

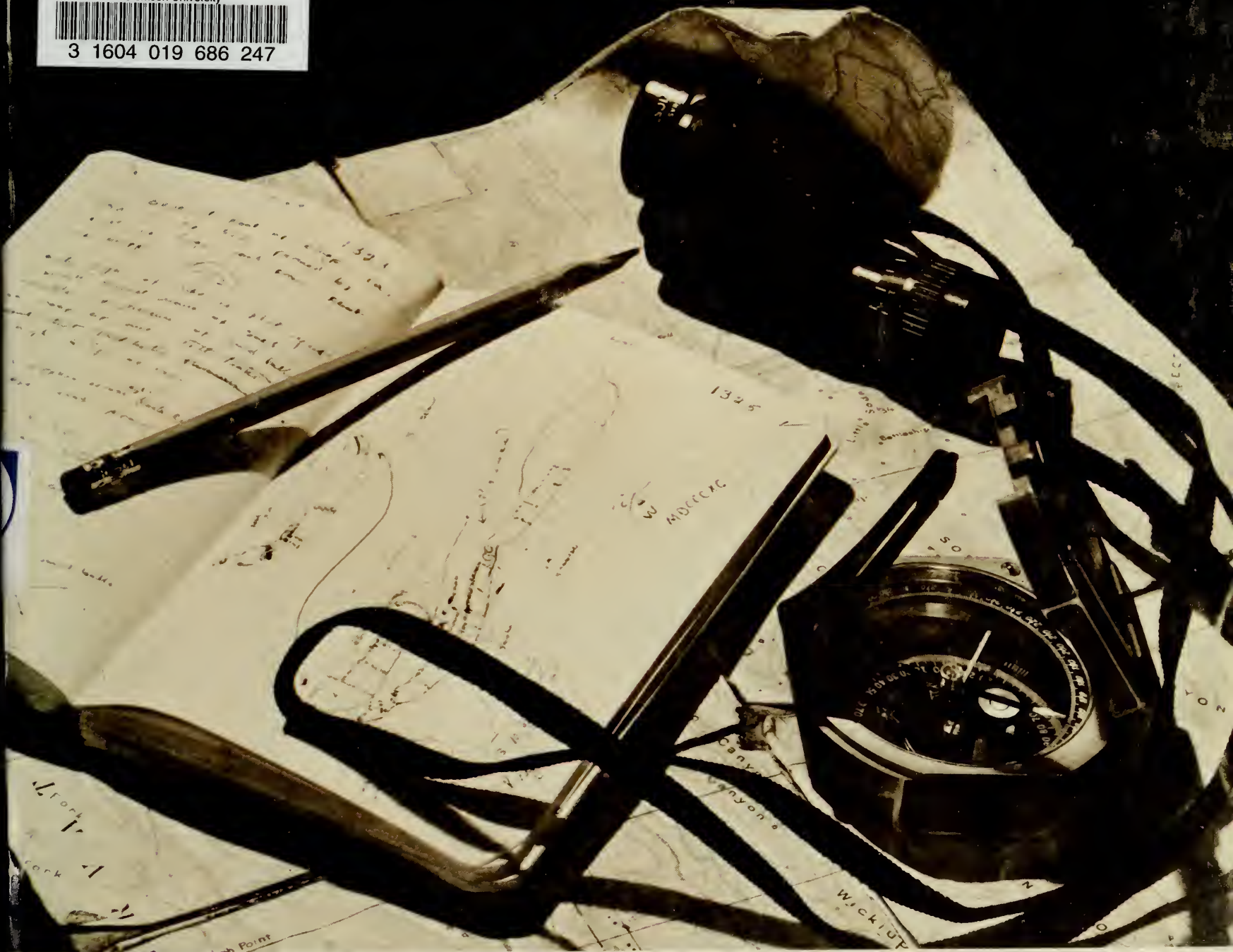
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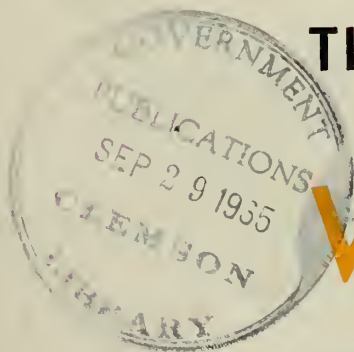
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THE ARCHEOLOGICAL SURVEY OF

wetherill mesa

MESA VERDE NATIONAL PARK—COLORADO



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THE ARCHEOLOGICAL SURVEY OF
wetherill mesa

MESA VERDE NATIONAL PARK—COLORADO

by ALDEN C. HAYES

Prologue to the Project by DOUGLAS OSBORNE



Archeological

Research Series

Number Seven-A

NATIONAL PARK SERVICE • U.S. DEPARTMENT OF THE INTERIOR • WASHINGTON 1964

This publication is one of a series of research studies devoted to specialized topics which have been explored in connection with the various areas in the National Park System. It is printed at the Government Printing Office and may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Price \$3.75 in paper cover.



United States Department of the Interior
Stewart L. Udall, *Secretary*
National Park Service
George B. Hartzog, Jr., *Director*

-
- No. 1 Archeology of the Bynum Mounds, Mississippi.
 - No. 2 Archeological Excavations in Mesa Verde National Park, Colorado, 1950.
 - No. 3 Archeology of the Funeral Mound, Ocmulgee National Monument, Georgia.
 - No. 4 Archeological Excavations at Jamestown, Virginia.
 - No. 5 The Hubbard Site and Other Tri-wall Structures in New Mexico and Colorado.
 - No. 6 Search for the Cittie of Raleigh, Archeological Excavations at Fort Raleigh National Historic Site, North Carolina.
 - No. 7A The Archeological Survey of Wetherill Mesa, Mesa Verde National Park, Colorado.



ADMINISTRATION

Mesa Verde National Park, established in 1906, and containing 52,074 acres, is administered by the National Park Service, U.S. Department of the Interior.

The National Park System, of which this area is a unit, is dedicated to conserving the scenic, scientific, and historic heritage of the United States for the benefit and inspiration of its people.

A superintendent, whose address is Mesa Verde National Park, Colo. 81330, is in immediate charge of the park.

AMERICA'S NATURAL RESOURCES

Created in 1849, the Department of the Interior—America's Department of Natural Resources—is concerned with the management, conservation, and development of the Nation's water, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States—now and in the future.

foreword

The excavations and stabilization of three major cliff dwellings and several mesa-top ruins at the Wetherill Mesa, Mesa Verde National Park, is the first major archeological project undertaken by the Service. This area is being developed so that the numerous visitors expected in future years will *all* have an opportunity to see at least one of America's outstanding prehistoric ruins.

This project is one of great scientific value. There are many unanswered questions about the ancient inhabitants of the Mesa Verde ruins: who they were, how they survived the rigors of a semiarid climate, why they left when they did.

It was funds made available by the National Geographic Society that allowed the National Park Service to bring to bear upon these problems all related sciences which might, piece by piece, help solve these puzzles. The Service owes a great debt of gratitude to the Society and its Committee for Research and Exploration for their enthusiastic support of this 6-year archeological program. Without their support, such a major scientific undertaking would have been impossible.

I want to thank, in particular, former Director Conrad L. Wirth, under whose able guidance this Wetherill Mesa Project was started and brought nearly to completion. He considered this to be one of the most important projects carried out by the National Park Service and his complete support has allowed it to be a great success.

It is, therefore, especially gratifying to present the first of a series of scientific reports on the various aspects of the Wetherill Mesa Project. This report, which is the complete archeological survey of the Wetherill Mesa, forms the basis on which the subsequent excavations were accomplished. Detailed reports on the excavations of these specially selected sites will follow in due course.

GEORGE B. HARTZOG, JR.
Director

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contributions

This publication is Contribution 3 of the Wetherill Mesa Archeological Project. Other contributions, as of September 1964, are:

1. Fixing Site Locations by Radio Direction Finder at Mesa Verde. Alden Hayes and Douglas Osborne. *American Antiquity*, vol. 27, no. 1, July 1961.
2. *Quercus Ajoensis* in Colorado. James Erdman, William Weber, and John M. Tucker. *The Southwestern Naturalist* 7 (3-4) ; 269-270, December 1962.
4. Annotated Checklist of the Plants of Mesa Verde, Colorado. Stanley L. Welsh and James A. Erdman. *Brigham Young University Science Bulletin, Biological Series*, vol. IV, no. 12, April 1964.
5. Apache Pocket Mouse Found in Mesa Verde National Park, Colorado. Charles L. Douglas. *The Southwestern Naturalist*, vol. 8, no. 3, November 1963.

A PROLOGUE TO THE PROJECT

the broad plan of approach

DOUGLAS OSBORNE

The report of the archeological survey of Wetherill Mesa by the National Park Service marks the beginning of a series of publications which should formulate reasoned hypotheses, phrase numerous searching questions, and supply some reasonable answers concerning the prehistory of Mesa Verde National Park. The appearance of this report offers me an opportunity to describe the organization and aims of the project. Following this description, I have given a short discussion of the geological and physiographic background of the region, which will serve also for our succeeding publications.

Arthur H. Rohn, Jr., is preparing a monograph on Chapin Mesa, not as part of the Wetherill Mesa Project. The publication of this work will make available two comprehensive surveys within a relatively small area. This done, and the archeological and related studies which are the Wetherill Mesa Archeological Project completed, plus other survey and salvage excavations attendant on the planned expansion of the park, will, when accomplished, altogether make Mesa Verde National Park one of the most intensively studied archeological zones in the world.

The mesa merits such intensive examination, and even more, the entire Four Corners area. It is the Anasazi heartland. The Mesa Verde itself is but a small and

perhaps atypical part of the region that supported the bearers of the Mesa Verde cultural style. Furthermore, the single largest excavation program of the past, that of J. Walter Fewkes, of the Smithsonian Institution, which still forms the physical basis for much of the park's interpretive program, has never been adequately reported. The regions around the Mesa Verde, particularly to the west, have not been surveyed. There are notable exceptions in terms of intensive effort but these are lost in vast areas which support a more than liberal sprinkling of Mesa Verde type sites. Literally hundreds of these have been lost during the last two decades because of agricultural expansion. No large problem of northern Anasazi archeology can be settled until Montezuma County is better known. This project, however, is not geared for that task.

The need for a full-scale and intensive research program at Mesa Verde has long been recognized, both as a desirable increase in knowledge and as a practical matter. As the park has become more and more popular, increasing thousands of visitors have come to see its great outdoor museum. As early as the 1930's, perhaps before that, park personnel were talking of expanded offerings or more efficient use of them. The project is, from the point of view of Mesa Verde National Park, part of a larger master plan which will result in a major rearrangement of the park's facilities and in an entirely new plan for accommodating visitors.

Serious consideration of additions or major changes in the park began in the late 1940's or early 1950's. By the late 1950's, during the incumbency of Superintendent Oscar Carlson, the desirability of a major archeological project which would achieve both park expansion and scientific information was accepted locally. By 1957 and 1958 planning was proceeding in earnest, and Carroll Burroughs, then park archeologist, was carrying most of the load for formulating financial estimates, staffing requirements, and organization of general facilities for a large project. By the winter of 1957-58 plans were on

the drawing boards; in the spring of 1958 I was asked to supervise the project.

There appears to have been no question that Wetherill Mesa should be selected for the site of the park's new archeological expansion. This small area contained several ruins already famous; one of them, Long House, is the second largest cliff dwelling within the park. Wetherill Mesa was accessible by a rather rough road, constructed originally because of a disastrous fire on and around the northern section of the mesa in 1934.

The first regular staff member to arrive was Alden C. Hayes, who began work as archeologist in August 1958. I arrived early in September, and George S. Cattanach, archeologist, came in late September. Hayes' task was to be the survey, Cattanach's the excavation of Long House. All three of us managed to get into the field for short periods in autumn, when Cattanach did some preliminary clearing and examining of the Long House ruins and Hayes surveyed in the northern part of Wetherill Mesa.

The winter of 1958-59 was spent in organizing and shaping the project. We worked in the small auditorium in the museum building at park headquarters, and an old Civilian Conservation Corps building was given to us as a warehouse. Fortunately the first autumn and spring were remarkably open, and we were able to plan the camp and the excavation program on the ground. The Federal money authorized for the project that year, the fiscal year ending June 30, 1959, was approximately \$60,000, of which about a third was set aside for salaries. Circumspection in the purchasing of supplies and materials was in order; the camp had to be built and field and laboratory items acquired. Government surplus property, fortunately rich and varied at that time, provided a large amount of equipment at substantial saving. Gretchen G. Hayes, Richard P. Wheeler, and Arthur H. Rohn, Jr., were recruited in 1959 as secretary, museum curator (or laboratory chief), and archeologist, respectively. Rohn spent his first field season at Long House assisting Cattanach, who at that time was responsible for building the camp as well as excavating the large site.

One of the important tasks in 1959 concerned the project's office and laboratory. The building, prefabricated steel on a concrete slab, 120 feet long by 50 feet wide, was begun in the spring and occupied early in September. In addition to Wheeler as the laboratory chief, the laboratory was staffed with five museum aids, none of whom had experience in anthropological work but all learned rapidly. In a remarkable lack of turnover, four—Ruth E. Chappell, Jean Lee, Sue Waite, and Gisela L. Eberling—have, to this date, been long-term employees, all recruited locally. Lucy P. Wheeler was engaged as a secretary in November of 1961.

Fieldwork started early in the spring of 1959 with two major objectives: the excavation of Long House, and the establishment of the camp and its facilities. Work went on concurrently in the two, and the camp, above and slightly west of Long House, was well established by autumn. A frame and sheet iron laboratory-office was built, 17 tent frames of 4 different sizes were constructed, and a water tank was purchased and set up. The roads in the camp area and cleaning up of the camp were also completed. An engine room and tool shed were built early in the summer; two 15kw diesel-powered generators were installed and the camp was wired.

During this summer Cattanach was in overall charge of the fieldwork and camp building. Rohn assisted in the excavation of Long House, and James A. Lancaster was transferred from the park's maintenance staff to take charge of the stabilization program. Hayes and his survey crew were busy on the talus slopes and cliffs of the mesa.

The winter of 1959-60 began the laboratory work in earnest. The cataloging system in use by the Museums Branch of the National Park Service, for which we were, ultimately, doing the cataloging of the Wetherill Mesa material, was adjusted to a suitable method for application in a research laboratory. The spring of 1960 saw the laboratory staff caught up with the previous year's fieldwork and ready to embark on current material.

During this year the field staff was reorganized to put Hayes, who now had the survey work moving well, in charge of the field operation. Lancaster, made available to the project throughout the entire field season, took over direction of the excavations. Cattanach was able to put in full time at Long House; Rohn was assigned to the new excavation of Mug House. J. Anthony Pomeroy served as seasonal archeologist during the summer, taking series of pollen samples and partially excavating Sites 1205 (a small rock shelter) and 1539 (a terrace and check-dam site).

Frank H. H. Roberts, Jr., Smithsonian Institution; Emil W. Haury, University of Arizona; J. O. Brew, Harvard University; and Robert H. Lister, University of Colorado, had been requested by the Director of the National Park Service to advise him on the conduct and progress of the project. This group held its first meeting at Mesa Verde in May 1960, and has since given valuable assistance and advice on our field and laboratory work. One of the major changes which this advisory group suggested in its first meeting was that a mess be installed in the camp. This suggestion had been discussed and discarded for the first year but the second year's National Park Service appropriation for this project gave us the financial potentiality to set up a kitchen and messhall, and staff it adequately. The mess was open for operation in mid-July

1960, and has since furnished our crews with excellent provender. During fiscal year 1960 the project had an authorization of nearly \$81,000 of Federal funds, of which slightly over \$52,000 went to salaries and wages.

The archeological survey was completed early in the autumn of 1960; the survey crew had recorded 800 sites and tested several small ones and other isolated manifestations.

The following spring of 1961 Hayes completed excavation of Site 1205 and started work on Site 1452, a mesa-top Pueblo II–Pueblo III ruin. It was named Badger House because of the large numbers of badger holes in the trash dump. Badger House was scheduled for completion during the 1963 season.

Our laboratory staff was augmented in January 1961 by Carolyn M. Osborne, who serves as textile analyst, cataloger and professional assistant. Fred E. Mang, Jr., came in November of the same year as project photographer.

All major excavation and stabilization at Long House and at Mug House were complete at the end of the 1961 season. Robert F. Nichols assisted Cattnach at the former site during the 1961 season. Nichols rejoined the project as archeologist in May 1962. Jervis D. Swannack, Jr., also joined the staff in the same capacity and at the same time.

An interpretive survey was made of the Wetherill Mesa in the summer of 1961 by Jack R. Rudy, assistant park archeologist, Mesa Verde National Park. Rudy examined the areas which appeared to offer the best interpretive possibilities, as recommended by Hayes on the basis of the archeological survey, and submitted alternative suggestions for the interpretive loop. Sites have been chosen which will follow one another along the road and will lead the visitor on a logical trip from the earlier into the later archeological manifestations. Obviously the research value of the individual sites was also considered in setting up the plan for the mesa-top excavations.

Plans for the summer of 1962 included a continuation of the Badger House excavation and the excavation of Basketmaker III pithouses, Site 1644, by Hayes, excavation and stabilization of Step House by Nichols, and excavation of two mesa-top sites, 1595 (Pueblo II–III) and 1645 (Pueblo II) by Swannack. These sites, after excavation and stabilization is complete, will be “moth-balled” to await the time when interpretive needs of the park will call them into use. Major responsibility for planning and controlling excavations and the stabilization of all ruins will rest on the shoulders of Lancaster, as did the work in Long House and Mug House. The summer of 1963 should see the end of all fieldwork on Wetherill Mesa. A single Pueblo I site (1676) will be excavated then. Mopping-up operations and preventive

stabilization will complete our work on the mesa. The project will continue laboratory and desk activities until early in 1965.

The National Geographic Society was informed of the development of the Wetherill Mesa Archeological Project by Conrad L. Wirth, Director of the National Park Service, who is also a member of the board of trustees of the National Geographic Society. Early in September 1958 Melville Bell Grosvenor and other officials of the Society came to Wetherill Mesa to examine its possibilities for an extended research effort. Shortly thereafter the National Geographic Society made a grant of \$50,000 to the National Park Service to undertake research activities connected with the project that could not be supported by Federal funds (these are specifically for excavation, stabilization, laboratory work, and writing of the archeological reports). There are numerous problems of prehistoric life which every archeologist hopes for an opportunity to explore. The plans of attack on these research problems were worked out and found acceptable to the Society, which made three additional research grants of \$50,000 each in 1960, 1961, and 1962.

PUBLICATIONS

The publication program contemplated by the project is a large one. We plan monographic treatment of the survey and of each site excavated, followed by specialized studies of certain aspects of the archeological recovery. These reports will be published in essentially the same manner and format as is this one.

Each of the special aspects of ancillary research supported by the National Geographic Society program—about 32 in all—will either contribute to the site monographs or be published independently. The soil, ecological, and dendrochronological-climatic studies will obviously all require separate treatment; the dendrochronology itself and others will appear with the site reports.

Summary reports covering both aspects of the project's program, together with a concluding study, will close the series. This first report in the Wetherill Mesa series was edited by Margaret A. L. Harrison, of Santa Fe, N. Mex. George A. King, of Denver, Colo., has prepared the maps and charts for the present text.

FUNDING

The project is envisioned as expending some \$795,000, by the National Park Service, of Federal money. This figure is supplemented by \$250,000 from the National Geographic Society. Fiscal data and the breakdowns

which will indicate the uses to which these funds were put will be available to interested investigators at the end of the project. Such a record may be of value to others planning similar programs of coordinated research.

DISCUSSION

I cannot see any useful purpose in discussing the administrative problems involved in starting and maintaining the National Geographic Society program. As in any program, these will vary with the origin of funds, the administrative base, and the problems encountered. A short statement on the history of each aspect of our research will appear in a foreword or introduction to the resulting publications.

On the other hand, the problems attendant on the development of such a research design are worthy of mention and exposition. A catholicity of research tastes must be both consulted and controlled. Too wide or inclusive an approach to programing should be rejected. The amputation of an effort once started, such as the Tanoan oral-tradition study, can be painful. Ordinarily a program is designed and only then the funds are sought, thus bringing a detailed background knowledge to bear on the design. Here, funds were available before the program was considered in any detail. This caused some strain in the planning and some false or incomplete starts. Although research organization difficulties were ironed out readily enough, the problems caused have echoed in the yearly budgets. Thanks to the understanding shown by higher echelons of the National Park Service and by the National Geographic Society Research Committee, budgetary changes have been allowed.

The environmental measurements-dendrochronology-climate aspect of the program is an excellent case in point. The stations first became part of the program because we needed answers to questions concerning local weather variation and because a modern study of ecology must have these data. Their possibilities for correlation of climate with a detailed study of present-day tree growth via the dendrographs and the potentialities of these data for a more detailed interpretation of the past followed soon after.

There can be no doubt that the problems of a program such as ours will have a bearing on the development and handling of future interdisciplinary endeavors, large and small. The project has by no means covered every possibility that exists for bringing the content and methods of other fields to bear on archeology. But it has enlisted the aid of a respectable share of the most obvious ones, and some that are not immediately obvious. Interdisciplinary attacks on a group of discrete problems, as

a valued method, have been strongly in the air for some time; and anthropology generally and archeology specifically have not been wholly backward in seeking outside participation. The National Geographic Society-supported program is not the first nor will it be the last of such activities. This increases rather than lessens its responsibilities to the scientific community.

Richard B. Woodbury of the University of Arizona was asked to offer a critique and commentary at the end of the Weatherill Mesa Project's Symposium held at the American Association for the Advancement of Science meetings at Denver in December 1961. I can do no better than to quote, with his permission, his thoughtful remarks on the subject:

But it would be unrealistic to overlook the potential problems that the very scope of the project raises, problems in the relating of each separate research program to the others and in their successful combination when the field work is completed and results are published. It seems to me that we have here a testing ground for the whole future of relationships between archeology and other scientific studies, a relationship that promises much more than has thus far been actually achieved. Three quite crucial questions will ultimately be answerable, on the basis of the work at Weatherill Mesa; and the answers will influence the organization and direction of future archeological research.

The first question is whether archeology can really ask sufficiently significant questions of other disciplines. Will the questions, by and large, be important enough to justify the time, expense, and diversion of attention by specialists in all the diverse fields that are being called on? If the questions are trivial or of too limited a nature, even though meaningful in a technical sense, they will have been unnecessary or even wasteful of scientific resources. Archeologists are thus challenged to frame each inquiry with great care, and in terms of the greatest possible promise for results of major value.

The second question is whether the specialists and the fields they represent can answer the significant questions asked. Doubtless at least a few questions will be unanswerable and a few will get equivocal answers. But most of them must be capable of answers that truly advance archeological understanding and insight, or the joint efforts of archeology and other studies will be unrewarding.

The third question is whether the archeological work can provide data of real value to the cooperating specialists, for work in their own fields. It would be tragic if collaboration of the kind established by the Weatherill Mesa Project could produce only a one-way advantage, archeology receiving help and giving nothing in return. For this pattern of joint endeavor to be followed in the future, benefits must flow in both directions, and the nonarcheological disciplines be advanced approximately as much as they contribute to the advance of archeology.

I can add here only two more points that are, to me, part of the responsibility that the project bears. They are of a slightly different order than those mentioned by Woodbury but they must, I feel, be kept in the foreground during the modeling stage of any project. First, there is the responsibility for diffusing the knowledge and viewpoints we have gained. Presumably specialists will have sufficient access to results and method through the specialized monographs. Whether we like it or not, the ivory tower is vanishing; and the general public must have access to the same results, obviously in a broadened and generalized interpretation. In our case, the National Park Service's interpretive program and the National Geographic Society will handle certain aspects of this interpretation, each in its own way. I believe this project should more than repay the public for the money we have spent, and should insure its interest in spending

more for other similar projects. The present-day development of "Big Science" and the potentialities inherent in rapid popularization indicate the nature of our responsibilities along these lines.

The second point is this: a large project can experiment with new techniques and methods whereas a smaller endeavor must ordinarily hew more closely to tried and true lines. I believe that it is a responsibility of any scientific activity to probe and experiment, and that this is especially true of larger and adequately financed ones. True, it is a ticklish business, and temptation to ramify is strong. When properly controlled and reported, ancillary investigations can contribute markedly to scholarly advance, through actual increase of knowledge or improvement of method, or through elimination of unprofitable approaches. Time will tell whether or not the choices made here were the right ones.



Field crew—1959, on ledge above Long House.



the project in diagram form

There are some 32 separate fields of study being brought to bear on problems and questions concerning the past and present environments of a small part of Mesa Verde National Park. This area is sufficiently varied so that the results will serve for the whole park.

A diagram is by far the simplest method of illustrating the size and varied complexity of interrelationships which form the project. Experimentation eliminated several approaches to the required graphic illustration. A wheel or target plan appeared to be the clearest and most true to fact.

George S. Cattanach, Jr., and Arthur H. Rohn, Jr., using a rough sketch that I prepared, made the working drawing, and George A. King did the final rendering.

The circle diagram shows the scope of the project as it stands in its fourth year. No scale is implied; the sizes of the interspoke boxes betoken no measure of scientific importance.

The circular chart is divided into two major sections: the anthropological and medical sciences in the first, and the earth, life, and meteorological sciences in the second. The first grouping yields data and interpretation which will permit development of a reasonably clear picture of the prehistoric way of life at Mesa Verde and of the circumstances that contributed to its decline as an ancient Pueblo Indian center, the reasons for its abandonment, and something of the movements and fates of the emigrants and their descendants. The sec-

ond grouping is designed to fill out knowledge of the environments of the past and present, and to provide dates for the cultural materials. Environmental change was presumably related to cultural change.

I shall discuss briefly each of the blocks in the chart starting with ethnology. It will not be possible to present findings and interpretations, even briefly. Rather I shall concentrate on the program, now well crystallized, and the reasons therefor. Many of the results achieved by 1961 were discussed in the 1961 symposium in Denver. There have been changes in emphasis since then. The project's concept is dynamic and experimental.

Anthropology. Ethnologic assessment appears in many archeological reports. In using this term I mean simply an evaluation of certain of the archeological remains in terms of the cultures of what are presumed to be their closest living cultural relatives. We shall ask ethnologists who have specialized in the Pueblo Indians to review our archeological reports, especially ground plans of the ruins, and to comment on any aspects of the non-material culture that they may discern therein, such as kinship groupings, religious practices, and others.

Groups of Rio Grande Pueblo Indians have been brought to Mesa Verde with the help of Florence Hawley Ellis of the University of New Mexico. These Pueblo men and women have examined archeological materials in the laboratory and have made valuable comments. More visits of this nature are planned. In addition, staff members make constant use of the voluminous literature on Southwestern ethnology as references.

Oral tradition studies are being carried on by Dr. Ellis. She is working with Keres-speaking Indians from Acoma, Laguna, Zia, and Santa Ana, and with the Tanoan speakers of Taos. The Keres have often been mentioned as possible descendants of the Mesa Verde peoples. The legendary history of these people is being explored in an effort to evaluate and use it in clarifying their prehistory from the point of view of origins. Most of the

legends have a religious function and are not readily available. The same is true of Taos legends. Some legends are surprisingly specific and appear to correlate periods of drought and migration. Dwelling areas or sites of the past two or three centuries may correlate with phases mentioned in the myths and, at the same time, bridge to the archeological past, primarily through pottery relationships. The trail is tenuous but inviting.

A survey of the Tanoans, exclusive of Taos, was made by Kenneth and Mary Knudson of the University of Arizona. The Tanoan data were not available, and the project has therefore concentrated on the Keres and Taos alone.

Glottochronology, an anthropologically influenced approach to linguistic time depth, is being employed by James Goss, University of Chicago, who is working with local Ute groups. Nomadic incursions have often been mentioned as a factor in the abandonment of the area by the Pueblo people of Mesa Verde. The Navajo and Apache have been removed from consideration by studies which show that these people are apparently too late in the area. It is conceivable that the Utes were earlier and that glottochronology will suggest a finer Ute linguistic divergence than previously recorded which can be interpreted as a period of movement. If this falls in the 12th or 13th centuries, it will be of interest and probably of significance in Mesa Verde prehistory.

Regional syntheses are logical developments of any archeological program. They are attempts, based on the knowledge and theory of the moment, to interpret local and regional knowledge in terms of one another. Syntheses of this kind are a part of the Wetherill Mesa publication program. This work will be based primarily on published data and will be done by various members of the staff.

Water-supply studies are a part of the archeological program, but they are not a part of the federally supported program. A brief evaluative study of the best-preserved ditches, reservoirs, check dams, and terraces on Wetherill Mesa and elsewhere in the Mesa Verde area will be made. This work will be done by Arthur Rohn, who has already completed similar studies elsewhere. Richard B. Woodbury, University of Arizona, has visited the area and advised Rohn.

Both the Colorado State Museum in Denver and the University Museum in Philadelphia have large collections of artifacts taken from Mesa Verde during the last quarter of the 19th century. Although only a minor part of the artifacts in these museums can be confidently assigned to specific sites, most of them were collected by the Wetherill family and so are indubitably native to the area. The Denver collection was studied during 1962 and the Philadelphia material is now being studied. This

work, which is expected to round out our understanding of the technology and material culture of the Pueblo III population, is being carried on by Carolyn M. and Douglas Osborne.

"Mesa Verde Surveys" refers to an attempt to follow the Mesa Verde cultural style as it spread and developed after the abandonment of this area. A series of archeological surveys is under way in regions to which the San Juan Mesa Verde peoples may have dispersed after they left the Four Corners area in the late 1200's or early 1300's. During the summer of 1961 a field party worked in the vicinity of Magdalena and in the Mount Taylor areas of New Mexico, collecting sherds and locating sites which may have Mesa Verde affiliations. In 1962 a detailed study was made of the black-on-white pottery recovered in 1961 and on that collected previously, under other auspices, from the region lying generally southeast of the Four Corners area. The first fieldwork was done by Emma Lou Davis of the University of California at Los Angeles and James Winkler of the University of New Mexico. Mrs. Davis is responsible for this program.

Midden analysis, as developed primarily at the University of California, Berkeley, consists of mechanical and chemical analyses of the materials that make up a prehistoric garbage dump. Richard Brooks used the mechanical method in sampling Long House, Mug House, and Step House trash. This has yielded detailed knowledge of some aspects of late occupational middens.

The work in physical anthropology consists of metric recording of human skeletal remains from archeological excavations, together with pertinent observations and interpretation. These studies follow a generally accepted pattern. It is too early yet to say whether analysis will reveal genetic traits that can be readily isolated or traced in the bones from excavations. Frederick S. Hulse, University of Arizona, is analyzing skeletal materials with the assistance (in 1962) of Charles Merbs, University of Wisconsin.

An osteopathological examination of skeletal material is a useful adjunct to physical anthropology. Ordinarily the osteopathologist has an opportunity to examine only those obviously pathological bones which are sent to him by the archeologist or by the physical anthropologist, but in this instance the entire collections are being sent to James S. Miles, orthopedic surgeon at University of Colorado Medical Center. Here they will be examined by Dr. Miles and his students. All pathologies or abnormalities will be observed, recorded, and interpreted.

The orthodontics of the Wetherill Mesa remains are being studied by E. H. Hixon, orthodontist, of the University of Oregon Dental School, Portland. This research is frankly experimental, and so its anthropological utility remains to be seen. For example, the orthodontist is still

uncertain as to whether the profiles of development that are normal for children and young people among ourselves were normal among the Mongoloid Pueblo Indians of the past.

Parasitological investigations of human fecal samples taken from the cliff dwellings are being pursued by Robert Samuels of Meharry Medical College, Nashville, Tenn. Specimens examined so far indicate that the ancient Mesa Verdeans did not support a heavy endoparasitic fauna.

Diet studies, based on the fecal remains which appear in surprising quantity in the cliff dwellings, appear to be a possibility. Amino and fatty acids in Long House feces have been identified at the Carnegie Institution of Washington by Patrick Parker and Bruno E. Sabels. The interpretation of these analyses depends on our ability, as archeologists, to relate the specimens to different periods of the occupation of Wetherill Mesa. It is known that long-range studies of this sort reveal a correlation between the amount of ingested trace elements, primarily manganese and phosphorus, found in fecal material, and large or coarse aspects of climate change. Because our studies are limited to short periods, the utility of this method for climatic interpretation over brief spans of comparative recency is not clearly known. Therefore this study also is, in part, an experimental one.

Geochronology-Pedology. The geochronological segment itself is small, but the chart divisions are misleading. The development and assessment of chronologies are also functions of a number of the other divisions.

Loess or loessic soils mantle much of the Wetherill Mesa area. Fine red dust is riding in on today's winds, apparently derived primarily from the southwest. We have an excellent column of loess in the park going through 8 to 9 feet of fine red soil to a caliche level, to residual sandstone on the bottom. Orville A. Parsons, a Soil Conservation Service soil scientist assigned to the project, has studied this profile intensively. Samples have been sent to Gustaf Arrhenius at Scripps Institute of Oceanography, and a radiocarbon date on the lower caliche of not less than 35,500 years has been received from Isotopes, Inc. Other radiocarbon dates will be forthcoming. Olof Arrhenius of Grottinge, Sweden, has run chemical analyses on this and other soil profiles from Mesa Verde. The loess study cannot be expected to throw light on the aboriginal period here, but it is of interest in itself and may be important in soil genesis study.

Palynological work for the project is being done by William Byers of the Geochronology Laboratories, University of Arizona, under the direction of Paul S. Martin and Terah L. Smiley. James Schoenwetter worked on the pollen in 1960. Hundreds of samples have been taken

from transects on the mesa top, from deposits in the ruins, and behind check dams or terraces in ravines. These are evaluated and counted in accordance with methods developed for pollen analysis of dry deposits. The results are encouraging and indicate that we shall be able to make generalizations about the flora and also identify floristic changes during the occupation and after abandonment. Such information is not only useful to archeologists but it also helps soil scientists and ecologists to make gross-climate determinations.

The dendrochronology, dendroclimatology, tree growth, and environmental measurement studies make a tight package of multidisciplinary interdependence.

Dendrochronology is a well-known method for dating wood fragments. Wood is being dated by the Laboratory of Tree-Ring Research of the University of Arizona. Although juniper wood is difficult to date, much *Juniperus* is yielding to modern techniques. An effort is made to date all of one season's specimens by the time the next season arrives. Over 200 dates have been established and as many more will be established before the project is completed. These form the chronological skeleton for archeological interpretation and the hard core of original fact for the climatological study. Robert F. Nichols and Thomas P. Harlan, working under Bryant Bannister, have done this dating.

Dendrochronological research has two major aspects. The first is dating of specimens from the ruins. The other aspect is somewhat more complex and goes back to some of the methods and initial theories of A. E. Douglass in the early development of dendrochronology. We have taken core samplings from trees in various environmental situations within Mesa Verde, trying to get as many of the older trees as possible. Dendrographs and dendrometers have been installed on conifers near the environmental measurement stations discussed below. In these ways we shall have: first, a long series of samples reaching back several hundred years; second, a complete record of tree growth of the present for comparison with the record of climatic and yearly variation from our weather stations; and third, the tree-ring record from excavated and surveyed sites. Anatomical studies of the growth of the trees being recorded by the dendrographs and dendrometers are going forward. This requires samplings of the xylem during the growing season, cores, and phenological observations of the trees themselves.

It should be noted that the tree-growth study has been listed a second time across the circle under "botany." The objective of the tree-growth and dendroclimatology portion of the project is to establish a basis for use of tree-rings in comparing our present-day climate with that of the past. Simply stated, the equation should

read: modern tree growth is to modern environment as past tree growth is to past environments. We already have a well-documented tree-ring chronology which continues to be strengthened through current archeological excavations. By measuring present environment and tree growth and relating this to the dendrochronological series, an attempt will be made to derive an equation for estimating past climates. The significance of this program revolves around the fact that a number of representative trees adjacent to several environmental stations can be studied, thus providing a control for the variety of tree-growth situations.

The study consists of (1) measuring and evaluating current tree growth by means of 30 dendrometers, 9 dendrographs, and weekly cambial samples of the bark and outer xylem taken with a 1/4-inch leather punch; (2) making phenological observations throughout the growing season in conjunction with environmental measurements; and (3) collecting tree cores from several species for correlations of ring widths with weather records of the park, and for evaluation of the variability inherent in sampling ring series from trees in a variety of sites.

Staff members of the Laboratory of Tree-Ring Research, University of Arizona, under the general direction of William McGinnies, aided by the environmental measurement staff of the project, are responsible for this program. David G. Smith, under the direction of Harold C. Fritts, made summer collections and is assisting in dendroclimatic analysis. The investigation of tree growth through the study of anatomical development is being done by Marvin A. Stokes, with the aid and advice of W. S. Phillips, Botany Department, University of Arizona. Thomas P. Harlan collected preliminary core samples in 1961. Servicing of instruments, phenological notation, and anatomical sampling during the nonsummer months are done by the environmental measurement staff, James A. Erdman and Charles L. Douglas.

The environmental measurements study is the second-largest effort being made by the project. It interdigitates most closely with dendroclimatology, with plant and animal ecology, and with soil studies, as well as standing on its own feet as a desirable contribution to knowledge.

Six regional environmental measurement stations are located in varying latitudes or environmental situations. The first is at Park Point, the highest elevation in the park, the second is about midway down Chapin Mesa, the third is near its foot. Three others are located on the east slope, on the west slope, and in the bottom of Navajo Canyon, just west of the headquarters area. These stations are yielding full regional environmental data, and will provide a baseline for the ecological studies and for the dendrochronologically oriented studies of past climates.

Instrumentation, designed to allow rigorous comparison of the regional environments, includes 6 hygrothermographs, 6 three-pen thermographs, 2 recording pyrhelimeters, 4 atmographs, 4 totalizing anemometers, 12 maximum-minimum thermometers, 1 psychron, 4 rain gauges, and 1 soil-temperature probe. This, together with the tree-growth instruments, totals 65 prime instruments, plus 14 check or evaluative instruments, used in measuring weather variation, soil temperature, and tree response. In addition to this, gravimetric analyses of soil moisture are made semimonthly at each station. All data are checked and key-punched for computer processing at the University of Arizona. James A. Erdman and Charles L. Douglas are responsible for this program, which is under the direction of John W. Marr, director of the Institute of Arctic and Alpine Research, University of Colorado.

Geologic work is limited to identification of raw stone materials once used in the making of artifacts and in the tempering of pottery. Sources have been located for the major categories. The studies have been done by Charles B. Hunt, Johns Hopkins University, the U.S. Geological Survey, and by the USGS laboratory at Denver through Leonard B. Riley.

Geochemical studies are limited, in this instance, to impurity analyses of human and turkey feces from the late (Pueblo III) occupation of the cliff dwellings. Spectrographic techniques are being used to measure manganese and phosphorous in the fecal material, and carbon isotopes measurements have been made at the Carnegie Institution's geophysical laboratory in Washington, D.C. The relative abundance of manganese is of climatic significance, and phosphorous provides a record of the general standard of nutrition. Bruno E. Sabels, formerly of the Desert Research Institute, University of Nevada, is doing this research.

Soil studies aim at providing a moderately detailed soil map of Wetherill Mesa and an understanding of local soils and their development. Orville A. Parsons, Soil Conservation Service, has provided invaluable data for plant and animal ecologists, for palynologists, and for tree physiology and environmental measurement studies. He likewise assists the archeologists with problems concerning soil profiles that are immediately germane to the excavation.

When the Wetherill project is concluded it will be able to present facets of local natural history and cultural history that will supplement each other interpretively. This archeological survey has resulted in a number of maps which detail the distributions of archeological manifestations of different periods. Soil studies and plant ecology will also result in soil and vegetation maps, and the environmental measurement research will yield climatic

data. The park has been mapped topographically and geologically. The correlations of data yielded by these various studies, especially as recorded in the maps, should be enlightening.

Of major value to those scientists who are mapping all or part of Wetherill Mesa are the aerial photographs prepared by the U.S. Coast and Geodetic Survey. One set of photos is in color, the other in infrared. These yield data that cannot be obtained from conventional aerial photographs.

Zoology. Entomology, or archeological entomology, is the first category under "Zoology." This work was initiated on the basis of two hypotheses: (1) that insects are sensitive climatically and that a detectable difference between the faunas of the archeological past and of the present is significant, and (2) that food-products pests may have contributed to the difficulty that the last aboriginal population of the area had in maintaining itself.

A number of species that lived in the past, particularly wood-boring insects, are the same as those in the area today. Most of the insect remains obtained from excavations are fragmentary. These fragments are obtained by washing down adobe-clay from Pueblo houses. Identification of these fragments is very difficult, and this difficulty is increased by the fact that the present entomology of the area is poorly known.

This brings to the fore one of the difficulties of cooperative or interdisciplinary studies. One of the participants may logically require information of another that cannot be furnished, not because of methodological or technical incapability, but simply because knowledge is lacking. A full entomological study of the Wetherill area is required, but this effort is beyond the capabilities of the project. Samuel A. Graham, University of Michigan, who did this entomological work, has recommended a full-scale past and present study. So far, attempts to initiate such a program have not been successful.

Identification of scats found in protected cliff dwellings was done by the late Olaus J. Murie. His identifications control the samples that are sent out for parasite identification, for geochemical determinations, and for diet and ethnobotanical study.

Excavated mammal and bird bones are obviously a part of the past of Mesa Verde, as food bones or as artifact materials used by the Indians, or as remnants of more recent intrusions of wild creatures. It is usually possible to separate the two. All bones are identified, and those that are part of the cultural leavings will be used by archeologists in interpreting past Indian life. A second use, also of great value, will be for the ecological interpretations which this knowledge of past faunas yield. Lyndon L. Hargrave and Thomas W. Mathews of the National Park Service's Southwest Archeological Center

are doing the identifications of bird and mammal remains, respectively. Hargrave also identifies feather and other avian remnants. Fragments of mammal debris, such as hair or hide, that require extensive comparative collections and laboratory facilities, are identified by the Federal Bureau of Investigation in Washington.

Modern animal ecology includes three phases, one of which is not modern except in that the distribution of present species will form a baseline for interpretation. Mentioned above are the basic data that can be derived concerning at least a part of the past mammal and bird life of the area from bones and other remains found in the ruins. Hargrave will compare past and present avian distributions, insofar as the collections will permit, and will interpret the results. The same will be done for the mammals by Charles L. Douglas. In the latter instance, the bone and fragment data will be somewhat increased by the identified scat collection.

The modern animal ecology research, which is being done by Douglas, consists of three major parts: (1) trapping small mammals (mice and voles primarily) and detailed examination of the mammals taken, (2) observations on larger forms with park population estimates, and (3) comparison of past and present species.

Trapping has been done at different altitudes, slopes, and in all of the major forms of vegetative cover, as recommended by the plant ecologist. Population densities and structures are being determined. As to the specimens themselves, research is concentrated on ectoparasites and endoparasites, skull and reproductive-system measurements, and stomach-content determinations. Slides have been made and photomicrographs taken of the plant epidermal patterns of the major vegetation areas at Mesa Verde. In this way the feeding habits of the trapped rodents can be most readily ascertained.

Botany. Plant-ecology researches are ordered in a similar manner. Actually the plant-ecology program was one of the first initiated, and it served as a model for the animal ecology program. It was originally intended to yield a modern baseline against which to project the information on ancient plant populations derived from cliff-dwelling excavations, and thus to make available some data on past environment through a knowledge of the plants living then. Another function of the ecologist was to identify the archeological plant remains. As in all the other studies, it was intended that the ecology should stand as a contribution in its own right.

As ecological studies and excavations progressed, it soon became apparent that James A. Erdman, ecologist, could not possibly cope with the thousands of plant specimens from the ruins, and at the same time carry on ecological studies and assist in the environmental measurement program. Other arrangements had to be made.

Erdinan's work now falls into three broad categories: (1) a descriptive treatise on the plant ecology of Wetherill Mesa; (2) preparation of a vegetation map of this mesa with the aid of vertical panchromatic, infrared, and color aerial photos; and (3) a statement on some of the ecosystem dynamics of Mesa Verde. Plant successions will be studied through the analysis of returning vegetation in burned areas.

The tree physiology-growth correlations have already been discussed above.

Agricultural plant studies depend upon identifications made in the field and laboratory and upon those made by the botanist. All fragments of cultivated plants (thus far these are maize, beans, squash, and bottle gourd) are sent to Hugh Cutler of the Missouri Botanical Garden. Cutler and his assistants are completing identifications and making interpretive studies of the agricultural plant remains in order to extract all possible data on the origin and kinds of agricultural plants and practices used by the Indians here.

Wild-plant identifications and archeological-ethnobotanical research are the responsibilities of Stanley L. Welsh of Brigham Young University. All plant materials, whether *in situ* in the ruins (lintels, wall pegs, and timbers) or fragments from the excavated fill are being identified. Although not insurmountable, one notable difficulty is the elimination of plant materials brought into the ruins by more recent mammal inhabitants, such as pack rats. Welsh is surveying pertinent modern ethnobotanies for comparative data on recent use of wild plants. This will enable him to interpret some aspects of prehistoric ethnobotany.

The mass of plant identifications will furnish data on the vegetal cover of the past and consequently will be of some value for climatic interpretation. Human and turkey scats have been washed down and fragments of plant materials from them sent to Welsh and his colleague, Glenn Moore, for identification and ultimate use in making statements about ancient diet. Quids, small wads of vegetation chewed by man, are being studied by Moore.

Summary. Reasonably successful development of this and other similar projects may be expected to have an almost revolutionary effect on the planning and prosecution of much of future archeology. I believe most anthropologists will agree that the study of prehistory offers tremendous opportunity for using the methods and content of many disciplines toward the solution of

anthropological problems. Several major programs in the United States and in Mexico reflect this interest and indicate the will to attack the numerous difficulties involved. Unfortunately both interest and will have been of longer standing in Europe than in the New World.

Thinking in terms of human geography is not new in anthropology. It is new when we put those thoughts into action in terms of large programs of what is sometimes unfortunately called environmental archeology. I suppose these did not *have* to await the availability of extensive funds, in an absolute sense, but this is certainly *the* controlling factor now.

Archeologists are in a uniquely favorable position to continue to take the lead in many-pronged attacks on problems of breadth and depth. An archeologist's training and interests will press him, at one time or another in his career, into problems that are not satisfactorily illuminable by archeological techniques. More and more, archeologists are responding with massive concerted attacks on such problems, as at Mesa Verde, at Tehuacan, in New Mexico and Texas, in Arizona, and in Idaho. I believe that no other cultural anthropologist will range as widely or delve as deeply, unless he is an ethnologist or social anthropologist who has a truly deep interest and insight into the basics of economics.

The archeologist, if he will view his anthropological core-interest as a core only, if he will view the past and present not as Past and Present, but as simply aspects of a continuum and, further, if he will view human and other life in the area of interest as a sort of superecology, then, indeed, he will find himself well-equipped intellectually for a powerful attack on his old problems. The new ones that arise and the contributions that such studies make to the content and method of other disciplines are all there, and they are overtime pay. They enhance the values and the stature of our own study.

It seems to me that, in our thinking, we should, we must, blur the divisions of many of the life and physical sciences and try to refocus them on social, historical, and humanistic problems. Thereby we can take a leading part in anthropological development and therein we can contribute importantly to teaching and to anthropological method and theory.

Not the least of the rewards in developing a program such as the one at Mesa Verde is the opportunity to work with scientists of diverse backgrounds and to see their interests flare as the overlapping in their individual fields of study becomes apparent.



geological and physiographic background

As with many arid areas of the world, the pre-Recent past of southwestern Colorado is written in bold strokes on the landscape. This prominence of its features offered, and still offers, strongly disparate choices to the men and women who made it their homeland. The value of an understanding of this land and its history to an understanding of the cultures it supported is thus obvious.

The following discussion is based primarily on the works of Hunt (1956) and Wanek (1959). Larsen and Cross (1956), Atwood and Mather (1932), Hunt and Sokoloff (1950), and Fenneman (1931) were consulted.

Mesa Verde lies in the extreme northeastern part of the Navajo section of the Colorado Plateau Physiographic Province, although the older work of Fenneman places it in the adjacent Canyon Lands section. The mesa itself is more properly called a *cuesta*. Its scarplike eroded front rises some 2,000 feet above the Montezuma Valley and the gently southwesterly sloping plain to the north, known as the Dolores Plateau. The great *cuesta* itself drops off to the south from some 8,600 feet at the northern rim to around 6,000 feet at the Colorado-New Mexico line. The relatively smooth surface of the great mass is dissected by generally north-south-trenching canyons, deep and cliff-sided, which have dissected the *cuesta* into similarly north-south-running *potreros*, locally called *mesas*. These vary from a mile or more to a few tens of yards in width. Their upland surfaces are forested or brushy with some open, grassy areas at the northern, higher parts, and are easily traversed. The surface is generally earthy with minimal stoniness; the percentage of bare ground is small in the higher, northerly parts of Mesa Verde but increases markedly as one goes south, to the Mancos River, as more shale is exposed.

