery. In the clan the children of one woman are not only brothers and sisters to each other, but also "brothers" and "sisters" to such of their cousins as reckon kinship in the female line. Thus, if there be three sisters their children call one another by reciprocal kinship names, as "brothers" and "sisters;" but if there be three brothers their children do not call one another by common kinship names, but by the kinship names determined through their mothers; that is, they call one another cousins. Among the collateral descendants through the female line there are thus a number of persons of varying ages calling

each other "brother" and "sister," though the term used always has a further significance in that it designates relative age, so that there is no single term for brother, but two, one signifying elder brother and the other younger brother; there are also two terms for sister, one signifying younger and one elder. Now, it is a law of savage society that one person must address another in the clan, in the tribe, and in the confederacy by a kinship term, and as superior age always gives authority, to address a person as elder is a symbol of yielding authority, and to address him as younger is a symbol of claiming authority. There is a curious modification of this custom which is a legal fiction. If any individual in the group of brothers exhibits superior ability, the clan or some other constituted authority takes him out of his kinship rank into a higher rank. Thus his kinship name is changed; younger brother becomes "elder brother," and elder brother becomes "younger brother" by a legal fiction; or the son may become the legal "father" and the father the legal "son."

A promotion in kinship is always attended with much tribal ceremony. Among the Iroquoian tribes it is called "putting a spike on the horns." In some tribes it is called "adding a feather to the bonnet," in others it is "adding a stripe to the war paint." There is often a preliminary course of instruction for the ceremony, which is performed by the priest. Important promotions may be revoked, and a man who becomes unworthy in his office may have his "horns" knocked off, or his "feathers" plucked out, or his "paint" washed away. In all such cases he falls back to his natural kinship name and state.

Every clan in a tribe receives a special name, which has come to be known as its totem. Thus in a tribe there may be a buffalo clan, a beaver clan, a cloud clan, a wind clan, an eagle clan, and a parrot clan, with others. Sometimes the clan name is the common name for all persons in the clan, but more often there is a group of names signifying some real or mythologic characteristic of the animal or object taken as the totem. For example, in the buffalo clan there may be a name signifying "sitting bull," another "standing bull," still another

"mad buffalo;" and names taken from the mythology of the buffalo may be used. The clan name or totem is used to distinguish the members of one clan from the members of another. It is never used in the first and second persons, but always in the third person. In direct address the kinship name expressing relative age must always be used. Uncles in the clan are addressed as "fathers," cousins in the clan as "brothers" and "sisters."

If two or more tribes unite in a confederacy, the first thing to be considered in the council by which such a confederacy is established is the kinship terms by which one tribe shall address another. Where two unite, one may be called "father" and the other "son," while with the females "mother" and "daughter" are used. One may be called "elder brother" and the other "younger brother," with "elder sister" and "younger sister." In compounding many tribes in this manner curious complications arise.

We thus see that a savage tribe is regimented by kinship through devices of naming, especially for the clan, tribe, and confederacy, and these names are so constituted that relative age is always expressed, for the elder has rights and the younger duties.

As in territorial organization special functions are relegated to the several units, so in kinship regimentation special functions are relegated severally to the hierarchy of bodies thus constituted—that is, certain offices are performed by the clan, others by the tribe, and still others by the confederacy. The possession of property which is exclusively used by the individual is inherent in the individual, such as clothing, ornaments, and various utensils and implements. Individual property can not be inherited, but at death is consigned to the grave. That property which belongs to the clan, such as the house, the boat, the garden, etc, inheres in the corporate person. No article of food belongs to the individual, but is the common property of the clan, and must be divided by the authorities of the clan, often according to some rule by which some special part is given to the person who provides the food. Thus when a hunter dispatches a deer a particular portion is given to him;

other portions may be given to those who assisted in its capture. All the rest is divided according to the needs of the individuals of the clan. The women gather fruits, seeds, or roots. That which is consumed at the time is divided by like methods, but that which is preserved for future use sometimes becomes the property of the clan. The elder man of the clan is responsible for the training of children, and it is no small part of his duty daily to exercise them in their games and to instruct them in their duties. Thus he who enforces clan custom is the same person who instructs in clan custom, and when councils of tribe or confederacy are held he is the representative of the clan in such councils. The chief of the confederacy is usually the chief of one of the tribes, and the chief of the tribe is usually an elderman in one of the clans. There are clan councils, tribal councils, and confederate councils, chief councilors and eldermen.

Another organization, which involves all civic relations, must be explained. There is a body of men, and sometimes women also, who are known as medicine-men, or shamans, or sometimes as priests, who control all religious ceremonies, and who are diviners. As disease is supposed to be the work of human or animal sorcery, it is their function to prevent or thwart sorcery. They have the management of all ceremonies relating to war, hunting, fishing, and gathering the fruits of the field and forest. It is their office to provide for abundant harvests, to regulate the climate, and generally to divine and control good and evil by means of ceremonies. The principal shamans are men, but all the people are united into shamanistic societies. Usually there is some determined number of these societies, over each of which some particular shaman presides, but he has subordinates, each one of whom has some particular office or function to perform in the societies. Sometimes a person may belong to two or more of these societies; usually he has the privilege to join any one, and a revered or successful shaman will gather a great society, while a shaman of less skill will preside over a society more feeble. Let us call these ecclesiastic corporations, and call the shamans priests. The only corporations in savagery are ecclesi-

astic. The way in which they are regimented and controlled differs from tribe to tribe, and there is a great variety of ceremonial observances. In all civic councils the ecclesiastic authorities take part and have specified functions to perform, and introduce into civic life the ceremonies which they believe will procure good fortune. Perhaps the ecclesiastic authorities may be more powerful than the civic authorities, and the hereditary line of special ecclesiastic governors may gradually overpower the civic constitution and absorb it as a secondary element in the ecclesiastic constitution, for it must be remembered that the chief priests are men; the women play a very small part in ecclesiastic affairs. Now, as the men manage ecclesiastic affairs as chief priests, so civil affairs are managed mainly by men as eldermen, and the conflict which sometimes arises between the two forms of government is mainly between men and men—between able eldermen and able shamans. Sometimes both offices are combined in one person, and the great elderman may also be the great shaman.

There are five fundamental principles of justice; that is, to secure justice, five fundamental purposes must be considered: Justice is the establishment of peace. Justice is the establishment of equality. Justice is the establishment of liberty. Justice is the establishment of equity; and justice is the establishment of truth. In all law, primitive and modern alike, these principles are recognized, and all institutions are organized for these purposes.

In the study of North American tribes it is always found that the purpose assigned and recognized for the organization of that unit is the establishment of peace. Two or more bodies have come to war and finally agree to live in peace and make a treaty, and the terms of the treaty are invariably of one character if they unite as a tribe. If they unite as a confederacy, it is for other purposes. This fundamental condition for the organization of a tribe is that the one party agrees that its women shall be the wives of the other, with a reciprocal obligation; and this is the characteristic which distinguishes tribes from confederacies. A body of people that is organized for the purpose of regulating marriage is a tribe, and a body of

people organized for war is a confederacy. Thus the organization of a tribe itself is the first recognition of the principle of peace in the origin of constitutions.

The principle of equality is recognized in the method of distributing the spoils of the arrow, the fish net, and the fruit basket, which is an equal division to all the members of the clan. The principle of liberty is first recognized when slavery is established, and the means of obtaining freedom are provided, and that is always the case in savage society. Slaves are captured enemies, who therefore deserve to die. They are not always killed, but sometimes (even quite often) adopted into the tribe. A captive can not become a member of the tribe without some kinship position, therefore he must be adopted by some woman as her child, and adoption in savagery is often called new birth. Now, he takes the kinship name under a legal fiction—that is, he is "younger" to every living person of the tribe at that time, and all persons subsequently born are younger to him. This is not yet slavery. If the captive belongs to a tribe of hereditary enemies who have from time immemorial been designated by some opprobrious term, as cannibals, liars, snakes, etc, then it may be that the captive is doomed to perpetual younger brotherhood, and can never exercise authority over any person within the tribe, though such person may be born after the new birth of the captive. This is the first form of slavery. Usually, though not invariably, the captives adopted are children. Now such children may ultimately become useful members of the tribe and by their virtues even win rank in kinship, and a captive may thus pass from slavery to freedom. The many methods adopted for conferring freedom would be a long and weary story, but they are practically the same as those conferring rank in kinship. This must be briefly explained, though it has been already shown in part. The successful warrior, hunter, or food gatherer is rewarded by a special portion of the spoil as an equity. Now he who has for a term of years been successful in any of the activities of tribal life and who exhibits skill and wisdom therein is promoted by giving him an advanced kinship designation. One or more grades may be climbed at one time and promotions may follow one another

rapidly, so that a brilliant youth may become an elder man, and gray-haired men must address him as "father," and he must even call his natural grandfather "grandson." By such methods primordial equity is established.

That which in modern civilization is the highest function of the court and best exhibits the talents of the advocate is the discovery of facts; but ready methods for discovering the truth prevail in savagery. This is the function of the priest, who by some form of divination discovers the facts. Thus it is that justice is distributed in its five elements of peace, equality, liberty, equity, and truth.

Justice is not always performed in savage society, and it even goes awry in civilized society; hence we have remedies in savagery and civilization alike. But sometimes there is no remedy, when punishment is executed. We have already shown how exogamous groups are organized. A man can not marry within his clan, because already the clan has promised its women for the wives of another clan, yet the marriage may be accomplished and crime is done. This is incest. Often nominally the punishment is death, and sometimes the law is executed, but there are many ways by which justice may be done without inflicting the ultimate penalty. The crime may be condoned and a price paid, and this often done may ultimately result in a custom of marriage by purchase. The clans of a tribe may prosper equally, and there may be more men in one clan than there are women in another, and men may quarrel or even fight for wives, and such contest may ultimately be regulated by law; this results in marriage by wager of battle. If the woman is unwilling, it may also require capture, and this may be legalized under certain forms and ceremonies, and we have marriage by capture. But young men and young women form mutual attachments which are sometimes stronger than tribal law, and they may abscond and live together as man and wife. If they can successfully maintain themselves in the wilderness until a child is born, the child becomes the certificate of marriage and the wedding is thus legalized, and with this certificate the crime is atoned. This is the only marriage by choice.

Now, in all of these extratribal marriages, crime is committed, and the peculiar methods and ceremonies of marriage by purchase, marriage by wager of battle, marriage by capture, and marriage by choice result in the reestablishment of justice as it is conceived in the savage mind. We have already explained much of personal law in the explanation of the law of marriage and the law of promotion and reduction. Yet there are other subjects worthy of present consideration. Murder is punished with death. The crime is against the clan, and any member of the clan may become the avenger, though often some particular person is delegated to that office. The murderer may also be defended by his clan; in such case the death of any of the murderer's clan atones for the death of the murdered man, but the murderer may be declared an outlaw by his clan, and any man of any clan may dispatch him with impunity. In some cases murder may be atoned by substitution; that is, the murderer may be expatriated, driven from his home and clan, and thus become dead to his own people and then be adopted by the injured family to replace the murdered person. Thus the wife of the murdered man may adopt the murderer for her husband; in so doing he loses his own name and all relations of kinship and adopts the name and relations of kinship of the murdered man. A quarrelsome man may embroil clans, and this may be carried on to such an extent that the clan will declare him an outlaw. Sometimes murder is atoned by the payment of a stipulated or customary price, and usually blood barter is graded by rank. Maiming is also avenged by the clan, "an eye for an eye and a tooth for a tooth;" but it may be compounded by common agreement between the belligerent clans.

A belief in witchcraft is universal. A person suspected may finally come to be universally recognized as practicing black art. Such a wicked person is killed as an outlaw. The wizard may not have such a reputation in his own clan, but may be accused of witchcraft by another clan; if there is a wish to preserve him, his witchcraft may be compounded.

We have already explained the equal division of property in the clan, the equitable division made to the successful hunter,

and that personal property is inherited by the grave, while clan and tribal property belong to a perpetual person. Theft sometimes but rarely occurs; when it does, the object stolen may be restored; when it can not be restored, the theft is compounded in some multiple proportion. The only corporations in savagery are ecclesiastic, and crimes against the medicine societies are those which result from the divulging of secrets or the teaching of rites by unauthorized persons or the exercise of such rites by persons incompetent therefor. Proceedings for witchcraft are conducted by the ecclesiastic bodies.

Such, in outline, are the plan of regimentation and the fundamental principles of justice recognized in the most primitive tribal states found among mankind. This stage of society is known as savagery. Savages are primitive sylvan men; they are denizens of forest and wold without the skill necessary to clear away the forests and establish higher agriculture and domesticate herds of animals. When these feats are accomplished, then men are said to have reached the stage of barbarism.

Savagery gradually develops into barbarism and barbarism itself is represented in the plan of regimentation, which involves a change in constitution, legislation, execution, administration, and adjudication. The change of regimentation is represented by the extinction of the clan and its replacement by the gens. The term gens is here used to mean the unit of government herein described as a group of persons who reckon consanguineal kinship in the male line.

We have already described the double organization of every savage tribe as civil and ecclesiastic, and noted the conflict which arises between the groups as thus organized. A powerful ecclesiastic organization will sometimes absorb the civil organization, especially when the priest and elderman is the same person. Quite often the sacerdotal office is hereditary, descending from father to son, and thus grows up a method of reckoning kinship in the male line as fundamental. Now there are many circumstances in primitive life which reinforce this tendency. When the men of the clan have to go to the annual fishing ground for the summer catch, they take with

them their wives and children. Such wives and children are no longer under the power of the eldermen; they are geographically separated from them, for the men of the clan who work together are distinct from the men of the other clans where each group fishes by itself. Hunting is often managed in this manner by clans. Such annual hunting and fishing excursions weaken the authority of the mothers, brothers, and uncles, and strengthen the authority of husbands and fathers. But there are two agencies which seem to be even more potent. Agriculture is born in arid lands where irrigation is necessary, and the men of the clan unite to manage the stream which is used in irrigation and to protect the crops which lie under the canals, though the crops themselves may be cultivated chiefly by the women. Here again there is a geographical segregation of the women and children under the immediate supervision and control of husbands and fathers. Finally, animals are domesticated and there are flocks and herds under the control of the men. The pasturage for one clan flock is in one valley and for another clan flock in another valley, for the property is thus kept apart; and this also serves to segregate the women from the men of their clan kindred and place them under the authority of husbands and fathers. By all of these methods clanship is broken down and a new fundamental method of reckoning in kinship is developed through males; this is the gens. Much time may be taken in making these changes, while the authority of the clan is gradually weakened and the authority of the gens established. Many of the tribes of North America are in the transitional stage.

When the change is made, councils as well as ecclesiastic bodies are still controlled by men, but the regimentation is radically distinct. Perhaps the most fundamental change that comes is the right of the father over his own children, especially in deciding their marriage relations, for this right is not transferred from clan to gens, but from clan to father. With this change comes another of fundamental importance. With the acquisition of herds, farming lands, and stores of grain, wealth is accumulated, and this wealth is controlled by the gentile patriarchs. It is no longer clan property, but gentile property

in the possession and under the control of the patriarch, who wields a power never known in savagery. The patriarch now is always chief and priest and the practical owner of the wealth; he thus becomes the master of the destiny of his retainers. A particular effect is noted in the council. The number of persons who compose the council is gradually reduced, and these chiefs and councilors are regimented into patriarchies for war and public works, while instruction falls mainly into the hands of husbands and fathers, and the wife is no longer controlled by her clansmen, for she is no longer under their protection. Thus the husband becomes the master of the wife and children.

In the clan the head is an elderman and is an "uncle" or "great uncle" because kinship is reckoned through females. This is expressed in Indian tongues by the aphorism that "the woman carries the clan," while in barbarism "the man carries the gens." This is the first great revolution in tribal society accomplished by the consolidation of power in the hands of the few and the organization of the gentile family. The gens is ruled by the patriarch who represents the family in the councils of the tribe and the confederacy and holds all the property in trust for the gens over which he rules by civil law with civil sanction and ecclesiastical law with ecclesiastic sanction.

In savage society there is no written language, hence the laws are classed and expressed in terms of kinship, but in barbaric society an additional mnemonic and classific method is developed, which must now be delineated; it arises out of ecclesiastic functions of government and ultimately becomes dominant so as to modify the kinship system. In savagery the world is divided into regions—the east, west, north, south, zenith, nadir, and center. This is continued in a more highly developed form in barbarism until it finally becomes the dominant system. Sometimes the regions are but five in number—east, west, north, south, and center; but more often the seven regions are recognized. Sometimes the number five, but more commonly the number seven, becomes the sacred number. This division of the world into regions is naturally born in the usages of language and at last becomes as deeply woven into society as

language itself, and the reality of the regions becomes sacred, as language is held to be sacred. The theory of the regions is not only woven into their speech and into their institutions, but it becomes one of the principal elements of picture writing and is represented by some form of the cross signifying the east, west, north, and south, to which are attached some other devices for representing the zenith, nadir, and center. Thus the swastika is found as a symbol among many savage tribes, and it seems to be universal among barbaric tribes.

These world symbols often govern methods of architecture. The theory of worlds is of vast extent and of profound influence. It is found to pervade tribal society not only in America, but elsewhere throughout the world. I am tempted in this place to go to the Orient for an example to show how laws and the maxims of laws are formulated in savage and barbaric society, but I must premise the statement by explaining one other method of formulating laws. The particulars of law are often represented by numbers—one number for each finger of the hand; and the reciprocal rights and duties by the five numbers represented by the five fingers of the other hand. Thus by pointing in the direction of one region with the proper finger of the right or left hand any particular law or maxim can be expressed in gesture speech.

I quote from the Sigālowāda Sutta, a table of aphorisms published by Rhys-Davids in his book on Buddhism, which might be duplicated as a method of schematization in many of the tribes of North America. The scheme in which the aphorisms are arranged is by regions. It has the same design as a scheme that the swastika has as a picture writing, and both are as natural to the human race as the recognition of the cardinal points. The regimentation in kinship society is taken by analogy from the recognized relationship of consanguinity and affinity for schematic and mnemonic purposes. The following schemes prevail among savage and barbaric people for a great variety of purposes: Schemes of four, five, six, or seven are derived from the regions, schemes of five are fixed and perpetuated by the number of fingers on the hand, schemes of ten are derived from the number of fingers on both hands, and

schemes of twenty from the number of fingers and toes, while schemes of four are sometimes found derived in a fanciful way from the colors of the four regions—east, west, north, and south. The scheme which Rhys-Davids records from India is, first, a scheme of six regions; second, it is a scheme of reciprocal fives as the fingers on the hand are reciprocal. In the second division of the sixth regional group it will be noticed that the last aphorism violates the symmetry of the arrangement. In all others there are five; in this there are six. This peculiarity may be found anywhere in North America and South America. It is the thirteenth of the baker's dozen. It is the common method of showing that the tale is complete. Thus Rhys-Davids:

The Teacher was staying at the bamboo grove near Rājagriha; and going out as usual to beg, sees the householder Sigāla bowing down, with streaming hair, and wet garments, and clasped hands, to the four quarters of the heaven, and the nadir, and the zenith. On the Teacher asking the reason why, Sigāla says that he does this, "honoring, reverencing, and holding sacred the words of his father." Then the Teacher, knowing that this was done to avert evil from the six directions, points out to him that the best way to guard the six quarters is by good deeds to men around him—to his parents as the east, his Teachers as the south, his wife and children as the west, his friends and relatives as the north, men devoted to the religious life (whether Brahmans or Buddhist mendicants) as the zenith, and his slaves and dependents as the nadir. Then in an orderly arrangement, evidently intended to assist the memory, after some general precepts and a description of true friendship, the chief duties men owe to one another are thus enumerated under the above six heads:

1. Parents and Children

Parents should—

1. Restrain their children from vice.
2. Train them in virtue.
3. Have them taught arts or sciences.
4. Provide them with suitable wives or husbands.
5. Give them their inheritance.

The child should say—

1. I will support them who supported me.
2. I will perform family duties incumbent on them.
3. I will guard their property.
4. I will make myself worthy to be their heir.
5. When they are gone, I will honor their memory.

2. Pupils and Teachers

The pupil should honor his teachers—

1. By rising in their presence.
2. By ministering to them.
3. By obeying them.
4. By supplying their wants.
5. By attention to instruction.

The teacher should show his affection to his pupils—

1. By training them in all that is good.
2. By teaching them to hold knowledge fast.
3. By instruction in science and lore.
4. By speaking well of them to their friends and companions.
5. By guarding them from danger.

3. Husband and Wife

The husband should cherish his wife—

1. By treating her with respect.
2. By treating her with kindness.
3. By being faithful to her.
4. By causing her to be honored by others.
5. By giving her suitable ornaments and clothes.

The wife should show her affection for her husband—

1. She orders her household aright.
2. She is hospitable to kinsmen and friends.
3. She is a chaste wife.
4. She is a thrifty housekeeper.
5. She shows skill and diligence in all she has to do.

4. Friends and Companions

The honorable man should minister to his friends—

1. By giving presents.
2. By courteous speech.
3. By promoting their interest.
4. By treating them as his equals.
5. By sharing with them his prosperity.

They should show their attachment to him—

1. By watching over him when he is off his guard.
2. By guarding his property when he is careless.
3. By offering him a refuge in danger.
4. By adhering to him in misfortune.
5. By showing kindness to his family.

5. Masters and Servants

The master should provide for the welfare of his dependents—

1. By apportioning work to them according to their strength.
2. By supplying suitable food and wages.
3. By tending them in sickness.
4. By sharing with them unusual delicacies.
5. By now and then granting them holidays.

They should show their attachment to him as follows:

1. They rise before him.
2. They retire later to rest.
3. They are content with what is given them.
4. They work cheerfully and thoroughly.
5. They speak well of him (or perhaps properly to him).

6. Laymen and those devoted to Religion

The honorable man ministers to mendicants and Brahmans—

1. By affection in act.
2. By affection in words.
3. By affection in thoughts.
4. By giving them a ready welcome.
5. By supplying their temporal wants.

They should show their affection to him—

1. By dissuading him from vice.
2. By exhorting him to virtue.
3. By feeling kindly towards him.
4. By instructing him in religion.
5. By clearing up his doubts.
6. By pointing the way to heaven.

I have spoken of phratries as a system of groups, sometimes found in savagery and always in barbarism. We are now able to explain the meaning of the phratry. There may be many clans or gentes in a tribe, and two or more clans or gentes may constitute an intervening unit which we call the phratry. With the Muskhogean there are four phratries, one for the east, one for the west, one for the north, and one for the south. With the Zuñi there are six phratries, one for the east, one for the west, one for the north, one for the south, one for the zenith, and one for the nadir Thus the phratries are organized by mythologic regions; and this method of regimentation finds expression in the structure of the council chamber, in the plaza, and in the plan of the village. Here in the phratry we have the beginning of district regimentation, which ultimately prevails in civilization.

The fabric of primitive society is a web of streams of kindred blood and a woof of marriage ties. This tapestry is wrought in wonderful patterns, for on it can be traced the outlines of primitive mythology. Some scholars have seen in the fabric only the mythic patterns enwrought and failed to discover the real institutional foundation.

ACCOMPANYING PAPERS

STONE IMPLEMENTS

OF THE

POTOMAC-CHESAPEAKE TIDEWATER PROVINCE

BY

WILLIAM HENRY HOLMES

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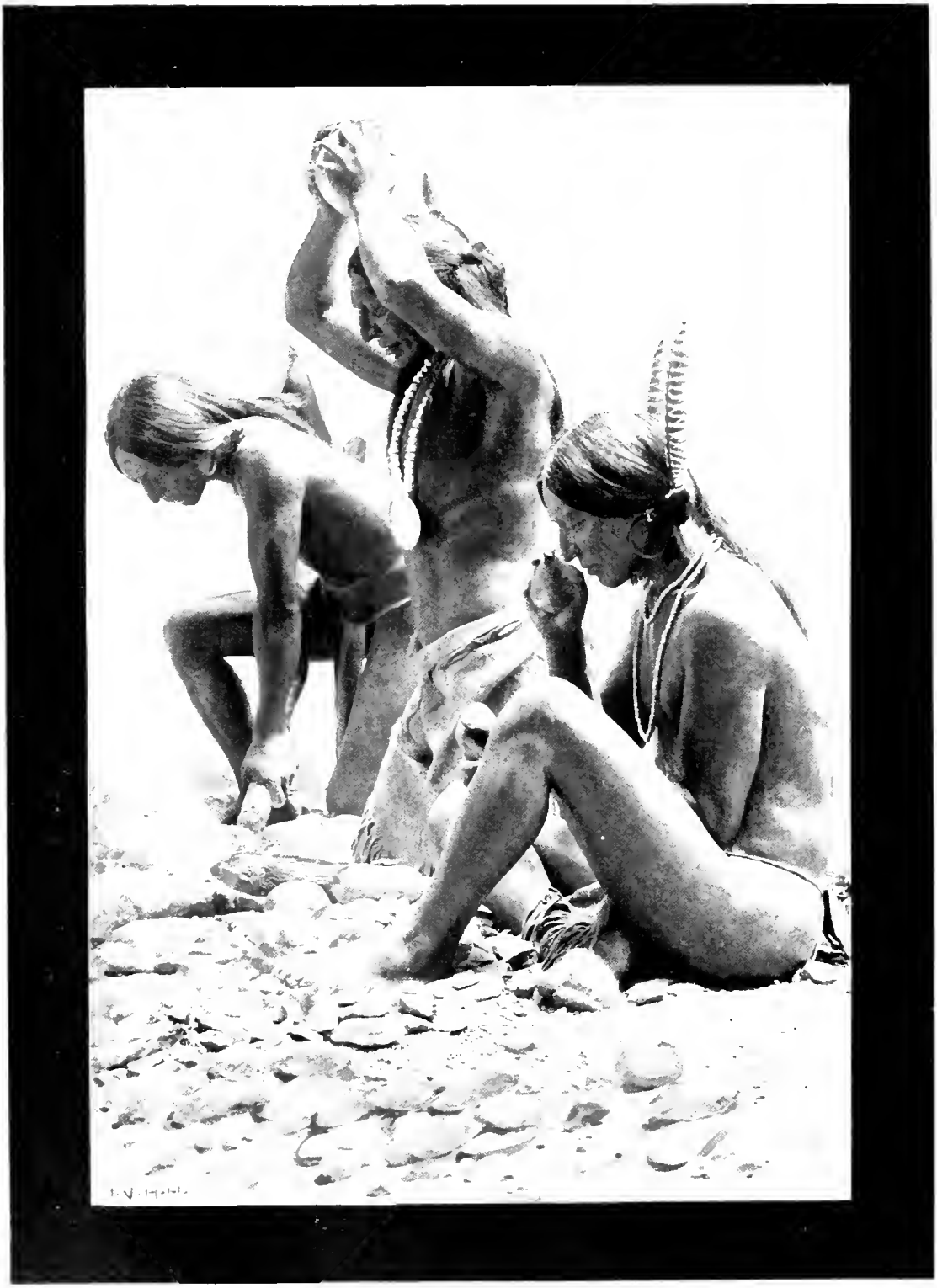


GROUP IN PLASTER ILLUSTRATING THE WORK CARRIED ON IN AN ABORIGINAL QUARRY WORKSHOP

Prepared by the author for the World's Columbian Exposition at Chicago. See Supplementary Note I, page 150

STONE IMPLEMENTS OF THE POTOMAC-CHESAPEAKE TIDEWATER PROVINCE

By William Henry Holmes

PREFATORY NOTES

I

The Indian tribes inhabiting the great province drained by the tidewater tributaries of the Chesapeake were simple fishermen, hunters, and warriors whose art aimed at little beyond the supply of passing needs, and the district now furnishes almost nothing in the way of art remains to attract the popular eye. Little has been preserved beyond the simplest varieties of stone implements; but inconspicuous and elementary as these objects are, they have attracted much attention on the part of archeologists, and are now eagerly studied because of their bearing, not only on the history of the region and its people, but on questions of general import in the history of primitive progress. The explorations and studies recorded in the present paper were undertaken for the purpose of determining, if possible, the precise status of these remains, thus making them safely available to the historian of the race who seeks first of all a safe basis on which to found his structure. But some special questions have arisen that for the time overshadow the more general features of the investigation.

The earlier studies of the stone implements of the province developed decided differences of opinion as to the significance of a peculiar class of rudely flaked stones found in vast numbers about the head of tidewater in James, Potomac, and Susquehanna valleys. The main question at issue may be stated as follows: Do these rude objects form part of the remains left by the peoples of the region known to us historically—the Algonquian tribes and their neighbors—as their associations in a general way indicate; or do they belong to an earlier race of much lower culture as suggested by the fact that somewhat analogous forms, found in other parts of the world, characterize the art of very ancient and primitive peoples?

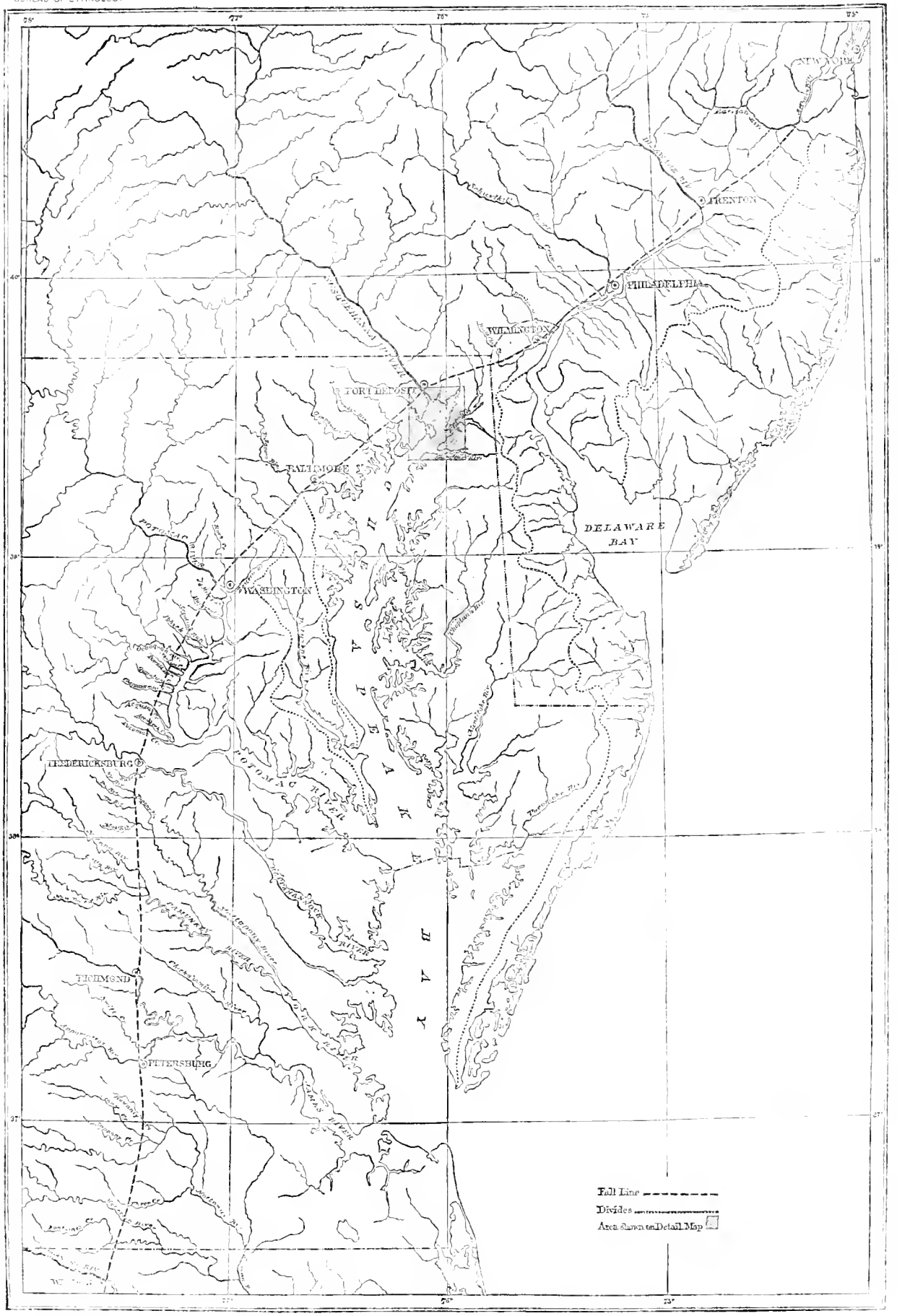
The most extensive deposits of the rudely flaked stones are found along the bluffs in and about the city of Washington. The careful

investigations so fully recorded in these pages have proved beyond the shadow of a doubt that the great deposits are on the sites of workshops connected with extensive quarries where the raw material (Cretaceous bowlders) was obtained. It was further found that the widely scattered specimens of the same class were on sites (village-sites or otherwise) yielding less plentiful supplies of the available raw material where manufacture had been conducted on a smaller scale. That the vast body of the rudely flaked stones of the province are rejects of manufacture was readily shown.

As a second step in the investigation it was deemed necessary to determine the exact relations of these objects with the real implements of the region. This was accomplished by first determining by most careful studies of the rejectage of the great flaking shops just what the product of the flaking operations was. This product, so far as the progress of specialization of form on the shop sites indicates, was found to be a leaf-shape blade. A third step in these explorations was then undertaken for the purpose of determining the destiny of these blades—where they were carried and how and by whom used. Many specimens of identical form were found on Indian village-sites in all parts of the surrounding region, and in several cases on sites of historic Algonquian settlements, where they were intimately intermingled with the midden refuse, pottery, and neolithic implements. It was further discovered that a large percentage of the countless stone implements—knives, spearheads, arrowpoints, etc—found in the broad valley below, were of leaf-blade genesis; that before they received their final shapes by trimming, stemming, and notching, they had been blades, corresponding exactly with those produced in the multitude of shops. The shops are, therefore, a necessary complement of the implements of the region and the implements are a necessary complement of the shops. The shops, great and small, are thus definitely connected with the great body of implements of the region, and these implements are directly connected with the dwelling sites of the historic peoples. The practical unity of the stone art of the region is in this way fully established, no type of implement or shaped stone not being fully accounted for by the well-established facts and necessary conditions of recent Indian occupancy.

That these demonstrations should be complete and satisfactory, studies were made of quarries of other materials in the neighboring highland, where the conditions proved to be the same in every respect. Similar leaf shape blades were made and carried out to the surrounding valleys where they and the implements specialized from them are found closely associated with the more local art products.

That the subject should be further rounded out and completed, all known classes of implements have been studied and relegated to their proper categories, and the history of their manufacture and the classes of rejectage pertaining to them have been determined. In all this work



Scale 1: 2,230,000 = 35 m. to 1 in.

MAP OF THE POTOMAC-CHESAPEAKE TIDEWATER PROVINCE

Extending from the heavy, broken line (the fall line) on the west to the dotted line on the east

there has not been found a single feature of the art remains or industrial phenomena of the region suggesting the presence of other than the known peoples.

The full series of illustrations presented in this paper will enable the student to make comparisons and arrive at his own conclusions. Great care has been taken to arrange these illustrations so that they will tell the story clearly and fully.

It is fortunate for those who may wish to verify or question the results reached in this study that the full range of phenomena is still well within their reach, and need only to be properly consulted to reveal the whole truth.

It is not attempted in the present paper to apply the results reached to the settlement of controversies arising elsewhere. The same is true of the preliminary paper published while the investigations were under way. Contrary to statements repeatedly made by writers on the subject, the question of the existence of a paleolithic period in Europe is not believed by me to be in any way involved. The verity of the determinations of Boucher de Perthes and his followers has never been questioned, and it is held that, where average conditions prevail, the paleolithic step, as usually defined, is the reasonable and natural first step in human progress. The proper settlement of local questions, and especially the question whether local evidence points toward a paleolithic or other early man in Potomac valley, is all that is directly sought.

The student, however, should not lose sight of the fact that the history of flaked stone implements, as developed by these studies, is their history everywhere, and that the lessons to be learned are of primary importance to the science of archeology. The chief lessons are those of the need of a full and proper discrimination of all the varied phenomena connected with the making, the using, and the distribution of the implements, and the impartial application of these phenomena to the elucidation of the history of culture and race.

II

It must be regarded as a striking circumstance that a large part of the varied phenomena considered in this paper are assembled within 2 or 3 miles of the capitol of the nation, much of it being within the capital city or within the area over which the city streets are now laid out. The greatest aboriginal bowlder quarry known, and the most important implement shops yet observed on the Atlantic slope, are located on Fourteenth street $2\frac{1}{2}$ miles from the President's house. One of the most interesting native soapstone quarries in the great series extending along the eastern base of the highland from Massachusetts to Georgia is on Connecticut avenue extended, barely beyond the city limits; and the most important ancient village-site in the whole tide-water province is situated on Anacostia river within the city and little more than a mile from the capitol. Partly within the city limits

and extending up the Potomac to Little falls, we have a great native fishing ground surrounded by a multitude of inhabited sites from which our collectors have filled their cabinets with curious objects of art. The spot now the political center of the nation was thus in prehistoric times a chief resort of the native peoples of the region.

It may not then be too much to expect that the glimpses of aboriginal life afforded by this study will prove of interest to the student of history, and the numerous phases of suburban scenery presented in the photographic views will doubtless be appreciated by future generations of Washingtonians.

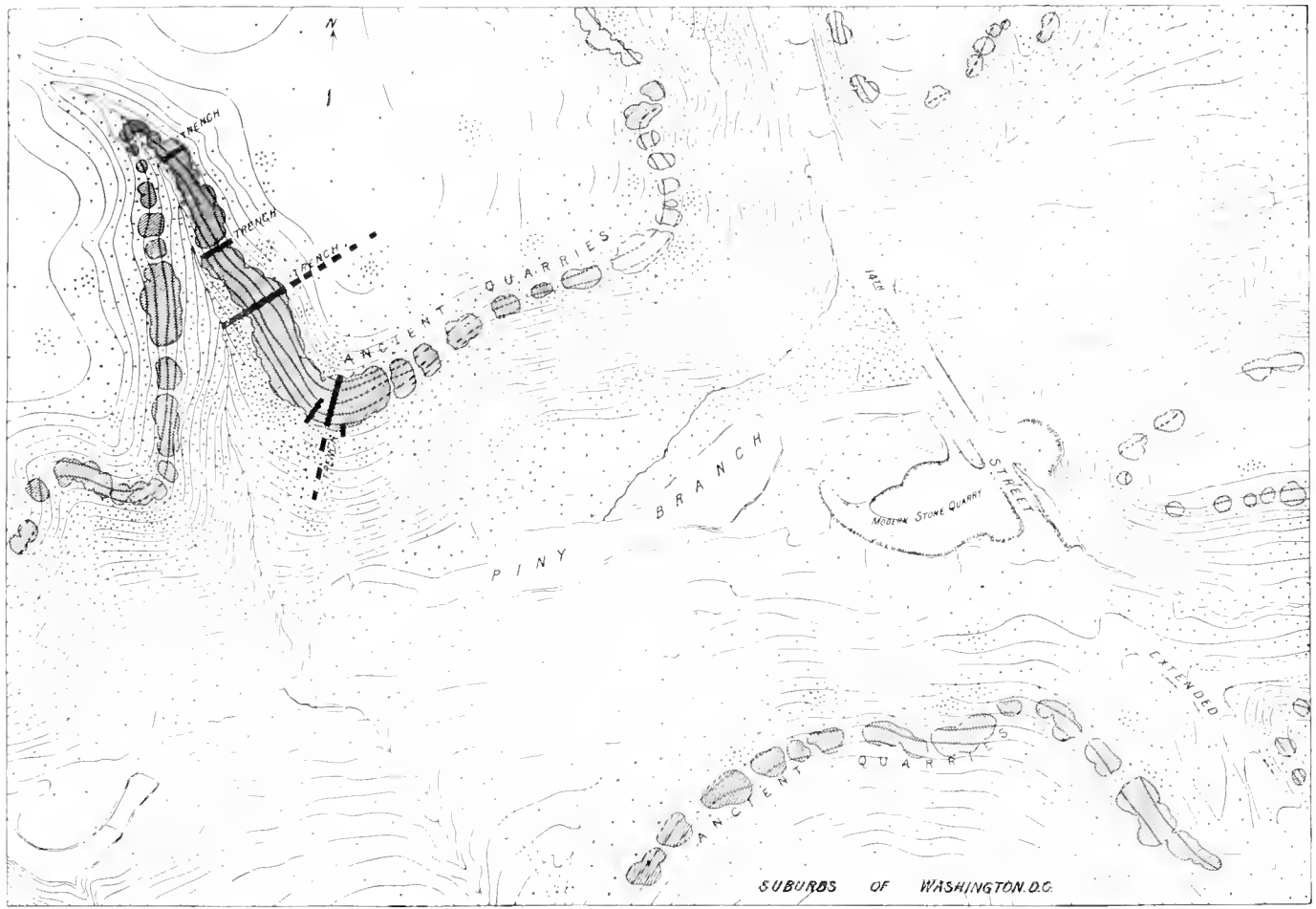
III

Until recently it was hardly suspected that the Potomac-Chesapeake province was so rich in ancient remains. The arts and industries of the historic aborigines were extremely simple, and no striking monuments or remains of any kind are found to tell of vanished peoples. Careful exploration has, however, developed evidences of an intelligence and enterprise hardly to be expected of tribes of indolent savages. The use of stone by the prehistoric aborigines was limited to the manufacture of implements and utensils, but their knowledge of the mineral resources of the region was so extensive that no deposit of bowlders, no ledge of flakable stone, no deposit of available stone of any kind, seems to have escaped their attention. Quarrying and manufacture were extensive, and the distribution of the product extended in several cases for a hundred miles or more beyond the source of supply.

The historic tribes of the region were mainly of the Algonquian linguistic stock, the stock of Powhatan and King Philip, and this notable people may be connected by means of the art remains of their numerous village-sites with the great body of ancient inhabitants whose domain extended from South Carolina to Nova Scotia. There are some traces of departure from ordinary Algonquian types of art, but these are not decided enough to warrant the assumption that other peoples of independent culture were directly concerned. The culture status indicated by the remains here brought to the attention of students is precisely that of the historic inhabitants encountered by John Smith.

IV

The explorations embodied in this paper began in 1889 and continued with much interruption until 1894. It is evident from this that the field has been but imperfectly covered, for the tidewater Chesapeake country comprises upward of 20,000 square miles of territory, nearly every mile of which abounds in important traces of ancient aboriginal occupancy. To visit all and examine all would require a good part of a lifetime. Realizing this, the method was adopted of passing rapidly over the various sections and selecting a few typical examples of each class of sites or groups of phenomena for minute examination. The detailed studies made of these sites serve in a great



MAP OF THE PINY BRANCH QUARRIES

The shaded areas indicate the quarries approximately and the dotting indicates the distribution of the shops and refuse of manufacture. Scale about 270 feet to the inch; contour internal, 5 feet

measure to illustrate the whole subject, and though imperfect in many ways, form nuclei about which additional details can be assembled as they are acquired.

V

There are many students of the aboriginal history of the Potomac-Chesapeake province to whom I am indebted for assistance and who should be mentioned in connection with the archeologic study of the region. Prominent among the collectors who have gathered and preserved the fast disappearing relics are Mr J. D. McGuire, of Ellicott, Maryland. The collection of this gentleman, now installed in his charming home in Ellicott, represents a large part of the province, and includes notable series of objects from the soapstone quarries and from the village-sites and shell banks of the Potomac and Chesapeake. Mr McGuire's writings include an important paper on the quarrying of soapstone as indicated by surface phenomena, and various other articles in which more or less specific references are made to the general archeology of the province.

Among the numerous collections of Potomac river material that of Mr W. Hallett Phillips, of Washington, takes first rank. It affords the student more satisfactory opportunities for study than any other collection, as the various sites were systematically visited and the specimens properly cared for and labeled. Many of the illustrations presented in this paper are from his well-stocked cabinets.

Mr Elmer R. Reynolds has for many years been an enthusiastic collector of local relics, and his various accumulations have largely gone to supply the museums of Europe. He has written valuable papers on the Potomac shell deposits and the soapstone quarries of the District of Columbia.

The historian of the Potomac valley is also deeply indebted to the efforts of Mr S. V. Proudfit, of Falls Church, Virginia, whose extensive collections, consisting of many thousands of specimens, were generously donated to the National Museum. Mr Proudfit's paper on local archeology is among the most important issued up to the beginning of systematic work by the Bureau of Ethnology.

Few students of the region have contributed more largely and successfully to the exposition of our local antiquities than Mr Louis A. Kengla, formerly of West Washington, whose collections are preserved by the Georgetown University and whose valuable pamphlet on the archeology of the District was published as a Toner prize essay by that institution.

Another collector, later in the field than the others yet hardly less persistent and successful, is Mr Thomas Dowling, junior, whose aid I have sought on various occasions. Many specimens from his collections appear in the illustrations of this paper.

Mr William Hunter, of Fairfax county, Virginia, made extensive collections along the banks of the Potomac in the Mount Vernon region,

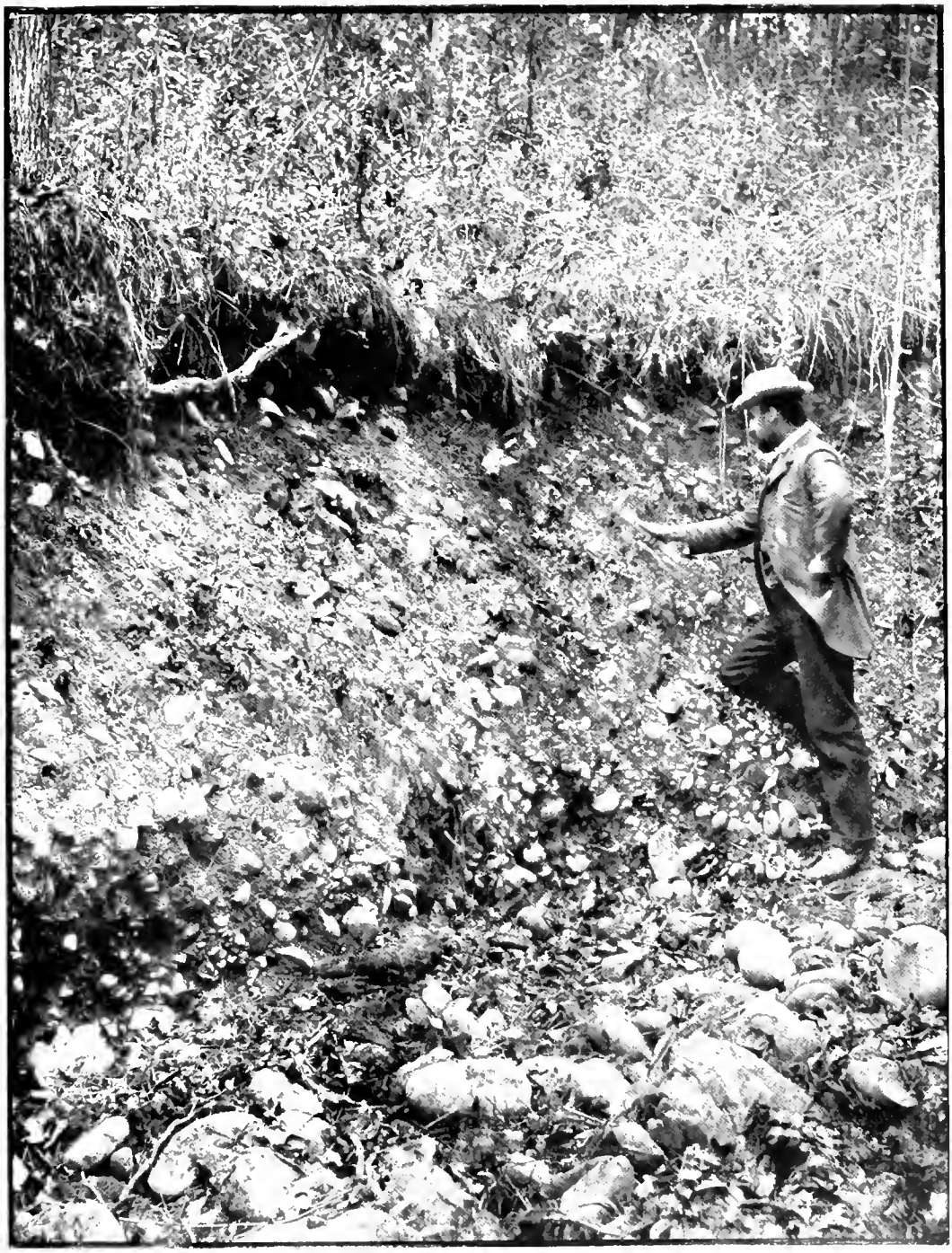
and on the opposite side of the river Mr O. N. Bryan gathered many things of value, both series of objects having found a resting place in the National Museum. Mr John Bury made a valuable collection from the Anacostia village-sites, which was acquired recently by the Bureau of Ethnology.

Baltimore has contributed her share to the work of preserving historic materials through her well-known citizen Colonel W. H. Love, whose large collections of specimens and extensive knowledge of sites have been of much service in the preparation of the present memoir. Among the many others who have taken an active part in the work of collecting are Mr J. C. Lang, of Washington, Mr C. M. Wallace, of Richmond, Mr M. H. Valentine, of Richmond, Mr H. M. Murray, of West River, Maryland, and Prof. Thomas Wilson, of Washington.

There are still others to whom acknowledgments must be made. To Mr Frank Hamilton Cushing, who a few years ago made a careful study of the Amelia county, Virginia, soapstone quarry; to Mr F. W. Von Dachenhausen, whose collections from the vicinity of Washington have been drawn upon for illustration, and to Mr De Lancey W. Gill, of the Geological Survey, who has been closely associated with me in the work of collecting and elaborating, I am greatly indebted.

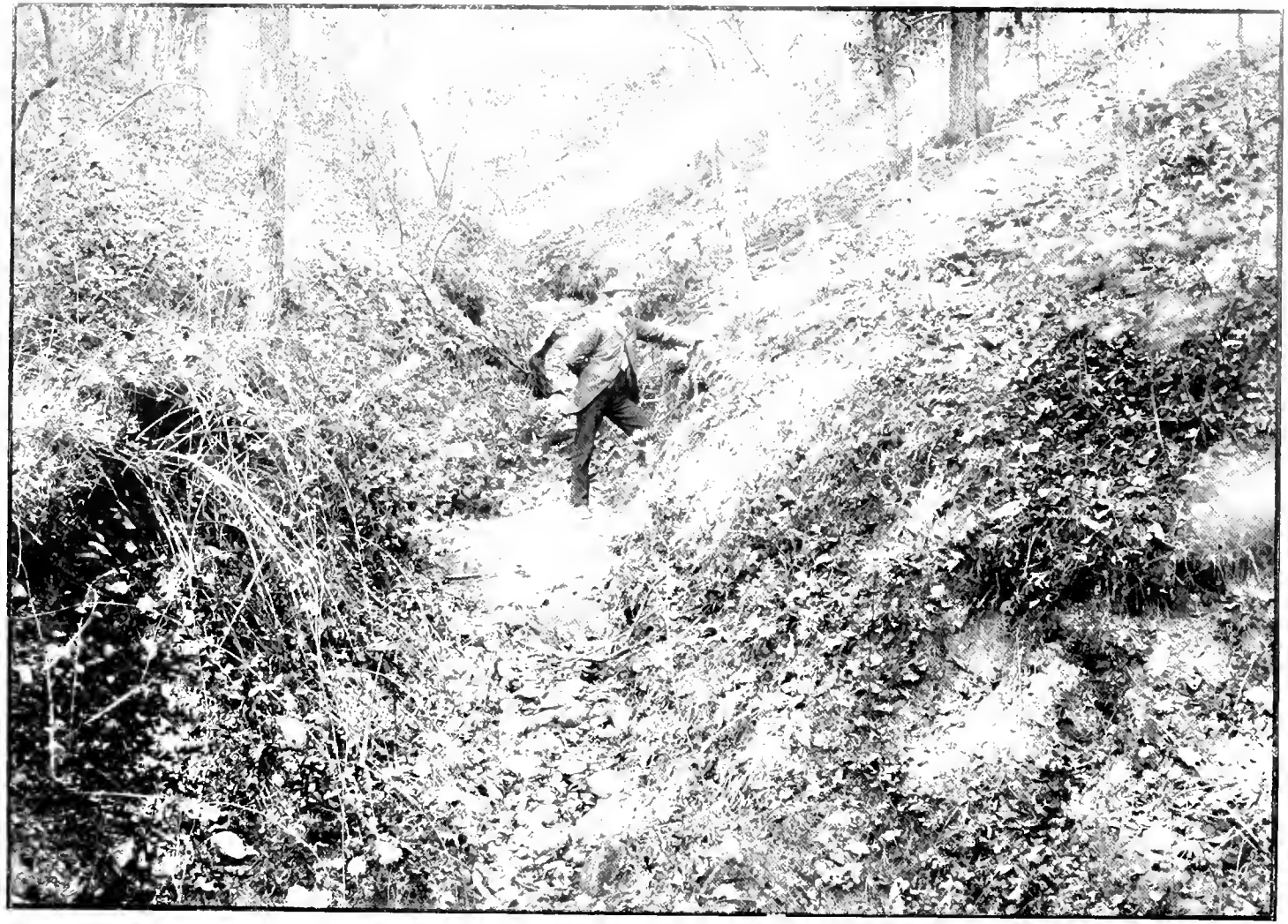
I wish especially to acknowledge the assistance given by Mr William Dinwiddie, who has been almost constantly associated with me in field work and in the office, and who was intrusted with much of the laborious task of quarry excavation; by Mr Gerard Fowke, who conducted the exploration of the Piedmont regions of Virginia and Maryland; and by Major J. W. Powell and Mr W J McGee, to whom I am greatly indebted for encouragement, sympathy, and support at all times and in all places.

The artists whose work adds so much to the effectiveness and scientific value of this publication are Miss Mary M. Mitchell, Mr H. C. Hunter, and Miss Frances Weser. The landscape photographs are largely the work of Mr Dinwiddie, and the series of plates of flaked stones are from the studio of Mr T. W. Smillie, of the National Museum.



QUARRY-SHOP REFUSE EXPOSED IN THE BANK OF THE RIVULET

The [illegible] appears in the bed of the stream beneath the left foot of the figure



VIEW LOOKING NORTH UP THE RIVULET AT THE FOOT OF THE QUARRY SLOPE

The left hand of the figure is placed to indicate the beginning of the first trench

Chapter I

INTRODUCTORY

THE FIELD OF INVESTIGATION

Previous to the year 1889 little archeologic work was done by the Bureau of Ethnology in the Atlantic coastal region, save, perhaps, in North Carolina, where a number of mounds had been opened under the direction of Dr Cyrus Thomas. A vast, though not an especially attractive field, extending from New Jersey through Delaware, Maryland, Virginia, the Carolinas, Georgia, and Florida, had never received careful or systematic attention. In 1890 the Director of the Bureau decided to begin the survey of this zone, and the first work undertaken was an examination of the tidewater Potomac. Work was begun in the District of Columbia; and with Washington as the initial point, exploration was carried westward into the Piedmont region and eastward and southward to the Atlantic coast.

The great artificial shell fields scattered along the brackish and salt water shore-lines appeared to be the leading feature of interest, and toward these attention was at first directed; but another and somewhat distinct field of investigation soon sprang into prominence. Within the decade ending with 1890 much interest had arisen in regard to the significance of certain rudely flaked stones found in great numbers in the region about Washington. These objects were thought to be of archaic type, and consequently to have an important bearing on two questions of great interest to archeologists, the first relating to the development of art in its early stages, and the second to the nature of the beginnings of man's prewritten history in this country.

A preliminary examination of the subject made it apparent that a solution of the problems thus suggested could be obtained only by a systematic study of the origin, manufacture, distribution, and geologic relations of the articles in question. It was decided to take up this study, and thus the field of investigation was greatly enlarged. The period required for exploration was lengthened indefinitely, and it became necessary to complete certain sections of the work for publication before the whole field could be covered. Division of the subject-matter of investigation into at least two parts was found to be easy and convenient. The main problems of the stone implements separated themselves readily from the history of the peoples and the ordinary traces of their prehistoric and historic presence.

It appeared also that there were convenient geographic subdivisions of the subject, and that in one case at least the geographic unit corresponds very closely with a well-marked ethnologic unit, and strangely enough also with an important unit of colonial history. The great Potomac-Chesapeake province, with its system of tidewater inlets, constitutes a natural subdivision of the coastal zone. Formerly the Susquehanna flowed southward through a restricted valley, entering the sea outside of capes Henry and Charles. By subsequent depression of the land this valley and its tributaries were submerged, and the floods rose until the tide reached Richmond on the James, Washington on the Potomac, and Havre de Grace in the main valley, and one-third of the land became sea, the tortuous shore line following the contours of the hills and valleys in and out in a marvelous maze. Tens of thousands of square miles of upland were transformed more or less completely into a maritime province, and this became the seat of a native confederacy, ruled over by the renowned Powhatan at the period of colonization. This district was thus a native ethnologic unit—a unit in race and culture—and the circumstances of colonization made it a unit in the history of civilization: it is the territory explored, conquered, and mapped by the intrepid John Smith: it is therefore a unit of exploration, conquest, and cartography.

It further appears, from what has been learned of the past of the region, that the historic peoples and conditions pass back without break into the prehistoric era, no traces of distinct occupation or culture phenomena having been found. Archeology but supplements history, and the archeologist works to great advantage in a unique and charming field illumined by the graphic records of the Roanoke, the Jamestown, and the Saint Mary colonies.

In treating the history of this province, it would seem the natural order to present, first, the historical phases of aboriginal occupancy, passing afterward back into the archeologic field; but this order proves inconvenient (as just indicated), and special studies of certain phases of art must receive first attention. The present paper is therefore devoted to examination of the derivation, manufacture, nature, and place in time and culture of the stone implements of the tidewater province—the province of John Smith. This will be followed by other studies, or by a single paper, on the aboriginal history and general archeology of the same area.

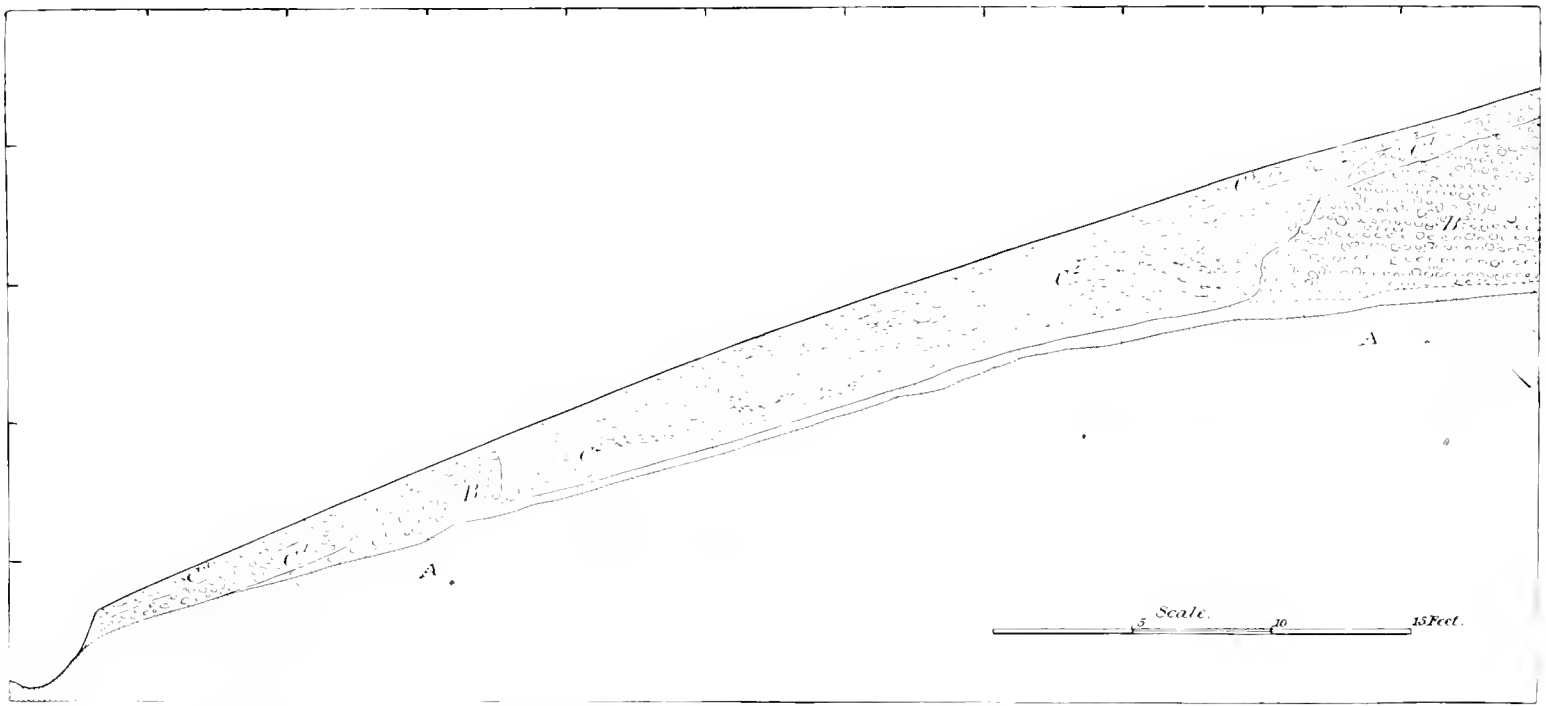
The Chesapeake tidewater province lies to the eastward of the heavy dotted line on the map presented in plate 1. This is the fall line, where the streams descend from the Piedmont plateau to the tidewater lowland.

THE ART REMAINS STUDIED

The art remains of a vanished people available for the archeologist comprise all material forms shaped or in any way modified by their hands, whether from design or from the incidents of use. There are

VIEW FROM THE BED OF THE RIVULET, SHOWING EXPLOITATION PITS

The first figure at the beginning of the trench and the third figure [illegible]



SECTION OF QUARRY EXPOSED BY THE FIRST TRENCH

a, Mica schists; *b*, Potomac (Mesozoic) bowlder beds; c^1, Preartificial slope gravels; c^2, Deposits of shop refuse, showing traces of pits; c^3, Materials rearranged by natural forces since the period of quarrying

(1) fixed works, consisting of structures—mortuary, defensive or otherwise—dwelling sites, stone hearths, pits, cemeteries, quarries, implement shops, and refuse deposits. There are (2) portable works, including implements, utensils, weapons, and articles of dress, ceremony, and diversion. The subject chosen for this paper, the stone implements, includes but a small section of this great field, but nevertheless a most important one. It will be necessary to deal not only with the things themselves which belong to the second group mentioned, but with their origin and manufacture, leading thus to an investigation of the quarries and workshops, which are fixed remains, and to a study of the industries arising from their operation.

The materials used by a great group of tribes like that occupying the tidewater country in colonial and precolonial times were numerous, and the forms given them in art were naturally extremely varied, but the visible remains today are confined to a few materials, and consequently to a limited number of forms. The consideration of these tangible evidences is of the utmost importance to archeology, and their study leads naturally to inquiries into the various arts and industries concerned in their production. Besides this, much may be learned and much more may be surmised with respect to arts and industries of which no material traces remain, and correct inferences may be drawn regarding the customs, habits, and culture of the peoples.

The materials utilized in art were sought and obtained at much expense of time and labor, and the industries to which this search gave rise were no doubt of great moment to the people, although little attention has been paid to the subject by students. Clay was used for pottery, and ocher was obtained for paint. Vegetal and animal substances also were sought and fully utilized. Stone was most extensively used by the primitive inhabitants of the tidewater region, and on account of its durability it is by far the most important material with which we have to deal in the prehistoric study. We can but conjecture as to the beginnings and progress of this search. When men first appeared they found vast supplies of water-worn stones suited to immediate use scattered over the country. These, however, did not serve for all classes of needs, and the energetic savages penetrated the hills, laid bare the rocky deposits, and little by little acquired a mastery of the geologic resources of the province.

CHARACTER OF THE STONE IMPLEMENTS

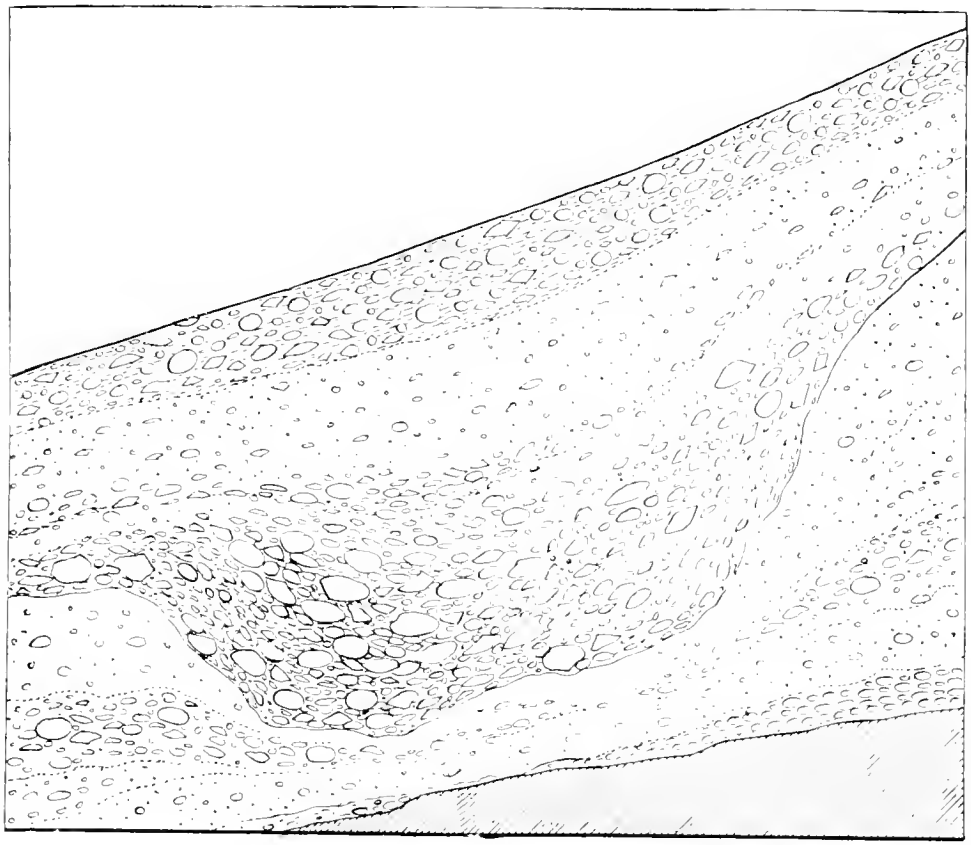
MATERIALS AND THEIR DISTRIBUTION

Stone exists in many varieties, forms, and conditions, which differ greatly in the various sections of the country, thus giving much diversity to the manner of its utilization and to the forms employed in art, and many local peculiarities of art phenomena have arisen. Moreover, the tribes of this region were not fully sedentary and the materials

acquired in one section were carried into another, giving rise to much variety in the materials employed by a single people or assembled in a given place. This complexity was also increased to some extent by trade, and no doubt by the undertaking of long journeys for the purpose of securing desired materials. Transportation was confined mainly to the smaller and more laboriously finished articles of use. Unshaped raw materials were not extensively transported, and the large body of the heavier tools and utensils made where material was plentiful were deserted when the locality was abandoned.

The peculiarities of the materials procurable in the tidewater region are very marked. The geologic formations found within this area include only limited portions of the crystalline or older sedimentary rocks, but are derived from them by erosive forces and consist of fragmental deposits, such as sands, clays, gravels, and beds of bowlders. The great rivers of Mesozoic and Cenozoic times swept down from the highlands, bearing fragments of all varieties of rocks and depositing them in beds along the margin of the sea. These transported fragments were, when first taken up by the water, sharp and rugged, but by constant rolling they were reduced to rounded forms, and included all sizes from grains of sand and minute pebbles to bowlders and even to great masses. All classes of rocks were thus seized by the floods and carried seaward; but all varieties did not reach the sea, save perhaps as sand or clay. The softer rocks were reduced to powder before the journey was fairly begun; brittle and much-flawed varieties, and all friable shales and slates, separated into minute fragments and formed beds of sand and gravel; the tough, hard, homogeneous pieces were rolled and rounded and carried ever onward, refusing to break or to be reduced to dust, and finally rested along the seashore and more especially about the mouths of the great rivers.

The primitive inhabitants of the crystalline highland had to make use of massive forms of rock or of rude angular or slightly water-worn fragments, and the reduction of these to available sizes and forms was a difficult work. But the inhabitants of the lowlands were born to more fortunate conditions. The agents of nature—the floods—had with more than human intelligence and power selected the choice bits of rock, the tough quartzite, the flinty quartz, the tough and brittle lavas, the indurated slates, the polished jasper, and the beautiful flints, from all the cliffs and gorges of the mountains, and had reduced them to convenient sizes and shapes, and had laid them down in the beds of the shallow estuaries, where through the subsequent rising of the land and the cutting of valleys they were found at the door of the tidewater lodge, ready or almost ready for immediate use in the arts. Each river coming from a different section of the highland secured and transported the varieties of rock most prevalent in its drainage basin, so that the great tidewater region is divided into mineralogic areas corresponding somewhat to those of the mountain valleys supplying the material.



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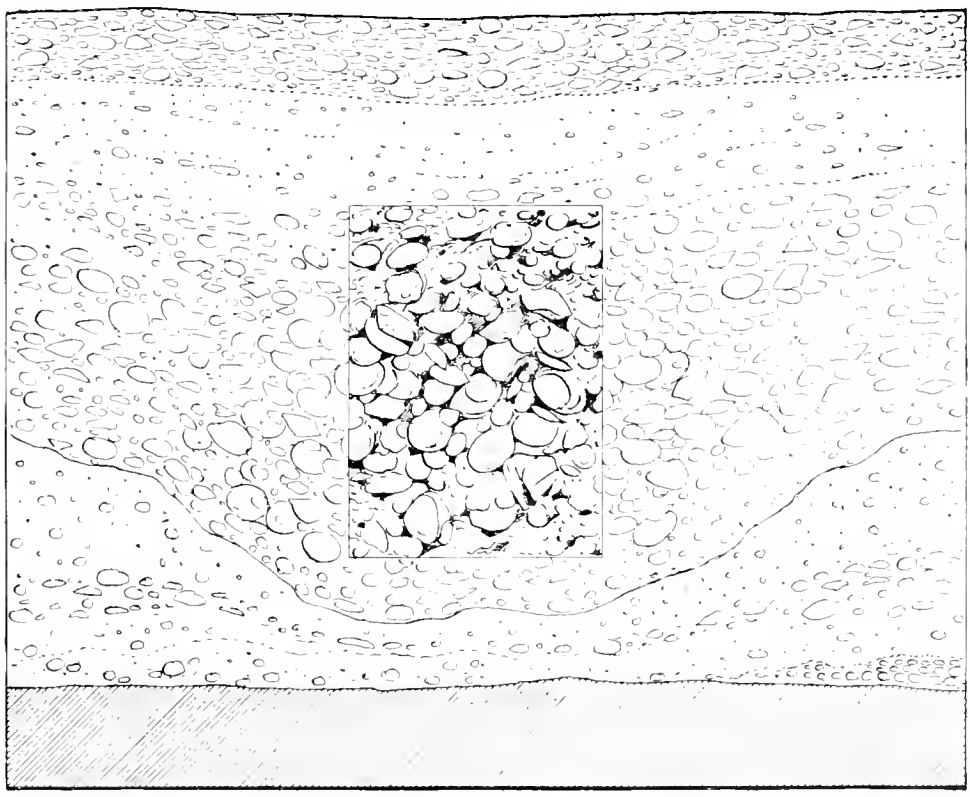


b

SECTION OF ANCIENT PIT FILLED WITH QUARRY-SHOP REFUSE FROM ABOVE

The rectangle elaborated in the lower figure indicates approximately the area included in the photograph reproduced in plate VIII

It will readily be seen that these conditions of mineral resources must have had a marked effect on the art of the region, and thus on the culture of the natives inhabiting it. One drainage area supplies quartz mainly, and the art is quartz art; another supplies quartzite, and the art is quartzite art, and so on. All of these and other conditions will be considered in the discussion of the distribution of the remains of the region, to which subject a subsequent chapter is devoted.

All kinds and conditions of rock in both lowland and highland were exposed to some extent on the surface of the ground and were thus readily obtained, but the more desirable varieties occur in the main beneath the surface, and when the demand for them was great they had to be sought and quarried, thus giving rise to one of the most important of primitive industries.

QUARRYING

Quarrying begins with the removal of a fragment or mass of material partially buried in the ground. It is but a step further to the uncovering and removal of portions wholly buried, and only another step to quarrying on a large scale. The methods and extent of the quarrying necessarily differed with the peoples and their circumstances, with the nature of the material, and with the conditions under which it existed.

Of the details of quarrying operations our knowledge is yet imperfect, though much has been learned in certain directions; and of the tools used in quarrying, aside from those made of stone and left on the sites, no definite information has as yet been obtained. It is quite likely that implements of wood, buckhorn, and bone were used as in foreign stone-age quarries, but traces of these have wholly disappeared from the sites thus far examined. Fire may have been used in some localities as an agent in fracturing masses of stone, but the tidewater region furnished little material, save perhaps quartz, suitable for manipulation by this means. Massive forms of rock are found west of the fall-line or western border of the tidewater country. Flint, jasper, and rhyolite were quarried far back in the highland, and vein quartz was found, and, no doubt, to some extent quarried, in a multitude of places over the whole Piedmont region, and down to and even below the margin of the tidewater area. Steatite or soapstone is a tough, massive rock interbedded with gneissic formations, and rarely occurs in detached masses. In the beginning of its use it was secured where exposed on the surface by prying off small masses. When its compactness made this impracticable it was removed by cutting out roundish masses with stone picks. The lumps thus secured were ready for the sculptor's chisel. In time quarrying developed and was extensively carried on in many parts of Virginia and Maryland beyond the tidewater border.

In the tidewater province proper, quartzite occurs in the shape of bowlders or cobbles only, which, mainly during the Potomac and

Lafayette periods, were derived by erosive forces as fragments from heavy strata in the mountainous region to the northwest. Heavy deposits of these stones accumulated about the mouths of the rivers; by subsequent erosion they were exposed to view in many places and most advantageously for human use in the steeper bluffs that border the streams. Countless numbers, loosened from the well-compacted beds by erosion, descended to the lower slopes and into the streams to be again deposited at lower levels. The surface or float cobbles were extensively used, but the aborigines came to need more than could thus be obtained, and resorted to digging them from their places in the bluffs. The implement makers seem to have found that the freshly removed stones were more easily worked than surface finds, and quarrying, thus encouraged, was carried, in at least two places, over acres of ground. The bowlders were not always easily loosened and removed, as the rounded stones were held together by a matrix of sand and clay which had assumed almost the consistency of a sandstone; but the miners did not always penetrate the formation from above or even directly from the face of the outcrop. It happened that in many cases the bowlder beds rested on a surface of disintegrated gneiss exposed in bluff slopes, and by removing the upper surface of this with such pikes as were at hand the bowlders were undermined and easily knocked down. So far as observed, the bowlder deposits containing workable stone in any considerable quantity rest on the gneissic surfaces where they were laid down by the waters of the ancient sea.

Quartz, which was more generally if not more extensively used than any other material, is found in two forms. It occurs in countless veins which penetrate the gneissic rocks over a large district west of the fall-line. Being much less destructible than the gneisses, it weathers out in dike-like ridges and breaks up into blocks and angular pieces which spread over the ground in vast numbers. Choice varieties of this vein rock were, without doubt, quarried to some extent, but it was so plentiful on the surface that quarrying was not generally necessary. Carried down by the streams of all periods, it occurs plentifully as pebbles and bowlders in all formations in the tidewater region, and was selected or quarried along with the quartzite.

Jasper, flint, rhyolite, and other varieties of stone were rather rare within the tidewater districts, occurring sparingly as pebbles, small bowlders, and worn fragments in gravel deposits and in the beds of rivers. They were procured, however, by the tidewater tribes from masses in place in the uplands and mountains, the quarries being quite extensive, as will be shown subsequently.

MANUFACTURE

Initial Stages

Having secured the raw materials from the surface or by quarrying, the next step was either to utilize them unchanged or to shape them for use. Sharp-edged and pointed stones were used for cutting,

CHARACTER OF QUARRY-SHOP REFUSE AT THE FORTYFOURTH FOOT

The bowlders have nearly all been broken and many pieces are partly shaped

digging, etc, and rounded cobbles from the river or from gravel beds were well suited for striking, pounding, grinding, etc, but with these unmodified forms we have little to do, as it is not easy to say that any given specimen was used at all unless it bears decided marks of use; and decided marks of use may be regarded as giving the object an artificial form, as in the case of the improvised mortars, mullers, and hammerstones so common in the Chesapeake-Potomac region.

Shaping Processes

The shaping processes by means of which stone was made to assume artificial forms adapted to human needs are varied and ingenious and their mastery is of the greatest importance to all primitive peoples. These processes are distinguished by such terms as breaking, flaking, cutting, drilling, scraping, pecking, grinding, and polishing. All are purely mechanical; none are chemical, save a possible use of fire to induce changes in the rock in some parts of the quarry work. A wide range of manual operations is represented, and these may be conveniently arranged in four groups: 1, *fracturing*, represented by the terms breaking, flaking, and chipping; 2, *incising*, including cutting, picking, and scraping; 3, *battering*, including such acts as bruising, pecking, and hammering; 4, *abrading*, as in rubbing, drilling, boring, sawing, and polishing. These acts are employed according to the nature of the stone or the results desired; as, for example, fracture is employed where the stone to be shaped is brittle, like flint, jasper, or quartz; incision is employed where the stone is relatively soft, such as soapstone, serpentine, and the like; battering is applied to tough materials, capable of resisting the shocks of percussion, like granitic rocks and many of the eruptives. Nearly all varieties are capable of being shaped by grinding and rubbing.

The processes employed in a given case were determined by the nature of the material, by the intelligence and skill of the workman, by the character of the object designed, and by a number of minor considerations. Ninety percent of the stone implements produced in the tidewater country were shaped by the fracturing processes. For convenience of treatment, I shall present the implements in groups determined by the processes mainly employed in their production as follows: 1, fractured or flaked implements; 2, battered or pecked implements, and, 3, incised or cut implements. Abrading processes were mainly auxiliary to the others and will not be presented at length.

Fracturing or flaking—The art of flaking stone was very extensively practiced in the tidewater region, and ample opportunity is furnished for observing the work in all its phases. The first step in the process, where masses were dealt with, consisted in breaking the material by heavy blows into somewhat approximate shapes and sizes; the second step was roughing out by free hand percussion the blank forms of the various classes of tool desired; the third step was the specialization of forms by direct or indirect percussion, or by pressure. As to the order

and the manner of conducting these steps, many observations have been made. The finished objects were often produced at once by carrying the work without interruption through all the stages of progress. This was true of sporadic work, where materials were scattered or where the implement was needed at once; but where materials were plentiful and demands not pressing, the workshops became factories and there was an opportunity for, and no doubt a tendency toward, specialization of labor. It was more convenient and profitable for certain individuals to give exclusive attention to the separate steps—first, to quarrying, breaking up the material and selecting pieces in large numbers; second, to roughing-out the blank forms in numbers; and, third, to the work of trimming, specializing, and finishing. These three well-defined steps gave rise to separate industries, carried on by the same individuals at different times or places or by distinct groups of experts at convenient times and places. It would seem that the first and second steps, whether performed by one or by two groups of workmen, were generally accomplished on the spot yielding the raw material; it would be unprofitable to transport masses of material of which nine-tenths would finally have to be consigned to the refuse heap. The blank forms of the articles to be shaped, worked out so far as thoroughly to test the material and its capacity for specialization, were removed from the source of supply to be finished when convenient or when need demanded.

Where disseminated materials were utilized, and especially in cases of immediate need, all the steps were frequently taken and the perfect implement produced at once; but it is observed that in many cases where the material was sparsely scattered as bowlders or nodules over the face of the country, the work of collection and blocking out was first attended to and the hoards of blanks thus produced were transported and stored, subject to final distribution for specialization or use.

Details of these steps in the art of flaking and the variations in process, resulting from differences in material and in articles designed, will, so far as possible, be given in connection with the investigation of the sites affording the observations.

As has been indicated, flaking was employed almost exclusively in the production of projectile points, knives, scrapers, perforators (or drills), hand axes or choppers, notched axes, hoes, and picks; it served to aid in roughing out the forms of various articles finished by pecking and grinding; these are mortars, pestles or mullers, axes, celts, chisels, pipes, ornaments, and diversional and ceremonial objects.

Battering or pecking processes—The acts employed in this class of operations were generally percussive, the impact resulting in a bruising and crumbling of minute portions of the surface of the stone. The hammer used was hard and tough, and the stone shaped was sufficiently tough practically to preclude fracture by the ordinary blow. No specialized tool was necessary, though such came to be made, the

FACE OF THE TRENCH AT THE SEVENTYSEVENTH FOOT, SHOWING PockETS OF ARTIFICIAL REFUSE

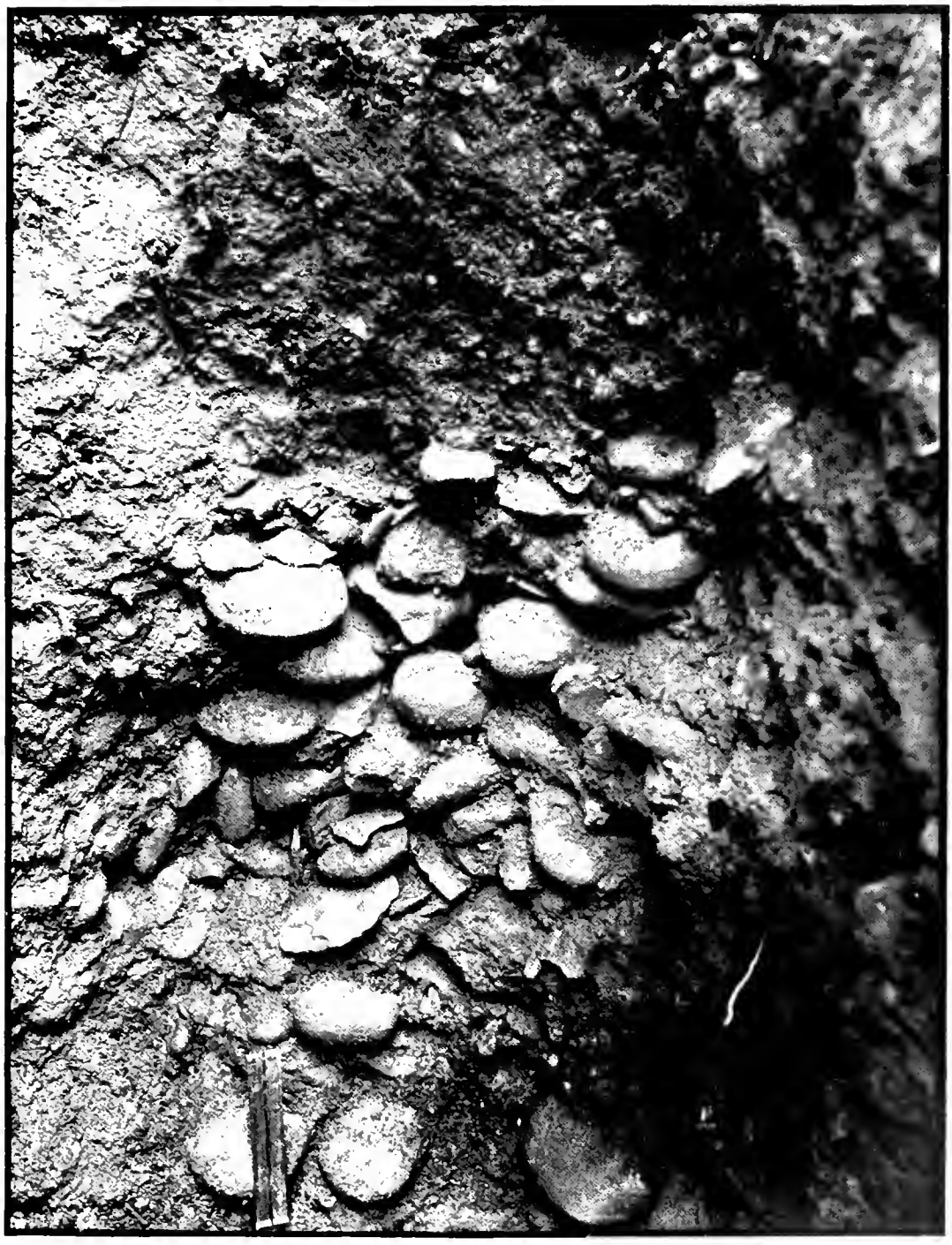
CHARACTER OF REFUSE DEPOSITS AT THE SEVENTYSEVENTH FOOT AND FROM TWO TO FOUR FEET BENEATH THE SURFACE

result being reached by striking one stone against another of proper relative durability. The several acts are known as battering, bruising, and pecking, the latter term being in common use for the act by which shaping was mostly accomplished. Materials suitable for shaping by this process are plentiful and widely distributed. They occur in the tidewater country wherever flakable stones abound, but the most favorable localities, so far as observed, are along the river banks about the head of tidewater. Village-sites located on the lower terraces about Washington and Georgetown furnish many specimens illustrating failures in all stages of the shaping of celts, grooved axes, pestles, and ceremonial articles from bowlders of diorite and various of the denser varieties of crystalline metamorphic rocks. An examination of certain inhabited sites farther up the river, and in various parts of the highland, develops the fact that extensive work of this class was carried on, and it is probable that a large part of the lowland supply of pecked tools was derived from these distant sources. Such a site and its products are described in detail further on. There is no evidence that the stone used was obtained by quarrying. The ordinary practice seems to have been to select water-worn stones of suitable texture that already approximated the form desired. Battering processes, and the tools produced by them, are presented systematically in a subsequent section.

Abrading processes—Shaping by abrasion in its most elemental form consists in rubbing one object against another with such force as to remove minute particles from one or both. The operations are generally expressed by such terms as grinding, sawing, boring, rubbing, and polishing. All stones are abradable, and all hard stones can be made to serve in the active operations of abrading. These processes were usually supplementary to those of flaking or battering, and were suited especially to sharpening edges and points already approximate in shape, and to giving smooth finish to surfaces. Their employment was very general but not confined to particular localities to such an extent as to leave extensive evidences of the work done. Stones modified in shape and surface characters from use in grinding and polishing are found on many sites in the tidewater country. The products of this group of processes are properly treated for the most part in connection with those of pecking.

Incising processes—This important class of operations shape materials by cutting, piercing, scraping, etc. They imply the use of a hard edged or pointed tool, and a substance to be shaped of somewhat less hardness. The presence of steatite in large bodies and often in exposed situations along the western border of the tidewater country from the Susquehanna to the Savannah led to the extensive utilization of cutting processes by the later aboriginal inhabitants of the region. Our extensive exploration of the quarry sites has given us a clear comprehension of methods of procuring and shaping, and of the results

achieved. Rudely shaped stone picks were employed in cutting out the masses, and neatly flaked, pecked, and ground chisels of hard stone served to rough out and trim the bowls and other articles. A subsequent section of the present memoir is devoted to this division of the subject.



POCKET OF REFUSE DEPOSITS AT THE SEVENTYSEVENTH FOOT AND FROM FIVE TO NINE FEET BENEATH THE SURFACE

CHAPTER II

MANUFACTURE OF FLAKED STONE IMPLEMENTS

INTRODUCTORY STATEMENT

The discussion of flaked implements comprehends a study of all that pertains to the procuring of flakable stone by means of search, collection, and quarrying, and of everything pertaining to the manufacture of implements by fracture, as in breaking and in flaking or chipping by percussion or pressure; it includes also a classification and descriptive presentation of the finished products and a reference to their respective uses. In the final section the distribution of the raw materials is treated in connection with the study of the distribution of implements.

It is most convenient in treating this complex subject to begin at once with the study of the great industries of quarrying and manufacture, taking up the regions studied or the sites examined in approximately the order of their exploration.

Five materials were extensively used for flaking by the tidewater peoples: quartzite, quartz, rhyolite, jasper, and flint. Several other materials occur less abundantly, among which may be mentioned sandstone, limestone, slate, argillite, basic eruptive rocks, iron quartzite, chalcedony, and quartz crystal. Quartzite and quartz were obtained largely in the form of water-worn pebbles and cobbles from the fragmental deposits of the tidewater region. These materials in this form are closely associated in distribution, and their examination will, in the main, be taken up conjointly. The most extensive deposits of fragmental quartz and quartzite occur about the head of the tidewater Potomac, and their most extensive utilization was confined to the vicinity of Washington. Surface deposits were worked wherever found on the Potomac, James, and other rivers. Rhyolite, argillite, jasper, and flint were obtained from quarries in the mountains, and to some extent along the rivers in fragments, bowlders, and pebbles.

The great quarries about Washington will be described and discussed in detail. Most of them were opened in the littoral deposits abounding in pebbles of quartz and quartzite; many others in veins of steatite or soapstone. They may be taken as types of this class of phenomena observed in and about the tidewater province as well as over the whole Atlantic slope.

Of the exotic materials—rhyolite, jasper, argillite, flint, etc—rhyolite is by far the most important, and the South mountain quarries of this

stone may be taken as a type of the great class of quarries furnishing rock from the mass.

QUARRY-WORKSHOPS OF THE DISTRICT OF COLUMBIA

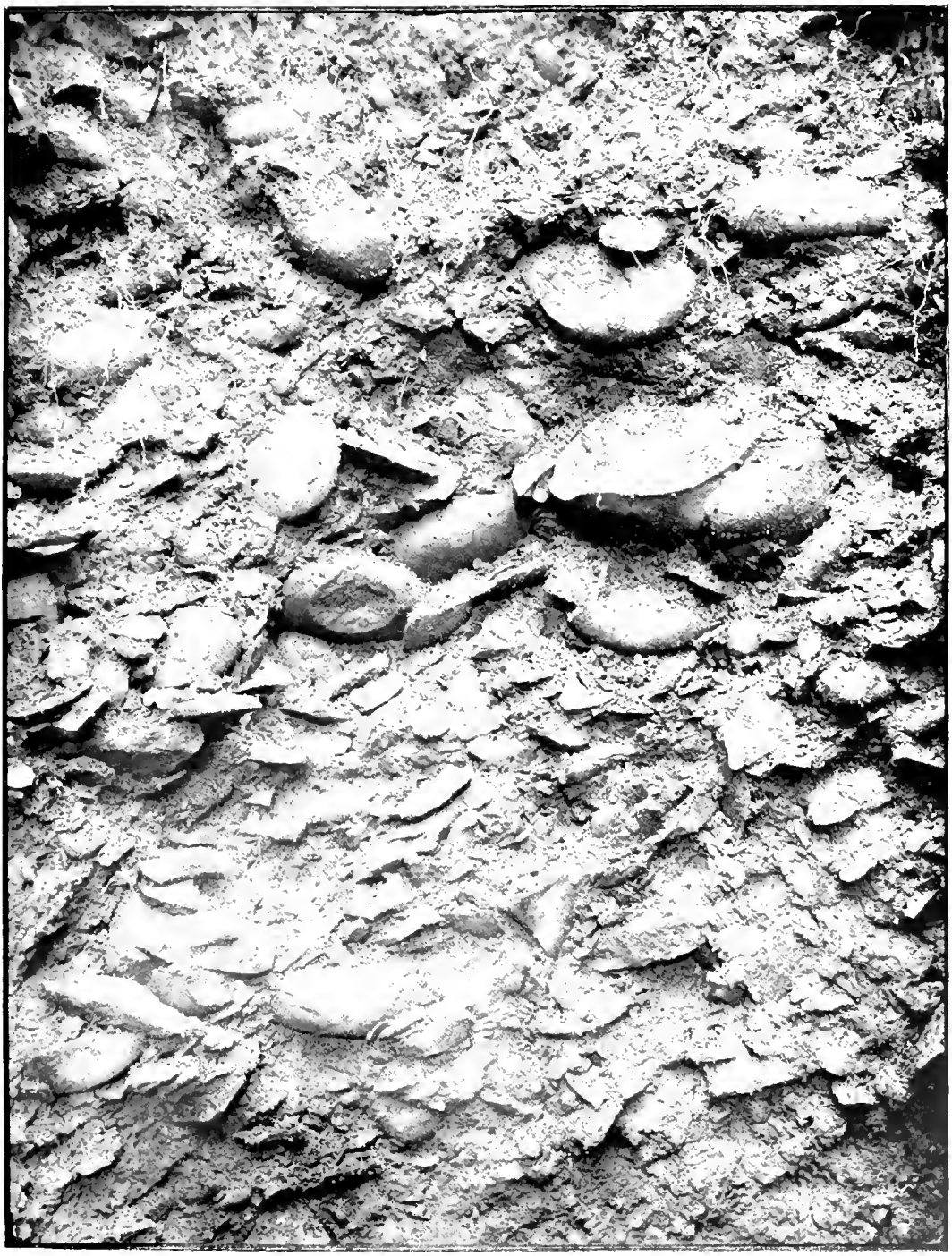
HISTORY OF THE RESEARCH

From time to time during the decade ending with 1890, the attention of archeologists was called to a class of rudely worked stones found in great numbers in the vicinity of the city of Washington; all are shaped exclusively by flaking, and are of forms so simple and rude that the idea prevailed that they were very ancient, this idea being strengthened by the assumption that they are somewhat closely related in form to typical European paleolithic implements. The best-known variety is the so-called "turtleback," a bowlder slightly flaked on one side, giving somewhat regularly arranged conchoid facets suggesting the plates of a turtle's back; but more highly developed forms of varying stages of elaboration are almost equally numerous. The materials are mainly quartzite and quartz, the former very largely predominating.

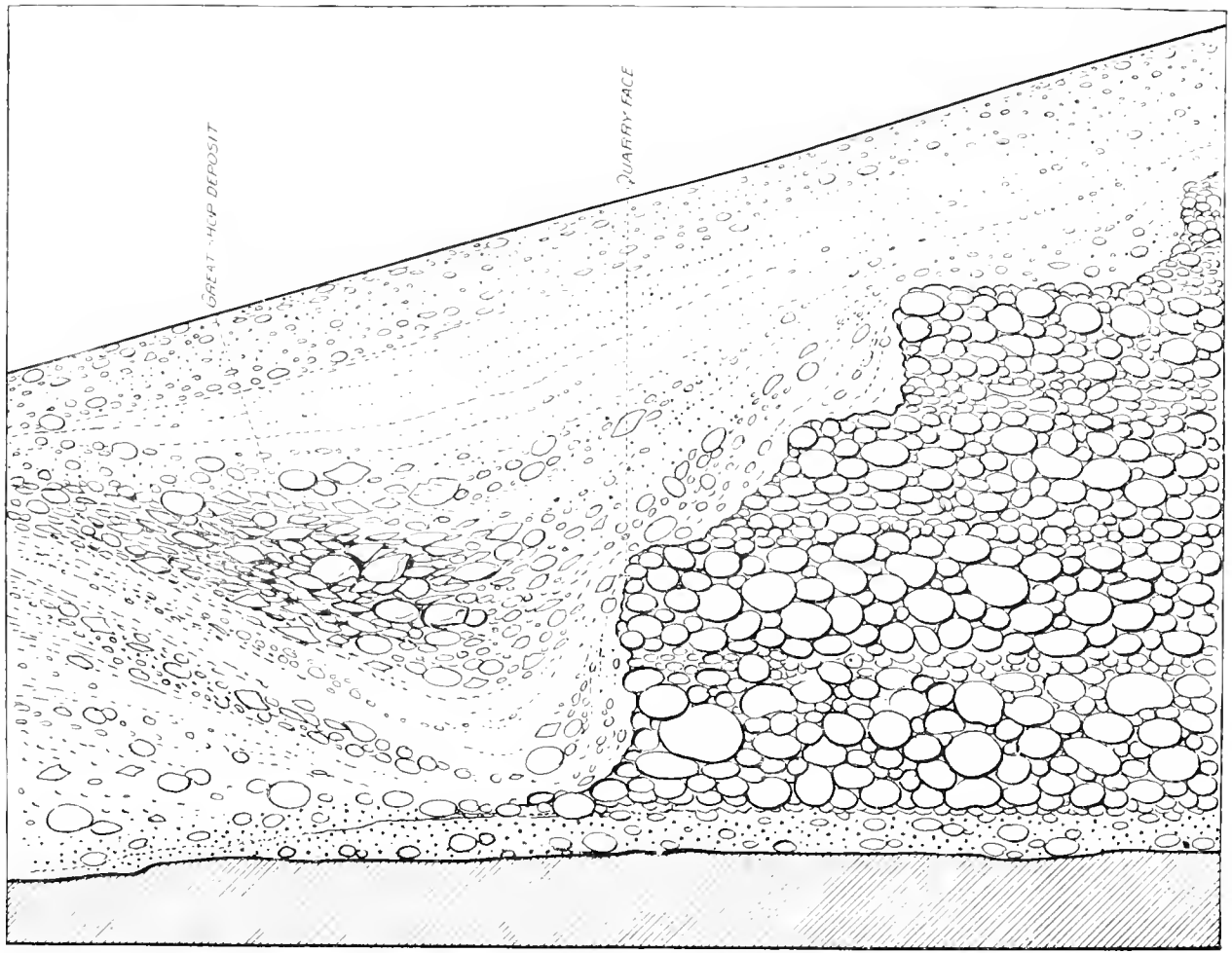
These objects are pretty generally scattered over the surface of the country, and are found to some extent throughout the tidewater region, being less numerous toward the sea. They occur in greatest abundance, however, as shown by recent discoveries, along the steep faces of the terraces bordering Washington city on the north and west. So plentiful are these rude objects in certain of the suburbs that they are brought in with every load of gravel from the creek beds, and the laborer who sits by the wayside breaking stones for the streets passes them by thousands beneath his hammer each year; the capital city is paved with the art remains of a race who occupied its site in the shadowy past, and whose identity has been a matter of much conjecture.

The first discussion of these objects within my memory occurred at a meeting of the Anthropological Society of Washington in the winter of 1878. A paper on the turtlebacks was read by Dr W. J. Hoffman, in which their character and manner of occurrence, their age and probable relations to the Abbott finds of New Jersey, were discussed, the conclusion reached being that they were probably paleolithic, and that they had, therefore, a purely adventitious association with the relics of Indian art with which they were intermingled on various sites. Later Mr S. V. Proudfit engaged in the collection and study of these forms, and in 1888 published a short paper relating thereto in the journal issued by the Anthropological Society, the *American Anthropologist*. His views of their nature, so far as elaborated, were opposed to those of Dr Hoffman, and have stood the test of later research.

Mr Thomas Wilson, on his return from a long sojourn in Europe in 1887, having been appointed curator of the department of prehistoric archeology in the National Museum, took up the subject afresh, and published a series of papers on the general subject of paleolithic man,



PORTION OF AN EXTENSIVE DEPOSIT OF SHOP REFUSE NEAR THE QUARRY FACE



SECTION SHOWING THE IRREGULAR QUARRY FACE, THE BOWLDER BEDS AT THE RIGHT AND A DEPOSIT OF SHOP REFUSE AT THE LEFT

making reference to and giving numerous illustrations of these finds. The view taken by Mr Wilson was that they are paleolithic; and as such they were labeled, distributed, and published. His assignment of these objects to this period of human progress was, I understand, based entirely on their supposed analogies of form with the paleolithic implements of Europe.

A somewhat elaborate discussion of the subject took place at a meeting of the Anthropological Society of Washington, held in the month of April, 1889. In the discussion of the archeology of the District of Columbia, three papers, by W J McGee, Thomas Wilson, and S. V. Proudfit, respectively, bore directly on these rude objects. Up to this time, however, no one had essayed to do more than study the surface finds and phenomena, and consequently little was definitely known of the true history and relationships of the objects in question.

My own investigation began in 1889, and the results of the first few months' work in the bluffs of Piny branch, in the northern suburbs of the city, were published in the *American Anthropologist* for the year 1890. The work was resumed in the same place in the spring of 1890, and during that year several other localities were examined. The only sites extensively explored are one on Piny branch and another in the vicinity of the new Naval Observatory, on the western side of Rock creek.

Quite early in the progress of the investigations, which were carried on by means of trenching the deposits yielding the objects, it became apparent that the sites were ancient quarries, where the aborigines had obtained the material and manufactured implements of quartzite and quartz, and that the supposed implements were only the failures, rejects, or wasters unavoidably produced in shaping brittle stone by percussion, and having no significant relationship with archaic or paleolithic art. The work had been very extensive, and consisted in quarrying the bowlders from the heavy beds of Potomac age and in roughing out the implements to be made. On account of the dual nature of the work carried on, I have called these sites quarry-workshops. The important bearing of these investigations on a number of the problems of archeologic science makes it advisable to present them in considerable detail.

GEOLOGY OF THE LOCALITY

As a preliminary step to a study of the evidence of human industry on these sites, it is important that the geology of the vicinity be carefully reviewed. Fortunately this is an easy task, as the identification and relationships of the various formations have been recently made out thoroughly by Messrs McGee and Darton, of the Geological Survey. It is found that the only clastic formations with which the quarry phenomena are directly associated are Cretaceous, and we are therefore not called on to trouble ourselves about the significance of this

relationship, since the association is necessarily purely adventitious. It is further ascertained that the other sedimentary rocks of the surrounding region are all older than those with which the works of man are known to be contemporaneously associated. The deposits with which remains of human handiwork are directly associated are mainly talus accumulations, the formation and modification of which have been going on for a long period and are still in progress.

The broad plateau bordering the city on the north is cut by Rock creek and Anacostia river and their tributaries. It is capped with sedimentary formations which extend far eastward and southward, covering the tidewater country; these are underlain by crystalline rocks, gneisses, granites, schists, etc (figure 1), well exposed by the deep scoring of Rock creek and its branches. On the western side of that stream the latter rocks rise to and form the surface of the country. The sedimentary rocks were laid down along the crystalline shore, which sloped gently eastward, in approximately horizontal strata, two formations in Mesozoic time and the Cretaceous period, known as the Potomac

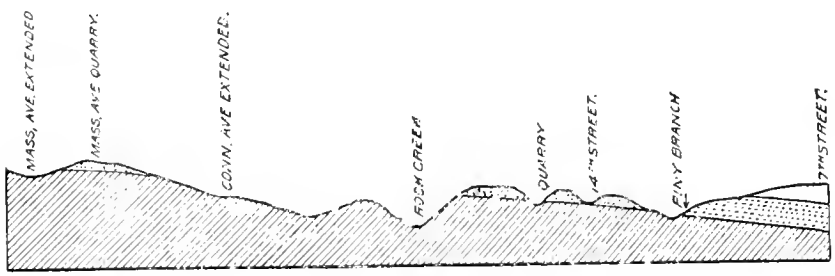


FIG. 1—General section across Rock creek and Piny branch valleys, showing gneissic formations and their relation to the overlying beds of Potomac gravels.

and Severn formations; two in the Eocene period, named in order of deposition the Pamunkey and the Chesapeake; one in the Neocene period, known as the Lafayette formation; and one in the Pleistocene, named after the Federal District the Columbia formation.

The Potomac formation rests on the uneven surface of the gneissic rocks exposed in Rock creek valley, and is composed to a great extent of coarse sediment and fragmental rocks, brought down mainly by the great streams that drained the highland. The lower members of this formation are usually of very coarse materials, and in the Rock creek region they consist largely of pebbles and bowlders of quartz and quartzite, well rounded by water action. The Lafayette formation, resting on the upper surface of the Potomac series in this region, is not to any extent concerned in the present study, although in some sections of the Potomac valley the heavy bowlder deposits included in it were utilized by the aborigines.

Especially heavy accumulations of bowlders occur along that portion of the old shore-line bordering the exit of the ancient Potomac

ROOTS OF A CHESTNUT TREE GROWING IN A BED OF SHOP REFUSE SEVEN FEET DEEP

Few pieces have not been broken or shaped by the hammer, and numerous thick leaf shape forms are in sight

river from the highland and its entry into the sea, now the District of Columbia; and as the streams draining this shore-line after its elevation from the sea cut down through the sedimentary formations, these bowlders were exposed, and are now found outcropping in the sides of the valleys at the base of the sedimentaries and resting on the gneisses. Other beds of bowlders are found higher in this section, but none happen to be so well suited to the use of the primitive implement maker as those representing the work of the waves along the crystalline beach. The surface of the gneisses was somewhat uneven, sloping gently beneath the waves, and the bowlder beds laid down on this surface are of uneven thickness and not of uniform character when followed out horizontally, coarseness decreasing with distance from the river channel. The aboriginal inhabitant, seeking for stone suitable for his use, discovered these outcrops of bowlders along the bluffs of the Potomac and its tributaries, and soon ascertained that the deposits were heavier and the quality of the material better and more uniform in Rock creek valley than in any other section. This discovery led in time to subterranean search on the more favorable sites and finally to extensive quarrying, the evidences of which are now brought to light.

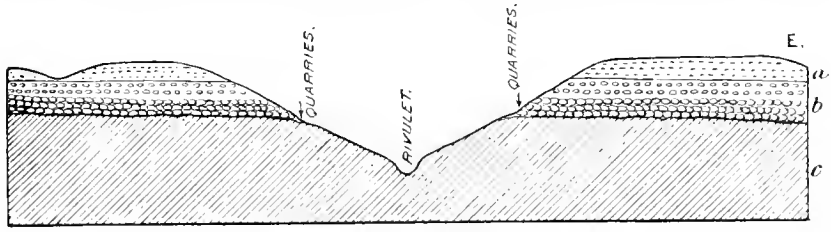


FIG. 2—Section of the ravine, showing formations and position of quarries.

Owing to the friable nature of the bowlder beds and of the gravels and sands overlying them, the terrace slopes bordering the streams (save where erosion had recently been particularly active) offered no good exposures of the bowlders in place, but were covered with deposits, often many feet in thickness, of gravelly talus derived from the crumbling edges of the strata. The bowlders contained in this overplaced deposit were the first to be utilized, and the work then extended to the bowlder beds proper, and the refuse of the quarrying was added to the creeping slope gravels or talus.

The section given in figure 2 shows the relation of the gneisses, the bowlder beds, and the superficial deposits of sand and gravel outcropping in the quarry ravine.

PINY BRANCH QUARRIES

LOCATION OF THE QUARRIES

In passing out of the city by way of Fourteenth street extended, the bridge over Piny branch of Rock creek is reached at a point $1\frac{1}{8}$ miles

beyond the present city boundary, Florida avenue. Here we are already in the midst of the quarry-shop sites, and the rudely worked stones may be picked up on all sides.

The quarries occur about half way up the wooded slopes north and south of the branch, on both sides of Fourteenth street, but the refuse has descended to the stream beds and is found everywhere in the overplaced gravels of the lower levels. The most extensive evidences of ancient working occur on the northern side of the stream west of the road. Here the terrace is upward of 100 feet in height and its faces extremely steep. The map presented in plate II serves to indicate the distribution of quarries over an area of about half a mile square. The bluffs at this point are capped with about 40 feet of the Potomac formation, clays, sands, gravels, and bowlder beds, the Neocene deposits of the Lafayette formation which forms the higher levels of the region having disappeared from the outer promontories, or being but slightly represented by obscure remnants. Beneath the Potomac beds the gneisses are exposed (figures 1 and 2) and may be seen at several

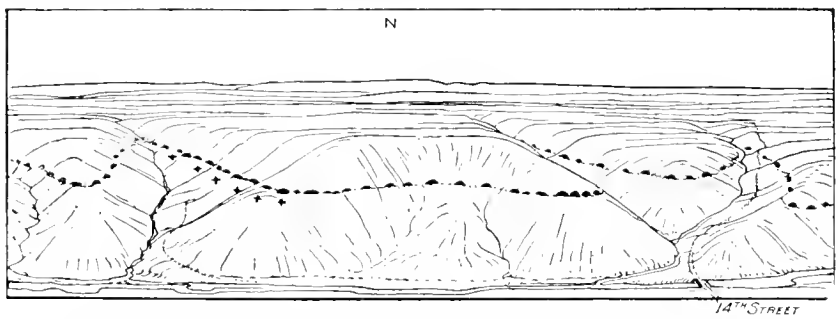
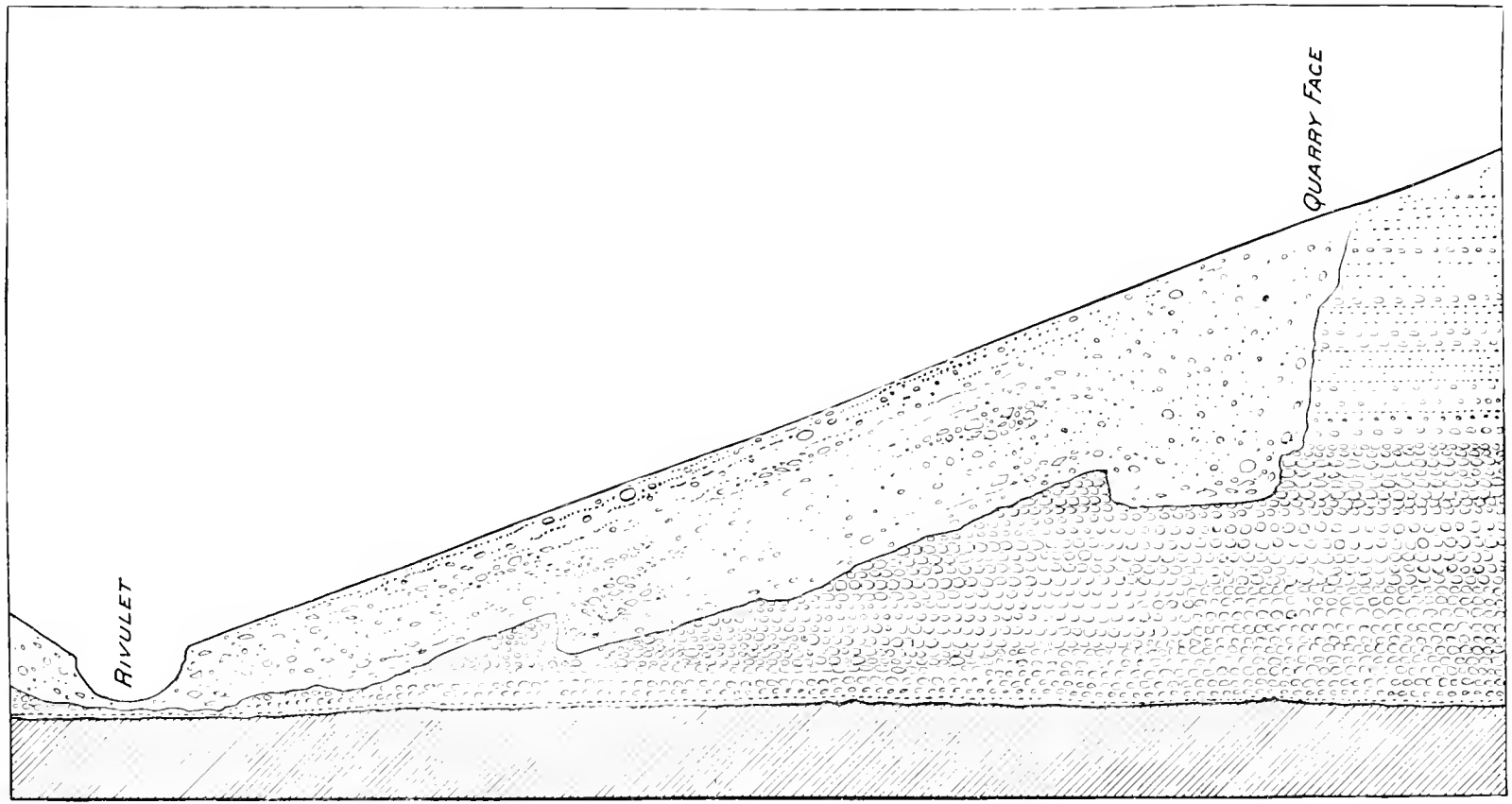


FIG. 3—Panoramic view of Piny branch quarry sites, looking north. The irregular dotted line indicates position of the quarries and the crosses mark the principal points of study.

points, especially about the bridge. They are more fully exposed farther down toward Rock creek, into which the branch flows half a mile below. The gneisses, as well as the Potomac beds resting on them, disintegrate and crumble on and near the surface through the action of various agencies, thus giving rather smooth though steep slopes on which the forest maintains itself with much uniformity. The surfaces are usually covered with a veneering of slope deposits composed of the disintegrated rocks and of vegetal mold, and this overplaced material abounds, up to the quarry level, in artificial débris. It was at first thought that this association of the worked stones with deposits of gravel might be of value as a means of determining the age or period of occupancy, but examination developed the fact that the gravel represented no definite period, its deposition extending from the present back indefinitely into the past.

In figure 3 a generalized view of the Piny branch quarry sites is depicted; it will give a comprehensive idea of the configuration of the



SECTION SHOWING DEPOSITS FILLING THE QUARRY EXPOSED BY THE THIRD TRENCH. QUARRY FACE 13 FEET IN HEIGHT

locality. The view looks northward across the valley of the branch; a dotted line half way up the slopes separates the sedimentary and crystalline rocks, and in connection with it the quarry sites are indicated by dark figures. The sites examined by trenching are indicated by small crosses.

Operations on the Site

Discovery and Reconnoissance

So far as known the first discovery of worked stones on the site of our excavations at Piny branch was made about 1880 by Mr De Lancey W. Gill, of the United States Geological Survey, who was engaged in sketching on the bank of the stream and by chance observed a flaked stone in the gravel at his feet. Subsequently Mr Gill came upon a number of heaps of quarry-shop refuse in the second ravine west of Fourteenth street, at the point selected in 1889 for our trenching operations.

In September, 1889, I visited Mr Thomas Blagden, owner of the property, to obtain permission to work on the premises, and learned from him that about the year 1878 a street contractor had been permitted to collect material for paving from these bluffs, and that various piles of refuse found by us on the surface were gathered together at that time, a portion only of the material collected having been carried away. At that time a narrow roadway was cut leading from the creek up the little ravine to the site of our recent labors. Mr Blagden subsequently informed me that while a boy, some twenty-five years ago, he had observed the great quantities of bowlders at this point, and desiring to know something of the reasons for their accumulation, had secured help to dig a trench, which was abandoned, however, before the bed of bowlder refuse was fully penetrated. I have no doubt that the evidences of former excavation discovered at the fiftieth foot of our first trench, and which caused us no little perplexity at first, is thus fully accounted for.

In beginning the examination of this site the first step taken was a careful examination of its topographic features with especial reference to such eccentricities of contour as might be due to the agency of man. Extensive working over of surface deposits, especially if the pitting were deep, would leave inequalities of profile which, if not obliterated or obscured by natural agencies, would be easily recognized as artificial. Such inequalities were readily found; indeed, they are so well defined in places that even the inexpert observer could not fail to detect them. It was partly on account of peculiarities of profile that excavations were undertaken at the spot selected, and the results have shown that these surface indications were not deceptive.

Toward the upper end of the ravine the elevations and depressions resulting from the ancient quarry work are more pronounced. Either the disturbances here are more recent than below or else the leveling agencies of nature have been less active.

THE FIRST TRENCH

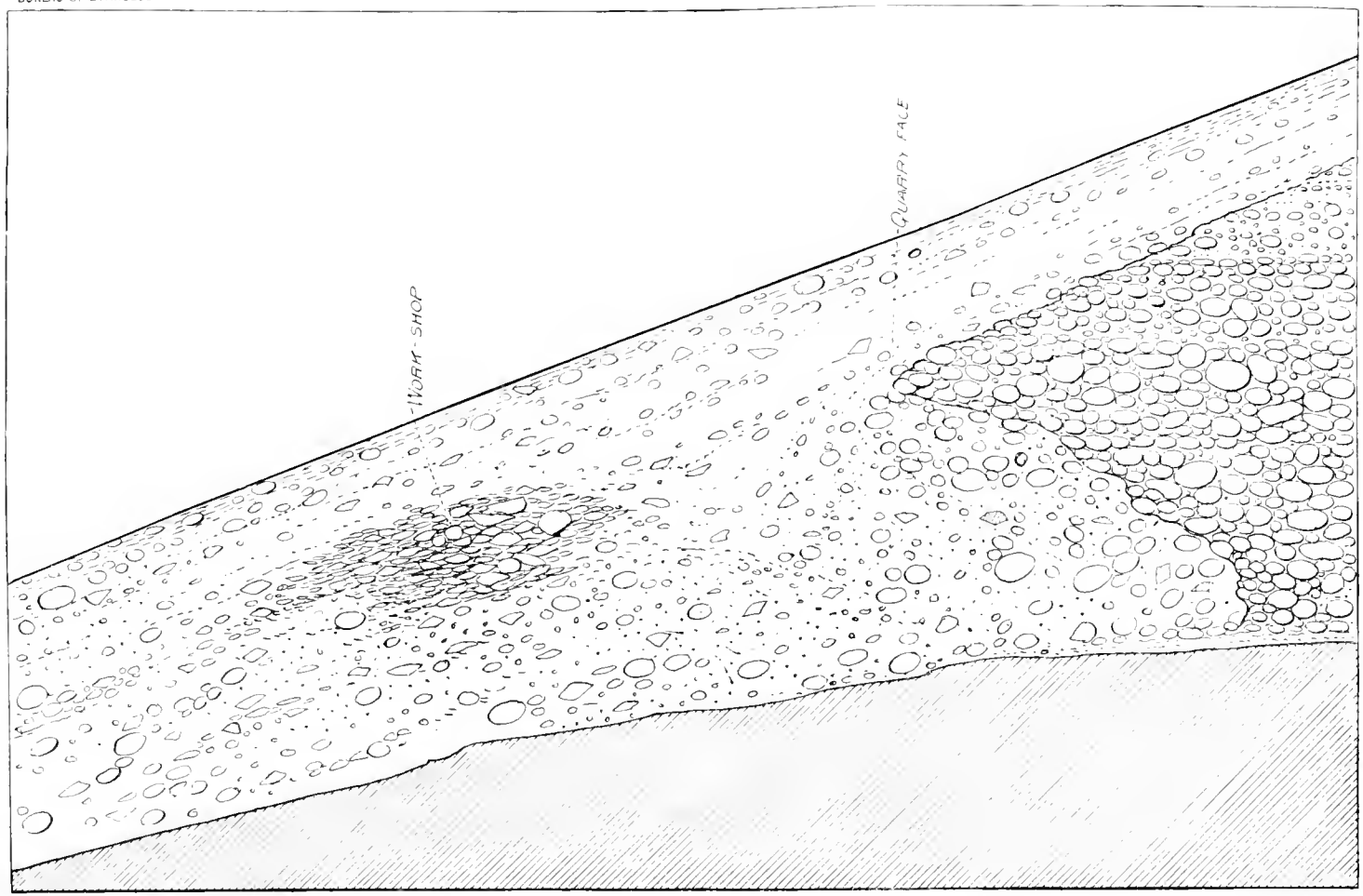
In selecting the position and course for a section through a series of deposits so extensive, and of which so little was known as to depth and mode and order of occurrence, there was considerable danger of missing the most instructive and vital spot. It seemed clear, however, that the section should cut the face of the slope from base to summit, and if necessary extend across the level surface of the spur and continue down the opposite side. This would in all probability reveal the true character of the art-bearing deposits; their relations to the geologic formations of the terrace, ancient and modern; the conditions of original deposition, and the effects of natural causes acting for an unknown period on distribution.

After looking over the ground carefully it was decided to go well up the ravine and rather beyond the apparent middle of the heavier deposits, so that other sections could be run if found necessary, or so that other investigators following should find a large portion of the area untouched. The sequel showed that a better selection could hardly have been made, and the results are so satisfactory, so far as the main points at issue in the investigation are concerned, as to make unnecessary the cutting of other complete sections.

The point selected for the beginning of the section was in the bed of the ravine, a few hundred feet from its junction with Piny branch, and where a line could be drawn from base to summit of the hill without serious embarrassment from the forest trees. This line crossed slightly to the left of the center of a gentle convexity in the profile of the lower half of the slope, thought to be due in a measure to deposits of artificial nature.

After a preliminary surface exploitation of the section, made to ascertain whether or not any considerable excavation would be necessary, a line was stretched on the surface of the ground, and to this numbered tags were fixed at intervals of one foot, to facilitate the accurate recording of data. To further serve the same purpose, a section of the hillside was drawn and divided into squares. For convenience of reference, this section was divided transversely into parts of 10 feet each. It was also arranged to make cross sections at intervals of 10 feet, representing the conditions exhibited in the front wall of the excavation; these were to be divided into square feet for record. This plan was substantially carried out, though modifications were made to suit various exigencies of the case. Sections were made at frequent intervals where increased interest demanded, all being scaled in the same manner. At every available point photographs of the vertical exposures were taken; and in connection with them detailed drawings were made recording character of soil and formations and manner of occurrence of relics.

Before describing the excavation, the conditions existing within the immediate channel of the rivulet at the base of the section may be



SECTION SHOWING THE QUARRY FACE EXPOSED BY THE FIFTH TRENCH

Bowlder bed undercut by ancient quarrymen at the right and shop refuse deposit at the left

sketched. The channel was about 6 feet deep and 10 feet wide at this point; the section across it, including both banks, is shown in figure 4. The slopes of the terrace rise from the steep banks of this inner channel at an angle of from 20 to 25 degrees through a vertical distance of 60 feet, giving a distance (measured on the slope) to the summit of about 160 feet on either side. This notch-like ravine is the result of a long period of erosion, which possibly extends far back into early Cenozoic or even Mesozoic time. It had much its present outline, and no doubt a greater part of its present depth, before man made his appearance in the region.

The area drained through this ravine is quite restricted, and, if wholly wooded, the work of erosion would be extremely slow, the refuse descending from the opposite sides so freely as to clog the channel, save at the time of great freshets. The clearing of the fields at the head of the basin has, in recent times, given some additional power to the floods, and the channel is now not only quite clear, but bears evi-

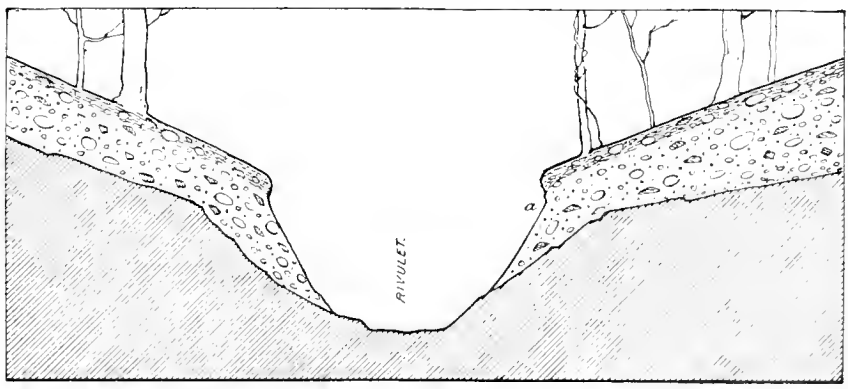


FIG. 4—Section across bed of rivulet at base of quarries.

dence of considerable recent deepening. The gneisses are exposed on the bottom and in the sides of the channel at the point crossed by our section, save where covered by the half-compacted art-bearing talus. The latter deposit is in places as much as 8 or 10 feet deep, and contains innumerable relics from the great shops along the slopes above on the right and left. An excellent illustration of the appearance of the art-bearing débris, from a photograph taken at a point about 30 feet below the initial point of the section, is given in plate III. Partially shaped implements and broken fragments project from the bank in great numbers. The exposure here is 8 feet in depth, but the deposits do not extend far into the bank, forming only a veil over the irregular surface of the gneiss. The latter is exposed beneath the left foot of the standing figure and slopes back from the rivulet bed at a lower angle than does the bank, as shown in the section, figure 4.

A general view of the ravine looking up from the beginning of the section is given in plate IV, and will serve to convey a clear impression

of the scenic characteristics of this retired and charming spot soon to be overwhelmed by the growing city. The left hand of the standing figure rests on the spot at which the excavation in the bank began; here the art-bearing talus deposit covered the gneiss with a veneering hardly more than a foot thick: its character and contents are shown in figure 5. This is the first of the series of crossents or transverse sections, and represents the front wall of the excavation within a foot of the beginning of the trench. Partially shaped implements and artificial refuse, which may have come from any part of the slopes above, occur throughout the deposits at this point. Near the surface a leaf-shape blade of ordinary type was found, and at 15 inches in depth three others, more or less perfect, together with typical turtle-backs, were encountered.

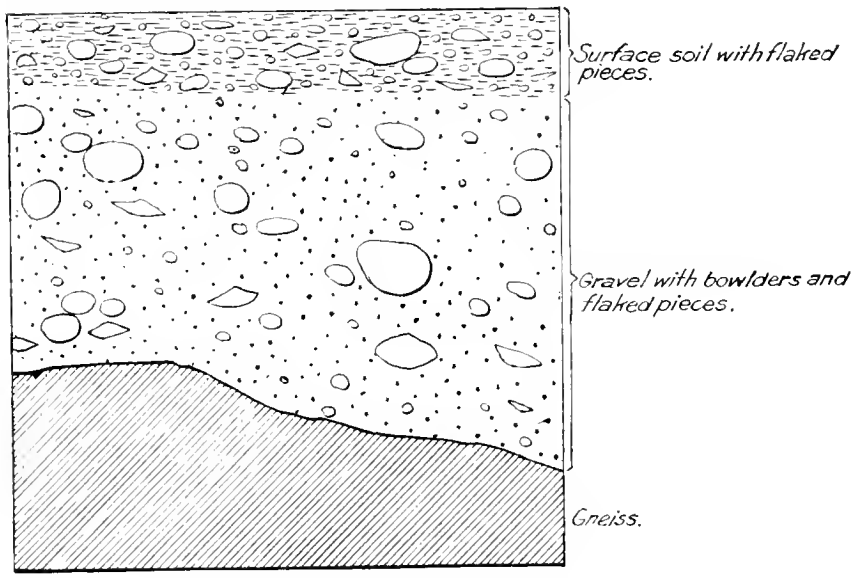
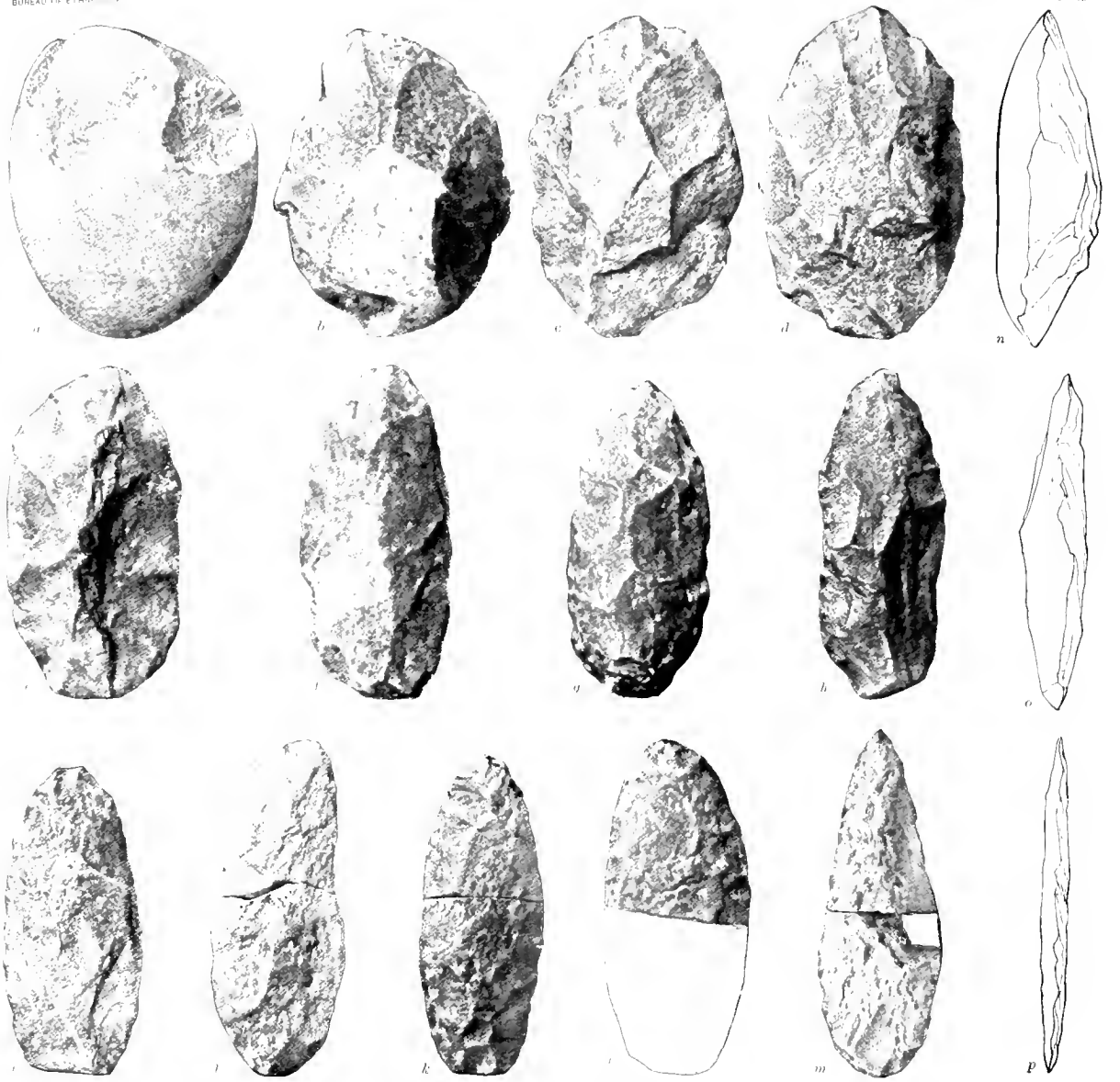


FIG. 5—Cross section at beginning of the first trench.

The exploitation pits (plate V), intended to determine something of the probable nature and extent of the work to be undertaken, were dug along the line of proposed excavation from the starting point in the ravine to the top of the terrace. It was observed that in the lower half the profile of the slope was convex, and that in the upper it was slightly concave. The convexity of the lower part, from the first figure leaning against the young tree to 20 feet beyond the third figure, is due to accumulations of refuse along the lower margin of the quarries, while the depression above (beyond the limit of the picture) is due to the pits left along the quarry face when the site was abandoned.

Continuing the excavation beyond the point at which the first cross section (figure 5) was taken, the art-bearing deposits became quite



QUARRY-SHOP REJECTS—PROGRESSIVE SERIES, BEGINNING WITH THE [illegible]WLDER AND ENDING WITH THE THIN BLADE

shallow. The dark mold of the surface was about 4 inches deep, and between the first and tenth foot of the section yielded numerous flaked stones and many artificial fragments and flakes; beneath this and resting on the uneven surface of the gneiss was a foot or more of quite compact gravelly clay, containing a few pebbles and occasionally a small bowlder; at the base the deposit contained much mica, derived from the decaying gneiss on which it rests. In this lower gravel there were no traces of art. Up to the twentieth foot these conditions remained practically unchanged. It will be seen, however, by reference to the longitudinal section (plate VI), that the surface of the gneiss rises less rapidly than the surface of the slope, and that the talus gravels increase in thickness to 3 feet. These pass down into a layer of pink and white clay, which rests on the gneiss. Worked specimens were found as before in the top soil, and artificially broken bowlders occurred in the gravel a foot deep. In the lower part of the dark soil a small pocket or cluster of chips was found, and between the tenth and twentieth foot several chipped stones in various stages of elaboration were unearthed. The cross section at the twentieth foot is shown in figure 6. Throughout the gravel occasional bowlders were found, some reaching 6 inches in diameter. From the twentieth to near the twentyfifth foot the conditions and the contents of the section showed no important change. The dark soil reached a thickness of 8 inches, and was underlain by a bed of light sandy subsoil, not before differentiated, about a foot thick. Many partially shaped stones were found in these beds. Beneath this again were gravels and gravelly clays.

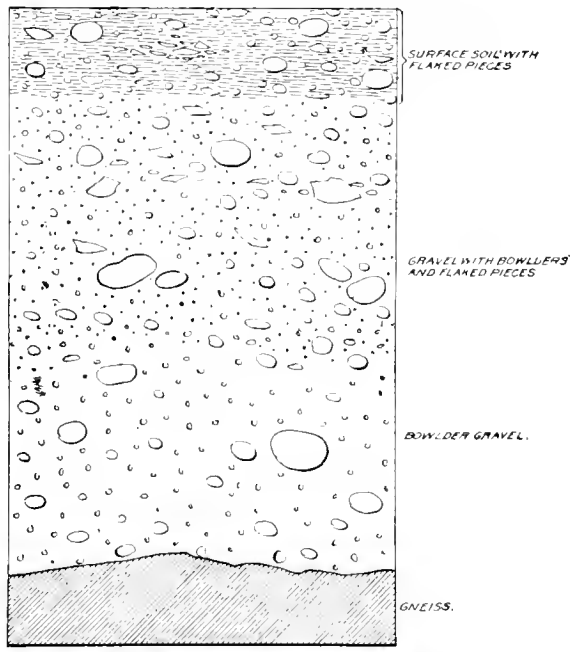


FIG. 6.—Cross section at the twentieth foot.

At about the twentyfifth foot the conditions of the deposits were observed to change. The limit of the compact gravels and clays forming the base of the deposit was reached, and a mass of rather loose heterogeneous material was encountered. The edge of an ancient excavation had been reached, though this fact was not at first appre-

ciated; for the idea of aboriginal quarrying had not yet been more than suggested, and the changes observed in the deposits were at first attributed to natural distributing agencies. In the light of facts subsequently observed, this body of heterogeneous material came to be recognized as part of the débris accumulated in an ancient trench, which was cut obliquely by our trench. The ancient trenching had been 4 or 5 feet deep at this point, and the side wall was quite broken and irregular, sloping at a low angle in some places and in others being vertical or even undercut. The digging had not penetrated to the gneiss surface at this point. The margin of the old trench is seen at *b*, plate VI. From this point (the twentyfifth foot) the work of excavation was carried through the quarry refuse and little by little many novel and striking features were brought to light, until at the eightythird foot the upper quarry face was reached.

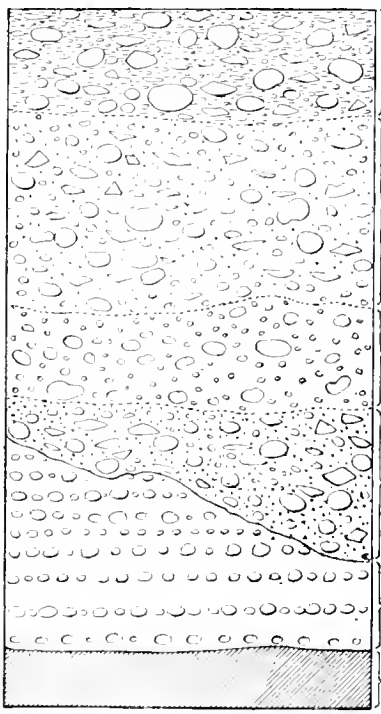
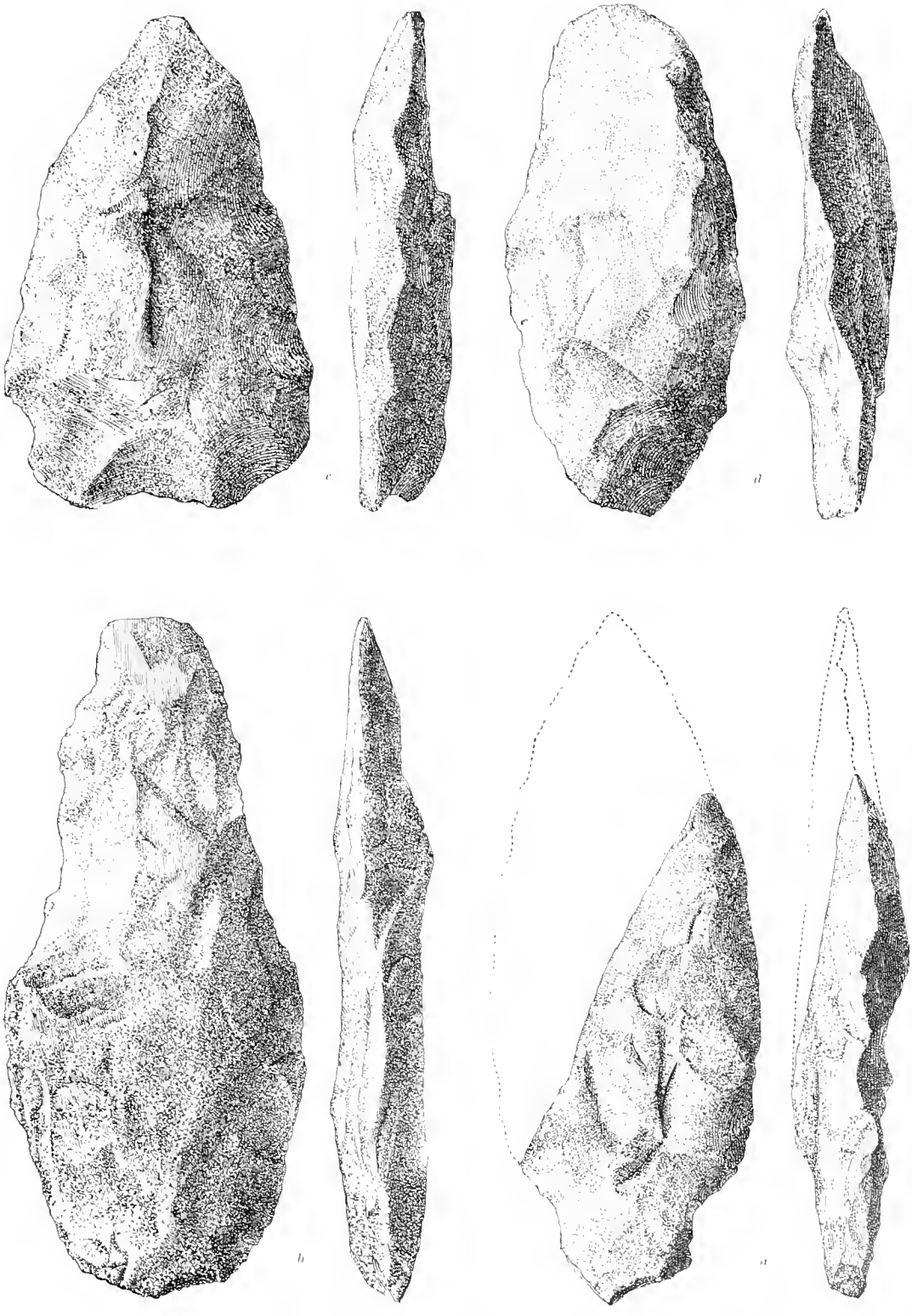


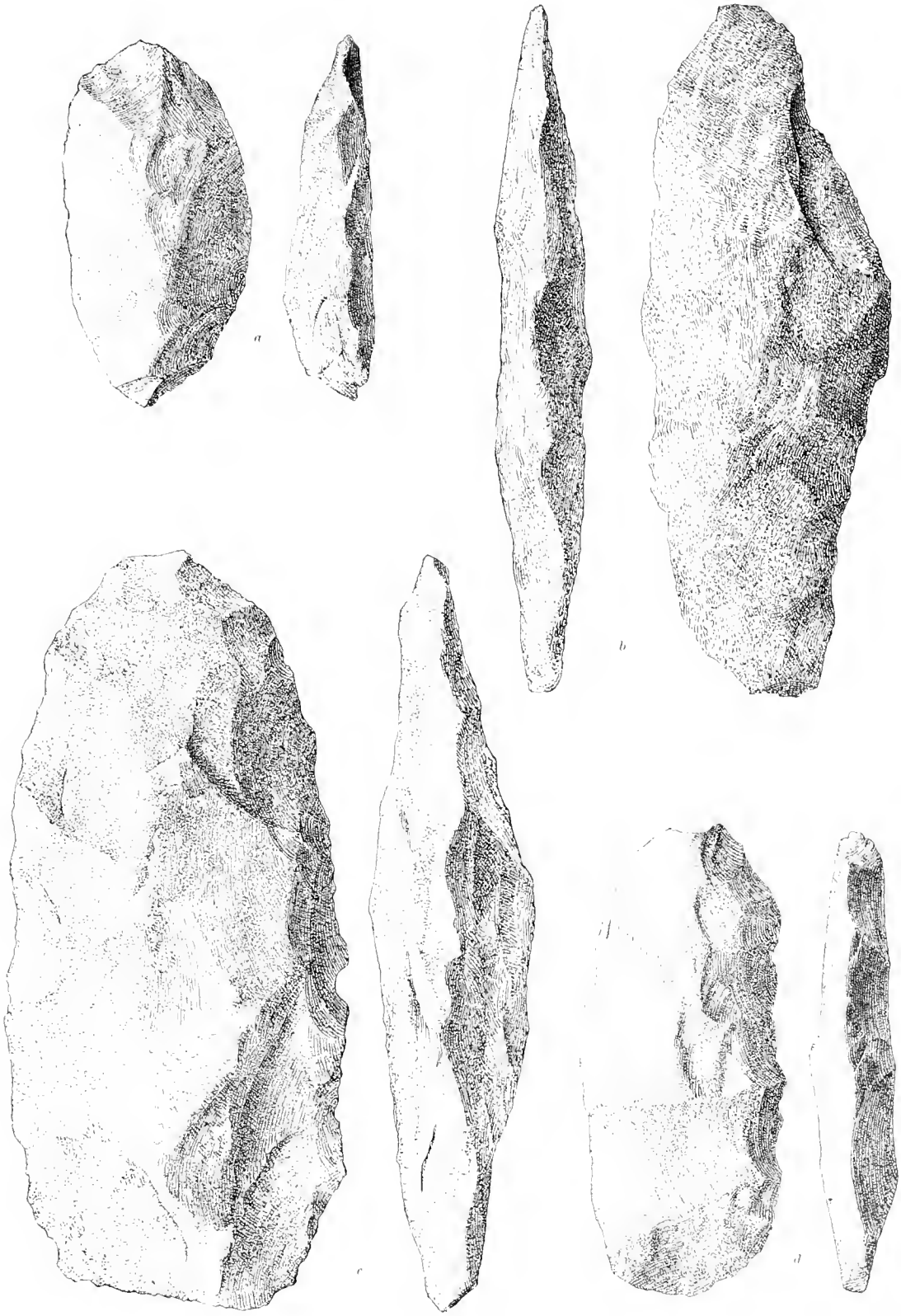
FIG. 7—Cross section at the fortieth foot.

Near the lower margin of the ancient digging a small percentage of artificial material was encountered, but before the thirtyfifth foot was reached the heterogeneous nature of the deposits began to be apparent. It became clear that nearly the entire mass from the surface of the ground to the gneiss floor, a thickness of from 6 to 12 feet, had been worked over by the primitive quarrymen. There was abundant evidence of the nature of the operations carried on both in securing and in working up the bowlders.

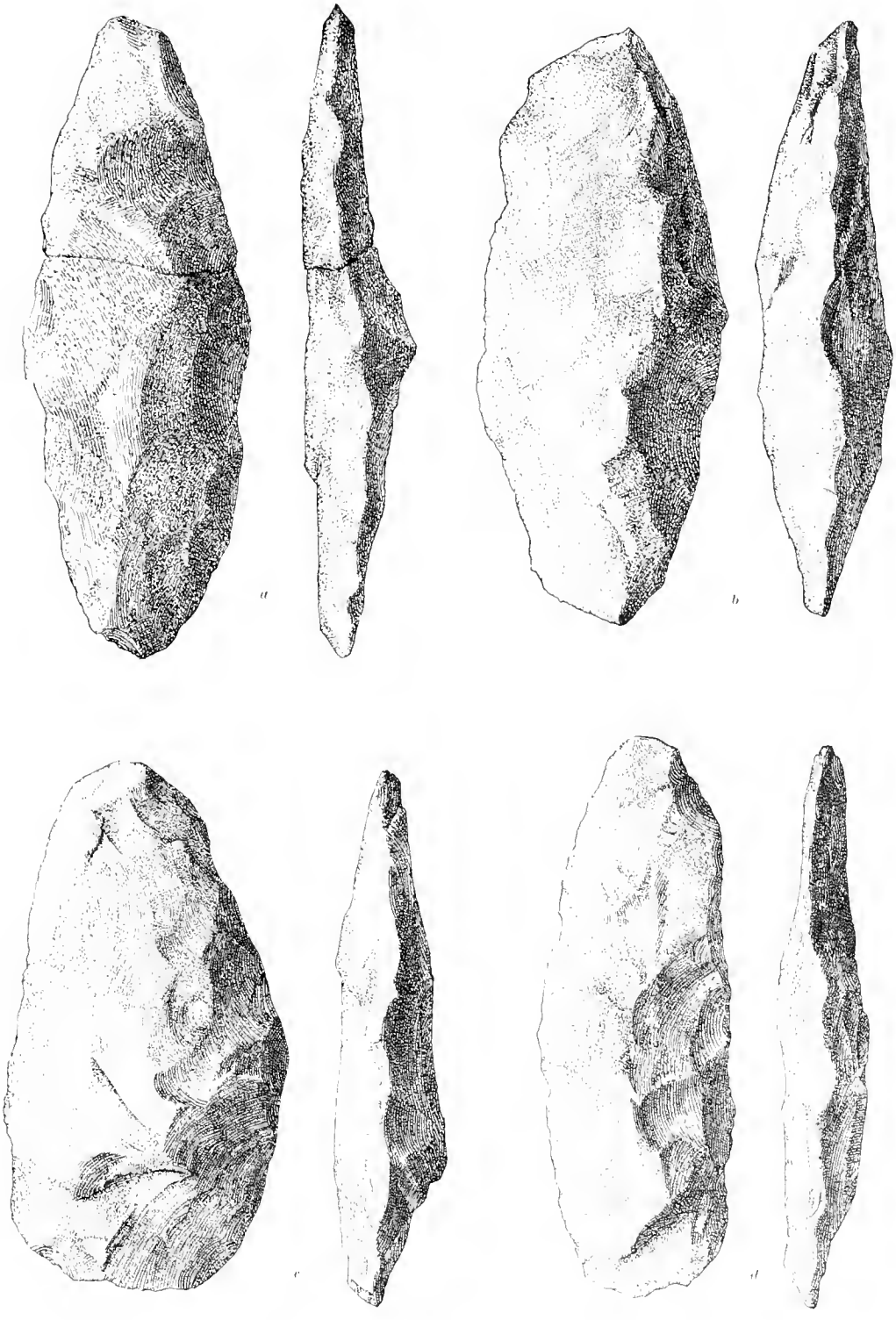
The cross section exposed in the front wall at the fortieth foot is given in figure 7. As might be expected in the refuse heaps of such a quarry there was little regularity and slight continuity in the deposits, so that the section exposed along the left wall of our excavation seldom corresponded closely with that along the right. The running section given in plate VI is not literal, but is drawn to express in a somewhat generalized way the conditions observed.



BLADE LIKE REJECTS FROM THE QUARRY-SHOP REFUSE—*a*, *b*, AND *c* SHOWING SLIGHT SPECIALIZATION (ACTUAL SIZE)



REJECTED BLADES OF MOST ADVANCED FORM FOUND IN THE QUARRY-SHOP REFUSE (ACTUAL SIZE)



REJECTED BLADES OF MOST ADVANCED FORM FOUND IN THE QUARRY-SHOP REFUSE (ACTUAL SIZE)

Between the fortieth and the fortyeighth foot the trench crossed, at about 3 feet from the surface, what had been a pit or transverse trench with sloping sides, between 2 and 3 feet deep. This had been filled with material previously worked over and containing much shop refuse. The character and relations of the deposits are well shown in the sections and photographs presented herewith.

The upper figure in plate VII represents a detailed study of the contents of the ancient pit as seen in the left wall of the excavation. Of this interesting exposure it was impracticable to obtain photographs, since the cutting was too narrow to permit the use of the camera; but the drawing was carefully made, and being supplemented by photographs of the face of the cutting at the fortieth and also at the fortyfourth foot, serves to assist in giving a satisfactory idea of the leading characteristics of the deposits. The bottom of the depression had been somewhat uneven when the filling-in began. The material, most of which consisted of fractured or partially flaked bowlders, had accumulated rapidly, and for a depth of 3 or 4 feet contained only a very small percentage of sand, clay, and gravel. Scattered over the bottom and sides was a layer of light, coarse sand which had descended from above and partially filled in the spaces between the bowlders and fragments; and throughout the mass, where the interspaces were filled at all, it was chiefly by coarse sand, small pebbles, and the flakes from the manufacture of implements.

A very decided bedding of these coarse materials was apparent, its curves following and repeating those of the bottom of the depression, but diminishing toward the surface. In the stratum of finer material overlying the coarser contents of the pit and in the dark loam of the surface there was also a slight sagging and thickening, indicating that the obliteration of the pit had been but recently accomplished.

It was observed that the distribution of the filling materials was unequal, the coarser gravel and larger bowlders being lodged at the left in the section, which was the lower side of the ancient pit (*a*, plate VII). This was to be expected, for the source of supply of filling débris was from above, and as the tool maker worked over the material upon the slope the heavier pieces rolled down until stopped by irregularities of the surface. It was also noticed that the percentage of flakes and failures was greatest at the left side of the depression from the fortyfirst to the fortysixth foot, where the flakers, it would appear, must have occupied the pit margins.

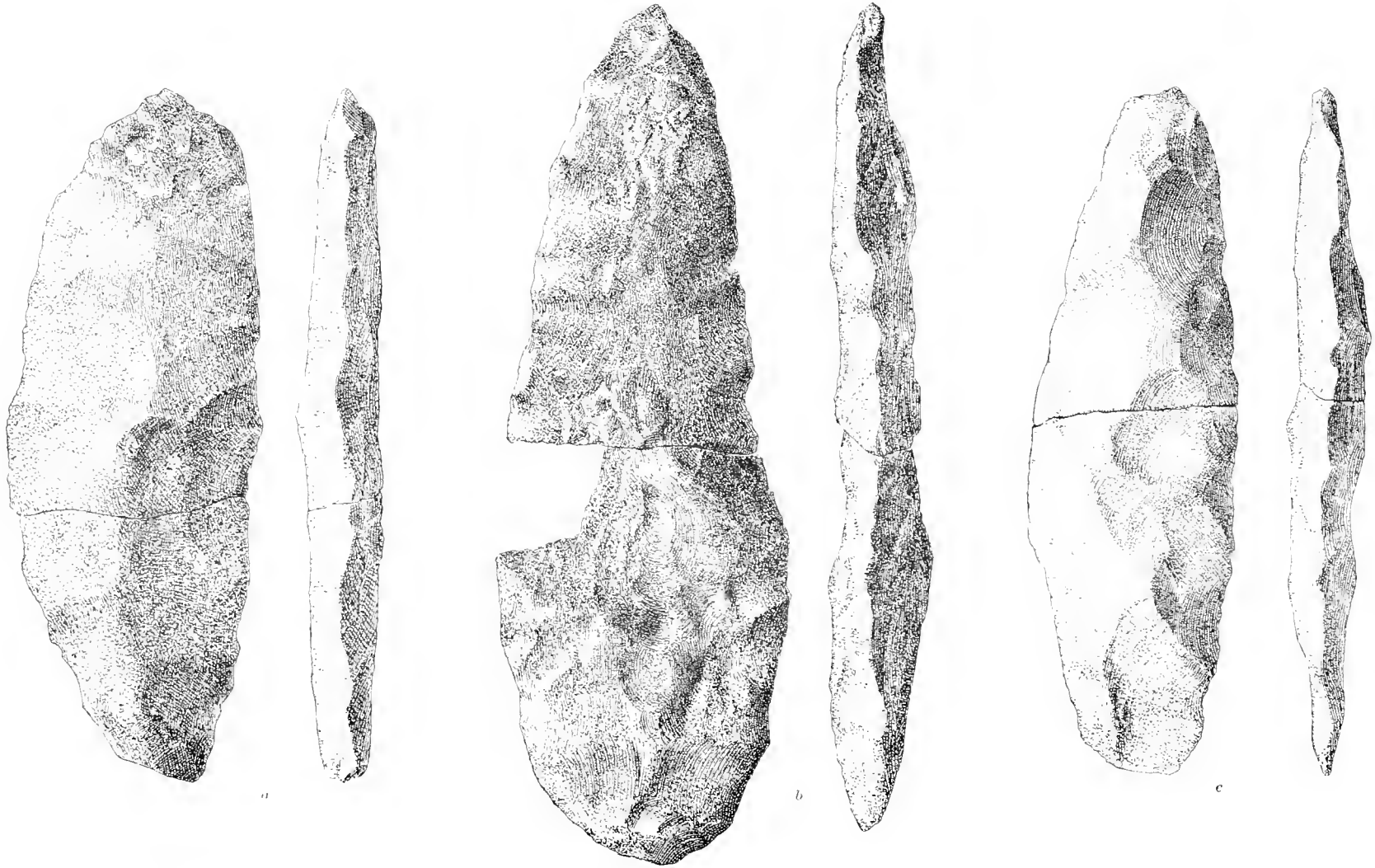
That the work was done on this spot, and that little subsequent distribution has taken place, is clearly seen, as the failures and broken tools often lie together with the flakes struck from them. It is safe to conclude also that the accumulation was rapid. The accumulation of the finer and more compact bed overlying the contents of the pit was probably slower and was no doubt due partially to natural slope agencies, though it contains a large percentage of worked material: the darker

soil of the surface was filled with shop refuse, most of which has not been far removed from the spot of manufacture. The cross sections are too limited in extent to show clearly the bedding of the accumulations, but they serve to illustrate the nature of the contents of the pits.

The conditions at the fortyfourth foot are given in (*b*) plate VII. By carrying the excavation to the right and left the outlines of the old depressions were found to be irregular and extended so far that I did not undertake to define them fully. It appeared, however, that our section had cut the deepest part of this particular depression. A photograph covering the rectangular space outlined by a dotted line in the section is reproduced in plate VIII. I am fortunate in being able to present such an illustration of the composition of the refuse at this point, as it affords evidence that can not be gainsaid, and the student may study the nature, conditions, and relations of the component parts with ease. The picture covers a space about 2 feet wide by 3 high, the top being 2½ feet below the surface of the ground and the bottom within a few inches of the deepest part of the ancient excavation. The unusual number of large bowlders is a notable feature, but it will be found that the broken and worked ones far outnumber the unbroken, and that several partially shaped tools are in sight, occupying positions no doubt very much the same as when dropped by the workman. A turtleback appears near the base beneath the large split bowlder; others are seen to the left and a little higher, while numbers are seen to be dropping out of the loose, open mass of refuse near the middle of the picture. The section abounds throughout with artificial material.

After passing the fiftieth foot the deposits exhibited the usual phenomena, and no features of exceptional interest were encountered until the seventieth foot was reached. The bottom of the old pits continued at about the same level, so that the artificial deposits became gradually deeper as we advanced. Occasionally small masses of the Potomac gravel (small bowlders and pebbles held together by an indurated sand matrix) were encountered, indicating the proximity of the ancient quarry face. The pitting had been carried down almost to the gneiss floor, which was here nearly level, being covered with a bed of sharp yellow sand from an inch to a foot thick. It was afterward ascertained that this layer of sand formed a part of the original Potomac deposits and separated the gneisses from the beds of bowlders above, as shown in the section. The artificial deposits, about 7 feet deep at the sixtieth foot, deepened to 10 or 11 feet at the quarry face 20 feet farther on.

Between the fiftieth foot and the sixtieth the refuse was distributed in alternating beds of gravelly earth and shop deposits, as shown in the general section. These beds constituted the refuse derived from extensive operations along the quarry face. After passing the seventieth foot the layers of refuse were inclined toward the quarry face, as indicated in the section.



BROKEN BLADES REPRESENTING THE MOST HIGHLY ELABORATED FORMS MADE IN THE QUARRY SHOPS (ACTUAL SIZE)

The quarry face (plate XIII) was encountered at about the eightieth foot, but sloped back in steps to the ninetieth foot and beyond. It showed a stratum, 10 feet or more in thickness, consisting largely of medium size quartzite bowlders embedded in a matrix of nearly pure sand, so indurated that the bowlders were extremely difficult to remove, and considerable masses of the conglomerate could be knocked down and removed without breaking up. The face was extremely irregular, indicating that when deserted the ancient quarrymen had penetrated to greatly varying depths; they had descended to the gneiss surface in excavations from 10 to 12 feet deep, had removed the bowlders by direct attack from above, from the front, and by undermining, and had selected and thrown out those best suited to the purpose of the flaker. Few of those left in the pits and dump had been more than tested by the removal of a flake or two. The work of shaping was in the main carried on about the margins of the pits out of the way of the quarryman. The earth, gravel, and undesirable bowlders were thrown back against the lower side of the pits, lodging in irregular beds sloping into the pits, as shown in the section.

Between the seventythird foot and the seventyeighth our trench passed through large pockets or masses of shop refuse. The largest body, consisting of tons of chips, failures, and broken bowlders, was confined to a space extending from 3 to 7 feet from the surface; smaller pockets of the same character were found as deep as 9 feet. The exposure in the sides and front of our trench showed these deposits clearly, and illustrations are selected from the fine series of photographs taken. Plate IX represents nearly the full height of the front of our trench at the seventyseventh foot, and plates X and XI illustrate the composition of the refuse in detail, showing a preponderance of rather large bowlders, most of which have been partially worked or broken to test the material. The portion shown in plate XI belongs lower in the section, extending down from the seventh nearly to the ninth foot in depth. Several shaped pieces are in sight. In plate XII we have a fine illustration of the clusters of shop refuse at about the eightieth foot. The clinging wet earth obscures many of the fine flakes, but enough is seen to indicate the very great amount of work done on this spot. The mass was made up of unshaped refuse and of shaped specimens, illustrating the whole range of quarry-shop work from the first flake to the rude thin blade; the latter, it was gradually learned, being the almost exclusive product of the flaking operations. A section showing the quarry pit and the face of Potomac bowlders is presented in plate XIII. This terraced face, receding in irregular steps, appears to have undergone little change since it was deserted by the prehistoric quarrymen. The bowlders are compactly bedded and retain their places with great tenacity.

The deepest work of which evidence was discovered was about 11 feet beneath the present surface. It is probable that when deserted the pit at the quarry face was much deeper, as considerable degra-

dation of the slope must have taken place since the desertion of the quarries. In another trench farther up the ravine the quarry face was exposed to a depth of from 12 to 15 feet.

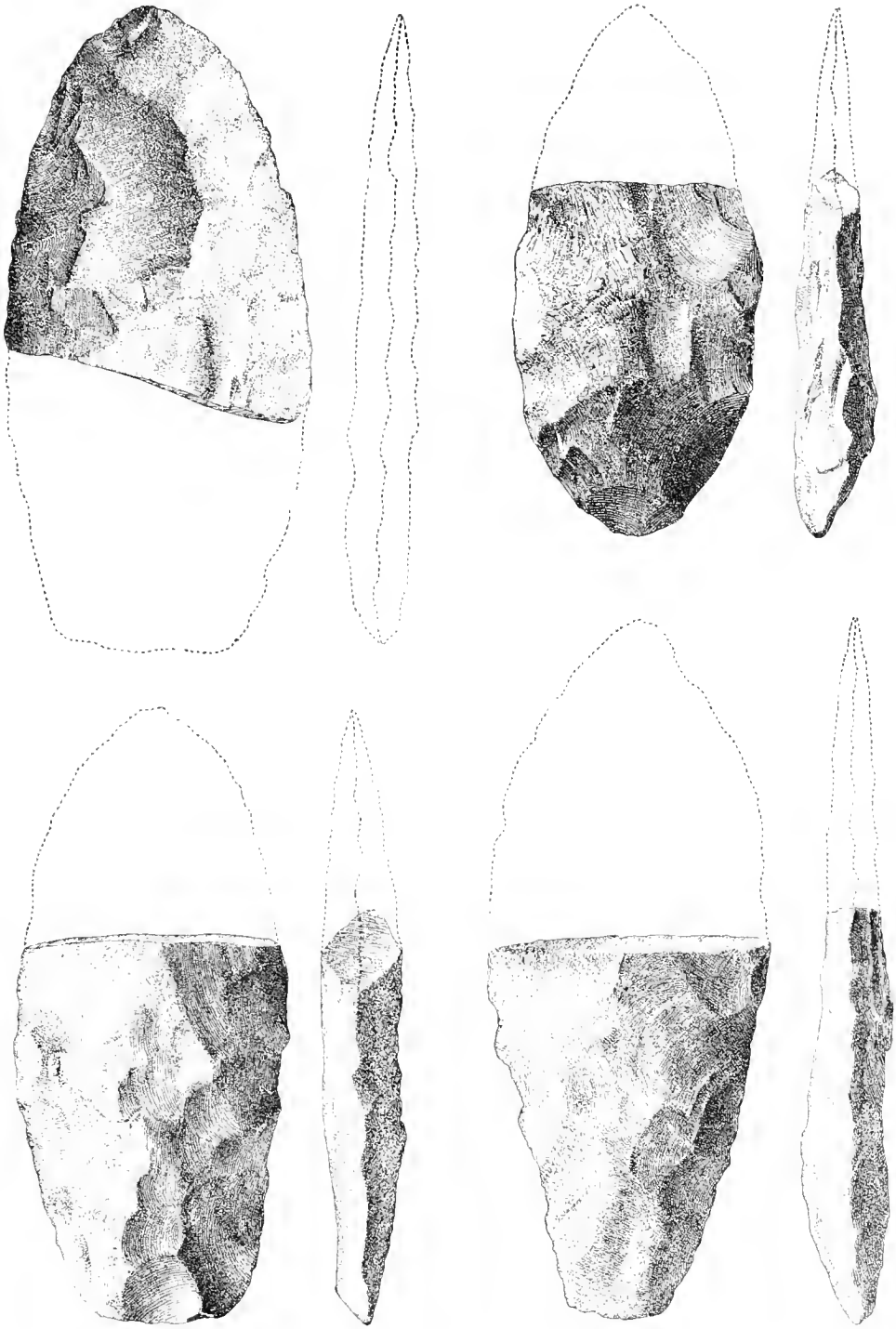
Plate CIII and the frontispiece, described in the supplement, serve to illustrate the probable conditions under which the work was carried on by the savage quarrymen. The miner with a strong wooden pike is seen dislodging bowlders from the bed; a second workman is breaking up a large mass of quartzite, and the flaker engaged in roughing-out the blades is seated near at hand. The life-size group from which these views were taken was prepared under the writer's direction for the World's Fair, in Chicago. The figures were modeled by U. S. J. Dunbar, sculptor, and were costumed after drawings published in the works of Hariot and John Smith, the assumption being that this work on Piny branch was done by the Algonquian tribes known to the colonists of Jamestown and Roanoke. However this may be, the work of procuring and working the bowlders is, I am convinced, correctly indicated by this group.

The quarry was about 60 feet wide where crossed by our trench, and was 3 or 4 feet deep at the lower margin and 11 feet deep at the quarry face. The bowlders, forming a large part of the mass worked over, had nearly all been tested for flakability by the removal of a flake or two, or had been more or less fully worked. All of the material removed from the trench was carefully assorted and studied by us, and the important results reached through its consideration will be given further on.

If we allow that the ancient operations were somewhat uniform in extent along the terrace face, say for a distance of 500 feet, the material worked over on this side of the ravine would amount to 100,000 cubic feet or more, and the number of bowlders secured and worked or partly shaped would reach millions.

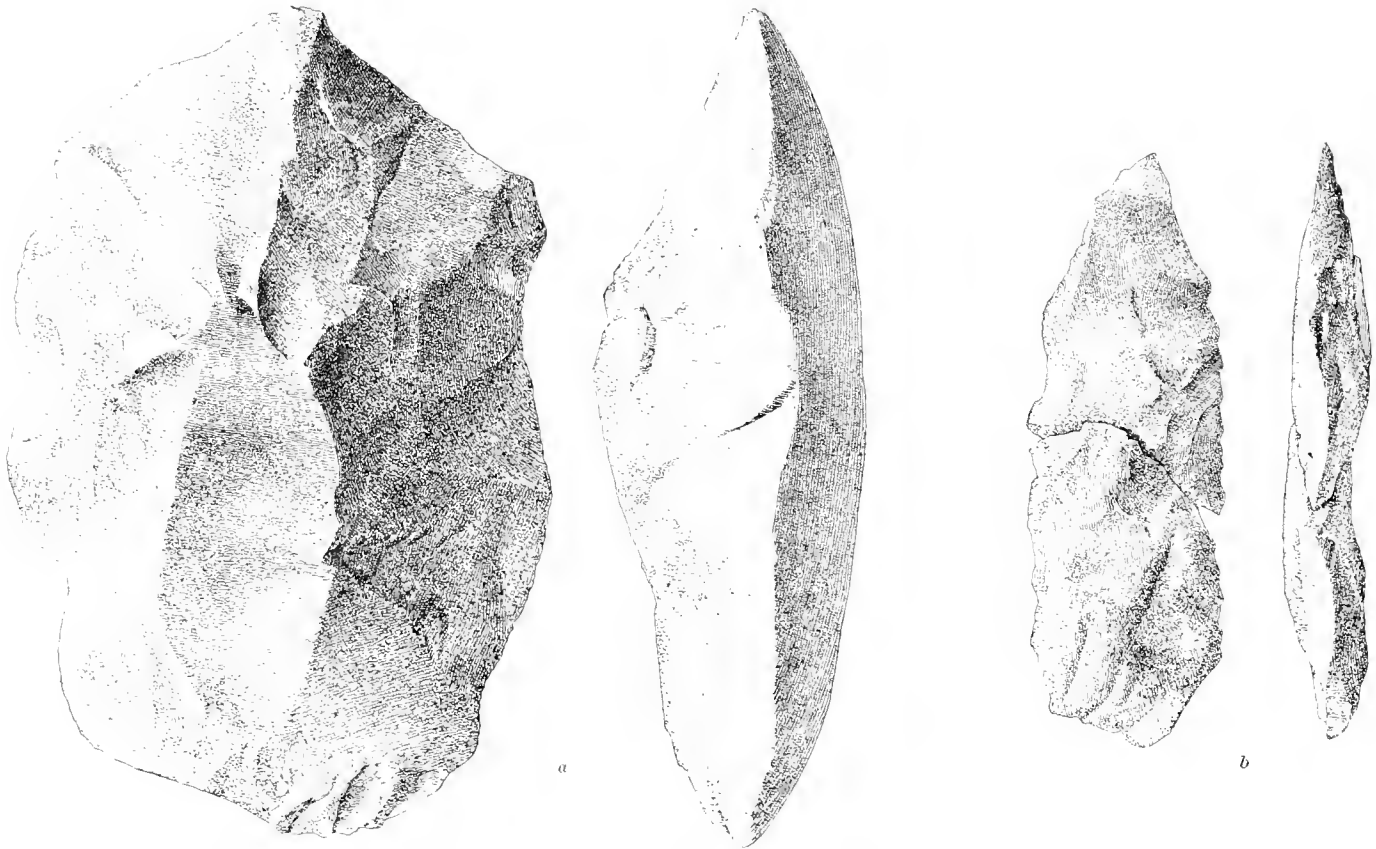
THE TREE PIT

Lateral excavations from the first trench were made wherever the appearance of the refuse encouraged it, but the deposits did not vary in any important respect. About 10 feet north of this trench, opposite the sixtieth foot, stands a chestnut tree some 3 feet in diameter and rather massive at the base. For the purpose of determining the relation of this tree to the artificial deposits, an excavation was made uncovering nearly one-half of the roots to the depth of about 7 feet. The main root penetrated the refuse and passed through the undisturbed gravel and into the decayed gneiss beneath. The roots had made their way through the deposit of compact quartzite fragments, inclosing many of them almost completely (plate XIV) and assuming irregular distorted forms imposed by the angular stones. As a matter of course, the tree postdates the quarry period, as do other trees much older. In one of the ravines near Fourteenth street a white oak, at least 200 years old, grows in the same manner in a mass of shop refuse.



FRAGMENTS OF BLADES REPRESENTING THE MOST HIGHLY ELABORATED FORMS MADE IN THE QUARRY SHOPS

RELATION OF THE FLAKED BLADE TO THE PARENT BOWLDER (ACTUAL SIZE)



TWO SPECIMENS OF FLAKED STONE THAT, TOGETHER WITH THE LOWER SPECIMEN OF PLATE XXIII AND THE FLAKES MADE IN SHAPING THEM, WERE FOUND IN A SINGLE CLUSTER (ACTUAL SIZE)

The refuse about the roots of the chestnut tree contained more than the usual percentage of partially shaped tools, and several bushels of these, showing rude leaf-shape outlines, were collected. A photograph made shortly after beginning the excavation shows the inclosure of worked stones in the base of the tree and their prevalence in the mass of refuse (plate XIV).

THE SECOND TRENCH

A second trench carried across the old quarry in the spring of 1890 failed to furnish features of especial interest and added little to the fund of information acquired from the trench made the previous year. It was not expected, however, that this second excavation would expose extensive deposits of refuse or well marked quarrying. The site was chosen in a depression, or incipient gulch in the slope, where no marks of disturbance could be detected, whereas the first trench was carried across a convexity in the face of the hill, which convexity bore every indication of being the result of artificial disturbance and accumulation. Having determined that surface appearances in the first case really indicated the conditions beneath the surface, the second trench was made where no indications of artificial disturbance could be noted. This trench was 100 feet north of the first. No well-defined shop sites were discovered, and evidences of ancient quarrying were quite meager. Artificial refuse was evenly distributed throughout the overplaced gravels to a depth of about 3 feet. These conditions would seem to indicate that the shallow depression in which the trench was dug had been filled from shops and quarries at the right and left, or perhaps from random working at higher points on the slope.

Excavation was begun in the rivulet bank, here about 6 feet high. The immediate bank was found to consist of a mass of refuse, well filled with broken bowlders and rejects and chips which exhibited a sort of rude bedding as if rearranged by the action of the rivulet or as if deposited on its successive though very narrow flood plains. Our trenching soon passed through these deposits. The gneiss which formed the bed of the stream rose rapidly beneath the loose mass forming the bank, and at 10 feet from the stream approached within 3 feet of the surface. From the tenth to the thirtieth foot the gneissic surface followed the slope of the hill at a pretty uniform depth of 3 feet; beyond this it passed horizontally beneath deposits of Potomac bowlders. Overplaced gravels from the tenth foot to the end of our trench contained but few artificial objects, and these did not occur at a greater depth than about 3 feet. These gravels for the most part were made up of a heterogeneous mixture of clay, sand, and pebbles, with occasional bowlders. Near the bottom they consisted principally of material derived directly from the disintegrating surface of the Potomac bowlder beds.

THE THIRD TRENCH

The site for a third trench was chosen with the view of securing evidence on two questions of especial interest. The first was the

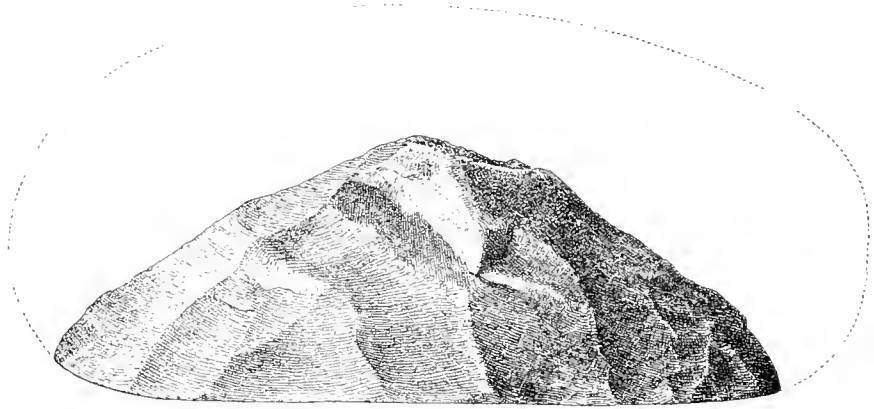
question of the relation of the ancient quarrying to the present bed of the rivulet; the second related to the significance of a series of depressions observed along the upper part of the slope a little above the quarry level (as determined at other points) and immediately below the upper margin of the terrace slope. The place selected was about 200 feet farther up the gulch than the second trench, and where the length of the slope was only 80 feet and the height about 40 feet. At this point the Potomac bowlder bed outcrops at or but little above the level of the stream bed, and it was thought that evidence of ancient excavation might be found so near the present bottom of the gulch as to indicate the comparative recentness of the work. Observations on this point are given in detail further on.

As to the other question, it was surmised that the depressions along the upper part of the slope marked the sites of ancient pits, and investigation showed that this surmise was not far wrong. The depressions are in all cases a little higher up than the old pits and above the bowlder bed level, and are apparently the result of miniature landslides, by means of which the original quarry pits were filled up.

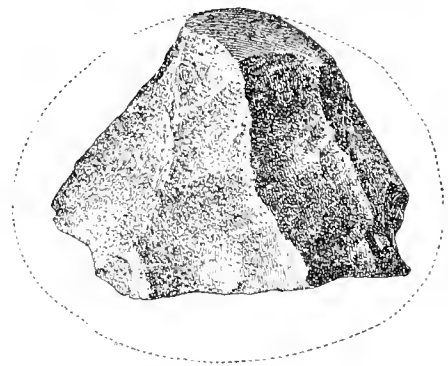
The phenomena disclosed in this trench are quite interesting and may be given in some detail. Entering the bank on the level of the stream bed, we followed the surface of the gneiss for a number of feet. Within the first 10 feet patches of undisturbed Potomac bowlder gravel remained on the gneiss surface. At about the twentieth foot the bowlder bed began to thicken, and its upper surface rose with the slope of the talus. The bank of the rivulet was between 4 and 5 feet in height, and was composed of loose heterogeneous refuse, which, as the excavation advanced, was found to be rudely bedded with the slope as indicated in the section (plate XV). The loose refuse was from 5 to 7 feet deep, and rested on the gneiss or the uneven surface of the bowlder bed. Broken cobbles, rude rejects, broken embryo implements, and chips were pretty evenly distributed throughout the mass. At the twentyseventh foot the floor of the quarry made an abrupt descent of 3 or 4 feet.

In advancing beyond the twentyseventh foot the bottom of the ancient quarry rose but slightly, and at the fortieth foot it was 10 feet beneath the surface. The deeper parts were filled with loose material—clay, gravel, and bowlders—intermingled with which were a number of fragments including chips and broken, unfinished tools, but there was not here or in the vicinity any very decided evidence of chipping on the spot. The lowest point of this ancient pit was only 2 feet above the present bed of the gulch at the nearest point.

Between the thirtieth and the fortieth foot no features of particular interest were encountered. As shown in the longitudinal section, a number of pockets of shop refuse occurred between the twentyeighth foot and the thirtyfifth. These may have been shop sites, but had more the character of refuse descended from above into depressions or



a



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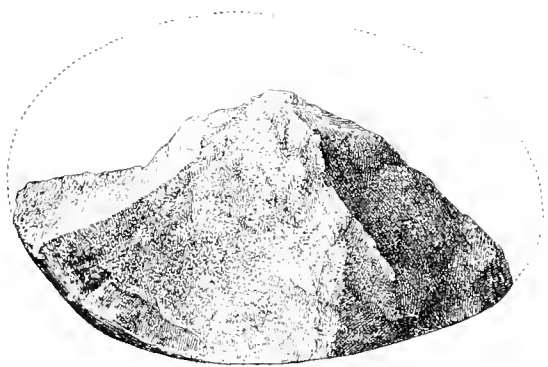

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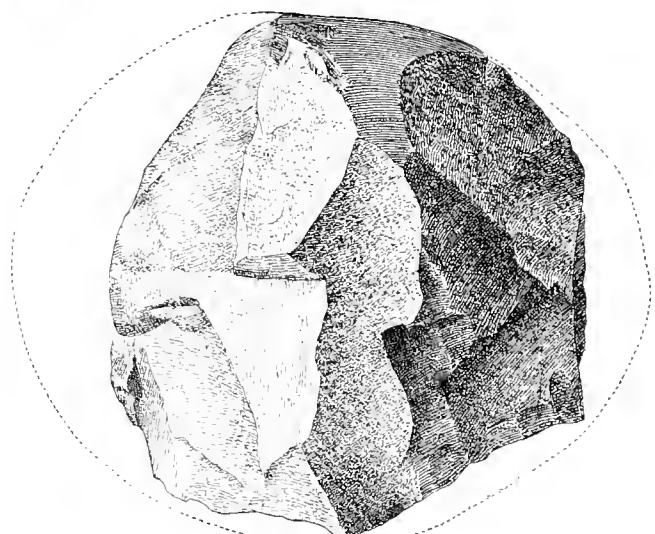


d

CORE-LIKE FORMS FROM WHICH FLAKES HAVE BEEN TAKEN EITHER IN FUTILE ATTEMPTS AT SHAPING AN IMPLEMENT OR FOR USE AS IMPLEMENTS

pits. The mass of material about these pockets and beyond, up to the fortyfifth foot, was comparatively barren of artificial refuse. The middle parts of the mass of filled-in material, as indicated in the section, is quite homogeneous, as if never worked over by man, and must have descended into the quarry pit en masse as a miniature landslide from above. It consists of loose, crumbling, sandy clay of reddish color—a characteristic of the higher-level beds—containing some gravel and occasional bowlders. Rather high up in the sides of the trench could be seen indications of old overplaced débris containing shop refuse and coarse materials, all of grayish color. Near the surface the overplaced gravel was again reddish and barren of art.

In approaching the fiftieth foot, pockets of shop refuse began to appear, and at from 4 to 6 feet deep and beyond the fifty-sixth foot characteristic quarry-shop phenomena were encountered. Beds of clay and refuse of varying colors were seen dipping into the hill as the quarry face was approached. Nature distributes her materials with the slope, but art reverses this; as the earth is thrown out of a quarry pit it forms layers conforming roughly to the slope into the pit. The section exposed in this trench is given in plate XV.

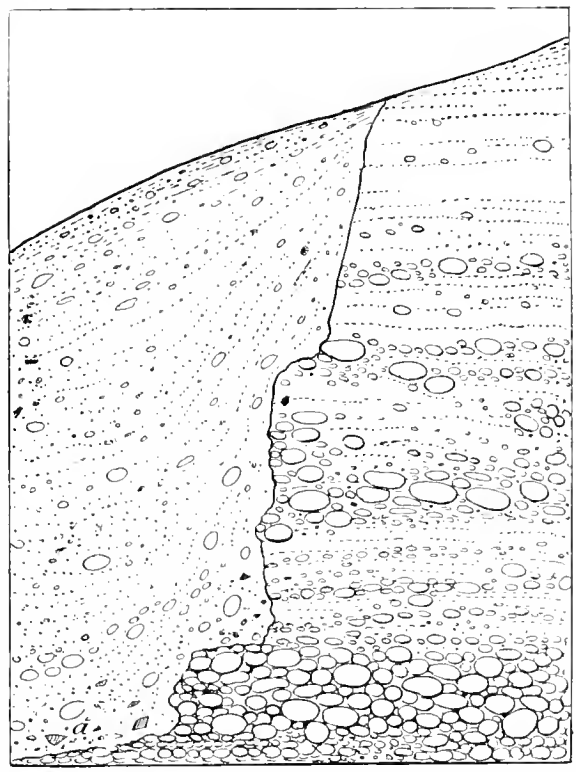


FIG. 8—Section of bowlder beds exposed in quarry face 13 feet in height.

At the fiftyseventh foot a descent of 2 feet was made into a deeper portion of the ancient quarry as shown in the section. At the sixtieth foot the bottom of the old quarry was 13 feet beneath the present surface, and at about the sixtythird foot the quarry face was encountered. When this was uncovered to the full width of our trench, the section shown in figure 8 was disclosed. Beginning at the top there were about 3 feet of overplaced slope material, dark above from the presence of vegetal mold and composed of sandy clay below; beneath this were

the Potomac beds in place, comprising, first, about 3 feet of coarse loose-bedded sands of varied kinds, then alternating layers of sand, gravel, and bowlders, and at the base a compact layer of bowlders. The ancient workmen had penetrated this latter bed at this point only to the depth of a foot or two. On the bottom and against the quarry face were a few chips and chipped bowlders, but the mass of material filling up the ancient excavation was barren of art and consisted of a mixture of clay with sand and gravel, derived from the margins of the ancient pit chiefly by sliding from the overhanging front wall. This wall or quarry face as uncovered by us was only 12 or 13 feet high, but when the ancient miners deserted the spot it must have been very much higher, probably 20 feet if the period was recent and perhaps more if the time was remote. As already stated, the configuration of the slope showed that a slide had taken place, leaving a hollow just under the crest of the slope and giving a rounded mass on the site of the ancient digging. Beneath the highest part of this mass our trench disclosed the deepest point reached by the aborigines. The filling up by sliding en masse was thus shown by the surface configuration of the site as well as by the character of the filling material.

It appears that the bottom or floor of the ancient quarry was quite uneven, but its full conformation could not be made out from the disclosures of a trench 3 feet wide. In examining the sides of our trench in the vicinity of the ancient quarry face I discovered that our left wall had for several feet coincided here and there with the steep side wall of the ancient excavation.

The digging of this trench amply repaid the labor expended, as answers were obtained to a number of the questions presenting themselves. It was found, first, that the ancient quarrying was carried on at a level only 2 or 3 feet above the present bed of the rivulet, and second, that the trenches had been filled by sliding masses in such manner as to produce inequalities of the surface not yet effaced. In addition, the conclusions reached by a study of the other trenches were confirmed: 1, that there were well-defined quarries with quarry faces of considerable vertical extent in the Potomac bowlder deposits; 2, that little shaping was done in the deeper pits save that required in testing the quality of the stone; 3, that the only work in the shops about the excavations consisted in the roughing-out of leaf-shape blades; 4, that the ancient diggings were extremely irregular, much labor having been expended in exploitation and in reaching the heavier deposits of workable bowlders; and, 5, that undermining was by no means the exclusive method of reaching and securing the bowlders.

Study of this trench afforded a remarkable instance of the confusion possible in the association of works of art with gravel bluffs where workable stone was sought. Had the cutting for a roadway or other modern improvement been made along the side of this gorge the exposures in the walls would have shown "implements" embedded

SITE OF THE DUMBARTON QUARRY, SHOWING REFUSE-COVERED SLOPES DESCENDING FROM THE QUARRIES ALONG THE MARGIN OF THE CREST

under unaltered gravels at a depth of 13 feet (*a*, figure 8), and it is thus seen that in such a cutting the detection of the true conditions might be next to impossible without careful and extensive excavation.

THE FOURTH AND FIFTH TRENCHES

A number of trenches were opened about the southwestern point of the promontory as indicated on the map. It was expected that these would throw light on various peculiar features of the topography, and also add to the information regarding quarrying and manufacture. The results are all that could be desired.

The fourth trench was opened on the rounded point of the promontory 300 feet south of the first trench, while the fifth was made a little farther around toward the east. The phenomena observed in these trenches were so nearly identical that I shall omit detailed mention save of the latter and more interesting.

The fifth trench furnished much of the evidence necessary to complete the story of the ancient quarries. The general conditions were uniform with those revealed in the first trench. At the thirty-fifth foot a pocket of shop refuse of unusual interest was encountered. As exposed by the trench (plate XVI) it was 4 or 5 feet in horizontal extent and perhaps 3 feet deep, and its upper surface was 2 or 3 feet beneath the surface of the ground. No part of the quarries, 30 feet across (measured on the slope) and from 6 to 9 feet deep, was entirely free from flakes and flaked stones, but the work of shaping had been carried on most extensively on this one spot. From the deposit upward of 40 blades, broken near the finishing stage, were recovered, though the search made was by no means exhaustive; fully one-fourth of the shaped pieces remained in the excavated débris. This pocket of refuse was not essentially different in any of its features from those encountered in the first trench, but it had somewhat more the appearance of a trimming or finishing shop than any yet seen. There were few large or rude pieces and the flakes averaged small; still no traces were found of specialized shapes, or even of well-trimmed edges or points. The highest form made was a roughed-out blade such as a majority of those found in caches.

The most interesting feature of this trench was its quarry face, which was encountered at about the fortieth foot. It was discovered that extensive undercutting had been done by the ancient quarrymen, and, as we advanced, the overhanging face was found to extend forward several feet, as shown in plate XVI. The phenomena of this quarry face are instructive in one important direction. They reveal, with more than usual clearness, a favorite method of the ancient quarrymen. The massive bowlder bed all around this promontory had been deposited on the gneiss. Entering the face of the bluff on the surface of this rock, rendered friable by decay, the overplaced stratum of compacted bowlders and sand was undermined, so that the quarrying of

the bowlders became a comparatively easy matter. They were easily loosened and fell into the hand of the workman from the matrix of compacted sand, as clean and fresh in color as when deposited by the sea in Mesozoic times. By thus working on the gneiss surface, antler picks or wooden stakes sharpened by fire would serve to perform the work of undermining and knocking down, whereas our men found it a difficult task to penetrate the closely compacted conglomerate from its upper surface or from the front, even with the aid of steel picks.

THE SIXTH TRENCH

The examination of the third trench made it clear that in certain cases the ancient pits had been filled, or partially filled, by the sliding of sand and gravel from the quarry wall and from the bluff above. This fact led to the opinion that some of the unique features of conformation observed about the outer point of the terrace were, in a measure at least, due to slides brought about by quarrying operations. To one familiar with the ancient quarrying in this locality, the concavity on the horizon of the bowlder outcrop and the convexity of profile just below, as seen in the sections, would at once be attributed to human agency. In this case, however, the deformation is on such a scale that natural agencies could alone have accomplished the result.

On the southwestern angle of the spur, and at a level about 60 feet below the crest, there is a roundish hump or shoulder 100 feet or more across and rising perhaps 15 feet above what would seem to be a normal profile. This occurs just beneath the level of the bowlder outcrop, and thus has the appearance of a great dump heap to the quarries.

The character of the rocks forming the bluff is such that they disintegrate very gradually, and with ordinary activity of the erosive forces a slope of sufficient declivity to invite landslides would not occur. The question arose as to whether extensive quarrying on the face of the bowlder bed and the consequent undermining of the superposed beds of gravels and sands, here some 40 feet in thickness, might have brought about the sliding of a mass from above sufficient to produce the hump observed. The only possible means of arriving at a satisfactory solution of the question was by trenching. A series of excavations was made covering the profile of the spur from near the summit to the outer base of the convexity that gave rise to the inquiry. The section shown in figure 9 serves to indicate the position of these pits as well as the nature of the profile. The light portions represent the excavations made, and the dotted line at the top indicates the position of the mass supposed to have descended to form the hump. The results of the pitting may briefly be given: The pit at *a* was in shop refuse similar to that usually found in the quarry dumps higher up. The pit *b* was carried 13 feet deep through a mass of sand and gravel more or less disturbed, but apparently not by human agency. The material corresponded closely to that of the beds above the quarry level. Near the base, at 12 feet deep, numerous quartzite chips and

POTOMAC BOWLDER BED RESTING ON THE SURFACE OF DISINTEGRATED GNEISS EXPOSED IN GRADING U STREET, BELAIR HEIGHTS, WASHINGTON CITY

fragments evidently of artificial origin were found. Analogous conditions were observed in pit *c*. Pit *d* on the quarry level passed through thin slope gravels, containing some artificial material, into the normal bowlder beds. Pit *e* disclosed the sands and gravel of the upper slopes.

Although the observations were not so complete as could be desired, the evidence secured supports the theory that sliding took place as a result of the quarrying operations, and that the protuberance on the slope below represents the transported mass. The presence of shop refuse in the lower pit, the occurrence of artificial flakes near the bottom of the mass of sand and gravel forming the hump, the absence of normal dump heaps and of quarry excavations along the bowlder outcrop above, all tend to confirm this conclusion. The movement of a large mass from the upper wall of the quarries would obliterate the quarries and carry the quarry refuse down in front of it to the position of pit *a*. These evidences, taken together with the apparently abnormal conformation of the spur, seem to be sufficient warrant for the conclusion reached.

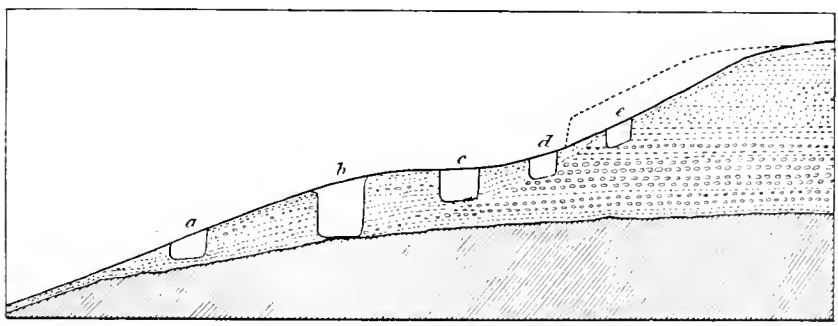


FIG. 9—Section exposed by trenching on outer angle of terrace. Flaked stones were found in pits *b* and *c* near the surface and near the bottom only.

OTHER PINY BRANCH SITES

East of the point just described the broad end of the terrace spur facing Piny branch is very steep, and few traces of quarry or shop work are to be seen; but lower down the slope, near the base, are masses of material that must have descended by sliding and creeping. Shop refuse is distributed through these masses and is found in the floodplain of the creek at the base. By stream action the flaked stones and refuse of flaking have been scattered through the recent floodplains of the whole valley below. On the eastern point or corner of the spur overlooking the Fourteenth street bridge over Piny branch there are numerous indications of ancient pitting on the bowlder-bed level, and shop refuse is plentiful. Following this level around the slopes of the ravines just west of Fourteenth street and across to the eastern side, the same phenomena are observed. The slopes of the bluff west of that in which the first trenching was done also bear evidence of having

been extensively worked, and all around the bluffs as we approach Rock creek valley proper, rising gradually to the crests of the terrace spurs, flaked stones are found.

On the southern side of the branch quarries occur both east and west of Fourteenth street at nearly the same level. Much work was done near a spring at a point beneath the "house in the tree" and opposite Spring road, which extends eastward from Fourteenth street.

East of Fourteenth street the only quarry of importance is on the place of Mr W. J. Rhees. This is on Spring road, a few hundred yards from Fourteenth street, as indicated on the map. It is probable that in this vicinity many evidences of ancient quarrying have been destroyed by building, cultivation, and landscape gardening. In this direction the bowlder beds, dipping gently eastward, descended beyond the reach of primitive quarrymen.

PINY BRANCH SHOPS

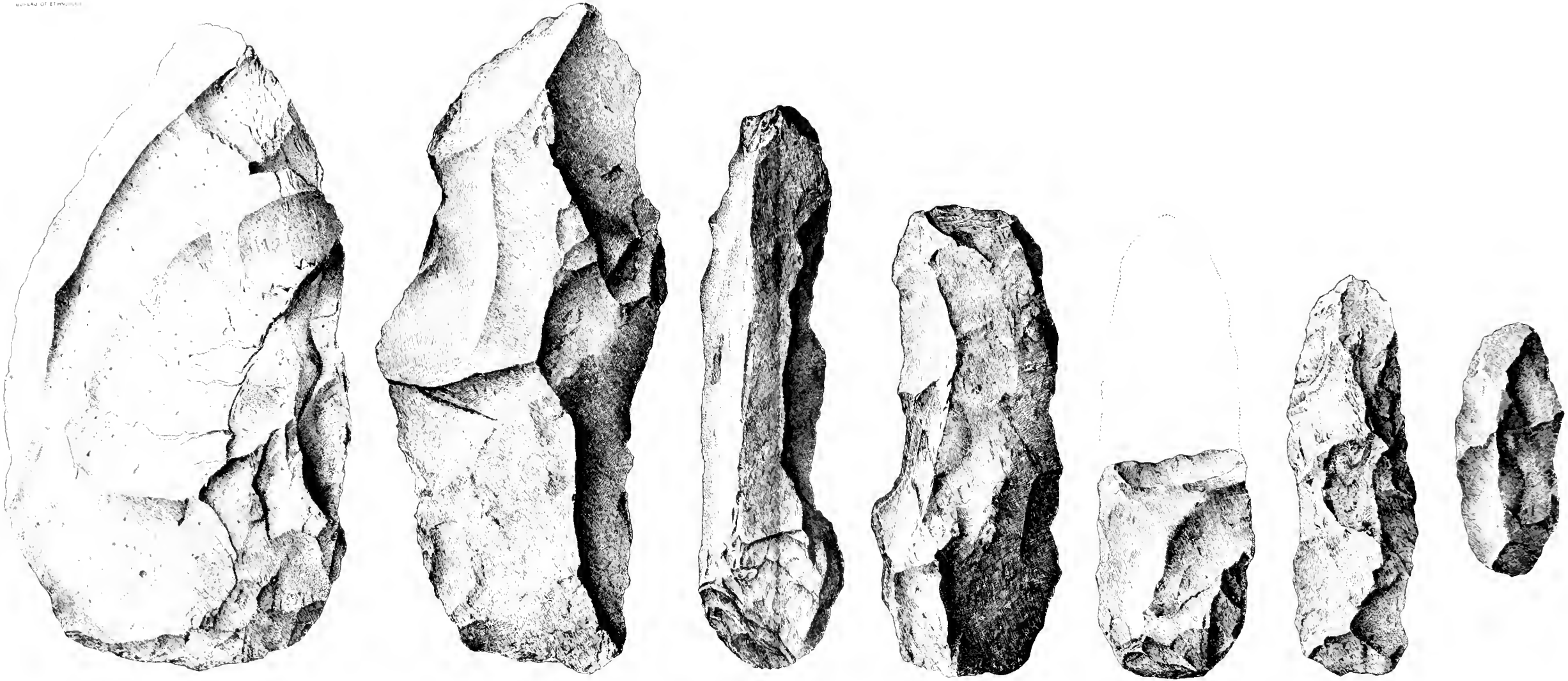
General Features

As indicated in describing the quarry phenomena, shops in which the bowlders were flaked were established at convenient points about the pits, and the piles or clusters of flakes, failures, and fragments are very numerous. The undisturbed clusters are often lenticular in form as originally accumulated, and occur within the body of the refuse just as they were covered by quarry refuse in the progress of the work. Some of those exposed by the trenches have been described and illustrated incidentally in the description of the quarries, and something may now be said of such as were scattered over the surface of the site.

In the bank of the rivulet, about 100 feet higher up the stream than the initial point of our first trench, the caving in of the bank has exposed a large deposit of shop debris. It consists in parts of exceptionally small flakes, fragments, and failures, and was evidently a favorite shop to which much of the selected material from the adjacent pits was carried.[1] Other similar shops are found near by, but in most cases the spots are obscured by refuse from above, or are partially obliterated by the sliding or creeping movements constantly acting on the steep declivities.

Farther away from the pits are what I have termed trimming shops. These are on high points, on bits of level terrace, or on the level upper surface of the plateau. To these places bowlders and fragments, after testing or partial working, were carried to be further trimmed and possibly, in some cases, fully specialized. Small flakes and well-advanced broken blades characterize these spots. It is probable that lodges were pitched on some of these sites, and it would seem reasonable that

[1] During the examination of the site many scientific men visited the spot and examined the trenches and masses of fragmental quartzite, observing for themselves the nature and extent of the operations carried on by the ancient peoples. Among these were J. W. Powell, D. G. Brinton, Henry Balfour, T. C. Chamberlin, W J McGee, J. A. Holmes, G. K. Gilbert, C. H. Hitchcock, G. Brown Goode, O. T. Mason, Thomas Wilson, H. C. Mercer, and F. W. Putnam.



SERIES OF REJECTS FROM THE SOUTH MOUNTAIN RHYOLITE QUARRY, SHOWING RANGE OF SHAPED FORMS

the quarrymen should have established a considerable community in the vicinity. A dwelling site is said to have been observed on the level ground, now a meadow, at the head of the ravine, and there are some evidences of primitive dwelling on the terrace overlooking Rock creek west of Mount Pleasant.

The terrace-like spurs bordering the ravine in which the trenches were dug are covered with flakes and broken blades left by the workmen. These are not now in clusters, as must have been the case originally, but are distributed rather evenly over the surface, as if the growth of forests and other disturbing agencies had been long at work shifting them about.

The distribution of shops and shop refuse is shown on the map forming plate II.

Special Features

The quarry-shop product

Examination of the phenomena of the quarries and shops is naturally followed by a study of the articles produced in them. This is a subject of the deepest interest, and no pains have been spared to obtain full and wholly reliable determinations.

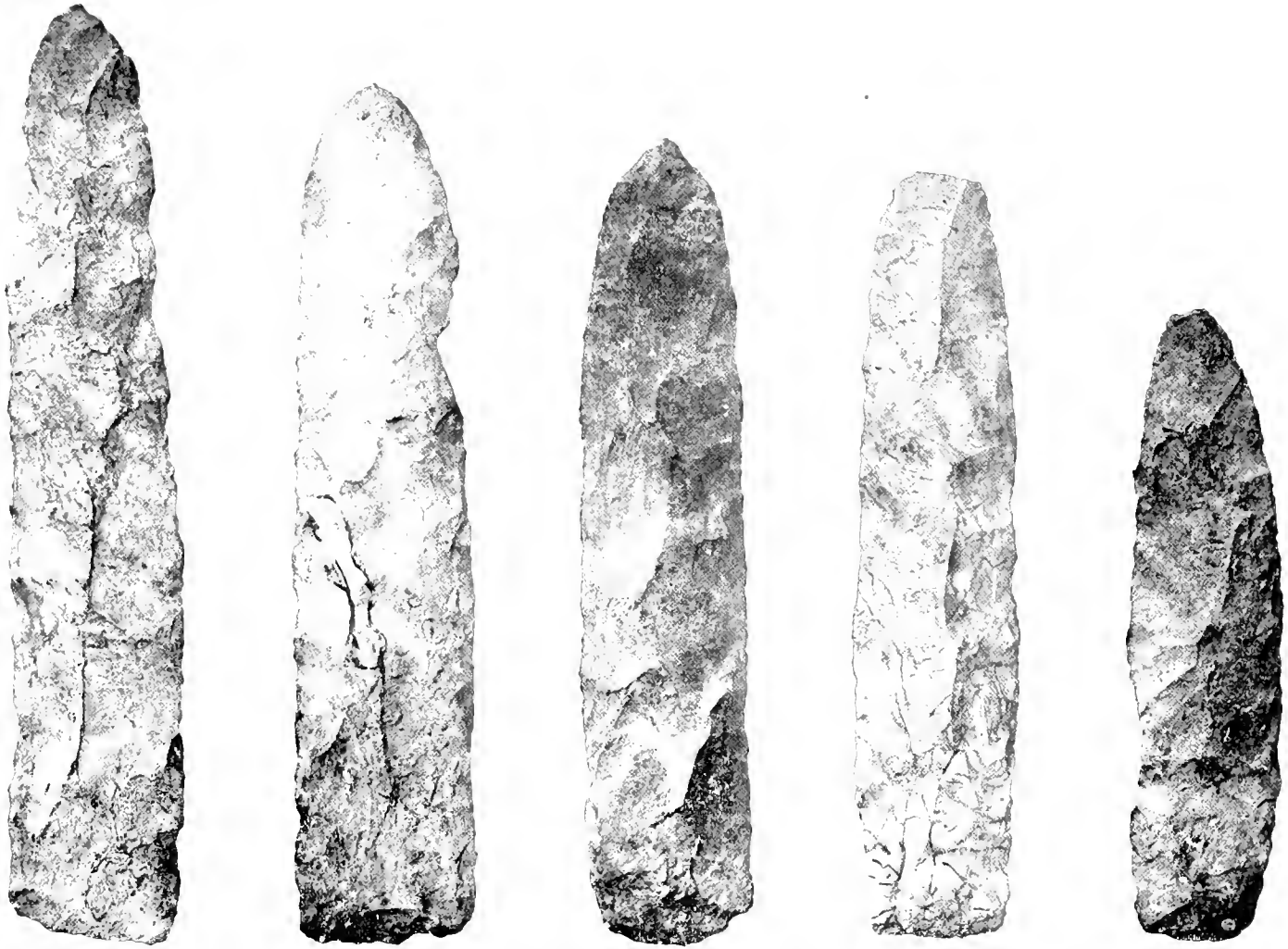
At first it was supposed that the rudely flaked stones found scattered over the sites of these quarries were bona-fide implements, and as such they found their way into literature, much speculation having been indulged in with respect to their age, to their use, and to the grade of culture to which they probably pertained. These and similar articles from the surface are still regarded by some as implements, and numerous specimens are still (1894) exhibited as paleolithic implements without any reason save that they somewhat resemble certain rude forms of European paleoliths.

Viewed in the light of the studies recorded herein, however, the roughly flaked stones are seen to be not implements at all, but the refuse of implement making, including many rejects or failures which, being partially shaped, indicate or suggest more or less fully the ruder forms of flaked implements used by primitive peoples, but which may not have even a remote resemblance to the final form to be made. It was observed that the work on the site was extremely limited in range; that it consisted in reducing the bowlders, or parts of bowlders, by flaking processes to thin leaf-shape blades, which were no doubt intended either for use as simple blades for cutting and scraping, or designed to be specialized, as occasion demanded, into arrowpoints, spearheads, perforators, and the like. So simple are the conditions that a dozen specimens may be made to illustrate the entire range of shaping work.

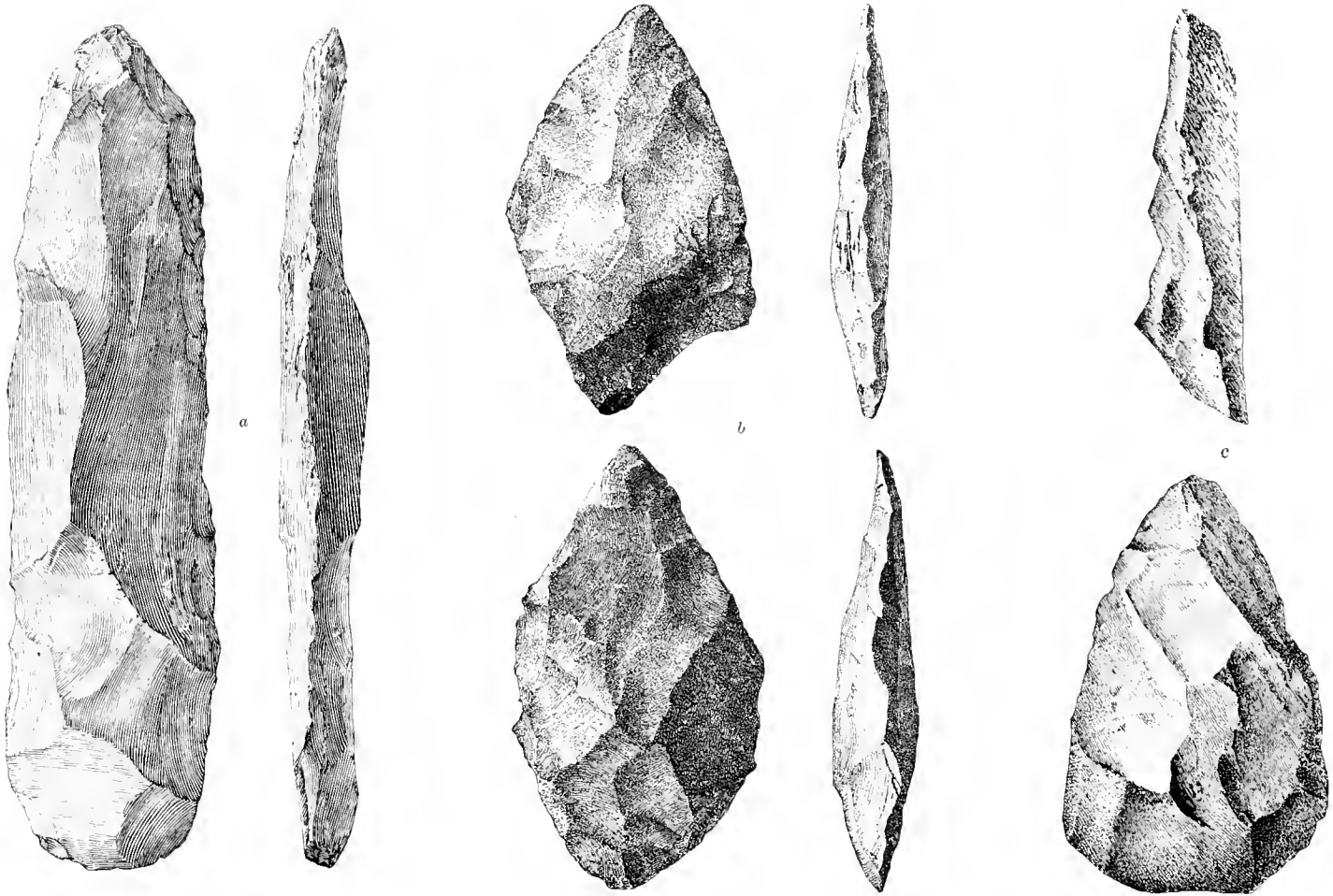
In plate XVII is shown a series of flaked stones, taken from this site, which includes all the ordinary forms of rejects and epitomizes the full range of shaping operations. Beginning with the bowlder *a*, from which two chips have been taken, we pass through successive stages of

elaboration, reaching the most highly developed forms in *k*, *l*, and *m*—long leaf-shape blades. Profiles of type specimens representing three stage of progress are placed at the right. The upper is the true turtleback, the second the double turtleback or incipient blade, and the third the well-advanced blade. As would be expected, no good examples of the fully finished (roughed-out) blades were found entire on the site, and illustrations of approximately finished work had to be selected from broken specimens of which both halves happened to be recovered, or from the many single halves. In nearly all cases these blades have a broad and a pointed end, and an examination of many specimens indicates that these features were generally foreshadowed in the earlier stages of shaping and were kept in view throughout the progress of the work. The blades of most advanced type, represented by broken pieces only, vary from 2 to 5 or 6 inches in length, and are generally under 2 inches in width and less than one-half an inch in thickness. It was apparently requisite that blades to be acceptable should be measurably straight and symmetric, that they should have an oval lanceolate outline, that they should be within a certain limit of weight, and that the edges should have a bevel adapted to further elaboration by flaking processes. Only one piece was found that had certainly been carried beyond this simple stage; in this piece a rude stem had been worked out at the broad end, as in the ordinary spearhead. This specimen (*a*, plate XVIII) was found near the surface of a mass of shop refuse, but was without reasonable doubt part of the original deposit. Two other pieces (*b* and *c*) found at considerable depths exhibit slight indications of specialization of form. The specimen shown in *d* is hardly more than an ordinary failure, rejected on account of too great thickness or other eccentricity of shape.

For the purpose of conveying a clear notion of the nature of the final quarry form—the leaf-shape blade—I have brought together in plates XIX, XX, XXI, and XXII a number of the rejects that seem to approach the form striven for by the quarry-shop flaker. Some are entire blades, all of which exhibit more or less palpable defects of form (as judged by the standards made out by a study of the quarry-shop work and by the ordinary blades found so plentifully on village-sites). Others were broken near the final stage of the shaping, and in numerous cases both pieces were found where they had been dropped by the workman and covered up by the accumulating débris. It will be noticed that nearly all the whole pieces are excessively thick in some part, while some are crooked or defective in outline, and we may conclude that they were rejected on account of some of these shortcomings. We are, in my judgment, sufficiently warranted in concluding that most of those specimens now in fragments were broken in vain efforts to reduce the excessive thickness (as in *a*, plate XX) or to correct some defect in outline. Breakage was liable to take place at any stage of the work, the danger increasing, however, as the form increased in tenuity.

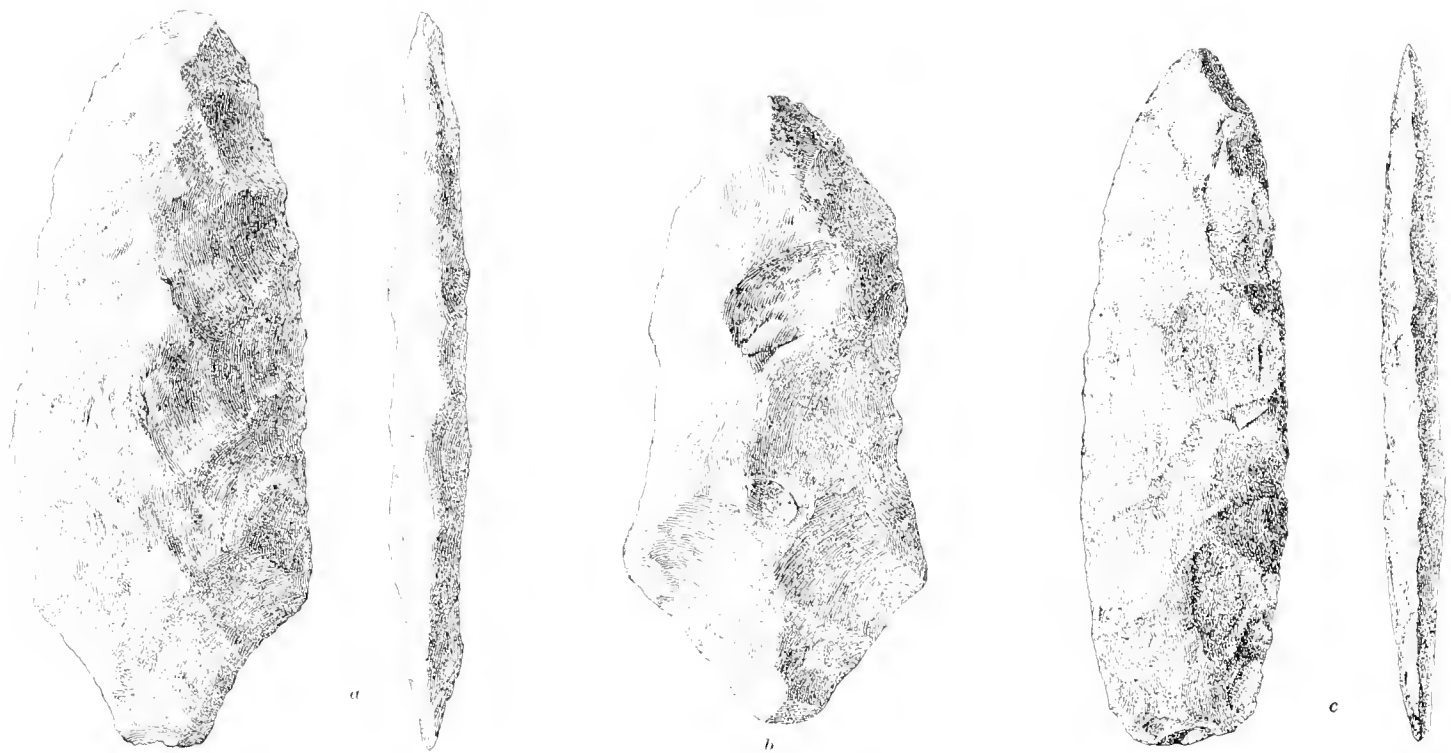


RHYOLITE CACHE BLADES FROM A GARDEN ON FROGMORE CREEK, NEAR BALTIMORE (ONE-HALF ACTUAL SIZE)



RHYOLITE BLADES FROM VARIOUS CACHES

a, Cache on South river, Maryland *b* Cache at Little Falls of the Potomac; *c*, Cache near Point of Rocks, Maryland



QUARTZITE CACHE BLADES FROM ANACOSTIA AND BENNINGS SITES, DISTRICT OF COLUMBIA

a, *b*, Phillips collection; *c*, Dowling collection

The excessive thickness so fatal to success results from the failure of flakes to carry sufficiently far back from the margin to overlap opposing flakes. In the process of shaping stones of varying degrees of availability by fracture, many eccentric forms are necessarily developed; and these peculiarities of failures, being due to common defects in the flaking qualities of the stone, are often repeated, giving to the superficial observer the impression that the particular form was the result of design. Thus, for example, there are many specimens having one flat side and one convex or pyramidal side. It happened in such cases that one side was reduced readily to the flattish or slightly convex surface desired, but that the other worked badly, giving a high peak which could not be removed. This form and the double-peaked variety are constantly repeated because the tendency of the flaking from a bowlder is strongly toward high apexes, great skill being required to prevent this result and to obtain just the proper convexity. To attempts to remove these high humps by violent strokes is due much of the breakage in all stages of the work. Examples of this class of failures are found on every shop site and need not be mistaken for finalities in shape.[1]

The incipient tools have very considerable range in size, the blade shown in *b*, plate XXI, being 5¼ inches in length, while others reach upward of 6 inches. The smallest specimens found in the quarry-shops are a little under 2 inches in length. Plate XXIII is intended to indicate the relation of the roughed-out blade to the bowlder from which it was derived. Two examples are given, the profile being added in each case that the conditions may be understood fully. In the specimens chosen for illustration, both ends retain small areas of the original surface of the bowlder. The relation of the blade to the original bowlder is not at all uniform. The fracture was sometimes such that three-fourths or more of the mass was removed all from the one side before the desired degree of convexity of that side was obtained, so that the blade was finally derived from very near one surface of the bowlder, as indicated in the profiles. The occurrence of such specimens as this has led to the supposition that in some cases a number of blades were made from a single bowlder by splitting, and this is no

[1] During the period intervening between the completion of the work on Piny branch and the date of the present writing (five years), I have examined many other quarries in various parts of the country and close analogies were observed everywhere and even identical results where conditions were identical. I have also encountered in this period numerous illustrations of the baneful results flowing from a lack of appreciation of the nature of the quarry and shop work and of the rejectage always associated with it. One very earnest and intelligent gentleman, who had dwelt for many years in a flint-producing district where the fields were filled with refuse of manufacture, had spent a great deal of time in gathering and classifying the varied forms of rejectage, supposing all to be implements. The result was truly astonishing. He had grouped similar forms together as so many varieties of tools and had worked out suppositious uses and was able to decide how some forms were shaped to fit the hand and others were designed for hafting. He had made excellent drawings and was ready to issue an elaborate and costly work. In his mind every shape was significant, and all fractures, such as come from necessity in all broken stones and are often remarkable, were indications of design, and the more eccentric accidents of fracture were evidences of consummate skill on the part of the workman.

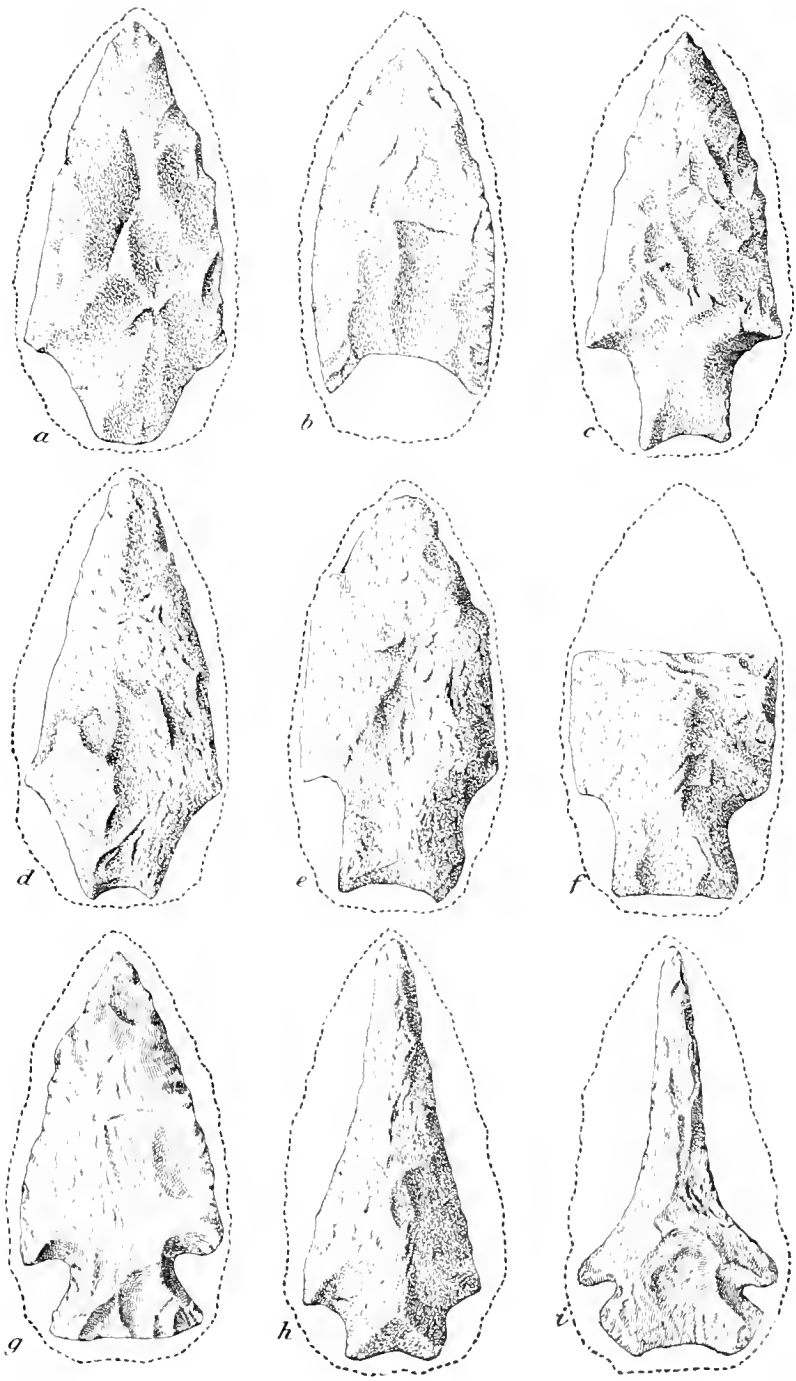
doubt correct where fracture was exceptionally favorable, but a bowlder did abundantly well in yielding a single specimen of the class roughed out on the quarry site.

In a majority of cases the completed blade retains no trace of the original surface of the bowlder, as the great number of blows necessary to obtain the desired shape removed it altogether; and in most cases, no doubt, the specimen was reduced to two-thirds or one half of the length and width of the bowlder. It is probable that the projectile point, 1½ or 2 inches in length, was often the entire result of flaking up a bowlder 3 or 4 inches long.

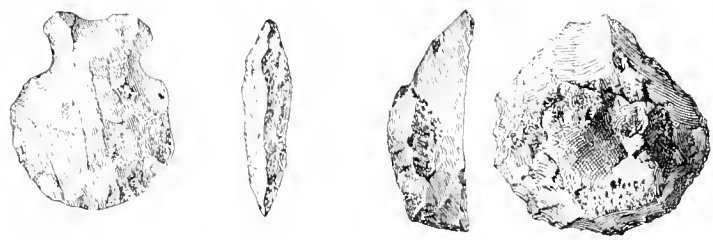
The various forms of worked stones are distributed throughout the mass of refuse, as would be expected in a quarry-shop. In many cases clusters of flakes are found, and with them the fragments and failures produced during a single sitting or by a series of sittings on the one spot. In *b*, plate XXIII, and in *a* and *b*, plate XXIV, three pieces are presented, illustrating three stages of progress, the first-mentioned specimen belonging between the other two. These were found, with the flakes derived from them, in a small cluster in the first trench.[1] The large specimen was rejected after having received a few blows from the hammer, the relief of the side flaked remaining too pronounced to warrant continuation of the work; the second piece was broken when both sides had been roughly reduced to approximate contour; while the third example was splintered after having reached almost the requisite thinness and contour. Thus we have, as the result of a few minutes' flaking, a series of forms representing the whole range of quarry-shop shaping operations and extending from the rudest to the most elaborate stage.

Occasionally we encounter specimens in which the flaking was carried all around the margin of the stone in such a manner as to give a number of steeply sloping facets. These have a close resemblance to what are known as cores, that is, masses of raw material from which flakes have been removed to be used as knives, etc. It is difficult to draw the line between the steep-faceted failure and the typical core form, as the one shape grades into the other. Four of these core-like pieces, the best and nearly the only specimens collected, are represented in plate XXV. It is impossible to determine whether or not they are really cores rather than mere failures of the blade maker. Certainly no use was made on the quarry or shop sites of flakes such as would be derived from them, for had such flakes been worked up on the site traces of the operations would have been left among the refuse. True, the flakes may have been carried away, as were the blades produced in the quarry, to be utilized or specialized elsewhere, but I have not

[1] It is quite possible that by a little careful work all the pieces of the bowlders used on this spot could have been recovered and the original form restored by fitting the bits together, but the true conditions were so patent that this was not considered essential. In subsequent years such restorations have been made in a number of cases and notably by Dr W. A. Phillips, of Evanston, Illinois, who has in two or three instances restored the bowlder so fully that each part can be taken off in the order in which it was flaked by the ancient arrow maker of the gravelly shores of Lake Michigan.

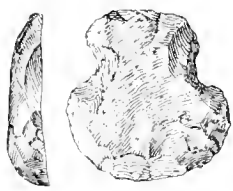


RELATION OF SPECIALIZED LEAF-BLADE IMPLEMENTS OF VARIOUS KINDS TO THE ORIGINAL BLADE



a

f



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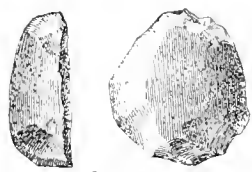
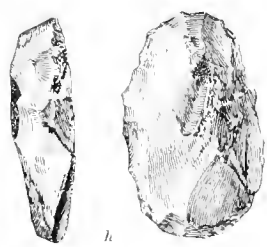


b

g



h

SCRAPING IMPLEMENTS OF QUARTZ AND QUARTZITE (ACTUAL SIZE)

a, *b* and *c* have one flat side and a bevel edge; *e*, *f*, *g*, appear to be broken projectile points sharpened at the edge

been able to learn that the primitive inhabitants of the Potomac region often used flakes such as were taken from these objects, either in their original form as cutting or scraping tools or in the manufacture of projectile points, scrapers, and drills; nearly all specialized quartzite implements are fairly thick bodied and substantial. The great rarity of typical core shapes on these shop sites should also be noted as indicating the probability that ordinary high-peaked specimens are mere accidents of blade-making operations.

In some cases large bowlders have been broken and flaked in such manner as to suggest the notion that the detached pieces were intended to be used in implement making; but howsoever this may be, much experience has taught me that irregular masses of quartzite are much more difficult to manage—to reduce to the symmetric blade—than are the bowlders when the latter are of convenient size. It is different with more brittle materials, which may be worked up to good advantage from the angular mass.

In my very careful and prolonged efforts to determine the object of the quarry-shop work and the character of the product I studied the numerical relations of the various forms of rejectage with excellent results, which may be given in some detail.

In shaping implements by flaking there are necessarily failures at all stages of the work from beginning to end, as already shown, and these failures are susceptible of grouping into four classes: The first class includes tested bowlders, rejected in early stages of the work because of unfavorable material, adverse fractures, flaws, etc, which occur in countless numbers on the site; the second stage includes those considerably worked on one side and rejected because of palpable defects developed or brought out by that work: the third group includes such specimens as were flaked somewhat fully on both sides before it became apparent that further effort was useless; and the fourth class comprises the well-defined leaf-like blade. Now it was found by study of the shaped refuse that breakage under the heavy blows of the hammer took place at all stages of the work, and that nearly as many failures had resulted from breakage into halves or approximate halves as from imperfectly developing contour. I found, however, by segregating and comparing the varieties, that one group of halves had no corresponding group of unbroken forms, and I concluded that this group of halves represented the true quarry product.

The observations may be formulated as follows (the first series—the tested bowlders—being omitted because they were practically innumerable): In the first trench I found, of the second class (*n*, plate XVII), 380 whole specimens and 460 halves; of the third class (*o*), 250 whole specimens and 320 halves; and of the fourth stage (*p*), no whole specimens and 380 halves. The latter were halves of comparatively thin, well-shaped blades, and were not represented by any whole blades of like proportions. In other words, there were 380 half blades of a grade of advancement superior to that of the best entire blade. From

this the inference was reached that all unbroken blades of this class were carried away. It would appear, also, that of the shaped stones no other varieties were carried away, since no other variety is without a full percentage of unbroken specimens, the presence of these in the refuse being sufficient evidence that they were not desired or removed from the site.

The determination that the leaf-shape blade was the exclusive shaped product of these great quarries is of greater importance than at first appears. It affords the key to many of the most puzzling problems of flaked stone art. It settles the status of multitudes of rudely flaked stones formerly of enigmatical status, and enables us to tell the story of the cache and write for the first time the full history of the countless flaked implements scattered over the land.

TOOLS USED IN FLAKING

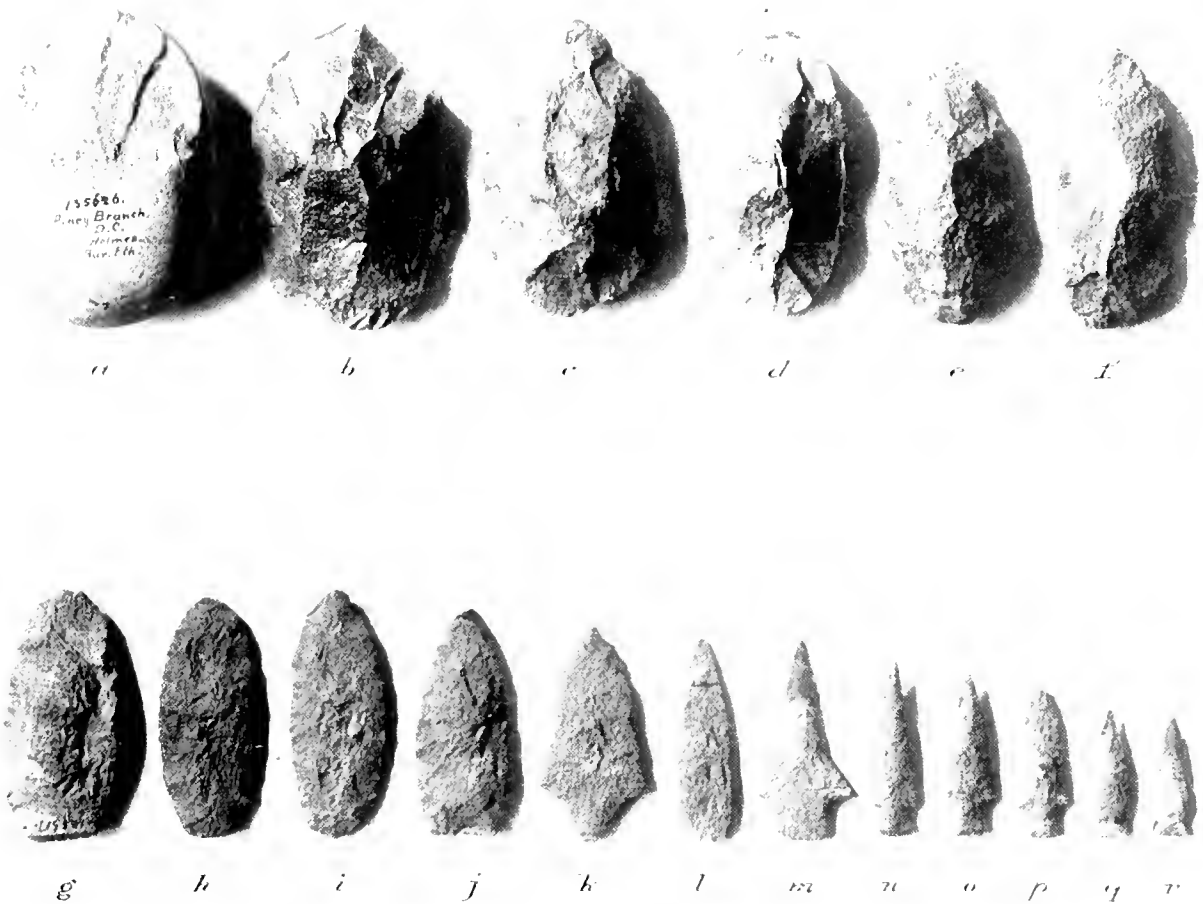
As has already been indicated, the flaking tools were probably bowlders selected for the purpose from the multitude of available examples. Though few were found that show any considerable evidence of wear, many specimens occur which are more or less battered, apparently by use. With multitudes of natural hammers of choice shapes and assorted sizes at hand, it was manifestly useless to shape special tools or to bring in shaped tools from the outside. The scarcity of well-shaped and much-used hammers in this quarry is a very notable fact, and has been the subject of much speculation. It is found that in other quarries, subsequently examined, these objects are very numerous, and this has led to the surmise that possibly hammers made of other material, such as buckhorn, were employed in flaking the bowlders. This, we must admit, is possible, but as the evidence stands today the matter must be left largely to conjecture.

PROCESSES OF MANUFACTURE

Discussion of the processes of manufacture, of the destiny of the shaped product, and of other general topics might be left until the other quarries and shop sites are described, but can as well be taken up here, since the results obtained by a study of this group of quarry-shops are repeated in the other cases.

It has been mentioned elsewhere that the first step, after the removal of the bowlders from the bed by the quarrymen, was to test them for quality of material. As a rule, the removal of a single flake, or at most a very few flakes, enabled the expert workman to determine whether or not the stone was reasonably tractable. The selected material was removed to the shop sites, where the flaker took up the work.

The process employed in flaking appears to have been exclusively fracture by free-hand percussion, the act being a quick, firm stroke, regulated in force by the nature of the resistance to be overcome and by the result desired; no trace or suggestion of other kind of procedure was observed. The bold but unsymmetric outline of the forms



SERIES OF FLAKED FORMS ILLUSTRATING PROGRESSIVE STEPS IN THE MANUFACTURE OF PROJECTILE POINTS, ETC, FROM QUARTZITE BOWLDERS (ABOUT ONE-THIRD ACTUAL SIZE). OBTAINED FROM SHOPS AND VILLAGE-SITES ABOUT WASHINGTON CITY

produced and the rather haphazard arrangement of the percussion points preclude the idea that any process capable of accurately adjusting the point of contact between the tool used and the article shaped could have been employed. At best such a method would certainly not be readily applicable to a stone of the refractory nature of quartzite. Though the manner of delivering the stroke seems sufficiently determined, the precise method of holding the stone shaped is left to conjecture. My own experiments have been conducted on the assumption that it was held in the hand. The account of flaking processes given in the following paragraphs is based on the belief that free-hand percussion with hammers of stone or other hard and heavy material was the exclusive or principal quarry-shop process.

Referring to the series of graded rejects illustrated in plate XVII, we observe that the process of manufacture and the steps of development

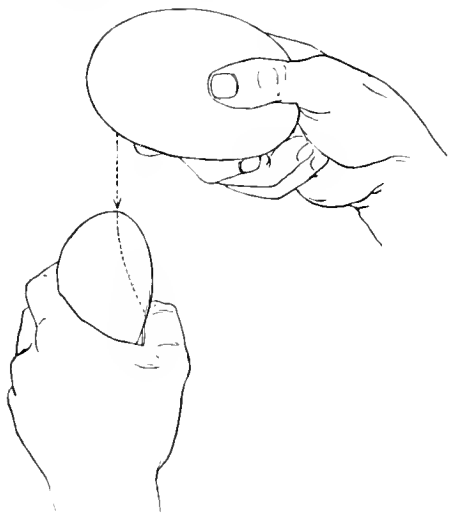


FIG. 10—First step in bowlder flaking.

were essentially as follows: Grasping a bowlder in either hand (supposing bowlder hammers to have been used), the first movement was to strike the edge of one against that of the other at the proper angle to detach a flake (figure 10). The second movement and the third were similar, and so on until the circuit was completed. If no false stroke was made and the stone had the right fracture, these few blows, occupying but as many seconds, gave as a result a typical turtleback—a bowlder with one side faceted by artificial flaking, the other side, save through accident, remaining smooth. If the removal of a single row of flakes was not sufficient, the work was continued until the one side was reduced to the proper degree of convexity, and the availability of the stone for further elaboration was made apparent. A type profile

is illustrated in *n*, plate XVII. If the results thus far reached were satisfactory, the stone was turned in the hand, and by a second series of blows the remaining smooth side was flaked away (figure 11), when the result was a two-faced stone or double turtleback—the incipient blade. With perhaps a few additional strong strokes the rough stone began to assume the appearance of the final form. A type profile is seen in *o*, plate XVII. If at this stage, and, I may say, if at any preceding stage, the stone developed defects or unmanageable features (such as too great thickness, crookedness, or humps that could not be removed), it was thrown away, and thus became part of the refuse; and it would appear that all the entire specimens collected, since they were taken by us from the refuse, did develop some of these shortcomings. If, however, the form developed properly, the work was continued into the final stage, which consisted in going over both sides a

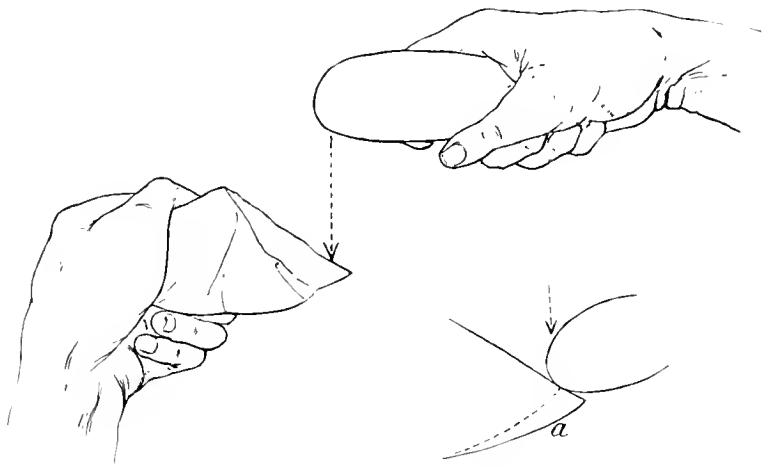
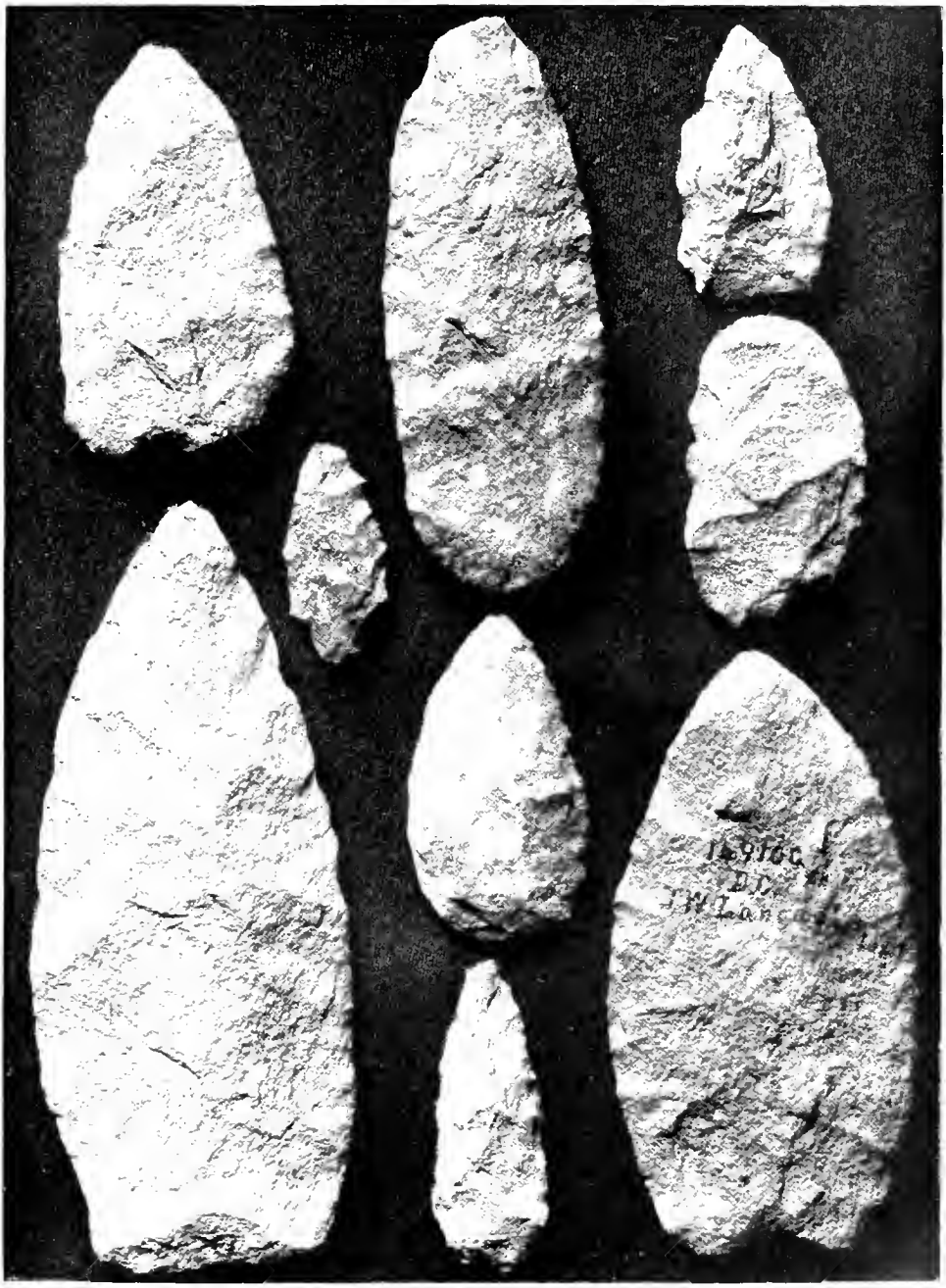


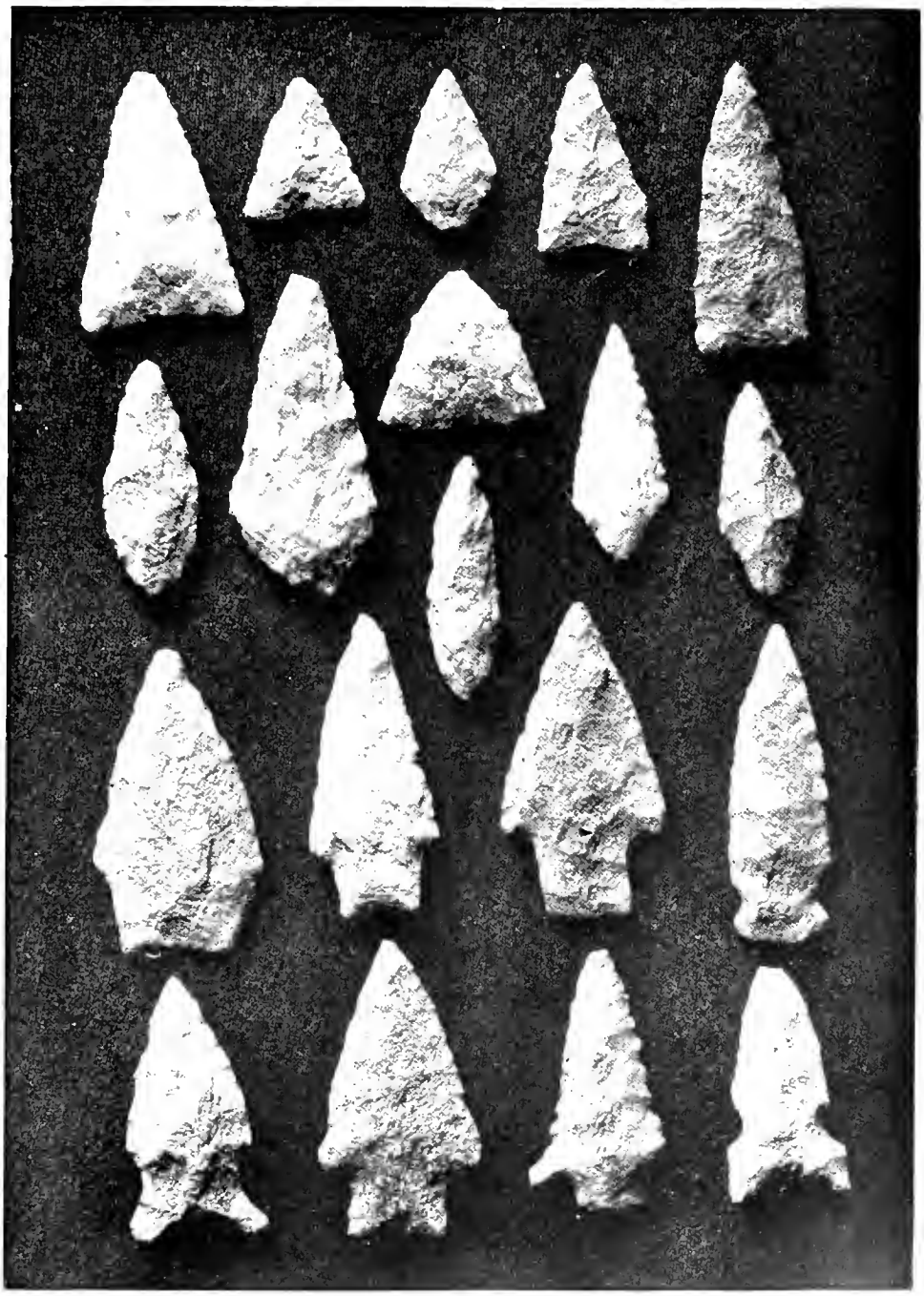
FIG. 11.—Second step in bowlder flaking.

second and perhaps a third time, securing, by the use of small hammers and by deft and careful blows upon the edges, a thin, symmetric blade. A profile is given in *p*, plate XVII. Four broken specimens that must have been all but complete, for they are apparently more perfect than any whole pieces left on the site, are shown in *j*, *k*, *l*, and *m* of the same plate. It is important to observe that when the thin blade represented by these halves was realized, the work of the quarry-shop (and the only work of the quarry-shop, so far as shaping is concerned) was ended. The process and the machinery had accomplished all that was asked of them, and all that they were capable of accomplishing. The neat, but withal rude, blades, and these only, of the shaped products were carried away. Further work, additional shaping—and such there was in most cases, no doubt—employed other processes and was carried on in other fields. Flakes and fragments suitable for elaboration



QUARTZITE BLADES OF VARYING SIZE AND OUTLINE, MAINLY UNSPECIALIZED (ACTUAL SIZE). OBTAINED FROM POTOMAC VILLAGE-SITES

SPECIALIZED QUARTZITE BLADES, PROBABLY IN THE MAIN PROJECTILE POINTS, FROM POTOMAC VILLAGE-SITES (ACTUAL SIZE)



SPECIALIZED QUARTZITE BLADES, PROBABLY IN THE MAIN ARROWPOINTS, FROM POTOMAC VILLAGE-SITES
(ACTUAL SIZE)

into implements may have been selected for transportation, but no evidence of this is procurable.

The course of procedure just described I have investigated in the most careful manner, and by experiment have followed every step of the process, and have achieved almost every result. I have found that in reaching one final form I have left many failures by the way, and that these failures duplicate, and in proper proportions, all the forms found on the quarry sites. I was unfortunately prevented from carrying out these experiments as fully as desirable by permanently disabling my left arm in attempting to flake a bowlder of very large size.

I further find by these experiments—and the conclusion is a most important one—that every implement resembling the final form here described, and every blade-shaped projectile point made from a bowlder or similar bit of rock not already approximate in shape, must pass through the same or nearly the same stages of development, leaving the same wasters, whether shaped today, yesterday, or a million years ago; whether in the hands of the civilized, the barbarous, or the savage man.

It may be well here to define with some care the apparent limitations of the classes of procedure concerned in the manufacture of flaked tools. Direct or free-hand percussion by means of unhafted or hafted implements is the natural method of reducing large amorphous masses to something approximating the special shapes reached in the advanced stages of the art. It was probably the leading method utilized in very early times; but this process, even in the most skillful hands, has its limitations in certain directions. For example, blows can not be given with sufficient regularity to produce great symmetry of outline and desirable uniformity of flaking; and, again, when implements under treatment become attenuated, the sharp blow is extremely liable to shatter them. The skill of the artificers being equal, these limitations vary with the degree of brittleness and homogeneity of the material used.

Quartzite is extremely refractory, and the skill of the workman must have been tried to the utmost to carry the manufacture by the free-hand process to a stage of elaboration where the other methods would be operative. It is possible that some method employing indirect percussion may have followed that of direct percussion. By indirect percussion I mean the use of two tools, one the hammer and the other the punch, the latter being set on the exact spot to receive the impact or blow, thus eliminating the element of uncertainty characteristic of the free-hand blow, although necessarily lacking in percussive power. By one or both of these methods the blades were carried to such a degree of symmetry and attenuation that the artist was able to employ pressure to advantage. Then, by skillfully using a bit of bone or antler, he could carry the tool to the highest possible degree of specialization and finish. That the latter method was employed by the

Chesapeake tribes is clearly indicated by John Smith, who, speaking of a Powhatan warrior, says, "His arrow head he quickly maketh with a little bone, which he ever weareth at his bracert, of any splint of a stone, or glasse in the forme of a heart, and these they glew to the end of their arrowes."[1] This could not apply, of course, save where the bit of stone already approximated the proportions and especially the thickness of the article to be made.

Destiny of the Quarry Blades

Now, although the blades produced in the quarry-shops may without modification have been used for cutting, scraping, perforating, and other purposes, I am decidedly of the opinion that as a rule they were intended for further elaboration; this is rendered almost certain, first, by the fact that the most fully shaped broken pieces found on the quarry-shop sites are but rudely trimmed on points and edges, specimens of like grade being little fitted for use in cutting and scraping; and, second, that all the tens of thousands of specialized forms—spearheads, arrowpoints, and perforators—are necessarily specialized from such blades, as shown in a subsequent section. The quarry-workshop was naturally not a place for finishing tools, but one for roughing-out the material and selecting that fitted to be carried away for final shaping. A laborer engaged in such work in a pit in the forest would not be likely to throw aside the rough hammer used in fracturing cobble stones to take up and operate an entirely different kind of machinery, involving a distinct and delicate process. Being a reasoning and practical creature, he would carry away the roughed-out tools, the long, thin blades, to be disposed of or to be finished at his leisure and by whatsoever method experience placed at his disposal.

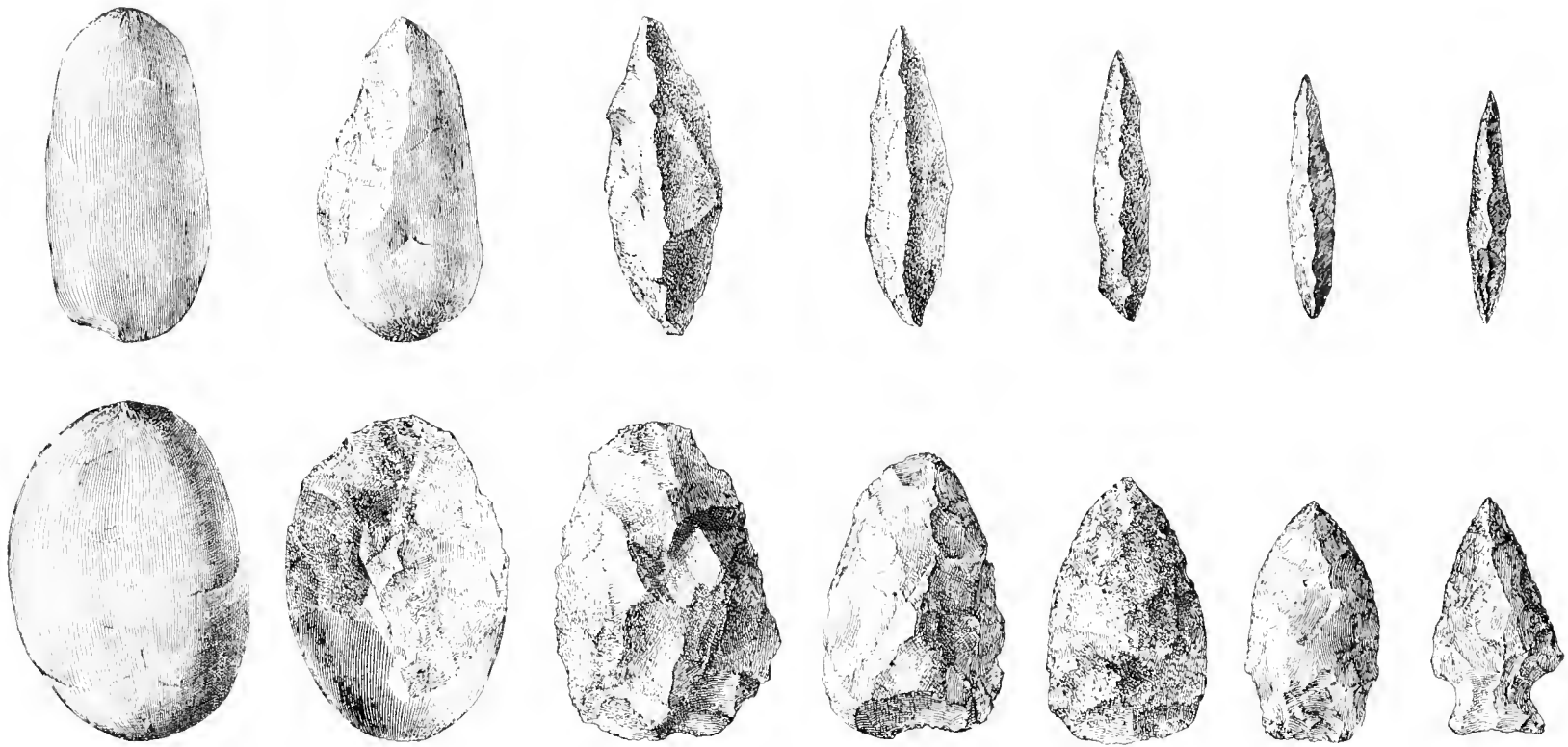
The quarries, being extensive, were worked somewhat systematically and the product was naturally of great importance to the people concerned. The blades made during a prolonged season's work were numerous and were carried to village-sites far and near for use, specialization, or trade. There would be in their history a period of transportation attended by storage, and this would explain the cache, an interesting feature of stone-implement phenomena, and one which involves just such blades as were produced in the quarry-shops.

THE DUMBARTON HEIGHTS QUARRY-SHOPS

Location

The second group of quarry-workshops to receive attention is located on the western side of Rock creek, a quarter of a mile north of the new Naval Observatory and a mile and a half southwest of the Piny branch site already described. The quarries occupy a narrow, heavily timbered spur of the Tennallytown ridge and overlook a deep and picturesque

[1] History of Virginia, Richmond, 1819, vol. I, p. 132.



SERIES OF FORMS ILLUSTRATING PROGRESSIVE STEPS IN THE MANUFACTURE OF ARROWPOINTS FROM QUARTZ PEBBLES, OBTAINED MAINLY FROM SHOPS AND VILLAGE-SITES NEAR ANACOSTIA (ACTUAL SIZE)

ravine. On the plats of the new city subdivisions bordering Massachusetts avenue extended this locality is called Dumbarton heights.

Although hardly beyond the city limits, this site still retains the extreme wildness of a primitive forest and is penetrated by obscure trails only. The sound of the hammer is now constantly heard, however, even in the wildest spots, and suburban avenues threaten it on all sides. It will probably not be many years before the illustration given in plate XXVI, from a photograph taken early in the spring of 1891, will be the only memento of the primal wilderness now covering these hills. A fine rivulet, tributary to Rock creek, meanders the deep ravine, overlooked on the north by the quarry promontory and on the south by the observatory.

Geology of the Site

In its geologic features this locality corresponds very closely with the Piny branch site. A bed of Potomac bowlders caps the summit of the ridge, extending to a depth of from 1 to 25 feet, and resting on the somewhat uneven surface of the gneissic rocks. The main ridge, with which this spur connects by a narrow and very slightly depressed saddle, rises toward Tennallytown, nearly 200 feet higher, and is composed of sands, gravels, and bowlder beds of more recent age. The outcrops of bowlders in the gulches and slopes have been worked in many places by the ancient quarrymen. On the spur or promontory examined the bowlders outcrop at a level of 280 feet above tidewater, which is 50 feet higher than the exposures on Piny branch. This difference is probably to some extent an index of the slope of the ancient gneissic beach or sea bed on which the Potomac bowlders were laid down. The bed resting on the gneissic surface seems to have contained a larger percentage of workable bowlders than any of the superposed deposits. This led to the almost exclusive working of this bed by the ancient peoples, who must have familiarized themselves with all exposed deposits of material.

The beds containing quartzite bowlders are at this point upward of 20 feet in thickness, but the workable material is confined to a few feet at the base, with scattering specimens in gravel deposits at higher levels. The bowlders sought and worked here are almost identical in every respect with those quarried on Piny branch. The deposits, however, present some points of difference. At the latter point the bowlders were pretty uniformly bedded, and the sands and gravels associated with them exhibited distinct traces of horizontal bedding; but on Dumbarton heights the bowlders are distributed pretty uniformly throughout a matrix of tough argillaceous sand, presenting the appearance of heterogeneous dumping, rather than of regular bedding by aqueous agencies.

Portions of the deposits were here in a most favorable condition to be worked, as they occupied the summit of the ridge and were exposed to view over the surface of the entire crest. The bowlders were obtained

by entering the hillside on the gneissic floor as well as by pitting the bowldery surface at various points. The latter method was extensively followed at the western end of the outstanding ridge, which is nearly flat for a width of 75 feet or more. This relation of the bowlder deposits to the surface of the ground had an important bearing on the preservation of the evidences of ancient work. On the sloping surfaces the pits are entirely obliterated by the descent of refuse from above, but on the upper surface they are still distinctly visible.

The worked-over surface is everywhere irregular, but the depressions are in no case more than a few inches in depth. It is probable that as a rule they were not deep when deserted by the ancient workmen, as one pit would be filled by refuse from another as the work went on. Such pits as were left open on the upper surface of the ridge would at first fill rapidly by falling in from the sides, but the rate of filling would decrease with the decrease of depth, and when a degree of shallowness like that observed at present had been reached, the compacted cobbles would have something of the stability of an artificial pavement; and where the position did not admit the accumulation of vegetal mold, centuries might pass without perceptible change. On steep sites, as in some parts of Piny branch, the friable overhanging deposits must have descended rapidly into the old quarries, obliterating all traces of the pits in a very short time.

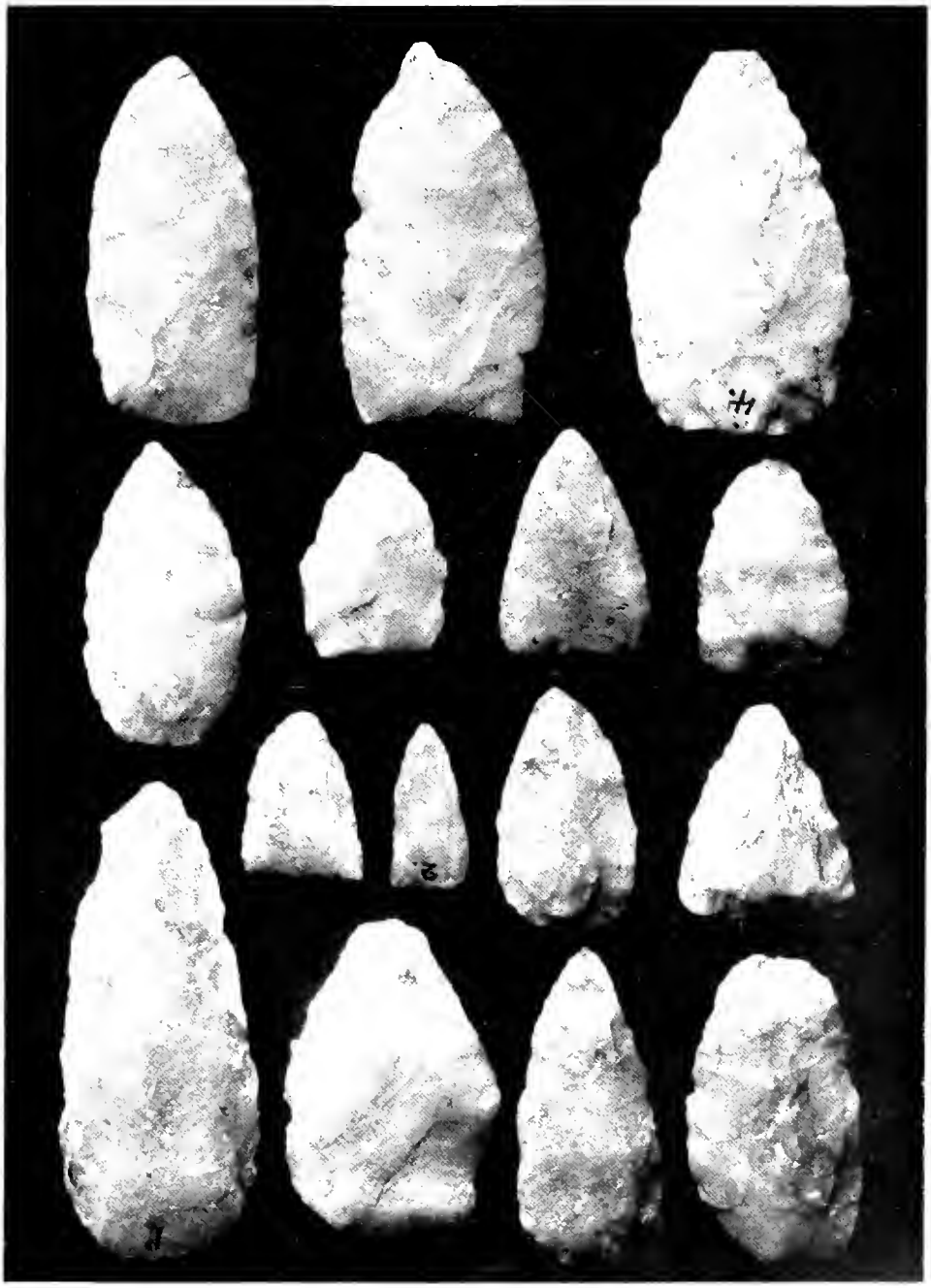
Distribution of Quarry Pits

On the map the crest of the promontory resembles the human foot in profile. The ancient quarries were located mainly on the heel, where they covered an acre or more. A little work was done along the sole of the foot, and several pits 2 or 3 feet deep had been dug at other points.

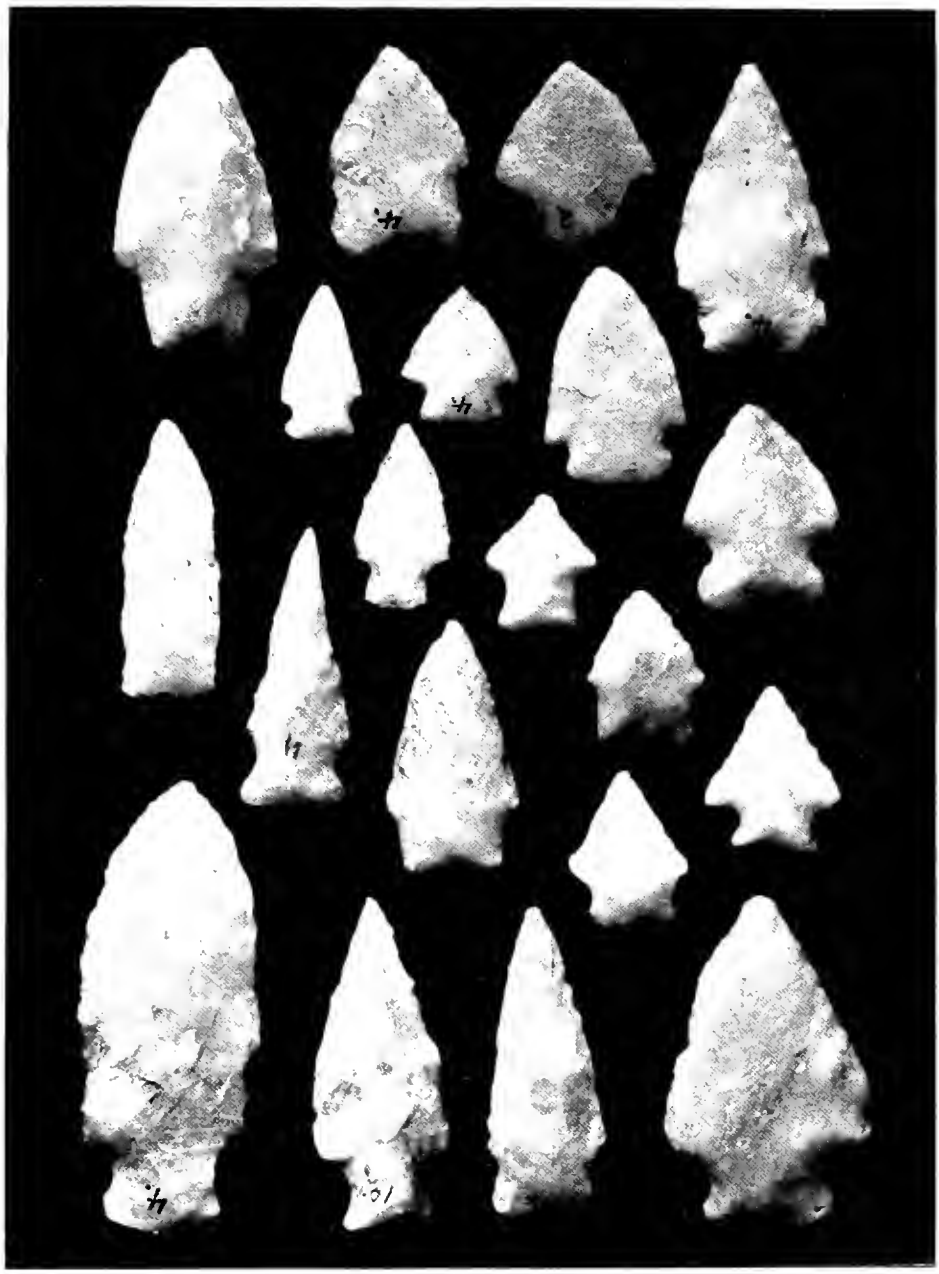
As the ancient work was prosecuted along the crest and margins of this promontory, the shop and quarry refuse is largely distributed over the slopes and has descended to the bed of the creek on the south and into the ravines and depressions on the other sides. The most striking feature of the promontory is its mantle of broken bowlders, admirably shown in plate XXVI. The whitish bowlders appear in strong contrast with the somber hues of the forest and its carpet of brown leaves and dark mold.

Trenching

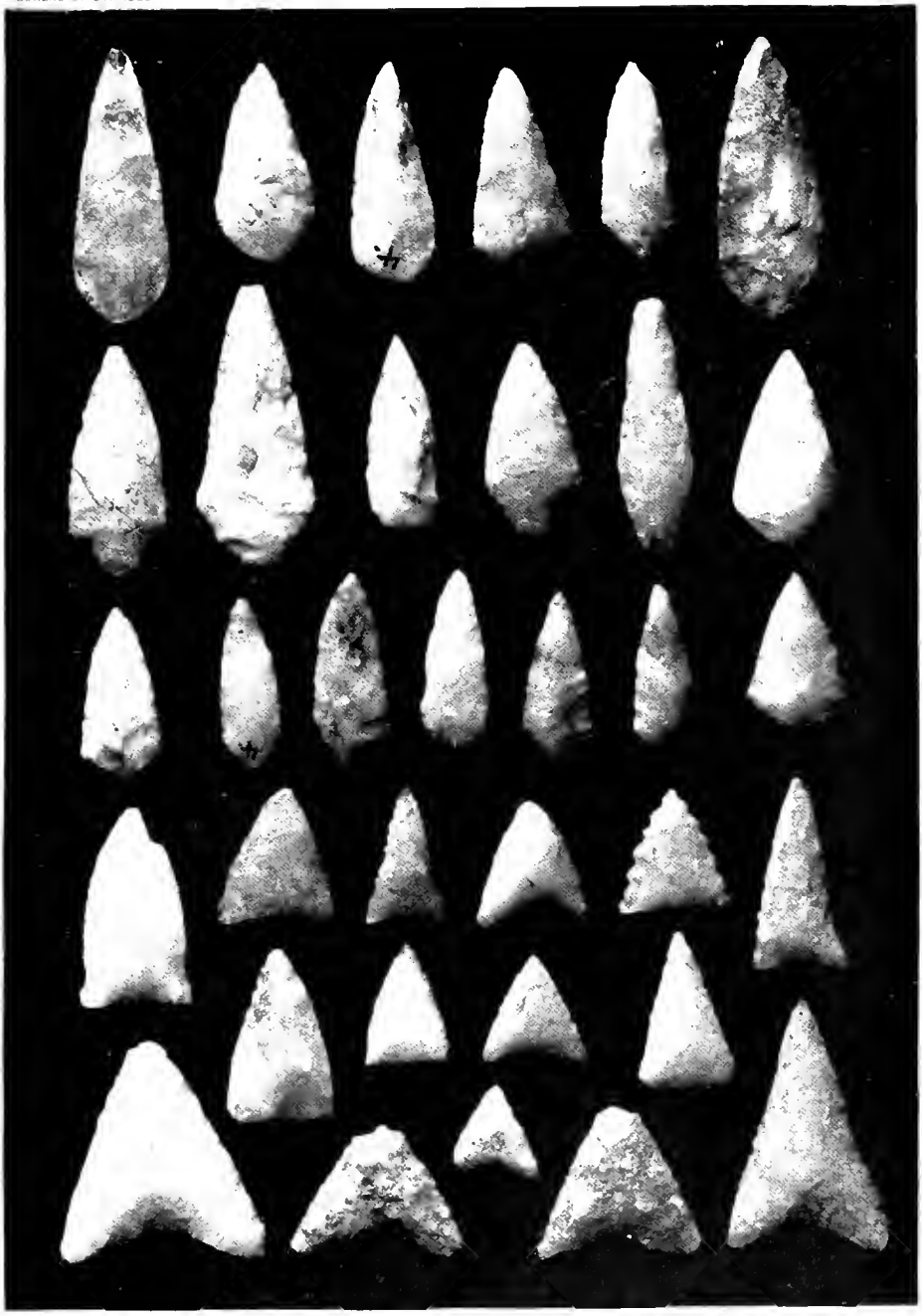
The western projection of the quarry spur bore the most decided traces of ancient operations, and was therefore chosen as the best place to begin the work of trenching. Beginning near the extreme southwest end of the crest, near the upper surface of the gneiss rocks and at the base of the capping of bowlders, a trench 3 feet wide was carried horizontally into the gently sloping hillside. Beyond the first 10 feet the digging was not continuous, but consisted of a line of short trenches with intervals of a few feet. For about 40 feet but little of



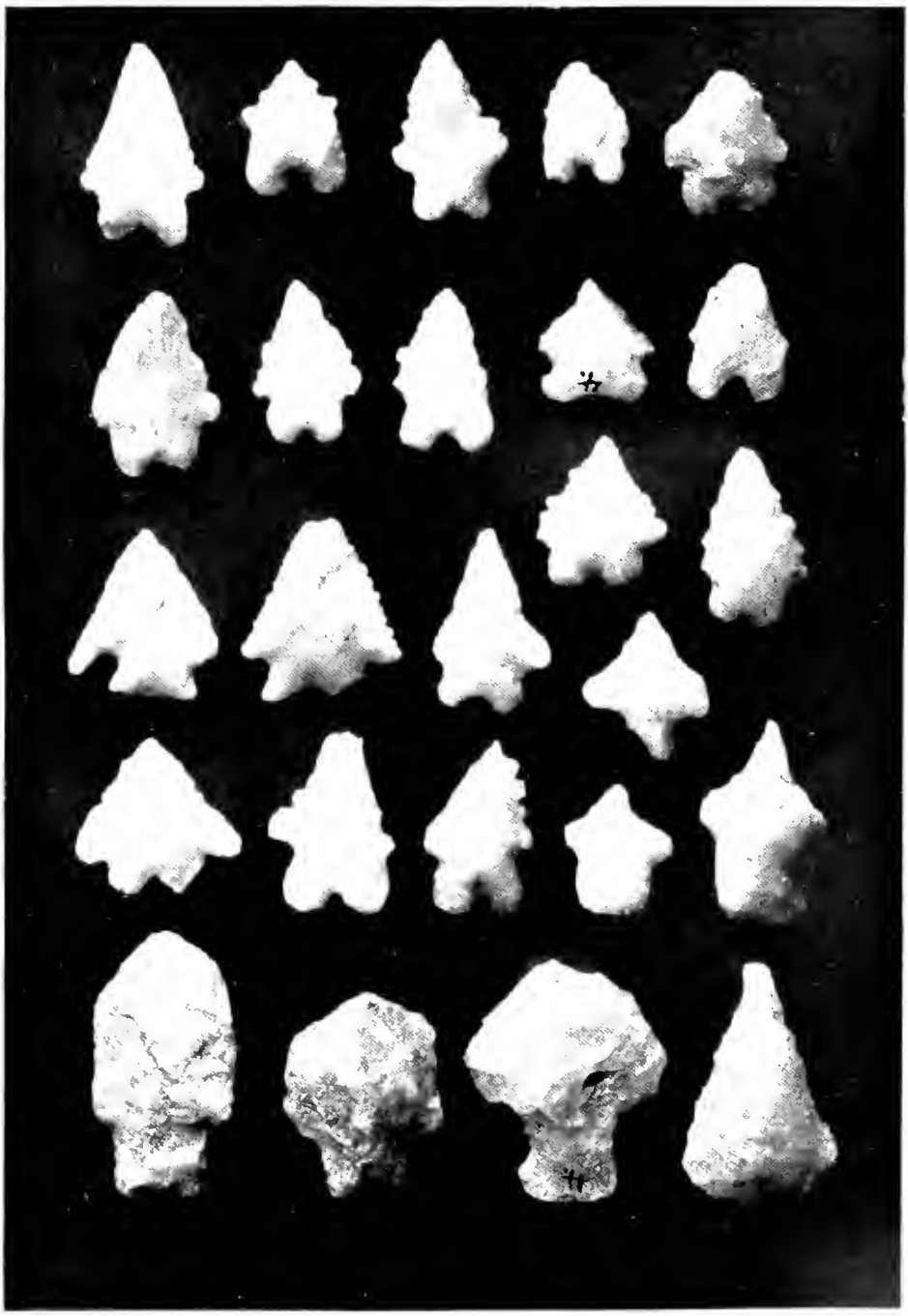
QUARTZ BLADES SHOWING LITTLE OR NO TRACE OF SPECIALIZATION, OBTAINED MAINLY FROM POTOMAC VILLAGE-SITES (ACTUAL SIZE)



SPECIALIZED QUARTZ BLADES, PROBABLY IN THE MAIN ARROWPOINTS, OBTAINED FROM POTOMAC VILLAGE-SITES (ACTUAL SIZE)



SPECIALIZED QUARTZ BLADES, PROBABLY IN THE MAIN ARROWPOINTS, OBTAINED FROM POTOMAC VILLAGE-SITES (ACTUAL SIZE)



QUARTZ ARROWPOINTS OF ECCENTRIC SHAPES, OBTAINED MAINLY FROM POTOMAC VILLAGE-SITES
(ACTUAL SIZE)

particular interest was encountered. The mass, to a depth gradually increasing to 8 feet as we advanced, consisted of earth and gravel, intermingled with shop refuse. This rested on the uneven floor of the old quarry, composed of the undisturbed, firmly compacted bowlder-bearing gravels. The ancient workmen rarely penetrated, save on the outer margins of the quarry, to the gneiss bed.

At the fortyfifth foot a pocket of refuse, containing broken bowlders, failures, broken blades, and flakes, in considerable quantities, was exposed. This was at a depth of about 3 feet. The conditions were identical with those of the Piny branch sites as the quarry wall was approached. The characteristics of the exposures in the trenches may be summed up in a few words. The quarry débris consists of a heterogeneous mass of sandy clays, sand, gravel, bowlders of quartz and quartzite, and shop refuse, all well compacted and difficult to penetrate and remove with pick and shovel. The shop refuse includes broken bowlders up to a foot in greatest dimension, rejects representing all varieties of failures, unfinished tools broken at various stages of development, and numberless flakes. These are generally distributed throughout the mass of quarry débris, but at intervals clusters or pockets were encountered, where considerable shaping had been done at a single sitting or on a particular spot.

The quarry face was reached at a distance of about 55 feet from the beginning point of the trenching. It was, at the point reached, quite abrupt, being nearly vertical for about 5 feet. The full depth was about 7½ feet. At other points, exposed in various lateral trenches, the old quarry face was found to be very poorly defined. It would appear that the ancient quarrymen did not work with any considerable regularity or system. Numerous excavations had been carried into the sloping face of the hill, and had been abandoned near the crest. The series of terminations constitute an irregularly scalloped and variously inclined quarry face. A detailed description of the numerous short trenches, opened at various points along the margin of the promontory crest, need not be given. The conditions are uniform, and at no point was the ancient work so extensive as where the first two trenches were dug.

In one of the side trenches a good deal of charcoal was found, and at the depth of about 6 feet a charred log more than 10 feet long and in places a foot in diameter was encountered. It rested on or near the bottom of the ancient excavation, and consisted of a shell of charcoal, the interior uncharred portion having been entirely replaced by sand, which had found its way through the crevices. There is no reason to suppose that it was used by the ancient quarrymen in their work, or that it was anything more than a log which, having fallen into the deserted pit, was burned by forest fires. Charred wood and small masses of charcoal were found, but man's agency was not necessarily involved in their production.

The nature of the quarrying, the processes of implement shaping, and the quarry product correspond closely with those of the Piny branch site, and a description would but repeat what has been already said in the previous section.

OTHER ROCK CREEK SITES

North of the Dumbarton heights quarries the bowlder beds occur near or on the summits of the hills, and traces of ancient manufacture are occasionally seen. On a high point less than a quarter of a mile west of the crossing of Connecticut avenue and Pierce mill road, much shop refuse is found. This is within a few hundred yards of the Rose hill soapstone quarry, and represents the extreme limit of the Potomac bowlder deposits in this direction.

The new Naval Observatory on the ridge south of the quarry just described is built on an ancient quarry site. Quarrying, apparently on a limited scale, was carried on in the banks of the ravine now occupied by the power house, as the excavations for foundations and drainage exposed quantities of the chipped bowlders.

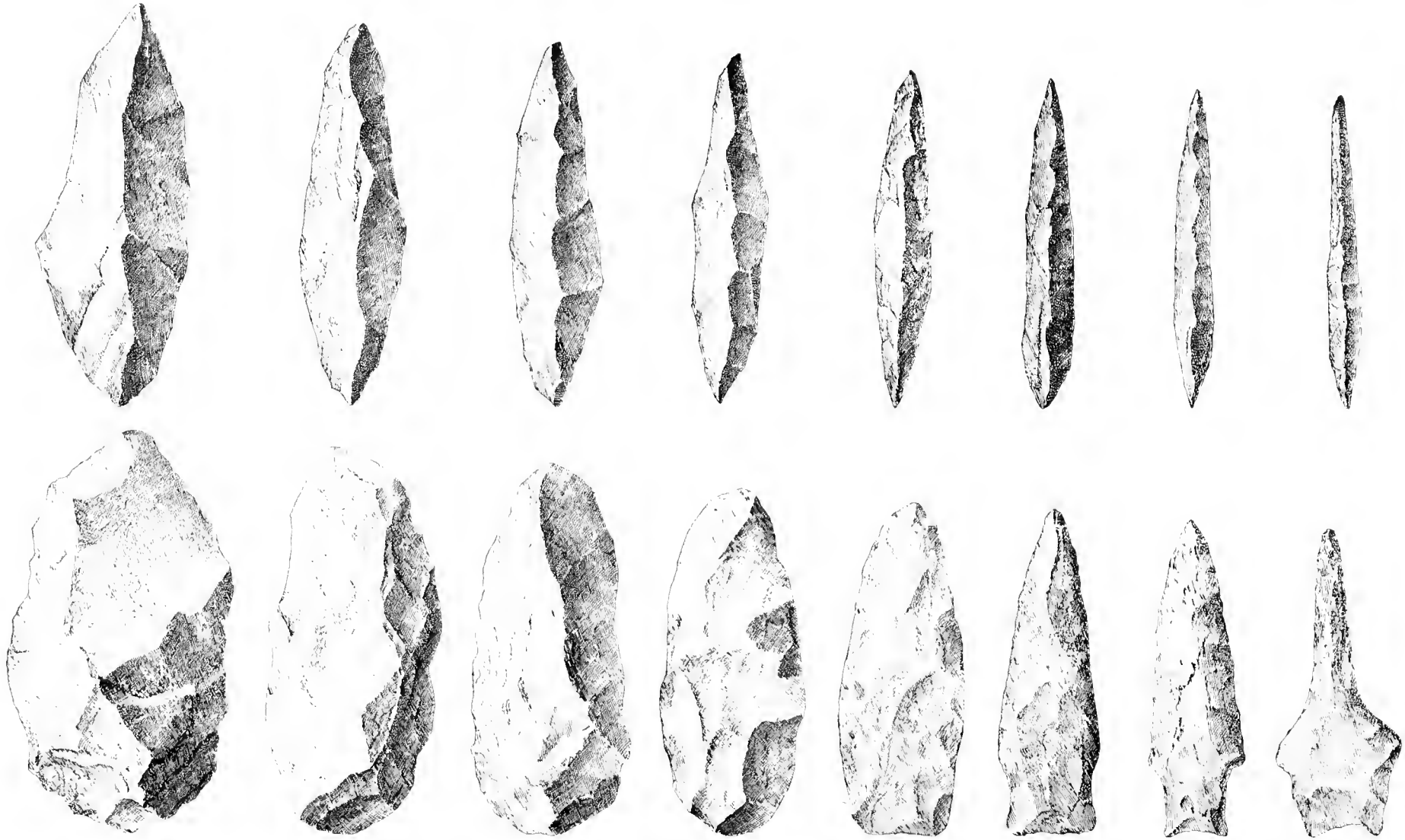
The bluffs of Rock creek within the suburbs of the city are lined with sites on which the ancient bowlder worker established his shops. The work was everywhere the same, save that as a rule quarrying was not carried on to such an extent as to leave traces of the pitting. On both sides of the creek at the crossing of Massachusetts avenue the refuse of bowlder flaking is strewn over the slopes from base to summit of the bluffs. The cutting of U street at a point overlooking the Massachusetts avenue bridge on the east has exposed an excellent section of the base of the Potomac bowlder beds. A portion of the exposure is shown in plate XXVII. Beneath the bowlders is the crumbling surface of the micaceous gneiss. Considerable flaking was done on the surface at this point, and clusters of flakes and failures occur on the slope back of the seated figure. Beyond is the valley of Rock creek and the heights on the west. In the Zoological park, a little farther up the valley and connecting around the faces of the Mount Pleasant bluffs to the Piny branch site, are numerous spots on which considerable work was done.

It may be added that on the level upper surfaces of the plateau occupied by Mount Pleasant and by neighboring suburbs there are traces of aboriginal occupation, consisting chiefly of finished, often broken flaked implements of ordinary varieties, and rarely of pecked and polished tools.

SHOP SITES OF THE MIDDLE POTOMAC VALLEY

FALLS SECTION OF THE POTOMAC

A study of the manufacture of stone implements in the Potomac region would properly include an examination of the thousands of



SELECTED FORMS ILLUSTRATING PROGRESSIVE STEPS IN SHAPING RHYOLITE IMPLEMENTS

a, *b*, *c*, and *d* are quarry-shop rejects, *e*, *f*, *g*, and *h*, are from village-sites in the lowland. Profiles are shown in the upper line

sites up and down the river and in the affluent valleys on the east and west, but there is a great degree of sameness in the materials employed and in the work done. While a few typical localities thoroughly studied illustrate the whole subject, the presentation will not be complete without a brief sketch of the whole field.