North-south travel is a simple matter, either on the mesa fingers or *potreros* or along the canyon bottoms. East-west movement is entirely the opposite. The traversing of a single canyon, in the middle to southern parts of the mesa where these are well developed, is an effort. The canyons themselves, in the area of greatest aboriginal and present-day occupation on the mesa, vary upward from 600 feet deep. The sides are vertical with steeply sloped colluvial talus and terraces; it is often difficult to find breaks for descending from the mesa top.

Vegetation is characterized by a sameness throughout undisturbed parts of the mesa. Forest fires have left some scars. These break the monotony; their impact is especially strong on hot, dry days!

A discussion of either soils or vegetation, although pertinent, is not offered here, for neither is well understood now. Their detailed examination forms part of our program. Suffice it to say that the most prominent vegetal cover is the pygmy pinyon-juniper forest. This is weak or nonexistent in the northerly, higher and moist sections of the *cuesta*, where it either is not fully at home or has been burned off. To the south the forest masks the land so thoroughly that special techniques had to be evolved in order to accomplish the archeological survey of the Wetherill Mesa surface (Hayes and Osborne, 1961). The nonforested northerly sections are primarily brushy: Gambel oak, serviceberry, sage, and *fendlera* are the major components. Open grassed areas, perhaps over 50 percent of the whole cover, lend a semiparkland effect to the scene. Autumn colors paint this section liberally with reds and yellows, and it is host to numerous deer. Canyon vegetation is generally brushy in the bottoms, mostly sage; the talus slopes are usually forested with juniper-pinyon or the impenetrable oak. Soils are red, moderately heavy desert soils and lithosols. Local areas of gray and fairly humus-rich soils appear. The role played by red loess, probably from the southwestward, has not been pinned down; presumably it was a large one.

Climatically our region is semiarid; rainfall has averaged nearly 19 inches a year over a period of 40 years. A program of environmental measurements, now in operation and centered chiefly around temperature and rainfall variation in the different altitudes and geomorphic variants of the mesa, will enable us later to offer details

concerning the present climate and to discuss the importance of these factors to the aboriginal occupants. We can say, now, that Mesa Verde and adjacent regions to the northwest were especially favored by precipitation and by deep deposits of the red loess. These advantages promoted use of this land by agricultural Indians.

THE GEOLOGY

It is the Mesozoic (Cretaceous) and Cenozoic eras that have contributed primarily to the visible landscape in the area of our interest. A description of the geology of earlier times is far less pertinent; indeed, it is not well known and need not be dealt with at length here. Although Precambrian structures and rocks no doubt provide a basement for the superficial and to us more important formations, they are exposed in few places in the Colorado Plateau and are lacking completely in the Mesa Verde area. The older deposits appear to have been originally laid down in troughs of unknown size and trend. They have been metamorphosed anciently and thoroughly and injected by igneous material of a now similar nature so that all semblances, other than chemical, to the parent materials have been lost. Such Precambrian formations as do show are, then, schists, quartzites, gneisses, amphibolites, granites and granodiorites, gabbros and andesites. They represent a history of geologic and early life processes as long as all later time but the script is difficult indeed to read.

The lower Paleozoic, Cambrian through Devonian, was a time of stability. Mountains of the upper Precambrian, within the east-central part of the Colorado Plateau or nearby, were reduced, resulting in a peneplain surface of low altitude. Most of the plateau was essentially a shelf area without geosynclinal development. By a contrast, rocks of great thickness were deposited to the west (in the now Basin and Range Province), and rocks of lesser thickness were laid down in central Colorado to the northeast. Troughs or synclines thus surrounded the plateau in these directions, as is generally true of the province through Permian (middle through upper Paleozoic) time except that the Paradox Basin, or Valley, developed as a deep trough in the Pennsylvanian. This was part of a large system of northwesterly trending down-

warps which transgressed the Rocky Mountain System of that same period. Some 7,000 feet of marine deposits were laid down in the Paradox Basin, but later Paleozoic rock formations are generally thin elsewhere in the plateau. Formations of this same time are enormously deep to the west and again less so in the east. Again very long-term stability as a shelf is indicated. This extends generally throughout the Paleozoic with the single exception of the relatively minor Paradox downfold and transgression.

In some ways the Paleozoic stability of the plateau continued almost throughout the Mesozoic. Formations thicken from south to north and northwest and, as usual, become much thicker in the country immediately west of the province. The Triassic and Jurassic red beds and other nonmarine or terrestrial formations appear to terminate with the Morrison (McElmo) of Upper Jurassic. Extensive fossiliferous deposits in these are not characteristic of this area. During the Upper Cretaceous the plateau, again almost as a unit, seems to have gone beneath the sea, with a slight downward tilt to the northwest where deposits thicken. The highlands that furnished the sediments for the late Cretaceous formations, which form the major geologic phenomenon at Mesa Verde, lay west and south of the plateau.

UPPER CRETACEOUS SERIES

Mesa Verde is in reality a small corner or detached islet of an immense south-sloping (from the La Plata Mountains) to roughly level synclinal sheet of Cretaceous sedimentaries, sandstones, and shales that extends far south into northwestern New Mexico. There it expands to cover a sizable part of that quarter of the State. The Mesaverde group (Point Lookout sandstone, Menefee shale, and Cliff House sandstone) thins toward the north and northeast (basinward or seaward) and is younger, more recent, in its northern than in its southern parts. To the south (highland- or mountainward) it is capped by increasingly younger, though still Upper Cretaceous, sediments which were formed first in marine situations (Lewis shale, Pictured Cliffs sandstone), then fluviially (Fruitland formation, Kirtland shale), and then wholly or largely terrestrially (McDermott formation).

The small corner of this great mass which has been called Mesa Verde has been isolated and given its peculiar character by Cenozoic erosion. Montezuma Valley and the Dolores Plateau lie immediately to the north of the mesa, the latter underlain by Dakota sandstone which in turn underlies Mancos shale. The valley is drained to the west by McElmo Creek and is locally as much as 2,000 feet below the high, northern scarp of the mesa. This scarp continues around to the west and towers over the valley there between itself and the Ute Mountain (El Late) to the west.

The mesa is isolated from the remainder of the Upper Cretaceous mass on the south, southeast, and east by the deeply entrenched Mancos River. This old stream has had to lower its base level, keeping pace with the San Juan River, into which it empties. This, in turn, led to the marked downcutting that resulted in the long, fingerlike mesas and deep intervening canyons of the Mesa Verde. This kind of drainage is far more marked in the south-sloping Mesa Verde corner of the Upper Cretaceous sediments than it is elsewhere on them. Some of the canyons have cut their way so far headward (northward) that they have encountered the south-eroding scarp and notched this high northern rim of the mesa.

Thus the Mancos River, following an old and probably antecedent course and cutting off a small islet of south-sloping sediments, which was likewise isolated on the northern and western sides, set the stage for a highly intensified and peculiar form of physiographic development which, after some millions of years, was put to an intensified and unusual use by a group of sedentary Indians.

Alexander Wanek's (1959, pp. 675-76) two introductory paragraphs to his geology section should be quoted rather than paraphrased:

The exposed sedimentary rocks in the area are late [Upper] Cretaceous in age and are about 3,600 feet thick. The rocks consist of sandstone, siltstone, shale, and coal that were deposited in marine, brackish, or fresh water. Locally these rocks are intruded by small irregular igneous bodies and by dikes. The stratigraphic sequence is conformable from the Dakota sandstone, the oldest exposed formation, to the Cliff House sandstone, the youngest exposed unit. Locally the Cliff House sandstone is unconformably overlain by small bodies of cemented gravels. The mesa surface appears to be a part of a late [upper] Tertiary (?) pediment (Atwood and Mather, 1932, p. 91) that rises northeastward toward the La Plata Mountains. The close relationship of the mesa to the La Plata and San Juan Mountains is indicated by the gravel deposits and a scattering of well-worn pebbles which, from their composition, must have been derived from these areas of uplift.

The major structural features of the area resulted from the Laramide orogeny and subsequent folding

and tilting movements. Mesa Verde lies in a shallow southward-plunging synclinal fold that is marginal to the northwest part of the San Juan Basin. On the west the beds are inclined away from the bordering Sleeping Ute Mountain uplift; on the east they dip gently from the La Plata Mountains and Barker Dome, and to the north the beds dip away from the Dolores Plateau. The strata flatten in the southern part of the area, but southeast of the area the dips increase sharply along the hogback or structural rim of the basin.

There can be no doubt that there were many strata of a respectable thickness, perhaps over a mile of them, overlying the sediments that remain. These younger rocks, partly Upper Cretaceous but mostly lower Cenozoic, still overlie the Cliff House member in the Durango area east of Mesa Verde.

The Dakota sandstone underlies the area as a whole but is not seen in exposures within the Mesa Verde proper. North and west of it, especially in the McElmo Canyon, which is the type area, it is generally light in color but ranges to rusty-brown or gray. It is quartzose and has local shale lenses and coal seams, the latter in minor commercial quantity. There is great range in the lithological quality of the formation. Its origin is partly marine and partly lagoon or estuarine and beach. It is unconformable upon the Upper Jurassic Morrison and is assignable to both upper Lower and lower Upper Cretaceous.

Mancos shales and the Dakota sandstone on which they lie conformably often intergrade or exhibit transitional zones, where it may be difficult to separate the two satisfactorily. The Mancos shale varies locally from 1,200 to slightly over 2,000 feet thick. It is generally dark greenish-gray to black with extensive calcareous and gypsiferous inclusions. Several limestone and sandstone beds within it are fossiliferous. The shales are highly carbonaceous and unstable; in general they support or underlie talus slopes north of the park. Their origin is marine.

The base of the Mesaverde group intertongues extensively with the upper parts of the Mancos shale. This indicates an instability of the shoreline and of the depths at which the deposits were being made during the transition from deposition of shale to sandstone. The Mesa-verde group is made up of three formations: the lower marine Point Lookout sandstone; the Menefee shales, sandstone and coal measures; and finally the Cliff House sandstone. These all rise stratigraphically to the north and are younger, of more recent deposition, as one moves northward.

Point Lookout sandstone becomes markedly massive as it develops upward from the transitional zone between itself and Mancos shale. Colors range from cream to buff and red-brown; thickness ranges upward to 300

feet. The massive member is actually formed of a series of long overlapping lenses that thin northward. This documents the retreat of the Cretaceous sea in that direction as land to the southwest rose and the detritus from its eroding surfaces poured down to the northeast into the sea and formed the Mesaverde group. Fossils are rare in this formation.

Next, the Menefee formation lies conformably on the Point Lookout. It is a gray clay and carbonaceous shale with sandstone and coal measures. Like the other formation, it thins to the northeast. Thickness in our area varies over 300 feet; the commercial coal comes primarily from a bed in the lower third of the formation. The coal beds of the upper parts of the formation have been burned in a number of places along the Mancos River. Here the adjacent shales have been clinkered and the red and red-brown colors are striking. Fine pieces of this burned shale were valued as a material for personal ornaments by the ancient inhabitants. The formation is primarily nonmarine but has a few beds. It underlies most of the talus slopes within the park.

Cliff House sandstone is the uppermost member of the Mesaverde group and the ground surfaces of most of the mesa today. Its total thickness varies from 90 to 400 feet now but at one time was much greater. It is essentially a light to red-brown sandstone with some inclusions of sandy shale. The beds are massive locally. The interfingering of the shaly members and the sandstone suggests an oscillating shoreline which controlled the depositions of this predominantly marine formation. It is divisible into several units, which are fossiliferous in some places. These units also react differently to erosion and form benches and the alcoves or overhangs, locally called caves, which shelter the famed cliff dwellings.

An impervious shaly layer, about midway in Cliff House sandstone, not only has led to the development of the local cliff profile and of most of the caves but is the prime control over the development of springs and seeps. It is a geologic arrangement that has brought caves and ruins and water into proximity.

The extensive interfingering of the lower Cliff House with the Menefee bespeaks a southward transgression of the ocean and a rapid rise in the rate of erosion of the southern highlands.

A great loss of depth of Upper Cretaceous strata, due to later erosion, has been noted. This plus the southward tilt and the deposition of gravels are all general aspects of geologic processes which took place during the Tertiary. We shall trace the broader aspects of change for the region of our particular interest.

During the Upper Cretaceous, then, the plateau was a basin into which sediments from the south were carried. Our area was near the edge of shallow seas and was

low-lying land at this time. With the onset of the Cenozoic era the conditions were reversed, and uplift, igneous activity, and degradation began. In the Paleocene the Four Corners and Mesa Verde area lay south of the developing San Juan upwarping, which had started in Upper Cretaceous. Drainage from this highland led south and east, and presumably both removed Cretaceous sedimentaries and deposited volcanic detritus in the Mesa Verde area.

In Eocene time a downwarping of the north-central parts of the plateau established a huge basin, and eventually the great Green River Lake in Utah filled it. This led a large part of the drainage from the ancient San Juans to the west and probably initiated the present pattern although interior drainage then characterized the plateau. Oligocene and early Miocene times were not drastic in their changes. River courses and patterns of erosion changed, no doubt, as the center of the interior drainage in southern or south-central Utah shifted, but the broad outlines of westward drainage and local Four Corners' erosion continued.

Miocene time was one of volcanism, igneous intrusion, and upwarping throughout the plateau. The Ute Mountain appeared by middle Miocene and the La Plata-San Juan-San Miguel Mountains complex was well along in its development. The Mesa Verde area and its overall drainage pattern must have been evolving too. It probably alternated between periods of intense downcutting and of extensive deposition from the La Platas. During the upper Miocene to middle Pliocene the whole plateau rose and was tilted to the northeast. Volcanic activity was renewed and several small stocks were intruded into the Cretaceous sandstones during the Pliocene. Probably much of the downcutting in the mesa area occurred during this period of uplift. The Mancos formed its impressive canyon, and the headward cutting of the tributary canyons to the north gave the mesa its basic mesa and canyon pattern. No major changes appear to have taken place in the drainage pattern since then. Gravel deposits still remain in the southern parts of Mesa Verde from the middle Tertiary cycles of erosion. Pleistocene glaciation carved out the present character of the neighboring mountains. Some uplift occurred then and a cycle of canyon cutting impressed the present topography on the land. Erosion and canyon cutting are still proceeding, especially by the larger streams.

Pre-Wisconsin soils, apparently widespread in the west, occur in the Mesa Verde area. They stem from a moister time than present and indicate various modes of formation. Those in the mesa appear to have formed partly *in situ* and to have been masked later by a rich red loess, an excellent agricultural soil. Colluvial talus slopes, common in the area, have been little studied.



THE ARCHEOLOGICAL SURVEY OF
wetherill mesa

AN INVENTORY OF RESOURCES



purpose of the survey and methods of work

ALDEN C. HAYES

The objective of the archeological survey of Wetherill Mesa was to record the presence of all archeological manifestations in the area, to locate them as accurately as possible on a map, to describe each by means of field notes, sketches and photographs, and to make surface collections. Our work was a comprehensive survey. We recorded all prehistoric remains for which there was physical evidence on the surface of the ground.

An inventory of archeological resources of a given area is a prerequisite to any attempt to reconstruct that area's prehistory. A careful excavation of a single site will provide a wealth of detail concerning the cultural activity of that specific site; a survey will serve to relate that activity culturally and historically in time and space. Some form of site inventory has become part of standard practice in the archeological investigation of any new area. This has not always been true but as early as 1916 Kroeber (1916, p. 21) had this to say: "... five thousand sherds can tell us more than a hundred whole vessels, and the bare knowledge of the average size of a room in a dozen contiguous ruins may be more indicative than the most laborious survey of two or three extensive sites."

In 1951 Don Watson, then park archeologist, instituted an archeological survey of the entire park as a long-range program. To date, over a thousand sites have been recorded on Chapin Mesa, which has been covered to the park boundary by James A. Lancaster. The survey on

Wetherill, though stimulated by the requirements of the Wetherill Mesa Archeological Project, is a continuation of Lancaster's work on Chapin.

Plans for the future development of the park call for the excavation on Wetherill Mesa of a series of sites to be used as exhibits-in-place, illustrating to visitors the development of the prehistoric culture of the area from the beginnings of sedentary life until the final abandonment of the mesas by Puebloan people. By duplicating facilities already existing on Chapin Mesa it is hoped to serve better the ever-increasing public use of the park and, by a planned program of research, to increase our knowledge of the ancient life on the Mesa Verde and thus improve the interpretive program of the park.

The archeological survey plays a part in both the development and research aspects of the park plan. Survey is necessary to determine which sites, when exhibited, will best illustrate the various phases represented and, of course first, and if possible, what those phases are. The careful plotting of sites is required for the planning of necessary roads and trails in such a manner as to destroy as little as possible of the archeological and natural values which the park was established to preserve.

METHODS

The area covered by the survey included all of Wetherill Mesa from the escarpment on the north to the confluence of Horse and Navajo Canyons below the southern tip (maps 1 and 2). The eastern limits, from north to south, were the easternmost tributary to upper Long Canyon following the bottom of the watercourse, along the bottom of Long to its confluence with Navajo Canyon, and down Navajo to its juncture with Horse Canyon at the south end of the mesa. On the west the limits were the eastern tributary to East Fork of Rock Canyon into the main course of Rock and down the latter to its confluence with Horse Canyon and thence again

to Navajo. The area thus defined is $10\frac{1}{4}$ miles long with an average width of a bit less than a mile. The total area surveyed was 6,274 acres, or 9.8 sections, of which 4,696 acres are within the park boundary and 1,578 on the Ute Mountain Indian Reservation.

Like most arbitrary boundaries, that surrounding the park was laid out in relation to the stars with no regard to the shape of the earth on which it lay. The archeological survey attempted to encompass a geographic unit rather than a political one. Two parts of the mesa are on Indian lands: a short section immediately south of Rock Springs where the mesa is a narrow hogback, and the southern tip which runs 2 miles below the south boundary of the park.

In addition to sites within the area described, several cliff dwellings on the west side of Long Mesa and on the east bluffs of Wildhorse Mesa were surveyed, areas adjacent to our self-imposed limits. Also a week's reconnaissance was made on that part of Wildhorse Mesa that lies in the park's extreme southwest corner. The sites recorded outside the survey's limits described above are not considered in plotting site distribution.

A "site," as used here, is any place showing some evidence of aboriginal activity. The sites include habitations of any kind, isolated kivas and towers, shrines, firepits, sherd areas, reservoirs, check dams, pictographs, storage structures. Also included were a few historic campsites and hogans.

The Wetherill site survey was accomplished in 13 months of fieldwork during 1958-60. In the autumn of 1958 I worked alone in the relatively open, burned-over area at the north end of the mesa and recorded 116 sites. From April through October 1959 I surveyed the cliffs and canyons surrounding the mesa and was assisted during most of this time by five capable men: F. Jerome Melbye as foreman, John W. Wade, Curtis Schaafsma, Christopher Hulse, and Loren Haury. The party was usually

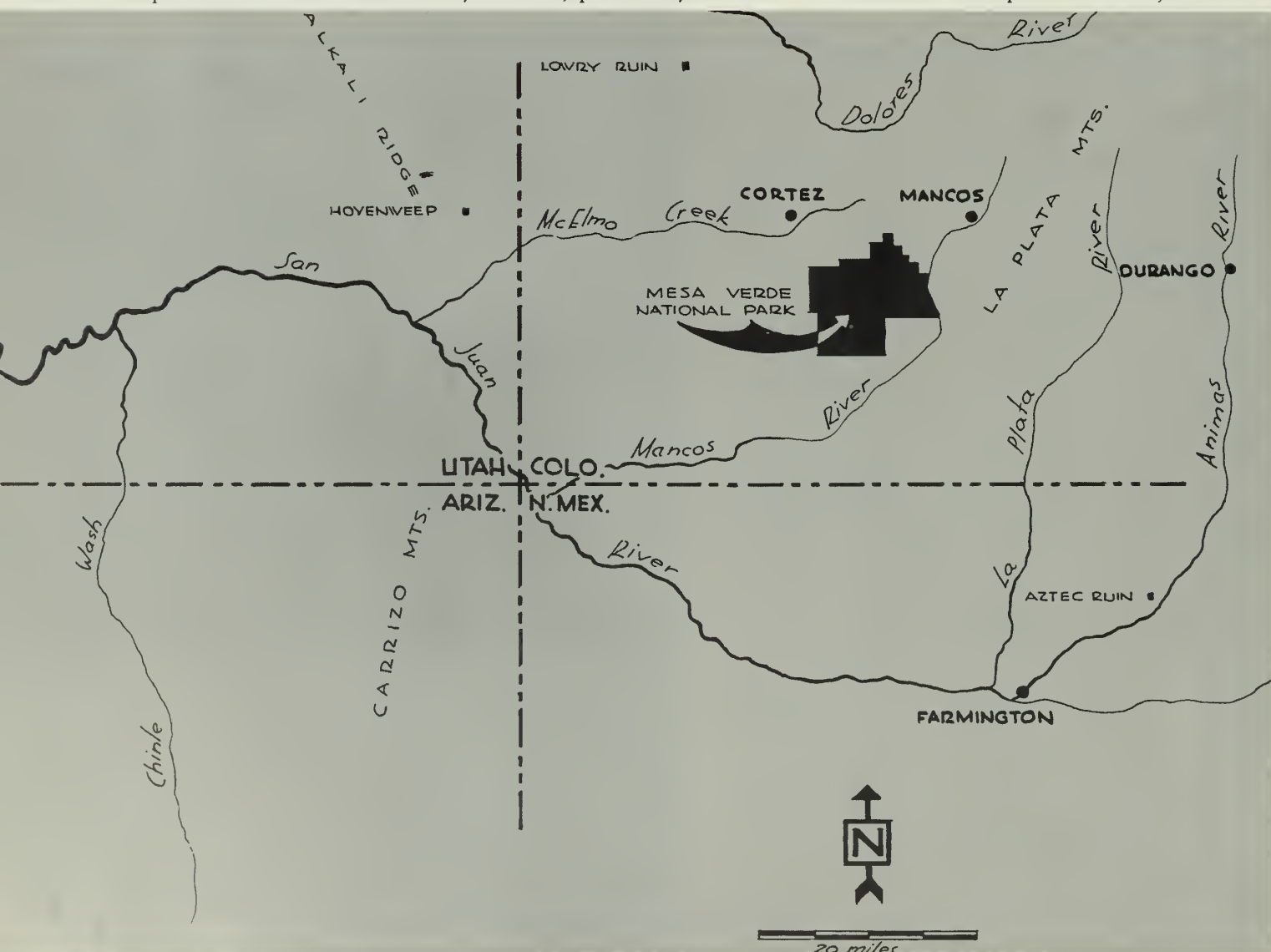
divided into two groups, each led by either Melbye or myself. One group would work along the top, the other along the bottom, of the upper cliff. Small ledges between were examined by whichever party had the more feasible route (figs. 1, 2, 3). After a section of cliff $\frac{1}{4}$ -to $\frac{1}{2}$ -mile long had been covered, the entire party reversed itself and backtracked along the lower bluff below. The talus slope from the base of the lower cliff to the canyon bottom was then swept by the men in line at approximate 50-foot intervals. Most sections of canyon thus required four passes from cliff top to canyon bottom.

When a site was found, the crew, or a section of the crew, assembled on it and each performed a specific function. In this way the time spent at a site was cut to the minimum, and maximum control was exercised.

The U.S. Geological Survey topographic map of the park was found to be reasonably accurate, particularly

as to cliff and canyon relationships, and site location was possible by means of hand-sighting with a Brunton compass to identifiable geographic features or cliff houses along both sides of the canyon. Field notes and sketches were made in an engineer's transit book. Sherds were collected in muslin bags equipped with drawstrings and cloth tags, which withstood handling and weather much better than the conventional paper sack. For photographs we used a $2\frac{1}{4}$ -by- $2\frac{1}{4}$ camera, which gave a negative identifiable without enlargement and was still light, easily portable, and, with its built-in exposure meter, speedy. On return to camp the data from notebooks were transcribed to a standard 8-by-11-inch field sheet while they were still warm.

In addition to collections of sherds, samples of stone chipping waste were picked up as well as all artifacts on the surface with the exception of metates, which were



MAP ONE—Mesa Verde National Park, containing 52,074 acres, is located within the Four Corners region of the Southwest. Established in 1906 to preserve thousands of structures and other remains which prehistoric Pueblo Indians left on the mesas and in the caves of a score of rugged canyons, it today attracts thousands of visitors annually.



MAP TWO
MESA VERDE NATIONAL PARK

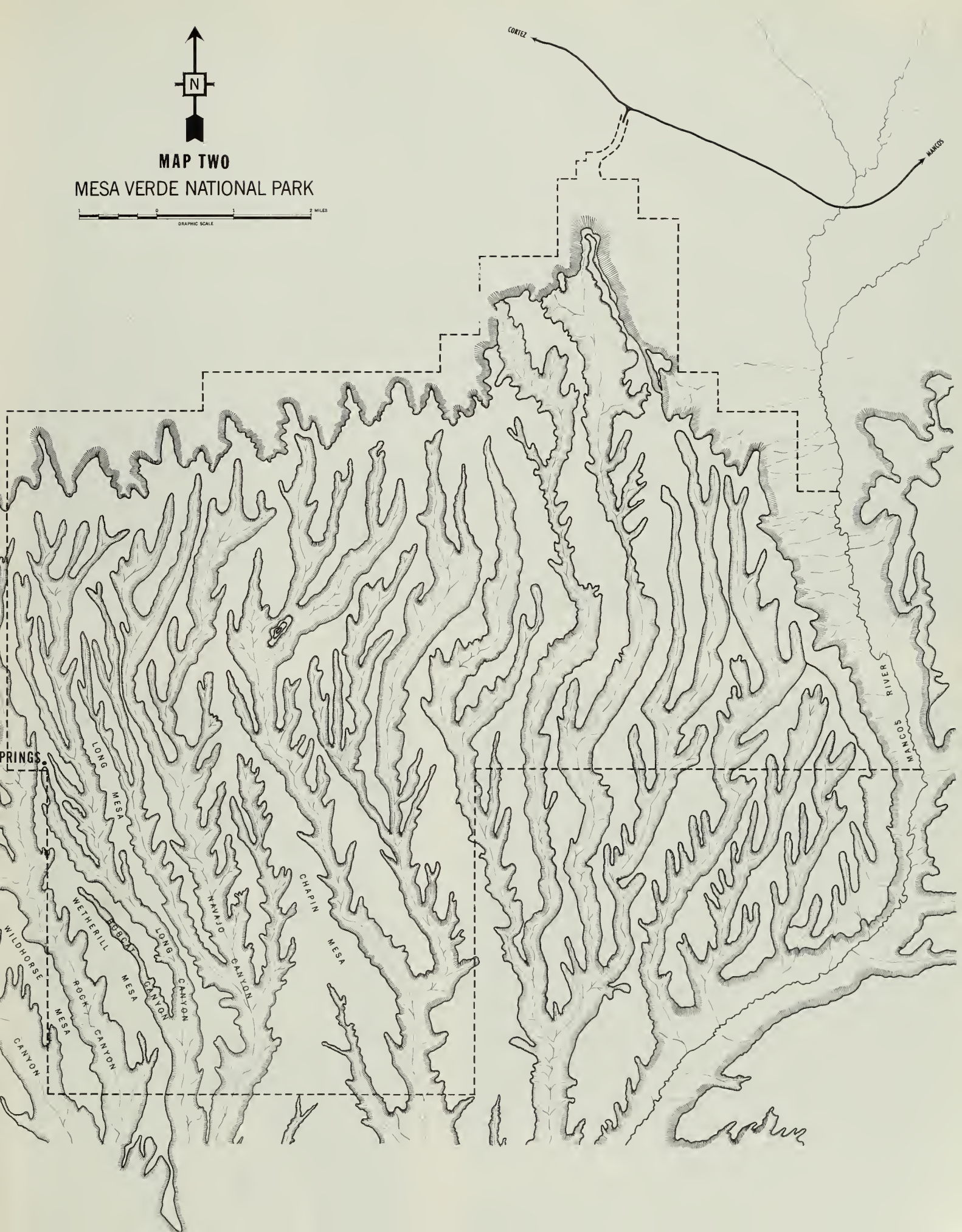




Figure 1—Reaching small cave by old toe-and hand-holds and belay rope. Site 1350.



Figure 2—Survey party member, on steel rope ladder, prepares to explore small cliff ruin. Site 1709.

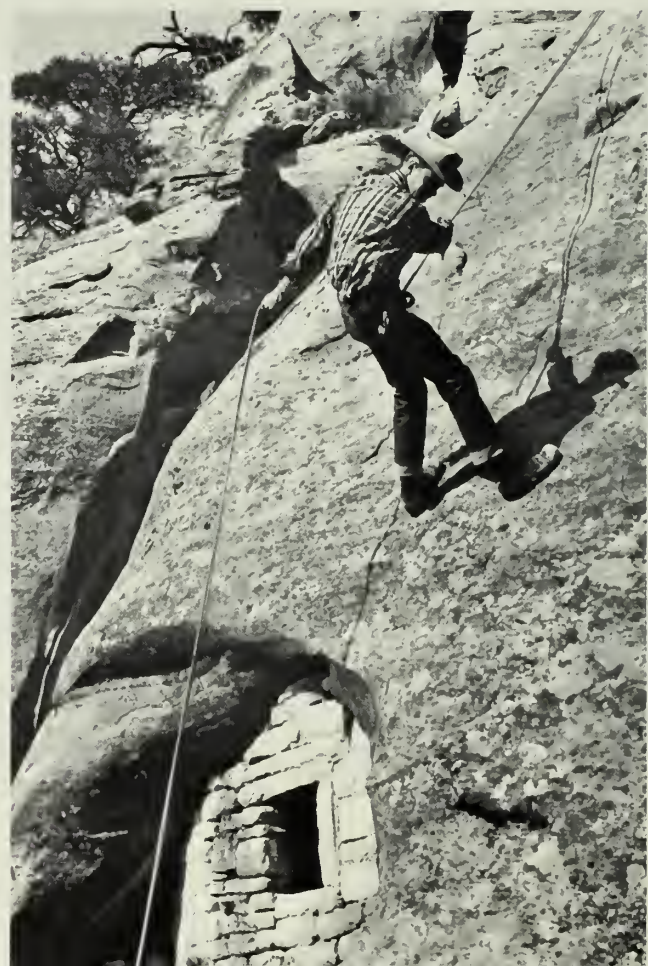


Figure 3—Entering Site 1246 on rappel from top of cliff.

noted. Twenty-three dendrochronological specimens were secured from many of the sheltered sites, as well as numerous fragmentary examples of textiles and cordage and 30 wooden objects. Stone tools brought in included 60 projectile points or knives notched for hafting, and 37 grooved axes or hammers. From the surface 42 whole or restorable pottery vessels were collected.

Bird and mammal bones were sent to the Southwest Archeological Center at Globe, Ariz., for identification by Lyndon L. Hargrave and Thomas W. Mathews. Corn cobs, cucurbit-rind fragments, and beans went to Dr. Hugh Cutler at the Missouri Botanical Garden for study. Species identification of plant remains, other than domestic, was made by Stanley L. Welsh of Brigham Young University.

During the early spring of 1960, before the snow was gone on the higher, northern sections of the mesa, Melbye and I worked the country on the reservation at the southern tip of the mesa. This was reached by way of the mouth of the Mancos River and up Navajo Canyon by jeep road to the mouth of Horse Canyon, where a temporary camp was made.

By the time the project camp was open early in May we were ready to work the heavily wooded mesa top. Our system had to be altered to fit the different terrain. Traversing the flat ground and finding a site was no problem, but accurate location of the site was another matter. Visibility through the woods is frequently limited to 50–100 feet, and on central parts of the mesa the ground itself is relatively featureless. To avoid the inaccuracies and great consumption of time inherent in estimating distances by pacing and by making a series of offset Brunton shots, a system of location by radio direction finder was devised. This involved the use of two low-power, tripod-mounted, portable transmitters placed over known points (fig. 4), and a small receiver which was carried to the site to be surveyed. Mounted on a compass rose and oriented to true north with the Brunton, the receiver was then tuned to each transmitter in turn and the two azimuths plotted. The radio direction finder made it possible to locate sites with reasonable accuracy and saved many man-months of labor (Hayes and Osborne, 1961).

The ground was covered by a "line of skirmishers" with intervals of about 50 feet between men. The man at one end followed a recognizable feature, such as the crest of a small ridge or the course of a shallow draw, and the others guided on him. On reaching the edge of the mesa or the particular spot to be covered, the entire line would wheel, reverse direction with the outside man on the first sweep following close to his own tracks and becoming the guide. Work in the dense brush required some degree

of woodsmanship on the part of the crew members. Keeping orientation and interval while at the same time looking for archeological debris on the ground allowed no time for daydreaming. A crew of only four men was used. Contact and control was too difficult with a larger group. Crew members in 1960 were Melbye as foreman and Wade with experience from the first season, H. Anthony Ruckel, Virgil Higgins, and Billy D. Watson.

After completing the survey of Wetherill Mesa in late August 1960, we camped for a week in mid-September on Wildhorse Mesa, making a reconnaissance and recording a few sites. A total of 800 sites were surveyed including those in areas adjacent to Wetherill. Despite efforts to tabulate completely all sites showing any surface remains, possibly not more than 80 percent of the discernible sites have been recorded to date. In fact, since "completion," six more were found during the summer of 1961 on ground considered to have been thoroughly covered. Although the files must remain open for additions, the 806 surveyed sites offer far more than a random sample.

Sherds were studied twice in the laboratory. First, collections from each site were examined and typed. All sherds were then separated and studied by type or ware; i.e. all Mancos Black-on-white sherds were studied as a unit. Information on the site survey forms was transferred to 3-by-5-inch punch cards for easy analysis. Thus we could quickly determine, for example, how many and which sites in the cliffs had double-coursed masonry or what Pueblo I sites were situated on the talus slopes.

Figure 4—Transmitter and radio direction finder.



terrain

The physiography of the area is covered by Osborne in the prologue. Briefly restated here, the Mesa Verde is a large uplift of sandstone and shales with a tilt to the southeast from a 2,000-foot scarp at the north. Erosion into the Mancos River, which cuts through the raised sedimentary rock, has formed numerous long canyons which cut headward to the north and leave almost equally narrow potrereros or fingers of mesa between them.

Wetherill Mesa, at the west side of the plateau, is a relatively insignificant landform throughout the northern half of its length. It is little more than a narrow hog-back from the northern scarp to Mug House, averaging about a quarter-mile wide. In this section there is little level ground except in small patches on the ridgetop and at the confluence of small tributaries in the canyon bottoms. Cliffs are shallow at the heads of the canyons and are often cut into numerous stepped ledges; in some places they are covered by soil or worn down altogether. As we move south the canyons rapidly attain a depth of some 600 feet and maintain about the same drop to the southern end of the mesa. Where they have a respectable depth, two cliff faces are exposed with a short talus between them (fig. 5). Cover, for a mile or less south of the rim, consists of scattered stands of Gambel oak and serviceberry. The pinyon-juniper forest begins at about the 7,900-foot contour and increases in density and vigor southward. A fire in 1934 removed this forest cover from a point just north of Rock Springs to the scarp, and it has been replaced only by shrubby stands of serviceberry, fendlera, and rabbitbrush (fig. 6). A few struggling seedlings of pinyon indicate that regeneration with-

out the proper nurse crop is slow. Soils in this area are mostly shallow and somewhat stony. Deeper brown loam occurs in such spots as gentle swales at the heads of drainages on the mesa or short benches below the cliffs in the upper reaches of the canyons.

South of the vicinity of Mug House, at an elevation of about 7,200 feet, the mesa widens to a maximum of 1 mile; the country from this point south to the mouth of Bobcat Canyon is of a different character. Here the mesa is relatively flat and is covered with a red loess soil several feet deep near the center of the mesa. This soil decreases in depth at the edges of the cliffs where short ledges of bare sandstone are frequently exposed.

The cover on the mesa top is a pinyon-and-juniper forest with pinyon slightly dominant at the upper end of the area but giving way to a preponderance of juniper at an approximate elevation of 7,000 feet (fig. 7). The understory is predominantly low-growing bitterbrush and bunch grasses. The forest is unrelieved except by a long, narrow sagebrush glade in the drainage leading into Bobcat Canyon. Below the glade in the upper end of Bobcat Canyon is a small relict stand of ponderosa pine.

The cliffs along this broader section of the mesa are sheer and deep, running from 50 to 100 feet in height with an average of about 65 feet. They are notched at intervals by rincons, indentations caused by small, ephemeral drainages off the mesa. The spot where water goes over the cliff is usually a broad area of exposed sandstone locally called a "pouroff." Two members of the Cliff House sandstone are exposed along the canyon walls, divided by a stratum of gray to black shale and a short talus slope. The lower cliff is usually shallower than the upper and composed of softer, more friable rock.

The two canyons bounding the mesa are slightly different in character. Rock Canyon to the west, due to the northwest-southeast run of the terrain, has more southern exposure on its left bank. Vegetation is open

Wetherill Mesa, looking south.





Figure 5—Looking south down Rock Canyon; Wetherill Mesa, left, Wildhorse Mesa, right.

Figure 6—Burn area of 1934. West Fork of Long Canyon in left center, Site 1173 in foreground.



juniper and pinyon. This canyon is rather broad, and the talus below the lower cliff often bears relatively level benches or terraces. The bottom itself is frequently punctuated with small flat areas of deep alluvial soil covered with tall, dense stands of big sage. Long Canyon, to the east of the mesa, is narrower; north of the mouth of Bobcat Canyon, to the east of the mesa, the talus is steep. With its more northerly exposure and consequent lower evaporation rate, the right bank supports numerous thick stands of brush, primarily serviceberry and oak. The heads of many of the rincons, facing north, support small stands of Douglas-fir.

Below 7,000 feet and south of the vicinity of Double House the mesa again becomes narrower, the soil shallower and more calcareous. Extensive areas of bare sandstone are exposed, and the vegetation is more open with some increase in brushy species. Pricklypear and Mormon tea are more in evidence. The character of the cliffs remains unchanged but the talus on both sides of the mesa is benched and bears a cover primarily of bitterbrush. The mesa makes a slight turn to the south allowing winter sunshine to reach slopes on both sides of the mesa. Snow does not cling long in this region, and the browse affords a favored winter range for the mesa's deer population.

For the last mile the mesa is a very narrow ridge cut by three volcanic dikes whose eroded channels provide an easy route past the cliffs. The southernmost of the dikes intersects a domelike "blowout," perhaps an exposed laccolith, of blue-gray rock which was used extensively by the Indians as flake material and for axes and hammerstones.

Permanent water sources are few. Eleven springs now produce water for part of the year. Of these, the strongest is in the bottom of Rock Canyon where the watercourse has cut through a sandstone member of the Menefee shale forming a pouroff in the canyon bottom. Below the drop a year-round spring produces water which trickles and stands in pools for 200 feet downstream, producing a small oasis of willow, cattail, and carrizo (*Phragmites*). That this spring has long been important is indicated by the concentration of ruins on the talus to the east and in the cliffs on both sides of the canyon.

Bobcat Canyon has two such drops over sandstone ledges, each with a spring which produces live water throughout most of the year. One is at the head of the canyon at the south end of the long sagebrush glade; the second is under a deeper pouroff about a quarter-mile north of Double House.

Rock Springs is the only spring used in recent years. It was a favored campsite for mustangers, cowboys, and early explorers. The National Park Service has built a small cabin there for the use of ranger patrols and smoke-

chasers. It is perhaps not as strong a supply of water as the others mentioned but its location on the mesa top makes it more useful.

The West Fork of Long Canyon also has two canyon-bottom ledges with periodic springs. The northernmost is 300 feet upstream from Site 1221, a canyon-bottom cliff dwelling. About 650 feet below Site 1218, another large cave site in the bottom of the canyon, there is a weaker spring or seep with a series of water-catching potholes in exposed rock in the channel just above it.

Two fairly constant water sources occur at the base of the upper cliff, forced out by the thin shale member of the Cliff House sandstone. One of these is at the rear of Long House cave, the other at the foot of the cliff below Site 1321. No water now appears on the surface at the latter site but the present tangle of carrizo and poison-ivy makes it almost certain that the removal of vegetation and the digging of a small reservoir would cause water to collect.

Three springs are on the talus, all on the west side of the mesa. Below Kodak House (Site 1212) in the decomposed shale of the short slope between the two cliffs is a constantly muddy spot and a growth of carrizo. A pocket dug into the mud will rapidly produce a small pool of water. A seasonal spring is in the lower talus slope only a short distance above the bottom of Rock Canyon in the watercourse of the draw below Jug House (Site 1233). In a location similar to that of the Kodak House spring but in the lower talus about 75 feet above the bottom of Horse Canyon is another spring, which goes dry in midsummer. It lies about halfway between the mouth of Rock Canyon and the confluence of Horse and Navajo Canyons and is the only water at the southern end of the mesa. It has been developed by the Utes to provide water for stock.

In addition to these fairly regular sources there are many spots at the foot of the upper bluff, at the juncture of sandstone and shale, where roots of brickellbush or serviceberry clinging to the rock along or into the seam indicate the presence of additional moisture. These places would probably produce surface water with only very little increase in the presently available moisture or if the earth were cleaned out and a rock catchment basin provided. One such point is in a shallow rock shelter 130 feet north of Site 1320; another is a small rincón 200 feet north of Site 1350. At the latter spot much moss and the fragment of a corrugated jar suggest a watering place. Just short of the southern tip of the long ridge between Bobcat Canyon and Long Canyon a "dry seep" occurs at each side of the mesa. Here the ridge is only 360 feet wide. The eastern of the two, on the Long Canyon side at Site 1362, is marked by a healthy cottonwood, a rarity on Wetherill Mesa, which

grows with its roots in the rock of the cliff face. It is probable that, with considerably more human activity on the mesa and consequent reduced brush cover, more seeps and stronger springs were present in the 1200's. It is certain that the removal of phreatophytes from the immediate vicinity of a seep will, from reduced transpiration, increase the water yield (Hack, 1942, p. 13; Gregory, 1916, p. 129).

Other transitory watering places were supplied by the numerous small potholes in the sandstone on the mesa's edge and in the exposed rock in watercourses. Those in the West Fork of Long Canyon have been mentioned. Other outstanding examples occur in the bottom of Rock Springs Canyon near the juncture of its two forks, and at the pouroff above Kodak House.

The face of the north scarp at the head of Wetherill Mesa is marked by a ridge, Long Spur, which projects a mile into the Montezuma Valley (fig. 8, p. 32). Its steep slopes at the higher elevations bear a cover of pinyon and juniper with small stands of Douglas-fir. The shaly expanses lower down are mostly bare of vegetation. Because of the southward tilt of the strata no water can percolate to the north face, and no springs or seeps are present. The only known archeological site along the entire stretch of the north scarp of Mesa Verde is a one-room cliff house (Site 1222) at the base of Long Spur on its east side. There is no trash below it and so appears to have been little used. It must have been a 1½-mile walk and a 450-foot climb to water. (Since this writing another cliff house was located).

Figure 7—Typical forest cover. House rubble of Site 1569.





previous archeological work on wetherill mesa

The history of archeological investigations in the Mesa Verde area has been amply covered by Brew (1946) and brought up to date or synopsized by O'Bryan (1950), Watson (1954), and Reed (1958). An account of subsequent investigations can be summarized briefly. In 1953-55 Robert Lister, with a crew of students from the University of Colorado, excavated Sites 499, 866, and 875 on Chapin Mesa in the vicinity of Far View House. The forthcoming publication on these excavations will add to our knowledge of the

Pueblo II-III mesa-top communities. Joe Ben Wheat of the University of Colorado Museum has worked for several seasons in a series of small sites with a long time span near the head of Yellow Jacket Canyon, about 15 miles north of Cortez, Colo. Results of this work, which still continues, have not yet been published. Salvage archeology, consisting of survey and several small excavations, was done along a pipeline from the Dolores River to the San Juan and through the Montezuma Valley by Albert Mohr and Laetitia Sample in 1956-60. A report of the work should be of great value but, as in many salvage operations, funds for fieldwork were not followed by sufficient money for analysis and report.

Within the park several small excavations have been made on Chapin Mesa in the past 10 years. In 1955 Ralph Luebber, Laurence Herold, and Arthur H. Rohn (1960) excavated an unusual Pueblo III masonry complex near Sun Temple. During the summers of 1957

John Wetherill,
1891

and 1958 Luebben, Rohn, and Dale Givens (1961) excavated another Pueblo III structure near Cedar Tree Tower. Also in 1958 Rohn made a partial excavation of a Pueblo I pithouse and storage structure near Far View House. During the construction of a new pipeline east of park headquarters in 1959 two pithouses were discovered; both were excavated by James A. Lancaster (Hayes and Lancaster, 1962).

Until the commencement of the Wetherill Mesa Project in 1958, archeological investigations in the park have been confined almost wholly to Chapin Mesa, the largest of the flat-topped tongues of land, but since the early days of exploration it has been known that on Wetherill Mesa, between 2 and 3 miles to the west, existed the second most spectacular concentration of cliff dwellings within the park boundaries.

The first large herds of cattle were trailed into the Mancos Valley in the autumn of 1876 (Freeman, 1958). The wide-ranging longhorns, with cowboys not far behind

them, probably wasted little time investigating their new country. It is very possible that some incurious rider had glimpsed most of the large ruins of the mesa before that stormy December day in 1888 when Richard Wetherill and his brother-in-law, Charles Mason, got their first view of Cliff Palace. For example, Bill Hayes, a cattleman and later justice of the peace, came to Mancos with those first cattle drives and left his name along with that of S. E. Osborne, a prospector, neatly carved on a doorsill in Hemenway House in Soda Canyon (which they called Bear Canyon) and dated the inscription "March 20, '84." Nevertheless, it was unquestionably the enthusiasm of the Wetherills which resulted in making the presence of the impressive ruins known to the rest of the world.

After their first cursory exploration in Cliff Palace and their subsequent discovery of Spruce Tree House and Square Tower House, Wetherill and Mason returned to their cow camp in Mancos Canyon where they en-



Figure 8—North Scarp of Wetherill Mesa with Long Spur to right.

countered Charles McLoyd, Howard Graham, and Levi Patrick camped nearby. Their tales whetted the interest of the others who, along with more Wetherills—John, Alfred, Clayton, and Wynn—shortly rode back up Soda Canyon and spent much of the winter investigating the large ruins of Chapin Mesa. The deep sheltered canyons of the Mesa Verde were winter pasture and it was while looking after cattle during the stormy months that a cowboy had time to look for “relics.” Summer took him back to the hayfields and to summer feed in the La Platas. During the fall of 1889, the men continued their explorations in Johnson Canyon, a tributary to the Mancos from the east side (McNitt, 1957).

Some of the party apparently split off from the main body and worked back up onto the Mesa Verde again, this time farther to the west, for carved on the cliff face in a precariously situated cliff dwelling at the tip of Long Mesa (Site 1709) is the record: L. C. Patrick The C. W. is certainly Clayton Wetherill. C. W. Only a half-mile up Long Canyon from 8-18-89 this spot, in Site 1445, also on Long Mesa, the two names appear again, this time without a date: here as “L. C. PATRICK” carved into the rock and “C. WETHERILL” written in longhand with charcoal. Since these two are the only sites in which the two names appear together, it seems probable they were made on the same excursion. Only a couple of hundred yards still further up Long Canyon from Site 1445 the men would have been able to see the impressive span of Double House; it is quite possible that they did and that they entered it. At any rate Clayton was able to report that there were fine prospects two canyons west of the mesa of their first winter’s work, and it may have been this report that spurred an expedition to Wetherill Mesa in the early months of 1890. Clayton, John, and Richard Wetherill were members of this party; perhaps there were others.

Clayton was more obliging with complete dates than were his brothers. On a doorsill high in the upper level of Ruin 11 (Site 1325) in Rock Canyon he left “3-10-90 Clayton W,” the earliest known date we have on the Wetherill Mesa since the 13th century. In the same ruin on a cliff wall someone, in more erudite vein, had carved “W MDCCCXC.” The commemoration “Wetherill 1890” also appears in Ruins 12 and 13, in Ruin 11½, Site 1370, and in Mug House. Mug House and Long House were both christened on this trip, the former because of the fine haul of those typical Mesa Verde vessels from there (Nordenskiöld, 1893). Ruin 16 was visited that season as Nordenskiöld recounts the Wetherills’ finding a mummy there. We know that a return was made the following year from the charcoal-

scrawled “John & Clate Wetherill, 3rd 9 1891” in the upper cave at the west end of Long House. It is likely that all the major ruins on Wetherill Mesa were worked over during the winters of 1890 and 1891.