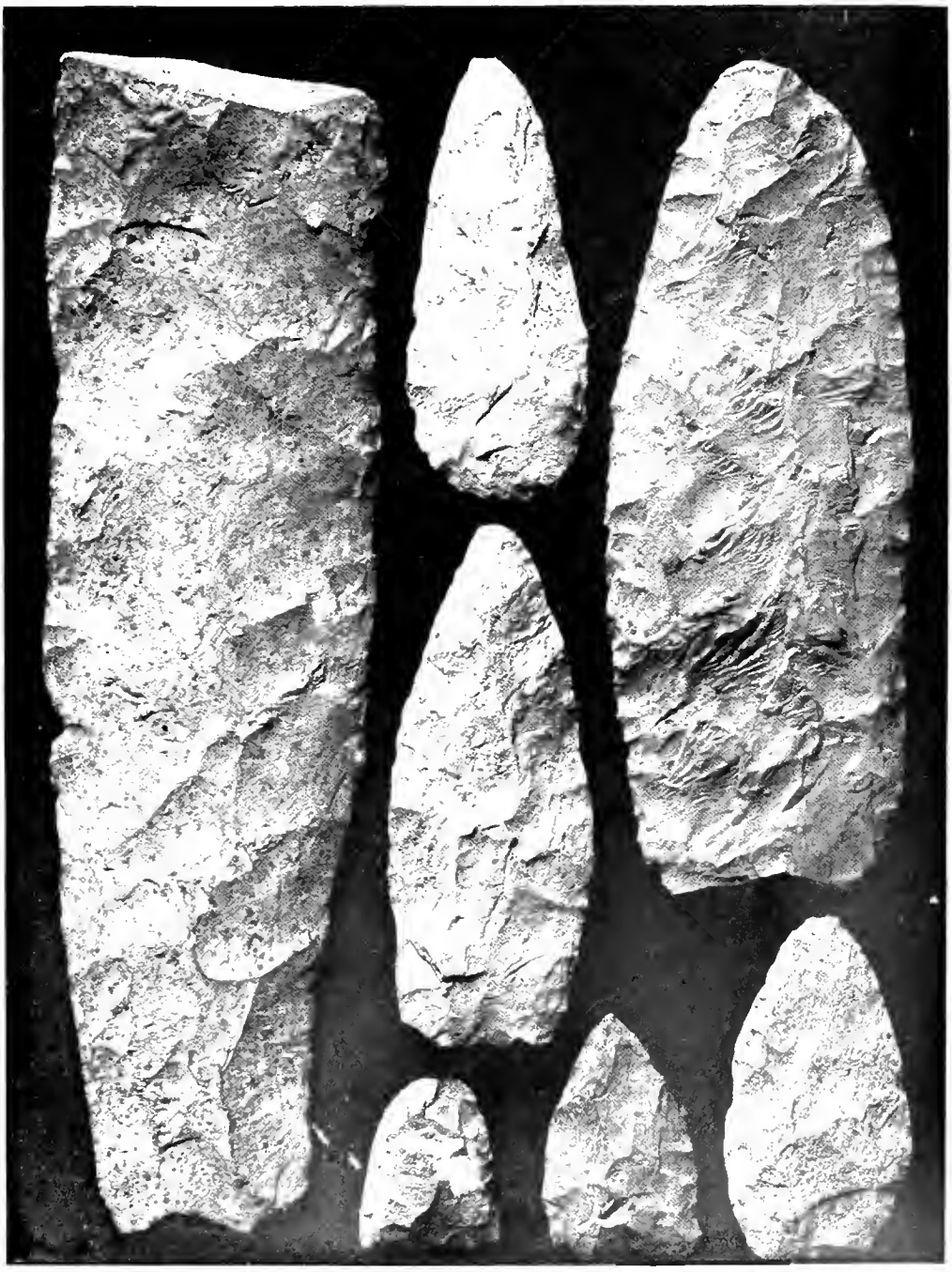
Investigations in the ancient bowlder quarries of the Rock creek valley were concluded in June, 1890, and attention was at once turned to the study of related phenomena in the surrounding region. That portion of the Potomac between the head of tidewater and Great falls—about 10 miles of the most interesting and picturesque part of its course—possesses very considerable archeologic interest. The natural phenomena are quite distinct from those of Rock creek, and as a consequence there is a distinct class of archeological phenomena. The falls portion of the Potomac was evidently a great fishing resort for the aborigines, where at one time or another every available site was occupied for more or less permanent dwelling. The section was rich in the materials most utilized in native art. All kinds of rocks were found: there were bowlders of quartz, quartzite, and slate; fragments of these and other rocks; veins of quartz suitable for use in arrow making; rounded masses of traps and metamorphosed slates, the favorite materials for making grooved axes and celts; soapstone in extensive beds; clay, and occasional bits of rare stones brought down from the distant mountains. The deposits of bowlders were not of a nature to encourage extensive quarrying as on Rock creek, but the varied resources were fully and constantly drawn on by the dwellers by the river. In cases the villages were distributed over beds of river drift which furnished nearly every variety of stone and in many forms; and the art products of such a site, as picked up by the archeologist, are varied in the extreme. There were considerable deposits of bowlders on the northern terraces from Georgetown to above Cabin John bridge, and quartz was everywhere.

The most notable sites of the fishing villages are in the vicinity of Little falls. Some are on the terraced bluffs overlooking the river on both sides, while others are on the floodplain, only a few feet above high tide or above the ordinary river current, being swept freely by every spring freshet.

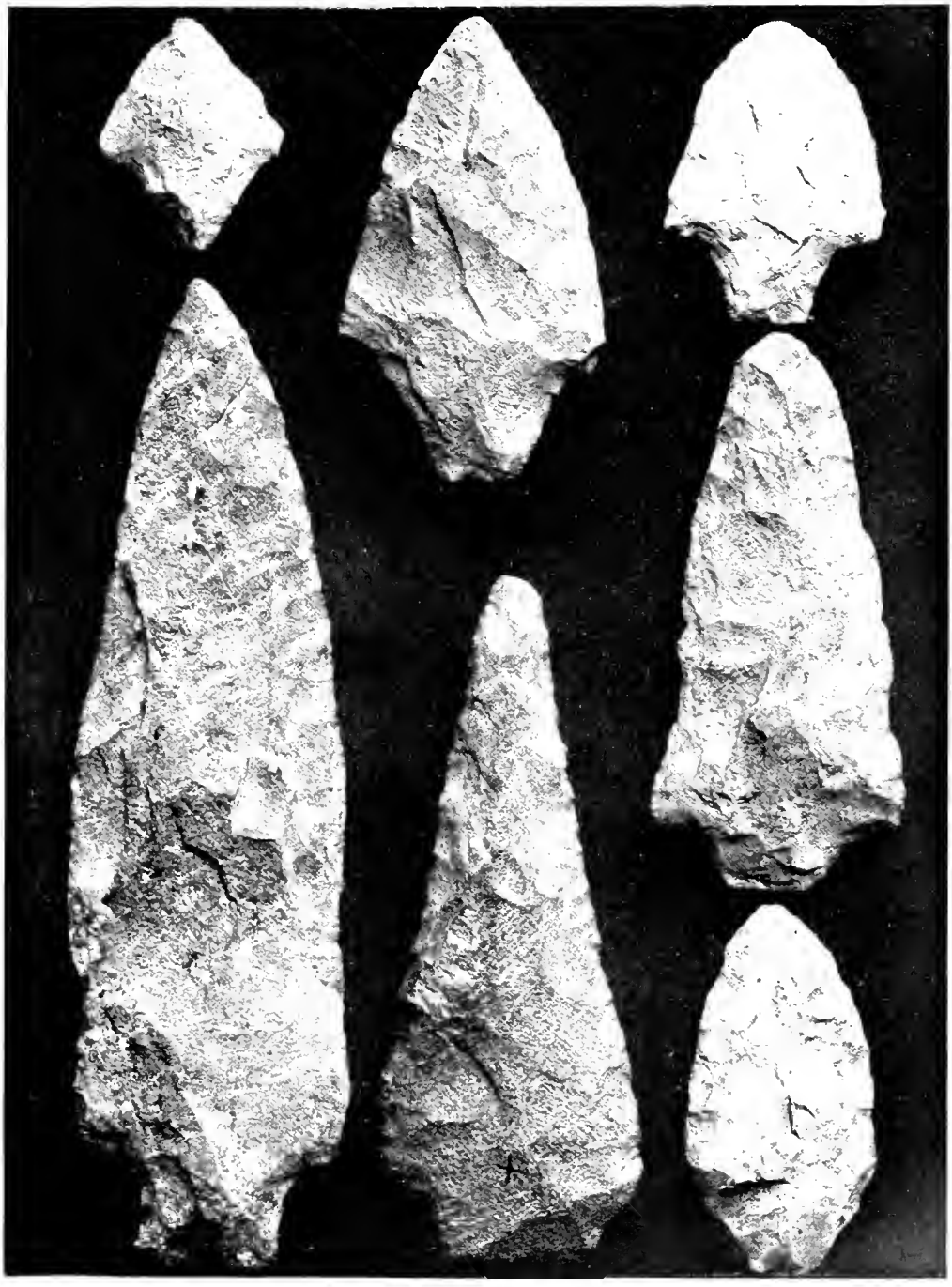
On the left bank of the river, almost at the foot of Little falls and about a quarter of a mile below the bridge, is a site that may receive particular attention. The floodplain is here several hundred feet in width, extending from the river, at the point where tide and cascade meet, back to the canal. This floodplain has been carved by the river out of the gneiss rocks, the scarred surface of which retains enough soil to encourage vegetation; the young growth develops during the summer, to be torn up by the freshet of the following spring. A portion of this plain, over against the canal and just above the antiquated Eades mill, half a mile below the bridge, was so free from invasion by the waters and had

accumulated so much soil that a small patch has been plowed and planted during recent years. In the spring of 1880 the great flood swept the site, tearing out pits and trenches and denuding the field of its soil. This spot was soon after this event visited by collectors who obtained numerous spearheads and arrowpoints, with some other well-fashioned relics. In the spring of 1890 I visited the site and found many objects of art and observed some interesting facts. Mainly the objects found were rude, representing that part of the art products not desired by collectors of specimens, but such as are essential, along with the more finished things, to the story of the occupancy of the site and the pursuit thereon of native arts and industries. The river had in former years deposited on the corrugated surface of the plain numbers of worn and partially worn stones of every variety. At one point was a bed of well-rounded bowlders containing many flakable pieces. Living on this site, surrounded by banks of gravel and heavy beds of bowlders, the savage artisan did not need to quarry the material from which to flake his projectile points and his knives. He gathered them at his lodge door, and with deft hand carried them through all the stages of manipulation from the first flake to the finished implement. Quartz and quartzite were freely used, and the soil is filled with the refuse of manufacture. The rejects are identical in every essential respect, so far as the rude stages are concerned, with those of the Piny branch quarries. But here at home the work was carried further; here the various forms were specialized, the points were affixed to the arrowshafts and spears, and here, within the limits of the village at which they were made, they were used and lost. Knives and scrapers and perforators and drills were made and used, and were lost or broken and left with the other village refuse.

On this site were found the fine-grain tough stones utilized for axes and chisels. They were selected by the primitive artisans from the heaps of drift, in shapes resembling the art form desired. They were broken and flaked, if need be, into approximate shape, and were then battered or pecked into final form and ground and polished according to custom or need. Specimens were collected illustrating every step from the beginning to the end of the process. Along with the other forms, several picks and chisels of the variety used in cutting soapstone were discovered. Their presence is explained by the fact that near at hand occur outcrops of soapstone, and an ancient quarry has been observed near the Virginia end of the bridge and within a stone's throw of Little falls. Hammerstones, whetstones, pestles, mortars, as well as fragments of ordinary Potomac pottery and pieces of soapstone ornaments and vessels, were found. It would seem that every form of relic known in the Potomac region, from the rudest turtleback to the most finished tool of polished stone, occurs on this site—a site, it should be remarked, so modern in its period of occupancy that it is still swept by the annual freshets. Numerous illustrations of articles from this site will appear in subsequent sections of this paper.



UNSPECIALIZED RHYOLITE BLADES, MAINLY FROM ANACOSTIA VILLAGE-SITES (ACTUAL SIZE)



SPECIALIZED RHYOLITE BLADES, PROBABLY LARGELY KNIVES AND SPEARPOINTS, MAINLY FROM ANACOSTA VILLAGE-SITES (ACTUAL SIZE)

An important village-site occurs on the high terrace overlooking the northern end of the bridge, formerly occupied by Freeman's greenhouses, now the property of the Baltimore and Ohio railway company, and another site yielding great numbers of relics is situated on the Donaldson place, high above the river on the southern side.

In June, 1890, my attention was called to a series of chipped stones obtained from the farm of Thomas Dowling, about a mile above Cabin John bridge and 8 miles from Washington. The collection was made by Thomas Dowling, junior, and included many of the rude forms common on the quarry-shop sites already examined, as well as a number of well-finished implements. During a visit to the locality it became apparent that this was an ordinary shop site, which bore also considerable evidence of having been occupied for dwelling. The site is a hundred yards beyond the Dowling gate, on a terrace, the summit of which is about 20 feet above the Conduit road and 160 feet above the Potomac. Back of the terrace, which is but a few acres in extent, the hills rise gradually to their full height of some 350 feet above the river. The surface of the terrace is somewhat uneven, and is covered with rocks of varying sizes, including many bowlders and masses of quartzite with irregularly shaped remnants of other varieties of stone. Much of this material was utilized by the aborigines. It is to be noted that the available material supplied by this site does not correspond closely to that of the great quarry sites of Rock creek. The hills above furnish but few workable bowlders until we go far back from the river. During the early Pleistocene Columbia period these lower terraces were subject to river overflow and thus received accessions of bowlders and fragments of rock from the up-river country, but this material is inferior, both in quantity and in quality, to that of the Potomac formation. It does not appear that extensive quarrying was carried on in this locality, as the deposits would not warrant it.

ANACOSTIA VALLEY

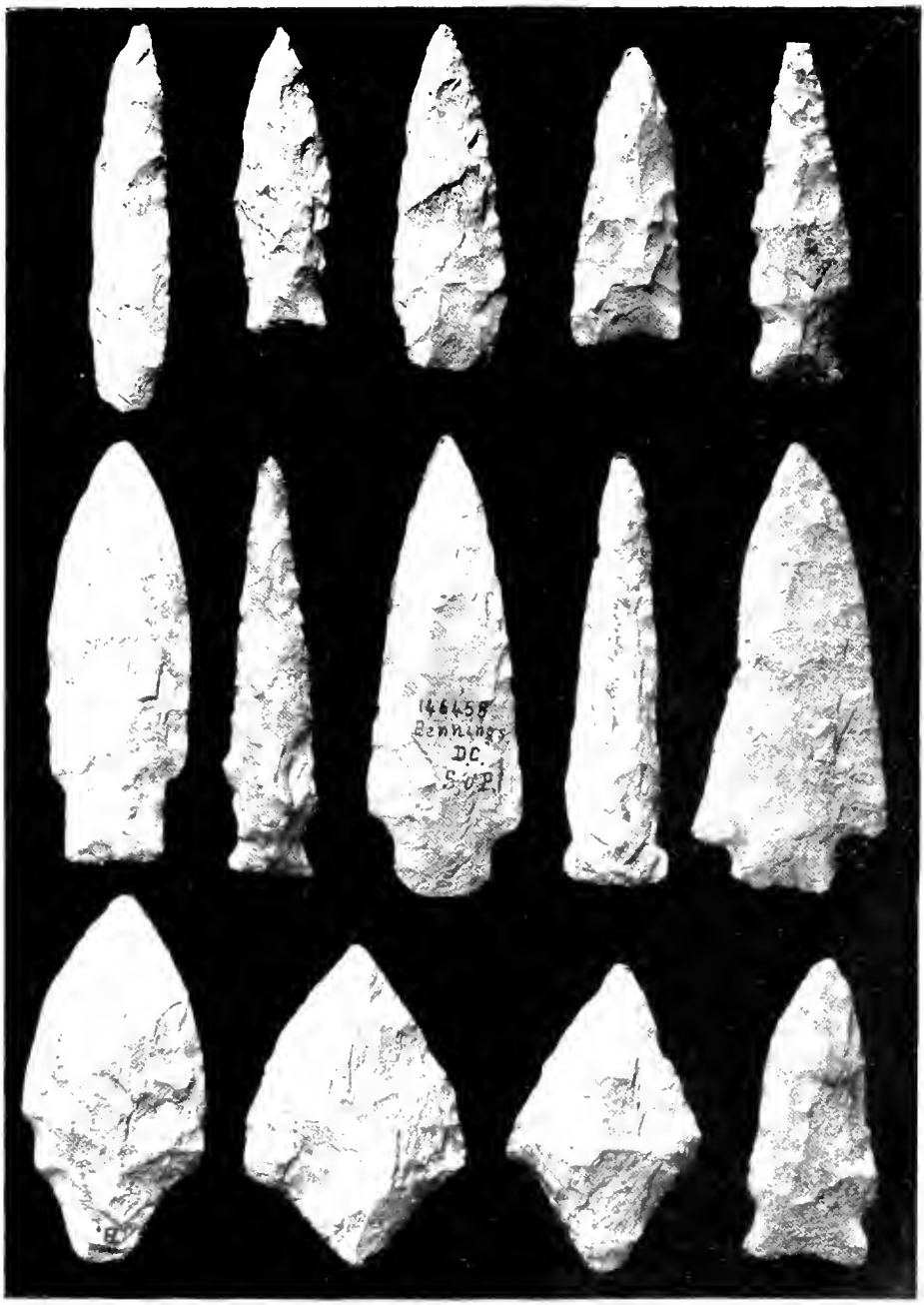
The estuary of Anacostia river varies from one-quarter to three-quarters of a mile in width in its lower course, but just above Bennings bridge it becomes quite narrow. It is bordered for the most part by low alluvial terraces which rise from the water to the base of the slopes of the plateau, here reaching nearly 300 feet in maximum height. In places low bluffs composed of Columbia gravels approach the river banks, and in the angle between the Anacostia and the Potomac the Columbia formation occurs in terraces varying from a few feet to nearly 100 feet in altitude; on these in the main the city of Washington is built.

The only members of the Columbia formation of particular interest in this study are the bowlder-bearing gravels. These are extensively exposed in places, and in the vicinity of the navy-yard reach a thickness of 20 feet or more, though the bowlders are not generally suited to the use of the implement maker. They are often of quartzite and

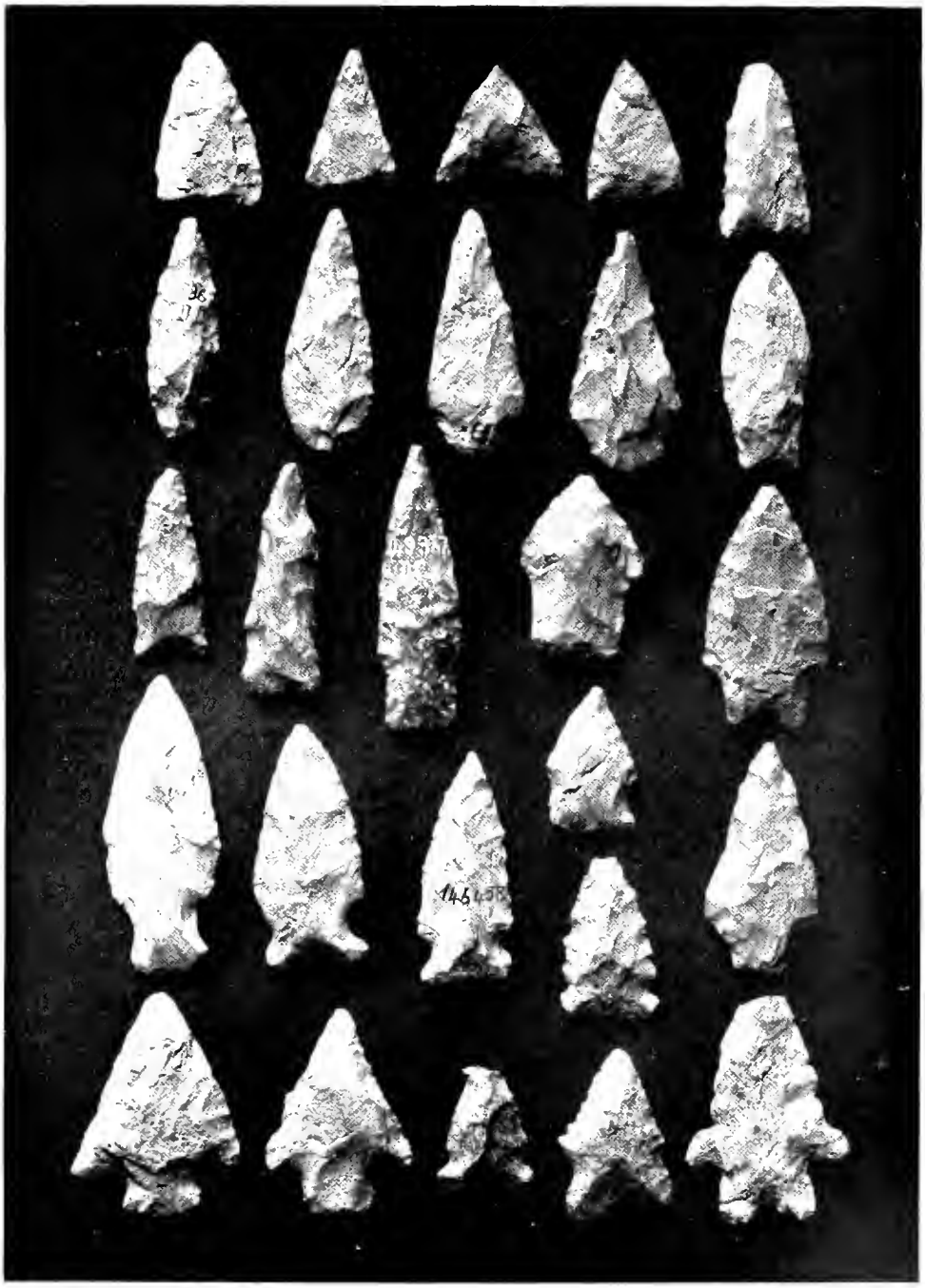
of a suitable size for flaking, but the material is not sufficiently glassy, and they are so scattered throughout the great mass of gravel that quarrying was not encouraged. Workable bowlders were weathered out in considerable numbers, however, and these were used by the aborigines. Quartz bowlders and pebbles were also found in plenty, and in some localities were sufficiently abundant to lead to extensive manufacture. Such a locality occurs on the left bank of the river near the Pennsylvania railway bridge. Here the terrace gravels are filled with workable pebbles, and many rejects and also many finished points are found on the sites, which were dwelling places as well as implement factories. The turtlebacks are often very minute, being in many cases less than an inch in length. Although the inhabitants of the tidewater section of Anacostia river were thus well supplied near at hand with the ordinary varieties of stones, they probably found it advantageous to visit the hills higher up when an unusual supply was called for.

The Potomac bowlder beds, which furnish the best materials in the region, outcrop around the slopes of the hills bordering the northwestern branch of the Anacostia, 10 miles up. In the vicinity of Riggs mill, 3½ miles above Hyattsville and a mile northwest of the Maryland Agricultural College, the manufacture of quartzite tools was carried on quite extensively. It has not been ascertained definitely that quarrying was resorted to, but there is a strong probability that such was the case. The bowlder beds are very heavy at this point, and agriculture is much impeded by the millions of rounded stones that come to the surface in the fields. A small percentage of quartz pebbles are intermingled with those of quartzite. The heaviest deposits of bowlders occur in the middle slopes about the mill, and the refuse of manufacture is found everywhere. The conditions are much the same as on the Rock creek sites. Here, however, all stages of the shaping process are represented, from the tested bowlder with one or two flakes removed to the finished arrowpoint and spearhead. Many pieces have one side worked, others have both sides rough flaked, and a very large number are reduced almost to the typical quarry blade. There are here more broken blades—that is, of those apparently almost completed—than at any other point yet examined. At least a hundred were found in an hour's search.

It is worthy of special note that on these sites a considerable amount of specialization was carried on, and some finished points are found, while there are many fragments of those evidently broken in trimming the edges and tips and in adding the notches; this was not true of the Rock creek quarries. This difference is accounted for by the fact that the Anacostian sites were habitable in places, and traces of encampments where finishing shops were probably established are found at a number of points. The occurrence of implements and projectile points of exotic materials on several of these sites is satisfactory proof of the presence of dwellings.



SPECIALIZED RHYOLITE BLADES, PROBABLY LARGELY PROJECTILE POINTS, MAINLY FROM POTOMAC VILLAGE-SITES (ACTUAL SIZE)



RHYOLITE ARROWPOINTS, MAINLY FROM POTOMAC VILLAGE-SITES (ACTUAL SIZE)

Many similar sites occur at corresponding localities on the other branches of the Anacostia. There is little doubt that the inhabitants of Nacochtank resorted to the quarries of Rock creek and Piny branch; for great numbers of leaf-shape blades of quartzite, as well as of quartz and rhyolite, are found on the chain of sites extending all the way from Bennings to a point opposite Alexandria.

THE TIDEWATER POTOMAC

The Potomac formation, which yields the great body of workable bowlders, extends far down the river, but is found to yield smaller amounts of available materials as the distance from Washington increases. The outcrops are generally at considerable altitude above the river, and at many points on the lower levels there are deposits of bowlder-bearing material derived from the erosion of the Potomac beds. This redistribution is now going on, so that everywhere there are more or less extensive accumulations of workable bowlders. The superior formations, the Lafayette and Columbia, also yield considerable workable stone, which is reassorted and redistributed by the river. There are in places deposits of exceptionally heavy bowlders of limited extent as far down as the confluence with Chesapeake bay. About the mouth of the Wicomico, for example, bowlders are found in large numbers. On Popes creek and along Port Tobacco river the gravels furnish many bowlders of all sizes, which were extensively used by the shell-bank peoples for mortars and mullers, and for shaping both small and large implements. The valley of Zakiah creek, in Charles county, is noted for the great number of arrowpoints and spearheads to be found on its banks; while the gravels are well supplied with workable pebbles of quartz and quartzite, suitable for the implement maker.

On the western side of the river, from Rosslyn to Potomac creek, and extending far back into the hills, extensive deposits of bowlders are exposed. In all of this district no quarries have been observed, although it is probable that in hundreds of places bowlders have been obtained by excavation; but it would appear that the deposits outside of the immediate vicinity of Washington were nowhere sufficiently rich in workable material to encourage quarrying on a large scale. Workshops are, however, found throughout this region, and refuse corresponding in every respect to that of the great quarries is widely distributed.

Especially notable sites are the high terraced points about Mount Vernon and on the island of Chopawomsic, several miles below. From the former Mr William Hunter has made extensive collections, now for the most part owned by the National Museum, and it is not unusual to see collections of quartzite and quartz points from the neighboring fields offered for sale to visitors at Mount Vernon. At Chopawomsic a bed of bowlders outcrops near the upper end of the island only a few feet above low water. The debris of manufacture of quartz and

quartzite tools is very plentiful on the island, and large collections have been made of these, and of finished implements as well, by Mr W. H. Phillips, of Washington. The débris of flaking duplicates the refuse of the quarries in character.

There is hardly a village-site on tidewater Potomac where quartz pebbles were not found and worked, and the workshops are innumerable. It is evident that manufacture was carried on wherever the proper material was obtained, and it is equally clear that the processes employed and the articles produced were uniform throughout.

SITES IN JAMES RIVER VALLEY

The manufacture of quartzite and quartz implements was carried on very extensively in all the principal valleys draining into the Chesapeake on the west. They are found scattered over the country, and on the more fully occupied sites along the rivers the store of arrowpoints and spearheads seems next to inexhaustible. The great collections made by M. S. Valentine, esquire, and his sons, in the James and neighboring valleys; of Mr C. M. Wallace, mainly about the falls of the James, and of J. H. Wrenshall, on Dan river, bear testimony to this.

Nearly all of the stones along Moccasin and Gillys creeks below Richmond are of sandstone or soft quartzite, unsuitable for arrow making, and very few chips are found along the banks of either. The banks of Shockoe creek are composed mostly of quartz and hard quartzite pebbles, and the bed of the creek is filled with them. If any quarrying was ever done here, no traces of such work have survived the changes due to grading for various improvements. It is probable that the aborigines did very little digging, as the creek would wash out more stone than they could well utilize. On the surface, and especially on the slopes of the park of "Chimborazo," quartz and compact quartzites exist in great plenty, but it is useless to seek for evidences of aboriginal work now.

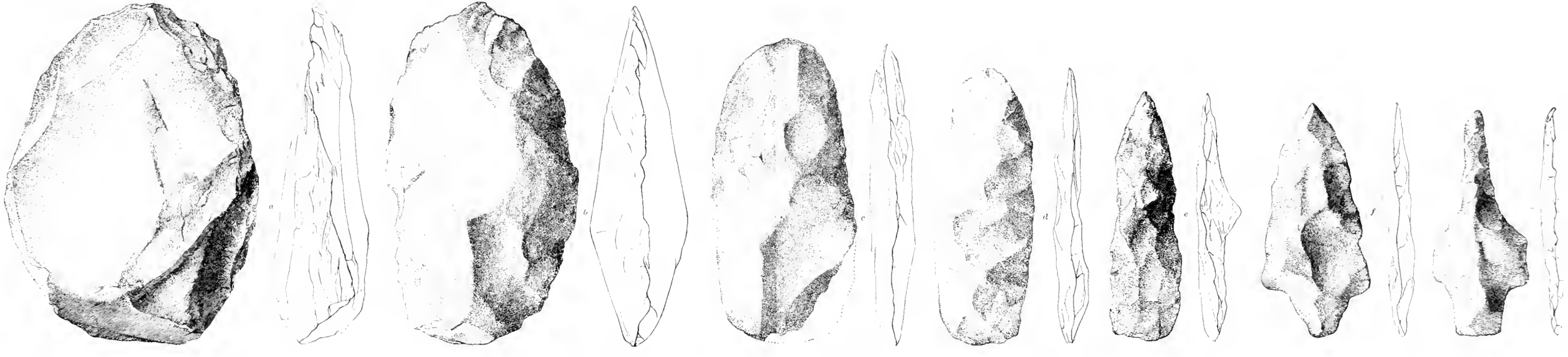
Near the ocher mills, about 5 miles above the mouth of the Appomattox, as also at points on the opposite side of the river, pebbles of quartz occur in the greatest profusion. On the bluff back of the mills the ground is covered with flakes and spalls, and it appears that much work was done here.

On a bluff 30 feet high between Gravelly run and the mouth of Baileys creek the ground in the few places where it is exposed is covered with small flakes and chips. It seems to have been a village-site, or at least a place where the implements were finished after being blocked out elsewhere.

QUARRIES OF THE HIGHLAND

MATERIALS QUARRIED

In a brief and necessarily imperfect manner the history of stone flaking within the valleys of the tidewater region has been sketched in the foregoing pages. Incidentally it was shown that much of the material



SELECTED FORMS ILLUSTRATING PROGRESSIVE STEPS IN THE SHAPING OF LEAF-BLADE IMPLEMENTS FROM ARGILLITE, FROM VILLAGE- AND SHOP-SITES AT POINT PLEASANT, PENNSYLVANIA

a b c d e f g h

employed in the tidewater region for stone implements was not indigenous. It will now be desirable to study the origin and manufacture of the exotic materials so extensively employed by the natives of the lowland.

The local materials were not of the best varieties, including little else, as I have shown, than brittle quartz and refractory quartzite. The other materials sought in the highland at distant points are rhyolite, jasper, argillite, and flint. All are found in limited quantity as pebbles in the tidewater portions of the valleys in which they occur in place in the highland, and the refuse left by arrow makers is found sparsely scattered over the valleys. This refuse is closely analogous in its forms with corresponding refuse resulting from the shaping of quartz and quartzite pebbles. In some manner the natives of the lowland acquired a knowledge of the location of the deposits of these materials in the highland, and quarries were opened and worked and transportation of the material, shaped or partly wrought, became an important industry.

LOCATION AND PRODUCT

Rhyolite Quarries

First in importance of the exotic materials used by the inhabitants of the lowland is a variety of rather coarse-grain rock found in South mountain, a high group of ridges extending from near the Potomac at Harpers Ferry to the southern side of the Susquehanna at Harrisburg, Pennsylvania. It is an ancient eruptive rock of the acidic class, occurring interbedded with other formations and outcropping in narrow belts parallel with the trend of the range. It is generally bluish gray in color, though sometimes purplish, and is often banded and mottled by what may be regarded as flow lines. Dark varieties closely resemble slate, and the structure is often somewhat slaty. Generally it is flecked with light-colored crystals of feldspar, by which character it is easily recognized. Its fracture is often uncertain on account of a shaly or laminated structure, but it is capable of being worked more readily into large and long implements than any other of the several varieties of rock found in the upper Potomac valley.

The history of the discovery of this material may be of interest to archeologists. On taking up the study of the tidewater region it was observed that at least one-fourth of the implements collected were made of a gray slaty stone. These objects were in the main knife-like blades, projectile points, drills, etc, of usual types of form, though occasional ruder pieces and flakes were found. In a very few cases larger masses of the rock were reported, one weighing several pounds having been obtained from the banks of the Potomac opposite Mount Vernon. It was of compact flakable stone, and although of turtleback type had somewhat the appearance of a core or mass from which flakes had been removed for shaping small implements. It may have been

used or intended for use as an implement, although this is not probable. It is shown in figure 12. A much larger piece, an oblong blade-like mass, was found by Mr J. D. McGuire in the Patapsco valley. Such shapes are very common in the quarries, and are often mere rejects of the blade maker.

For several years the source of this stone remained unknown. Members of the Geological Survey were engaged in examining parts of the Piedmont plateau drained by the Potomac, and I appealed to them to keep a lookout for the stone. In the summer of 1892 Professor

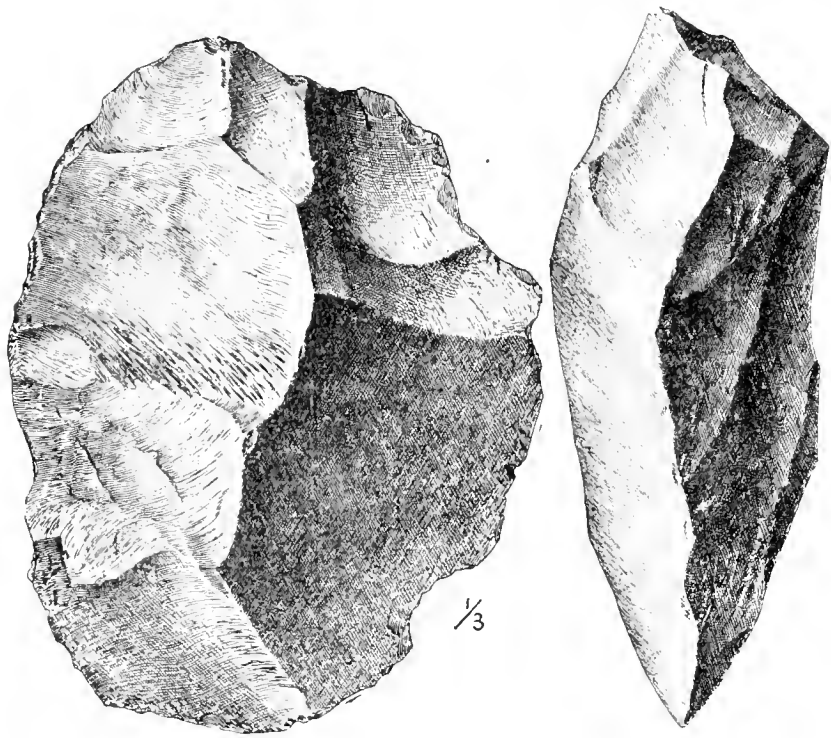
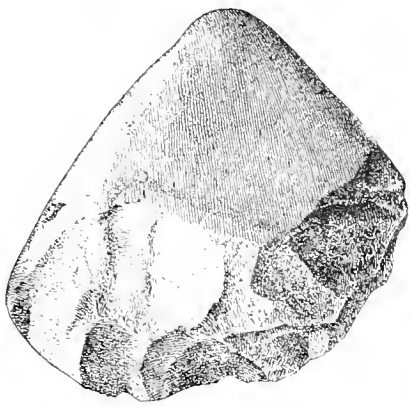


FIG. 12—Fragment of rhyolite from the Potomac, 10 miles below Washington.

G. H. Williams, of Johns Hopkins university, an assistant geologist on the Survey (whose untimely death in 1894 was a serious loss to science), reported its occurrence in South mountain, and in the autumn he and Mr Arthur Keith, of the Geological Survey, furnished me with a map of the formations so far as outlined at that time. The outcrops extended in broken narrow belts through Maryland and Pennsylvania, as already mentioned.

Early in November, 1892, I set out in search of the quarries. Taking a team at Keedysville, Maryland, I crossed the mountain ridge at several points, finding excellent outcrops of the rock at many points, but no trace of aboriginal operations appeared until I reached Maria



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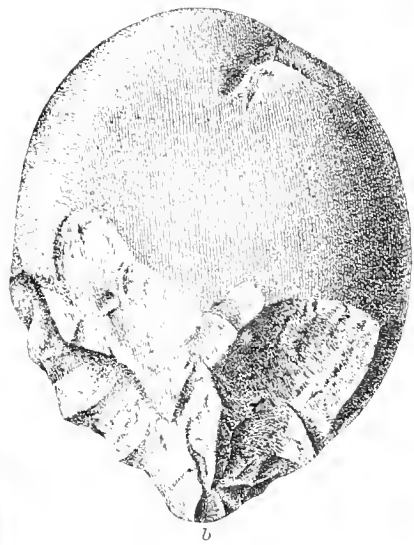

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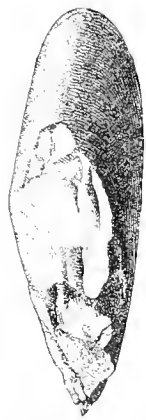
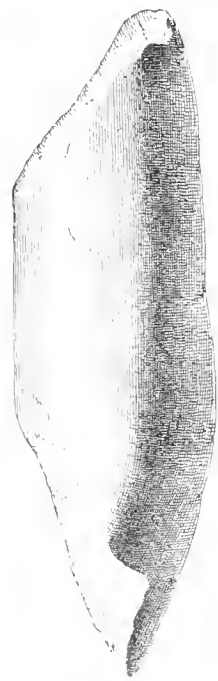




SHARPENED BOWLDERS FROM POTOMAC VILLAGE-SITES (ACTUAL SIZE)

Furnace, Pennsylvania, on a branch of the Monocacy, 10 miles southwest of Gettysburg. Here the mountains rise abruptly and to great heights from the narrow stream bed, and the rhyolite forms a large part of the rocky mass. A cluster of flakes was observed on the roadside some 2 miles above the railway crossing, and extensive aboriginal quarries were soon found on the mountain side half a mile up the northern slope.

During the first visit only a preliminary examination was made. The ancient workings observed cover several acres of the wooded mountain side. The pitting is not pronounced, although traces of disturbance are readily recognized and the entire soil is filled with broken masses of the rock and the refuse of blade making. Near the lower margin of the quarries a small patch had recently been cleared and planted in peach trees. Here countless numbers of the partially shaped pieces were to be seen, and in an hour I had my wagon loaded with turtlebacks, broken blades, and hammerstones. The rock tends to break in flattish forms, and the rejects indicate that the blades made here averaged long and thin as compared with the shapes made from the compact bowlders of the tidewater region.

As in all the quarries so far examined, blade making was, so far as the refuse indicates, the almost exclusive work of the shops. Plate XXVIII is devoted to the illustration of specimens of successive grades of development, from the mass of raw material reduced to convenient size for beginning shaping operations to the long slender blades almost as fully developed or advanced as are the blades found in the caches and on the village-sites of the lowland.

No evidence was found of attempts at specialization of form, and there is not the least doubt that finishing operations were conducted subsequent to transportation to the villages in the valleys. Shops where many small flakes were found contained fragments of unspecialized blades only. The hammerstones were not numerous, and were as a rule rather unsymmetric globular masses of greenish-gray eruptive rock—probably a diabase.

These and probably other quarries of South mountain were the centers from which the natives distributed rhyolite over a vast area including 20,000 square miles or more of the Chesapeake-Potomac region. The quarry examined is 75 miles northwest of Washington, and was readily accessible to the inhabitants of Potomac and Patuxent rivers. The amount of material transported was very great, and the industry must have been a most important one, frequent journeys to the mountains of Pennsylvania being a necessary feature.

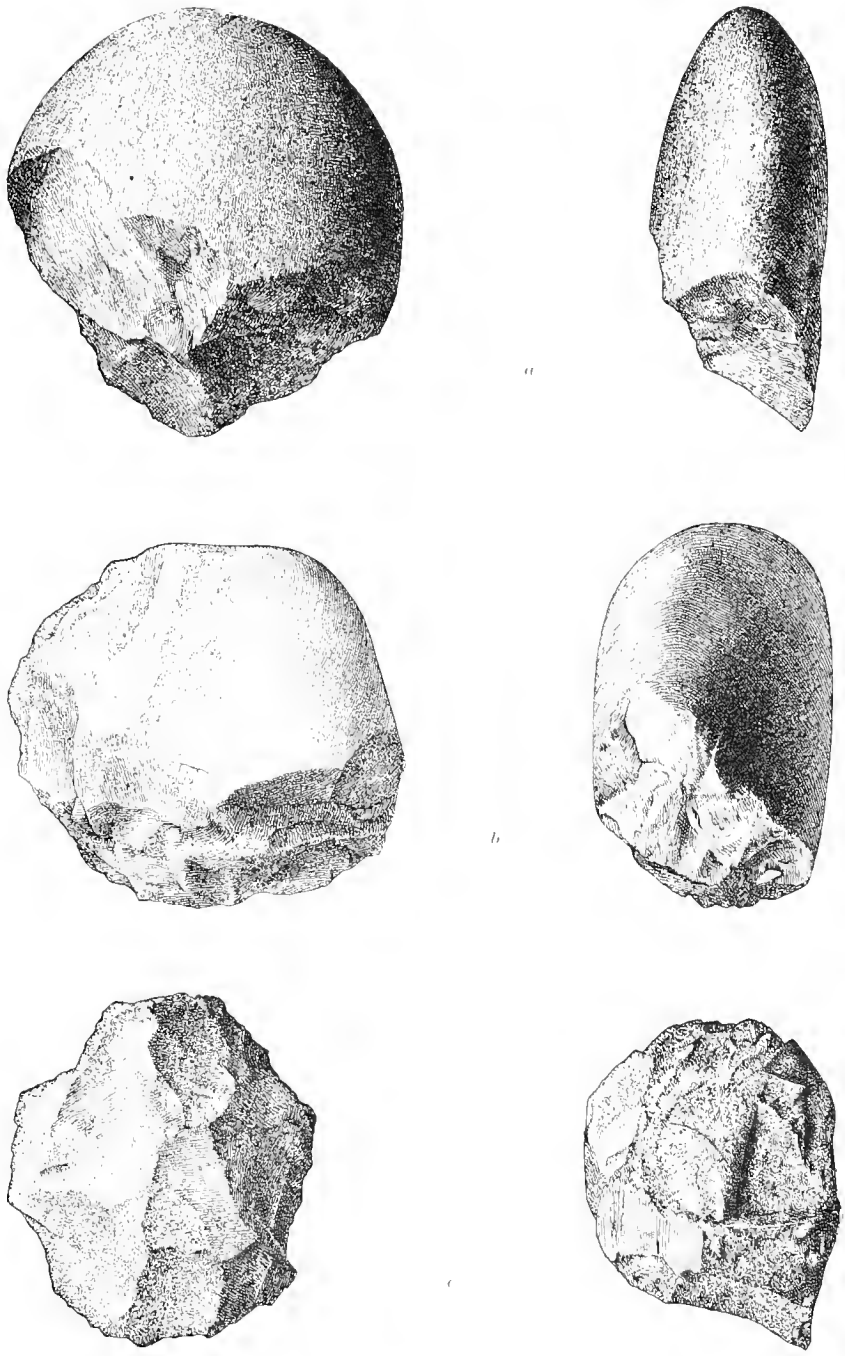
By a study of the range of quarry elaboration it is readily determined that the chief product was a blade corresponding to the products of other quarries, and differing only as a result of the difference in material. It has already been mentioned that multitudes of specimens derived from this or other similar quarries in the mountains are

scattered over the tidewater province. In a few cases flaked masses have been seen weighing a number of pounds, much larger than would ordinarily be carried to points distant from the quarry. It is possible that in cases they are derived from water-transported masses.

As would naturally be expected, a great many blades of the roughed-out type are found in the lowland. Several caches have been reported, and in plates XXIX, XXX, and XXXI examples from a number of these are given. Through the kindness of Colonel W. H. Love, of Baltimore, I am able to present the remarkable set of blades given in plate XXIX. The cache, plowed up in a garden on Frogmore creek, near Baltimore, contained eight pieces, three of them being broken. The entire blades range from 7 to nearly 11 inches in length, and in form are very narrow and thin, with straight sides, and with the usual broad base and acute point.

The boldly flaked and handsome blade presented in *a*, plate XXX, was obtained, with several others like it, by Mr Brewer on South river, Maryland, from a few inches beneath the surface of the ground in a grove near his house. The two specimens *b* and *c* are of very different type, and the former is slightly specialized, rude notches having been broken in the sides near the base. These are from a cache of about a dozen pieces found near a village-site on the floodplain of the Potomac a few hundred yards below Chain bridge.

Very much like the preceding, though ruder, were a number of blades found by Colonel W. H. Love on an island at Point of Rocks, Maryland. I introduce these specimens here, as they clearly indicate what must have been a common practice with the South mountain quarrymen—the carrying away from the quarries of hoards of bits and roughly trimmed blades of rhyolite. The island has in recent years suffered much from the great floods that now and then devastate the valley, and a few years ago an ancient village-site of considerable extent was exposed by the removal to a few feet in depth of the surface soil. Pottery and stone implements of usual types were found, and at one point Colonel Love discovered what appeared to be a flaking shop, as many bits of broken rock flakes and chipped pieces were scattered about. Partly buried in the soil was a flattish stone a foot or more across and 2 or 3 inches thick, on and about which, as well as scattered through the soil near by, were numerous bits of rhyolite, a dozen or two being of the type shown in *c*, plate XXX, while others were ruder and some were mere flakes and fragments. Scattered about were a few finished and partially finished arrowpoints. The relation of these to the squarish stone, the presence of hammerstones, and the fact that the upper surface of the stone was considerably roughened and picked into holes by sharp points led to the surmise that possibly this was a shop, the stone being the anvil on which the fragments of rhyolite were placed to be shattered or shaped. I am at a loss, however, to understand just how such appliances could be utilized in the work of flaking. A



SHARPENED AND BATTERED BOWLDERS FROM POTOMAC SHELL HEAPS (ACTUAL SIZE)

sketch indicating approximately the relation of the cluster of partially shaped fragments to the large stone is presented in figure 13.

Flint Quarries

Flint does not occur in any considerable bodies within convenient reach of the tidewater region. Pebbles are found in limited numbers in the various bowlder deposits and along the stream courses. Limited masses of the rock occur in the limestone formations of the Piedmont plateau; and one considerable outcrop of the rock in Highland county, Virginia, is known to have been worked by the natives. In May, 1893, Mr Gerard Fowke, of the Bureau of Ethnology, at my request made a reconnoissance in the region to verify the reports of extensive aboriginal quarries in Crabapple bottom, Highland county, and furnished the following notes:

"On a spur that rises to a height of 200 feet, just west of the village of New Hampden, a large amount of flint has been released by the decomposition of the limestone in which it was embedded. It is mostly in the form of small nodules or fragments, although some of it is interstratified with the limestone. Over a considerable area on the

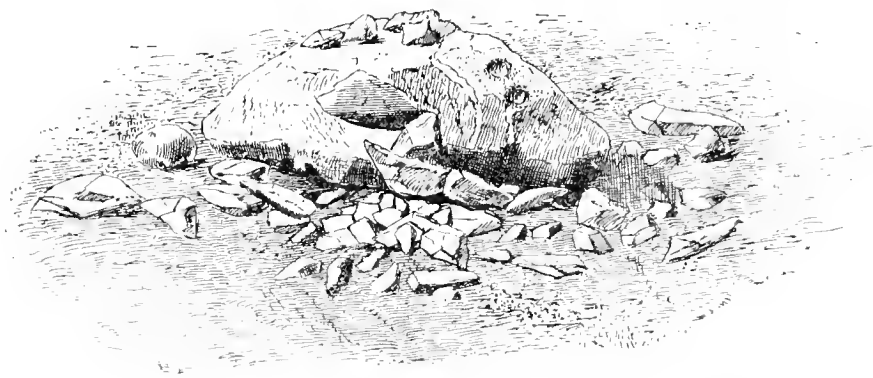


FIG. 13 Supposed anvil stone and cluster of slightly shaped bits of rhyolite

northern end and at the top of the ridge, the earth has been much dug over by the aborigines for the purpose of procuring the stone. Most of the pits remaining are quite small, few larger than would contain a cartload of earth. The largest are on top of the ridge, where a few have a depth of 2 to 3½ feet, with a diameter of 20 to 30 feet. The latter cover an area of about an acre; the others are so scattered that it is difficult to estimate their extent. There is no outcrop of stone at any point where digging has been done, and it appears that the searchers for the material had learned that the flint nodules and fragments were distributed through the soil excavated for them in such spots as proved to contain them in greatest abundance, making no effort to quarry out the stone in which they occur. At various places on the summit of the ridge the flint projected above the ground, and

there it had been battered off with stones; but there is no evidence that quarrying was resorted to.

"Such portion of the hill as is not in timber has a heavy blue-grass sod, and the ground is visible only in a few small spots where animals have burrowed. Flint chips and flakes were found at several of these. At the foot of the spur at its northwestern terminus is a spring, around which these indications of manufacture are abundant; and it is reported that before the grass had become so thick a great many broken or unfinished implements were picked up. Spalls and chips are abundant in the face of the bank around the spring, but it can not be ascertained except by excavation how far they extend. So far as could be learned the space covered by this workshop seems too limited to have been utilized for flaking more than a small part of the flint that could have been obtained by the amount of digging apparent; it may, however, be more extensive than reported, or there may be others in the vicinity which have been overlooked. This can be determined only by researches at such points as seem favorable for the location of arrowpoint factories."

It is a notable fact that the existence of these quarries was known and recorded at a very early date, as the following extract from Maxwell's Historical Register, Richmond, 1850, will show:

> On the lands of Mr John Sitlington, in Crabbottom, Highland county, there is an area of perhaps 100 acres all dug over in pits. This was the great treasury of that dark clouded flintstone out of which the Indians made those arrowheads of that color found all over our state. The rock there is in great perfection, and in inexhaustible quantity. It would surprise anyone to see what labor had been expended here and what vast quantity of the rock obtained. Here was the red man's California.

Flint implements occur so sparingly over the great tidewater areas that it seems hardly likely that extensive quarries existed within easy reach of the lowland peoples. No caches have been recorded, and it seems unnecessary to illustrate the forms of implements, which do not differ in type from those of other materials. In the Potomac valley above Harpers Ferry the village-sites yield flint arrowpoints and spearheads, mostly black in color, in very considerable numbers.

JASPER AND ARGILLITE QUARRIES

Although these materials were used by the tidewater peoples, and although some of the articles found were undoubtedly derived from quarries, the exact location of these sources of supply can not be determined. It is not improbable, however, that the quarries in Berks and Lehigh counties, Pennsylvania, furnished the material. Implements and other articles of these materials are later referred to.

CACHES

It will be observed that the leaf shape blades made in the quarries are identical in character with the hoard or cache blades so well known all over the country. There can be little doubt that these hoards are

RUDE AXES MADE BY SHARPENING AND NOTCHING QUARTZITE BOWLDERS BY FLAKING, FROM POTOMAC VILLAGE-SITES (ACTUAL SIZE)

deposits of blades produced in the quarry-shops or on sites furnishing supplies of the raw material and transported and stored for utilization or trade. Few caches of the quartzite blades have been reported from the tidewater country. It is much more common to find deposits of blades of other materials not obtained in the region, and therefore brought from a distance by quarry workers or traders. At the mouth of South river, Maryland, near the banks of Selby bay, four hoards have been found, and are now for the most part in the collection of Mr J. D. McGuire. Two are of argillite and one of jasper, brought, no doubt, from workshops in Pennsylvania, some 150 miles away, and one is of rhyolite, probably from the quarries on the head of Monocacy creek, in Pennsylvania. A fifth cluster, consisting of eight fine, long blades, was found in a garden near Baltimore, and is now owned by Colonel W. H. Love of that city. Five examples appear in plate XXIX. Still another hoard, consisting of six long, slender blades of slaty South mountain rhyolite, was obtained by Mr H. Newton Brewer, from his farm on South river, Maryland. An illustration from this cache is given in *a*, plate XXX. A cache of a dozen blades, found on a village-site at Eades mill, below Chain bridge, is represented in *b*, plate XXX, and a similar lot from an island in the Potomac, below Harpers Ferry, is illustrated in *c* of the same plate. Nests of quartzite blades are reported from different parts of the Potomac valley. One, consisting of six pieces, all slightly specialized, was obtained from a village-site in Anacostia by Mr W. H. Phillips (*a* and *b*, plate XXXI); a second (*c*, in the same plate), owned by Mr Thomas Dowling, junior, contains four or five blades, and is from Bennings; and a third, now in the National Museum, is also from the vicinity of Washington. Others reported from Potomac creek and elsewhere have been scattered by collectors who did not appreciate their importance. We can not say in any case that the quartzite blades found in caches had their origin in the Washington quarries, for identical forms were produced on numberless sites throughout the region yielding the raw material, but, in the nature of things, the greater quarries would be more frequently represented in the caches than the smaller.

The quarry-shop type of blade is not confined to the cache or to cache finds. It is found widely distributed over the country on village-sites, fishing stations, etc. These objects are plentiful on village-sites in the region producing the raw material in plenty, and decrease rapidly in numbers as we recede from that region. Thus a village-site on the Anacostia yields hundreds of these blades, while a similar site on the lower Potomac may not yield half a dozen. They are found in considerable numbers in such places as the bluff village-sites about Mount Vernon and the great shell fields of Popes creek, where beds of workable bowlders are convenient. The cache is not a necessary result of the quarry, but the quarry explains the cache.

Chapter III

FLAKED STONE IMPLEMENTS

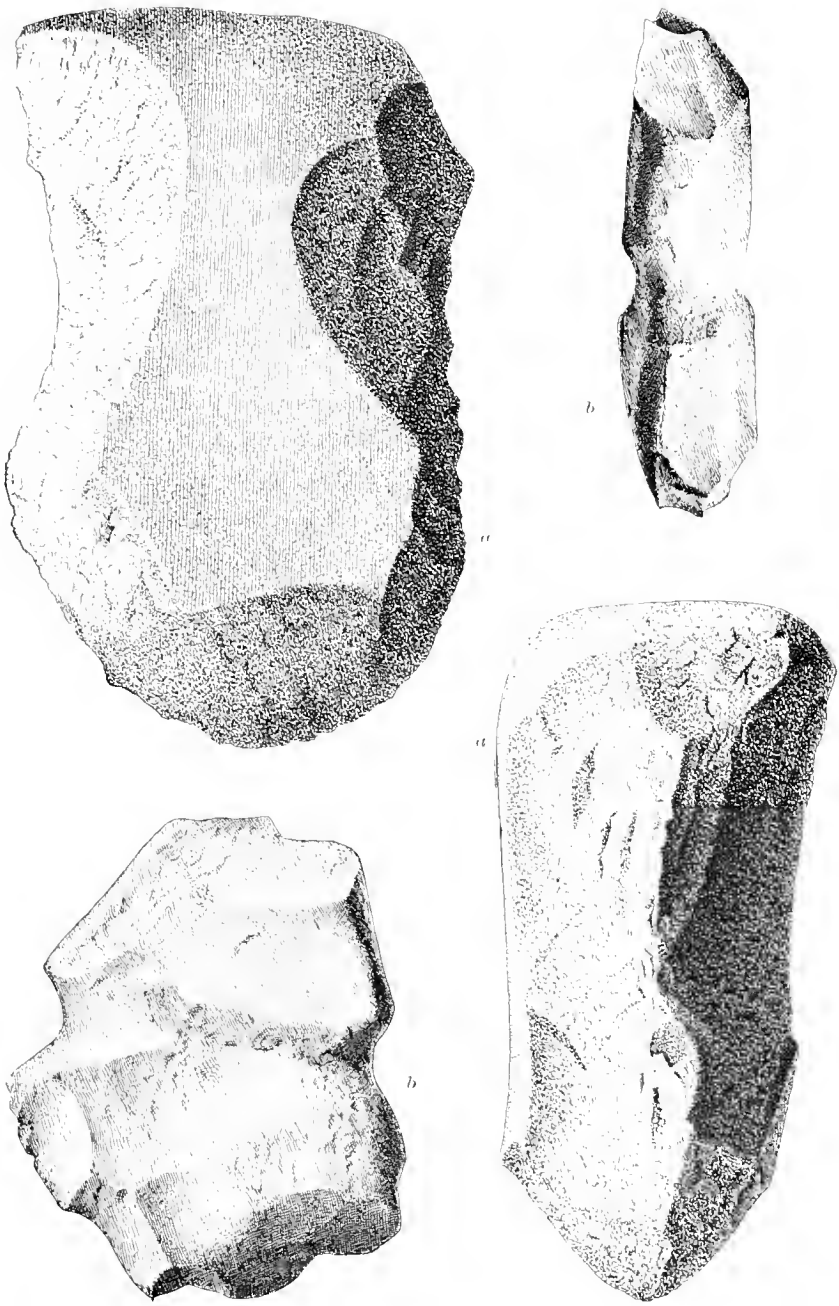
GENERAL FEATURES

The treatment of this division of the subject will be brief, since the object of the present paper is chiefly to develop the history of the great industries connected with quarrying, manufacture, and distribution, rather than to discuss the finished implements and their uses. Up to the present time a rational account of the earlier stages of the work of the aboriginal artisans, of the history of the implement up to the point where its functions as an implement began, has not been given. The finished objects have been voluminously discussed by many authors, but this discussion began in the middle of the subject as now developed and is thus incomplete and unsatisfactory. Unfinished forms and rejects have not been clearly distinguished from implements proper, and much time has been wasted in classifying and finding uses for objects that are not implements at all.

Attention has already been given to the destiny of the blades produced in such great numbers in the quarry-shops and in the workshops scattered over areas affording the raw material. From these sites were distributed, often in unfinished condition, the innumerable specimens found in caches and on dwelling, hunting, fishing, and other sites all over the tidewater country. The processes of elaboration, by means of which the blades are roughed-out and prepared for final shaping, have already been considered at some length.

We are not able to say at just what point in the shaping of the blade or implement from quartzite and each of the other stones (for the point would not be uniform with all varieties) the percussion processes ceased and the pressure processes took up the work. It was certainly later in the quartzite than in any of the others, because of its coarse grain and exceeding toughness and the consequent lack of thin and sharp edges on which the pressure tool must take hold. The pressure methods were applied somewhat as indicated in the following paragraphs.

In the method mostreadily available for the final steps a blank form or a flake having the approximate shape was held firmly between the fingers and thumb of the left hand. A firm piece of bone having a rather thin edge or angle like that of a three-cornered file was taken in the right hand and set upon the sharp edge of the stone and at right angles to it so firmly that a slight cut or notch was made in the bone, then, with a quick, firm movement of the right hand, met by a similar



RUDE AX-LIKE IMPLEMENTS FROM POTOMAC VILLAGE-SITES (ACTUAL SIZE)

a, made by sharpening and notching a quartzite bowlder; *b*, made by sharpening a rude grooved ax

movement of the left, the bone was made to move across the edge of the stone (figure 14), in doing which it took with it a flake, varying in length, width, and depth with the skill and power of the workman, the nature of the stone, etc. A rapid repetition of this operation,

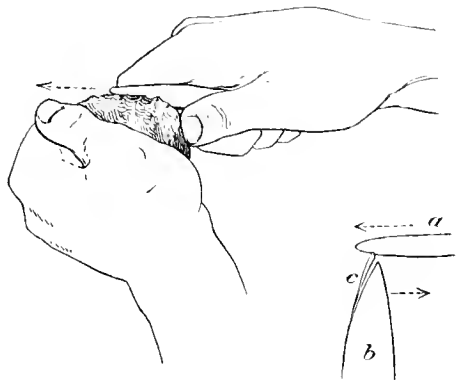


FIG. 14—Flaking by pressure, a bone implement being used. *a* the bone tool, *b* the stone, *c* the flake.

accompanied by a proper resetting of the tool, quickly reduced the piece, if it worked readily, to almost any desired outline. The same result was obtained in various other ways, but always by means of suddenly applied or spasmodic pressure. The blank form may have been held down by the fingers on the edge of a stone, as shown in figure 15, and the point of the bone held in the other set so as to

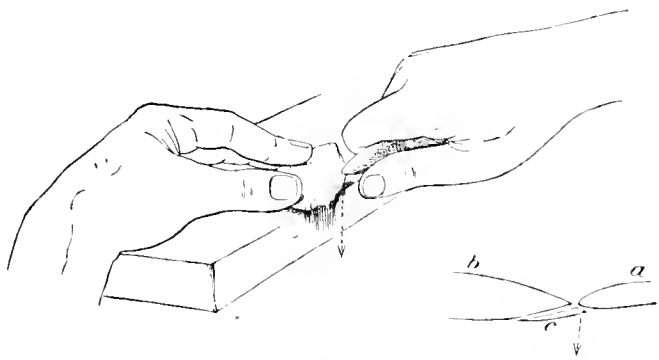


FIG. 15—Flaking by pressure, a bone point being used, the implement to be shaped resting on a support.

catch the edge of the stone to a width corresponding to that caught by the notched bone in the other position, when a quick downward pressure upon the flaking tool would remove the flake. Again, in larger work, where greater force was required to remove the flakes,

a tool long enough to place against the arm or chest of the operator may have been used. In this way much additional force could be thrown into the spasmodic movement. Another device, practiced by some tribes, consisted of a notched or forked bone or pincers, which was set upon the sharp edge of the blank and given a sudden twist, thus removing the flake.

These operations apply exclusively to implements of leaf-blade type and to minute forms of other origin. The various ruder and heavier varieties of tools were shaped by percussion exclusively.

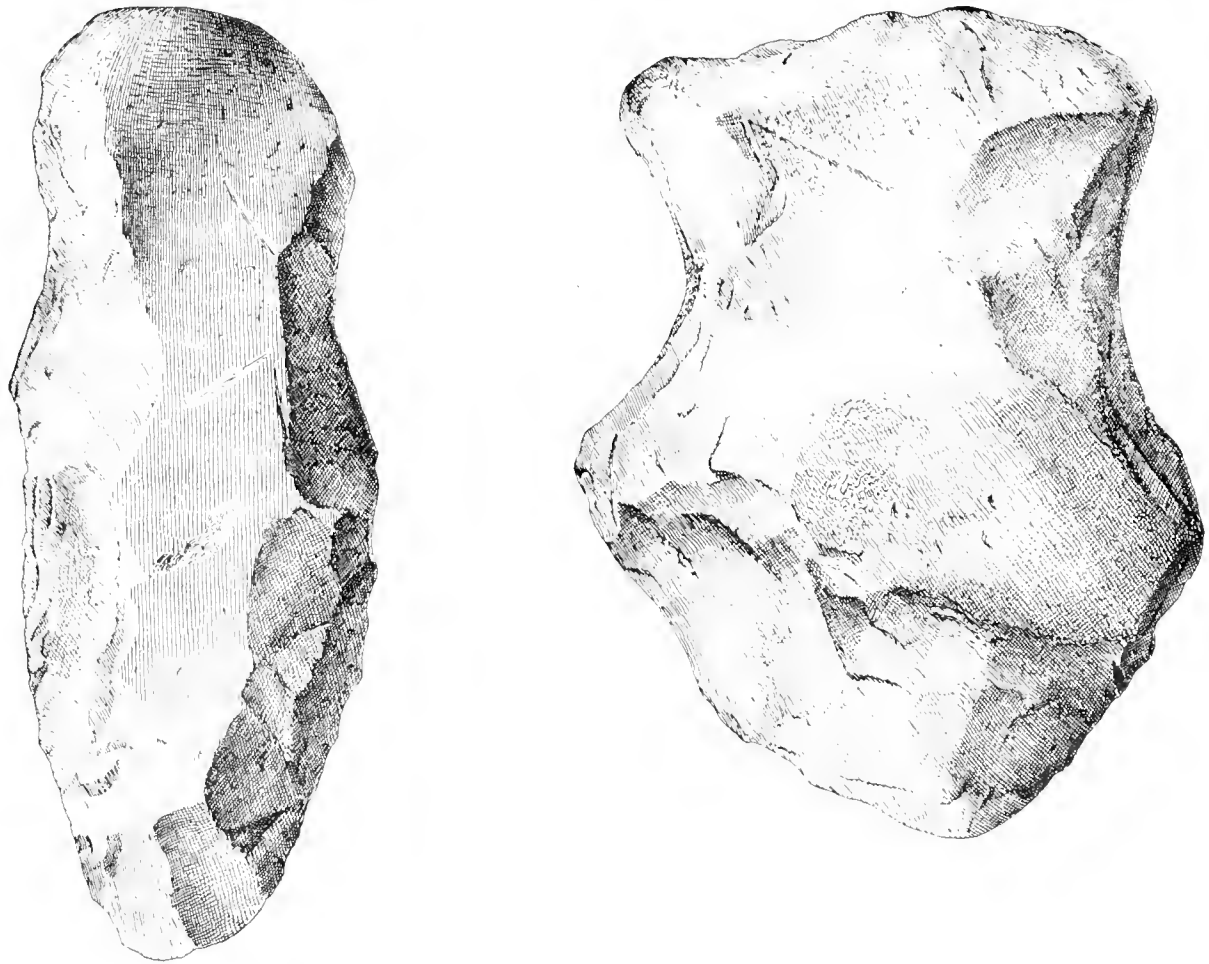
The flaked implements of the province may be arranged in two great groups: One consists of small and well-shaped forms, such as knives, drills, scrapers, and projectile points, almost universally employed by the native tribes; the other comprises heavier and ruder tools, generally made on or near the site of intended use, and probably rarely carried about the person or transported to any great distance. The latter class includes bowlders sharpened at one end by removing a few flakes, giving a cutting edge or a pick-like point; bowlders and other stones, often large, similarly sharpened, and in addition notched at the sides for hafting; as well as quite heavy bowlders, or other compact bits of rock, rudely notched for hafting, designed for use probably as hammers or sledges. A unique group of this class of implements was developed in connection with the quarrying and shaping of steatite. It includes digging tools and picks of large size and often of rude shape, and of cutting tools of chisel-like character, shaped by flaking but often sharpened by grinding. These are fully illustrated in a subsequent chapter. We may also add sledge heads and hammers used for breaking up the rock in rhyolite, jasper, and argillite quarries, and such flaking hammers and other large tools and utensils as are in cases shaped by fracture.

Implements of the first-mentioned class originated in the quarries and in scattered shops, and were not easily made, save from material of good flaking qualities; the latter could be made of ordinary surface bowlders and of coarse, inferior stone. The former are almost universally distributed; the latter are found but little beyond the sites yielding the raw material. The former are light, thin, and symmetric, and have their genesis mainly through the leaf shape blade; the latter are heavy, thick, and not necessarily symmetric, and never reach a high degree of elaboration.

IMPLEMENTS OF LEAF-BLADE GENESIS

TYPICAL CHARACTERS

Perhaps none of the products of aboriginal art are better known than those which may be grouped under this head and which are referred to as knives, drills, scrapers, and projectile points. Their employment must have been general, as their dissemination is almost universal.



RUDE AXES OR PICKS MADE OF QUARTZITE BOWLDERS SHARPENED AND NOTCHED BY FLAKING, FROM POTOMAC VILLAGE-SITES (ACTUAL SIZE)

Their number is beyond estimate. Their most important characteristic is their general shape, nearly all being referable to origin through the leaf-shape blade. Fill out the outline of almost any specimen, large or small, and the blade form is restored (plate XXXII). As a rule they are thin, a necessary condition for projectile points (save the most minute forms, which are merely sharp bits of stone) and a convenience in the case of knives, scrapers, and drills, which were carried more or less about the person. The typical scraper, with one side flat and the other sharply beveled, is an exception; it is illustrated in plate XXXIII, *a*, *b*, *c*, and is a rare form in this region. Another form of scraper is of leaf-blade genesis, as seen in the same plate, *e*, *f*, *g*, and in *f*, plate XXXII, which illustrate a prevailing form of scraper made by sharpening the broken end of a spearhead. Other exceptions to the rule are minute drills and other points made from bits of angular stone so small and so approximate in shape that systematic shaping was unnecessary. All of the implements of these several classes are designed to be set in handles or in the ends of shafts.

It is the common practice to speak of spearheads and arrowpoints as if they belong to well-distinguished classes, but the line can not be drawn between them with any degree of clearness. The larger forms were, in general, doubtless used as spearheads and the smaller for arrowpoints; yet it is probable that a large percentage of specimens of medium size were used in either way as occasion required. These implements were also equally serviceable for other purposes, and any of them may have been hafted and used for cutting, scraping, or digging. The slender-shafted perforator or drill, evidently adapted to boring stone, wood, bone, and the like, and in numerous cases bearing evidence of use, may also have served at times as a projectile point. The line separating these classes of objects into functional groups is therefore somewhat arbitrary, although convenient for descriptive purposes. In presenting illustrations I shall not attempt to separate them fully by function or manner of use. It is better to arrange them in groups by shape and size. One group may include simple blades of the larger sizes, unspecialized forms, which may have been used for various purposes; a second, the larger stemmed and notched specimens which served largely as knives, scrapers, and spearheads; a third, the medium-size specimens, mainly spearheads; a fourth, the smaller varieties, used mainly as arrowpoints; a fifth, drills, and a sixth, scrapers. These groups will be reviewed briefly in the order named, but in presenting the numerous illustrations further on the grouping is based principally on material in order that form genesis and peculiarities due to material may be better indicated. The grouping by shape is made secondary.

The materials found in this region did not encourage great elaboration. Quartzite was tough and coarse grained; quartz was extremely brittle. The forms are, therefore, not elaborate and do not compare in

refinement with those of the interior where flint was abundant. Rhyolite was hardly less tractable, but flint and jasper admitted of much higher refinement.

There are somewhat marked variations in the shape of objects of like class, material, and size, and this is possibly due partly to the presence of different tribes or families within the district. Though there is some tendency toward localization of particular shapes, all forms are, so far as I can learn, pretty well distributed up and down the province. Many of the differences in detail of shape may have their origin in causes operating within the limits of a particular district or within a single tribe. Of possible causes of variation may be mentioned differences in method of hafting, differences in use, variations in models, or the tendencies of individual taste.

BLADES—BLANKS, CUTTING IMPLEMENTS

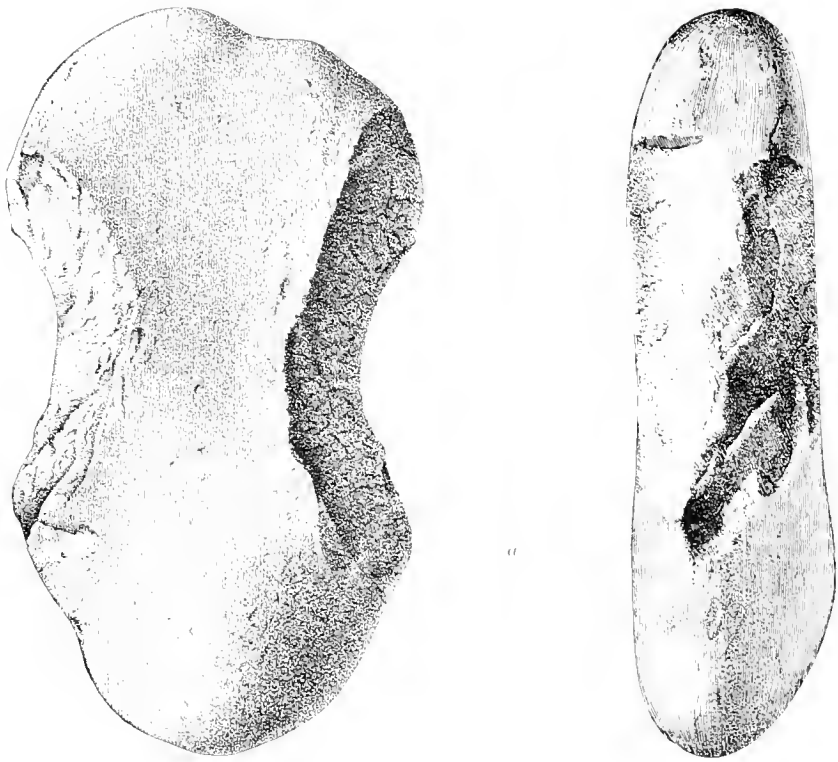
It is the fashion to speak of the leaf-shape blades as knives; but no one can say of any particular unspecialized blade, save where it shows signs of use, whether it was a finished tool intended to be used in this form as knife or scraper, or whether it was simply a blank awaiting the pleasure of the elaborator. It was not necessary to stem or notch the knife blade for hafting, as the haft could be made the full width of the blade, but the projectile point had to be trimmed down or notched at the stem end to accommodate it to the width of the slender shaft in which it was set. The large size of some of the stemmed and notched forms would seem to preclude the notion of their use as projectile points, yet it is not safe to say that any one of these objects was not used or could not have been used, on occasion, by some of the warlike natives of the Chesapeake province as heads for their spears or javelins.

It is a matter worthy of note that colonial writers rarely mention the use of stone knives, while shell and reed knives are many times referred to. One mention of the former may be given. Smith,[1] speaking of medical practices, makes the following remark: "But to scarrifie a swelling, or make incision, their best instruments are some splinted stone." This may, of course, refer either to elaborately shaped implements or to mere flakes or sharp fragments. Plate XXXV illustrates blades of quartzite; plate XXXIX, blades of quartz, and plate XLIV, blades of rhyolite.

SPECIALIZED BLADES—PROJECTILE POINTS, ETC

Under this head may be placed, for convenience of description, all medium and small size points having outlines specialized for hafting, since all such may have been used for arrowpoints or for heads of spears or javelins. Colonial writers make frequent mention of the use of arrows by the Chesapeake peoples, and spears and javelins are occasionally referred to. Smith describes a variety of forms in the

[1] History of Virginia, Richmond, 1819, vol. I, p. 137.



b

SLIGHTLY MODIFIED QUARTZITE BOWLDERS USED AS IMPLEMENTS, FROM POTOMAC VILLAGE-SITES (ACTUAL SIZE)

following extracts: "They (the Powhatan Indians) vse also long arrowes tyed in[to] a line, wherewith they shoote at fish in the rivers. But they of *Accawmacke* vse staues like vnto launces headed with bone. With these they dart fish swimming in the water."[1] The Susquehannocks, inhabiting the upper Chesapeake, used arrows "fine quarters long, headed with the splinters of a white christall-like stone, in forme of a heart, an inch broad, and an inch and a halfe or more long."[2] The Powhatan Indians pointed their arrows "with splinters of christall, or some sharpe stone, the spurres of a Turkey, or the bill of some bird."[3] Father White mentions the use of spears by some of the Maryland Indians.

It appears from the writings of Smith and others that great numbers of arrows were used, and that the natives expended them on occasion without apparent reserve. The manufacture of the points was undoubtedly a matter of great and vital importance to these people, and much time and labor must have been expended in procuring, roughing-out, and transporting the material, and in shaping the implements.

The projectile points of the Chesapeake province have a wide range in form and size. This is due in a measure to the widely diverse nature of the materials used and to the wide range of use, and partly, no doubt, to the fact that numerous tribes of people have occupied the region or have bequeathed to it their peculiar art forms. Projectile points are fully illustrated in subsequent plates.

NARROW-SHAFTED BLADES—PERFORATORS OR DRILLS

The so-called perforator or drilling point is a feature of importance in the flaked-stone art of the Chesapeake. These objects are derived, as are the projectile points, from leaf-shape blades produced in the ordinary workshops, and are of like form in all materials. They were probably used in some sort of hand drill, e. g., the pump drill in use among many tribes; and it is not uncommon to find specimens with the points rounded and worn smooth by use; yet we are not at all certain that they were exclusively used as drills, or that they are not really a variety of projectile points well adapted, on account of their shape, to use in drilling. The delicacy and brittleness of many specimens must have unfitted them for use in the drilling of hard substances. Examples in quartzite, quartz, and rhyolite are presented, along with the projectile points, in accompanying plates.

SPECIALIZED BLADES, ETC—SCRAPERS

Scraping tools were constantly required in the arts of the savage tribes, and the forms developed are uniform over a wide extent of country. In many sections special shapes were made for dressing skins,

[1] History of Virginia, Richmond, 1819, vol. I, p. 133.
[2] Ibid, p. 125.
[3] Ibid, p. 132.

shaping wood, and related uses. The most common type is a short, often rather thick, discoid blade or flake with blunt end, beveled by minute flaking from one side, which is usually flat, the other side being convex; this gives a keen and strong scraping edge. This form must have been set in bits of wood or bone after the manner of the woman's knife of Arctic peoples. These objects are, as a rule, not of leaf-blade genesis. Another variety was often made by sharpening the broken ends of projectile points. Implements of this class are usually of leaf-blade genesis. They were set in handles after the manner of ordinary knives, and are notched for that purpose (plate XXXIII, *e*, *f*, *g*). In three years' work in the tidewater region I have not obtained more than two or three well-specialized specimens of each of the classes; other collectors, however, have been more fortunate.

A very few specimens are found of imperfect semilunar shape which may have been hafted as scrapers or knives. Those brought to my attention are so rude that it is not possible to say whether they are designed shapes or only freaks of eccentric flaking.

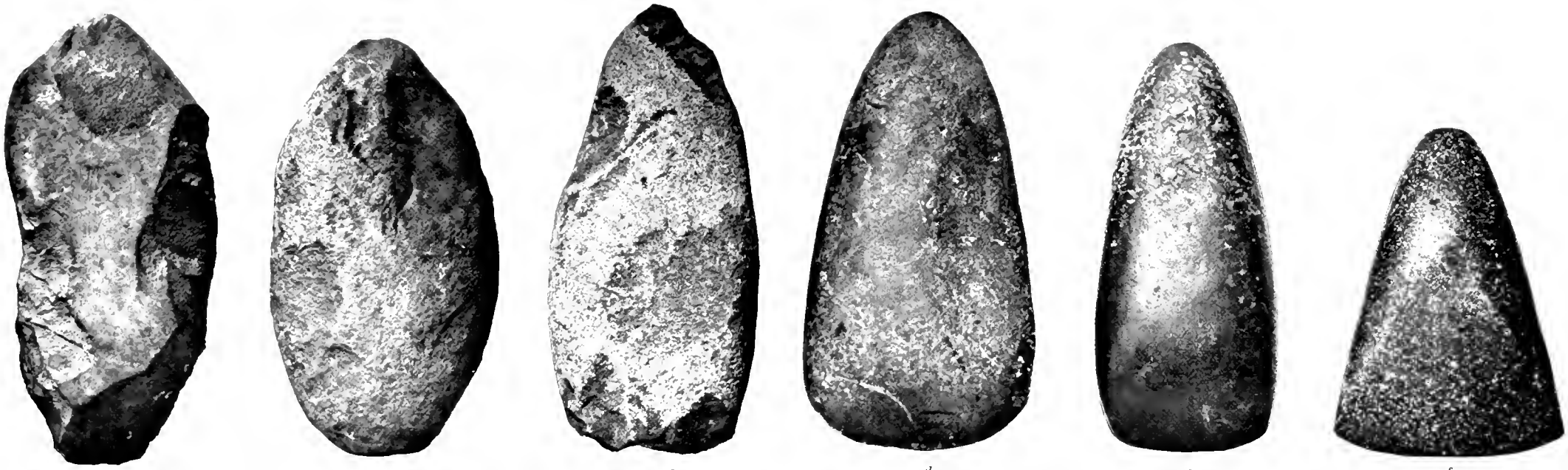
LEAF-BLADE IMPLEMENTS GROUPED BY MATERIAL

For the reason that satisfactory separation of the various classes of leaf-derived implements—knives, scrapers, drills, arrowpoints, and spearheads—can not be made, I have brought together a series of plates and figures illustrating the whole group as developed in the three materials best representing the native work of the region. In each case plates illustrating successive steps in form development of the individual are given, while the other plates and figures are intended to convey an idea of types of form and range of shape and size.

QUARTZITE IMPLEMENTS

The quartzite implements here represented are derived almost wholly from bowlders, and in the main passed through the leaf-blade stage. The material does not admit of great elaboration or refinement of form. The larger varieties, presumably spearheads, prevail, yet all types of form known in the whole range of material appear. In numbers the quartzite tools, taking the whole Chesapeake-Potomac tidewater area, are perhaps inferior to quartz.

Plate XVII illustrates a series of steps in the individual form development of the average projectile point, beginning with the bowlder and passing forward to the leaf-shape blade—the extent of the quarry-shop elaboration; and plate XXXIV illustrates the complete morphology of the fully specialized implement of this class. It is not assumed that all or any of the seven or eight specialized specimens passed through exactly the forms indicated by the blades and rejects preceding them, these being selected merely to indicate in a general way the course of progress from the raw material to the final forms. The beginnings



a *b* *c* *d* *e* *f*

SERIES OF SPECIMENS ILLUSTRATING PROGRESSIVE STAGES IN THE SHAPING OF CELTS BY FRACTURING, BATTERING, AND ABRADING

may have been in large or small bowlders, fragments, or flakes, but all must have passed through kindred transformations.

Plate XXXV contains a few examples of the leaf-shape blades, the outlines varying from the oval to the imperfectly ovoid form, with one point sharp and the other blunt, the ratio of length to width also varying. These are the forms produced in the quarry-shops and in other roughing-out shops. As a rule they show traces of the bold work of the free-hand flaking, and the untrimmed edges and points bear strong evidence that they were not yet ready to be devoted to any use. They are rarely above three-eighths of an inch thick. They are found occasionally in caches, but generally on village-sites where the plow turns them out of the soil along with other classes of relics. Plates XXXVI and XXXVII illustrate many excellent examples of the specialized forms of leaf-blade genesis. They include pretty nearly the full range of what may be, with approximate accuracy, designated projectile points. It happens that none of the scraper or perforator forms are included, but these are rare in quartzite.

QUARTZ IMPLEMENTS

Quartz implements were derived from the raw material, chiefly in two forms: first, vein rock, procured from outcrops or by quarrying; and, second, water-worn pieces in the form of bowlders and pebbles, obtained from surface accumulations, outcrops of gravel, or from quarries. The former was used in the highland and down to the margin of the vein-bearing crystalline rocks—a line somewhat outside of the present fall-line. The latter was the great source of supply to dwellers in the lowland. It is not possible to distinguish implements made from the two forms of the stone save where portions of the water-worn surface are preserved. This rarely occurs in a well-finished piece, but vast areas are sprinkled with the wasters of manufacture, all indicating failures in blade making from pebbles. Notwithstanding the fact that bowlders and pebbles are nature-selected material—that is, those bits least weakened by flaws and seams—they are still extremely liable to shatter under the hammer.

Years of study in the tidewater country have led me to the conclusion that pebbles were the source of at least three-fourths of the quartz implements there found. The vein quartz is much more difficult to use, being hard to reduce to the blade form, while the pebbles are readily reduced. An evolution series is given in plate XXXVIII, the upper line showing profiles of the specimens represented in the lower line. Plate XXXIX contains a series of blades such as were derived from the working of pebbles. The range of form and size is not great. The largest are rarely so much as 4 inches in length and an inch and a half in width; the smallest are very minute. In shape the ordinary leaf like blade is most common, some are long and slender, others wide and triangular, while a few are approximately discoid. Some of these may

have been completed implements, for they are well finished and very handsome, while others, as clearly indicated by the crude surfaces, irregular edges, and blunt points, are blanks intended for further elaboration. A few of those illustrated may be rejects, as they are rather thick and clumsy.

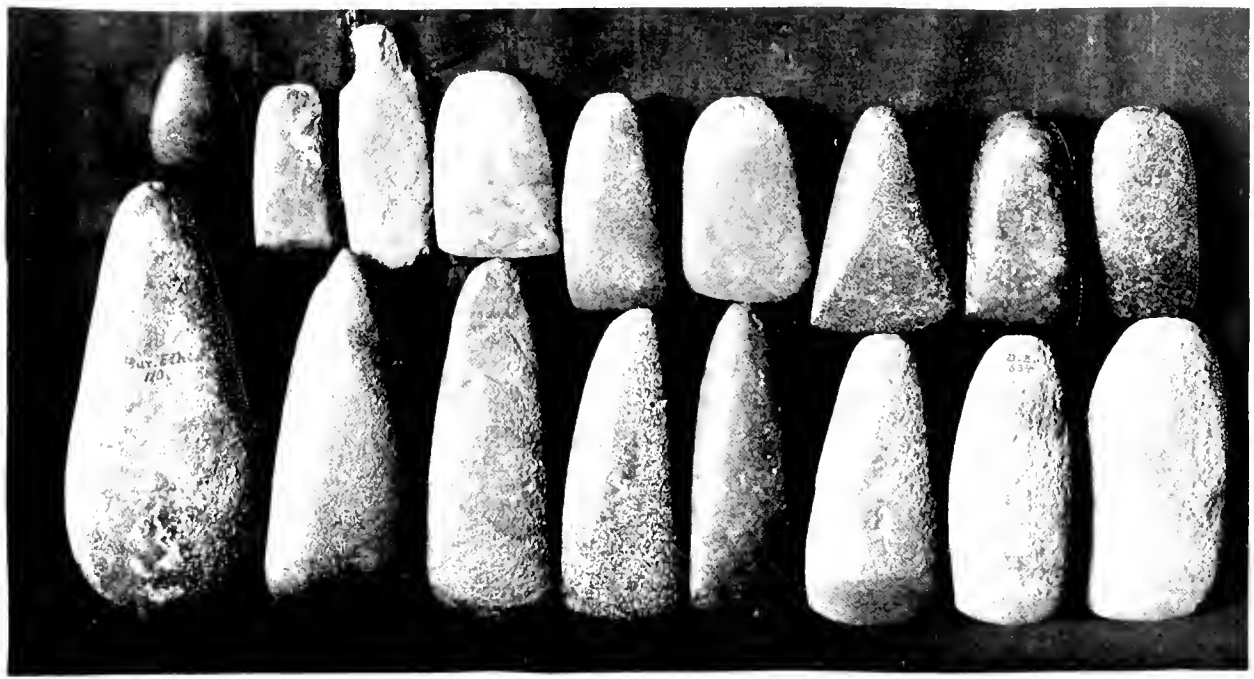
If the blades shown in plate XXXIX were elaborated a little more by means of the bone flaker, edges and points trimmed and delicate notches cut, we should have about the series of specialized implements illustrated in plate XL. These represent some large specimens, which may be knives or spearheads, and a number of smaller size, probably arrowpoints.

Plates XLI and XLII include a pretty wide range of the smaller points, and, so far as photographic representation is capable, convey a complete idea of the Potomac valley forms. The majority of the specimens are from the collection of Mr W. H. Phillips. The long lozenge forms, occupying the upper part of plate XLI, are very plentiful and often extremely neat in finish and graceful in outline. Below are triangular forms, also very pleasing in appearance; and in plate XLII notched forms and various eccentric shapes are seen.

RHYOLITE IMPLEMENTS

The South mountain rhyolite quarry and its phenomena, and the transported masses, fragments, and blades referable to it, have received attention on earlier pages. It is now necessary only to present an epitome of the varied and interesting articles of this material that may be classed as finished implements. This brittle stone was shaped almost exclusively by flaking processes, and the final forms were in nearly all cases derived through the leaf-shape blade. The massive, or laminated, free-flaking stone encouraged the making of large blades, and the range of size in the finished objects is considerably above that of any other tidewater material. The texture was too coarse to encourage elaboration, and the specialized forms include very little beyond the simple blades and spearheads and arrowpoints and an occasional perforator. The order and manner of development of the average blade-derived implement of rhyolite are well shown in the series of drawings presented in plate XLIII. The quarry forms extend to *d*, and the cache and disseminated forms appear in *e*, *f*, *g*, and *h* (side views below, profiles above).

As shown in a preceding section, the cache blades of this material are often long and highly attenuated, and few examples of flaked blades east of the Appalachian ranges surpass in size the fragmentary specimen shown at the left in plate XLIV. Just what this blade should be called may not be determined, but it seems that such a specimen was more probably designed to be hafted as a symbol of authority or as a ceremonial object than as an implement to be used for any practical purpose. The contour of the fragment preserved would seem to



GROUP OF CELT-AXES FROM THE TIDEWATER REGION (ABOUT ONE-THIRD ACTUAL SIZE)

indicate that the original could not have been much short of 12 or 13 inches in length. Blades of this general class are all very thin, rarely exceeding three-eighths of an inch in thickness. The plate contains six other blades of varying length and outline. The two larger specimens are from the Anacostia site, near the Pennsylvania avenue bridge; the others are from various points in the vicinity of Washington.

In plate XLV a number of partially or wholly specialized forms are shown. They may be classed as knives or spearheads. Spearheads are well represented in plate XLVI, and many smaller projectile points of varied form are seen in plate XLVII. They repeat in a great measure the quartz and quartzite shapes.

FLINT AND JASPER IMPLEMENTS

As already remarked of the use of flint in another place, it does not seem necessary to dwell at length on implements of this material, since they are comparatively rare, and but repeat the forms seen in other materials.

Jasper also has a somewhat meager interest in the tidewater province. Although the sources of this material are not definitely determined, it is safe to conclude that certain large and boldly flaked cache forms found in the Chesapeake country were derived from material in the mass and not from the small blocks or pebbles sometimes found in the gravel deposits of the lower Susquehanna and lower Delaware valleys.

The only quarries of jasper so far brought to public notice are those discovered and examined by Mr H. C. Mercer, of the University of Pennsylvania. They are located in Bucks and Lehigh counties, Pennsylvania. In these localities there is evidence of extensive quarrying and of considerable shaping operations. There can be no doubt that much of the jasper and many of the jasper tools found so plentifully in the Delaware and Susquehanna valleys came from these quarries or others of the same mineral belt, and it is highly probable that the hoards of blades and some of the larger flaked implements of the tidewater country came from these distant sources. It was probably difficult to secure jasper sufficiently massive to permit of the manufacture of such blades, and these objects must have represented much labor on the part of the makers. A noteworthy hoard of large jasper blades was obtained from a cache in a field near the mouth of South river, Maryland, 120 miles from the nearest known quarry. It may be noted, however, that no known quarry produces jasper of the dark-green color characterizing these specimens, which are now in the cabinet of Mr. J. D. McGuire, of Ellicott, Maryland.

ARGILLITE IMPLEMENTS

The conditions of the occurrence of argillite objects and implements in the Chesapeake province correspond very closely to those characterizing the occurrence of jasper. The objects are blades, mostly of the

cache type, with an occasional specialized implement. The only source of this material known to have been extensively utilized by the ancient peoples is on Delaware river some 25 miles above Trenton. Here there are quarries and roughing-out and specializing shops, and the refuse clearly indicates the manufacture of just such blades as those obtained from caches and on village-sites on the shores of Chesapeake bay. Caches of similar blades are found in many parts of Pennsylvania and New Jersey, and there can be no doubt that the products of the Berks county quarries were extensively disseminated over the Delaware and Susquehanna valleys, and that some of them were owned and stored in the usual hoards, even so much as 150 miles south of the source of supply.

In order that the evidences of manufacture as represented by the argillite quarry refuse may be compared with corresponding features in the other quarries, a series of the rejects from the Point Pleasant (Pennsylvania) shops and associated village-sites is represented in plate XLVIII. An examination of the specimens of cache clusters from South river, Maryland, makes clear their close relationship with the forms produced in the quarry.

RUDE FLAKED IMPLEMENTS

Besides the thin forms of flaked implements which have their genesis through the blade-like blank, or through flakes or fragments of like conformation, there are many heavy forms, some of which may be regarded as extemporized or emergency tools, since they appear to have been made to supply temporary or exceptional wants, or for use largely on or near the spot of manufacture only. They may be grouped for description under the following classes: 1, hatchet-like tools, made of bowlders by striking off a few flakes, thus giving a rude edge or point; 2, ax-like implements, made like the first but having notches broken in the sides to aid in attaching a handle; their uses were probably cutting, hoeing, and the like; 3, picks and digging tools, much like the preceding and used in quarrying soapstone, as well as in other similar uses; 4, slightly notched bowlders, used as hammers and sledges; 5, hammerstones. Where bowlders were not plentiful, implements of corresponding classes were made from ordinary fragments of stone. It seems probable that these ruder implements were in many cases devoted to the same uses subserved by several more highly finished forms, and no doubt specimens could be selected connecting the lower with some of the higher forms by a graduated series. It is the intention to include here only such classes or groups of utensils as are made ready for use mainly by processes of fracturing.

The hatchet-like tool, made mainly of bowlders by striking off a few flakes from one end, is found in great numbers in many parts of the region. Though belonging to late times it is extremely archaic in type. It would seem to approach more nearly the proper idea of a paleolithic

SERIES OF SPECIMENS ILLUSTRATING PROGRESSIVE STAGES IN THE SHAPING OF THE GROOVED AX BY FRACTURING-BATTERING-ABRADING PROCESSES

tool than any other known form, as hardly more than half a dozen blows were ever expended in elaborating its shape. It is found on fishing village-sites and elsewhere all over the bowlder-yielding districts. At Rock point on the Potomac, 80 miles below Washington, the shell banks and village-sites are literally strewn with these objects, and they are found by hundreds in the great shell bank at the mouth of Popes creek. The bowlders used were obtained in the vicinity in each case. These tools were apparently intended to be held in the hand, as there is usually insufficient space for hafting, and the unmodified end is round and well suited for grasping. Their great number and very wide utilization sufficiently indicate that they served some important function in the arts and industries of the fisher people. To cut up fish, to break bones, to open oysters, and to cut wood may be regarded as possible uses. I have selected several specimens, shown in face and profile in plates XLIX and L, to illustrate the various forms. Typical examples appear in *a* and *b*, plate XLIX. Specimen *a*, plate L, is of medium size and usual shape, and *b* and *c* are more elaborately flaked and have a greater appearance of battering or of use in rough work than is usual; the latter are rather exceptional forms. Many have broader edges and longer bodies. A specimen sharpened at both ends and probably intended for hafting is shown in *c*, plate XLIX. It is not unusual to find implements of other varieties, such as polished axes, which have become much worn or have ceased to be valued, sharpened by a few heavy strokes as are these bowlders. This form grades almost imperceptibly into the notched axes, picks, and hoe-like forms, as will be seen by reference to succeeding illustrations. These tools are identical in shape with thousands of the rejects found in our quarries where a few flakes were removed to test the material of the bowlders. They are identical also with specimens published by some authors as paleolithic implements. The sharpened bowlder tool is distinguished from the bowlder reject by the aid of the following observations: 1, it is found on the sites where implements were used, i. e., on village-sites and in shell heaps; 2, thus found it has evidently been obtained and removed from the deposits of bowlders, generally near at hand; 3, as found on village-sites and in shell heaps it often shows signs of use; 4, the same form in the bowlder-flaking shop is evidently one of the necessary forms of bowlder-flaking rejectage and never shows traces of use. The quarry reject is associated with its complement of refuse and related forms, whereas the implement on the site of use stands alone. The implement also presents suggestions of specialization when studied in numbers, but the quarry reject conforms to no one well-defined type of form. A similar form is found also in the soapstone quarries, where it was employed as a quarrying and cutting tool. It thus appears that objects of this general type, this essentially paleolithic type, may, in the Potomac valley, be either (1) quarry rejects, (2) a common variety of village-site tool, or (3) a quarry tool; but found in the vicinity of Washington,

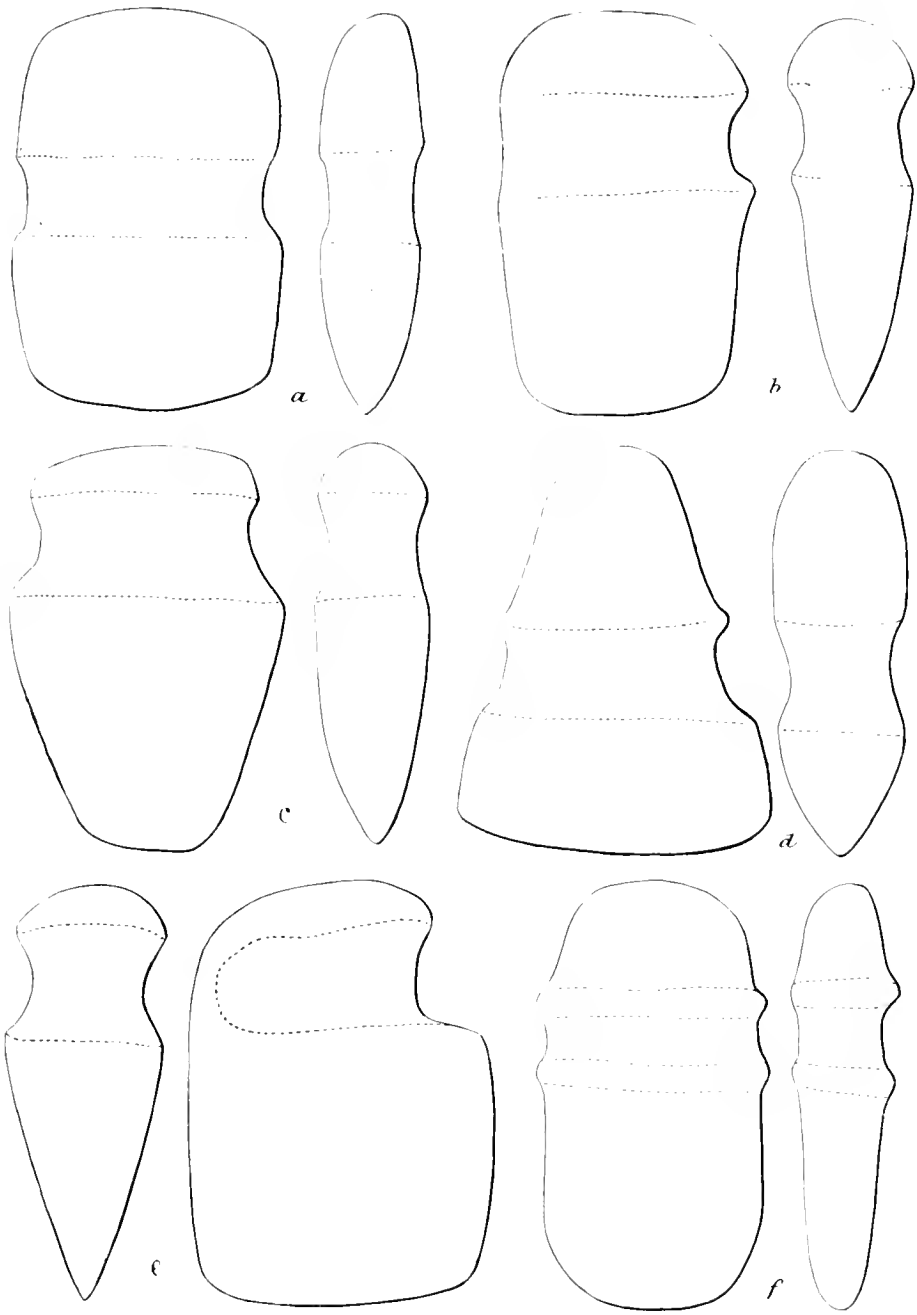
where bowlders were used by tens of thousands in blade making, the chances are a hundred to one that they are rejects of blade making.

It may occur to some that possibly this village site tool was produced in the quarries and that the rejected forms of like type are the rejects resulting from its manufacture. That this is not the case may be inferred from the facts that it usually occurs in the immediate vicinity of supplies of bowlders, and that it could be made of bowlders of inferior material, such as are found in countless places all over the Potomac region. By those who have studied the various forms on the ground, the idea that it is in any sense connected with the quarry work would not be entertained.

The notched ax is found scattered over an extended area which includes all the western tributaries of the Chesapeake. It is especially abundant in districts which, like portions of the Potomac valley, are supplied with abundance of large bowlders. In some localities these tools are quite numerous, and on sites such as the Popes creek shell heaps they are obtained by scores. As a rule they are extremely rude, and seem like tools intended for temporary rather than permanent use. They were certainly not sufficiently valuable to be transported to any great extent, and I have seen few that show pronounced marks of use. They were usually made by striking off half a dozen chips from one end of a flattish, oblong bowlder and by breaking rude notches in its sides, as shown in plate LI. The appearance is mostly that of a very elementary form of the grooved ax, the notches evidently having served to facilitate hafting. They could have been used for chopping, for digging and hoeing, or for cutting up game and breaking bones. In very many cases the edge is made by removing the flakes from one side of the bowlder only, leaving an adz-like profile. It is hard to say whether the haft was attached with the edge at right angles to the handle, as in our adzes or hoes, or whether the blade was placed as in our ax. Some idea of the variety of forms taken by these tools is conveyed by the specimens shown in plates LII and LIII. Occasional specimens show considerable elaboration, and it is quite possible to assemble a series showing a complete gradation from the simplest notched ax to symmetrically shaped and well-finished forms of grooved axes.

All of the forms referred to as picks, and which pertain largely to the quarrying and working of soapstone, are abundantly illustrated under the head of cut-stone implements, with which they are placed, not because they are themselves in any sense cut stones, but because they were employed in cutting the soapstone and because it seems better that all phenomena pertaining to that interesting and important subject be kept together. To obtain a complete notion of the ruder forms of flaked-stone implements it will therefore be necessary to turn to the pages treating of steatite.

A few other implements of correspondingly rude character are shaped exclusively by flaking, though in many cases continued use



OUTLINES OF GROOVED AXES ILLUSTRATING THE RANGE OF FORM COMMON IN THE TIDEWATER REGION

has given them the appearance of pecked, abraded, or polished forms. In *a*, plate LIV, we have a hammer or sledge—a flattish bowlder notched on the sides for hafting. The flat face is shown at the left and the profile at the right. The smaller objects of this class may have been used for sinkers and the larger possibly for anchors, for sledges, or even for weapons of war and the chase, and, properly hafted, would have been as highly effective as the more elaborately finished articles. The lower figure in this plate is an oblong bowlder that was probably hafted as a sledge, and the ends have been fractured by use. Examples of this class sometimes show traces of wear by the haft.

The foregoing varieties of rudely flaked stones are those most characteristic of the inhabited sites, including fishing grounds, shell heaps, and village-sites generally, in the Potomac and Chesapeake valleys.

Chapter IV

BATTERED AND ABRADED STONE IMPLEMENTS

GENERAL PROCESSES OF MANUFACTURE

The term pecked implements is used to designate such articles as owe certain of their more marked characteristics of form to the battering processes of bruising and crushing by successive blows—the bushing or bush-hammering of modern stone workers. The aboriginal stone worker produced this effect largely by means of pecking the object undergoing manufacture lightly with a suitable stone tool. The process is a tedious one, and especially so in the hands of a novice, but the skilled operator with proper stone and suitable tools soon defines a groove or removes an excrescence.

The battering processes do not generally stand alone, but are associated to greater or less extent with (1) flaking, which, when employed, precedes the pecking, and (2) grinding and rubbing which follow it. Percussive drilling of hard stone is a variety of battering, and rotary drilling and sawing go with the auxiliary process of grinding. Implements shaped largely by battering are so often finished by abrasion that the term "polished stone implements" is often applied to the entire group, but as I desire to deal here mainly with the more decidedly dynamic shaping agencies, abrading will not be referred to save as an auxiliary process.

All, or nearly all, primitive peoples with whom we are acquainted understand and practice the art of shaping stone by battering and its auxiliary processes. Archeologists have reached the conclusion, from a study of certain groups of prehistoric remains, that the battering-abrading operations belong to a somewhat advanced stage of human progress, and that their employment was preceded by a period in which fracturing processes alone were practically used. This is probably in a broad way true of the race, and is certainly true of many peoples or nations. The reason for this order must be sought in (1) the nature of the operations involved, (2) in the materials available to primitive artisans, and (3) in the capacities and needs of men.

Of the four leading shaping acts, which may be designated as fracturing, battering, abrading, and incising, it may be hard to say which is the most elemental. However, the ease with which, or the order in

GROUP OF GROOVED AXES FROM POTOMAC-CHESAPEAKE VILLAGE-SITES

which, they would come into actual use would not depend on the simplicity of the single act, but, supposing materials and needs uniform, on the ease with which they could be made to produce desired results. Without going into details, which I have discussed elsewhere,[1] it may be stated that although the flaking act is not more simple or elemental than the others it is not decidedly more difficult, and that it has an enormous advantage over them in being capable by a single operation—a simple blow—of producing effective and constantly needed implements for cutting and piercing, whereas the other acts must be repeated many times without marked results, and repeated in such manner and order as to bring about a result not comprehensible save through long periods of experiment. Therefore, I conclude that where materials are favorable the powers and wants of men will tend most decidedly to the adoption and general practice of the flaking processes in advance of the other stone-shaping processes. At the same time it would seem that there need be assumed no great gulf between the two classes of operations. It is indeed hard to see how one could exist for a long period without the development of the other. Assuming that in general flaking is the first to be utilized, we can understand how the other process would be suggested to man. When a mass of stone is to be broken and flaked into shape, a flaking stone or hammer is called for. This hammer in use becomes bruised and gradually takes upon itself a purely artificial shape—the result of battering. If irregularly ovoid, it is in use turned between the thumb and fingers until its periphery becomes symmetric. Viewing this result it would seem but natural that the workman should understand and apply to producing other shapes the processes by means of which the tool in his hand is reduced to specialized shape. Again, the stone flaked, if it be somewhat tough, is often battered on the edges by the hammer in vain attempts to remove flakes, so that portions of the surface are changed in contour and exhibit the battered character. It seems remarkable that such operations should go on for long ages producing visible results without attempts to utilize the means of modifying shape thus distinctly suggested. At any rate the time did come when primitive men recognized the adequacy of battering as a means of shaping stones. Natural forms were first modified in use and the operations came to be understood and applied. Battering, called in its typical development pecking, was resorted to as a means of increasing the adaptability of available forms to ordinary needs, and a new and important group of shaping operations sprang into existence.

The tidewater country furnishes much evidence on the practice of this branch of the shaping arts among a rude seminomadic people. On ancient sites we find artificially modified water-worn rocks—bowlders and pebbles of hard and tenacious materials—cast away at all stages of the shaping operations from the first traces of pecking, where the

[1] Proceedings of the American Association for the Advancement of Science, Madison meeting, 1893, pp. 289–300.

work of removing an objectionable lobe or projection was just begun, to the stage where the traces of natural contour are all but obliterated. We find also specimens that have passed into the wholly artificial state, into symmetric and perfected tools, as well as others which have been modified by use, reshaped, reused, and practically worn out. Similarly we observe various worked stones of tough and hard varieties in which the pecking has been preceded by flaking. In some cases the whole surface has been flaked over, and in other cases projecting portions only have been removed. Examples are found in which the battering process has been merely commenced, and others on which the work has gone so far that only the deeper flaked conchoids are traceable. Of course many wholly artificial and highly finished articles have passed through this series of operations, preserving no record of their earlier morphology.

SPECIAL PROCESSES

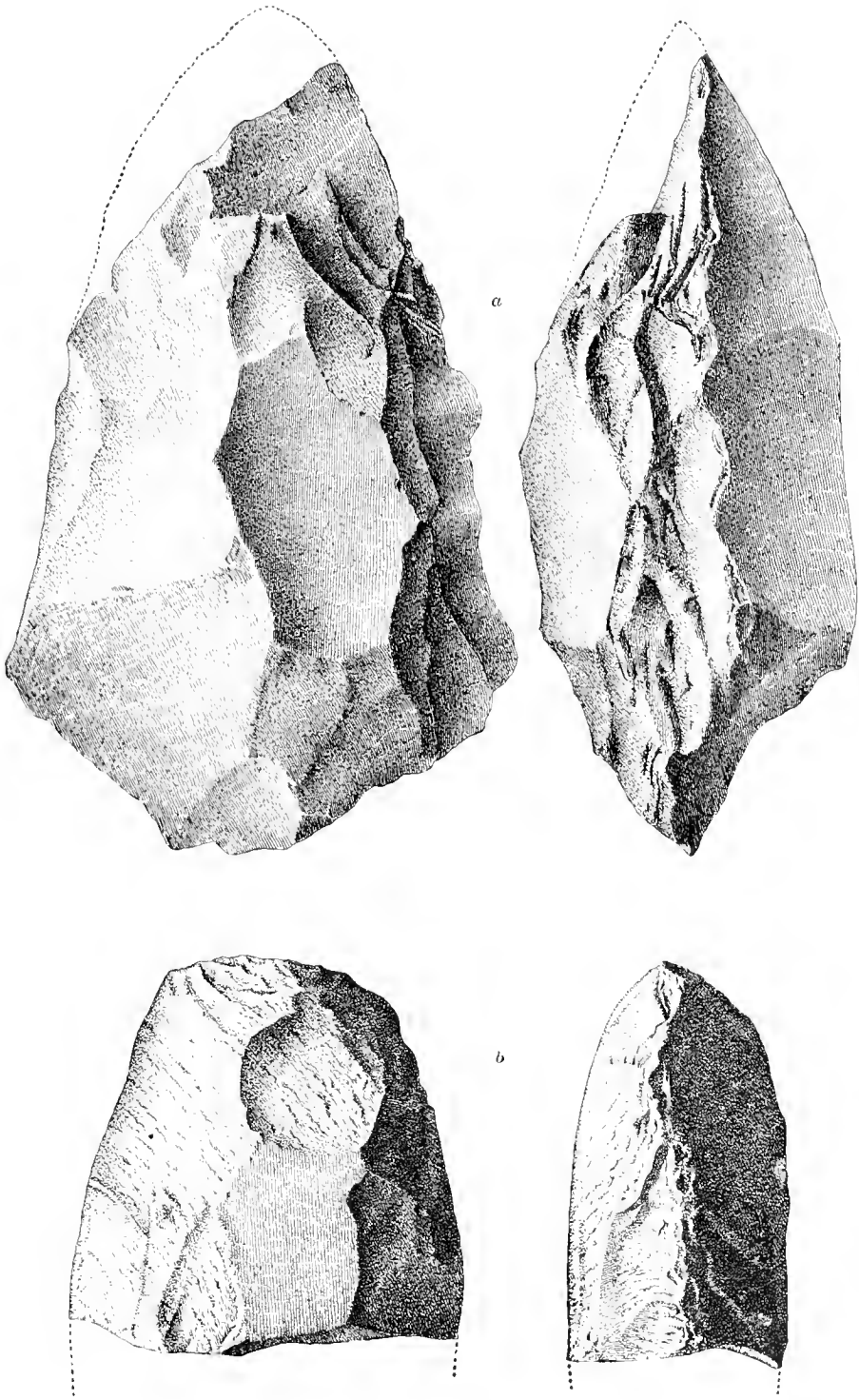
CLASSES OF IMPLEMENTS

With a people so simple and primitive as those inhabiting the tidewater country, the range of pecked and polished implements and other objects is not great. Two standard forms employed by them in common with nearly all the native peoples of America are the celt or hatchet and the grooved ax. These are too well known to call for presentation except in so far as they may be needed in explaining the processes of manufacture or in indicating local peculiarities of shape. Besides the two leading forms there are pestles and mullers, mortars, picks, chisels, pierced tablets, winged ceremonial stones, plummet-like forms, beads, and pipes; to these we may add hammerstones and grinding and polishing stones. Few of these objects occur in large numbers, and a very small percentage only of any variety exhibit high elaboration or neat finish. The artificial shapes of many of these objects are due largely or entirely to the effects of use. Illustrations of several classes of forms are given in the accompanying plates.

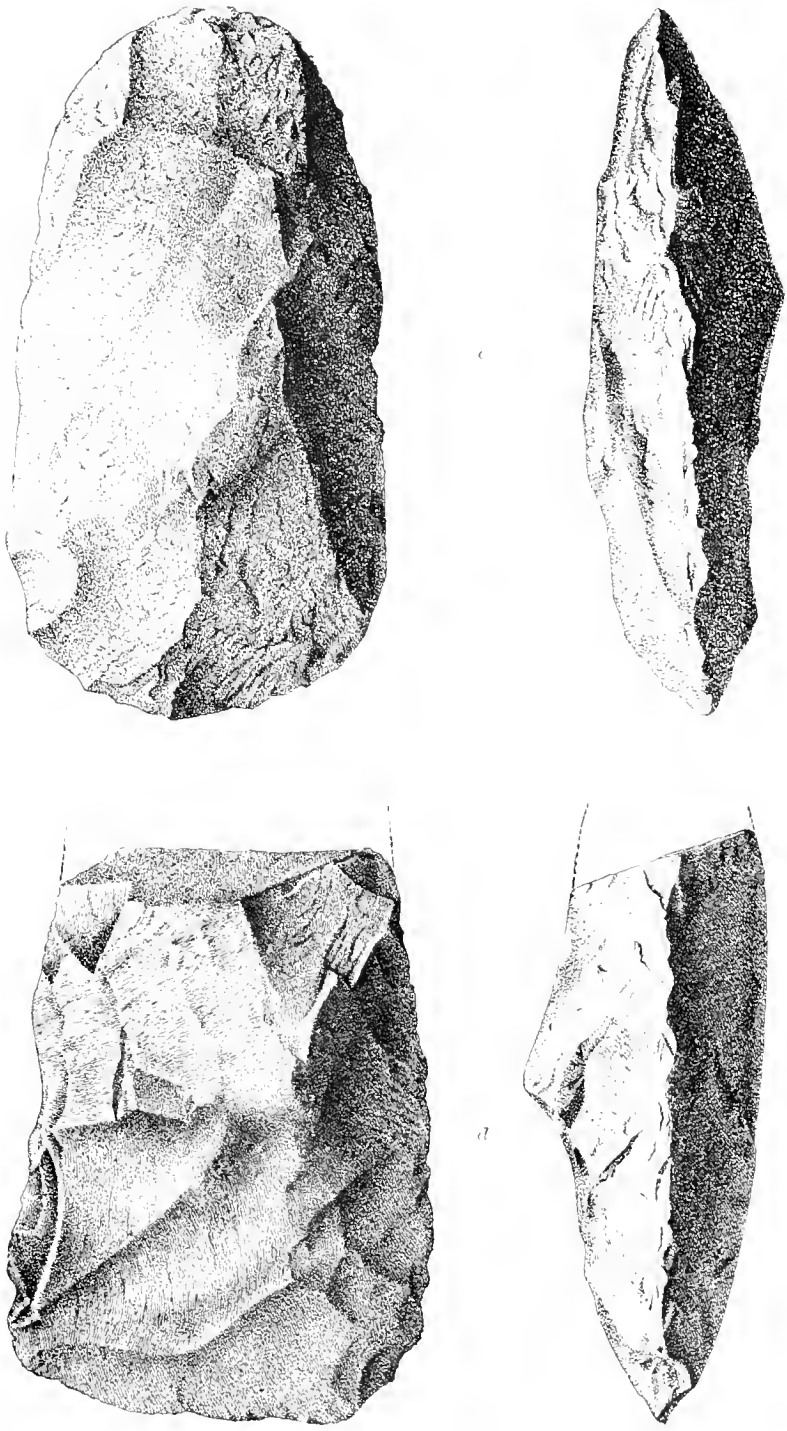
So far as I have been able to learn, no example of the carving of a human figure or animal form has been discovered in this whole province, a circumstance confirming the story of the potter's art as well as the records of colonial times, which indicate that although the peoples cultivated maize and were an able and enterprising race they were in many respects not far removed in matters of art from the base of the American culture scale.

MATERIALS USED

The materials employed for shaping by the battering processes must possess a high degree of toughness combined with the hardness necessary to effective use when finished. Quartzite, quartz, flint, chert, and various other brittle forms of rock are ill fitted for reduction by pecking, and were not extensively used for highly finished tools. Granites



FLAKED SPECIMENS ILLUSTRATING THE REJECTAGE OF CELT MAKING; RUDE FORMS FROM SHOP NEAR LURAY, VIRGINIA; THREE-FOURTHS ACTUAL SIZE



FLAKED SPECIMENS ILLUSTRATING THE REJECTAGE OF CELT MAKING; THE WORK OF PECKING NOT BEGUN; FROM SHOP NEAR LURAY, VIRGINIA; THREE-FOURTHS ACTUAL SIZE

and certain varieties of eruptive rock were preferred; these are heavy, hard, tough, and fine grained. The tidewater country furnishes none of these rocks save such as were brought down in fragmentary form by the rivers and deposited along their banks. The search for materials was not confined to the tidewater country but extended far up into the hills and ranges on the west. Shapes approaching the form desired were selected when possible, and the water-worn pieces often had the double advantage of being already approximate in shape as well as especially compact and durable. The exact source of the raw material used in any given case is difficult to determine, (1) because the pieces used are commonly erratic, and (2) because the implements and other articles made are of a nature to be treasured and hoarded up and of a size permitting ready transportation. Perhaps 75 percent of the implements made were of the compact basic volcanic rocks of the Piedmont region, and 80 or 90 percent were made from the water-worn masses or bowlders.

EXAMPLES OF THE IMPLEMENTS

The manufacture of pecked implements can not be studied so readily and satisfactorily as can that of flaked stones, for the work was not often so extensive as to lead to the opening of quarries and the development of permanent workshops where evidence could accumulate, yet we are still able to secure full information with respect to the processes and steps of manufacture. Village-sites in the vicinity of deposits of the raw material yield ample evidence as to the nature of the various operations.

Two series of illustrations presented herewith will suffice to show the processes and progress of the shaping of pecked tools. These series (plates LV and LVII) are composed of a number of different specimens selected of a size and shape to represent as nearly as possible the appearance that would be assumed at successive stages of progress by a single specimen undergoing manipulation.

The evolution of the celt is shown in plate LV. The first three specimens are rejects or unfinished forms thrown aside during the process of shaping. We begin with a water-worn stone, 1, approximating in general outline the tool to be made. A few flakes have been removed, making the edges thinner and sharper and thus saving a large amount of pecking. In 2 the surface has been gone over roughly with the pecking hammer, reducing the ruggedness; in 3 the pecking is well advanced, and in 4 the grinding is well under way; 5 represents a specimen well polished and with marks of use, and 6 is a celt that appears to have been much shortened by use and resharpening.

The range of contour is not great in these simple tools, yet there are marked variations in proportion; thus we have cylindrical, flat, pyramidal, and pointed forms, and there are always local variations indicating differences in people, material, functions, etc. In plate LVI a group of celts from the tidewater village-sites is presented.

A series of forms illustrating the development of a grooved ax is shown in plate LVII. These specimens were obtained from village-sites in the neighborhood of the head of tidewater on the Potomac. On account of the length of the series I have omitted the bowlder which would naturally precede the artificially shaped series. The first figure represents an early stage in the work of shaping. The side shown has been flaked into shape save at the top where a portion of the bowlder surface is still seen. The work of pecking away the irregularities has extended over most of the surface, and the deeper conchoids at the edges, and one or two some distance from the margin, are still visible. The opposite side is less fully worked, the original surface of the bowlder being less than half removed. The groove has not been commenced save perhaps as indicated by a very faint depression at the left. In this rudimentary state it is difficult to determine, save by the general outline, whether a celt or a grooved ax was to be made.

In the second example the bowlder chosen was originally much nearer the general outline desired than in the first case. Little flaking had to be done. The groove is already well under way, although fully one-half of the original surface remains untouched either by the flaking or by the pecking hammer.

In a third specimen, omitted from the series to reduce its length, the battering operations are well advanced, small portions of the original surface only remaining. There is a freshness and crudeness about the work, indicating that the specimen, if regarded as complete, had not yet been devoted to use.

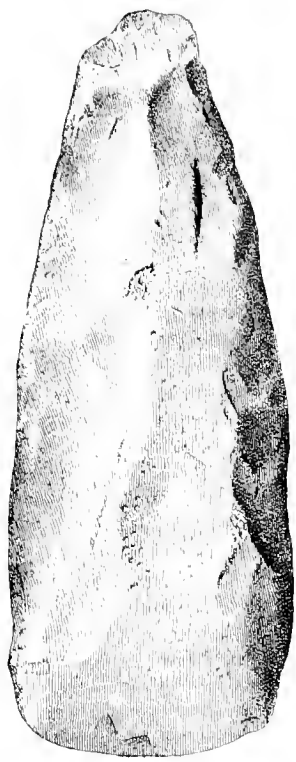
The next example (the third illustrated) bears evidence of use, and was probably finished, though the edge has been broken by accident or flaked for remodeling. It is somewhat crude in surface, and retains small patches of the original bowlder surface.

The fourth specimen figured is apparently a finished implement, though bits of the bowlder surface still appear. The battered surface has been considerably rubbed down and the edge has been ground.

The last specimen of the series is a highly elaborated and well-finished specimen, purely artificial in every part. The battered surface is entirely removed by abrading operations, and the blade and the groove are well polished—first by the finisher and second, no doubt, by use. A final specimen, originally in the series, but omitted for want of space, shows much evidence of use and repeated sharpening of the edge. The blade is shortened and blunted, and the poll is well worn. In size the axes of this region vary from less than 2 inches in width by 3 in length to 6 or 7 inches in width by 12 in length. Their shapes are probably less varied than those of many other regions, yet the extremes of shape are very wide apart. The series of outlines presented in plate LVIII will serve to convey an idea of the range of form.

A broad distinction in shape is based on the manner of hafting. In one group the groove extends entirely around the implement, while

SPECIMENS ILLUSTRATING THE REJECTAGE OF CELT MAKING; THE WORK OF PECKING BEGUN; FROM SHOP NEAR LURAY, VIRGINIA; THREE FOURTHS ACTUAL SIZE



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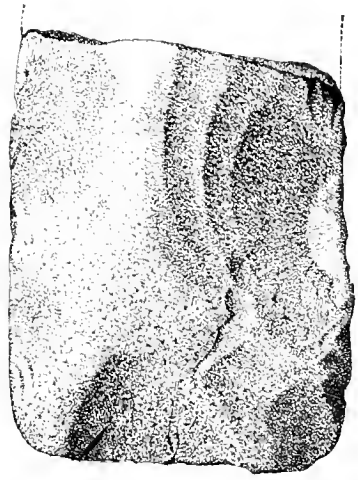

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SPECIMENS ILLUSTRATING THE REJECTAGE OF CELT MAKING; THE WORK OF PECKING WELL UNDER WAY AND GRINDING COMMENCED; FROM SHOP NEAR LURAY, VIRGINIA; THREE-FOURTHS ACTUAL SIZE

in another group one lateral edge is straight, being so arranged as to permit the wedging of the haft band. There are specimens, however, varying so far from the type forms as to bridge the gap between types. The specimen seen in *a*, plate LVIII, is flat and rectangular in outline, with encircling groove in the middle; *b* is similar, but with groove more shallow on one margin, and placed about one-third of the way from the top; *c* has a wide encircling groove near the top and a narrowing toward the point; *d* has the groove very low on the shaft and the blade is wide at the edge; *e* has one straight side for wedge hafting, and a wide projecting shoulder below the groove in the opposite edge; *f* has the groove bordered by low ridges all around.

A very good idea of the appearance and range of form of these implements may be gained from the numerous examples brought together in plate LIX. These specimens belong partly to the National Museum and partly to the collection of Mr W. H. Phillips. Nearly all are from the village-sites of the Potomac valley.

MANUFACTURING SHOPS

Pecked, ground, and polished implements were made in large numbers by our aboriginal tribes, but not in such abundance as were the flaked tools. They were in a measure luxuries, requiring time and skill in manufacture, and serving no purely utilitarian purpose that could not be served almost as well by the products of pure flaking—a shaping process many times more economical of time and labor than the battering-grinding processes. As a result of this relation of the two great classes of processes, the phenomena of manufacture observed by the archeologist present many decided differences.

The manufacture of implements in large numbers required abundance of material, the deposits of which had to be uncovered and then broken up and removed, and this resulted in the opening of quarries and in the accumulation of large bodies of débris. This is true of the manufacture of flaked and cut-stone implements, as we have seen, but the battered-abraded tool used in limited numbers usually had a sporadic or random origin, suitable pieces of stone being picked up and utilized; the amount of the product depended very considerably, no doubt, on the plenitude of convenient pieces of stone. Rarely, therefore, do we find sites where the making of these forms was carried on extensively. The phenomena of manufacture by pecking and grinding, being scattered, have not been so well understood as the phenomena of flaking.

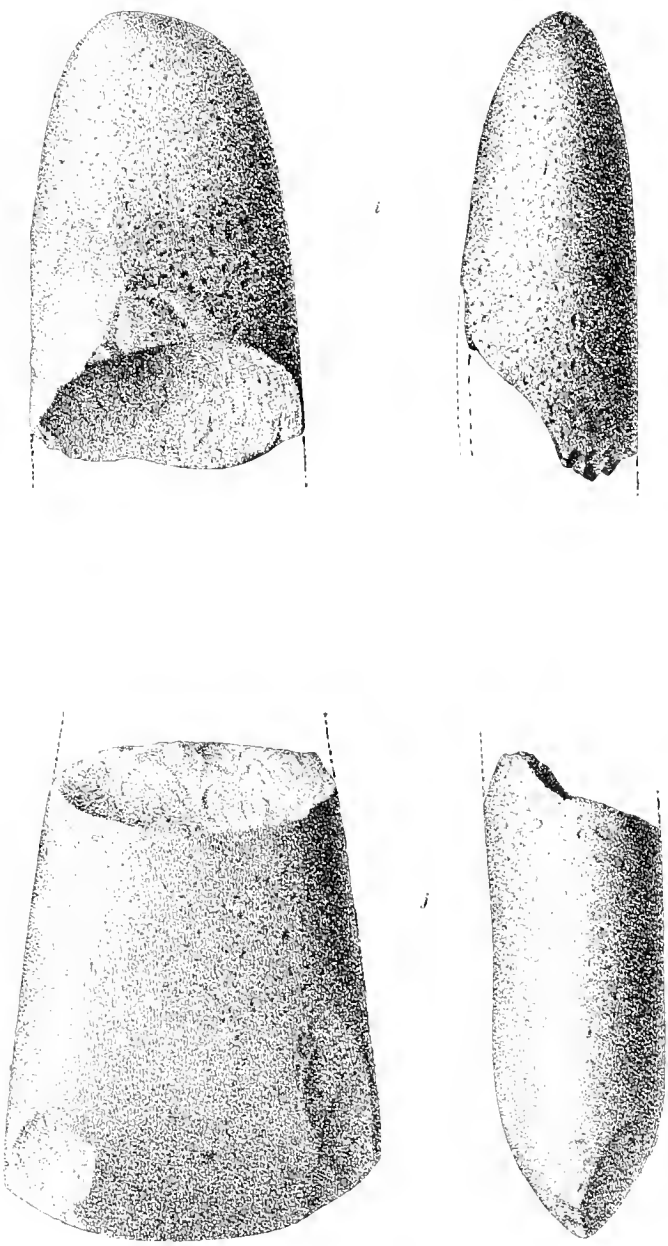
The variety of stone most used for the manufacture of celts and axes is a compact, greenish-gray trap or trap like rock derived originally from the highlands of Maryland and Virginia, but obtained by the aborigines very largely from the bowlder beds of the tidewater rivers near their exit from the highland or at other points higher up the streams where partly rounded fragments had been deposited in large numbers. A

great deal of shaping was done on the various village-sites about the Little falls of the Potomac and on other streams at the crossing of the fall-line.

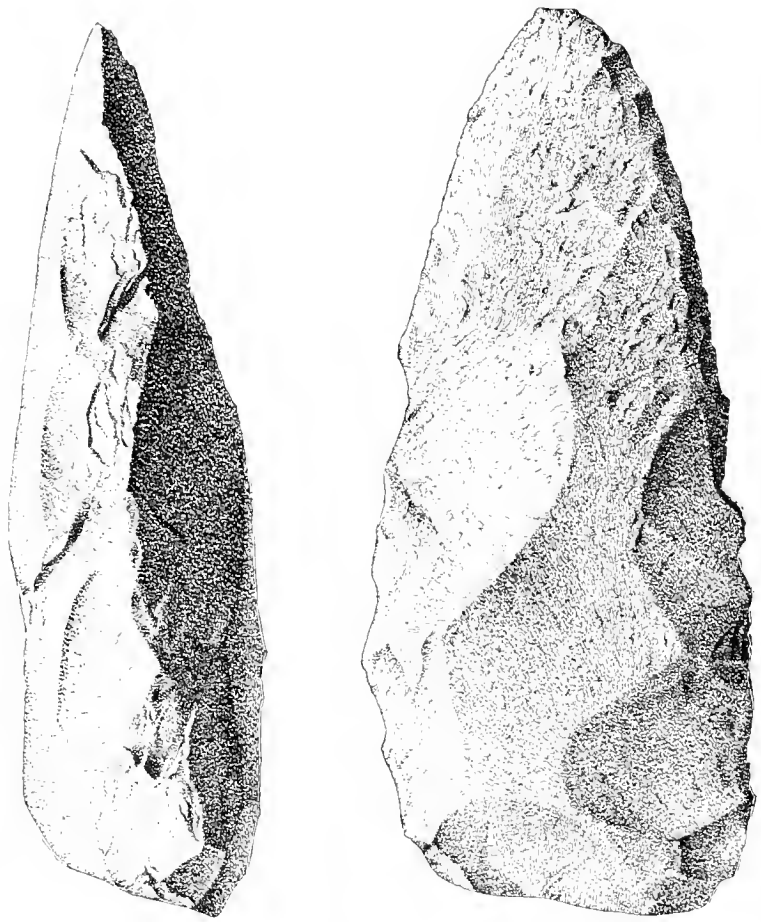
The most striking example of this class of site yet observed is located in Page county, Virginia, 2½ miles east of Luray. The spot was first visited by Mr Gerard Fowke in 1892; but his report,[1] dealing with evidences of dwelling and mound building, contains slight mention of the phenomena referred to here. The site, which must be that of an important aboriginal village, occupies several acres of bottom land located on the eastern side of Pass creek, a few hundred yards above its confluence with Hawksbill creek. The only notable topographic feature of the site is a mound some 3 feet high and 200 feet in diameter, in which Mr Fowke found human remains in almost incredible numbers, besides occasional implements and utensils deposited with the dead. There are many graves scattered over the terrace, a row of eight, each containing decayed human bones, together with implements and earthenware, having been freshly disturbed by the plow at the time of my visit. The materials utilized in implement making by the inhabitants were derived from great accumulations of pebbles, bowlders, and partly water-worn fragments of rock occurring in the banks and bed of the stream and now exposed where the floods have torn channels through the alluvial bottom; and probably also from deposits of similar but rather coarser materials outcropping in the face of a terrace which rises to a considerable height from the eastern margin of the narrow bottom. On the village-site about the mound the phenomena of manufacture are more or less confused with those of utilization, but separation of the varied features is in the main possible and easy. The evidence of manufacture consists of large quantities of rejectage, comprising broken masses of stone, tested bowlders and rejects of all stages of development, together with flakes and hammerstones. The phenomena of dwelling are—aside from the mounds and graves—arrowpoints and spearheads, drills, worn celts and axes, pitted stones, mortars, pestles, and pottery.

Two principal materials were utilized and two distinct classes of implements were made, leaving equally distinct varieties of rejectage. Quartzite was utilized in making the ordinary flaked tools, mostly projectile points, and the ground is filled with turtlebacks, flakes, and broken blades of this material, duplicating the rejectage of the well-known tidewater sites. The greenish-gray trap or trap-like rock was employed in the manufacture of battered-abraded tools, mostly celts, and the flat ground about the mound and extending from the stream back to the base of the terrace is strewn with the rejectage. This stone occurs in bowlders and irregularly water-worn masses in the banks of the stream and scattered over the floodplain, but not to any extent in the higher-cut terraces which represent the Lafayette period. It was assumed, therefore, that the implement rock had a local origin

[1] Archeologic Investigations in James and Potomac Valleys, Bull. Bur. of Eth., 1894.



SPECIMENS ILLUSTRATING BREAKAGE IN CELT MAKING; PECKING AND GRINDING WELL ADVANCED; FROM SHOP NEAR LURAY, VIRGINIA; THREE-FOURTHS ACTUAL SIZE



SPECIMEN ILLUSTRATING ROUGHED-OUT CELT, VERY THICK AT THE LOWER END; FROM SHOP NEAR LURAY, VIRGINIA; THREE-FOURTHS ACTUAL SIZE

This object might readily be taken either for a reject of leaf-shape blade-making or for a completed implement of one of the larger varieties, but, found on a celt-making site, it may safely be classed as a reject of celt making. It is a typical celt blank, defective, however, in having insufficient thickness of poll and at the same time too great massiveness at the broader edge. The latter condition would have made the pecking necessary in producing an edge very prolonged and laborious.

somewhere within the drainage of Pass creek. Mr W J McGee, who accompanied me to the spot, undertook to trace the material to its source and met with almost immediate success. Observing that the particular variety of stone did not occur to any notable extent in the beds of neighboring streams, he followed Pass creek to the forks, and there found it confined mainly to the bed of the middle fork. Ascending this, he soon encountered a body of intrusive rock, a rather coarsely crystalline diabase, not identical save in parts with the rock used by the Indians, which is of finer grain and has the appearance of a sedimentary slate or shale altered by contact with the intruded mass. It appears, as remarked by Mr McGee, that the spot occupied by the village was probably the only spot to be found on which this stone could be found in forms well suited to the needs of the implement maker, and at the same time in sufficient quantity to make extensive manufacture possible. It is not improbable that the village came to be located here as a result of the discovery of these conditions.

It was found that in nearly all cases the work of shaping by the battering-abrading processes was preceded by flaking the rounded masses into approximate shape. Rejects representing all stages of the work of flaking, pecking, and grinding are found in numbers. There is the bowlder or mass with a few flakes removed in testing, or the shattered fragments resulting from breakage under the preliminary testing or shaping blows; there are hundreds of rejects representing early stages of manipulation, the thick turtleback forms duplicating in general appearance the corresponding rejectage of projectile-point making; there are the approximate blade-like forms but rarely approaching thinness; there are many pieces broken under the flaking hammer at all stages of the work; there are also many specimens in which the pecking has just begun, and others more advanced, and these stages are represented by much breakage under the pecking hammer; finally, there are the completed implements with ground edges and surfaces, in which the pecking and grinding has to a large degree obliterated the conchoids of flaking.

Although the celt is usually classed with the pecked and polished implements, it is readily seen that on this site flaking was of greatest importance as the main difficulties were encountered, the chief shaping work accomplished, within the flaking stage. The pecking removed excrescences and added to symmetry, and grinding reduced the edge to an even curve and uniform bevel. Grooved axes also were made on this site, but to a less extent, the operations being well represented, however, in the rejectage and in numerous finished implements occurring on the site.

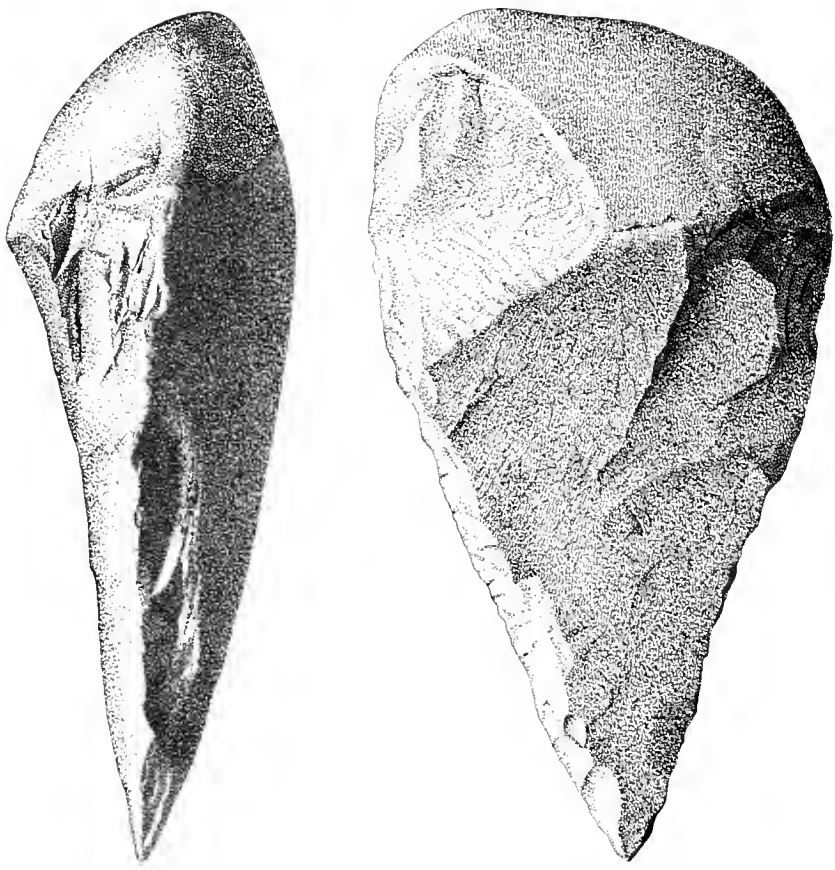
The series of specimens presented in plates LX to LXIV illustrate a progression from incipient stages through a succession of rejects, fragments, and unfinished forms to broken specimens of well-finished tools. The reference letters are continuous through the set of plates.

The first step—the testing and shaping of the crude mass—though represented by much rejectage, is omitted for economy of space. An illustration of a slightly advanced stage is given in *a*, a thick, clumsy form, rejected no doubt on account of the breaking away of portions of the upper end. A half blade representing a somewhat more advanced stage is given in *b*, in which a portion of the water-worn surface remains; and *c* and *d* illustrate further progress in flaking out the thick blade. In *e* and *f* the battering has begun, the former having been rejected probably on account of defective shape at the upper end, and the latter having broken under the hammer. In the fragment *g* the pecking was well under way, and in *h* much of the surface has been pecked and the edge with portions of the sides ground. In this case the flaking seems to have been so successful that little pecking intervened between the roughing-out by the flaking process and the finishing by the grinding process. The specimen shown in *i* is the upper end of a well-advanced specimen, and *j* is the blade of what must have been a perfected implement. It is, of course, impossible to say whether these latter pieces were broken during the finishing operations or in use.

COMPARISON OF CELT MAKING WITH BLADE MAKING

A comparison of the rejected forms produced in celt making as practiced in such shops as that of Pass creek with corresponding forms from the flaked-blade shops such as those of Piny branch will prove instructive. In general appearance the rejects of the two sites are very much alike. At a glance we see that the form constantly kept in view in both cases is of leaf shape, one end being decidedly pointed and the other broad and abruptly terminated. We observe, however, that in the flaked group—the leaf-shape group proper—the *pointed* end was designed to be finished for use, and that in the group shaped by flaking, pecking, and grinding—the celt group—the *broad* end was designed to form the edge of the implement, and this distinction can be traced in the rejectage back toward the inceptive stage by the difference in degree of attention given to the two ends. In the one case the narrow end was to be specialized for use and the broad end for hafting; in the other, the broad end was to be specialized for use and the narrow end for holding or hafting. In general, we may say that rejectage in the one class was the result of too great thickness, and in the other class of (in many cases) too great thinness. Two excellent examples of failure in celt making resulting from too great thickness at the broad end and thinness at the small end are shown in plates LXV and LXVI.

As made on the Pass creek site, the grooved axes were roughed-out by flaking pretty much as were the celts, rude notches being broken in the sides as the only possible contribution of the flaking process to the groove making. In plate LXVII specimens of axes are given, showing traces of the conchoids of flaking, though the implements are well advanced through the subsequent pecking and grinding stages.



SPECIMEN FROM CELT SHOP NEAR LURAY, VIRGINIA; PROBABLY REJECTED ON ACCOUNT OF DEFECTIVE WORK WITH FLAKING HAMMER; POSSIBLY AN IMPLEMENT INTENDED FOR LOCAL USE; THREE-FOURTHS ACTUAL SIZE

Plates LXVIII and LXIX are devoted to the illustration of the hammerstones of this site. They are interesting as representing all the forms used in flaking, as well as pecking and grinding, on a site where nearly every form of tool was made and where every shaping process was employed. I do not consider it probable that any fully satisfactory separation of the specimens used for one purpose from those habitually employed in another can be made, though it is to be expected that each process separately practiced would lead to pronounced specialization. The first specimen of the series (*a*, plate LXVIII) is a water-worn pebble modified by crushing and flaking of the edges, probably in part or wholly by use, while *b* retains little of the natural surface, and at least a part of the flaking was manifestly designed to give shape to the object. The specimen shown in *c*, plate LXIX, is a stage further advanced, the surface being partly battered into roundness, and *d* is still more highly specialized. The last specimen of the series, *e*, has been much reduced by pecking and perhaps, in part, by abrading, and exemplifies the pitted hammerstones characteristic of the eastern United States.

MISCELLANEOUS PECKED IMPLEMENTS

As already remarked, the pecked and abraded implements of the tidewater province comprise few objects aside from the celt and the grooved ax. Several varieties are represented, but the numbers are limited and the shape and finish, save in a few rare exceptions, are rather rude. The accompanying plates, from LXX to LXXV, inclusive, illustrate such varieties as I encountered during the period of my investigations. Numerous more perfect implements of several of the classes have been found, but they are now out of my reach.

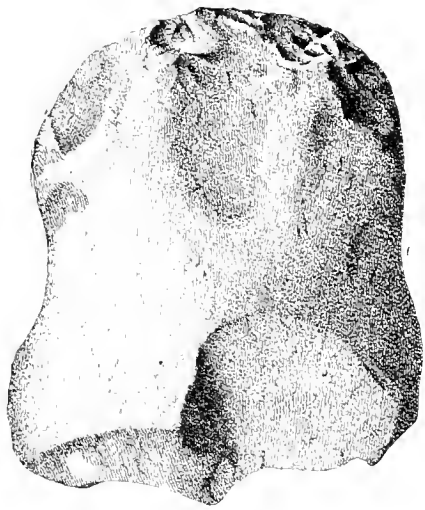
Plate LXX contains four examples of perforated tablets, two having two perforations and two having one each. The fragment *a*, made of gray slate, is from the Potomac near Washington and is covered with apparently meaningless engraved figures. The specimen shown in *b* is of red-banded slate and was obtained from the great shell deposit at the mouth of Popes creek, Maryland. The large specimen *c* is of banded slate and was found in the highland in Virginia. The small fragment *d* is from the District of Columbia.

Four examples of winged ceremonial stones are illustrated in plate LXXI. The roughed-out form *a* was obtained from a village-site at Little falls, and the other specimens, all fragmentary, came from the vicinity of Washington.

The pitted stones and mortar shown in plate LXXII are from the great shell heap at the mouth of Popes creek, and are common forms. The same may be said of the upper figure in plate LXXIII. The pestle shown in *b* was found on a village-site at Halls landing, Patuxent river; the pestle *c* was picked up in a field above Little falls, and the sinker came from a village-site near Little falls.

Of the peculiar stones illustrated in the upper figures of plate LXXIV I will not venture to say more than that they are apparently abrading implements, but whether they were for the shaping of stone tools or the dressing of wood, bone, or thongs can not be determined. The material appears to be a dark-gray eruptive rock. The lower specimen is of a somewhat gritty stone and was probably a simple grindstone. All are from sites about the head of tidewater on the Potomac.

The hammerstones brought together in plate LXXV represent the varieties most common on the village-sites of the province. All are from the tidewater Potomac. The smaller specimens in the upper line are of quartz and the others are of quartzite.



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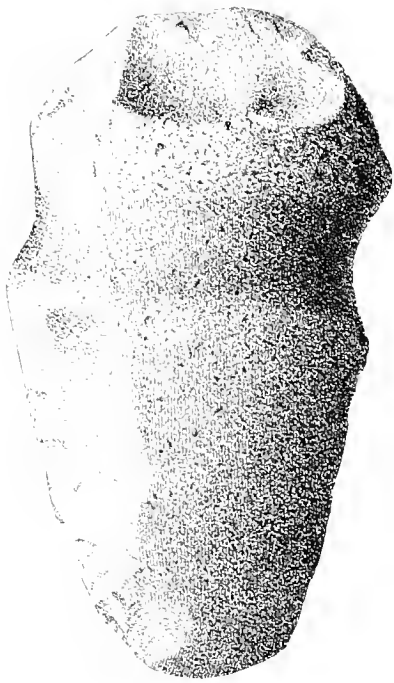

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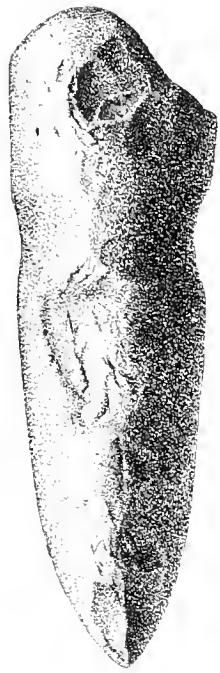


SPECIMENS ILLUSTRATING THE MANUFACTURE OF GROOVED AXES; FROM THE CELT SHOP NEAR LURAY, VIRGINIA; THREE-FOURTHS ACTUAL SIZE

Chapter V

INCISED OR CUT STONE UTENSILS

SCOPE OF THE TOPIC

This chapter is made to include two distinct yet necessarily associated groups of phenomena: 1, all that relates to the origin, manufacture, nature, use, and historic significance of utensils shaped by the incising methods; and, 2, all that relates to the utensils and implements employed in the shaping operations. In order that the whole subject of the manipulation of the softer varieties of stone might appear together as a unit in this place, the various flaked, battered or pecked, and polished implements used in quarrying and carving were passed over with mere mention in the sections to which they strictly belong, and are presented in some detail in the following pages, with a series of illustrations.

PROCESSES AND MATERIALS

Under the head of cut stone we have to deal with but few materials, and only one of these (steatite, or soapstone) was of importance in the native art of the tidewater country. Mica, serpentine, clay-slates, and others of the softer calcareous and argillaceous rocks were sparingly shaped by the process in some sections. The shaping operations were necessarily confined to narrow limits by the lack of effective cutting tools. Steatite and like soft and tough massive substances were cut with pointed pick-like tools and by edged, chisel-like blades, probably in most cases set in some sort of handle for direct free-hand operation, or with other classes of handles, to be operated with the aid of a mallet of bone or of antler or wood. Mica must have been cut with sharp edges or points, such as are furnished by the fracture of glassy varieties of stone.

Subsidiary to the incising processes in the shaping of soft stones are several of the other processes, such as sawing, drilling, scraping, and grinding.

USE OF MICA

So far as we can learn, mica was not extensively used by the Chesapeake-Potomac peoples; but it can not safely be affirmed that it was not used in some quantity in nearly any given locality, since the material is not sufficiently durable to be preserved, save under very favorable conditions. Mica does not occur in forms suitable for working within considerable distances of tidewater sites. It is said to have

been worked by the natives in several counties of southern-central Virginia and in Pennsylvania and the Carolinas. The processes of mining, as observed in the mines of North Carolina, appear to have been much the same as in the quarrying of steatite. The deposits were uncovered and the massive crystals were broken up with hammers and the best sheets secured to be used for mirrors, or cut into desired shapes for ornaments. In the spring of 1893 Mr De Lancey W. Gill went to Mitchell county, North Carolina, under my direction, to collect materials representing the ancient mica-quarrying industry for the Columbian Exposition at Chicago. Numerous quarrying implements resembling those used in the soapstone quarries were found, and the excavations are reported to be quite as extensive as in any other class of the aboriginal quarries of the east.

STEATITE UTENSILS

CHARACTER, USE, AND DISTRIBUTION OF THE MATERIAL

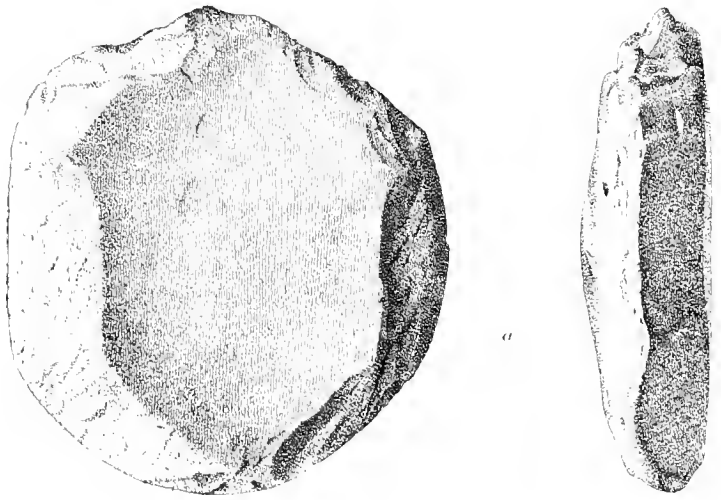
Steatite (or soapstone) was used somewhat extensively by the natives of the tidewater country in the manufacture of pots, dishes, and cups, as well as of smaller articles, such as pipes and ornaments. It was obtained along the western border of the tidewater country, either from the surface or by quarrying, and the articles made are scattered over the entire province, occurring somewhat less frequently as we pass outward toward the Atlantic shore-line. The larger objects were extremely heavy and their transportation was necessarily limited largely to the waterways.

Steatite is of common occurrence over a wide belt of territory extending through the New England states and continuing down the Atlantic slope to Alabama. In Maryland and Virginia the best-known deposits occur along the eastern border of the Piedmont highland, often within the border of the tidewater area. Its geologic relations and character are now pretty well made out.

Being a tenacious rock, it resists erosion and is consequently well exposed in stream banks, in cliffs, and on the crests of hills and ridges. The outcrops have been worked by the aborigines in innumerable places in Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New Jersey, Pennsylvania, Maryland, Virginia, the Carolinas, and Georgia. More recently the whites have mined it extensively, and many of the quarries originally worked by the Indians have been reopened for commercial purposes, and the traces of the ancient operations thereby partially or entirely obliterated. At the same time this work has resulted in calling the attention of students of archeology to the subject and in giving them an excellent opportunity for investigating the ancient industry.

SURFACE INDICATIONS OF QUARRYING

As a rule the surface indications of the ancient operations are not distinctly marked. The pittings are commonly not very deep; on



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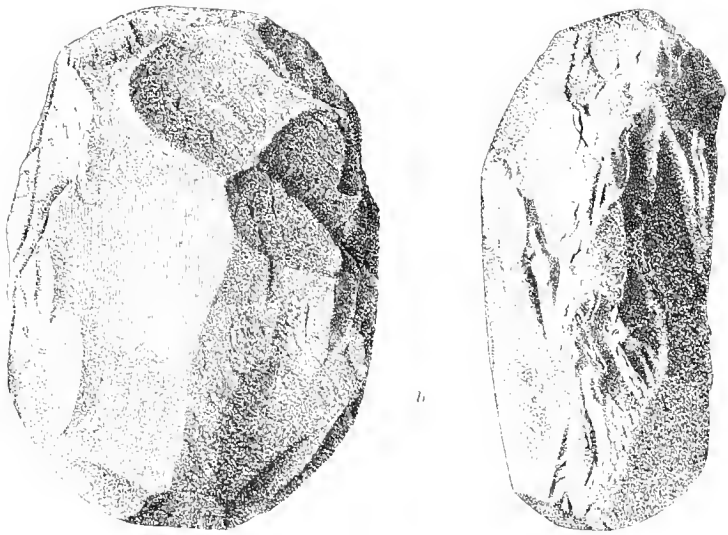
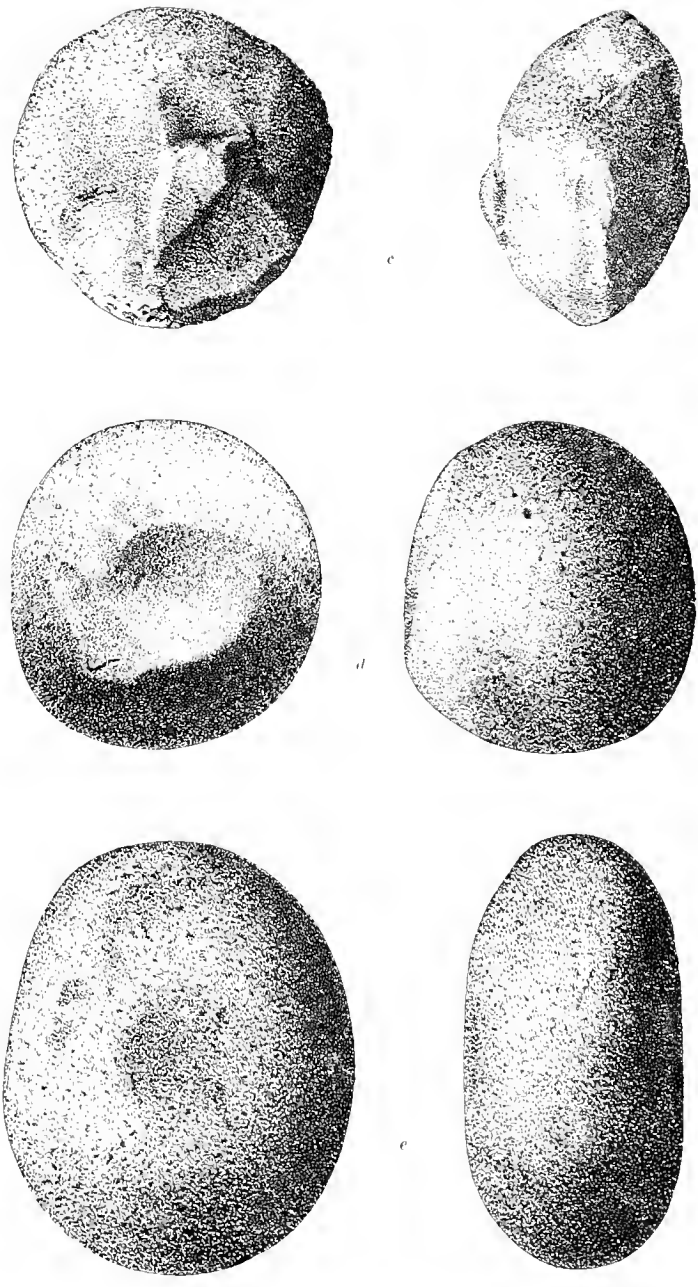


b

HAMMERSTONES FROM THE CELT SHOP NEAR LURAY, VIRGINIA; THREE-FOURTHS ACTUAL SIZE



HAMMERSTONES FROM THE CELT SHOP NEAR LURAY, VIRGINIA; THREE-FOURTHS ACTUAL SIZE

slopes where filling-in takes place rapidly they are wholly obliterated. Few instances occur in which the depressions now remaining are more than 2 or 3 feet deep. The diameter of the pittings does not generally exceed 20 or 30 feet, yet in cases they had the form of trenches or chains of pits extending for hundreds of feet along the strike of the deposit. Mr Fowke describes an excavation seen by him near Culpeper, Virginia, which is 150 feet in diameter and of undetermined depth, being filled with water and débris.

SPECIAL INVESTIGATIONS

Early Knowledge of Steatite

The use of soapstone by the native races is frequently mentioned by early writers, but no information is given of the acquisition and shaping of the material. One of the earliest accounts of the work in this country is that of Mr Paul Schumacher, who discovered typical quarries in the state of California. His illustration of the quarry face, with its partly developed nodes of the stone, published in the eleventh annual report of the Peabody Museum, would equally well illustrate the operations in our eastern quarries. The vessels and other articles produced are very numerous and differ widely from eastern forms.

Subsequently, Dr Elmer R. Reynolds, of Washington city, made some studies in the Rose hill quarry near Washington, and published a paper on the subject in the thirteenth annual report of the Peabody Museum. About this time Mr F. H. Cushing, representing the Smithsonian Institution, made extensive excavations in an ancient quarry in Amelia county, Virginia, and prepared a model of the exposed quarry surface illustrating the various phases of cutting out the incipient vessels. No report of his work was published, save a note in the *American Naturalist* for 1878.

In 1882 an important paper by Mr J. D. McGuire on the soapstone quarries of Maryland and the District of Columbia was read before the Anthropological Society of Washington, an extract of which is published in the second volume of its transactions. The present writer's preliminary paper on the Connecticut avenue quarries appeared in the *American Anthropologist* for October, 1890.

A very interesting and extensive quarry was discovered in about the year 1877, on the ground of Mr H. N. Angell, near Providence, Rhode Island, and a note describing the phenomena observed appears in the *American Naturalist* for 1878. These phenomena are essentially identical with those of more southern localities.

A like example was observed on the farm of J. T. Case near Bristol, Connecticut, in 1892, and excavations were made therein by Marshall H. Saville for the Peabody Museum. Many interesting specimens were obtained, not differing materially from those of other quarries. Vermont has furnished a similar example, and Pennsylvania abounds

in such quarries. According to Charles H. Stubbs, in a note in the Smithsonian Report for 1882, an important quarry is located near Christiana, Lancaster county, in the latter state.

Explorations conducted for the Bureau of Ethnology during the years 1890–1894 extend from the Patuxent valley in Howard county, Maryland, to the southern borders of Virginia. I made it a rule in this as in other departments of field work to visit and examine as many sites as possible, and then to select certain favorable examples for detailed study, making these the types of groups of phenomena too extensive to be fully gone over. Excavation has been undertaken at but two points—the Rose hill or Connecticut avenue quarry, near Washington, and a quarry near Clifton, Fairfax county, Virginia, 22 miles southwest of Washington.

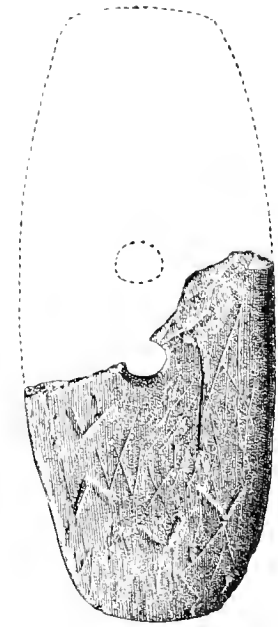
Development of the Quarrying Industry

The early occupants of the Potomac region, in their search for materials capable of serving them in their simple arts, probably discovered and attempted to utilize loose masses of the soft and tough stone known to us as steatite or soapstone. The progress toward its extensive utilization was no doubt very slow, and unless previous knowledge of such stone had been gained elsewhere, must have continued for centuries. Step by step the peculiar qualities and adaptabilities of the material were developed and diligent search was made for it throughout the highland. When the convenient loose masses were exhausted, the rock in place was attacked where it outcropped in the stream beds and on the hillsides, and partially detached portions were pried or broken off; then the process of uncovering followed and the quarrying industry was initiated. Sharp stones were employed to cut off projecting pieces, and finally cutting tools were made and improved, so that the solid stone could be removed to considerable depths.

We are not able to discover just what devices were employed in the preliminary quarry work. The earth was probably loosened with wooden pikes and with picks of stone and antler, and was thrown up with the hands or carried out in baskets of bark or cane, or in skins. As the quarrying advanced the older pits were filled with the débris, and evidences of the operations were much obscured. It is only when the pits are fully cleaned out that we come to realize the full nature and extent of the ancient work. Our excavations brought to light surprising evidences of the energy, perseverance, and skill of the native miner, and showed the practice of an art totally distinct from that carried on in the bowlder quarries of Piny branch.

Mining and Shaping Operations

The method of conducting the quarry work was substantially as follows: When a sufficient area of the solid stone had been uncovered, the



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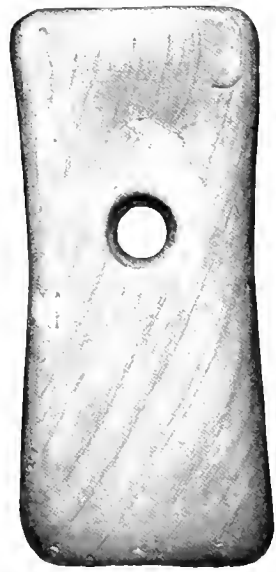

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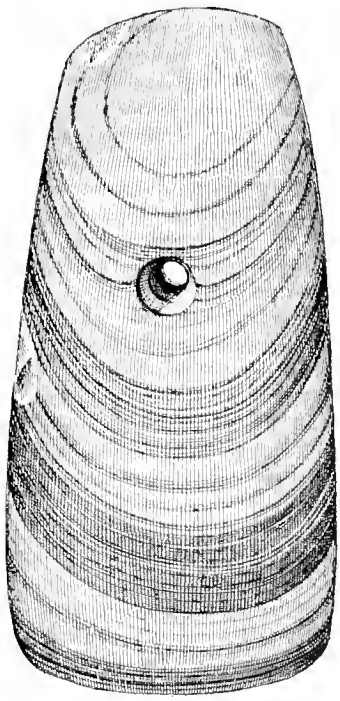

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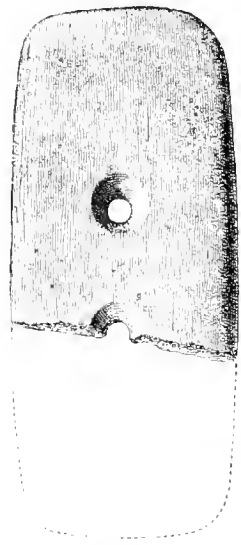


d

PERFORATED TABLETS OF SLATE; THREE-FOURTHS ACTUAL SIZE

a, *b*, and *d*, from tidewater Potomac, and *c* from middle Potomac

workmen proceeded with pick and chisel to detach such portions as were desired. If this surface happened to be uneven, the projections or convexities were utilized, and the cutting was not difficult; if the rock was massive and the surface flat, a circular groove was cut, outlining the mass to be removed, and the cutting was continued until a depth was reached corresponding to the height of the utensil to be made; then, by undercutting, the nucleus was detached or so far severed that it could be broken off by means of sledges or levers. If the stone happened to be laminated, a circular groove was cut through at right angles to the bedding, and the discoid mass was removed without the need of undercutting. If the conditions were favorable, a second disk was cut adjoining the first, and then a third, and so on, pretty much as the housewife cuts up the thin layer of dough in biscuit making.

In cases where the floor and walls of a well-developed quarry are fully exposed, as in the Clifton and Amelia county quarries in Virginia, the details of ancient operations are clearly displayed. In cases it is seen that the task of cutting out the mass was just begun when operations in the quarry closed, while in others it was well under way and the bulbous nuclei stand out in bold relief. In cases where undercutting has taken place the rounded form resembles a mushroom on its stem and is ready to be removed by a blow; while in many other cases we see only roundish depressions in the quarry surface, in the bottoms of which are stumps or scars indicating that removal of the mass had taken place. It often happened that the work of cutting was stopped by the discovery of defects in the stone. In very many cases defects were not discovered until too late, and the operations of removal at the last moment became abortive; instead of breaking off at the base, as was intended, the cleavage of the stone was such that the body split in two, leaving a portion remaining attached to the stem. The drawing presented in plate LXXVI will give a more satisfactory idea of the whole range of phenomena than can any mere description.

A notable feature of the cutting out of these masses of stone is the attendant shaping of the mass, which was rudely sculptured as the work went on, the contour of the vessel being approximately developed. Although I have seen no good examples of this class, it is confidently stated by others that rude nodes were carved at opposite ends of the mass as incipient handles, and that excavation of the bowl was begun, so that when severed from the stem the vessel was already well under way.

Quarry Product

So far as I have observed, the quarries rarely yield evidence of the prosecution of any other shaping work than that of obtaining the rounded bodies of stone and the partial development of vessels. Pipes, sinkers, ceremonial stones, and ornaments were made by the same people, but mostly no doubt from choice bits of stone carried

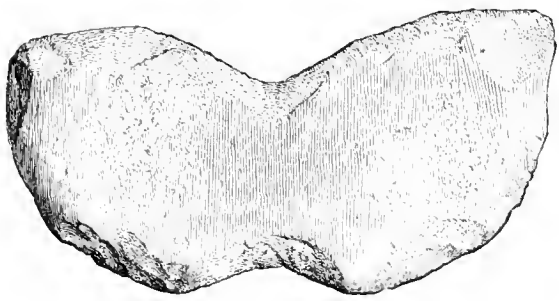
away for the purpose, or perhaps often from fragments of vessels broken in use.

About the quarries and in the quarry débris are specimens exhibiting every stage of the vessel shaping work; irregular fragments and well-rounded masses just as cut from the quarry, but usually showing some defect of texture or shape, explaining their desertion or rejection; other pieces partly shaped before the defects became apparent; and very many specimens broken by the blows of the shaping tools, as illustrated in plate LXXVII; so that every step of the work and every phase of the shaping operations are fully represented. The rough-dressed shapes vary a good deal with the different quarries, though on the whole there is decided uniformity in the work as carried on throughout the soapstone belt. Final forms, as shown by village-site remains, are limited to shallow trays or dishes, trough-like forms, and deep basins. Nowhere in eastern United States were pots made of the deep globular form so common in California.

A prevailing shape in the Potomac-Chesapeake region is an oblong basin with ear-like projections or handles at the ends. The largest specimens are about 25 inches in length. The width is often hardly more than half the length, and the depth averages perhaps one-half the width. This form may have been suggested by wooden dishes or mortars of like shape, examples of which are still in use among some of the Algonquian tribes. Other forms approach more nearly a circular outline, as viewed from above, and these usually have greater depth. In cases the outline is somewhat rectangular. Roughed-out cups of small size are sometimes found.

The handles of steatite vessels differ much in size and shape as well as in position. Some are placed near the margin or rim, but others, where the vessels are deep, occur low on the profile. The accompanying illustrations (plates LXXVIII, LXXIX, and LXXX) convey accurate notions of many details.

The form development of a vessel of ordinary character is illustrated in plate LXXVIII. The ovoid nucleus as cut out of the quarry appears in *a*, the handles being only slightly suggested. Excavation of the bowls was begun by a series of pick strokes outlining the basin, as seen in *b*, a core-like elevation remaining in the center until removed by continued cutting, as suggested in *c* and *d*. The form of the roughed-out vessel as developed in the quarries is quite fairly indicated in *e*. In some cases the excavation began with a pit in the center and was carried outward by successive strokes toward the rim; and in very many cases the work was unsystematic and crude, as is well shown in plate LXXIX. In specimens found on the surface of the ground the tool marks are much obscured by weathering, but in those from a depth they are as fresh as if made but yesterday. The cutting implement was in some cases pointed or spike-like, but generally had a chisel-like, though rounded, cutting edge half an inch or more in width, leaving impressions such as are shown in plate LXXIX, which illustrates two somewhat



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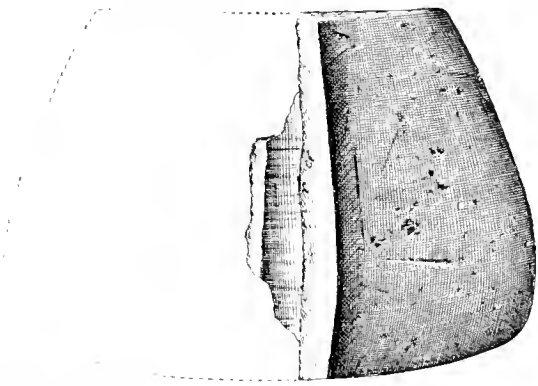

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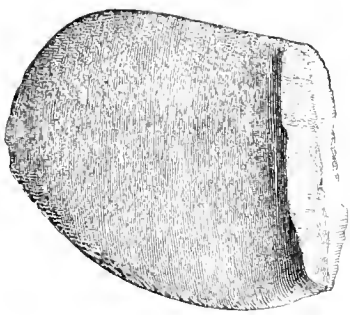

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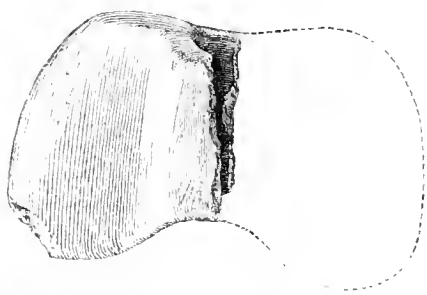


d

WINGED CEREMONIAL STONES FROM THE VICINITY OF WASHINGTON, D. C.

a, 3¼ inches in length; *b*, 2 1/2 inches in height; *c*, 2 inches in height; *d*, 1½ inch in height

small rejects from the Connecticut avenue quarries. This edge was sometimes rather rough and uneven, leaving scratchy lines, suggesting a flaked rather than a polished tool. The character of the work varies a great deal; in some cases the strokes were bold and professional in appearance, in others timid and uncertain. Three excellent examples of roughed-out vessels are shown in plate LXXX; *a* and *b* are from quarry sites, where they were rejected and deserted, while *c* is from a village-site at College Station, Maryland, several miles from the nearest quarry. These specimens show decided differences in shape of bowl and placement of handles.

IMPLEMENTS USED IN QUARRYING AND CUTTING

Character of the Tools

The tools and utensils employed in the quarrying and shaping of steatite may be reviewed with considerable care, since they prove to be, as far as brought to light, largely of classes peculiar to the work and hitherto practically unknown to archeologists.

It is safe to assume that there were many implements of wood as well as bone and antler used in uncovering and removing the stone that have wholly disappeared. These hypothetic utensils would no doubt include levers, pikes, mauls or mallets, picks, hoes, and shovel-like tools.

Naturally very many of the tools used were of stone, and these are found in considerable numbers on the quarry sites and on shop and village sites in the vicinity. There is no clear distinction to be drawn between those used in quarrying and cutting out the raw material and those employed in shaping the vessels, yet it may be assumed that in general the heavy, rude tools were for quarrying and that the more delicate, sharp-edged or pointed tools were for shaping and finishing. The heavier tools consist of rounded sledge-like masses used for driving wedges and for breaking off portions of the stone, of heavy wedge-like stones, often much battered as if from blows by heavy sledges, and of pick-like forms, some rude, others well shaped by flaking and pecking. One variety of the picks is roughly grooved by flaking and pecking, and another has a plain shaft, often a little curved as if to be attached to a handle somewhat as our picks and adzes. In several of the quarries we have found ordinary grooved axes, most of them having been remodeled or resharpened by flaking to make them efficient in picking and cutting; then there is a large class of chisel-like tools of varied sizes and shapes, sometimes improvised from stones of approximate proportions slightly flaked or ground to effective points, sometimes flaked out of the raw material, which is generally a greenish-gray basic eruptive rock obtained from the highland, and possibly by quarrying.

Generally these tools were made by skilled hands and are developed into such highly individualized shapes that we are compelled to allow

that the industry in which they were employed was one of importance and long standing. Nearly all the forms are represented in the several plates accompanying this chapter.

The number of the tools and their importance to the steatite-working peoples is illustrated by the following observations: Around a single pit located in a plowed field on Patuxent river, and nearly obliterated by successive plowings, I found during a single visit some 30 entire and broken implements, and from the excavation in the quarry near Clifton, Virginia, nearly four dozen of the chisel-like tools, some broken and some entire, were found.

Manner of Using the Tools

There are three or four ways in which the cutting tools could have been used. The simplest was that of holding the pointed stone in the hand or hands, and thus striking the potstone. This would, however, be a most unsatisfactory method and would hardly be applied where opportunity was afforded for superior methods.

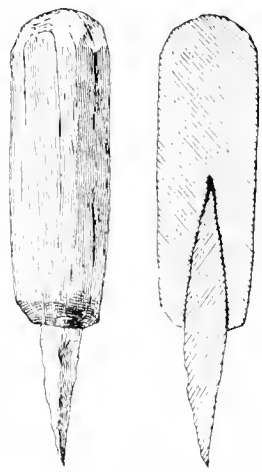
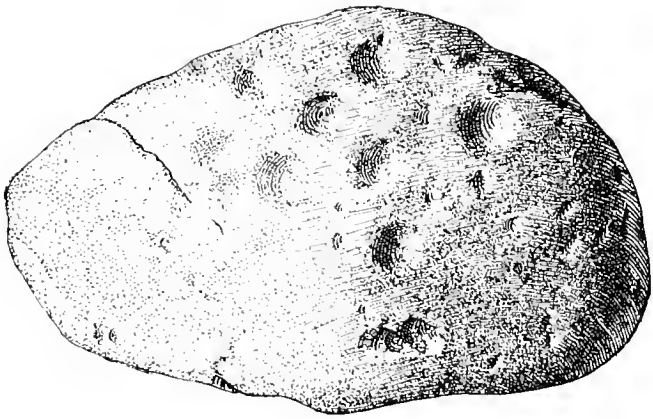


FIG. 16—Probable manner of hafting the smaller chisels.

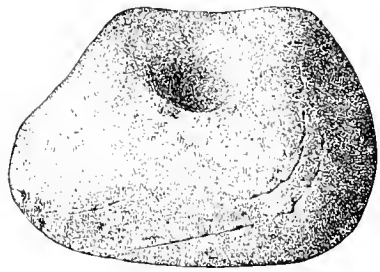
Another manner of use was that of setting the sharpened stone or chisel in a short handle of buckhorn, and striking this with a stone or billet of wood. The chisel marks left in many cases suggest this method very strongly, and the heavy end of the tool as found is usually furnished with a short and rough-flaked point suitable for setting in a handle, as suggested in figure 16. Many specimens of this class are too minute to be utilized in any other way, and some are slightly notched as if mere knives.

A third method is that of hafting the pointed stone as an adz or ax is hafted. The grooved tools were undoubtedly used in this way, and many of the grooveless forms could have been attached as is the ordinary primitive adz. This would give much greater efficiency in all the work of cutting and roughing-out, and the boldness and irregularity of the stroke marks left on the quarry face and on the detached masses and partly finished vessels make it practically certain that this was the manner of their attachment. With short handles, such as indicated in figure 17, effective and very neat work could be done, and it may be remarked that such a tool could be handled in the cramped quarters in which the cutting was often carried on almost as conveniently as could the chisel driven by a mallet.

Among the chisels there are numerous slightly curved forms, some with one ground point that could have been hafted as in *a*, figure 17, and others with two points that may have been mounted so as to make both points effective, as in *b*, figure 17. The shortest two-pointed tool, a



a



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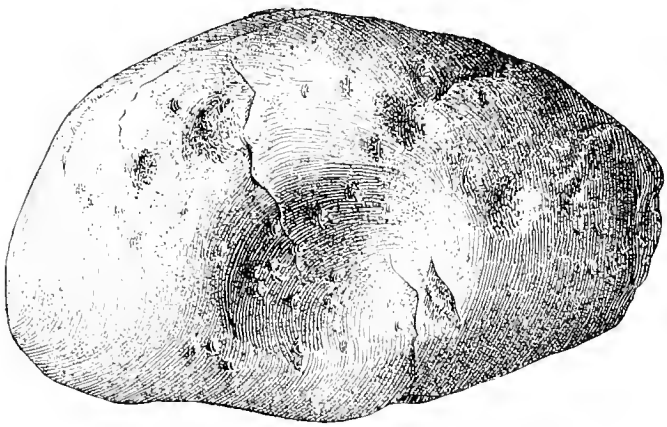


b

d

e

PITTED STONES AND MORTAR FROM TIDEWATER VILLAGE-SITES

a-b, one-third actual size; *c-d*, *e*, one-half actual size

very neat and delicate specimen, is hardly more than 3 inches long, while the largest is 11 inches in length.

STEATITE QUARRIES

THE CLIFTON QUARRY

The most interesting example of the soapstone quarries examined by the Bureau during the progress of the work described in the present paper was the Hetzel-Hunter quarry, near Clifton, in Fairfax county, Virginia. Late in the fall of 1893 Mrs Margaret Hetzel, of Clifton and Washington city, communicated to Professor O. T. Mason, of the National Museum, the fact that in prospecting a soapstone deposit near

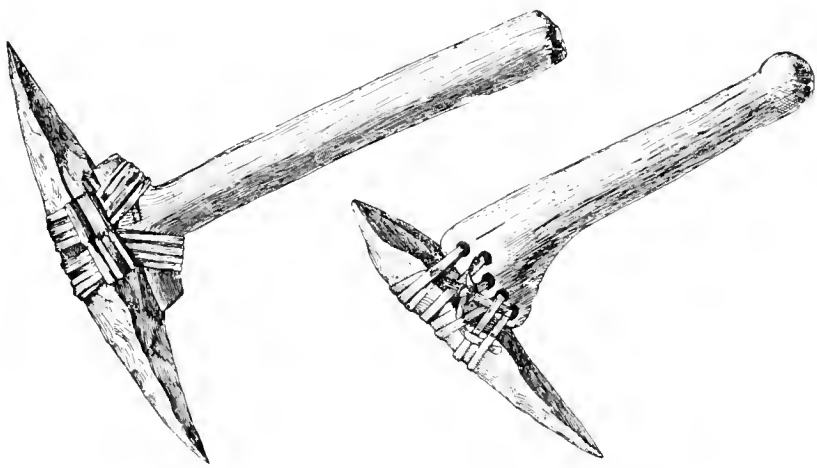


FIG. 17—Probable manner of hafting the single-pointed and the two-pointed chisels or picks.

Clifton the owners had discovered traces of aboriginal operations, and expressed a desire that the Smithsonian Institution should undertake an examination. This was reported to me by Professor Mason, and the quarry was put on the list for examination so soon as the field season of 1894 opened. Late in March the work was taken up, and Mr William Dinwiddie was sent out with instructions to clear out the ancient excavations in such a way that, if possible, the entire floor and the quarry faces would be exposed for study and photography. This was done in the completest possible manner, and in a few weeks a most striking illustration of the enterprise and skill of our aboriginal tribes was exposed to view. A trench or gallery some 25 feet wide and reaching in places a depth of 16 feet had been carried into the face of the hill to a distance of 60 or 70 feet, and a second pit, inferior in dimensions, had been opened beyond this. Almost the entire excavation had been carved out of the solid steatite by means of stone picks and

chisels, and all the evidences of the cutting and sculpturing—even the whitened surfaces of the tool marks—were as fresh as if the work of yesterday.

The quarry is located on a small branch of Bull run, 2 miles northwest of Clifton and 22 miles a little south of west of Washington city. The steatite outcrops in the bed and banks of a small rivulet, crossing it at right angles, and seems to be an irregular bed or stratum intercalated with the gneiss of the Piedmont formation. It varies from 20 to 40 or 50 feet in thickness, and has a nearly north-and-south strike and a dip of from 70° to 80° toward the west.

The ancient peoples probably began work by removing detached or partly detached masses from the stream bed, and then little by little followed the ledge up and into the steep hillside toward the north. This hill is a spur of a low ridge on the west, and is some 40 feet in height. It slopes off rapidly to the junction of the quarry rivulet with another branch two or three hundred feet below. The surface is covered with soil and disintegrated gneiss.

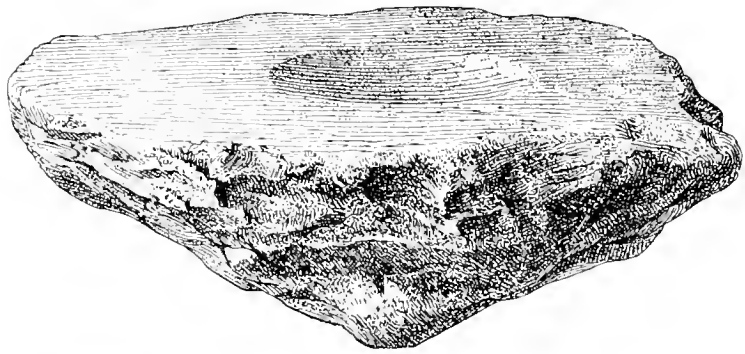
Our investigations developed the fact that there had been two main pits or excavations—a long and wide gallery mentioned above, and higher up a second pit about 20 feet in diameter and 8 or 10 feet deep connecting with the first but lying at the left, as indicated in the accompanying sketch map, figure 18.

So completely were the ancient excavations filled up that inexperienced eyes would hardly have detected anything unusual in the appearance of the rounded slope of the hill. The main trench was marked by a slight depression toward the upper end, and the débris accumulated low down along the sides formed barely perceptible convexities. No doubt the excavations had been largely filled as the work advanced, and material from the upper pit had helped to obliterate what remained of the main final depression.

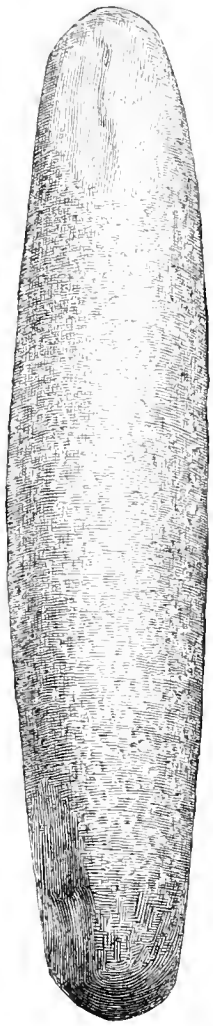
The location of the upper pit was indicated by a shallow depression some 20 feet in diameter and 2 or 3 feet deep, where modern exploiters had sunk a prospect hole. This pit had been left open, and its position high on the hill had prevented rapid filling.

When the Bureau began its work of excavation the owners of the quarry had already uncovered a portion of the ancient quarry floor, which rises from the stream bed at a low angle, so that at 30 feet it is about 10 feet above the stream and not more than 4 or 5 feet beneath the slope surface. But little stone had been removed by the ancient workmen, although evidences of excavation and cutting were distinctly seen, and a few stumps, scars, and bulbous chiseled masses appeared at the upper edge.

Soon after beginning work the floor was found to descend into numerous pits and depressions where the superior quality of the stone had led the quarrymen to persist in their work. The general level of the floor was maintained for a distance of some 70 feet back into the hill, and the deeper pittings at the back reached 15 or 16 feet beneath the



a



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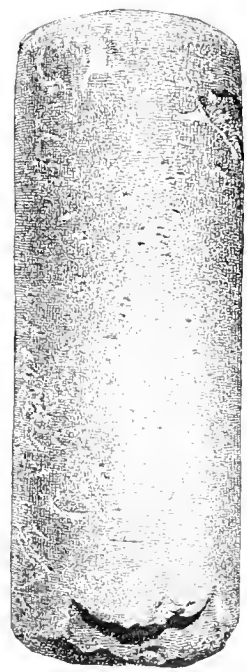


c

MORTAR, PESTLES, AND SINKER(?) FROM THE TIDEWATER PROVINCE

a, 11¾ inches in length; *b*, 14 inches in length; *c*, 7 (?) inches in length; *d*, 3 inches in length

profile of the slope. Much impure stone had been cut away in efforts to reach the purer masses, and this was a most laborious work. But it is safe to say that one-half or three-fourths of the excavation was accomplished by cutting out, with chisels and picks, the solid and massive steatite. The whole surface, with its nodes and humps and depressions, covered everywhere with the markings, groovings, and pittings of the chisel, presented a striking example of the effectiveness

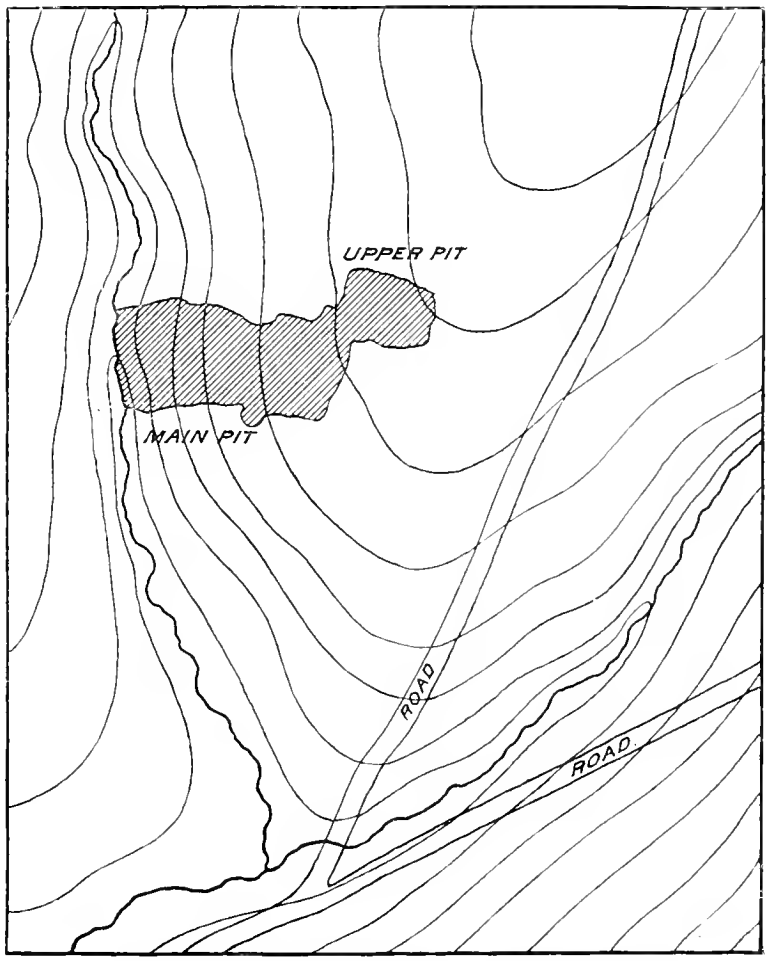


FIG. 18—Sketch map of the Clifton quarry; scale about 50 feet to the inch.

of native methods and the persistence of native efforts. A view of the quarry, after it had been thoroughly cleaned out and swept, is shown in plate LXXXI. The photograph was obtained by erecting a platform 20 feet in height in the stream bed at the foot of the quarry. The deepest part of the pitting is at the back, where the figure of a man may be imperfectly made out. The farther extension of the quarry is

indistinctly seen at the left beyond the measuring rod. The irregularly noded and pitted surface is rather imperfectly shown in the picture. The width of the seam of workable stone is indicated by the width of the quarry, and the change in direction at the farther end of the main pit seems to have been due to a change in the character of the stone.

In plate LXXXII I have brought together a number of the cutting implements selected from the two or three score recovered. Many examples are of small size and show varying degrees of finish. Those shown are of a dark-gray eruptive rock and have been carefully shaped and finished. The larger specimen *a*, *a* has been ground into nearly symmetrical shape and has a fine conical point. The chisel *b*, *b* was flaked into general shape and both ends were reduced by grinding to excellent flattish cutting edges. The smaller specimen *c* has a neatly sharpened point and is wide at the opposite end, and like the smaller example *d*, which is obscurely notched near the top, was probably set in an antler handle for use as a chisel. Among the finds was a well-shaped and much-used hammerstone of quartzite, which had probably served to trim and sharpen the cutting tools.

Traces of an old village-site were discovered on the stream bank, a hundred yards or more below the quarry, and here various objects of steatite, including a partially shaped but broken pipe, were found. The more ordinary dwelling sites of the operators of this quarry were doubtless on the larger streams below, and probably extended far down the Potomac. This quarry can not be a great many miles from the "antimony mines" reported by the native guides to the English who first explored the Potomac. The fact that these peoples were enterprising enough to work an "antimony mine" suggests the probable identity of these Indians with the workers of the soapstone mines as well as of the quartzite quarries of the general region.

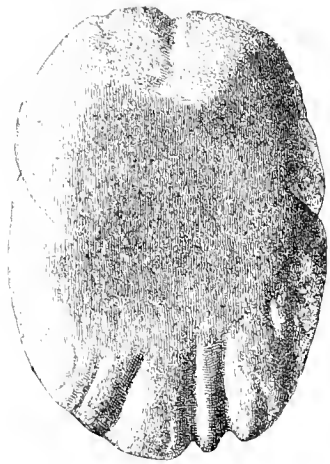
THE CONNECTICUT AVENUE QUARRIES

Extensive deposits of steatite are found within the limits of the District of Columbia, but only one locality presents abundant traces of ancient operations. This site is by some called the Rose hill quarry and by others the Dumbarton quarry. It is situated on Connecticut avenue extended, 4 miles from the Executive Mansion, three-fourths of a mile east of Tenallytown, and a mile and a half from each of the two great quartzite-bowlder quarries already described.

LITERATURE

The quarries in this locality seem to have been first studied by Dr Elmer R. Reynolds, who in 1878 published[1] a careful description of the

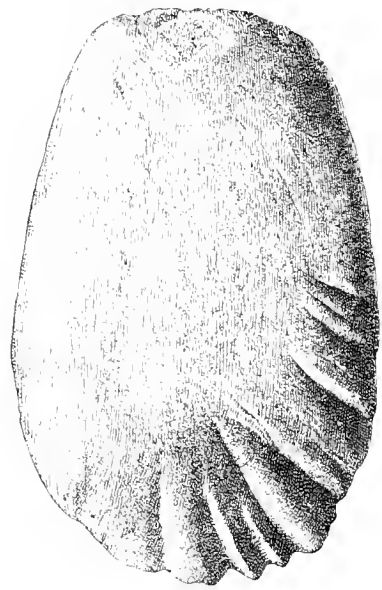
[1] Thirteenth annual report of the Peabody Museum, 1878, p. 526.



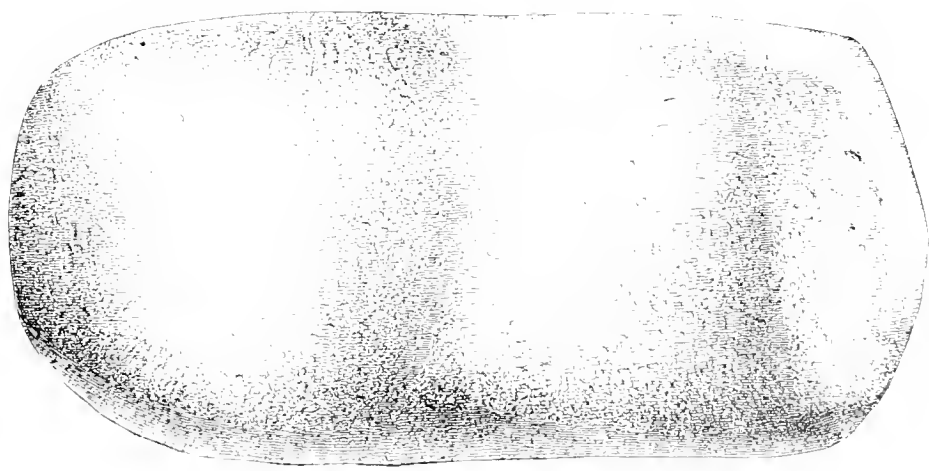
a

a

b



c



d

ABRADING STONES FROM THE VICINITY OF WASHINGTON, D. C.

a, *b*, *c*, three-fourths actual size; *d* actual size.

site and of the articles collected by him. About that time visits to the site were made by Dr Charles Rau, Professor O. T. Mason, Mr F. H. Cushing, and others, and extensive collections of articles, mainly from the surface of the ground, were made. Mention is made by Dr Reynolds of excavations conducted by these gentlemen, but no definite information on this point is on record. Mr Cushing informs me that slight excavations were made on the southern hill. A paper published by Mr Louis A. Kengla, formerly of Washington, gives considerable additional matter, accompanied by illustrations of fragments of vessels obtained in the District of Columbia.[1]

Site and Surface Indications

The mass of steatite exposed on this site, being firmer and tougher than the gneisses with which it is associated, gave rise, as erosion progressed, to two very decided prominences, separated by a sharp ravine cut by a small stream, tributary to Rock creek, known as Soapstone creek. The natural exposures are confined to the bed and the steeper banks of the stream and to the crests of the hills, the latter rising in somewhat conical form—the one on the southern side of the ravine to about 80 feet and the one on the northern side to fully 90 feet above the stream.

The northern hill has a rounded, oblong summit, in which the steatite is exposed or approaches very near the surface for a length, nearly north and south, of more than 100 feet and a width of 20 or 30 feet. The rock seems to be bedded with the greatest length of the crest, and consists of nearly vertical, more or less massive layers of steatite. The slopes of the hill are covered with deposits of disintegrated gneiss and vegetal mold, and consequently the gneiss with which the steatite is surrounded and interbedded is in no place visible. The whole site is thickly covered with forest trees and underbrush.

In 1891 the extension of Connecticut avenue led to the removal of the lower portions of both hills, as indicated in the sketch map *a*, plate LXXXIII, the cut in the southern hill exposing portions of the strata to a depth of 60 feet, and obliterating a number of the ancient pits. The steatite brought to light by the grading is, however, of very poor quality and unfit for commercial purposes, which is true also of the entire deposit, as indicated by the cessation of recent quarrying operations conducted by the Hunter brothers. A section of the two hills appears in *c*, plate LXXXIII.

The evidences of ancient pitting are confined chiefly to the summits of the hills, but no one can say to what extent the exposures of soapstone in the sides of the ravine were worked. The southern bank of the stream has recently been excavated to a considerable depth by the Hunter brothers, and the original configuration is somewhat destroyed;

[1] Archeology of the District of Columbia, Washington, 1883.

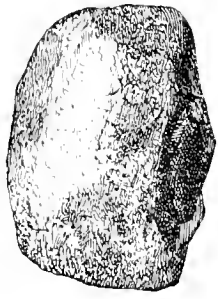
but on the northern side there is an obscure excavation of considerable dimensions that may be at least partially due to aboriginal operations. Pits sunk in the sides of the hills would soon be filled by débris descending from above, but on the crests they would necessarily remain clearly marked for a long period of time; their obliteration in the latter case would depend on the very slow accumulation of vegetal mold or of wind blown material. In any attempt at estimating age from mere appearances, therefore, the relation of the excavation to the surrounding surface must be considered; this has already been pointed out with some degree of care in describing the quartzite-bowlder quarries.

The excavations undertaken under my supervision were confined largely to the summit of the northern hill, as the ancient quarries had there remained wholly undisturbed save by the normal agencies of nature. A row of pits, forming almost a connected trench, extended along the crest and for a short distance down the northern end of the hill. There were five well marked depressions in this series, the outlines being irregular (see plate LXXXIV). All were less than 25 feet in diameter, and the greatest depth was not above 2 or 3 feet. Dr Elmer R. Reynolds describes one pit on the southern hill as being over 3 feet deep. The heaps and ridges of débris thrown from the pits by the ancient miners extended along the sides of the row of pits, and were not above a foot in height. This débris consisted for the greater part of earth and irregular masses of steatite. Among the latter were found many fragments of unfinished vessels and rejects of various kinds. Shallow depressions, marking the sites of ancient pits, occur along the sides of the crest on the southern and western slopes of the hill.

Excavations Made

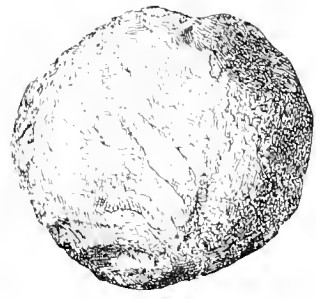
Our examinations of the Connecticut avenue quarries were commenced by carrying a trench across the southern pit of the series on the northern hill. This exposed portions of the ancient quarry face on the southern, eastern, and western sides, while the northern edge of our excavation penetrated the full depth of the ancient quarry, which was here not more than 4 or 5 feet.

Beginning with the deepest part of this first trench, a wide trench was carried northward along the chain of ancient pits. Cross trenches were dug at frequent intervals, and others were subsequently dug on the southern slope. In all, not less than 800 square feet of the ancient quarry floors were exposed and cleared off, and a very good idea of the nature of the ancient quarrying was obtained. The principal pits were worked to a depth of from 2 to 6 feet by the aborigines, and the bottoms and sides present the irregular appearance necessarily produced by prying out such masses of potstone as the quarrymen were able to detach. A view taken in the main trench is shown in plate LXXXV,

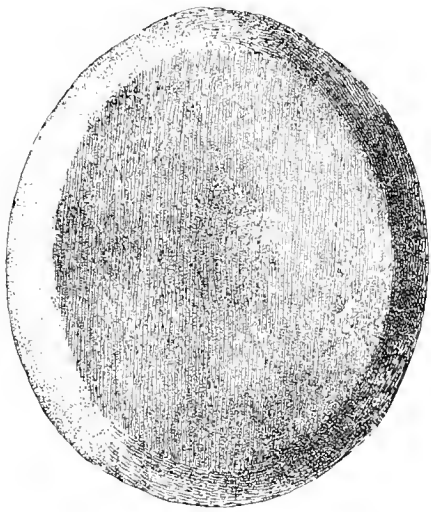


a

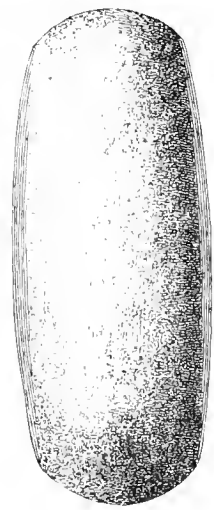
b

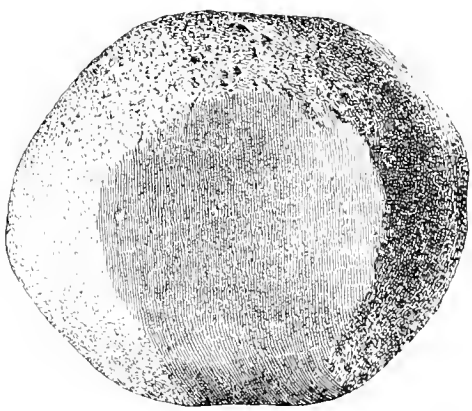


a

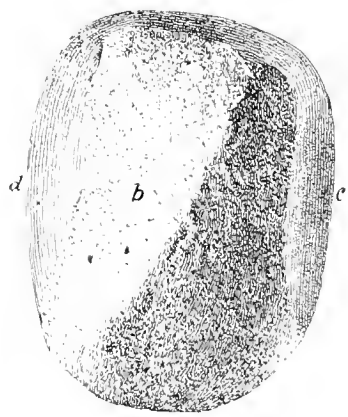


c





d



HAMMERSTONES FROM POTOMAC VILLAGE-SITES; THREE-FOURTHS ACTUAL SIZE

a, quartz, *b*, *c*, *d*, quartzite

and a section across one of the pits is given in *b*, plate LXXXIII. The beds of steatite are quite massive, exhibiting irregular lines of cleavage; the quality is, however, in the main, rather inferior. A sketch plan showing the trenches made on the quarry site is given in plate LXXXIV.

As in the quartzite-bowlder quarries, little evidence remains of the methods of quarrying. Tools of the classes already referred to were no doubt used to loosen and remove the earth and to pry up masses of the stone. Heavy rounded stones and hafted sledges served to break up the larger pieces and to detach projecting portions. In several places on the floor and sides of the quarry the surface of the potstone shows the usual pick marks, and in one place a slight grooving was seen where the work of dividing a large block had begun. The exposed surfaces seem for the most part to represent cleavage planes, and until solid massive rock was encountered the laborious process of cutting was uncalled for.

So far as the evidence obtained on the site shows, work was confined almost exclusively to procuring material for use in vessel making, but apparently the pots were not often shaped or even partly shaped in place, to be afterward detached by undercutting and wedging as observed in many other places. It appears that as a rule the rough block was first obtained, then trimmed down to the approximate size and form, and afterward hollowed out ready for the finishing operations, which were in most cases conducted elsewhere. There were naturally many failures from breaking, from splitting along partially developed cleavage planes, and from imperfections in texture; and many hundreds of these failures yet remain on the site, in the pits, in the heaps of débris, and scattered far down the slopes of the hill and along the stream bed.

Tools Recovered

The tools with which the work of quarrying was accomplished were sought most assiduously. It was expected that they would, in a measure at least, correspond to the tools known to be used by the modern Indians of the region, as many steatite pots are found on ordinary village-sites. This was found to be the case to a limited extent only. It was found that the tools used were, as a rule, made for and especially adapted to the work, which is unlike any other industry of the aborigines. The implements prove, therefore, to be in a measure unique, forming a class of their own.

The remoteness of the site and the rugged conformation of the hills on which the quarries are located render it improbable that the locality was used for dwelling or for any other purpose than that of quarrying and shaping the potstone.

The tools found all pertain to quarrying and to roughing-out the vessels, and may conveniently be divided into three classes: 1, those improvised on the spot for local temporary use; 2, those made for the

purpose on distant sites; and, 3, those pertaining originally to other uses, brought from the villages and utilized in the quarries. A majority are of the first of these classes. They are, as a rule, quite rude, and were derived from quartz veins and bowlder beds in the vicinity of the quarry. Specimens collected approach as nearly a paleolithic type as any tools found in the Potomac region. Nothing more primitive is possible. The hills and slopes in the vicinity abound in outcrops of vein quartz, which breaks up into angular fragments. These are now so plentiful on the neighboring fields as to burden agriculture. Such angular fragments were gathered for use in the quarries. Some were already well adapted to use, while others were slightly trimmed, to give them better points and edges. Illustrations of these tools appear in figures 19 and 20.

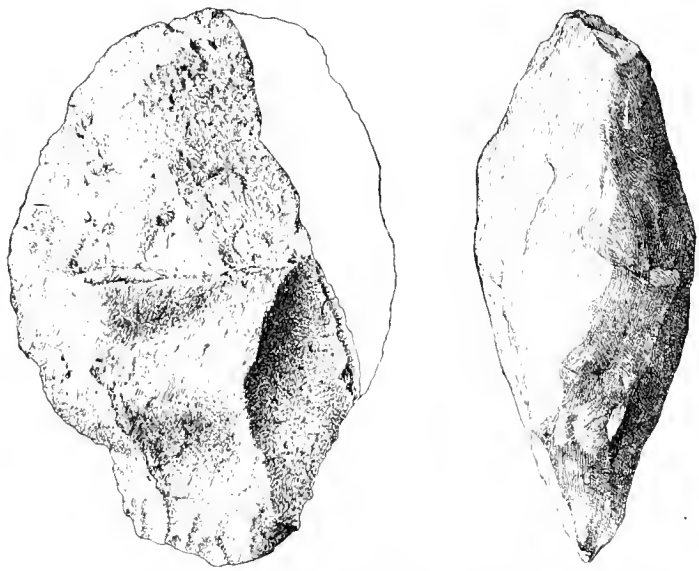


FIG. 19—Rude pick of quartz, slightly sharpened by flaking.

A number of angular masses of quartz were discovered that were not apparently adapted to any use and that showed no signs of having been used. They may be fragments of larger masses broken in use. A few bruised cobbles were found that must have been utilized in some way in the quarry work.

It is not considered necessary to take further notice of specimens showing no decided evidence of design or use, or that do not by their natural conformation show especial adaptation to use. The objects of quartz that show evidence of shaping by percussion are all of one type. They are thick, angular masses, weighing a pound or more; one end is brought to a short, sharp point, and the other is somewhat rounded, as if to be held in the hand or hands for striking. Of the

SURFACE OF A SOAPSTONE QUARRY SHOWING VARIOUS PHASES OF THE CUTTING OPERATIONS

In the Clifton quarry an area of upward of 2,000 square feet is covered with these evidences of ancient industry

same general shape are two picks made from quartzite bowlders and resembling heavy-pointed turtlebacks (figures 21, 22). In no case

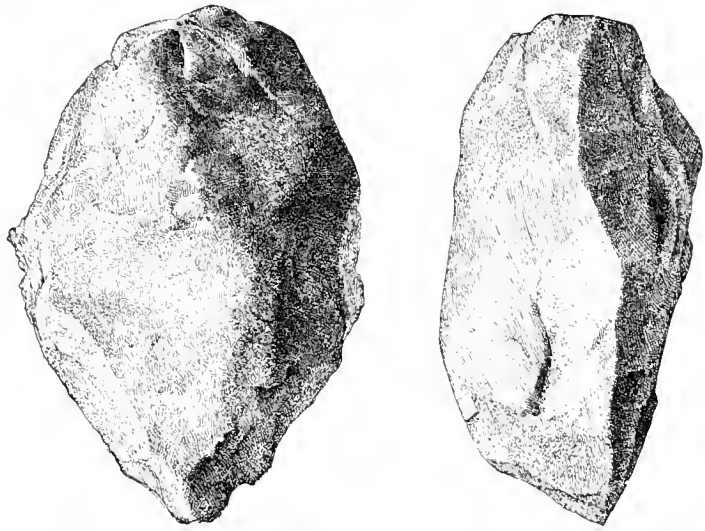


FIG. 20—Rude pick of quartz, slightly sharpened by flaking.

does the form of these tools suggest the attachment of a haft, although such attachment would probably be feasible.

Three chisel-like tools were found in the main trench on the summit of the hill. They are of peculiar types, and we may fairly assume that

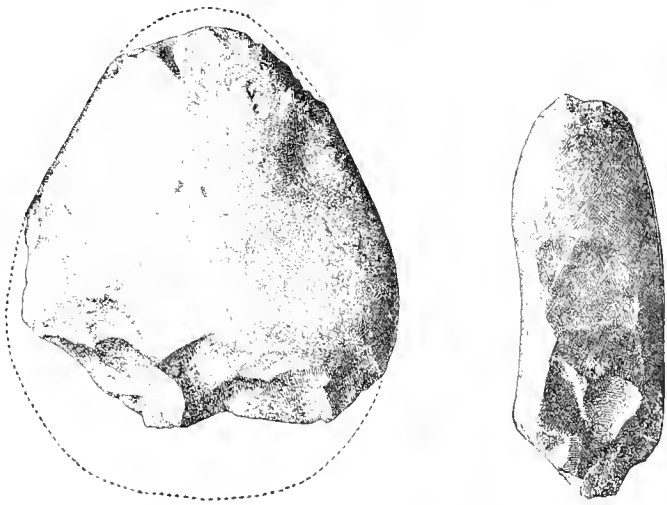


FIG. 21—Rude pick made by sharpening quartzite bowlder.

they were made for use in the potstone shop. One made of gray eruptive rock is blade-shaped and has a fine chisel-like point or edge. It is shown in *a*,*a*, plate LXXXVIII.

Another specimen (illustrated in *b,b*, plate LXXXVI) is of greenish-gray slaty-looking eruptive rock, very slightly altered by chemical changes. It is rather rudely chipped along both sides, and the point has been made quite sharp by grinding. Properly hafted as a pick, or as a chisel to be driven by a mallet, this little celt would have been a very effective tool in shaping and trimming the vessels. As it stands, without hafting, it is too small for effective use. A small chisel from the southern hill is given in *c,c* in the same plate.

From the soil that filled one of the shallow pits on the southern margin of the crest of the hill, a chipped tool of unusual shape, given in *a,a*, plate LXXXVII, was obtained. It resembles somewhat the drills or perforators of the same material found on village-sites, but is larger, ruder, and less symmetrical, and was probably made especially for use in the trimming of soapstone vessels.

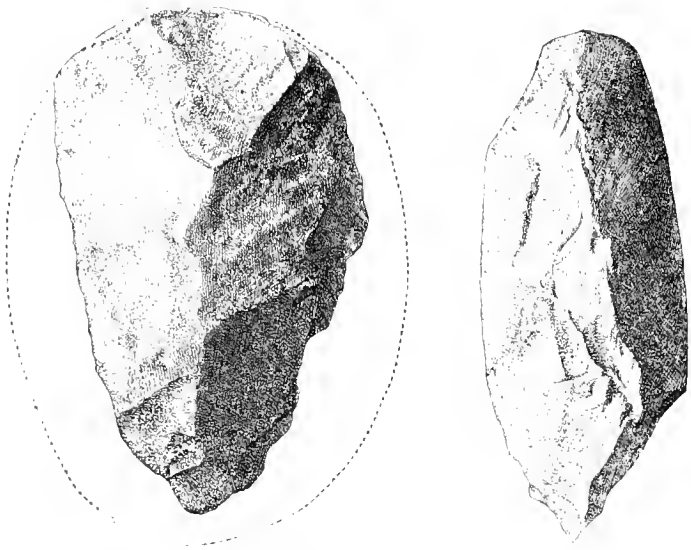
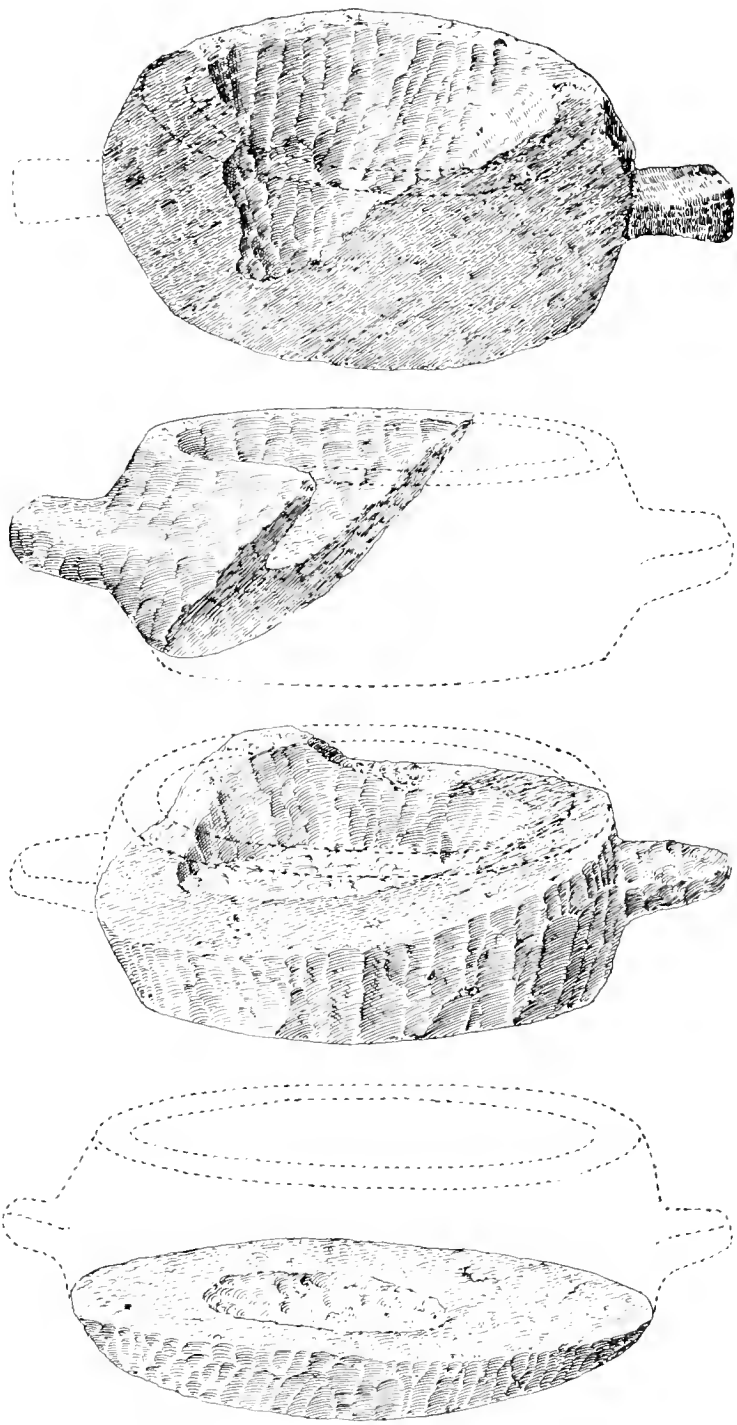


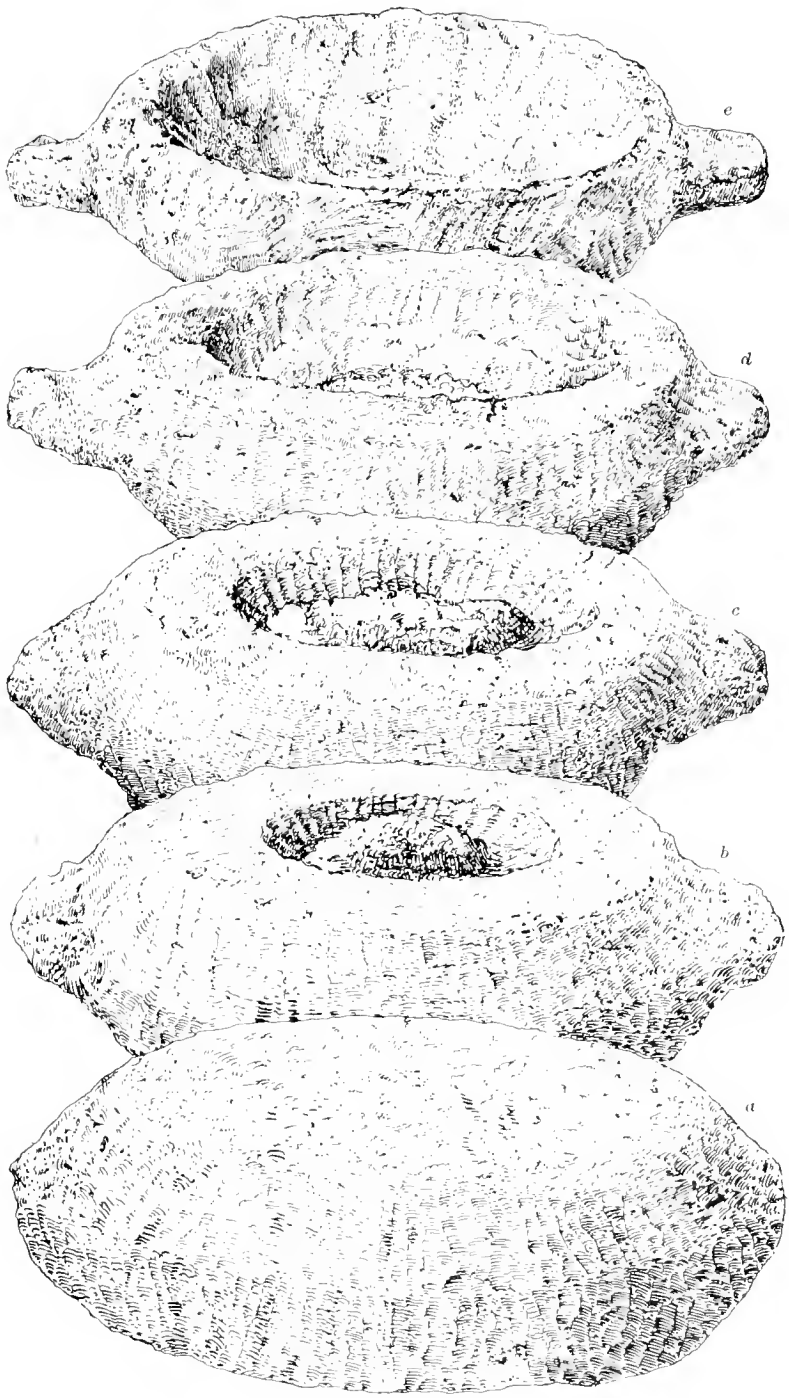
FIG. 22—Rude pick made by sharpening quartzite bowlder.

Another is made of a blackish argillite like rock that has become gray on the surface through oxidation of some of its constituent minerals. In its general configuration it is somewhat like the quartzite blades produced in the quarry-shops of the district, but it differs from them in having a chisel-like point or edge. This edge is somewhat oblique and shows but little evidence of use, although chemical changes in the stone may have obliterated such evidence. It is shown in *b,b*, plate LXXXVII.

A quite perfect specimen of this class, having a well rounded body and neat, sharp edge, was picked up on the southern hill; it is shown in *d,d*. A much larger example of the same class was brought to light by the grading operations along Connecticut avenue, on the eastern



INCIPIENT VESSELS BROKEN DURING THE SHAPING OPERATIONS AND LEFT WITH THE QUARRY REFUSE; FROM THE CLIFTON QUARRY; ABOUT ONE-THIRD ACTUAL SIZE



SERIES OF FORMS SHOWING STEPS IN THE STEATITE-SHAPING PROCESS RANGING FROM THE OVOID MASS CUT FROM THE QUARRY TO THE ROUGH FINISHED VESSEL; FROM THE CLIFTON QUARRY; ABOUT ONE-THIRD ACTUAL SIZE

slope of the southern hill (plate LXXXVIII). A nest of four well-shaped chisels, two of which appear in plate XCI, was discovered by me near the summit of the hill; all were sharpened by grinding.

One of the most important finds made during the excavations at this place was a large grooved ax of the wedge-hafted type (*a*, plate XCII). It was found in one of the shallow pits on the southern margin of the hilltop, a foot from the surface and resting on the surface of the soapstone in place. There is no doubt that this tool was used by the ancient quarrymen in dislodging, and possibly in trimming, the masses of stone. Its edge shows considerable wear, apparently from use as a pick, and its surface irregularities are filled with steatite. Its weight and shape would make it a very effective tool. If proof that the workers of these quarries were Indians were necessary, the discovery of this object would seem to be satisfactory. Finds on the sites of ancient soapstone quarries in Maryland include many of these grooved axes. In most cases they have been more or less completely remodeled by flaking to fit them more fully for use as picks.

Correlation with Bowlder Quarries

The question arises as to what correlations can be made out between the steatite quarries and the quartzite-bowlder quarries of the District of Columbia. Are they all probably of one age and the work of one people, or are they separated by long periods of time and by marked differences in art characters? It is observed that the two classes of quarries are located in the same valley and only a mile and a half apart; that they correspond as closely in extent and in appearances as could be expected if worked at one time and by one people; that modern neolithic implements are found in the steatite quarries, and that the products of the steatite quarries are found on many modern village-sites.

It appears that the steatite was not quarried to a depth equal to that of the quartzite bowlders, but it will be seen at a glance that the difficulties attending the working of the former are much the greater. With increasing depth the steatite becomes firmer and more massive, and the difficulty of detaching the necessary masses with primitive tools increases. With the bowlders the difficulty does not increase with the depth in the same degree, and greater depths could be reached with comparative ease.

It is true that the bowlder quarries exhibit more decided evidence of great age than do the steatite quarries in that the pits are much more completely filled up and obliterated. This fact may, however, lead to erroneous conclusions if the conditions under which the two classes of pits existed are not considered. The deepest steatite pits were not over 5 or 6 feet in depth, but they were excavated in solid rock and on the crests of hills where there was little or no material to fall into them save the leaves from the trees. Such of the pits as were not on the summits were entirely or almost entirely filled up. The cobble pits on

Piny branch were in all cases situated on the slope of the hills, and were therefore directly beneath overhanging masses of loosely compacted sands and gravels and may have been more completely filled up in one year than the steatite pits in a century.

The character of the two sites corresponds very closely in the respect that both are in hills so steep as to be quite unsuited for camping or dwelling. Both are therefore naturally free from village refuse, and the tools found, for the most part if not exclusively, consist of those actually used in the work of quarrying and roughing-out the articles produced.

In the cobble quarries no tools of a durable material were needed save the natural bowlders found by thousands in the quarries. Carefully shaped hammerstones, polished celts, and grooved axes had no place in the industries carried on in these localities. A grooved ax, such as that found in the Connecticut avenue quarry, would be an effective tool in the work of quarrying steatite, and could be used without the least danger of breakage. The chisels were especially adapted to, and no doubt made for, the cutting out and carving of the steatite.

The nature and range of the work of shaping carried on in both classes of quarries has a close correspondence. No finished pieces of work of the classes made there were found in either class. In the cobble quarries the blade was roughed-out to a convenient shape for transportation and subsequent elaboration; in the steatite quarries the pots were roughed-out and carried away to be finished elsewhere. It is significant also that on many village-sites in the vicinity the shaped objects of both materials are found freely and intimately associated.

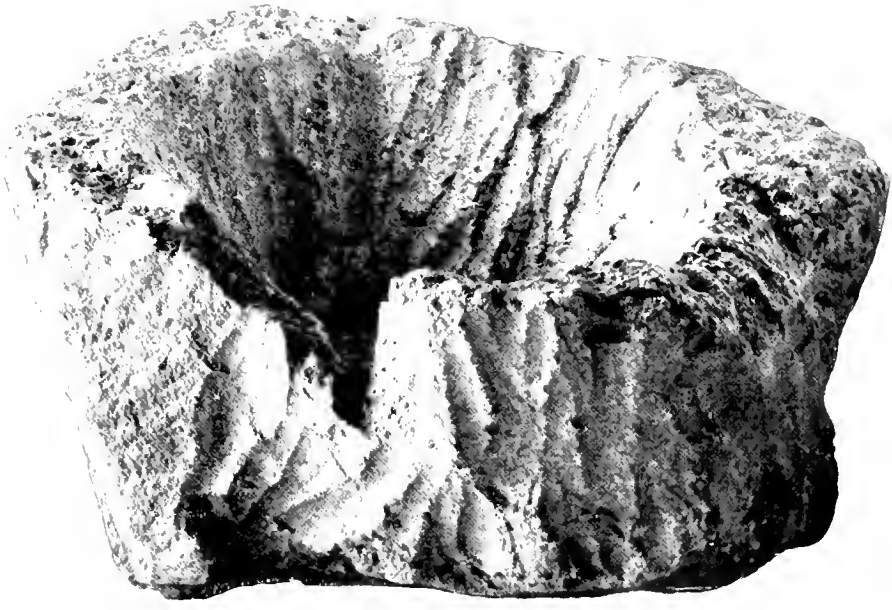
Review of the evidence thus shows many significant correspondences in the work of the two classes of quarries, and no differences that require the assumption of wide distinction either in time, people, or culture. The historical aborigines are probably responsible for all the phenomena observed.

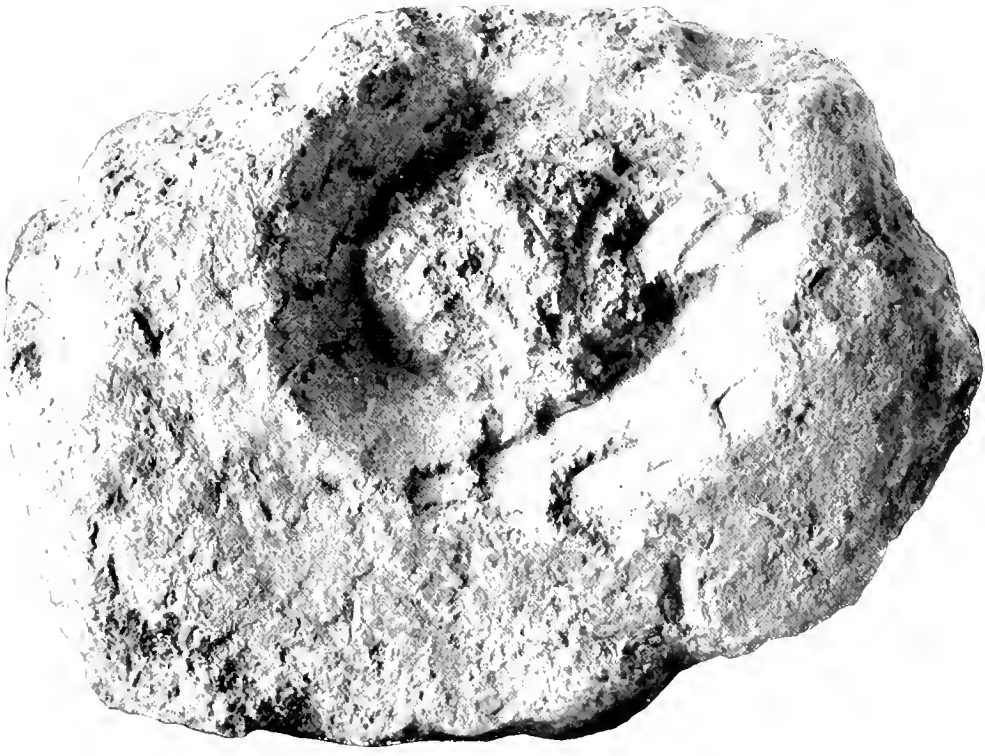
THE SHOEMAKER QUARRY

About 2 miles southwest of the Rose hill quarries, and not far from the grounds of the American University, there are several obscure outcrops of steatite. Numerous partially worked vessels have been found, but if quarries ever existed they are now entirely obliterated by the plow.

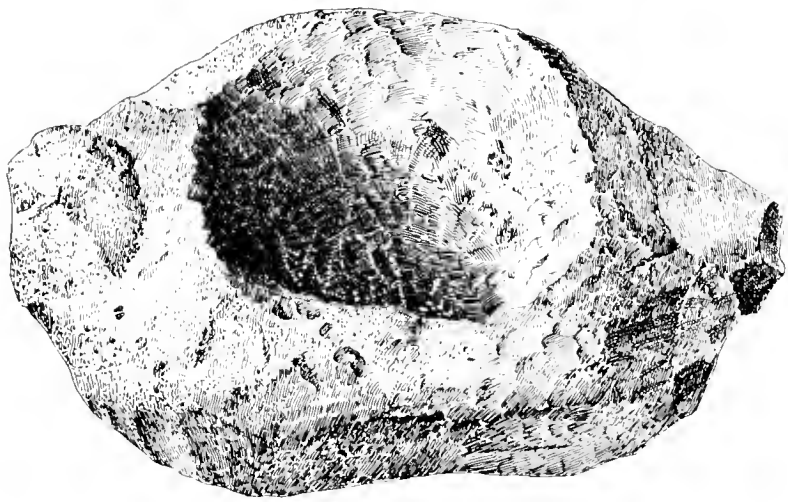
THE LITTLE FALLS SITES

A slight outcrop of steatite occurs in the creek bank at the Virginia end of Chain bridge over the Potomac, just below Little falls and at the head of tidewater; but no traces of ancient work have been observed. That the work of quarrying and cutting this rock was prosecuted in the vicinity is indicated by the discovery of steatite picks and chisels, and many articles made of steatite, finished and unfinished, on the village-

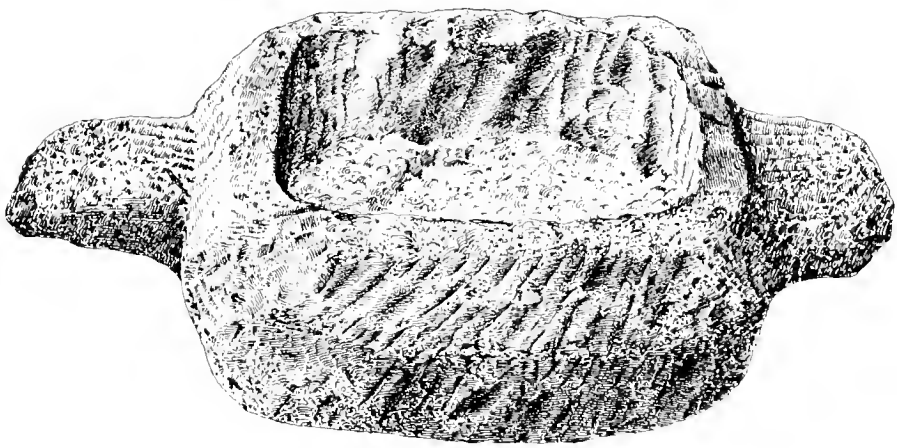




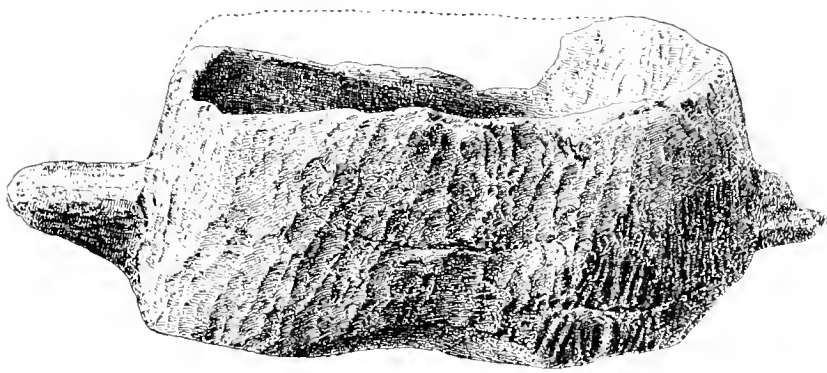
QUARRY-SHOP REJECTS SHOWING EARLY STAGES OF THE STEATITE SHAPING WORK AND SHOWING THE CHISEL OR PICK MARKS WITH PERFECT CLEARNESS. FROM THE CONNECTICUT AVENUE QUARRIES; ABOUT ONE-HALF ACTUAL SIZE



a



b



c

EXAMPLES OF UNFINISHED STEATITE VESSELS

a and *b* (11 inches and 8 inches, respectively, in length) are from the Clifton quarry, and *c* (11 inches in length) is from a village-site at College Station, Maryland

sites in the vicinity. These are well represented in the collections of Thomas Dowling, junior, and F. W. von Dachenhausen, of Washington. Typical mining and cutting tools are rarely found at any considerable distance from the quarries. Several small chisels of the usual type, shown in plate XC, were obtained from a village-site between Chain bridge and Eades mill, on the northeastern side of the river; and two sinker-like objects of soapstone from this locality, one discoidal with a peripheral groove and the other oblong with a groove passing along the sides and across the ends, are shown in *a* and *b*, plate XCIX. A small, partially finished ring or bead is represented in *c* on the same plate.

THE BRYANT QUARRY

Following the trend of the soapstone belt northeastward from the Tenley quarries, the first observed occurrence of a primitive quarry is at Four Corners, on the estate of Mr Bryant. Near this gentleman's mansion are two clusters of trees, each less than an acre in area, in which the steatite outcrops, and on account of which the land has not been utilized for agricultural purposes. Considerable work has been done on this site. In the first cluster of trees, 100 yards south of the house, a number of shallow depressions are seen marking the sites of ancient pits and trenches. Numerous worked pieces and partially shaped pots are scattered about, and a few tools have been found, mostly by Mr W. H. Phillips, who kindly directed my notice to this site. The material, the nature of the work, and the tools used correspond very closely with the same features of neighboring sites.

QUARRIES OF THE PATUXENT VALLEY

Numerous steatite quarries have been discovered in Montgomery and Howard counties, Maryland, within the limits of the Patuxent valley. Our knowledge of them is due chiefly to the enterprise of two resident archeologists, Mr J. D. McGuire, of Ellicott, and the late Thomas Bentley, of Sandyspring. The former gentleman has an extensive series of the quarry utensils and products, and has published a valuable paper concerning them.[1] I have been permitted to make illustrations of several specimens from the Bentley collection by Mrs E. P. Thomas, the collector's daughter, and additional illustrations have been obtained from the local collections of Mrs Charles Kirk and Miss Frances D. Stabler, of Olney.

Schooley's mill site—At Schooley's mill, on the eastern side of the Patuxent and about half a mile below Snells bridge, steatite of excellent quality outcrops in a number of places. These outcrops have recently been worked to some extent by the residents of the vicinity, but traces of ancient quarrying have not been entirely obliterated. It is difficult in most cases to distinguish the modern from the ancient

[1] Transactions of the Anthropological Society, vol. II, 1882, p. 39.

pits, but there are a number of irregular depressions in a grove on the hillside just above the mill that may be regarded as of aboriginal origin. Masses of steatite appear at many points, and some of these bear evidence of the use of stone picks in detaching masses of the rock. A number of broken pots were observed, including several varieties of form. One is a flat-bottom basin or pan of circular outline and vertical periphery, about 13 inches in diameter and from 3 to 4 inches deep, the bowl being roughed-out to about half that depth. The entire surface retains the marks of the roughing-out pick, which has been boldly handled. Another specimen, half of which was found, represents an oblong shallow basin with projections for handles at the ends. Another appeared to be part of a deep, almost hemispherical bowl, neatly worked but retaining no traces of handles.

In an hour's search two fragmentary tools were found. They are ordinary chisel picks, one showing the point and the other the head or rounded end. The surfaces have the appearance and feel of ordinary sandstone, but on examination the material is found to be a very fine-grained argillite. Part of the surface of the larger specimen has been shaped by pecking, the remainder having been flaked.

Thompson quarry—The region about Browns bridge over the Patuxent abounds in deposits of steatite, and the ancient workings are extensive. The first outcrop encountered after leaving the Laurel and Sandy-spring pike is on the farm of Mr Benjamin Thompson, midway between the tollgate at Ednor and the bridge. A grove of trees with much undergrowth borders the road on the right, covering an area of 2 or 3 acres. In the grove the soapstone outcrops at many points; numerous large masses protrude from the beds of leaves and mold, and present the deeply excoriated surfaces characteristic of weathered steatite. At the roadside and in the lanes, as well as in the neighboring fields, fragments and protruding masses of the rock are seen. A careful search revealed no very definite traces of ancient pitting, but an interesting feature was encountered near the entrance to the wood at the right. An angular mass of the rock rises about 2 feet above the ground, and the highest corner of this has been partially encircled by a deep, wide groove, which still shows the pick marks as seen in plate XCI. It seems remarkable that pick marks exposed to the weather should have been preserved for so long a period, yet the work must undoubtedly be attributed to the aborigines who disappeared from this region a century and a half ago.

The fragments of pots observed here are of ordinary types. A fine medium-size chisel (*b*, plate XCIV) was found in a field adjoining the grove, and other fragments were picked up at different points in the vicinity. A boy living near by had found two fine picks, made by remodeling grooved axes, illustrated in *b* and *c*, plate XCII.

Brown quarry—On the farm of Mr T. E. Brown, within about half a mile of the last-mentioned bridge over the Patuxent, steatite is quite

VIEW OF THE CLIFTON QUARRY AFTER CLEARING OUT, AS IT APPEARED FROM A PLATFORM ERECTED IN THE STREAM BED AT THE FOOT OF THE EXCAVATION

plentiful. In the fields near the house masses project from the ground and fragments are scattered about in great profusion. A number of worked places were seen, and a grooved pick made from a grooved ax and the point of an ungrooved pick of medium size were collected.

Wilson quarry—The site most productive of implements for working steatite is located within 50 yards of the Patuxent, half a mile below Brown's bridge, on the farm of Mr W. F. Wilson. The quarry sites have been cultivated to such an extent that but slight indications of the ancient pits are seen. A few small outcrops of the steatite are found, and within a radius of 60 feet about one of these over thirty

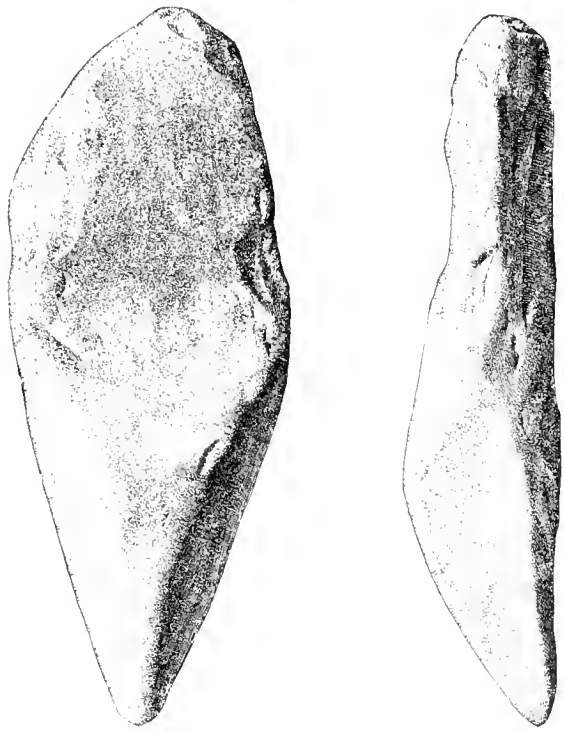


FIG. 23—Implement used in cutting steatite; from quarry in Howard County, Maryland

tools were picked up. This series includes chisels of ordinary varieties (*c*, plate XCIV) and rude grooved picks of the extemporized variety, one of the latter appearing in plate XCIII.

Fragments of unfinished vessels of various forms were observed on the land of Mr Wilson on the northern side of the river within the limits of Howard county. Several acres of forest land are covered by rough-looking masses of dark steatite. In some places it has been worked and indistinct pits can be traced, and rudely shaped pieces of the material, together with specimens of the tools, were encountered. Beyond this spot, on the farm of Mr Henry Kruhm,

another quarry is located. The outcrops are limited, but characteristic fragments of worked steatite and three rather rude chisels were found, two of which are shown in figures 23 and 24.

QUARRIES NEAR OLNEY

During a short stay at "Fair Hill," the residence of Mr Richard Kirk, at Olney, Maryland, my attention was called to a number of rude soapstone dishes that lay strewn about the grounds, and Mrs Charles

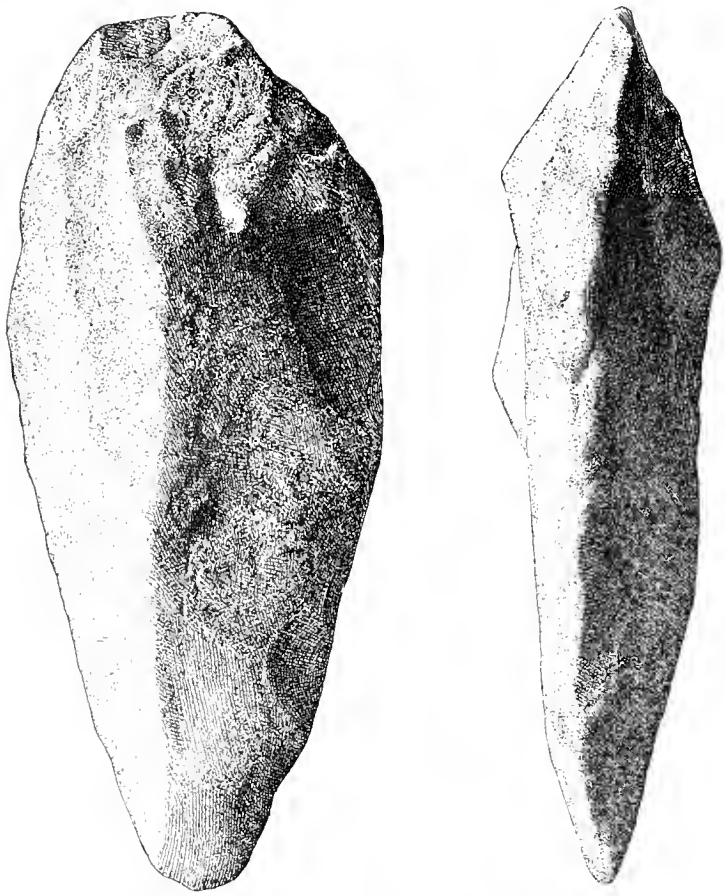
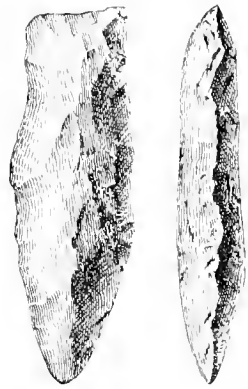


FIG. 24—Implement used in cutting steatite; from quarry in Howard County, Maryland.

Kirk had in her possession an excellent specimen of the two-point chisel-pick (shown in figure 25). Ancient quarries are located in the meadows below the house and in the adjoining woods on Brooke grove farm; they are now almost obliterated by recent quarrying and by farming over the sites. Worked pieces of steatite and specimens of the tools used are still occasionally picked up in the vicinity. The rude vessels are all of usual types, and no example was seen that approaches at all near a finish.

c

b



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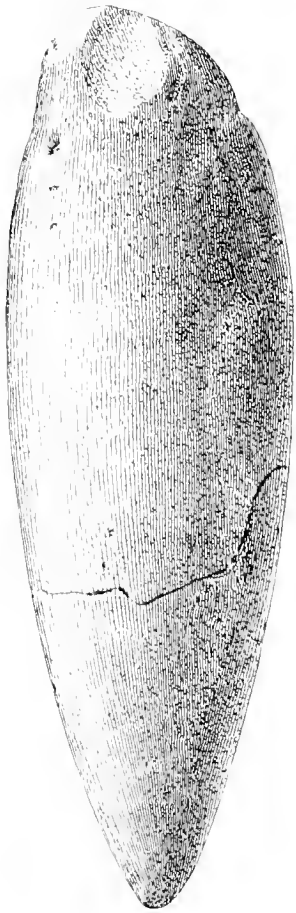
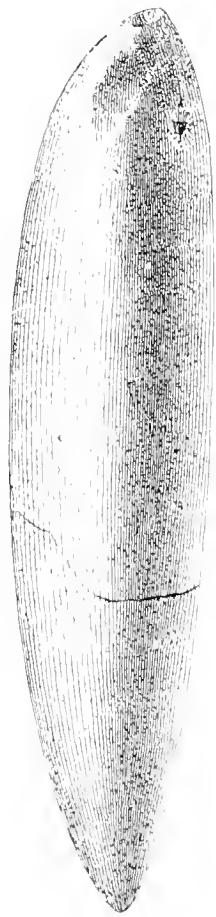


a

b



a

IMPLEMENTS USED IN CUTTING STEATITE ; FROM THE CLIFTON QUARRY

a two-thirds actual size *b c d* actual size

The chisel pick mentioned above was found by Mr Charles Kirk on the quarry site. It is made of iron-impregnated sandstone, which appears and rings like metal. It has been worked rudely into shape

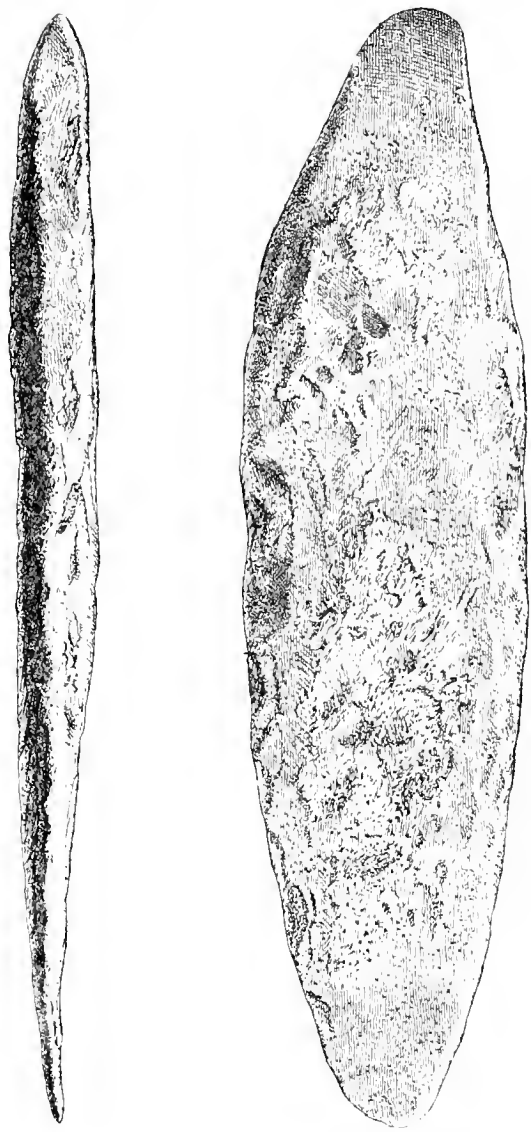


FIG. 25—Implement used in cutting steatite; from the Olney quarry.

by flaking, and then finished apparently by grinding. It is 8 inches long, 3 inches wide, and half an inch thick, and would appear to be one of the most effective tools of its class yet found. I was so fortunate as to find on this site the small chisel shown in *a*, plate XCIV,

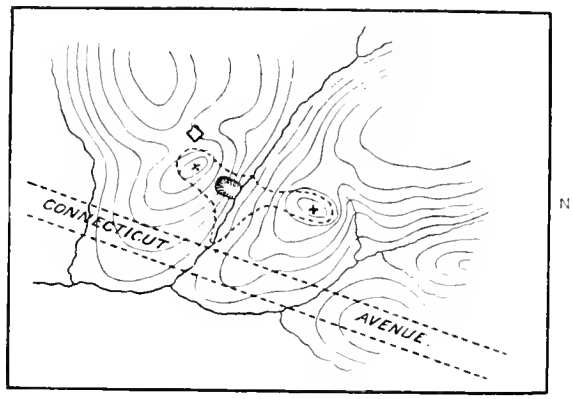
which is almost identical in size, appearance, and material with one found in the Rose hill quarry in the District of Columbia. The point is well shaped, and shows the effects of use. The head terminates in a sharp edge, which is not worn, and must have been protected by a haft when in use. The material appears to be a fine-grain greenish-gray argillite. A second chisel of small size (*a*, plate XCV) was subsequently picked up in the field near the Kirk residence. Half a dozen fine soapstone tools were obtained from this vicinity by Miss Frances D. Stabler, who resides at Sharon, a neighboring estate.

FIG. 26—Implement used in cutting steatite; from Sandyspring quarry.

About a mile south of Olney, on the farm of Mr Mackall, the location of an ancient quarry was noted, and the usual refuse of aboriginal operations was observed. A chisel made of blue-gray porphyry and a very rudely grooved or notched fragment of quartz, once hafted as a pick, were picked up. This quarry is said to extend to the farm of Dr Kirk, which lies south of Mr Mackall's place.

Another site formerly occupied by the aboriginal soapstone worker is situated about 4 miles west of Olney, on the premises of Mr Holland. This place did not yield any form of tool, but the unfinished vessels occur as usual. Other sites are reported in this vicinity.

The collection of Mrs Mary Bentley Thomas, of Sandyspring, was made from the quarries of the vicinity, several of which are mentioned above. There are many specimens of the partially shaped vessels illustrating all phases of the work. The picks comprised in this collection are very fine. Some are modified grooved axes, others are fragments of rock roughed out by flaking just enough to make them available, with the addition of a haft, for working the soft stone. One of the former is shown in plate XCVI, while the latter type is illustrated in figure 26. One of the most striking implements found in this collection, and of wider interest than the other quarry tools, is a gouge of the New England type, which has been roughly grooved by the steatite worker in order that a haft might be attached (figure 27). This specimen serves to add to the force of the remark, suggested by the remodeling of

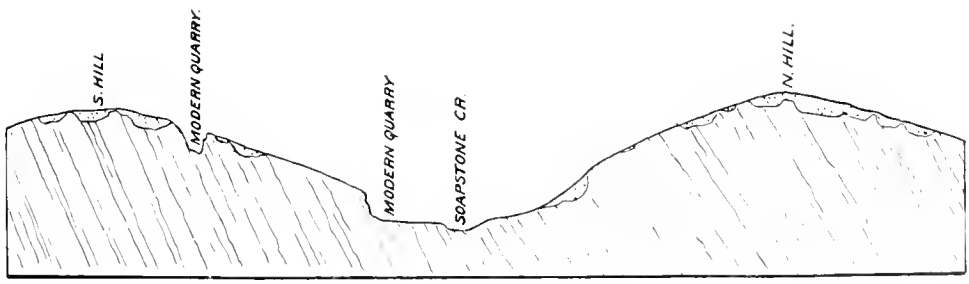


a

Sketch map of the Connecticut avenue quarries. The area of the soapstone outcrop is inclosed by a dotted line and the tops of the two hills are marked by crosses.

b

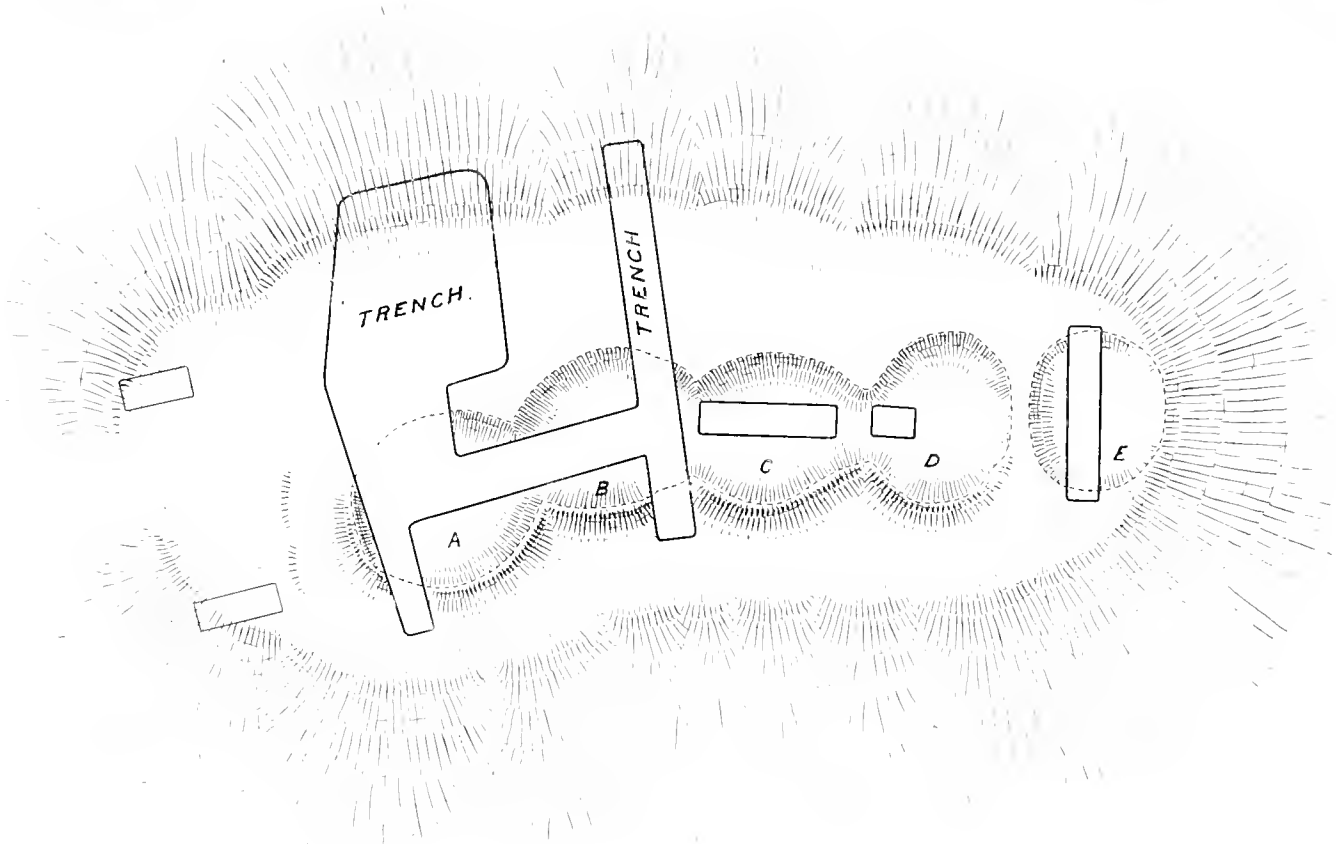
Section of the pittings on the northern hill. The dotted line indicates the original profile.



c

Section through the two hills. Connecticut avenue quarries.

MAP AND SECTIONS OF THE CONNECTICUT AVENUE STEATITE QUARRIES



MAP SHOWING TRENCHING OF THE ANCIENT STEATITE QUARRIES ON THE NORTHERN HILL; SCALE ABOUT 20 FEET TO THE INCH

grooved axes for the rough work of the quarries, that the date of this work is comparatively recent. It would seem that older tools from all sources were pressed into service for carrying on a new art.

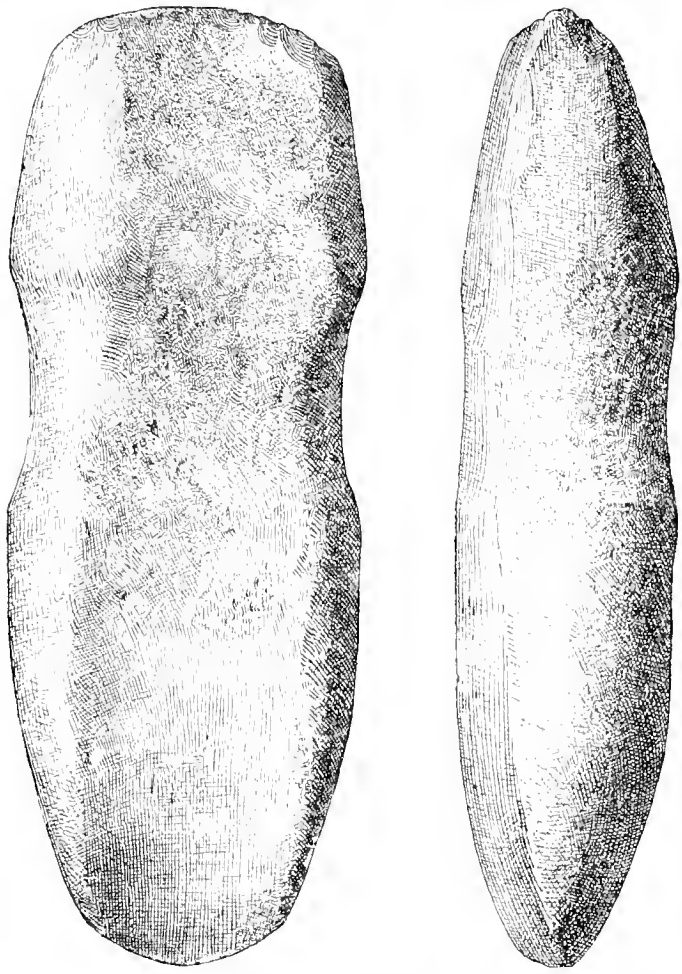


FIG. 27—Gouge-like implement grooved for hafting and used in a steatite quarry near Sandy spring, Maryland.

FALLS CHURCH AND HOLMES RUN QUARRIES

Near Falls Church, and some 3½ miles southwest of Little falls, Virginia, steatite has been found, and some traces of ancient work have been reported. Similar reports come from several other localities in Alexandria and Fairfax counties.

In 1891 a soapstone mine was opened on what was then the Bassett place, on Holmes run, 7 miles from Alexandria and the same distance from Georgetown. As the work advanced a few shallow depressions

marking the sites of ancient pits were observed, and in cutting through them several rudimentary vessels and numerous mining and cutting tools, broken and entire, were encountered. The ancient work had extended to the depth in one place of 7 or 8 feet. Several specimens from this site are illustrated in the accompanying plates. An ordinary grooved ax, broken in use, is illustrated in plate XCVII, and two other axes modified by flaking to give them sharper cutting edges (plate XCVIII) are of special interest as further illustrating the subordination of general to special function among the tools of the aboriginal quarrymen.

AMELIA COUNTY QUARRIES

On the southern side of James river, in Amelia county, Virginia, a very interesting site was studied by Mr F. H. Cushing, who conducted extended excavations and made a model of an ancient pit illustrating the manner in which the masses of partially shaped steatite were cut out and removed. The tools recovered and the quarry rejects were identical with those from the more northern sites.

MADISON COUNTY QUARRIES

Between 5 and 6 miles from Orange, on the road to Madison court-house, Virginia, is a negro church, at which a road turns off northward. At a point about 200 yards from the church the latter road strikes an outcrop of steatite, along which it runs for 500 or 600 yards. Most of the deposit has been so much worked by residents that it is now impossible to determine whether there is any trace of aboriginal work except at the extreme northern end of the outcrop. Here there are a few small pits that seem due to ancient work.

CULPEPER COUNTY QUARRIES

There is a very extensive quarry of steatite near Waylands mills, on the Orange road, 9 or 10 miles west of Culpeper court-house. At the top of a hill, something over 100 feet high, the steatite outcrops and the pits begin at once. They are all to the right of the road, and vary from a foot to 4 feet in depth, with the exception of one, which is fully 150 feet in diameter, the bottom being filled over an area of 50 or 60 feet across with muck, so that its depth can not be determined. Almost the entire surface has been dug over for half a mile in extent.

On the farm of H. I. Aylor, about 2½ miles from the mill, is another steatite quarry, in which it is reported that aboriginal digging was extensive, and that fragments of pots and the like were plentiful. Specimens may be found at neighboring houses, especially at the negro cabins, where they are used for "chicken troughs."

BRUNSWICK COUNTY QUARRIES

On the farm of Bassett B. Wilkes, at Charlie Hope station, 6 miles west of Lawrenceville, Virginia, there are several pits, extending over an acre in area, where steatite has been quarried by the Indians. The

VIEW IN EXCAVATION ON THE NORTHERN HILL, SHOWING SURFACE OF MASSIVE STEATITE NEA[illegible]GHTLY MARKED BY THE QUARRY IMPLEMENTS

stone crops out near the top of a narrow ridge on which considerable manufacturing seems to have been carried on, as fragments of vessels are numerous.

RELATION OF CLAY AND STEATITE POTTERY

It might appear that peoples employing earthenware would hardly resort to the difficult task of quarrying and working steatite for vessel making, since the uses to which both classes of utensils were devoted must have been nearly identical; but that the historical tribes made pottery and at the same time employed soapstone vessels is known through colonial records, and also from the frequent occurrence together on village-sites and in shell banks of vessels made of both materials. It has also been observed that pulverized steatite was often used in tempering ordinary pottery, and that the vessels so tempered are occasionally modeled in the form of steatite vessels, having the heavy projections or handles at the sides.

The occurrence of grooved axes and celts in the quarries, and the adaptation of these tools by slight modification to use as picks and chisels, indicates with sufficient clearness that the quarrying of steatite was a comparatively recent industry, practiced after all forms of polished implements had been perfected, and in all probability by the Algonquian peoples.

VARIOUS ARTICLES OF STEATITE

The number of miscellaneous carvings of steatite found in the tidewater districts is very limited, and the execution is usually inferior. They are in striking contrast with the work in neighboring districts in North Carolina and Tennessee, which furnish pipes and ornaments of remarkable beauty.

The fragment of a neatly carved platform pipe shown in *a*, plate XCIX, was found on an Anacostia village-site, near the Pennsylvania avenue bridge. The rudely shaped, channeled, sinker-like objects, *b*, *c*, *d*, are from village-sites near Little falls of the Potomac, and the bit of pipestem *e* is from a dwelling site near the Clifton quarry, Virginia.

The specimens illustrated in plate C are from village-sites in Virginia, and represent several stages of the shaping operations—*a* was roughed-out by breaking and sawing; *b* was reduced to approximate shape by cutting and abrasion, but the bowl is not yet excavated; and *c* appears to be a finished specimen, though quite rude in appearance. The object shown in *d* has been carefully trimmed, but the work is not sufficiently advanced to show whether a pipe or an ornament was to be made.

That such a very limited number of miscellaneous steatite carvings should be found in the tidewater country is a matter of some surprise.

CHAPTER VI

DISTRIBUTION OF STONE IMPLEMENTS

THE AREA INVESTIGATED

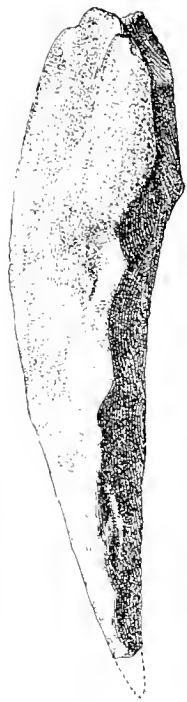
The tidewater portions of Maryland and Virginia have an area nearly equal to that of the state of Maryland. About one-fourth of the area is occupied by broad arms of the sea, chiefly Chesapeake bay and its tributaries, and the land is a much diversified plain, broken by erosion into hills and terraced valleys. It extends inland from the Atlantic seaboard to the base of the highland or Piedmont plateau, which rises on the west to the Appalachian mountains. The curved line separating the two topographic divisions—the lowland and the highland—is marked by falls in all the rivers, and by the location of town and cities through which pass the great highways of travel connecting the north with the south. On this line are located Philadelphia, Havre de Grace, Baltimore, Laurel, Washington, Fredericksburg, Richmond, and Petersburg (see plate 1). This was the shore-line of the Atlantic when the formations constituting the lowlands were laid down.

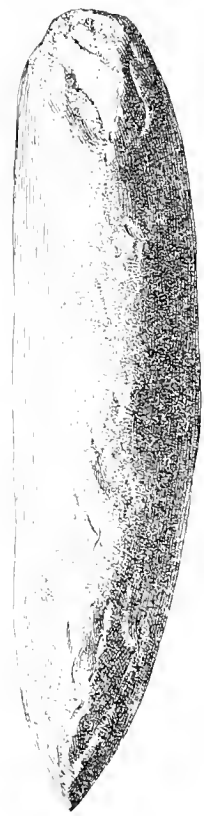
The separation of the lowland from the highland is not a topographic separation only; there are pronounced biologic and geologic distinctions, and these combined in archaic times to produce marked anthropologic distinctions. The tidewater region furnished a plentiful supply of game and fish, and in the brackish and salt water areas an abundance of oysters. The natives lived much on the water, and were perhaps more nearly a maritime people than any other group of tribes in the east. Their peculiar biologic environment had a marked influence on their art, giving it unique forms and exceptional distribution; while their unusual geologic surroundings had a still more pronounced effect on their implements, utensils, and weapons, limiting the forms and sizes and determining to a considerable extent the kinds employed in the various districts, independently of biologic and other conditions.

In early historic times the tidewater country was inhabited by numerous tribes of Indians, mainly of Algonquian stock, subject to the renowned Powhatan. A few other nations were located about the headwaters of Chesapeake bay and others appeared at times along the western and southern borders. The period covered by this occupancy practically closed about the middle of the last century. Its beginning is not determined, but it probably does not date back very many centuries. Of antecedent or prehistoric peoples, if such there were, we have no

THREE CHISEL-LIKE IMPLEMENTS OF DARK ERUPTIVE ROCK FROM THE CONNECTICUT AVENUE QUARRIES; ROUGHED OUT BY FLAKING AND SHARPENED BY GRINDING; ACTUAL SIZE

a





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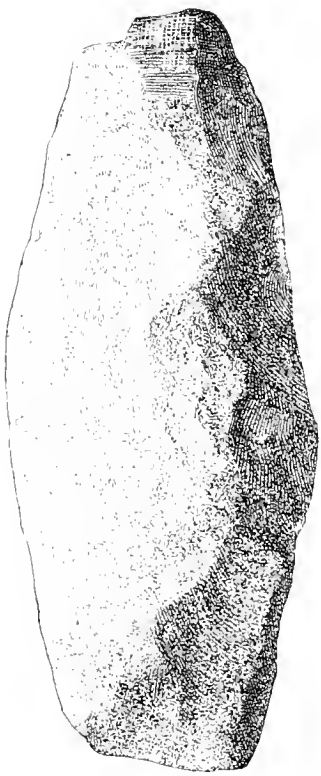

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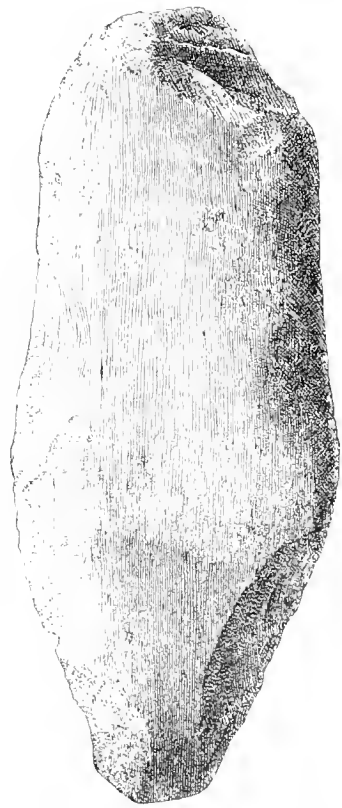
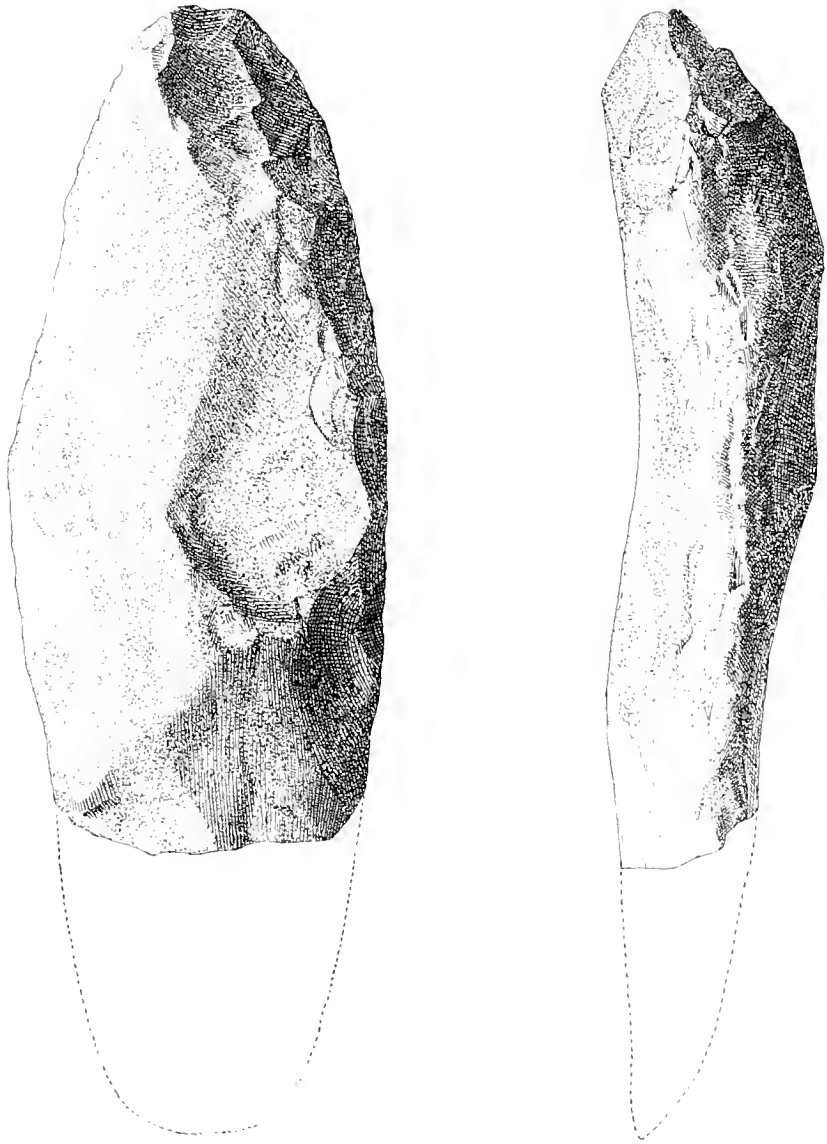


d

STEATITE-CUTTING IMPLEMENTS OF ERUPTIVE ROCK FROM THE CONNECTICUT AVENUE QUARRIES; ACTUAL SIZE



FRAGMENT OF A STEATITE QUARRY IMPLEMENT OF GREENISH-GRAY ERUPTIVE ROCK, EXPOSED BY GRADING OF CONNECTICUT AVENUE ; THREE-FOURTHS ACTUAL SIZE

information, for the art remains are simple and homogeneous, giving no hint of the presence in this region of any other than the historic tribes. The region is nearly identical with that explored by that intrepid and illustrious adventurer and colonist, John Smith, whose accounts of the natives are among our most valuable contributions to the aboriginal history of the Atlantic states.

DISTRIBUTION OF MATERIALS

GEOLOGIC DISTRIBUTION OF STONE

The geology of the tidewater country is wholly unlike that of the highland, and the rocks available to the aborigines in the two regions were not only different in distribution but peculiar in the shapes they took and in other features that affect the character of the utensils made and employed. In the highland, west of the dotted line on the map forming plate I, the varieties of rock occur in massive forms and with definite independent distribution. The workable varieties, such as quartz, quartzite, rhyolite, jasper, and flint, were much sought by the aborigines of the lowland. Fragmental material was to be obtained almost everywhere on the surface, but choice varieties were confined to limited areas and often to distant regions, and where the surface exposures were not sufficient to supply the demand, quarrying was resorted to and the work of extracting, transporting, and trading or exchanging the stone must have become an important factor in the lives of the people. The masses of rock were uncovered, broken up, and tested; the choice pieces were selected and reduced to forms approximating the implements to be made, and in this shape they were carried to the lowland.

In the lowland all varieties of hard stones are fragmental, and the species are intermingled in varied ways. These fragments of rock are not merely broken, angular pieces, such as characterize the surface of the highland, but are rounded masses and bits known as bowlders or cobbles and pebbles, and comprise chiefly such tough, flinty, homogeneous stones as are available in the arts of primitive man. Nature, in her own way, selected from the highland along the stream courses the very choicest bits of the crumbled rocks, reduced them in hundreds of cataract mills and in the breakers of the seashore to rounded forms, and deposited them in what are now the lowlands, in great heaps and beds, ready to the hand of primitive man.

At first it would seem to even the keenest observer that a cobble or ovoid bowlder or pebble would be a difficult form of stone to utilize in making knives, spearheads, arrowpoints, drills, and scrapers. The smooth, rounded mass had to be transformed into a thin blade, every contour of which is incisive or angular. So far apart are the two classes of forms that few people have thought of the bowlder as a prominent source of these objects. But when we look into the matter

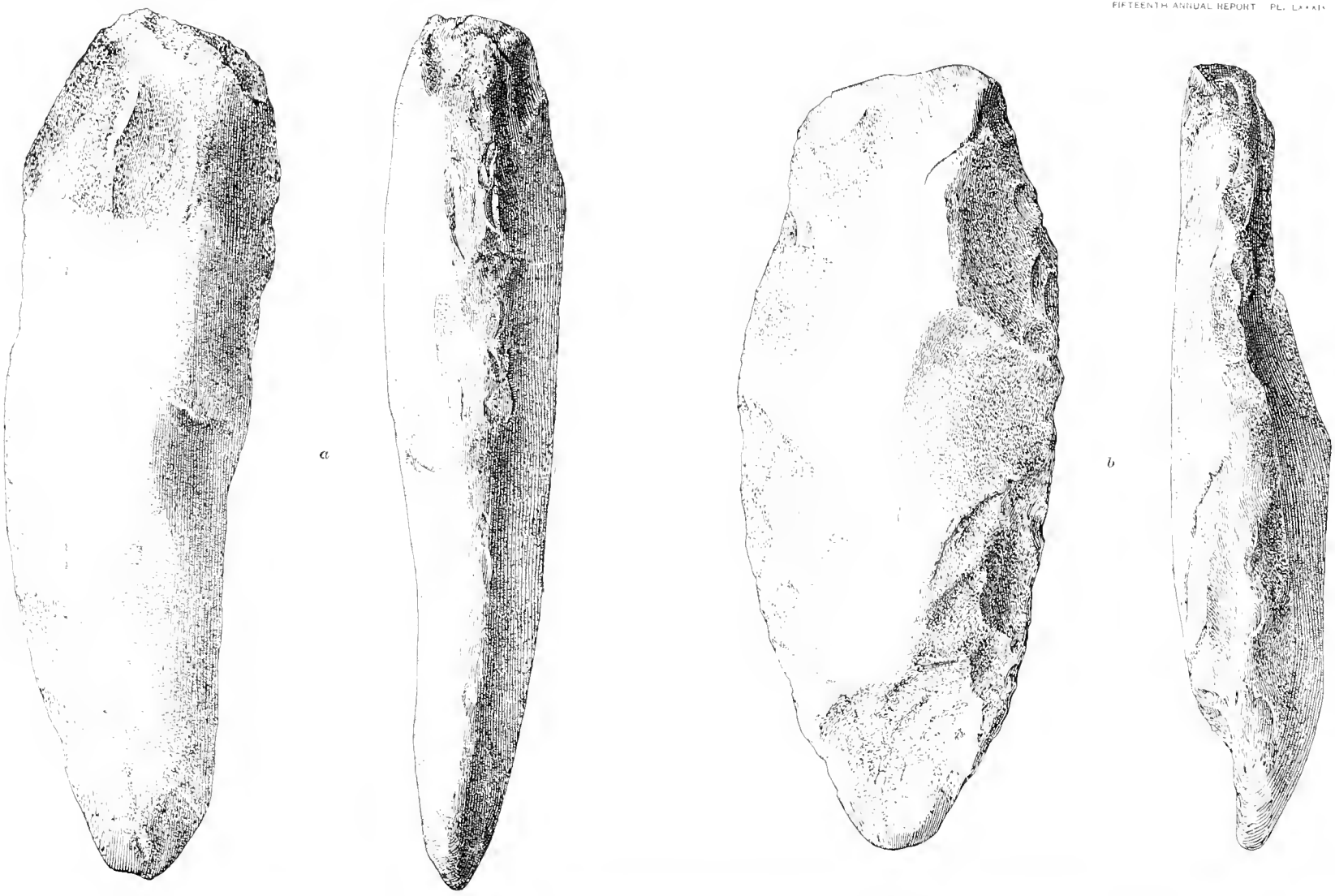
more carefully we find that nature has not provided any other form of the several tough varieties of stone so perfectly suited to the purposes of the stone-implement flaker as the bowlder or pebble.

Each river brought down from the highland only such varieties of stone as belonged to the drainage of that river, so that in one valley one set of materials prevails and in another a different set of materials appears, varying with the geologic formations of the region drained. Rivers having identical formations have nearly identical bowlders; long rivers crossing numerous formations have many varieties; short rivers crossing but few formations have but a limited number.

There is also a selection as to size by each drainage way. Near the base of the highland, where the force of the current is reduced by meeting tidewater, the larger bowlders are dropped, the smaller ones are deposited farther down, and the pebbles and sand are carried far seaward. Small and weak streams transport fewer pieces and drop them sooner. This selection does not hold good with ice transportation, which agency has carried irregular masses of stone to many widely distributed points. Notwithstanding the fact that all water-transported stones are more or less rounded, there is a selection with respect to degree of roundness. If dropped early in the progress of transportation, the bowlder is imperfectly rounded; if carried far, it is fully rounded. Near the margin of the highland, therefore, there is a large percentage of imperfectly rounded stones, and farther out there is a small percentage of decidedly irregular forms. These conditions are probably considerably modified by the action of the waves along the ancient seashore which skirted the base of the highland. Such fragments as were subjected to wave action became fully rounded and were deposited in beds along the ancient beach-lines. It is not easy to distinguish the beach-rolled material from that rounded by the flow of streams, both agencies having no doubt frequently acted in turn on the same material.

Again, we observe that on river banks near the base of the highland many varieties of rock are present, but with each mile as we descend the number is diminished—the softer species are reduced to sand as they move toward the sea and one after another disappears. Quartz, being the hardest, is last to yield to the erosive agents, and at various points along the ocean beach well-polished quartz pebbles are found.

A comparison of the Potomac and Patuxent rivers with respect to these points is instructive. In ancient times both streams, as they descended from the mountains, gathered fragments of rock and carried them downward until the soft and friable ones were reduced to sand and the tough, flinty varieties became bowlders and pebbles. The latter consisted chiefly of quartz and quartzite. The Potomac was a long stream, heading far in the west and cutting through many ranges of mountains and hills. It crossed heavy beds of quartzite in the region of the Blue ridge. This rock is tough and massive, and breaks



IMPLEMENTS USED IN CUTTING STEATITE; FROM A CACHE OF FOUR FOUND NEAR THE SURFACE ON THE SOUTHERN HILL

a, two-thirds actual size; *b*, actual size

up into rather large fragments; thus it is that we have many large quartzite bowlders deposited in the valley about Washington and below, the sizes diminishing toward the sea. Between the Blue ridge and tidewater the river crosses a belt of gneiss rocks intersected by many veins of quartz. This latter rock is hard and brittle, and breaks up into small fragments, which, when rounded, are usually of the size denominated pebbles. These were taken up by the waters in countless numbers and distributed with the quartzite bowlders from Washington to the sea. But the quartz is harder than the quartzite and resisted the erosive agents more successfully, so that after the quartzite disappears there are still quartz pebbles in plenty.

The other stream, the Patuxent, has a limited drainage and does not cross the quartzite belt but drains the quartz-bearing zone. Below the point of its entrance into the tidewater country at Laurel, we find, of the flakable stones, chiefly quartz in small fragments; lower down all are well rounded, forming pebbly gravels. It is thus seen that nature has selected the rocks used by the tidewater peoples and has distributed them in groups varying with original location, with hardness, with toughness, with shape, and with size.

GEOLOGY AND ART

The effect of the natural conditions of distribution on the stone art of the various districts was necessarily pronounced. One community located conveniently to deposits of large bowlders used large stones, and the tools shaped from them average large. Another community located in a pebble-bearing district utilized pebbles, so far as they are capable of utilization, and this people had few large tools and many small ones, the average size being small. Dwellers in quartzite-bearing districts had quartzite tools, those having quartz deposits had quartz tools, and those residing near the base of the highland had many varieties of stone and hence used a much greater diversity of stone tools, since the working qualities or capacities of each stone vary from the rest.

As a result of these conditions the tidewater Potomac is rich in chipped tools, both of quartzite and of quartz, of home production. The Patuxent yields a large percentage of quartz tools, most of which are native. The Potomac yields to the collector a large percentage of large tools, the Patuxent a large percentage of small ones. These remarks relate to the native varieties of material and implements made from them. Exotic materials had their own peculiar distribution, which will be examined further on.

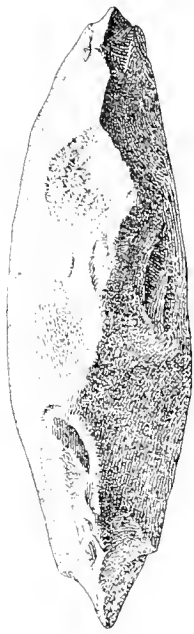
Nearly all rude, bulky implements of chipped stone, and all failures or rejects of manufacture, are, as a matter of course, found on or near the sites from which the raw materials were derived. Rejects are large and clumsy on the upper tidewater Potomac because of the large size of the bowlders available; they are small on the Patuxent because the pebbles utilized were small.

Again, we observe that the percentage of failures—the turtlebacks and other refuse of manufacture—decreases rapidly with the distance from the source of supply of the raw material. This may be illustrated by a suppositious case. In the vicinity of Washington we have a great deposit of quartzite bowlders. In figure 28 the dotted line may be taken as roughly indicating the area yielding workable bowlders, and the angular markings show the distribution of rejects of manufacture. The successful blades and the finished tools produced radiate much more widely, but also diminish with distance from the source of supply, as indicated by the smaller strokes in figure 19, a generalized case also. Favorite routes of travel would receive the fuller supply of these

FIG. 28.—Distribution of rejects of manufacture, confined largely to the area yielding the raw material

objects, and dwelling and important hunting and fishing sites would have large supplies, as indicated by "village-sites" in figure 29. On the source of supply of the raw material, failures and unfinished implements or rejects exceed finished implements in numbers, but beyond this the latter are almost wholly prevalent. So-called paleolithic forms, the rejects of manufacture, are thus confined to certain areas—the areas producing the raw material—and it is easy to see how, in various sections of the country before the true nature of these forms was known, certain localities were thought to have been especially favored by the hypothetic paleolithic man.