In 1891, in the tradition of Maximilian von Wied and many lesser European scholars of the period, Gustav Nordenskiöld of Sweden made a western trip and, hearing of the Wetherills’ discoveries, came to Mancos to see for himself. After a trip to Chapin Mesa via the Mancos River and Navajo Canyon, he was so intrigued by what he saw that he altered his plans and decided to spend the summer in more thorough investigation. He engaged John Wetherill as guide and foreman, hired two Mexican laborers, and packed in to Wetherill Mesa over a new trail only recently shown to the Wetherills by a friendly Ute. This route, though more difficult than the longer trail first used, climbed up the north scarp near its eastern end and followed the rim to the west. Wetherill Mesa, named by the 23-year-old scientist for John and his brothers, was chosen for his first work because his guide advised him it had been pawed over less than other areas on the tableland.

First camp was made at Rock Springs, and work was started at Long House with the intention of making a fairly complete excavation. After a month with rather disappointing results, Nordenskiöld prospected at Ruin 16, around the corner to the northwest, then moved down the mesa for another try. The second camp location (Site 1834), still distinguishable by the remains of a firepit, cut poles, and a few sardine cans of the soldered-bottom type, was on the rim of Rock Canyon just south of Kodak House, so dubbed by Nordenskiöld after their practice of caching a camera in one of the rooms. The canyon in front of him he called Mountain Sheep Canyon because of a bighorn sighted there. The name did not stick although bighorns are more numerous there today than they were then. John told him their one sheep was the first he had seen in 6 years.

Work was carried on simultaneously at Kodak House, Ruins 11, 12, and 13, with more encouraging results. Ruin 11, plastered precariously high on a cliff of soft, scaling sandstone, was difficult to enter. After the first ascent by toehold and fingernail, they braced a beam through a doorway, weighted the inner end with building stones, and from then on entered and descended by a rope from the outer, overhanging end. The same beam was very useful to the later survey crew of 1959. Although the digging was better here than at Long House, it still was not enough. Furthermore, water had to be packed 200 feet out of the canyon and over two cliffs from a muddy seep in the shale on the talus below. So camp was moved again after 2 weeks.

Nordenskiöld wanted a virgin ruin, but the Wetherills apparently had left none. He was not convinced that it was necessary, however, and as his guides had had good luck at Mug House he set up his third camp on the ridgetop halfway between Mug House and Step House. The latter had not been worked but seemed rather unpromising. Water could be packed by horse from Rock Springs to the new camp, which had a more central location than the old one at the springs. This campsite, too, is discernible by the old cut stumps and a few glass sherds.

Nordenskiöld was correct in assuming that Mug House would be a good prospect, as recent excavation there has proven, but he did not stay long enough to become aware of its potential because he had meanwhile discovered a very rewarding site in Step House. Here the remains of the pueblo produced little, but the refuse at the rear of the cave yielded eight burials. Digging into the area where pithouses were found 35 years later, but not recognizing a structure, he found a bowl and an effigy jar "of unusual type," so different from the ordinary run of pottery that he wondered if they might have been made by progenitors of the builders of large cliff houses.

While work was in progress in Step House, Nordenskiöld also dug in Spring House across Long Canyon (which he called Spring House Canyon) and prowled around Double House, then known only as "Ruin 14," a number he had assigned. At Double House the difficult entry to the south end of the upper level of the cave was made when Clayton Wetherill threw a saddle rope across the two small projecting poles of juniper and climbed the rope. The same poles served the recent survey crew.

Clayton must have been an agile young man. The small ruin on the south tip of Long Mesa, Site 1709, where his initials appear with Patrick's name, was approached by the survey crew with high hopes. The only feasible access, down a 30-foot chimney over an additional 30 feet of cliff, aroused our hopes that we had not been preceded in recent centuries. Our equipment included a 30-foot steel wire ladder that is not usually part of a cowboy's equipment and certainly made entry safer if not easier. Finding Clate's initials was a disappointment.

After 2 weeks in and around Step House, Nordenskiöld and his crew moved camp over to Chapin Mesa to investigate undug sections of the large ruins there. While on Wetherill, Nordenskiöld made the first survey in which he numbered and described 12 cliff ruins and located them on a map. Eleven of these lie within the area covered by the present survey. Several, Ruins 11, 12, 13, 16, and 18, are still known by the numbers assigned to them in 1891. Nordenskiöld published, with enviable speed, his *Cliff Dwellers of the Mesa Verde* (1893), which to this date is the only scientific account of Wether-

ill Mesa archeology. In it he presented good house plans, excellent photographs of artifacts and structures, and some remarkably apt speculations. He suggested the purpose of the kiva ventilator shaft, recognized Basketmaker pottery as different from that typical of the cliff dwellings, and suggested its earlier place in a cultural sequence. He also described the masonry check dams and their probable place in native agriculture.

J. Walter Fewkes, who worked for many years excavating and stabilizing ruins on Chapin Mesa, did no work west of Long Mesa, where he excavated Daniel's House in 1915, thus clearing out what was probably the last remaining "virgin" cliff house of any size on the Mesa Verde. That he had visited Wetherill Mesa ruins is fairly certain, as one of his reports to the Secretary of the Smithsonian Institution recommended the excavation of Step House and its public presentation because of its interesting two-phase occupation (Fewkes, 1922, p. 71).

The U.S. Geological Survey made a topographical survey of the Mesa Verde in 1910-11, noting the location of 54 cliff dwellings and "Pueblo Type" ruins within the area of our survey. Double House and a diffuse site in the head of Long Canyon (Site 1193) are indicated by the surveyors with three symbols each. In one instance a symbol for a cliff dwelling was placed at a cave in the rincón immediately north of Step House where no archeological site exists. Adjustment of these discrepancies leaves a total of 49 recorded sites, 11 of which were ruins already surveyed by Nordenskiöld.

In order to learn more of the earlier occupants of the country and to add specimens to the scant collections of the museum, Jesse L. Nusbaum, then park superintendent, did some excavation in Step House cave in 1926. Three Basketmaker III pithouses were excavated at the south end of the cave. A manuscript recording this work awaits publication. The same party returned to Wetherill Mesa in the winter of 1928-29, again primarily to augment museum collections. During this season they dug in Long House and Mug House, in Ruins 12, 16, and 11½, the last so named at this time because it lay between Nordenskiöld's Ruins 11 and 12. Field notes by Marshall Finnan recording the excavation of a kiva in Ruin 11½ are the only available records of the season's work (Museum Files, MVNP). That same winter Nusbaum did some extensive trenching in Site 1291, a large cave south of Step House containing several feet of recent alluvial deposit.

A forest fire in July 1934 burned for days and, before it was brought under control, swept bare the northern part of Wetherill Mesa from Rock Springs to the northern scarp. It also burned across Rock Canyon and Wildhorse Mesa to the west and onto the upper part of Long Mesa to the east. During the fight to corral the blaze, a

truck road was bulldozed on an old horse trail running along the rim from the automobile road at the head of Chapin Mesa, around the upper tributaries to Long Canyon, to Rock Springs and Long House. Prior to this time access to Wetherill Mesa was by foot or horseback.

After the fire, in order to take advantage of the removal of cover, Park Archeologist Don Watson and Superintendent Paul Franke made a partial survey of the northern end of the burn, adding 13 previously unrecorded sites to the number of surveyed ruins.

Comparative ease of access afforded by the new fire road made it possible for James A. Lancaster of the park staff to transport tools and material to Wetherill Mesa, extending to that side of the park the stabilization work he had been doing on Chapin. In 1935, while getting adobe mortar for use in holding together a wall in Mug House, he discovered a "mummified" skull carefully buried in a small cave (Site 1228) a short distance north of the larger Mug House cave. Stimulated by Lancaster's find, Paul Franke and Robert Burgh excavated two rooms in the site, which they named Adobe Cave. Over a period of several years Lancaster also did stabilization work in Long, Step, Kodak, and Double Houses and in Ruins 12 and 16. In the process of stabilizing fragile walls he frequently gleaned bits of information about the ruins. His findings are recorded in the Stabilization File in the park museum.

As part of Gila Pueblo's Tree-Ring Expedition in 1941, Deric O'Bryan made collections and assigned Gila Pueblo Survey numbers to 14 ruins on Wetherill and 1 on Wildhorse Mesa. Ten of the sites surveyed were cliff dwellings previously recorded by Nordenskiold, Nusbaum, or Watson. Five were small pueblos in the open on the mesa between Mug and Long Houses. Of these, because of rather vague locations given on the Gila Pueblo Survey sheets, we are able to correlate only one, Site MV:107

with Site 1553, in the current survey numbering system. The purpose of the expedition was the collection of dendrochronological material and in that it was successful. The work added to knowledge of cultural sequences and chronologies involved (O'Bryan, 1950).

Table 1 correlates earlier site names and numbers on Wetherill and adjacent sections of Long and Wildhorse Mesas with the numbers of the park survey.

TABLE 1.—*Correlation of various survey names and numbers*

Mesa Verde archeo- logical site survey numbers	Named ruins	Norden- skiold's numbers	Wat- son- Franke survey	Gila Pueblo survey
1106.....			10	
1109.....			11	
1138.....			13	
1139.....			12	MV:154
1153.....			5	
1154.....			1	
1157.....			3&4	
1159.....			6	
1160.....			2	
1169.....			7	
1180.....			9	
1200.....	Long House.....	Ruin 15.....		MV:132
1212.....	Kodak House.....	Ruin 22.....		MV:131
1228.....	Adobe Cave.....			
1229.....	Mug House.....	Ruin 19.....		MV:118
1233.....	Jug House.....	Ruin 17.....		
1240.....		Ruin 18.....		
1241.....		Ruin 16.....		MV:125
1285.....	Step House.....	Ruin 21.....		MV:134
1320.....		Ruin 13.....		MV:148
1321.....		Ruin 12.....		MV:147
1322.....	Ruin 11½.....			MV:150
1325.....		Ruin 11.....		MV:146
1355.....	Plank House.....			
1385.....	Double House.....	Ruin 14.....		
1406.....	Spring House.....	Ruin 20.....		MV:119
1448.....	Daniel's House.....			
1449.....	Ruin 20½.....			
1500.....	Lancaster House.....			

In the early 1890's, Nordenskiold gave these ruins the name Kodak House, because of the expedition's practice of caching their camera in one of the rooms. Site 1212.





site data

Field data for each site were recorded on the spot. Here the site was first numbered and marked. Sites in caves, along cliffs, or among large fallen rocks were usually marked by carving the number into the rock. Where this was impossible, as it usually was on the mesa top, a 2-foot length of $\frac{3}{4}$ -inch steel reinforcing rod was numbered with dies and driven into the ground, leaving approximately 6 inches above the surface.

Next, the location was recorded by bearings to known points and estimated distances plus a prose description of the spot, such as: "On talus, right bank of Rock Springs Canyon 200 feet below confluence with its west fork and 50 feet in elevation above canyon bottom. In dense oak brush." Any remark that would aid in the relocation of the site by a man on the ground was entered.

A sketch map was made with the use of standard symbols and with distances estimated by pacing. The map was supplemented with notes on the estimated number of rooms, type of construction, height of standing walls, depth of mound, relative amount of trash, and the presence or absence of kiva depressions, towers, pictographs, or evidence of vandalism. If sherds were collected, it was so noted with the area from which they came.

After cataloging was completed in the laboratory, the file numbers of photographic negatives and catalog numbers of field specimens, other than sherds, which may have been collected at a site were entered on the cards.

The duplication of record cards for all the sites surveyed is too formidable a project for publication. Pertinent data have been reduced to the tabulation in table 10 in the back of the book.

Some explanation of terms and abbreviations is necessary for the reader.

Estimated number of rooms: Size in terms of the number of rooms is, in some cases, accurately stated but for most sites this has to be estimated from the size of the mound. Some early sites exhibit such scant or scattered surface evidence as to make any reasonable estimate impossible.

Location: Location of sites is indicated by the initials M, C, T, or B for mesa top, cliff, talus, or canyon bottom.

The presence of various architectural features is indicated on the tables by a check.

Spall and adobe: the low mound or thin scattering without relief of small sandstone spalls and an occasional piece of burnt adobe; remains of adobe or jacal wall (figs. 9–10, 15).

Slabs: a sandstone slab on edge whether a small slab used to line the base of a wall or a large megalith making up the greater part of a wall's height (figs. 11–13).

Dry wall: a masonry wall laid without mortar. Impossible to determine at exposed sites where mortar, if used, is usually washed out (fig. 14).

Rough masonry: masonry of unworked, unshaped stone (figs. 15–16).

Scabbled masonry: masonry of stone which has received some primary shaping (figs. 17–19). The term includes, but is not confined to, the common wedge-shaped, "chipped edge" stone.

Finished masonry: coursed masonry in which some stones have been shaped by means of pecking or grinding (figs. 20–24).

Compound wall: a wall in which some or all of the stones are exposed on only one face of the wall. The term includes double walls in which each face of the wall is laid independently (fig. 25).

Retaining wall: a wall built to hold level ground for a house site or working surface.

Terrace: masonry wall in a watercourse or on a slope for the purpose of holding agricultural soil and moisture. The number of individual walls, either actual or estimated, included under the site number is given.

Tower: an aboveground, usually circular structure, an adjunct of many kivas. Not included are rooms connected by passageway to a kiva that are otherwise undifferentiated from ordinary dwelling rooms.

Kiva: kivas and kiva depressions indicated by the number for which there is evidence.

Ceremonial only: sites which consist of a kiva, a tower, or a shrine or a combination but with no domestic structure present.

Storage only: small room separated from all others which shows no evidence of use as living quarters.

Phase: A discussion of phases and their attributes will be found in a later chapter. A continuous occupation is indicated by a hyphen: *P-M*, meaning Piedra through Mancos Phases. Reoccupation or discontinuous use is indicated by a comma: *P, M*.

Pottery typology in the Southwest is not an exact science and there is almost as much variation in descriptions of the various types as there are archeologists working with them. In order to define my terms the local pottery types are discussed at considerable length in a separate chapter. Under each type is the number of sherds of that type picked up at the site. Unidentified sherds are not listed.

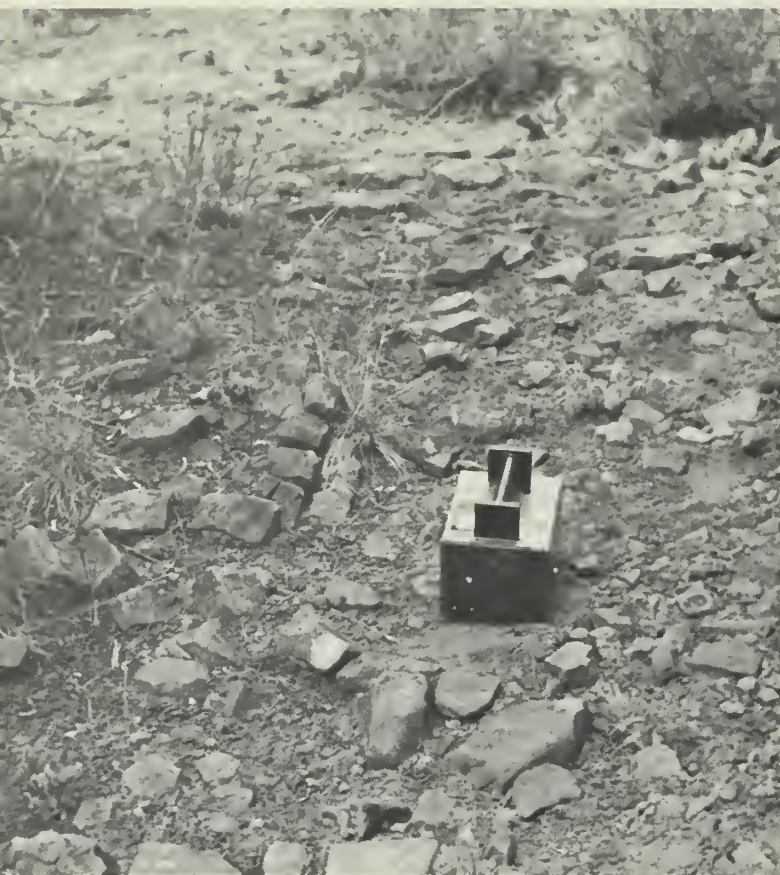


Figure 9—Small rocks and scattered spalls typical of surface indications of Pueblo I house. Site 1824.

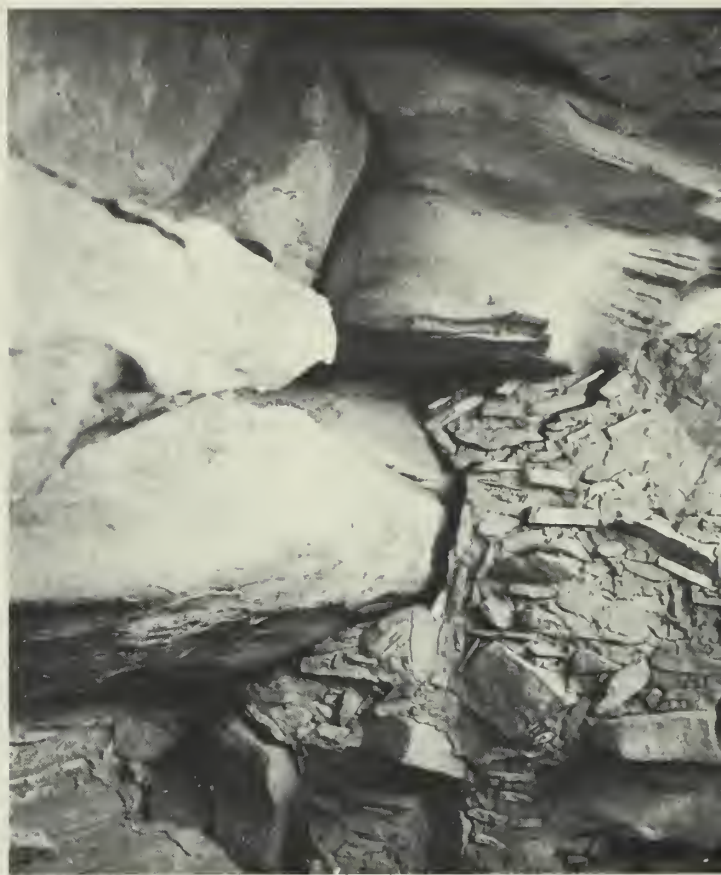


Figure 10—Wall of rough masonry and adobe at Site 1344. Scattered rocks in figure 9 are probably remains of this type of construction.



Figure 11—Upright slabs typical of many late Pueblo I and early Pueblo II sites. Site 1815.



Figure 12—Megalithic slabs which formed the base of some late Pueblo II and early Pueblo III walls. Site 1439.



Figure 14—Dry-laid wall. Site 1409.



Figure 13—Megalithic slabs supporting wall of scabbled stone. Site 1447.



Figure 15—Wall of rough, unshaped rock and spalled adobe. Site 1504.

Figure 16—Rough wall, 2 or 3 stones showing some scabbling. Site 1266.





Figure 17—Wall of scabbled stone in "chipped edge" style. Many spalls but little mortar. Site 1446.



Figure 18—Scabbled stone wall in small cliff dwelling in Bobcat Canyon. Site 1373.

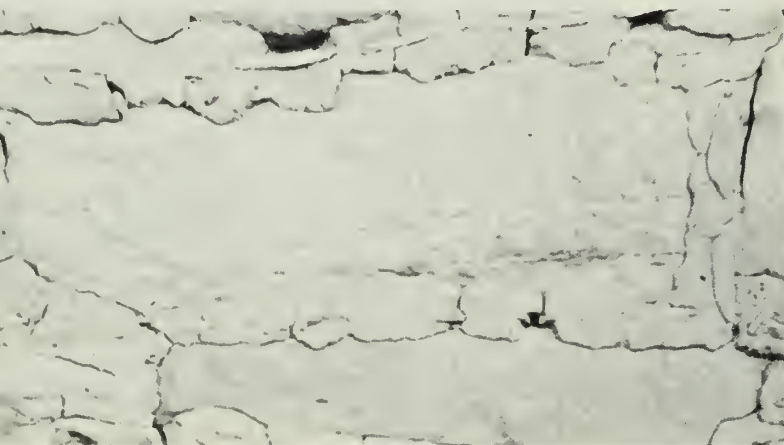


Figure 21—Typical pecked surface of stone in classic, finished masonry of Pueblo III period. Site 1890.

Figure 22—Finished stone with ground surfaces. Site 1320.



Figure 23—Corner of a doorway that has been shaped to receive a door slab. Site 1500 (Lancaster House).



Figure 19—Scabbled masonry wall: stones are shaped but pecked or ground on the surface. Site 1202.



Figure 20—Finished masonry. Pecked surfaces of rock in classic wall of tower on Wildhorse Mesa. Site 1138.

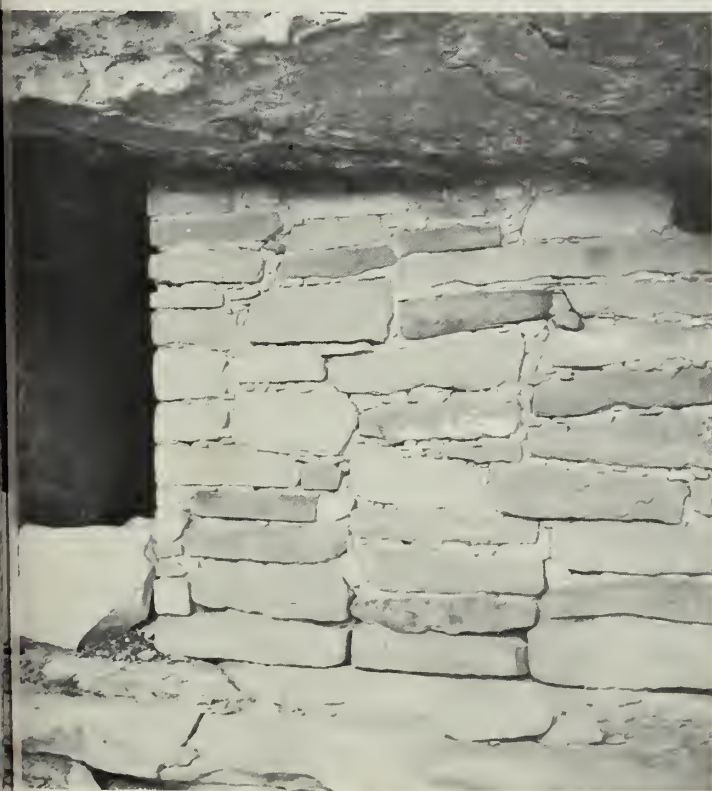


Figure 24—Closeup of wall in figure 23. Size of stone and regularity of courses denote a classic Pueblo III wall.



Figure 25—Exposed section of compound wall. Site 1355.

ceramics

The sherds collected on the survey received much handling. First, all sherds which could be classified were recorded on cards listing the types found on each site, just as they are listed in the tables in this report. During this phase of the work I was indebted to Arthur Rohn, who had been working for a year with the pottery from the Chapin Mesa Survey and who gave generously of his time and experience. I am grateful for his introduction to the local pottery; though I have borrowed many of his observations, I alone am responsible for the descriptions and interpretations which follow.

After the first classification by site the sherds were then divided and studied by types. When, as occasionally happened, I felt that I had initially called some things Mancos which should have been called Cortez, corrections were made on the site's pottery card. The descriptions which follow are of these specific batches of sherds compared with similar types described in the literature on Mesa Verde archeology. A reader with a strong interest in taxonomic system perhaps will be frustrated by my careless use of the words "type," "variety," and "ware." I use them as the dictionary defines them rather than according to any current system of ceramic taxonomy. As used here, a "type" is a "kind" of pottery—a group of vessels or sherds which have enough features in common to make it possible to identify them and to separate them from others, and which have a demonstrably significant niche in place or time. In some of the following discussions, I have speculated on how my types might be related to the common system of "type and variety." The frequent result of such an effort demonstrates the inconsistencies of typological

frameworks which attempt to provide rigid rules for recording an activity which itself followed no rules in its development. The inconsistencies of the "typer" may be even more apparent.

CHAPIN GRAY

The earliest and the basic pottery of Mesa Verde is a plain gray ware described many times. Hargrave in 1932 named the early plain pottery of northeast Arizona "Lino Gray," and Martin (1936) first applied that name to the similar ware of the Mesa Verde area. His lead was followed by Lancaster et al. (1954) and O'Bryan (1950). Abel (1955), recognizing the crushed-rock temper of the local gray ware, first used the name Chapin Gray to differentiate it from Lino Gray which was originally described as tempered with sand. Reed (1958) refers to it as "plain gray" recognizing the confusion that might exist if the Lino name should be applied. There does seem to be a spatial separation of the two tempering materials, the consistent use of rock temper being largely confined to the country north of the San Juan. If the differences were sand versus sherd tempering, the justification of a new type would be easier to accept. I am a little reluctant to admit cultural significance in a potter's use of coarse quartz sand rather than crushed rock. Local gray ware sherds mixed with Lino Gray sherds from the Kletthla Valley or from Chaco Canyon cannot be separated without microscopic inspection of temper. In dealing with large numbers of sherds one gets a vague feeling that in the aggregate Lino may have a somewhat smoother surface with less scratching caused by dragging protruding temper during the smoothing process, but there is such a wide range of surface textures in both the sand and the rock-tempered vessels that a few sherds of one would be lost in a collection of the other.

In order not to overemphasize a slight difference and to avoid confusion in the literature, most of which refers to the local pottery as Lino Gray, one is tempted to suggest a compromise and call it "Lino Gray, Chapin Variety." An objection to this procedure is that it would make it a component of Tusayan Gray ware and would ignore the obvious continuity of the local banded-neck and corrugated types from the earlier plain pottery.

When the sherds from the surface collections were typed and separated, only a sampling of perhaps 20 percent of the total was taken. Close study was given to 1,553 plain sherds from 316 sites. Of this number many were undoubtedly from smoothed portions of banded-neck Mancos Gray vessels and even of corrugated jars of late periods. They differ only in percentages of large numbers of sherds. Plain gray sherds were found on 148 sites showing no other indication of Pueblo I or earlier occupation. Of these, 28 were apparently purely Pueblo III. Only those sherds which because of shape could be said with certainty to come from plain gray vessels were used to arrive at description and percentages. These included rim sherds, body sherds from neck and shoulder of a vessel, a few handles, and pieces of effigy vessels.

DESCRIPTION (of 1,553 sherds)

Construction. Probably concentric rings of fillets rather than coiling.

Paste. Light to dark gray with carbon streak on 11 percent of sherds inspected. Vitrified paste in 5 percent of samples. *Temper:* Medium-to-coarse crushed rock. Ninety-four percent of igneous rock, probably of alluvial cobble and characterized by large pieces of quartzite and smaller ones of black rock in the majority of specimens; 5 percent of an igneous rock containing much biotite mica, probably from intrusive dykes at south end of the mesa; 1 percent crushed sandstone. The latter could be confused with sand temper but for the presence of a few pieces of stone with the grains still cemented.



Surface. Color: Light cream to dark gray, most commonly light gray with fire-clouding on 7 percent. *Treatment:* Wiped or scraped, presenting a characteristically uneven or pitted surface with bits of temper showing through. One percent of sherds showed some spotty polishing (remarks below). Fugitive red exterior common.

Shape. Seed jars, bowls, jars with narrow, vertical necks, half-gourd ladles, and eccentric or effigy vessels. Percentages of rim sherds collected indicates a preponderance of jars, 63 percent of total. Bowl rims 22 percent, seed jars 15 percent. *Handles:* Usually round in cross-section. Sometimes a thick, rounded strap. Handles frequently placed vertically on jars to make pitchers. Small, pinched nipple-lugs common; often perforated. Cylindrical lugs, flared at the rim with deep depression in the outer end. *Rims:* Rims were 80 percent either gently rounded or flat at the top. Apparently the potter drew the tip of her finger around the rim, frequently causing a bit of clay to be squeezed down on the side making an almost imperceptible "beading." Fourteen percent were flat on the outside but gently tapered toward the interior of the vessel (fig. 26). There is little variation in these percentages between the three vessel forms.

Thickness. Average 5.5 mm.; range 3-9mm.

Remarks. At Site 145 on Chapin Mesa, O'Bryan (1950) found that polished plain ware constituted 26 percent of his sherds. On the basis of these and collections made at Step House by Nusbaum's "West Side Expedition" of 1928 (no published data) he described a type called "Twin Trees Plain." This description is amplified by Abel. The Wetherill Mesa Survey produced 25 sherds of lightly polished plain ware. Seven of these are bowl sherds with an interior polish and are quite likely undecorated portions of Black-on-white vessels. Eliminating these, 19 sherds or 1.2 percent of the total exhibit a polishing which hits the high points of the surface, leaving scored areas and depressions untouched. Ten of the 19 come from Step House, one of the two type sites. Eight of the 315 other sites which produced Chapin Gray furnished the remaining 9 sherds. In view of its scarcity and its virtual limitation, as far as is known, to two sites, it is probably best to consider occasional polishing strokes a minor variation of Chapin Gray, and to suggest the elimination of Twin Trees.

Step House was perhaps occupied by a family or two of square pegs. The 5 percent of sherds showing a micaceous temper under the binocular microscope stimulated a curiosity to refer to the larger collection for the same thing. Visual inspection revealed the flecks of mica on the surface of 22 sherds of the entire collection. (Apparently it floated to the surface during the smoothing of the damp vessel as it frequently is evident on the surface when it cannot be found in a cross section.) Nine-

teen of the 22 came again from Step House; several of these were the unusual polished sherds. Lancaster and Watson (1942) also found a high percentage of micaceous grit at Pithouse B on Chapin Mesa.

At sites just 4 miles south of the tip of Wetherhill Mesa Reed (1958) found Rosa Gray pottery. It would seem likely that it occurs on Wetherill but I cannot segregate it on the basis of written description and I have been unable to obtain sample sherds for a careful comparison.

MOCCASIN GRAY

Banded-neck unpainted pottery is considered the typical and diagnostic Pueblo I pottery in the Anasazi area. The practice of leaving the bands of clay unobliterated on the necks of jars seems to occur along with the deeper pithouses, the conversion of the antechamber into a ventilator shaft, and with the use of small adobe or jacal structures at the rear of the pithouses. Banded-neck sherds will occur only in small percentages on Pueblo I sites, however, as body sherds of banded-neck vessels are indistinguishable from Chapin Gray, which continued in the form of bowls and some jars. O'Bryan (1950, p. 92), considering just identifiable rim sherds, found that banded-neck pottery was 35 percent of the total gray ware on Site 102 on Chapin Mesa.

Moccasin Gray was named and described as a type by Leland Abel (1955) to differentiate it from the sand-tempered Kana's Gray of the Tusayan Gray ware series. Rohn (1959) considers Moccasin to be a variety of Chapin Gray rather than a separate type.

Banded-neck gray pottery, which appeared in the Four Corners area between A.D. 700 and 800, was the seed from which sprang the ubiquitous corrugated culinary ware of Classic Pueblo times. The progression from the wide bands of concentric fillets, through narrower fillets, unindented coils, to overall corrugated vessels provides a steady continuum which can be separated into types only on the basis of arbitrarily defined criteria. Separations in this continuum having any temporal significance are most difficult to make in the earlier phases and will be discussed in detail below in considering Mancos Gray.

Moccasin Gray sherds were found on 61 of the 128 Pueblo I sites surveyed. Only 116 sherds were collected and all were used in the study of Moccasin Gray on Wetherill Mesa.

DESCRIPTION (of 116 sherds)

Construction. Of concentric bands or rings.

Paste. Same as Chapin Gray. Carbon streak in 15 percent. *Temper:* Crushed rock. One sherd with addition of some sand to the crushed rock.

Surface. Same as Chapin Gray except that the bands of clay on the neck are purposefully left unsmoothed for

decorative effect. Typically the bands lie flat and are sloppy and variable in width not only on the vessel but within a single fillet (fig. 27, *a-d*). The average band width is 12 mm. with a range of 8–18 mm. No treatment of the surface except for a trace of light wiping of the bands on a few with either the fingers or a bit of grass. Fire-clouding on 10 percent of the specimens.

Shape. Jars, pitchers (one bowl sherd on which bands were not obliterated). *Rims:* Same as Chapin Gray with 87 percent either rounded or flat (fig. 28).

Thickness. Average 5.3 mm.; range 4–8 mm.

Remarks. See remarks under Mancos Gray.

MANCOS GRAY

It has long been recognized that the transition from banded-neck pottery to the indented corrugated culinary ware derived from it was not cleancut and abrupt. Morris (1939, p. 185) illustrated sherds and vessels which show “the shift from banding through ridging to true corrugation.” The technique displayed consists of the use of narrow, overlapped bands on the necks of jars with some instances of emphasizing the bands by tooling, drawing a line under the coil with a sharp stick. He believes the style to have been a short-lived one. Martin (1936) found, in the lower fill at Lowry Ruin, what he calls “plain (unindented) corrugated neck.” O’Byrne (1950) found a few sherds of “coiled ware” at Site 34 but has little more to say about them. Brew (1946) records “plain (not indented) corrugated” sherds from

Pueblo II levels on Alkali Ridge. But it was not until Abel’s (1955) description of Mancos Gray that we had a convenient handle. The few such sherds brought in with the survey collections and their association with short rows of rooms of rough or cobble masonry and with Cortez Black-on-white would bear out the contention that it was made for a brief period, a transition ware in the banded-neck to corrugated continuum in early Pueblo II times. Parallel development in surrounding areas is represented by Coconino Gray in northeastern Arizona, by Clapboard Corrugated of the upper Pecos, and by pottery using identical techniques found by Judd (1954, pl. 50) in the old trash at Pueblo Bonito.

DESCRIPTION (of 128 sherds from 68 sites)

Construction. Coiled for the most part with probably some continuation of concentric banding.

Paste. Same as Chapin Gray. Carbon streak 4 percent. *Temper:* Crushed igneous rock.

Surface. Body sherds indistinguishable from those of Chapin or Moccasin Gray. Unobliterated coils on neck reaching down to shoulder of vessel (lower than on Moccasin Gray); average 5 mm.; range 3–9 mm. Coils frequently overlap with clapboard effect (fig. 27, *e*). Bottom of coil frequently emphasized by tooling. 17 percent fire-clouded.

Shapes. Jars only. Shapes approach the wide mouth, sloping shoulder of the later corrugated vessels. *Rims:* Round or flat as in earlier styles with some incidence of a very slight outward-flaring of the lip as on Mancos Corrugated. Rim usually an additional fillet.



Figure 26—Chapin Gray rim forms. Inside of vessel is at left, here and in all rim illustrations following.



Figure 28—Moccasin Gray rim forms.

Figure 30—Corrugated rim sherds with painted designs inside the rim—possibly ownership marks.



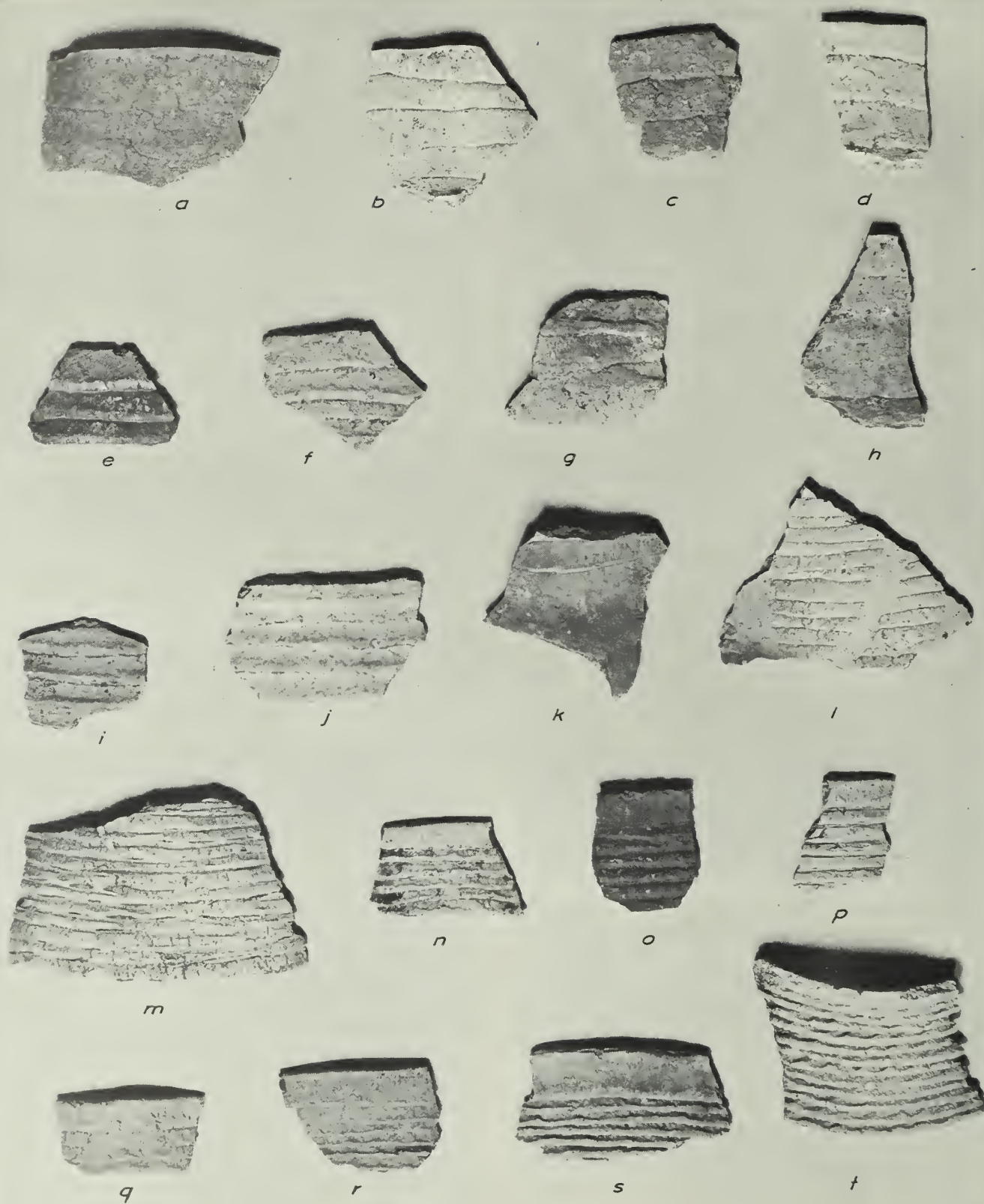


Figure 27—Sherds of Moccasin Gray, *a-d*; Mancos Gray, *m-t*; and possibly one or the other but typed arbitrarily, *e-l*.

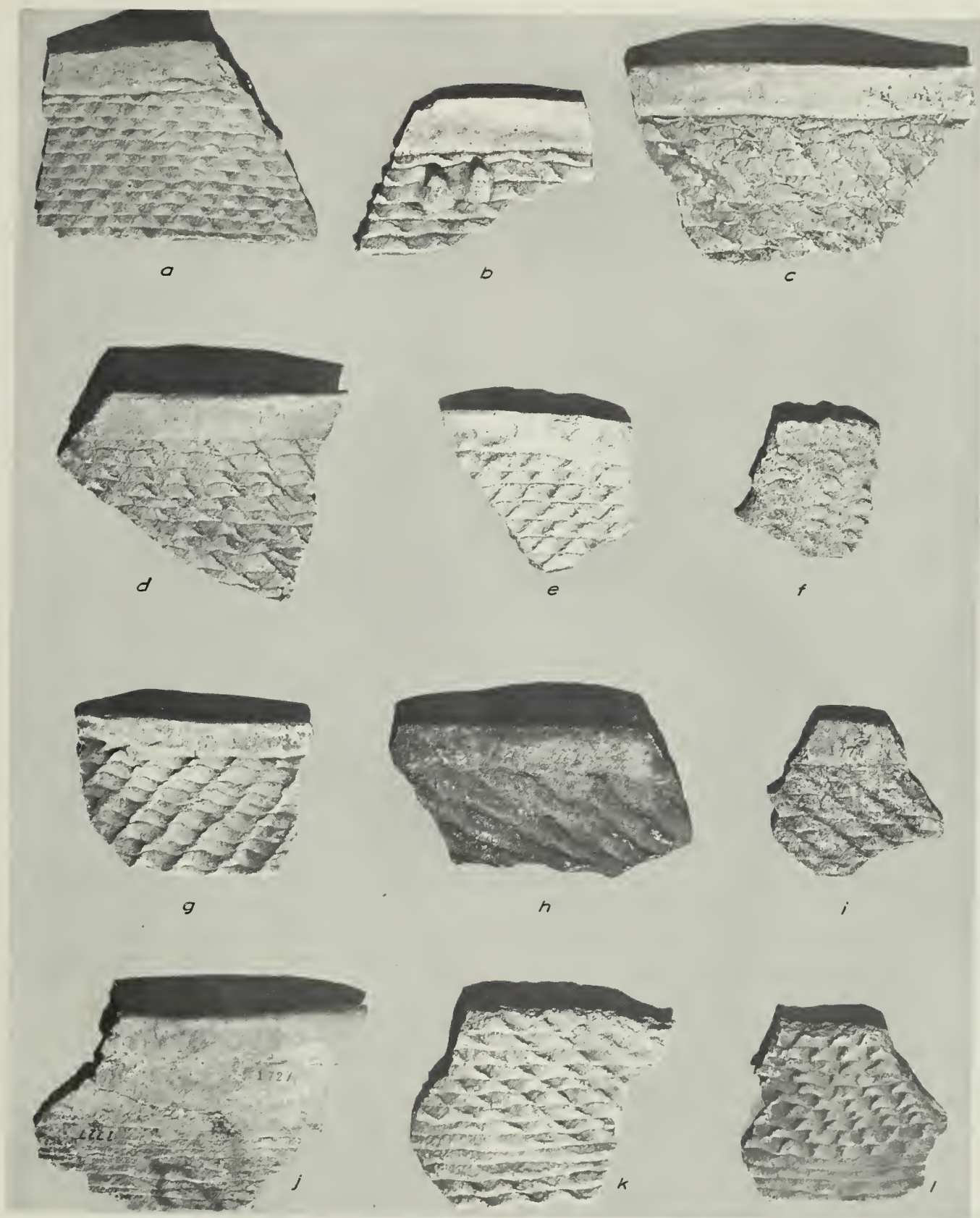


Figure 29—Mancos Corrugated sherds.

Thickness. Average 5 mm.; range 4–6 mm. Note a slight decrease in thickness of vessel walls from Chapin through Moccasin to Mancos Gray.

Remarks. The sherds described as Moccasin and Mancos Gray above were those which were easily separated. Of the total number in the coiled or banded-neck series 37.5 percent were definitely Moccasin, 41.5 percent Mancos Gray. The remaining 21 percent were neither or both. Though unquestionably in the continuum, they were impossible to type without setting up an arbitrary set of criteria. These were:

<i>Moccasin Gray</i>	<i>Mancos Gray</i>
Concentric fillets	Coiled
Wide bands (8–18 mm.)	Narrow bands (4–9 mm.)
Rim formed by top band	Rim an additional fillet
Smoothed by finger, if at all	Frequently tooled
Bands lie flat	Clapboarded
Bands on neck only	Bands sometimes below shoulder

If features of a sherd match more items in one column than in the other, it can be given a name. As an experiment all but six of the indeterminate sherds were forced through this system and found a home. The results are less than satisfactory. In one case a Mancos Gray sherd showing the start of coiling at the base of the neck is obviously from the same vessel as a Moccasin Gray sherd which does not. A more realistic approach, and one which more closely reflects true ceramic history, is to admit that 21 percent of the sherds cannot be typed and that they represent progressive and regressive variants between two distinct styles (fig. 27, *e-l*). Such a large nameless percentage is a nuisance to the taxonomist but as a member of the species, I am reassured that human endeavor cannot easily be reduced to a formula and filed on punch cards.

The variation in treatment of bands or coils observed on these transitional sherds are: (1) Rather narrow bands ranging from 4 to 9 mm., smoothed along the band with thumb or finger frequently forcing up a ridge at point of overlap with the fingernail (fig. 27, *h-j*). This is the most common variation. The fact that it occurs in Pueblo I contexts (see Morris, 1939, pl. 219, *f*) might argue for calling it Moccasin Gray, but typing of pottery by its association defeats itself. (2) Bands smoothed over but site of the break marked or simulated by incised lines (fig. 27, *k*). Incised lines suggest Mancos but the average 10 mm. between lines has an earlier look. (3) Bands of medium width, of slight or no relief, showing incipient but probably accidental indentation. These could probably be slipped into Moccasin Gray by stretching the point that they all have narrower bands (8.9 mm.) than the described type (12 mm.). (4) Wide bands (9–

15 mm.) with pronounced overlap or clapboard (fig. 27, *e-g*). (5) Wide bands (13 mm.) faintly incised at break.

MANCOS CORRUGATED

The most ubiquitous pottery in the Anasazi area is the utility corrugated ware. It is also the most difficult to fit into time or place. Abel (1955) made an attempt to tie it down for the Mesa Verde by creating two types that he called Mancos and Mesa Verde Corrugated which, although recognizing difference in vessel forms, he differentiates mainly by the "heavier, rougher corrugations, diversity of treatment such as alternating plain and pinched coils" characterizing the earlier Mancos Corrugated. The more than 2,000 sherds studied from the Wetherill Survey showed little difference in treatment.

Rohn (1959) seems to have come much closer to the mark in relying primarily on vessel shape and rim form. It has been thoroughly demonstrated by all past fieldwork in the area that a comparatively abrupt change occurred in shape from the straight or slightly flared rimmed, wide or "bell-mouthed" jar of Pueblo II times, associated with Mancos Black-on-white pottery and small pueblos, to the "egg-shaped" vessel with a narrow mouth and sharply everted rim of late Pueblo III associated with Mesa Verde Black-on-white, enclosed kivas, and large cliff houses. The descriptions that follow were based on a study of rim sherds that could be accurately typed, and by 28 whole or restorable vessels collected by the survey.

Before describing the corrugated pottery collected by the survey, I admit again that the shift from Mancos Gray, perhaps in the early 900's, did not come as a "mutation." Several sherds, at first thrown into the "corrugated" box, were in the end left unclassified. Although they showed incipient indentations, it could not be said definitely that the indentations were not an accidental result of pressing one coil onto another rather than an intended decorative device. The practice in early Pueblo II of making indented corrugations on the neck of a vessel but leaving the base smooth is well known and was a logical step to the final overall indented corrugated.

Reed (1958, p. 117) has suggested that the corrugated-neck pottery should be recognized as a separate type, significant as the transitional ware from banded-neck to allover corrugation. He included all Mancos Gray, however, with the banded-neck pottery. It seems to me that the decorative technique of indenting was a more significant step than that of failing to smooth over the coils at the base of the jar. The temporal significance of corrugated necks is valid only at the early end of the scale, as the practice continued to some extent through-

out the occupation of the area. Half the sherds of this type (corrugated neck) that came from pure sites were from Pueblo III ruins.

DESCRIPTION (of 559 rim sherds)

Construction. Coiled.

Paste. Indistinguishable from Chapin Gray. Carbon streak 23 percent. *Temper:* 98.5 percent coarse-to-medium crushed igneous rock, 1 percent sand, 0.5 percent sherd.

Surface. Corrugated. As the coils were pinched to the body of the vessel an indentation was made with the thumb. An almost infinite variety of surfaces resulted but they can be roughly sorted into four principal styles: (1) Plain indented: the depressions are staggered so as to fall between indentations on the coil below. This style constituted 78 percent of the total (fig. 29, *a-f*). (2) Diagonal ridge: in making the indentation the potter forced up a ridge of clay in front of the thumb. Since the depressions are staggered the ridges are also, with the result that a series of ridges sweep diagonally from rim to base with such prominence as to be more evident than the horizontal corrugations. This style is typical of Mancos Corrugated and does not occur later. It made up 14 percent of the total count. Since the diagonal ridges are seldom as prominent immediately under the rim, it is likely that many rim sherds called "plain" should raise this percentage if larger sherds or whole pots were available (fig. 29, *g-i*). (3) "Shadow" indented: 6.5 percent of the sherds are carefully but so lightly indented on flat bands as to be scarcely apparent. This is a style that continued through Mesa Verde Corrugated (fig. 29, *j*). (4) Patterned: varied treatments additional to the indentations (listed in decreasing order of occurrence), leaving one or more bands unindented, same but tooling the bottom of unindented bands as in Mancos Gray, smearing across the corrugations with the finger, incising across the corrugations. All these variations also are noted later on Mesa Verde Corrugated except the Mancos Gray style of tooling the unindented bands. Patterned variations were noted on only 2 percent of the rim sherds, but since the patterning is usually placed well down on the body of the jar, it probably occurs much more frequently. The numbers of patterned body sherds from purely Pueblo II sites would bear this out (fig. 29, *k, l*).

Occasionally an appliqué element of clay was added just below the rim, usually in the form of small, conical tits or an open, recumbent "S" (fig. 29, *b*). Fourteen and five-tenths percent fire-clouded. Average width of coils 4.14 mm. The painting of simple designs such as circles, squares, or bird tracks inside the jar near the rim, perhaps as the owner's mark, is common (fig. 30).