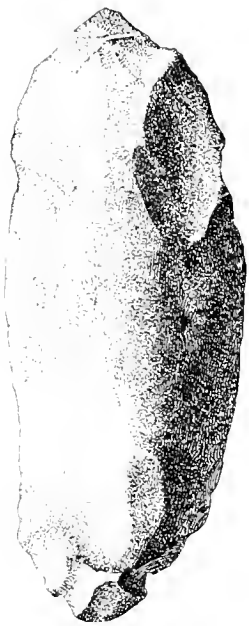
It would appear from what has been said that the artificial distribution of materials is limited by, and is indeed a modification of,



a'

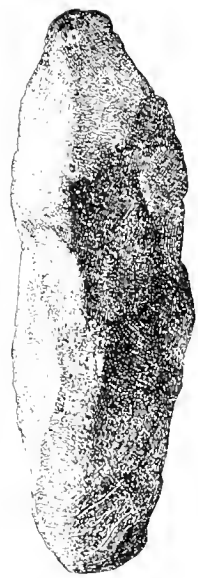
b'

c'



a

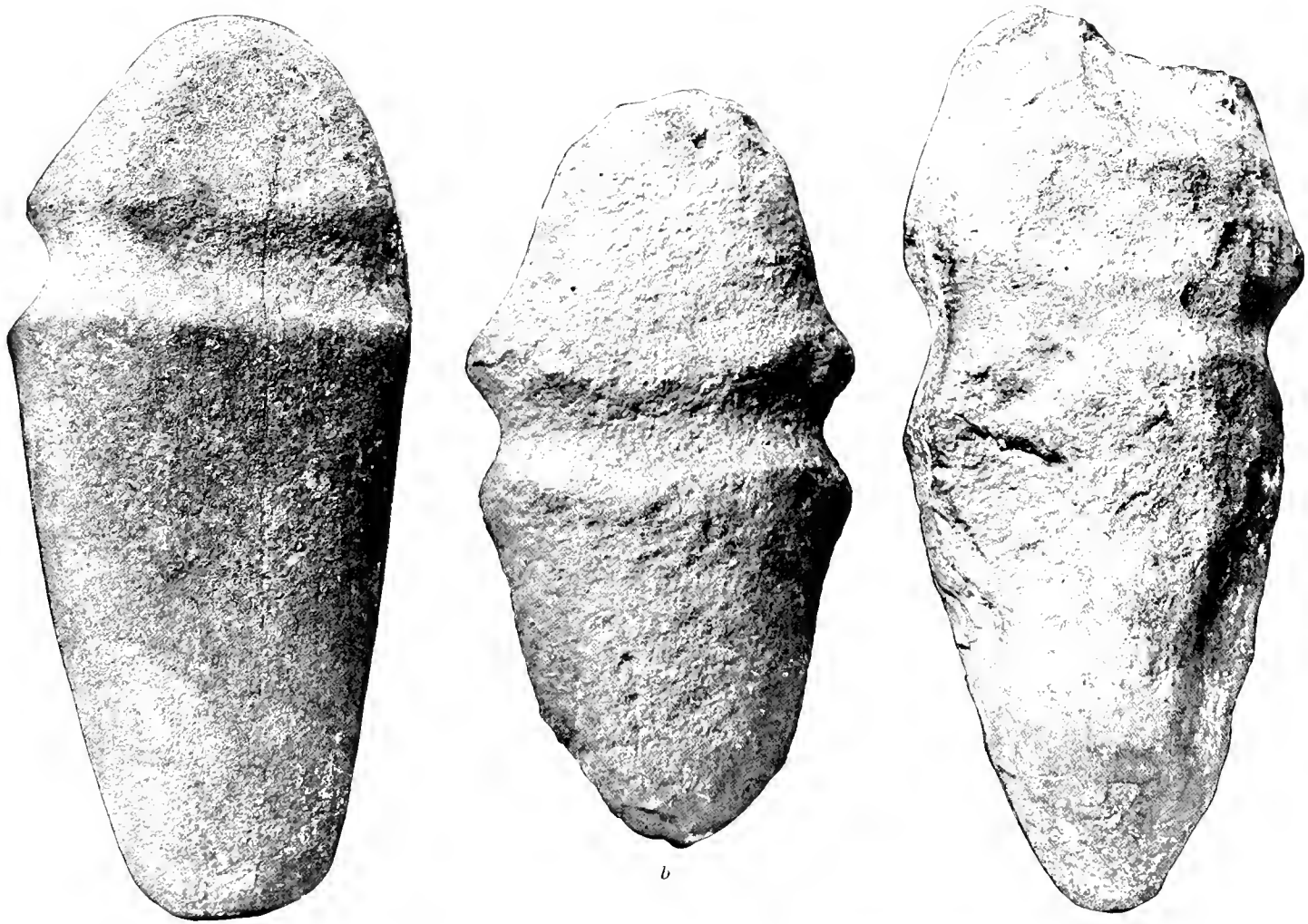
b



c

IMPLEMENTS USED IN CUTTING STEATITE; FROM VILLAGE-SITES AT LITTLE FALLS OF THE POTOMAC; ACTUAL SIZE

MASS OF STEATITE PARTIALLY CUT OUT BY MEANS OF STONE CHISELS AND NOW EXPOSED ON THE SITE OF THE THOMPSON QUARRY



a *b* *c*

GROOVED AXES USED IN SOAPSTONE QUARRIES

The fine specimen *a* is from the Connecticut avenue quarry, north hill, three-fourths actual size; *b* and *c* are from the Thompson quarry, about one-half actual size

the natural distribution, and that each class of artificial objects is scattered in a way peculiar to itself. But the human agent is an important factor. Other things being equal, human distribution of small things is far, of large objects near; implements of war and the chase travel far, domestic utensils remain near; improvised articles or devices are near, highly elaborated and valuable objects go far; along thoroughfares distribution is far, across thoroughfares it is near. Again, much-occupied sites are richly stocked with utensils, while slightly occupied spots have but few; sites near the source or sources of supply have a wealth of art, very distant ones have almost nothing; and sites convenient to a plentiful supply of one material have many tools of that material; sites remote from any of the sources

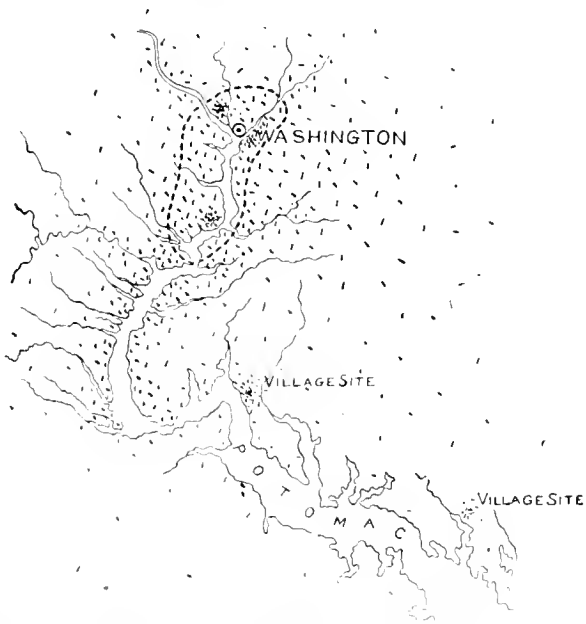


FIG. 29—Distribution of implements, much more general and extensive than the distribution of rejects.

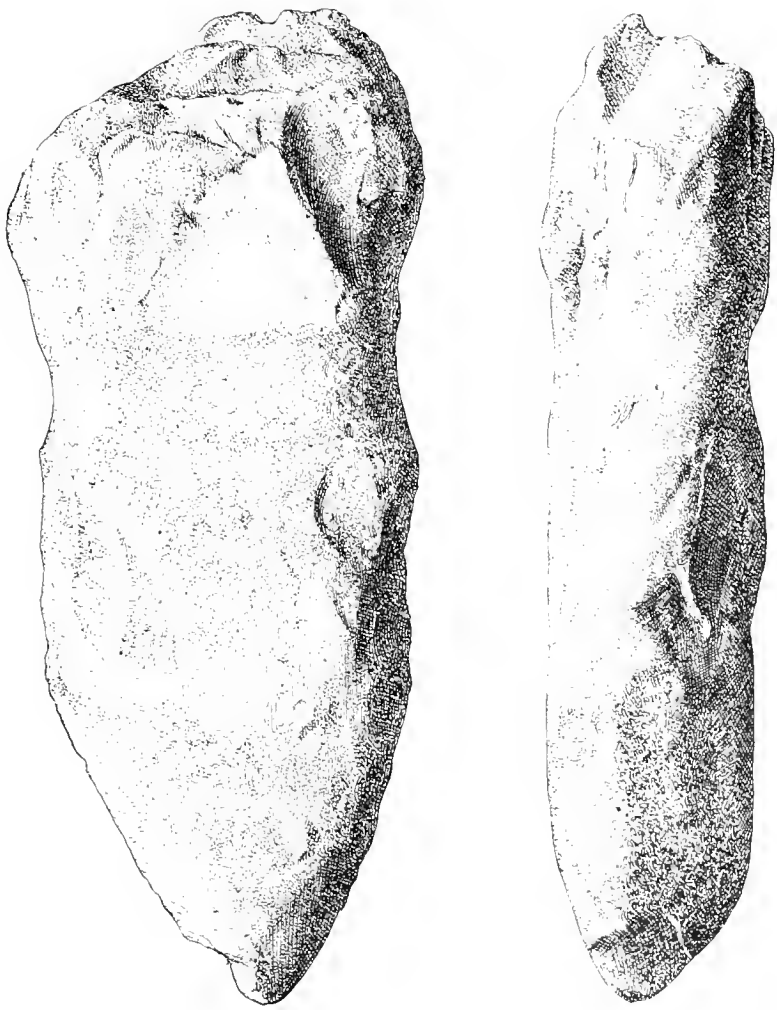
have a limited supply from many sources. So, too, a sedentary people will not distribute widely, while wandering or semisedentary tribes will transport their possessions to many distant places; and sites occupied by numerous tribes in turn will have diversified art remains. It may be further noted that on sites devoted to single or simple industries the range of tools will be small, while on sites where occupations were varied the range will be large; and that where peoples were varied, occupations varied, materials varied, and time was long, we will have the widest range.

The tidewater peoples were by no means content with the materials supplied by the province in which they lived, although these naturally

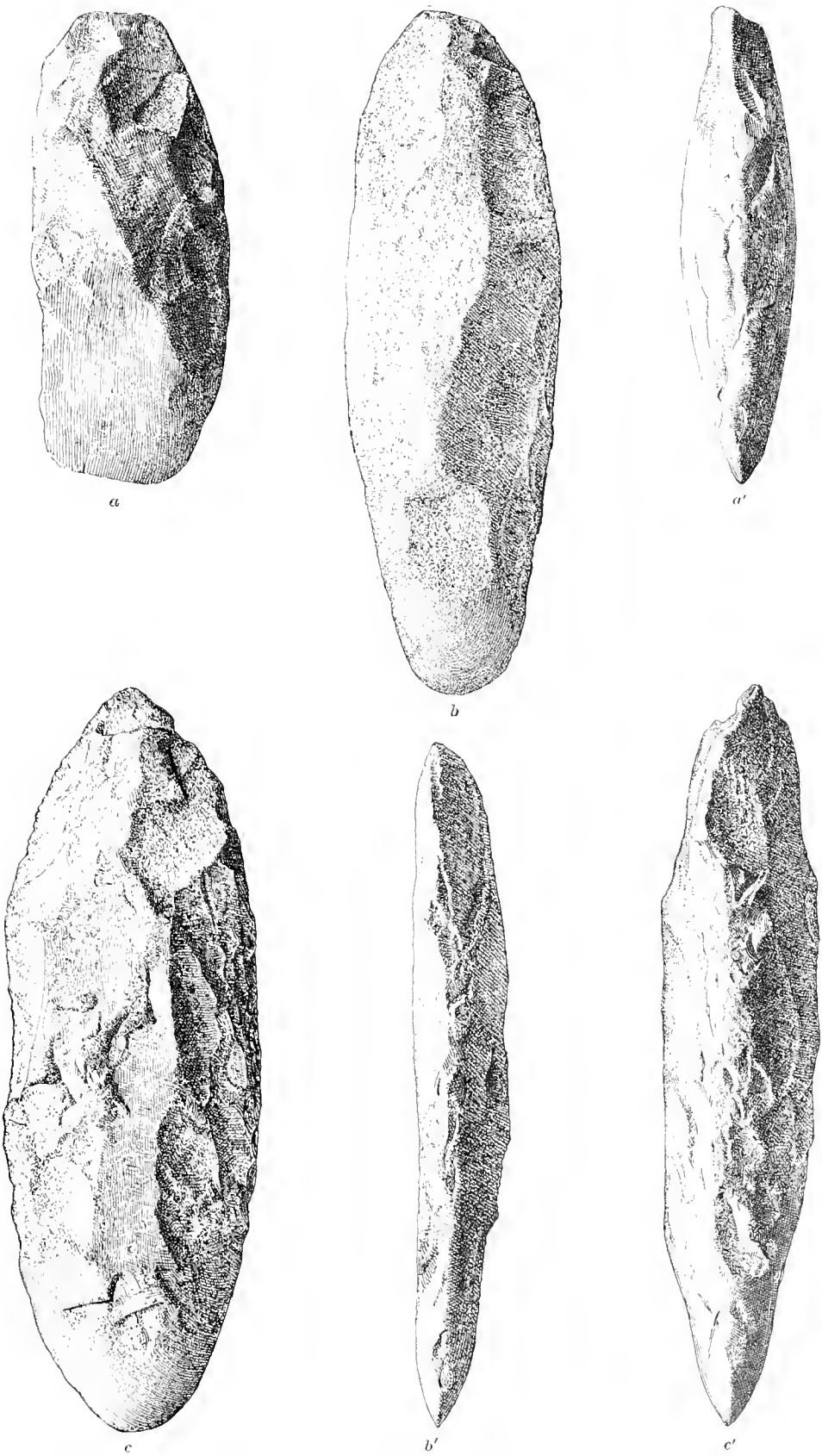
received first attention. Not being favored by nature in the quality and range of their material, they seem to have searched far and near for those finer-grained, homogeneous varieties so much used in other regions. They sought flint in the mountains of Virginia fully a hundred miles beyond the tidewater limit; they discovered the slaty-looking volcanic porphyry called rhyolite in South mountain 75 miles northwest of Washington, and jasper and argillite were obtained from eastern and northeastern Pennsylvania. It is probable that in some cases the tidewater peoples made long journeys in search of these rocks and spent a considerable season quarrying and roughing-out the blank forms and selecting choice bits to be carried home. On the other hand, much of the material from these distant places may have reached the lowland by exchange or trade, and a certain amount, not ascertainable, of the supply of implements of exotic materials was no doubt due to visits and incursions of the peoples occupying the region of the source of supply, as, for example, jasper by the Susquehannocks of the north and flint by the Monacans of the west. It may be that in time, by careful comparison of the forms of implements characterizing various exotic materials, something may be suggested of the presence of neighboring peoples in, or at least of their influence on, the art of the tidewater region. Distribution is really very general, implements made of all of the varieties of stone mentioned being scattered more or less fully over the Chesapeake-Potomac country as far south as James river.

Jasper, the quarries of which have recently been located by Mr H. C. Mercer, of Philadelphia, is most plentiful in the upper Chesapeake and Susquehanna regions. Argillite, which was obtained in the Delaware valley, did not find its way to any great extent into Maryland and Virginia, although several caches of blades have been discovered in the middle Chesapeake region and implements are occasionally found. Rhyolite implements are most plentiful in the Patuxent and Potomac valleys, and especially in those portions of them adjoining South mountain. The quarries of this stone are in Pennsylvania near the head of the Monocacy, and the implements are very numerous on that stream, while fragments of considerable size have been carried far down the Potomac. Transportation was, no doubt, mainly by water. Probably one-fourth of the spearheads and arrowpoints of the Potomac region are made of this rock. Dark or blackish flint was used in making smaller projectile points, and these are rare in the tidewater country, but increase in number toward the west, and prevail in the middle and upper Potomac region.

It should be noted that of these exotic materials we have in the tidewater country very few large or rude implements, and as a matter of course failures of manufacture are rare, save those that result from breakage during such specializing and finishing operations as were conducted subsequently to transportation from the quarry. Of quartz

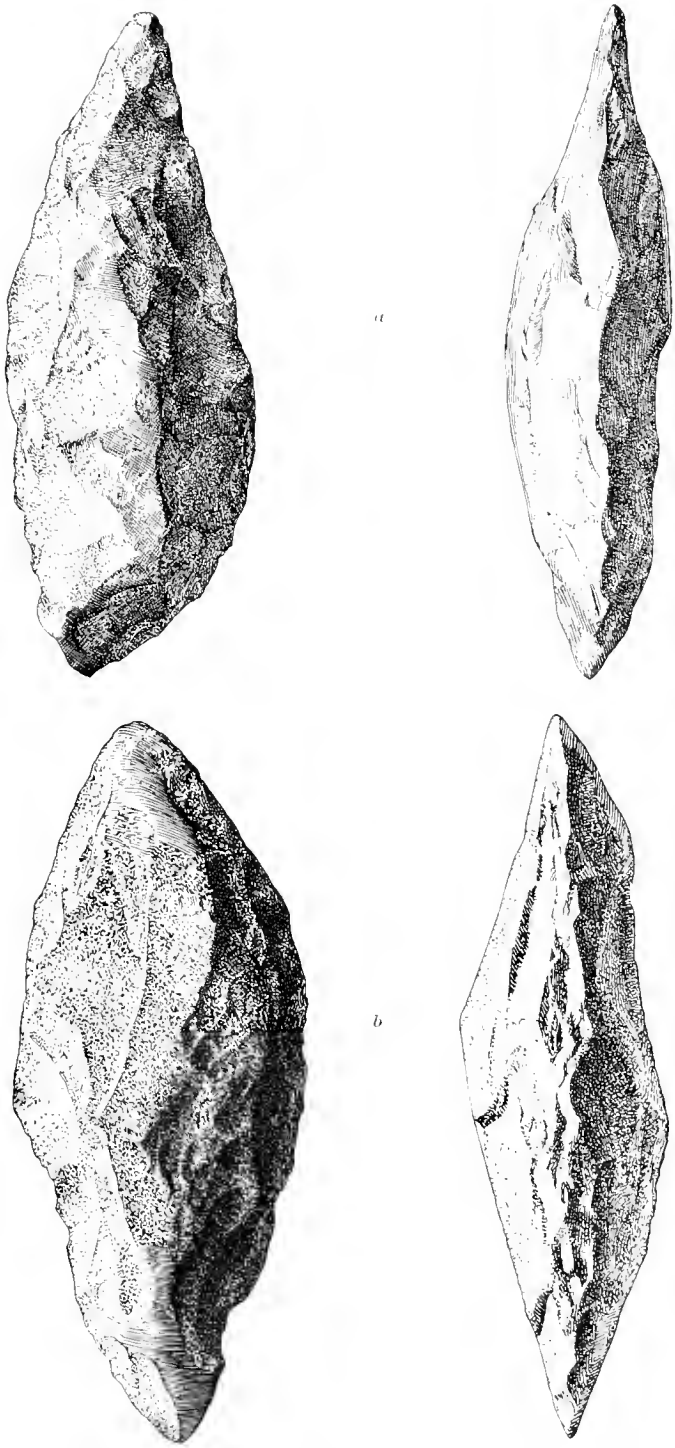


RUDE GROOVED PICK OF DARK ERUPTIVE ROCK FROM THE WILSON QUARRY; THREE-FOURTHS ACTUAL SIZE



IMPLEMENTS USED IN CUTTING STEATITE; FROM QUARRIES IN THE VICINITY OF SANDYSPRING, MARYLAND

a and *b* actual size; *c*, two-thirds actual size



POINTED IMPLEMENTS OF DARK ERUPTIVE ROCK USED IN CUTTING STEATITE

The lower specimens are from the Kirk place, Olney, Maryland; actual size

and quartzite, the native flakable stones, there are countless rejects of manufacture of all grades, as described in the foregoing pages.

It may be said of quartzite and quartz that a portion of these materials, perhaps a large portion, especially of the latter, was gathered from the highland beyond the tidewater limit, and no one can say from the examination of ordinary finished implements of these materials whether or not they were made from a native bowlder or pebble or from a foreign mass or flake; yet the presence of countless numbers of the rejects of manufacture from bowlders and pebbles of these materials within the tidewater area, and the rarity, so far as I have been able to discover, of refuse of manufacture in the highland, seem to make the true conditions clear.

Cut, pecked, ground, and polished implements of usual types are common in this region. Steatite, used in making pots, pipes, sinkers, ceremonial stones, and ornaments, was quarried in hundreds of places along the eastern border of the highland. The unfinished objects are found on and about the quarry sites and on dwelling sites near by. The finished utensils and implements are scattered far and wide over the tidewater province, but grow less plentiful as we approach the Atlantic coast. The picks and chisels used in working the soapstone are confined to the quarries and to shop and dwelling sites in the vicinity. Scores of these objects have been gathered from the Chain bridge sites, within an hour's walk of numerous quarries of the stone they were used in shaping.

Grooved axes and celts were made for the most part of tough bowlders of volcanic and rarely of granitic rocks obtained from the stream beds or about the margins of the highland. Failures resulting from the manufacture of these implements are frequently found on village-sites along the banks of the larger streams but rarely very far beyond the range of the raw material. The implements themselves are of the widest distribution.

COMPARATIVE DISTRIBUTION OF IMPLEMENTS

DISTRIBUTION BY CLASSES

The liability of the various stone implements of the tidewater region to transportation is approximately expressed in the partial list given below. Beginning with those least subject to transportation and ending with those most subject to it we have the following tentative order:

Mortars, generally extemporized from large, flattish or ovoid bowlders having at least one concave surface, which was gradually deepened by use or purposely hollowed out, were probably rarely far removed from the site of their first utilization. Many other improvised tools and utensils—mullers, pestles, hammerstones, etc—were equally home stayers, being merely natural shapes picked up and adapted to the needs of a place or occasion.

Sharpened bowlders, embracing extemporized chopping or bone-breaking tools, occur on all river sites where bowlders were at hand. The edge or point was made by removing one or more flakes, which required but a moment's work. They were not transported far beyond the limits of the bowlder-producing area.

Notched and sharpened bowlders, used as improvised axes and picks or hoes, are closely related to the preceding, but intended to be hafted. Their transportation was but slight, as they are rarely found far beyond the range of deposits of heavy bowlders. Half a dozen blows with a hammerstone were sufficient to fashion one of these objects. They were probably not sufficiently essential or valued to be transported, save in exceptional cases. Blunt-end hammer-like objects notched for hafting are distributed sparsely over corresponding areas.

Picks and chisels, used for working steatite, traveled but little beyond the quarries and the neighboring villages where the finishing was done. These consist of rude, sharp stones, of axes and celts worked over or "upset" to secure good points and edges, and of thick leaf-shape chisels reduced to approximate shape by flaking and then ground to an edge at one or both ends.

Net sinkers are not common. The rude specimens were probably carried back and forth to some extent along the streams, and small well-finished pieces may have been carried everywhere.

Pestles, cylindrical stones symmetrically shaped and well finished by battering, were apparently carried from place to place and perhaps for long distances. Ruder specimens were extemporized and not transported.

Hammerstones—Many of these objects are improvised from bowlders and were quickly cast aside, as already indicated, but others were carried far out into the bowlderless region.

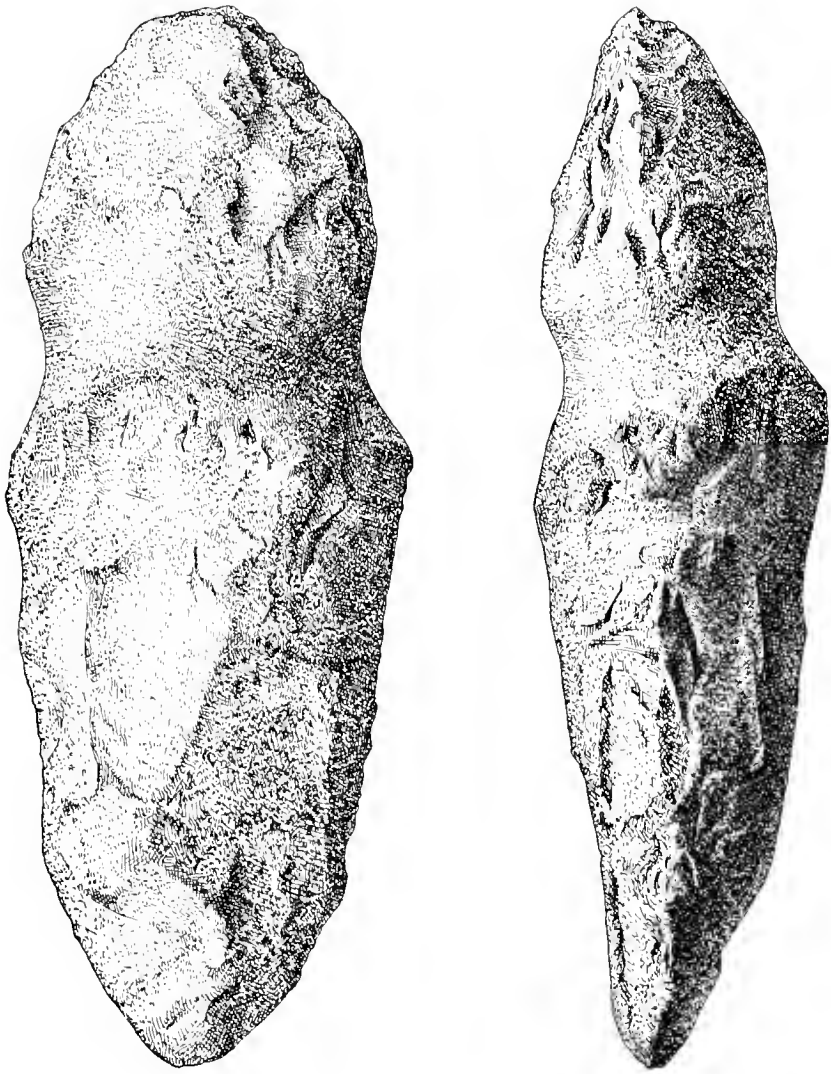
Soapstone vessels are widely distributed, reaching in rather rare cases points 50 miles or more from the highland in which the material was quarried.

Grooved axes, *celts*, *scrapers*, *drills*, *knives*, *spearheads*, *arrowpoints*, as well as *pipes*, *ceremonial stones*, and *ornaments* were freely transported, covering the full range of the peoples employing them, and not infrequently, no doubt, passing from district to district through other hands.

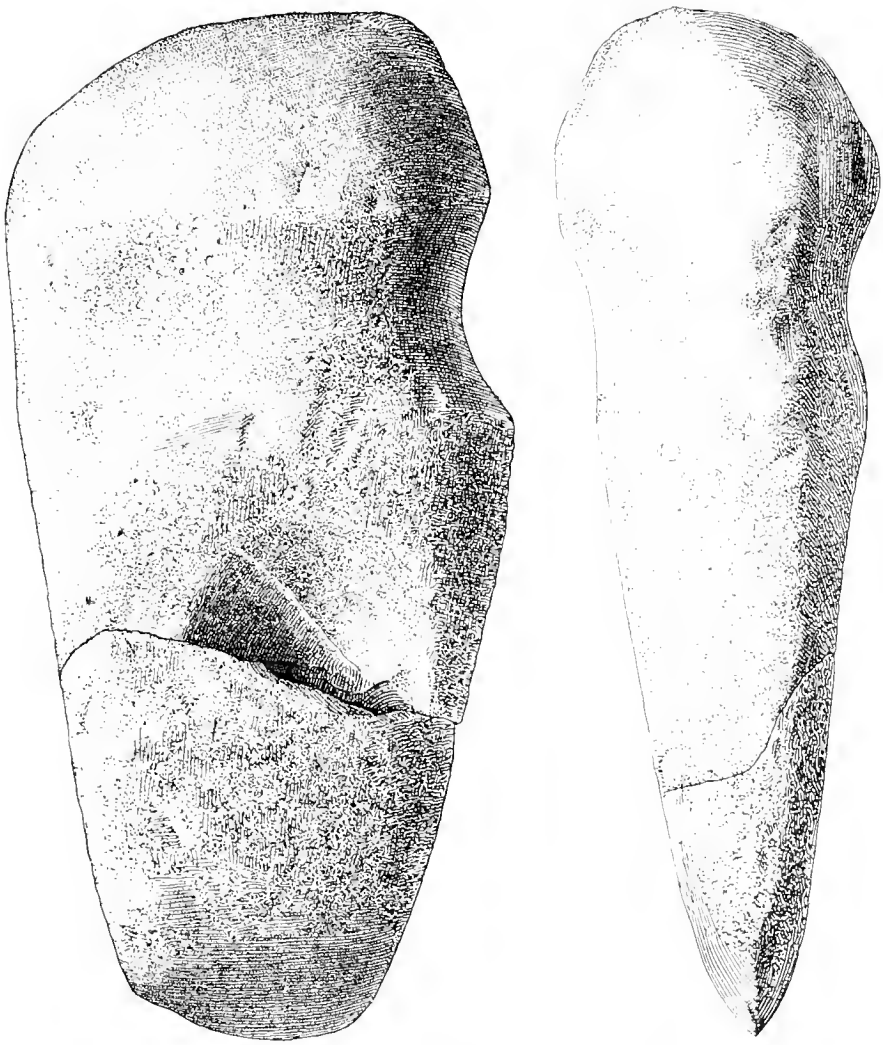
Rejects resulting from failures in specialization of transported forms and of attempts at remodeling of worn or broken tools are to be found everywhere, but rejects of the roughing-out processes are not greatly affected by the transporting agencies, remaining on the shop sites, as has been shown.

DISTRIBUTION BY PARTICULAR SITES

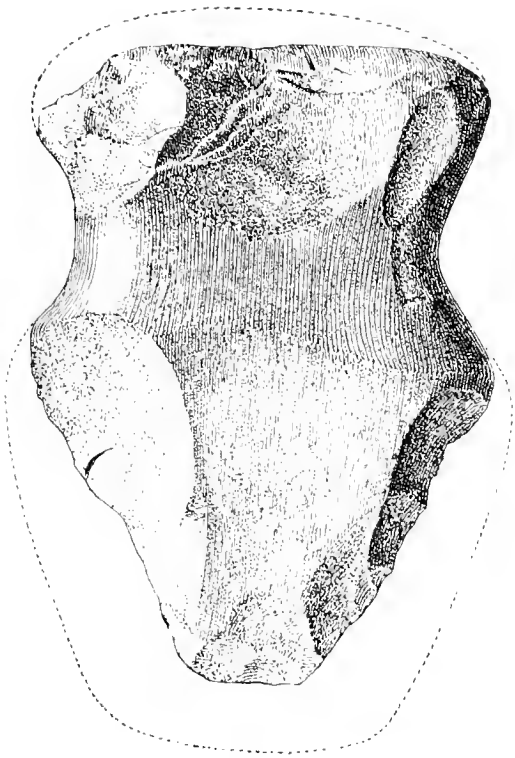
Some of the eccentricities of distribution may be illustrated by an examination of the art contents of sites having varying relations to the deposits of raw material.

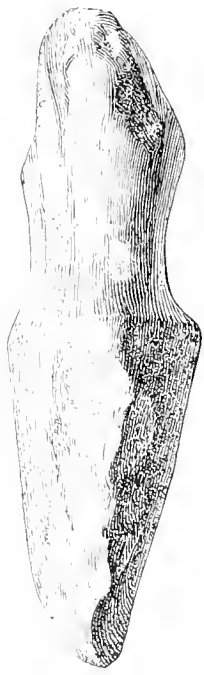


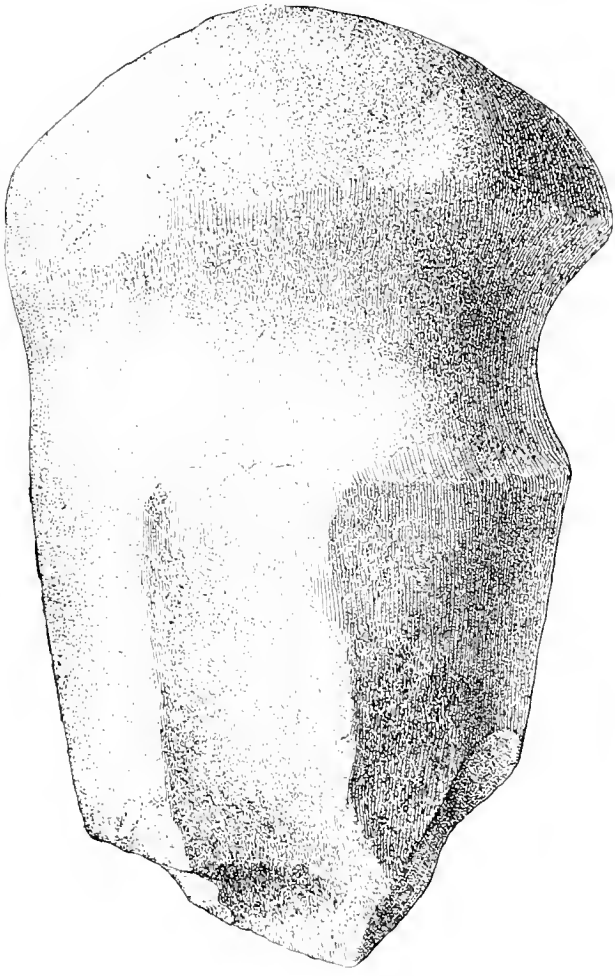
STEATITE PICK MADE BY SHARPENING A GROOVED AX, FROM A QUARRY NEAR SANDYSPRING, MARYLAND; ONE-HALF ACTUAL SIZE



GROOVED AX USED AND BROKEN IN A STEATITE QUARRY IN FAIRFAX COUNTY, VIRGINIA;
TWO-THIRDS ACTUAL SIZE







GROOVED AXES SHARPENED BY FLAKING FOR USE IN QUARRYING STEATITE, FROM THE HOLMES RUN QUARRIES; TWO-THIRDS ACTUAL SIZE

1. On a site of quarrying and manufacture where dwelling was inconvenient, as on the bluffs of Rock creek, the work was confined mainly to roughing-out leaf-shape blades, and the series of art forms comprises a limited range, including turtlebacks and other kinds of rejects, with refuse and implements of manufacture. On the quarry-shop sites of Rock creek nothing exotic, nothing finished, nothing that might not readily be classed as paleolithic, if shape alone were considered, was found in three months' work.

2. On a site of quarrying and manufacture where dwelling was practicable, and where lodges were actually pitched to a limited extent, we find intermingled with the rude forms some specialized implements and a few tools of exotic origin, such as projectile points of rhyolite, with axes and celts, as at Riggs mill, 8 miles northeast of Washington.

3. On a site of manufacture and at the same time of extensive dwelling, as at Anacostia, in the District of Columbia, where much raw material was at hand, all varieties of refuse and of rude forms are found; likewise well-shaped and wholly finished specimens of flaked tools of local origin prevail. There are also all the cut, pecked, and polished tools, and the ceremonial stones and ornaments common to village-sites. Besides these many exotic materials in varied forms are found.

4. On a village-site where no raw material save small quartz pebbles is found there will be a full range of small quartz rejects and of small quartz implements, with a liberal supply of finished implements of exotic materials, averaging small.

5. On a site remote from all sources of raw material, as on the eastern shore, the objects average small and are much varied in material and style, having come far, through numerous peoples, and from many sources.

Typical illustrations of the two last-mentioned varieties of sites are difficult to find, for the reason that in all sections, even far out toward the present ocean beach, there are occasional ice-borne bowlders and fragments of considerable size, and these were collected by the natives and used for mortars and mullers and for various flaked and battered implements; and such objects destroy the entire simplicity of conditions conceived for the sites described.

DISTRIBUTION BY GENESIS AND FUNCTION

A synoptical statement is made in the accompanying plate (CI), which exhibits many of the most striking features of the flaked-stone archeology of this province, and indicates clearly the points most requiring attention in other regions. The stories of the origin and form of the material, of manufacture, rejection, elaboration, transportation, storage, specialization, and use are all expressed or suggested. Four materials are represented—two native and in the form of bowlders, and two exclusively exotic and derived from mass deposits. Each series indicates the course of development through which most of the

finished forms passed between the first stroke given to the shapeless stone and the finished work of art. The size is considerably reduced in the drawing.

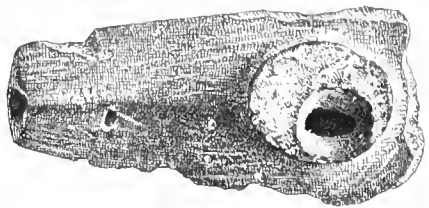
In the first and second series all the forms from the bowlder to the most minute art shapes are represented in solid lines, being exclusively tidewater art. In the first series, numbers 1, 2, 3, 4, 5, and 6 are shop rejects (turtlebacks, etc) and are not implements. Numbers 7, 8, and 9 are roughed-out forms (blanks or blades ready for further specialization) and are not necessarily implements, although they were perhaps available as knives and scrapers. The numbers from 10 to 18 are specialized forms derived mainly, no doubt, from bowlders, and include knives, spearheads, arrowpoints, and perforators or drills.

The second series comprises forms derived mainly from quartz pebbles; naturally they are smaller than the quartzite forms. They are drawn in solid lines, being of native derivation. Numbers 1, 2, 3, 4, 5, 6, and 7 are shop rejects (turtlebacks) and are not implements. Number 8 is a profile showing an ordinary "peak" or hump of the reject. Numbers 9, 10, and 11 are successful blades, which may have been employed as knives or scrapers, though such forms were usually intended for specialization into arrowpoints, spearheads, perforators, etc, as indicated in numbers 12 to 20.

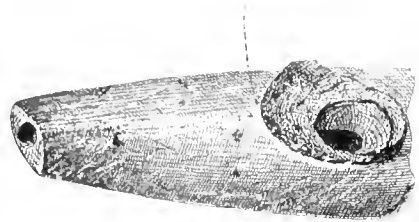
The third series, consisting of objects of rhyolite, is drawn partly in solid lines and partly in dotted outlines. Those in solid lines comprise transported and specialized objects, which were collected in the tidewater country. Those in dotted lines, *a*, *b*, *c*, *d*, *e*, and *f*, are the rejects of manufacture which are not found in the tidewater country, being obtained only on the quarry-shop sites in Adams county, Pennsylvania. The successful blades, illustrated in *g*, *h*, and *i*, were carried away from the quarry to be used as they are or for specialization into the succeeding forms, *j* to *q*, when needed. The tidewater province is abundantly supplied with all the forms from *g* to *q*.

The fourth series, composed of articles of jasper, repeats very closely the conditions of the third or rhyolite series. The sizes average smaller on account of the inferior massiveness and minuter cleavage of the rock. The rejects of manufacture, indicated in dotted lines, are obtained mainly from the recently discovered quarries in eastern Pennsylvania. Other quarries nearer at hand may yet be found, and some of our rivers furnish occasional bits and pebbles of this material. The cache and finished objects, *g* to *q*, are widely scattered over the tidewater region. Three or four other materials of equal interest with those given could be added, but the lesson would not be made clearer than as it stands.

It is of the utmost importance, in taking up the stone implements of a region, that each leading material be traced back to its source, so that from this point of view a study can be made of the full life history of the implements—the work of quarrying, shaping, transporting, finishing,



a



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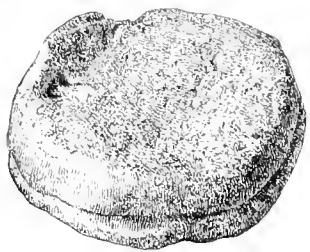

e

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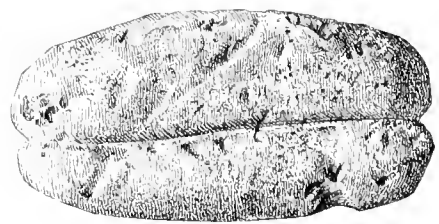


d

SMALL ARTICLES—PIPES, SINKERS, AND A BEAD—MADE OF STEATITE; ACTUAL SIZE

and use. Each form or class of implement will thus be found to have left in its wake a trail of "wasters" or rejects peculiar to itself. Until these are understood, selected, and set apart, there is necessarily much confusion.

It is seen by a study of plate CI, in conjunction with the representations of actual specimens in preceding plates, that a half or more of the range of native flaked forms are actually not implements. The separation is approximately indicated by the upper brackets marked "not implements" and "implements." It will be observed that this division separates the cache forms or blanks of the middle column into two parts. Portions of this class of objects were mere quarry shapes, distributed to be elaborated when needed, but some of them were probably utilized in their blank shape as knives, etc, and some show a slight degree of specialization (as in number 9 of the first series), and thus properly take their place with implements. Nearly all of the specimens shown in this column are actual cache finds, some being depicted on reduced scale in order to get the entire series within the limits of a plate.

The distribution of cut, battered, ground, and polished stone implements, and of the refuse of their manufacture, is governed by laws similar to those governing the distribution of flaked stone.

RÉSUMÉ

Geologic history of the province—The Potomac-Chesapeake tidewater province lies outside or east of what is known as the "fall line"—the base of the highland proper—and is a broad, much broken plateau, nowhere more than a few hundred feet in height. The geologic formations consist in the main of loosely bedded bowlder-gravels and sands derived from the highland at periods when the sea covered the entire area, washing the highland along the fall line. Subsequent elevations of a few hundred feet drove the sea outward beyond its present limit, and erosion carved the exposed land into hills and valleys.

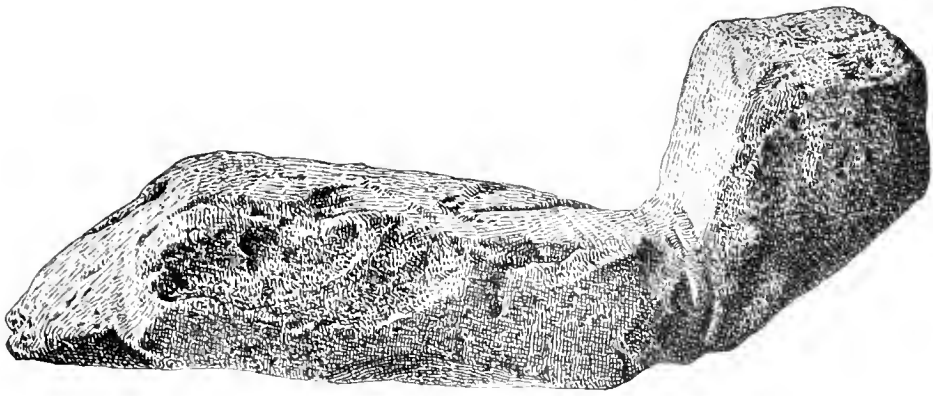
At a later period the land was depressed a hundred feet or more, and the valleys were filled with water from the sea, forming a thousand arms and inlets whose tortuous margins now meander the old hill slopes of the province midway in their height.

Historic peoples—When first visited by the English this district was occupied by numerous Indian tribes, who subsisted largely by hunting and fishing, but engaged to some extent in the cultivation of maize. They were a vigorous, valiant race, but had made but little progress in any of the arts save those of mere subsistence. Today they have entirely disappeared, and students interested in their history gather the scattered remains of their art, seeking thus to supplement the meager records of colonial days.

Art remains—The art remains preserved to our time indicate the prevalence of extremely simple conditions of life throughout the past, and exhibit no features at variance with those characterizing the historic occupancy. While their study throws much light on numerous episodes of the history of the aboriginal tribes, the story they tell of themselves and of the industrial struggles of primitive peoples in general is of profound interest.

Status of art—As indicated by the remains, art in stone—which is the leading art represented—was still almost wholly within the implement making phase of the stone age, mythology and the esthetic forces not yet having lent their inspiration to the hand of the sculptor.

Utilization of stone—Stone in its various forms was much valued and used by these people and was sought both in the lowland and in the highland beyond. In the lowland it occurred as bowlders and pebbles brought down by the waters and in the highland as original masses and as surface fragments dislodged by natural forces. It was gathered from the surface for various uses, and when the supply was insufficient



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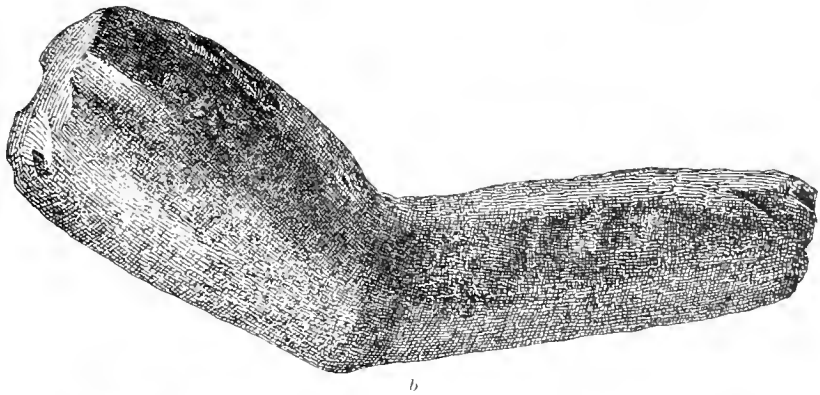

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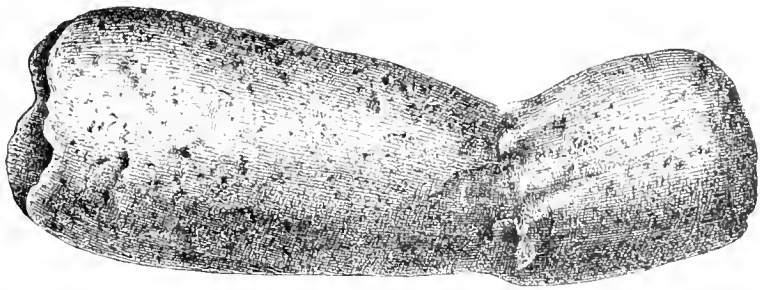

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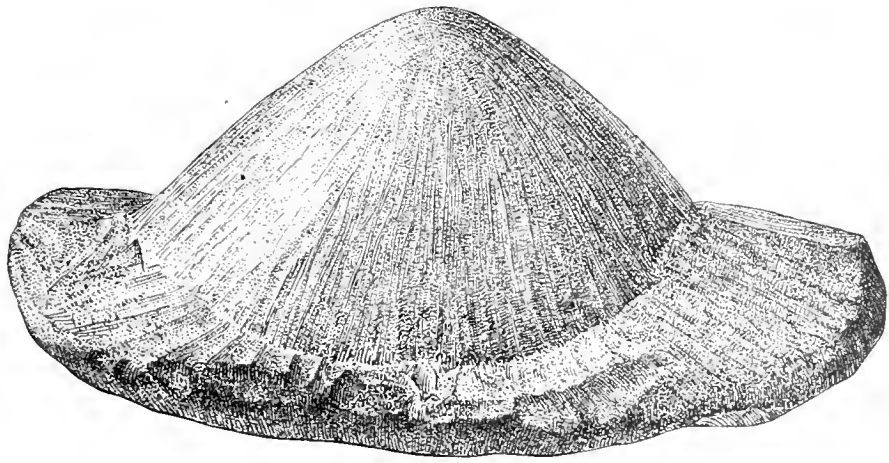


d

SPECIALIZED AND PARTIALLY SPECIALIZED OBJECTS OF STEATITE; ACTUAL SIZE

it was dug from the ground; and thereby the quarrying industry developed.

Shaping processes—The implements made were of many forms and served a multitude of purposes. Their history divides itself naturally into two sections, the period of manufacture being sharply separated from the period of utilization. The first stage, the full analysis of which is of the utmost importance, is studied to best advantage through the shaping processes employed in manufacture. These processes were adapted to the kind of material utilized and the nature of the results desired and are grouped under four heads, as follows: (1) Fracturing processes, (2) battering processes, (3) incising processes, and (4) abrading processes.

Fracture processes—Of the implements made and used in this province perhaps 90 per cent were shaped by fracture processes. These deal with all brittle stone, and the shaping is attended by constant breakage and failure, so that for each completed form several abortive forms are produced more or less closely resembling some of the simpler varieties of finished implements. This work was carried on all over the large area furnishing the raw material, and the articles made and used were everywhere intimately intermingled with the rejectage of manufacture. So confusing were the conditions that no definite line could be drawn between the two classes of objects. The discovery of quarries in the hills, entirely isolated from sites and phenomena of specialization and use, made the separation easy, and led to a correct understanding of what may well be called the morphology of flaked implements.

Lowland quarries—The great quarries of the lowland were located in the bluffs about the head of tidewater on the Potomac and yielded quartzite bowlders in vast numbers. These were obtained and partially elaborated on the local shop sites. The bowlders were cast out of the pits and a few flakes removed to test the material; the best stone was selected and the desired implements roughed-out by free hand fracture. The form almost universally sought was a leaf-shape blade suitable for further elaboration into any of the specialized forms having their genesis through this general form. The blades made—with perhaps unshaped flakes and fragments—were carried away, and the soil soon closed over the pits and the vast bodies of shop refuse; and these latter, now for the first time systematically examined, tell the story of operations and results with absolute certainty and complete uniformity.

Story of rejectage and refuse—The debris of the quarry-shops consists of (1) tested and shattered bowlders, (2) flakes, and (3) broken and abortive incipient implements, the last necessarily illustrating all the steps of implement development from inception to the end of the quarry work. Thinness was an essential feature of the blades made, and failure resulted in a majority of cases from the development of too

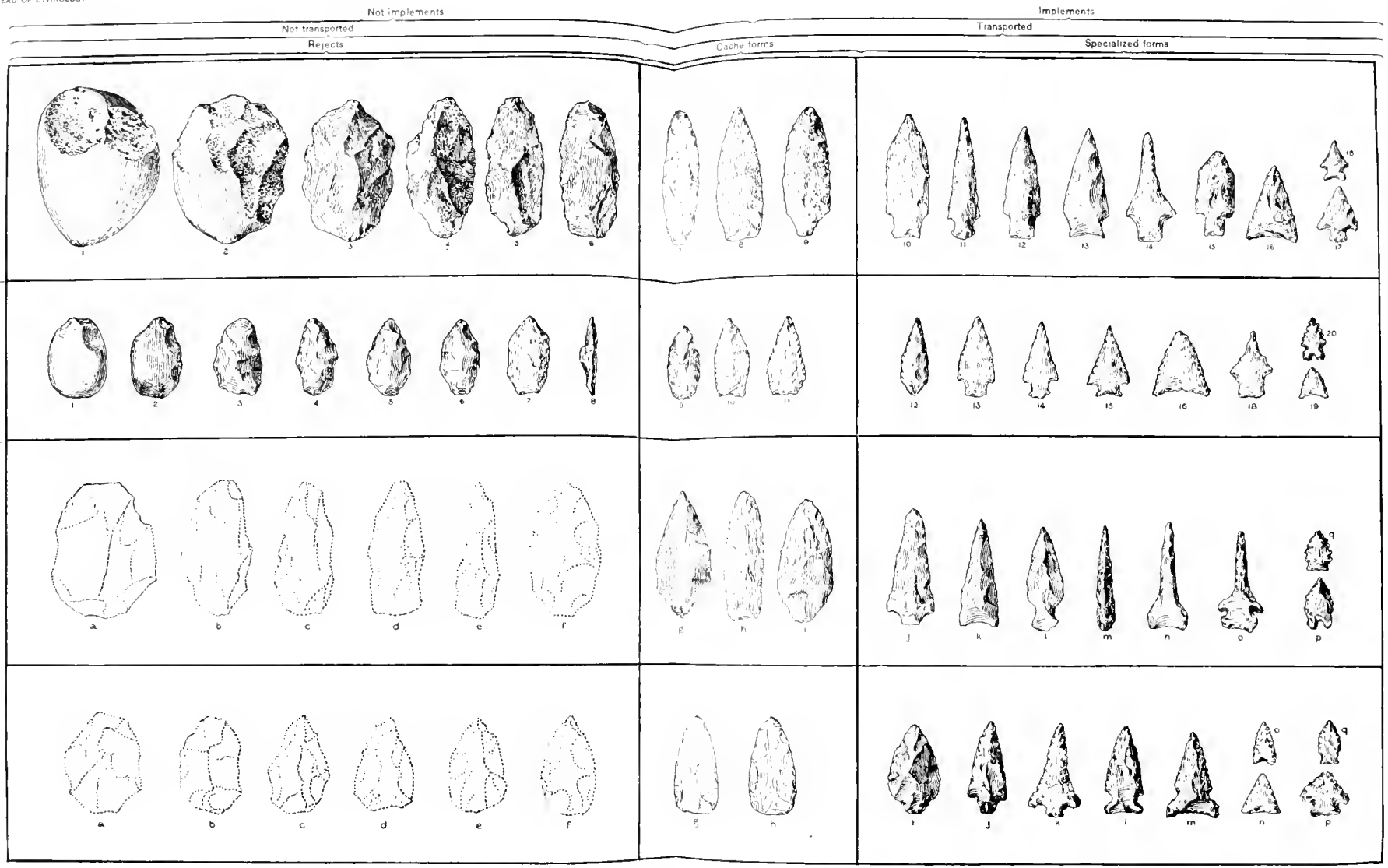
great thickness along the middle of the form. It is these thick forms, flaked on one or both sides and exhibiting types of conformation necessarily oft repeated, and scattered over the country wherever shaping from bowlders was attempted, that have puzzled and confused archeologists. It was not the practice here or elsewhere to finish the implements on the quarry site. The form was developed just far enough to make transportation easy and the subsequent work of specialization simple and safe.

Destiny of the quarry product—From the quarry-shops the blades were carried away to be specialized, finished, and used. Some are found in hoards or caches, suggesting transportation from the quarries or from place to place in numbers; some are found on village-sites and scattered over the fields, and many examples still retain the crude edges and points just as they came from the roughing-out shops; others are neatly trimmed, probably for use as knives, scrapers, etc, while the vast majority are sharpened and stemmed, or notched for hafting as projectile points. In these objects we have not only the quarry-shop product but the product of all other shops of the province as well.

Rude flaked implements—Numerous heavy flaked implements of the region, found on village-sites, in shell banks, and elsewhere, were shaped from bowlders by striking off a few flakes, giving rude edges and points. They are not of quarry origin as the inferior grades of material, found very generally distributed, were utilized. As scattered about they are not easily distinguished from the ordinary rejectage of blade making.

Highland quarries—Quarries beyond the limits of the tidewater region were extensively worked by implement makers. The stone was in the mass, but the processes employed in shaping it and the results reached closely duplicate corresponding features in the lowland quarries. The blades made were transported to all parts of the lowland and worked up into implements duplicating the local varieties. No rejects of this work are found in the lowland, and rude implements of the materials involved are extremely rare outside of the highland.

Battering and abrading processes—Implements to be shaped by these processes—celts, axes, and the like—were very often reduced to approximate shape by flaking. Tough, heavy, hard stones were preferred, and disseminated water-worn pieces were often chosen. The fracturing processes employed were the same as those concerned in ordinary flaking, but since the objects to be made were of different classes the rejectage presents distinct types of form. The celt, the most numerous class of pecked-abraded tools, has a wide edge and a roundish body somewhat pointed above. Flaked implements of leaf-blade origin have a point instead of an edge, while the bodies are flat and the upper end is broad. These distinctions were necessarily foreshadowed in the incipient forms, and aborted specimens, found intermingled on sites of manufacture, may be distinguished by tendencies, in the one type, to specialization of a broad end, and in the other by tendencies to defini-



SYNOPTIC GROUPING SHOWING ORIGIN, FORM GENESIS, AND DISTRIBUTION OF THE FLAKED-STONE IMPLEMENTS OF THE CHESAPEAKE-POTOMAC TIDEWATER REGION. THE SCALE VARIES FROM ONE-THIRD TO ONE-SIXTH

tion of a pointed end. The celt forms roughed-out by flaking were specialized by pecking processes and completed by grinding and polishing, the rejectage being unimportant, as the processes were not so violent as to lead to frequent breakage.

Incision processes—Softer varieties of stone were shaped by cutting. The rock, chiefly soapstone, was extensively quarried from massive deposits in the highland and worked into vessels, pipes, and a few less important varieties of objects. As with the other groups, the articles made were only roughed-out in the quarries, specializing and finishing being conducted mainly on sites of use. The implements employed in this work form a distinct class. Many of the quarry forms are rude sledges and picks, while the cutting tool proper is a chisel or pick—according to the manner of hafting—made of hard, tough stone and shaped usually by flaking, pecking, and grinding. Sites of manufacture for these tools have not been observed, and are probably scattered and unimportant.

Distribution of implements—Distribution is found to present a number of points of interest, most of which pertain to the relation of the implements as found to the sources of the raw material. Rejectage of manufacture is little subject to transportation, though raw material in convenient form may have traveled a long way. The smaller implements found their way to very distant parts, while the larger and especially the ruder forms remained on or near the sites of original use. Distribution from the great quarries was doubtless in large numbers, and trade as well as use may have assisted in the dissemination. The general distribution over the country was brought about by many minor agencies connected with use. Each province, each district, and site, here and elsewhere, is supplied with art remains brought together by the various agencies of environment—topographic, geologic, biologic, and ethnic—and the action of these agencies is to a large extent susceptible of analysis, and this analysis, properly conducted, constitutes a very large part of the science of prehistoric archeology.

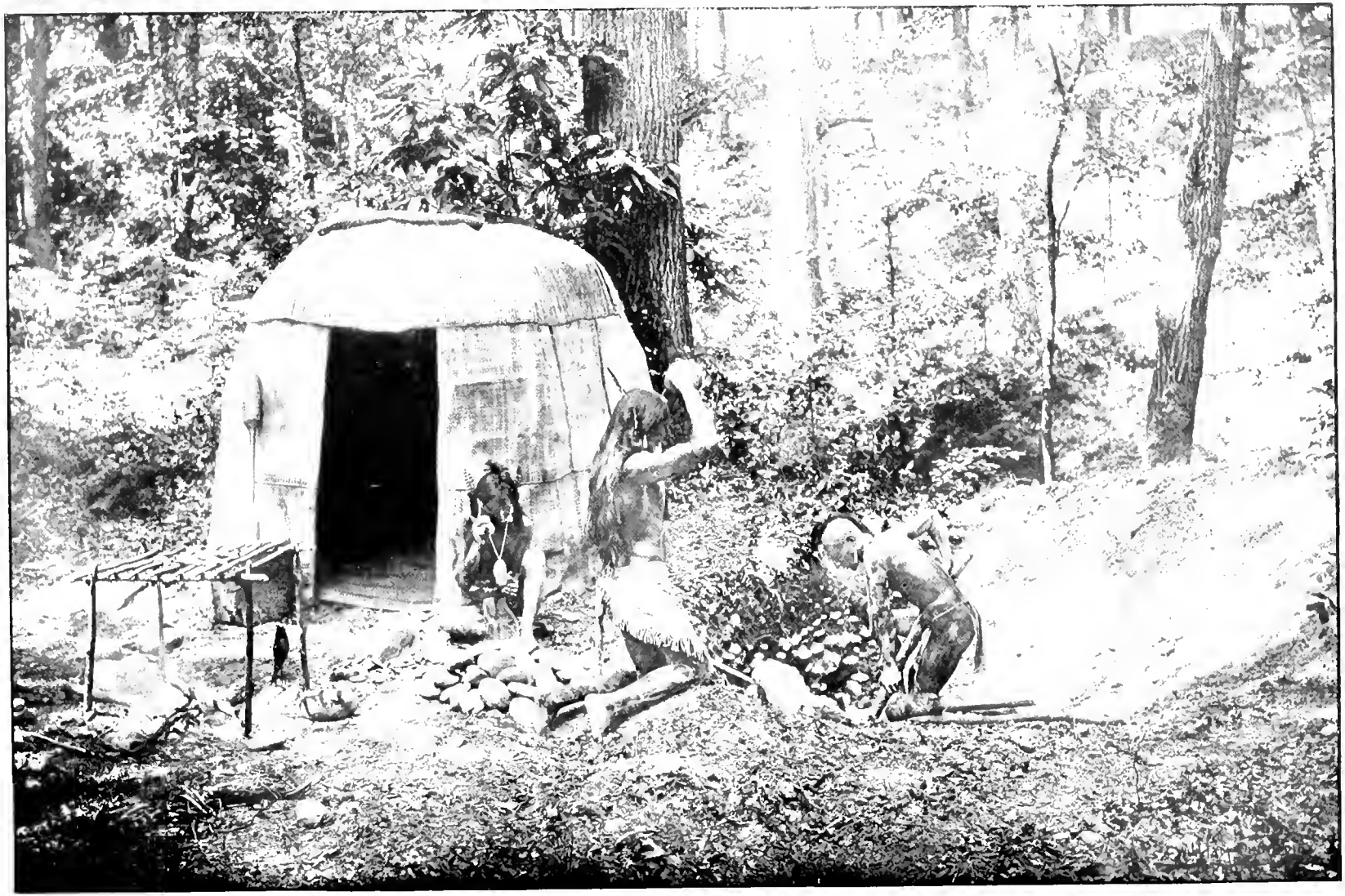
SUPPLEMENTARY NOTES

I

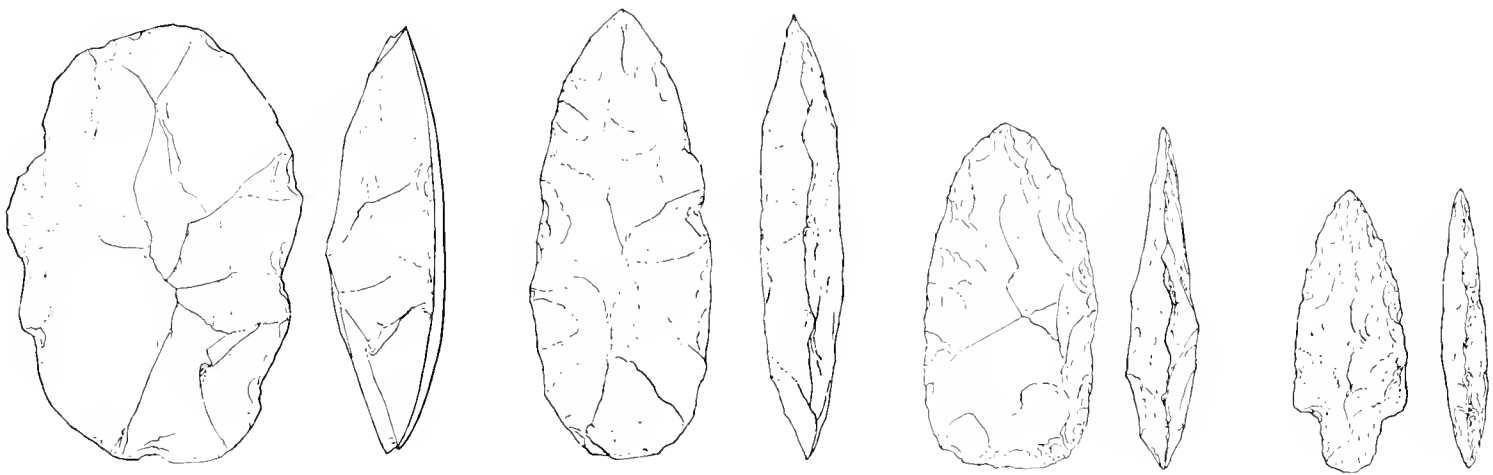
The quarry group presented in the frontispiece and again in another setting in plate CII was prepared as an exposition exhibit rather than as a necessary feature of the studies recorded in the present paper. It may be further stated that it is intended to exemplify a great art of the race—the shaping of stone by flaking processes—rather than to illustrate a satisfactorily established episode in the history of a particular people. After the return of the group from the World's Columbian Exposition at Chicago, where it formed part of a set of exhibits illustrating the various great quarry-shops of the United States, I conceived the notion that the figures could be taken to Piny branch and placed in the actual quarries, thus more graphically portraying the ancient operations. A site was selected for the purpose on the margin of a gulch near Fourteenth street, where some great oaks grow on the beds of ancient refuse; but before the project could be carried out I was called away from the work permanently. I happened, however, to mention my plans to Messrs Cushing and Dinwiddie, of the Bureau of Ethnology, and these gentlemen very generously took up the work, and the result is indicated in the accompanying view, plate CII, which on its receipt was a great surprise to me, as much more had been done than I had contemplated. It seems that Mr Cushing found traces of dwelling on the site selected, and resolved to restore the scenes of the past in all possible detail without deviating from the theoretic historic models. He established a camp, built the lodge of matting, carried out an antique wooden mortar and other appropriate utensils, laid a hearth of bowlders, and constructed the framework of poles for drying fish and game. The scene is altogether complete and realistic though the picture is somewhat lacking in contrast of light and shade.

It remains only to say in this connection that I desire nothing more than that the group should be taken for what it is worth as an illustration of a most important industry carried on in nearly every part of the country. It will, however, I am sure, assist in conveying a definite impression of the work prosecuted so extensively in the District of Columbia, and as it associates with the quarries the only people that have any claim whatsoever to the occupancy of the region and the site, the chances are greatly in favor of the practical correctness of the impressions conveyed.

Since the completion of this group it has been a source of regret that a fourth figure was not added to illustrate the final steps of the work—the specializing of the blades by pressure processes—though it is true



QUARRY GROUP IN PLASTER SET UP ON THE PINY BRANCH SITE, WITH RESTORATION OF HISTORIC ACCESSORIES BY MR F. H. CUSHING



RESULTS OF EXPERIMENTAL FLAKING BY PERCUSSION AND PRESSURE; THREE-FOURTHS ACTUAL SIZE

a, Turtleback with convexity so pronounced as to lead to rejection. *b*, Blade approximating desired form, but so thick as to lead to rejection. *c*, Blade successful, save for slightly too great thickness near the wider end. *d*, Point slightly specialized by use of flaking tool impelled by pressure from shoulder.

that this would be putting together portions of the work not usually associated in the great quarries here and elsewhere. General conditions would have warranted the association, however, for, as has been shown elsewhere, where sites of dwelling or use were closely combined with sites producing the raw material the roughing-out operations were doubtless often followed by the finishing processes in a continuous series.

Copies of the group, as illustrated in the frontispiece, are now set up in the National Museum at Washington and in the Field Columbian Museum at Chicago.

II

While engaged in the work of excavation on the Piny branch quarry site, I took up the matter of the shaping processes employed by the quarrymen, and assuming that bowlders were used for hammerstones, attempted to accomplish by free-hand flaking what had been done by the ancient artisans. For some time I labored at great disadvantage, as I was experimenting as a rule with material already rejected as unfit for use. When the quarry face was reached and the superiority of the bowlders fresh from the bed realized, I took up the work with renewed hope, but an accident to my left arm, resulting from attempts to flake a very large stone held in the left hand, caused the practical discontinuance of the experiments. Although not absolutely sure that I was working as the quarrymen had worked, there can be no doubt that I was not far wrong, for no other known process could take the place of free-hand percussion in fracturing and flaking the firm, smooth, round bowlders. The hammer, even if of other material, would have to be operated in an identical manner.

In taking up the work of flaking stone I fully realized the difficulty of the task. The art is not to be learned in a day any more than are any of the ordinary mechanic arts such as carpentry or the working of metal, yet if savages learned it others can learn it, and no doubt of ultimate success need be felt by any student willing to give liberally of time and labor.

The difficulty of flaking the stone was not great, for a considerable percentage of the bowlders fracture with comparative ease; but the great difficulty was in causing the flakes to carry far enough across the face of the stone to give the necessary low convexity to the surface, and when this result was reached approximately on one side it was extremely uncertain whether it could be repeated on the other side, the requisite form, as indicated in this and all other quarry-shops of the same class, being a thin blade of lens-like profile. The sections shown in figure 29a illustrate phases of successful and unsuccessful flaking.

In the first illustration the left side shows the removal of four flakes and reduction of the surface to nearly the necessary degree of convexity. The work on the other side failed utterly, the flakes did not carry, and a high peak resulted. This is the profile of multitudes of failures.

In the second figure the flaking progressed encouragingly on both sides, but neither was reduced to the requisite flatness. A blade of this degree of convexity was usually rejected. A satisfactory profile was produced in the third case illustrated, and as indicated in the fourth figure a lucky splitting of the bowlder made it possible to produce two successful blades. I found that very often before I had obtained the desired profile some unfortunate blow shattered the stone, but I got very near the desired result in numerous cases, duplicating the best of the rejected forms, but falling a little short of the blade as perfected by the ancient workmen and carried away for use and elaboration.

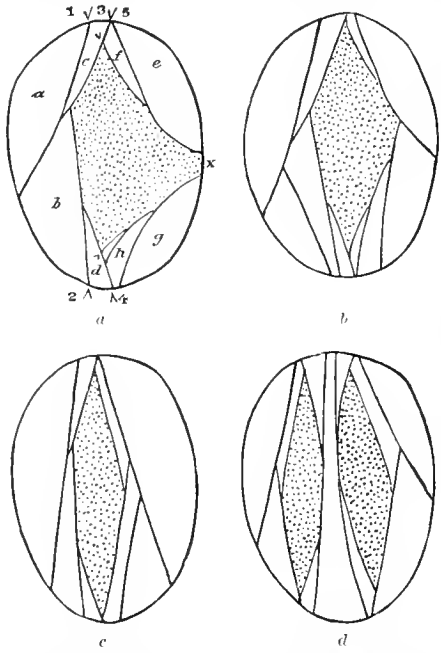


FIG. 29a Cross sections illustrating successive removal of flakes from bowlders. The dotted space is the section of form produced, *a* and *b* being failures and *c* and *d* successes

In plate CIII some of the results of my efforts at blade making are presented. I observed that the rejectage of my work, where falling among the freshly uncovered rejectage of the site, was not to be distinguished from it in any way—not even in many cases by the freshness of the fracture.

As to the work of specializing the perfected blade into keen-edged knives, slender drills, and stemmed and notched projectile points, it does not seem to compare in difficulty with the making of the thin blades themselves from the bowlders.

THE SIOUAN INDIANS

A PRELIMINARY SKETCH BY

W J McGEE

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THE SIOUAN INDIANS

A PRELIMINARY SKETCH[1]

By W J McGee

THE SIOUAN STOCK

DEFINITION

EXTENT OF THE STOCK

Out of some sixty aboriginal stocks or families found in North America above the Tropic of Cancer, about five-sixths were confined to the tenth of the territory bordering Pacific ocean; the remaining nine-tenths of the land was occupied by a few strong stocks, comprising the Algonquian, Athapascan, Iroquoian, Shoshonean, Siouan, and others of more limited extent.

The Indians of the Siouan stock occupied the central portion of the continent. They were preeminently plains Indians, ranging from Lake Michigan to the Rocky mountains, and from the Arkansas to the Saskatchewan, while an outlying body stretched to the shores of the Atlantic. They were typical American barbarians, headed by hunters and warriors and grouped in shifting tribes led by the chase or driven by battle from place to place over their vast and naturally rich domain, though a crude agriculture sprang up whenever a tribe tarried long in one spot. No native stock is more interesting than the great Siouan group, and none save the Algonquian and Iroquoian approach it in wealth of literary and historical records; for since the advent of white men the Siouan Indians have played striking rôles on the stage of human development, and have caught the eye of every thoughtful observer.

The term *Siouan* is the adjective denoting the "Sioux" Indians and cognate tribes. The word "Sioux" has been variously and vaguely used. Originally it was a corruption of a term expressing enmity or contempt, applied to a part of the plains tribes by the forest dwelling Algonquian Indians. According to Trumbull, it was the popular appellation of those tribes which call themselves Dakota, Lakota, or Nakota

[1] Prepared as a complement and introduction to the following paper on "Siouan Sociology," by the late James Owen Dorsey

("Friendly," implying confederated or allied), and was an abbreviation of *Nadowessioux*, a Canadian-French corruption of *Nadowe-ssi-wag* ("the snake-like ones" or "enemies"), a term rooted in the Algonquian *nadowe* ("a snake"); and some writers have applied the designation to different portions of the stock, while others have rejected it because of the offensive implication or for other reasons. So long ago as 1836, however, Gallatin employed the term "Sioux" to designate collectively "the nations which speak the Sioux language,"[1] and used an alternative term to designate the subordinate confederacy—i. e., he used the term in a systematic way for the first time to denote an ethnic unit which experience has shown to be well defined. Gallatin's terminology was soon after adopted by Prichard and others, and has been followed by most careful writers on the American Indians. Accordingly the name must be regarded as established through priority and prescription, and has been used in the original sense in various standard publications.[2]

In colloquial usage and in the usage of the ephemeral press, the term "Sioux" was applied sometimes to one but oftener to several of the allied tribes embraced in the first of the principal groups of which the stock is composed, i. e., the group or confederacy styling themselves Dakota. Sometimes the term was employed in its simple form, but as explorers and pioneers gained an inkling of the organization of the group, it was often compounded with the tribal name as "Santee-Sioux," "Yanktonnai-Sioux," "Sisseton-Sioux," etc. As acquaintance between white men and red increased, the stock name was gradually displaced by tribe names until the colloquial appellation "Sioux" became but a memory or tradition throughout much of the territory formerly dominated by the great Siouan stock. One of the reasons for the abandonment of the name was undoubtedly its inappropriateness as a designation for the confederacy occupying the plains of the upper Missouri, since it was an alien and opprobrious designation for a people bearing a euphonious appellation of their own. Moreover, colloquial usage was gradually influenced by the usage of scholars, who accepted the native name for the Dakota (spelled Dahcota by Gallatin) confederacy, as well as the tribal names adopted by Gallatin, Prichard, and others. Thus the ill-defined term "Sioux" has dropped out of use in the substantive form, and is retained, in the adjective form only, to designate a great stock to which no other collective name, either intern or alien, has ever been definitely and justly applied.

The earlier students of the Siouan Indians recognized the plains tribes alone as belonging to that stock, and it has only recently been shown that certain of the native forest-dwellers long ago encountered by English colonists on the Atlantic coast were closely akin to the

[1] "A synopsis of the Indian tribes . . . in North America," Trans. and Coll. Am. Antiq. Soc., vol. II, p. 120.

[2] "Indian linguistic families of America north of Mexico," Seventh Annual Report of the Bureau of Ethnology, for 1885–86 (1891), pp. 111–118. Johnson's Cyclopedia, 1893–95 edition, vol. VII, p. 546, etc.

plains Indians in language, institutions, and beliefs. In 1872 Hale noted a resemblance between the Tutelo and Dakota languages, and this resemblance was discussed orally and in correspondence with several students of Indian languages, but the probability of direct connection seemed so remote that the affinity was not generally accepted. Even in 1880, after extended comparison with Dakota material (including that collected by the newly instituted Bureau of Ethnology), this distinguished investigator was able to detect only certain general similarities between the Tutelo tongue and the dialects of the Dakota tribes.[1] In 1881 Gatschet made a collection of linguistic material among the Catawba Indians of South Carolina, and was struck with the resemblance of many of the vocables to Siouan terms of like meaning, and began the preparation of a comparative Catawba-Dakota vocabulary. To this the Tutelo, ¢egiha, ⊥ɔiwe′re, and Hotcañgara (Winnebago) were added by Dorsey, who made a critical examination of all Catawba material extant and compared it with several Dakota dialects, with which he was specially conversant. These examinations and comparisons demonstrated the affinity between the Dakota and Catawba tongues and showed them to be of common descent; and the establishment of this relation made easy the acceptance of the affinity suggested by Hale between the Dakota and Tutelo.

Up to this time it was supposed that the eastern tribes "were merely offshoots of the Dakota;" but in 1883 Hale observed that "while the language of these eastern tribes is closely allied to that of the western Dakota, it bears evidence of being older in form,"[2] and consequently that the Siouan tribes of the interior seem to have migrated westward from a common fatherland with their eastern brethren bordering the Atlantic. Subsequently Gatschet discovered that the Biloxi Indians of the Gulf coast used many terms common to the Siouan tongues; and in 1891 Dorsey visited these Indians and procured a rich collection of words, phrases, and myths, whereby the Siouan affinity of these Indians was established. Meantime Mooney began researches among the Cherokee and cognate tribes of the southern Atlantic slope and found fresh evidence that their ancient neighbors were related in tongue and belief with the buffalo hunters of the plains; and he has recently set forth the relations of the several Atlantic slope tribes of Siouan affinity in full detail.[3] Through the addition of these eastern tribes the great Siouan stock is augmented in extent and range and enhanced in interest; for the records of a group of cognate tribes are thereby increased so fully as to afford historical perspective and to indicate, if not clearly to display, the course of tribal differentiation.

According to Dorsey, whose acquaintance with the Siouan Indians was especially close, the main portion of the Siouan stock, occupying the continental interior, comprised seven principal divisions (including

[1] Correspondence with the Bureau of Ethnology.

[2] "The Tutelo tribe and language," Proc. Am. Philos. Soc., vol. XXI, 1883, p. 1.

[3] Siouan Tribes of the East; bulletin of the Bureau of Ethnology, 1894.

the Biloxi and not distinguishing the Asiniboin), each composed of one or more tribes or confederacies, all defined and classified by linguistic, social, and mythologic relations; and he and Mooney recognize several additional groups, defined by linguistic affinity or historical evidence of intimate relations, in the eastern part of the country. So far as made out through the latest researches, the grand divisions, confederacies, and tribes of the stock,[1] with their present condition, are as follows:

1. *Dakota-Asiniboin*

Dakota ("Friendly") or Ot'-ce-ti ca-ko-wi^{n} ("Seven council-fires") confederacy, comprising—

(*A*) Santee, including Mde-wa-ka^{n}'-to^{n}-wa^{n} ("Spirit Lake village") and Wa-qpe'-ku-te ("Shoot among deciduous trees"), mostly located in Knox county, Nebraska, on the former Santee reservation, with some on Fort Peck reservation, Montana.

(*B*) Sisseton or Si-si'-to^{n}-wa^{n}' ("Fish-scale village"), mostly on Sisseton reservation, South Dakota, partly on Devils Lake reservation, North Dakota.

(*C*) Wahpeton or Wa'-qpe'-to^{n}-wa^{n} ("Dwellers among deciduous trees"), mostly on Devils Lake reservation, North Dakota.

(*D*) Yankton or I-hank'-to^{n}-wa^{n} ("End village"), in Yankton village, South Dakota.

(*E*) Yanktonai or I-hank'-to^{n}-wa^{n}-na ("Little End village"), comprising—

(*a*) Upper Yanktonai, on Standing Rock reservation, North Dakota, with the Pa'-ba-kse ("Cut head") gens on Devils Lake reservation, North Dakota.

(*b*) Lower Yanktonai, or Hañkpatina ("Campers at the horn [or end of the camping circle]"), mostly on Crow Creek reservation, South Dakota, with some on Standing Rock reservation, North Dakota, and others on Fort Peck reservation, Montana.

(*F*) Teton or Ti'-to^{n}-wa^{n} ("Prairie dwellers"), comprising—

(*a*) Brulé or Si-tca^{n}'-xu ("Burnt thighs"), including Upper Brulé, mostly on Rosebud reservation, South Dakota, and Lower Brulé, on Lower Brulé reservation, in the same state, with some of both on Standing Rock reservation, North Dakota, and others on Fort Peck reservation, Montana.

(*b*) Sans Arcs or I-ta'-zip-tco ("Without bows"), largely on Cheyenne reservation, South Dakota, with others on Standing Rock reservation, North Dakota.

(*c*) Blackfeet or Si-ha'-sa-pa ("Black-feet"), mostly on Cheyenne reservation, South Dakota, with some on Standing Rock reservation, North Dakota.

[1] The subdivisions are set forth in the following treatise on "Siouan Sociology."

(*d*) Minneconjou or Mi′-ni-ko′-o-ju ("Plant beside the stream"), mostly on Cheyenne reservation, South Dakota, partly on Rosebud reservation, South Dakota, with some on Standing Rock reservation, North Dakota.

(*e*) Two Kettles or O-o′-he no^{n}′-pa ("Two boilings"), on Cheyenne reservation, South Dakota.

(*f*) Ogalala or O-gla′-la ("She poured out her own"), mostly on Pine Ridge reservation, South Dakota, with some on Standing Rock reservation, North Dakota, including the Wa-ja′-ja ("Fringed") gens on Pine Ridge reservation, South Dakota, and Loafers or Wa-glu′-xe ("In-breeders"), mostly on Pine Ridge reservation, with some on Rosebud reservation, South Dakota.

(*g*) Huñkpapa ("At the entrance"), on Standing Rock reservation, North Dakota.

Asiniboin ("Cook-with-stones people" in Algonquian), commonly called Nakota among themselves, and called Hohe ("Rebels") by the Dakota; an offshoot from the Yanktonnai; not studied in detail during recent years; partly on Fort Peck reservation, Montana, mostly in Canada; comprising in 1833 (according to Prince Maximilian)[1]—

(*A*) Itscheabiné ("Les gens des filles"=Girl people?).

(*B*) Jatonabinè ("Les gens des roches"=Stone people); apparently the leading band.

(*C*) Otopachgnato ("Les gens du large"=Roamers?).

(*D*) Otaopabinè ("Les gens des canots"=Canoe people?).

(*E*) Tschantoga ("Les gens des bois"=Forest people).

(*F*) Watópachnato ("Les gens de l'age"=Ancient people?).

(*G*) Tanintauei ("Les gens des osayes"=Bone people).

(*H*) Chábin ("Les gens des montagnes"=Mountain people).

2. *ȹegiha* ("*People dwelling here*")[2]

(*A*) Omaha or U-ma^{n}-ha^{n} ("Upstream people"), located on Omaha reservation, Nebraska, comprising in 1819 (according to James)[3]—

(*a*) Honga-sha-no tribe, including—

(1) Wase-ish-ta band.

(2) Enk-ka-sa-ba band.

[1] Travels in the Interior of North America; Translated by H. Evans Lloyd. London, 1843, p. 194. In this and other lists of names taken from early writers the original orthography and interpretation are preserved.

[2] Defined in "The ȹegiha Language," by J. Owen Dorsey, Cont. N. A. Eth., vol. VI, 1890, p. xv. Miss Fletcher, who is intimately acquainted with the Omaha, questions whether the relations between the tribes are so close as to warrant the maintenance of this division; yet as an expression of linguistic affinity, at least, the division seems to be useful and desirable.

[3] Account of an Expedition from Pittsburgh to the Rocky Mountains, performed in the Years 1819-1820. . . . under the Command of Major S. H. Long, by Edwin James. London, 1823, vol. II, p. 47 et seq.

(3) Wa-sa-ba-eta-je ("Those who do not touch bears") band.
(4) Ka-e-ta-je ("Those who do not touch turtles") band.
(5) Wa-jinga-e-ta-je band.
(6) Hun-guh band.
(7) Kon-za band.
(8) Ta-pa-taj-je band.

(*b*) Ish-ta-sun-da ("Gray eyes") tribe, including—
(1) Ta-pa-eta-je band.
(2) Mon-eka-goh-ha ("Earth makers") band.
(3) Ta-sin-da ("Bison tail") band.
(4) Ing-gera-je-da ("Red dung") band.
(5) Wash-a-tung band.

(*B*) Ponka ("Medicine" ?), mostly on Ponca reservation, Indian Territory, partly at Santee agency, Nebraska.

(*C*) Kwapa, Quapaw, or U-ɣa′-qpa ("Downstream people," a correlative of U-ma^{n}′-ha^{n}), the "Arkansa" of early writers, mostly on Osage reservation, Oklahoma, partly on Quapaw reservation, Indian Territory.

(*D*) Osage or Wa-ca′-ce ("People"), comprising—
(*a*) Big Osage or Pa-he′-tsi ("Campers on the mountain"), on Osage reservation, Indian Territory.
(*b*) Little Osage or U-ɣsĕq′-ta ("Campers on the lowland,") on Osage reservation, Indian Territory.
(*c*) San-ɣsn′-ɣφi^{n}[1] ("Campers in the highland grove") or "Arkansa band," chiefly on Osage reservation, Indian Territory.

(*E*) Kansa or Ka^{n}′-ze (refers to winds, though precise significance is unknown; frequently called Kaw), on Kansas reservation, Indian Territory.

3. *Ioiwe′re* ("*People of this place*")

(*A*) Iowa or Pá-qo-tee ("Dusty-heads"), chiefly on Great Nemaha reservation, Kansas and Nebraska, partly on Sac and Fox reservation, Indian Territory.

(*B*) Oto or Wa-to′-ta ("Aphrodisian"), on Otoe reservation, Indian Territory.

(*C*) Missouri or Ni-u^{n}′-t'a-tci (exact meaning uncertain; said to refer to drowning of people in a stream: possibly a corruption of Ni-shu′-dje, "Smoky water," the name of Missouri river); on Otoe reservation, Indian Territory.

4. *Winnebago*

Winnebago (Algonquian designation, meaning "Turbid water people"?) or Ho-tcañ-ga-ra ("People of the parent speech"),

[1] Corrupted to "Chancers" in early days; cf. James ibid., vol. III, p. 108.

mostly on Winnebago reservation in Nebraska, some in Wisconsin, and a few in Michigan; composition never definitely ascertained; comprised in 1850 (according to Schoolcraft[1]) twenty-one bands, all west of the Mississippi, viz.:

(*a*) Little Mills' band.
(*b*) Little Dekonie's band.
(*c*) Maw-kuh-soonch-kaw's band.
(*d*) Ho-pee-kaw's band.
(*e*) Waw-kon-haw-kaw's band.
(*f*) Baptiste's band.
(*g*) Wee-noo-shik's band.
(*h*) Con-a-ha-ta-kaw's band.
(*i*) Paw-sed-ech-kaw's band.
(*j*) Taw-nu-nuk's band.
(*k*) Ah-hoo-zeeb-kaw's band.
(*l*) Is-chaw-go-baw-kaw's band.
(*m*) Watch-ha-ta-kaw's band.
(*n*) Waw-maw-noo-kaw-kaw's band.
(*o*) Waw-kon-chaw-zu-kaw's band.
(*p*) Good Thunder's band.
(*q*) Koog-ay-ray-kaw's band.
(*r*) Black Hawk's band.
(*s*) Little Thunder's band.
(*t*) Naw-key-ku-kaw's band.
(*u*) O-chin-chin-nu-kaw's band.

5. *Mandan*

Mandan (their own name is questionable: Catlin says they called themselves See-pohs-kah-nu-mah-kah-kee, "People of the pheasants;"[2] Prince Maximilian says they called themselves Numangkake, "Men," adding usually the name of their village, and that another name is Mahna-Narra, "The Sulky [Ones]," applied because they separated from the rest of their nation;[3] of the latter name their common appellation seems to be a corruption); on Fort Berthold reservation, North Dakota, comprising in 1804 (according to Lewis and Clark[4]) three villages—

(*a*) Matootonha.
(*b*) Rooptahee.
(*c*) ———— (Eapanopa's village).

[1] Information Respecting the History, Condition, and Prospects of the Indian Tribes of the United States, part I, Philadelphia 1853, p. 498.

[2] Letters and Notes on the Manners, Customs, and Condition of the North American Indians, 4th edition; London, 1844, vol. I, p. 80.

[3] Travels, op. cit., p. 335.

[4] History of the Expedition under the Command of Lewis and Clark, by Elliott Coues, 1893, vol. I, pp. 182-4. The other two villages enumerated appear to belong rather to the Hidatsa. Prince Maximilian found but two villages in 1833, Mih-Tutta Hang-Kush and Ruhptare, evidently corresponding to the first two mentioned by the earlier explorers (op. cit., p. 335).

6. *Hidatsa*

(*A*) Hidatsa (their own name, the meaning of which is uncertain, but appears to refer to a traditional buffalo paunch connected with the division of the group, though supposed by some to refer to "willows"); formerly called Minitari ("Cross the water," or, objectionally, Gros Ventres); on Fort Berthold reservation, North Dakota, comprising in 1796 (according to information gained by Matthews[1]) three villages—

(*a*) Hidatsa.
(*b*) Amatilia ("Earth-lodge [village]"?).
(*c*) Amaliami ("Mountain-country [people]"?).

(*B*) Crow or Ab-sa'-ru-ke, on the Crow reservation, Montana.

7. *Biloxi*

(*A*) Biloxi ("Trifling" or "Worthless" in Choctaw) or Ta-neks' Ha^{n}-ya-di' ("Original people" in their own language); partly in Rapides parish, Louisiana; partly in Indian Territory, with the Choctaw and Caddo.

(*B*) Paskagula ("Bread people" in Choctaw), probably extinct.

(*C*) ? Moctobi (meaning unknown), extinct.

(*D*) ? Chozetta (meaning unknown), extinct.

8. *Monakan*

Monakan confederacy.

(*A*) Monakan ("Country [people of?]"), ? extinct.

(*B*) Meipontsky (meaning unknown), extinct.

(*C*) ? Mahoc (meaning unknown), extinct.

(*D*) Nuntaneuck or Nuntaly (meaning unknown), extinct.

(*E*) Mohetan ("People of the earth"?), extinct.

Tutelo.

(*A*) Tutelo or Ye-sa$^{n'}$ (meaning unknown), probably extinct.

(*A'*) Saponi (meaning unknown), probably extinct. (According to Mooney, the Tutelo and Saponi tribes were intimately connected or identical, and the names were used interchangeably, the former becoming more prominent after the removal of the tribal remnant from the Carolinas to New York.[2])

(*B*) Occanichi (meaning unknown), probably extinct.

? Manahoac confederacy, extinct.

(*A*) Manahoac (meaning unknown).

(*B*) Stegarake (meaning unknown).

(*C*) Shackakoni (meaning unknown).

(*D*) Tauxitania (meaning unknown).

[1] Ethnography and Philology of the Hidatsa Indians, Miscel. Publ. No. 7, U. S. Geol. and Geog. Survey, 1877, p. 38.

[2] Siouan Tribes of the East, p. 37. Local names derived from the Saponi dialect were recognized and interpreted by a Kwapa when pronounced by Dorsey.

(*E*) Outponi (meaning unknown).
(*F*) Tegniati (meaning unknown).
(*G*) Whonkenti (meaning unknown).
(*H*) Hasinninga (meaning unknown).

9. *Catawba or Ni-ya* ("*People*")

(*A*) Catawba (meaning unknown; they called themselves Ni-ya, "Men" in the comprehensive sense), nearly extinct.
(*B*) Woccon (meaning unknown), extinct.
(*C*) ? Sissipahaw (meaning unknown), extinct.
(*D*) ? Cape Fear (proper name unknown), extinct.
(*E*) ? Warrennuncock (meaning unknown), extinct.
(*F*) ? Adshusheer (meaning unknown), extinct.
(*G*) ? Eno (meaning unknown), extinct.
(*H*) ? Shoeco (meaning unknown), extinct.
(*I*) ? Waxhaw (meaning unknown), extinct.
(*J*) ? Sugeri (meaning unknown), extinct.
(*K*) Santee (meaning unknown).
(*L*) Wateree (derived from the Catawba word watērān, "to float in the water").
(*M*) Sewee (meaning unknown).
(*N*) Congaree (meaning unknown).

10. *Sara* (*extinct*)

(*A*) Sara ("Tall grass").
(*B*) Keyauwi (meaning unknown).

11. *? Pedee* (*extinct*)

(*A*) Pedee (meaning unknown).
(*B*) Waccamaw (meaning unknown).
(*C*) Winyaw (meaning unknown).
(*D*) "Hooks" and "Backhooks" (?).

The definition of the first six of these divisions is based on extended researches among the tribes and in the literature representing the work of earlier observers, and may be regarded as satisfactory. In some cases, notably the Dakota confederacy, the constitution of the divisions is also satisfactory, though in others, including the Asiniboin, Mandan, and Winnebago, the tabulation represents little more than superficial enumeration of villages and bands, generally by observers possessing little knowledge of Indian sociology or language. So far as the survivors of the Biloxi are concerned the classification is satisfactory; but there is doubt concerning the former limits of the division, and also concerning the relations of the extinct tribes referred to on slender, yet the best available, evidence. The classification of

the extinct and nearly extinct Siouan Indians of the east is much less satisfactory. In several cases languages are utterly lost, and in others a few doubtful terms alone remain. In these cases affinity is inferred in part from geographic relation, but chiefly from the recorded federation of tribes and union of remnants as the aboriginal population faded under the light of brighter intelligence; and in all such instances it has been assumed that federation and union grew out of that conformity in mode of thought which is characteristic of peoples speaking identical or closely related tongues. Accordingly, while the grouping of eastern tribes rests in part on meager testimony and is open to question at many points, it is perhaps the best that can be devised, and suffices for convenience of statement if not as a final classification.

So far as practicable the names adopted for the tribes, confederacies, and other groups are those in common use, the aboriginal designations, when distinct, being added in those cases in which they are known.

The present population of the Siouan stock is probably between 40,000 and 45,000, including 2,000 or more (mainly Asiniboin) in Canada.

TRIBAL NOMENCLATURE

In the Siouan stock, as among the American Indians generally, the accepted appellations for tribes and other groups are variously derived. Many of the Siouan tribal names were, like the name of the stock, given by alien peoples, including white men, though most are founded on the descriptive or other designations used in the groups to which they pertain. At first glance, the names seem to be loosely applied and perhaps vaguely defined, and this laxity in application and definition does not disappear, but rather increases, with closer examination.

There are special reasons for the indefiniteness of Indian nomenclature: The aborigines were at the time of discovery, and indeed most of them remain today, in the prescriptorial stage of culture, i. e., the stage in which ideas are crystallized, not by means of arbitrary symbols, but by means of arbitrary associations,[1] and in this stage names are connotive or descriptive, rather than denotive as in the scriptorial stage. Moreover, among the Indians, as among all other prescriptorial peoples, the ego is paramount, and all things are described, much more largely than among cultured peoples, with reference to the describer and the position which he occupies—Self and Here, and, if need be, Now and Thus, are the fundamental elements of primitive conception and description, and these elements are implied and exemplified, rather than expressed, in thought and utterance. Accordingly there is a notable paucity in names, especially for themselves, among the Indian tribes, while the descriptive designations applied to a given group by neighboring tribes are often diverse.

[1] The leading culture stages are defined in the Thirteenth Annual Report of the Bureau of Ethnology, for 1891–92 (1896), p. xxiii et seq.

The principles controlling nomenclature in its inchoate stages are illustrated among the Siouan peoples. So far as their own tongues were concerned, the stock was nameless, and could not be designated save through integral parts. Even the great Dakota confederacy, one of the most extensive and powerful aboriginal organizations, bore no better designation than a term probably applied originally to associated tribes in a descriptive way and perhaps used as a greeting or countersign, although there was an alternative proper descriptive term—"Seven Council-fires"—apparently of considerable antiquity, since it seems to have been originally applied before the separation of the Asiniboin.[1] In like manner the Ɋegiha, Ʇɔiwe're, and Hotcañgara groups, and perhaps the Niya, were without denotive designations for themselves, merely styling themselves "Local People," "Men," "Inhabitants," or, still more ambitiously, "People of the Parent Speech," in terms which are variously rendered by different interpreters; they were lords in their own domain, and felt no need for special title. Different Dakota tribes went so far as to claim that their respective habitats marked the middle of the world, so that each insisted on precedence as the leading tribe,[2] and it was the boast of the Mandan that they were the original people of the earth.[3] In the more carefully studied confederacies the constituent groups generally bore designations apparently used for convenient distinction in the confederation; sometimes they were purely descriptive, as in the case of the Sisseton, Wahpeton, Sans Arcs, Blackfeet, Oto, and several others; again they referred to the federate organization (probably, possibly to relative position of habitat), as in the Yankton, Yanktonai, and Huñkpapa; more frequently they referred to geographic or topographic position, e. g., Teton, Omaha, Pahe'tsi, Kwapa, etc; while some appear to have had a figurative or symbolic connotation, as Brulé, Ogalala, and Ponka. Usually the designations employed by alien peoples were more definite than those used in the group designated, as illustrated by the stock name, Asiniboin, and Iowa. Commonly the alien appellations were terms of reproach; thus Sioux, Biloxi, and Hohe (the Dakota designation for the Asiniboin) are clearly opprobrious, while Paskagula might easily be opprobrious among hunters and warriors, and Iowa and Oto appear to be derogatory or contemptuous expressions. The names applied by the whites were sometimes taken from geographic positions, as in the case of Upper Yanktonai and Cape Fear—the geographic names themselves being frequently of Indian origin. Some of the current names represent translations of the aboriginal terms either into English ("Blackfeet," "Two Kettles," "Crow,") or into French ("Sans Arcs," "Brulé," "Gros Ventres"); yet most of the names, at least of the prairie tribes, are simply corruptions of the aboriginal terms, though frequently the modification is so complete as to render identification and interpretation difficult—it

[1] Cf. Schoolcraft, "Information," etc, op. cit., pt. II, 1852, p. 169. Dorsey was inclined to consider the number as made up without the Asiniboin.

[2] Riggs-Dorsey: "Dakota Grammar, Texts, and Ethnography," Cont. N. A. Eth., vol IX, 1893, p. 164

[3] Catlin: "Letters and Notes," op. cit., p. 80.

is not easy to find Waca'ce in "Osage" (so spelled by the French, whose orthography was adopted and mispronounced by English-speaking pioneers), or Pa'qotce in "Iowa."

The meanings of most of the eastern names are lost; yet so far as they are preserved they are of a kind with those of the interior. So, too, are the subtribal names enumerated by Dorsey.

PRINCIPAL CHARACTERS

PHONETIC AND GRAPHIC ARTS

The Siouan stock is defined by linguistic characters. The several tribes and larger and smaller groups speak dialects so closely related as to imply occasional or habitual association, and hence to indicate community in interests and affinity in development; and while the arts (reflecting as they did the varying environment of a wide territorial range) were diversified, the similarity in language was, as is usual, accompanied by similarity in institutions and beliefs. Nearly all of the known dialects are eminently vocalic, and the tongues of the plains, which have been most extensively studied, are notably melodious; thus the leading languages of the group display moderately high phonetic development. In grammatic structure the better-known dialects are not so well developed; the structure is complex, chiefly through the large use of inflection, though agglutination sometimes occurs. In some cases the germ of organization is found in fairly definite juxtaposition or placement. The vocabulary is moderately rich, and of course represents the daily needs of a primitive people, their surroundings, their avocations, and their thoughts, while expressing little of the richer ideation of cultured cosmopolites. On the whole, the speech of the Siouan stock may be said to have been fairly developed, and may, with the Algonquian, Iroquoian, and Shoshonean, be regarded as typical for the portion of North America lying north of Mexico. Fortunately it has been extensively studied by Riggs, Hale, Dorsey, and several others, including distinguished representatives of some of the tribes, and is thus accessible to students. The high phonetic development of the Siouan tongues reflects the needs and records the history of the hunter and warrior tribes, whose phonetic symbols were necessarily so differentiated as to be intelligible in whisper, oratory, and war cry, as well as in ordinary converse, while the complex structure is in harmony with the elaborate social organization and ritual of the Siouan people.

Many of the Siouan Indians were adepts in the sign language; indeed, this mode of conveying intelligence attained perhaps its highest development among some of the tribes of this stock, who, with other plains Indians, developed pantomime and gesture into a surprisingly perfect art of expression adapted to the needs of huntsmen and warriors.

Most of the tribes were fairly proficient in pictography; totemic and other designs were inscribed on bark and wood, painted on skins,

wrought into domestic wares, and sometimes carved on rocks. Jonathan Carver gives an example of picture-writing on a tree, in charcoal mixed with bear's grease, designed to convey information from the "Chipe'ways" (Algonquian) to the "Naudowessies,"[1] and other instances of intertribal communication by means of pictography are on record. Personal decoration was common, and was largely symbolic; the face and body were painted in distinctive ways when going on the warpath, in organizing the hunt, in mourning the dead, in celebrating the victory, and in performing various ceremonials. Scarification and maiming were practiced by some of the tribes, always in a symbolic way. Among the Mandan and Hidatsa scars were produced in cruel ceremonials originally connected with war and hunting, and served as enduring witnesses of courage and fortitude. Symbolic tattooing was fairly common among the westernmost tribes. Eagle and other feathers were worn as insignia of rank and for other symbolic purposes, while bear claws and the scalps of enemies were worn as symbols of the chase and battle. Some of the tribes recorded current history by means of "winter counts" or calendaric inscriptions, though their arithmetic was meager and crude, and their calendar proper was limited to recognition of the year, lunation, and day—or, as among so many primitive people, the "snow," "dead moon," and "night."—with no definite system of fitting lunations to the annual seasons. Most of the graphic records were perishable, and have long ago disappeared; but during recent decades several untutored tribesmen have executed vigorous drawings representing hunting scenes and conflicts with white soldiery, which have been preserved or reproduced. These crude essays in graphic art were the germ of writing, and indicate that, at the time of discovery, several Siouan tribes were near the gateway opening into the broader field of scriptorial culture. So far as it extends, the crude graphic symbolism betokens warlike habit and militant organization, which were doubtless measurably inimical to further progress.

It would appear that, in connection with their proficiency in gesture speech and their meager graphic art, the Siouan Indians had become masters in a vaguely understood system of dramaturgy or symbolized conduct. Among them the use of the peace-pipe was general; among several and perhaps all of the tribes the definite use of insignia was common; among them the customary hierarchic organization of the aborigines was remarkably developed and was maintained by an elaborate and strict code of etiquette whose observance was exacted and yielded by every tribesman. Thus the warriors, habituated to expressing and recognizing tribal affiliation and status in address and deportment, were notably observant of social minutiæ, and this habit extended into every activity of their lives. They were ceremonious among themselves and

[1] Travels Through the Interior Parts of North America in the Years 1766, 1767, and 1768. London, 1778, p. 418.

crafty toward enemies, tactful diplomatists as well as brave soldiers, shrewd strategists as well as fierce fighters; ever they were skillful readers of human nature, even when ruthless takers of human life. Among some of the tribes every movement and gesture and expression of the male adult seems to have been affected or controlled with the view of impressing spectators and auditors, and through constant schooling the warriors became most consummate actors. To the casual observer, they were stoics or stupids according to the conditions of observation; to many observers, they were cheats or charlatans; to scientific students, their eccentrically developed volition and the thaumaturgy by which it was normally accompanied suggests early stages in that curious development which, in the Orient, culminates in necromancy and occultism. Unfortunately this phase of the Indian character (which was shared by various tribes) was little appreciated by the early travelers, and little record of it remains; yet there is enough to indicate the importance of constantly studied ceremony, or symbolic conduct, among them. The development of affectation and self-control among the Siouan tribesmen was undoubtedly shaped by warlike disposition, and their stoicism was displayed largely in war—as when the captured warrior went exultingly to the torture, taunting and tempting his captors to multiply their atrocities even until his tongue was torn from its roots, in order that his fortitude might be proved; but the habit was firmly fixed and found constant expression in commonplace as well as in more dramatic actions.

INDUSTRIAL AND ESTHETIC ARTS

Since the arts of primitive people reflect environmental conditions with close fidelity, and since the Siouan Indians were distributed over a vast territory varying in climate, hydrography, geology, fauna, and flora, their industrial and esthetic arts can hardly be regarded as distinctive, and were indeed shared by other tribes of all neighboring stocks.

The best developed industries were hunting and warfare, though all of the tribes subsisted in part on fruits, nuts, berries, tubers, grains, and other vegetal products, largely wild, though sometimes planted and even cultivated in rude fashion. The southwestern tribes, and to some extent all of the prairie denizens and probably the eastern remnant, grew maize, beans, pumpkins, melons, squashes, sunflowers, and tobacco, though their agriculture seems always to have been subordinated to the chase. Aboriginally, they appear to have had no domestic animals except dogs, which, according to Carver—one of the first white men seen by the prairie tribes,—were kept for their flesh, which was eaten ceremonially,[1] and for use in the chase.[2] According to

[1] Op. cit., p. 278.

[2] Op. cit., p. 145. Carver says, "The dogs employed by the Indians in hunting appear to be all of the same species, they carry their ears erect, and greatly resemble a wolf about the head. They are exceedingly useful to them in their hunting excursions and will attack the fiercest of the game they are in pursuit of. They are also remarkable for their fidelity to their masters, but being ill fed by them are very troublesome in their huts or tents."

Lewis and Clark (1804–1806), they were used for burden and draft;[1] according to the naturalists accompanying Long's expedition (1819–20), for flesh (eaten ceremonially and on ordinary occasions), draft, burden, and the chase,[2] and according to Prince Maximilian, for food and draft,[3] all these functions indicating long familiarity with the canines. Catlin, too, found "dog's meat . . . the most honorable food that can be presented to a stranger;" it was eaten ceremonially and on important occasions.[4] Moreover, the terms used for the dog and his harness are ancient and even archaic, and some of the most important ceremonials were connected with this animal,[5] implying long-continued association. Casual references indicate that some of the tribes lived in mutual tolerance with several birds[6] and mammals not yet domesticated (indeed the buffalo may be said to have been in this condition), so that the people were at the threshold of zooculture.

The chief implements and weapons were of stone, wood, bone, horn, and antler. According to Carver, the "Nadowessie" were skillful bowmen, using also the "casse-tête"[7] or warclub, and a flint scalping-knife. Catlin was impressed with the shortness of the bows used by the prairie tribes, though among the southwestern tribes they were longer. Many of the Siouan Indians used the lance, javelin, or spear. The domestic utensils were scant and simple, as became wanderers and fighters, wood being the common material, though crude pottery

[1]Cones, "History of the Expedition," op. cit., vol. I, p. 140. A note adds, "The dogs are not large, much resemble a wolf, and will haul about 70 pounds each."

[2]Narrative of an Expedition to the Source of St. Peter's River . . . under the Command of Stephen H. Long, U. S. T. E., by William H. Keating; London, 1825, vol. I, p. 451; vol. II, p. 44, et al. Account of an Expedition from Pittsburgh to the Rocky Mountains . . . under the Command of Major S. H. Long, U. S. T. E., by Edwin James; London, 1823, vol. I, pp. 155, 182, et al.

Say remarks (James, loc. cit., p. 155) of the coyote (?), "This animal . . . is probably the original of the domestic dog, so common in the villages of the Indians of this region [about Council Bluffs and Omaha], some of the varieties of which still retain much of the habit and manners of this species." James says (loc. cit., vol. II, p. 13), "The dogs of the Konzas are generally of a mixed breed, between our dogs with pendent ears and the native dogs, whose ears are universally erect. The Indians of this nation seek every opportunity to cross the breed. These mongrel dogs are less common with the Omawhaws, while the dogs of the Pawnees generally have preserved their original form."

[3]Travels in the Interior of North America, London, 1843. The Prince adds, "In shape they differ very little from the wolf, and are equally large and strong. Some are of the real wolf color; others are black, white, or spotted with black and white, and differing only by the tail being rather more turned up. Their voice is not a proper barking, but a howl like that of the wolf, and they partly descend from wolves, which approach the Indian huts, even in the daytime, and mix with the dogs" (cf. p. 203 et al.). Writing at the Mandan village, he says, "The Mandans and Manitaries have not, by any means, so many dogs as the Assiniboin, Crows, and Blackfeet. They are rarely of true wolf color, but generally black or white, or else resemble the wolf, but here they are more like the prairie wolf (*Canis latrans*). We likewise found among these animals a brown race, descended from European pointers; hence the genuine bark of the dog is more frequently heard here, whereas among the western nations they only howl. The Indian dogs are worked very hard, have hard blows and hard fare; in fact, they are treated just as this fine animal is treated among the Esquimaux" (p. 345).

[4]"Letters and Notes," etc, vol. I, p. 14; cf. p. 230 et al. He speaks (p. 201) of the Minitari canines as "semiloup dogs and whelps."

[5]Keating's "Narrative," op. cit., vol. II, p. 452; James' "Account," op. cit., vol. I, p. 127 et al.

[6]According to Prince Maximilian, both the Mandan and Minitari kept owls in their lodges and regarded them as soothsayers ("Travels," op. cit., pp. 383, 403), and the eagle was apparently tolerated for the sake of his feathers.

[7]"Cassa Tate, the antient tomahawk" on the plate illustrating the objects ("Travels," op. cit., pl. 4, p. 298).

and basketry were manufactured, together with bags and bottles of skins or animal intestines. Ceremonial objects were common, the most conspicuous being the calumet, carved out of the sacred pipestone or catlinite quarried for many generations in the midst of the Siouan territory. Frequently the pipes were fashioned in the form of tomahawks, when they carried a double symbolic significance, standing alike for peace and war, and thus expressing well the dominant idea of the Siouan mind. Tobacco and kinnikinic (a mixture of tobacco with shredded bark, leaves, etc[1]) were smoked.

Aboriginally the Siouan apparel was scanty, commonly comprising breechclout, moccasins, leggings, and robe, and consisted chiefly of dressed skins, though several of the tribes made simple fabrics of bast, rushes, and other vegetal substances. Fur robes and rush mats commonly served for bedding, some of the tribes using rude bedsteads. The buffalo hunting prairie tribes depended largely for apparel, bedding, and habitations, as well as for food, on the great beast to whose comings and goings their movements were adjusted. Like other Indians, the Siouan hunters and their consorts quickly availed themselves of the white man's stuffs, as well as his metal implements, and the primitive dress was soon modified.

The woodland habitations were chiefly tent-shape structures of saplings covered with bark, rush mats, skins, or bushes; the prairie habitations were mainly earth lodges for winter and buffalo-skin tipis for summer. Among many of the tribes these domiciles, simple as they were, were constructed in accordance with an elaborate plan controlled by ritual. According to Morgan, the framework of the aboriginal Dakota house consisted of 13 poles;[2] and Dorsey describes the systematic grouping of the tipis belonging to different gentes and tribes. Sudatories were characteristic in most of the tribes, menstrual lodges were common, and most of the more sedentary tribes had council houses or other communal structures. The Siouan domiciles were thus adapted with remarkable closeness to the daily habits and environment of the tribesmen, while at the same time they reflected the complex social organization growing out of their prescriptorial status and militant disposition.

Most of the Siouan men, women, and children were fine swimmers, though they did not compare well with neighboring tribes as makers and managers of water craft. The Dakota women made coracles of buffalo hides, in which they transported themselves and their householdry, but the use of these and other craft seems to have been regarded as little better than a feminine weakness. Other tribes were better boatmen; for the Siouan Indian generally preferred land travel to journeying by water, and avoided the burden of vehicles by which his

[1] Described by Coues, "History of the Expedition under the Command of Lewis and Clark," 1893, vol. I, p. 139, note.

[2] "Houses and House-life of the American Aborigines," Cont. N. A. Eth., vol. IV, 1881, p. 114.

ever-varying movements in pursuit of game or in waylaying and evading enemies would have been limited and handicapped.

There are many indications and some suggestive evidences that the chief arts and certain institutions and beliefs, as well as the geographic distribution, of the principal Siouan tribes were determined by a single conspicuous feature in their environment—the buffalo. As Riggs, Hale, and Dorsey have demonstrated, the original home of the Siouan stock lay on the eastern slope of the Appalachian mountains, stretching down over the Piedmont and Coastplain provinces to the shores of the Atlantic between the Potomac and the Savannah. As shown by Allen, the buffalo, "prior to the year 1800," spread eastward across the Appalachians[1] and into the priscan territory of the Siouan tribes. As suggested by Shaler, the presence of this ponderous and peaceful animal materially affected the vocations of the Indians, tending to discourage agriculture and encourage the chase; and it can hardly be doubted that the bison was the bridge that carried the ancestors of the western tribes from the crest of the Alleghenies to the Côteau des Prairies and enabled them to disperse so widely over the plains beyond. Certainly the toothsome flesh and useful skins must have attracted the valiant huntsmen among the Appalachians; certainly the feral herds must have become constantly larger and more numerous westward, thus tempting the pursuers down the waterways toward the great river; certainly the vast herds beyond the Mississippi gave stronger incentives and richer rewards than the hunters of big game found elsewhere; and certainly when the prairie tribes were discovered, the men and animals lived in constant interaction, and many of the hunters acted and thought only as they were moved by their easy prey. As the Spanish horse spread northward over the Llano Estacado and overflowed across the mountains from the plains of the Cayuse, the Dakota and other tribes found a new means of conquest over the herds, and entered on a career so facile that they increased and multiplied despite strife and imported disease.

The horse was acquired by the prairie tribes toward the end of the last century. Carver (1766–1768) describes the methods of hunting among the "Nandowessie" without referring to the horse,[2] though he gives their name for the animal in his vocabulary,[3] and describes their mode of warfare with "Indians that inhabit still farther to the westward a country which extends to the South Sea," having "great plenty of horses."[4] Lewis and Clark (1804–1806) mention that the "Sioux of the Teton tribe . . . frequently make excursions to steal horses" from the Mandan,[5] and make other references indicating that the horse

[1] "The American Bisons, Living and Extinct," by J. A. Allen; Memoirs of the Geol. Survey of Kentucky, vol. i, pt. ii, 1876, map; also pp. 55, 72–101, et al.

[2] Op. cit., p. 283 et seq.

[3] Ibid., p. 435.

[4] Ibid., p. 294.

[5] "History of the Expedition under the Command of Lewis and Clark," etc. by Elliott Coues, 1893 vol. i, p. 175. It is noted that in winter the Mandan kept their horses in their lodges at night, and, fed them on cottonwood branches. Ibid., pp. 220, 233, et al.

was in fairly common use among some of the Siouan tribes, though the animal was "confined principally to the nations inhabiting the great plains of the Columbia,"[1] and dogs were still used for burden and draft.[2] Grinnell learned from an aged Indian that horses came into the hands of the neighboring Piegan (Algonquian) about 1804–1806.[3] Long's naturalists found the horse, ass, and mule in use among the Kansa and other tribes,[4] and described the mode of capture of wild horses by the Osage;[5] yet when, two-thirds of a century after Carver, Catlin (1832–1839) and Prince Maximilian (1833–34) visited the Siouan territory, they found the horse established and in common use in the chase and in war.[6] It is significant that the Dakota word for horse (śuk-taŋ'-ka or śuŋ-ka'-wa-kaŋ) is composed of the word for dog (śuŋ'-ka), with an affix indicating greatness, sacredness, or mystery, so that the horse is literally "great mysterious dog," or "ancient sacred dog," and that several terms for harness and other appurtenances correspond with those used for the gear of the dog when used as a draft animal.[7] This terminology corroborates the direct evidence that the dog was domesticated by the Siouan aborigines long before the advent of the horse.

Among the Siouan tribes, as among other Indians, amusements absorbed a considerable part of the time and energy of the old and young of both sexes. Among the young, the gambols, races, and other sports were chiefly or wholly diversional, and commonly mimicked the avocations of the adults. The girls played at the building and care of houses and were absorbed in dolls, while the boys played at archery, foot racing, and mimic hunting, which soon grew into the actual chase of small birds and animals. Some of the sports of the elders were unorganized diversions, leaping, racing, wrestling, and other spontaneous expressions of exuberance. Certain diversions were controlled by more persistent motive, as when the idle warrior occupied his leisure in meaningless ornamentation of his garment or tipi, or spent hours of leisure in esthetic modification of his weapon or ceremonial badge, and to this purposeless activity, which engendered design with its own progress, the incipient graphic art of the tribes was largely due. The more important and characteristic sports were organized and interwoven with social organization and belief so as commonly to take the form of elaborate ceremonial, in which dancing, feasting, fasting, symbolic painting, song, and sacrifice played important parts, and these organized sports were largely fiducial. To many

[1] Cones' Expedition of Lewis and Clark, vol. III, p. 839.

[2] Ibid., vol. I, p. 140.

"The Story of the Indian," 1895, p. 237.

[4] James' "Account," op. cit., vol. I, pp. 126, 148; vol. II, p. 12 et al.

[5] Ibid., vol. III, p. 107.

[6] "Letters and Notes," op. cit., vol. I, pp. 142 (where the manner of lassoing wild horses is mentioned) p. 251 et al.; "Travels," op. cit., p. 149 et al. (The Crow were said to have between 9,000 and 10,000 head, p. 174.)

[7] Keating in Long's Expedition, op. cit., vol. II, appendix, p. 152. Riggs' "Dakota-English Dictionary," Cont. N. A. Eth., vol. VII, 1890.

of the early observers the observances were nothing more than meaningless mummeries; to some they were sacrilegious, to others sortilegious; to the more careful students, like Carver, whose notes are of especial value by reason of the author's clear insight into the Indian character, they were invocations, expiations, propitiations, expressing profound and overpowering devotion. Carver says of the "Naudowessie," "They usually dance either before or after every meal; and by this cheerfulness, probably, render the Great Spirit, to whom they consider themselves as indebted for every good, a more acceptable sacrifice than a formal and unanimated thanksgiving;"[1] and he proceeds to describe the informal dances as well as the more formal ceremonials preparatory to joining in the chase or setting out on the warpath. The ceremonial observances of the Siouan tribes were not different in kind from those of neighboring contemporaries, yet some of them were developed in remarkable degree—for example, the bloody rites by which youths were raised to the rank of warriors in some of the prairie tribes were without parallel in severity among the aborigines of America, or even among the known primitive peoples of the world. So the sports of the Siouan Indians were both diversional and divinatory, and the latter were highly organized in a manner reflecting the environment of the tribes, their culture-status, their belief, and especially their disposition toward bloodshed; for their most characteristic ceremonials were connected, genetically if not immediately, with warfare and the chase.

Among many of the Siouan tribes, games of chance were played habitually and with great avidity, both men and women becoming so absorbed as to forget avocations and food, mothers even neglecting their children; for, as among other primitive peoples, the charm of hazard was greater than among the enlightened. The games were not specially distinctive, and were less widely differentiated than in certain other Indian stocks. The sport or game of chungke stood high in favor among the young men in many of the tribes, and was played as a game partly of chance, partly of skill; but dice games (played with plum stones among the southwestern prairie tribes) were generally preferred, especially by the women, children, and older men. The games were partly, sometimes wholly, diversional, but generally they were in large part divinatory, and thus reflected the hazardous occupations and low culture-status of the people. One of the evils resulting from the advent of the whites was the introduction of new games of chance which tended further to pervert the simple Siouan mind; but in time the evil brought its own remedy, for association with white gamblers taught the ingenuous sortilegers that there is nothing divine or sacred about the gaming table or the conduct of its votaries.

The primitive Siouan music was limited to the chant and rather simple vocal melody, accompanied by rattle, drum, and flute, the drum among the northwestern tribes being a skin bottle or bag of water.

[1] Op. cit., p. 265.

The music of the Omaha and some other tribes has been most appreciatively studied by Miss Fletcher, and her memoir ranks among the Indian classics.[1] In general the Siouan music was typical for the aboriginal stocks of the northern interior. Its dominant feature was rhythm, by which the dance was controlled, though melody was inchoate, while harmony was not yet developed.

The germ of painting was revealed in the calendars and the seed of sculpture in the carvings of the Siouan Indians. The pictographic paintings comprised not only recognizable but even vigorous representations of men and animals, depicted in form and color though without perspective, while the calumet of catlinite was sometimes chiseled into striking verisimilitude of human and animal forms in miniature. To the collector these representations suggest fairly developed art, though to the Indian they were mainly, if not wholly, symbolic; for everything indicates that the primitive artisan had not yet broken the shackles of fetichistic symbolism, and had little conception of artistic portrayal for its own sake.

INSTITUTIONS

Among civilized peoples, institutions are crystallized in statutes about nuclei of common law or custom; among peoples in the prescriptorial culture-stage statutes are unborn, and various mnemonic devices are employed for fixing and perpetuating institutions; and, as is usual in this stage, the devices involve associations which appear to be essentially arbitrary at the outset, though they tend to become natural through the survival of the fittest. A favorite device for perpetuating institutions among the primitive peoples of many districts on different continents is the taboo, or prohibition, which is commonly fiducial but is often of general application. This device finds its best development in the earlier stages in the development of belief, and is normally connected with totemism. Another device, which is remarkably widespread, as shown by Morgan, is kinship nomenclature. This device rests on a natural and easily ascertained basis, though its applications are arbitrary and vary widely from tribe to tribe and from culture-status to culture-status. A third device, which found much favor among the American aborigines and among some other primitive peoples, may be called *ordination*, or the arrangement of individuals and groups classified from the prescriptorial point of view of Self, Here, and Now, with respect to each other or to some dominant personage or group. This device seems to have grown out of the kin name system, in which the Ego is the basis from which relation is reckoned. It tends to develop into federate organization on the one hand or into caste on the other hand, according to the attendant conditions.[2] There are various other

[1] "A study of Omaha Indian Music, by Alice C. Fletcher . . aided by Francis La Flesche, with a report on the structural peculiarities of the music, by John Comfort Fillmore, A. M.," Arch. and Eth. papers of the Peabody Museum, vol. I, No. 5, 1893, pp. i-vi, 7-152 (= 231-382).

[2] Ordination, as the term is here used, comprehends regimentation as defined by Powell, yet relates especially to the method of reckoning from the constantly recognized but ever varying standpoint of prescriptorial culture.

devices for fixing and perpetuating institutions or for expressing the laws embodied therein. Some of these are connected with thaumaturgy and shamanism, some are connected with the powers of nature, and the several devices overlap and interlace in puzzling fashion.

Among the Siouan Indians the devices of taboo, kin-names, and ordination are found in such relation as to throw some light on the growth of primitive institutions. While they blend and are measurably involved with thaumaturgic devices, there are indications that in a general way the three devices stand for stages in the development of law. Among the best-known tribes the taboo pertained to the clan, and was used (in a much more limited way than among some other peoples) to commemorate and perpetuate the clan organization; kin-names, which were partly natural and thus normal to the clan organization, and at the same time partly artificial and thus characteristic of gentile organization, served to commemorate and perpetuate not only the family relations but the relations of the constituent elements of the tribe; while the ordination expressed in the camping circle, in the phratries, in the ceremonials, and in many other ways, served to commemorate intertribal as well as intergentile relations, and thus to promote peace and harmonious action. It is significant that the taboo was less potent among the Siouan Indians than among some other stocks, and that among some tribes it has not been found; and it is especially significant that in some instances the taboo was apparently inversely related to kin naming and ordination, as among the Biloxi, where the taboo is exceptionally weak and kin naming exceptionally strong, and among the Dakota, where the system of ordination attained perhaps its highest American development in domiciliary arrangement, while the taboo was limited in function; for the relations indicate that the taboo was archaic or even vestigial. It is noteworthy also that among most of the Siouan tribes the kin name system was less elaborate than in many other stocks, while the system of ordination is so elaborate as to constitute one of the leading characteristics of the stock.

At the time of the discovery, most of the Siouan tribes had apparently passed into gentile organization, though vestiges of clan organization were found—e. g., among the best-known tribes the man was the head of the family, though the tipi usually belonged to the woman. Thus, as defined by institutions, the stock was just above savagery and just within the lower stages of barbarism. Accordingly the governmental functions were hereditary in the male line, yet the law of heredity was subject to modification or suspension at the will of the group, commonly at the instance of rebels or usurpers of marked prowess or shrewdness. The property regulations were definite and strictly observed; as among other barbarous peoples, the land was common to the tribe or other group occupying it, yet was defended against alien invasion; the ownership of movable property was a combination of communalism and individualism delicately adjusted to the needs and habits of the several tribes—

in general, evanescent property, such as food and fuel, was shared in common (subject to carefully regulated individual claims), while permanent property, such as tipis, dogs, apparel, weapons, etc, was held by individuals. As among other tribes, the more strictly personal property was usually destroyed on the death of the owner, though the real reason for the custom—the prevention of dispute—was shrouded in a mantle of mysticism.

Although of primary importance in shaping the career of the Siouan tribes, the marital institutions of the stock were not specially distinctive. Marriage was usually effected by negotiation through parents or elders; among some of the tribes the bride was purchased, while among others there was an interchange of presents. Polygyny was common; in several of the tribes the bride's sisters became subordinate wives of the husband. The regulations concerning divorce and the punishment of infidelity were somewhat variable among the different tribes, some of whom furnished temporary wives to distinguished visitors. Generally there were sanctions for marriage by elopement or individual choice. In every tribe, so far as known, gentile exogamy prevailed—i. e., marriage in the gens was forbidden, under pain of ostracism or still heavier penalty, while the gentes intermarried among one another; in some cases intermarriage between certain tribes was regarded with special favor. There seems to have been no system of marriage by capture, though captive women were usually espoused by the successful tribesmen, and girls were sometimes abducted. In general it would appear that intergentile and intertribal marriage was practiced and sanctioned by the sages, and that it tended toward harmony and federation, and thus contributed much toward the increase and diffusion of the great Siouan stock.

As set forth in some detail by Dorsey, the ordination of the Siouan tribes extended beyond the hierarchic organization into families, subgentes, gentes, tribes, and confederacies; there were also phratries, sometimes (perhaps typically) arranged in pairs; there were societies or associations established on social or fiducial bases; there was a general arrangement or classification of each group on a military basis, as into soldiers and two or more classes of noncombatants, etc. Among the Siouan peoples, too, the individual brotherhood of the David-Jonathan or Damon-Pythias type was characteristically developed. Thus the corporate institutions were interwoven and superimposed in a manner nearly as complex as that found in the national, state, municipal, and minor institutions of civilization; yet the ordination preserved by means of the camping circle, the kinship system, the simple series of taboos, and the elaborate symbolism was apparently so complete as to meet every social and governmental demand.

BELIEFS

The Development of Mythology

As explained by Powell, philosophies and beliefs may be seriated in four stages: The first stage is hecastotheism; in this stage extranatural or mysterious potencies are imputed to objects both animate

and inanimate. The second stage is zootheism; within it the powers of animate forms are exaggerated and amplified into the realm of the supernal, and certain animals are deified. The third stage is that of physitheism, in which the agencies of nature are personified and exalted unto omnipotence. The fourth stage is that of psychotheism, which includes the domain of spiritual concept. In general the development of belief coincides with the growth of abstraction; yet it is to be remembered that this growth represents increase in definiteness of the abstract concepts rather than augmentation in numbers and kinds of subjective impressions, i. e., the advance is in quality rather than in quantity; indeed, it would almost appear that the vague and indefinite abstraction of hecastotheism is more pervasive and prevalent than the clearer abstraction of higher stages. Appreciation of the fundamental characteristics of belief is essential to even the most general understanding of the Indian mythology and philosophy, and even after careful study it is difficult for thinkers trained in the higher methods of thought to understand the crude and confused ideation of the primitive thinker.

In hecastotheism the believer finds mysterious properties and potencies everywhere. To his mind every object is endued with occult power, moved by a vague volition, actuated by shadowy motive ranging capriciously from malevolence to benevolence; in his lax estimation some objects are more potent or more mysterious than others, the strong, the sharp, the hard, and the swift-moving rising superior to the feeble, the dull, the soft, and the slow. Commonly he singles out some special object as his personal, family, or tribal mystery-symbol or fetich, the object usually representing that which is most feared or worst hated among his surroundings. Vaguely realizing from the memory of accidents or unforeseen events that he is dependent on his surroundings, he invests every feature of his environment with a capricious humor reflecting his own disposition, and gives to each and all a subtlety and inscrutability corresponding to his exalted estimation of his own craft in the chase and war; and, conceiving himself to live and move only at the mercy of his multitudinous associates, he becomes a fatalist—kismet is his watchword, and he meets defeat and death with resignation, just as he goes to victory with complacence; for so it was ordained.

Zootheism is the offspring of hecastotheism. As the primitive believer assigns special potency or mystery to the strong and the swift, he gradually comes to give exceptional rank to self-moving animals; as his experience of the strength, alertness, swiftness, and courage of his animate enemy or prey increases, these animals are invested with successively higher and higher attributes, each reflecting the mental operations of the mystical huntsman, and in time the animals with which the primitive believers are most intimately associated come to be regarded as tutelary daimons of supernatural power and intelligence. At first the animals, like the undifferentiated things of hecastotheism,

are regarded in fear or awe by reason of their strength and ferocity, and this regard grows into an incipient worship in the form of sacrifice or other ceremonial; meanwhile, inanimate things, and in due season rare and unimportant animals, are neglected, and a half dozen, a dozen, or a score of the well-known animals are exalted into a hierarchy of petty gods, headed by the strongest like the bear, the swiftest like the deer, the most majestic like the eagle, the most cunning like the fox or coyote, or the most deadly like the rattlesnake. Commonly the arts and the skill of the mystical huntsman improve from youth to adolescence and from generation to generation, so that the later animals appear to be easier snared or slain than the earlier; moreover, the accounts of conflicts between men and animals grow by repetition and are gilded by imagination as memory grows dim; and for these and other reasons the notion grows up that the ancient animals were stronger, swifter, slier, statelier, deadlier than their modern representatives, and the hierarchy of petty gods is exalted into an omnipotent thearchy. Eventually, in the most highly developed zootheistic systems, the leading beast-god is regarded as the creator of the lesser deities of the earth, sun, and sky, of the mythic under-world and its real counterpart the ground or mid-world, as well as the visionary upper-world, of men, and of the ignoble animals; sometimes the most exalted beast-god is worshiped especially by the great man or leading class and incidentally by all, while other men and groups choose the lesser beast-gods, according to their rank, for special worship. In hecastotheism the potencies revered or worshiped are polymorphic, while their attributes reflect the mental operations of the believers; in zootheism the deities worshiped are zoomorphic, and their attributes continue to reflect the human mind.

Physitheism, in its turn, springs from zootheism. Through contemplation of the strong the idea of strength arises, and a means is found for bringing the bear into analogy with thunder, with the sun, or with the avalanche-bearing mountain; through contemplation of the swift the concept of swiftness is engendered, and comparison of the deer with the wind or rushing river is made easy; through contemplation of the deadly stroke of the rattlesnake the notion of death-dealing power assumes shape, and comparison of the snake bite and the lightning stroke is made possible; and in every case it is inevitably perceived that the agency is stronger, swifter, deadlier than the animal. At first the agency is not abstracted or dissociated from the parent zootheistic concept, and the sun is the mightiest animal as among many peoples, the thunder is the voice of the bear as among different woodland tribes or the flapping of the wings of the great ancient eagle as among the Dakota and Ɂegiha, while lightning is the great serpent of the sky as among the Zuñi. Subsequently the zoic concept fades, and the constant association of human intellectual qualities engenders an anthropic concept, when the sun becomes an anthropomorphic deity (perhaps bearing a dazzling mask, as among the Zuñi), and thunder is

the rumbling of quoits pitched by the shades of old-time giants, as among different American tribes. Eventually all the leading agencies of nature are personified in anthropic form, and retain the human attributes of caprice, love, and hate which are found in the minds of the believers.

Psychotheism is born of physitheism as the anthropomorphic element in the concept of natural agency gradually fades; but since none of the aborigines of the United States had passed into the higher stage, the mode of transition does not require consideration.

It is to be borne in mind that throughout the course of development of belief, from the beginning of hecastotheism into the borderland of psychotheism, the dominant characteristic is the vague notion of mystery. At first the mystery pervades all things and extends in all directions, representing an indefinite ideal world, which is the counterpart of the real world with the addition of human qualities. Gradually the mystery segregates, deepening with respect to animals and disappearing with respect to inanimate things; and at length the slowly changing mysteries shape themselves into semiabstractions having a strong anthropic cast, while the remainder of the earth and the things thereof gradually become real, though they remain under the spell and dominion of the mysterious. Thus at every stage the primitive believer is a mystic—a fatalist in one stage, a beast worshiper in another, a thanmaturgist in a third, yet ever and first of all a mystic. It is also to be borne in mind (and the more firmly because of a widespread misapprehension) that the primitive believer, up to the highest stage attained by the North American Indian, is not a psychotheist, much less a monotheist. His "Great Spirit" is simply a great mystery, perhaps vaguely anthropomorphic, oftener zoomorphic, yet not a spirit, which he is unable to conceive save by reflection of the white man's concept and inquiry; and his departed spirit is but a shade, much like that of the ancient Greeks, the associate and often the inferior of animal shades.

While the four stages in development of belief are fundamentally distinct, they nevertheless overlap in such manner as apparently, and in a measure really, to coexist and blend. Culture progress is slow. In biotic development the effect of beneficial modification is felt immediately, and the modified organs or organisms are stimulated and strengthened cumulatively, while the unmodified are enfeebled and paralyzed cumulatively through inactivity and quickly pass toward atrophy and extinction. Conversely in demotic development, which is characterized by the persistence of the organisms and by the elimination of the bad and the preservation of the good among qualities only, there is a constant tendency toward retardation of progress; for in savagery and barbarism as in civilization, age commonly produces conservatism, and at the same time brings responsibility for the conduct of old and young, so that modification, howsoever beneficial, is

measurably held in check, and so that the progress of each generation buds in the springtime of youth yet is not permitted to fruit until the winter of old age approaches. Accordingly the mean of demotic progress tends to lag far behind its foremost advances, and modes of action and especially of thought change slowly. This is especially true of beliefs, which, during each generation, are largely vestigial. So the stages in the evolution of mythologic philosophy overlap widely; there is probably no tribe now living among whom zootheism has not yet taken root, though hecastotheism has been found dominant among different tribes; there is probably no people in the zootheistic stage who are completely divested of hecastotheistic vestiges; and one of the curious features of even the most advanced psychotheism is the occasional outcropping of features inherited from all of the earlier stages. Yet it is none the less important to discriminate the stages.

THE SIOUAN MYTHOLOGY

It was partly through pioneer study of the Siouan Indians that the popular fallacy concerning the aboriginal "Great Spirit" gained currency; and it was partly through the work of Dorsey among the Ɂegiha and Dakota tribes, first as a missionary and afterward as a linguist, that the early error was corrected. Among these tribes the creation and control of the world and the things thereof are ascribed to "wa-ka^{n}-da" (the term varying somewhat from tribe to tribe), just as among the Algonquian tribes omnipotence was assigned to "ma-ni-do" ("Manito the Mighty" of "Hiawatha"); yet inquiry shows that waka^{n}da assumes various forms, and is rather a quality than a definite entity. Thus, among many of the tribes the sun is waka^{n}da—not *the* waka^{n}da or *a* waka^{n}da, but simply waka^{n}da; and among the same tribes the moon is waka^{n}da, and so is thunder, lightning, the stars, the winds, the cedar, and various other things; even a man, especially a shaman, might be waka^{n}da or a waka^{n}da. In addition the term was applied to mythic monsters of the earth, air, and waters; according to some of the sages the ground or earth, the mythic under-world, the ideal upper-world, darkness, etc, were waka^{n}da or waka^{n}das. So, too, the fetiches and the ceremonial objects and decorations were waka^{n}da among different tribes. Among some of the groups various animals and other trees besides the specially waka^{n}da cedar were regarded as waka^{n}das; as already noted, the horse, among the prairie tribes, was the waka^{n}da dog. In like manner many natural objects and places of striking character were considered waka^{n}da. Thus the term was applied to all sorts of entities and ideas, and was used (with or without inflectional variations) indiscriminately as substantive and adjective, and with slight modification as verb and adverb. Manifestly a term so protean is not susceptible of translation into the more highly differentiated language of civilization. Manifestly, too, the idea expressed by the term is indefinite, and can not justly be rendered into "spirit," much less into "Great Spirit;" though it is easy to under-

stand how the superficial inquirer, dominated by definite spiritual concept, handicapped by unfamiliarity with the Indian tongue, misled by ignorance of the vague prescriptorial ideation, and perhaps deceived by crafty native informants or mischievous interpreters, came to adopt and perpetuate the erroneous interpretation. The term may be translated into "mystery" perhaps more satisfactorily than into any other single English word, yet this rendering is at the same time much too limited and much too definite. As used by the Siouan Indian, waka^{n}da vaguely connotes also "power," "sacred," "ancient," "grandeur," "animate," "immortal," and other words, yet does not express with any degree of fullness and clearness the ideas conveyed by these terms singly or collectively—indeed, no English sentence of reasonable length can do justice to the aboriginal idea expressed by the term waka^{n}da.

While the beliefs of many of the Siouan tribes are lost through the extinction of the tribesmen or transformed through acculturation, it is fortunate that a large body of information concerning the myths and ceremonials of several prairie tribes has been collected. The records of Carver, Lewis and Clark, Say, Catlin, and Prince Maximilian are of great value when interpreted in the light of modern knowledge. More recent researches by Miss Fletcher[1] and by Dorsey[2] are of especial value, not only as direct sources of information but as a means of interpreting the earlier writings. From these records it appears that, in so far as they grasped the theistic concept, the Siouan Indians were polytheists; that their mysteries or deities varied in rank and power; that some were good but more were bad, while others combined bad and good attributes; that they assumed various forms, actual and imaginary; and that their dispositions and motives resembled those found among mankind.

The organization of the vague Siouan thearchy appears to have varied from group to group. Among all of the tribes whose beliefs are known, the sun was an important waka^{n}da, perhaps the leading one potentially, though usually of less immediate consideration than certain others, such as thunder, lightning, and the cedar tree; among the Osage the sun was invoked as "grandfather," and among various tribes there were sun ceremonials, some of which are still maintained; among the Omaha and Ponka, according to Miss Fletcher, the mythic thunder-bird plays a prominent, perhaps dominant rôle, and the cedar tree or pole is deified as its tangible representative. The moon was waka^{n}da among the Osage and the stars among the Omaha and Ponka, yet they seem to have occupied subordinate positions; the winds and the four quarters were apparently given higher rank; and, in individual cases, the mythic water-monsters or earth-deities seem to have occupied leading positions. On the whole, it may be safe to consider the

[1] Several of these are summarized in "The emblematic use of the tree in the Dakota group," Science, n. s., vol. IV, 1896, pp. 475-487.

[2] Notably "A Study of Siouan Cults," Seventh Annual Report of the Bureau of Ethnology, for 1889-90 (1894), pp. 351-544.

sun as the Siouan arch-mystery, with the mythic thunder-bird or family of thunder-birds as a sort of mediate link between the mysteries and men, possessing less power but displaying more activity in human affairs than the remoter waka^{n}da of the heavens. Under these controlling waka^{n}das, other members of the series were vaguely and variably arranged. Somewhere in the lower ranks, sacred animals—especially sports, such as the white buffalo cow—were placed, and still lower came totems and shamans, which, according to Dorsey, were reverenced rather than worshiped. It is noteworthy that this thearchic arrangement corresponded in many respects with the hierarchic social organization of the stock.

The Siouan thearchy was invoked and adored by means of forms and ceremonies, as well as through orisons. The set observances were highly elaborate; they comprised dancing and chanting, feasting and fasting, and in some cases sacrifice and torture, the shocking atrocities of the Mandan and Minitari rites being especially impressive. From these great collective devotions the ceremonials graded down through war-dance and hunting-feast to the terpsichorean grace extolled by Carver, and to individual fetich worship. In general the adoration expressed fear of the evil rather than love of the good—but this can hardly be regarded as a distinctive feature, much less a peculiar one.

Some of the mystery places were especially distinctive and noteworthy. Foremost among them was the sacred pipestone quarry near Big Sioux river, whence the material for the waka^{n}da calumet was obtained; another was the far-famed Minne-waka^{n} of North Dakota, not aptly translated "Devil's lake;" a third was the mystery-rock or medicine-rock of the Mandan and Hidatsa near Yellowstone river; and there were many others of less importance. About all of these places picturesque legends and myths clustered.

The Siouan mythology is especially instructive, partly because so well recorded, partly because it so clearly reflects the habits and customs of the tribesmen and thus gives an indirect reflection of a well-marked environment. As among so many peoples, the sun is a prominent element; the ice monsters of the north and the rain-myths of the arid region are lacking, and are replaced by the frequent thunder and the trees shaken by the storm-winds; the mythic creatures are shaped in the image of the indigenous animals and birds; the myths center in the local rocks and waters; the mysterious thearchy corresponds with the tribal hierarchy, and the attributes ascribed to the deities are those characteristic of warriors and hunters.

Considering the mythology in relation to the stages in development of mythologic philosophy, it appears that the dominant beliefs, such as those pertaining to the sun and the winds, represent a crude physitheism, while vestiges of hecastotheism crop out in the object-worship and place-worship of the leading tribes and in other features. At the

same time well-marked zootheistic features are found in the mythic thunder-birds and in the more or less complete deification of various animals, in the exaltation of the horse into the rank of the mythic dog father, and in the animal forms of the water-monsters and earth-beings; and the living application of zootheism is found in the animal fetiches and totems. On the whole, it seems just to assign the Siouan mythology to the upper strata of zootheism, just verging on physitheism, with vestigial traces of hecastotheism.

SOMATOLOGY

The vigorous avocations of the chase and war were reflected in fine stature, broad and deep chests, strong and clean limbs, and sound constitution among the Siouan tribesmen and their consorts. The skin was of the usual coppery cast characteristic of the native American; the teeth were strong, indicating and befitting a largely carnivorous diet, little worn by sandy foods, and seldom mutilated; the hands and feet were commonly large and sinewy. The Siouan Indians were among those who impressed white pioneers by the parallel placing of the feet; for, as among other walkers and runners, who rest sitting and lying, the feet assumed the pedestrian attitude of approximate parallelism rather than the standing attitude of divergence forward. The hair was luxuriant, stiff, straight, and more uniformly jet black than that of the southerly stocks; it was worn long by the women and most of the men, though partly clipped or shaved in some tribes by the warriors as well as the worthless dandies, who, according to Catlin, spent more time over their toilets than ever did the grande dame of Paris. The women were beardless and the men more or less nearly so; commonly the men plucked out by the roots the scanty hair springing on their faces, as did both sexes that on other parts of the body. The crania were seldom deformed artificially save through cradle accident, and while varying considerably in capacity and in the ratio of length to width were usually mesocephalic. The facial features were strong, yet in no way distinctly unlike those found among neighboring peoples.

Since the advent of white men the characteristics of the Siouan Indians, like those of other tribes, have been somewhat modified, partly through infusion of Caucasian blood but chiefly through acculturation. With the abandonment of hunting and war and the tardy adoption of a slothful, semidependent agriculture, the frame has lost something of its stalwart vigor; with the adaptation of the white man's costume and the incomplete assimilation of his hygiene, various weaknesses and disorders have been developed; and through imitation the erstwhile luxuriant hair is cropped, and the beard, made scanty through generations of extirpation, is commonly cultivated. Although the acultural condition of the Siouan survivors ranges from the essentially primitive status of the Asiniboin to the practical civilization of the representatives of several tribes, it is fair to consider the stock in a

state of transition from barbarism to civilization; and many of the tribesmen are losing the characteristics of activity and somatic development normal to primitive life, while they have not yet assimilated the activities and acquired the somatic characteristics normal to peaceful sedentary life.

Briefly, certain somatic features of the Siouan Indians, past and present, may be traced to their causes in custom and exercise of function; yet by far the greater number of the features are common to the American people or to all mankind, and are of ill-understood significance. The few features of known cause indicate that special somatic characteristics are determined largely or wholly by industrial and other arts, which are primarily shaped by environment.

HABITAT

Excepting the Asiniboin, who are chiefly in Canada, nearly all of the Siouan Indians are now gathered on the reservations indicated on earlier pages, most of these reservations lying within the aboriginal territory of the stock.

At the advent of white men, the Siouan territory was vaguely defined, and its limits were found to vary somewhat from exploration to exploration. This vagueness and variability of habitat grew out of the characteristics of the tribesmen. Of all the great stocks south of the Arctic, the Siouan was perhaps least given to agriculture, most influenced by hunting, and most addicted to warfare; thus most of the tribes were but feebly attached to the soil, and freely followed the movements of the feral fauna as it shifted with climatic vicissitudes or was driven from place to place by excessive hunting or by fires set to destroy the undergrowth in the interests of the chase; at the same time, the borderward tribes were alternately driven and led back and forth through strife against the tribes of neighboring stocks. Accordingly the Siouan habitat can be outlined only in approximate and somewhat arbitrary fashion.

The difficulty in defining the priscan home of the Siouan tribes is increased by its vast extent and scant peopling, by the length of the period intervening between discovery in the east and complete exploration in the west, and by the internal changes and migrations which occurred during this period. The task of collating the records of exploration and pioneer observation concerning the Siouan and other stocks was undertaken by Powell a few years ago, and was found to be of great magnitude. It was at length successfully accomplished, and the respective areas occupied by the several stocks were approximately mapped.[1]

As shown on Powell's map, the chief part of the Siouan area comprised a single body covering most of the region of the Great plains,

[1] Seventh Annual Report of the Bureau of Ethnology, for 1885-86 (1891), pp. 1-142, and map

stretching from the Rocky mountains to the Mississippi and from the Arkansas-Red river divide nearly to the Saskatchewan, with an arm crossing the Mississippi and extending to Lake Michigan. In addition there were a few outlying bodies, the largest and easternmost bordering the Atlantic from Santee river nearly to Capes Lookout and Hatteras, and skirting the Appalachian range northward to the Potomac; the next considerable area lay on the Gulf coast about Pascagoula river and bay, stretching nearly from the Pearl to the Mobile; and there were one or two unimportant areas on Ohio river, which were temporarily occupied by small groups of Siouan Indians during recent times.

There is little probability that the Siouan habitat, as thus outlined, ran far into the prehistoric age. As already noted, the Siouan Indians of the plains were undoubtedly descended from the Siouan tribes of the east (indeed the Mandan had a tradition to that effect); and reason has been given for supposing that the ancestors of the prairie hunters followed the straggling buffalo through the cis-Mississippi forests into his normal trans-Mississippi habitat and spread over his domain save as they were held in check by alien huntsmen, chiefly of the warlike Caddoan and Kiowan tribes; and the buffalo itself was a geologically recent—indeed essentially post-glacial—animal. Little if any definite trace of Siouan occupancy has been found in the more ancient prehistoric works of the Mississippi valley. On the whole it appears probable that the prehistoric development of the Siouan stock and habitat was exceptionally rapid, that the Siouan Indians were a vigorous and virile people that arose quickly under the stimulus of strong vitality (the acquisition of which need not here be considered), coupled with exceptionally favorable opportunity, to a power and glory culminating about the time of discovery.

ORGANIZATION

The demotic organization of the Siouan peoples, so far as known, is set forth in considerable detail in Mr Dorsey's treatises[1] and in the foregoing enumeration of tribes, confederacies, and other linguistic groups.

Like the other aborigines north of Mexico, the Siouan Indians were organized on the basis of kinship, and were thus in the stage of tribal society. All of the best-known tribes had reached that plane in organization characterized by descent in the male line, though many vestiges and some relatively unimportant examples of descent in the female line have been discovered. Thus the clan system was obsolescent and the gentile system fairly developed; i. e., the people were practically out of the stage of savagery and well advanced in the stage of barbarism.

[1] Chiefly "Omaha Sociology," Third Ann. Rep. Bur. Eth., for 1881–82 (1884), pp. 205–370, "A study of Siouan cults," Eleventh Ann. Rep. Bur. Eth., for 1889–90 (1894), pp. 351–544, and that printed on the following pages.

Confederation for defense and offense was fairly defined and was strengthened by intermarriage between tribes and gentes and the prohibition of marriage within the gens; yet the organization was such as to maintain tribal autonomy in considerable degree; i. e., the social structure was such as to facilitate union in time of war and division into small groups adapted to hunting in times of peace. No indication of feudalism has been found in the stock.

The government was autocratic, largely by military leaders sometimes (particularly in peace) advised by the elders and priests; the leadership was determined primarily by ability—prowess in war and the chase and wisdom in the council,—and was thus hereditary only a little further than characteristics were inherited; indeed, excepting slight recognition of the divinity that doth hedge about a king, the leaders were practically self chosen, arising gradually to the level determined by their abilities. The germ of theocracy was fairly developed, and apparently burgeoned vigorously during each period of peace, only to be checked and withered during the ensuing war when the shamans and their craft were forced into the background.

During recent years, since the tribes began to yield to the domination of the peace-loving whites, the government and election are determined chiefly by kinship, as appears from Dorsey's researches; yet definite traces of the militant organization appear, and any man can win name and rank in his gens, tribe, or confederacy by bravery or generosity.

The institutional connection between the Siouan tribes of the plains and those of the Atlantic slope and the Gulf coast is completely lost, and it is doubtful whether the several branches have ever been united in a single confederation (or "nation," in the language of the pioneers), at least since the division in the Appalachian region perhaps five or ten centuries ago. Since this division the tribes have separated widely, and some of the bloodiest wars of the region in the historic period have been between Siouan tribes; the most extensive union possessing the slightest claim to federal organization was the great Dakota confederacy, which was grown into instability and partial disruption; and most of the tribal unions and coalitions were of temporary character.

Although highly elaborate (perhaps because of this character), the Siouan organization was highly unstable; with every shock of conflict, whether intestine or external, some autocrats were displaced or slain; and after each important event—great battle, epidemic, emigration, or destructive flood—new combinations were formed. The undoubtedly rapid development of the stock, especially after the passage of the Mississippi, indicates growth by conquest and assimilation as well as by direct propagation (it is known that the Dakota and perhaps other groups adopted aliens regularly); and, doubtless for this reason in part, there was a strong tendency toward differentiation and dichotomy in the demotic growth. In some groups the history is too vague to indicate this tendency with certainty; in others the tendency is clear.

Perhaps the best example is found in the Quegiha, which divided into two great branches, the stronger of which threw off minor branches in the Osage and Kansa, and afterward separated into the Omaha and Ponka, while the feebler branch also ramified widely; and only less notable is the example of the Winnebago trunk, with its three great branches in the Iowa, Oto, and Missouri. This strong divergent tendency in itself suggests rapid, perhaps abnormally rapid, growth in the stock; for it outran and partially concealed the tendency toward convergence and ultimate coalescence which characterizes demotic phenomena.

The half-dozen eastern stocks occupying by far the greater part of North America contrast strongly with the half-hundred local stocks covering the Pacific coast; and none of the strong Atlantic stocks is more characteristic, more sharply contrasted with the limited groups of the western coast, or better understood as regards organization and development, than the great Siouan stock of the northern interior. There is promise that, as the demology of aboriginal America is pushed forward, the records relating to the Siouan Indians and especially to their structure and institutions will aid in explaining why some stocks are limited and others extensive, why large stocks in general characterize the interior and small stocks the coasts, and why the dominant peoples of the fifteenth and sixteenth centuries were successful in displacing the preexistent and probably more primitive peoples of the Mississippi valley. While the time is not yet ripe for making final answer to these inquiries, it is not premature to suggest a relation between a peculiar development of the aboriginal stocks and a peculiar geographic conformation: In general the coastward stocks are small, indicating a provincial shoreland habit, yet their population and area commonly increase toward those shores indented by deep bays, along which maritime and inland industries naturally blend; so (confining attention to eastern United States) the extensive Muskhogean stock stretches inland from the deep-bayed eastern Gulf coast; and so, too, three of the largest stocks on the continent (Algonquian, Iroquoian, Siouan) stretch far into the interior from the still more deeply indented Atlantic coast. In two of these cases (Iroquoian and Siouan) history and tradition indicate expansion and migration from the land of bays between Cape Lookout and Cape May, while in the third there are similar (though perhaps less definite) indications of an inland drift from the northern Atlantic bays and along the Laurentian river and lakes.

HISTORY[1]

DAKOTA-ASINIBOIN

The Dakota are mentioned in the Jesuit Relations as early as 1639–40; the tradition is noted that the Ojibwa, on arriving at the Great Lakes in an early migration from the Atlantic coast, encountered representatives

[1] Taken chiefly from notes and manuscripts prepared by Mr Dorsey.

of the great confederacy of the plains. In 1641 the French voyageurs met the Potawatomi Indians flying from a nation called Nadawessi (enemies); and the Frenchmen adopted the alien name for the warlike prairie tribes. By 1658 the Jesuits had learned of the existence of thirty Dakota villages west-northwest from the Potawatomi mission St Michel; and in 1689 they recorded the presence of tribes apparently representing the Dakota confederacy on the upper Mississippi, near the mouth of the St Croix. According to Croghan's History of Western Pennsylvania, the "Sue" Indians occupied the country southwest of Lake Superior about 1759; and Dr T. S. Williamson, "the father of the Dakota mission," states that the Dakota must have resided about the confluence of the Mississippi and the Minnesota or St Peters for at least two hundred years prior to 1860.

According to traditions collected by Dorsey, the Teton took possession of the Black Hills region, which had previously been occupied by the Crow Indians, long before white men came; and the Yankton and Yanktonnai, which were found on the Missouri by Lewis and Clark, were not long removed from the region about Minnesota river. In 1862 the Santee and other Dakota tribes united in a formidable outbreak in which more than 1,000 whites were massacred or slain in battle. Through this outbreak and the consequent governmental action toward the control and settlement of the tribes, much was learned concerning the characteristics of the people, and various Indian leaders became known; Spotted Tail, Red Cloud, Crazy Horse, Sitting Bull, American Horse, and Even-his-horse-is-feared (commonly miscalled Man-afraid-of-his-horses) were among the famous Dakota chiefs and warriors, notable representatives of a passing race, whose names are prominent in the history of the country. Other outbreaks occurred, the last of note resulting from the ghost-dance fantasy in 1890–91, which fortunately was quickly suppressed. Yet, with slight interruptions, the Dakota tribes in the United States were steadily gathered on reservations. Some 800 or more still roam the prairies north of the international boundary, but the great body of the confederacy, numbering nearly 28,000, are domiciled on reservations (already noted) in Minnesota, Montana, Nebraska, North Dakota, and South Dakota.

The separation of the Asiniboin from the Wazi-kute gens of the Yanktonai apparently occurred before the middle of the seventeenth century, since the Jesuit relation of 1658 distinguishes between the Ponalak or Guerriers (undoubtedly the Dakota proper) and the Assiniponalak or Guerriers de pierre. The Asiniboin are undoubtedly the Essanape (Essanapi or Assinapi) who were next to the Makatapi (Dakota) in the Walam-Olum record of the Lenni-Lenape or Delaware. In 1680 Hennepin located the Asniboin northeast of the Issati (Isanyati or Santee) who were on Knife lake (Minnesota); and the Jesuit map of 1681 placed them on Lake of-the-Woods, then called "L. Assineponalaes." La Hontan claimed to have visited the Eokoro (Arikara)

in 1689–90, when the Essanape were sixty leagues above; and Perrot's Mémoire refers to the Asiniboin as a Sioux tribe which, in the seventeenth century, seceded from their nation and took refuge among the rocks of Lake-of-the-Woods. Chauvignerie located some of the tribe south of Onnipigan (Winnipeg) lake in 1736, and they were near Lake-of-the-Woods as late as 1766, when they were said to have 1,500 warriors. It is well known that in 1829 they occupied a considerable territory west of the Dakota and north of Missouri river, with a population estimated at 8,000; and Drake estimated their number at 10,000 before the smallpox epidemic of 1838, which is said to have carried off 4,000. From this blow the tribe seems never to have fully recovered, and now numbers probably no more than 3,000, mostly in Canada, where they continue to roam the plains they have occupied for half a century.

¢EGIHA

According to tribal traditions collected by Dorsey, the ancestors of the Omaha, Ponka, Kwapa, Osage, and Kansa were originally one people dwelling on Ohio and Wabash rivers, but gradually working westward. The first separation took place at the mouth of the Ohio, when those who went down the Mississippi became the Kwapa or Down-stream People, while those who ascended the great river became the Omaha or Up-stream People. This separation must have occurred at least as early as 1500, since it preceded De Soto's discovery of the Mississippi.

The Omaha group (from whom the Osage, Kansa, and Ponka were not yet separated) ascended the Mississippi to the mouth of the Missouri, where they remained for some time, though war and hunting parties explored the country northwestward, and the body of the tribe gradually followed these pioneers, though the Osage and Kansa were successively left behind. Some of the pioneer parties discovered the pipestone quarry, and many traditions cling about this landmark. Subsequently they were driven across the Big Sioux by the Yankton Indians, who then lived toward the confluence of the Minnesota and Mississippi. The group gradually differentiated and finally divided through the separation of the Ponka, probably about the middle of the seventeenth century. The Omaha gathered south of the Missouri, between the mouths of the Platte and Niobrara, while the Ponka pushed into the Black Hills country.

The Omaha tribe remained within the great bend of the Missouri, opposite the mouth of the Big Sioux, until white men came. Their hunting ground extended westward and southwestward, chiefly north of the Platte and along the Elkhorn, to the territory of the Ponka and the Pawnee (Caddoan); and in 1766 Carver met their hunting parties on Minnesota river. Toward the end of the eighteenth century they were nearly destroyed by smallpox, their number having been reduced from about 3,500 to but little over 300 when they were visited by Lewis

and Clark, their famous chief Blackbird being one of those carried off by the epidemic. Subsequently they increased in numbers; in 1890 their population was about 1,200. They are now on reservations, mostly owning land in severalty, and are citizens of the United States and of the state of Nebraska.

Although the name Ponka did not appear in history before 1700 it must have been used for many generations earlier, since it is an archaic designation connected with the social organization of several tribes and the secret societies of the Osage and Kansa, as well as the Ponka. In 1700 the Ponka were indicated on De l'Isle's map, though they were not then segregated territorially from the Omaha. They, too, suffered terribly from the smallpox epidemic, and when met by Lewis and Clark in 1804 numbered only about 200. They increased rapidly, reaching about 600 in 1829 and some 800 in 1842; in 1871, when they were first visited by Dorsey, they numbered 747. Up to this time the Ponka and Dakota were amicable; but a dispute grew out of the cession of lands, and the Teton made annual raids on the Ponka until the enforced removal of the tribe to Indian Territory took place in 1877. Through this warfare, more than a quarter of the Ponka lost their lives. The displacement of this tribe from lands owned by them in fee simple attracted attention, and a commission was appointed by President Hayes in 1880 to inquire into the matter; the commission, consisting of Generals Crook and Miles and Messrs William Stickney and Walter Allen, visited the Ponka settlements in Indian Territory and on the Niobrara and effected a satisfactory arrangement of the affairs of the tribe, through which the greater portion (some 600) remained in Indian Territory, while some 225 kept their reservation in Nebraska.

When the Ꞓegiha divided at the mouth of the Ohio, the ancestors of the Osage and Kansa accompanied the main Omaha body up the Mississippi to the mouth of Osage river. There the Osage separated from the group, ascending the river which bears their name. They were distinguished by Marquette in 1673 as the "Ouchage" and "Autrechaha," and by Penicaut in 1719 as the "Huzzau," "Ous," and "Wawha." According to Croghan, they were, in 1759, on "White creek, a branch of the Mississippi," with the "Grand Tuc;" but "White creek" (or White water) was an old designation for Osage river, and "Grand Tuc" is, according to Mooney, a corruption of "Grandes Eaux," or Great Osage; and there is accordingly no sufficient reason for supposing that they returned to the Mississippi. Toward the close of the eighteenth century the Osage and Kansa encountered the Comanche and perhaps other Shoshonean peoples, and their course was turned southward; and in 1817, according to Brown, the Great Osage and Little Osage were chiefly on Osage and Arkansas rivers, in four villages. In 1829 Porter described their country as beginning 25 miles west of the Missouri line and running to the Mexican line of that date, being 50 miles wide; and he gave their number as 5,000. According to

Schoolcraft, they numbered 3,758 in April, 1853, but this was after the removal of an important branch known as Black Dog's band to a new locality farther down Verdigris river. In 1850 the Osage occupied at least seven large villages, besides numerous small ones, on Neosho and Verdigris rivers. In 1873, when visited by Dorsey, they were gathered on their reservations in what is now Oklahoma. In 1890 they numbered 158.

The Kansa remained with the Up stream People in their gradual ascent of the Missouri to the mouth of the Kaw or Kansas, when they diverged westward; but they soon came in contact with inimical peoples, and, like the Osage, were driven southward. The date of this divergence is not fixed, but it must have been after 1723, when Bourgmont mentioned a large village of "Quaus" located on a small river flowing northward thirty leagues above Kaw river, near the Missouri. After the cession of Louisiana to the United States, a treaty was made with the Kansa Indians, who were then on Kaw river, at the mouth of the Saline, having been forced back from the Missouri by the Dakota; they then numbered about 1,500 and occupied about thirty earth lodges. In 1825 they ceded their lands on the Missouri to the Government, retaining a reservation on the Kaw, where they were constantly subjected to attacks from the Pawnee and other tribes, through which large numbers of their warriors were slain. In 1846 they again ceded their lands and received a new reservation on Neosho river in Kansas. This was soon overrun by settlers, when another reservation was assigned to them in Indian Territory, near the Osage country. By 1890 their population was reduced to 214.

The Kwapa were found by De Soto in 1541 on the Mississippi above the mouth of the St Francis, and, according to Marquette's map, they were partly east of the Mississippi in 1673. In 1681 La Salle found them in three villages distributed along the Mississippi, and soon afterward Tonty mentioned four villages, one (Kappa=Uqaqpaqti, "Real Kwapa") on the Mississippi and three (Toyengan=Ta^{n}wa^{n}-jiqa, "Small Village"; Toriman=Ti-nad¢iman, and Osotonoy=Uzutiuwe) inland; this observation was verified by Dorsey in 1883 by the discovery that these names are still in use. In early days the Kwapa were known as "Akansa," or Arkansa, first noted by La Metairie in 1682. It is probable that this name was an Algonquian designation given because of confusion with, or recognition of affinity to, the Kansa or Ka^{n}ze, the prefix "a" being a common one in Algonquian appellations. In 1687 Joutel located two of the villages of the tribe on the Arkansas and two on the Mississippi, one of the latter being on the eastern side. According to St Cosme, the greater part of the tribe died of smallpox in October, 1699. In 1700 De l'Isle placed the principal "Acansa" village on the southern side of Arkansas river; and, according to Gravier, there were in 1701 five villages, the largest, Imaha (Omaha), being highest on the Arkansas. In 1805 Sibley placed the "Arkensa"

in three villages on the southern side of Arkansas river, about 12 miles above Arkansas post. They claimed to be the original proprietors of the country bordering the Arkansas for 300 miles, or up to the confluence of the Cadwa, above which lay the territory of the Osage. Subsequently the Kwapa affiliated with the Caddo Indians, though of another stock; according to Porter they were in the Caddo country in 1829. As reservations were established, the Kwapa were re-segregated, and in 1877 were on their reservation in northwestern Indian Territory; but most of them afterward scattered, chiefly to the Osage country, where in 1890 they were found to number 232.

ŁOIWE'RE

The ancestry and prehistoric movements of the tribes constituting this group are involved in considerable obscurity, though it is known from tradition as well as linguistic affinity that they sprung from the Winnebago.

Since the days of Marquette (1673) the Iowa have ranged over the country between the Mississippi and Missouri, up to the latitude of Oneota (formerly upper Iowa) river, and even across the Missouri about the mouth of the Platte. Chauvignerie located them in 1736 west of the Mississippi and (probably through error in identification of the waterway) south of the Missouri; and in 1761 Jefferys placed them between Missouri river and the headwaters of Des Moines river, above the Oto and below the Maha (Omaha). In 1805, according to Drake, they dwelt on Des Moines river, forty leagues above its mouth, and numbered 800. In 1811 Pike found them in two villages on Des Moines and Iowa rivers. In 1815 they were decimated by smallpox, and also lost heavily through war against the tribes of the Dakota confederacy. In 1829 Porter placed them on the Little Platte, some 15 miles from the Missouri line, and about 1853 Schoolcraft located them on Nemaha river, their principal village being near the mouth of the Great Nemaha. In 1848 they suffered another epidemic of smallpox, by which 100 warriors, besides women and children, were carried off. As the country settled, the Iowa, like the other Indians of the stock, were collected on reservations which they still occupy in Kansas and Oklahoma. According to the last census their population was 273.

The Missouri were first seen by Tonty about 1670; they were located near the Mississippi on Marquette's map (1673) under the name of Ouemessourit, probably a corruption of their name by the Illinois tribe, with the characteristic Algonquian prefix. The name Missouri was first used by Joutel in 1687. In 1723 Bourgmont located their principal village 30 leagues below Kaw river and 60 leagues below the chief settlement of the Kansa; according to Croghan, they were located on Mississippi river opposite the Illinois country in 1759. Although the early locations are somewhat indefinite, it seems certain that the tribe formerly dwelt on the Mississippi about the mouth of

the Missouri, and that they gradually ascended the latter stream, remaining for a time between Grand and Chariton rivers and establishing a town on the left bank of the Missouri near the mouth of the Grand. There they were found by French traders, who built a fort on an island quite near their village about the beginning of the eighteenth century. Soon afterward they were conquered and dispersed by a combination of Sac, Fox, and other Indians; they also suffered from smallpox. On the division, five or six lodges joined the Osage, two or three took refuge with the Kansa, and most of the remainder amalgamated with the Oto. In 1805 Lewis and Clark found a part of the tribe, numbering about 300, south of Platte river. The only known survivors in 1829 were with the Oto, when they numbered no more than 80. In 1842 their village stood on the southern bank of Platte river near the Oto settlement, and they followed the latter tribe to Indian Territory in 1882.

According to Winnebago tradition, the Ļoiwe're tribes separated from that "People of the parent speech" long ago, the Iowa being the first and the Oto the last to leave. In 1673 the Oto were located by Marquette west of Missouri river, between the fortieth and fortyfirst parallels; in 1680 they were 130 leagues from the Illinois, almost opposite the mouth of the Miskoncing (Wisconsin), and in 1687 they were on Osage river. According to La Hontan they were, in 1690, on Otontas (Osage) river; and in 1698 Hennepin placed them ten days' journey from Fort Crève Coeur. Iberville, in 1700, located the Iowa and Oto with the Omaha, between Wisconsin and Missouri rivers, about 100 leagues from the Illinois tribe; and Charlevoix, in 1721, fixed the Oto habitat as below that of the Iowa and above that of the Kansa on the western side of the Missouri. Dupratz mentions the Oto as a small nation on Missouri river in 1758, and Jefferys (1761) described them as occupying the southern bank of the Panis (Platte) between its mouth and the Pawnee territory; according to Porter, they occupied the same position in 1829. The Oto claimed the land bordering the Platte from their village to the mouth of the river, and also that on both sides of the Missouri as far as the Big Nemaha. In 1833 Catlin found the Oto and Missouri together in the Pawnee country; about 1841 they were gathered in four villages on the southern side of the Platte, from 5 to 18 miles above its mouth. In 1880 a part of the tribe removed to the Sac and Fox reservation in Indian Territory, where they still remain; in 1882 the rest of the tribe, with the remnant of the Missouri, emigrated to the Ponka, Pawnee, and Oto reservation in the present Oklahoma, where, in 1890 they were found to number 400.

WINNEBAGO

Linguistieally the Winnebago Indians are closely related to the Ļoiwe're on the one side and to the Mandan on the other. They were first mentioned in the Jesuit Relation of 1636, though the earliest

known use of the name Winnebago occurs in the Relation of 1640; Nicollet found them on Green bay in 1639. According to Shea, the Winnebago were almost annihilated by the Illinois (Algonquian) tribe in early days, and the historical group was made up of the survivors of the early battles. Chauvignerie placed the Winnebago on Lake Superior in 1736, and Jefferys referred to them and the Sac as living near the head of Green bay in 1761; Carver mentions a Winnebago village on a small island near the eastern end of Winnebago lake in 1778. Pike enumerated seven Winnebago villages existing in 1811; and in 1822 the population of the tribe was estimated at 5,800 (including 900 warriors) in the country about Winnebago lake and extending thence southwestward to the Mississippi. By treaties in 1825 and 1832 they ceded their lands south of Wisconsin and Fox rivers for a reservation on the Mississippi above the Oneota; one of their villages in 1832 was at Prairie la Crosse. They suffered several visitations of smallpox; the third, which occurred in 1836, carried off more than a quarter of the tribe. A part of the people long remained widely distributed over their old country east of the Mississippi and along that river in Iowa and Minnesota; in 1840 most of the tribe removed to the neutral ground in the then territory of Iowa; in 1846 they surrendered their reservation for another above the Minnesota, and in 1856 they were removed to Blue Earth, Minnesota. Here they were mastering agriculture, when the Sioux war broke out and the settlers demanded their removal. Those who had taken up farms, thereby abandoning tribal rights, were allowed to remain, but the others were transferred to Crow creek, on Missouri river, whence they soon escaped. Their privations and sufferings were terrible: out of 2,000 taken to Crow creek only 1,200 reached the Omaha reservation, whither most of them fled. They were assigned a new reservation on the Omaha lands, where they now remain, occupying lands allotted in severalty. In 1890 there were 1,215 Winnebago on the reservation, but nearly an equal number were scattered over Minnesota, Iowa, Wisconsin, and Michigan, where they now live chiefly by agriculture, with a strong predilection for hunting.

MANDAN

The Mandan had a vague tradition of emigration from the eastern part of the country, and Lewis and Clark, Prince Maximilian, and others found traces of Mandan house-structures at various points along the Missouri; thus they appear to have ascended that stream before the advent of the Ȼegiha. During the historical period their movements were limited; they were first visited in the upper Missouri country by Sieur de la Verendrye in 1738. About 1750 they established two villages on the eastern side and seven on the western side of the Missouri, near the mouth of Heart river. Here they were assailed by the Asiniboin and Dakota and attacked by smallpox, and were greatly reduced; the two eastern villages consolidated, and the people

migrated up the Missouri to a point 1,430 miles above its mouth (as subsequently determined by Lewis and Clark); the seven villages were soon reduced to five, and these people also ascended the river and formed two villages in the Arikara country, near the Mandan of the eastern side, where they remained until about 1766, when they also consolidated. Thus the once powerful and populous tribe was reduced to two villages which, in 1804, were found by Lewis and Clark on opposite banks of the Missouri, about 4 miles below Knife river. Here for a time the tribe waxed and promised to regain the early prestige, reaching a population of 1,600 in 1837; but in that year they were again attacked by smallpox and almost annihilated, the survivors numbering only 31 according to one account, or 125 to 145 according to others. After this visitation they united in one village. When the Hidatsa removed from Knife river in 1845, some of the Mandan accompanied them, and others followed at intervals as late as 1858, when only a few still remained at their old home. In 1872 a reservation was set apart for the Hidatsa and Arikara and the survivors of the Mandan on Missouri and Yellowstone rivers in Dakota and Montana, but in 1886 the reservation was reduced. According to the census returns, the Mandan numbered 252 in 1890.

HIDATSA

There has been much confusion concerning the definition and designation of the Hidatsa Indians. They were formerly known as Minitari or Gros Ventres of the Missouri, in distinction from the Gros Ventres of the plains, who belong to another stock. The origin of the term Gros Ventres is somewhat obscure, and various observers have pointed out its inapplicability, especially to the well-formed Hidatsa tribesmen. According to Dorsey, the French pioneers probably translated a native term referring to a traditional buffalo paunch, which occupies a prominent place in the Hidatsa mythology and which, in early times, led to a dispute and the separation of the Crow from the main group some time in the eighteenth century.

The earlier legends of the Hidatsa are vague, but there is a definite tradition of a migration northward, about 1765, from the neighborhood of Heart river, where they were associated with the Mandan, to Knife river. At least as early as 1796, according to Matthews, there were three villages belonging to this tribe on Knife river—one at the mouth, another half a mile above, and the third and largest 3 miles from the mouth. Here the people were found by Lewis and Clark in 1804, and here they remained until 1837, when the scourge of smallpox fell and many of the people perished, the survivors uniting in a single village. About 1845 the Hidatsa and a part of the Mandan again migrated up the Missouri, and established a village 30 miles by land and 60 miles by water above their old home, within what is now Fort Berthold reservation. Their population has apparently varied greatly, partly by

reason of the ill definition of the tribe by different enumerators, partly by reason of the inroads of smallpox. In 1890 they numbered 522.

The Crow people are known by the Hidatsa as Kiliatsa (They-refused-the-paunch), according to Matthews; and Dorsey points out that their own name, Absaruke, does not mean "crow," but refers to a variety of hawk. Lewis and Clark found the tribe in four bands. In 1817 Brown located them on Yellowstone river. In 1829 they were described by Porter as ranging along Yellowstone river on the eastern side of the Rocky mountains, and numbered at 4,000; while in 1834, according to Drake, they occupied the southern branch of the Yellowstone, about the fortysixth parallel and one hundred and fifth meridian, with a population of 4,500. In 1842 their number was estimated at 4,000, and they were described as inhabiting the headwaters of the Yellowstone. They have since been duly gathered on the Crow reservation in Montana, and are slowly adopting civilization. In 1890 they numbered 2,287.

THE EASTERN AND SOUTHERN TRIBES

The history of the Monakan, Catawba, Sara, Pedee, and Santee, and incidentally that of the Biloxi, has been carefully reviewed in a recent publication by Mooney,[1] and does not require repetition.

GENERAL MOVEMENTS

On reviewing the records of explorers and pioneers and the few traditions which have been preserved, the course of Siouan migration and development becomes clear. In general the movements were westward and northwestward. The Dakota tribes have not been traced far, though several of them, like the Yanktonnai, migrated hundreds of miles from the period of first observation to the end of the eighteenth century; then came the Mandan, according to their tradition, and as they ascended the Missouri left traces of their occupancy scattered over 1,000 miles of migration; next the Ofegiha descended the Ohio and passed from the cis-Mississippi forests over the trans-Mississippi plains—the stronger branch following the Mandan, while the lesser at first descended the great river and then worked up the Arkansas into the buffalo country until checked and diverted by antagonistic tribes. So also the Ioiwere, first recorded near the Mississippi, pushed 300 miles westward; while the Winnebago gradually emigrated from the region of the Great Lakes into the trans-Mississippi country even before their movements were affected by contact with white men. In like manner the Hidatsa are known to have flowed northwestward many scores of miles; and the Asiniboin swept more rapidly across the plains from the place of their rebellion against the Yanktonnai, on the Mississippi, before they found final resting place on the Saskatchewan

[1] Siouan Tribes of the East, 1894.

plains 500 or 800 miles away. All of the movements were consistent and, despite intertribal friction and strife, measurably harmonious. The lines of movement, so far as they can be restored, are in full accord with the lines of linguistic evolution traced by Hale and Dorsey and Gatschet, and indicate that some five hundred or possibly one thousand years ago the tribesmen pushed over the Appalachians to the Ohio and followed that stream and its tributaries to the Mississippi (though there are faint indications that some of the early emigrants ascended the northern tributaries to the region of the Great Lakes); and that the human flood gained volume as it advanced and expanded to cover the entire region of the plains. The records concerning the movement of this great human stream find support in the manifest reason for the movement: the reason was the food quest by which all primitive men are led, and its end was the abundant fauna of the prairieland, with the buffalo at its head.

While the early population of the Siouan stock, when first the huntsmen crossed the Appalachians, may not be known, the lines of migration indicate that the people increased and multiplied amain during their long journey, and that their numbers culminated, despite external conflict and internal strife, about the beginning of written history, when the Siouan population may have been 100,000 or more. Then came war against the whites and the still more deadly smallpox, whereby the vigorous stock was checked and crippled and the population gradually reduced; but since the first shock, which occurred at different dates in different parts of the great region, the Siouan people have fairly held their own, and some branches are perhaps gaining in strength.

SOME FEATURES OF INDIAN SOCIOLOGY

As shown by Powell, there are two fundamentally distinct classes or stages in human society—(1) tribal society and (2) national society. National society characterizes civilization; primarily it is organized on a territorial basis, but as enlightenment grows the bases are multiplied. Tribal society is characteristic of savagery and barbarism; so far as known, all tribal societies are organized on the basis of kinship. The transfer from tribal society to national society is often, perhaps always, through feudalism, in which the territorial motive takes root and in which the kinship motive withers.

All of the American aborigines north of Mexico and most of those farther southward were in the stage of tribal society when the continents were discovered, though feudalism was apparently budding in South America, Central America, and parts of Mexico. The partly developed transitional stage may, for the present, be neglected, and American Indian sociology may be considered as representing tribal society or kinship organization.

The fundamental principles of tribal organization through kinship have been formulated by Powell; they are as follows:[1]

I. A body of kindred constituting a distinct body politic is divided into groups, the males into groups of brothers and the females into groups of sisters, on distinctions of generations, regardless of degrees of consanguinity; and the kinship terms used express relative age. In civilized society kinships are classified on distinctions of sex, distinctions of generations, and distinctions arising from degrees of consanguinity.

II. When descent is in the female line, the brother-group consists of natal brothers, together with all the materterate male cousins of whatever degree. Thus mother's sisters' sons and mother's mother's sisters' daughters' sons, etc, are included in a group with natal brothers. In like manner the sister-group is composed of natal sisters, together with all materterate female cousins of whatever degree.

III. When descent is in the male line, the brother-group is composed of natal brothers, together with all patruate male cousins of whatever degree, and the sister-group is composed of natal sisters, together with all patruate female cousins of whatever degree.

IV. The son of a member of a brother-group calls each one of the group, father; the father of a member of a brother-group calls each one of the group, son. Thus a father-group is coextensive with the brother-group to which the father belongs. A brother-group may also constitute a father-group and grandfather-group, a son-group and a grandson-group. It may also be a patruate-group and an avunculate-group. It may also be a patruate cousin-group and an avunculate cousin-group; and in general, every member of a brother-group has the same consanguineal relation to persons outside of the group as that of every other member.

Two postulates concerning primitive society, adopted by various ethnologic students of other countries, have been erroneously applied to the American aborigines; at the same time they have been so widely accepted as to demand consideration.

The first postulate is that primitive men were originally assembled in chaotic hordes, and that organized society was developed out of the chaotic mass by the segregation of groups and the differentiation of functions within each group. Now the American aborigines collectively represent a wide range in development, extending from a condition about as primitive as ever observed well toward the verge of feudalism, and thus offer opportunities for testing the postulate; and it has been found that when higher and lower stages representing any portion of the developmental succession are compared, the social organizations of the lower grade are no less definite, perhaps more definite, than those pertaining to the higher grade; so that when the history of demotic growth among the American Indians is traced backward, the organizations are found on the whole to grow more definite, albeit more simple. When the lines of development revealed through research are projected still farther toward their origin, they indicate an initial condition, directly antithetic to the postulated horde, in which the scant population was segregated in small discrete bodies, probably family groups; and that in each of these bodies there was a definite organization, while each group was practically independent of, and probably

[1] Third Annual Report of the Bureau of Ethnology, for 1881–82 (1884), pp. xliv–xlv.

inimical to, all other groups. The testimony of the observed institutions is corroborated by the testimony of language, which, as clearly shown by Powell,[1] represents progressive combination rather than continued differentiation, a process of involution rather than evolution. It would appear that the original definitely organized groups occasionally met and coalesced, whereby changes in organization were required; that these compound groups occasionally coalesced with other groups, both simple and compound, whereby they were elaborated in structure, always with some loss in definiteness and permanence; and that gradually the groups enlarged by incorporation, while the composite organization grew complex and variable to meet the ever-changing conditions. It would also appear that in some cases the corporeal growth outran the structural or institutional growth, when the bodies—clans, gentes, tribes, or confederacies—split into two or more fragments which continued to grow independently; yet that in general the progress of institutional development went forward through incorporation of peoples and differentiation of institutions. The same process was followed as tribal society passed into national society; and it is the same process which is today exalting national society into world society, and transforming simple civilization into enlightenment. Thus the evolution of social organization is from the simple and definite toward the complex and variable; or from the involuntary to the voluntary; or from the environment-shaped to the environment-shaping; or from the biotic to the demotic.

The second postulate, which may be regarded as a corollary of the first, is that the primary conjugal condition was one of promiscuity, out of which different forms of marriage were successively segregated. Now the wide range in institutional development exemplified by the American Indians affords unprecedented opportunities for testing this postulate also. The simplest demotic unit found among the aborigines is the clan or mother-descent group, in which the normal conjugal relation is essentially monogamous,[2] in which marriage is more or less strictly regulated by a system of prohibitions, and in which the chief conjugal regulation is commonly that of exogamy with respect to the clan; in higher groups, more deeply affected by contact with neighboring peoples, the simple clan organization is sometimes found to be modified, (1) by the adoption and subsequent conjugation of captive men and boys, and, doubtless more profoundly, (2) by the adoption and polygamous marriage of female captives; and in still more highly organized groups the mother-descent is lost and polygamy is regular and limited only by the capacity of the husband as a provider. The second and third stages are commonly characterized, like the first,

[1] Notably in "Relation of primitive peoples to environment, illustrated by American examples," Smithsonian Report for 1896, pp. 625–638, especially p. 635.

[2] Neither space nor present occasion warrants discussion of the curious aphrodisian cults found among many peoples, usually in the barbaric stage of development; it may be noted merely that this is an aberrant branch from the main stem of institutional growth. The subject is touched briefly in "The beginning of marriage," American Anthropologist, vol. IX, pp. 371–383, Nov., 1896.

by established prohibitions and by clan exogamy; though with the advance in organization amicable relations with certain other groups are usually established, whereby the germ of tribal organization is implanted and a system of interclan marriage, or tribal endogamy, is developed. With further advance the mother descent group is transformed into a father-descent group, when the clan is replaced by the gens; and polygamy is a common feature of the gentile organization. In all of these stages the conjugal and consanguineal regulations are affected by the militant habits characteristic of primitive groups: more warriors than women are slain in battle, and there are more female captives than male; and thus the polygamy is mainly or wholly polygyny. In many cases civil conditions combine with or partially replace the militant conditions, yet the tendency of conjugal development is not changed. Among the Seri Indians, probably the most primitive tribe in North America, in which the demotic unit is the clan, there is a rigorous marriage custom under which the would-be groom is required to enter the family of the girl and demonstrate (1) his capacity as a provider and (2) his strength of character as a man, by a year's probation, before he is finally accepted—the conjugal theory of the tribe being monogamy, though the practice, at least during recent years, has, by reason of conditions, passed into polygyny. Among several other tribes of more provident and less exclusive habit, the first of the two conditions recognized by the Seri is met by rich presents (representing accumulated property) from the groom to the girl's family, the second condition being usually ignored, the clan organization remaining in force; among still other tribes the first condition is more or less vaguely recognized, though the voluntary present is commuted into, or replaced by, a negotiated value exacted by the girl's family, when the mother-descent is commonly vestigial; and in the next stage, which is abundantly exemplified, wife-purchase prevails, and the clan is replaced by the gens. In this succession the development of wife-purchase and the decadence of mother-descent may be traced, and it is significant that there is a tendency first toward partial enslavement of the wife and later toward the multiplication of wives to the limit of the husband's means, and toward transforming all, or all but one, of the wives into menials. Thus the lines of development under militant and civil conditions are essentially parallel. It is possible to project these lines some distance backward into the unknown of the exceedingly primitive, when they are found to define small discrete bodies—just such as are indicated by the institutional and linguistic lines—probably family groups, which must have been essentially, and were perhaps strictly, monogamous. It would appear that in these groups mating was either between distant members (under a law of attraction toward the remote and repulsion from the near, which is shared by mankind and the higher animals), or the result of accidental meeting between nubile members of different groups; that in the second case and sometimes in the first the conjugation

produced a new monogamic family; and that sometimes in the first case (and possibly in the second) the new group retained a more or less definite connection with the parent group—this connection constituting the germ of the clan. In passing, it may be noted merely that this inferential origin of the lines of institutional development is in accord with the habits of certain higher and incipiently organized animals. From this hypothetic beginning, primitive marriage may be traced through the various observed stages of monogamy and polygamy and concubinage and wife-subordination, through savagery and barbarism and into civilization, with its curious combination of exoteric monogamy and esoteric promiscuity. Fortunately the burden of the proof of this evolution does not now rest wholly on the evidence obtained among the American aborigines; for Westermarck has recently reviewed the records of observation among the primitive peoples of many lands, and has found traces of the same sequence in all.[1] Thus the evolution of marriage, like that of other human institutions, is from the simple and definite to the complex and variable; i. e., from approximate or complete monogamy through polygamy to a mixed status of undetermined signification; or from the mechanical to the spontaneous; or from the involuntary to the voluntary; or from the provincial to the cosmopolitan.

As implied in several foregoing paragraphs, and as clearly set forth in various publications by Powell, tribal society falls into two classes or stages—(1) clan organization and (2) gentile organization, these stages corresponding respectively to savagery and barbarism, strictly defined.

At the time of discovery, most of the American Indians were in the upper stages of savagery and the lower stages of barbarism, as defined by organization; among some tribes descent was reckoned in the female line, though definite matriarchies have not been discovered; among several tribes descent was and still is reckoned in the male line, and among all of the tribes thus far investigated the patriarchal system is found.

In tribal society, both clan and gentile, the entire social structure is based on real or assumed kinship, and a large part of the demotic devices are designed to establish, perpetuate, and advertise kinship relations. As already indicated, the conspicuous devices in order of development are the taboo with the prohibitions growing out of it, kinship nomenclature and regulations, and a system of ordination by which incongruous things are brought into association.

Among the American Indians the taboo and derivative prohibitions are used chiefly in connection with marriage and clan or gentile organization. Marriage in the clan or gens is prohibited: among many tribes a vestige of the inferential primitive condition is found in the curious

[1] The History of Human Marriage (London, 1891), especially chapters iv–vi, xiii–xv, xx–xxii.

prohibition of communications between children-in-law and parents-in-law; the clan taboos are commonly connected with the tutelar beast-god, perhaps represented by a totem.

The essential feature of the kinship terminology is the reckoning from ego, whereby each individual remembers his own relation to every other member of the clan or tribe; and commonly the kinship terms are classific rather than descriptive (i. e., a single term expresses the relation which in English is expressed by the phrase "My elder brother's second son's wife"). The system is curiously complex and elaborate. It was not discovered by the earlier and more superficial observers of the Indians, and was brought out chiefly by Morgan, who detected numerous striking examples among different tribes; but it would appear that the system is not equally complete among all of the tribes, probably because of immature development in some cases and because of decadence in others.

The system of ordination, like that of kinship, is characterized by reckoning from the ego and by adventitious associations. It may have been developed from the kinship system through the need for recognition and assignment of adopted captives, collective property, and other things pertaining to the group; yet it bears traces of influence by the taboo system. Its ramifications are wide: In some cases it emphasizes kinship by assigning members of the family group to fixed positions about the camp-fire or in the house; this function develops into the placement of family groups in fixed order, as exemplified in the Iroquoian long-house and the Siouan camping circle; or it develops into a curiously exaggerated direction-concept culminating in the cult of the Four Quarters and the Here, and this prepares the way for a quinary, decimal, and vigesimal numeration; this last branch sends off another in which the cult of the Six Quarters and the Here arises to prepare the way for the mystical numbers 7, 13, and 7×7, whose vestiges come down to civilization; both the four-quarter and the six-quarter associations are sometimes bound up with colors; and there are numberless other ramifications. Sometimes the function and development of these curious concepts, which constitute perhaps the most striking characteristic of prescriptorial culture, are obscure at first glance, and hardly to be discovered even through prolonged research; yet, so far as they have been detected and interpreted, they are especially adapted to fixing demotic relations; and through them the manifold relations of individuals and groups are crystallized and kept in mind.

Thus the American Indians, including the Siouan stock, are made up of families organized into clans or gentes, and combined in tribes, sometimes united in confederacies, all on a basis of kinship, real or assumed; and the organization is shaped and perpetuated by a series of devices pertaining to the plane of prescriptorial culture, whereby each member of the organization is constantly reminded of his position in the group.

SIOUAN SOCIOLOGY

A POSTHUMOUS PAPER BY

JAMES OWEN DORSEY

In 1871, at the age of 23, James Owen Dorsey, previously a student of divinity with a predilection for science, was ordained a deacon of the Protestant Episcopal church by the bishop of Virginia; and in May of that year he was sent to Dakota Territory as a missionary among the Ponka Indians. Characterized by an amiability that quickly won the confidence of the Indians, possessed of unbounded enthusiasm, and gifted with remarkable aptitude in discriminating and imitating vocal sounds, he at once took up the study of the native language, and, during the ensuing two years, familiarized himself with the Ponka and cognate dialects; at the same time he obtained a rich fund of information concerning the arts, institutions, traditions, and beliefs of the Indians with whom he was brought into daily contact. In August, 1873, his field work was interrupted by illness, and he returned to his home in Maryland and assumed parish work, meantime continuing his linguistic studies. In July, 1878, he was induced by Major Powell to resume field researches among the aborigines, and repaired to the Omaha reservation, in Nebraska, under the auspices of the Smithsonian Institution, where he greatly increased his stock of linguistic and other material. When the Bureau of Ethnology was instituted in 1879, his services were at once enlisted, and the remainder of his life was devoted to the collection and publication of ethnologic material, chiefly linguistic. Although most of his energies were devoted to the Siouan stock, he studied also the Athapascan, Kusan, Takilman, and Yakonan stocks; and while his researches were primarily linguistic, his collections relating to other subjects, especially institutions and beliefs, were remarkably rich. His publications were many, yet the greater part of the material amassed during his years of labor remains for elaboration by others. The memoir on "Siouan Sociology," which was substantially ready for the press, is the only one of his many manuscripts left in condition for publication. He died in Washington, February 4, 1895, of typhoid fever, at the early age of 47.

W J M.

ALPHABET

a, as in *father*.
'a, an initially exploded a.
ă, as in *what*, or as *o* in *not*.
'ă, an initially exploded ă.
ä, as in *hat*.
c, as *sh* in *she*. See ś.
ɔ, a medial *sh*, a sonant-surd.
ć (Dakota letter), as *ch* in *church*.
ç, as *th* in *thin*.
ȝ, a medial ç, sonant-surd.
ȼ, as *th* in *the*.
e, as in *they*.
'e, an initially exploded e.
ĕ, as in *get*.
'ĕ, an initially exploded ĕ.
g, as in *go*.
ġ (in Dakota), *gh*. See x.
ɳ (in Osage), an h after a pure or nasalized vowel, expelled through the mouth with the lips wide apart.
h̀ (in Dakota), *kh*, etc. See q.
i, as in *machine*.
'i, an initially exploded i.
ĭ, as in *pin*.
j, as *z* in *azure*, or as *j* in the French *Jacques*.
ʞ, a medial k, a sonant-surd.
k', an exploded k. See next letter.
ḳ (in Dakota), an exploded k.
m (in Kansa), a medial m, a sound between m and b.
ŋ (in Dakota), after a vowel has the sound of *n* in the French *bon*. See ^{n}.
ñ, as *ng* in *sing*.
hn, its initial sound is expelled from the nostrils and is scarcely heard.
o, as in *no*.
'o, an initially exploded o.
d, a medial b or p, a sonant-surd.
p', an exploded p.
q, as German *ch* in *ach*. See h̀.
s, a medial z or s, a sonant-surd.
ś (in Dakota), as *sh* in *she*. See c.
ʇ, a medial d or t, a sonant-surd.
t', an exploded t.
u, as *oo* in *tool*.
'u, an initially exploded u.
ŭ, as *oo* in *foot*.
ų, a sound between o and u.
ü, as in German *kühl, süss*.
x, *gh*, or nearly the Arabic *ghain*. See ġ.
ż (in Dakota), as *z* in *azure*. See j.
dj, as *j* in *judge*.
tc, as *ch* in *church*. See ć.
tc', an exploded tc.
ʇɔ, a medial tc, a sonant-surd.
ts', an exploded ts.
ʇs, a medial ts, a sonant-surd.
ai, as in *aisle*.
au, as *ow* in *how*.
yu, as *u* in *tune*, or *ew* in *few*.

The following have the ordinary English sounds: b, d, h, k, l, m, n, p, r, s, t, w, y, and z. A superior n (^{n}) after a vowel (compare the Dakota ŋ) has the sound of the French n in *bon*, *vin*, etc. A plus sign (+) after any letter prolongs it.

The vowels 'a, 'e, 'i, 'o, 'u, and their modifications are styled initially exploded vowels for want of a better appellation, there being in each case an initial explosion. These vowels are approximately or partially pectoral sounds found in the Siouan languages and also in some of the languages of western Oregon and in the language of the Hawaiian islands.

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SIOUAN SOCIOLOGY

By James Owen Dorsey

GENERAL FEATURES OF ORGANIZATION

In the study of the organization of societies, units of different orders are discovered. Among the tribes of the Siouan family the primary unit is the clan or gens, which is composed of a number of consanguinei, claiming descent from a common ancestor and having common taboos; the term clan implying descent in the female line, while gens implies descent in the male line. Among the Dakota, as among the Ɬegiha and other groups, the man is the head of the family.

Several of the Siouan tribes are divided into two, and one (the Osage) is divided into three subtribes. Other tribes are composed of phratries, and each subtribe or phratry comprises a number of gentes. In some tribes each gens is made up of subgentes, and these in turn of a lower order of groups, which are provisionally termed sections for want of a better designation. The existence of these minor groups among the Omaha has been disputed by some, though other members of the tribe claim that they are real units of the lowest order. Among the Teton many groups which were originally sections have become gentes, for the marriage laws do not affect the original phratries, gentes, and subgentes.

The state, as existing among the Siouan tribes, may be termed a kinship state, in that the governmental functions are performed by men whose offices are determined by kinship, and in that the rules relating to kinship and reproduction constitute the main body of the recognized law. By this law marriage and the mutual rights and duties of the several members of each body of kindred are regulated. Individuals are held responsible chiefly to their kindred; and certain groups of kindred are in some cases held responsible to other groups of kindred. When other conduct, such as the distribution of game taken in the forest or fish from the waters, is regulated, the rules or laws pertaining thereto involve, to a certain extent, the considerations of kinship.

The legislative, executive, and judicative functions have not been differentiated in Indian society as found among the Siouan groups. Two tendencies or processes of opposite character have been observed among the tribes, viz, consolidation and segregation. The effects of consolidation are conspicuous among the Omaha, Kansa, Osage, and Oto, while segregation has affected the social organization among the Kansa, Ponka, and Teton. There have been instances of emigration from one tribe to another of the same linguistic family; and among the Dakota new gentes have been formed by the adoption into the tribe of foreigners, i. e., those of a different stock.

Two classes of organization are found in the constitution of the state, viz, (1) major organizations, which relate directly to government, and (2) minor organizations, which relate only indirectly to government. The former embraces the state functionaries, the latter comprises corporations.

Although the state functionaries are not clearly differentiated, three classes of such men have been recognized: chiefs, policemen or soldiers, and young men or "the common people." The chiefs are the civil and religious leaders of the masses; the policemen are the servants of the chiefs; the young men are such as have not distinguished themselves in war or in any other way. These last have no voice in the assembly, which is composed of the chiefs alone. Among the Omaha there is no military class, yet there is a war element which is regulated by the Elk gens. The ʃixuda gens and part of the Nikadaona gens of the Ponka tribe are considered to be the warriors of the tribe, though members of other gentes have participated in war. In the Kansa tribe two gentes, the Large Hañga and the Small Hañga, form the phratry connected with war, though warriors did not necessarily belong to those gentes alone. In the Osage camping circle all the gentes on the right side are war gentes, but the first and second, reckoning from the van, are the soldiers or policemen; while all the gentes camping on the left are associated with peace, though their first and second gentes, reckoning from the van, are policemen or soldiers. Among the Omaha both officers and warriors must be taken from the class of "young men," as the chiefs are afraid to act as leaders in war; and among both the Omaha and the Ponka the chiefs, being the civil and religious leaders of the people, can not serve as captains, or even as members, of an ordinary war party, though they may fight when the whole tribe engages in war. Among the Dakota, however, chiefs have led in time of war.

Corporations among the Siouan tribes are minor organizations, indirectly related to the government, though they do not constitute a part of it. The Omaha, for instance, and perhaps other tribes of the family, are organized into certain societies for religious, industrial, and other ends. There are two kinds of societies, the brotherhoods and the feasting organizations. The former are the dancing societies, to some of which the physicians belong.

Social classes are undifferentiated. Any man can win a name and rank in the section, gens, phratry, tribe, or nation by bravery in war or by generosity in the bestowal of presents and the frequent giving of feasts. While there are no slaves among the Siouan tribes, there are several kinds of servants in civil, military, and religious affairs.

THE DAKOTA TRIBES

DESIGNATION AND MODE OF CAMPING

The Dakota call themselves Oteeti cakowi^{n} (Oćeti śakowiŋ[1]), The Seven Fireplaces or Council-fires. This designation refers to their original gentes, the Mdewaka^{n}to^{n}wa^{n} (Mdewakaŋ-toŋwaŋ), Waqpekute (Walipe-kute), Waqpe-to^{n}wa^{n} (Walipetoŋwaŋ), Sisito^{n}wa^{n} (Sisitoŋwaŋ), Ihañk to^{n}wa^{n} (Ihaŋktoŋwaŋ), Ihañk-to^{n}wa^{n}na (Ihaŋktoŋwaŋna), and Tito^{n}wa^{n} (Titoŋwaŋ). They camped in two sets of concentric circles, one of four circles, consisting probably of the Mdewaka^{n}to^{n}wa^{n}, Waqpe-kute, Waqpe-to^{n}wa^{n} and Sisito^{n}wa^{n}; and the other of three circles, including the Ihañkto^{n}wa^{n}, Ihañkto^{n}wa^{n}na, and Tito^{n}wa^{n}, as shown by the dialectal resemblances and variations as well as by the relative positions of their former habitats.

THE MDEWAKA^{N}TO^{N}WA^{N}

The Mdewaka^{n}to^{n}wa^{n} were so called from their former habitat, Mdewaka^{n}, or Mysterious lake, commonly called Spirit lake, one of the Mille Lacs in Minnesota. The whole name means Mysterious Lake village, and the term was used by De l'Isle as early as 1703. The Mdewaka^{n}to^{n}wa^{n} were the original Santee, but the white people, following the usage of the Ihañkto^{n}wa^{n}, Ihañkto^{n}wa^{n}na, and Tito^{n}wa^{n}, now extend that name to the Waqpekute, Waqpeto^{n}wa^{n}, and Sisito^{n}wa^{n}. The gentes of the Mdewaka^{n}to^{n}wa^{n} are as follows:[2]

1. Kiyuksa, Breakers (of the law or custom); so called because members of this gens disregarded the marriage law by taking wives within the gens.

2. Qe-mini-tca^{n} (Ḣe-mini-ćaŋ) or Qemnitca (Ḣemnića), literally, "Mountain-water-wood;" so called from a hill covered with timber that appears to rise out of the water. This was the gens of Red Wing, whose village was a short distance from Lake Pepin, Minnesota.

3. Kap'oja (Kaꞑoża), Not encumbered-with much baggage; "Light Infantry." "Kaposia, or Little Crow's village," in Minnesota, in 1852.

4. Maxa-ynte-cni (Maġa yute-śni), Eats-no-geese.

5. Qeyata oto^{n}we (Ḣeyata-otoŋwe), of its-chief-Hake-waete (Hake waśte); Qeyata-to^{n}wa^{n} (Ḣeyata-toŋwaŋ) of Reverend A. L. Riggs, Village-back-from-the-river.

[1] Wherever in this paper there is a double notation of a Dakota name the former is expressed in the alphabet of the Bureau of Ethnology and the latter in that of Dr S. R. Riggs, author of the memoirs in Contributions to North American Ethnology, vols. VII and IX.

[2] S. R. Riggs, in Smithsonian Contributions to Knowledge, vol. IV, p. xvi, 1852, and in Contributions to North American Ethnology, vol. IX.

6. Oyate-citca (Oyate šiča), Bad nation.

7. Tiⁿta-otoⁿwe (Tiŋta-otoŋwe), of Hake-wacte, or Tiⁿta toⁿwaⁿ (Tiŋta-toŋwaŋ) of A. L. Riggs, Village on-the-prairie (tiŋta).

These seven gentes still exist, or did exist as late as 1880.

THE WAQPE-KUTE

The name waqpe-kute is derived from waqpe (walipe), leaf, and kute, to shoot at, and signifies Shooters-among-the-leaves, i. e., among the deciduous trees, as distinguished from Wazi-kute, Shooters-at-or-among-the pines. The gentes exist, but their names have not been recorded.

THE WAQPE-TOᴺWAᴺ OR WAHPETON

The name of this people signifies Village-among-the-leaves (of deciduous trees), the gens being known to the whites as Leaf Village or Wahpeton. The gentes of this people, as given in 1884 by Reverend Edward Ashley, are the following:

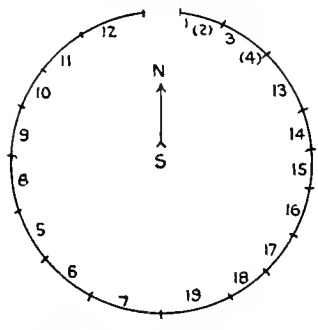

FIG 30—Sisseton and Wahpeton camping circle

13. Iⁿyaⁿ-tceyaka-atoⁿwaⁿ (Iŋyaŋ-ćeyaka-atoŋwaŋ), Village-at-the-dam or-rapids.

14. Takapsin-toⁿwaⁿna (Takapsin-toŋwaŋna), Village at-the-shinny-ground.

15. Wiyaka-otina, Dwellers-on-the-sand (wiyaka).

16. Oteqi-atoⁿwaⁿ (Otehi-atoŋwaŋ), Village-in-the-thicket (otehi).

17. Wita-otina. Dwellers-on-the-island (wita).

18. Wakpa-atoⁿwaⁿ (Wakpa-atoŋwaŋ), Village-on-the river.

19. Tcaⁿ-kaxa-otina (Ćan-kaġa-otina). Dwellers in-log (-huts?).

The numbers prefixed to the names of these gentes denote their respective places in the camping circle of the Sisseton and Wahpeton, as shown in figure 30.

THE SISITOᴺWAᴺ OR SISSETON

It is evident that the Sisseton were formerly in seven divisions, the Wita-waziyata-otina and the Ohdihe being counted as one; the Basdetce-cni and Itokaq-tina as another; the Kaqmi-atoⁿwaⁿ, Maniti, and Keze as a third, and the Tizaptaⁿ and Okopeya as a fifth. When only a part of the tribe journeyed together, the people camped in the following manner: The Amdo-wapuskiyapi pitched their tents between the west and north, the Wita-waziyata-otina between the north and east, the Itokaq-tina between the east and south, and the Kap'oja between the south and west. The following are the Sisseton gentes (figure 31):

1. Wita-waziyata-otina, Village-at-the-north-island.

2. Ohdihe (from ohdiha^{n}, to fall into an object endwise). This gens is an offshoot of the Wita-waziyata-otina.

3. Basdetce-eni (Basdeće-šni), Do-not-split (the body of a buffalo)-with-a knife (but cut it up as they please).

4. Itokaq-tina (Itokaḳ-tina), Dwellers-at-the-south (itokaġa). These are an offshoot of the Basdetce-eni.

5. Kaqmi-ato^{n}wa^{n} (Kaḳmi-atoŋwaŋ), Village-at-the-bend (kaḳmiŋ).

6. Mani ti. Those-who-camp (ti)-away-from-the-village. An offshoot of the Kaqmi-ato^{n}wa^{n}.

7. Keze. Barbed-like-a fishhook. An offshoot of the Kaqmi-ato^{n}wa^{n}.

8. Tca^{n}-kute (Ćaŋ kute), Shoot-in-the-woods (among the deciduous trees); a name of derision. These people, according to Ashley, resemble the Keze, whom he styles a "cross clan."

9. Ti-zapta^{n} (Ti-zaptaŋ), Five-lodges.

10. Okopeya, In-danger. An offshoot of the Ti-zapta^{n}.

11. Kaṗoja (Kaṗoża), Those-who-travel-with-light-burdens. (See number 3 of the Mdewaka^{n}to^{n}wa^{n}.)

12. Amdo-wapuskiyapi, Those-who-lay-meat-on-their-shoulders (amdo)-to-dry-it (wapuskiya)-during-the-hunt.

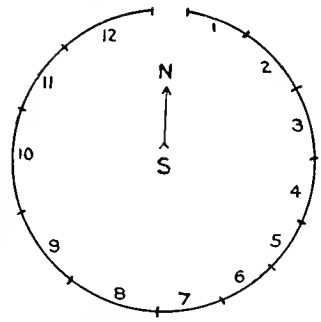

FIG. 31—Sisseton camping circle.

THE IHAÑKTO^{N}WA^{N} OR YANKTON

The Yankton and Yanktonai speak the Yankton dialect, which has many words in common with the Teton.

In 1878 Walking Elk wrote the names of the Yankton gentes in the following order: 1, Tca^{n}-kute (Ćaŋ kute), Shoot-in-the-woods; 2, Tcaxu (Ćaġu), Lights or lungs; 3, Wakmuha-oi^{n} (Wakmuha oiŋ), Pumpkin-rind-earring; 4, Ihaisdaye, Mouth-greasers; 5, Watceu^{n}pa (Waćeuŋpa), Roasters; 6, Ikmu^{n} (Ikmuŋ), An animal of the cat kind (lynx, panther, or wildcat); 7, Oyate-citca (Oyate-šiča), Bad-nation; 8, Waciteu^{n}-tci^{n}tca (Wašiċuŋ-ċiŋċa) (a modern addition), Sons-of-white-men, the "Half-blood band." But in 1891 Reverend Joseph W. Cook, who has been missionary to the Yankton since 1870, obtained from several men the following order of gentes (ignoring the half-bloods): On the right side of the circle were, 1, Iha isdaye; 2, Wakmuha-oi^{n}; 3, Ikmu^{n}. On the left side of the circle were, 4, Watceu^{n}pa; 5, Tca^{n}-kute; 6, Oyate-citca; and, 7, Tcaxu.

THE IHAÑKTO^{N}WA^{N}NA OR YANKTONAI

The Yanktonai are divided into the Upper and Lower Yanktonai, the latter being known as the Huñkpatina, Those-camping-at one-end (or "horn")-of-the-tribal-circle.

The Upper Yanktonai gentes are as follows: 1, Tca^{n}-ona (Ćaŋ ona), Shoot-at-trees, or Wazi-kute, Shooters-among-the-pines; from these the Ho-he or Asiniboin have sprung. 2, Takini, Improved-in-condition (as a lean animal or a poor man). 3, Cikcitcena (Śikśićena), Bad-ones-of-different-sorts. 4, Bakiho^{n} (Bakihoŋ), Gash-themselves-with-knives. 5, Kiyuksa, Breakers (of the law or custom); see Mdewaka^{n}to^{n}wa^{n} gens number 1. 6, Pa-baksa, Cut-heads; some of these are on Devils Lake reservation, North Dakota. 7, Name forgotten.

The following are the gentes of the Lower Yanktonai, or Huñkpatina: 1, Pute-temini, Sweat-lips; the gens of Maxa-bomdu or Drifting Goose. 2, Cŭ^{n}-ikteeka (Śuŋ ikćeka), Common dogs. 3, Taquha-yuta (Talinha-yuta), Eat-the-scrapings-of-hides. 4, Sa^{n}-ona (Saŋ-ona), Shot-at-some-white-object; this name originated from killing an albino buffalo; a Huñkpapa chief said that refugees or strangers from another tribe were so called. 5, Iha-ca (Iha-ṡa), Red-lips. 6, Ite-xu (Ite-ġu), Burned-face. 7, Pte-yute-cni (Pte-yute-ṡni), Eat-no-buffalo-cows.

THE TITO^{N}WA^{N} OR TETON

TRIBAL DIVISIONS

The Teton are divided into seven tribes, which were formerly gentes. These are the Sitca^{n}xu (Sićanġu), Itazipteo (Itazipćo), Siha-sapa, Mini-kooju (Minikoożu), Oohe-no^{n}pa (Oohe-noŋpa), Oglala, and Huñkpapa.

THE SITCA^{N}XU

The Sitca^{n}xu, Bois Brulés or Burned Thighs, are divided locally into (1) Qeyata-witcaca (Ḣeyata wićaṡa), People-away-from-the-river, the Highland or Upper Brule, and (2) the Kud (Kuta or Ku^{n}ta)-witcaca, the Lowland or Lower Brulé. The Sitca^{n}xu are divided socially into gentes, of which the number has increased in recent years. The following names of their gentes were given to the author in 1880 by Tatañka-waka^{n}, Mysterious Buffalo-bull: 1, Iyak'oza (Iyaḳoza), Lump (or wart)-on-a-horse's-leg. 2, Tcoka-towela (Ćoka-towela), Blue-spot-in-the middle. 3, Ciyo-tañka (Śiyo-taŋka), Large grouse or prairie chicken. 4, Ho-mna, Fish-smellers. 5, Ciyo-subula (Śiyo-subula), Sharp-tail grouse. 6, Ka^{n}xi-yuha (Kaŋġi-yuha), Raven keepers. 7, Pispiza-witcaca (Pispiza-wićaṡa), Prairie-dog people. 8, Walexa-u^{n}-woha^{n} (Waleġa uŋ wohaŋ), Boil-food-with-the-paunch-skin (waleġa). 9, Watceu^{n}pa (Waće-uŋpa), Roasters. 10, Cawala (Śawala), Shawnee; the descendants of a Shawnee chief adopted into the tribe. 11, Ihañkto^{n}wa^{n} (Ihaŋktoŋwaŋ), Yankton, so called from their mothers, Yankton women; not an original Sitca^{n}xu gens. 12, Naqpaqpa (Nalipalipa), Take down (their)-leggings (after returning from war). 13, Apewa^{n}-tañka (Apewaŋ taŋka), Big manes (of horses).

In 1884 Reverend W. J. Cleveland sent the author the accompanying diagram (figure 32) and the following list of Sitca^{n}xu gentes, containing names which he said were of very recent origin: 1, Sitca^{n}xu

proper. 2, Kak'exa (Kaḳeġa), Making-a-grating-sound. 3a, Hi^{n}ha^{n} cŭ^{n}-wapa (Hiŋhaŋ-šun wapa), Toward-the-owl-feather. 3b, Cŭñkaha-nap'i^{n} (Šuŋkaha napiŋ), Wears-a-dogskin-around-the-neck. 4, Hi-ha ka^{n}ha^{n}-ha^{n} wi^{n} (Hi-ha kaŋhaŋhaŋ wiŋ), Woman (wiŋ) -the-skin (ha) -of-whose-teeth (hi) -dangles (kaŋhaŋhaŋ). 5, Hŭñku-wanitca (Huŋku-wanića), Without-a-mother. 6, Miniskuya kite'u^{n} (Miniskuya kiçuŋ), Wears salt. 7a, Kiyuksa, Breaks-or-cuts-in two-his-own (custom, etc; probably referring to the marriage law; see Mdewaka^{n}to^{n}wa^{n} gens number 1). 7b, Ti-glabu, Drums-in-his-own-lodge. 8, Watceŭ^{n}pa (Waćeuŋpa), Roasters. 9, Wagluqe (Waglulie), Followers, commonly called loafers; A. L. Riggs thinks the word means "in-breeders." 10, Isa^{n}yati (Isaŋyati), Santee (probably derived from the Mdewaka^{n}to^{n}wa^{n}). 11, Wagmeza-yuha, Has corn. 12a, Walexa-o^{n}-woha^{n} (Waleġa-oŋ-wohaŋ), Boils-with-the-paunch-skin. 12b, Waqna (Walina), Snorts. 13, Oglala-ite'itcaxa (Oglala içićaġa), Makes-himself-an-Oglala. 14, Tiyotcesli (Tiyoćesli), Dungs-in the-lodge. 15, Wajaja (Wažaža), Osage (?). 16, Ieska-tci^{n}tca (Ieska-ćiŋća), Interpreter'ssons; "half-bloods." 17, Ohe-no^{n}pa (Ohe-noŋpa), Two boilings or kettles. 18, Okaxa-witcaca (Okaġa-wićaša), Man-of-the-south.

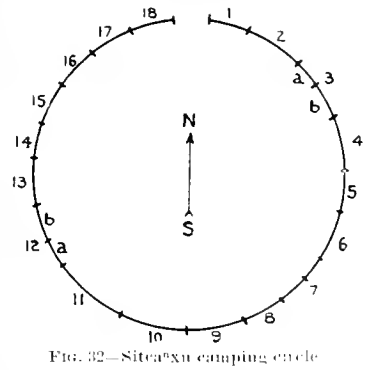

FIG. 32—Sitca^{n}xu camping circle

THE ITAZIPTCO

The Itaziptco (Itazipćo), in full, Itazipa-tcoda^{n} (Itazipa-ćodaŋ), Without-bows or Sans Arcs, had seven gentes, according to Waanata^{n} or Charger, in 1880 and 1884: 1, Itaziptco-qtca (Itazipćo-lića), Real Itaziptco, also called Mini-cala (Mini-šala), Red water. 2, Cina-luta-oi^{n} (Šina-luta-oiŋ), Scarlet-cloth-earring. 3, Woluta-yuta, Eat-dried-venison (or buffalo meat) -from-the-hind-quarter. 4, Maz-pegnaka, Wear (pieces-of) -metal-in-the-hair. 5, Tatañka-tcesli (Tataŋka-ćesli), Dung-of-a-buffalo bull. 6, Cikcitcela (Šikšićela), Bad-ones-of-different-kinds. 7, Tiyopa-otca^{n}nu^{n}pa (Tiyopa-oćaŋnuŋpa), Smokes-at-the-entrance-to-the-lodge.

THE SIHA-SAPA OR BLACKFEET

The following are the gentes of the Siha-sapa or Blackfeet as given by Peji or John Grass, in 1880: 1, Siha-sapa-qtca, Real Blackfeet. 2, Ka^{n}xi-cŭ^{n}-pegnaka (Kaŋġi-šuŋ-pegnaka), Wears-raven-feathers-in-the-hair. 3, Glagla-hetca (Glagla-heća), Untidy, slovenly ("Too lazy to tie their moccasins"). 4, Wajaje (Wažaze; Kill Eagle's band; named after Kill Eagle's father, who was a Wajaje of the Oglala tribe). 5, Hohe, Asiniboin. 6, Wamnuxa-oi^{n} (Wamnuġa-oiŋ), Shell-ear-pendant. In 1884 Reverend H. Swift obtained the following from Waanata^{n} or Charger as the true list of Siha sapa gentes: 1, Ti-zapta^{n} (Ti-zaptaŋ),

Five lodges. 2, Siha-sapa-qtca, Real Blackfeet. 3, Hohe, Asiniboin. 4, Ka^{n}xi-cũ^{n}-pegnaka (as above). 5, Wajaje (as above). 6, Wamnuxa-oi^{n} (as above). Mr Swift stated that there was no Siha-sapa division called Glagla-hetca.

THE MINIKOOJU

In 1880 Tatañka-wanbli, or Buffalo-bull Eagle, gave the author the names of numbers 1, 2, 3, 5, 6, 7, and 8 of the following list of the Minikoojn (Minikoožu), Minika^{n}ye-woju (Minikaŋye-woži), or Minneconjou gentes. These were given in 1884, with numbers 4 and 9, to Reverend H. Swift by No Heart (Ćaŋte-wanića): 1, Ũñktce-yuta (Uŋkće-yuta), Eat-dung. 2, Glagla-hetca (Glagla-heća), Slovenly. 3, Cuñka-yute-cni (Šuŋka yute-šni), Eat-no-dogs. 4, Nixe-tañka (Nige-taŋka), Big-belly. 5, Wakpoki^{n}ya^{n} (Wakpokiŋyaŋ), Flies-along-the-creek (wakpa). 6, I^{n}ya^{n}-ha-oi^{n} (Iŋyaŋ-h-oiŋ), Musselshell-earring. 7, Cikcitcela (Šiksićela), Bad-ones-of-different-sorts. 8, Wagleza-oi^{n}, Watersnake-earring. 9, Wa^{n}-nawexa (Waŋ-naweġa), Broken-arrows. The Wa^{n}nawexa are nearly extinct.

THE OOHE-NO^{n}PA OR TWO KETTLES

Of the Oohe-no^{n}pa (Oohe-no^{n}pa), Two Boilings or Two Kettles, Charger knew the names of only two gentes, which he gave to Reverend H. Swift in 1884, as follows: 1, Oohe-no^{n}pa, Two-boilings. 2, Ma-waqota (Ma-waliota), Skin-smeared-with-whitish-earth.

THE OGLALA

The first list of Oglala gentes was obtained in 1879 from Reverend John Robinson and confirmed in 1880 by a member of the tribe. These gentes are as follows: 1, Payabya, Pushed-aside. 2, Tapicletca (Tapišleća), Spleen (of an animal). 3, Kiyuksa, Breaks-his-own (marriage custom). 4, Wajaja (Waźaźa. See the Siha-sapa list of gentes). 5, Ite-citca (Ite-šića), Bad-face, or Oglala-qtca (Oglala-lića), Real Oglala. 6, Oyuqpe (Oyulipe); identical with Oiyuqpe of the next list. 7, Waglnqe (Waglulie). Followers or Loafers. These were probably the earlier divisions of the Oglala, but by 1884 considerable segregation had been accomplished, as shown by the following list furnished by Reverend W. J. Cleveland: 1, Ite-citca (Ite-šića), Bad-face, under Maqpiya-luta, Scarlet Cloud ("Red Cloud"). 2, Payabyeya, Pushed-aside (under Tašuŋka-kokipapi, They-fear-even-his-horse; wrongly rendered Man-afraid-of-his-horses). 3, Oyuqpe (Oyulipe), Thrown down or unloaded. 4, Tapicletca, Spleen (of an animal). 5, Pe-cla (Pe-śla), Baldhead. 6, Tceq-huha-to^{n} (Ćeli-huha-toŋ), Kettle-with-legs. 7, Wablenitca (Wablenića), Orphans. 8, Pe-cla-ptcetcela (Pe-śla-ptećela), Short-baldhead. 9, Tacnahetca (Tašnaheća), Gopher. 10, I-wayusota, Uses-up-by-begging-for, "Uses-up-with-the-mouth." 11, Waka^{n} (Waka), Mysterious. 12a, Iglaka-teqila (Iglaka-teliila), Refuses-to-move-camp. 12b, Ite-citca, Bad-face (as number 1). 13, Ite-citca-eta^{n}ha^{n} (Ite-šića-etaŋhaŋ), "From-bad-face," Part-of-bad-face. 14, Zuzeteakiyaksa (Zuzeća kiyaksa), Bit-the snake-in-two. 15, Watceo^{n}pa (Waće-

oŋpa), Roasters. 16, Watcape (Waćape), Stabber. 17, Tiyotcesli (Tiyoćesli), Dungs-in-the-lodge. 18 and 19, Waglnqe, Followers or Loafers. 20, Oglala, Scattered her-own. 21, Ieska-teiⁿtca (Ieska-ćinca), Interpreter's sons, "Half-bloods."

According to Mr Cleveland the whole Oglala tribe had two other names, Oyuqpe, Thrown-down or unloaded, and Kiyaksa, Bit-it-in-two.

THE HUÑKPAPA

The name Hnñkpapa (sometimes corrupted into Unepapa, Onepapa, etc), should be compared with the Yanktonai name Huñkpatina; both refer to the huñkpa or ends of a tribal circle. A Huñkpapa man in 1880 gave the following as the names of the gentes: 1, Tcañka-oqaⁿ (Ćaŋka-oliaŋ) Sore-backs (of horses), not the original name. 2, Tce-oqba (Će-oliba), in which tce (će) has either a vulgar meaning or is a contraction of teeya (ćeya), to weep, and oqba (oliba), sleepy. 3, Tinazipe-citca (Tinazipe-šića), Bad-bows. 4, Talo-naŋ'iⁿ (Talo-naŋiŋ), Fresh-meat-necklace. 5, Kiglacka (Kiglaška), Ties-his-own. 6, Tcegnake-okisela (Ćegnake-okisela), Half-a-breecheloth. 7, Cikcitcela (Šikšićela), Bad-ones-of-different-sorts. 8, Wakaⁿ (Wakaŋ), Mysterions. 9, Hũⁿska-teaⁿ-tojuha (Huŋska-ćaŋtoźuha), Legging-tobacco-pouch.

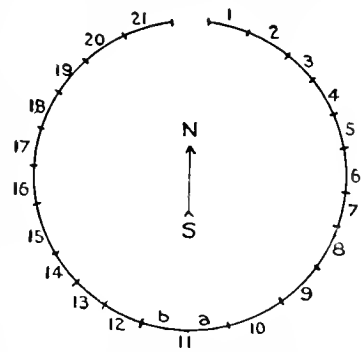

FIG 33—Oglala camping circle.

The real foundation for the totemic system exists among the Dakota, as well as among the other Siouan tribes and the Iroquois, in the names of men often being taken from mythical animals, but, in the opinion of Dr S. R. Riggs, the system was never carried to perfection.

DAKOTA SOCIAL CUSTOMS

Among the eastern Dakota the phratry was never a permanent organization, but it was resorted to on special occasions and for various purposes, such as war or the buffalo hunt. The exponent of the phratry was the tiyotipi or "soldiers' lodge," which has been described at length by Dr Riggs.[1]

While no political organization has been known to exist within the historic period over the whole Dakota nation, the traditional alliance of the "Seven Council-fires" is perpetuated in the common name Dakota, signifying allied, friendly.

Among the Dakota it is customary for the rank and title of chief to descend from father to son, unless some other near relative is ambitious and influential enough to obtain the place. The same is claimed also in regard to the rank of brave or soldier, but this position is more dependent

[1] Contributions to North American Ethnology, vol., IX, pp. 195–202.

on personal bravery. While among the Omaha and Ponka a chief can not lead in war, there is a different custom among the Dakota. The Sisseton chief Standing Buffalo told Little Crow, the leader of the hostile Santee in the Minnesota outbreak of 1862, that, having commenced hostilities with the whites, he must fight it out without help from him, and that, failing to make himself master of the situation, he should not flee through the country of the Sisseton.

Regarding chieftainship among the Dakota, Philander Prescott[1] says:

> The chieftainship is of modern date, there being no chiefs before the whites came. The chiefs have little power. The chief's band is almost always a kin totem which helps to sustain him. The chiefs have no votes in council; there the majority rules and the voice of the chief is not decisive till then.
>
> On the death of a chief, the nearest kinsman in the right line is eligible. If there are no kin, the council of the band can make a chief. Civil chiefs scarcely ever make a war party.

The Dakota woman owns the tipi. If a man has more wives than one, they have separate tipis, or they arrange to occupy different sides of one. Sometimes the young man goes to live with his wife's kindred, but in such matters there is no fixed rule. To purchase a wife was regarded the most honorable form of marriage, though elopement was sometimes resorted to.

THE ASINIBOIN

The Asiniboin were originally part of the Wazi-kute gens of the Yanktonai (Ihañktoⁿwaⁿna) Dakota. According to the report of E. T. Denig to Governor I. I. Stevens,[2] "the Asiniboin call themselves Dakota, meaning Our people." The Dakota style them Hohe, "rebels," but Denig says the term signifies "fish eaters," and that they may have been so called from the fact that they subsisted principally on fish while in British territory.

Lists of the gentes of this people have been recorded by Denig, Maximilian, and Hayden, but in the opinion of the present writer they need revision.

Asiniboin gentes

Denig	*Maximilian*	*Hayden*
We-che-ap-pe-nah, 60 lodges, under Les Yeux Gris.	Itscheabine, Les gens des filles.	Wi-ic-ap-i-nah, Girls' band.
E-an-to-ah, Stone Indians, the original appellation for the whole nation; 50 lodges, under Premier qui Volle.	Jatonabine, Les gens des roches, the Stone Indians of the English. Call themselves "Eascab."	I-an-to-an. (Either Iⁿyaⁿ toⁿwaⁿ, Stone village, or Ihanktoⁿwaⁿ, End village or Yankton. J. O. D.)
Wah-to-pan-ah, Canoe Indians, 100 lodges, under Serpent.	Otaopabine, Les gens des canots.	Wah-to-pap-i-nah

[1] Schoolcraft Indian Tribes, vol. II, 182, Philadelphia, 1852.
[2] Manuscript in the archives of the Bureau of Ethnology.

Asiniboin gentes—Continued

Denig	*Maximilian*	*Hayden*
Wah-to-pah-han-da-toh, Old Gauche's gens, i. e., Those who row in canoes; 100 lodges, under Trembling Hand.	Watopachnato, Les gens de l'age.	Wah-to-pah-an-da-to, Gens du Gauché or Left Hand.
Wah-ze-ah we-chas-ta, Northern People (so called because they came from the north in 1839); 60 lodges, under Le Robe de Vent.	O-see-gah (of Lewis and Clark, Discoveries, p. 13, 1806).	Wah-zi-ah, or To-kum-pi, Gens du Nord.

The following gentes have not been collated: Of Maximilian's list, Otopachgnato, les gens du large, possibly a duplication, by mistake, of Watopachnato, les gens de l'age; Tschantoga, les gens des bois; Tanintanei, les gens des osayes; Chabm, les gens des montagnes. Of Hayden's list, Min'-i-shi-nak'-a to, gens du lac.

The correct form in the Yankton dialect of the first name is Witci^{n}-ya^{n}pina (Wićiŋyaŋpina), girls; of the second, probably I^{n}ya^{n}to^{n}wa^{n} (Iŋyaŋ toŋwaŋ); the third and fourth gentes derive their names from the verb watopa, to paddle a canoe; the fifth is Waziya witcacta (Waziya wićašta). Tschan in Tschantoga is the German notation of the Dakota tca^{n} (ćaŋ), tree, wood. Cha in Chabm is the German notation of the Dakota word he, a high ridge of hills, a mountain.

In his report to Governor Stevens, from which the following information respecting the Asiniboin is condensed, Denig used the term "band" to denote a gens of the tribe, and "clans" instead of corporations, under which latter term are included the feasting and dancing societies and the orders of doctors, shamans, or theurgists.

These bands are distinct and occupy different parts of the country, although they readily combine when required by circumstances, such as scarcity of game or an attack by a large body of the enemy.

The roving tribes call no general council with other nations; indeed, they are suspicious even of those with whom they have been at peace for many years, so that they seldom act together in a large body. With the exception of the Hidatsa, Mandan, and Arikara, who are stationary and live in a manner together, the neighboring tribes are quite ignorant of one another's government, rarely knowing even the names of the principal chiefs and warriors.

In all these tribes there is no such thing as hereditary rank. If a son of a chief is wanting in bravery, generosity, or other desirable qualities, he is regarded merely as an ordinary individual; at the same time it is true that one qualification for the position of chief consists in having a large number of kindred in the tribe or gens. Should there be two or more candidates, equally capable and socially well connected, the question would be decided on the day of the first removal of the camp, or else in council by the principal men. In the former

case, each man would follow the leader whom he liked best, and the smaller body of Indians would soon adhere to the majority.

Women are never acknowledged as chiefs, nor have they anything to say in the council. A chief would be deposed for any conduct causing general disgust or dissatisfaction, such as incest (marrying within his gens) or lack of generosity. Though crime in the abstract would not tend to create dissatisfaction with a chief, yet if he murdered, without sufficient cause, one whose kindred were numerous, a fight between the two bodies of kindred would result and an immediate separation of his former adherents would ensue; but should the murdered person be without friends, there would be no attempt to avenge the crime, and the people would fear the chief only the more. To preserve his popularity a chief must give away all his property, and he is consequently always the poorest man in the band; but he takes care to distribute his possessions to his own kindred or to the rich, from whom he might draw in times of need.

The duties of a leading chief are to study the welfare of his people, by whom he is regarded as a father, and whom he addresses as his children. He must determine where the camp should be placed and when it should be moved; when war parties are advisable and of whom they should be composed—a custom radically different from that of the Omaha and Ponka,—and all other matters of like character. Power is tacitly committed to the leading chief, to be held so long as he governs to general satisfaction, subject, however, to the advice of the soldiers. Age, debility, or any other natural defect, or incapacity to act, advise, or command, would lead a chief to resign in favor of a younger man.

When war is deemed necessary, any chief, soldier, or brave warrior has the privilege of raising and leading a war party, provided he can get followers. The powers of a warrior and civil chief may be united in one person, thus differing from the Omaha and Ponka custom. The leading chief may and often does lead the whole band to war; in fact, it devolves on him to lead any general expedition.

The Akitcita (Akićita), soldiers or guards (policemen), form an important body among the Asiniboin as they do among the other Siouan tribes. These soldiers, who are chosen from the band on account of their bravery, are from 25 to 45 years of age, steady, resolute, and respected; and in them is vested the power of executing the decisions of the council. In a camp of 200 lodges these soldiers would number from 50 to 60 men; their lodge is pitched in the center of the camp and is occupied by some of them all the time, though the whole body is called together only when the chief wishes a public meeting or when their hunting regulations are to be decided. In their lodge all tribal and intertribal business is transacted, and all strangers, both white men and Indians, are domiciled. The young men, women, and children are not allowed to enter the soldiers' lodge during the time that tribal matters are being considered, and, indeed, they are seldom, if ever,

seen there. All the choicest parts of meat and the tongues of animals killed in hunting are reserved for the soldiers' lodge, and are furnished by the young men from time to time. A tax is levied on the camp for the tobacco smoked there, which is no small quantity, and the women are obliged to furnish wood and water daily. This lodge corresponds in some degree to the two sacred lodges of the Hañga gens of the Omaha.

Judging from the meager information which we possess concerning the Asiniboin kinship system, the latter closely resembles that of the Dakota tribes, descent being in the male line. After the smallpox epidemic of 1838, only 400 thinly populated lodges out of 1,000 remained, relationship was nearly annihilated, property lost, and but few, the very young and very old, were left to mourn the loss. Remnants of bands had to be collected and property acquired, and several years elapsed ere the young people were old enough to marry.

The names of the wife's parents are never pronounced by the husband; to do so would excite the ridicule of the whole camp. The husband and the father-in-law never look on each other if they can avoid it, nor do they enter the same lodge. In like manner the wife never addresses her father-in-law.

A plurality of wives is required by a good hunter, since in the labors of the chase women are of great service to their husbands. An Indian with one wife can not amass property, as she is constantly occupied in household labors, and has no time for preparing skins for trading. The first wife and the last are generally the favorites, all others being regarded as servants. The right of divorce lies altogether with the husband; if he has children by his wife, he seldom puts her away. Should they separate, all the larger children—those who require no further care—remain with the father, the smaller ones departing with the mother. When the women have no children they are divorced without scruple.

After one gets acquainted with Indians the very opposite of taciturnity exists. The evenings are devoted to jests and amusing stories and the days to gambling. The soldiers' lodge, when the soldiers are not in session, is a very theater of amusement; all sorts of jokes are made and obscene stories are told, scarcely a woman in the camp escaping the ribaldry; but when business is in order decorum must prevail.

The personal property of these tribes consists chiefly of horses. Possession of an article of small value is a right seldom disputed, if the article has been honestly obtained; but the possession of horses being almost the principal object in life of an Indian of the plains, the retention of them is a matter of great uncertainty, if he has not the large force necessary to defend them. Rights to property are based on the method of acquirement, as (1) articles found; (2) those made by themselves (the sole and undisputed property of the makers); (3) those stolen from enemies, and (4) those given or bought. Nothing is given except with

a view to a gift in return. Property obtained by gambling is held by a very indefinite tenure.

Murder is generally avenged by the kindred of the deceased, as among the Omaha and Ponka. Goods, horses, etc, may be offered to expiate the crime, when the murderer's friends are rich in these things, and sometimes they are accepted; but sooner or later the kindred of the murdered man will try to avenge him. Everything except loss of life or personal chastisement can be compensated among these Indians. Rape is nearly unknown, not that the crime is considered morally wrong, but the punishment would be death, as the price of the woman would be depreciated and the chances of marriage lessened. Besides, it would be an insult to her kindred, as implying contempt of their feelings and their power of protection. Marriage within the gens is regarded as incest and is a serious offense.

THE OMAHA

The gentes keeping the sacred pipes and those having the sacred tents are designated among the Omaha by appropriate designs. The sacred tent of the Wejiⁿcte was the tent of war, those of the Hañga were the tents associated with the buffalo hunt and the cultivation of the soil. The diameter of the circle (figure 34) represents the road traveled by the tribe when going on the buffalo hunt, numbers 1 and 10 being the gentes which were always in the van. The tribe was divided into half tribes, each half tribe consisting of five gentes. The sacred tents of the Omaha and all the objects that were kept in them are now in the Peabody Museum of Archæology and Ethnology at Cambridge, Massachusetts.

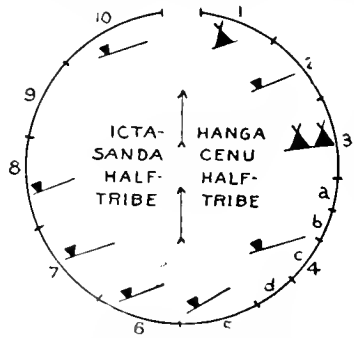

FIG. 34—Omaha camping circle.

The two groups of gentes forming the half tribes or phratries, sometimes composed of subgentes or sections, are as follows:

Hañgacenu gentes—1, Wejiⁿcte, Elk. 2, Iñke-sabē, Black shoulder, a Buffalo gens; the custodian of the real pipes of peace. 3, Hañga or Ancestral, a Buffalo gens; the regulator of all the so-called pipes of peace and keeper of two sacred tents. 4, ɸatada, meaning uncertain; in four subgentes: *a*, Wasabe hitᵉajī, Touch-not-the-skin-of-a-black-bear; *b*, Wajiñga ɸatajī, Eat-no-small-birds; Bird people; *c*, ᒪe-ḍa itᵉajī, Touch-no-buffalo-head; Eagle people; *d*, ᖻe-ɬiⁿ, Carry-a-turtle-on-the-back; Turtle people. 5, ᖻaⁿze, Wind people.

Ictasanda gentes—6, Maⁿɸiñka-gaxe, Earth-lodge-makers; coyote and wolf people. 7, ᒪe-sĭnde, Buffalo-tail; a Buffalo-calf people. 8, ᒪa-da, Deer-head; Deer people. 9, Iñgɸe-jide, Red dung; a Buffalo-calf gens.

10, Icta-sanda, meaning uncertain ("gray eyes"?), said to refer to the effect of lightning on the eyes. This last gens consists of Thunder and Reptile people.

The Iũke-sabĕ formerly consisted of four subgentes. When the gens met as a whole, the order of sitting was that shown in figure 35. In the tribal circle the Waɸigije camped next to the Hañga gens, and the other Iũke-sabĕ people came next to the Wejiⁿcte; but in the gentile "council fire" the first became last and the last first.

The Iekiɸĕ or Criers.

The Naqɸeitᶜa-bajĭ, Those-who-touch-no-charcoal.

The three subgentes here named sat on the same side of fireplace.

The Hañga formerly had four subgentes, but two of them, the Waɸitaⁿ or Workers, and the Ha-ɻu-itᶜajĭ, Touches-no-green(-corn)-husks, are extinct, the few survivors having joined the other subgentes. The remaining subgentes are each called by several names: 1, Ꞗesaⁿha-ɻaɸicaⁿ, pertaining to the sacred skin of an albino buffalo cow, or Wacaĭbe, Dark buffalo; or Hañga-qti, real Hañga; or Ꞗeᶜɸeze-ɸatajĭ, Do-not-eat-buffalo-tongues. 2, Jaⁿha-ɻaɸicaⁿ, pertaining to the sacred (cottonwood) bark; or Waqɸexe-aɸiⁿ, Keeps-the-"spotted-object" (the sacred pole); or Jaⁿ-waqube-aɸiⁿ, Keeps-the-sacred-or-mysterious-wood (pole); or Ꞗaᶜwaqube-ɸatajĭ, Does-not-eat-the-sacred (mysterious)-buffalo-sides; or Miⁿxa-saⁿ-ɸatajĭ-kĭ Ꮷetaⁿ-ɸatajĭ, Eat-no-geese-or-swans-or-cranes.

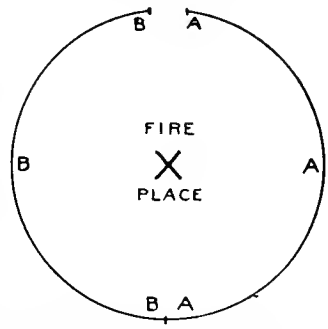

Fig. 35—Iũke-sabĕ gentile assembly. A, The Waɸigije, Maze or Whorl, or Waqube gaxe-aka, He-who-acts-mysteriously. B, The Wataⁿzi jide-ɸataji, Those-who-eat-no-red-corn.

In the tribal circle the Waĭcaĭbe camped next to the Iũke sabĕ, and the Waqɸexe-aɸiⁿ were next to the Wasabe-hitᶜajĭ subgens of the ɸᶜatada; but in the Hañga gentile assembly the positions were reversed, the Waĭcaĭbe sitting on the right side of the fire and the Waqɸexe-aɸiⁿ on the left.

The Wasabe-hitᶜajĭ subgens of the ɸᶜatada was divided into four sections: Black-bear, Raccoon, Grizzly-bear, and Porcupine. The only survivors are the Black-bear and Raccoon (Singers).

The Wajiũga ɸatajĭ subgens was divided into four sections: 1, Hawk people, under the chief Standing Hawk (now dead). 2, Blackbird people, under the chief Waji^{n}a-gahiga. 3, Starling or Thunder people. 4, Owl and Magpie people.

The ɣaⁿze gens was divided into at least two subgentes, the Keepers of the pipe and the Wind people. Lion, of the Deer-head gens, said that there were four subgentes, but this was denied in 1882 by Two Crows of the Hañga gens.

The Maⁿ¢iñka-gaxe subgentes, as given by Lion, were: 1, Miqasi, Coyote and Wolf people. 2, Iⁿ‘c̃-waqube-a¢iⁿ, Keepers-of-the-mysterious-stones. 3, Niniba-t‘aⁿ, Keepers-of-the-pipe. 4, Miⁿxa-saⁿ-wet‘ajĭ, Touch(es)-not-swans. Cañge-skā, White Horse, chief of the Maⁿ¢iñ-ka-gaxe (in 1878–1880) named three subgentes, thus: 1, Qube, Mysterious person, a modern name (probably including the Miqasi and Iⁿ‘c̃-waqube-a¢iⁿ, and certainly consisting of the descendants of the chief Wa-jiñga-sabe or Blackbird). 2, Niniba t‘aⁿ. 3, Miⁿxa-saⁿ-wet‘ajĭ.

The ₗa-da were divided into four parts: 1, Niniba-t‘aⁿ, Keepers-of-the-pipe, under Lion. 2, Naq¢e-it‘ajĭ, Touches-no-charcoal, under Boy Chief. 3, Thunder-people, under Pawnee Chief. 4, Deer-people, under Sinde-xaⁿxaⁿ (Deer's-)tail-shows-red-at-intervals (-as-it-bounds-away).

The Ietasanda gens also was in four parts: 1, Niniba-t‘aⁿ, Keepers-of-the-pipe. 2, Real Ietasanda people. (Numbers 1 and 2 were consolidated prior to 1880.) 3, Waceta[n] or Reptile people, sometimes called Keepers-of-the-claws-of-a-wildcat. 4, Real Thunder people, or Those-who-do-not-touch-a-clamshell, or Keepers-of-the-clamshell-and-the-tooth-of-a-black-bear.

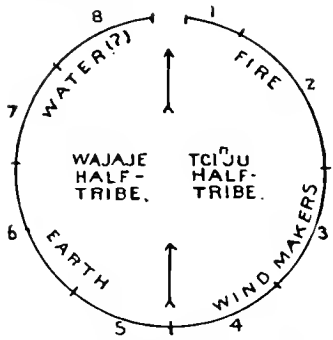

FIG. 36—Ponka camping circle.

The social organization of the Omaha has been treated at length by the author in his paper on Omaha Sociology.[1]

THE PONKA

The Ponka tribal circle was divided equally between the Tciⁿju and Wajaje half-tribes. To the former belonged two phratries of two gentes each, i. e., numbers 1 to 4, inclusive, and to the latter two similar phratries, including gentes 5 to 8.

Tciⁿju half-tribe—Thunder or Fire phratry: Gens 1, Hisada, Legs-stretched-out-stiff (refers to a dead quadruped); Thunder people. Gens 2, Touch-not-the-skin-of-a-black-bear. Wind-makers or War phratry: Gens 3, ¢ixida, Wildcat (in two subgentes: 1, Sinde-ag¢c̃, Wears-tails, i. e., locks of hair; Naq¢e-it‘ajĭ, Does-not-touch-charcoal; and Waseɲu-it‘ajĭ, Does-not-touch-verdigris. 2, Wami-it‘ajĭ, Does-not-touch-blood). Gens 4, Nika-da-ɲua, "Bald human-head:" Elk people (in at least three subgentes: 1, ₗe-sĭnde-it‘ajĭ, Does-not-touch-a-buffalo-tail; 2, ₗe ¢eze ¢atajĭ, Does-not-eat-buffalo-tongues; 3, ₗaqti kĭ Aⁿpaⁿ ¢atajĭ, Does-not-eat deer-and elk).

Wajaje half-tribe—Earth phratry: Gens 5, Maɣaⁿ, Medicine, a buffalo gens, also called ₗe-sĭnde it‘ajĭ, Does-not-touch-buffalo-tails (in two subgentes: 1, Real Ponka, Keepers-of-a-sacred-pipe; 2, Gray Ponka). Gens 6, Wacabe, Dark buffalo (in two subgentes: 1, ₗe-sĭnde,

[1] Third Annual Report of the Bureau of Ethnology, 1881–82.

Buffalo tail, or ⌊e-ɸeze ɸatajĭ, Does-not-eat-buffalo tongues, or ⌊e-jiũga ɸatajĭ, Does-not-eat-a-very-young-buffalo-calf; 2, ⌊e-da it'ajĭ, Does-not-touch-a-buffalo-head or skull). Water phratry (?): Gens 7, Wajaje, Osage (in two subgentes at present: 1, Dark Osage, Keepers-of-a-sacred-pipe, or Waseɲu-it'ajĭ, Does-not-touch-verdigris, or Naqɸe-it'ajĭ, Does-not-touch-charcoal; 2, Gray Osage, or Wĕs'ă wet'ajĭ, Does-not-touch-serpents; 3, Necta, an Owl subgens, now extinct). Gens 8, Nuqe, Reddish-yellow buffalo (miscalled Nuxe, Ice). Subgentes uncertain, but there are four taboo names: Does not-touch-a-buffalo-head (or skull), Does-not-touch-a-buffalo-calf, Does-not-touch-the-yellow-hide-of-a-buffalo-calf, and Does-not-eat-buffalo-tongues.

THE QUAPAW OR KWAPA

When the Kwapa were discovered by the French they dwelt in five villages, described by the early chroniclers as the Imaha (Imahan, Imahao), Capaha, Toriman, Tonginga (Doginga, Topinga), and Southois (Atotchasi, Ossouteouez). Three of these village names are known to all the tribe: 1, Uɣa'qpa-qti, Real Kwapa; 2, Ti'-u-a'-dɸi-ma^{n} (Toriman), Ti'-u-a-dɸi' ma^{n} (of Mrs Stafford); 3, U'-zu'-ti-u'-wē (Southois, etc). The fourth was Ta^{n}'wa^{n} ji'ɣa, Small village. Judging from analogy and the fact that the fifth village, Imaha, was the farthest up Arkansas river, that village name must have meant, as did the term Omaha, the upstream people.

The following names of Kwapa gentes were obtained chiefly from Alphonsus Vallière, a full-blood Kwapa, who assisted the author at Washington, from December, 1890, to March, 1891:

Na^{n}'pa^{n}ta, a Deer gens; O^{n}phũ^{n} enikaciɣa, the Elk gens; Qidɸ e'nikaci'ɣa, the Eagle gens; Wajiũ'ɣa enikaci'ɣa, the Small-bird gens; Haũ'ɣa e'nikaci'ɣa, the Haũ'ɣa or Ancestral gens; Wasa' e'nikaci'ɣa, the Black-bear gens; Ma^{n}tu' e'nkaci'ɣa, the Grizzly-bear (?) gens; Te e'nikaci'ɣa, the Buffalo gens (the ordinary buffalo); Tuqe'-nikaci'ɣa, the Reddish-yellow Buffalo gens (answering to Nuqe of the Ponka, Yuqe of the Kansa, ɸuqe of the Osage); Jawe' nikaci'ɣa, the Beaver gens; Hu i'nikaci'ɣa, the Fish gens; Mika'q'e ni'kaci'ɣa, the Star gens; Pe'ta^{n} e'nikaci'ɣa, the Crane gens; Cañɣe'-nikaci'ɣa, the Dog (or Wolf ?) gens; Wakan'ɟā e'nikaci'ɣa, the Thunder-being gens; Ta^{n}dɸa^{n}' e'nikaci'ɣa or Ta^{n}'dɸa^{n} tañ'ɣa e'nikaci'ɣa, the Panther or Mountain-lion gens; Ke-ni'kaci'ɣa, the Turtle gens; Wĕs'ă e'nikaci'ɣa, the Serpent gens; Mi e'nikaci'ɣa, the Sun gens. Vallière was unable to say on which side of the tribal circle each gens camped, but he gave the personal names of some members of most of the gentes.

On visiting the Kwapa, in the northeastern corner of Indian Territory, in January, 1894, the author recorded the following, with the assistance of Mrs Stafford, a full-blood Kwapa of about 90 years of age: Among

the Hañka gentes are the Hañ'ɣa tañɣa, Large Hañɣa or Ma^{n}cka' e'nikaci'ɣa, Crawfish people; Wajiñɣa e'nikaci'ɣa, Small-bird people; Jiñ'ɣa e'nikaci'ɣa, Small-bird people; Te ni'kaci'ɣa, Buffalo people, or Hañ'ɣa ji'ɣa, Small Hañɣa; A^{n}'pa^{n} e'nikaei'ɣa, Elk people; Qidɸa' e'nikaci'ɣa, Eagle people; Tuqe'-nikaci'ɣa, Reddish-yellow Buffalo people; and Cañɣe'-nikaci'ɣa, Dog (or Wolf ?) people. Mrs Stafford knew that five gentes were not on the Hañɣa side, three of them, Hu i'nikaci'ɣa, Fish people, Ni'kia'ta (meaning unknown), and Ke-ni'ka-ci'ɣa, Turtle people, being on the same side; Ma^{n}tu' e'nikaci'ɣa, Lion people; and Ti'ju (answering to the Osage Tsiɔn, the Kansa Teiju, and the Ponka Tei^{n}jn), meaning not obtained, which last is extinct. Mrs Stafford could not tell on which side camped any of the following gentes given by Vallière: Maqe, Wēs·ā, Wasa, Jawe, Mikaq'e, Mi, etc. The only persons capable of giving the needed information are among those Kwaɲa who reside on Osage reservation. According to George Redeagle and Buffalo Calf, two full-blood Quapaw, the Maqe-nika-ci'ɣa, Upper World people, were identical with the Wakaɲa e'nikaci'ɣa, Thunder-being people, of Vallière. These two men said, also, that there was no single gens known as the Hañɣa, that name belonging to a major division, probably a half-tribe.

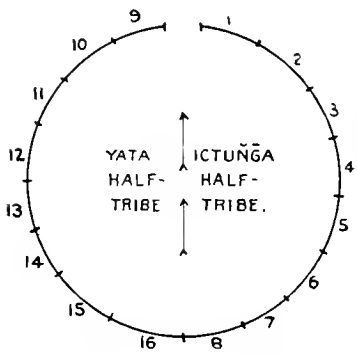

FIG. 37—Kansa camping circle.

THE KAŊZE OR KANSA

Among the Omaha the Yata people are those who camp on the yata or left side of the tribal circle; the Ictüñga people, those who camp on the ictüñga or right side. The tribe is divided into seven phratries, or, as the Kansa style each, wayu^{n}mi^{n}da^{n}, (i. e., those who sing together), as follows:

Phratries	*Gentes*	*Subgentes*
I	1. Ma^{n}yiñka. Earth, or Ma^{n}yiñka gaxe, Earth-lodge-makers.	*a*, Ma^{n}yinka tañga, Large earth. *b*, Ma^{n}yiñka jiñga, Small earth.
II	2. Ta, Deer, or Wajaje, Osage.	*a*, Taqtci, Real deer. *b*, Ta yatcaji, Eats-no-deer, or Ta ts'eyē, Kills-deer, or Wadjüta ts'eyē, Kills-quadrupeds.

Phratries	*Gentes*	*Subgentes*
III	3. Pañka, Ponka	*a*, Pañk unikaci^{n}ga, Ponka people. *b*, Qūndj-ala^{n}, Wear-red-cedar (-fronds)-on-their-heads.
III	4. Ka^{n}ze, Kansa, or Tci haci^{n}, Lodge-in-the-rear; Last-lodge.	*a*, Tadje unikaci^{n}ga, Wind people, or Ak'a unikaci^{n}ga, South-wind people, or Tci haci^{n}qtci, Real Tci haci^{n}, Camp-behind-all. *b*, Tadje jiñga, Small-wind, or Ma^{n}na^{n}hindje, Makes-a-breeze-near-the-ground.
III	5. Wasabe, Black bear.	*a*, Wasabĕqtci, Real Black-bear, or Sakū^{n} wayatee, Eats-raw (-food). *b*, Sindjalĕ, Wear-tails (locks of hair) -on-the-head.
I	6. Wanaxe, Ghost.....	Not learned.
IV	7. Ke k'i^{n}, Carries-a-turtle-on-his-back.	Not learned.
V	8. Mi^{n} k'i^{n}, Carries-the-sun-on-his-back.	Not learned.
I	9. Ụpa^{n}, Elk	*a*, Ụpa^{n}-qtci, Real elk, or Ma^{n}sa^{n}ha, referring to the color of the fur. *b*, Sa^{n}ha^{n}ge, meaning unknown.
VI	10. Qiiya, White eagle..	*a*, Hüsada, Legs stretched-out-stiff; Qiiyunikaci^{n}ga, White-eagle people. *b*, Wabi^{n} ijnpye, Wade-in-blood; Wabi^{n} unikaci^{n}ga, Blood people.
VI	11. Ha^{n}, Night	*a*, Ha^{n} nikaci^{n}ga, Night people. *b*, Daka^{n} ma^{n}yi^{n}, Walks-shining (Star people?).
VII	12. Ibate'ĕ, Holds-the-firebrand-to-sacred pipes, or Hañga jiñga, small Hañga.	*a*, Qiiyegu jiñga, Hawk-that-has-a-tail-like-a-"king-eagle;" "Little-one-like-an-eagle." *b*, Mika unikaci^{n}ga, Raccoon people, or Mika qla jiñga, Small lean raccoon.
VII	13. Hañga tañga, Large Hañga; Hañga utanandji, Hañga apart-from-the-rest, or Ta sindje qaga, Stiff-deer-tail.	A black eagle with spots. Subgentes not recorded.

Phratries	*Gentes*	*Subgentes*
II	14. Tcedũñga, Buffalo (bull), or Si tañga, Big feet.	*a*, Tcedũñga, Buffalo with dark hair. *b*, Yuqe, Reddish-yellow buffalo. (See Ponka Nuqe, Osage ₵'nqe, Kwapa Tuqe.)
V	15. Tci ju wactage, Tci-ju peacemaker.	(Red-hawk people?). Subgentes not recorded.
II	16. Lu nikaci^{n}ga, Thunder-being people; Leda^{n} nuikaci^{n}ga, Gray-hawk people.	Subgentes not recorded.

Great changes have occurred among the Kansa since they have come in contact with the white race; but when Say visited them in the early part of the present century they still observed their aboriginal marriage laws. No Kansa could take a wife from a gens on his side of the tribal circle, nor could he marry any kinswoman, however remote the relationship might be. There are certain gentes that exchange personal names (jaje kik'iibe an), as among the Osage. Civil and military distinctions were based on bravery and generosity. Say informs us that the Kansa had been at peace with the Osage since 1806; that they had intermarried freely with them, so that "in stature, features, and customs they are more and more closely approaching that people." He states also that the head chief of the Kansa was Gahi^{n}ge Wadayiñga, Saucy Chief (which he renders "Fool Chief"), and that the ten or twelve underchiefs did not seem to have the respect of the people.

Unmarried females labored in the fields, served their parents, carried wood and water, and cooked. When the eldest daughter married she controlled the lodge, her mother, and all the sisters; the latter were always the wives of the same man. Presents were exchanged when a youth took his first wife. On the death of the husband the widow scarified herself, rubbed her person with clay, and became careless about her dress for a year. Then the eldest brother of the deceased married her without any ceremony, regarding her children as his own. When the deceased left no brother (real or potential) the widow was free to select her next husband. Fellowhood (as in cases of Damon and Pythias, David and Jonathan) often continues through life.

The Kansa had two kinds of criers or heralds: 1, the wadji'pa^{n}yi^{n} or village crier; 2, the ie'kiye' (Omaha and Ponka i'ẽki'₵ẽ). In 1882, Sa^{n}sile (a woman) was hereditary wadji'pa^{n}yi^{n} of the Kansa, having succeeded her father, Pezihi, the last male crier. At the time of an

issue (about 1882) Sa^{n}sile's son-in-law died, so she, being a mourner, could not act as crier; hence her office devolved on K'axe of the Taqtci subgens. In that year one of the Ta yatcajī subgens (of the Taqtci or Deer gens) was iekiye number 1. Iekiye number 2 belonged to the Tadje or Ka^{n}ze (Wind) gens.

THE OSAGE

In the Osage nation there are three primary divisions, which are tribes in the original acceptation of that term. These are known as the Tsiɔu uɟse peɸū^{n}da, the Seven Tsiɔu fireplaces, Hañɣa uɟse peɸū^{n}da, the Seven Hañɣa fireplaces, and Waɔaɔe uɟse peɸū^{n}da, the Seven Osage fireplaces. Each "fireplace" is a gens, so that there are twenty-one gentes in the Osage nation. The Seven Hañɣa fireplaces were the last to join the nation, according to the tradition of the Tsiɔu wactaɣe people. When this occurred, the seven Hañɣa gentes were reckoned as five, and the seven Osage gentes as two, in order to have not more than seven gentes on the right side of the tribal circle.

At first the Hañɣa utaɸanɟse gens had seven pipes, and the Waɔaɔe had as many. The Waɔaɔe gave their seventh pipe to the Tsiɔu, with the right to make seven pipes from it, so now the Waɔaɔe people have but six pipes, though they retain the ceremonies pertaining to the seventh.

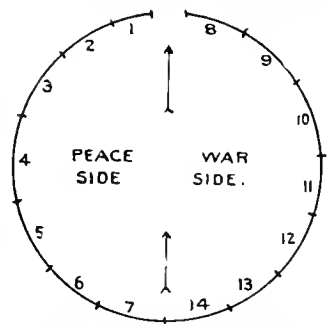

FIG. 38.—Osage camping circle.

When there is sickness among the children on the Waɔaɔe or right (war) side of the circle, their parents apply to the Tsiɔu (Tsiɔu wactaɣe?) for food for them. In like manner, when the children on the left or Tsiɔu side are ill, their parents apply to the Pa^{n}ɥka (wactaɣe?), on the other side, in order to get food for them.

The Seven Tsiɔu fireplaces occupy the left or peace side of the circle. Their names are:

1. Tsiɔu Sĭnɟsaɣɸē, Tsiɔu-wearing-a-tail (of hair)-on-the-head; also called Tsiɔu Wanū^{n}′, Elder Tsiɔu; in two subgentes, Sinɟsaɣɸē, Sun and Comet people, and Cūñɣe i′niɥk·ăci^{n}′a, Wolf people.

2. Tse ɟu′ɣa inɟse′, Buffalo-bull face; in two subgentes, of which the second is Tse′ ɸañka′ or Mi^{n}′paha′, Hide-with-the-hair-on. The policemen or soldiers on the left side belong to these two gentes.

3. Mi^{n} k'i^{n}′, Sun carriers, i. e., Carry-the-sun (or Buffalo hides)-on-their-backs. These have two subgentes, *a*, Mi^{n}i′niɥk·ăci^{n}′a, Sun people; *b*, Mi^{n}xa′ ska i′niɥk·ăci^{n}′a, Swan people.

4. Tsi′ɔu wacta′ɣe, Tsiɔu peacemaker, or Ta^{n}′wa^{n}ɣa′xe, Village-maker, or, Ni′waɸē, Giver of life. These have two subgentes, *a*, Wapi^{n}, it·a′ɔi, Touches-no-blood, or Qüɸa′ ɔü′ɟse, Red-eagle (really a hawk);

b, Qüɸa′ pa sa^{n}′, Bald-eagle, or ɔa^{n}sa^{n}′u′niɥk·āci^{n}′a, Sycamore people, the leading gens on the left side of the circle.

5. Ha^{n} i′niɥk·āci^{n}′a, Night people, or Tsi′ɔu we′haɥiɸe, the Tsiɔu-at-the-end, or Tse′ɸañka′. Their two subgentes are: *a*, Night people proper; *b*, Wasa′de, Black-bear people.

6. Tse ɟu̯′ɥa, Buffalo bull. In two subgentes, *a*, Tse ɟu̯′ɥa, Buffalo bull; *b*, ɸu′qe, Reddish-yellow buffalo (corresponding to the Nuqe of the Ponka, Tuqe of the Quapaw, and Yuqe of the Kansa).

7. ɥɸū^{n}, Thunder-being, or Tsi′haci^{n}, Camp-last, or Ma′xe, Upper-world people, or Niɥ′ka wakan′ɟaɥi, Mysterious-male-being. Subgentes not recorded.

On the right (Hañɥa or Waɔaɔe) side of the circle are the following:

8. Waɔa′ɔe Wanū^{n}′, Elder Osage, composed of six of the seven Osage fireplaces, as follows: *a*, Waɔa′ɔe ska′, White Osage; *b*, Ke k'i^{n}′, Turtle carriers; *c*, Wake′ɸe ste′ɟse, Tall-flags (?), Ehna^{n}′ min′ɟse tū^{n}′, They-alone-have-bows, or Mi^{n}ke′ɸe ste′ɟse, Tall-flags; *d*, Ta ɸa′xü, Deer-lights, or Ta i′niɥk·āci^{n}′a, Deer people; *e*, Hu i′niɥk·āci^{n}′a, Fish people; *f*, Na^{n}′pa^{n}ta, a deer gens, called by some Ke ɥa′tsü, Turtle-with-a-serrated-crest-along-the-shell (probably a water monster, as there is no such species of turtle).

9. Hañ′ɥa uta′ɸanɟsi, Hañɥa-apart-from-the-rest, or Qüɸa′qtsi i′niɥk·āci^{n}′a, Real eagle people—the War eagle gens, and one of the original Hañɥa fireplaces. The soldiers or policemen from the right side are chosen from the eighth and ninth gentes.

10. The leading gens on the right side of the circle, and one of the original seven Osage fireplaces. Pa^{n}ɥ′ka wacta′ɥe, Ponka peace-maker, according to a Tsiɔu man; in two subgentes, *a*, Tse′waɸē, Pond-lily, and *b*, Waca′de, Dark-buffalo; but according to Pa^{n}ɥ′ka waɟa′yinɥa, a member of the gens, his people have three subgentes, *a*, Wake′ɸe, Flags; *b*, Wa′tsetsi, meaning, perhaps, Has-come hither (tsi)-after-touching-the-foe (watse); *c*, Qūnɟse′, Red cedar.

11. Hañ′ɥa a′hü tū^{n}′, Hañɥa-having-wings, or Hü′saɟa, Limbs-stretched-stiff, or Qüɸ i′niɥk·āci^{n}′a, White-eagle people, in two subgentes, which were two of the original Hañɥa fireplaces: *a*, Hü′saɟa Wanū^{n}′, Elder Hüsaɟa; *b*, Hü′saɟa, those wearing four locks of hair resembling those worn by the second division of the Wasape tu^{n}.

12. Wasa′de tū^{n}, Having-black-bears. In two parts, which were originally two of the Hañɥa fireplaces: A, Sīnɟsaɥɸē, Wearing-a-tail- (or lock)-of-hair-on-the-head; in two subgentes, (*a*) Wasade, Black bear, or Hañ′ɥa Wa′ts·ekawa′ (meaning not learned); (*b*) Iñɥɸūñ′ɥa ɔiñ′ɥa, Small cat. B, Wasa′de tū^{n}, Wearing-four-locks-of-hair, in two subgentes, (*a*) Mi^{n}xa′ska, Swan; (*b*) Tse′waɸē qe′ɥa, Dried pond-lily.

13. U̯′pqa^{n}, Elk, one of the seven Hañɥa fireplaces.

14. Ka^{n}′se, Kansa, or I′dats·ē, Holds-a-firebrand-to-the-sacred-pipes-in-order-to-light them, or A′k'a i′niɥak·āci^{n}′a, South-wind people, or Taɟse′ i′niɥk·āci^{n}′a, Wind people, or Pe′ɟse i′niɥk·āci^{n}′a, Fire people. One of the seven Hañɥa fireplaces.

The following social divisions can not be identified: ɔa'de i'niɥk'ăci^{n}'a, Beaver people, said to be a subgens of the Waɔaɔe, no gens specified; Pe'tqa^{n} i'niɥk'ăci^{n}'a, Crane people, said to be a subgens of the Hañɥa (?) sĭnɥsaɥɸĕ; Wapŭñ'ɥa i'niɥk'ăci^{n}'a, Owl people; Ma^{n}yiñ'ka i'niɥk'ăci^{n}'a, Earth people; ɹaqpü' i'niɥk'ăci^{n}'a, meaning not recorded.

There is some uncertainty respecting the true positions of a few subgentes in the camping circle. For instance, Alvin Wood said that the Tsewaɸe qeɥa formed the fourth subgens of the Tse ɥu̱'ɥa inɥse; but this was denied by ɥahiɥe waɥayiñɥa, of the Tsi'ɔu wacta'ɥe, who said that it belonged to the Pa^{n}ɥka wactaɥe prior to the extinction of the subgens. Tsepa ɥaxe of the Wasape gens said that it formed the fourth subgens of his own people. Some make the Tsiɔu wactaɥe the third gens on the left, instead of the fourth. According to ɥahiɥe waɥayiñɥa, "All the Waɔaɔe gentes claim to have come from the water, so they have ceremonies referring to beavers, because those animals swim in the water." The same authority said in 1883 that there were seven men who acted as wactaɥe, as follows: 1, Kaɥiɥe wactaɥe, of the Tsiɔu wactaɥe subgens, who had acted for eight years; 2, Pahü-ska, of the Bald-eagle or Qüɸa pa sa^{n} subgens; 3, ɥɸema^{n}, Clermont, of the ———; 4, Ta^{n}wa^{n}ɥsi hi, of the ———; 5, Niɥka kiɗana^{n} of the Tsiɔu wehakiɸĕ or Night gens; 6, Pa^{n}ɥka waɥayiñɥa, Saucy Ponka, of the Wa'tsetsi or Ponka gens; 7, Niɥka waɔi^{n} ta^{n}a, of the same gens.

On the death of the head chief among the Osage the leading men call a council. At this council four men are named as candidates for the office, and it is asked, "Which one shall be appointed?" At this council a cuka of the Watsetsi (Ponka gens, or else from some other gens on the right) carries his pipe around the circle of councilors from right to left, while a Tsiɔu cuka (one of the Tsiɔu wactaɥe gens, or else one from some other gens on the left) carries the other pipe around from left to right. The ceremonies resemble the Ponka ceremonies for making chiefs. When the chiefs assemble in council a member of the Ka^{n}se or Iɗats'ĕ gens (one on the right) lights the pipes. The criers are chosen from the Ka^{n}se, U̱pqa^{n}, and Mi^{n} k'i^{n} gentes. The Tsiɔu Sĭnɥsaɥɸĕ and Tse ɥu̱ɥa inɥse gentes furnish the soldiers or policemen for the Tsiɔu wactaɥe. A similar function is performed for the Pa^{n}ɥka wactaɥe by the Waɔaɔe wanŭ^{n} and Hañɥa uɥaɸanɥsi gentes. The Sĭnɥsaɥɸĕ and Hañɥa uɥaɸanɥsi are "akiɥa watañɥa," chiefs of the soldiers; the Tse ɥu̱ɥa inɥse and Waɔaɔe Wanŭ^{n} being ordinary soldiers, i. e., subordinate to the others. The Waɔaɔe Ke k'i^{n} are the moccasin makers for the tribe. It is said that in the olden days the members of this gens used turtle shells instead of moccasins, with leeches for strings. The makers of the war-standards and war-pipes must belong to the Waɔaɔe ska.

Saucy Chief is the authority for the following: "Should all the Osage wish to dwell very near another tribe, or in case two or three families of us wish to remove to another part of the reservation, we let the

others know our desire to live near them. We make up prizes for them—a pony, a blanket, strouding, etc—and we ask them to race for them. The fastest horse takes the first prize, and so on. We take along a pipe and some sticks—one stick for each member of the party that is removing. The other people meet us and race with us back to their home. They make us sit in a row; then one of their men or children brings a pipe to one of our party to whom he intends giving a horse. The pipe is handed to the rest of the party. The newcomers are invited to feasts, all of which they are obliged to attend." When the Osage go on the hunt the Tsiəu wactaɣe (chief) tells the Sīnʇsaɣɸĕ and Tse ʇu̱ɣa inʇse where the people must camp. The following evening the Paⁿɥka wactaɣe (chief) tells the soldiers on his side (the Waəaəe and Hañɣa nʇaɸanʇsi) where the camp must be on the following day. The members of the four gentes of soldiers or policemen meet in council and decide on the time for departure. They consult the Tsiəu wactaɣe and Hañɣa (Paⁿɥka wactaɣe?) who attend the council. The crier is generally a man of either the Ʊpqaⁿ or Kaⁿse gens, but sometimes a Miⁿ k'iⁿ man acts. The four leaders of the soldier gentes call on the crier to proclaim the next camping place, etc, which he does thus:

"Ha+! haⁿ da ɣasiⁿ ʇaⁿ awahe əńⁿ tatsi' a piⁿʇau+! Ha+! (Niəü ʇse masiⁿ'ta)
Halloo! day tomorrow on you make up in packs shall they really say Halloo! Missouri river on the other side

tci i heɸa ɸe ta tsi a diⁿtau+!"
tent you place shall they really
(?) in a line (?) say.

which is to say, "Halloo! tomorrow morning you shall pack your goods (strike camp). Halloo! you shall lay them down after reaching (the other side of Missouri river)!"

Then the four leaders of the soldier gentes choose a'kiʇa (policemen) who have a ʇuʇaⁿ'hañɣa or captain, who then acts as crier in giving orders, thus:

"Ha+! ni kawasa e! Ha+! ɣahi ɣe waʇa yiñɣa ni kawasa e! a ɸaki ʇa tatsi'
Halloo! O warrior! Halloo, Chief Saucy! O warrior! you guard shall

adiⁿtau' ni kawasa e!"
they say O warrior!
really

which means, "Halloo, O warrior! Halloo, O warrior, Saucy Chief! They have really said that you shall act as policeman or guard, O warrior!"

These a'kiʇa have to punish any persons who violate the laws of the hunt. But there is another grade of men; the four leaders of the soldier gentes tell the captain to call certain men wa'paɣɸa'əi utsiⁿ', and they are expected to punish any a'kiʇa who fail to do their duty. Supposing Miⁿ k'iⁿ waʇayiñɣa was selected, the crier would say:

"Ha+! ni kawasa e! Ha+, Miⁿ k'iⁿ' waʇa yiñɣa n ikawasa e! Ha+! wa'daɣɸa'əi nɸa tsiⁿ tatsi a diⁿtau, ni kawasa e!"

"Halloo, O warrior! Halloo, O warrior, Saucy Sun Carrier! Halloo, it has been really said that you shall strike the offenders without hesitation, O warrior!"

The four headmen direct a captain to order a Hañka ugaᵭanʇsi man to lead the scouts, and subsequently to call on a Sinʇsaᵭᵭē man for that purpose, alternating between the two sides of the camping circle. There are thus three grades of men engaged in the hunt—the ordinary members of the soldier gentes, the akiga, and the wapaᵭᵭaɔi utsiⁿ.

Should the Osage be warring against the Kansa or any other tribe, and one of the foe slip into the Osage camp and beg for protection of the Tsiɔu waᵭaᵭe (chief), the latter is obliged to help the suppliant. He must send for the Sinʇsaᵭᵭē and Tse ʇᵭka inʇse (leaders), whom he would thus address: "I have a man whom I wish to live. I desire you to act as my soldiers." At the same time the Tsiɔu waᵭaᵭe would send word to the Paⁿᵭka waᵭaᵭe, who would summon a Waɔaɔe and a Hañka utaᵭanʇsi to act as his soldiers or policemen. Meantime the kettle of the Tsiɔu waᵭaᵭe was hung over the fire as soon as possible and food was cooked and given to the fugitive. When he had eaten (a mouthful) he was safe. He could then go through the camp with impunity. This condition of affairs lasted as long as he remained with the tribe, but it terminated when he returned to his home. After food had been given to the fugitive by the Tsiɔu waᵭaᵭe any prominent man of the tribe could invite the fugitive to a feast.

The privilege of taking care of the children was given to the Tsiɔu waᵭaᵭe and the Paⁿᵭka waᵭaᵭe, according to Sauey Chief. When a child (on the Tsiɔu side) is named, a certain old man is required to sing songs outside of the camp, dropping some tobacco from his pipe down on the toes of his left foot as he sings each song. On the first day the old man of the Tsiɔu (waᵭaᵭe?) takes four grains of corn, one grain being black, another red, a third blue, and a fourth white, answering to the four kinds of corn dropped by the four buffalo, as mentioned in the tradition of the Osage. After chewing the four grains and mixing them with his saliva, he passes them between the lips of the child to be named. Four stones are put into a fire, one stone toward each of the four quarters. The Tsiɔu old man orders some cedar and a few blades of a certain kind of grass that does not die in winter, to be put aside for his use on the second day. On the second day, before sunrise, the Tsiɔu old man speaks of the cedar tree and its branches, saying, "It shall be for the children." Then he mentions the river, the deep holes in it, and its branches, which he declares shall be medicine in future for the children. He takes the four heated stones, places them in a pile, on which he puts the grass and cedar. Over this he pours water, making steam, over which the child is held. Then four names are given by the headman of the gens to the father, who selects one of them as the name for the child. Meantime men of different gentes bring cedar, stones, etc, and perform their respective ceremonies. The headman (Tsiɔu waᵭaᵭe?) takes some of the water (into which he puts some cedar), giving four sips to the child. Then he dips his own left hand into the water and rubs the child down the left

side, from the top of the head to the feet; next he rubs it in front, then down the right side, and finally down the back. He invites all the women of his gens who wish to be blessed to come forward, and he treats them as he did the infant. At the same time the women of the other gentes are blessed in like manner by the headmen of their respective gentes.

THE IOWA

The Iowa camping circle was divided into two half-circles, occupied by two phratries of four gentes each. The first phratry regulated the hunt and other tribal affairs during the autumn and winter; the second phratry took the lead during the spring and summer. The author is indebted to the late Reverend William Hamilton for a list of the Iowa gentes, obtained in 1880 during a visit to the tribe. Since then the author has recorded the following list of gentes and subgentes, with the aid of a delegation of the Iowa who visited Washington:

First phratry

Gentes	*Subgentes*
1. Tu′-na^{n}-p'i^{n}, Black bear. Tohi^{n} and Çiɥre wonañe were chiefs of this gens in 1880. Tohi^{n} kept the sacred pipe.	1. Ta′-po-çka, a large black bear with a white spot on the chest. 2. Pū^{n}′-xa çka, a black bear with a red nose; literally, Nose White. 3. Mŭ^{n}-tci′-nye, Young black bear, a short black bear. 4. Ki′-ro-ko′-qo-tce, a small reddish black bear, motherless; it has little hair and runs swiftly.
2. Mi-tci′-ra-tce, Wolf. . . . . Ma′ hi^{n} was a chief of this gens.	1. Cū^{n}′-ta^{n} çka, White-wolf. 2. Cŭn′-ta^{n} çe-we, Black-wolf. 3. Cū^{n}′-ta^{n} qo′-ɥɔe, Gray-wolf. 4. Ma-nyi′-ka-qçi′, Coyote.
3. Tce′-xi-ta, Eagle and Thunder-being gens.	1. Na′ tci-tce′, i. e., Qra′-qtci, Real or Golden eagle. 2. Qra′ hŭñ′-e, Ancestral or Gray eagle. 3. Qra′ ɥre′-ye, Spotted-eagle. 4. Qra′ pa ça^{n}, Bald-eagle.
4. Qo′-ta-tci, Elk; now extinct. The Elk gens furnished the soldiers or policemen.	1. Ŭ^{n}′-pe-xa qa^{n}′-ye, Big-elk. 2. Ŭ^{n}′-pe-xa yiñ′-e, Young-elk (?). 3. Ŭ^{n}′-pe-xa ɔre′-ɥɔe yiñ′-e, Elk-somewhat-long. 4. Ho′-ma yiñ′-e, Young elk (?). The difference between Ŭ^{n}pexa and Homa is unknown. The former may be the archaic name for "elk."

First phratry—Continued

Gentes	*Subgentes*
5. Pa′-qça, Beaver. Probably the archaic name, as beaver is now ra-we. The survivors of this gens have joined the Pa-ça or Beaver gens of the Oto tribe.	1. Ra-we′ qa^{n}′ ye, Big-beaver. 2. Ra-ɓro′-ɻɔe, meaning unknown. 3. Ra-we′ yiñ′-e, Young-beaver. 4. Ni′wa^{n}-ci′-ke, Water-person.

Second phratry

6. Ru′-tce, Pigeon.....	1. Mi^{n}-ke′ qa^{n}′-ye, Big-raccoon. 2. Mi^{n}-ke′ yiñ′-e, Young-raccoon. 3. Ru′-tce yiñ′-e, Young-pigeon. 4. Co′-ke, Prairie-chicken, gronse.
7. A′-ru-qwa, Buffalo.....	1. Tce-ɻo′ qa^{n}′-ye, Big-buffalo-bull. 2. Tce-ɻo′ yiñ′-e, Young-buffalo-bull. 3. Tce p'o′-cke yiñ′-e, Young-buffalo-bull-that-is-distended (?). 4. Tce yiñ′-ye, Buffalo-calf.
8. Wa-ka^{n}′, Snake. An extinct gens.	1. Wa-ka^{n}′ ɔi, Yellow-snake, i. e., Rattlesnake. 2. Wa-ka^{n}′-qtci, Real-snake (named after a species shorter than the rattlesnake). 3. Ce′-ke yiñ′-e, Small or young ceke, the copperhead snake (?). 4. Wa-ka^{n}′ qo′-ɻɔe, Gray-snake (a long snake, which the Omaha call swift blue snake).
9. Mañ′-ko-ke, Owl. Extinct.	The names of the subgentes have been forgotten.

An account of the mythical origin of each Iowa gens, first recorded by the Reverend William Hamilton, has been published in the Journal of American Folk-lore.[1]

The visiting and marriage customs of the Iowa did not differ from those of the cognate tribes, nor did their management of the children differ from that of the Dakota, the Omaha, and others.

Murder was often punished with death, by the nearest of kin or by

[1] Vol. IV, No. 15, pp. 338–340, 1891.

some friend of the murdered person. Sometimes, however, the murderer made presents to the avengers of blood, and was permitted to live.

THE OTO

The author has not yet learned the exact camping order of the Oto and Missouri tribes, though he has recorded lists of their gentes (subject to future revision), with the aid of Ke-ɥreɔ̃e, an Oto, Ckaɥɔinye, a Missouri, and Battiste Deroin, the interpreter for the two tribes. These gentes are as follows: 1, Pa-ça′, Beaver; 2, Tuna^{n}′-p'i^{n}, Black bear, or Mũ^{n}-tci′-ra-tce, Wolf; 3, A-ru′-qwa, Buffalo; 4, Ru′-qtca, Pigeon; 5, Ma-ka′ tce, Owl; 6, Tce′-xi-ta, Eagle, Thunderbird, etc; 7, Wa-ka^{n}′, Snake.

THE NI-U -T'A-TCI OR MISSOURI

This tribe, which for many years has been consolidated with the Oto, has at least three gentes. It may have had more, but their names have not yet been recorded. 1, Tu-na^{n}′-p'i^{n}, Black bear; 2, Tce-xi′-ta, Eagle, Thunderbird, etc, in four subgentes: (*a*) Wa-kan′-ta, Thunderbird; (*b*) Qra, Eagle; (*c*) ɥre'-ta^{n}, Hawk; (*d*) Mo′-mi, A-people-who eat-no-small-birds-which-have-been-killed-by-larger-ones (a recent addition to this gens, probably from another tribe); 3, Ho-ma′ or Ho-ta′-tci, Elk.

THE HOTCAÑGARA OR WINNEBAGO

The Winnebago call themselves Ho tcañ′-ga-ră, "First or parent speech." While they have gentes, they have no camping circle, as their priscan habitat was in a forest region. The following names were obtained from James Alexander, a full-blood of the Wolf gens, and from other members of the tribe:

1. *Wolf gens*—Common name, Cũñk i-ki′-ka-ra′ tca-da, or Cũñk-tcañk′ i-ki′-ka-ra′-tca-da, Those-calling-themselves-after-the-dog-or-wolf; archaic name, ¢e-go′-ni-na, meaning not recorded.

2. *Black-bear gens*—Common name, Ho^{n}tc′ i-ki′-ka-ra′-tca da, They-call-themselves-after-the-black-bear; archaic name, Tco′-na-ke-ră, meaning not recorded.

3. *Elk gens*—Common name, Hu wa^{n}′-i-ki′-ka-ra′-tca-da, They-call-themselves-after-the elk; archaic name not recorded.

4. *Snake gens*—Common name, Wa-ka^{n}′ i ki′-ka-ra′-tca-da, They-call-themselves-after-a-snake; archaic name not recorded.

5. *Bird gens*—Common name, Wa-niñk′ i-ki′-ka-ra′-tca-da, They-call-themselves-after-a-bird; archaic name not recorded. This gens is composed of four subgentes, as follows: (*a*) Hi-tca-qce-pa-ră, or Eagle; (*b*) Ru-tcke, or Pigeon; (*c*) Ke-re-tcũ^{n}, probably Hawk; (*d*) Wa-ka^{n}′-tca-ră, or Thunderbird. The archaic names of the subgentes were not recorded.

6. *Buffalo gens*—Common name, Tce′ i-ki′-ka-ra′-tca da, They-call-themselves-after-a-buffalo; archaic name not recorded.

7. *Deer gens*—Common name, Tca′ i-ki′-ka-ra′-tca-da, They-call-themselves-after-a-deer; archaic name not recorded.

8. *Water-monster gens*—Common name, Wa-ktee′-qi i-ki′-ka-ra′-tca-da, They-call-themselves-after-a-water-monster; archaic name not recorded.

Some of the Winnebago say that there is an Omaha gens among the Winnebago of Wisconsin, but James Alexander knew nothing about it. It is very probable that each Winnebago gens was composed of four subgentes; thus, in the tradition of the Winnebago Wolf gens, there is an account of four kinds of wolves, as in the corresponding Iowa tradition.

The Winnebago lodges were always built with the entrances facing the east. When the warriors returned from a fight they circumambulated the lodge four times, sunwise, stopping at the east just before entering.

THE MANDAN

The Mandan tribe has not been visited by the author, who must content himself with giving the list of gentes furnished by Morgan, in his "Ancient Society." This author's system of spelling is preserved:

1. Wolf gens, Ho-ra-ta′-mŭ-make (Qa-ra-ta′ nu-mañ′-ke?).
2. Bear gens, Mä-to′-no-mäke (Ma-to′ nu-mañ′-ke).
3. Prairie-chicken gens, See-poosh′-kä (Si-pu′-eka nu-mañ′-ke).
4. Good-knife gens, Tä-na-tsŭ′-kä (Ta-ne-tsu′-ka nu-mañ′-ke?).
5. Eagle gens, Ki-tä′-ne-mäke (Qi-ta′ nu-mañ′-ke?).
6. Flat-head gens, E-stä-pa′ (Hi-sta pe′ nu-mañ′-ke?).
7. High-village gens, Me-te-ah′-ke.

All that follows concerning the Mandan was recorded by Prince Maximilian in 1833. Polygamy was everywhere practiced, the number of wives differing, there being seldom more than four, and in general only one. The Mandan marriage customs resemble those of the Dakota and other cognate peoples.

When a child is born a person is paid to give it the name chosen by the parents and kindred. The child is held up, then turned to all sides of the heavens, in the direction of the course of the sun, and its name is proclaimed. A Mandan cradle consists of a leather bag suspended by a strap to a crossbeam in the hut.

There are traces of descent in the female line; for example, sisters have great privileges; all the horses that a young man steals or captures in war are brought by him to his sister. He can demand from his sister any object in her possession, even the clothing which she is wearing, and he receives it immediately. The mother-in-law never speaks to her son-in-law, unless on his return from war he bring her the scalp and gun of a slain foe, in which event she is at liberty from that moment to converse with him. This custom is found, says Maximilian, among the Hidatsa, but not among the Crow and Arikara. While the Dakota, Omaha, and other tribes visited by the author have the custom of

"bashfulness," which forbids the mother-in-law and son-in-law to speak to each other, no allowable relaxation of the prohibition has been recorded.

THE HIDATSA

Our chief authority for the names of the Hidatsa gentes is Morgan's "Ancient Society." Dr Washington Matthews could have furnished a corrected list from his own notes had they not unfortunately been destroyed by fire. All that can now be done is to give Morgan's list, using his system of spelling:

1. Knife, Mit-che-ro′-ka.
2. Water, Min-ne pä′-ta.
3. Lodge, Bä-ho-hä′-ta.
4. Prairie chicken, Seech-ka-be-ruh-pä′-ka (Tsi-tska′ do-lipa′-ka of Matthews; Tsi-tska′ dȼo-qpa′-ka in the Bureau alphabet).
5. Hill people, E-tish-sho′-ka.
6. Unknown animal, Ali-nali-ha-nä′-me-te.
7. Bonnet, E-ku′-pä-be-ka.

The Hidatsa have been studied by Prince Maximilian (1833), Hayden, and Matthews, the work of the last writer[1] being the latest one treating of them; and from it the following is taken:

Marriage among the Hidatsa is usually made formal by the distribution of gifts on the part of the man to the woman's kindred. Afterward presents of equal value are commonly returned by the wife's relations, if they have the means of so doing and are satisfied with the conduct of the husband. Some travelers have represented that the "marriage by purchase" among the Indians is a mere sale of the woman to the highest bidder, whose slave she becomes. Matthews regards this a misrepresentation so far as it concerns the Hidatsa, the wedding gift being a pledge to the parents for the proper treatment of their daughter, as well as an evidence of the wealth of the suitor and his kindred. Matthews has known many cases where large marriage presents were refused from one person, and gifts of much less value accepted from another, simply because the girl showed a preference for the poorer lover. Marriages by elopement are considered undignified, and different terms are applied to a marriage by elopement and one by parental consent. Polygamy is practiced, but usually with certain restrictions. The husband of the eldest of several sisters has a claim to each of the others as she grows up, and in most cases the man takes such a potential wife unless she form another attachment. A man usually marries his brother's widow, unless she object, and he may adopt the orphans as his own children. Divorce is easily effected, but is rare among the better class of people in the tribe. The unions of such people often last for life; but among persons of a different character divorces are common. Their social discipline is not very severe. Punishments by law, administered by the

[1] Ethnography and Philology of the Hidatsa Indians; U. S. Geological and Geographical Survey, miscellaneous publications No. 7, Washington, 1877.

"soldier band," are only for serious offenses against the regulations of the camp. He who simply violates social customs in the tribe often subjects himself to no worse punishment than an occasional sneer or taunting remark; but for grave transgressions he may lose the regard of his friends. With the Hidatsa, as with other western tribes, it is improper for a man to hold a direct conversation with his mother-in-law; but this custom seems to be falling into disuse.

The kinship system of the Hidatsa does not differ materially from that of any of the cognate tribes. When they wish to distinguish between the actual father and a father's real or potential brothers, or between the actual mother and the mother's real or potential sisters, they use the adjective ka'ti (kaqtᶜi), real, true, after the kinship term when the actual parent is meant.