Shapes. Jars greater in height than in diameter with only slightly flared rims, and mouths almost as wide as the widest diameter (figs. 31-32). Bowls rare, with straight rims, often not indented. *Rims:* Rounded 67 percent, flat 23 percent, tapered or pinched 8 percent. Rim an unindented fillet averaging 15.5 mm. and ranging 9-26 mm. (fig. 33).

Thickness. Average 5 mm.; range 4-6 mm.

Comparisons. See remarks below.

MESA VERDE CORRUGATED

DESCRIPTION (of 113 rim sherds)

Construction. Coiled.

Paste. Same as Chapin Gray or Mancos Corrugated. Carbon streak 36 percent. *Temper:* 97 percent crushed igneous rock, 2 percent sand, 1 percent sandstone and sherd.

Surface. Indented corrugated as in Mancos Corrugated and in the same styles with the exception of diagonal ridges. Some ridging occurs but rarely and in low relief, not predominating over the corrugations. Plain indented makes up 97 percent of the total (fig. 34, *b-j*). "Shadow"-indented or low-relief corrugations 2 percent, less frequent than in the earlier pottery (fig. 34, *a*). Patterned sherds (3 percent) included the very common alternating of several unindented bands with a wider series of indented bands but with no tooled emphasis of the division of unindented bands as in the preceding types. Also appearing, but in small numbers, are finger-smear bands either across corrugations or following several coils so as to make a smoothed band around the vessel, tooled lines across corrugations, punctate dots or dashes, and incised patterns made with the thumbnail. Appliquéd tits persist, but more typical is the common use of small fillets of clay applied under the rim as tight scrolls (fig. 34, *a* and *j*). Twenty percent of sherds are fire-clouded. Identification marks in paint inside the rim continue (fig. 30).

Shapes. Jars, squat or bulbous, egg shaped, with mouths often only half the maximum diameter of the vessel (figs. 35-36). *Rims:* Sharply everted, often 90° or less, to the wall of the jar below. Rim is formed of one or several fillets smoothed to a width ranging 10-38 mm. and averaging 21.5 mm. On 3 percent of the rims there was no smoothed fillet, but the corrugations extended to the outer edge. This practice may have been more common than this percentage indicates because 6 of the 26, or 23 percent, of the whole or restorable Mesa Verde Corrugated jars retrieved by the survey exhibit a corrugated rim. Rim lips are 62 percent rounded, 21 percent tapered; they supplant in popularity the squared or flattened rim which has slipped to 16 percent (fig. 37).



Figure 31—Mancos Corrugated jar (cat. #13159/702).
From Site 1344.



Figure 32—Mancos Corrugated jar (cat. #13180/702).
From Site 1400.



Figure 33—Mancos Corrugated rim forms.

Figure 35—Mesa Verde Corrugated jar (cat. #13146/
702), found with McElmo Black-on-white bowl in figure
50. From Site 1308.



Figure 36—Mesa Verde Corrugated jar (cat. #13183/
702). From Site 1433. Note smoothed band at mid-
section.



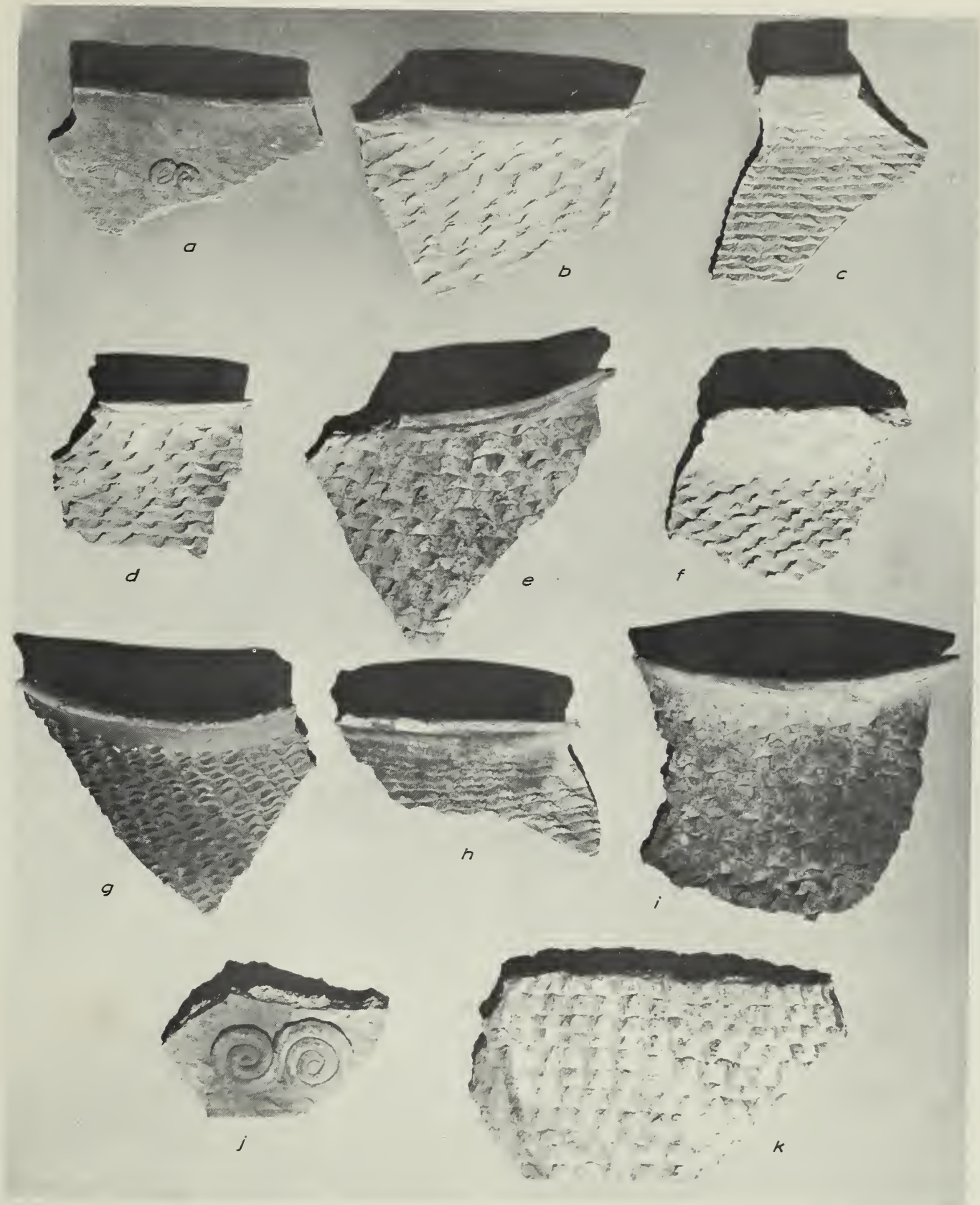


Figure 34—Mesa Verde Corrugated sherds.

Thickness. Average 4.9 mm.; range 4–6 mm.

Remarks. A study of Wetherill Mesa sherd collections reveals but two traits, other than shape of body and rim, that can be used to distinguish Pueblo II from Pueblo III corrugated pottery. The presence of diagonal ridges or of tooled coil separations would probably preclude Mesa Verde Corrugated, but since the two traits combined did not make up 15 percent of Mancos Corrugated, their absence would leave the door wide open. To check the validity of the rim sherd counts, all the diagonally ridged sherds from the large collection of body sherds were checked for provenience. All sherds from mixed Pueblo II–III sites were thrown back, period designations being made on basis of combination of pottery and architecture. Only 6 of 128 were picked up on late sites; the large balance were from sites which appeared to have no occupation later than Pueblo II.

The same procedure was followed with patterned sherds—any sherds which showed surface decoration other than indentation of the coils. Of those coming from sites showing a single-phase occupancy, 71 percent were Pueblo II and 29 percent Pueblo III. The discrepancy is not as great as might be suspected. Since more Pueblo II sites were encountered on the survey, it seems likely that patterned variations were nearly as common on Mesa Verde Corrugated as Mancos Corrugated. Sherds of the alternate unindented *tooled* bands and indented bands came only from Pueblo II sites.

Heavy corrugation has been considered a trait of Pueblo II corrugated pottery (Abel, 1955). To check this the deeply indented body sherds were separated from the pile. After sherds from mixed sites were thrown back, 70 percent of the remainder were from Pueblo II sites and 30 percent were Pueblo III. When we consider that the ratio of Pueblo II to Pueblo III sites surveyed was 5:4, the disparity is reduced. Certainly deep indentations cannot be used as a criterion for separation of the types. In fact, on the basis of a smaller body of sherds, those of known type, 11 percent of the Mesa Verde Cor-

rugated rim sherds were deeply indented whereas only 4 percent of Mancos Corrugated rims could be so classified.

Although vessel shape and rim form remain the best indicators of type for corrugated pottery, certain trends can be noted as changes in proportion, not only from Mancos to Mesa Verde Corrugated, but from Chapin Gray all the way through the Gray Ware series. Table 2 shows a consistent decrease in the number of vessels lacking an extra rim fillet, an increase in carbon streak and fire-clouding, and changes in emphasis in rim styles. A rounded rim was constantly the most popular. The flat rim, quite common on Chapin Gray, declined consistently throughout the series while the tapered rim was increasing in importance. It will be noted later that almost the reverse was true on decorated pottery.

Another method of surface treatment, carried over from the times of Chapin Gray, is the removal of all evidence of corrugation. This pottery differs from Chapin Gray only in vessel shapes and in the fillet of clay added at the rim. Moccasin Gray is sometimes found with all bands rubbed out except the one at the top, but does not have the built-up rim characteristic of later gray wares. The plain-surface pottery is found with the shapes and rims of Mancos Gray, Mancos Corrugated, and Mesa Verde Corrugated and in the same associations as those types. It was probably made in small quantities after A.D. 900 through the late Classic period. Morris (1939, p. 93) found it in Pueblo III sites on the La Plata and considered it a smoothed variant of Mesa Verde Phase Corrugated. Rohn (1959), who found some of it in the Chapin Mesa survey collections, described it as Mummy Lake Gray. Body sherds cannot be distinguished from those of Chapin Gray, and he classified it as a variety of that type. The Wetherill Survey turned up only 10 sherds and 1 complete vessel from 7 sites. This is too small a sample to consider other than to record the occurrence. Seven of the 10 rims are the straight rims of Mancos Gray or Mancos Corrugated; 3 are sharply everted Mesa Verde Corrugated rims. These sherds were

TABLE 2.—*Changes in emphasis in gray wares*

T: Trace

Ware	Carbon streak (%)	Fire- clouding (%)	Average width band or coil (mm.)	Average width, rim band (mm.)	Lacking rim fillet (%)	Average thickness (mm.)	Tapered rim (%)	Rounded rim (%)	Flat rim (%)
Chapin Gray.....	11	7			100	5.5	T	49	37
Moccasin Gray.....	15	10	12		100	5.3	5	49	37
Mancos Gray.....	4	17	5	14.9	26	5	7	59	33
Mancos Corrugated.....	23	14.5	4.1	15.5	6	5	8	67	23
Mesa Verde Corrugated....	36	20	4.3	21.5	3	4.9	21	62	16

classified in the tables as either of the corrugated types according to rim form (fig. 63, f-j).

Perhaps because most of us are likely to describe what we find in a relatively small area without relating it with surrounding areas, there is confusion and overlapping of corrugated types in the Four Corners area. The corrugated pottery described above is called, after Abel, "Mancos" and "Mesa Verde." In Chaco Canyon the Pueblo II corrugated was named "Exuberant" by Roberts; the name "Chaco Corrugated" grew up around the later form. The similarities of Exuberant to Mancos and of Chaco to Mesa Verde are far more obvious than are any differences. These differences seem to boil down to the use in the southern types of sand temper predominantly, with some crushed rock temper and a little sherd temper. Our local ware is mostly rock tempered, some sand tempered, a few sherd tempered. A large sample of corrugated sherds from Chaco Canyon sent to us by Gordon Vivian would be lost if stirred up in the Survey collection. Differences in the aggregate of large numbers of sherds exist, but accurate typing of a few would be difficult if not impossible. Alexander Lindsay of the Museum of Northern Arizona, a visitor to our laboratory, thought it would be difficult to separate the local ware from the Tusayan with which he had been working. I will not attempt to defend the type names that I have used in this section, but what I have described as "Mancos Corrugated" is found on Pueblo II Ackmen and Mancos Phase sites and early Pueblo III McElmo Phase sites on Wetherill Mesa. That described under the heading of "Mesa Verde Corrugated" is associated with Pueblo III sites of the Mesa Verde Phase.

HOVENWEEP CORRUGATED

A late type of corrugated ware from Hovenweep and Hackberry Canyons on both sides of the Utah and Colorado boundaries has been described by Abel (1955) as Hovenweep Corrugated. It is a comparatively thick-walled type, frequently marked with vertical indentations giving a square rather than wedge aspect to the pattern. The vessels have a smeared or puddled appearance as though the coils were handled when wetter than was usual or if the surface were moistened after completion but before drying. The temper consists of coarse pieces of crushed sandstone at the type site. It occurs as only a small percentage of the corrugated sherds in collections from the Hovenweep area.

Sherds more or less answering this description (fig. 34, k) were found at six Pueblo III sites surveyed, and some of the material is turning up in the excavations at Long

House and Mug House. The sherds were compared with sample collections from the Holly Group and from near Square Tower at Hovenweep National Monument. The Wetherill sherds have a temper of crushed igneous rock of particles larger than average. There is no reason to believe that it was not locally made. Reed (1958, p. 122) has suggested a possible influence from the southwest to account for it, Moenkopi Corrugated and Kietsiel Gray being cited as having some similarities.

LA PLATA BLACK-ON-WHITE

The earliest painted pottery on the Mesa Verde is the familiar Basketmaker III ware common to most of the Anasazi area. It was first described by Colton and Hargrave (1937) as Lino Black-on-gray, with quartz sand temper and a design applied in carbon paint. The first application of the name to the local Basketmaker III pottery was made by Martin (1936) in his work in the Ackmen-Lowry area. Hawley in 1936 described La Plata Black-on-white as a mineral-paint eastern corollary to Lino Black-on-gray. Recognizing that the early pottery on Mesa Verde made use of both, or either, mineral and organic paint, Lancaster and Watson (1954, p. 19) and O'Bryan (1950, p. 105) used both terms depending on the paint type.

In an attempt to clarify the taxonomic confusion Abel (1955) renamed and redescribed the type as Chapin Black-on-white with mineral paint and rock temper. The descriptions for both Lino and La Plata called for sand temper almost exclusively. This still left organic-painted, rock-tempered Basketmaker pottery uncovered by a type name. However, to avoid complete fragmentation of what is, on the basis of design and vessel form, an easily recognizable and essentially homogeneous type throughout the northern Southwest, Rohn (1959) accepted the name "Chapin B/W" but redescribed it to include organic-painted design.

Although incompletely described, it was apparently the Basketmaker pottery of the Mesa Verde to which Hawley referred in her *Field Manual of Prehistoric Southwestern Pottery Types* (1936). She gave credit for the name to Gladwin (1934), who used the name "La Plata Phase" for the San Juan Basketmaker and for type sites referred to MV:27 of the Gila Pueblo Survey, and to Morris (1919a). MV:27 is a Basketmaker III-Pueblo I site on Chapin Mesa about a mile from park headquarters. Morris was describing Basketmaker pottery from the La Plata River approximately 20 miles southeast of Spruce Tree House. From his and Shepard's (1939) painstaking analysis, it is obvious that local Lino-Chapin-La Plata Black-on-white is the same ware.



Figure 37—Mesa Verde Corrugated rim forms.



Figure 38—La Plata Black-on-white rim forms.

The earliest decorated pottery on the Mesa Verde as shown by the Wetherill Mesa Survey collections occurs in the following variations:

- organic paint—sand temper
- organic paint—rock temper
- mineral paint—sand temper
- mineral paint—rock temper
- mineral (glaze) paint—rock temper
- mineral (glaze) paint—sandstone temper
- organic and mineral paint—rock temper

I have not examined a sherd with mineral paint in an organic medium that contains sand temper but I have no doubt that one will turn up. All these variations in the same design tradition, with no apparent spatial or temporal significance, I am here calling La Plata Black-on-white, recognizing Abel's mineral-paint, rock-tempered Chapin as a variety that is predominant in this area. Either name when used on Mesa Verde would be correct in most cases. This seems to be an evasion and it is. All attempts to settle the terminology have been based on survey and relatively small numbers of sherds. The Wetherill excavations are expected to furnish more material with stratigraphic associations. A breakdown of variants and a complete taxonomy should be postponed until that material can be examined.

My acceptance of the separation of Chapin Gray and Moccasin Gray from the sand-tempered Lino and Kana'a Gray is an apparent inconsistency. Perhaps it is, and perhaps they too should be considered as varieties; but the difference in temper in plain wares represents half the criteria available—temper and vessel form. With the addition of paint on decorated pottery, temper becomes only one of four criteria, because with paint we have also gained design. The importance of the change of temper should not outweigh the value of the sum of the other

three factors, which, in the case of the local Basketmaker III painted pottery, remain unchanged from La Plata Black-on-white.

Twin Trees Black-on-white (O'Bryan, 1950; Abel, 1955) is also included in the description below. Slightly polished sherds in all combinations of paint and temper are found on Chapin as well as Wetherill Mesa from Basketmaker and Pueblo I sites.

DESCRIPTION (of 99 sherds from 60 sites)

Construction. Probably of concentric rings as in Moccasin Gray.

Paste. Same as Chapin Gray, light to dark gray, some with vitrified paste. *Temper:* 96 percent crushed igneous rock (one sherd contained sandstone), 3 percent sand. Carbon streak 29 percent.

Surface. Light cream to dark gray. Scraped and smoothed. Eleven percent show rubbing marks and reflect a little light from high points on the surface. Five percent might be called polished. Fire-clouding on 10 percent. Most rubbing is on bowl interiors. Exteriors of most sherds indistinguishable from Chapin Gray.

Shapes. Ninety-one percent bowls. Four sherds of narrow-necked jars or pitchers and one seed bowl. *Rims:* As in the plain gray ware of the same period, 88 percent of the rims are gently rounded or flat (fig. 38).

Thickness. Average (of 50 sherds) 4.5 mm.; range 3–6 mm.

Designs. Lines of dots, Z's, crosses, flags, hooks or small triangles, frequently framed by parallel lines, radiating out from the bottom of the bowl, frequently from a small circle (fig. 39, a-s). The bowl is thus divided into two, three, or four sections. Design is centered on and oriented to the bottom of the vessel. Two bowl sherds had exterior decoration: one a short, slanting line just under the rim, and the other a deer or mountain sheep. Twenty-five percent with solid painted rim. *Paint:* 79 percent mineral paint including five sherds with glazed paint in which vitrification was apparent. Color ranges from black, to red on the numerous oxidized pieces, and to an almost emerald green on the glazes. Eight percent organic paint; 7 percent showed evidence of a paint containing both organic and mineral elements; 6 percent could not be determined.

Remarks. Despite the variety in paint and temper there is no reason to believe that any of the above sherds were made elsewhere. One of these was an organic-painted, sand-tempered sherd which one could argue should more properly have been typed Lino Black-on-gray, but the sand was not the distinctive white quartz of northern Arizona temper, consisting instead of rounded grains of black, brown, and cream-colored grains such as can be found along the Mancos River. In assigning

sites to a period, I consider La Plata Black-on-white diagnostic of Basketmaker III and Pueblo I. It was the only decorated ware of the earlier period but continued to be manufactured for some time after pithouse antechambers became narrow ventilator shafts and the houses themselves were backed by crescentic rows of jacal, adobe, and rough masonry rooms. It was the only decorated pottery picked up on many Pueblo I sites.

PIEDRA BLACK-ON-WHITE

Piedra Black-on-white, along with Moccasin Gray, is the diagnostic pottery type for a Pueblo I occupation of a site in the Mesa Verde area. Although Basketmaker III design styles were remarkably similar throughout Anasazi country, some regional differences show up in the eighth century. South of the San Juan some form of the White Mound-Kiatuthlanna-Kana'a style was the Pueblo I preference. This style does not make its appearance until about A.D. 900 on the Mancos and La Plata Rivers, where the Pueblo I decorated pottery continued the La Plata Black-on-white tradition with refinement and a changing approach to design layout. Relationship to the upper San Juan drainage was stronger than to the Chaco at this time.

The type was named by Mera (1935) in referring to the Pueblo I pottery excavated by Roberts (1930) on the Piedra River. Mera includes it as a component of the Gallina series.

As the type is a further development of La Plata Black-on-white and as changes were gradual, it is not always possible to separate Piedra from La Plata. Piedra Black-on-white is sometimes polished. The same design elements were used, and the differences in composition are not always apparent on sherds. About 25 percent of the sherds in the survey collection which were either La Plata or Piedra could not be separated further.

DESCRIPTION (of 68 sherds from 43 sites)

Paste. Like La Plata. Carbon streak common, 9 percent. Some vitrification. *Temper:* Fine-to-coarse, crushed igneous rock. One sherd with sand temper.

Surface. All but 10 percent show some degree of polish, with many (12 percent) bowl sherds also showing some extra rubbing on the exterior. *Slip:* 10 percent of bowl sherds give appearance of having been slipped. At least three sherds have a true slip, the others may be floated. No indication of slip on other shapes. One bowl and one jar with unobliterated bands as in Moccasin Gray. Fire-clouding 9 percent.

Shapes. Eighty-three percent bowls. Jars or pitchers, squash pots represented. One large jar with a round handle as on Chapin Gray. *Rims:* As in La Plata Black-on-white, 86 percent either flat or gently rounded.

Thickness. Average (of 50 sherds) 4.7 mm.; range 3–7 mm.

Design. Generally much like La Plata Black-on-white, with same elements of design but with more refinement and more elaborate layout. Pattern usually dependant from the rim rather than centering at bottom. Frequently banded. Emphasis on triangles and parallel lines and lessened use of dots, hooks, and flags. Suggestions of pre-Gallina in use of parallel banding lines. Some use of nested or concentric characters or rectangles. Forty-three percent of rims painted. One sherd with paint on bowl exterior. *Paint:* Mineral in all but 4 percent. Light gray to black. Mostly a pale "shadow" gray. The oxidized reds and browns common on La Plata quite rare here. Examples of Piedra Black-on-white are shown in figure 39, *t-c'*.

Remarks. Piedra Black-on-white differs from its predecessor and parent (it is hard to avoid genetic terms) in this area mainly in design layout, which is difficult to recognize from sherds alone. Other differences are matters of trends which can be expressed in percentages but are of little value in typing a single sherd. Polishing has increased from "some" to "most," and a slip makes an appearance. The use of sand temper and organic paint has decreased. A larger percentage of rims are painted, and decorated jars and pitchers have increased. Morris (1939, p. 177) expresses the difficulty of describing design on Pueblo I pottery on the La Plata: "Painted ornamentation of pottery was still in its formative stage and in consequence remarkably fluid and variable. Obviously there were certain trends but these had not become sufficiently crystallized to herd the pot painters into any definite or restricted path." It should be noted that Morris found no organic paint on his Pueblo I pottery.

The written history of Piedra Black-on-white presents some contradictions. O'Bryan, who made the first careful excavations of Pueblo I sites on the Mesa Verde, lists Piedra Black-on-white as a Pueblo I painted type and illustrates sherds that seem to fit the description given here for the type (O'Bryan, 1950, p. 92, pl. 42). Abel (1950, p. 5), however, would not accept Piedra as a local type because Roberts' pottery from the Piedra River originally was described as sand tempered. To cover the gap from Basketmaker III to Pueblo II on the Mesa Verde he re-described Twin Trees Black-on-white and gave it a longer time span, but ignored the changes in design that occurred. Reed (1958, p. 80) saved the name from threatened oblivion but includes as Piedra some pottery that here is described as Cortez Black-on-white, a type that had not been separated at the time he made his analysis. He found it associated with banded-neck pottery but he included in his banded neck the narrow coil, tooled and



Figure 39—La Plata Black-on-white sherds, a-s; and Piedra Black-on-white sherds, t-c'.

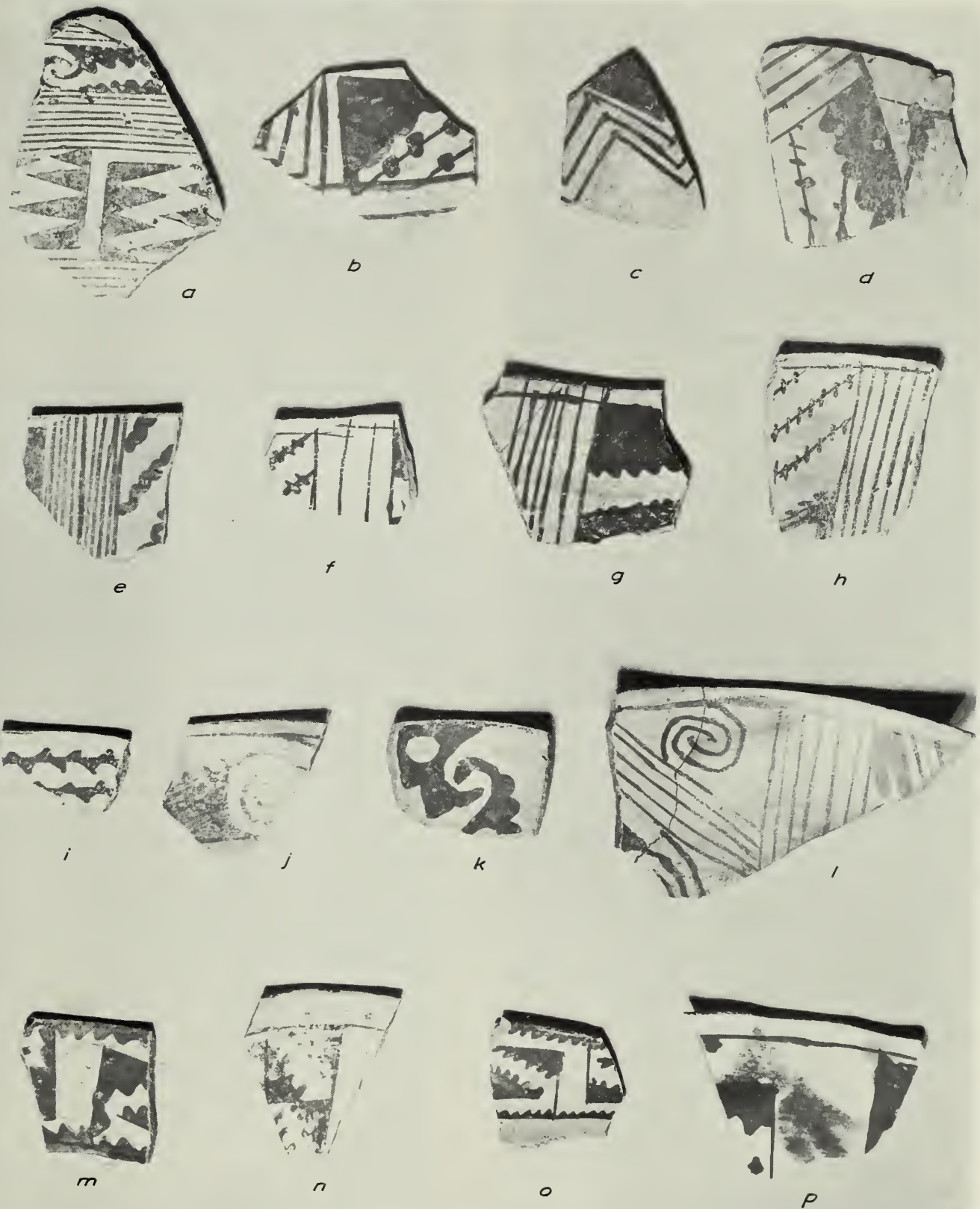


Figure 42—Cortez Black-on-white sherds.

clapboard Mancos Gray (Reed, 1958, p. 115). Again, it had not yet been demonstrated that the latter had a temporal separation from the earlier Moccasin Gray.

Abel, as we have seen above, placed strong emphasis on the temper of pottery and on the basis of sand temper in Piedra Black-on-white in the original description assigned it to the Chaco Series, as Colton did in his *Check List of Southwestern Pottery Types* (1955). In her examination of the pottery at BC 50–51, Hawley (1937, 1939) did not find Piedra Black-on-white part of the Chaco Canyon pottery complex. Hawley (1936) considers Piedra Black-on-white the Pueblo I pottery of the Piedra, Largo, and Gobernador drainages. As a result of their recent work in the Navajo Reservoir area, Dittert, Hester, and Eddy (1961, p. 232) are able to concur with Hawley. Some of us from the Wetherill Mesa Project had the opportunity of examining pottery from the upper San Juan in Santa Fe and discussing it with Dittert. The Piedra Black-on-white from that area is not as varied in design as that from Mesa Verde and is largely made up of simple parallel lines. There it is considered part of the Rosa-Gallina series. It is not unreasonable to accept Piedra as a component of two groups of pottery. It is a sand-tempered transitional form in the east, between Rosa-La Plata and Gallina-Arboles; in the west, with rock temper, it falls between La Plata and Cortez Black-on-white.

CORTEZ BLACK-ON-WHITE

We have seen, in the decorated pottery of the Pueblo I period here, the beginnings of the use of the concentric triangles, chevrons, and rectangles which were a dominant feature of Pueblo I pottery to the south. This style, as displayed on White Mound and Kiatuthlanna Black-on-white to the south, and on Kana'a to the southwest of Mesa Verde, made an impact in this area somewhat later and combined with the scalloped or ticked solid triangles and frets of the southern Red Mesa or Chaco Transitional style. These influences, plus a continuation of Piedra design elements, made up the characteristic early Pueblo II pottery of the Mesa Verde. The type was named Cortez Black-on-white by Abel (1955).

Previously it had been considered part of Mancos Black-on-white by O'Bryan and by Lancaster and Pinkley (1954, p. 70, pls. 47, 49, 50, 52, 53), although they admit the possibility of a separation. Morris (1939, p. 191) mentions the great similarity of his Pueblo II pottery to the earlier ware of Kiatuthlanna and describes and illustrates vessels generally quite distinct in design from later decorated pottery but assigns no names. In his survey on the Mancos River, Reed (1958, p. 81) found that "occasional sherds are difficult to place definitely between Piedra and Mancos, and a distinctive group

decorated in squiggled hachure seems to be transitional." He recognized a wide range of styles in Mancos but did not feel there was enough evidence on hand to justify a split of types. He mentions Piedra sherds with a tooled-coil exterior. The tooling of coils is a Mancos Gray trait and is considered here as early Pueblo II. What is here described as Cortez would include some of Reed's Piedra and some of his Mancos.

Prior to Abel's description, Martin (1936, p. 104), in his work at Lowry Ruin, was the only fieldworker in the area to attempt to separate the type. He found it in the lower levels of the excavation underlying his Mancos and McElmo and referred to it as Red Mesa, considering it to be intrusive from the Chaco country. Certainly the similarities of Cortez to Red Mesa are more striking than the differences, and a good case could be made for calling the former a mere variety of the latter. In spite of the fact that the design style is often identical, Cortez pottery differs from Red Mesa in its superior slip and polish and is definitely part of the local continuum despite the borrowing of design elements.

I believe Abel's establishment of the type to be a valid contribution which recognizes a style with definite spatial and temporal implication. Cortez Black-on-white is found only on Pueblo II sites and is associated with houses of rough masonry constructed in straight rows of rooms or ells, and with Mancos Gray, corrugated-neck straight-rim gray ware, and straight-rim Mancos Corrugated. The difficulty lies, as it does with every other type, in our inability to type all sherds. Since many Piedra elements were continued on Cortez and many elements adopted on Cortez continued in use on Mancos, a large body of sherds at each end of the scale must remain undetermined as to type. Cortez, manufactured for a comparatively short time, is a valuable diagnostic type, and one should be fairly demanding in recognizing it in order not to destroy its value. All sherds in the survey collections which exhibited features found on both Cortez and Mancos but none which seem to be purely Cortez were called either Mancos or were not named—accounting for the greater amount of Mancos Black-on-white in the sherd counts for Ackmen Phase sites. The current excavation of Badger House, an early Pueblo II site on Wetherill Mesa, is turning up great quantities of Cortez Black-on-white. Soon we should have a better description of the type and of its place in the picture.

DESCRIPTION (of 921 sherds from 162 sites)

Paste. From almost white to dark gray. Generally somewhat finer than in preceding types. Carbon streak on 29 percent; less common on jars than on bowls. *Temper:* Mostly crushed igneous rock, considerable sherd temper, and some of sand (see remarks).



Figure 40—Bowl and pitcher of Cortez Black-on-white. Chappell collection, Mancos, Colo. (pitcher 0.6' high).



Figure 41—Cortez Black-on-white rim forms.

Surface. Ninety-five percent of sherds were slipped and polished; 77 percent of bowls slipped on both inside and out. Slip usually thick and white and often with fine crackling. Three percent of bowl sherds with corrugated exterior with few of these slipped and polished over corrugations. Fire-clouding on 20 percent.

Shapes. Bowls, ladles, jars and canteens, and pitchers. Only two squash-pot rim sherds found. Bowls run three to two over jars and canteens, indicating much higher proportion of the latter than in Piedra. Indented jar base and indented strap handle make appearance. The hollow tube ladle handle occurs but the U-shape, half-gourd or wide flat handles are much more common (fig. 40). *Rims:* 85 percent either rounded or flat and somewhat tapered (fig. 41).

Thickness. Average 5 mm.; range 3–9 mm.

Design. Carried forward from Piedra are groups of vertical or oblique parallel lines from bottom to rim which frequently cross over a narrow subrim band, and often with a series of flags or triangles appended to the outside lines (fig. 42, *e–h, l*). Most characteristic of the type is the use of ticked or scalloped frets or scrolls employed either singly or interlocked in the Red Mesa style

(fig. 42, *a, j–l*); series of nested rectangles framing a small design element such as a stepped or terraced solid (fig. 42, *c*); “barbed wire,” wavy or zigzag lines (fig. 42, *b, d, f, h, i*); checkerboard and opposed ticked or scalloped triangles (fig. 42, *m–p*). Squiggle hachure, usually combined with one or more of the above techniques, appears on Cortez. Straight-line hachure is rare. Hachure, when it occurs, tends to be rather open and at right angles to the framing lines. Eighty-five percent of rims are painted. *Paint:* Mineral and usually a deep matte black with oxidation on some. (Since this was first written sherds from Badger House, Site 1452, have appeared which seem to be Cortez Black-on-white but with an organic paint.) Exterior decoration of bowls rare.

Remarks. The considerable variation in tempering material is of interest. The use of sherds as temper, first noted in Cortez, occurred in 30 percent of the 75 sherds inspected under a binocular microscope. Finely crushed rock was also present in most sherd-tempered specimens. Three sherds contained sand in addition to sherd temper; 13 percent were tempered with sand alone. The presence of so many sand-tempered sherds in a type receiving its decorative influence from the sand-tempered Chaco pottery is suggestive. The thick, white, highly polished slip on these specimens would rule out the possibility that they were imported from that area, however. Some sherds bearing Piedra design styles, but none of the elements typical of the new ware, were called Cortez because they bore a corrugated exterior or were heavily slipped and polished on both sides and were found in Pueblo II contexts.

Cortez Black-on-white differs from Mancos Black-on-white chiefly in the element of painted design, but because of an association limited to early Pueblo II traits the separation is useful. Because of its similarity in every other criterion, it might more appropriately be considered a variety of Mancos.

MANCOS BLACK-ON-WHITE

Mancos Black-on-white is the most common decorated pottery of the Mesa Verde area and was probably made for a longer period, with comparatively little change, than any other type since the La Plata Black-on-white of Basketmaker III and early Pueblo I times. It parallels quite closely the Escavada-Puerco-Gallup-Chaco series to the south both in design and in timespan. It is not so useful in dating as other local types because it occurred in the early Pueblo II Ackmen Phase, was common throughout the Pueblo II Mancos Phase, and was the predominant ware on many of the early Pueblo III McElmo Phase sites surveyed on Wetherill, thus spanning the years from about A.D. 950 to 1150.

Gladwin (1934) makes the first use of the name "Mancos Black on White," giving credit to Earl Morris for suggesting the name for the Mancos Phase. The ware was described by Martin (1936) for the first time, and the description has been amplified and redescribed often and well. Morris' (1939) exhaustive analysis of "Early Pueblo III" pottery would be difficult to improve on. The discrepancies in the various descriptions are largely differences of opinion as to where to draw the line dividing one type from another.

I should point out wherein the following description of Mancos Black-on-white from the Wetherill Mesa survey differs from others. Abel (1955) has described a type he calls Morfield Black-on-white, distinguished from Mancos by its rock temper and absence of slip. Both rock temper and unslipped pottery are common in all local types including classic Mesa Verde Black-on-white. Abel's Morfield sherds, available in the park museum, could probably be called either Mancos or Cortez Black-on-white. The bulk of "Morfield" I consider, with Rohn (1959), to be Mancos Black-on-white. Reed (1958), as mentioned above, included Cortez Black-on-white in his description of Mancos. Rohn (1959) has included in Mancos an organic paint variation which I shall treat separately for reasons brought out later.

DESCRIPTION (of 2,600 sherds from 400 sites)

Paste. Light to dark gray. Much like Cortez, well fired with carbon streak in 24 percent. *Temper:* 44 percent sherd (with varying proportions of crushed rock or sand—more rock than sherd in most specimens), 37 percent crushed rock, 8.5 percent sand.

Surface. Fire-clouding on 8 percent. Ten percent of jars and 13 percent of bowls unslipped but majority of these polished. Most bowls (69 percent) slipped both inside and out. Slip sometimes thin and bluish but usually substantial, clear white and well polished with a fine crackling of the surface. Although unpolished low spots can usually be found, compared with earlier wares or contemporary wares from surrounding areas, Mancos has an excellent surface finish. Corrugated exterior on 4.5 percent of bowls with rare occurrence of coiled or twined basket impression (fig. 63, *b*).

Shapes. Bowls, ladles (73 percent), short-necked jars, canteens, pitchers, seed jars (fig. 43), and but few sherds that could be from effigy vessels. No mug sherds here but Mancos Black-on-white mugs appear in the Clifford Chappell collection in Mancos, Colo. (fig. 44). The hollow tube ladle handle most numerous but the half-gourd handle still common. Some continuation of the early rounded loop handle on jars but the flat, depressed strap the most common. Handles on bowls occur rarely but observed were round horizontal loop, flat but-

ton of applied clay, and small perforated nipple. *Rims:* 78 percent rounded, 14 percent flat, 4 percent tapered, with no apparent differences between jars and bowls (fig. 45).

Design. A greater variety of design styles than in the preceding types, reflecting or paralleling most of the Pueblo II styles of the Anasazi and including solid triangles (15 percent), broad-line elements as in Escavada, Puerco, or Sosi (14 percent), checkerboard pattern (9 percent), and hachure between parallel framing lines as in Gallup, Chaco, or Dogoszhi (55 percent) (figs. 46-48). Life forms very rare. Rims usually painted solid (69 percent), sometimes ticked (4 percent). Simple line decoration of bowl exterior still rare (2 percent). *Paint:* Mineral. Dark gray, sometimes a greenish-gray to black; usually a deep, matte black. Eight sherds in polychrome: two shades of mineral paint.

Thickness. Average 4.5 mm.; range 3-7 mm. Jars average slightly less than bowls.

Remarks. The determination of the presence of a slip is not an easy matter when dealing with pottery as highly polished as most Mancos. Occasionally brush strokes indicate that an extra wash of thin clay was added, but more frequently there is no evidence that what appears to be an added coating has not been floated to the surface by excessive polishing of the damp surface. A check of 50 specimens under the microscope revealed the presence of a thin slip on two sherds which had previously been called unslipped. Several sherds which were thought to have been slipped showed in cross section no sharp demarcation between surface and the body of the paste.

In the working out of measurements and percentages, each of the design elements used was studied separately and checked against the sites from which they came to see if significant differences existed. Of the total of 2,600 sherds, 675 could not be typed by design style. In addition to the organization of elements mentioned above under "Design" were the following ones which altogether made up only 7 percent: step-and-terraces, broad-line spirals, dots and the use of repeated groups of parallel short lines of progressive increasing length pendant from the rim (common on small bowls and ladles) (fig. 46, *p*). Hachured sherds were further broken down into cross-hachure (fig. 46, *e*), straight line hachure (fig. 46, *c*, *d*), or squiggle hachure (fig. 46, *a*, *b*). Of the three, the cross-hachured sherds were the least common and straight-line hachure the most common, making up over a third of all sherds. Nothing much came of all this except that squiggle hachure appears to be an early trait, straight-line hachure comparatively late. We have already observed the appearance of the squiggles in Cortez and that the majority of Mancos sherds bearing



Figure 43—Mancos Black-on-white vessels from the Chappell collection. (Bowl on left 0.54' wide).



Figure 47—Mancos Black-on-white pitcher (cat. #13157/702). From Site 1344. (0.5' high).

Figure 48—Mancos Black-on-white bowl (#13156/702). From Site 1337. (0.65' high).

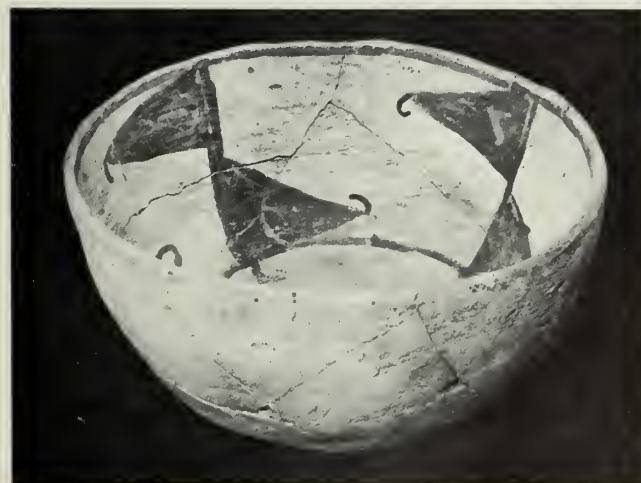


Figure 44—Mancos Black-on-white mug. Chappell collection. (0.3' high).



Figure 45—Mancos Black-on-white rim forms.

this design element came from early Pueblo II sites. Also of possible significance is that most of the broad-line spirals (fig. 46, *m*, *n*.) came from McElmo Phase sites. The most common style of Mancos found on Pueblo III sites was the straight-line hachure. Morris (1939, p. 202) had already found this out for us. Also of interest is the fact that straight-line hachured sherds were predominantly rock tempered whereas all other styles showed a predominance of sherd temper. The majority of ticked rim sherds were found on Pueblo III sites.

As with all other types discussed, there were sherds which could not be classified. Eighty sherds were felt to be in the Cortez-Mancos continuum but were not clearly one or the other and were not considered in the description. Perhaps both types could be better defined; this may be possible after future excavations supply us with more whole vessels. Many of the sherds which have been here considered Mancos could have been from Cortez vessels. Squiggle hachure and checkerboard patterns occur on the latter, but if not combined on the sherds with exclusively Cortez features, they were considered to be Mancos.

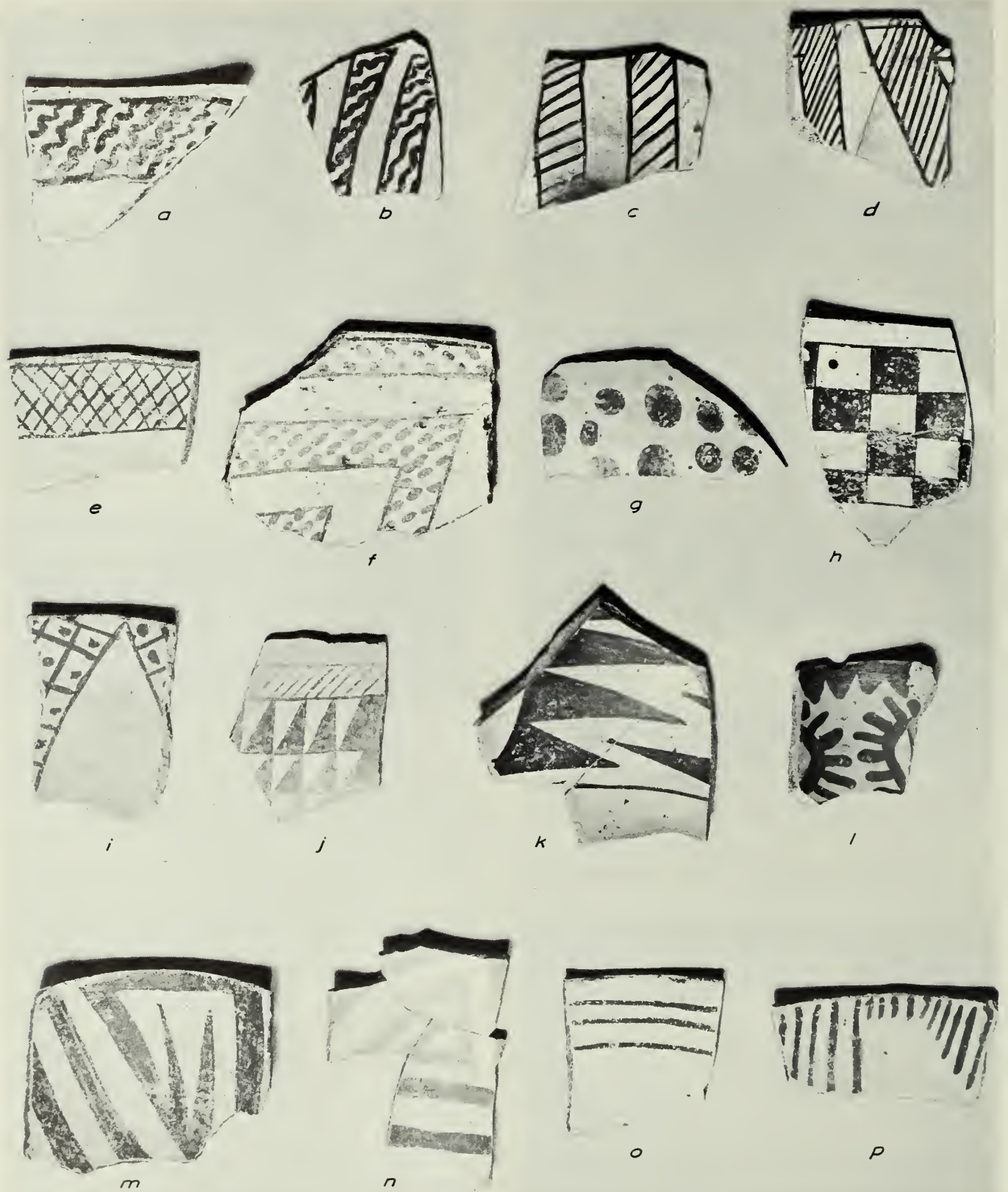


Figure 46—Mancos Black-on-white sherds.

WETHERILL BLACK-ON-WHITE



Figure 49—Mancos Black-on-white bowl and pitcher in carbon paint, the proposed Wetherill Black-on-white. Chappell collection.



Figure 50—McElmo Black-on-white bowl (cat. #13147/702), 1.1' wide. Found at Site 1308 with jar in figure 35.

Figure 51—McElmo Black-on-white jar 0.6' high with remnants of yucca leaf sling (cat. #13182/702). From Site 1433.



The continuum of types from early to late in the occupation of the Mesa Verde is quite clear. The changes in decorated pottery styles from Mancos Black-on-white to Mesa Verde Black-on-white can be demonstrated to be a gradual and continuous change within the same tradition, but the narrative of this change is difficult because of the confusion in the literature. It is with trepidation and at risk of compounding the confusion that I relate what the transition looks like from a study of the Wetherill Mesa Survey material.

Reed (1958, p. 102) has defined the extent of the problem of McElmo Black-on-white. Most students of Mesa Verde ceramics have recognized the local continuity of types and that in the series between Mancos Black-on-white and Mesa Verde Black-on-white something else occurred which has usually been called McElmo Black-on-white, but descriptions of the type or types vary greatly. At least three fairly distinctive styles or techniques belong in this part of the ceramic history and have been called McElmo Black-on-white, entirely or in part, by someone. They are: (1) what is essentially Mancos Black-on-white in carbon-paint (fig. 49), (2) an often unslipped, primitively decorated pottery with sloppy carbon paint linework (figs. 50, 51), and (3) Kidder's "proto-Mesa Verde" (fig. 52).