THE CROW OR ABSAROKA

As this tribe belongs to the Hidatsa linguistic substock, it is very probable that the social laws and customs of the one people are identical with those of the other, as there has been nothing to cause extensive differentiation.

It is not known whether the Hidatsa and Crow tribes ever camped in a circle. Morgan's list of the Crow gentes is given, with his peculiar notation, as follows:

1. Prairie Dog gens, A-che-pä-be'-cha.
2. Bad Leggings, E-sach'-ka-buk.
3. Skunk, Ho-ka-rut'-cha.
4. Treacherous Lodges, Ash-bot-chee-ah.
5. Lost Lodges, Ah-shin'-nä de'-ah (possibly intended for Last Lodges, those who camped in the rear).
6. Bad Honors, Ese-kep-kä'-buk.
7. Butchers, Oo-sä-bot'-see.
8. Moving Lodges, Ah-hä-chick.
9. Bear-paw Mountain, Ship-tet'-zä.
10. Blackfoot Lodges, Ash-kane'-na.
11. Fish Catchers, Boo-a-dä'-sha.
12. Antelope, O-hot-du-sha.
13. Raven, Pet-chale-ruh-pä'-ka.

THE BILOXI

The tribal organization of this people has disappeared. When the few survivors were visited by the author at Lecompte, Louisiana, in 1892 and 1893, they gave him the names of three of the clans of the Biloxi, descent being reckoned in the female line. These clans are: 1, Ita aⁿyadi, Deer people; 2, Oⁿ‡i aⁿyadi, Bear people; 3, Naqotod¢a aⁿyadi, Alligator people. Most of the survivors belong to the Deer clan. The kinship system of the Biloxi is more complicated than that of any other tribe of the stock; in fact, more than that of any of the

tribes visited by the author. The names of 53 kinship groups are still remembered, but there are at least a dozen others whose names have been forgotten. Where the ɸegiha language, for example, has but one term for grandchild and one grandchild group, the Biloxi has at least fourteen. In the ascending series the Dakota and ɸegiha do not have any terms beyond grandfather and grandmother. But for each sex the Biloxi has terms for at least three degrees beyond the grandparent. The ɸegiha has but one term for father's sister and one for mother's brother, father's brother being "father," and mother's sister "mother." But the Biloxi has distinct terms (and groups) for father's elder sister, father's younger sister, father's elder brother, father's younger brother, and so on for the mother's elder and younger brothers and sisters. The Biloxi distinguishes between an elder sister's son and the son of a younger sister, and so between the daughter of an elder sister and a younger sister's daughter. A Biloxi man may not marry his wife's brother's daughter, nor his wife's father's sister, differing in this respect from a Dakota, an Omaha, a Ponka, etc; but he can marry his deceased wife's sister. A Biloxi woman may marry the brother of her deceased husband. Judging from the analogy furnished by the Kansa tribe it was very probably the rule before the advent of the white race that a Biloxi man could not marry a woman of his own clan.

THE TUTELO

It is impossible to learn whether the Tutelo ever camped in a circle The author obtained the following clan names (descent being in the female line) from John Key, an Indian, on Grand River reservation, Ontario, Canada, in September, 1882: On "one side of the fire" were the Bear and Deer clans, the Wolf and Turtle being on the other side. John Key's mother, maternal grandmother, and Mrs Christine Buck were members of the Deer clan. There were no taboos. The Tutelo names of the clans have been forgotten.

THE CATAWBA

Dr A. S. Gatschet, of the Bureau of Ethnology, visited the Catawba tribe prior to March, 1882, when he obtained an extensive vocabulary of the Catawba language, but he did not record any information respecting the social organization of the people.

For further information regarding the Siouan tribes formerly inhabiting the Atlantic coast region, see "Siouan Tribes of the East," by James Mooney, published as a bulletin of the Bureau of Ethnology.

TUSAYAN KATCINAS

BY

JESSE WALTER FEWKES

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THE GROUP OF TUSAYAN CEREMONIALS CALLED KATCINAS[1]

By Jesse Walter Fewkes

INTRODUCTION

In their use of the word Katcina[2] the Hopi or Moki apply the term to supernatural beings impersonated by men wearing masks or by statuettes in imitation of the same. The dances in which the former appear are likewise called by the same name which with the orthography "Cachena" is used in descriptions of these dances in the valley of the upper Rio Grande. The present use of the term among the Tusayan Indians leads me to consider it as almost a synonym of a supernatural being of surbordinate rank to the great deities. Ancestral worship plays a not inconspicuous part in the Hopi conception of a Katcina.

When we endeavor to classify the ceremonials which form the ritual practiced by the Tusayan villagers, the subject is found to be so complex that it can be adequately treated only by the help of observations extending through many years. The plan which I have followed in my work, as will be seen in previous publications, has been to gather and record data in regard to the details of individual observances as a basis for generalization.

My former publications on this subject have therefore been simply records of observations.[3] For various reasons it has seemed well to anticipate a final and general account and interpretation, with tentative efforts at a classification to serve as a stepping-stone to a more exhaustive and complete discussion of the relationship of these observances, which would naturally appear in an elaborate memoir necessitating a broader method of treatment than any yet adopted.

[1] These studies were made while the author was connected with the Hemenway Expedition from 1890 to 1894, and the memoir, which was prepared in 1894, includes the results of the observations of the late A. M. Stephen as well as of those of the author.

[2] The letters used in spelling Indian words in this article have the following sounds: a, as in far; à, as in what; ai, as i in pine; e, as a in fate; i, as in pique; ı, as in pin; u, as in rule; ŭ, as in but; ü, as in the French tu; p, b, v, similar in sound; t and d, like the same in tare and dare, almost indistinguishable; tc, as ch in chunk; c, as sh in shall; ñ, as n in syncope; s, sibilant; r, obscure rolling sound; l, m, n, k, h, y, z, as in English.

[3] These observations are confined to three villages on the East mesa, which has been the field more thoroughly cultivated by the members of the Hemenway Expedition.

At the present stage of my researches it would be too early to write such an account of the ceremonial calendar of the Tusayan villagers, but it has been deemed well to put on record, with many new observations, this preliminary outline of what may be a portion of a general system, to aid other investigators in kindred fields of study. When I began my work, four years ago, the task of bringing order out of what appeared to be a hopeless confusion seemed well-nigh impossible, but as one ceremony after another was studied it was found that the exactness of the ritual as exemplified in ceremonial presentations pertained even to details, and that there was a logical connection running throughout all the religious observances of the Tusayan Indians, the presentations of which were practically little influenced by white races with whom the people had been brought in contact. As these ceremonials were studied more sympathetically I discovered a unity throughout them which, whatever their origin may have been, placed them in marked contrast to those of the nomads by whom they were surrounded. They were found to belong to a type or ceremonial area in which the other Pueblos are embraced, the affinities of which carry us into different geographic regions of the American continent.

But while this type differs or differed in ancient times from those of Athapascan or Shoshonean aborigines, it bears evidence of a composite nature. It had become so by contributions from many sources, and had in turn left its impress on other areas, so that as a type the Pueblo culture was the only one of its kind in aboriginal America. With strong affinities on all sides it was unique, having nearest kinship with those of Mexico and Central America.

The geographic extension of the Pueblo type of culture was no doubt formerly much greater than it is at the present time. What its original boundaries were future investigation will no doubt help us to decide, but the problem at present before us is the determination of its characteristics as a survival in our times. When once this is satisfactorily known, and not until then, can we advance with confidence to wider generalizations as to its past distribution and offer theories regarding its affinities with other ceremonial areas of the American race.

It is doubtless true that we are not progressing beyond what can be claimed to be known when we say that all the Pueblo peoples belong to the same ceremonial type. I am sure that in prehistoric and historic times delegations from the Rio Grande country have settled among the Tusayan villagers, and that many families of the latter have migrated back to the Rio Grande again to make permanent homes in that section. The most western and the most eastern peoples of this Pueblo culture-stock have been repeatedly united in marriage, bringing about a consequent commingling of blood, and the legends of both tell of their common character. It is too early in research to inject into science the idea that the Pueblos are modified Indians of other stocks, and

we outstrip our knowledge of facts if we ascribe to any one village or group of villages the implication involved in the expression, "Father of the Pueblos." Part of the Pueblo culture is autochthonal, but its germ may have originated elsewhere, and no one existing Pueblo people is able satisfactorily to support the claim that it is ancestral outside of a very limited area.

In the present article I have tried to present a picture of one of the two great natural groups of ceremonials into which the Tusayan ritual is divided. I have sought also to lay a foundation for comparative studies of the same group as it exists in other pueblos, but have not found sufficient data in regard to these celebrations in other villages to carry this comparative research very far. Notwithstanding these dances occur in most of the pueblos, the published data about them is too meager for comparative uses. No connected description of these ceremonies in other pueblos has been published; of theoretical explanations we have more than are profitable. It is to be hoped that the ever-increasing interest in the ceremonials of the Pueblos of the southwest will lead to didactic, exoteric accounts of the rituals of all these peoples, for a great field for research in this direction is yet to be tilled.

In the use, throughout this article, of the words "gods," "deities," and "worship" we undoubtedly endow the subject with conceptions which do not exist in the Indian mind, but spring from philosophic ideas resulting from our higher culture. For the first two the more cumbersome term "supernatural beings"[1] is more expressive, and the word "spirit" is perhaps more convenient, except from the fact that it likewise has come to have a definite meaning unknown to the primitive mind.

Worship, as we understand it, is not a proper term to use in the description of the Indian's methods of approaching his supernal beings. It involves much which is unknown to him, and implies the existence of that which is foreign to his conceptions. Still, until some better nomenclature, more exactly defining his methods, is suggested, these terms from their convenience will still continue in common use.

The dramatic element which is ascribed to the Katcina[2] ritual is more prominent in the elaborate than in the abbreviated presentations, as would naturally be the case, but even there it is believed to be less striking than in the second group or those in which the performers are without masks.

There exists in Hopi mythology many stories of the old times which form an accompanying body of tradition explaining much of the symbolism and some of the ritual, but nowhere have I found the sequence of the ceremonials to closely correspond with the episodes of the myth. In the Snake or the Flute dramatizations this coincidence of myth and ritual is more striking, but in them it has not gone so far as to be

[1] "Souls" in the broadest conception of the believers in Tylor's animistic theory.

[2] The distinction between elaborate and abbreviated Katcinas will be spoken of later.

comparable with religious dramatizations of more cultured peoples. Among the Katcinas, however, it is more obscure or even very limited. While an abbreviated Katcina may be regarded as a reproduction of the celebrations recounted in legends of times when real supernatural beings visited the pueblos, and thus dramatizes semimythic stories, I fail to see aught else in them of the dramatic element.

The characteristic symbolism is prescribed and strictly conforms to the legends. Explanations of why each Katcina is marked this or that way can be gathered from legends, but the continuous carrying out of the sequence of events in the life of any Katcina, or any story of creation or migration, did not appear in any abbreviated[1] Katcina which was studied. In this subdivision a dramatic element is present, but only in the crudest form. In the elaborate Katcinas, however, we find an advance in the amount of dramatization, or an attempt to represent a story or parts of the same. Thus we can in Soyáluña follow a dramatic presentation of the legend of the conflict of the sun with hostile deities or powers, in which both are personified.

I must plead ignorance of the esoteric aspect of the Tusayan conceptions of the Katcinas when such exists. This want of knowledge is immaterial, for the object of this article is simply to record what has been seen and goes no further. I will not say that a complete account of the Katcinas can be given by such a treatment, and do not know how much or how little of their esoterism has eluded me, but these observations are wholly exoteric records of events rather than esoteric explanations of causes. It is thought that such a treatment of the subject will be an important contribution to the appreciation of explanations which it naturally precedes.

Although it seems probable that the ritual of primitive man contains elements of a more or less perfect dramatization of his mythology, I incline to the opinion that the ritual is the least variable and from it has grown the legend as we now know it. The question, Which came first, myth or ritual? is outside the scope of this article.

Any one who has studied the ceremonial system of the Tusayan Indians will have noticed the predominance of great ceremonials in winter. From harvest time to planting there is a succession of celebrations of most complicated and varied nature, but from planting to harvesting all these rites are much curtailed. The simplest explanation of this condition would be, and probably is, necessity. There is

[1] It would be interesting to know what relationship exists between abbreviated and elaborate Katcinas. Are the former, for instance, remnants of more complicated presentations in which the secret elements have been dropped in the course of time? Were they formerly more complicated, or are they in lower stages of evolution, gathering episodes which if left alone would finally make them more complex? I incline to the belief that the abbreviated Katcinas are remnants, and their reduction due to practical reasons. In a general way the word Katcina may be translated "soul" or "deified ancestor," and in this respect affords most valuable data to the upholders of the animistic theory. But there are other elements in Tusayan mythology which are not animistic. As Mogk has well shown in Teutonic mythology, nature elements and the great gods are original, so among the Hopi the nature elements are not identified with remote ancestors, nor is there evidence that their worship was derivative. As Saussaye remarks, "Animism is always and everywhere mixed up with religion; it is never and nowhere the whole of religion."

not time enough to devote to great and elaborate ceremonials when the corn must be cared for. Time is then too precious, but when the corn is high and the crop is in sight, or during the long winter when the agriculturist is at home unemployed, then the superstitious mind has freedom to carry on elaborate rites and observances, and then naturally he takes part in the complex ceremonies. Hence the spring and early summer religious observances are abbreviated. Although the Pueblo farmer may thoroughly believe in his ceremonial system as efficacious, his human nature is too practical to consume the precious planting time with elaborate ceremonials. But when he sees that the crop is coming and harvest is at hand, then he begins the series of, to him, magnificent pageants which extend from the latter part of August until March of the following year.

It has been proven by repeated observations of the same ceremonials that there is great constancy in the way successive presentations of the ritual are carried out year after year. The inevitable modifications resulting from the death of old priests undoubtedly in course of time affect individual observances, but their ritual is never voluntarily changed. The ceremonials which I have here and elsewhere described were not invented by them to show to me, nor will any religious society of the Hopi at the present day get up a ceremony to please the white man. Each observance is traditional and prescribed for a certain time of the year.

TABULAR VIEW OF THE SEQUENCE OF TUSAYAN CELEBRATIONS[1]

The following tabular view of the sequence of ceremonials may aid in the study of the Hopi calendar, and indicate the ceremonials presented to us for classification:

A^2 { Katcina's return. / Powámû. / Pálüliikoñti.

The abbreviated Katcinas commonly come in the interval, and vary somewhat from year to year.

B { Nimán (Katcina's departure). / Snake or Flute (alternating). / Lálakoñti. / Mamzraúti. / Wüwütcimti[3] (sometimes Naácnaiya). / Soyáluña.

[1] By Gregorian months, which of course the Hopi do not recognize by these names or limits. Their own "moons" have been given elsewhere.

[2] The months to which the first division roughly corresponds are January to July. The second division includes, roughly speaking, August and December (inclusive). More accurately defined the solar year is about equally divided into two parts by the Niman, which is probably the exact dividing celebration of the ceremonial year.

[3] There is a slight *r* sound in the first two syllables of Wuwutcimti.

Masked or Katcina Ceremonials

December	*January*	*February*	*March*	*April–June*	*July*
Soyáluña.	Pa.	Powámú.	Pálülükoñti.	Variable abbreviated Katcinas.	Nimán.

Unmasked or Nine Days' Ceremonials

August	*September*	*October*	*November*
Snake or Flute.	Lálakoñti.	Mamzraúti.	Wüwütcímti or Naácnaiya.

The Katcina chief, Íntiwa, erects his altar every year in the Móñkiva, but different kivas by rotation or otherwise celebrate the dance of the Nimán by their appropriate presentation, thus: The men of the Wikwáliobikiva celebrated the dance in 1891; those of Nacábkiva in 1892; those of the Álkiva in 1893, and probably in 1894 the men of the Teivatokiva will personate the last Katcina of the summer. It thus will appear that the special supernatural personage represented varies from year to year within certain limits, and the variations mean nothing more than that the members of the different kivas participate in rotation.

NAMES OF MONTHS AND CORRESPONDING CEREMONIALS

The Tusayan names of the months are as follows:

Months	*Ceremonials*
1. Powámü'iyawû[1]	Powámû.
2. Ü'cümü'iyawû	Palülükoñti.
3. Kwiyaomü'iyawû.	
4. Hakitonmü'iyawû.	
5. Kelemü'iyawû.	

[1] The word mü'iyawû means "moon," by which it would seem that our satellite determines the smaller divisions of the year.

Months	*Ceremonials*
6. Kyamü'iyawû	Nimán.
7. Pamü'iyawû	(Snake, Flute.)
8. Powa'mü'iyawû	Lálakoñti.
9. Hüüikmü'iyawû.	
10. Ŭ'ciümü'iyawû	Mamzraúti.
11. Kelemü'iyawû	Wüwütcimti.
12. Kyamü'iyawû	Soyalñña.
13. Pamü'iyawû	Katcina's return.

The second part of the October (Ŭ'cü) is said to be called Tü'hoe. If this is recognized as a lunar period we would have 14 divisions to the ceremonial year. In the Pamü'iyawû, the Snake ceremony, and the Katcina's return, the same Nüitiwa (struggle of maids for bowls, etc) occurs.

It will be noticed that the five summer moons have the same names as those of the winter; by that I do not mean to discard the divisions "named" and "nameless," elsewhere used on good authority. The questions regarding the nomenclature of the different moons and their number are very perplexing and not yet satisfactorily answered.

The determination of the number of moons recognized in the year or the interval between the successive reappearance of the sun in his house (Táwaki) at the summer solstitial rising is a most important question, for a satisfactory answer to which my researches thus far are insufficient. Several of the priests have told me that there were 13, as given above; but others say there are 12, and still others, 14. The comparative ethnologist, familiar with Mexican calendars, would be glad to accept the report that there were 13, in which case there would be introduced a remarkable harmony between peoples akin in many ways. Although, however, there is good evidence that 13 is recognized by some priests, the negative evidence must be mentioned, especially as it is derived from men whose knowledge of Hopi lore I have come to respect. I have, however, provisionally followed the opinion of those who hold that the Hopi recognize 13 ceremonial months in their calendar.

If the second part of the Ŭ'cü moon be called Tü'hoe, we would have 14 moons, which would give 6 between 2 Powa, or 2 Pa, Kele, Kya, and divide the ceremonial year into two parts of 7 moons each. The Katcina's return (Ŭ'kine), or the beginning of the Katcinas, then occurs in the Pa moon; they end in Kyá at the Nimán (last, farewell). The group of unmasked ceremonials (nine days) likewise begins at the Pa moon in the Snake or Flute, and ends at the winter, Kyá, or Soyáluña.

In endeavoring to find some reason for the similarity of names in the two groups of months which compose the ceremonial year I have this interesting hint, dropped by one of the priests: "When we of the upper world," he said, "are celebrating the winter Pa moon the people of the under world are engaged in the observance of the Snake or Flute, and vice versa." The ceremonials in the two worlds are synchronous. "That is the reason," said my informant, "that we make the Snake or Flute pahos during the winter season, although the dance is not celebrated until the corresponding month of the following summer."[1]

MEANS OF DETERMINING THE TIME FOR CEREMONIALS

Among the Hopi Indians there are priests (tawawympkiyas) skilled in the lore of the sun, who determine, by observations of the points on the horizon, where the sun rises or sets, the time of the year proper for religious ceremonials. Two of these points are called sun houses, one at tátyüka,[2] which is called the sun house (táwaki) par excellence, another at kwiniwi, which also is called táwaki, or sun house.

The points on the horizon used in the determination of ceremonial events are as follows:

1. Táwaki (hüitca, opening). The horizon point properly called saywúwee marks the cardinal point tátyüka or place of sunrise at the winter solstice. The winter ceremony Soyáluña is determined not by sunrise, but by sunset, although, as a general thing, the time of summer ceremonials is determined by observations of sunrise.

2. Másnamüzrii (másІ, drab or gray; namüzrii, wooded ridge). This point is the ridge or crest of the mesa, east of Püp'ee.

3. Paviiñ'teómo (paviiñ', young corn; teómo, mound). A point on the old wagon trail to Fort Defiance, a little beyond the head of Keams canyon.

4. Hoñwíteomo (derivation obscure; hóñwi, erect).

5. Nüvákteomo (nüvák, snow; teomo, mound). When the sun reaches here on its northern journey the Honáni or Badger people plant corn; the other Hopi people plant melons, squashes, and gourds.

6. Püihomotaka (püiii, round, hump; hómo, obscure; táka, man; possibly many hump-back men). When the sun reaches here the Pátki

[1] From their many stories of the under world I am led to believe that the Hopi consider it a counterpart of the earth's surface, and a region inhabited by sentient beings. In this under world the seasons alternate with those in the upper world, and when it is summer in the above it is winter in the world below, and vice versa. Moreover, ceremonies are said to be performed there as here, and frequent references are made to their character. It is believed that these ceremonies somewhat resemble each other and are complemental. In their cultus of the dead the under world is also regarded as the abode of the "breath-body" of the deceased, who enter it through a sipapu, often spoken of as a lake. I have not detected that they differentiate this world into two regions, the abode of the blessed and that of the damned.

[2] The Tawaki of tátyüka is the sun house. There is no sun house at hopeko nor at tevyuña. The names of the four horizon cardinal points are, kwiniwi, northwest; tevyú'ña, southwest; tatyúka, southeast, and hopokyüka (syncopated hopeko), northeast.

or Water people plant corn. When the sun returns here the Snake-Antelope fraternities assemble for the Snake dance.

7. Kwiteala.[1] When the sun rises at this point on his northward journey general planting begins, which continues until the summer solstice. When the sun returns to this point on his southerly journey the Nimaŋkateina is celebrated.

8. Taíovi (?).

9. Owatcoki (owa, rock; tcoki, mound house).

10. Wii'nacakabi (wii'na, pole; caka, ladder).

11. Wakáeva, cattle spring, 12 miles north of Keams canyon.

12. Pavánkyaki, swallow house.

13. Tiiyiika, summer solstice.

We are justified in accepting the theory that sun and moon[2] worship is usual among primitive men. Whether that of the sun or of our satellite was the earlier it is not in the province of this article to discuss, but it is doubtless true that sun worship is a very ancient cult among most primitive peoples. The Pueblos are not exceptions, and while we can not say that their adoration is limited to the sun, it forms an essential element of their ritual, while their anhydrous environment has led them into a rain-cloud worship and other complexities. I think we can safely say, however, that the germ of their astronomy sprang from observations of the sun, and while yet in a most primitive condition they noticed the fact that this celestial body did not always rise or set at the same points on the horizon. The connection between these facts and the seasons of the year must have been noted early in their history, and have led to orientation, which plays such an important part in all their rituals. Thus the approach of the sun to a more vertical position in the sky in summer and its recession in winter led to the association of time when the earth yielded them their crops with its approach, and the time when the earth was barren with its recession. These epochs were noticed, however, not by the position of the sun at midday, but at risings and settings, or the horizon points. The two great epochs, summer and winter, were, it is believed, connected with

[1] Note the similarity in sound to the Nahuatl month, Quecholli, in which the Atamalqualiztli was celebrated. See "A Central American ceremony which suggests the Snake dance of the Tusayan villagers," American Anthropologist, Washington, vol. VI, No. 3. Quecholli, however, according to both Sahagun and Serna, was in November. The Snake dance at Walpi is thus celebrated about six months from Atamalqualiztli, or not far from the time when the people of the under world celebrate their Snake-Antelope solemnities. In this connection attention may be called to the fact that the Snake-Antelope priests in Walpi have a simple gathering in the winter Pa moon (January), when their sacerdotal kindred of the under world are supposed by them to be performing their unabbreviated snake rites. This is at most only about a month from the time Atamalqualizth was celebrated. Teotlico, the Nahuatl return of the war god, occurred in November; Soyáluña, the warriors' return, in December. There are important comparative data bearing on the likeness of Hopi and Nahuatl ceremonies hidden in the resemblance between Kwteála and Quecholli (Kwetcoli).

[2] Müyiñwuh, the goddess of germs, is preeminently the divinity of the under world, and has some remarkable similarities to the Nahuatl Mictlanteuctli or his female companion Mictlancihuatl. The name is very similar to that for moon. This was the ruler of the world of shades visited by Tiyo, the snake hero. (See the legend of the Snake Youth in Journal of American Ethnology and Archæology, vol. IV, Boston, 1894.)

solstitial amplitudes, and the equinoctial, horizontal points, unconnected with important times to agriculturists, were not considered as of much worth. There is every evidence, however, that the time of day was early indicated by the altitude of the sun, although the connection of the altitude at midday with the time of year was subordinated to observations on the horizon.

CLASSIFICATION OF CEREMONIALS

In attempting to make out the annual cycle of ceremonial observances, as determined by observations made during the last three years, I recognize two groups, the differences between which may be more or less arbitrary. These groups are called—

I. The Katcinas.

II. The Nine days' ceremonials.

The former of these groups, which is the subject of this article, begins with the Katcinas' return,[1] and ends with their departure (Nimán). It is not my purpose here to do more than refer to the latter group, as a short reference to them may be of value for a proper understanding of the Katcinas.

There are significant likenesses between different members of the series of nine days' ceremonials, and they may be grouped in several pairs, of which the following may be mentioned:

I. Snake or Flute.[2]

II. Lálakoñti and Mamzraúti.

III. Powámû and Páliilükoñti.

IV. Wüwütcímti and Naácnaiya.

The likenesses are built on the similarity of the rites practiced in both members of each pair. The Hopi priests recognize another kinship which does not appear in the nature of the ceremonies as much as in the subordinate parts. Thus, Lálakoñti and Páliilükoñti, Wüwütcímti and Mamzraúti are brother and sister ceremonials, according to their conceptions. This kinship is said to account for certain events in the ceremonials, and friendly feeling manifested between certain societies, but much obscurity envelops this whole subject of relationships.

The term "Nine days' ceremonies" refers to the active[3] ceremonial days, including those in which the chiefs perform the secret observance and the open dance of the last days. Strictly speaking, the ceremonial smoke to determine the time is a part of the observance, and from

[1] The Soyaluña has been called the Kactina's return, which name is not inaccurate. It is, strictly speaking, a warriors' celebration, and marks the return of the leader of the Katcinas, as in Teotleco. The Katcinas appear in force in the Pa celebration.

[2] I have elsewhere pointed out the similarity between the dramatizations of the Snake-Antelope and the Flute societies, but the members of the former scout the idea that they are related. Evidently the similarity in their ceremonials, which can not be denied, are not akin to the relationships which they recognize between brother and sister societies.

[3] Strictly speaking, eight active, since the first day is not regarded as a ceremonial day. See Journal of American Ethnology and Archæology, vol. IV, p. 13, 1894.

this date to the final public exhibition there are sixteen days, a multiple of the omnipresent number four.

Some of the Katcinas have nine days of ceremonials, counting the assembly and the final purification.

The inception of the ceremony is called teotcoñ yüñya, smoking assembly, in which the chiefs (moñ'mowitû) meet together in the evening at a prescribed house. The meeting places are as follows:

Tcütcüb (Snake-Antelope fraternity)	Snake chief's mother's house.
Mamzraú	Sálako's.
Lálakoñ	Kotenümsi's.
Soyáluña	Vénsi's.
Wüwütcim	Tciwüqti's.
Lénya (Flute)	Talásvensi's.
Nimán	Kwümaletci's.

On the day following this smoke the speaker chief (teaákmoñwi) at early sunrise announces to the public that the ceremony is to begin, and to the six direction deities (nananivo moñ'mowitû) that the priests are about to assemble to pray for rain. Eight days after the announcement the chiefs gather in the kiva, and that day is called yüñya, assemblage, but is not counted in the sequence of ceremonial days. The first ceremonial day is Cüctála, after which follow the remaining days as already explained in my account of the Snake ceremonials. Counting the days from the commencement, the Snake, Flute, Nimán, Lálakoñti, and Mamzraúti are always celebrated in extenso sixteen days, or nine days of active ceremonies, as shown in articles elsewhere. When Naácnaiya is not celebrated, Wüwütcimti, Powámû, Soyaluña, and Pálülükoñti are abbreviated to four days of active ceremonials.

The following diagnosis may be made of these great nine days' ceremonials: Duration of the ceremony, nine consecutive days and nights; no masked dancers in secret or public exhibitions; no Katcinas; no Teukúwympkiyas.[1] Altars and sand mosaics generally present. Individual ceremonials either annual or biennial, but in either case at approximately the same time of the year; sequence constant. Tiponi[2] generally brought out in the public dance. Many páhos,[3] ordinarily of different length (Snake, Flute, Lálakoñti, Mamzraúti), to deposit in shrines at varying distances from the town. Ceremonial racing, generally in the morning of the eighth and ninth days.

[1] Clowns called likewise "mudheads" and "gluttons."

[2] The tiponi is supposed to be the mother or the palladium, the sacred badge of office of the society. It is one of the wüwi or sacred objects in the keeping of a chief, and is the insignium of his official standing. The character of this object varies with different societies, and, in a simple form, is an ear of corn surrounded by sticks and bright-colored feathers bound by a buckskin string. For the contents of the more elaborate forms, see my description of the Lálakoñti tiponi (called bundles of páhos).

[3] Páhos or prayer-sticks are prayer-bearers of different forms conceived to be male and female when double. Their common form is figured in my memoir on the Snake Ceremonials at Walpi (Jour. Am. Eth. and Arch., vol IV, p 27. Prescribed forms vary with different deities.

The following are the important nine days' ceremonies:

1. The Antelope-Snake celebration, alternating biennially with the Lélenti or Flute observance.

2. The Lálakoñti. This ceremony lasts nine days and as many nights, and is celebrated by women. The details of the celebration at Walpi in 1891, together with the altars, fetiches, and the like have already been published.[1] It has some likenesses with the Mamzraúti, which follows it in sequence. There are four priestesses, the chief of whom is Kotcnümsi. Three típonis were laid on the altar in

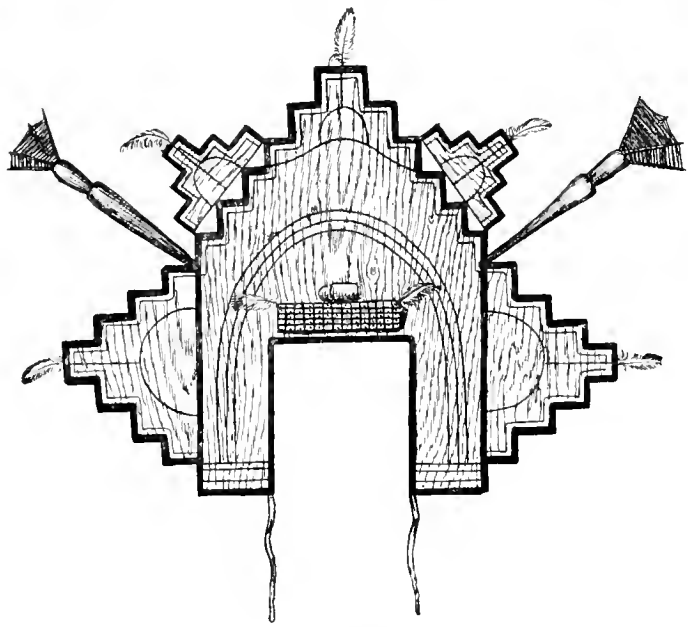

FIG. 39—Tablet of the Palahikomana mask.

the celebration of 1891, although it is customary for each society to have but one típoni, which, with the other paraphernalia, is in the keeping of the chief priest.

3. The Mamzraúti. This ceremonial has likewise been described.[2] In some celebrations of this festival girls appear with tablets on their heads personifying maids called Palahikomanas. In 1891 these personages were represented by pictures[3] of the same on slabs carried in the hands of girls. In this way the variations of their celebrations in different years may be explained: sometimes women are dressed to impersonate the Palahikomanas, at others only pictures of the same are carried.

[1] The American Anthropologist, Washington, April, 1892.

[2] Ibid., July, 1892.

[3] Erroneously identified as Calako in my description and plates of the presentation of the Mamzraúti in 1891.

SHIELD WITH STAR SYMBOL.

SOYALUNA SHIELD WITH UNKNOWN SYMBOL.

SYMBOLIC SUN SHIELD.

DRAWN BY MARY M. MITCHELL

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4. The Wüwütcimti. The Naáenaiya, of which this is an abbreviated observance, has been described.[1] One of the most prominent events is the ceremonial making of the new fire; and as this is in a measure distinctive of these two, it is proper to designate them the New Fire ceremonies.

In essentials the Naaenaiya and the Wüwütcimti are the same, but the former appears to be of less constant appearance and more complicated. In it, as elsewhere described, the statuette of Talátumsi is brought into the pueblo, but in the abbreviated form offerings are made at her shrine down the trail. During the making of the new fire Ánawita,[2] personifying Masauwŭh, is hidden behind a blanket held by two assistants.

The second group, called the Katcinas, which may be divided into two smaller divisions, known as the elaborate and the abbreviated, fills out the sequence of religious ceremonials between the Soyáluña and the Nimánkatcina. These celebrations are distinguished from those of the former group by the presence of masked personages to whom is given the name of Katcinas. By the use of these masks or helmets the participant is supposed to be transformed into the deity represented, and women and children avoid looking at Katcinas when unmasked. The main symbolism of the deity is depicted on the helmet or head, and varies in different presentations, but the remaining paraphernalia is constant, whatever personage is represented.[3]

The mask (kü'ïtü, head) is often addressed as ikwatci, "my friend or double." Prescriptively it must be put on and taken off with the left hand.[4] It is of helmet shape, fitting closely to the head and resting on the shoulders. These masks or helmets are repainted at each presentation with the symbolism of the personage intended to be represented. They are ordinarily made of leather, portions of boot legs or saddles, and in one or two instances I have found on their inside the embossed or incised markings characteristic of Spanish saddles. Old felt hats are sometimes used in the manufacture of the simpler masks and those of the mud-heads are of coarse cloth. Few of the helmets now used give evidence of very great antiqnity, although some are made of the skin of the bison. One can seldom purchase these helmets, as their manufacture is difficult, and instead of being discarded after use in one ceremony they are repainted for other presentations.

[1] The four societies who celebrate the Wuwutcimti are the Aalwympkiya, Wuwütcimwympkiya, Tatankyamŭ and Kwakwantû.

[2] Chief of the Kwakwantu, a powerful warrior society. Among various attributes Masauwŭh is the Fire God.

[3] The body, save for a kilt, is uncovered. This kilt is white or green in color, with embroidered rain-cloud symbols. This is tied by a sash, with dependent fox-skin behind. Rattles made of a turtle shell and sheep or antelope hoofs are tied to one leg back of the knee, and moccasins are ordinarily worn. Spruce twigs are inserted in the girdle, and the Katcina carries a rattle in one hand. This rattle is a gourd shell with stones within and with a short wooden handle.

[4] The left hand is always used to receive meal offerings and nakwakwocis, and is spoken of as kyakyauina, desirable. The right hand is called tümücmahtu, food hand.

There is a similar uniformity year by year in the time of the celebration of the extended or elaborate Katcinas called Nimán, Powámû, Pálülükoñti, Soyáluña, and the Pa or Katcina's return. Their sequence is always the same, but in the abbreviated Katcinas or masked dances this uniformity is not adhered to. A certain number of these are celebrated each spring and summer, but the particular abbreviated Katcina[1] which is presented varies from year to year, and may or may not be reproduced.

While Katcinas or masked dances do not generally occur during the interval of the nine days' ceremonials (autumn and early winter), I have notes on one of these which indicate that they sometimes take place in this epoch.

On September 20, 1893, a Katcina called Ñakatcina[2] was performed in Hano after the Nimán had been celebrated in Walpi. Theoretically it would not be expected, as the farewell Katcina is universally said to be a celebration of the departure of these personages to their distant home, an event which does not occur at Hano. It would be strange if later observations should show that Katcinas are celebrated in other villages between the departure and return of these personages.

DISCUSSION OF PREVIOUS DESCRIPTIONS OF KATCINAS

Our exact knowledge of the character of the Hopi Katcinas dates back to Schoolcraft's valuable compilation. While the existence of these dances was known previously to that time, and several references to similar dances among the other Pueblos might be quoted from the writings of Spanish visitors, our information of the Katcina celebrations in Tusayan previously to 1852 is so fragmentary that it is hardly of value in comparative studies. In the year named Dr P. S. G. Ten Broeck visited Tusayan and published a description of what was probably a Katcina dance at Sitcomovi. Although his account is so imperfect that we can not definitely say what Katcina was personated, his description was the first important contribution to our knowledge of the character of these dances among the Hopi Indians. It will be noticed in a general way that the personation differed but slightly from those of the present day. Ten Broeck noted that the male dancers, Katcinas, wore on their heads "large pasteboard towers"

[1] The word Katcina, as already stated, is applied to a ceremonial dance and to a personator in the same. The symbolism of each is best expressed by the carved wooden statuettes or dolls, tihus, many examples of which I have described in my article on "Dolls of the Tusayan Indians" in Internationales Archiv fur Ethnographie, 1894. Profitable sources of information in regard to the symbolic characteristics of the Katcinas are ceramic objects, photographs, clay tiles, clay images, pictures on altars, etc. All pictorial or glyptic representations of the same Katcina are in the main identical, with slight variations in detail, due to technique.

[2] For a description of the Ñakatcina see Journal of American Ethnology and Archæology, vol. II, No. I.

(náktci?), and "visors[1] made of small willows, with the bark peeled off and dyed a deep brown." He recognized that the female dancers (Katcinamanas) were men dressed as women and that they wore yellow "visors" and dressed their hair in whorls as at the present time. He described the musical (?) accompaniment of the dance with the scapula of an animal rubbed over a "ground piece of wood." He likewise noticed the priests who sprinkled the dancers with sacred meal, and speaks of two small boys painted black with white rings who accompanied the dance. The latter may have been personifications of the Little Fire Gods.

The Hopi clowns, Tcukúwympkiyas, were likewise seen by Ten Broeck, who described their comical actions. From his description of the byplay of their "assistants," I find very little change has taken place since his time. In the Katcina which he observed food was distributed during the dance, as I have elsewhere described is the case today. Although much might be added to Ten Broeck's description, his observations were the most important which had been made known up to his time, and continued for forty years the most valuable record of this group[2] of dances among the Tusayan Indians.

CLASSIFICATION OF KATCINAS

Before considering the various ceremonials in which the Katcinas appear, it may be well to say something of the nature of these supernatural beings which figure in them as made known by the testimony of some of the best-informed men of the tribe. The various legends which are told about them are numerous and can not be repeated here, but a few notions gathered from them may render it possible for the reader to better understand the character of the ceremonials in which they appear.

These deities are generally regarded as animistic and subordinate to the greater gods.[3] They have been called intercessors between man

[1] I have also seen visors of this kind, and an old priest of my acquaintance on secular occasions sometimes wore a huge eye shade or visor made of basketware. The helmet of the Humiskatcina bears a willow framework which forms a kind of visor, and if, as I suspect from the "large pasteboard [skin over framework or wooden board] tower," it was a tablet or náksi, the personification mentioned by Ten Broeck may have been a Humiskatcina. In May, 1891, I observed a Humis, but there is no reason from the theory of the time of abbreviated Katcinas to limit it to May. It might have been performed in April equally well. The Katcinamanas were not observed by me to wear such visors as Ten Broeck observed.

[2] During that time our knowledge of the Snake dance had been enlarged by Stephen, Bourke, and others.

[3] The Katcinas, sometimes spelt Cachinas, are believed to be the same as the Zuñi Kókos and possibly the Nahuatl teotls. The derivation is obscure; possibly it is from kate, spread out, horizontal, the surface of the earth, náa, father, abbreviated na, surface of land, father. The Tusayan Indians say that their Katcinas are the same as the Zuñi Koko, pronouncing the word as here spelled. Cushing insists, however, that the proper name of the organization is Ka'kâ. I find Mrs Stevenson, in her valuable article on the Religious Life of a Zuñi Child, has used the spelling Kok ko, which introduces the o sound which the Tusayan people distinctly use in speaking of the Katcinas of their nearest Pueblo neighbors. This variation in spelling of one of the more common words by conscientious

and the highest supernatural beings. There are misty legends that long ago the Katcinas, like men, came from the under world and brought with them various charms or náhii with which the Hopi are familiar. By some it is said that a Honáni (Badger) chief came up from the Átkyaa, or under world, in the center of a square whose four sides were formed of lines of Katcinas, and that he bore in his left hand a buzzard wing feather and a bundle of medicine hats on his back. The Katcinas recognized him as their chief, and became Katcina Honáni, Badger Katcinas.

The legend runs that in ancient times Hahaiwiiqti[1] emerged from the under world followed by four sons, who were Katcinas, each bearing in his arms a pet called páliilükoñûh, plumed serpent. Following these four came other Katcinas with pets (pókomatii), of whom the following are mentioned:

One bearing pákwa, frog (water-eagle).

One bearing pátsro, water-bird.

One bearing pawíkya, duck.

One bearing paváki'yuta, water on the backs bearers, aquatic animals.

One bearing yüñ'ocona, turtle.

One bearing zrána, bullfrog.

One bearing pavátiya, young water bearer (tadpole).

The others with kwáhü (eagle), parrot, crow, cooper's hawk, swallow, and night hawk.

The Súmaikoli pets for the six directions are:

Sowiiñwû, deer	Kwiníwi.
Pañ'wû, mountain sheep	Tevyiiña.
Tcii'bio, antelope	Tatyúka.
Tcaízrisa, elk	Hópoka.
Sówi, hare	Omyúka.
Tábo, cottontail rabbit	Atkyántuka.

The first four Katcinas bear a startling yet foreign resemblance to the Navaho Etsuthçle.[2] The word pókomatii is difficult to translate, but "pets" seems a good rendering. Its usage is similar to that of certain Navaho words. A Navaho woman speaks of a favorite child as cili[n]; a man calls his pet horse cili[n], and the shaman designates his fetich-emblem of a nature deity bïli[n]; a Hopi calls his dog póko. The pet of Tuñwup is depicted on the altar as elsewhere mentioned in my account of the reredos of the farewell Katcina at Walpi.[3]

observers shows one of the difficulties which besets the path of those who attempt etymologic dissection of Pueblo words. Many Zuñi words in the mouths of the Hopi suffer strange modifications, so that I am not greatly surprised to find idiomatic differences between the Hopi dialect of the East mesa and that of Oraibi. How much may result after years of separation no one can tell, but the linguist must be prepared to find these differences very considerable.

[1] This person is said to have been the mother of the Katcinas. She also was the mother of the monsters, the slaughter of whom by the cultus hero, Pä'ükoñhoya, and his twin brother is a constant theme in Tusayan folklore

[2] Stevenson, Navaho Sand Paintings, in Eighth Annual Report of the Bureau of Ethnology.

[3] Journal of American Ethnology and Archæolgy, vol. II, No. 1.

THE NATACKA CEREMONY AT WALPI

In the Hopi conception of the All Katcina there seems to be an idea that they dwell in four terrestrial places or world-quarters.[1] This may be looked on as an application of a general idea of world-quarter deities so common among them.

Northwest, kwinıwi ..... Kicyúba.
Southwest, tevyiña ..... Nüvatikyaubi, San Francisco mountains.
Southeast, tatyúka ..... Wéuima.
Northeast, hópoko ..... Nüvatikyaubi, San Mateo mountains.

If there is any one feature which distinguishes a Katcina it is the use, by some or all of the participants, of a mask or ceremonial helmet. The Katcinas are divided into two groups, the complete and the abbreviated; the former is constant year by year, the latter varying. Altars are present in the complete, absent in abbreviated presentations. A cloud-charm altar or invocation to the six world-quarter deities is sometimes made. Public announcements are not prescribed. The Teukúwympkiya or clowns are generally present. Abbreviated Katcinas consist mainly of public dances in which Katcinas, Katcinamanas, and clowns take part. The páhos or prayer offerings are few in number. Ceremony ends with a feast; generally no altars. Tıponi[2] is not brought out in public. It is possible that the fox-skin so universally worn by the animistic personifications called Katcinas hanging from the belt behind, is a survival comparable with the skin of the animal in which formerly, as in Nahuatl ceremonials, the whole body was clothed. In the case of Natácka, for instance, a skin is still worn over the shoulders. Conservatism in dress is tenaciously adhered to in religious paraphernalia among all peoples.

Roughly speaking we may say that the Katcina celebrations are characterized by the presence of the Teukúwympkiyas (Tatcükti, Tcückütû, Paikyamû or clowns), which do not appear in the unmasked or nine days' ceremonials. The epoch in which they remain among the Hopi is therefore approximately that from the winter to the summer

[1] The Hopi report that the Zuñi believe that the dead are changed into Katcinas and go to a Sipapû, which they descend and tell the "chiefs" to send the rain. The Hopi believe that the dead become divinized (Katcinas in a loose meaning) and intercede for rain. (See discussion of Mrs Stevenson's statement that the dead send rain.) It seems to me that students of primitive myth and ritual have hardly begun to realize the important part which orientation plays in early religions. As research progresses it will be found to be of primary importance. The idea of world-quarter deities sprang from astronomical conceptions and was derived from a primitive sun worship in which the lesser deities naturally came to be associated with the four horizon points of solstitial sunrise and sunset.

[2] I have elsewhere pointed out that the tıponi is called the mother, and this usage seems to hold among the other Pueblos. As a badge of chieftaincy it is carried by the chiefs on certain occasions of initiation and public exhibitions, as can be seen by consulting my memoir of the Snake Ceremonials at Walpi. Cimo, the old Flute chief (obit 1893), once made the following remark about his tıponi. "This is my mother, the outer wrapping is her garment; the string of shells is her necklace; the feathers typify the birds, and within it are all the desirable seeds. When I go to sleep she watches over me, and when I die one of the feathers will be placed upon my heart, and I hope the tıponi will take care of me." From these words we learn how much the tıponi is venerated, and it is not remarkable, considering the benefits which are thought to come from it, that it is designated "the mother."

solstices; that in which they are absent, from the summer to the winter solstices.[1]

I classify the Katcina celebrations into two large groups, which may be called the elaborate and the abbreviated, and have considered them in the following pages.

ELABORATE KATCINAS

Under the head of elaborate Katcinas[2] may be included:

Soyáluña.
Katcina's return.[3]
Powámû.
Pálülükoñti.
Nimánkacma.

SOYÁLUÑA

The celebration in the December moon has not as yet been described,[4] but a large body of material relating thereto is in my hands. In order to give a general idea of its character a brief outline of a characteristic portion of it is inserted in this place. Soyáluña is distinctly a warriors' observance, and has been called the Return Katcina. In one sense it may be so designated, but more strictly it is the return of the War god, regarded as a leader of the gods, and in that recalls the Nahuatl Teotleco, as elsewhere pointed out. The singing of the night songs of the warriors is one of the most effective archaic episodes of the ceremonial of the winter solstice.

In the following account a description of a few events in the celebration of 1891 is introduced:

On the 22d of December of that year most of the men of the villages prepared cotton strings, to the end of which they tied feathers and piñon needles. These were given away during the day to different persons, some receiving from one to two dozen, which they tied in their hair. When a maker of these feathered strings presented one to a friend, he said, as translated, "Tomorrow all the Katcinas to you grant your wishes," holding his bundle vertically and moving it with a hori-

[1] I mention this fact since, following Bandelier's studies among the Rio Grande Pueblos, we have something different. The Koshare, which appear to correspond with a group of the Tenkúwympkiya, the Paiakyamû, are regarded by him as the summer and autumn men, while the Cuirana are the spring men. During the late summer and autumn the Tenkuwympkiya take no part in the ceremonials at the East mesa of Tusayan. No Tenkúwympkiyas appear in the Snake, Flute, Lálakoñti, Mamzranti, Wúwütcimti, or in certain minor festivals. They appear to be almost universal accompaniments of the Katcina observances.

[2] The elaboration is of course along different lines of growth, and its characteristics are treated in the several already published articles devoted to these subjects. In none of the abbreviated Katcinas described was there an altar or complicated kiva performance, but on the other hand, in the elaborate Katcinas such secret observances always existed. Stocalako, described in this article, affords an interesting abbreviated ceremonial with kiva rites.

[3] This might better be called a composite, abbreviated Katcina.

[4] The late Mr Stephen made extended studies of this presentation in 1892, but his fatal illness prevented his being in the kiva the following winter. It is necessary that a continued study of this dramatization be made before a complete account of the ceremonial calendar can be attempted.

The following men are distinctly called chiefs: Moñ'mowitû of Soyaluña, Kwatcakwa, Sakwistiwa Anawita, Nasimoki, Kwaa, Sikyáustiwa, and Supela.

zontal motion. At nightfall each man procured a willow wand from 3 to 4 feet long and looped upon it all the strings which he had received. He then carried his stick to the Móñkiva and placed it in the rafters, thus imparting to the ceiling the appearance of a bower of feathers and piñon needles.

All the kivas were meeting places of the participants, but the Tataukyamû met at the Móñkiva, where the principal festivities took place. Their chief wore a head-dress decorated with symbols of rain-clouds (plate CVIII), and carried a shield upon which was depicted the sun (plate CIV). The chief of a second society carried a shield upon which was drawn a star (plate CIV), and a third chief bore a shield with an antelope drawn upon it. The head-dress of the chief of the Aáwympkiya was adorned with glistening triplex horns, and on his shield was represented an unknown Kateina (plate CIV). The fifth society was Kwákwantû, or warrior, whose chief carried in his hand an effigy of the great snake (Pálülükoñûh) which was carved from the woody stalk of the agave (kwan), from which the society was named. He came from the Teivato-kiva and on his shield was depicted a Kwákwantü in full costume. The sixth society was the Tatcük'ti or "knobbed heads;" their shield-bearer wore a head-dress like a coronet, while on his shield was drawn a black figure with lozenge-shape eyes. The shield of the chief of the seventh society was adorned with a picture of the Tawamoñwi or sun chief.

After the societies had entered the kiva an invocation to the cardinal points was chanted, and the shield-bearers, in turn, standing over the sipapû, stamped on it. At a signal the society arranged itself into two irregular groups, one on the north, the other on the south side of the main floor. All then vehemently burst forth into a song, the shield-bearer making eccentric dashes among his associates, first to one side and then to the other.

While the song lasted the shield-bearer continued these short, swift rushes, and the assembled groups crouched down and met his dashes by rising and driving him back to the sipapû. He madly oscillated from right to left, that is, from the north to the south side of the room, and swung his shield in rhythm, while those near him beat their feet in time. The shield was dashed from face to face, and the groups made many motions as if to seize it, but no one did more than to touch it with outstretched hands. The movements on both sides were highly suggestive of attack and defense.

At 8 p. m. about one dozen men were collected in the Moñkiva, among whom was Lésma playing a flageolet. The hatchway was guarded by a tyler, and for a natci there was placed there a wicker skullcap ornamented with a pair of imitation mountain-sheep horns (plate CX). Two hours later the room was densely packed with naked men, their bodies undecorated, wearing small eagle plumes attached to the crown of the head. Two women were present. Anawita, chief

of the Kwákwantû, sat alone on the southern side of the main floor which was clear in the middle, and twelve chiefs, among them Cíno, Súpela, and Teubéma, sat opposite him.

Ten novices from the other kivas entered gorgeously arrayed in white kilts, brilliant crowns of feathers, white body decorations, bearing an imitation squash blossom, with spruce sprigs in their left hands and corn in their right hands. As the chiefs took their places Lésma sprinkled the floor of the room near the ladder with moist valley sand, about an inch deep. The novices stepped from the ladder upon this sand and passed up in front of the chiefs, then squatted before them facing the south, their kilts having been lifted so that they sat on the cold floor.

Anawita then crossed over to the south side of the room and seated himself at the east end of the line of chiefs.

At the west wall of the kiva a strange altar had been erected. Lésma had piled against the ledge of this part of the kiva a stack of corn, two or more ears of which had been contributed by the maternal head of each family in the pueblo. At either side and in front of the stack of corn shrubbery had been placed. In the space between the top of the corn pile and the roof wands were placed, and to these wands had been fastened many artificial flowers, 4 or 5 inches in diameter, set close together but in no regular lines. There were over 200 of these flowers of different colors, dark-red and white predominating. Nearly in the center of this artificial shrubbery there was a large gourd shell with the convex side turned toward the audience and having an aperture about 8 inches in diameter in its center. Through this opening had been thrust the head of an effigy[1] of Pálülükoñûh, the plumed-head snake, painted black, with a tongue-like appendage protruding from the mouth. When all the assembled priests were seated a moment of solemn stillness ensued, after which Súpela arose, cast a handful of meal toward the effigy of the snake, and said a short prayer in a reverent tone.[2] Then the head of the snake, which was manipulated by an unseen person behind the altar, was observed to rise slowly to the center of the aperture, and a mellow sounding roar like a blast through a conch appeared to come from the mouth, while the whole head was made to quiver and wave. The sound was of short duration, repeated four times, and then the head reposed again on the lower rim of the ground shell. Presently was heard a sound as of a scapula drawn across a notched stick six times. All the old chiefs in succession cast meal to the effigy and prayed, and in response to each the great snake emitted sounds identical with those mentioned above. The spectators then left the kiva, and a frenzied dance of strange character occurred. The societies from other kivas came in, and the chief of each declaimed in a half-chanting voice which rose to a shriek at the close of a stanza.

[1] See figures of this effigy in my account of the Palülükoñti, Journal of American Folk-lore, Oct.-Dec., 1893.

[2] Here evidently we have a prayer to the deity symbolized by the effigy and not an invocation to the effigy itself.

First, he drew back to the fireplace, and then with a shuffling gait approached the symbolic opening in the floor called the sípapû.

Anawíta then shouted at the top of his voice, and the shuffler sprang in the air and vaulted over the sípapû. Then everybody in the room shouted loudly and a song in concert followed. A moment later the visiting societies dashed down the ladder, each bearing a splendid shield ornamented with the figure of the sun and a rim of radiating eagle feathers. Each society had its distinctive sun shield, which on entering was handed to the chief. As he received it he stamped on the sípapû and a fierce song was sung. Meanwhile two members of the society stood apart from their fellows against the southern wall facing each other, each holding a squash flower emblem in a bouquet of spruce twigs and an ear of corn in his left hand.

Suddenly the fifteen or twenty members of the society drew back from their chief, who then sprang upon the sípapû plank, and quickly turning faced them as all burst forth in an ecstatic shouting, with wild flinging of their arms as they approached the shield-bearers. They naturally formed two clusters, and as the shield-bearer dashed his shield in their faces they surged back, to leap again toward him. This seeming assault, wild though it appeared, was maintained in time with the song. The two chieftains joined their men, all in ecstatic frenzy, and one of them, shaking his shield, sprang from right to left, drawing back his assistants in rhythm with the beating of the feet of all on the floor. After a few moments of most exhaustive movements some of the weaker staggered up the ladder, and shortly after one of the chiefs fell fainting to the floor, overcome by exhaustion and the intense heat of the room. One splendid athlete danced with vigor for fully five minutes, and then swept toward the ladder where the assistant was standing in readiness to receive his shield. Another stride and he reached the foot of the ladder and suddenly became as rigid as a corpse. The men who belonged to the Mõñkiva took no part in this exhaustive dance but stood in readiness to carry those who fainted up the ladder to the cool air outside.

It has been suggested that this assault of the men on the bearer of the sun-shield dramatizes the attack of hostile powers on the sun, and that the object is to offset malign influences or to draw back the sun from a disappearance suggested by its southern declination.[1] In this possible interpretation it is well to consider that immediately preceding it the archaic offerings and prayers to the great snake were made, as described, in the presence of spectators. The idea of hostility of the great snake to the sun is an aboriginal American conception. In the Maya Codex Cortesianus (33*b*) the plumed snake is represented[2]

[1] The dance with the sun-shield remotely resembles certain so-called "sun dances," which have been described among the nomads, in which physical exhaustion and suffering are common features. This dance, it must be borne in mind, took place when the sun was at the winter solstice, and the dramatization of attack and defense may have some meaning in connection with this fact.

[2] On the authority of Cyrus Thomas, "Are the Maya hieroglyphs phonetic?" American Anthropologist, Washington, July, 1893, p. 266. His reasoning that the scribe of the codex intended to represent this astronomical event is plausible but not conclusive.

as swallowing the sun as in an eclipse. If Soyáluña is a propitiatory ceremony to prevent the destruction or disappearance of the sun in winter or to offset the attacks of hostile malevolent deities upon him, we can see a possible explanation of the attacks and defenses of the sun as here dramatized.[1] The evil influences of the great snake are met by the prayers to his effigy; the attacks of other less powerful deities are dramatized in the manner indicated.

The following contains a few suggestions in regard to the character of the dramatization in the December celebration. In the prayers to the Plumed Snake his hostility was quieted, and the chiefs did what they could to propitiate that powerful deity, who was the great cause of their apprehension that the beneficent sun (Táwa) would be overcome. Then followed the dramatization of the conflict of opposing powers, possibly representing other deities hostile to our beneficent father, the sun. Although the struggle involved, so far as the participants were concerned, their highest powers of endurance and bodily suffering, the sun-shield or symbol of Táwa had the good fortune to resist the many assaults made upon it.

The introduction of dramatization as an explanation of the warrior celebration is theoretic, therefore not insisted upon, and is at least plausible until a better interpretation is suggested. It has in its support the evidence drawn from a comparative study of ceremonials. In the light of this theory the return and departure of the Katcina has a new significance, and may be regarded as a modified sun myth. At the winter solstice the sun and his attendant deities have reached their most distant point, and turned to come back to the pueblos. In the midsummer the solar deity approached them; he was near them, and in appreciation of this fact, which means blessings, the poor Hopi made his offering;[2] danced the Snake dance, asking the snake to bring the rain, believing he was no longer hostile or at enmity with the sun. But the withdrawal of the gods (Farewell Katcinas) could not be delayed by these rites, and the sun each day drew farther from them. The Katcinas (gods) departed; the bright, beneficent summer gave place to cold, dreary winter; life was replaced by death. In this most critical epoch the warriors, the most potent human powers of the pueblo, performed their ceremony to bring back the beneficent god and his train. The Nahuatl priest called a similar ceremony "Teotleco," the god comes—"The dead god is reborn," says Duran. The gods (Katcinas) come, say the Hopi (Soyáluña, all assemblage; derived from co, all; yuñya, assemblage). The Nahuatl priest sprinkled meal on the floor of the teocalli, and when he saw in the meal the footprint

[1] There are members of the American race living where the sun disappears at the winter solstice or succumbs to evil powers. Have the Pueblos inherited this rite from people who once lived far to the north?

[2] The fact that the Snake dance follows the Niman may be explained as follows: The sun begins to be affected by the Plumed Snake at the Farewell dance, and the growing influence of this divinity is recognized, hence his children (reptiles) are gathered from the fields and intrusted with the prayers of men to cease his malign influence.

HAHAIWÜQTI, NATACKA, AND SOYOKMANA

of the War god, the leader of the divinities, he announced the fact. The Hopi priest still continues to sprinkle sand on the kiva floor during the ceremony.

KATCINA'S RETURN

The first celebration of the Katcinas in the spring, several months after their departure,[1] took place in that division of the year called the Pamüyawû, and is known as Mohti Katcinumyüñya, or "First Katcina assembly." I have called it the Return Katcina. It follows directly after the winter páho making of the Snake-Antelope or Flute societies, which varies in character according to whether the Snake or the Flute society gives the presentation that year. In 1893 it followed the Snake páho making, and in 1894 that of the Flute. It may be called a composite, abbreviated assembly of Katcinas.

During the day Katcina masks were renovated in the kivas of the mesa, and there were visitations at all the kivas by the personators in the coming celebration. Women and children crowded the spectators' quarters of these rooms, and the performances lasted from 10 oclock in the evening until 2 oclock of the following morning. Previously to the exhibition in the kivas, men personating different Katcinas visited the following points to make homoya or meal offerings and to say appropriate prayers:

Kiva	*Katcina*	*Points from which prayers are made*	*Prayers directed, or meal thrown toward—*
Moñ	Kütca anák[2]	S. W. Walpi	Nüvátikyanbi.
Wikwaliobi	Coyóhim momoyamm.	do	do.
Nacab	Tcatca kwanna	do	do.
Al	Popkotn	N. E. Walpi	Kicyuba.
Teivato	Miicaízrn	do	
Puvüñtcomo	Hüiki.		
	Hehéa.		
Kwinyaptcomo.	Avátchoya mana	N. E. Sitcomovi.	do.
Mónete	Tacábi	N. E. Hano	do.
Pendíte	Humis.		

On the 24th of this month (Pa), as after the Snake ceremonials,[3] the Nüitiwa, or struggles of the maids with the men for bowls, etc, took place, except that in this instance it was a struggle with a Katcina and not, as in the Snake observance, between girls and young men.

[1] At the Niman in the preceding July.
[2] With Tatcû kci (Mud-heads).
[3] Journal of American Ethnology and Archæology, vol. IV.

From the foregoing table we learn that in the Return Katcina for 1894 the following[1] were personified:

1. Kütca (white) aña.
2. Coyóhim.
3. Tcakwaina.
4. Pópkotu.
5. Mucaízru.
6. Hü'iki.
7. Hehéa.
8. Avátchoya.
9. Tacáb.
10. Humis.

The accompanying clowns were the Tatcü'kti or knob-head priests. It is an interesting fact that in the celebration of the departure of the Katcinas the clowns took no part, but these priests were important additions to the Siocálako.

The celebration of the Return Katcina, which occurs in the winter Pa moon, is accompanied by elaborate rites performed by either the Snake-Antelope or the Flute fraternity, the society observing it being that which will give its celebration in the summer Pa moon of the same year. A description of these rites naturally falls in an account of the group of unmasked dances. They extend over several days and appear to be wholly distinct from the celebration of the Return Katcina. While these are being performed in the "upper world," the complemental Flute or Snake observances are supposed to be taking place in the "under world," where the summer Pa moon then reigns. Precisely the same relationship is thought to exist between the two as that between the seasons of the north and south temperate zones.

POWÁMŬ

This ceremony is one of the most elaborate in which the Katcinas appear, and for want of a better name may be designated a renovation[2] or purification observance. In the year 1893 it took place near the close of January and continued for nine days, and in a previous[3] article I have mentioned and figured the most striking personages, the monsters or Natáckas, who appear in its presentation (plates CV, CVI, CXI). There are, however, certain other personages new to students of Tusayan ceremonials who are introduced, and I have therefore thought it well to describe the presentation in extenso.

The details of this ceremony in 1893 were as follows:[4]

January 20—Early this morning Hoñyi went to all the kivas and formally announced that the ceremony was soon to begin. There was no public announcement, as no Katcina celebration is made known in

[1] Numbers 1, 2, 7, 9 and 10 of this list have been described as abbreviated Katcinas. The symbolism of 3 and 8 is shown in my figures of dolls, of the remainder my information is as yet very limited.

[2] Comparable with the Nahuatl Ochpanitzli. The points of similarity between the two are the predominance of the Earth goddess and the ceremonial renovation of the sacred gathering places.

[3] American Anthropologist, Washington, January, 1894

[4] The accompanying observations on the Powámu were made by the late A. M. Stephen in his work for the Hemenway Expedition.

this way, and the Katcinas must not be spoken of in public. Íntiwa and Pauwatiwa began making páhos in the Moñkiva without preliminary ceremony at about 9 a. m., and fifteen other priests removed the masks and redecorated them, after having scraped off the old paint remaining from other ceremonials.

All the masks were finished about 7 p. m., after which Suñoitiwa and the other elders brought fox-skins and other paraphernalia into the kiva, where Kwáteakwa, Kópeli, Teábi, Kákapti, and four or five other men began to decorate their bodies with pigment, using a pale-red iron oxide (cúta) on their legs, knees, and waists. They daubed the whole upper leg above the knee with a white pigment, and drew two lines across the shins, the fore and upper arms, and on each side of the chest and abdomen. The entrance into the katcínaki, or paraphernalia closet, was open while this took place.

The masks were all ornamented with large clusters of feathers. They were tied to the head with a loose loop across the top which slipped over the crown where the plumage rested, and there were strings at the sides of the mask by which they were attached. The body was ornamented with ribbons, red flannel, and other articles of white man's make, which are innovations.

Kwáteakwa, who later personated a Teukúwympkiya, drew a broad band of white clay across his shins, thighs, arms, and body. A great wisp of cornhusks was tied in his hair, which was all brought forward and coiled over the forehead. The others donned their kilts, necklaces, turquoise eardrops, and moccasins. Each one wore a fox-skin hanging tail downward at the loins, and on the left leg below the knee a string of bells, while the majority had garters of blue yarn. Their hair, which was first bound in long cues, wrapped high with strings, was later loosened, hanging in a fine fluffy mass.

Sakwístiwa, who was the púciicütoi or drummer, wore pantaloons held up by a belt of silver disks, and a grotesque mask. All left the kiva immediately after their disguises were completed and assembled in the Moñkiva court.

Íntiwa hurriedly but thoroughly swept the floor of the chamber, during which time a number of women and children came down the ladder, filling the spectators' part of the room. The assembled group of Katcinas prayed and then went out, but about fifteen minutes later returned to the kiva entrance and shook their rattles at the hatchway. "Yuñya ai," "come, assemble," said the old men, and the women invited them to come down, which they did. Kwáteakwa, who personated the Niivákkatcina, entered, followed by ten others. They assembled in a semicircle, each with a rattle in the right hand and a spruce bough in the left. Íntiwa sprinkled with meal all who came, after which they performed a dance, in which, however, their leader did not join.

Before they finished a band of ten men, disguised as Paintes, carrying bows and arrows, rabbits, and small game which they wished to trade,

came to the hatchway. They had a drummer with a Painte drum, made of a bundle of skins wrapped in an oblong package, on which he beat with a stick held in both hands. The persons performed a dance, which they accompanied with a song. They likewise talked, cracked jokes, and presented the rabbits to the assembled women.

After them there came others from the Nacabkiva, each with a crook in the left hand and a rattle in the right. These wore grotesque masks, one representing an old woman with a long crooked staff in her hand. Their bodies were whitened and they wore saddle-mat kilts around their loins and tortoise rattles on the right leg. They sang a very spirited song, shaking their rattles as they advanced. These were six in number and were called the Powámûkatcinas. Directly after them there came a band of Tatcü'kti, who sang and danced on the roof of the kiva. The old men within repeatedly invited them to enter the room, and a dialogue of some length ensued. Their leader carried a large basket tray in which were four cones made of wood and each mud-head had in his hand a wooden rod and an eagle feather. The leader placed the cones in the middle of the floor in a pile, one above the other, near the fireplace. The others danced around the pile, roaring a song with much dramatic action, and heaped up ears of corn in the tray.

They then brought a young married woman from those assembled to the middle of the floor, where she knelt and tried without success to lift the cones as high as the staff which the leader held beside them. Four or five other women tried in turn, and all failed. The mud-heads then divided the cones into two piles and one of the women lifted them the required height. All the Tatcü'kti[1] then fell down on the floor and kicked their heels in the air, while certain of them stood on their heads for a minute or two. The woman who was successful in lifting the cones received the contents of the tray. The Tatcük'ti then left the room and the Katcinas returned and unmasked, indicating that this part of the ceremony was over.

January 21—During last night there were ceremonials which were not seen in the Móñkiva, in which it was said the Ahü'lkatcina made parallel marks in meal on the four sides of the kiva and upon the ceiling and floor as in the Mamzraúti and other ceremonials. A basin with sprouting beans, which had been planted at the full of the Pamüiya or Pa moon (January 2) and which were about a foot high, was brought from one of the houses opposite the Teívatokiva. The beans, which were growing in a basin, were plucked from the sand, tied into a separate bundle, and given to Ahü'lkatcina. A large squirrel-skin was filled with meal and given to him, and he was handed also a wooden staff (móñkohu). The large discoidal mask characteristic of this personage had a pouch-like attachment of buckskin which was pulled over the head,

[1] These men were from the Alkiva. They wore the knob-head helmets and their bodies were stained red. Each carried a rattle in the right and an eagle feather in the left hand, and had a pouch of skin or other material slung over the right shoulder. This held corn, beans, and other seeds, which they gave to the women and elders.

upon which was a large cluster of feathers. A white kilt was worn as a cape and the skin of a gray fox hung from the girdle at his loins.

At daylight Ahü'lktacina and Íntiwa returned, passing the gap (Wala) and halting at the pahoki (shrine[1]) to deposit certain nakwákwoeis and páhos. Just as the sun rose the two visited a kiva in Hano. Stooping down in front of it, Ahü'l drew a vertical mark with meal on the inside of the front of the hatchway, on the side of the entrance opposite the ladder. He turned to the sun and made six silent inclinations, after which, standing erect, he bent his head backward and began a low rumbling growl, and as he bent his head forward, raised his voice to a high falsetto. The sound he emitted was one long expiration, and continued as long as he had breath. This act he repeated four times and, turning toward the hatchway, made four silent inclinations, emitting the same four characteristic expiratory calls. The first two of these calls began with a low growl, the other two were in the same high falsetto from beginning to end.

The kiva chief and two or three other principal members, each carrying a handful of meal, then advanced, bearing short nakwákwoci hotomni, which they placed in his left hand while they muttered low, reverent prayers. They received in return a few stems of the corn and bean plants which Ahü'l carried.

Ahü'l and Íntiwa next proceeded to the house of Tetapobi,[2] who is the only representative of the Bear clan in Hano. Here at the right-hand side of the door Ahü'l pressed his hand full of meal against the wall at about the height of his chest and moved his hand upward.[3] He then, as at the kiva, turned around and faced the sun, holding his staff vertically at arm's length with one end on the ground, and made six silent inclinations and four calls. Turning then to the doorway he made four inclinations and four calls. He then went to the house of Nampíyo's mother, where the same ceremony was performed, and so on to the houses of each man or woman of the pueblo who owns a tiponi or other principal wimi (fetich).

He repeated the same ceremony in houses in Sitcomovi and in Walpi, where Íntiwa left him. Ahü'l entered this pueblo by the north street and passed through the passageway to the Móñkiva. He proceeded to the houses of Kwumawumsi, Nasyúñwewe, Samiwiki, and to all the kivas and the houses of all the leading chiefs.

After visiting all the kivas and appropriate houses mentioned above, Ahü'l went to Kowawainovi (the ledge under Talatrynku) and depos-

[1] With the coiled stone, which resembles the cast of some large fossil shell. I venture to suggest that the reason we find petrified wood in some shrines can be explained in the following manner: In times long past trees were believed by the Hopi to have souls and these breath bodies were powerful agents in obtaining blessings or answering prayers. The fossilized logs now put in shrines date back to the times of which I speak, consequently they are efficacious in the prayers of the present people. This is but the expression of an animistic belief in the souls of trees.

[2] She has the Bear tiponi and other fetiches.

[3] The name given for this marking by Ahü'l is omowuh moñwitupeadta. It is an appeal to all the gods of the six regions to bless these kivas and houses.

ited in the pahóki all the offerings that he had received, after which he returned to the Móñkiva, divested himself of his ceremonial disguises, and went home.

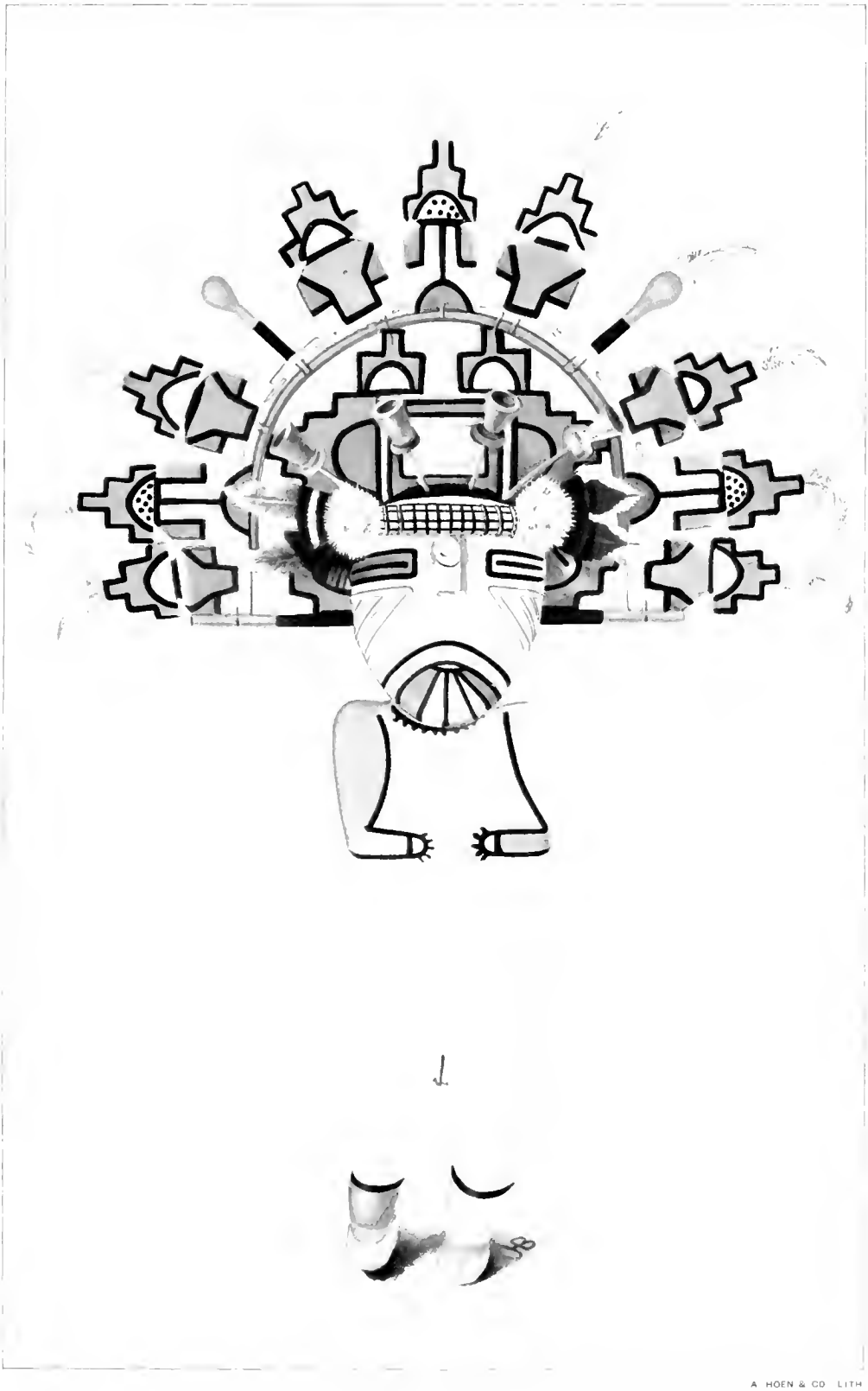
At 2 p. m. the Nüvák (snow) Katcinas came from the Nacabki, led by Soyóko. They were nine in number and were accompanied by a drummer. All wore bright plumage on their heads and their masks were painted green and white, but that of the drummer was pink. They were adorned with many necklaces, and wore white kilts and gray fox-skins. Yellow stripes were painted on the shoulders, the forearm, on each breast and the abdomen, and the bodies of all were stained red.

After singing and dancing for about five minutes, nine clowns (Tatcü'kti) came from the Álkiva and danced madly around the court, at first independently, but finally keeping step with the Katcinas. They joined in line one behind the other, each grasping the uplifted leg of the man in front of him, and then tumbled pell-mell over one another, shouting and laughing as they did so.[1]

At 2.20 a personification of Tcavayo, arrayed in a conical black mask with globular eyes and great teeth, entered the kiva. He carried a bow and arrows in his left hand and a saw in his right. His forearms and legs were painted black with white spots. This monster dispersed the clowns, during which many Zuñi words were uttered.

At 2.50 the Katcinas again returned and repeated their former dance in the same way as described. The antics of the Tatcü'kti continued, and the Katcinas appeared again at 4.20 p. m.; then later at 5, when they all departed, not to return. When the Katcinas retired to Wikyátiwa's house at 4 o'clock the clowns went down into the Álkiva and returned in their characteristic procession, the drummer in front, the other eight in two lines of four persons. Each carried on his back a large bundle composed of a fine blanket, cotton cloth, yarn, and all kinds of textile articles of value. One also had the four cones which they had used the night before and a tray of shelled corn of all colors, mixed with various kinds of seeds. They laid the tray in the center of the court and spread a blanket beside it, on which they placed all their bundles. One of their number then piled the cones, one on top of another, and while he was doing this the drummer rapidly beat his drum, while the others shook their rattles and sung vigorously. When the cones had been set up one of the men sought out a girl and brought her to them and told her if she would take hold of the lowest cone with both hands, raise the pile, and set it back in place without letting any of the cones fall she should have all the wealth piled on the blanket. But the least jar tumbled the cones down, and each one of the half dozen or more girls to whom they made the same offer failed in turn. Then they invited the youths to try, and several essayed, but none were able to perform the feat. So the prize, doubtless designedly, was left in the original owner's hands. They then brought a blanket full of hoyiani

[1] The performances with the clowns were not unlike others in which they appear.



A. HOEN & CO. LITH.

DOLL OF CALAKO MANA.

and placed the cones in two piles, but even then none of the girls succeeded in carrying it. No one was allowed a second trial. Finally one youth, Macakwáptiwa, carried them around safely and won the prize. He was closely followed around the pillar by the Tatcü'kti shaking their rattles, singing and crying, "Don't fall, don't fall," and when he laid them safely down in their original place all the Tatcü'kti fell down as if dead. Íntiwa then ran and obtained ashes from a cooking pit and placed them on a private part of their bodies. Then all the clowns got up and danced around with their usual pranks.

A tray full of corn and other seeds which was set beside the cones was obtained by the Tatcü'kti from Nakwaiyumsi, the chief priestess of the Katcina clan. At the close of the ceremony Íntiwa distributed these seeds in small handfuls to all the women spectators, to be planted the coming season. It was not learned that these seeds were consecrated by the priestess, but they were part of those planted in the kivas on the night of the 21st.

January 22—The younger men brought sand from a mound[1] and threw it down in a pile at the east of the kiva, and each man, as he came into the room with his basin, box, or other receptacle, filled it with this sand. He then thickly sprinkled the surface of the sand with seeds of every kind. Some had several vessels which they thus planted, and the old wife of Soyóko gave her grandson a bag of large white beans to plant for her.[2] The basins were well watered, a hot fire was kept in the kiva, and the hatch or entrance was entirely covered with a straw mat to retain the heat in the chamber, making it a veritable hothouse.

January 24—No ceremonies occurred today, but constant fires were maintained in the kivas, from the heat of which the beans soon sprouted. It was understood that children must not be told that beans were growing in the kivas nor be allowed to look into the room.

January 25—The Tatcü'kti went out from the Álkiva this morning for wood, making their way northward, past Wala and along the mesa to the cedar grove. They returned at evening, but left the wood they had gathered at the gap.[3] There was no singing nor dancing in the kivas during the night.

January 26—During the morning the Tatcü'kti went to Wala to bring in the wood they had collected yesterday. Before their departure they covered their bodies with pinkish clay, put on an old kilt (kwáca),[4] blue leggings, and masks with knobs. Each carried an eagle-tail feather in the left and a small gourd in the right hand. They

[1] The mound from which it was obtained is close to the base of the foothills eastward from Walpi, and all the sand for all the kivas was obtained from this particular mound.

[2] During the festival the women clip the hair of their children. The hair is cut over the entire cranium of the little boys, but in the case of the girls a fringe is left around the base of the head, especially on each side, for the characteristic whorls worn by maidens.

[3] The gap in the East mesa, known as Wala, whence the name of the pueblo of Walpi at the western end of the same height.

[4] Woman's blanket without decoration.

returned along the trail, marching in single file, with the loads of wood on their backs, stamping their feet as they came. They likewise shook their rattles and occasionally turned and walked backward.

They first assembled around each of the kiva hatchways in Hano, singing and chaffing one another, and were sprinkled with meal by the kiva chiefs. Proceeding onward to Siteomovi, they went to the entrances of the kivas of this pueblo and were there sprinkled with meal by the chiefs as they sang their curious songs, accompanying them with a stamping of the feet and a rotating movement of the body. It was after 1 o'clock when they arrived at Walpi, for they halted a short time at the neck of the mesa to arrange their loads. As they entered the pueblo they advanced along the south street singing as they went.

At the entrance to Teívatokiva they stopped and told Pauwatíwa a facetious story of their wood-gathering. He sprinkled them with meal, and they then went on to the dance court and set down their bundles, all the time making a droll byplay. They then separated into parties of two or three members and visited the houses of several women, with whom they left one or more bundles of wood. These women had previously prepared nakwakwocis, which they gave to the clowns with a handful of meal.

After all the wood had been distributed, with much rollicking fun, several women gave them food, and the small parties of Tateü'kti resumed their songs and marched through the dance court, where they all assembled. One of them was a drummer, who sat in the middle of the court, and the others danced about him in a circle, singing a Zuñi song. Pauwatíwa, Íntiwa, Teosra, and Soyóko sprinkled them with meal, and the first-mentioned invited the women who had been given wood to approach, which they did, sprinkling the individual Tateü'ktis with meal. Their masks were then harshly removed and thrust into a bag, tied up in a bundle, and carried to the house of Wikyátiwa. Most of the food which they had received was carried down into the Álkiva, which was the assemblage place of the Tateü'kti in this ceremony.

In all the kivas the beans had sprouted and were now called házrü (angular), possibly so named from the angle formed by the cotyledons with the stem. When they had grown somewhat higher they were called wupáhazrü (great or long, angular).

January 28—No ceremonials were observed on this day.

January 29—This was called the first ceremonial day of the Powámuh. About 11 o'clock last night the Natáčka donned their masks in the Álkiva, and the man who took the part of Hahaíwüqti, the mother of the Natáčkas, put on her disguise and took her long juniper bough. Háhawe went up the ladder, standing on it with his shoulders just above the hatchway, while the mother of the monsters stood at the foot of the same in the room. Assuming a hollow falsetto voice, in which the mother of the Natáčkas always speaks, she announced that

she was ready to visit the children. Hâhawe shouted his replies to her in a voice audible through the pueblo that the children were all asleep and that she had better put off her visit to them until the morning. A dialogue, the real object of which was to announce to the children that the Natáckas had arrived, was maintained for five minutes, and Hâhawe then went down the ladder; the Natáckas and Hahaiwüqti took off their masks and all laid down to sleep.

About 4.20 p. m. the Tewa personification of Hahaiwüqti, accompanied by one Natácka, came to Walpi and went to Kókyanwü'qti's and Kele's houses, giving to the little girls a few seeds and a snare of yucca shred. They dressed the Walpi Hahaiwüqti, Natáckas, and Soyókmana in the Álkiva at 4.25 p. m. Hahaiwüqti carried, besides a whitened gourd ladle, a basket (póota) containing two ears of corn, and two boiled hoyiani, some squash seeds, and a small bundle of sticks, of which she gave one to each little girl, who will later redeem it by presenting Hahaiwüqti with some hótomni. She gave each little boy, who will also redeem it with some kinds of game, a shred of yucca looped to a stick at the butt end (a rude snare). Natácka and Náamû wore cloth shirts, trousers and buckskin leggings, and two buckskins hung as loose mantles over their shoulders. The former carried a tortoise-shell rattle on his right leg, and had a bow and arrows in his left hand and an arrow in the right. Soyokmana had the hair smeared with white clay. She wore a loose mantle and whistled as Natácka hooted. Hahaiwüqti wore a fox-skin around the neck. The hands of all were whitened. Soyokmana wore a hideous black mask and was dressed in dilapidated clothing. She had a large knife in her left hand and a crook in her right (plates CV and CVI).

The Natácka helmets had turkey-tail feathers[1] closely radiating vertically at the crown, and they wore a cloth shirt and trousers, with belt with silver disks. Each had buckskin leggings and wore a fox-skin around the base of the mask; two large buckskins hung as mantles over the right shoulder. He carried a bow and arrows[2] in the left hand and with his right hand he received the food and placed it in the tozrúki[3] slung over his right shoulder. Soyókmana was personified by a lad of 12 years, wearing a woman's blanket (kwáca) and a buckskin mantle. He had a nakwákwoci, stained red, tied to the scalp lock.

A similar group, all costumed identically, was prepared in each of the three villages. The group of Tewa personifications went to every house in that pueblo and then to the houses in other villages where men from Hano have married. The groups of the other towns go first to the houses of their own pueblo and then to the houses in the other villages where men have transferred themselves by marriage.

When the Walpi group had finished their exercises at Hano and Sitcomovi they went back to Walpi and proceeded along the front side of

[1] At the tip of the lowest tail feather on each side a nakwakwoci stained with cuta was hung.
[2] Natácka carried a handsaw in the left hand.
[3] Bandoleer.

their pueblo to their own kiva, where they disrobed about dark. The object of the exhibition was to frighten children who exhibited fear of them, but children 6 years of age or thereabouts were somewhat familiar with them, and while it was evident they held the monsters in considerable awe they tried to assume a bold front when receiving the seeds and snares.[1]

At 8.30 a man personifying Tümáckatcina ran through Walpi from the Móñkiva toward Wala, emitting hoots as he went. A full half hour after, about 9 oclock, a group of masked but uncostumed men wrapped in blankets went to the kiva hatches and uttered most ferocious groans for four or five minutes. This was done in an informal manner, but was said to be prescribed ceremonially.

January 30—Between 7 and 8 oclock Wikokuitkatcina emerged from the Álkiva, passed around Walpi to the east end of the pueblo, and then down through the north lane, past Íntiwa's house, under the passageways back to the Álkiva. His body was painted white and he wore a blanket tied with a girdle (wukokwena), a fox-skin dangling at his loins. Nothing was elicited in relation to this event.

Between 8 and 9 oclock uncostumed groups of Tateü'kti went to the entrances of the kivas and laid themselves prone upon the hatch, their heads projecting over its edges. Several of them uttered their characteristic growls and pretended to snarl at and worry one another, possibly imitating ferocious animals or monsters. One of them carried on a dialogue with some one in the kiva.

At 9 oclock Tümac and two Tuñwúpkatcina (masked but uncostumed) made the tour of the pueblos, emitting peculiar hoots. Between 9 and 10 oclock Owana zrozrokatcina and Wupámokatcina appeared separately, each making a solitary tour of the village. They were not masked, but so wrapped in blankets that their masks were not visible.

At 10 oclock the Hano clowns and Natácka group came to Walpi and performed the same ceremony as the Walpi group, which has been described. There was informal singing in all the kivas.

January 31—During this day the masks of Hililikatcina and Soyókmana were painted. After dark a masked man (Katcina not known) rushed through the pueblo, and shortly after Tümac and her two sons (Tuñwúpkatcina), unmasked, ran through the pueblo hooting. About 9 oclock delegates from Sitcomovi, with a drum and rattles, made the rounds of Walpi and carried on a dialogue with the kiva chief.

At 10 oclock 18 Tcakwainakatcinas came to the Móñkiva from Hano. They were naked, save a breechcloth, but their bodies and limbs were ornamented with white zigzag markings. They wore fillets of a dozen or more yucca bands around the head, and necklaces in profusion on their necks. They passed in succession into the kivas, dancing a few minutes in each, and returned home shortly before midnight.

[1] Hahaiwúqti did not enter any of the houses, but merely went up the ladder two or three rungs and stood there just high enough to bring her helmet on a level with the first terrace. She then gave her shrill hoot, and when the women had brought out their children spoke to them in high falsetto.

February 1—Several tihus (dolls) were carved in the kivas, to be distributed to the children as in the Nimánkatcina. Tumae and her sons went around the pueblo about half past 7 o'clock, as on former evenings.

In the Tcivatokiva 11 men and a boy about 10 years of age, with Pauwatiwa as chief, whitened their faces, bound a fillet around their foreheads, and made curious crescentic marks on their cheeks. They afterward danced and sang. Sitcomovi priests, beginning at the Moñkiva, made formal visits to each kiva in Walpi. There were 12 of these men and they were decorated like those of the Tcivatokiva. They sang Sohumiskatcina songs, but wore no masks. They later visited the Sitcomovi kivas. The Tcivatokiva people then put on their kilts, tied on their turtle-shell rattles, took their juniper staffs and gourd rattles, and, led by Pauwatiwa, went to the Álkiva, and later to all the other kivas, where they danced and sang Pawik (duck) Katcina songs. Pauwatiwa sprinkled meal on the Katcinas from Sitcomovi before they began, and the chiefs of the other kivas did the same to those who visited them before they opened their dance.

February 2—This afternoon 8 girls, assisted by the men, washed the walls of the Móñkiva with a thin mud made of valley sand. The following girls took part in this work: Kaiyonsi, Humisi, Humita, Lénho (a woman), Leúnaisi, Tuvéwaisi, Hokwáti, and Hónka. The girls also made mud designs, lightning symbols, and hand-prints on the rafters of the room.

Tuñwúpkatcina[1] (personified by Takála) arrayed himself as follows: He donned trousers made of cotton cloth and wrapped himself in a blanket, under which he concealed all his paraphernalia. He received two bunches of yucca with about twelve or fifteen leaves in each bunch, and concealing them under his blanket hastened off to the northeastern end of the village. There he arrayed himself, and at 5 p. m. he returned, running back and hooting as he came, until he halted at the court, where he kept trotting up and down, marking time. He wore a mud-head helmet with a black band across the eyes, and parrakeet feathers on the top of the head. Turkey-tail feathers were arranged radiating horizontally from the crown to the back of the head. He wore also a cotton shirt and a kilt girded with a white belt (wukókwena). He had yellow clay on his legs and a tortoise-shell rattle below each knee. His moccasins were painted black. A whip or bunch of yucca with the butts in front was held in each hand.

The children who were flogged were brought to Tuñwup in the following way: The mother, sometimes accompanied by the father, led the child to the court, and if it were a boy the godfather took him in charge. He gave the lad an ear of corn, his teotcunwa, and a handful of prayer meal, and led the frightened child close up to Tuñwup. The godfather

[1] A figure of Tuñwupkachina with his pet (pókcna) appears on the reredos of the altar of the Nimánkatcina. (See Journal of American Ethnology and Archaeology, vol. II No 1.) The sprig which he is depicted as bearing in the hand was supposed to represent a cornstalk but from the new observations of the personification of Tuñwup there is no doubt that a yucca whip was intended.

prompted the boy, who cast his handful of meal on or toward Tuñwup. The godfather also cast meal on the same personage and then divested the boy of all his clothing and presented the lad with his back toward Tuñwup, who all this time had maintained his trotting motion but without advancing. Tuñwup then plied one of his yucca wands vigorously, giving the boy five or six forcible lashes on the back. After this was over the godfather withdrew the screaming boy and tied a nakwákwoci to his scalplock. The mother was standing by and hurriedly covered her son, frightened with his punishment, and led him home, but the mother was careful to see that he carried his tcótcnunwa in his hand.

If the child were a girl, her godmother led her up to Tuñwup, but her little gown was not taken off; only the mantle was removed for the flogging. Notwithstanding this, however, the blows were delivered with enough force to cause considerable pain, but her crying probably resulted as much from fright as from physical suffering. The godmother led the little girl back to her home, after having cast meal on Tuñwup, and was very careful that the child carried her tcótcnunwa.

There were five children of age varying from about eight to ten years who were thus flagellated. After each boy was flogged the godfather cast meal toward Tuñwup and then held out his own bared arms and legs successively, which Tuñwup lashed four or five times with all his might; but no women were submitted to this flagellation. Several men who had some ailment also went up to Tuñwup, and casting meal upon him received lashes on their bare arms and legs.

The man who personified Tuñwup exercised considerable discretion in performing his duty. In the case of a little girl who showed more than ordinary fear, he simply whirled his yucca whip over her head without touching her, and then motioned her away; but on the arms and legs of the adults he laid his whip without restraint. When all had been flagellated, Pauwatiwa came up from his kiva and gave Tuñwup a handful of meal and a nakwákwoci, who then trotted off, going outside the pueblo, possibly to preserve the illusion among the children that he was a real Katcina who had visited the pueblo from afar.

For four successive mornings the flagellated child was taken to a point on the mesa called Talatiyuka and there deposited a nakwákwoci in a shrine and cast meal toward the sun. During this time the child was not permitted to eat salt nor flesh, but on the fourth day a little before sunset this abstinence ceased, and the child might henceforth look upon Katcinas and sacred objects in the kivas without harm.

The primary significance of the flogging seems to be that until children have acquired sufficient intelligence or are eight or ten years of age, they are made to believe that the Katcinas, appearing at each dance, are superhuman visitors, and they are never permitted to see an unmasked Katcina. When they have matured enough or have sufficient understanding, they are instructed that the real[1] Katcinas have

[1] As I have already pointed out, the youth who dons the mask of a Katcina is believed to be for the time transformed into a deity (soul).

long since ceased their visits to mankind and are merely impersonated by men; but they acquire that knowledge at the expense of a sound flogging, such as I have just described.

At 10 o'clock six Teŭ'tekiitii (clowns), accompanied by Piptuku, who was dressed as an old woman and wore an old mask, passed about the pueblo from one kiva to another. These six persons entered the Móñkiva, and Píptuku, after some urging, followed them. One of the Teŭ'tekiitii was sent out, and the other five in succession took a pinch of ashes in the left hand from the fireplace, and poising it as if taking aim at something through the hatch struck off the ashes with the right hand.

A few minutes later four Wuwíyomokatcinas wearing characteristic masks appeared at the kiva hatch with turkey feathers radiating vertically around the upper part. They carried móñkohus[1] and an undressed skin pouch. Their leader, Silánktiwa, was without costume, and Cálako, Kwáteakwa, and seven other unmasked persons followed. Their faces and bodies were whitened, the hair hanging loose, and limbs bare. They wore plumes of gaudy feathers on their heads, were arrayed in white kilts, and held crooks in their hands. A personage called Eótoto[2] preceded them, and Hahaiwiiqti, continually talking, followed. The procession was closed by a warrior (Kaléktaka),[3] who carried a bundle of arrows in one hand and a bow and arrows in the other, and frequently hooted. The uncostumed chorus, composed of about twelve persons, accompanied by a drummer, followed in a cluster.

When the leading Wuwíyomo came to the Móñkiva he threw down the hatchway a ball of moist meal, which struck the middle of the floor. After this announcement he was clamorously invited by those within the chamber to enter, which he did, followed by the others. Each Wuwíyomo bore a bundle of deer scapulæ, which he clanked as a rattle, and all were sprinkled with meal by Íntiwa as they entered the kiva. They afterward filed to the western side of the room where the plants were growing; they sang for about five minutes, all standing.

When Eótoto entered the chamber he made on the floor with meal four symbols of the rain-cloud, one in advance of the other, and each of the Cálakos squatted on one of these symbols. The chorus, remaining outside, continued their song for a few minutes, while the Wuwíyomos were singing. Those who had last entered the kiva then passed out in the same order, and as they did so were sprinkled with meal, and each of the four Wuwiyomos was handed a nakwakwoci. They then visited the other Walpi kivas, where no observations

[1]Moñ, chief; kohu, wood—a chieftain's badge.

[2]Eótoto ("Aiwótoto") has been described in my account of the daybreak ceremonials of the Farewell Katcina (Journal of American Ethnology and Archæology, vol II, No. 1). Hahaiwuqti has been figured and described in my article on Certain Personages who Appear in a Tusayan Ceremony (American Anthropologist, January, 1894).

[3]A society comparable with the "Priesthood of the Bow" at Zuñi. This society is a priesthood apparently with much less power than that of the neighboring Ciholan pueblo, but its chief Panwatiwa is powerful, and, it may be said, en passant, a most genial and highly valuable friend to have in ethnologic work at Walpi.

were made, but the same ceremonials were probably repeated. After this they went off to perform the same ceremonies in the kivas of other villages on the mesa.

At 11 oclock a group of 12 men and a boy from Hano, costumed but accompanied by an uncostumed fiddler,[1] visited all the kivas in succession. Their bodies were painted white and they had plumes in their hair, but were unmasked. Each wore a fox skin depending from the loins, was barefoot, and carried a gourd rattle in the right hand and a sprig of spruce in the left hand. Their visits were expected but they personated no especial Katcina, and after their departure the men in the Moñkiva rehearsed a song.

February 3—No ceremonial took place throughout the day. The walls of the kivas were renovated by the girls with a wash of mud, and every kiva on the mesa was replastered in this way during the festival.

February 4—This day the manufacture of tihus (dolls) went on in all the kivas, and there was a continuation of the replastering and decoration of the walls of these chambers.

At 9 oclock a dialogue similar to that above recorded on the 29th of January took place between Hahaiwüqti and the kiva chief. The former wished to go among the children, but was told that it was very dark and the children were asleep. She was finally prevailed on to wait until the morrow.

At 10 p. m. 20 unmasked persons,[2] men and women with flowing hair, from Sitcomovi visited all the Walpi kivas. Each of the male personators carried a narrow green tablet (pavanyikaci),[3] fringed with long red hair and decorated with a symbol of the sun painted in colors. Each had a gourd rattle, and a stick about 2 feet long, to the end of which was attached half a gourd painted to represent a squash blossom, was held in the right hand. The 10 men personating women were not costumed. The leader carried a large Oraibi basket tray with a broad, brightly colored handle. In this was an effigy of a bird.

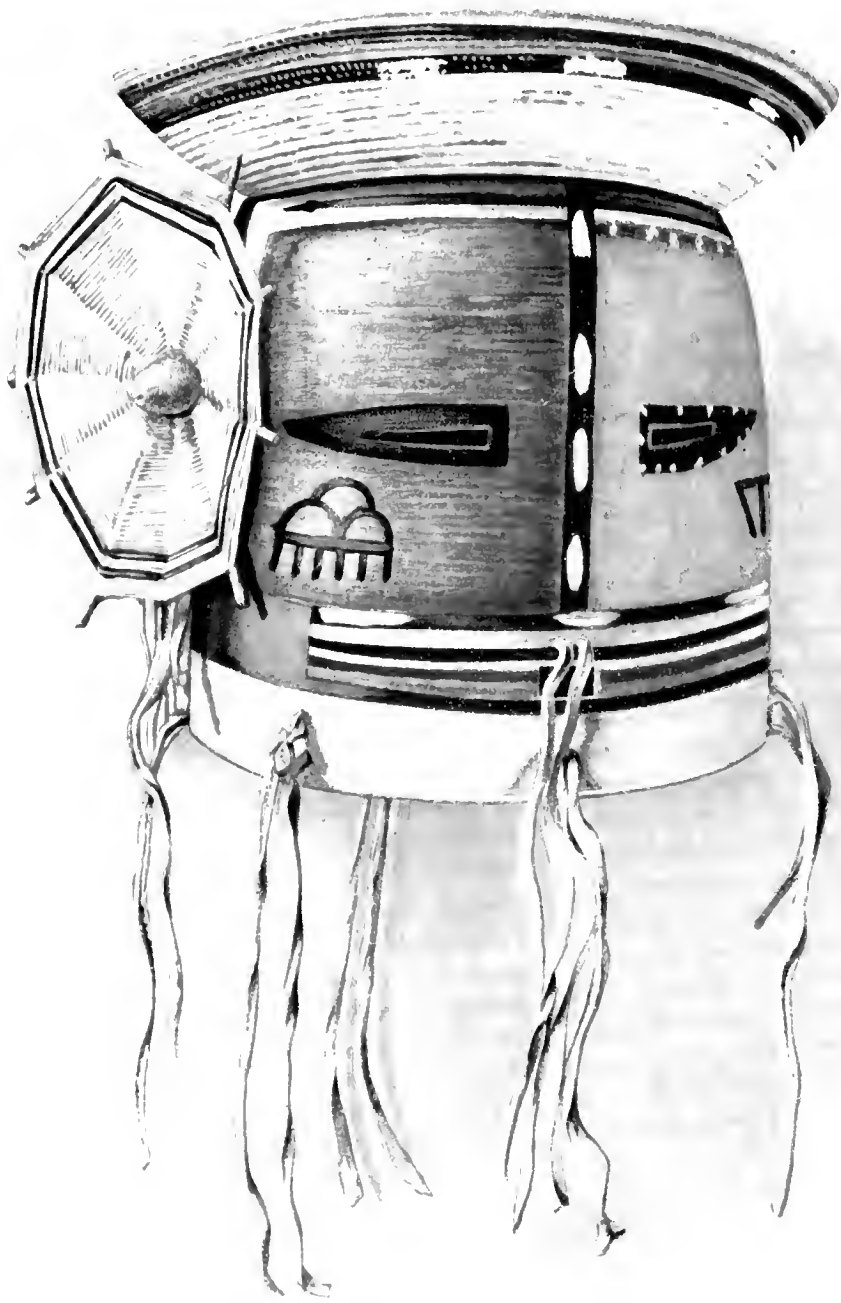
He set this tray on the floor near the fireplace, and after the chief of the kiva had sprinkled the visitors with meal a male and a female personator advanced from the western end of the kiva to the fireplace. The man picked up the basket on the butt end of his stick and presented it to the woman, who held it in both hands and danced a few moments, while all the others sang. She then laid the tray down and passed to the northern side of the chamber, the man retiring to the southern side. After the other couples had performed the same ceremony they left the kivas.

Immediately after their departure 28 personators from Hano entered. These consisted of male and female deities, the latter personated by men. The former passed to the southern, the latter to the northern

[1] His fiddle was a notched stick which he scraped with a sheep scapula

[2] Kawaikakatcinas. Kawaika is a Hopi name for the Laguna people of Keresan stock

[3] See figure in Naacnaiya, Journal of American Folk lore, July–September, 1892



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KATCINA MASK WITH SQUASH BLOSSOM APPENDAGE AND RAIN CLOUD SYMBOLISM.

side of the kiva. Each of the male personages wore a yucca fillet on his head and his legs were decorated with clay streaks; he wore white kilts and girdles, with dependent fox-skins. They also had tortoise rattles on the legs and carried a gourd rattle in the right hand. Their costume was as follows: They were without masks; the hair was loose and an imitation of a squash blossom was tied therein. The face was not colored, but on the right shoulder curving to the breast was daubed a mass of blue and green pigment. On the left shoulder and over the breast they were painted with yellow, and bright red streaks were drawn from the neck down the center of the breast and middle of the back. The upper part of the right arm was colored yellow, the left forearm green, the upper part of the left arm green. These colors were reversed on the right arm. The right leg also was yellow and the left leg was green with two contrasting bands below the knee. The hands, waist, and upper portion of the thighs were whitened. They likewise wore white kilts tied with girdles (wukokwéna and nanelkwéna). A gray fox-skin depended from the loins. Each had a tortoise-shell rattle on the right leg and on the left leg generally a garter to which small sleigh-bells were attached. Their moccasins were blue or green. In his right hand each carried a blue or green painted rattle, and in the left a sprig or small branch of spruce. Those personating females neither wore fox-skins nor held anything in the left hand. The female personators carried in the left hand a bundle of straw held well up before the face. After they had been sprinkled with meal they began to sing, and the couple in the center on the west side joined hands, holding them above the head—the female with the palm turned up, the male with the palm down and fingers imbricated. They advanced close to the fireplace and then returned to their respective places. The personators executed this figure four times in sequence and then went out.

Immediately after this presentation the delegation from the Móñkiva, led by a masked person, entered. The bodily decorations of these were not uniform; one had a figure of a gourd drawn on his breast, another zigzag lines, and still another parallel bars. The males carried a gourd rattle in the right hand; they wore no fillets on the head but allowed the hair to hang loosely. The female personators held a bunch of straw[1] and a sprig of spruce in the left hand, carrying it high up before the face. They sang the same song and executed the same figure as that already mentioned in the account of the presentation by the men from the village of Hano. The groups finished their visits at about midday.

[1] The signification of the bundle of straw may be that here we have the symbolic broom of the purification ceremony, if I am right in my interpretation that the Powamû is a lustral ceremony. In Nahuatl ceremonial Ochpamitzli the mother Toci carries the broom which is her symbol in this celebration, as shown in Seler's interpretation of the Humboldt manuscripts. In this connection the reader is referred to the facts mentioned elsewhere in this article that all the kivas are replastered in the course of the Powamu

February 5—At earliest dawn (5 a. m.) either the chief or one of his elders roused all the sleepers in the kiva, and each spread his blanket beside his basin of growing plants. He then carefully plucked the plants, one by one, so as not to bruise either stalk or roots. He laid them on the blanket in an orderly pile, the leaves together. The sand which remained in the basin was carried to some place where children would not see it, and the vessels were dried before the kiva fire and hidden away in the houses out of sight of the prying eyes of the young ones.

Nearly all the plants were tied with a yucca shred and a sprig of spruce (symbol of a Katcina), in neat bundles, leaving loose bights of the yucca by which to hold them. Each priest also tied up the dolls which he had made. All traces of the soil in which the corn had been forced to sprout had disappeared long before dawn.

The presents (dolls) which were made in the Tcivatoki were then distributed by a man personifying Pawikkatcina, under the instruction of those who had fashioned them. The distributing Katcinas of the Nacabki were two Niivákteinas,[1] and the same did this duty with the dolls in the Moñkiva. For the Álkiva two Tcoshiihiiwûh performed this duty. These Katcinas and two persons called Kawaíka (Keres) from Sitcomovi bustled about the pueblo on their errands and the distribution was finished about sunrise. The men did not speak when they approached a house with their gifts, but hooted after the customary manner of Katcinas.

Almost half an hour before sunrise the Soyókmana passed around the kivas, holding a dialogue at the hatchways with the chiefs inside. She wore a black conical mask with red mouth and white teeth, and was costumed as an old woman. In the right hand she bore a crook 7 feet long, at the end of which were tied many shells. In the left hand she carried a knife smeared with rabbit blood. Hii'hiiwûh also held a dialogue with the kiva chiefs and made gifts of watermelons and squashes to various persons.

At 11.30 a. m. Soyokmana, Hahaiwiiqti, and the Natáckas (plate CVI) made a visit to all the houses. They were followed by two Hehéakatcinas[2] with bags and pouches of food recently received, and after them followed three black and two white Natáckas. These five went together and were constantly in motion, moving or beating time with their feet.

The strange company went to each house demanding food, and when it was refused or poor quality offered the Natackas uttered a hoot like an owl, and at the same time Soyokmana whistled. They refused to leave a house until proper food had been given them, and if a child who had not been ceremonially flogged appeared with the mother its eyes were shaded by the mother's hand while she presented food to the Natackas.

[1] Elision of the syllable *ka* in this and similar compounds is common.

[2] The symbolism of their masks and their dance is described in the Journal of American Ethnology and Archaeology, vol. II, No. I.

Between 12 and 1 oclock Íntiwa, assisted by Hoñyi and Letaiyo, finished making twelve sets of cákwa (blue) páhos, most of which were composed of two sticks of uniform diameter, and only one set showed the flat face characteristic of the female. They likewise made twelve nakwákwoci hotomni, consisting of a twig about 2 feet long from which four nakwákwocis depended at intervals, and twelve simple feathered strings. When these were finished Íntiwa placed them in a tray of meal beside the sípapû and brought from the paraphernalia closet of the kiva six ears of corn of different colors, his típoni, two nákwipis and as many aspergills, two or more rattles, and other bundles containing the remaining paraphernalia of the cloud-charm altar.

At 1.30 p. m. he placed a small hillock of sand back of the sípapû and deposited his típoni upright upon it; he then made the cloud-charm altar,[1] arranging the corn at the ends of six radial lines of meal in a sinistral circuit, placing two crystals upon each ear of corn except that corresponding to the nadir. The aspergills (nakwámpis) also were laid down beside each ear of corn except that which was symbolic of the nadir. The sequence of ceremonials which then took place about this altar was as follows:

1. Ceremonial smoke.
2. Prayers.
3. Liquid poured into the crenelated vessel or nakwipi.
4. Songs.

   Synopsis of ceremonial events during the songs:

   (*a*) Meal shaken from the six aspergills into the liquid.

   (*b*) Whistling into the liquid through a turkey bone, and asperging to the cardinal points with the same, six times in all.

   (*c*) Meal cast into liquid, on tray of páhos and over the típoni in ceremonial circuit.

   (*d*) Pollen cast on the same objects in sequence.
5. Prayers.
6. Ceremonial smoke into the liquid with two pipes.

At the close of this observance Hahaíwüqti and the Natáckas came to the kiva hatch and a comic dialogue ensued. She demanded meat and other food, and the elders went up the ladder and refused to grant her wishes. Natácka hooted and Soyókmana whistled back, and then the Hehéakatcinas threw down the end of their lariat, and those in the kiva below hung a piece of sheepskin and horns of goats to it.

Íntiwa then called two youths, and without anointing them[2] gave them instructions where to deposit the offerings which had been conse-

[1] See Nimánkatcina altar, called nananivo poñya, six-directions altar. The whole ceremony is an invocation to the six world-quarter deities.

[2] It is generally the custom to anoint the feet, hands, etc, with honey when a person is sent out with offerings to shrines. (See "Snake dance," Journal of American Ethnology and Archæology, vol. IV.)

[3] See cloud-charm altar in other ceremonials. It is redundant in this place to repeat these accounts, as the variations are not important. (See Journal of American Ethnology and Archæology, vol. II, No. 1.) The Powámů altars are the same as the Niman, q. v.

erated on the cloud-charm altar.[3] One youth was told to deposit his at shrines in a circuit, beginning with Tawapa (Sun spring), and the other at Kokyanba (Spider spring) and Tuveskyabi. Two sets of offerings were left, and these with Katcinas were placed on the southwest point of the mesa. This closed the ceremony, for Íntiwa then replaced the plug of the sípapû and tied up his típoni and other paraphernalia.

The Natácka group went to the Wikwaliobikiva, and there Sóyoko gave each of them and the Hehéakatcina a handful of meal and a nakwákwoci. Taláhoya blew puffs of smoke over them. They then marched around the houses to the Nacabki, along the plaza to Teivatoki, and then to Álkiva, where they begged for meat and held comic dialogues with different chiefs. At the last-mentioned place there came from the kiva six men arrayed and costumed as the Mamzraúti teatumakaa, who, singing as they went, marched to the dance court and halted close to the edge of the cliff, facing the houses. The Natácka group accompanied them, and two men personifying Hehéakatcinas assumed erotic paroxysms and lay down on their backs on the ground close to the disguised Mamzraúti personages, endeavoring to lift up their kilts and performing obscene actions. Then they rolled on the ground in assumed fits. The Natáckas, as usual, maintained their prancing step around them, and occasionally Soyokmana thumped them with the butt end of her crook. After about five minutes of this exhibition the Hehéa seized the Mamzraúti personators and tumbled them into an indiscriminate heap, fell on top of them, and did other acts which need not be mentioned. The Natácka then retired for food, and, unmasking in the kiva, did not again appear.

February 6—Food was carried to all the kivas yesterday morning, but there was neither dancing nor ceremonials.

February 7—No ceremony took place on this day, but the kiva chief and the Hehéakatcinas played a curious game of ball called sunwuwinpa, in which the ball is attached to a looped string. The player lay on his back and, passing the loop over the great toe, projected the ball back over his head. Two groups of these players were noted.

The following Katcinas were personated in the Powamû of 1893:[1]

Hahaiwüqti, Ancient Woman, Mother of Monsters.
Natácka, Monster.
Soyókmana, Attendant of Natácka.
Tuñwúp, Flogging Katcina.
Ahü'l.
Tümác, Mother of Ahü'l.
Wuyokwati.
Teakwaina.
Wuwíyomo.
Pawik, Duck.
Nüvák, Snow.
Hehéa.
Mamzraúti teatumakaa.
Teavaiyo, Giant Elk
Wupámo, Great Cloud.
Owanazrozro, Stone Devourer.

[1] As the number of these personages was large in this presentation, this summary mention of their names may be of interest.

PÁLŬLŬKOÑTI

The screen drama of the Pálülükoñti ceremonial as performed in 1893 has already been described.[1]

The following personifications of Katcinas appeared in the Palülükoñti in 1893:

Coyohim, All.	Hokyaña.
Pawik, Duck.	Húhian, Barter.
Tacab, Navaho.	Calako, Calako.

Its presentation in other years differs very materially from the description given.

In the celebration of 1891 a wooden figure representing Cálako was introduced with two carved marionettes, which were manipulated as if grinding corn, and serpent effigies were thrust through the sun opening of the screen. These were likewise used in the presentation in 1894.[2]

The celebration of Pálülükoñti in 1894 was controlled by the Badger people, and the exhibition of the screen drama occurred March 16. A number of slabs with symbolic figures of Táwa (the sun), and Cotükinuñwa (the heart of all the sky), and two small effigies of Pálülükoñnh (plumed snake) were introduced. The two mechanical figurines, which were so manipulated as to appear to be in the act of grinding corn on metates, represented Cálakomanas, and were made by Totci of the Badger people.

This variation from year to year, it will be observed, preserves without change the various deities introduced and recalls what I have already written about the variations in altars of the Nimán in different villages. In stage effects latitude is permissible, but there is no change in the deities represented. Something similar occurs in the Mamzraúti, where, in 1891, tablets with Palahikomana symbols were used, while in 1893 women represented that personage.

So far as I know the essential personages[3] to be represented by symbolism or by men in disguise, are:

Táwa, Sun.
Mii'iyawû, Moon.
Cótokinuñwa, Heart of the Sky.
Hahaíwüqti, Ancient Mother.
Pálülükoñti, Plumed Snake.
Cálako taka or mana, Corn Man or Maid.
Various Katcinas, mentioned above, but these may vary year by year.
Másanwûh, Fire God.
Various Tenkúwympkiyas, Clowns.

[1] Journal of American Folk-lore, October–December, 1893.

[2] It will thus be seen that the details of this ceremony vary in different years, but the variation depends simply on the kiva presenting it. It is commonly said that the original wimi of the Palülükoñti (Great Plumed Snake) were brought to Tusayan by the Water people from the far south. Other observations support that statement.

[3] To these must be added the constant accompanying priests in all ceremonials, who are unmasked and do not personate supernatural beings.

NIMÁNKATCINA

An outline of the ceremonials attending the departure of the Katcinas from three of the Tusayan villages has already been given elsewhere.[1] From new observations it is found that much remains to complete this account, but the main events have already been described. While the dance resembles the abbreviated Katcinas, from which it should not be widely separated, the altar and kiva ceremonials place it in the group of elaborate Katcinas or those with complicated secret usages. It is only in those villages in which are preserved the wíni of the Kachina moñwi that this celebration can occur, although, as we shall later see, abbreviated Katcinas are not so limited. It will probably be found that any abbreviated Katcina may be used for the public dance of the Nimán, but no abbreviated Katcina can have the secret ceremonials of the Nimán without becoming the same. When the Katcina chief, Íntiwa, sets up his altar it is but natural that any set of Katcinas may give the public dance, which, while a necessary accompaniment, is far from being prescribed as to kind.

ABBREVIATED KATCINAS

CHARACTERISTICS

This group includes a large number of simple ceremonials in which a masked dance in public is the most significant part. The general character of these observances may be seen by a consultation of my article, "A few summer ceremonials at the Tusayan pueblos."[2] The distinctive name is determined by the characters personified as indicated by the symbolic markings of the masks or by other paraphernalia. No elaborate kiva ceremonials are performed.[3]

All the abbreviated presentations have certain common features which run through them. These characteristics may be learned from my description in the article on "The summer ceremonials,"[4] but in order to make them more prominent I have mentioned them in an appended footnote.[2]

The special Katcina celebrated is designated by the symbolism depicted on the mask, which is repainted and redecorated according to the Katcina which it is intended to represent. For the special

[1] Journal of American Ethnology and Archæology, vol. II, No. I.

[2] Ibid. The following abbreviated Katcinas have been described and figured: (1) Humiskatcina, Corn Flower. (2) Ñañakatcina, Long Beard; (3) Coyóhimkatcina, All; (4) Hehcakatcina; (5) Siokatcina, Zuñi. (6) Málokatcina. The symbolic characters of the different Katcinas are best shown in my article on "Dolls of the Tusayan Indians." The Nimánkatcina is likewise outlined in the Journal of American Ethnology and Archæology, op. cit., and some of these abbreviated Katcinas are accompaniments of the Niman.

[3] The participants of course frequent the kiva to prepare their masks and costume for one or more days previous to the public dance, and certain simple ceremonial objects, as páhos and nakwákwocis are made there, but in none of those Katcinas which are included in this group have I as yet observed any altar or the like. The very name "abbreviated" eliminates naturally these complex proceedings and paraphernalia.

[4] Op. cit. The spruce tree of the Katcinas is commonly set up in the plaza.

name and the accompanying symbolism a study of the dolls will give as good an idea as can yet be obtained from published articles.[1]

The participants in the abbreviated Katcinas may be divided into two groups: (1) The Katcinas, male and female, with related masked personages, and the priests who pray to them and sprinkle meal upon them, and (2) the accompanying clowns and masked or other persons who participate in their antics and presentation. The details of the proceedings of the second or possibly subordinate group vary in different dances more than those of the first.

The participants of the first group are:

1. Masked personages (always men) called Katcinas.

2. Masked men, personifying women, called Katcinamanas.

3. One or more masked persons, who vary in symbolic characters in different Katcinas. These are often absent.

4. Priests (unmasked), directors of the dance, who sprinkle the Katcinas with sacred meal. These priests are vehicles of prayers to the Katcinas and masked participants, and are generally few in number.

The presentation is accompanied with a feast[2] (generally at noon) limited to Katcinas and Katcinamanas. The Katcinas dance in line, sing, distribute gifts, but never utter any continuous sentence or prayer. The Katcinamanas dance in line facing the Katcinas, or kneel in front of the same, accompanying their songs with a rasping noise made by rubbing a scapula over a notched stick. Ordinarily their mask is identical in all Katcinas of the abbreviated form, and they generally have their hair in two whorls on the sides of the head, and wear white blankets and other feminine apparel. The second group of personifications are the Tcukúwympkias (Tatcü'kti, knob-head priests; Tcü'ckütû, gluttons; or Paiakaiamû, horned clowns). Their representation consists of a series of antics and dramatizations, story telling, gluttony, obscene gestures or bawdy remarks, and flogging and other indignities heaped upon each other or upon accompanying masked persons. These representations and the personifications who carry on their portion of the observance vary in different reproductions of the same drama.

The Tcukúwympkia do not dance or sing with the Katcinas, but sprinkle them with meal and pray to them. While an essential feature in certain abbreviated Katcinas, they are not always present, and their exhibition has many secular or temporal characteristics or innovations more or less dependent on the invention of the participants. The masked persons who assist them are representatives of semimythologic beings, called Piptuka, Ü'tci (Apache), Tacáb (Navaho), Kése, and others. A description of the various modifications of their performances would mean special account of each presentation

[1] Dolls of the Tusayan Indians, op. cit.

[2] The food is brought to each by wives, daughters, or other women of his household. This feast takes place in the open air, not as at Zuñi in the kivas.

and would vary in details for each exhibition, but except in a very general way these variations are quite unimportant in the study of the characteristics of the abbreviated Katcinas. The following are some of the episodes introduced:

1. Inordinate eating and begging, urine drinking, gluttony, and obscenity.

2. Flogging of one another, stripping off breechcloths, drenching with foul water, ribald remarks to spectators, and comical episodes with donkeys and dogs.

FIG. 40—The Ñakatcina.

3. Story telling for pieces of corn under severe flogging by masked persons, races, smearing one another with blood, urinating upon one another, tormenting with cactus branches, etc.

The Katcina dance ordinarily lasts from daybreak to sunset, with intermissions, during which the participants unmask under an overhanging cliff on the southern side of the mesa. Here likewise they have their feast at midday. The dances in the forenoon are slimly attended by spectators, but in the afternoon all the terraces and roofs of the houses surrounding the plaza[1] in which the pillar mound is situated are occupied by natives and visitors. The line of Katcinas is led by an uncostumed chief, who sprinkles meal on the ground as he enters and leaves the dance court, and who from time to time shouts to

[1] This is the only plaza large enough for a long line of dancers, and hence is ordinarily used.

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DOLL OF CALAKO TAKA.

the dancers (figure 40). The leader of the Katcinas stands midway in the line, and by a rapid movement of his rattle as a signal changes the song and directs the termination. To him[1] as a representative the prayers are addressed. The dance is a rhythmic stamping movement of one foot on the ground, and all keep in line, elbowing their neighbors, turning now to one side, then to another, as directed. The female Katcinas face the male and stand about midway in the line. They use the serrated stick and scapula as an accompaniment to the song.

It is common for both male and female Katcinas to bring gifts to the plaza for spectators, especially children, as they return to the dance.[2] These gifts are ordinarily corn, bread, or tortillas. It is customary for priests to sprinkle the Katcinas with sacred meal, and the Teukúwympkiyas, or clowns, also perform this function. The tiponi or Katcina badge of office is not carried in every celebration, nor does the Katcina chief, Íutiwa, always lead the line.

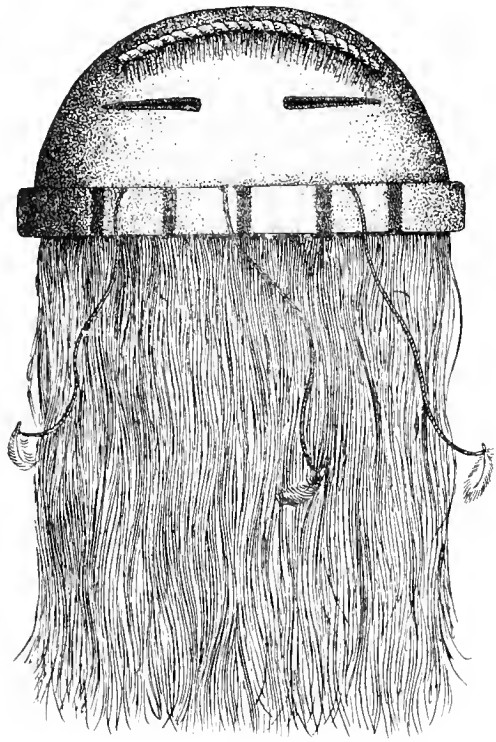

FIG. 41—Maskette of Áñakatcinamana.

The one garment worn by the male Katcinas is the ceremonial kilt. This is not confined to them, but is likewise worn in other ceremonials, as in the Snake Antelope observance and in minor celebrations. Every male Katcina, whatever his helmet, has one of these about his loins. It is made of coarse cotton, on the ends of which are embroidered symbolic figures of rain-clouds, falling rain, and lightning. Ordinarily half of the width is painted green, and the lower edge is black, with nine square blocks of the same color at regular intervals. This kilt is represented on many dolls of the Katcinas figured in my article on that subject.[3]

The Katcinas, irrespective of the special personage depicted, wear a broad cotton sash with knotted strings at the proximal end. In this

[1] To these prayers he alone responds "Antcai," right.

[2] The configuration of the mesa and the fact that the house walls rise almost continuously with the side of the cliff prevent the Katcinas dancing on the different sides of the pueblo, but in Zuñi the open spaces outside the village, in addition to the plaza in the heart of the pueblo, are used for dances as I have elsewhere described.

[3] See also Journal of American Ethnology and Archæology, vol. IV, p. 66.

belt spruce branches are held. A fox-skin depends from the belt, and turtle-shell rattles on the leg are invariably part of a Katcina's costume. Moccasins and heel bands are prescribed and bodily decoration with pigments is common, but none of the above are characteristic of special kinds of Katcinas. The mask is in general the one distinctive characteristic of a definite personification.

SÍOCÁLAKO

The Shálako is one of the most important observances at Zuñi, and is partially described by Cushing in an article on his life in Zuñi.[1] An exhaustive account, however, has never been published. The Hopi occasionally celebrate a Cálako, which from its name and other reasons is undoubtedly an incorporated modification of this ceremonial, as the Tusayan legends distinctly state.[2] The following pages give an outline of the Hopi presentation as a contribution to the comparative study of Pueblo ritual. A complete account of the Shálako at Zuñi is a great desideratum before it is possible to undertake close comparisons.

The presentation of Cálako is not an annual event at the East mesa of Tusayan, but occurs after long intervals of time. The paraphernalia are kept in a house in Sitcomovi and belong to the Badger clan. The house in which they are deposited is the property of Koïkáamii, the daughter of Masiúmtiwa's eldest sister, now deceased, and the wimi likewise belong to her by descent.

The chiefs of all the gentes in Walpi and Sitcomovi, the chief of the Katcinas, and one or two others from Hano assembled in this house on the 16th of July, 1893, and made a large number (over two hundred) of páhos for use in the ceremonials to be described.

Early on the morning of the next day the masks and effigies of Síocálako were renovated and carried to the spring called Kwañwába (sweet water), which is situated on the Zuñi trail southward from the mesa. In a modern house owned by a Sitcomovi family[3] at this spring the masks were repainted and the hoops which were used to make a framework for the bodies were set around with eagle feathers.

The effigies which were used in personifications were made up of masks or helmets of the ordinary size for the heads and a crinoline-like[4] framework of willow hoops for the bodies. These masks were made from narrow shreds of leaves of the agave plaited together diagonally, and this plaited frame was covered with a painted buckskin upon which the symbolism of the Síocálako was delineated. The projecting beak of the face had a movable under jaw, which was hinged and manipulated with a string. The helmet was attached to a staff forming a backbone, 3½ feet long, by which it was carried. The series of

[1] 'Adventures in Zuñi,' Century Magazine, vol. xxv, p. 507 et seq.

[2] Several ceremonials are derived from Zuñi, while others are peculiar to Tusayan. The symbolism of the Síocálako and the Hopi Cálako is different. No girls (manas) were represented in the Síocálako.

[3] All the women and children of this family had been moved to the mesa a few days before.

[4] Compare the crinoline hoops of the effigies of Palülükoñüh (Journal of American Folk-lore, October–December, 1893).

crinoline hoops or supports of the blankets which formed the body were about fifteen in number, the upper being about the size of the helmet, the lower 4½ feet in diameter. A tü'ihi or large white embroidered mantle was draped about the upper hoops or the shoulders, and a gray fox-skin was hung around the neck, which was likewise profusely decorated with shell necklaces.

The man who acted the part of bearer walked inside the crinoline, freely supporting the effigy by the staff or backbone, holding it at such a height as to permit the lowest hoop with its attached feathers to reach to his knees. Each effigy bearer was bareheaded, and although hidden from view, was decorated with the white kilt of a typical Katcina.

An uncostumed chief led the four giants in single file toward the mesa, followed by a large number of men dressed as mud-heads or Tatcü'kti, who were called "Koyímse," a term adapted from their Zuñi name.[1] All who had sufficient knowledge of the idiom spoke Zuñi, and the procession reached the Sun spring (Tawápa) at about sunset. It was there met by two priests, Taláhoẓa and a nephew of Masiúmtiwa, who were to act as conductors. All were welcomed and homoya (prayers) were recited and much sacred meal was sprinkled. Headed by the two conductors the procession climbed the trail to the top of the mesa, and from thence marched into the main court of Sitcomovi by the northeastern entrance, near which the men bearing the four giant effigies, together with the mud-heads, halted. The latter were closely huddled together in four groups, drumming with deafening noise on as many drums.

The Katcina chief, Íntiwa, and a man personifying Eototo[2] then drew four circles with intersecting lines of meal on the ground at the north side of the court in the positions indicated. This was followed by a command of Hahaíwüqti, who signaled with an ear of corn for the first (kwiníwi, north) Cálako effigy to advance. He did so with a short, rapid step, and halted over the first circle of meal. The "bearer" bobbed the effigy up and down so that the feathers which had been fastened to the lower hoop of the crinoline touched the ground. The bearer then stooped and rested the end of his staff on the ground, holding it upright. The other three giant impersonators were then brought up, one at a time, by Hahaiwüqti. As each settled to its position the bearer cried "Ho!" six times in a shrill falsetto, and rapidly snapped the beak of the effigy he bore by means of a string. The Cálakos were then sprinkled with meal by the chiefs and others, after which the effigies were moved one by one to circles of meal on the southern side of the plaza. Six times this removal was repeated, each time attended by ceremonials similar to those mentioned above.

[1] Koyeamashe (see Journal of American Ethnology and Archæology, vol. I).

[2] The association of Eototo with Íntiwa has already been described in my account of the Nimankatcina (Journal of American Ethnology and Archæology, vol. II, No. I).

At the conclusion of this observance in the plaza the four giants were conducted by the chiefs of the Lizard, Ásа, Badger, and Water gentes to the houses of the elder sisters of the respective clans. The Cálako effigies were suspended by the mask from the rafters of each room, and as the length of each was 7 feet 6 inches the tips of the radiating feathers on the head and those on the last hoop of the framework of the body just touched the roof and floor of the chamber. The same ceremony took place in each house and there were prayers by the elders, dancing by the effigy bearers, and singing and drumming by the "Koyimse." At sunrise—for the exhibitions in the houses lasted all night—a final presentation in the court similar to that which opened the ceremonies took place, after which the Cálakos and mud-heads went

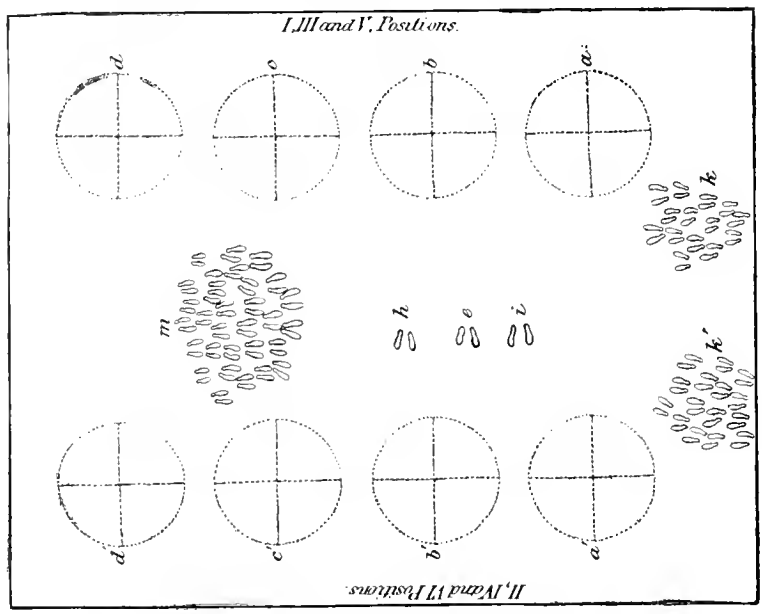

FIG. 42—Position of celebrants in the court of Sitcomovi in Stocálako.[1]

to the cliff and unmasked at the Kachinaki. There they performed purification ceremonies (navoteiwa) and dismantled the effigies. They donned their ordinary habiliments and smuggled the paraphernalia back into the chamber in Sitcomovi, where it is ordinarily kept.

On the 8th and 9th of the month, following the demise of the Cálakos, a most elaborate Wáwac or Racing Katcina was performed.[2]

[1] Explanation of the diagram: *a, b, c, d*, and *a', b', c', d'*, successive positions of the effigy bearers on the northern and southern sides of the plaza; *e*, Eototo; *h*, Hahaiwuqti; *i*, Íntiwa, *k*, Koyimse; *m*, accompanying celebrants. The figures *a*–*d* and *a'*–*d'* represent the circles of meal, with cross lines, over which the effigy bearers stand in the course of the ceremonials.

[2] The general character of the Wáwac is described in my article in the Bulletin of the Essex Institute, where certain of the masks made use of in it are figured. The Racing Katcina performed at this time was, however, much more complicated, and a description of it would be a digression from the subject of this article.

PAWÍKKATCINA

The Pawikkatcina, which I observed at Sitcomovi in 1892, had certain differences from any abbreviated Katcina dance which I have yet described, and illustrated the ceremonial reception of these personages after they had visited another pueblo. A priest of Sitcomovi suggested that his fellow villagers should send a delegation of young men to Cipaulovi to return a dance with which they had previously been honored by the latter pueblo. Accordingly the masks were painted and the preliminary ceremonials took place in one of the Sitcomovi kivas,

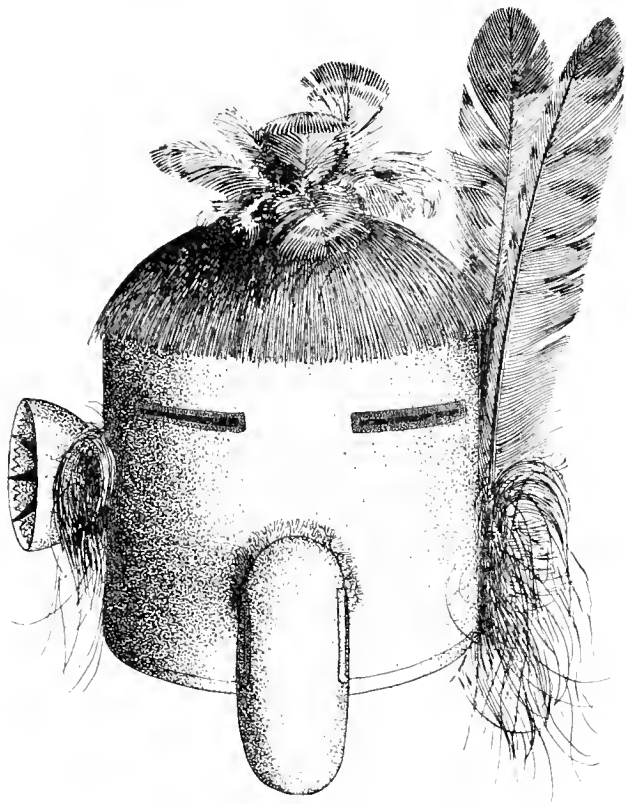

FIG. 43—Mask of Pawíkkatcina (front view).

those who were to participate in the ceremonial beginning their work on the 25th of June. The visitors danced all day of the 27th at Cipaulovi, rested on the 28th, and continued their dance on the 29th at Sitcomovi. The ceremonials on their return at the trail approaching Sitcomovi took place on June 28th, an hour before sunset.

This dance differed very little from that of other Katcinas, to which attention has hitherto been directed.[1] There were twenty-three Katci-

[1] Journal of American Ethnology and Archæology, vol. II, No. 1.

nas and five[1] Katcinamanas, and the masks of both are illustrated in figures 43, 44, and 45, while one of the staffs which they bore is represented in figure 46. They sang five songs called Ómowûh (cloud), Yoivíkka (swift), Pakwa (frog), Pawykia (duck), and Patzro (quail). An interesting feature which I had never before seen in Tusayan abbreviated Katcinas was the unmasked dance in the kiva.[2]

The secret ceremonials in the kiva were as follows: The three priests, who had previously bathed their heads in their own houses, made the páhos and nakwákwoeis. Two of these men made four prayer sticks similar to those described in the Walpi ceremonial, and one made a long single páho. These were deposited in a flat basket

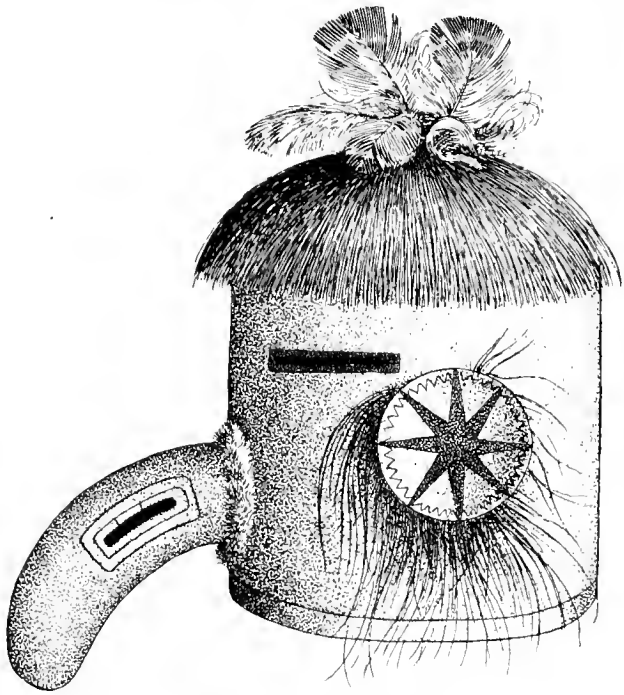

FIG. 44—Mask of Pawíkkatcina (side view).

tray and smoked upon by those present. Before beginning the manufacture of the páhos the makers prepared themselves by a ceremonial smoke.[3] At the same time that the páhos were made twenty-three nakwákwoeis for the Katcinas and five for the Katcinamanas were likewise manufactured.

[1] It was said that there ought to have been six (possibly one for each cardinal point) of these, who are called Cíwáata, sisters of the Pawíkkatcinas.

[2] I have not been permitted to see the unmasked dance of the Koko in the Zuñi kivas, where it is common, and was glad to supplement my observations by the same in one of the Tusayan kivas. In the Katcinas which I saw in 1891 at Walpi there was no dance in the kivas.

[3] The pipe was passed ceremonially after having been lit with a coal (burning corncob) brought by a woman from a house in Sitcomovi. In most ceremonials it is also prescribed that the makers of páhos shall wash their heads before beginning their duties, but this takes place in their own dwellings.

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HEAD DRESS OF ALOSAKA.

At midday food was passed down into the kiva, but before partaking of it one of the priests took a pinch of each kind of food (dunópna) and went with it to a cleft in the mesa on the north side of Sitcomovi. He there deposited it with a páho, a pinch of each kind of pigment used in painting the paraphernalia, a little tobacco,[1] but no sacred

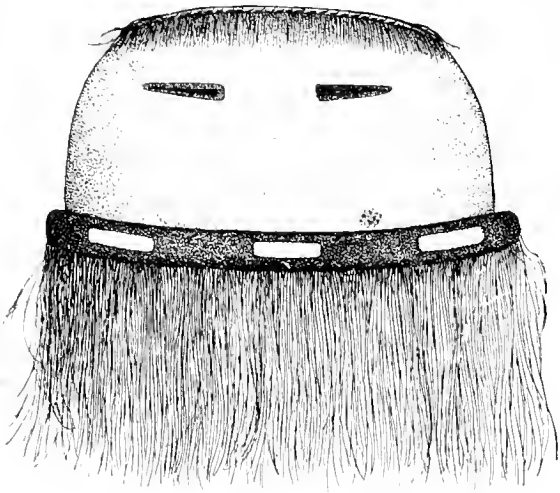

FIG. 45—Mask of Pawíkkatcinamana.

meal. This was an offering, it was said, to the Grand Canyon of the Colorado sipapû. He then went to the southern side of the mesa and placed in a similar cleft a nakwákwoci, said to be an offering to Másauwûh.

At sunrise on the 29th two offerings were deposited, and each of the twenty-three Katcinas placed his nakwákwoci in a shrine.

Ceremonials attending visits of people from adjacent or remote pueblos are simple but interesting. The following reception ceremony of visitors from a distant pueblo not of their own people was noted: In the progress of the summer dances of Walpi in 1892 I observed the ceremonial reception of several Zuñis who came over to assist in the Húmiskatcina. They were formally "received" in the Wikwaliobi kiva by Íntiwa,[2] Kópeli, Hoñyi, Pauatiwa, and Lésma. Íntiwa gave their headman a twig of spruce, to which Lésma tied four nakwákwocis.[3] Íntiwa sprinkled it with sacred meal and laid

FIG. 46—Staff of Pawíkkatcina.

[1] The first reference which I have found to the use of tobacco in the ceremonial smoke by the American Indians is by Monardes. This interesting description of tobacco and its uses, accompanied with a figure of the plant, is one of the most complete for its date (1590) which I have seen.

[2] Íntiwa is Katcina moñwi, chief of the Katcinas; Kopeli, chief of the Snakes; Hoñyi, hereditary Snake-Antelope chief; Wíki, chief of the Snake-Antelopes; Pauatiwa, chief of warriors; Lésma, Bear chief.

[3] See Journal of American Ethnology and Archæology, vol. II, No. I.

it in front of the Zuñis, and finally all smoked together. This was said to be a formal act of reception.[1]

The reception ceremony of the Pawikkatcinas when they returned from Cipaulovi was as follows: At 4 p. m. Panatíwa's father, a very old man, sat on the edge of the mesa looking west and north toward Cipaulovi. He called my attention to a line of men coming along the trail. When the line halted on the last rise before the trail ascends to the top of the mesa we went down to welcome them.