The first of these forms was treated by Morris, who called what we now know as Mancos Black-on-white, "early Pueblo III Black-on-white." He mentions "the gradual coming-in of the organic black" (Morris, 1939, p. 206) and illustrates several vessels of the ware (*ibid.*, pls. 299–301) which he considers the forerunner of true Mesa Verde. The elements of the designs are Mancos, the arrangement of the elements tends to banding below the bowl rims, and the paint is carbon. It is this style that Wendorf refers to as McElmo Black-on-white, which he describes as having "designs in organic paint in the 'Dogoszhi' and 'Sosi' styles" (Wendorf, 1956, p. 6, figs. 36, 38, 120, 121). O'Bryan lumps all carbon-paint pottery that is not true Mesa Verde Black-on-white into the McElmo category, including that with Mancos design (O'Bryan, 1950, pls. 46, a; 47, a, f, g, i). Rohn's approach to the problem is to consider it an organic-paint variation of Mancos Black-on-white (Rohn, 1959, p. 11). This is reasonable inasmuch as he has further considered Styles 2 and 3 of this transitional pottery to be the McElmo varieties of the *type* Mesa Verde, and certainly the style in question is closer to Mancos than to Mesa Verde. I agree with the principle of separating this style from McElmo but would go farther.

As the survey material was studied in the laboratory it became more and more obvious that it was this "Mancos" in carbon paint which was associated with the early Pueblo III unit pueblos and with no other phase; whereas Styles 2 and 3, here acknowledged as McElmo Black-on-white, although occurring in varying proportions in large collections from these sites, are also found in greater quantities on late Pueblo III sites. "Carbon-paint variety of Mancos Black-on-white" was an awkward term to use for anything referred to so often; in labora-



Figure 52—McElmo Black-on-white (proto-Mesa Verde) bowls from the Chappell collection. (Bowl on right is 0.6' wide).



Figure 53—Wetherill Black-on-white rim forms.

tory notes it was called "type x." I do not like to be responsible for adding to the proliferation of names of pottery; but as I believe it to be more significant than McElmo Black-on-white, I propose to call it Wetherill Black-on-white. If this "kind" of pottery continues to deserve being singled out, it might properly be called

the Wetherill variety of Mancos Black-on-white. Table 3 correlates, if I have interpreted them correctly, various systems of Mesa Verde ceramic classification and, in particular, shows how Wetherill Black-on-white fits into the series.

DESCRIPTION (of 269 sherds)

Paste. Indistinguishable from Mancos Black-on-white. *Temper:* 60 percent crushed rock, 40 percent sherd. Most sherd-tempered specimens carry more rock than sherd. Carbon streak 20 percent.

Surface. Same as Mancos Black-on-white. Seventy-six percent of bowls slipped and polished on both sides; 6 percent unslipped but polished inside or both sides; 3 percent with corrugated exterior. One sherd each of tooled coil exterior and basket impression. Slip and polish a little heavier than on Mancos average.

Shapes. Same as Mancos Black-on-white. Seventy-four percent were bowls or ladles but possibly many jar sherds were not recognized, as jars in McElmo and Mesa Verde often have very open design and are more primitive-looking than bowls. *Rims:* 62 percent rounded, 30 percent flat. Flat rims increased over Mancos Black-on-white; these are not the square rims of Mesa Verde Black-on-white but are tapered (fig. 53).

Design. Essentially the same as Mancos Black-on-white, employing same elements as in earlier ware but in carbon paint. Tendency to arrange design in a band under the rim (fig. 54, c-e, j, k) and in a somewhat bolder or more open layout, perhaps necessary because of blurring of painted lines, for new carbon-paint medium not yet mastered. Three sherds of "polychrome" using combinations of mineral and organic paint. One with anthropomorphic figure. Rim ticking increased to 34 percent, unpainted rims to 44 percent. Exterior decoration of bowls even rarer than on Mancos Black-on-white.

Thickness. Bowls average 5 mm.; range 4-6 mm. Jars average 4.6 mm.; range 3-6 mm.

Remarks. In this ware we see the first steps in the trail from Mancos Black-on-white to Mesa Verde in the increase in rim ticking and of the flattened rims, a slight increase in thickness of vessel wall, a little more emphasis on surface finish, the beginnings of banded design layout, and, most significant, the jump to carbon paint. It is not the dominant type at any site, but is found in appreciable quantities only on the mesa-top unit pueblos of the McElmo Phase, associated with Mancos Black-on-white and Mancos Corrugated, and rarely with the proto-Mesa Verde style of McElmo Black-on-white. The latter, however, is more common on Mesa Verde Phase sites where Wetherill Black-on-white does not follow.

McELMO BLACK-ON-WHITE

That the transition from Mancos Black-on-white to classical Mesa Verde was not abrupt was first pointed out by Kidder (1924, p. 67, pl. 27, *a*), who called the pottery from the large unit pueblos of the Four Corners country "proto-Mesa Verde." The pottery he illustrates appears to be the same type that Martin (1936) describes as McElmo Black-on-white, borrowing the name from Gladwin (1934). O'Bryan (1950) and Abel (1955) at least include "proto-Mesa Verde" in their McElmo from Chapin Mesa, although the former illustrates some that I would call classic Mesa Verde Black-on-white. Reed (1958) describes McElmo from his Mancos Canyon Site 1 that would be Kidder's proto-Mesa Verde but recognizes from his collection that he had several varieties that were either McElmo or Mesa Verde but not cohesive enough to type. On Alkali Ridge, in Unit 1 of Site 13, Brew found such variety in the transition from Mancos to Mesa Verde that he was content with the understanding that a large number of the sherds between the two were untypable and that McElmo can safely be called early Mesa Verde (Brew, 1946, pp. 199, 285). The publications dealing with Chaco Canyon also lack agreement on what McElmo is.

Lancaster and Van Cleave (1954, p. 103), in dealing with the pottery from Sun Point Pueblo, thought of McElmo as a style of Mesa Verde rather than a separate type. Some of it certainly is that, but when O'Bryan

(1950, p. 99) says, "Undoubtedly, inferior Mesa Verde potters continued to make many McElmo vessels," he is implying that it is sloppy Mesa Verde, which it is not. A vast range of skill is exhibited in every type. Carelessly done Mesa Verde is still Mesa Verde Black-on-white. Rohn (1959) has gone a step farther than Lancaster and Brew and described McElmo not as a type but as a variety of Mesa Verde. Like O'Bryan, Rohn includes in his description of McElmo "very crudely executed Mesa Verde Black-on-white designs as might be done by novices or physically ailing potters." Although I cannot agree with classificatory separation of substandard pots, I do agree that there is logic to the assignment of varietal status to McElmo.

Certainly the differences between McElmo, whatever it is, and Mesa Verde are not as great as those between some of the design styles within the type Mancos Black-on-white. What is described below as McElmo is essentially "proto-Mesa Verde" (fig. 55, *k-m*) and is Rohn's McElmo, minus the amateur Mesa Verde. It succeeded Wetherill Black-on-white described above, closely preceded classic Mesa Verde, and then continued to be manufactured concurrently with the latter. It is found in small percentages on McElmo Phase surface pueblos associated with Mancos Black-on-white and Wetherill Black-on-white, and also in minor proportions in cliff dwellings where Mesa Verde Black-on-white is the dominant decorated pottery. On only two sites surveyed was it the dominant type.

TABLE 3.—*Correlation of various systems of Mesa Verde pottery classification*

Dates A.D.	900	1000	1100	1200	1300
		(illustrates carbon paint and ticked rim)			
Martin	Red Mesa B/W	Mancos B/W	McElmo B/W	Mesa Verde B/W	
Morris	Pueblo II B/W	Early P III (mineral paint)	Early P III (carbon paint)	Mesa Verde B/W	
Abel	Cortez B/W	Mancos and Morfield B/W (no mention of carbon paint)		McElmo B/W	Mesa Verde B/W
Reed	(admits possibility of separation)	Mancos B/W	(admits possibility of separation)	Mesa Verde B/W	
Rohn	Cortez B/W	Mancos B/W (organic paint variation)		McElmo and Mesa Verde B/W	
Hayes	Cortez B/W	Mancos B/W	Wetherill B/W	McElmo and Mesa Verde B/W	



Figure 54—Wetherill Black-on-white sherds.

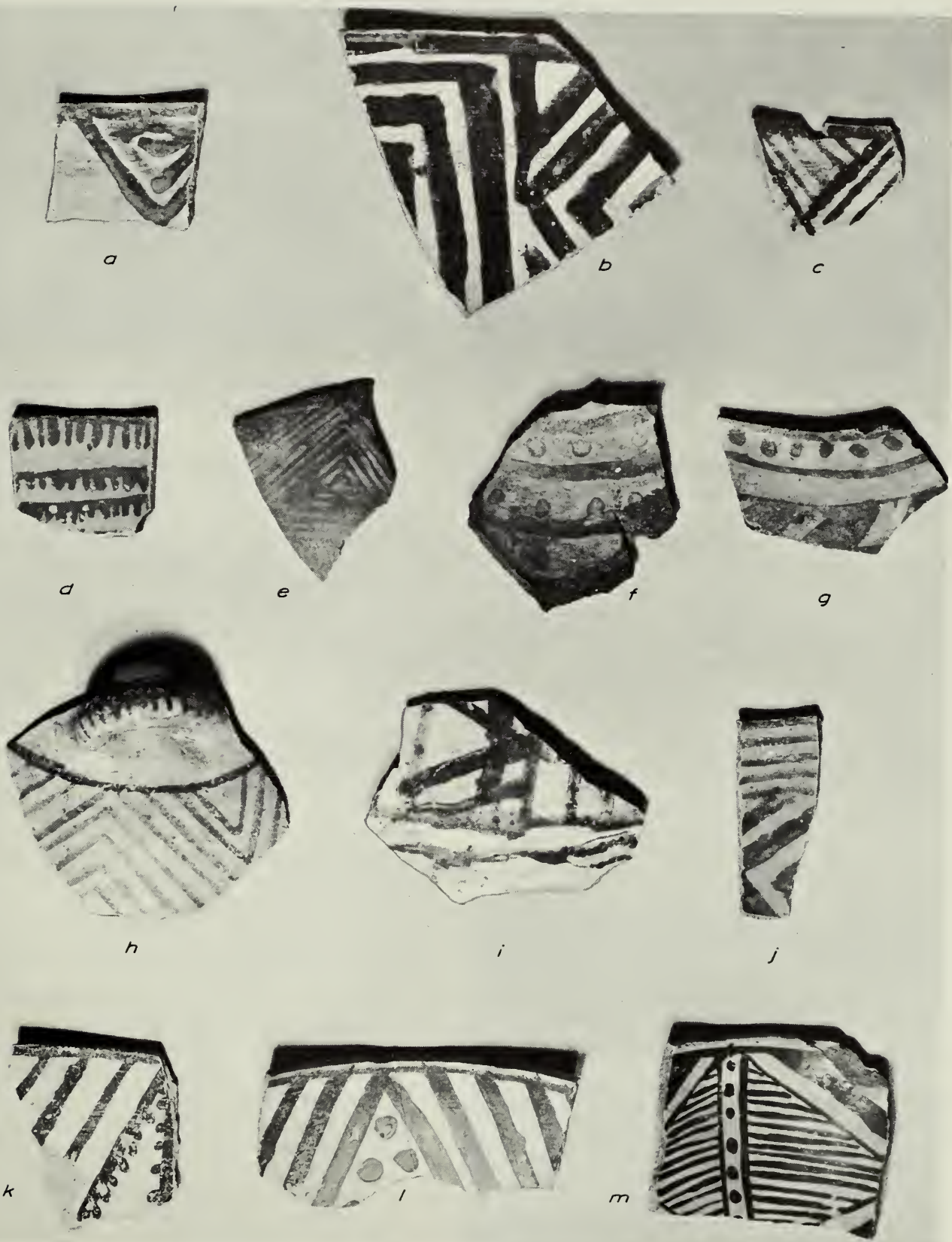


Figure 55—McElmo Black-on-white sherds.



Figure 57—Mesa Verde Black-on-white bowl (cat. #12043/702), 0.96' high. From Site 1365.



Figure 58—Mesa Verde Black-on-white jar (cat. #12043/702), 0.92' high. From Site 1187.

After separating Wetherill Black-on-white and eliminating unesthetic Mesa Verde, we are left with a couple of fairly distinctive groups, but unfortunately a number of combinations of Mancos and Mesa Verde still make a catchall of McElmo. This makes a far from satisfactory typology whether McElmo is a "type" or a "variety." I do not consider the style to be diagnostic of the McElmo Phase unless found in some quantity in sites displaying no Mesa Verde, and such sites are rare. In coarse sorting I include it with Mesa Verde Black-on-white.

DESCRIPTION (of 346 sherds)

Paste. Dark gray to almost white. Carbon streak 30 percent. Tends to be somewhat crumbly and softer than Mancos. Fifty-five percent sherd tempered (with much rock included), 45 percent rock tempered. Temper ground finer than in Mancos.

Surface. Twenty-eight percent unslipped but with some degree of polish, most of balance slipped and polished both sides. Slip often thick and heavily polished. Some crazing of surface. Rare bowls are slipped and polished inside but unfinished out.

Figure 56—McElmo Black-on-white rim forms.



Shapes. Bowls shallower and with more sloping sides than in Mancos. Ladles with hollow tube, round solid, or strap handles. Half-gourd type diminishing in importance but persisting. Jars, canteens, and mugs. Bird effigies seen in local collections. Reappearance of Piedra-style round loop jar handle. *Rims:* 55 percent round, 45 percent flat but only one of these squared as in Mesa Verde. Less taper to rims than in Mancos and often none (fig. 56).

Design. Primitive Mesa Verde designs consisting of broad line, triangular frets, nested chevrons, often in banded layout under bowl rims (fig. 55). The dark gray, unslipped sherds most often with modified Mancos styles such as closely spaced lines framing rows of ticks or dots, checkerboard pattern with dots in the white squares. Paint organic and often runny or blurred. Mineral paint on rare specimens. No polychromes in survey sherds. Sixty-seven percent of rims ticked. Also occurring are Mancos designs on thick-walled, untapered-rim bowls and Mesa Verde designs on thin-walled, tapered- and rounded-rim vessels. No exterior decoration noted.

Thickness. Bowls average 5.5 mm.; range 4.5–7 mm. Jars average 5.6 mm.; range 4–8 mm.

Remarks. Typical of the range of pottery in McElmo Phase site are the 83 decorated sherds picked up at Site 1801, a small unit pueblo on the ridge east of Bobcat Canyon. Twenty-seven of these were Mancos Black-on-white decorated with mineral paint. Eight were Wetherill Black-on-white, Mancos design in organic paint. Twenty-one sherds were typed as McElmo Black-on-white constituting a higher percentage of this type than is usual. Five were thin walled and with tapered rims, and one was Mancos in design but Mesa Verde in thickness.



Figure 59—Mesa Verde Black-on-white mugs from ruins near Cortez, Colo. Mug on extreme left is in mineral paint. Chappell collection.

of paste and in approach to design layout. Fourteen sherds could not be ascribed to any variety or type but belonged in the continuum. Thus 43 of the 83 sherds were neither Mancos nor Mesa Verde. The site seems to have been occupied for a comparatively short time in the Mancos Phase, not at all in the Mesa Verde Phase. There is little question what era the site represents and no indication that any of the pottery is exotic. If we were to lump all the pottery decorated with carbon paint from this site into McElmo Black-on-white, we might be guilty of a rather loose-jointed use of taxonomy but we would be describing the pottery of a spatially and temporally compact phase.

Rohn has assigned the later styles of McElmo a varietal status under the type Mesa Verde Black-on-white; some of McElmo has become the carbon-paint, or Wetherill, variety of Mancos. We have thus eliminated the type, but whether the problem of McElmo has been eliminated will have to be proved by the spade. We can hope the excavations on Wetherill will help.

MESA VERDE BLACK-ON-WHITE

DESCRIPTION (1,059 sherds)

Paste. Gray to white. Tends to be softer than Mancos and crumbly. Averages 2.5 on hardness scale, contrasted to 4.9 for Mancos. *Temper:* 26 percent crushed rock (combined with sand or sandstone in 2 percent), 72 percent sherds (combined with sand or sandstone in 14 percent), 2 percent sand. The sand or sandstone in many sherds could be result of grinding temper on sandstone metates. Carbon streak 24 percent.

Surface. Eighty percent of bowls slipped and polished both sides, 14 percent with self-slip or float in and out, 2 percent unslipped. Surface, whether slip or float, usu-

ally heavy or opaque, gray through cream to clear white, frequently with fine crackling, polish frequently a high luster with appearance of a glaze. Slip harder than paste (3.7). Corrugated exterior very rare.

Shapes. Bowls, ladles, jars, canteens, mugs (figs. 57–59). Pitchers and effigies seen in private collections from vicinity. Jars globular with high shoulders and narrow mouth, short necks often corrugated. Kiva jars with pottery lids; seed jars rare. Jar handles round, or undepressed flat straps, below shoulder of vessel. Ladle handles hollow tube, round or flat, none of the half-gourd type seen. One narrow troughlike handle. *Rims:* 94 percent untapered and flat, usually squared. Jar rims slightly flared. The bowl rim sloped from the inside or slightly flared is rare, between 1 and 2 percent (fig. 60).

Figure 60—Mesa Verde Black-on-white rim forms.



TABLE 4.—Changes in black-on-white pottery

T: Trace

Type of black-on-white pottery	Carbon streak (%)	Fire-clouding (%)	Thickness (mm.)	Tapered rim (%)	Rounded rim (%)	Flat rim (%)	Solid painted rim (%)	Ticked rim (%)	Exterior decoration of bowls (%)	Rock temper (%)	Sherd temper (%)	Sand temper (%)	Mineral paint (%)	Organic paint (%)	Slipped (%)
La Plata.....	29	10	4.5	T	68	24	25	0	2	96	0	3	79	8	0
Piedra.....	9	9	4.7	7	50	36	43	0	1	96	0	3	96	4	10
Cortez.....	29	20	5	5	62	23	85	0	3	44	30	13	100	0	95
Mancos.....	24	8	4.5	4	78	14	69	4	2	37	44	8.5	100	0	88
Wetherill.....	20	?	5	2	62	30	22	34	T	60	40	0	0	100	94
McElmo.....	30	30	5.5	0	55	45	12	67	0	45	55	0	T	100	72
Mesa Verde.....	24	?	6.4	0	3	94	0	97	25	26	72	2	T	100	94

Designs. Same design elements as earlier but different approach to layout. Eighty-one percent applied as bands, between base of neck and shoulder on jars, and under the rim of bowls. Narrow bands of lines immediately under the rim either comprising the sole decoration or preceding a band of other elements is common. Seventy percent display from 2 to 17 such lines (fig. 61, *a-e, g*). Allover patterns, only 11 percent of survey sherds, are combinations of curved-line solids and hachured areas suggestive of Tularosa style (fig. 61, *g-i*). Linework neat and balanced in well-controlled organic paint. Three sherds in mineral paint. Three sherds had a polychrome in gray and black, evidently a planned effect (fig. 61, *j*). A few sherds heavily slipped and polished with no design (fig. 63, *g*). Rare design in small, widely separated elements. Occurrence of zoomorphic figures rare but increased over Mancos Black-on-white. Twenty-five percent of bowls have an exterior decoration, most commonly in a banded pattern under rim (fig. 57) but often consisting of several widely separated single elements. Ninety-seven percent of rims decorated with ticks, dots, triangles, or some combination of them. None were painted solidly.

Thickness. Bowls average 6.4 mm.; range 4—11 mm. Jars average 5.4 mm.; range 4—7 mm.

Remarks. Proportions of jars to bowls cannot be figured accurately. Decoration on jars did not always follow the distinctive style common on bowls, with the result that varietal difference is hard to determine. Design on ladle interiors also seemed to lag, so that ladles of the late Pueblo III Period were often merely Mancos designs in carbon paint. A feeling that the Tularosa style is foreign and late rather than an outgrowth of somewhat similar layout sometimes seen on Mancos might be

checked by future excavation or perhaps be determined by current work in Mug House and Long House. The appearance of the sloped or flared bowl rims is interesting. It is a fashion not presaged by anything in the earlier local wares, but occurs on earlier Pueblo III Flagstaff Black-on-white and later on Polacca Black-on-white, both from Arizona to the southwest.

SUMMARY OF BLACK-ON-WHITES

Table 4 illustrates some trends in the continuum of decorated black-on-white pottery on Wetherill Mesa. There is a relatively steady increase in thickness of vessel wall from La Plata to Mesa Verde, in percentage of slipped surfaces, and in use of sherd temper. Other features show no consistent pattern. Flattened rims, quite common on the earlier types, diminish with Mancos Black-on-white then climb steeply to almost 100 percent with Mesa Verde. Occurrence of solid painted rims increases through Cortez and then drops off in importance just as rim ticking increases from an appearance in Mancos to become *de rigueur* on Mesa Verde bowls.

The thickness of vessel walls is interesting compared to measurements given in Table 2 for utility wares. We note that, as dimensions increase on decorated pottery, there is a consistent refinement of gray ware. The thinnest-walled painted pottery is Mancos Black-on-white; it was with this pottery that Mesa Verde potters reached their peak of ceramic skill though brushwork became finer with succeeding generations. A classic Mesa Verde Black-on-white bowl might win a blue ribbon at the arts and crafts fair and draw more comment on the whatnot shelf, but its parent was lighter and harder.



Figure 61—Mesa Verde Black-on-white sherds.

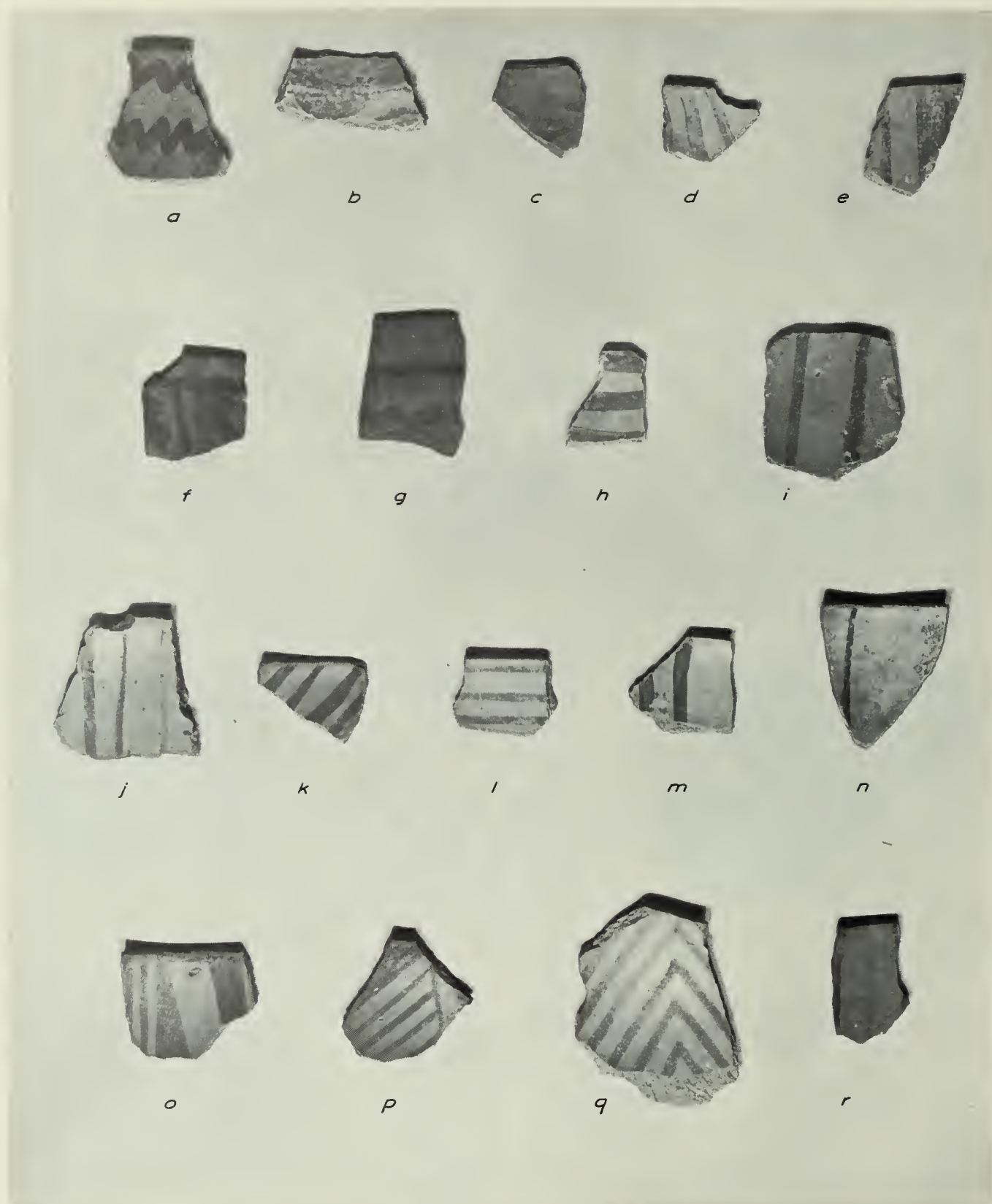


Figure 62—Sherds of San Juan Redware, a–g. Abajo Red-on-orange, o–r. Bluff or La Plata Black-on-red. The others not typed.

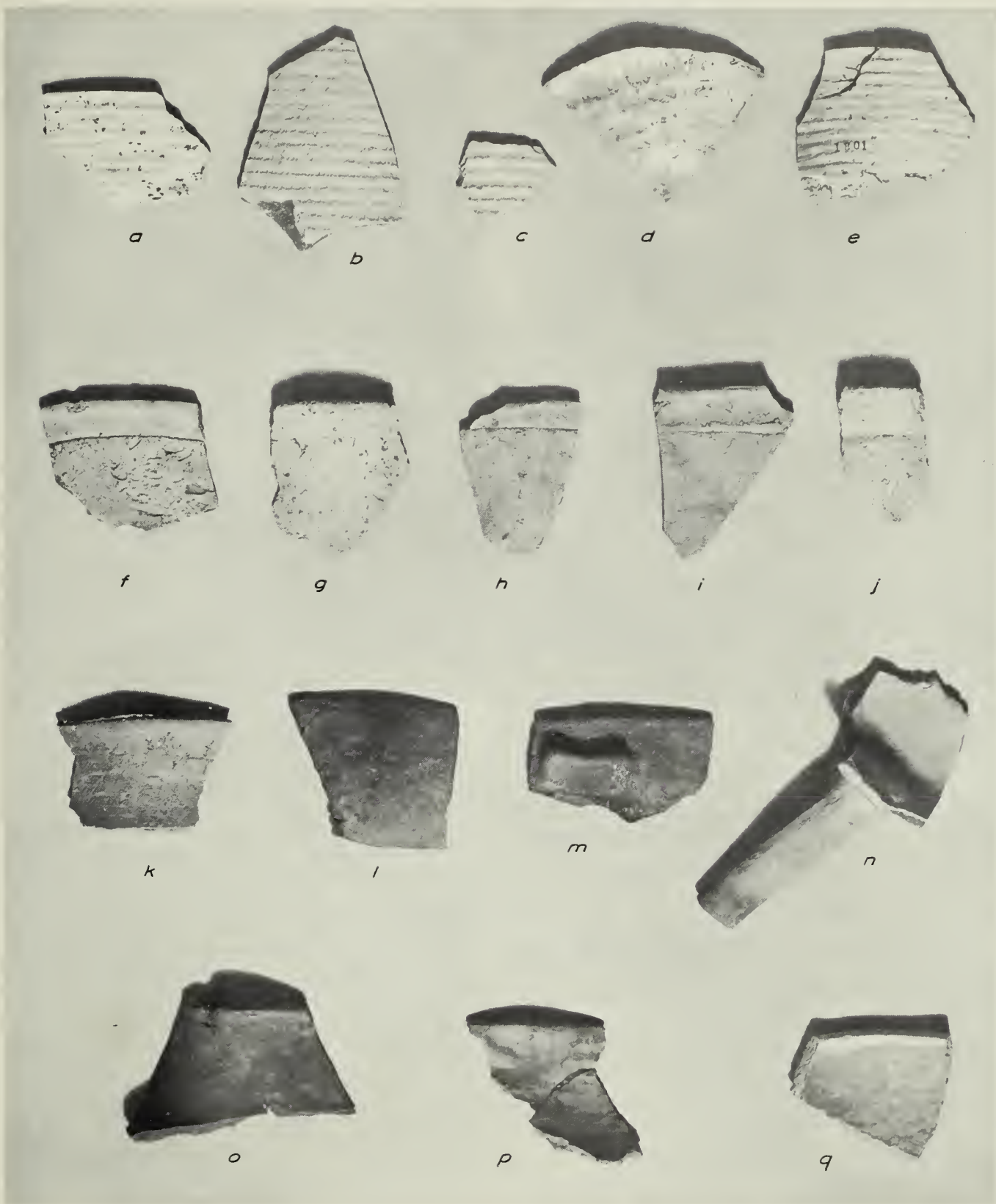


Figure 63—Miscellaneous sherds. *a*–*e* with basket impressions; *f*–*k* from utility vessels with all corrugations rubbed out; *l*–*q*, sherds of vessels probably intended for decoration but fired before finishing.

SAN JUAN REDWARE

Exclusive of definitely exotic types, only 226 red sherds were collected from 65 sites. Although they make a very small percentage of the decorated sherds collected, they do amount to more than the total of all La Plata and Piedra Black-on-white picked up. Almost unquestionably red pottery was made locally in Pueblo I and II times but did not equal in popularity the black-on-white types.

Abajo Red-on-orange was described for the Alkali Ridge country to the west of Mesa Verde (Brew, 1946), and La Plata or Bluff Black-on-red from the La Plata Valley to the east by Morris and Shepard. The latter has this to say after comparing La Plata and Alkali Ridge sherds. "The black-on-red ware of the intervening area has not yet been studied, however, and for the present the origin and relationships of La Plata black-on-red must remain an open question" (Shepard, 1939, p. 272). The intervening area is the Mesa Verde, and it is obvious that both types are represented in local surface collections; but the question must remain open a while longer. Of the total number of red sherds collected, 130 were painted; of this number I felt confident in the naming of only 20. The rest of the sherds could not be distinguished.

Local red sherds are recorded in the tables as San Juan Redware. This is an evasion of the question but an attempt at anything more definitive with so small a sample would be of little value. Excavation planned and already underway on Wetherill Mesa should provide a great quantity of red pottery, holding promise of shedding light on the "open question."

Of the sherds illustrated in figure 62, I have called *a-g* Abajo Red-on-orange; the four sherds *o-r* I believe are Bluff or La Plata Black-on-red; those in between belong there but where the line is drawn I do not know.

MISCELLANEOUS

Mentioned here are a few odd sherds that could not be conveniently worked into discussions of named types and varieties. Of several bearing the impression of textile material on the exterior, five are illustrated in the top row of figure 63. The practice of using a small basket as a mold in forming the base of early gray wares has been mentioned in several ceramic studies. It is interesting that all the basket impressions on survey sherds appear on later types. All those illustrated bear the impression of coiled basketry. In figure 63, *a* and *c* are of small bowls, unpainted but with a polished interior. The first is from a small Ackmen Phase house, Site 1739; the second, from a one-room Mesa Verde Phase house on

the talus, Site 1425. Figure 63, *b*, bearing a Mancos Black-on-white cross-hachured design on the inside, was found on a pueblo, Site 1149, built on the talus slope and occupied in the Mancos through Mesa Verde Phases. A small cave near the south end of the mesa, Site 1717, produced *d*, a jar base with a spotty white slip. Mancos and McElmo Phase pottery was abundant here. The inside of the sherd, figure 63, *e*, is decorated in the McElmo style. It was in the collection from Site 1801, a unit pueblo representing Mancos and McElmo Phases. One bowl sherd, not illustrated, bore the impression of what seemed to be a twined fabric. The interior design was Mancos Black-on-white. The sherd was found at Site 1649, a small Ackmen Phase house.

It has been noted that the decorated vessels from Cortez through Mesa Verde Black-on-white were of a different paste than the utility wares that were made at the same times. Frequently sherds are found on Pueblo II and III ruins which are made in the same shapes and of the same clay and temper as those decorated types but are plain. These undoubtedly are from vessels which were planned as black-on-white pots but, at the whim or convenience of the potter, were fired before they were finished. Some of the intermediate steps were eliminated. In figure 63, *l-n* the sherds have been scraped or smoothed but not polished. The jar rims, *o* and *p*, have been lightly polished; and *q*, a Mesa Verde bowl rim, has been slipped and polished but not painted. Pottery was discovered in all stages of manufacture from a lump of potter's clay found in Site 1365 through sherds of unfired vessels, from several sites, to the finished product.

TRADE WARES

Trade contacts with surrounding areas as evidenced by the occurrence of "exotic" pottery types was comparatively slight. Only 47 sherds from 33 sites were classified as trade wares, but it is likely that others were overlooked. The range of variation within any type is so great that the eye becomes dimmed. And, too, one has a tendency to see in pottery the types he knows best. Some of our "foreigners" were shown to Alexander Lindsay of the Museum of Northern Arizona and to Roy Carlson and William Wasley at the University of Arizona. Lindsay saw the possibility of Tsegi Black-on-orange in a sherd for which Wasley and Carlson suggested Puerco Black-on-red. A sherd that Lindsay suggested might be Medicine Black-on-red, a type near to his base, is to me a quite acceptable La Plata Black-on-red. With the exception of a very few, however, it was possible to assign a ware if not a type, and for help on the northeastern Arizona and White Mountain wares I am indebted to the

three men named above and to Florence Lister for their contributions.

Types identified were:

- Kiatuthlanna Black-on-white from Site 1573
- Red Mesa Black-on-white from Sites 1157, 1559, 1591, 1617, 1671
- Escavada Black-on-white from Sites 1230, 1232, 1452, 1517, 1651
- Gallup-Chaco Black-on-white from Sites 1178, 1230, 1326, 1437, 1520
- Padre Black-on-white from Site 1452
- Snowflake Black-on-white from Site 1610
- Kana'a Black-on-white from Site 1597
- Lino Gray from Sites 1685, 1793
- Puerco Black-on-red from Site 1670
- Wingate Black-on-red from Sites 1106, 1107
- Tusayan Black-on-red from Sites, 1241, 1244, 1671, 1780
- Tusayan Polychrome from Sites 1169, 1291
- St. Johns Polychrome from Sites 1180, 1896
- Houck Polychrome from Site 1106

The most common trade ware was Escavada Black-on-white, which with Red Mesa made up almost half the

total number of foreign sherds. The greater occurrence and the time-space distribution of all trade types suggest an earlier and more sustained contact with peoples in northwestern New Mexico, the Chaco drainage, and Chuska Valley than with people west of the Lukachukai Mountains (table 5). Except for the lone piece of Kana'a Black-on-white, all types with an Arizona provenience are essentially Pueblo III types. The later date of sherds originating west of Mesa Verde does not necessarily indicate a change of direction on the part of trade or traders so much as a wider range. The lack of late types from the south is to be expected, for by late Pueblo III the sites of the Chaco Plateau were dominated by Mesa Verde pottery types.

Of interest are two sherds, from different vessels, from Site 1452, identified by Florence Lister as Ivie Creek Black-on-white. This suggestion of contact with the Fremont culture needs more exploration; it is a thing one would expect from Mesa Verde's location. Ivie Creek Black-on-white and Mesa Verde Black-on-white sherds were found together at the Coombs site near Boulder, Utah (Lister, 1960).

TABLE 5.—*Exotic sherd types from Wetherill Mesa survey with estimated period of manufacture*

Sherd type	Date, A. D. —													Number of sherds
	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	
Kiatuthlanna B/W														1
Red Mesa B/W														5
Escavada B/W														6
Gallup-Chaco B/W														2
Wingate B/R														2
Puerco B/R														1
Kana'a B/W														1
St. Johns Polychrome ..														2
Tusayan B/R														5
Tusayan Polychrome ...														2
Snowflake B/W														1
Padre B/W														1
Houck Polychrome														1

conservation of soil and water

Construction for the purpose of conserving soil and moisture on Wetherill Mesa is of two general types. First are tanks or reservoirs for the impounding of domestic water, and second, low terraces to catch eroding soil and to slow the runoff. The latter can be further subdivided into check dams built across arroyos where water is channeled (fig. 64), and terraces following the contour of a slope where runoff is sheeted (fig. 65). The few definite storage tanks on Mesa Verde will be dealt with later. Soil-holding terraces are numerous. Sites including one or more such terraces numbered 136 with an estimated 943 individual terrace walls. Many more must have been washed away (map 4).

Nordenskiöld (1893) noted and illustrated terraces on Mesa Verde and speculated on the possibility of their use for farming plots. Stewart (1943) made a more detailed description of some of the extensive check-dam sites on the mesa. Remarkably similar developments are described for the Point of Pines area in southeastern Arizona by Woodbury (1961), who uses the terms "terraces" and "linear border" for "check dam" and "contour terrace" as they are used here. The latter two terms are in common use in present-day soil conservation practice to denote two types of terraces, whereas the term "border" has a somewhat different meaning in current irrigation farming.

Of the 136 sites surveyed, only 71, containing 412 individual terraces, were on the mesa top. A few of these were long contour terraces on the slopes just above the top of the cliff, but the majority were check dams located in shallow arroyos near the cliff edge. With the exception of a very few in the bottoms of the main canyons, the rest of the terraces were found on talus slopes between the base of the lower bluffs and canyon bottoms. On the talus locations check dams were most numerous, but contour terraces common.

Typical mesa-top check dams occur at Site 1444 near



Figure 64—Four of a series of 10 check dams in the drainage of Rock Springs Canyon. Site 1485.



Figure 65—One of four terraces on the talus slope in Long Canyon. This one is 15 feet long, 2 feet high, and holds considerable soil. Site 1361.

the cliff edge above Kodak House (fig. 66). Here bedrock is exposed in an arroyo for 200 feet back from the pour-off at the edge of the mesa. Six terraces built across the wash above this point have collected soil to the depth of 3 feet. Subsequent washing has partially destroyed five of the six checks but the remaining portions of those still hold soil. One, still complete, is 50 feet long and holds a depth of 3.5 feet of soil. The ends of the unbroken terrace are buried in the banks of the arroyo. The grade is gentle, with an average of 21.6 feet between walls. The masonry, of large unshaped stones, is based on bedrock. The considerable amount of soil retained for better than six centuries by these check dams is a testament to their value. Since it is unlikely that the builders placed them in a trench, the arroyo bottom must have been bare rock at the time of their construction.

Eight check dams in a series at Site 1404, on the talus slope at the mouth of Bobcat Canyon, are on steeper ground and are placed closer together, averaging 8.7 feet between checks (fig. 67). They vary in width from 6 to 20 feet, with a maximum wall height of 3 feet. Large colluvial sandstone boulders were used by the builders as abutments for several of the check dams, and other large stones were incorporated in the walls. Three of

these large boulders were topped with smaller stones which may have served as boundary markers, like the upright slabs used for that purpose in the Point of Pines area (Woodbury, 1961, p. 13). One of these is shown in figure 68. Another possible boundary marker is found near Site 1399 about 200 feet to the south.

Not far from Site 1404 is a terrace complex combining check dams and contour terraces. Site 1398 (fig. 69) consists of two check dams and two contour terraces 42 and 53 feet long. The latter probably carried overflow water from the shallow arroyo and spread it onto the relatively level bench to the south. The two walls running east and west to the south of the contour terraces are built against the base of a steep bank, and prevent alluvium from washing onto the farm plots, but allow water to be kicked back to the west above the upper terrace. A similar system of water control is described by Cushing (1920, p. 156) at modern Zuñi Pueblo.

A true terrace is Site 1316 in Rock Canyon near the mouth of the *rincon* below Long House. Here an unbroken wall 5 feet high and 16 feet long is butted on a large fallen boulder some 20 feet in front of the foot of the talus. An artificial bench, 40 by 30 feet, was created of rather level alluvial soil (fig. 70).

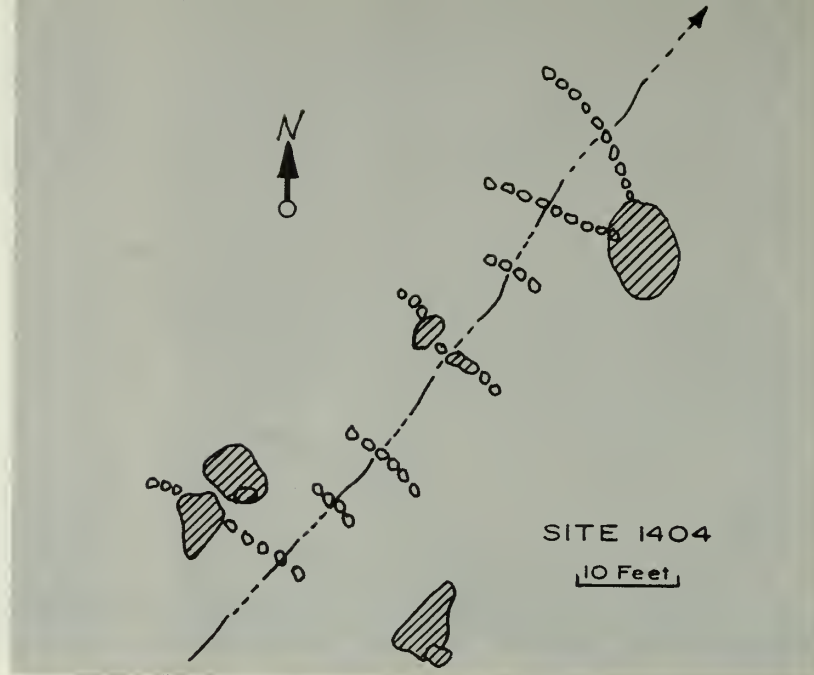
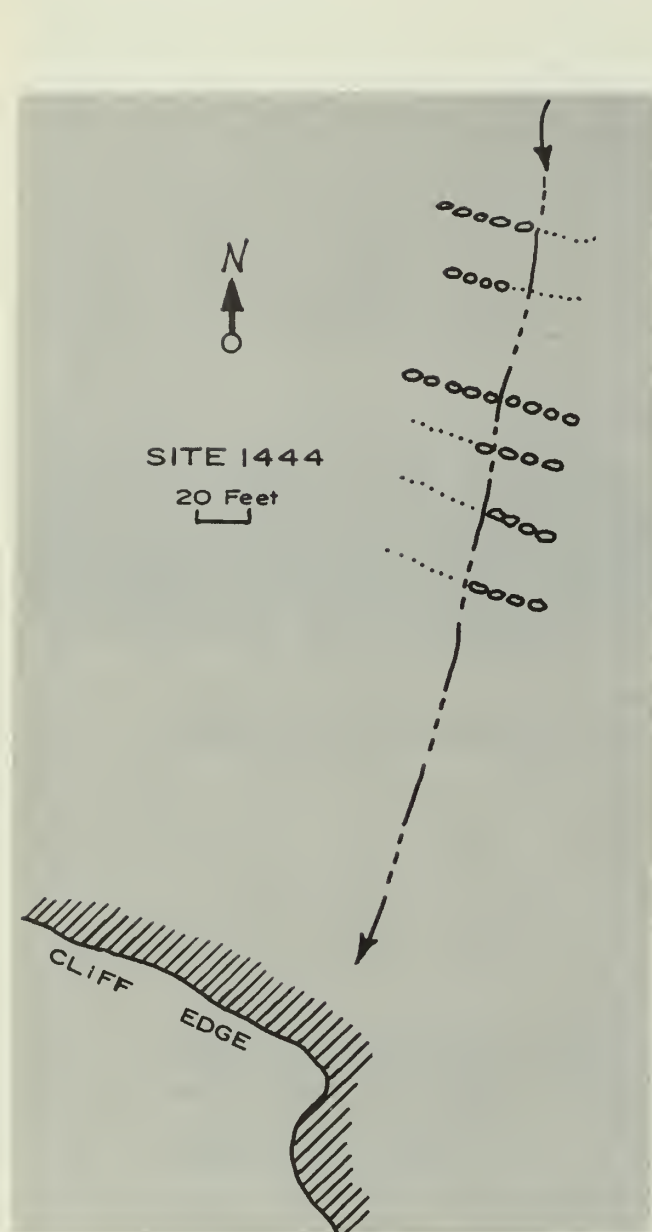


Figure 66—Sketch map of a series of check dams at Site 1444, near Kodak House.

Figure 67—Sketch map of agricultural terrace on the talus in Bobcat Canyon. Site 1404.

Figure 68—Possible boundary-marking stones. Site 1404.

On the steep, brushy talus slope in Long Canyon south of Step House is Site 1297, where a group of an estimated number of 100 terraces from 6 to 15 feet long runs for a quarter of a mile from north to south. This section of the talus was surveyed by 8 men abreast, at an interval of 25–30 feet, who counted a total of 60 individual terraces. Because of the dense brush and limited visibility we felt we had probably missed half the structures. This area represents the largest concentration of terraces found. Most are built across small watercourses but many of the check dams are connected, from one small arroyo to the next, by long contour terraces on the unchanneled slope.

Another large area of intensive development is Site 1539, which is placed in a short, steep tributary from the west into Rock Springs Canyon. A series of 25 check dams extend for 500 feet from near the foot of the cliff to the bottom of the main canyon. At their southern ends many of the checks are connected to contour terraces running along the foot of the steep hillside to the south (fig. 71). Two smaller arroyos coming off this steep hill are also equipped with a dozen or more check dams. A 300-foot stretch of hillside between the two smaller arroyos is covered with numerous lateral terraces on the contour, which thus made cultivatable an area of

about 3 acres. Some testing with the shovel at a couple of the check dams indicates that the work in the large arroyo was not so much soil conservation as actually soil building. The check shown in figure 72 as a terrace 8 inches high was excavated to reveal almost 6 feet of wall built on bedrock. Three, perhaps four, stages of building are represented, for the terrace wall is battered and leans toward the uphill slope in such a way that it could not have stood if built to its full height at one time. When the area upstream above the wall was silted in, the wall was raised a few courses in order to trap still more soil and enlarge the catchment area. Profiles show several strata of water-laid soil with no evidence that any had been carried in by hand. A few sherds were found in the fill, with one Cortez Black-on-white sherd at the lowest level. It had probably washed from Site 1540, a Pueblo II site of 10 scattered rooms and many terraces built on a talus bench at the top of the hill to the south of the arroyo. It is probable that Sites 1539 and 1540 are parts of a single complex.

Still in place at Site 1539 are many yards of soil collected as a result of the building of the terraces—soil that, at least in the arroyo, was not there prior to the building. More work is planned at the site.

Figure 69—Sketch map of check dams and contour terraces on the talus in Bobcat Canyon.

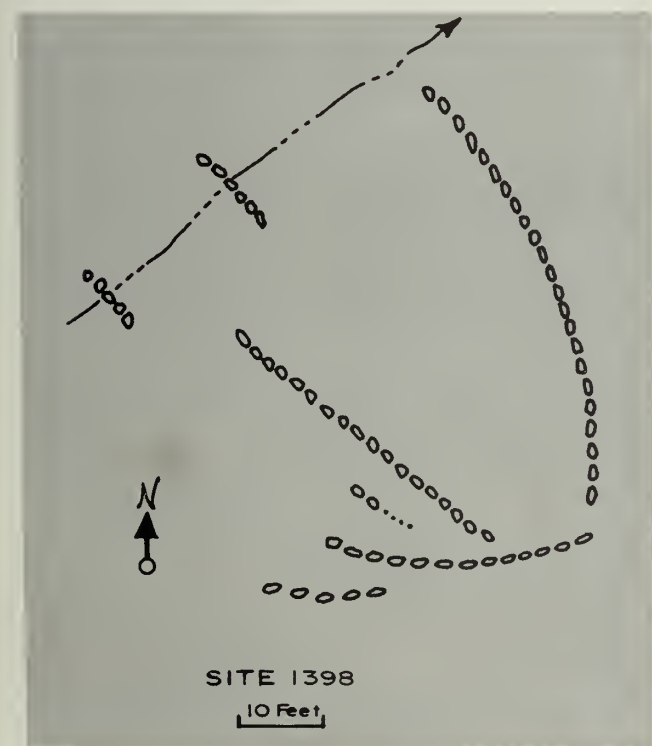
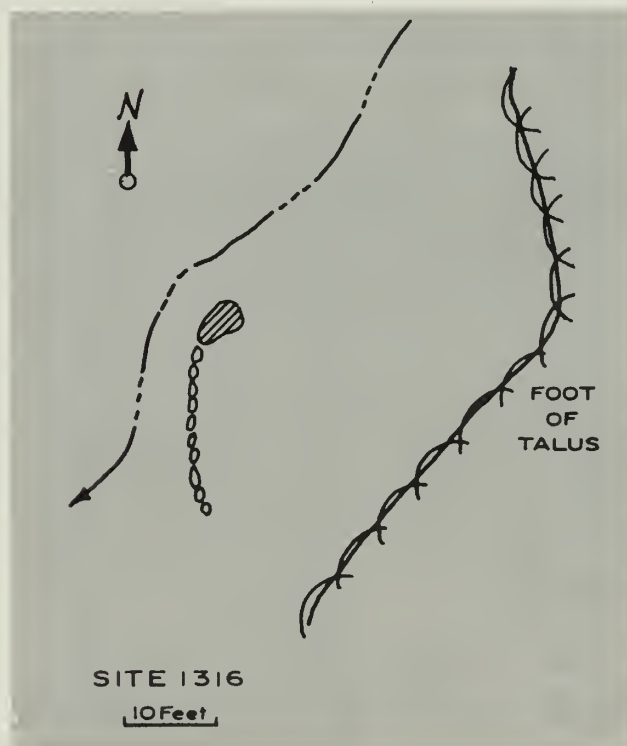


Figure 70—Sketch map of large terrace near confluence of Long House draw with Rock Canyon. Site 1316.