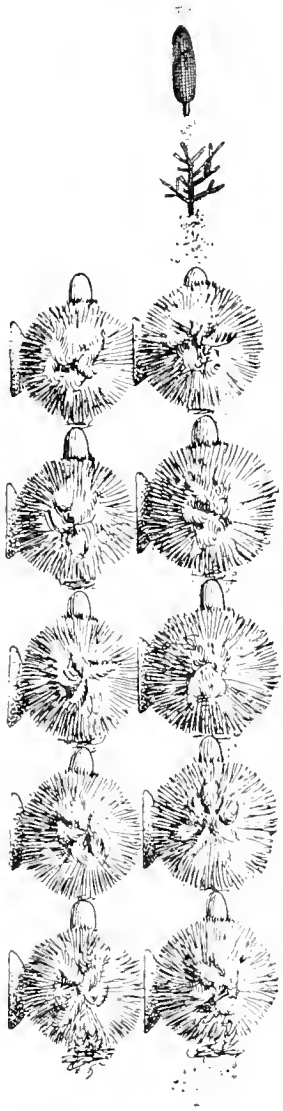

FIG. 47.—Helmets, ear of corn, and spruce bough arranged for reception ceremony.

Each Katcina placed his helmet in one of two parallel lines arranged along the trail, and in front of the two lines he laid the spruce bough which he carried. In front of this pile of spruce boughs an ear of corn was placed in the trail not far from the helmets. All the Katcinas then marched around the line in a sinistral circuit, sprinkling sacred meal upon the masks, corn, and spruce boughs and throwing a pinch along the trail in advance of the ear of corn. The circuit around the line of helmets was sinistral, as in all Hopi ceremonials.

Nine old men then formed a circle at the left of the corn and smoked, sitting in a squatting posture.[2] No one was allowed to go up the trail before this ceremony was completed, and one who attempted to do so was warned back. A short address of welcome was spoken by the priests to the leader of the Katcinas, and at sunset they put on their masks and marched to the plaza of Sitcomovi. They first danced on the southern, then on the eastern, and lastly on the western sides of the plaza, omitting the northern side. The priests sprinkled the Katcinas with sacred meal, observing the sinistral ceremonial circuit as they passed around the line. A small spruce tree, upon which nakwákwocis were tied, had been placed near the middle of the plaza.

[1] When the inhabitants of another pueblo visit that in which a sacred dance is taking place, it is customary for the hosts to entertain by setting before them food, and it is no uncommon thing to see visitors passing from house to house partaking of the pikami (mush) and other delicacies. It is not unusual for the headmen of one pueblo to send official thanks to the people of another for their sacred dances and other efforts for rain. In a memoir on the Snake dance I mention an instance where even the distant Havasupai Indians brought offerings from their home to Walpi (Journal of American Ethnology and Archæology, vol. IV).

[2] I need not describe their actions, as I have already done so for other Katcina dances (Journal of American Ethnology and Archæology, vol. II, No. I.)

The Katcinas and Katcinamanas then adjourned to the kiva, where they unmasked, placing their helmets in a row and the spruce boughs in the middle of the kiva.[1] The two priests seated themselves on the uprise, one on each side of the ladder.

On the following day the dance was continued from sunrise to sunset. In the afternoon there appeared the Teúkuwympkiya, Mnñ'we (Owl Katcina), two Teósbiici, Pü'üikoñhoya (the Little War God), and a Navaho Katcina.

ÁÑAKATCINA

The celebration of the Áñakatcina at Hano, in the Nimán of 1892, gave me the following additional data to that already mentioned in the description[2] of the Áña of 1891. These are due in part to the variations in ceremonial customs, and are not regarded as essentials.

The Hopi Áñakatcina was invited to Hano by Kálakwai, and its public presentation was identical with that of 1891 and that of the Zuñi Kókokci. The antics of the gluttons were very much more complicated. This I ascribe to two causes—the rarity with which Katcinas are celebrated in Hano, and the great need of rain at the time.

One interesting but highly disgusting part of the show of these priests was the slaughter of a huge dog and the use of his entrails and blood in distinguishing one of their number as Másauwúh,[3] the Death god. The details of this may be had by consultation with the author.

About 4 oclock on the morning of the public dance of the Áña the participants danced in the Hano plaza, destitute of all clothing or helmets and accompanied by the clowns, also without masks. This feature I had not previously observed. After this early dance páhos were deposited at the shrine situated in the middle of the dance plaza.

As no account of the ceremonial deposit of offerings to the winds has ever been published, the following observations are given to fill this gap in our knowledge. Probably the object of the wind offerings is propitiatory, for high wind, it is believed, blows away the rain, to produce which is the main object of the observance. Kwálakwa took for this purpose in a blanket the following objects: Nakwákwocis, native tobacco, paper bread, pikami (pudding mush), sugar, and peaches. He deposited a packet containing a pinch of each of these in six

[1] One marked difference between Katcina and Koko, or Hopi and Zuñi dancers is that in the latter the unmasked dance occurs in the kiva and the feast is held in the same place. At Tusayan the feast is open, and generally there is no unmasked dance. The feast in the kiva at Zuñi is possibly a secondary modification for effecting secrecy.

[2] Journal of American Ethnology and Archaeology, vol. II, No. I.

[3] This is the only time I have seen the Death god personified. The Paiakamana rushed up to me and demanded a knife, and when I refused to give it, not aware of their intention, they sought other ways to kill the poor brute. It was an exhibition of extreme savagery, but of course with no danger to any of the spectators. Later in their antics the gluttons themselves were lightly struck with a cactus branch, and the person who performed this painful act went from housetop to housetop touching the arm or neck of every spectator—man, woman, and child. During this dance these Teukuwympkiyas performed the disgusting act of drinking human urine. Mr Cushing, in the Century Magazine, records the slaughter of a dog in a similar manner, except that he says that his life was threatened before the dog was killed, and it was by his defiant attitude that he was not seized by the performers.

shrines situated at cardinal points, beginning at the east.[1] The Hopi begin their ceremonial circuit ordinarily at the north, but the Tewa, it would seem, place their offerings in the following order: East, northwest, southwest by south, southwest, southeast by east, southeast.

In the interval between two of the dances, while the Katcinas were unmasked, and had halted under an overhanging rock on the trail a few feet below Hano, I observed a test of endurance which I had never before seen. Kopeli, the Snake chief, took a bundle of yucca branches, and different volunteers from the Katcinas, stepping up to him, first held out one arm, then the other; Kopeli struck the outstretched limb with more or less force, and at the conclusion presented his own arm and naked body for this trying ordeal. The Ñañakatcina is illustrated in figure 40.

COMPARATIVE STUDY OF KATCINA DANCES IN CIBOLA AND TUSAYAN

The published material which can be used as a basis of comparison in the study of Katcinas in other villages is meager and insufficient. Even of the nearest pueblo, Zuñi, which has been more studied than many of the others, and in which Katcina observances closely akin to those of Tusayan are performed, the published accounts are very limited. In a general way it seems to me that the Tusayan ceremonials are more showy and elaborate than those at Zuñi. There is, however, one marked exception;[2] the powerful war society, called the Priesthood of the Bow, has more elaborate ceremonials in Zuñi than in Walpi, where this organization is weak. It is not possible from my limited knowledge of Zuñi ceremonials to declare that it is less complicated than that of Tusayan, but I believe that the powerful organization mentioned has had much to do with many of the differences between the two.

One source of information in regard to the differences and likenesses between the Zuñi and Hopi ceremonials is the testimony of the chiefs themselves. This does not hold in regard to modified ceremonials primarily the same or derived from a common source, and is only hearsay, not science.

All the Hopi priests say that the Siotü (Zuñis) have no knowledge of the Teütcübwimi (Snake-Antelope mysteries). The same chiefs likewise claim that the Zuñis have no Mamzraúti, Lálakoñti,[3] Wüwütcimti, and no societies corresponding to the Tátankyamû, Ñaltû, or Kwákwantû.

[1] The direction of the ceremonial circuit of the Tewa is sinistral. In this instance it began at the east. I believe this is the prescribed circuit of all the Pueblos. Some of the Tewa have told me that in their folktales their people did not emerge from the same sípapú as the Hopi, but from a sípapú to the east. Although some of the priests say that all people came from the middle of the earth, from one sípapú, others believe that each pueblo has its own ancestral geographical opening. The idea has been localized by environment, as is so often the case with modified legends.

[2] There are certainly more evidences of white man's influences in dance paraphernalia in Zuñi than at Tusayan such for instance as the use of hats and calico shirts in dances, American chairs, rifles, etc, etc.

[3] Notwithstanding this statement, I have already pointed out similarities between both these women's celebrations and certain Zuñi dances (see American Anthropologist, vol. v, p. 236, note).

Although they may not reproduce some of these ceremonials in the form celebrated by the Hopi, it is not clear to me that some of those which they observe may not be differentiations of the same ceremony, as I have shown in my accounts of the women's dances.[1] There is a marked similarity in many of the myths, which would seem to imply resemblances in ritualistic dramatizations of the same.

It is possible to verify historical data and legendary history by a study of the same ceremony. For instance, the five oldest Tusayan pueblos of which we have accounts in the earliest records are Awatobi, Walpi, Micoñinovi, Cuñopavi, and Oraibi.[2] Awatobi was destroyed in 1700, so that but four original communities of the time of Vargas still remain. It is in these four and at Cipaulovi that the Snake ceremony is still celebrated, and Sitcomovi and Hano are ascribed by Hopi legends to a much later time than the first appearance of the Spaniards; their names do not appear in the early descriptions of the province.

It is a mistaken idea, and one which has led to many misconceptions, to suppose that what is true of one group of pueblos is true of all. While in a general way the mythology and ritual of all may be said to have general resemblances, there is far from an identity between the ceremonials, for instance, of the Hopi and the Zuñi, or those of the Rio Grande pueblos and Tusayan. It is not a question of knowing all by an intimate knowledge of one; but each branch, even individual pueblos, must be investigated separately before by comparative knowledge we can obtain an adequate conception of the character of the pueblo type of mythology and ritual. Moreover, there is evidence that this difference existed in ancient times, and while the differentiation of the manners and customs of different pueblos may have been less rapid in the past than today they were far from being identical. It does not follow, except in certain limits, that the most primitive pueblos today show in their survivals a better picture of the character of life in another pueblo than the existing state of things in the latter. To reconstruct the probable character of the ancient culture we must trace similarities by comparative studies.

In a comparative study of the ceremonials of different pueblos, it is important to decide which are most primitive or nearest the aboriginal condition and which are least affected by foreign influences. The purer the present aboriginal culture, the greater worth will it have

[1] Howina (Zuñi, Ówinahe), a kind of thanksgiving dance, is distinctly a Zuñi dance, and is so recognized by the Hopi. I have seen photographs of the celebration at Zuñi which bear such a close resemblance to that called by the Hopi the Howina that in all probability the two are identical. The elaborate war dances celebrated at Zuñi and the observances of the Priesthood of the Bow at that pueblo are very much abbreviated in Tusayan (East mesa), where the organization has not the same power as with the Cibolans.

[2] Cipaulovi, or the "Place of Peaches," would necessarily have received its name after those who brought peaches came among the Hopi. It is known that Sitcomovi was a late colony of Asa people from the Rio Grande, united with others from Walpi, while Hano was founded about 1700. The Cipaulovi people, however, celebrate the Flute ceremony, and the Flute people came to Tusayan shortly after the Snake. It would thus appear that we have a date to determine that the Flute people came to Tusayan after Vargas (1692). Morfi, in 1782, says that the people of Xipaulovi (Cipaulovi) came from Xongopabi (Cuñopavi).

in our approximation to a true conception of the primitive pueblo culture. Many of the Pueblos practice a religious system which may be rightly called aboriginal, but in some it has been modified by outside influences. I think no one, for instance, would say that the present Zuñi custom of burial in a churchyard was not due in part to the influence of Catholic priests, for Spanish narratives of three and a half centuries ago are quite explicit in their statement that the Zuñis burned their dead. If one custom has been changed, how are we to distinguish the modified from the primitive? It can be shown that strong influences have been used for the direct purpose of destroying the Katcina worship. Take, for instance, Zuñi, the least changed of all the pueblos except those of Tusayan. It is pagan today, and probably never was profoundly modified by Christianity, but Roman Catholic fathers, with the avowed determination to Christianize it, could not have lived there continuously for over a century and caused the great missions to be built without modifying the religious customs of the Zuñians. It is said that after the priests were driven out the Pueblos returned to their ancient practices, but it must be admitted that no one has yet shown how the pure Katcina practices were preserved over three generations. They returned to an old worship, but who has evidence to say that it was the same as that of their great-great-grandfathers?

In some instances the natives have very willingly adopted Christian teachings and the Christian God, believing that by so doing their own religion would necessarily become strengthened by an addition to their pantheon. Such adoption, however, no matter how regarded by them, made a permanent impression on their primitive condition by changing their mode of thought and life.

They apparently may have abandoned all that the church taught; but what means could have been used to restore the pure worship of pre-Columbian times? The culture which was revived was aboriginal, but could never be identical[1] with that of the times before Coronado.

The question then resolves itself into a historical one—which pueblos were the home of Catholic priests for the shortest time, and in which were their influences least powerful? The historian will of course answer the Tusayan pueblos, and ethnology contributes her quota of facts to indicate that the purest form of Pueblo ceremonials are now practiced by these villagers.

Although there are several ceremonials which the Hopi claim are not performed at Zuñi, and conversely others performed at Zuñi which are not observed in Tusayan, there is a similarity, differing in details, between the Koko and Katcina dances close enough to show their identity. The Hopi recognize this fact, and to prove it I need only mention that the Áñakatcina in 1891 was danced at Zuñi by some of the Hopi as a Kóko. I have already pointed out the identity of the masks, paraphernalia, and songs of the Kókokshi, performed by the Zuñians, and

[1] I do not for a moment doubt that even when nominally Christianized the succession of the chiefs in the several sacerdotal societies has not been broken up to our time.

A. HOEN & CO. LITH.

A POWAMU MASK.

the Áñakatcina at Walpi. There is no doubt in my mind that they are the same, but I can not accept the dictum that what is observed in one is identical with what exists in the other. There are slight modifications which exist likewise in different Hopi villages, as will be seen by a comparison of my descriptions of the two. One marked difference is that several Kókokshi dances were performed in the summer I spent at Zuñi, and that this identical Katcina (the Áña) is performed but once each summer in any one Hopi village.

The only other Koko[1] dance which I know of from personal observation is the tablet dance, which is in many respects homologous with the Húmiskatcina. The symbolism of the mask and tablet, however, dif-

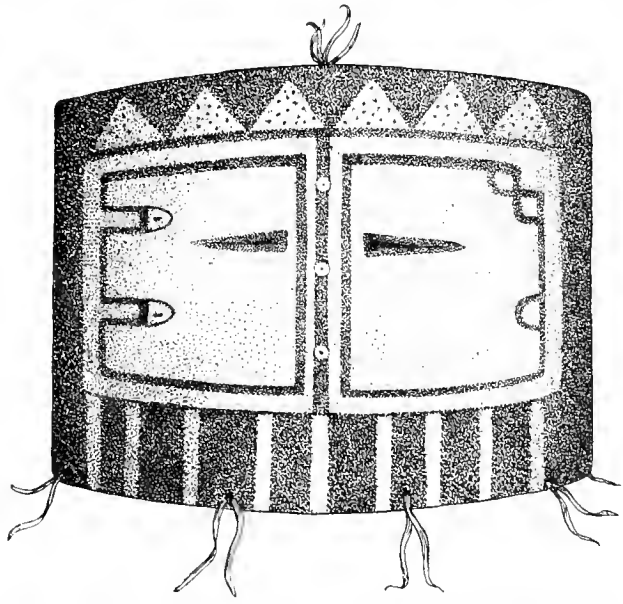

FIG. 48—Symbolism of the helmet of Humiskatcina (tablet removed).

fers from the Húmis, and while in a speculative way I regard them the same we must await more research to prove them identical. The subject is still more complicated by the fact that the Hopi have a tablet mask with still a third symbolic character, which they call the Zuñi or Siohúmiskatcina.

I think we need have no hesitation in supposing that the so-called Sio (Zuñi) Katcina, which I have elsewhere described, is a Zuñi celebration derived from that pueblo. I do not know whether it is ever performed there in the same way as at Walpi, since it has not been described by any of the students of the Zuñians.

We have, however, as before mentioned, a partial description by Cushing of the Zuñi Shálako, and from his account we can gather a

[1]Coco in Spanish signifies a bogy. In compounds it can be detected in Cocomaricopa, where it may mean fool possibly referring to the inferiority of this stem. The derivation of Kóko or Ká'ká is not known to me. The word Katcina has the advantage of Kóko or Ká'ká as a general designation.

few of the main points of difference between it and the Siocálako performed at Walpi and described in the preceding pages. The Hopi, however, have a Cálako of their own. They distinguish it from the Síocálako, which they not only recognize as of Zuñi origin, but are also able to designate the family which brought it from the Zuñians. The name of the celebration and the use of Zuñi words in it both point to this conclusion.

The correspondence between the Hé'emashikwi, or last[1] dance—the tablet dance described by me elsewhere as occurring at the close of the series of Kókos—is probably the same as the Nimánkatcina. There are many similarities to indicate this fact, and, although as yet we know nothing of the secret observances connected with it, I suspect that a similarity between them and those described in the Móñkiva will later be made known.

Dolls in imitation of the Hé'emashikwi are reported in the catalogue of Colonel James Stevenson's collection from Zuñi in 1881, and I have no doubt it will be found that there formerly was, and possibly still survives, at the celebration of this dance at Zuñi the characteristic habit in Tusayan of distributing dolls as presents at the departure of the Kachinas.

Mrs Stevenson has given short descriptions of some of the Zuñi Kokos and figures of the masks of the same. While it is not possible for me to use them in a comparison with Katcina celebrations, they are interesting in studies of symbolism. The "flogging Kókos," for instance, seem to function the same as Túñwup among the Hopi, but as the symbolism of the mask of the floggers, Saiāhlias, is not given by Mrs Stevenson I am not able to express an opinion whether the same personage is intended or not. The time of year when the flagellation is inflicted by the Saiāhlia of Zuñi would be an interesting observation, and the accompanying ceremonials would also be of great interest for comparison with the Powámû.

I have not been able to find the equivalents of the Sälämobias among the Hopi, but the symbolism of Pooatiwa agrees almost exactly with that of the Hopi Paútiwa.

The Sälämobias of the different world-quarters agree in color with those assigned by the Hopi to the same points, with the exception of those for the above and below. In Zuñi, according to Cushing and Mrs Stevenson, the above is all colors, the below black. Among the Hopi the above was found to be black and the below all colors. This discrepancy in observations is recommended as a good subject for future students, both in Tusayan and Zuñi.

In reviewing the Hopi ceremonial personages I have been unable to find any homology with the Sälämobias. The views of the masks[2]

[1] That is the last Katcina before their departure in Cibola, as in Tusayan. In Walpi it is not an autumn dance, but occurs at about the same time that I witnessed it at Zuñi, near the end of July (see Journal of American Ethnology and Archæology, vol. I, No 1).

[2] It is recommended that in illustrating Zuñi masks a full face view be given, for in that way the symbolism is much better expressed than by profile views.

given by Mrs Stevenson afford little information on this subject, but in her sand picture, surrounded by the Plumed Snake, I find some of the figures of Sälämobias with indication of a connecting band between the eyes, which recalls Paŭtiwa's[1] symbolism. There does not seem to be a wide difference between the profile views of the masks of Paŭtiwa and Sälämobia of the different world-quarters.

The environment of the pueblos of Tusayan and of Cibola is so similar and the rain-cloud worship so imperative in both that, a priori, we should expect the rain-cloud symbol to be as frequent in Zuñi as in Walpi. I am much surprised therefore in studying the description of Zuñi ceremonials to find nothing said of the characteristic Hopi symbols of the rain clouds, the semicircles and the parallel lines of falling rain (plate CVIII). If the rain clouds at Zuñi are limited to the terraced[2] figures found on the prayer-meal bowls and the same made in sacred meal we certainly have a significant difference between the symbolism of these two peoples. In Tusayan there is not one of the great religious festivals where the semicircular clouds and falling rain do not appear as symbols. Thus far students of the Zuñi ceremonials have not figured one instance in which they are used.[3]

The short account of the effigy of the Plumed Snake (Kólowisi) with attendant ceremonials at Zuñi, by Mrs Stevenson, shows the existence of archaic rites with the Plumed Serpent which have been observed in a different form (Palülükoñti) at Tusayan. The time of the year when the Zuñi effigy is brought to the kivas on a rude altar is not given, nor is the special name of the ceremony. The conch shell is similarly used to imitate the voice of the Plumed Serpent at Zuñi, as at Walpi, in the Soyáluña and the Palülükoñti. In neither of these ceremonials, however, have the effigies been observed to be carried ceremonially about the pueblos of the Tusayan mesas. The symbolism of Palülükoñûh and Kolowisi seems to differ, judging from published accounts and symbolism on Zuñi and Hopi pottery. I find no intimation of the horn on the head of Zuñi pictures of the Plumed Snake, and the arrowhead decoration fails on the body. The two crescents which are common on the body of the Zuñi figures have not been observed in Hopi pictographs or effigies.

It would seem both from legendary and other reasons that there has not been the warmest friendship between the inhabitants of Tusayan and Cibola. This is not to be wondered at, for only on rare occasions has there been good feeling between two pueblos even of the same

[1] Pocatiwa is considered by Mrs Stevenson the "Sun Father." I have not gone far enough in my studies to accept this relationship for Paŭtiwa. There are some reasons for considering Paŭtiwa the Mist Father, which speculation has led me to interpret the Salämobias as Paŭtiwa forms of the rain-clouds of the six world quarters, but such an opinion is highly theoretical.

[2] The terraced elevations are common on the Zuñi nakwipis and handled prayer-meal bowls, as can be seen in any large collection of Zuñi ceramics; but the semicircular rain-cloud figures are very rare, indeed wanting, in all I have seen. The frog, tadpole, snake, and similar symbols appear, however, to be present in both. The question of the characteristic symbolism of Zuñi and Hopi pottery is a complicated one, which can not be considered in this article, but the two types can readily be distinguished by a student of this subject.

[3] It would be a remarkable fact if accounts of this symbolism are not later described.

speech. The massacre of Awatobi at the hands of the other Hopi has been told elsewhere, and even at the present day Oraibi is not on the best of terms with the other Hopi towns. The legends of the Hopi are full of quarrels of one pueblo with another, and bitter hatred sometimes developing into bloody wars in which their own kindred were attacked and pueblos destroyed.

In her article, "A chapter of Zuñi mythology,"[1] Mrs Stevenson says: "The Ahshiwanni,[2] a priesthood of fourteen men who fast and pray for rain; the Kokko, an organization bearing the name of anthropomorphic beings (principally ancestral) whom they personate, and thirteen esoteric societies are the three fundamental religious bodies of Zuñi . . . The society of the Kokko personate anthropomorphic gods by wearing masks and other paraphernalia. There are six estufas or chambers of the Kokko for the six regions, the north, west, south, east, zenith, and nadir, and these rooms present fantastic scenes when the primitive drama is enacted by the personators of these anthropomorphic gods. . . . The esoteric societies, with but one or two exceptions, have nothing to do with anthropomorphic beings, this category of gods being zoomorphic."

Accepting these statements as a correct idea of the "three fundamental religious bodies of Zuñi" I find great difficulty in tracing an intimate relation between them and those of the Hopi system. A large number of the Katcinas are anthropomorphic and likewise ancestral. They bear the names of animals, and in that sense may be called in some instances zoomorphic. Walpi, however, has but five kivas, the members of each of which in the Powámû personify different Katcinas. I have not yet discovered that each of these kivas is associated with a different cardinal world-quarter, as Mrs Stevenson finds to be the case in Zuñi. The esoteric societies of the Zuñi, according to Mrs Stevenson, "with but one or two exceptions have nothing to do with anthropomorphic beings." I am not able to harmonize my observations of the secret societies in Tusayan with the definition given of the esoteric societies in Zuñi, and must await some clearer insight into the character of the latter before offering any discussion of several resemblances which can be detected. From an examination of Cushing's article in the *Century Magazine*, in which the esoteric societies of Zuñi are briefly defined, I am led to believe that the so-called esoteric societies in that pueblo differ a good deal from those in Walpi. The Hopi testify that while some of their secret fraternities are represented in Zuñi several of them are not identical.[3]

[1] Memoirs of the International Congress of Anthropology, Chicago, 1894. p. 315.

[2] On page 314 she mentions six Ahshiwanni as "rain priests." I am not able to definitely decide from the text whether these six are the same as the fourteen mentioned above. It is not clear to me in which group Mrs Stevenson places the "Mud-heads" and "Gluttons," well described by Ten Broeck in 1852 from Tusayan, and later by herself and Cushing from Zuñi, and by other writers from the Rio Grande pueblos.

[3] If these statements are true one sees that they tell in favor of the theory which the ritual emphasized, and that while in a general way there is a similarity between the ceremonial system of the two

Mrs Stevenson does not make it clear who these fourteen (six) so-called Ahshiwanni are, but calls them "rain priests." She intimates that they appeal directly to the Sun father, their supreme deity, and to the rain makers, while the "societies" address "the beast gods of their worship to intercede with the Sun father and rain makers." There is apparently no parallelism between these conditions and those at Tusayan, but I can readily find truth in the statement when applied to the Hopi that "no society convenes without giving much time to invocations for rain." I am sure that some of the societies at Tusayan do not appeal to the beast gods to intercede with the Sun father and rain makers, but address the latter directly in their prayers. In this particular there is certainly a marked difference between the conceptions back of the rites in Tusayan and those ascribed to the Cibolans.[1]

The custom of the Yókimoñwi, or rain chief, retiring alone to a cell to pray for rain was practiced in Tusayan. One of these retreats is to be seen at the Middle mesa. Among the foothills there is a block of sandstone, 15 feet long, 5 feet wide, and 4 feet thick. Its flat face is about horizontal or slightly tilted toward the northeast. Portions of a rough wall are still in place under the block, confirming the story that there was here formerly a chamber of which the block was the roof. An aperture on the northeastern corner, about 20 inches square, is usually closed with loose stones, but the chamber is now filled in with sand to within about 2 feet of the roof or lower surface of the slab. The interior of the chamber was about 8 feet long and 4 feet wide. On the roof, which was painted white, are figures of yellow, green, red, and white rain clouds with parallel lines of falling rain and zigzag lightning symbols in conventional patterns. To this chamber, it is said, the Rain chief of the Water people retired at planting time and lived there sixteen days, his food being brought to him by a girl during his vigils. He

people, it is absurd to say that "what is written of one is true also of the other." Long ago their systems may have been identical; at present they have more or less differentiated one from the other. In Zuñi, according to Mrs Stevenson, "at the winter and summer solstices synchronal meetings of most of these societies are held, and also at other times." After having carefully studied the ceremonials at the time of the summer solstice at Tusayan, I have not found any synchronal meetings of the societies which correspond with those mentioned as occurring at Zuñi at that time.

[1]It is desirable that the names of the priests who officiate in ceremonials be given in extended accounts of them in order that the intimate character of this sacerdotal organization may be made out. Until the names of the members of the different societies are complete we are more or less hampered in our studies. The Zuñi equivalent of wympkia appears to be kyalikwe (Teihkyalikwe, Snake priests; from teihtola, snake, and kyalikwe, wympkia). I am unable to tell to what priests in Tusayan the "Ahshiwanni" correspond. The Tawa (Sun) wympkia or Sun priests have certain points in common with them, but this is as truly an esoteric society as any in Tusayan. I have elsewhere described the Tewa ceremony in which the Sun priests make the páhos and their chief, Kálaca, appeals directly to the rising sun. In that same ceremony páhos are likewise made to the Rain gods directly. In the Katcina celebrations some of the same Sun priests, however, appeal to the leader of the Katcinas to bring them rain, and this personage replies that he will. In this case, supposing, as I think we justly can, that the Katcinas are intercessors between men and gods of highest rank, we have in Tusayan the possible equivalent of the "Ahshiwanni (rain priests)" intrusting their prayers to a zoomorphic and anthropomorphic supernatural personage. The prayer of a single chief for rain for the people, showing something similar to the so-called Ahshiwanni at Zuñi, are not uncommon in Tusayan. In Tusayan an organization of rain priests is not differentiated at the present day from the other societies. All holders of wimis are Rain priests, as well as the organization called the Sun priests, and all at times make special prayers to the Rain gods.

was able by his prayers to bring the rain. These visits were made long ago, but even now there are páhos strewn about the chamber, and devout persons visit the place at the present day with a nakwákwoci and pray for rain. Although the Rain chief no longer passes the sixteen days there, it is a holy place for the purposes mentioned.

"The earth," says Mrs Stevenson,[1] "is watered by the deceased Zuñi of both sexes, who are controlled and directed by a council composed of ancestral gods. These shadow people collect water in vases and gourd jugs from the six great waters of the world, and pass to and fro over the middle plane, protected from view of the people below by cloud masks."

I find a different conception from this of the rain-making powers of the dead among the Hopi. Among other ceremonials, when certain persons die, after the chin has been blackened, the body washed, and prescribed feathers placed on different parts of it, a thin wad of raw cotton in which is punched holes for the eyes is laid upon the face. This is a mask and is called a rain-cloud or "prayer to the dead to bring the rain." In general, as many writers have said, the use of the mask transforms the wearer into a deity designated by the symbolism of the same,[2] and as a consequence the dead, we may theoretically suppose, are thereby endowed with supernatural powers to bring rain. The Ómowûhs, however, are the Rain gods, and so far as I can explain the significance of the symbolic rain-cloud mask on the face of the dead and the black color on the chin, it is simply a method of prayer through the divinized dead to the Rain-cloud deities. Among the Hopi the earth is watered by the Rain gods, but the dead are ceremonially made intercessors to affect them. In this view of the case the Hopi may be said to believe that the earth is "watered by the deceased of both sexes."

The Hopi believe that the breath body of the Zuñi goes to a sacred place near Saint Johns, called Wénima. There the dead are supposed to be changed into Katcinas, and the place is reputed to be one of the homes of these personages. It is likewise specially spoken of as the house of Cálako, and it is believed that the Zuñi hold the same views of this mysterious place. In lagoons near it turtles are abundant, and not far away Mr Hubbell and others discovered sacrificial caverns in which were large collections of pottery. Tótei, a Hopi resident of Zuñi, is the authority for the statement that the Cibolans do not use the raw cotton mortuary mask, although they blacken the face of the dead chiefs. He says the same idea of divinization of the breath body into a Katcina seems to be current among the Zuñi as among the Hopi.

According to Mrs Stevenson the father of the Kokko is Kaklo (Kyäklu), whose servants are the Sälämobiyas. The name of their mother is not known to me. The Katcinas are said to be the offspring of an Earth

[1] Op. cit., p. 314. I believe many facts might be marshaled to prove that ancestor worship is a most vital part of the Tusayan religious system.

[2] See "The Graft collection of Greek portraits," New England Magazine, January, 1894. Mr J. G. Frazer (Jour. Anth. Inst. of Great Britain and Ireland, vol. XV, p. 73) from comparative studies of burial customs suggests that the habit of masking the dead is "to keep the way to the grave a secret from the dead man." This explanation seems to me much more labored than that given above.

goddess,[1] who figures under many names. Their father's name on comparative grounds is supposed to be Táwa, the sun, or Túñwup, their elder brother.

A study of the group of Katcina ceremonials as compared with the Kóko brings out in prominence the conclusion that while some of them may be identical, as a rule there is considerable difference in the ritual of the Tusayan people and their nearest neighbor, the Zuñi. If variations exist between these neighbors we are justified in the suspicion, which observation as far as it has thus far gone supports, that there are even wider differences between pueblos more distant from each other. The ethnologist fully cognizant with the ritual in one pueblo has a general conception of the character of all, but changes due to suppression of ceremonials, survivals, dying out of societies, and many other causes have modified the pueblos in different ways. The character of the ancient system is adulterated in all. We can form an idea of this modification in no better way than by a minute study of the existing ritual in every pueblo. Upon such comprehensive study science is at the very threshold.

The foregoing pages open many considerations of a theoretical nature which I have not attempted to develop. My greatest solicitude has been to sketch the outline of the Katcina ceremonials as performed at the Hopi village of Walpi in Tusayan.

[1] Hahaíwüqti. I have elsewhere shown reasons to suspect that several personages may be the same "Earth goddess." Kókyanwüqti, the Spider woman, is also an "Earth goddess." As everything, even man himself, came from the womb of the earth, symbolized by the spider, it is not surprising that an Indian should call the spider the creator. It is a very different thing, however, to interpret such information by our philosophic ideas. That the primitive mind should consider the earth as the mother of everything, its creator in one sense, is natural; that the Pueblo Indian should symbolize that mother by the Spider woman is probable, for other races have done likewise; but that he associates with mother earth the spiritual idea which we have of the Creator is absurd. His cosmogony bears no evidence that he rose, in pre-Columbian times, to the belief in a Great Spirit who created the universe.

THE REPAIR OF CASA GRANDE RUIN, ARIZONA, IN 1891

BY

COSMOS MINDELEFF

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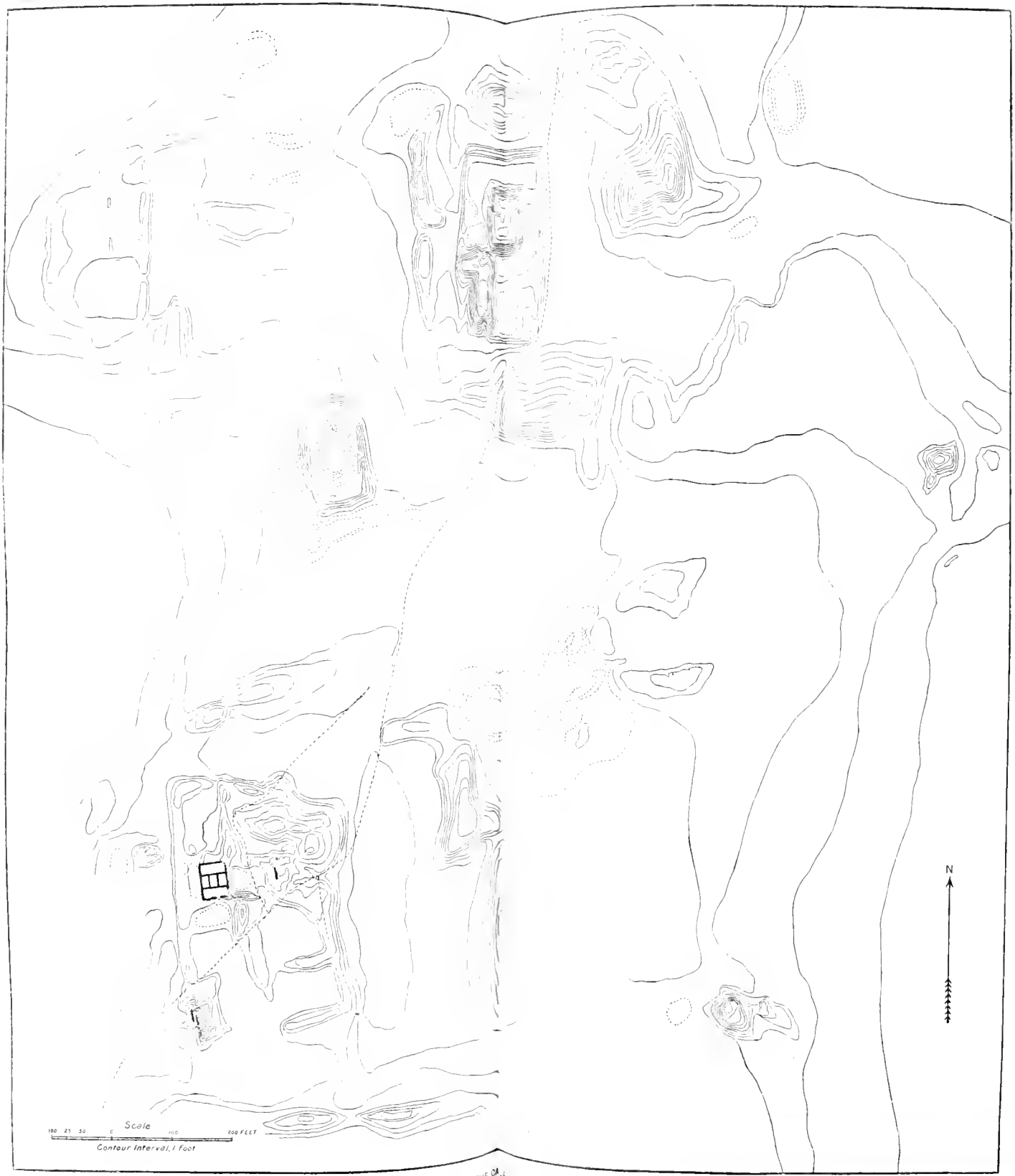


MAP OF THE [illegible] GROUP

THE REPAIR OF CASA GRANDE RUIN

By Cosmos Mindeleff

INTRODUCTION

In March, 1889, an appropriation of $2,000 was made by Congress for the repair of Casa Grande ruin in southern Arizona. This amount was insufficient for complete restoration, but under the authority of the act of Congress making the appropriation some work was done. Partly as an aid to further possible work, and partly that there may be an available record of what has been done for the benefit of future students of American archeology, this report is presented.

A full description of Casa Grande has been given by the writer in a published memoir[1] on that ruin, hence only a brief account will now be necessary to aid in making the present report intelligible. Following this description is a statement of the condition of the ruin in 1891 and of the plans formed for its repair, the latter being necessarily controlled by the amount appropriated. After this there is an account of the work done, from the passage of the bill until the delivery of the work to the agent of the United States who received it, and of the reservation of an area of land about the ruin by order of the President. This is followed by a catalogue of the articles found during the excavations in and about the ruin, which were subsequently deposited in the National Museum; a transcript of the contract under which the work was done, including specifications, plans, and sections, and the report of Mr H. C. Rizer, who inspected and received the work. Finally, there are appended the correspondence and report relating to the condition of Casa Grande in 1895, with recommendations concerning its further protection.

Casa Grande has occupied a very important place in the literature of American archeology, a place which it doubtless will continue to occupy; and as dates are frequently of importance an effort has been made to make the present report as full as possible in that respect.

DESCRIPTION OF THE RUINS

Casa Grande appears to be the sole surviving remnant of an extensive and important class of remains in the southwest. These remains occur usually in large groups or clusters, and Casa Grande is no exception.

[1] Thirteenth Annual Report of the Bureau of Ethnology, p. 289 et seq.

The name has been ordinarily applied to a single house structure standing near the southwestern corner of a large area covered by mounds and other débris; but some writers have applied the term to the southwestern portion of the area, others to the whole area.

Probably no two investigators would assign exactly the same limits to this area, as its margins merge imperceptibly into the surrounding country. The accompanying map (plate CXII) shows the limits of the ruins as interpreted by the writer. The surface covered by well-defined remains, as there shown, extends about 1,800 feet north and south and 1,500 feet east and west, or a total area of about 65 acres.

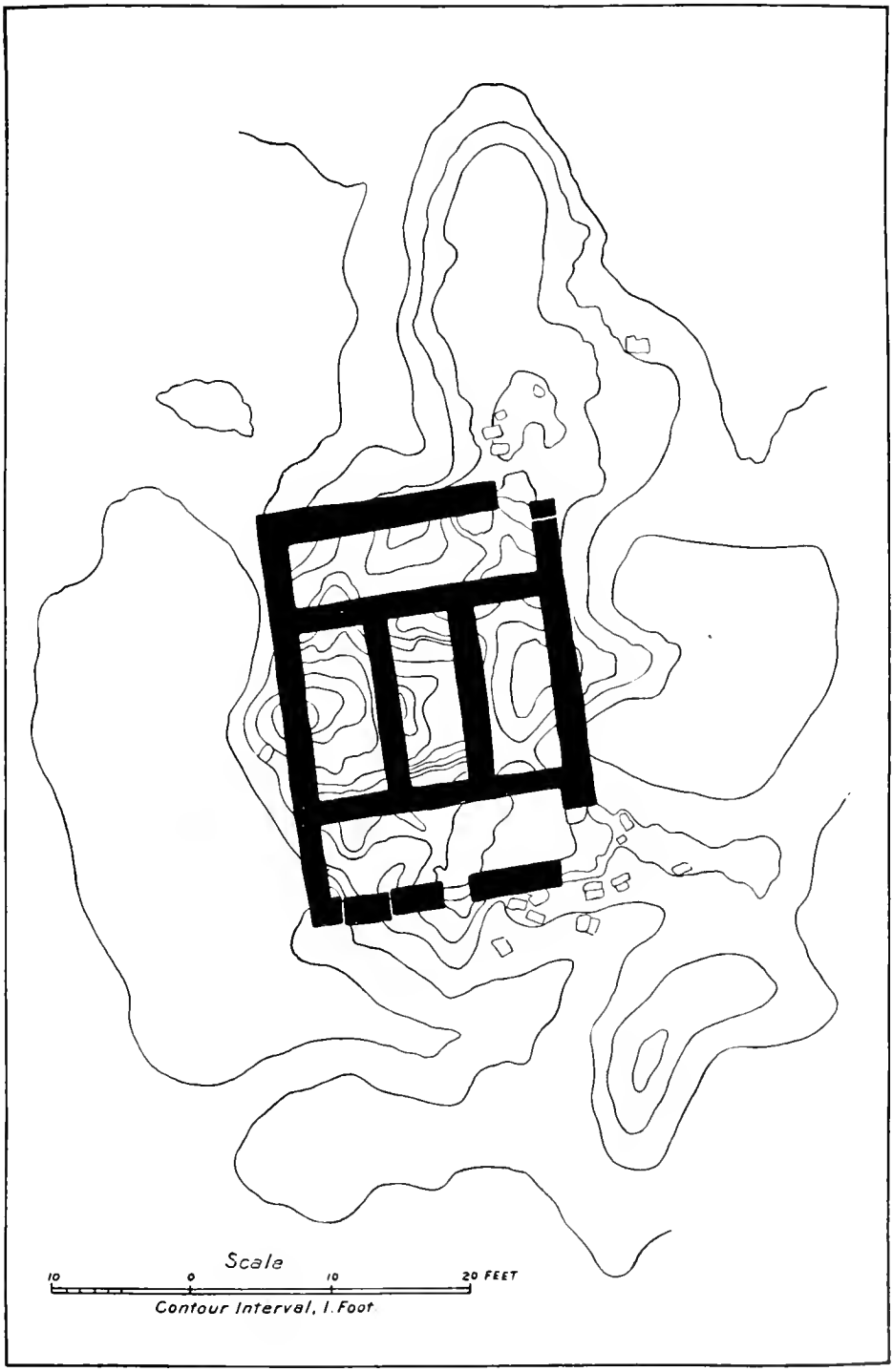
Casa Grande ruin occupies a position near the southwestern corner of the group, and its size is insignificant as compared with the entire cluster of ruins, or even with the remains of the large structure which occupied the north-central part of the area. The contour interval on the map is 1 foot, sufficiently small to show much surface detail. The depressions are indicated by dotted contours.

Within the area shown on the map there are a large number of mounds, more or less leveled by long-continued exposure to the elements. Some appear to be quite old, others represent buildings which were standing within the historic period, and many interesting features are presented which can not even be alluded to here.

Casa Grande proper was one of the smallest of the house clusters, but it is unique in that the walls are still standing to a height of more than 25 feet. While fragments of standing wall are not uncommon, either in the area mentioned or in the valleys of Gila and Salt rivers generally, no other example exists, so far as known, so well preserved as the one under consideration.

For miles around Casa Grande the ground surface is so flat that from the summit of the walls an immense stretch of country is brought under view in every direction. In the whole southwest, where there are thousands of ruins, many of which represent villages located with especial reference to outlook, there are few, if any, so well situated as this.

A ground plan of the ruin is shown in plate CXII and a general view in plate CXIV. The area covered and inclosed by standing walls is about 43 by 59 feet, but the building is not exactly rectangular, nor do its sides exactly face the cardinal points, notwithstanding many published statements to that effect. The building comprised three central rooms, each approximately 10 by 24 feet, arranged side by side with the longer axes north and south, and two other rooms, each about 9 by 35 feet, occupying, respectively, the northern and southern ends of the building, and arranged transversely across the ends of the central rooms, the longer axes running east and west. Excepting the central tier of rooms, which was three stories high, all the walls rose to a height of two stories above the ground. The northeastern and southeastern corners of the structure have fallen, and large blocks of the material of which they were composed are strewn upon the ground in the vicinity.



GROUND PLAN OF CASA GRANDE RUIN

The exterior walls rise to a height of from 20 to 25 feet above the ground. This height accommodated two stories, but the top of the wall is from 1 to 2 feet higher than the roof level of the second story. The middle room or space was built up three stories high, and the walls are still standing to a height of 28 to 30 feet above the ground level. The tops of the walls, while rough and greatly eroded, are approximately level. The exterior surface of the walls is rough, as shown in the illustrations, but the interior walls of the rooms are finished with a remarkable degree of smoothness, so much so that it has attracted the attention of everyone who has visited the ruin. Plate CXV shows this feature. At the ground level the exterior wall is from 3½ to 4½ feet thick, and in one place over 5 feet thick. The interior walls are from 3 to 4 feet thick. At the tops the walls are about 2 feet thick. The building was constructed by crude methods, thoroughly aboriginal in character, and there is no uniformity in its measurements. The walls, even in the same room, are not of even thickness; the floor joists were seldom in a straight line, and measurements made at similar places (for example, at the two ends of a room) seldom agree.

Casa Grande is often referred to as an adobe structure, but this use of the term is misleading. Adobe construction consists of the use of molded brick, dried in the sun, but not baked. The walls here are composed of huge blocks of rammed earth, 3 to 5 feet long, 2 feet high and 3 to 4 feet thick. These blocks were not molded and then laid in the wall, but were manufactured in place.

Plate CXVI shows the character of these blocks. The material employed was admirably suited for the purpose, being when dry almost as hard as sandstone and nearly as durable. A building with walls of this material would last indefinitely, provided a few slight repairs were made at the conclusion of each rainy season. When abandoned, however, sapping at the ground level would commence and would in time bring down all the walls; yet in the two centuries which have elapsed since Padre Kino's visit to this place—and Casa Grande was then a ruin—there has been but little destruction from the elements, the damage done by relic hunters during the last twenty years being, in fact, much greater than that due to all causes in the preceding two centuries.

The building was well provided with doorways and other openings, arranged in pairs, one above the other. There were doorways from each room into every adjoining room, except that the rooms of the middle tier were entered only from the east. Some of the openings were not used, and were closed with blocks of solid masonry, built into them long prior to the final abandonment of the structure.

CONDITION OF CASA GRANDE IN 1891

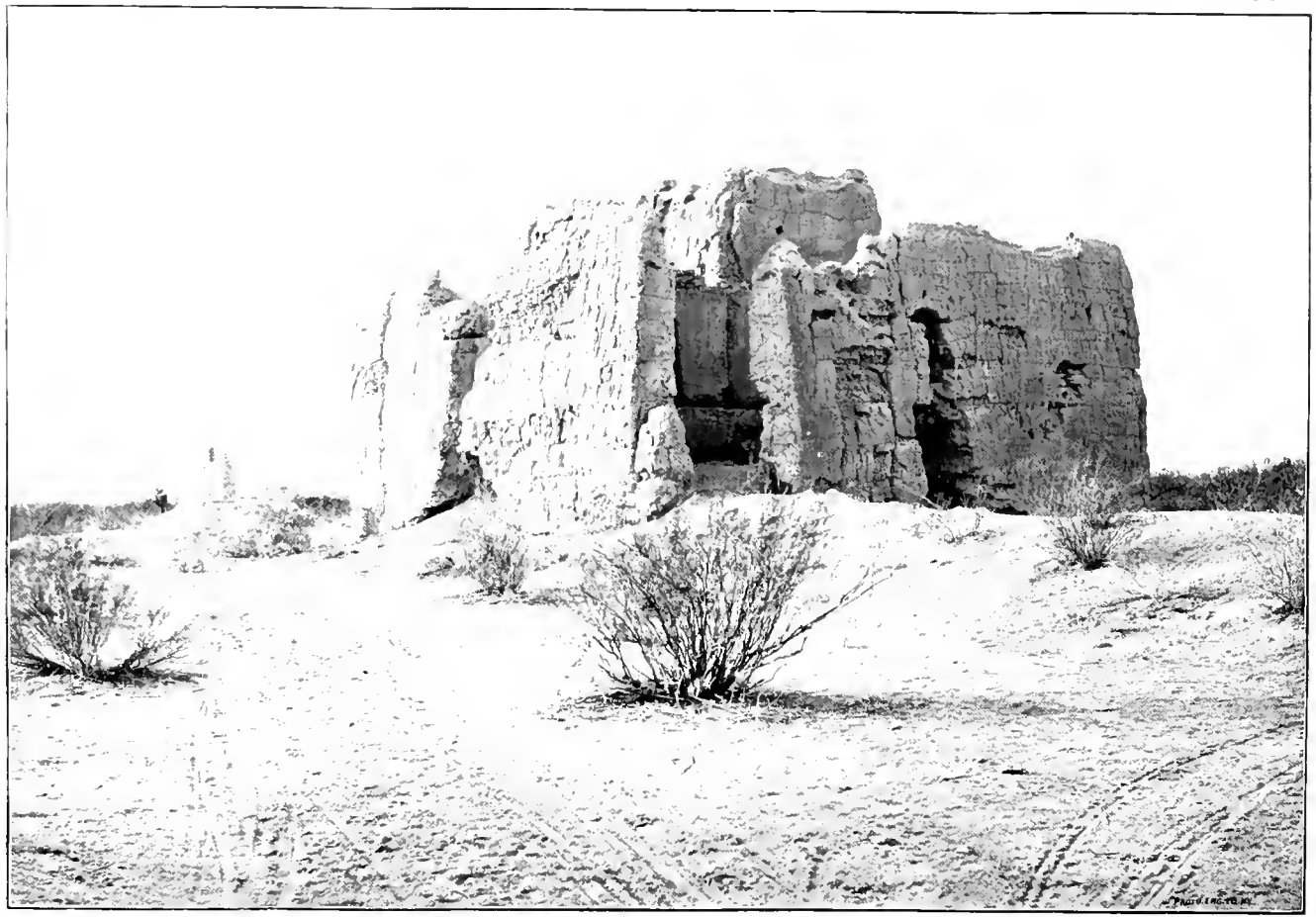
The south and east fronts of Casa Grande seem to have suffered particularly from the weather, and here rainstorms have probably caused some of the damage. The outer faces of the walls are of the same material as the wall mass, all the masonry being composed of

earth from the immediate site. In the construction of the walls this soil was laid up in successive courses of varying thickness, whose limits form clearly defined and approximately horizontal joints. The northeast and southeast corners of the building have entirely fallen away, and low mounds of their débris still show many knobs and lumps, parts of the original wall mass.

The destruction of the walls was due mainly to undermining at the ground level. The character of this undermining is shown in many of the illustrations to this report, especially in plate CXVI, and its extent is indicated on the accompanying ground plan (plate CXVII) by dotted lines within the wall mass. Although the material of which the walls are composed is very hard when dry, and capable of resisting the destructive influences to which it has been subjected for a long time, yet under certain conditions it becomes more yielding. The excessively dry climate of this region, which in one respect has made the preservation of the ruin possible, has also furnished, in its periodic sandstorms, a most efficient agent of destruction. The amount of moisture in the soil is so small as scarcely to be detected, but what there is in the soil next to the walls is absorbed by the latter, rising doubtless by capillary attraction to a height of a foot or more from the ground. This portion of the wall being then more moist than the remainder, although possibly only in an infinitesimal degree, is more subject to erosion by flying sand in the windstorms so frequent in this region, and gradually the base of the wall is eaten away until the support becomes insufficient and the wall falls en masse. The plan shows that in some places the walls have been eaten away at the ground level to a depth of more than a foot. Portions of the south wall were in a dangerous condition and likely to fall at any time.

Visiting tourists have done much damage by their vandalism. They have torn out and carried away every lintel and every particle of visible wood in the building. After the removal of the lintels a comparatively short time elapses before the falling in of the wall above. Apparently but a small amount of this damage can be attributed to rainstorms, which, although rare in this region, are sometimes violent. There is evidence that the present height of the walls is nearly the original height, in other words, that the loss from surface erosion in several centuries has been trifling, although numerous opinions to the contrary have been expressed by casual observers. The eastern wall has suffered more from this cause than the others; a belt on the northern half, apparently softer than the remainder of the wall, has been eaten away to a depth of nearly a foot. The interior wall faces are in good condition generally, except about openings and in places near the top.

Evidences of the original flooring are preserved in several of the rooms, especially in the north room. The flooring conformed to the pueblo type in the use of a series of principal beams, about 3 inches in diameter, above which was a secondary series smaller in size and placed



GENERAL VIEW OF CASA GRANDE RUIN

quite close together, and above this again a layer of rushes with a coating of clay. All the walls show evidences of the principal series of beams in the line of holes formed by their ends where they were embedded in the walls. In the south wall, in parts of the east wall high up on the level of the upper roof, and in parts of other walls a few stumps of floor beams remained. These specimens of aboriginal woodwork have survived only because they are not in sight from the ground, and their existence therefore was not suspected by the tourists. Evidence of the other features of the floor construction can be seen on the walls in places where they have left an imprint, as described in the memoir previously cited.

No single opening remains intact, as the lintels have been removed from every one of them. This is particularly unfortunate, for openings at their best are an element of weakness in a wall, and here each opening, after the lintel was removed, became, as it were, a center of weakness from which the destruction of the wall mass gradually proceeded further and further.

PLANS FOR THE REPAIRS

The plans for the repair of the ruin and its preservation included the reservation of the area covered by remains and, if possible, its inclosure, for within that area are exhibited all the various degrees of decay and disintegration which clearly link the comparatively well-preserved Casa Grande with the numerous almost obliterated ruins along the Gila and the Salt, whose vestiges will become even less distinct as time passes and cultivation increases.

It was deemed necessary to remove all the rubbish and débris within the building and from an area measuring 10 feet from the outer walls in every direction. Plate VI shows the extent of this area, and six sections are shown in plates VII and VIII, three on east-and-west lines and three on north-and-south lines. The lines along which these sections were made are indicated on the plan, plate CXVII. The ground level was determined by excavation, and is of course only approximate. The sections show the estimated amount of débris which was to be removed. Aside from other considerations, it was necessary to uncover the walls to the ground level in order to do the necessary underpinning.

It was planned to underpin the walls, where erosion at the ground level had weakened them, with hard-burned brick laid in cement mortar. Plate CXVII shows in a measure the extent of this erosion. The brick surface was to be set back an inch or two and faced with that thickness of cement mortar. Plate CXX shows the south front and plate CXXI the south and east fronts when the brickwork was completed, but before it was plastered, and will illustrate what was planned better than can a description.

This treatment, it was believed, would give a surface capable of effectually resisting atmospheric influences and the destructive action of flying sand, and at the same time would not disfigure the ruin by making the repairs obtrusive.

The broken-out lintels of openings were to be replaced, and the cavities above them filled in with brick faced with mortar similar to the underpinning.

The south wall, which was in a dangerous condition, was to be supported by three internal braces, as shown in the plan, plate CXVII. The longest brace or beam was necessarily of wood, as the wide range of temperature in this region, even between day and night, would produce so much expansion and contraction in an iron rod 60 feet long that without some compensating device the wall would be rocked on its base and its rapid destruction necessarily follow.

EXECUTION OF THE WORK

Appended to that portion of the sundry civil appropriation act approved March 2, 1889,[1] in which certain expenses of the United States Geological Survey are provided for, is the following item:

> Repair of the ruin of Casa Grande, Arizona: To enable the Secretary of the Interior to repair and protect the ruin of Casa Grande, situate in Pinal County, near Florence, Arizona, two thousand dollars; and the President is authorized to reserve from settlement and sale the land on which said ruin is situated and so much of the public land adjacent thereto as in his judgment may be necessary for the protection of said ruin and of the ancient city of which it is a part.

On the 12th of April, 1889, there was a conference between the Secretary of the Interior and the Commissioner of the General Land Office looking to the execution of the law, and on the 16th of that month the Commissioner submitted a statement on the subject, calling attention to the fact that the appropriation would not be available until July 1 following, and suggesting that a special agent should be sent out to examine the ruin. This suggestion was approved, and on April 27, 1889, Special Agent Alexander L. Morrison, of the General Land Office, was instructed to proceed to the ruins for the purpose of investigating and reporting as to what method should be adopted for their repair and protection. Mr Morrison was further instructed to report "all the facts obtainable as regards said ruins of 'Casa Grande,' in order that appropriate action may be taken by the Department for its preservation."

On May 15, 1889, Mr Morrison submitted a report to the Commissioner, describing his journey, the location of the ruin, the ruin itself, and other ruins in the vicinity. He stated that danger to the ruin was of three kinds—(1) by vandalism, (2) by elements, (3) by undermining. He recommended the construction of a roof and an underpinning of

[1] 25 Statutes, p. 961.

INTERIOR WALL OF CASA GRANDE RUIN

stone for the walls. Finally, he gave some historical notes, and closed with a peroration.

Mr Morrison's plans were found impracticable, as their execution would require an expenditure of many times the sum appropriated, and on September 23, 1889, all the papers in the case were transmitted by the Secretary to the Director of the Geological Survey, "for appropriate action under the clause of the act referred to, as being within the province of your Bureau." It was ordered that the work be commenced without the least delay, and November 27, 1889, Mr Victor Mindeleff, of the Bureau of Ethnology, was detailed by the Director and ordered to proceed to the ruin and report on the best means of repairing it and protecting it from further destruction. He was also directed to make other investigations in the vicinity, which have no relation to the present case.

On July 1, 1890, Mr Mindeleff submitted a report. He described the ruins of which Casa Grande is the type, and also Casa Grande itself. He also made a statement of the condition of the ruin and suggested that the main destruction was due to the undermining of the walls, and stated that much damage had been done by tourists. He recommended (1) that an area about the ruin be fenced in; (2) that a man be located permanently on the ground to watch the ruins; (3) that the ruins be cleaned out; (4) that the walls be underpinned with brick instead of stone, as previously suggested; (5) that the tops of the walls, after removing several inches to afford a good bearing surface, be treated with a coping of cement. It was regarded that this plan, if carried into effect, would afford sufficient protection against the weather, but a plan for a roof was submitted should such a structure be deemed desirable and practicable. Mr Mindeleff also recommended a number of tie-rods and beams, the replacement of the broken-out lintels, and the filling of the cavities above.

This plan was approved in its general features, but the means provided for its execution were found insufficient. A further complication arose from the fact that a few months later Mr Mindeleff severed his connection with the Bureau of Ethnology and his knowledge became no longer available.

November 20, 1890, the writer was ordered to proceed to the ruin and inaugurate the work of repair, following, so far as practicable, the plans already approved. He left Washington soon afterward and reached the ruin late in December. It was found necessary to make a detailed survey of the ruin and of the group of which it forms a part, and to make plans and sections showing the probable amount of excavation for the use of those who were invited to bid on the work. Furthermore, the amount appropriated was so well known to be inadequate that great difficulty was experienced in obtaining bids, and it was only through the efficient cooperation of the Reverend I. T. Whittemore at Florence and of Mr C. A. Garlick at Phœnix that success was finally

achieved. Two bids were received from the former place and one from the latter; but this was not accomplished until March 17, 1891, the date when the last bid was received. In the meantime the writer, having completed his work at Casa Grande, so far as he could, had entered, in January, on an archeologic investigation of the valley of the Rio Verde, in compliance with his orders to that effect.

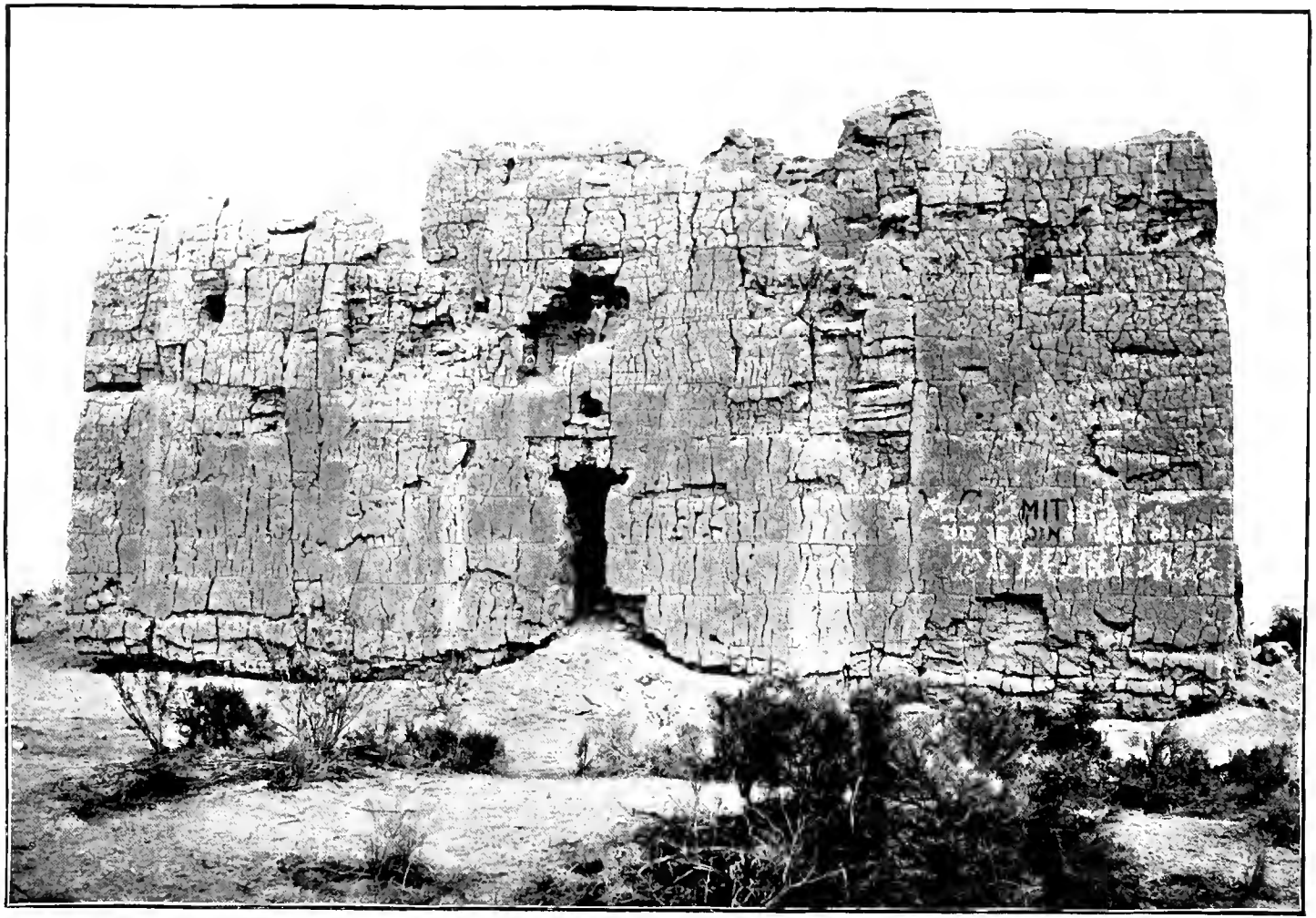
It was found impossible to execute all the work deemed requisite for the preservation of the ruin within the limits of the appropriation. A selection of items became necessary, therefore, and those which were of most importance were chosen. Even in this, however, it was found that a maximum limit on the amount of work to be done on each item must be set, and this limit was considerably below the amount of work estimated to be necessary.

The first thing to be done was, of course, the clearing out of the rubbish and débris. The item next in importance was the underpinning of the walls with brick wherever it was needed. The third item was the restoration of the lintels and the filling of the cavities above them. The fourth item was the tying in of the south wall, or of the several parts of it, with braces. This was the only feature of the plan which would appreciably disfigure the ruin, but some such device was deemed essential for the preservation of the south wall.

These four items consumed practically all of the amount appropriated, and the other items of the original plan were therefore omitted. The bid of T. L. Stouffer and F. E. White, of Florence, Arizona, covering the four items, was accepted, and a contract was made with them, under date of May 9, 1891, for the execution of the work for the sum of $1,985. This contract, together with the specifications, plans, and other drawings which formed part of it, accompany this report. It was transmitted to the Director of the Geological Survey, and by him approved and forwarded to the Secretary of the Interior June 6, 1891. It was approved by the Acting Secretary June 20, 1891. Finally, on July 20, 1891, it was placed on file, together "with the bids, proposals, and all the original papers."

A time limit of two months was made in the contract, expiring August 20, 1891, but it was changed to four months from July 1, 1891, expiring October 31, 1891. Before the time expired, however, Mr H. C. Rizer, then chief clerk of the Bureau of Ethnology, was ordered to proceed to Casa Grande ruin to examine the work done and, if in accord with the terms of the contract and the specifications, to certify the amount due the contractors. He submitted a report, under date of November 24, 1891, which is appended hereto. He also obtained six photographic negatives of the work as it stood a short time before its completion, and two of these (reproduced in plates CXX and CXXI) have been utilized in the preparation of this report.

Mr Rizer found that a considerable amount of work had been done by the contractors in excess of that authorized, and also that not sufficient



WEST FRONT OF CASA GRANDE RUIN, SHOWING BLOCKS OF MASONRY

work had been done to render the repairs permanently effective. Under the terms of the contract, no amount in excess of that stated ($1,985) could be paid, and payment of this amount was made late in 1891. On January 7, 1892, the contractors filed a claim for extra work on the ruin amounting to $600.40. The work was actually performed, but the terms of the contract were clear, and the claim was therefore disapproved January 28, 1892.

It would have been desirable to have had a supervisor of the work, but as the contract consumed practically all of the amount appropriated no provision could be made for one. It is fortunate, therefore, that the Reverend I. T. Whittemore, who had in the meantime been appointed honorary custodian of the ruin, generously undertook to look after the work without compensation, and on its conclusion the small sum remaining ($15) was turned over to him, thus exhausting the appropriation. In the sundry civil appropriation act for the year ending June 30, 1893, provision was made for a salaried custodian of the ruin, and Mr Whittemore was appointed to this position. Similar provision has been continued from year to year to the present time.

It is to be regretted that the necessities of the case, imposed by the limited amount appropriated, compelled the fixing of a maximum amount of work so far below the amount necessary that the repair of the ruin is incomplete. Had it been possible to carry out the plans, it is believed that the ruin would have stood unchanged for many decades, if not for a century. Should further provision be made for the continuation of the work, it should include an item for the fencing of the area covered by the ruins or of the reservation, and possibly an item for the construction of a roof.

It is not clear that a roof is absolutely necessary, but it is certain that it would be very undesirable. The region where this ruin occurs has probably less rainfall than any other part of the United States, but it must not be forgotten that while rainstorms are infrequent they are sometimes violent, and what damage they do may be done in a few hours. All the items for the repair of the ruin, except that pertaining to a roof, were so devised that the ruin was not materially disfigured or changed, and were they fully carried out the ruin would present much the same general appearance as before. It is important that this appearance should be preserved as far as possible, but it can not be maintained if a roof is erected over the walls. As four years have elapsed since the completion of the work, it should be possible now to determine whether atmospheric erosion has played a material part in the work of destruction.[1]

In the original plans and in the specifications which formed part of the contract (although this section was not operative) a plan for a roof was included. Such a structure, if erected at all, should be made as

[1] See the letter of the Director of the Bureau of American Ethnology to the Secretary of the Interior regarding the examination of Casa Grande by Mr W J McGee in the supplement to the present paper.

inconspicuous as possible and should be supported entirely from within the building. The system of framing employed might safely be left to the contractor if he were made responsible for the strength of the completed structure.

RESERVATION OF THE LAND

The final step in the execution of the law quoted was taken June 22, 1892. On that date the recommendation of the writer to the Director of the Geological Survey, referred by him to the Secretary of the Interior and by the latter to the President, was finally approved, and it was ordered that an area of land sufficient for the preservation of the ruin, and comprising in all 480 acres, be reserved under authority of act of Congress approved March 2, 1889. This area is shown on the map reproduced in plate CXXV, the base of which is a map accompanying the report of Mr H. C. Rizer.

The letter of the Secretary of the Interior recommending the reservation of the Casa Grande tract, with its indorsement by the President, is as follows:

DEPARTMENT OF THE INTERIOR,
Washington, June 20, 1892.

SIR: I have the honor to recommend that the SW. ¼ SW. ¼, SE. ¼ SW. ¼, SW. ¼ SE. ¼ section 9, NW. ¼, NW. ¼ NE. ¼, SW. ¼ NE. ¼, NW. ¼ SW. ¼, NE. ¼ SW. ¼, and NW. ¼ SE. ¼ section 16, all in township 5 south, range 8 east, Gila and Salt river meridian, Arizona, containing 480 acres more or less, and including the Casa Grande ruin, be reserved in accordance with the authority vested in you by the act of March 2, 1889 (25 Stat., 961), for the protection of the ruin.

The Director of the Bureau of Ethnology requests that the reservation be made, and the Acting Commissioner of the General Land Office knows of no objection to such action.

Very respectfully, JOHN W. NOBLE,
Secretary.

The PRESIDENT.

[*Indorsement by the President*]

EXECUTIVE MANSION, *June 22, 1892.*

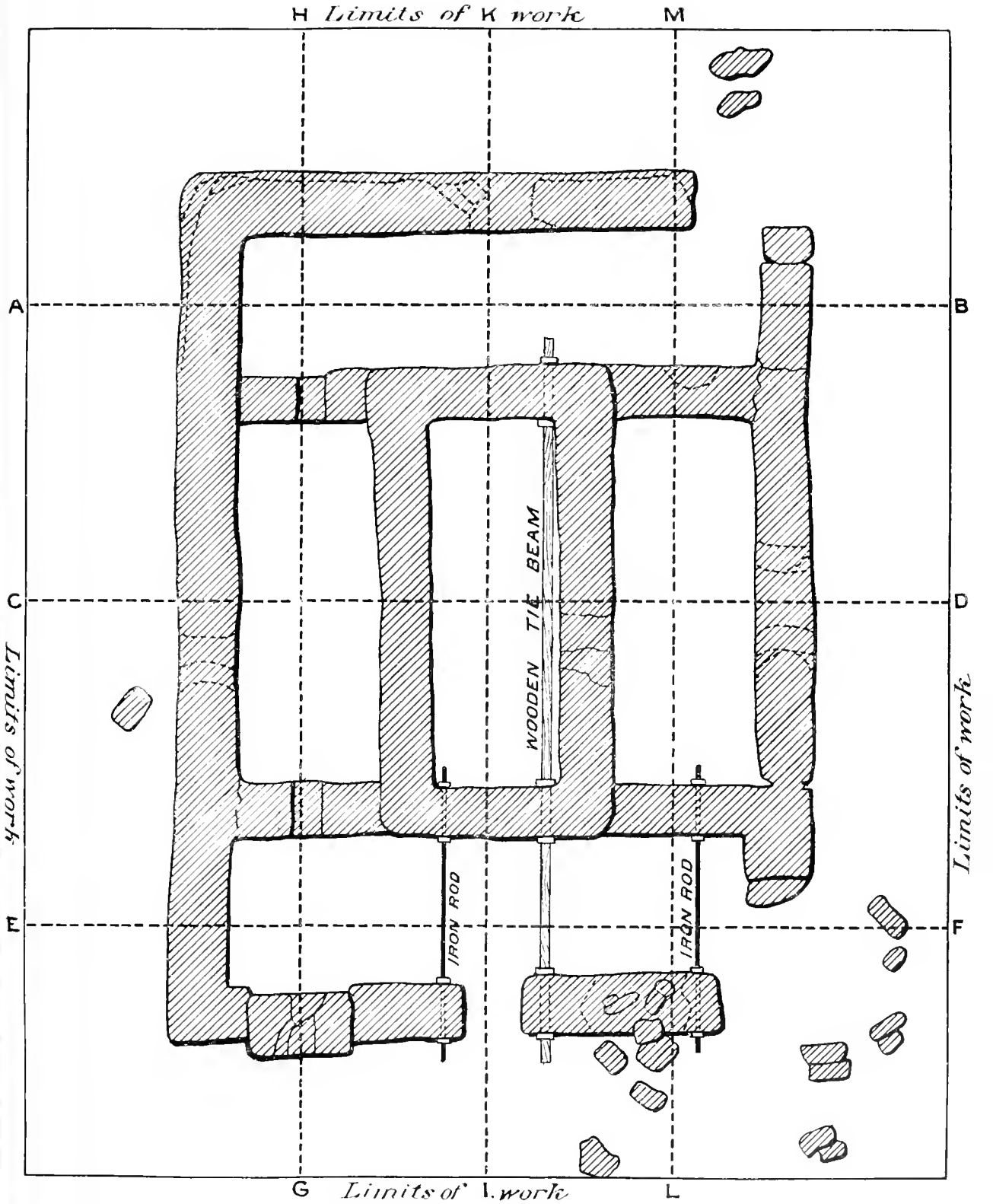
Let the lands described within be reserved for the protection of the Casa Grande ruin as recommended by the Secretary of the Interior.

BENJ. HARRISON.

The limits of this reservation are laid down on the plat of the survey of said township in the General Land Office, and the reservation is now under the control of the Secretary of the Interior.

SPECIMENS FOUND IN THE EXCAVATIONS

In the course of the excavations a number of specimens of archeologic interest were unearthed. These were all preserved and on the conclusion of the work were forwarded to the National Museum in Washington, in compliance with the terms of the contract. Following is a list showing the collection number and also the Museum number.

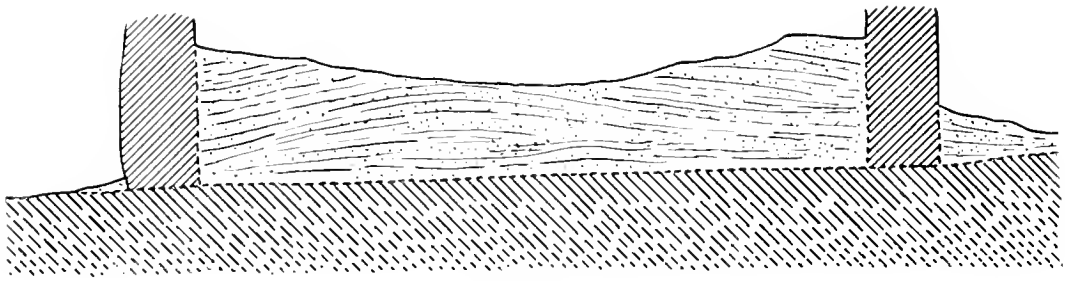


PLAN SHOWING GROUND-LEVEL EROSION, TIE-RODS, LIMITS OF WORK, AND LINES OF GROUND SECTIONS

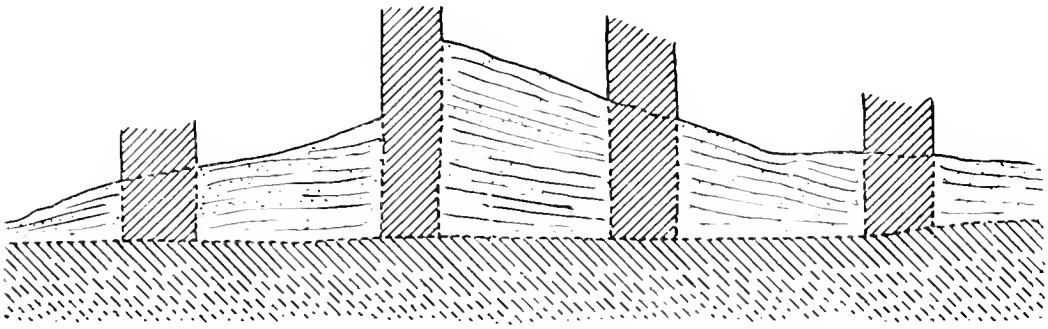
Specimen number 627 B. E. was not obtained from the ruin itself, but was found in that vicinity by Mr Whittemore and presented by him:

National Museum number	Bureau of Ethnology number	Article	Number of specimens	Remarks
155088	595	Fragments of large earthenware vessel.	Lot.	Plain red on both sides.
155089	596	Large bowl	1	Red outside; black, polished inside; restored.
155090	597	Large vase	1	Decorated outside; restored.
155091	598	Pottery fragments	14	Decorated.
155092	599	Pottery vase (toy)	1	Small, dark brown.
155093	600	Pottery bowl (toy)	1	Small, black.
155094	601	Pottery disk or spindle	4	
155095	602	Pottery toy (mountain goat)	1	Dark brown.
	603	Adobe	2	Lumps; 1 showing impression of cloth, the other of a human foot.
	604	Small shells	Lot.	
	605	....do	Lot.	
	606	Small shells (Ionus?)	Lot.	
	607	Small shells (cut and perforated).	Lot.	For use as pendants.
	608	Small shells, beads, and pendants.	Lot.	1 string and 2 fragments.
	609	Bone awls	3	
	610	Bone fragments	6	Partly charred.
	611	Chalk, obsidian chips, and brown adobe.	Lot.	
	612	Charred wood, 2 nuts, and a corncob.	4	
	613	Charred textiles, cloth	2	
	614	Wooden joist fragments	3	3, 6, and 9 inches long; 4 inches diameter.
	615	Reed	1	12 inches long.
	616	Stone axes	7	And 3 broken, grooved.
	617	Pounding stone and fragment.	2	Of sandstone, with ring-shape handle.
	618	Stone pestles	2	One 12½ inches long, 1¾ inches diameter; one 9½ inches long, 1¾ inches diameter; also a fragment.
	619	Stone mullers	4	
	620	Stone hammers	6	1 pitted.
	621	Stone mullers, flat	6	5 broken.

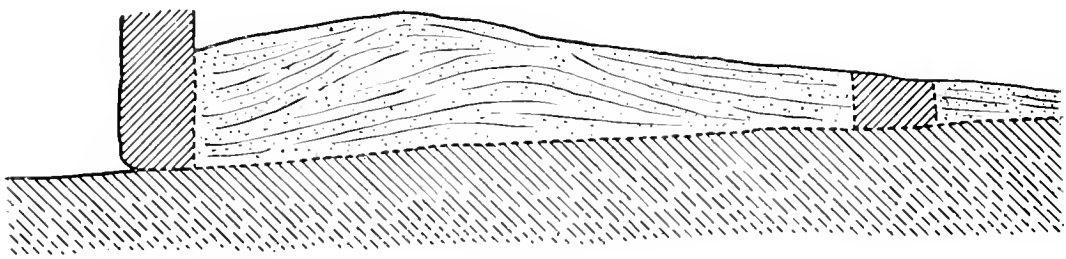
National Museum number	Bureau of Ethnology number	Article	Number of specimens	Remarks
	622	Stone mortar, flat	1	6½ by 12 inches; 2 inches thick.
	623	.....do	1	13 by 22 inches; 6 inches thick.
	624	Stone, polished	1	22 inches long, 6½ inches diameter; restored.
	625	Stone hoes or chopping knives.	2	
	626	Limestone ornament	1	Carved; fragmentary.
	627	Small stone vessel	1	Serpent carved on the outside.
	628	Stone arrowhead	2	1 of obsidian, very small, and 1 of flint; also a broken specimen.



Section A—B



Section C—D



Section E—F

EAST-AND-WEST GROUND SECTIONS

EXHIBITS

I. CONTRACT FOR REPAIRING AND PRESERVING CASA GRANDE RUIN, ARIZONA

This contract, made and entered into this ninth day of May, eighteen hundred and ninety-one, between Theodore Louis Stouffer and Frederick Emerson White, both of Florence, Arizona, as principals, and Augustine Gray Williams, of Florence, Arizona, Andrew James Doran, of Florence, Arizona, as sureties, of the first part, and the United States of America, by Cosmos Mindeleff, acting for the Secretary of the Interior, of the second part:

Witnesseth, That the said parties of the first part do hereby contract and agree with the United States of America, as follows: That for the consideration hereinafter mentioned they will at their own expense and risk perform and execute the work upon the Casa Grande ruin, described and specified in the specification hereto annexed and forming a part hereof, in the manner and with the conditions specified, items of said work to be as follows:

Item No. 1. Clearing out the débris: To excavate and remove 350 cubic yards of earth and débris, or less, as specified, amount of excavation not to exceed 350 cubic yards.

Item No. 2. Underpinning walls: To underpin the walls as specified, requiring 750 cubic feet of brick masonry, or less, amount of masonry not to exceed 750 cubic feet.

Item No. 3. Filling in cavities: To fill in cavities and openings as specified, 500 lineal feet of 2 by 4 inches squared lumber and 800 cubic feet of masonry, or less, whole amount of filling not to exceed 825 cubic feet.

Item No. 4. To brace the walls as specified in the annexed plan and specifications.

Items numbered five and six of the specifications hereto annexed, together with the plans, specifications, and conditions pertaining especially and only to them and not to the other items, are omitted.

The said parties of the first part further contract and agree to deliver over the work, completed and finished, to such person as the Secretary of the Interior may designate, within two months after receipt of notice that this contract has been approved by the Secretary of the Interior.

It is further stipulated and agreed, That should the parties of the first part fail to complete the work within the time specified, or should they deliver work which is not in accordance with the plans and specifications hereto annexed, only such sum shall be paid for the work as may be agreed upon by the said parties of the first part and the Secretary

of the Interior; and it is further stipulated and agreed on the part of the parties of the first part that if the work is not completed in the time specified and according to the specifications hereto annexed they will pay to the United States a sum not exceeding fifty dollars for each and every week after the time specified, such payments to be deducted from the amount due for work done: *Provided*, That the Secretary of the Interior, or such person as he may authorize to do so, may extend the time for the completion of the work.

And the United States of America, by the said Cosmos Mindeleff, acting for the Secretary of the Interior, do hereby contract and agree with the said parties of the first part that for the aforesaid work, performed and executed in the manner and under the conditions aforesaid, there shall be paid to the said parties of the first part the following sums:

For item No. 1. For clearing out the débris, as specified and as above limited, sixty cents ($0.60) for each cubic yard.

For item No. 2. For underpinning walls, as specified and as above limited, one dollar ($1) for each cubic foot.

For item No. 3. For filling in cavities, as specified and as above limited, one dollar ($1) for each cubic foot, including lumber.

For item No. 4. For bracing walls, as specified, two hundred dollars ($200). *Provided*, That payments for the work here contracted for shall be made only after the inspection and approval of the work by such person as the Secretary of the Interior shall designate.

It is an express condition of this contract that it shall have no force or effect until it is submitted to and approved by the Secretary of the Interior.

It is a further condition of this contract that no Member or Delegate to Congress, or any other officer or agent of the United States, either directly or indirectly, himself or by any other person in trust for him, or for his use and benefit, or on his account, is a party to or in any manner interested, in whole or in part, in this contract, or in the enjoyments, benefits, profits, or emoluments arising therefrom.

(Signed) THEODORE LOUIS STOUFFER. [SEAL]
FREDERICK EMERSON WHITE. [SEAL]
AUGUSTINE GRAY WILLIAMS. [SEAL]
ANDREW JAMES DORAN. [SEAL]

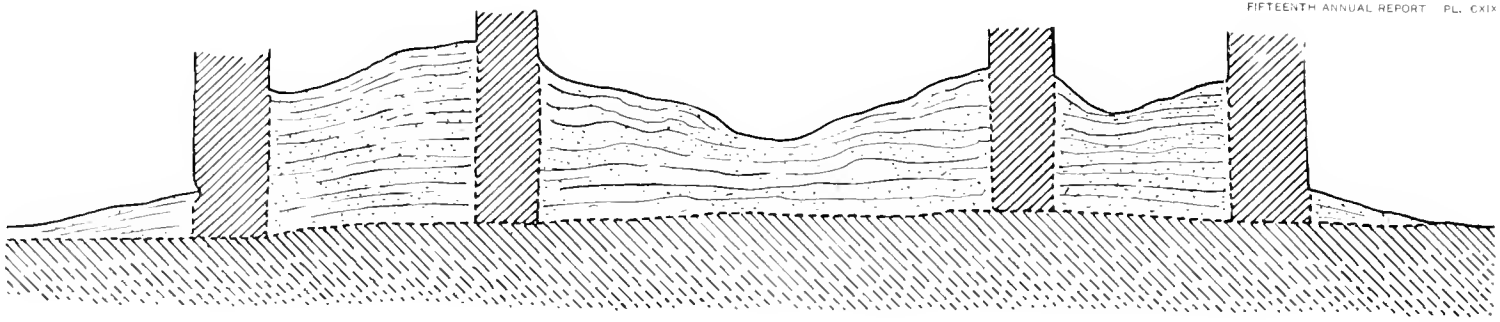
Witnesses as to Stouffer, White, Doran, and Williams:

(Signed) FRANK C. KEBBEY,
Clerk District Court, Second Judicial District,
Territory of Arizona.

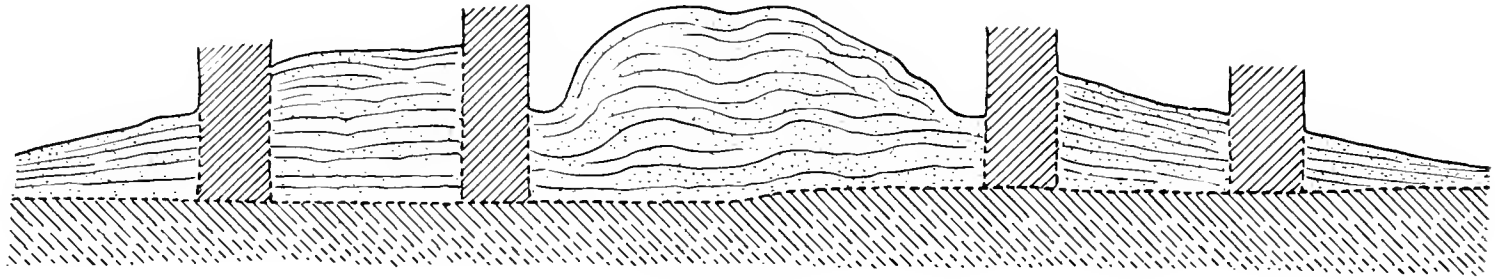
COSMOS MINDELEFF, [SEAL]
Acting for the Secretary of the Interior.

Witnesses as to Cosmos Mindeleff:

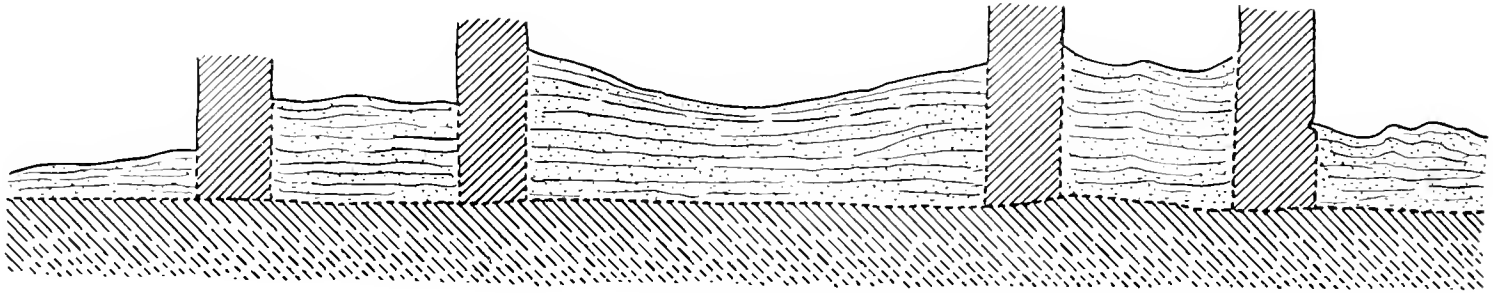
(Signed) JEFF HUNT.
CHAS. B. EAMAN.



Section G—H



Section I—K



Section L—M

NORTH-AND-SOUTH GROUND SECTIONS

TERRITORY OF ARIZONA, *County of Pinal, ss:*

Augustine Gray Williams and Andrew James Doran, subscribers to and sureties in the contract hereto annexed, being duly sworn, depose and say, each for himself, that he is worth the sum of two thousand dollars over and above all debts and liabilities which he owes or has incurred, and exclusive of property exempt by law from levy and sale under execution.

(Signed) AUGUSTINE GRAY WILLIAMS. [SEAL]
ANDREW JAMES DORAN. [SEAL]

Sworn to and subscribed before me this ninth day of May, A. D. 1891.

[SEAL.] (Signed) FRANK C. KEBBEY,
Clerk District Court, Second Judicial District, Territory of Arizona.

TERRITORY OF ARIZONA, *S Ct:*

I, Joseph H. Kebbey, associate justice of the supreme court of the Territory of Arizona, certify that I am personally acquainted with Augustine Gray Williams and Andrew James Doran, sureties, and that in my opinion they are good and sufficient to the amounts in which they have bound themselves in the foregoing contract.

Florence, Arizona Territory, 9th May, 1891.

(Signed) JOSEPH H. KEBBEY,
Associate Justice Supreme Court, Arizona Territory.

II. PLANS AND SPECIFICATIONS FOR THE PRESERVATION OF THE CASA GRANDE RUIN, ARIZONA, 1891

(Attached to and forming part of contract)

GENERAL REQUIREMENTS

All the work upon this ruin is to be carried out in such a manner as to interfere as little as possible with the present condition and appearance of the building, and the contractors will be held responsible for any injury to it.

The work is to be carried on under a supervisor, acting for the United States, who shall have power to reject any materials it is proposed to use in the work which are not in his judgment equal to those specified, and he shall have power to have torn down any work done which he has reason to suspect is not such as required by the specifications, but if such work shall prove upon inspection to have been well done the contractor may make a charge of the amount which would have been allowed for that part of the work had it passed inspection.

When the work is completed it must pass the final inspection of the supervisor, or such person as the Secretary of the Interior may designate for the purpose.

1. CLEARING OUT THE DÉBRIS

The débris now filling up the interior is to be removed down to the floor level, or the original ground level. The débris covering an area

measuring 10 feet from the exterior walls of the building in every direction is also to be removed. This work is to be carried on in conjunction with the underpinning of the walls, and is to be dependent upon the progress of the latter, the work being done as required by the person holding the contract for the underpinning. All proper precautions must be observed during the progress of the work to prevent any injury to the building, the walls being properly braced and supported before excavation is commenced. The contractor will be held responsible for any injury to the building. Any objects found of archeologic or other value properly belong to the United States and must be deposited in the National Museum. The material removed from the building and from the area about it is to be removed to a proper distance, not less than 100 yards from the building. Proper drainage channels must be provided to keep the excavated area permanently clear of water.

2. UNDERPINNING WALLS

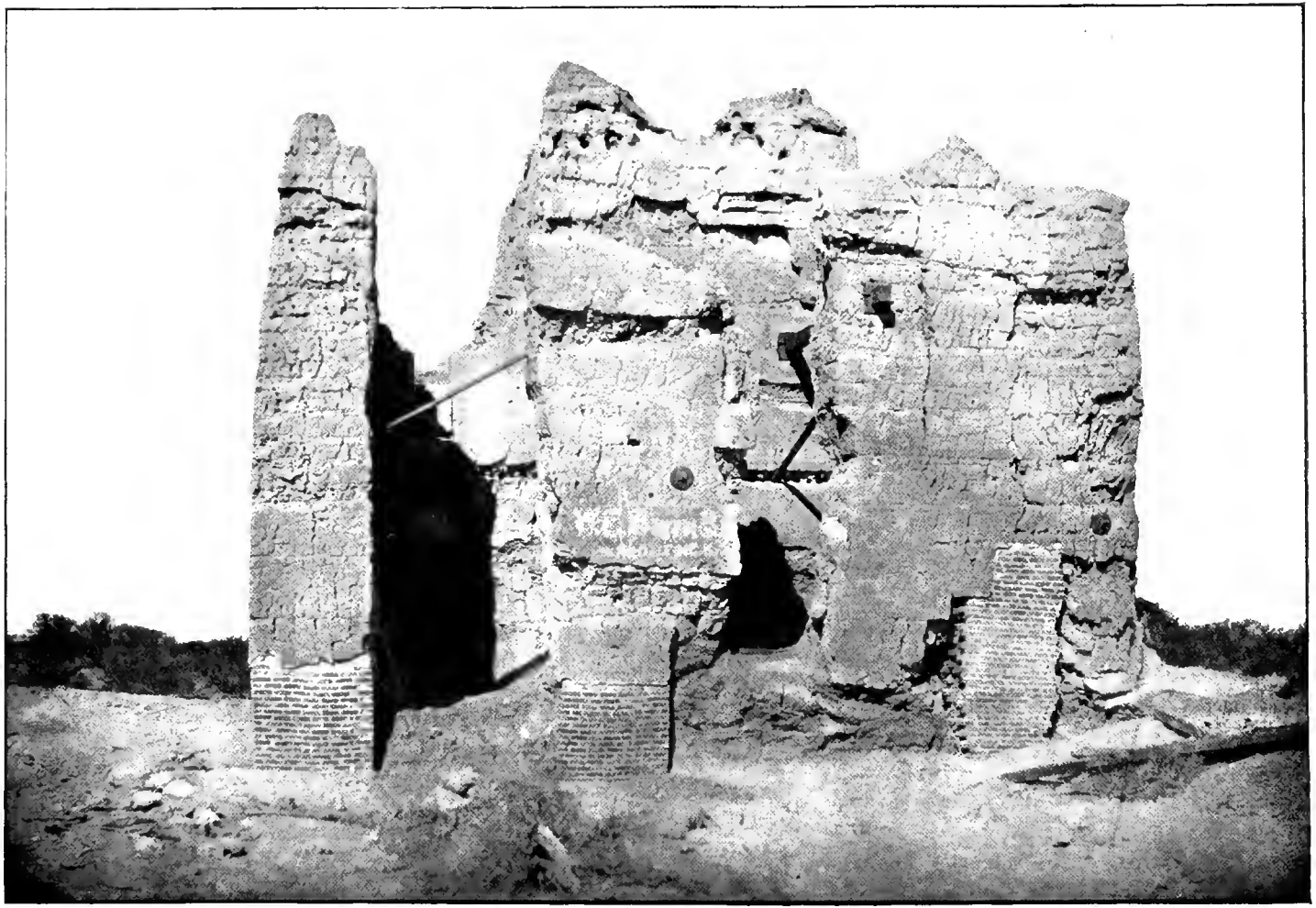
The walls where eroded at the ground level are to be underpinned with hard-burned brick, laid in good cement mortar and extending to a depth of at least 12 inches below the original ground level. This work must be carried on gradually and very carefully in conjunction with the clearing out of the débris. The under surfaces of the overhanging walls must be carefully trimmed to afford solid horizontal bearings against the brickwork. The face of the brickwork is to be set back at least 1 inch and not more than 2 inches from the face of the wall, and the brickwork is to be plastered with a coating of cement mortar, 1 to 2 inches thick, bringing it out flush with the outer wall.

3. FILLING IN OPENINGS

The broken-out lintels of openings are to be replaced by wooden lintels composed of squared lumber, 2 by 4 inches in size, laid side by side across nearly the whole thickness of the walls, with not more than 1 inch space between the boards, and of the same length as the original lintels. The broken-out walls are to be trimmed to afford solid resting places for the new lintels, which are to occupy the same horizontal planes that the old ones did. The openings above the lintels are to be filled in in the same manner as the underpinning previously described, the under wall surfaces being carefully dressed to afford solid horizontal bearings, the brick work being set back 1 inch from the wall surfaces and plastered with a coating of cement mortar to bring it out flush with the wall.

4. BRACING

One wooden brace and two iron braces are to be put in, as shown upon the plan hereto annexed. The wooden brace is to be of one piece, or of two pieces well bolted together, of selected lumber, free from knots and other imperfections, squared, and measuring 6 by 8 inches in



SOUTH FRONT OF THE RUIN, SHOWING UNDERPINNING AND ENDS OF TIE-RODS

cross section. The iron braces are to be of 1 inch diameter, best quality wrought-iron rods. The bearing plates, four to each rod, are to be not less than 10 inches in diameter, of sufficient strength, and securely and permanently fastened to the braces.

5. WIRE FENCING

Such area as may be determined is to be fenced with the best quality of galvanized iron barbed wire, strung upon posts placed 20 feet apart. The posts are to be of mesquite, not less than 3 inches in diameter and of a reasonable degree of straightness (not varying more than 5 inches from a straight line). The posts are to be at least 6 feet 6 inches long and are to be planted perpendicularly with 4 feet 6 inches clear and at least 2 feet below the ground surface. Three lines of double wire are to be stretched upon and securely fastened to the posts, the first at a distance of 2 feet from the ground, the second at 3 feet, and the third at 4 feet from the ground. Two gateways are to be provided, at such points as may be directed, the side posts to be of squared timber, 6 by 6 inches in cross section, and the gates to be made of sawed lumber 1 inch by 5 inches, hung upon good iron hinges, and leaving a clear space of not less than 12 feet when open, the whole to be executed in the best and most workmanlike manner.

6. ROOF

The building is to be crowned by a roof of corrugated iron, supported in the manner shown in the accompanying plan and sections. The uprights are to be of selected squared lumber 1 foot square, each in a single piece, the lower ends planted at least 3 feet below the original ground level, and to be braced and tied to each other, as shown in the plan. The tie pieces are to be of selected squared lumber, 4 inches by 6 inches in cross section. The roof is to be framed and braced in the ordinary manner, and this framing is to extend beyond the outer wall 6 feet. The covering is to be a good quality of corrugated iron roofing, securely fastened to the framework, and painted with three good coats of the best quality of roof paint. The whole to be constructed and executed, in the best and most workmanlike manner, of good materials throughout, and to be of a strength sufficient to withstand the wind-storms to which it may be subjected.

III. PLANS AND SECTIONS—PRESERVATION OF THE CASA GRANDE RUIN, ARIZONA. SCALE OF ALL THE PLANS AND SECTIONS, 0.1 INCH = 1 FOOT

Plans and sections accompanying specifications are as follows:

Plan showing tie-rods, limits of work, and lines of ground sections. [Plate CXVII of this report.]

Three east-and-west sections to show estimated amount of excavation necessary. [Plate CXVIII of this report.]

Three north-and-south sections to show estimated amount of excavation necessary. [Plate CXIX of this report.]

Plan showing roof support. [Plate CXXII of this report.]

Two sections showing roof support. [Plate CXXIII and plate CXXIV of this report.]

IV. OATH OF DISINTERESTEDNESS

I do solemnly swear that the copy of contract hereunto annexed is an exact copy of contract made by me personally with Theodore Louis Stouffer and Frederick Emerson White; that I made the same fairly, without any benefit or advantage to myself, or allowing any such benefit or advantage corruptly to the said Theodore Louis Stouffer and Frederick Emerson White, or to any other person or persons; and that the papers accompanying include all those relating to the said contract, as required by the statute in such case made and provided.

(Signed) COSMOS MINDELEFF.

Sworn to and subscribed before me at Washington, D. C., this 18th day of July, 1891.

[SEAL] (Signed) JNO. D. MCCHESNEY,
Notary Public.

V. BIDS

I

Bid for repairs on the Casa Grande ruins, in Pinal County, Arizona, bidders to furnish all labor and materials according to specifications:

Item No. 1. Cleaning out débris, 60 cents per cubic yard.
Item No. 2. Underpinning walls, $1 per cubic foot.
Item No. 3. Filling in openings, $1 per cubic foot.
Item No. 4. Bracing walls, $200.
Item No. 5. Wire fence, 3 cents per foot complete.
Item No. 6. Roof, $2,000.

(Signed) T. L. STOUFFER.
F. E. WHITE.

FLORENCE, ARIZONA, *January 28, 1891.*

II

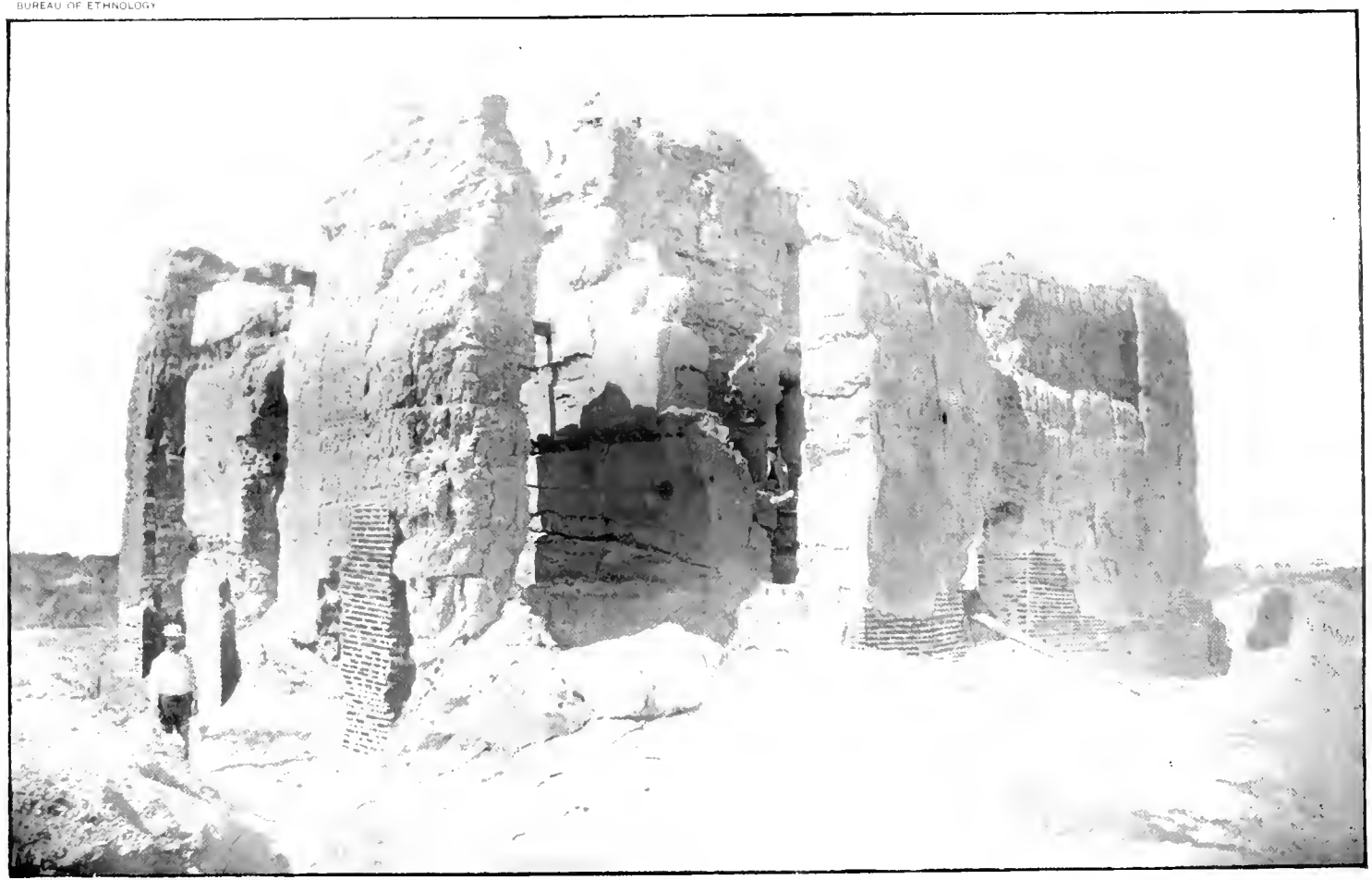
Bid for putting a roof on the Casa Grande ruins as per plans and specifications furnished, $3,000.

(Signed) C. D. HENRY.

III

Bid for fencing in the Casa Grande ruins: Furnishing the posts and barbed wire for 100 feet of fence, $7 per 100 feet.

(Signed) C. D. HENRY.



VIEW FROM THE SOUTHEAST BEFORE THE COMPLETION OF THE WORK

IV

Bids for restoring the Casa Grande ruins:

First. Removing debris from interior of the ruins, 320 cubic yards, more or less, $1 per yard; 140 cubic yards from exterior of the ruins, at 60 cents per yard.

Second. Eight hundred cubic feet of brick masonry underpinning, more or less, at $1.30 per cubic foot.

Third. One thousand cubic feet, more or less, of brick masonry to fill in cavities, at $1.40 per cubic foot.

Fourth. Bracing walls, as per plans, $120.

Fifth. Five hundred lineal feet of 2 by 4 square timber at 8 cents per foot, lumber measure.

(Signed) C. D. HENRY.

V

PHOENIX, ARIZONA, *February 11, 1891.*

COSMOS MINDELEFF, Esq.,

Tempe, Arizona.

DEAR SIR: I hereby submit for your consideration, in reference to the plans and specifications for the preservation of the Casa Grande ruins of Arizona, bids upon the following propositions, to wit:

First. "Cleaning out the débris." For the removal of 470 cubic yards of material, more or less, at $2.65 per cubic yard.

Second. "Underpinning walls." For 800 cubic feet of brick masonry, more or less, laid and plastered as specified, at $4.25 per cubic foot.

Third. "Filling in openings." For filling in cavities in walls and restoring lintels of openings, as specified, 1,000 cubic feet, more or less, at $2.25 per cubic foot.

Fourth. "Bracing walls." For bracing walls, $85.30.

Fifth. "Wire fencing." Twenty-five dollars and twenty-five cents per 100 feet of completed fence.

Sixth. "Roofing." As per specifications, $4,722.

Respectfully submitted.

(Signed) M. E. CLAUTON.

VI. INDORSEMENTS

Contract for the repair and preservation of the Casa Grande ruin, Arizona, 1891

DEPARTMENT OF THE INTERIOR,
U. S. GEOLOGICAL SURVEY,
June 6, 1891.

Respectfully forwarded to the Secretary of the Interior, recommending approval.

(Signed) J. W. POWELL, *Director.*

DEPARTMENT OF THE INTERIOR,
June 20, 1891.

The within contract is hereby approved.

(Signed) GEO. C. CHANDLER,
Acting Secretary.

June 30, 1891. Transmitted by J. W. Powell, Director, to the Secretary of the Interior for file in returns office.

July 1, 1891. Returned for oath.

July 20, 1891. J. W. Powell, Director, transmits amended contract, with bids, proposals, and all original papers attached.

VII. REPORT OF MR H. C. RIZER

SMITHSONIAN INSTITUTION,
BUREAU OF ETHNOLOGY,
WASHINGTON, *November 24, 1891.*

Honorable J. W. POWELL,
Director of the Bureau of Ethnology.

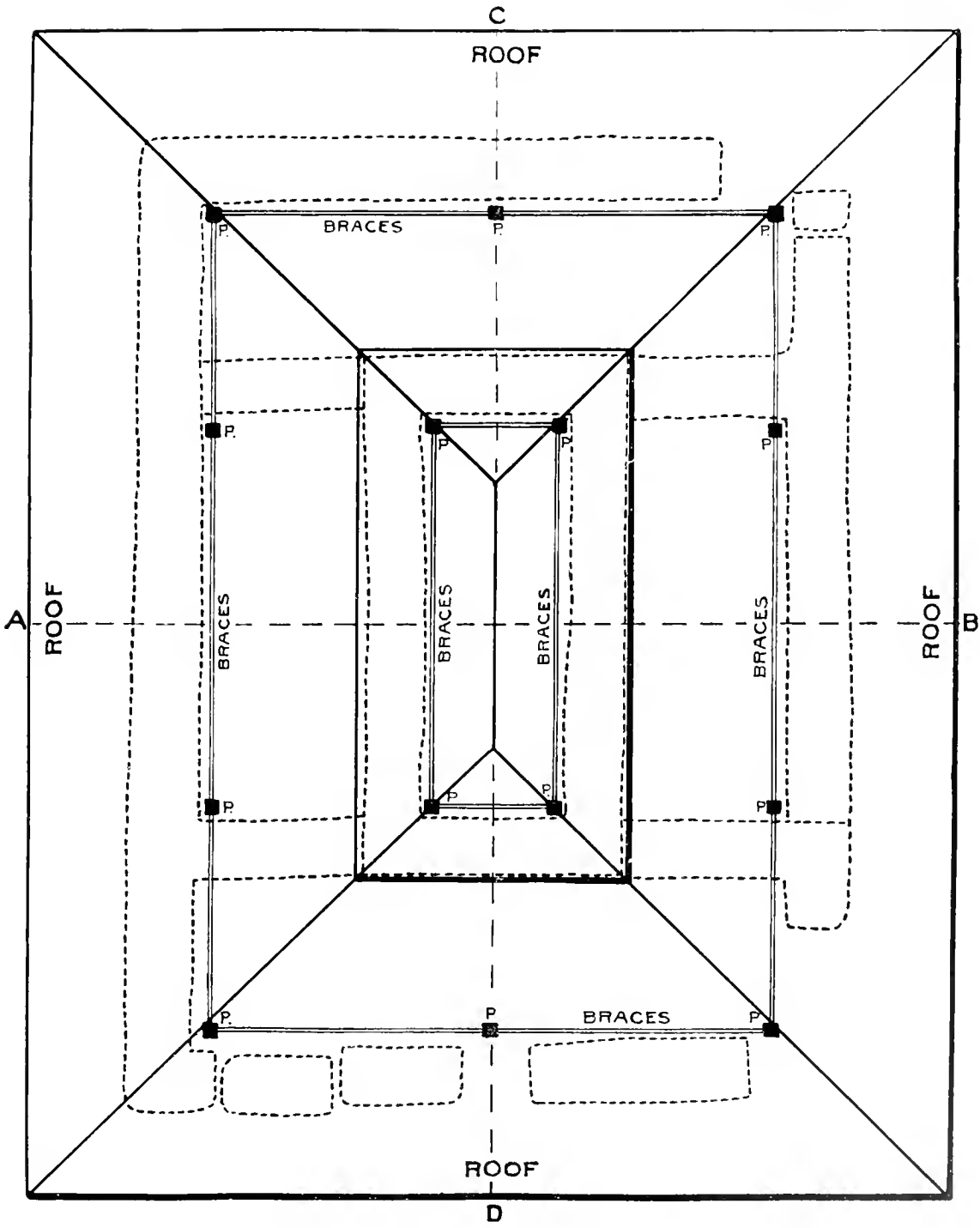
SIR: Complying with your order directing me to proceed to Florence, Arizona, to witness the closing up of the work under contract for the preservation of Casa Grande ruin near that place, and to report to you the amount and character of the work accomplished, certifying the amount due the contractors under each item, I have the honor to submit the following report:

I visited the ruin first on October 20, and found the work well advanced. Steady progress was made from said date until October 31, the limitation expressed in the contract for prosecuting it.

In order to ascertain the exact location of Casa Grande ruin and to aid me in the determination of the amount of work performed by the contractors, I employed Mr Albert T. Colton, a civil engineer and the official surveyor of Pinal county, Arizona, within the limits of which the ruin stands. From actual measurements made by Mr Colton, based upon official notes in his custody, he informed me the ruin was located in the northeast corner of the northwest quarter of the southwest quarter of section 16 of township 5 south, range 8 east. A congressional township plat on which Mr Colton has marked the exact location of the ruin is filed herewith, marked Exhibit A, and made a part of this report [plate CXXV].

On October 29 Mr Colton at my instance took measurements of the brickwork in underpinning and filling in cavities in the walls and of the excavation done by the contractors. His estimate, based upon these measurements, was submitted to me in writing. It is filed herewith, marked Exhibit B, and is made a part of this report.

I find from these measurements that the contractors excavated and removed to a point 100 yards from the ruin 570 cubic yards of débris, 271 cubic yards of which were removed from the interior and 299 cubic



SUGGESTED PLAN OF ROOF AND SUPPORT

yards from the exterior walls of the building, within an area of 10 feet of said walls.

I also find the amount of underpinning done by the contractors to be 919 cubic feet, and the amount of filling in openings to be 1,161 cubic feet. The underpinning is done with hard-burned brick laid in good cement mortar extending to a depth of 12 inches below the original ground level. The face of the brickwork is set back from 1 to 2 inches from the face of the wall and plastered with a coat of good cement mortar, making it flush with the outer wall.

In filling in cavities more than 500 lineal feet of 2 by 4 inch squared lumber was used to replace broken-out lintels and laid side by side across nearly the whole thickness of the walls, with not more than 1 inch space between the boards. They occupy the same horizontal planes as the original lintels, and the walls are trimmed to afford solid resting places for them. The openings above the lintels have been filled in the same manner as the underpinning, with hard-burned brick set back 1 inch from the wall surfaces and plastered with a coating of cement mortar, bringing it out flush with the original wall.

I further find that the contractors have placed one wooden brace and two iron braces as designated in the specifications. The wooden brace is constructed of two pieces of good, clear, squared lumber 6 by 8 inches in cross section, well bolted together, secured by plates of boiler iron three-eighths of an inch thick and 14 by 18 inches square. The specifications provide for this brace to run from the south side of the south wall through the center room with a plate on each side of the south wall and one on each side of the wall on the north side of the center room. The contractors have deviated from these requirements in having extended the said brace through the entire length of the building and placed the plates that were specified for the north wall of the center room on the respective sides of the extreme north wall of the building. While this deviation adds nothing to the security of the south wall, it is doubtless as effective as it would have been had it been placed as contemplated in the plan. It may in some degree strengthen the north wall, and I recommend that it be accepted as in compliance with the terms of the contract. The two iron rods called for in the specifications are of wrought iron 1¼ inches in diameter, secured by boiler-iron plates three-eighths of an inch thick and 12 inches in diameter, securely fastened as required in the specifications. There was a necessary deviation from the plan as to the place the rod nearest the east side of the building should be placed. Early in the prosecution of the work a portion of the débris in contact with the eastern wall was removed. During the night following this a section of the south end of the east wall fell, carrying with it that portion of the wall between the south and east rooms to which the plan required said rod to be attached. In consequence the contractors placed the rod so as to connect it with the portion of the wall

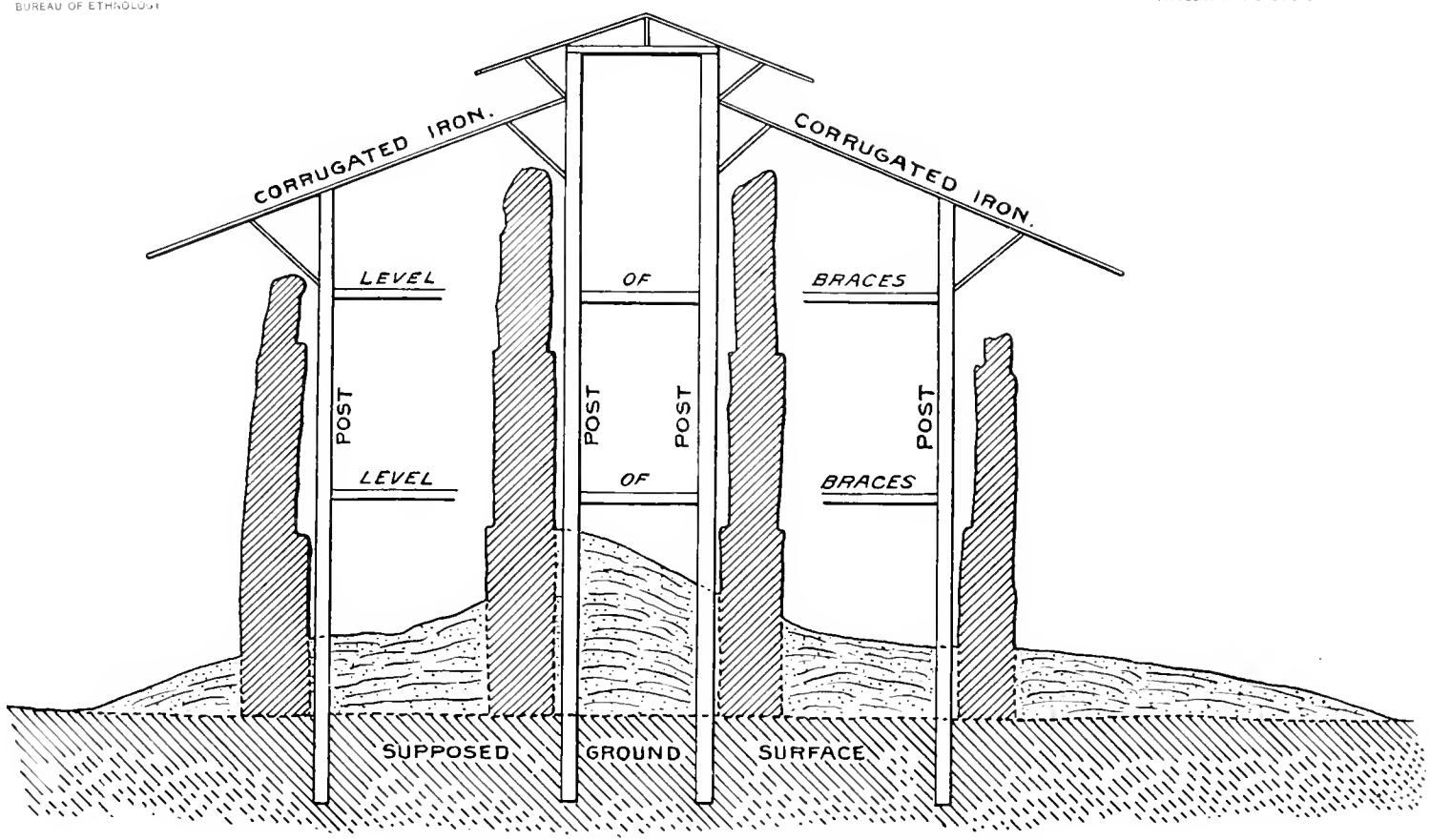
still intact. As a brace to the south wall it is placed advantageously. In excavation, underpinning, and filling in the contractors have exceeded the limitations prescribed in the contract, and have therefore performed an amount of work for the remuneration of which there is no provision. The following table shows the amount of work authorized in each of the four items with reference to which the contract was drawn and the amount actually performed by contractors:

Item	Maximum authorized	Performed by contractors	Excess	Contract price	Maximum allowance under contract	Amount contractors claim to have earned	Excess of contractors' claim over amount authorized
1. Excavating and clearing out débris.	350 cubic yards.	570 cubic yards.	220 cubic yards.	60 cents per cubic yard	$210	$342	$132
2. Underpinning walls.	750 cubic feet.	919 cubic feet.	169 cubic feet.	$1 per cubic foot.	750	919	169
3. Filling in cavities.	825 cubic feet.	1,161 cubic feet.	336 cubic feet.	$1 per cubic foot.	825	1,161	336
4. Braces.....	1 wood and 1 iron.	1 wood and 2 iron.	.....	$200	200	200	.....

From this it will be observed that, taking the rate of compensation provided for in the contract as a basis, the contractors have performed work in excess of that authorized to the amount of $638 [$637]. They are fully advised that there is no provision for the payment of this excess. The requirements of the contract are, in my opinion, fully met in the quality of material used and the work performed.

The preservation of the ruin is incomplete. There are six places where lintels have disappeared and not been replaced and a corresponding number of cavities that should be filled. Deep seams have been cut in the walls by the action of the elements, and unless far greater provision is made for its protection the work already done will be of small avail.

At many places where the débris came in contact with the wall disintegration seems to have resulted. At a slight touch it frequently crumbles. Owing to this fact two sections of the wall fell during the progress of the work when the débris was removed—one from the east wall, described above, and one from the south wall near the west extremity. These breaches may be observed as shown in two of the six accompanying photographs [plates CXX, CXXI]. These photographs



SECTION THROUGH A—B OF ROOF PLAN, SHOWING SUGGESTED ROOF SUPPORT

were taken ten days before the work was completed. There being no professional photographer in that vicinity I was compelled to take advantage of the kind offer of Mr H. H. Burrell, an amateur photographer, who happened to be there at that time. Thus the views I secured failed to show all the brickwork done. The coating of mortar was not applied until after the date on which the views were taken, in consequence of which the bare bricks are shown in the views.

During the progress of work in removing the débris a number of articles of interest to the ethnologist were found at various depths and localities. They have been packed by the contractors and will be sent to the National Museum.

The floors in the center, north, and east rooms were found to be about 8 feet above the ground surface. The material was similar to that of which the walls are composed. The west and south rooms appeared to have had floors at one time on the same level, but the surfaces had disintegrated, and there was a mass of loose earth which was removed to a depth of 6.9 feet below the floors of the other three rooms, where another floor was found slightly less firm than those.

Reverend Isaac T. Whittemore, who has been designated by the honorable the Secretary of the Interior as the custodian of the ruin, rendered me valuable assistance in the performance of my mission. He has manifested a zealous concern for the preservation of the ruin and has given time and labor to that end. There is no provision for his just compensation. I therefore recommend that if any funds be found available after the payment of the amount due the contractors the same be ordered paid to Mr Whittemore for his services.

Very respectfully,

H. C. RIZER, *Chief Clerk*

SUPPLEMENT

CORRESPONDENCE AND REPORT RELATING TO THE CONDITION OF CASA GRANDE IN 1895, WITH RECOMMENDATIONS CONCERNING ITS FURTHER PROTECTION

I. *Letter of Reverend Isaac T. Whittemore, custodian of Casa Grande, to the Secretary of the Interior, recommending an appropriation for further protecting the ruin*

FLORENCE, ARIZONA,
July 25, 1895.

Honorable HOKE SMITH,
Secretary of the Interior.

DEAR SIR: It is with great hesitancy that I write to add to the burdens of one so busy and burdened as I presume you to be. But it is not for myself but for others that I write, and will try to be laconic.

Can you embody in your next report to Congress an appeal for an appropriation of $7,000 or $8,00[0] to roof the Casa Grande ruin, to fence 40 acres, and make excavations of all the mounds in the vicinity for the purpose of learning the history of the wonderful people who once lived here and erected the buildings and built canals?

* * * * * * *

Very sincerely, yours,

ISAAC T. WHITTEMORE,
Custodian Casa Grande.

II. *Indorsement of the Mr Whittemore's by the Acting Secretary of the Interior*

DEPARTMENT OF THE INTERIOR,
August 7, 1895.

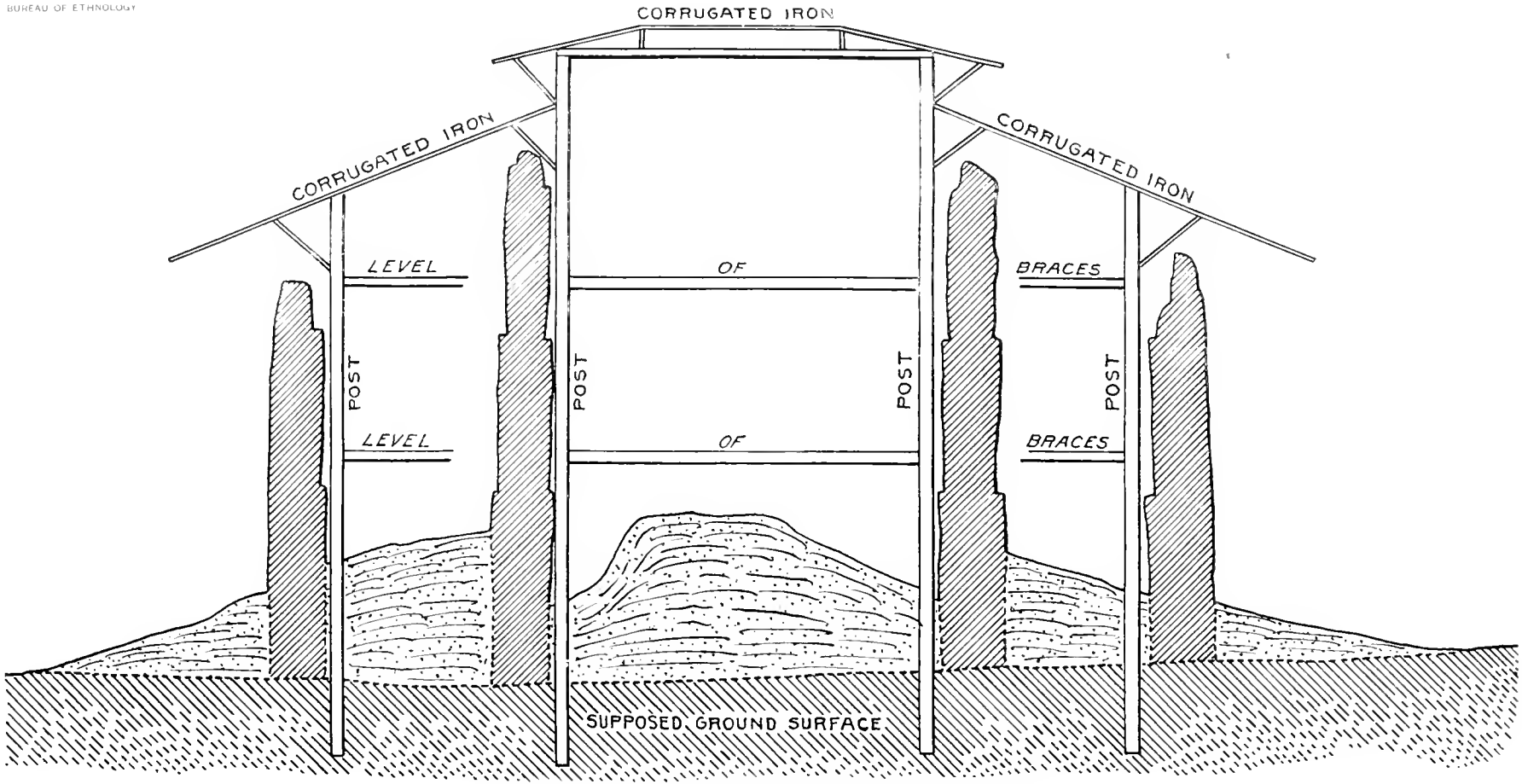
Respectfully referred to the Director of Bureau of Ethnology for consideration of so much of within letter as relates to the Casa Grande ruin, and such recommendation as the facts may warrant, and report.

WM. H. SIMS,
Acting Secretary.

III. *Letter of the Acting Director of the Bureau of American Ethnology to the Secretary of the Interior suggesting an examination of Casa Grande with a view of its further protection*

SMITHSONIAN INSTITUTION,
BUREAU OF AMERICAN ETHNOLOGY,
Washington, August 28, 1895.

SIR: Your request of August 7 for a report concerning a recommendation by Reverend Isaac T. Whittemore, under date of July 25, that



SECTION THROUGH C—D OF ROOF PLAN, SHOWING SUGGESTED ROOF SUPPORT

provision be made for further protecting Casa Grande ruin, near Florence, Arizona, by the erection of a suitable roof, has been under consideration.

In many respects Casa Grande ruin is one of the most noteworthy relics of a prehistoric age and people remaining within the limits of the United States. It was discovered, already in a ruinous condition, by Padre Kino in 1694, and since that time it has been a subject of record by explorers and historians. Thus its history is exceptionally extended and complete. By reason of its early discovery and its condition when first seen by white men, it is known that Casa Grande is a strictly aboriginal structure; and archeologic researches in this country and Mexico afford grounds for considering it a typical structure for its times and for the natives of the southwestern region. Many other structures were mentioned or described by the Spanish explorers, but the impressions of these explorers were tinctured by previous experience in an inhospitable region, and their descriptions were tinged by the romantic ideas of the age; very few of these structures were within the limits of the United States, and nearly all of these situated in the neighboring republic of Mexico disappeared long ago; there is hardly a structure left, except Casa Grande ruin, by which the early accounts of Spanish explorers in North America can be checked and interpreted—none other of its class exists in the United States. Casa Grande ruin is, therefore, a relic of exceptional importance and of essentially unique character.

Unfortunately this structure, like others erected by the most advanced among the native races in the southwest, is of perishable material; it is built of adobe, or rather of cajon, i. e., of a puddled clay, molded into walls, dried in the sun. Such walls would stand a short time only in humid regions; but in the arid region the material is desiccated and baked under cloudless sky and sun for many months at a time, and becomes so hard as to resist, fairly, the rare storms of the region. It is by reason of climatal conditions that cajon and adobe have come into general use for building in southwestern United States, as in contiguous parts of Mexico; and it is by reason of the same conditions that a few of the ancient structures remain, and the best preserved of all is found in the Gila valley, one of the most desert regions on the western hemisphere. Yet the best of the cajon structures is perishable; so long as the roof remains and the summits of the walls are protected, disintegration proceeds slowly; but when the projecting roof is removed, the rare but violent storms attack the walls, and they are gradually channeled and gullied by the storm waters, while the exterior surface gradually disintegrates and falls away under the alternate wetting and drying. Even in the most arid regions, the earth-built structures typical of the southwest are surely, albeit slowly, ravaged and destroyed.

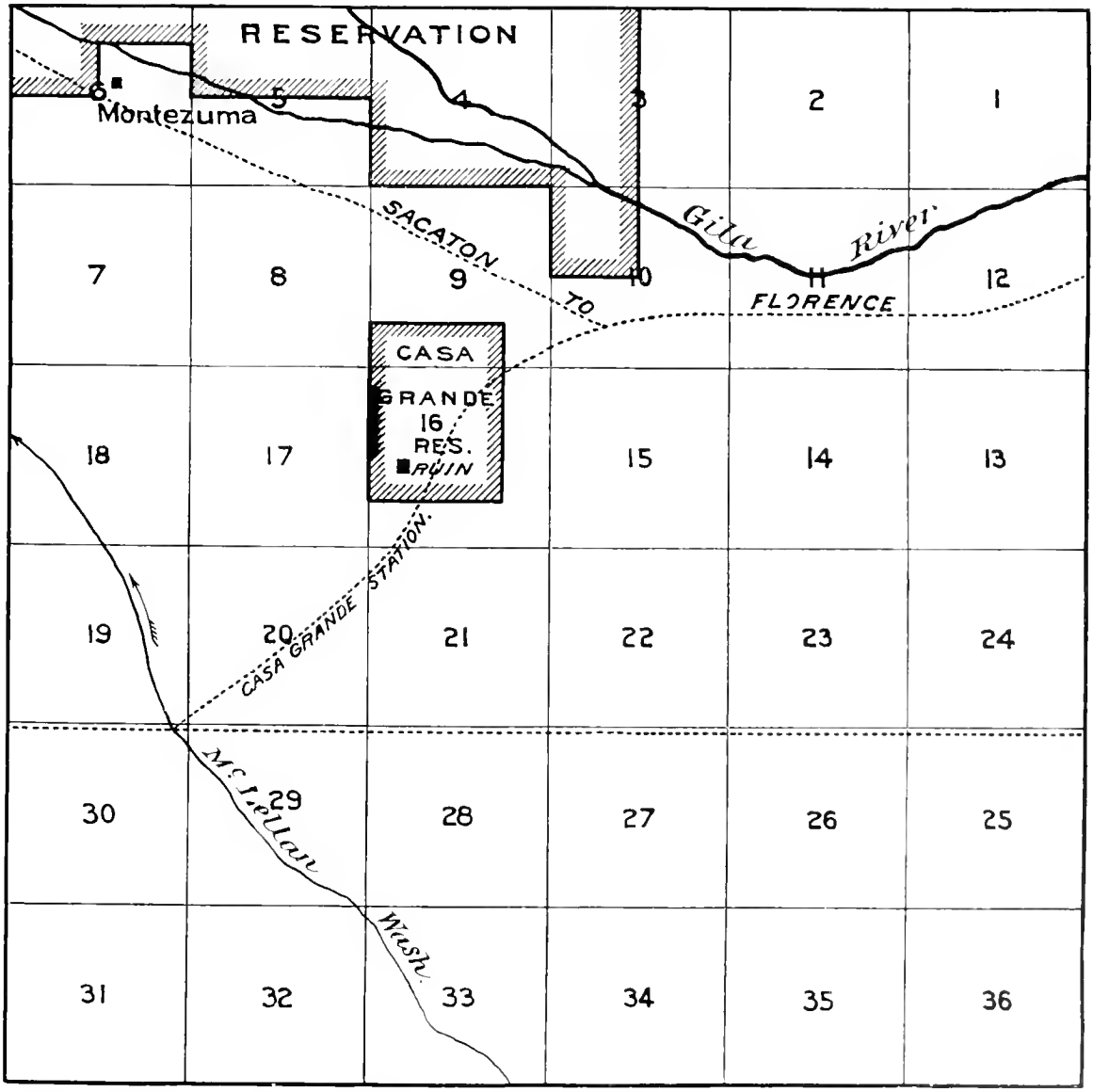
Several years ago Casa Grande ruin was brought into general notice throughout the United States in consequence of southwestern explora-

tions; and in 1889, in response to a petition from several illustrious Americans, the Congress of the United States, at the instance of Senator Hoar, of Massachusetts, made an appropriation of $2,000 for the purpose of undertaking the preservation of this ruin. This appropriation was expended in works urgently required to prevent the falling of the walls and final destruction of the ruin; they included metal stays for the walls, with brickwork for the support and protection of the walls at their bases. Subsequently an area of about 480 acres, including the ruin, was reserved from settlement by Executive order. A custodian was also appointed, and, as this office has been informed, has been continued down to the present. This action on the part of the legislative and executive branches of the Government can only be regarded as indicating a desire and continued intention to preserve the ruin for the benefit of the people of the United States.

The expenditures thus far authorized for the preservation of Casa Grande ruin have been made in such manner as to meet the most urgent needs only, and without them the structure would probably have been, before this time, beyond the reach of preservation. The preservative works were undertaken as emergency measures, rather than as steps in carrying out a well considered plan. From the outset it has been understood by architects and archeologists and others familiar with the structure that preservation can be insured only by throwing a roof over the entire ruin in such manner as to protect the walls from the fierce rainstorms which occasionally occur in the Gila valley. No lesser work will preserve the ruin more than a generation or two; and unless this work of roofing is contemplated and is undertaken within a few years, the emergency work will be of little avail and the money expended therein will be lost. Accordingly, assuming a desire and continued intention on the part of the Government to preserve this noteworthy relic, no hesitation is felt in recommending that a suitable roof be placed over Casa Grande ruin, at such time as may be expedient; and, in view of the rapidity with which destruction is now in progress, there is no hesitation in saying that the work should be undertaken at the earliest practicable date.

It should be added that neither the Director nor any of the collaborators in the Bureau of American Ethnology have visited Casa Grande ruin for some three years, and accordingly that there are no data in this office to indicate whether there is especially urgent necessity for undertaking preservative work at this time; but much confidence is placed in the judgment of the custodian, Reverend Isaac T. Whittemore, who is known to several collaborators in the Bureau.

The subject of the preservation of Casa Grande, in many respects the most noteworthy ruin in the United States, is deemed important; and if the Secretary of the Interior desires more specific information concerning the present condition of the ruin, as a basis for further action or judgment, it will be a pleasure to have an officer of this Bureau



MAP OF TOWNSHIP 5 SOUTH, RANGE 8 EAST, GILA AND SALT RIVER BASE AND MERIDIAN (6 MILES SQUARE), SHOWING LOCATION OF CASA GRANDE RESERVATION AND RUIN

make a special examination of, and report on, the ruin during the autumn.

I have the honor to be, yours, with great respect,

W J McGEE, *Acting Director.*

The SECRETARY OF THE INTERIOR.

IV. *Letter of the Acting Secretary of the Interior to the Director of the Bureau of American Ethnology, approving the suggestion that Casa Grande be visited with a view of determining the desirability of its further protection*

DEPARTMENT OF THE INTERIOR,
Washington, September 12, 1895.

The DIRECTOR OF THE BUREAU OF AMERICAN ETHNOLOGY,
Smithsonian Institution.

DEAR SIR: I am in receipt of your letter of the 28th ultimo submitting a report upon the recommendation made by the Reverend Isaac T. Whittemore, custodian, that provision be made for further protection of the Casa Grande ruin near Florence, Arizona, by the erection of a suitable roof.

In response thereto I have to state that more specific information concerning the present condition of the ruin and the probable cost of providing proper protection for it is desirable in the preparation of an estimate to be submitted to Congress with a view of securing appropriation for the work. To this end the Department gladly avails itself of your offer to send an officer of your Bureau, at its expense, to make a special examination and report on the ruin during the autumn of this year.

Very respectfully, JOHN M. REYNOLDS,
Acting Secretary.

V. *Letter of the Director of the Bureau of American Ethnology to the Secretary of the Interior regarding the examination of Casa Grande by Mr W J McGee*

SMITHSONIAN INSTITUTION,
BUREAU OF AMERICAN ETHNOLOGY,
Washington, October 18, 1895.

SIR: Pursuant to your request of September 12, 1895, Mr W J McGee, ethnologist in charge in the Bureau of American Ethnology, will in a few days repair to Florence, Arizona, for the purpose of examining Casa Grande ruin and determining the desirability of further works for its preservation. * * *

In accordance with terms of preceding correspondence, it is of course understood that the cost of the work will be borne wholly by this Bureau.

I have the honor to be, yours, with great respect,

J. W. POWELL, *Director.*

The SECRETARY OF THE INTERIOR,
Washington, D. C.

VI. *Report of the Director of the Bureau of American Ethnology to the Secretary of the Interior on the examination of the condition of Casa Grande by Mr W J McGee, with a recommendation concerning its further protection*

SMITHSONIAN INSTITUTION,
BUREAU OF AMERICAN ETHNOLOGY,
Washington, November 15, 1895.

SIR: Pursuant to a proposal made in connection with a report from this office relating to the ruins known as Casa Grande, near Florence, Arizona, under date of August 28, 1895, and to the acceptance of this proposal in a communication from the Department of the Interior under date of September 12, 1895, Mr W J McGee, ethnologist in charge of the Bureau of American Ethnology, has within a few days made an examination of Casa Grande ruin with the view of determining the need for further protection of the ruin by a roof or otherwise.

There are in this office two series of photographs representing the ruin. The first series was taken in 1892 before the protective works authorized by the Congress were commenced; the second series represents the work in progress. In the recent examination the present condition of the ruin was carefully compared with the condition represented in the photographs.

On comparing the profiles of the walls, it was found that in many cases the irregular upper surfaces retain the exact configuration of 1892, even to the slightest knobs and rain-formed crevices; the correspondence being so close as to show that the injury and loss by weathering during the interim has been imperceptible. In some other cases, notably along the southern and eastern walls, the profiles are more extensively modified; some of the points and knobs shown in the photographs are gone, some of the old crevices are widened and deepened, and some new crevices appear; and in some parts it can be seen that walls are lowered several inches. On the whole the modification of the profiles of the walls is limited, yet such as to indicate that destruction is proceeding at a not inconsiderable rate.

On comparing the scars and crevices on the sides of the walls, it was found that, while many remain essentially unchanged, most are enlarged and deepened. This is particularly noteworthy on the eastern and southern walls, which are most beaten by wind-driven rains, and which are also most modified in profile. It would appear that destruction is proceeding more rapidly along the sides of the walls than along the crests.

On examining the walls with respect to apparent solidity and stability, it was found that nearly all are in fair or good condition. The only portion that would seem in special danger is the central section of the southern exterior wall. This section seems insecure, and might at any time be overthrown by a heavy wind following a rain storm. This section was not, unfortunately, braced or tied to the stronger interior wall when the protective works were carried out in 1892.

On examining the structure to ascertain the effect of the protective works of 1892 in staying the destructive processes, particularly the undermining of the walls by spattering rain and drifting sand, it was found that in most cases the results have been excellent. On the inner side of the middle section of the southern exterior wall sapping is in progress at the ground level, and also along the rows of joist openings for the first and second stories, and in a few other places the protection seems inadequate; but in general the anticipations of the projectors of the protective works seem to have been realized.

The most serious of the destructive processes was sapping, and this process has been nearly checked by the protective works. The second was the desurfacing and subsequent eating away of the walls by beating rains and frost, and this is still in progress at a moderate rate. The least serious process was the wearing away of the crests of the walls by rain and winds, and this is still going on at a perceptible rate. It is impossible to determine, and difficult even to approximate, the rate of destruction quantitatively, especially so since it goes on cumulatively, with constantly increasing rapidity, as the cemented surfaces are destroyed and the crevices widen and deepen; but judging from the history of the ruin, and from the rate of destruction indicated by comparing the photographs of 1892 with the present aspect, it would seem safe to conclude that, if protected completely from vandalism, the ruin will be comparatively little injured during the next five years, and will stand perhaps half a century, without further protective works, before moldering into dust.

In view of the slow yet ever increasing rate of destruction of the ruin, and of its great interest as a tangible record of the prehistoric inhabitants of this country, no hesitation is felt in recommending that the structure be further protected, and practically perpetuated, by a suitable roof, so designed as to shield the walls from rain and sun and at the same time permit an unobstructed view of the ruin from any direction.

* * * * * * *

I have the honor to be, sir, yours, with great respect,

J. W. POWELL, *Director*.

The SECRETARY OF THE INTERIOR.

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