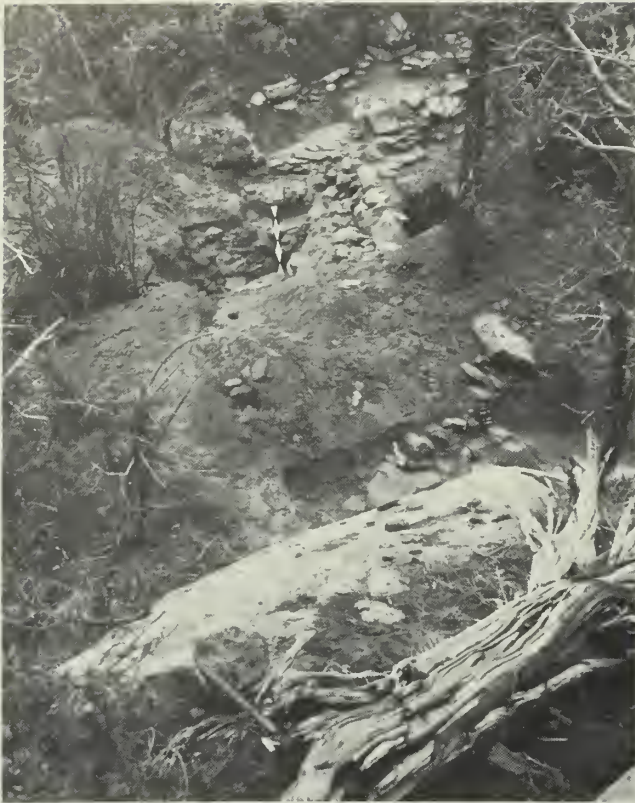


Figure 71—Exploratory pits exposing two sections of a check dam running from large exposed rock at the bottom of the photo to the steep talus near the top. Site 1539.

At several locations on Wetherill Mesa, under cliffs at a pouroff or at seeps, a little scattered rock was found which suggested that walls had been built for the purpose of catching domestic water. At only one place, Site 1586, was evidence sufficient for proof. The site, at the foot of the cliff at the head of a small rincon a few hundred feet south of Mug House, probably served as a principal water supply for that pueblo. A battered wall 10 feet high forms a basin, about 10 by 25 feet, which caught water coming over the pouroff and from the talus at either side. The reservoir was excavated in the summer of 1961 and will be reported fully with the account of the Mug House excavations.

Two tanks similar in structure to Mummy Lake on Chapin Mesa (Nordenskiöld, 1893; Stewart, 1940) were found, neither on Wetherill Mesa but on small unnamed ridges between Wetherill and Chapin Mesas. Site 1669 is on a narrow ridge between the two upper tributaries to the West Fork of Navajo Canyon. It is a U-shaped earthen bank 2 feet high, lined with masonry of finished rock, and encloses an area measuring 27 by 40 feet. The open end faces up the slope of the ridge to the northeast and with the help of shallow lateral ditches could have trapped runoff from an area of about 2 acres. The soil on the ridge both above and below the tank is shallow and rocky and not well suited to farming. Several small Pueblo II and III sites nearby may have used the water stored for domestic purposes.

Figure 72—One of a series of 25 check dams. Site 1539.



On a longer ridge immediately to the east, that between the West and East Forks of Navajo Canyon, is a similar reservoir, smaller in area but deeper. The site was investigated in a snowstorm and is not yet surveyed.

The capacity of these tanks, and of Mummy Lake, is not great enough to have provided a sufficient head of water to be of much use for ditch irrigation. There is no indication of an outlet from either of the two lying between Wetherill and Chapin Mesas and, through testing, Rohn has determined that none existed at Mummy Lake (Rohn, 1963). It is probable that domestic water supply was their primary purpose.

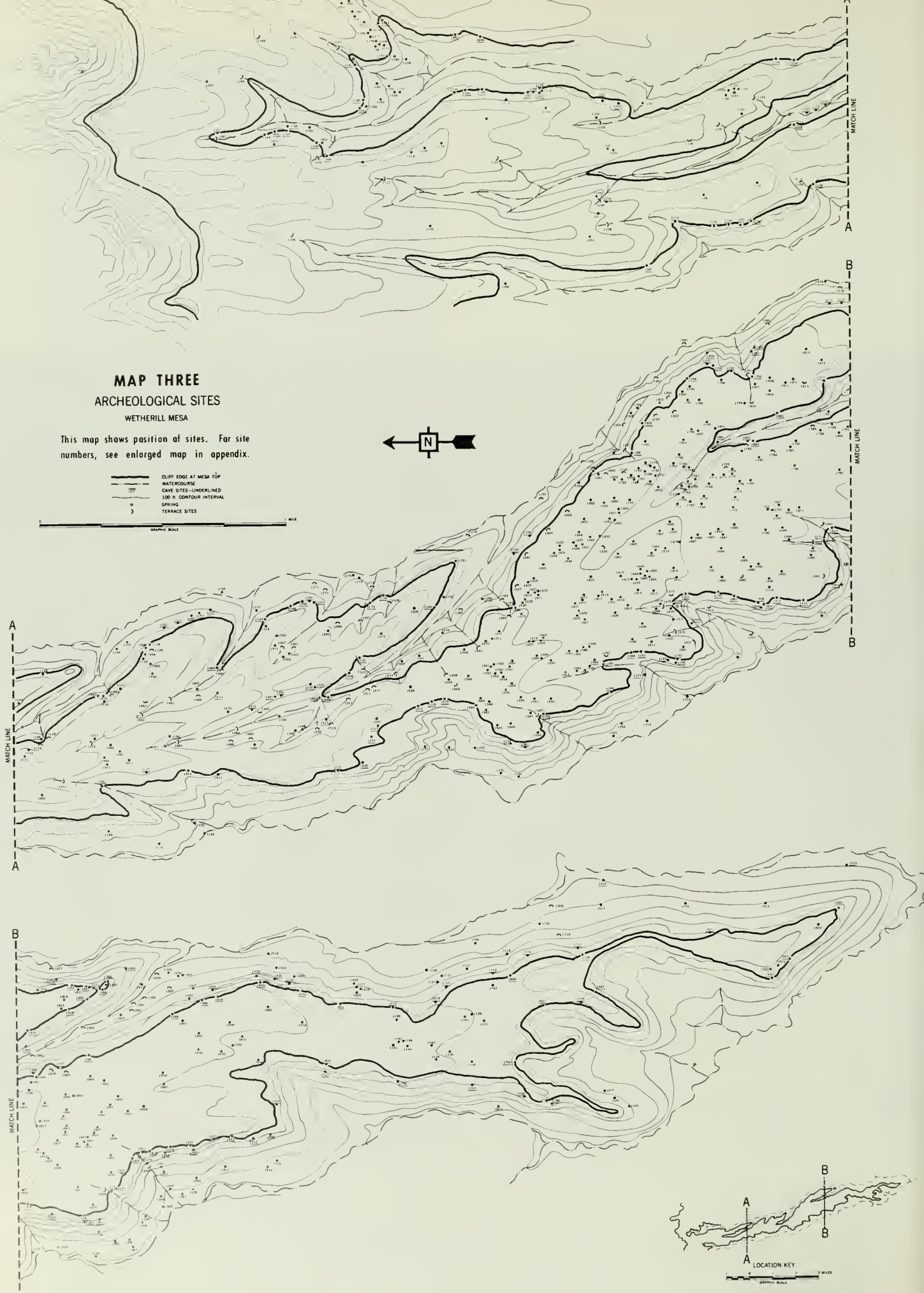
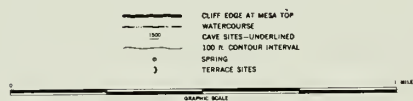
The use of large blocks of scabbled or rough stone in house construction was developed in the Mancos Phase, and we can presume that it did not occur earlier in the construction of check dams. The type of masonry coupled with the fact of increased use of the talus slopes as habitation sites during the period, and the proximity of agricultural terraces to most of those sites, strongly suggest that first construction of terraces was late in the 10th or early in the 11th century. The evidence of several rebuilding periods at Site 1539 would further indicate that the use of terraces was continuous, probably until the abandonment of the area.

Terrace in Long Canyon. Site 1361.



MAP THREE **ARCHEOLOGICAL SITES** **WETHERILL MESA**

This map shows position of sites. For site numbers, see enlarged map in appendix.



MAP FOUR **AGRICULTURAL TERRACES** WETHERILL MESA

This map shows position of sites. For site numbers, see enlarged map in appendix.

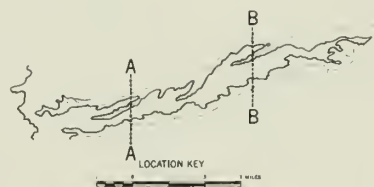


- CLIFF EDGE AT MESA TOP
- - - WATERCOURSE
- 100 ft. CONTOUR INTERVAL
- SPRING
- TERRACE SITES



A
MATCH LINE

B
MATCH LINE



MAP FIVE

LA PLATA AND PIEDRA PHASE SITES

WETHERILL MESA

This map shows position of sites. For site numbers, see enlarged map in appendix.

CLIFF EDGE AT MESA TOP
WATERCOURSE
CAVE SITES—UNDERLINED
100 FT. CONTOUR INTERVAL



A
MATCH LINE
A

MATCH LINE
A

B

MATCH LINE
B

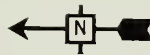
B

B
MATCH LINE
B

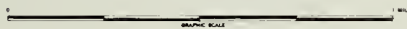


MAP SIX **ACKMEN PHASE SITES** WETHERILL MESA

This map shows position of sites. For site numbers, see enlarged map in appendix.



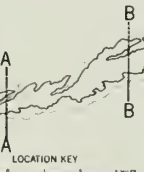
CLIFF EDGE AT MESA TOP
 WATERCOURSE
 CAVE SITES—UNDERLINED
 100 FT. CONTOUR INTERVAL



A
MATCH LINE
A

B
MATCH LINE
B

B
MATCH LINE
B



phase development

While collecting data from sites, I made at the same time an attempt to relate pottery types with architectural forms and to form tentative categories. Some labels were needed, when still in the field, in order to separate groupings of related data. I was not yet familiar enough with the material to make the fine distinctions required by the phase system proposed by Gila Pueblo and Deric O'Bryan, yet I hoped for greater definition than that afforded by Roberts' rather general classification (1935). The Pecos classification, familiar to all of us, in spite of its limitations, provided a series of pigeonholes that could be modified or abandoned with the least amount of confusion after all the material had been studied.

The Pecos classification, or a modification of it, is useful for field sorting, but for accurate description of cultural growth it has several drawbacks. The system was conceived at a time when stratigraphic excavation in the Southwest was just beginning, and some of the period descriptions were based on speculation which was not supported by later excavation. Like Morris (1939, p. 34), I learned that early concepts of Pueblo II tried to cover too much ground in accounting for all developments from pithouse to complex pueblo and included much of Pueblo III by classifying Prudden-type unit pueblos as typical Pueblo II. In recent years the Pecos classification has often been so tied to a rigid chronology that its value in ordering cultural stages has been largely lost. Within the Anasazi Province some people were liv-

ing in subterranean pithouses while others were building great pueblos.

As used here, the Pecos classification refers to general periods applicable to the Anasazi culture area. The stages of development in the specific Mesa Verde subarea will be defined as phases applicable only to this area.

The first attempt to establish a system of phases descriptive of the Mesa Verde Branch and to correlate that system with the Pecos classification was made by Harold Gladwin (1934, p. 28), who proposed a La Plata Phase for Basketmaker III and Pueblo I, a Mancos Mesa Phase equivalent to Pueblo II, and McElmo and Montezuma Phases for early and late Pueblo III. As a result of Gila Pueblo's excavation on Chapin Mesa in 1948-49, O'Bryan (1950, p. 103) was able to separate Basketmaker III, which he named the Four Corners Phase, from Pueblo I, his Chapin Mesa Phase. In working up his material from Mancos Canyon, Reed (1958, p. 160) found Gladwin's original phase system usable by retaining the La Plata Phase of Gladwin to represent Basketmaker III and by giving the name Piedra Phase to the Pueblo I period in the Mesa Verde area.

Excluding agricultural terraces and historic sites from consideration, I felt reasonably sure in fitting 70 percent of the remaining sites into the phase system. Some of these designations are admittedly forced and are indicated with a question mark in table 10 at the back. With such a large body of material a few bad guesses will probably be absorbed in the averages.

Table 6 shows a correlation of the systems describing the succession of cultural periods as used by O'Bryan and Reed, the adaptations of the Pecos classification to Mesa Verde by Watson (1950) and by Morris, with Roberts' general classification for the Anasazi and Brew's phases for Alkali Ridge, and the modifications of the Gladwin-Reed system suggested by the survey material. The dates in the stub of table 6 are approximate.



TABLE 6.—*Correlation of various period and phase systems devised for the Mesa Verde area*

Date A.D.	Pecos Classification (Watson) (Morris)		Gila Pueblo (O'Bryan)	Gladwin (Modi- fied by Reed)	Roberts	Alkali Ridge (Brew)	Wetherill Survey
400	Basketmaker II				Basketmaker Period		
500							
600	Basketmaker III	Basketmaker III	Four Corners Phase	La Plata Focus	Modified Basketmaker Period	-----?-----	La Plata Phase
700		-----?-----				Abajo Focus	
800	Pueblo I	Pueblo I	Chapin Mesa Phase	Piedra Focus	Develop- mental Pueblo Period	Ackmen Focus	Piedra Phase
900		-----?-----					
1000	Pueblo II	Pueblo II	Mancos Mesa Phase	Mancos Focus		Mancos Focus	Ackmen Phase
1100		Early Pueblo III	McElmo Phase			-----?-----	Mancos Phase
1200	Pueblo III	Late Pueblo III (Mesa Verde Phase)	Montezuma Phase	-----?----- McElmo?-----	Great Pueblo Period	McElmo Focus -----?----- Montezuma (Mesa Verde)	McElmo Phase
1300				Mesa Verde Focus			Mesa Verde Phase

It was one of the hopes of the survey that we could push back in time the record of occupation of the Mesa Verde. Evidences of sedentary pottery-making farmers are plentiful. The environment of the mesa would seem to be as suitable for their precursors as that of Butler Wash, 65 miles west, or of Durango, 40 miles to the east, where preceramic Basketmakers have been found. In this hope we were disappointed, and the suggestions of earlier occupation can be disposed of in short order.

That ancient hunters knew the area is suggested by the find of a projectile point of the Milnesand type. The point, of gray quartzite, measures 52.5 by 21 by 7 mm., weighs 9.5 gm., and is lanceolate with slightly convex base. It is horizontally flaked and has ground sides (fig. 121, third from the right, top row). Unfortunately the point was found on the surface of the arroyo bed in the bottom of Rock Canyon with 5 square miles of drainage area above it.

A suggestion of a Basketmaker II occupation is found in Site 1205, a small cave at the northern end of the mesa near the head of the West Fork of Long Canyon. Here a test trench into trash and alluvium in front of the cave revealed that the bottom 4 feet of the refuse contained charcoal and chert rejects but no pottery. This deep layer was topped by several strata bearing Piedra through

Mesa Verde Phase material. No structure relating to the preceramic trash was found. Further testing is planned for the site.

LA PLATA PHASE

Surface evidence of Basketmaker III sites is slight or nonexistent. Although the material is known and common on Mesa Verde, discovery of sites has usually been through prospecting with probe and shovel or through accidental discovery, the result of pipeline or other construction, or by finding a pithouse underlying other structures during the excavation of later sites. On the theory that surface remains are more likely those of a later period, the survey recorded only nine La Plata Phase sites on Wetherill Mesa—two were caves excavated by Nusbaum, three more were caves tested by the survey crew. The frequency with which they have been found on Chapin Mesa implies a similar occurrence on Wetherill. Unquestionably excavation or testing in many of the sites reported as Pueblo I, Piedra Phase, will reveal La Plata Phase structures.

The trait list for the phase includes domestication of turkeys, cultivation of corn and beans, troughed metates, basally notched projectile points, undeformed skulls,

and pottery of Chapin Gray and La Plata Black-on-white. Dwellings were shallow pithouses, circular to roughly rectangular, with four roof-support posts, a bench support for sloping wall poles, a firepit often intersected by a low partition wall, and a ventilator that is sometimes narrow but more often a widened antechamber. Houses are oriented with ventilator-entrance to the south or south-east and may be backed by small storage huts on the surface of the ground. The majority of known sites have been on the top of the mesa, but two on Wetherill, Step House and Site 1291 (Nusbaum's excavations), are in caves. Two small caves, Sites 1165 and 1493, showing no traces of occupation except smoke deposit on the ceiling, were tested by trenching. The trenches did not intersect any structural remains but under considerable fill uncovered charcoal, burnt adobe, and Chapin Gray sherds, evidence of use during the La Plata or possibly the Piedra Phase. Probably other cave sites exist under houses of later phases.

Estimated dates run from A.D. 450-550 for the beginning to A.D. 700-750 for the end of the phase. Actual tree-ring dates from La Plata Phase sites on Chapin Mesa run from A.D. 574 to 700.

Excavated examples of representative sites are First and Second Pithouses (Lancaster and Watson, 1954), Pithouses B and C (Lancaster and Watson, 1942), Pithouse 1 (Smiley, 1949), Site 145 (O'Bryan, 1950), and Site 1060 (Hayes and Lancaster, 1962), all on Chapin Mesa, and Site 2 in the Ackmen-Lowry area (Martin, 1939). Site 1285 in Step House Cave on Wetherill Mesa should be included, but a report has not yet been published (Nusbaum, n.d.).

The few sites on Wetherill Mesa which could be assigned to the La Plata Phase with some confidence are (map 5): 1165, 1285, 1291, 1491?, 1493?, 1506, 1542, 1544, 1705.

PIEDRA PHASE

The Piedra Phase marks the transition from year-round residence in semisubterranean pithouses to life in substantial houses above ground. The villages representative of this period are crescentic rows of contiguous rooms of jacal and adobe, often slab based, from one to three rows deep. They are fronted by one or several deep pithouses, sometimes circular and more often rectangular, with rounded corners and narrow ventilator shafts. Both the pithouses and some of those on the surface show signs of having been lived in whereas some of the surface structures seem to have been purely for storage. It has been suggested that the combination of houses may have been for seasonal use, the pits serving as winter shelter, the people moving into the surface rooms in the summer

and using the pits for family prayer meetings. The term "proto-kiva" as used by Morris is apt.

The pottery of the preceding phase continued to be used, La Plata Black-on-white giving way sometime during the period to Piedra Black-on-white, though for a time the types were contemporary. Chapin Gray remained the principal utility pottery but banded-neck vessels were introduced. Abajo Red-on-orange occurs in small percentages. The troughed metate and basally notched arrowpoint were still used. The practice of lambdoidal skull deformation started during the Piedra Phase and was continued throughout the time the Anasazi lived in the region.

Excavated and published examples of this phase in the area include O'Bryan's Sites 1 and 102 on Chapin Mesa (1950), Martin's Site 1 in the Ackmen-Lowry vicinity (1938), and Morris' Building I, Site 23, in the La Plata drainage (1939).

The ruins of Piedra Phase houses are indicated on Wetherill by long, narrow, sometimes slightly curving lines of small burnt sandstone spalls and occasional fragments of burnt adobe. The average line of rooms is 50 to 60 feet long by about 10 feet wide and has a depth of only a few inches. The trash, with few exceptions, is thin and scattered toward the front of the houses, which face somewhere in the range of the south half of the compass. Only rarely does a slight depression in front of the mound suggest the presence of a pithouse. Four Pueblo I sites south of Mug House between two washes tributary to Rock Canyon are representative. Site 1552, near the center of the mesa, is a mound less than a foot deep of small burnt sandstone spalls and pieces of burnt adobe. The mound is 35 feet long, 5 to 10 feet wide, and lies along the axis of the ridge. The sherd count was 32 Chapin Gray, 2 Piedra Black-on-white, 1 corrugated, and 3 Mancos Black-on-white. Trash was thin and scattered toward the south.

Site 1553 is a somewhat curved mound 135 feet long, 120 feet down the ridge to the south. An artificial-looking flat area to the south may be the location of several pithouses. In this area a test with a soil auger brought up flecks of charcoal from a depth of 4 feet. To the south of the level ground is a trash mound about 18 inches deep. The sherds collected included 66 Chapin Gray, 10 Moccasin Gray, 1 Chapin Black-on-white, 5 Piedra Black-on-white, and 35 San Juan Redware. Several Pueblo II sherds and rooms of rough masonry at the east end of the house mound indicate a later occupation on part of the mound. Site 1554, a scattering of burnt spalls and adobe, of no depth and about 20 feet long, is 105 feet farther down the same ridge. No trash mound is present, but sherds are spread for 75 feet down the slope below. They were 38 Chapin Gray, 2 Chapin

Black-on-white, 2 Piedra Black-on-white, and 1 obviously stray Mesa Verde Black-on-white.

Still farther toward Rock Canyon on the same high ground is Site 1555, very similar to 1553. It is a somewhat curved mound 65 feet long and of the same composition as the others. A few upright slabs are exposed at one end. A well-defined trash area produced 77 Chapin Gray, 4 Moccasin Gray, 5 each of Chapin and Piedra Black-on-white, and 16 San Juan Redware sherds. The two larger sites were not typical in the depth of trash and in the high percentage of red sherds found.

From the surface, Pueblo I sites on Wetherill Mesa are amorphous. Wall outlines, when visible at all, show for only a few feet. A ground plan of any could indicate only the area of the mound. Site 2022 on the east side of the park was surveyed by project personnel in the fall of 1959. It is a Pueblo I site on the ridge between East Canyon and Morfield Canyon, and the overburden has been removed by erosion in such a way as to reveal the outline of slab-based walls as shown in figure 73. The sherds collected at Site 2022 were all Chapin or Moccasin Gray and La Plata or Piedra Black-on-white.

One hundred and thirty-eight Piedra Phase sites, or sites containing Piedra material, were found on Wetherill Mesa. They range from the 7,900-foot contour down to 6,500 feet (a cave site in Navajo Canyon), but 83 percent of these sites are concentrated between the 7,300-foot contour above Mug House (Site 1229) and 7,000 feet near Ruin 13 (Site 1320). This territory comprises the broadest, most level part of the mesa and the area of deepest soil. In the center of the area, east of Long House (Site 1200), the sites are nearly continuous along the main crest of the mesa, running so close together that it is difficult to separate them. Houses and trash that could be distinguished were surveyed as separate sites, but many of these were probably parts of a single community such as the great complex of Site 13 on Alkali Ridge (Brew, 1946). At least two, Sites 1664 and 1676, are definitely of that type. The latter is made up of two lines of house mound, the longer being a 350-foot curving line of rooms. An exceptional trash mound, 60 feet wide and 3 feet deep, fronts this ruin.

The flat top of the mesa was the preferred ground for building, 91 percent of the sites surveyed being located there. One was found on a talus slope, two in the canyon bottoms, and nine in caves. There was probably more use of caves than the survey figures indicate. A pithouse found in the recent excavations in Long House was not suggested by any surface features or by the original sherd collections.

With 7 feet as the average length of a Pueblo I room in excavated sites, the 41 pure Piedra Phase sites gave an estimate of 8 rooms in the average site of this period.

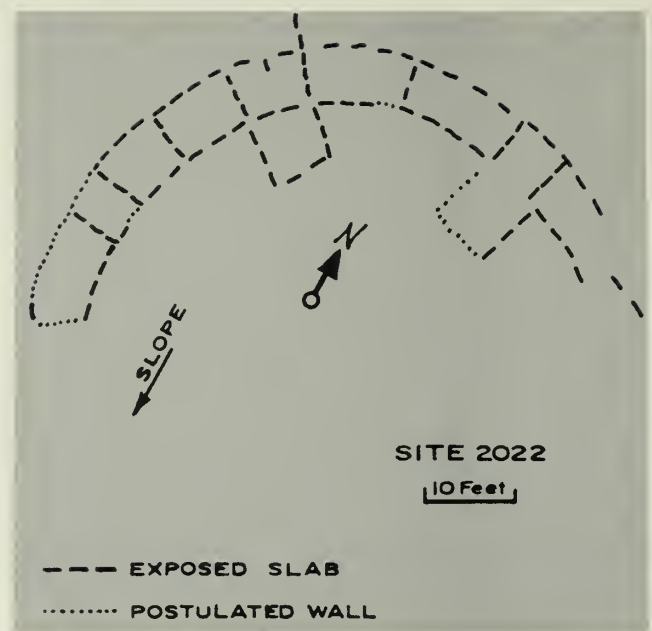


Figure 73—Sketch map of Site 2022, a Piedra Phase site near Morfield Canyon.

By multiplying the total number of sites we reach a figure of 1,104 rooms. From the ephemeral nature of the flimsy structures, from the period's span of 150 to 200 years, and from the fact that nearly all sites show evidence of burning, we can suppose that not all rooms were occupied simultaneously. The negative factor is probably outweighed, however, by the equally valid supposition that a greater number of Piedra sites were missed by the surveyors than were those of any subsequent phase. The archeological remains are usually comparatively insignificant, they are frequently covered by brush or duff, and the sites were often reused and concealed by later builders.

Dates for this phase of development are estimated from A.D. 700 to 900.

I have followed Reed in using the name Piedra for the phase because the predominant decorated pottery seems to have been strongly influenced from the southeast. From architecture and village plan, the Piedra Phase of Mesa Verde might equally well take its name from the contemporary Abajo Phase of Alkali Ridge (Brew, 1946), where the decorated ware is Abajo Red-on-orange. In speaking of the Pueblo I villages he excavated on Chapin Mesa, O'Bryan (1950, p. 105) wrote that they "appear to be a convincing blend of the characteristics of the Abajo Phase to the northwest, and the La Plata Phase to the southeast." I assume that by "La Plata Phase" he here referred to the Pueblo I sites excavated by Morris in the drainage of the La Plata River. On the basis of the blend, he proposed that the local material be assigned to the Chapin Mesa Phase.

Mesa Verde does appear to have been on the fringes of two hearth areas at this time, to have been marginally both Piedra and Abajo. According to pottery the balance is in favor of the Piedra Phase, but it is likely that sites can be found on the mesa which could be logically assigned to the Abajo focus. Site 1553, a Pueblo I site of an estimated 20 rooms west of Step House, has, on the surface of the trash mound, more Abajo Red-on-orange than black-on-white types. It is atypical but it is there. Until it can be demonstrated by more excavation that the Pueblo I villages of Mesa Verde represent a cultural entity markedly different from those to the east and west, there is little justification in assigning them to a phase or focus distinctive of Mesa Verde.

Piedra Phase sites recorded on Wetherill Mesa are (map 5):

1109	1556	1626	1672	1805
1112	1557	1627	1673	1808
1117	1559	1628	1675	1809
1178	1562	1629	1676	1820
	1563	1630	1685	1821
1200	1565	1631	1688	1822
1205	1566	1632	1697?	1823
1279	1571	1633		1824
	1572	1634?	1705?	1825
1303	1578?	1635	1717	1827
1331	1582	1638	1723	1833
1391?	1583	1639	1724	1843
	1584	1642	1725	1844
1452	1590	1643	1733	1845
1458	1591	1644	1756	1846
1464	1596	1646	1762	1847
1466	1598	1647	1770	1849
1470?		1648	1772	1850
1472	1609	1649	1777	1851
1473?	1610	1650	1778	1855
1487?	1613	1651	1781	1863
	1614	1653	1785	1864
1502	1615	1655	1786	1867
1544	1616	1656	1790	1869
1548	1617	1657	1793	
1549	1619	1664	1795	1900
1552	1620	1665	1796	
1553	1621	1666	1797	
1554	1623	1667	1798	
1555	1624	1668		

ACKMEN PHASE

The Pueblo II period has always been the most hazily defined, or has covered the widest range of architectural types and has involved a long span of time in the Pueblo area. Various students have included in the period all developments from conversion of the pithouse to a true

kiva and residence in small surface pueblos of rough masonry to and through life in the compact unit pueblos described by Prudden (1905). Morris in 1939 demonstrated that the Prudden-type house was late and was contemporary with the finest of the great pueblos of Pueblo III times. What is left between Pueblo I and Pueblo III after the removal of unit pueblos still consists of considerable development and change in material culture which, under the Gladwin system, has been labeled the Mancos Phase. Morris, dealing with the same material as that described for the Mancos Phase but using the Pecos classification, divides the phase, defining as Pueblo II the beginning of the true kiva, the earliest crude masonry, and the beginning of indented corrugated pottery. Most of the Mancos Phase of Gladwin, O'Bryan, and Reed, by Morris' definition would be Pueblo III. It is Morris' Pueblo II, a short but distinctive period, that is here defined as the Ackmen Phase. It is composed of the first century of the old Mancos Phase, or the earlier half of Pueblo II as defined by Watson (1950), and should date roughly from A.D. 900 to 975 or 1000. It equates culturally with the Red Mesa Phase of the Chaco area.

Brew (1946, p. 94) first suggested the division and the name on the basis of Martin's Site 1 in the Ackmen-Lowry region (Martin, 1938). The small house at Site 1 is of rough, slab-based masonry. A kiva with no southern recess has its roof supported by posts rather than pilasters of masonry. A trough metate and much Cortez Black-on-white and squiggle-hachured Mancos Black-on-white pottery was found at the site. Tree-ring dates of 855 to 872 were published for the site (Martin, 1939). I suspect that those dates will prove to be a little early for the phase. Site 4 in the vicinity exhibited like traits.

A typical site of the phase on Wetherill Mesa consists of a few contiguous rooms in a straight line, constructed of posts and adobe or more often of a crude masonry of unshaped rock. To quote Morris (1939, p. 34): "Previously mud had been regarded as the mass, and such stones as were tucked into it were more or less fortuitous additions to its bulk. Now, however, stone came to be regarded as the substance and mud only as a filler." The kiva is circular and equipped either with post roof supports or masonry pilasters, is not always masonry lined to the full height of the wall, and lacks the southern recess of later phases. It is placed well to the front (in a southerly direction) of the rooms and does not form an integral part of the house. Trash mounds are usually well-defined areas to the south of the kiva in distinction to the sheet trash of earlier times.

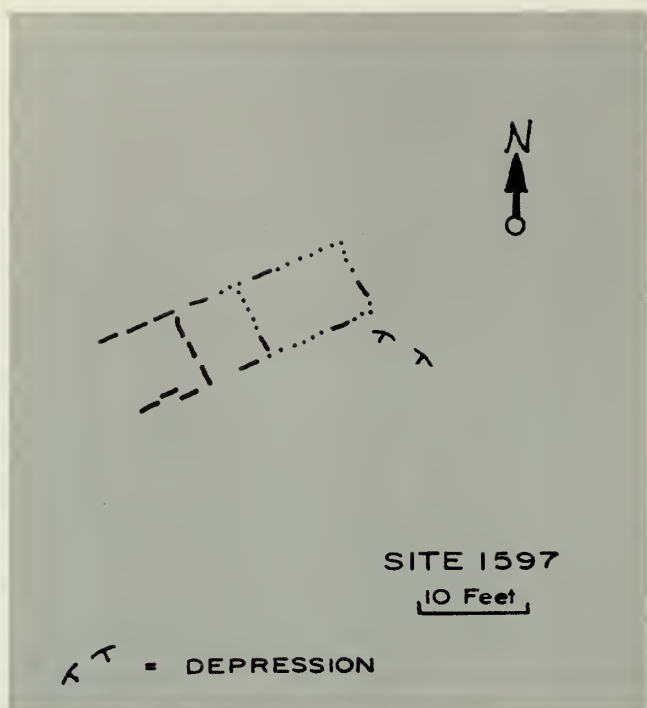


Figure 74—Sketch map of Site 1597, an Ackmen Phase pueblo on Wetherill Mesa top between Long House and Jug House.

Ackmen Phase pottery is distinguished by the first manufacture of Mancos Corrugated ware in the form of wide-mouthed jars, often equipped with vertical loop handles. Mancos Gray forms a smaller percentage of the utility ware but was manufactured during this phase only. Cortez Black-on-white, the predominant decorated ware, is also almost exclusively confined to the phase. Mancos Black-on-white appears in its earlier design styles: squiggle hachure, pendant triangles, and checkerboards. Bowls are deep with straight sides; dippers have strap or half-gourd handles; pitchers are more common than jars. La Plata Black-on-red forms a small percentage of the decorated ware.

Other items of material culture are apparently unchanged. Trough metates are still in use. Skull deformation, which had its inception in the preceding phase, is now universally practiced.

The earliest house at Site 16 on Chapin Mesa, excavated by Lancaster and Pinkley (1954), is an example of an Ackmen Phase site. The first house, a post-and-adobe structure, was associated with an unlined kiva with four posts used as roof support. The excavators estimated its date as about A.D. 900. A subsequent occupation was in a small Mancos Phase pueblo. The association of sherds with a specific structure was impossible because of the nature of the site, but much of what was later described as Cortez Black-on-white was found at

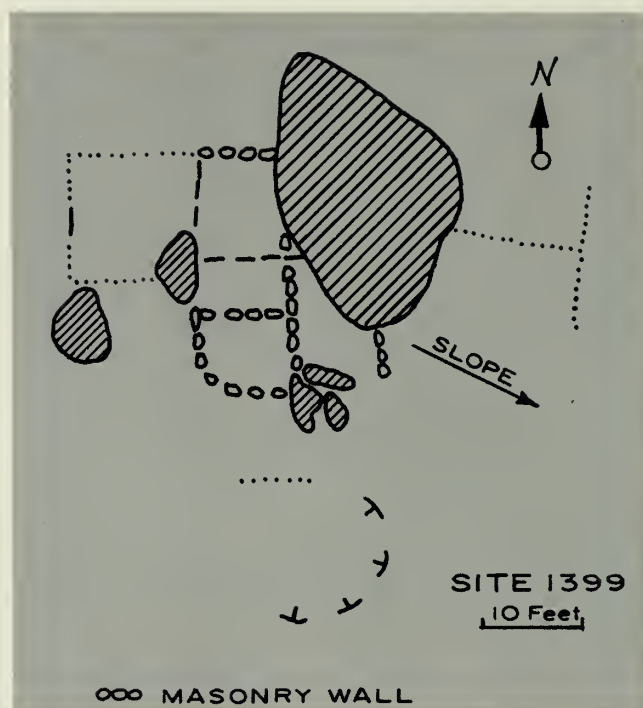
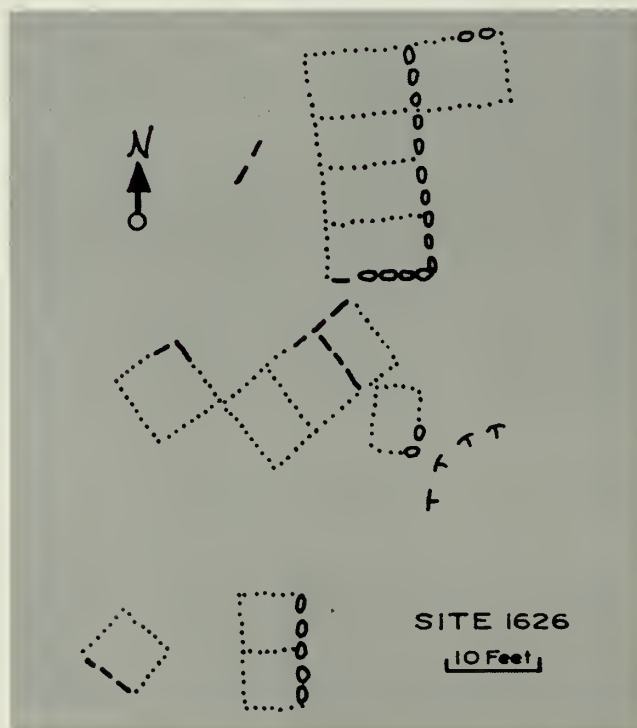


Figure 75—Sketch map of Site 1399, an Ackmen Phase site on talus slope in Bobcat Canyon.

Figure 76—Sketch map of Site 1626, an Ackmen Phase pueblo near Step House.



the site and illustrated. I would expect that it was derived mostly from the post-and-adobe village, an early Ackmen Phase site.

Another excavated example of an Ackmen Phase house on Chapin Mesa is Site 102 (O'Bryan, 1950). A two-room house of a combination of crude masonry, slabs, adobe and wattle-and-daub is associated with an unlined kiva with masonry pilasters but no southern recess. A date of 947 was obtained from the kiva. The sherds from the sites were identified as Mancos Black-on-white, but many of the Mancos sherds illustrated in the report are Cortez Black-on-white, a type not previously described.

Morris (1939) excavated no Pueblo II sites completely, but beneath Building I, Site 39, at the confluence of Barker Arroyo and the La Plata River, he found the remains of walls of cobble masonry of undetermined extent. The walls were apparently associated with a kiva, lined with rough cobble masonry but again with no southern recess. Four of the five vessels pertaining to this early occupation of the site were Cortez Black-on-white; the fifth, unclassifiable, could be either Cortez or Mancos. This is one of the few sites which Morris was willing to attribute to Pueblo II times. It could well be classified as an Ackmen Phase dwelling as described here.

On Wetherill Mesa 208 sites of the Ackmen Phase were surveyed. The sites are smaller than those of the Piedra Phase and more widely distributed. They average an estimated six rooms in size, by the method of arriving at a figure described above for the Piedra Phase. Only 68 percent of the sites fall in the area of mesa-top concentration between Mug House and Ruin 13. Nine of the sites were in caves; 27, or 13 percent, occupied positions on the talus slopes or in the canyon bottoms.

Surface characteristics of an Ackmen Phase site on Wetherill Mesa often differ little from those of the Piedra Phase. When the building was of jacal or adobe, only the pottery will indicate the later phase. More often, however, the rock that appears as small spalls on the earlier mound is, in the Ackmen Phase, larger, fist-sized fragments—remains of masonry walls, not stone inclusions in adobe. The house mounds tend to be deeper and, if occupied for any length of time, are fronted by a mounded concentration of trash. A faint depression marking the presence of a kiva is sometimes apparent but more often lacking. A pit unlined with masonry probably will collapse more readily and rapidly fill to a level surface. Rarely does a house mound reach 2 feet in depth or show traceable wall outlines. Examples given below are exceptional in that respect and are probably larger than the average site.

Site 1597, on the mesa between Long House and Jug House, was a three- or four-room house of slab-based

masonry of small unshaped stone. A shallow depression may mark the site of a kiva. Sherds from the trash mound include Mancos Black-on-white, Cortez Black-on-white, Mancos Corrugated, and Mancos Gray (fig. 74).

Site 1399, a pueblo of about eight rooms, is built around large fallen boulders, sections of collapsed cliff wall, on the talus slope in Bobcat Canyon (fig. 75). Walls are of slab-based rough masonry. Mancos Corrugated and Mancos Black-and-white sherds predominate; Cortez Black-on-white and Mancos Gray are present.

Site 1626 is an irregular arrangement of about 15 rooms on the east side of the mesa south of Step House. It was built of rough masonry, some of it based on slabs. A kiva depression is faintly visible at the southeast side of the house. Trash is extensive but scattered (fig. 76).

Ackmen Phase sites on Wetherill Mesa are (map 6):

1102	1416	1590	1667	1770
1104	1417	1591	1668	1771
1107	1426	1595	1672	1774
1123	1428	1596	1673	1775
1125	1432?	1597	1676	1776
1130	1436		1678	1779?
1134	1452	1603	1679	1780
1151	1453	1604	1682	1781
1153	1458	1605	1684	1785
1154	1459	1606?	1685	1786
1157	1464	1607?	1686	1789
1158	1466	1609	1687	1790?
1159	1471	1610	1688	1791
1160	1478	1611	1689	1792
1162		1616	1691	1795
1163	1505	1617	1693	1796
1172	1520	1619	1694	1798
1176	1522	1620	1698	
1177	1523?	1623		1810
1178	1525?	1624	1700	1815
1179	1531?	1626	1720	1817
1181	1533	1627	1723	1818
1182?	1541	1628	1724	1821
	1547?	1629	1725	1822
1205	1548	1630	1733	1826
1229	1552	1631	1739?	1827
1243	1553	1632	1744	1828
1244	1557?	1633	1746	1830
1254	1558	1637?	1748?	1831
	1561	1639	1749?	1832
1303	1562	1642	1750?	1838
1306	1563	1643	1751?	1842
1320	1565?	1645	1752	1844
1330	1566	1649	1753	1845
1331	1569?	1650	1754	1846
1334	1570?	1651	1755	1847
1337	1571	1653	1756	1852
1391	1572	1654	1757	1854
1399	1573	1655	1760	1860
	1577?	1658	1762	1862
1403	1582	1659	1764?	1870
1412	1583	1661	1766?	1875
1413	1584	1662	1769	1879

MANCOS PHASE

After the crude masonry of unshaped rocks of the Ackmen Phase, improvement in masonry and elaboration of building techniques were rapid. In the Mancos Phase some houses were still built of unshaped stone—once a technique was learned it was not forgotten, as we find poor masonry and wattle-and-daub in late Pueblo III construction—but generally walls were better built. Rock was selected with more concern for uniformity and was laid in courses rather than at random. Blocks were often given a rough shaping with a hammerstone, a common practice being to work the four sides of a flat rock by spalling back the edges to get a beveled or wedge cross section like that on a bifacially flaked chopper or scraper. Some walls were based on large upright slabs, heavier and more massive than those of the earlier phases, as the walls they supported became thicker. The first limited use was made at this stage of compound and double walls, sometimes rubble cored or rubble filled and capable of carrying greater weight than the earlier simple wall. The size and shape of the houses were little changed. They were still of one story and usually were a single or double row of up to 12 rooms laid in a straight line, though a short ell was built onto the end of some houses. Kivas were still in front of the houses but were drawn closer, not yet part of the house but immediately adjacent. They were equipped with masonry pilasters, and were usually lined with masonry from floor to banquette level if not all the way to the roof.

An addition to the list of architectural traits in the Mancos Phase may be the circular, surface structure known locally as a tower. Towers were usually adjacent to a kiva and were seemingly of an esoteric nature. In this phase they were probably never more than one story.

Mancos Black-on-white is the decorated pottery of the phase, with emphasis on the use of straight-line hachure between parallel lines. Cortez Black-on-white is no longer made. The wide-mouthed, straight- or slightly flared-rimmed Mancos Corrugated is the culinary ware. The troughed metate is replaced with the slab metate used in a bin, a type which remained unchanged through later phases. The side-notched projectile point was introduced (Lancaster and Pinkley, 1954, p. 42).

The phase dates from A.D. 975–1000 to 1050–1075.

No purely Mancos Phase site, uncomplicated by occupation during other phases, has been excavated in the Mesa Verde area. Unit Pueblo I at Site 16 on Chapin Mesa (Lancaster and Pinkley, 1954), partly overlying the post-and-adobe Ackmen Phase site referred to above, is a typical Mancos Phase house. A three-room house of chipped-edge masonry lies 3 feet behind a six-pilaster

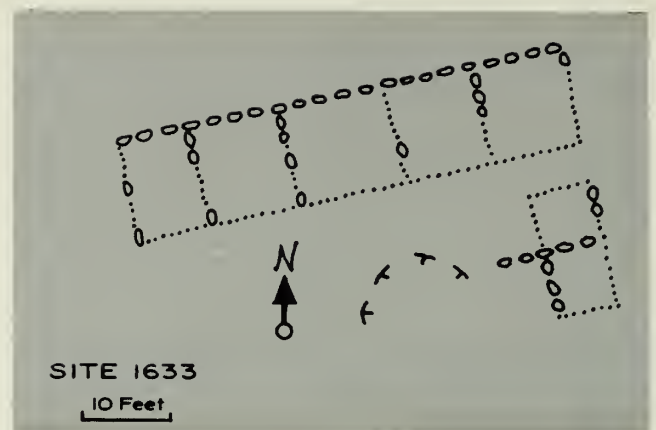


Figure 77—Sketch map of Site 1633, a Mancos Phase pueblo on top of mesa south of Step House.

kiva, which is lined with masonry from floor to the top of the banquette.

Two of the buildings excavated at Site 41 by Morris on the La Plata River contained Mancos Phase components (Morris, 1939). Under Building III lay thin walls of rough masonry associated with a partially lined, four-pilaster kiva. Pottery associated with the older house was Mancos Black-on-white and Mancos Corrugated. The original seven-room nucleus of Building VII, also at Site 41, was of cobble masonry fronted by a kiva which was unexcavated. Associated pottery was “early Pueblo III, pre-Mesa Verde sherds.”

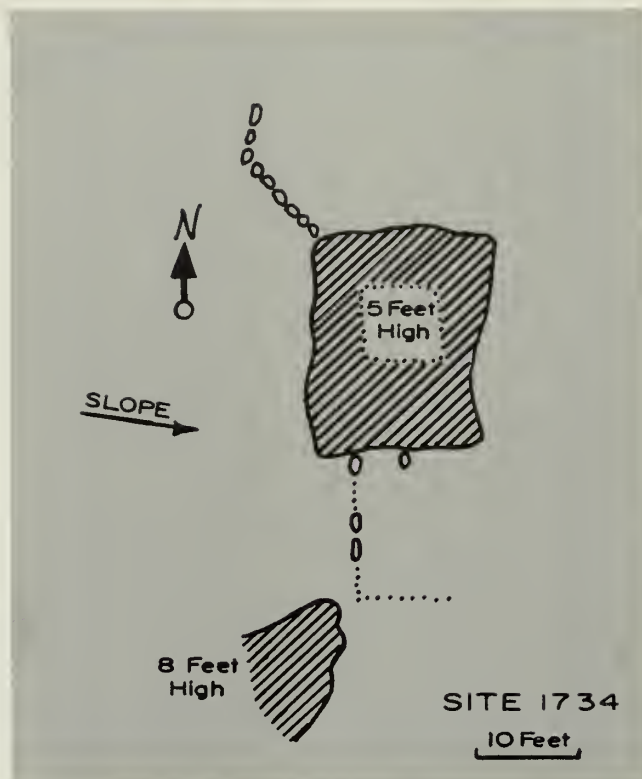
At Lowry Ruin, Martin (1936) reckoned the four rooms which were first in construction, and around which the larger Pueblo III pueblo was constructed, to have been a Pueblo II house. The masonry is good and Chaco-like. Five beams supplied a cutting date of A.D. 1090, but Martin believed they represented a later remodeling and estimated the original construction date to have been closer to 1050. This early house might well fit into the Mancos Phase, but unfortunately the pottery associated with its first occupation is impossible to determine.

In surface appearance the smaller Mancos Phase sites on Wetherill Mesa can often be distinguished from those of other phases only when there is a considerable quantity of pottery. The presence of Mancos Black-on-white and the absence of Cortez or Mesa Verde types are good indications. Typically there is more depth of house mound than on earlier sites with often enough walls standing in the rubble to enable one to trace outlines. Coursed masonry of scabbled rocks is often exposed for a few courses and even when fallen the chipping on individual rocks is apparent. Kiva depressions are more frequently visible than on Ackmen Phase sites. Trash mounds, even in front of two- or three-room houses, are often well concentrated



Figure 78—Sketch map of Site 1141, a Mancos Phase site on talus slope in Rock Canyon.

Figure 79—Sketch map of Site 1734, a small Mancos Phase house on talus near south end of mesa.



and of some depth. The sites have the same average size—six rooms—as in the preceding phase but are fewer and still more widely scattered. Surveyed sites containing a Mancos component numbered 185 in all, and 166 on Wetherill Mesa with 59 of that phase alone.

An increased use of caves and talus slopes is shown. Sixteen percent of the sites were caves and 36 percent were located on the talus below the cliffs. Because of subsequent use it is certain that there are many caves with a Mancos Phase occupation which were not so noted. Current excavations in Mug House reveal a Pueblo II stratum in the trash not indicated on the surface.

Four representative Mancos Phase sites on Wetherill Mesa will be discussed briefly. Site 1633 (fig. 77) on the ridge east of Bobcat Canyon in a characteristic L-shaped pueblo of seven or eight rooms and a kiva. The masonry is of chipped-edge stone. Sherds in the scattered refuse run from Piedra Phase types through Mancos Black-on-white and Mancos Corrugated.

Site 1141 (fig. 78) consists of terracing or retaining walls about a kiva on the talus in upper Rock Canyon. Such walls are common from the Ackmen through McElmo Phases and may have been built to support level soil on which to build jacal structures. The kiva and considerable trash indicate a permanently occupied site and not a seasonal farmhouse. Sherds are predominantly Mancos Black-on-white and Mancos Corrugated. Two

axes and a plain gray seed jar were also picked up on the surface. Site 1734 is in a similar location on the talus in Long Canyon near the south end of the mesa. It is built of chipped-edge masonry, some of it slab-based, around large boulders, and it consisted of perhaps three rooms but no kiva (fig. 79). One of the rooms was built on top of a boulder; the others were at its base. The same Mancos Phase types of sherds were present.

A three- or four-room cliff house, Site 1706, is built on two sides of a piece of collapsed cave ceiling in a small cave in Rock Canyon near the south end of the mesa (figs. 80, 81). The masonry, some of it double wall, is of carefully selected split rock. All sherds were of Mancos Corrugated or Mancos Black-on-white.

Kiva-associated towers were found at two pueblos showing no materials representative of a later phase. Site 1101, on the narrow ridge between Long Canyon and its West Fork, is a shapeless agglomeration of 15 rooms built of coursed masonry in which the stones have had some primary shaping. One room at the east side is of large, upright slabs. A large rock-lined kiva sits close to the house with rooms adjacent to two sides. At the southwest side of the kiva—the side away from the house—is a circular structure of small slabs; part of its wall is formed by a section of kiva wall. The proximity of the kiva to the house is the only suggestion of a McElmo Phase trait. The pottery is Mancos Black-on-white and

MAP SEVEN **MANCOS PHASE SITES** WETHERILL MESA

This map shows position of sites. For site numbers, see enlarged map in appendix.



MATCH LINE
 A
 A

MATCH LINE
 A

B

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 B

B

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 B
 B

MATCH LINE
 B
 B



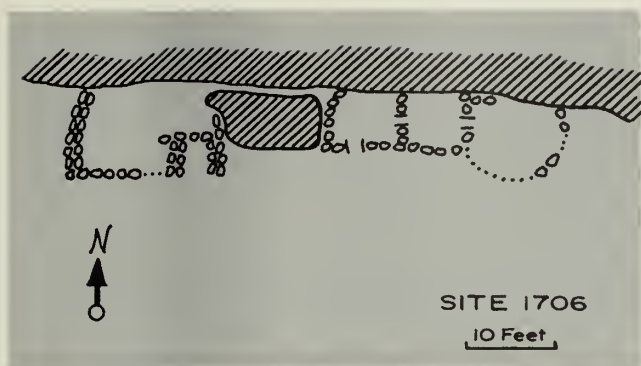


Figure 80—Sketch map of Site 1706, a Mancos Phase cliff dwelling on Rock Canyon side of Wetherill Mesa.



Figure 81—Room at west end of Site 1706.

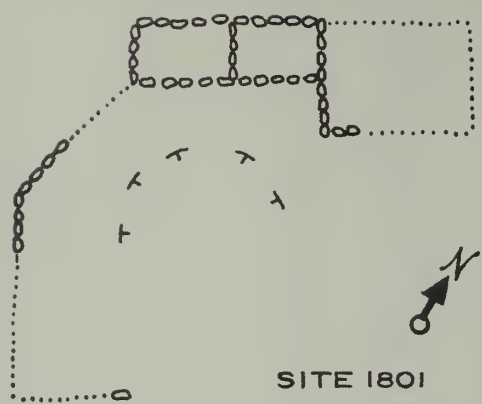
Mancos Corrugated. It seems to be a late Mancos Phase house with an incipient one-story tower. Site 1573 is a pueblo of scabbled masonry on the mesa above Step House. About 12 rooms are built in a single line with a kiva depression in front of one end. The walls of a tower are outlined between the kiva and the west end of the house and touching both. A well-defined trash mound lies downslope; a large collection of sherds is mostly Mancos Black-on-white and Mancos Corrugated.

Mancos Phase sites surveyed on Wetherill Mesa are (map 7):

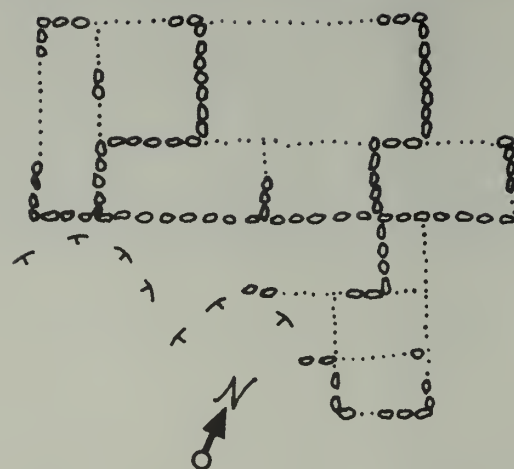
1101	1207	1405	1545?	1700
1104	1210	1414?	1546?	1701?
1113	1220	1421	1550?	1703
1119	1229	1426	1551	1706
1121	1243	1428	1560	1707?
1124	1244	1430	1573	1717
1126?	1249	1431?	1579?	1722
1130	1251	1436	1582	1724
1131	1254	1437	1589	1732?
1132?	1257	1447	1590	1734
1141	1270	1452	1591	1735
1143	1281	1453	1593?	1737
1144?	1282	1468	1594	1747?
1146?	1291	1474?	1595	1753
1149	1294?	1477	1596	1754
1150		1490	1599?	1758
1151	1306	1492		1765?
1153	1315	1499	1600	1774
1154	1319		1603	1780
1157	1320	1500	1610	1797
1158	1329?	1503	1618?	
1159	1331	1504	1624	1801
1160	1332	1509	1631	1804
1162	1336?	1514	1633	1807?
1163	1337	1517	1645	1810
1164	1338?	1518	1651	1811
1169	1339	1519	1652	1826
1170?	1340?	1521	1654	1852
1176	1344	1523	1681?	1857
1177	1353?	1524	1685	1872
1181	1369	1528?	1687	1875
1191	1375	1529	1689	1876?
	1391	1536?	1690	1878?
1202		1538?	1691	
1205	1401	1540	1699	

McELMO PHASE

In the late 11th century the long cultural development north of the San Juan, through accumulated impetus, reached a stage of comparative architectural sophistication. The small but substantial pueblos and the development of coursed masonry of shaped rock during the Mancos Phase provided the basis to evolve the larger and more complex pueblos of the McElmo. The kiva, now completely lined and equipped with the enlarged southern recess of the typical Mesa Verde keyhole-shaped kiva, was made an integral part of the house. The kiva roof and the area immediately around it became a patio by surrounding it on two or more sides by rooms or by wing walls. Towers were more common and often of two stories. Compound walls of shaped rock with both surfaces faced became the rule, particularly in pueblos exposed to the weather. Additional treatment of stone



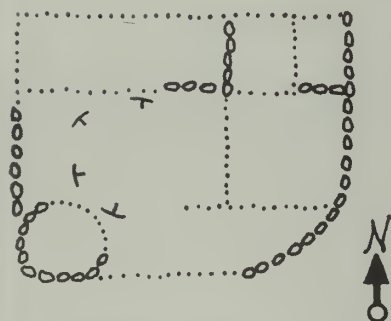
SITE 1801



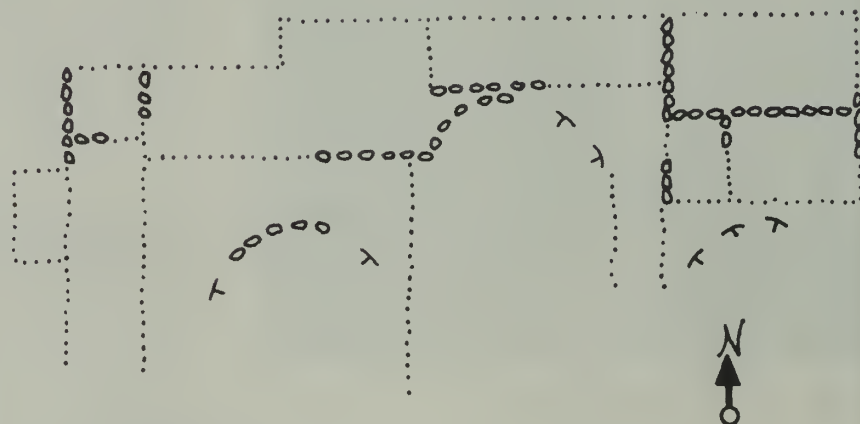
SITE 1610



SITE 1753



SITE 1780



SITE 1595

10 Feet

Figure 82—McElmo Phase sites.

appearing during this phase was the finishing of the exposed surface by dimpling with a hammer or pecking stone. Though most houses were of a single story, some were multistoried structures; communities of 30 or more rooms were built, though pueblos of 10 to 15 rooms were more common.

The McElmo Phase ushers in the true Pueblo III period in the area. The Pecos classification defines Pueblo III as the period of large communities. Settlements were certainly larger than in preceding phases, but it would be an error to think of such compact communities as Aztec, Yucca House, and Pueblo del Arroyo as being typical housing for the times. Large pueblos were not developed before Pueblo III times but were still exceptional. Many more sites contain only one or two kivas and a dozen or so rooms, and even smaller sites were not uncommon. But the tendency for kiva groups to cluster into one pueblo had started.

Other changes from the Mancos Phase are confined to the pottery. Mancos Black-on-white is still the dominant decorated ware on McElmo Phase sites with the addition of the carbon-paint variety discussed earlier as Wetherill Black-on-white. McElmo Black-on-white appears in both of its variations but in minimal quantities. Mancos Corrugated jars with wide mouths and a slight flare to the rim are still manufactured.

Gladwin used One Clan House on Chapin Mesa as the type site for his first definition of the McElmo Phase. One Clan House is a small unit of 10 to 12 rooms on three sides of a kiva, which was enclosed on the south side by a low wall. The site was excavated by Fewkes, who disposes of it in two brief paragraphs (Fewkes, 1923). A collection of sherds from the site made by Lancaster, in the course of the archeological survey of Chapin Mesa, contains classic Mesa Verde Black-on-white—in fact, nearly half the decorated sherds collected. Though the architecture is right for the McElmo Phase, the site was occupied into the Mesa Verde Phase. Pipe Shrine House nearby, also excavated by Fewkes in 1922, is as representative of the phase architecturally as One Clan House, and is recorded in a little more detail. Mancos Corrugated and Wetherill Black-on-white pottery are illustrated as coming from the house and the trash in front of it (Fewkes, 1923.)

O'Bryan (1950) enriched the description of the phase after his excavation of Site 34. The pueblo is a large compound of five kivas, a tower, and about 50 rooms, at the head of Soda Canyon just east of Chapin Mesa. Several accretions to the original structure had been made, with its final use in the Mesa Verde Phase.

Lowry Ruin (Martin, 1936), with its long occupation, contained much McElmo Phase material. Much of the pottery illustrated from its rooms appears to be Wetherill

and McElmo Black-on-white. But this large ruin, too, was also occupied in the later Mesa Verde Phase and probably received its ultimate additions and remodeling at that time.

On the La Plata at Site 41 (Morris, 1939) Buildings V and VII are late Pueblo III structures which, like Lowry Ruin and Site 34 on Mesa Verde, contain earlier material that could be attributed to the McElmo Phase. Two mounds at the same site, Buildings XII and XIV, however, appear to have had their last occupation during the McElmo Phase. Wetherill and McElmo Black-on-white sherds and vessels predominated; no classic Mesa Verde pottery was found in the ruins except accompanying the burials. The excavator believed the latter to have been placed there by occupants of later buildings nearby after the abandonment of the sites in question. The two buildings had been used as a source of construction stone during late Pueblo III, and had been badly torn up by pothunters. They were only partially excavated by Morris.

Except for the incomplete record of Buildings XII and XIV in the La Plata Valley we have no excavated site in the area in which the final construction was during the McElmo Phase and which can serve as an adequate type site. Such ruins do exist, I believe, and occur in greater numbers on the Mesa Verde, where most of the subsequent population was living in caves, than in the surrounding valleys where the same sites were more often used continuously until the area was evacuated. There are several likely prospects on Wetherill Mesa. Typical examples are illustrated by rough sketches in figure 82, and will be described briefly.

Site 1801, approximately a half-mile east of Long House, is built on the crest of a gently sloping ridge. The house is a small block of perhaps eight rooms with a single kiva in front. The masonry is of large, blocklike scabbled stone. The kiva is partially enclosed by a wall built along the east and south sides. Pottery from the site included Wetherill and McElmo sherds but nothing more recent. The pottery from this site has been covered in more detail under the discussion of McElmo Black-on-white. Reference may be made to table 10 for a complete count of identifiable sherds. A few Cortez Black-on-white sherds, a large trough metate, and a trash mound 2 feet in depth and measuring 40 by 60 feet indicate a fairly long occupation culminating during the McElmo Phase.

In the center of the mesa top between Step House and Long House lies Site 1610, a larger pueblo of an estimated 25 rooms, possibly with some of two stories at the rear. The two kivas are built in close to the house with one joined to the rooms to the east. A trace of a low wall to the south suggests that the kivas were

fully enclosed in a plaza. Wetherill Black-on-white sherds were picked up on the deep trash mound just south of the front wall along with the slightly everted rims of late Mancos Corrugated.

Site 1753 near the east edge of the mesa south of Step House has an unusual crescentic arc at the rear, or north side, of the building. This shape, common in Chaco Canyon and occurring in Building IV of Site 33 near Johnson Canyon about 12 miles to the southeast, is found at only one other site on Wetherill Mesa built after the Piedra Phase, Site 1654, a Pueblo II structure. Nine rooms of chipped-edge masonry nearly surround a single kiva. The sherds again include Mancos Corrugated, Wetherill and McElmo Black-on-white but no Classic Mesa Verde.

A three-kiva unit of 25 to 30 rooms, Site 1595, lies to the southwest of Step House near the west edge of the mesa. The mound is about 3 feet deep, of irregular E-shape. The masonry is of well-shaped rock, some stones possibly finished by pecking. The same sherd assemblage was present.

Site 1780 presents a similar combination of architecture and pottery. The masonry is of finished rock, and the unit includes a low tower at the southwest corner adjacent to the kiva. Each of the above sites was settled prior to the McElmo Phase but shows no evidence of subsequent use. Large concentrations of refuse lie before all sites but one. Site 1780, the last mentioned, is located on a small point above a sharp pitch of ground; sheet erosion has carried away and scattered the trash.

Though the unit pueblos are the distinctive architectural feature of the phase, the movement into caves which started during the Mancos Phase increased, with 30 percent of the McElmo sites on Wetherill Mesa located in the cliffs. The small houses built around large boulders on the talus are still common, and a new site location used during this period is at the foot of the upper cliff at the top of the talus. Here houses were built against the bluff but without the protection of an overhang. Examples of this occur at Site 1230 at the north point of the Mug House rincon and at the north end of Double House (Site 1385).

Sites recorded for the McElmo Phase are fewer and somewhat larger. Eighty-eight surveyed sites, with an average of nine rooms, could be attributed to the phase; of these 60 were on Wetherill Mesa. The low number of sites probably reflects some drop in population but is also accounted for in part by the probability that many of the McElmo sites were not recognized as such. The distinctive pottery types were not the dominant wares; in a 50-sherd collection from a small talus site consisting of Mancos Black-on-white the site might be typed Mancos Phase, whereas a 75-sherd sample might include a couple

of Wetherill Black-on-white. The presence of McElmo Black-on-white is to be expected in the Mesa Verde Phase cliff dwellings, and the earlier occupation is often concealed.

O'Bryan has suggested dates of about A.D. 1050 to 1150 for the phase.

McElmo Phase sites on Wetherill Mesa are (map 8):

1100	1169	1243?	1333	1610
1104	1173	1244	1369?	1651
1106	1174	1249	1385	1681
1110	1176	1251	1391	
1124	1180	1254		1714?
1149	1181	1257	1430	1717
1151	1189	1281	1437	1724
1153	1191	1282	1452	1753
1154		1293	1453	1780
1155?	1202		1475?	
1157	1205	1306	1495	1801
1158	1207	1313?	1496?	1810
1160	1210	1320		1875
1162?	1229	1331	1500	1905
1164	1230	1332	1595	
1168				

MESA VERDE PHASE

The most notable innovation in living accommodations since the pithouse became a kiva was made in the McElmo Phase with the construction of unit pueblos and the use of finished rock in masonry. Little was added to the architecture in the Mesa Verde Phase. Some of the unit pueblos constructed earlier were added to and made larger, although in many cases it was only the "ruin" that was larger, since earlier rooms were often abandoned and filled with trash and a new wing added. It would be difficult to prove that the larger Mesa Verde ruin had ever held more people than the smaller one of a hundred years earlier. Nearly all the larger five- and six-kiva-unit pueblos in the area, however, show evidence of a late occupation. If any changes in masonry occurred, they were more a matter of degree than of style. More of the rock exhibits the technique of pecking, and more double walls were used in the later sites. I have observed no ground surfaces on building stone except in Mesa Verde Phase sites, but it is not common even then (figs. 22, 23).

The chief difference in dwellings was in their location. By this time the majority of the sites were in caves, where the limitations imposed by the configuration of the rock were frequently a more important factor in the village plan than were the inherited notions of the builder. Where the size of the cave permitted some adaptation of the unit pueblo, the grouping of domiciles

about a kiva was usually followed. The placement of the kiva to the south of the house, a plan rigidly adhered to up to this time and still followed in the surface or exposed sites of the phase, was no longer so important. The shape of the cave often made it easier to place the kiva to the front of the cave regardless of the direction it faced. Perhaps this practice conditioned the builders to be less concerned about where a kiva was built, because in seven cliff dwellings encountered by the Wetherill Survey (Sites 1217, 1280, 1365, 1370, 1442, 1446, 1882) the kiva was placed north of the houses; in none of these did the conditions at the site prevent the use of the more conventional location.

Adaptation of the architecture to caves led to other small changes. Because of the protection from the weather afforded by the overhanging rock many rooms were not roofed with timbers but were built to the cave roof, which served as a ceiling, or were sometimes left open at the top of the wall. Much of the masonry in cliff sites, where there was no need to support extra stories, is not of high quality, and the need to conserve space in the cramped locations was probably responsible for the building of smaller rooms. Again it may have been the factor of space that led to the development of the square kiva. Six sites (1195, 1217, 1293, 1448, 1449, 1885) contained rectangular kivas.

The towers that appeared with the Mancos Phase as low structures were often of two or three stories in the Mesa Verde Phase (figs. 83, 84). Most are part of a house unit, usually near a kiva and frequently connected to it by a passageway or tunnel, but many towers occur alone or with a kiva in a location isolated from any dwellings. Site 1253 in the bottom of Rock Canyon is remarkable in having the only square tower found by the survey (fig. 85). This site consists of a structure 10 feet square of double-walled, finished masonry, still standing to the height of 8 feet. The amount of rubble at its foot suggests a building of at least two stories. The tower stands at the northwest side of a kiva depression 23 feet in diameter. A low retaining wall below the kiva is the only other construction in the vicinity.

The pottery of the phase underwent distinct changes. McElmo Black-on-white was carried over from the McElmo Phase but Wetherill was not. Mesa Verde Corrugated, with its small mouth and everted rim shape, is diagnostic of the phase, and the shapes of the earlier Mancos Corrugated were discontinued. The easily recognized and beautifully decorated Mesa Verde Black-on-white is symbolic of this last period of pueblo occupation north of the San Juan.

Excavated Mesa Verde Phase sites in the park itself are numerous but unfortunately are not so well recorded as we would wish; the preserved sites themselves perhaps

reveal more than written records of the investigations. Nordenskiöld's (1893) notes on cliff dwellings on Wetherill and Chapin Mesas afford some material. J. W. Fewkes did more work on Mesa Verde than any other archeologist; he reported on his first excavation, Spruce Tree House, in 1909, and on Cliff Palace in 1911. The Far View House excavation was treated briefly in 1917. Site 34 (O'Bryan, 1950) in Soda Canyon and Sun Point Pueblo (Lancaster and Van Cleave, 1954) are the only well reported excavations. These five ruins, though larger than the average for the period, may be considered illustrative of the phase, though the smaller Eagle Nest House in Lion Canyon across the Mancos River from the park is a more typical cliff dwelling (Morris, 1919a).

Among the many late Pueblo III ruins excavated on the La Plata by Morris (1939), Buildings, V, VII, XV, and XVI at Site 41 are good examples of Mesa Verde Phase pueblos, as is the final construction at Lowry Ruin (Martin, 1936). Site 4 in Mancos Canyon (Reed, 1958) is more typical in size. The great pueblo of Aztec (Morris 1919b, 1924a,b, 1928) was, at least in its last occupation, a Mesa Verde Phase site. Up to Pueblo III times Aztec had been on the southern periphery of the Mesa Verde area but during this period, if not earlier, during the McElmo Phase, the realm was extended south to Chaco Canyon, where a Mesa Verde Phase occupation is found at Pueblo del Arroyo (Judd, 1959), Pueblo Bonito (Judd, 1954), and Leyit Kin (Dutton, 1938). Reconnaissance conducted by Emma Lou Davis for the Wetherill Mesa Project indicates that, as pointed out long ago by H. P. Mera (1935), this range may be extended to the east and west flanks of Mount Taylor.

The survey tabulated 153 Mesa Verde Phase sites on Wetherill Mesa, of which 100 (66 percent) are placed in the cliffs. The average number of rooms for all sites is 9, with those in the caves averaging 10 rooms and being somewhat larger than those in the open which have a 7-room average. The ratio of rooms to kivas in open sites is 1 kiva to 12 rooms, and in the cliffs is 1 to 10. Such averages may be useful, but the actual settlement picture covers a great range from the many caves containing 1 room to Long House with about 150. Over half the cliff sites contain no kiva; some have several kivas and no rooms, or very few, which may not have been secular. Site 1209 containing a tower and a kiva is several hundred feet removed from Site 1207 (fig. 86), a 15 to 20-room pueblo with no kiva; the former probably served as the ceremonial center for the community. There are other similar combinations. Sites 1218 and 1221 (figs. 87, 88), caves in the bottom of the West Fork of Long Canyon, are of 30 and 35 rooms with only 1 kiva each, whereas Ruin 12 (Site 1321) has a ratio of only 4 rooms to a kiva (fig. 89).



Figure 83—A three-story tower. Site 1138.

LEFT—

Figure 85—Remains of a square tower associated with a kiva. Site 1253 in the bottom of Rock Canyon.

CENTER—

Figure 86—Site 1207, Mancos through Mesa Verde Phases, a cliff dwelling in Rock Canyon.

RIGHT—

Figure 87—Mesa Verde Phase cliff dwelling in the bottom of West Fork of Long Canyon. Site 1218.





Figure 84—Tower at small pueblo. Site 1139.





Ground plans of three representative Wetherill Mesa sites are shown in figure 90. Site 1810 is a pueblo near the end of the long ridge between Bobcat and Long Canyons. The outlines of at least nine rooms are discernible with a depth of mound suggesting that some of the rear rooms may have been of two stories. A tower is placed between two kivas, and all three structures are definitely part of the house. Masonry is of shaped rock with some chipped edge, characteristic of the Mancos Phase. Mesa Verde Black-on-white sherds are present, but many earlier sherds indicate long site occupation.

A small cliff house, Site 1446 (see also fig. 91), situated high in the upper cliff above Long Canyon, can be reached only by rope or ladder from the mesa top. The house consists of three rooms, the long one to the rear probably for storage. The largest room contains two mealing bins of upright slabs and a small, low-walled storage bin (fig. 92). The D-shaped kiva employs the cliff face for its rear wall. The masonry is substantial but of unfinished stone. The ceiling timbers and the metates had been removed, probably by other builders of the same general period. The few decorated sherds found were all Mesa Verde Black-on-white.

Site 1365 is in the cliff directly across Bobcat Canyon from Double House (Site 1385). The site consists of six rooms completely filling a small cave 40 feet above the talus plus a kiva and mound of house rubble immediately below built against the cliff and on the talus. Entry to the cave is now made by swinging in from the top of the cliff but when in use may have been via a ladder from the top of a two-story house on the talus. Split-level living was common. Many cliff sites are built on several small ledges within a cave or are scattered through several small adjacent caves.

Figure 93 shows a type of construction not uncommon in caves. Two juniper poles remain of the several that were laid across a notch in the cave floor near the lip to serve as floor joists. The outer timber was a sill that supported the outer wall of the room. The joists were

covered with rock slabs and adobe flooring. The same technique was employed at Ruin 12 (Site 1321; fig. 94) and Daniels House (Site 1448) on Long Mesa; the logs still carry the weight of unbroken walls and floors. Masonry in the cave was mediocre and of rough-shaped stone. Two Mesa Verde Black-on-white bowls and two Mesa Verde Corrugated jars were found on the cave floor. All sherds from the slope below were of the same types.

The phase dates from about A.D. 1150 to 1300.

Mesa Verde Phase sites surveyed on Wetherill Mesa area (map 9):

1106	1217	1301	1370	1621
1142	1218	1302	1372	1628
1148	1219	1303	1373	1681
1149	1221	1306	1374	
1151	1222	1307	1381	1712
1153	1224	1308	1384	1715
1156	1226	1309	1385	1726
1157	1227	1310	1387?	1727
1166	1229	1317?	1388	1728?
1167	1230	1318	1390?	1729
1168	1232	1320	1391?	1730
1174	1233	1321	1396	1731
1175	1239?	1322		1741
1176	1240	1323	1402?	1742
1180	1241	1325	1403	1743
1187	1244	1326	1409	1745
1189	1245	1327	1411	1787?
1191?	1246	1335	1419	1788
1193?	1249	1343	1425	1792
1194	1251	1345	1429?	1794
1195	1253	1347?	1433	
1199	1254	1349	1438	1810
	1260	1350	1439	1811
1200	1261	1351?	1446	1833
1201	1262	1354	1451	1848
1203?	1274	1356	1452	1866
1204?	1275	1357	1453	1872
1205	1284	1359?	1465	1874
1206	1285	1362	1482	1880
1207	1286	1363	1483	1881?
1208?	1288	1364		1882
1209	1290	1365		1883
1212	1291	1366	1500	
1213?	1293	1367	1505	1901
1216	1295	1368	1527	1902

LOWER LEFT—

Figure 88—Mesa Verde Phase cliff dwelling in bottom of West Fork of Long Canyon. Site 1221.

TOP—

Figure 89—Site 1321, Nordenskiöld's Ruin 12, on west side of Wetherill Mesa.

LOWER RIGHT—

Figure 91—Site 1446. Cliff dwelling in Long Canyon.

SUMMARY

The previous section related the data and materials collected to a series of phases outlining the sequences of cultural change on Wetherill Mesa. A review of the data and phase outline pictures a settlement pattern by phase and strongly indicates changes in population numbers. Little can be said at this point of a preceramic occupation except that the excavations in Site 1205 sug-

3

MAP EIGHT
McELMO PHASE SITES
WETHERILL MESA

This map shows position of sites. For site numbers, see enlarged map in appendix.



- CLIFF EDGE AT MESA TOP
- WATERCOURSE
- CAVE SITES—UNDERLINED
- 100 FT. CONTOUR INTERVAL



A
MATCH LINE
A

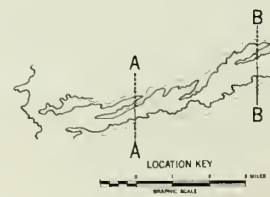
B
MATCH LINE
B

MATCH LINE
A

B

MATCH LINE
B

B



MAP NINE **MESA VERDE PHASE SITES** **WETHERILL MESA**

This map shows position of sites. For site numbers, see enlarged map in appendix.

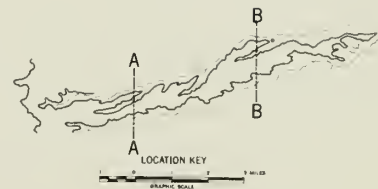
CLIFF EDGE AT MESA TOP
 WATERCOURSE
 CAVE SITES—UNDERLINED
 100 FT. CONTOUR INTERVAL



A
 MATCH LINE
 A

B
 MATCH LINE
 B

B
 MATCH LINE
 B



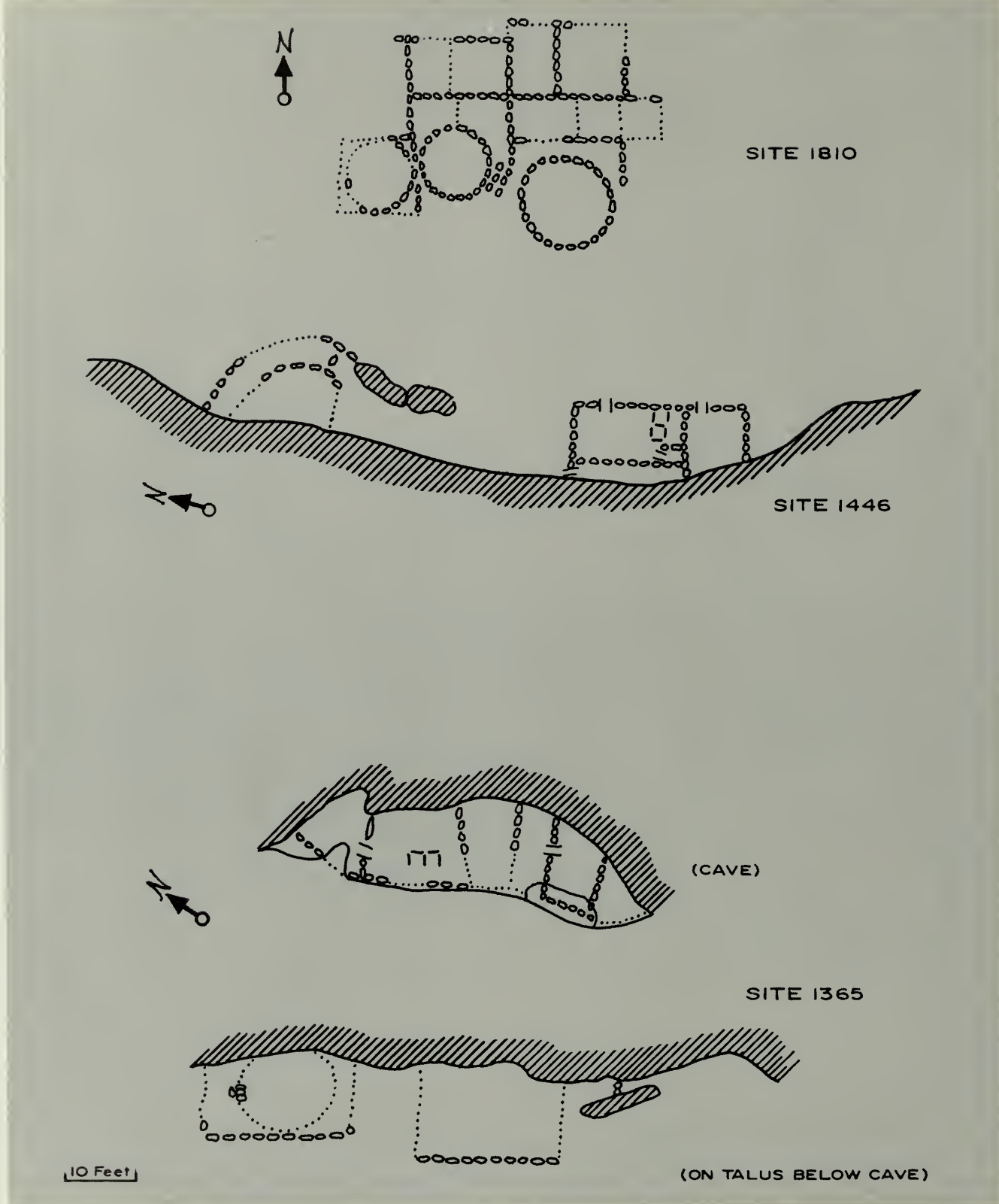


Figure 90—Three Mesa Verde Phase sites.

gest that there probably was one. On the basis of the survey we cannot say much about the La Plata Phase except that it is unquestionably represented and that use probably was made of both caves and the mesa top for homesite location.

Evidence of Piedra Phase occupation is plentiful; the period may have seen the peak of population on the mesa, or very near it. A total of 147 sites with an estimated 1,176 surface rooms was recorded. The individual sites average eight rooms in size but it seems probable, as we have observed above, that frequently two or more site numbers were assigned to what was, in reality, a large community of several houses. Map 5, showing the occurrence of Piedra Phase sites, also shows a significant preference for the area of greatest width to the mesa top. It is this part of the mesa, between Mug House and Ruin 13, where the relatively level ground has the deepest deposit of red loess soil. It was the choice dry-farming area on Wetherill Mesa, and 83 percent of the Piedra Phase sites were located here. From the density of sites on this favored ground we can assume that practically all the available space in this area got some use. It was saturated from end to end.

Changes in site distribution were made during the next two centuries. If the maximum population figure had not been reached earlier, it had reached its peak with the Ackmen Phase. The 208 sites recorded with an estimated number of 1,248 rooms may not indicate an increased population but merely that more of them were found, but it seems certain that numbers diminished in subsequent phases.

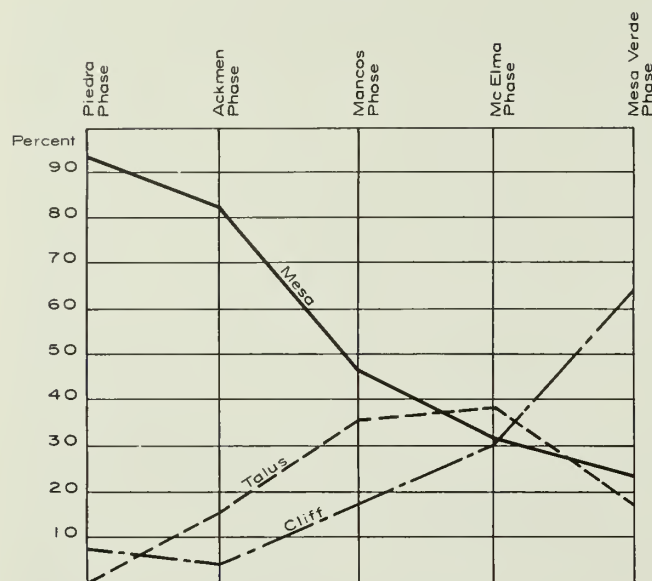
Two trends are noted: a reduction in the size of house and a more scattered distribution of settlements (map 6). The average Ackmen Phase site having no subsequent occupation was of six rooms, considerably smaller than in the preceding phase, particularly if we are right in assuming that the six-room Piedra house is actually part of a larger village. No such grouping of houses is apparent in Ackmen times. The mesa top still carries most of the sites, but they are more spread out with use made of the narrow, stony ridges. The broad central section of the mesa is still the preferred area but the percentage of sites located there has dropped from 83 to 68. Pioneers not only settled the outlying edges of the mesa but, in equal numbers, built on the talus slopes. By the close of the Ackmen Phase there had been a concentrated use, by relatively high numbers of people for about 300 years, of the choice location. Generations of firewood cutting, of clearing for planting, and of cultivating must have resulted in denuded and eroded ground. Relief from population pressure and a search for new soil led some to settle in apparently less desirable locations.

The reduced number of sites found representing the Mancos Phase must certainly reflect an actual reduction in numbers of people. It is likely that a greater percentage of the substantial masonry houses were found by the survey crew than of the earlier Pueblo II houses, many of which were of wattle and daub. The spreading out, which began in the Ackmen Phase, continued with greatly increased settlement on the talus and in caves, leaving only 32 percent of the sites in the formerly choice part of the mesa, with fewer than half the houses on the entire mesa top (map 7). The development of terrace farming, in this phase or earlier, must have been a valuable addition to farming practice—check dams on the talus slope enabled a man to trap his topsoil after it was eroded from the higher ground—but the evidence of a smaller population suggests that it may not have been enough. It will be interesting to see if a study of survey material from areas adjacent to the Mesa Verde area will support a theory of the beginnings of an exodus in the Mancos Phase.

The McElmo Phase marks a reversal of the fragmentation started in the Ackmen Phase with the breaking up of the large communities. The average site contains nine rooms with many much larger. Kiva units were grouped, a tendency which continued through the last phase. The other trends, away from the mesa top and onto the talus slopes and into the cliffs, continued. The Piedra Phase hearth area on the wide section of the mesa was populated by only 10 percent of the total number of McElmo Phase sites. Over two-thirds of the houses are now in the cliffs or below them. The most popular type of settlement was a unit pueblo on the talus slope or in the canyon bottom. Most of these were on broad benches at the canyon heads or were built at the top of the talus against the cliff (map 8). Population seems to be still lower in numbers.

During the Mesa Verde Phase the drift off the mesa top continued; only 25 percent of the sites were located there, and the use of the broad, flat area had dropped to 9 percent. The use of caves climbed sharply with a correspondingly diminishing use of the talus (map 9). The Mesa Verde Phase material in the majority of mesa-top ruins is scanty and gives the impression that it was the result of short-term use of few rooms in an older pueblo or possibly even was confined to ceremonial use. The pattern shown in tables 7 and 8 of changing preferences for homesites, however, is not duplicated in site numbers and room count. The sites number more than in the previous phase, and the room count more than for any phase. I nevertheless believe that we can postulate a continued drop in population.

TABLE 7.—*Changing preference for homesites, in percentage*



Because most of the sites were in protected caves, and because the country was thereafter abandoned with no further plundering for building material, the survey party could obviously make a much more complete count. We know from current excavation that Long House and Mug House had been used before the Mesa Verde Phase, although the fact was not evident as a result of the survey. It is altogether probable that in other caves the same situation exists. The figures given for the preceding phases, therefore, are probably distinctly lower than they should be. We know that caves were used in the McElmo Phase, and the material culture of the phase is difficult to distinguish if mixed with Mesa Verde trash.

TABLE 8.—*Sites by phase and location, with estimated room numbers*

Phase	Total number of sites	Mesa sites (%)	Talus and canyon sites (%)	Cliff sites (%)	Estimated number of rooms	Number of rooms in average site
La Plata and Piedra.	147	91	2	7	1, 166	8
Ackmen	208	82	14	4	1, 248	6
Mancos	166	47	37	16	996	6
McElmo	60	31	39	30	540	9
Mesa Verde . .	168	25	19	66	1, 512	9

Since the room count for this phase is most likely to be fairly accurate, we have for the first time some basis for a population estimate involving actual numbers rather

than relative gain or loss. We know that not all the 1,512 rooms were used simultaneously. Large numbers of the rooms in the count had been robbed of roof timbers for reuse elsewhere. In many sites only a hard-packed adobe floor and scattered adobe mortar remain of an entire room razed for the salvage of building material. Others have a fill of Pueblo III trash. An estimate of 1,000 rooms with concurrent use would probably be generous. In seven representative cliff dwellings on Wetherill Mesa an average of 27 percent of the rooms are small cubbyholes thought to have been for storage. If we apply the same percentage to the estimated number of rooms of contemporary use, we are left with 730 rooms to provide sleeping quarters. We have no reliable data on which to base an estimate of the size of a family. The birth rate may have been high, but it is certain that the infant mortality rate was high also. A family might have two to four children under the wing at a time but some rooms were probably occupied by a widow, widower, or surviving couple whose children had set up housekeeping for themselves. The size of the rooms would preclude a large number of recumbent bodies unless sleeping was in shifts. If we allow an average of 1 or 2 to a room, our figures run from 730 to 1,460. I feel that the lower figure would be a safer estimate, and even this figure represents a heavy population for an area of 10 sections of marginal land.

The Chapin Mesa Survey and a survey of a smaller area between White's and Morfield Canyons on the east side of the park revealed a site density comparable to that on Wetherill Mesa, as did Reed's survey in Mancos Canyon (Reed, 1958). A reconnaissance of the southern half of Wildhorse Mesa and more casual inspection of the rest of the mesa would indicate that sites are not unusually thickly concentrated on Wetherill. The Wetherill survey covered a little less than a tenth of Mesa Verde north of the Mancos River. If a population of 730 for Wetherill Mesa is hard to accept, a projected figure of 7,300 for the Mesa Verde leaves one even more dubious.

Of course, the results of the survey can only speak for events within the area surveyed. Arthur Rohn's analysis of the Chapin Mesa Survey will afford comparative data, but the Mesa Verde is, again, but a small part of the cultural area to which it gave its name. The entire area from the La Plata River to the Abajo Mountains and from the San Juan to the Dolores is generously sprinkled with Pueblo III ruins. Mesa Verde Phase Indians in the Montezuma Valley at the northern foot of the mesa were living in unit pueblos and had no caves to go to. Whether the population decline, from the Ackmen Phase onward, that occurred on Wetherill Mesa was duplicated in surrounding sections of the Mesa Verde area may be shown by future surveys.



Figure 92—Storage bin in room corner. Bin was originally roofed with sticks. Site 1446.



Figure 94—Timber still supporting outer wall over irregularity in cave floor. Site 1321.



Figure 93—Timber joists laid across crack in cave floor to support floor and wall. Site 1365.

miscellaneous observations

Many random bits of data and items of material culture were collected during the course of the survey that were not of a sufficient volume to warrant a separate discussion but should be recorded here.

CEREMONIAL SITES

Isolated ceremonial sites were mentioned in the discussion of the Mesa Verde Phase. Fourteen were found consisting of one or more kivas, a tower, or a kiva-tower association, but these were without attached living quarters.

Seven of these fourteen can be associated with nearby sites. The probable association of Sites 1207 and 1209 has been mentioned above (p. 101). Site 1167 is a kiva in a cave immediately below the cliff edge in the head of Long Canyon and probably served one or both of the unit pueblos (Sites 1168 and 1176) on the mesa above it. Site 1201, three kivas in a cave south of Long House, and the single kiva in Site 1295 may have been used by occupants of Long House. The lone kivas in small caves, Site 1317, 300 feet southeast of Kodak House, and Site 1387, about 500 feet south of Double House, were possibly associated with those two cliff dwellings. Site 1364, consisting of three kivas and a tower at the base of a butte at the end of the long ridge between Bobcat and Long Canyons, was probably the ceremonial complex for Site 1368 on top of the butte.

Several sites with a solely religious function were so far removed from habitations that associations cannot be suggested. The kiva and square tower, Site 1253 in

Rock Canyon, have been discussed. Also falling into this category are isolated kivas, Site 1135 in the bottom of Rock Canyon and Site 1814 on the ridge east of Bobcat Canyon. A cave in Long Canyon, Site 1195, contains an unusual structure illustrated in figures 95 and 96. Here a rectangular room, 9 by 10 feet, was built from cave floor to roof. A door or window measuring 10 by 20 inches placed 3 feet above the floor leads into a small room which fills the remaining cave area to the north of the large rectangular room. In the south wall of the latter, at floor level, is an opening barred with sticks set in the masonry. On the outside of the wall the opening is enclosed in a masonry wall, 1 foot high and open at the top. This seems to have served as a ventilator. Low, narrow masonry benches were built along the east and west walls. A niche, 6 by 6 inches, is incorporated in the east bench and a larger one, 12 by 15 inches, is located in the south wall, 2 feet off the floor between the west bench and the ventilator. At some later date the east wall was refaced on the outside with classic masonry and the remaining area of the cave to the south of the kiva, which is what it seems to be, was walled in, making a single room 21 feet long. This last wall was pierced by two doors, the northernmost was partly filled still later to reduce it to the size of a small window. The remaining door, the largest noted on the survey, was 5.5 feet high.

Site 1275, on the narrow ridge east of Rock Springs Canyon, is a circular tower 20 feet in diameter built of pecked rock. The maximum wall height at present is 4 feet; from the amount of rubble at its base one would guess that it was never over 6 or 7 feet high. There is no other structure in the vicinity. Site 1601, a small circular structure on the point to the north of the Long House rincon, may be the remains of a Pueblo II tower. The site was excavated by the survey crew to reveal a hard-packed adobe floor 5.5 feet in diameter. The masonry wall, for a third of the circumference, is based on upright slabs of chipped-edge rock. Present wall height averages 1 foot. There is not enough fallen rock

on the mound to raise the height more than another 2 or 3 feet. Either the structure was low or was robbed of stone by later builders. One more site classed by the survey as a possible tower may have had another use. Site 1782, on the ridge east of Bobcat Canyon, is built against a low sandstone outcrop. It is 9 feet in diameter, circular, and built of coursed masonry, too weathered to reveal the technique used in shaping the stone. The wall still stands to the height of 2 feet, and it is doubtful if it was ever more than 4. Slabs of sandstone 2 to 3 feet broad lying in the center may have been a roof covering at one time supported by timbers.

SHRINES

Just as artifacts of unknown use are often called "ceremonial objects," so is there a tendency to ascribe an esoteric function to architectural forms that do not fit an understood pattern. The sites that I have called shrines are of two types: the first, a monument of carefully stacked stones, and the second a more complex walled-in area.

In the first category, Site 1213 is a series of five monuments on the extreme outer edge of the cliff facing Long Canyon above the caves containing Sites 1199 and 1217 (figs. 97, 98). From north to south the first four monuments average 28 feet apart, but only 15 feet separate the fourth and fifth. As can be seen in figure 99, considerable care was taken in laying up the stone to hold the monuments to precarious perches. A similar pile of stones was built on the rounded cliff edge immediately above the three-room cliff dwelling, Site 1236, on the east side of Wildhorse Mesa.

Site 1422 is a monument, seven courses high, on a small projecting ledge 5 feet above the base of a sheer cliff in Long Canyon near the south end of the mesa (fig. 100). Dorsey (1902, pl. CIV) illustrates a monument similar to those described above at Mishongnovi,



one that was at that time used as a shrine in connection with the Snake Dance ceremonies.

The second type of shrine is represented on Wetherill by only two sites, which are so classified by default. Neither seems to fit any more mundane purpose. Site 1146 is at the tip of the long ridge between Long Canyon and its West Fork, built on a low ledge which breaks off sharply into Long Canyon. Two double walls of scabbled masonry, 12 to 15 feet long, parallel each other about 3 feet apart. The walls are joined at one end by a low terrace wall which curves below them on the steeper slope. Site 1214 is in a similar situation on more level ground on the point of the short ridge between the eastern and middle tributaries to the head of Long Canyon; it looks down on a bench to the southeast that was thickly populated during the McElmo Phase. Here two low double walls form an ell with legs 5 to 7 feet long. The open angle is partially enclosed by a low curving simple wall, one stone wide. None of the walls in either of the sites appears to have enough stone to raise them over 2 or 3 feet.

Historic shrines at Mishongnovi (Dorsey, 1902), Oraibi (Voth, 1901), and Zuñi (Stevenson, 1904) assume several shapes but the most common is a three-sided masonry structure 3 to 4 feet high and about as wide, covered with slabs. It is possible that Sites 1146 and 1214 were similar and served the same purpose.

Two other sites which may have had some ceremonial or religious significance have to stand in classes by themselves. Site 1545, on top of a narrow ridge west of the draw which goes into Rock Canyon over Jug House, is a walled enclosure 15 feet square. Masonry of large stones now stands 2 feet high with enough rubble present to indicate that it was originally of normal room height. There are no signs of cross walls, and the span from wall to wall is greater than that of an average room; it would be difficult to roof without additional support. A depression in the center indicates a floor level lower than the surrounding ground surface.

The bottom of the watercourse draining into the rincon north of Long House is, for a considerable distance, a broad expanse of exposed bedrock. At a point about 400 feet above the pouroff is Site 1588. Here a channel has been pecked into the rock for a distance of 100 feet down the middle of the wash. At its upper end it starts just below a 2-foot ledge in the bedrock, travels down the middle of the arroyo bed rather than following the lowest levels of the stream channel, and in the last 30 feet descends a steeper grade to end in a narrow basin (fig. 101). The groove averages about 2 inches wide and 1 inch deep. It could have served no purpose in collecting water.

FIREBOXES

Thirteen slab-lined fireboxes or firepits were surveyed; all but three were isolated from any habitation and could hardly have been used for ordinary cooking. Those that were surveyed as part of a house site were also somewhat removed from the house itself. Site 1110 is a McElmo Phase pueblo on the mesa. A slab firebox 2 feet long is 100 feet to the south below the toe of the trash mound. A similar slab box is built against a large boulder, which forms its fourth side, on the talus near the south end of the mesa. It sits only 20 feet from a one-room house, Site 1528. A D-shaped slab-lined pit 7 feet across is situated 15 feet north of a one-room Ackmen Phase house at Site 1459. All others surveyed were located at considerable distances from any house.

Nine of the 13 were rectangular, ranging from 12 to 30 inches wide and from 24 to 40 inches long and averaging 22 by 31 inches. The remaining four had curving or partly curving outlines with two circular, one D-shaped, and one elliptical. These averaged 7 feet long. The consistently smaller size of the rectangular fireboxes suggest a possibly different function of the two shapes. Excavation of five of the boxes, however, showed more similarity than difference.

Site 1231, northeast of Rock Springs, is in the bottom of a shallow draw with a gentle slope, 42 feet below a check dam (Site 1116). It is built of nine vertical slabs, and is almost square with an inside measurement of 31 by 33 inches. This was the first of the type found on the survey, and because of its position in the bottom of an intermittent stream channel and proximity to an agricultural terrace, it was thought to be a shrine—and, of course, I do not know that it was not. Because of it, the crew referred to the canyon which evolves from this draw as Shrine Canyon. The box was originally included under the number of the series of terraces, but a return trip was made 6 months later to excavate it, and at that time it was assigned a site number of its own.

A floor of flat pieces of burned sandstone was found 12 to 16 inches below the top of the upright slabs (fig. 102). Beneath the floor was a shallow layer of 1 to 2 inches of charcoal which lay on a subfloor of flagstones set into subsoil.

Site 1800 was a partially destroyed or eroded firepit on the east edge of the ridge east of Bobcat Canyon and was several hundred feet from the nearest ruin. Only one corner and two sides remained of the slab box which had original dimensions of 15 inches wide and over 25 inches long. It was cleaned out to reveal three flat slabs of burned rock lying on subsoil in a thin stratum of charcoal.



Figure 95—Site 1195 in Long Canyon. Room at right is square kiva. Note unusually high doorway at left.

On the Long Canyon edge of the mesa almost due east of Rock Springs is Site 1459, a D-shaped enclosure, 7 feet in length, outlined with slabs on edge. The slabs are heavily oxidized by fire. A trowel exposed quantities of broken burnt rock and charcoal at a depth of 8 inches below the top of the upright slabs. There seemed to have been more fire than could be accounted for by a burning house, and more charcoal than one would expect from anything but a jacal wall. The latter should also have produced burnt adobe, which was not found. No rubble of rock indicated the presence of a masonry structure above the slabs. The small Ackmen Phase house 15 feet to the southeast may or may not have had a temporal association, but it was included under the same site number.

Site 1695 is a circular firepit located on the tip of the point west of the Kodak House rincon. Four burned slabs arranged in a semicircle are all that show from the surface. If the arc were continued, the area enclosed would be 10 to 12 feet across. Pitting with a trowel uncovered flat, burned slabs 6 inches below the surface. Under the slabs was a layer of fine charcoal 3 inches

deep. On the point west of Long House rincon, at the edge of the project's camp, were two upright slabs thought to indicate another of the small rectangular fireboxes. A pit there was completely excavated to reveal a somewhat elliptical "tub" 6.5 feet long by 3 feet wide (fig. 103). The slabs outlining the structure were not perpendicular but sloped outward at an angle of

Figure 96—Sketch map of Site 1195.

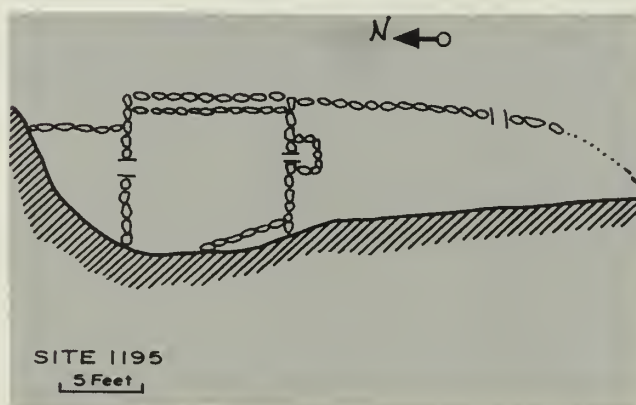




Figure 97—Stone monuments on cliff edge. Site 1213.



UPPER RIGHT—

Figure 98—Two of five monuments on cliff edge. Site 1213.

LOWER RIGHT—

Figure 100—Rock monument on cliff ledge in Long Canyon, isolated from any habitation. Site 1422.



about 30°, thus the dimensions of the bottom of the pit were less than on the surface. A foot below the surface was a “floor” of rough, unshaped rocks showing no evidence of fire. They lay on 1 to 3 inches of charcoal on a fire-hardened adobe floor. Some of the larger pieces of charcoal were identified as juniper.

The 13 sites share enough features to suggest a common function. All are lined with upright slabs; none show any evidence of a superstructure. All were shallow pits averaging 8.3 inches from the top of slab to the stones in the bottom, with a range of 6 to 15 inches. All but two, Sites 1118 and 1528, both unexcavated, show signs of fire. All but the three mentioned earlier are far removed from a house site, and the temporal association of those three with the houses near them is not known. All five that were excavated or tested have charcoal on the floor and all have stone either in or just above the charcoal. In none of the pits was there any cultural material which would be helpful in dating. The slabs of the box at Site 1528 had chipped edges, which suggest the Mancos Phase or later.

The size of the structures, both lateral and in depth, eliminates the possibility that they were houses. A few are large enough for sweat houses but the evidence of fire inside and the lack of a pile of burned rocks outside obviate that likelihood. The relative isolation does not suggest an ordinary cooking fire for the preparation of meals, but the possibility of field cooking remains. Cushing (1920, p. 204) has described the baking of corn in the husk in deep bottlenecked ovens dug at the fields near Zuñi, and identical ovens have been found in archeological sites (Morris, 1939, p. 111; Kidder, 1958, p. 92). Though different in character than the bell-shaped underground pit, the Wetherill Mesa fireboxes could have served as bake ovens. If fires were built in the pits and after burning down were covered with stones, corn in the husk laid on the stones and covered with stalks and earth should be well cooked in 8 to 12 hours. After the overburden and the corn were removed, only the rocks and charcoal would remain. But our pits are far too small to handle more than a few ears, and most of the sites are farther from the best corn land than they are from habitations.

Cushing (1920, p. 257) also describes small ovens built of sandstone slabs which were used at Zuñi for baking unleavened cornmeal cakes by placing alternate layers of cake and hot sandstone slab in the preheated oven. These appear to be similar to the small vented, subterranean ovens used in the Hopi towns for baking mush (Mindeleff, 1891, p. 163). The small Zuñi and Hopi ovens are located immediately outside their houses and require the use of ground meal. There would seem to be little purpose in leaving home to do the baking.

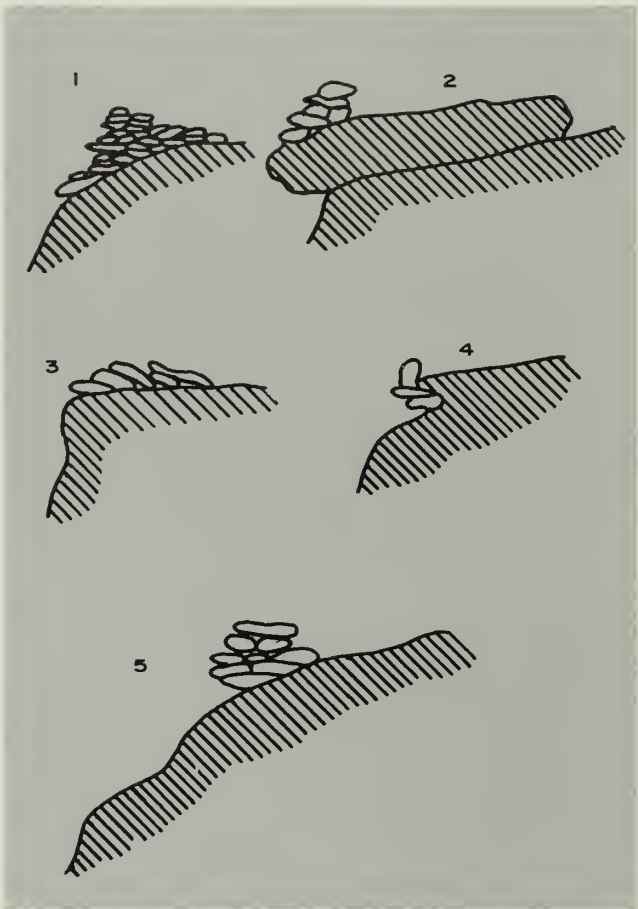


Figure 99—Sketch of stone monuments, numbered from north to south. Site 1213.

The fact that charcoal rather than ash is found in these pits indicates that the fires in them were smothered while still burning. The flat stones on top of the charcoal probably caused or helped to cause the smothering of the fires.

One more site remains to be discussed in connection with the fireboxes. Because of some differences in construction it was separated from the 13, but perhaps it should fall into the same category. On a level bench midway on the talus slope in Long Canyon, and 50 feet north of a 10-room Mancos Phase pueblo, Site 1426, was a crack in a large boulder walled in at each end. The structure was assigned site number 1427. The rock, colluvial detritus from the cliff above, had maximum measurements of 4 feet in height and 13 feet in length. It had split vertically, forming a V-shaped crack 10 feet long, 2 to 4 feet deep, and averaging 2 feet wide at the top (fig. 104). Each end was walled in with large, scabbled rock—the north end completely and the south

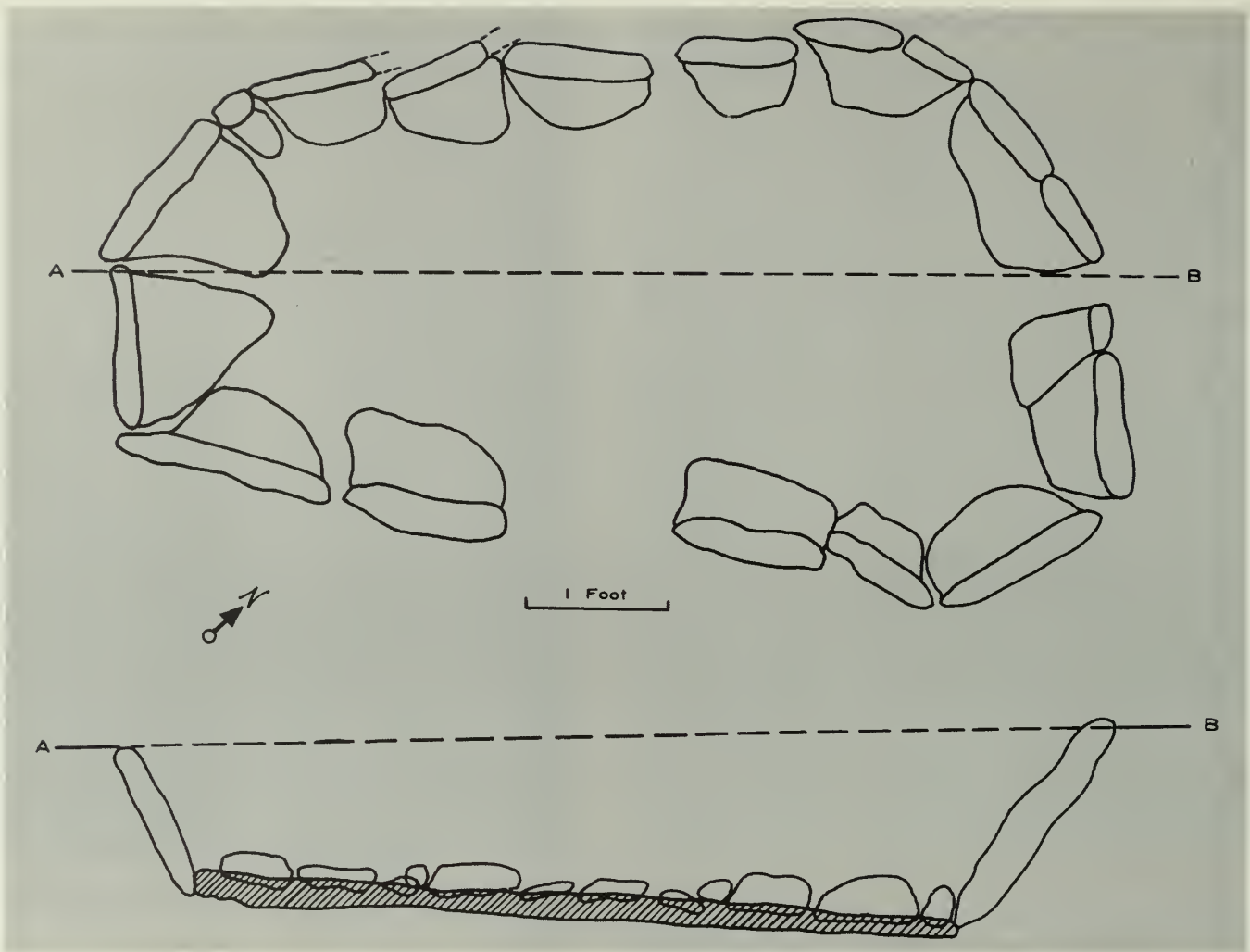


Figure 103—Firebox. Upper figure, a ground plan of box lined with upright slabs; lower figure, a cross section showing layer of charcoal on floor and paving of burned, rough rock. Site 1871.

end leaving an aperture 0.6 to 0.9 foot. The chamber thus formed, with an inside length of 7 feet, was covered with large slabs of rock (fig. 105).

The site was excavated in September 1959. The rock on the interior was fire-reddened, and 0.4 foot of fine charcoal covered the floor. A few small fragments of unbroken charcoal appeared to be of sagebrush. On the floor, protruding above the charcoal and just inside the aperture in the southern wall, were three more or less cube-shaped rocks 0.7 foot high (fig. 106). The structure may have been a corncrib which suffered an accidental fire or may have been used as an oven with the opening in the south wall serving as a vent.

STEPS

A common architectural manifestation on Mesa Verde, where much of the travel was across sloping rock, is a

series of steps. No such series were accorded survey numbers or described separately, but were usually recorded when they occurred in or near habitation sites. Many occurrences were noted at sections of cliff far from a cliff dwelling but were not recorded. Though no systematic collection of data was made, it should be noted here that they exist.

Steps on Wetherill can be classified as of three types. By far the most common is the shallow, cup-shaped "toe-and-handhold" pecked into the rock. These are found from few to dozens at or near almost every cliff dwelling. Notable examples negotiate the cliff at each side of the small rincón at Double House.

More elaborate and less numerous is the type shown in figure 107. The series of 10 steps illustrated, part of a flight of 50 in the bottom of the steep gulch below Jug House, made easier passage to the spring on the talus below. Broad, level treads and vertical risers have



Figure 101—Long groove pecked into bedrock of water-course. Site 1588.



Figure 102—Slab-lined firebox, showing upper layer of flat burned stones in the bottom. Site 1231.



Figure 104—Vault made by walling in ends of crack in colluvial boulder. Site 1427.



ABOVE RIGHT—

Figure 105—Site 1427 after excavation. Walls at each end are visible.

RIGHT—

Figure 106—Interior view of vault and three stones on floor, after removal of charcoal. Site 1427.





Figure 107—Steps carved in bedrock in wash below Jug House.

been laboriously cut into the living rock with a pecking stone. Other examples of the type are found in a series of 11 steps cut into the cliff face immediately under the cave at Site 1187. The lower end of this stairway ends in midair and was probably reached by a 10- to 20-foot ladder from a foot of the rock. Several well-made steps are found at the top of the cliff at the head of a chimney leading down to the talus north of Ruin 16.

The third type of stairs is made by setting broad slabs of stone into the earth. The long flight which gave its name to Step House is the only good example of this on Wetherill Mesa, although there is a suggestion of such construction at two or three other sites. Their eroded condition made exact designations uncertain.

PICTOGRAPHS

Pictographs were recorded at 27 sites. Only one, Site 1341, was of pictographs alone; the others were found at or near a cliff dwelling. The majority were placed on a smooth section of cliff face or on a collapsed piece of it, a few were on cave ceilings, and still fewer on masonry walls. As the sandstone is easily scored with

a sharp chert fragment, most of the pictographs were scratched or engraved into the rock, but many were pecked—with loss of line control. Figures were also painted on stone or plaster; probably more of this was done than the evidence now indicates. In several locations flecks of red, white, or yellow paint were found on cliff walls, remains of a larger figure now eroded away. A pictograph in charcoal was found at only one site.

The symbol, or picture, appearing most frequently, both in individual occurrence and in the number of sites where it is found, is the imprint or outline of a human hand. Most of these were made by placing the hand in a slurry of wet plaster and slapping it on the smooth rock. At Site 1364 the shapes of three hands are pecked into the rock; at Sites 1341 and 1882 hands are outlined in negative design, possibly by a mouthful of thin adobe soup (fig. 108). Stevenson (1904) reports many negative handprints at a Zuñi shrine 6 or 7 miles south of the pueblo.

The next most common element is a bird track. People from Acoma, Santa Ana, and Zia pueblos who observed identical designs on pottery in the project laboratory referred to them as turkey tracks.

Next in numbers but found at only three sites are animal figures. Several horned quadrupeds, probably bighorn, appear on the cliff below Ruin 12 cave, and a sheep is painted in white over red plaster on a kiva pilaster at Double House (fig. 109). A series of doglike animals were placed on the rocks at Site 1882, a cliff dwelling on Wildhorse Mesa.

Anthropomorphic figures were fewer in numbers than those of animals but were found at six sites. Figure 110 shows typical examples.

Observed at five sites were nested or concentric circles or rectangles, and at four sites a tight spiral. A zigzag snake or lightning design was also found at five sites; that at Site 1227 (fig. 111) was painted in red at the back of the cave. At Site 1341 was a series of 30 or more "tadpoles" in mud on the smooth cliff face (fig. 112). Perhaps the two taus, with the same outline as the T-shaped doorway, which appear on a fallen rock at Site 1421, should be placed in the same category. The tau was found by the Coltons near Willow Spring in the Hopi country. According to their informant, it symbolized a cloud, the mark of the Cloud clan, which also used a tadpole or rainbow as a clan symbol (Colton, 1931).

Recent petroglyphs include the names or initials of 28 individuals and two cattle brands (the Wetherills' Open A Diamond is one). The historical value of some of these inscriptions was mentioned in the chapter on the history of the archeology on Wetherill Mesa. The majority of names have been identified as those of explorers of 50 years ago and more.



Figure 108—Handprints in negative design on cliff face at Site 1341, south of Kodak House in Rock Canyon.



Figure 109—Mountain sheep in white on red background painted on plaster. Kiva pilaster in Double House.



A



B



C



D



E



F

Figure 110—Anthropomorphic pictographs. A, from Site 1320; B, C, from Site 1890 on Wildhorse Mesa; D, from Site 1527; E, from Site 1450; F, from Site 1370.



Figure 111—Zigzag pattern painted on rear wall of cave. Site 1227, north of Mug House.

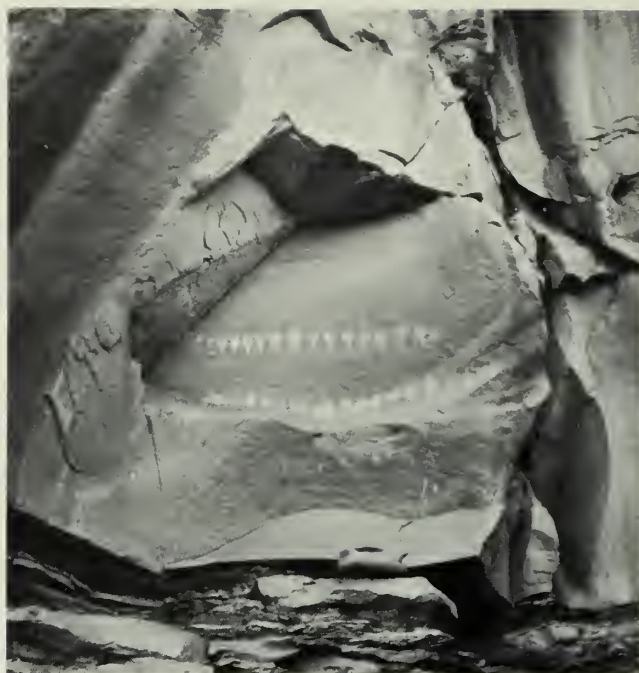


Figure 112—"Tadpoles" in mud on cliff face. Site 1341.

RECENT SITES

Six aboriginal sites of the recent period were recorded. All can be attributed to Navajos. Site 1234 near the bottom of Rock Canyon west of Rock Springs is an unfinished five-sided log hogan. Only the first course of what was apparently to be a typical cribbed structure was laid. Twenty-five poles cut and stacked nearby were never put in place.

Site 1803, in the drainage of Bobcat Canyon above the pouroff, is a brush-covered, five-sided lean-to, made by running poles between supporting trees. A firepit was

placed in the approximate center.

Site 1581 is a brush-covered hogan built on a forked stick framework, and was occupied by Navajo workmen employed by Nusbaum during his excavations in Step House cave.

The remaining three sites, 1467, 1476, 1479, are the remains of small sweat lodges; all built with the door to the east and fronted by piles of burned sandstone (fig. 113).

All these recent sites probably date within the past 70 years, and were likely built either by Navajo workmen employed at the park or as sheepherders for the Utes.



Figure 113—Recent Navajo sweat lodge built against a fallen tree near Rock Springs. Site 1476.



smaller collections

A number of specimens were collected, which, although they do not constitute a large enough body of material for thorough analysis, should be recorded to serve as comparative or supplementary data for other studies. Some of the specimens which are of interest, either because they are unusual or because they are representative, will be discussed briefly.

WOOD

The dry environment of the caves and the comparative lack of disturbance in many of the sites visited were responsible for the collection of more items of perishable material than is usually the fortune of a survey archeologist. Among such items were 16 digging sticks, whole or fragmentary, from 9 sites. Four are illustrated in figure 114. They are of two types: a straight dibble with a short beveled point, and a spatulate hoe or weeder with a third to a half of the distal end a flattened blade. The hoes are carefully worked, with a round knob carved at the proximal end, and average 3.6 feet in length. Blades averaged 0.2 foot wide. That straight dibbles were used for planting and the bladed tools for weeding is recorded ethnographically for Cochiti (Lange, 1959), Walpi, San Ildefonso, Santa Ana, and the Navajo (Gifford, 1940). The stick at the top of figure 114 was found placed above a viga in Site 1193, a cliff dwelling at the head of Long Canyon. Porfirio Montoya of Santa Ana, who examined our specimens in the laboratory, said his father used a similar hoe and placed it in the ceiling timbers of the house when he came in from the fields. The second item from the top of figure 114 was part of a cache of six sticks found with the jar in figure 58. Broken hoes were frequently used as lintel

sticks. Figure 115 shows one in place at Site 1221 in the West Fork of Long Canyon.

Three shallow wooden dishes were collected and are illustrated in figure 116. The dish at the top, from Site 1370, measures 0.5 by 1.1 feet and was made of Douglas-fir. All surfaces have been carefully sanded. The center dish, from Site 1892, was made by splitting an unidentified species of pine and hollowing the inside. The inside and the ends were ground but the exterior was unfinished. The dish at the bottom of the figure, made of pinyon, shows evidence of sanding on both sides and the corners and cutting-marks at the ends. It was found in a metate bin (fig. 117) at Site 1365. Though found lying the long way of the bin beside the metate, it almost exactly fits a depression at the foot of the metate and served the purpose of collecting the ground meal.

Also from Site 1365 is the rectangular object shown at the top of figure 118. Made of juniper, it was well sanded, leaving no tool-marks. Three holes 2 to 4 mm. wide were drilled on one edge. The larger hole, to the right in the photo, was drilled from both sides with a coarse drill. The other holes have nearly perpendicular walls. There is a slight depression in the center of the board. To informants from Rio Grande pueblos brought to the laboratory by Florence Ellis of the University of New Mexico, the artifact suggested the head of a cradleboard.

At the bottom of figure 118 is a board of juniper measuring 0.45 by 2.4 feet. The under surface is flat and "planed" or sanded; the upper is irregular but smoothed and with beveled shoulders. Thirty-one pits, averaging 0.2 inch deep, have been drilled at random in the upper surface. The bottoms of some of the pits were coated with pitch. The Indians thought it was a lapboard used in making beads, the small pits to hold blanks of stone or shell in place while the center perforation was drilled. All but the flat under surface of the board was heavily smoke-blackened and it may have had a secondary use as a lintel.



Figure 114—Digging sticks. From top to bottom: oak hoe from Site 1193, serviceberry hoe from Site 1187, mountain-mahogany hoe from Site 1218, serviceberry dibble (proximal end missing) from Site 1322 (cat. #'s from top 12045/702, 12038/702, 12044/702, 13483/702).



Figure 115—Doorway with digging stick used as false lintel or stop for slab door. Site 1221.

Figure 116—Wooden dishes. From top to bottom: cat. #13520/702 from Site 1370, cat. #17216/702 from Site 1892, cat. #13506/702 from Site 1365.

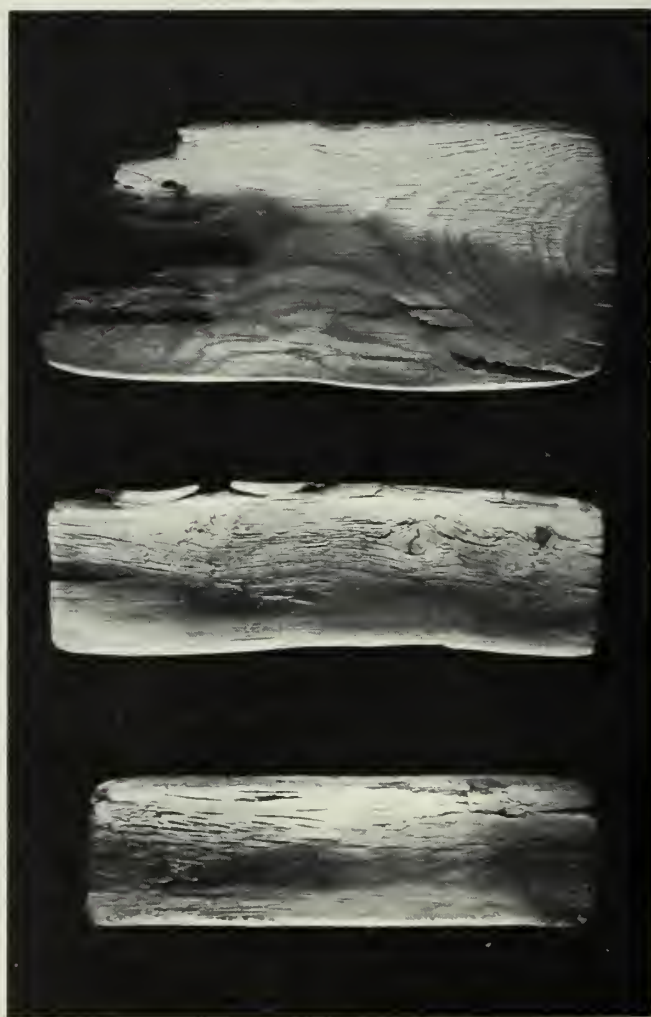




Figure 117—Metate bins. Wooden dish in left bin, mano in right bin. Site 1365.

Figure 118—Possible cradleboard part and lapboard (cat. #'s 13504/702 and 13524/702).





Figure 119—Sandal with toe-strings (cat. #13517/702). From Site 1370.



Figure 120—Mended sandal (cat. #13526/702). From Site 1382.

TEXTILES

A detailed analysis of textile material from the survey and excavations is planned for a future publication. Numerous examples of knotted yucca leaves and pieces of yucca cordage were collected from cave sites, but few specimens of weaving were found. Fragments of three baskets, two coiled and one twilled, were collected. One

small piece of finely woven yucca fabric was found and one short length of cotton twine. Fragments of four sandals twilled of yucca leaves came from cliff dwellings. One, with a nearly complete set of tie strings, was picked up on the surface at Site 1370 in Bobcat Canyon (fig. 119). Another, from Site 1382, a large cliff dwelling on Long Mesa, has been reinforced by mending with yucca leaves (fig. 120).



Figure 121—Pressure flaked tools. (Proveniences and catalog numbers listed left to right, top to bottom: from head of Long Canyon, cat. #17195/702; from Site 1230, cat. #17166/702; from Site 1670, cat. #23471/702; from bottom of Rock Canyon, cat. #13611/702; from Site 1861, cat. #17199/702; from Site 1285, cat. #17162/702; middle row—from Site 1164, cat. #12065/702; from Site 1555, cat. #17109/702; from Site 1664, cat. #17139/702; from Site 1872, cat. #17203/702;

from Site 1169, cat. #12069/702; from Site 1230, cat. #12080/702; from Site 1414, cat. #13411/702; bottom row—from Site 1749, cat. #17174/702; from Site 1801, cat. #17181/702; from Site 1600, cat. #17125/702; from Site 1688, cat. #17171/702; from Site 1172, cat. #12066/702; from Site 1155, cat. #12064/702; from Site 1500, cat. #13619/702; from Site 1344, cat. #13326/702; from Site 1106, cat. #13308/702).

STONE

Though all vegetal material is from a Mesa Verde Phase context, the stone represents the entire gamut of Wetherill Mesa prehistory. It was all surface collected from sites of several different phases, but of insufficient quantity to make a significant analysis. The specimens will be used for comparative data in the study of stone from the various Project excavations. Representative samples of chipped stone appear in figure 121. The Milnesand point mentioned in the discussion of phases (p. 88) is third from the right in the top row. The point at the extreme left, middle row, was picked up in front of a unit pueblo in the head of Long Canyon but is not a familiar Anasazi type. I do not know how it would compare with recent Ute projectile points. The second and

third from the left, middle row, are typical points of the La Plata and Piedra Phases. The bottom row are the familiar side-notched Pueblo II and III type. Typical full-groove, polished axes and hammers are shown in figure 122.

The stone tools in the top row, the first three from the left, have pecked surfaces on the ends and small pecked depressions on the flat surfaces. Morris (1939, p. 128) describes similar artifacts as "pitted rubbing and pounding stones" and believes the pits were provided for a thumb-and-finger grip. He found them commonly on Pueblo I sites but diminishing thereafter. All four found by the survey were from Pueblo III sites. The one on the far left came from a site that also had a Mancos Phase occupation.

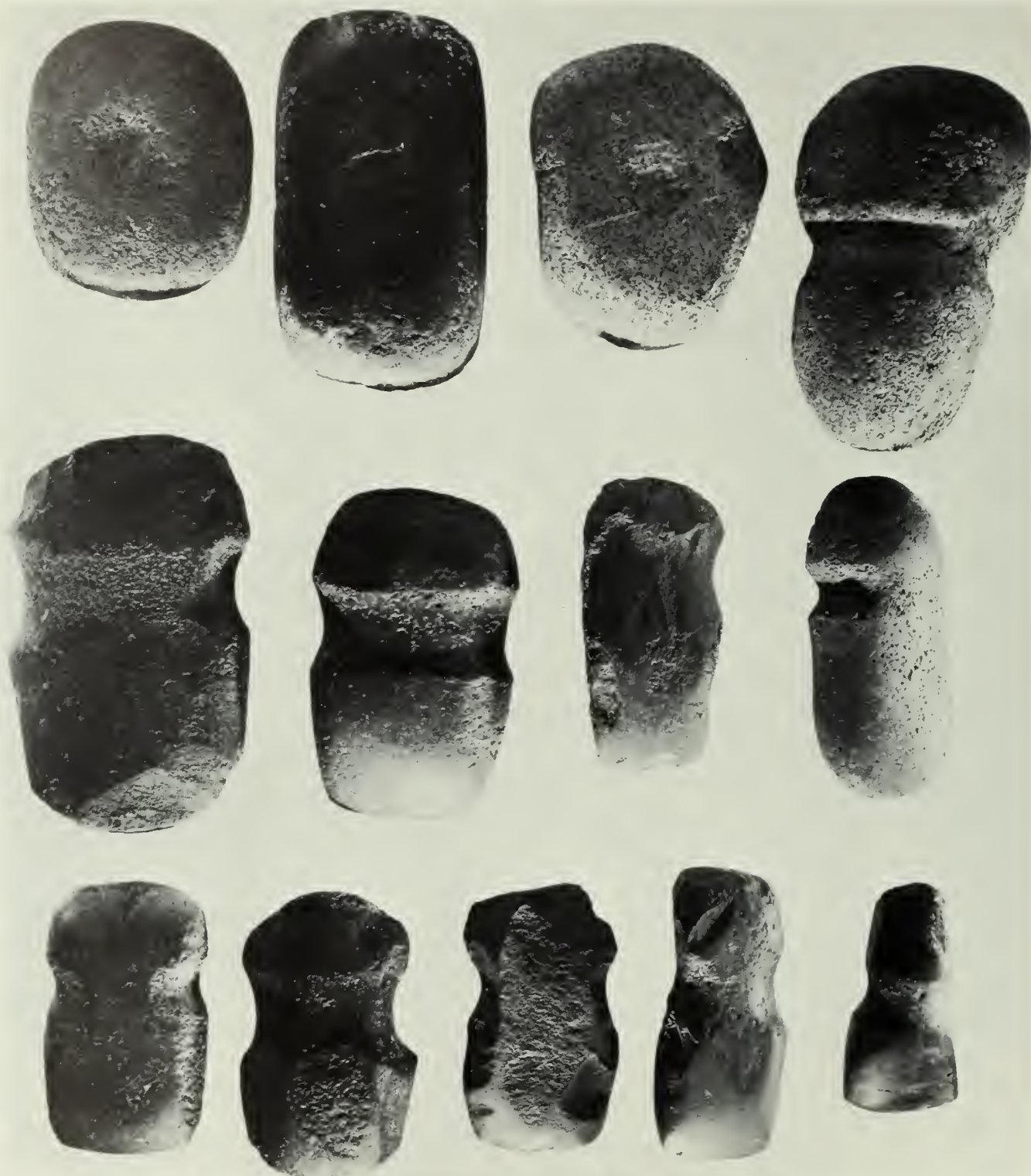


Figure 122—Pecked and polished stone tools. (Proveniences and catalog numbers listed left to right, top to bottom: from Site 1681, cat. #17122/702; from Site 1302, cat. #13335/702; from Site 1321, cat. #13352/702; from Site 1241, cat. #17164/702; middle row—

#13387/702; from Site 1357, cat. #13384/702; from Site 1193, cat. #12031/702; bottom row—from Site 1365, cat. #13395/702; from Site 1365, cat. #1339/702; from Site 1141, cat. #12029/702; from Site 1448, cat. #13422/702; from Site 1320/702, cat. #13342/702).

BONE

Thirty-five bird bones collected from nine sites were identified by Lyndon L. Hargrave. Except for three bones from three individual turkey vultures from Plank House on Wildhorse Mesa, a probable recent nesting place, all were turkey bones. Four were made into awls and one showed evidence of cooking.

Twenty-six mammal bones from nine sites were studied by Thomas W. Mathews at the Southwest Archeological Center. Identified species were cottontail, gray fox, mule deer, coyote, bobcat, and bighorn. All the worked bone was from a single ruin, Site 1302, a cliff house in Rock Canyon. These specimens were three awls of bobcat ulnae, a perforated coyote tibia, and two worked deer bones. Cottontail was collected at the most sites (four), but bighorn was represented by the largest number of specimens (seven), although six of these came from one site, reducing the significance. Site 1493, a small cave in Rock Springs Canyon, produced Chapin Gray pottery and the bighorn bones. One of the latter from a test trench was burned and probably was a food bone. The site can be assigned to the La Plata or Piedra Phase. All other bones may or may not represent aboriginal food

bones. They were collected on the surface and may be the recent leavings of carnivores. Animals definitely associated with the period of occupation are bighorn, coyote, mule deer, and bobcat.

FOOD PLANTS

Food plant remains were collected from 49 cliff dwellings. Most specimens were of corn, but also included were squash and/or pumpkin, gourd, and beans. A full report by Hugh Cutler of the Missouri Botanical Garden will be included in a later publication.

TREE-RING SPECIMENS

Twenty-eight wood specimens from construction timbers in 15 cliff houses were sent to the Tree-Ring Laboratory at the University of Arizona, where they were examined by Robert F. Nichols. Juniper led the list with 13 samples, all undatable, as were the single specimens of serviceberry and cottonwood. The one piece of pinyon, four of the seven ponderosa specimens, and two of four from Douglas-fir were dated (table 9). Dates were checked by Bryant Bannister.

TABLE 9.—*Dated wood specimens collected by the survey*

Site	Specimen no.	Form	Species	Date—A.D. Inner Outer	Location
1448..... (Daniels House)	MV-525	Cross section....	Douglas-fir...	1179p-1271v.....	?
1221.....	MV-526	Core.....	Ponderosa....	1183p-1253B.....	Viga in place, Room 4
1207.....	MV-527	Cross section....	Pinyon.....	1064p-1169L.....	Viga, northmost room
1355..... (Plank House)	MV-538	Cross section....	Ponderosa....	1145p-1256vv.....	On floor, destroyed room south of kiva
1365.....	MV-542	Cross section....	Ponderosa....	1126p-1270vv.....	Collapsed ceiling south room
	MV-543	Three-quarter section	Ponderosa....	1059p-1260v.....	Do.
1385..... (Double House)	MV-549	Half section....	Douglas-fir...	1199p-1244vv.....	Ladder landing platform, middle cave
1241..... (Ruin 16)	MV-553	Cross section....	Pinyon.....	1017p-1238vv.....	Second kiva from south
	MV-556	Cross section....	Juniper.....	1132p-1215L.....	Third kiva from south
	MV-558	Cross section....	Juniper.....	1180p-1256R.....	Do.
	MV-566	Cross section....	Juniper.....	1188p-1256RL.....	Room south side of third kiva from south
	MV-569	Cross section....	Juniper.....	1195p-1256R.....	Near fifth kiva from south
	MV-570	Section.....	Juniper.....	1055p-1170vv.....	Fourth kiva from south
	MV-573	Section.....	Juniper.....	1115-1204vv.....	Talus below ruin
	MV-574	Cross section....	Pinyon.....	1151p-1266R.....	Do.
1834..... (Nordenskiöld's camp)	MV-1302	Cross section....	Pinyon.....	1812p-1891vv.....	

p: Pith ring present.

B: Bark present, probable cutting date.

v: Outside shows erosion, last ring variable around circumference.

vv: Outside shows extreme erosion, last rings very variable.

L: Outer surface uniform in texture and color.

R: Outer ring constant over significant portion of circumference.

appendix

References, Tables, Maps

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TABLE 10.—*Site data*

Location: B, canyon bottom; C, cliff; M, mesa top; T, talus.
 Phase: A, Akkemi; L.P., La Plata; M, Mancos; McE, McElmo; MV, Mesa Verde; Mod., modern; P, Piedra; PI, PII, PIII, Pueblo I, Pueblo II, and Pueblo III, respectively.
 x: present but uncultured.

Site number	Location	Estimated number of rooms	Architecture											Pottery											Phase	Remarks						
			Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Cermonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancos Gray	PII corrugated	PIII corrugated	Unidentified corrugated	La Plata B/W	Piedra B/W	Cortez B/W			Mancos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red	Exotic
1100	M	6												1	1					8				3	5					McE		
1101	M	15	X	X										1	1					9				14						M		
1102	M	15-18		X										1?						1			1							A?		
1103	M	7-10													1					12	1	18			22	2	1			A-McE		
1104	M	7-10												1	1					4	1	16			3	3	8	37	1	2	McE-MV	(1)
1105	M	15-20												1						7	6									A	(2)	
1106	M	4-10	X											1	1								1							P		
1107	M	?	X	X											10	1																
1108	M																															
1109	M																															
1110	M	10-15		X										1	2					5				2	2	3				McE		
1111	M																															
1112	M	7-8	X	X										1	33	1				1										P		
1113	M	8		X										1	2				4	13				7	1					M		
1114	M																															
1115	M																															
1116	M																															
1117	M		X	X											33	1			1	2									2	P	(3)	
1118	M																		5	12				6						M		
1119	M	4												?	1																	
1120	M																															
1121	M	3												?						6				4						M		
1122	M						X												1													
1123	M	3-10		X																												
1124	M	9-13		X										2?	1				1	2	35			1	12	3	6	9		A		
1125	M	5-7		X											2	2			1	1										M-McE		
1126	M	1		X																											A	
1127	M			X																											M?	
1128	M																															
1129	M																															
1130	M	7-8		X										1	3				6	24				3	18					A-M		
1131	M	5	X	X										?	1				4	9					8					M		
1132	M	3	X	X																3										M?		
1133	M																															
1134	M	6-10	X																												A?	
1135	B	3																													McE	
1136	B	10-20	X												20																LP?	
1137	T	?																		15				6	9	7				McE		

(1) Wingate b/r, Houck polychrome.

(2) Wingate b/r.

(3) Firepit.

TABLE 10.—*Site data—Continued*

Site number	Location	Architecture										Pottery										Phase	Remarks							
		Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Ceremonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancos Gray	PII corrugated	PIII corrugated	Unidentified corrugated	La Plata B/W			Piedra B/W	Cortez B/W	Mancos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red
1138	T					X	X	X	X	X	X			1						30				2	3	5	5		MV	
1139	M					X	X	X	X	X	X			1				2		32				1		3	24		MV	
1140	T				X										3			6		11				8				M		
1141	T				X			X	X					1	1			12		15				9				M		
1142	C																											M		
1143	M		X		X															2								M?		
1144	M		X		X									?				1		3				3				M?		
1145	M																											M?	(4)	
1146	M				X		X			3								3										M?		
1147	M																											MV		
1148	C		X		X		X	X	X				?	1	2			3	1	2			1	13	3	1	6		M-MV	
1149	T												?	2						12			1					M		
1150	B		X		X		X										2	2	1	4				1		2	1		A-MV	
1151	C				X					3									26				1	3	2				A-MV	
1152	M																													
1153	B		X		X			X					3				2	3		5			2	11	2	16	5		A-MV	
1154	T		X												2				14			2	13	7	5	1	1		A-MV	
1155	C		X		X										1				2							1		McE?		
1156	C				X		X	X																				MV?		
1157	B		X		X		X						2				8	4	1	18			6	26	3	7	37	2	A-MV	(5)
1158	B		X		X		X						1	2			1	7	16				5	7	3	15	1		A-McE	
1159	B		X										?	18	1		6	3	1	15			1	17		3	1		A ₁ M	(6)
1160	B				X						X			2	4		1	2	1	22			1	10	1	13	6	1	A-McE	
1161	M																													
1162	M		X										?				1	3		1			2	6	3	1			A-M ₁ McE?	
1163	M		X		X								1					6		6			5	23	7				A-M	(7)
1164	M		X		X						?		2					2	1	13				7	2	11	2		M-McE	
1165	C				X										63					1									LP	
1166	C		X		X															4									MV	
1167	C		X		X		X	X					1						5				3		1	1			MV	
1168	M		X		X		X						3					2	2	11			2	5	3	4	5		McE-MV	
1169	T		X										?					4		3			2	17	2	4			M-McE	(8)
1170	M		X										?						7				3					M?		
1171	M												1?	3				4		18			4	6		3			A?	(9)
1172	M		X		X								2					1	2	25						11	9		McE	
1173	M																													

(4) Shrine.
(5) Eseevada B/W.
(6) MV sherds probably intrusive from Sites 1153 and 1160.
(7) Late sherds probably intrusive from Site 1176.
(8) Tusayan on Polychrome.
(9) McElmo sherds possibly drifted from Site 1176.

TABLE 10.—Site data—Continued

Site number	Location	Estimated number of rooms	Architecture											Pottery										Phase	Remarks						
			Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Cermonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancos Gray	PII corrugated	PIII corrugated	Unidentified corrugated	La Plata B/W	Piedra B/W			Cortez B/W	Mancos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red
1210	T	1-5									X			1				7		24			1	17	9	5				M-McE	
1211	M	10-15											1	2			1	1	1	19			1	6	2	5				A-McE	
1212	C	60									X								5	7						1	26			MV	
1213	M						X	X				X																		MV?	
1214	M	4					X	X					3							21								13			MV
1215	C	1		X			X													1			1	1			1			MV	
1216	C	1					X												1	9			1	1			2			MV	
1217	C	4-5		X			X					X								3							2			MV	
1218	C	25-35		X			X					X																			MV
1219	C	1																													MV
1220	C	2																		6										M	
1221	C	35					X	X					1	1				1	16					4			1	17			MV
1222	C	1					X	X											2											MV	
1223	C	1					X	X					1											3							?
1224	C	1					X	X																							?
1225	C	2-3			X		X	X												4							1	1			MV
1226	C	2					X												5	50			1	4			12			MV	
1227	C	6					X	X							1?																MV
1228	C	3					X	X						1																	PIII
1229	C	94					X	X	X			X			8																A-MV
1230	T	10			X		X				X			1				3	8	3				11	3	38	7		2		McE-MV
1231	M			X																										?	
1232	T	5					X				X			3				2	2	33				7		9	15		1		MV
1233	C	30					X	X	X						3				2	7						1	36				MV
1234	B	1																													Mod.
1235	C	4					X	X	X		X								1							1	2				MV
1236	C	3					X	X	X											2							3				MV
1237	C	6					X	X	X		X			1?				1	4	22							21				MV
1238	T	?					X	X			X							1		5			1	19	1						M
1239	C	2					X	X	X											1											MV?
1240	C	30			X		X	X		X				1?					1	44				2			1	13			MV
1241	C	50					X	X	X					5					3	9							3	46		1	MV
1242	T																														
1243	T	10-15	X				X							1				5		20	1		6	40							A-McE?

(19) Kodak House, Jaecal wall in upper level.

(20) Series of five rock monuments, probably associated with Site 1217.

(21) Shrine?

(22) Rectangular kiva.

(23) Tested September 1961.

(24) Mug House, excavated 1960-61.

(25) One Escavada B/W, one undetermined Chacoan sherd.

(26) Firepit.

(27) Escavada B/W.

(28) Jug House.

(29) Modern pentagonal log hogan.

(30) Ruin 18.

(31) Ruin 16. Tusayan b/r.

TABLE 10.—Site data—Continued

Site number	Location	Estimated number of rooms	Architecture										Pottery										Phase	Remarks									
			Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Cermonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancos Gray	PII corrugated	PIII corrugated	Unidentified corrugated	La Plata B/W			Piedra B/W	Cortez B/W	Mancos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red	Exotic	
1244	T	5-6				X								1					1	2	12			3	22	9	17	6	2	A-MV	(32)		
1245	C	3				X														14							9		MV				
1246	C	1																		1							1		MV				
1247	C	1		X								X																		?			
1248	C	1		X																										?			
1249	C	9		X		X							2						3	2	19						4	13		M-MV			
1250	C	1			X							X																		?	M-MV		
1251	T	5													9				3	2	28					5	5	2	2		M-MV		
1252	T																																
1253	T											X							1		1									MV			
1254	T	5-6		X		X								1	5		2	6		29				5	41	14				A-McE			
1255	T	7																															
1256	T																																
1257	T	1																														M-McE	
1258	C														2				3		8				4		1				?		
1259	C	1			X																												
1260	C	1 ²																													MV		
1261	C	1-2				X									1					6							1	2		MV			
1262	C	1				X														3								1		MV			
1263	T	2		X																											?		
1264	T	3 ²		X		X														3						1 ²				?			
1265	C	2		X																											?		
1266	C	1				X																									?		
1267	C	1																													?		
1268	C	1				X																									?		
1269	C	2		X																											?		
1270	T	1					X								4															M			
1271	T																																
1272	B																																
1273	C	1																															
1274	C	1																													?	(33)	
1275	M	1					X								1															MV			
1276	M														4															MV			
1277	T																																
1278	T	2		X																											?		
1279	T	1 ²		X											30	1				1										P			
1280	C	8-9							X																						MV		
1281	T	1-2													1					14								11		M-McE			
1282	T	2																	2	11										M-McE			
1283	T																		6	1	22						15	2		M-McE			
1284	C	5-6				X																									MV		

(32) Tusayan b/r and Gallup-Chaco B/W.

(33) Restorable PIII corrugated jar.

TABLE 10.—Site data—Continued

Site number	Location	Estimated number of rooms	Architecture											Pottery											Phase	Remarks										
			Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Ceremonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancos Gray	PII corrugated	PIII corrugated	Unidentified corrugated	La Plata B/W	Piedra B/W	Cortez B/W			Mancos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red	Exotic				
1285.....	C	15-20		X	X	X	X	X	X	X	X			1	88		1?		2	3	4				1	1	7	2			LP, MV MV	(34)				
1286.....	C	3				X	X	X												3								1?								
1287.....	C	6		X						5										2																
1288.....	T	1				X				1					1					1						1?						MV ?	(35)			
1289.....	C											X			X																					
1290.....	T	?																		7								4				MV LP, M, MV	(36)			
1291.....	C	5		X		X					X				7				3	2	21				4								LP, M, MV	(36)		
1292.....	T																																			
1293.....	C	30		X	X	X	X	X	X					1	2			1	3	37					10	2	5	38					McE-MV M? MV	(37)		
1294.....	T	2				X	X							1	1					3																
1295.....	C											X		1						1																
1296.....	T																																			
1297.....	T	1																															?			
1298.....	C	1				X	X													2													?			
1299.....	C	1																		3													?			
1300.....	C	1				X																											?			
1301.....	C	2				X	X				4				1			1	13	27								8					MV MV P, A, MV	(38)		
1302.....	C	4-6												1				3	20						5			15								
1303.....	T	?				X											1	1	2	2					2			2								
1304.....	T										9						1	1	1	2					1			1								
1305.....	T										25																									
1306.....	C	?				X								1				6		18						1		1					A-MV MV MV MV	(39)		
1307.....	C	5		X			X	X	X									2	6	30								4								
1308.....	C	1		X																																
1309.....	C	3		X	X	X		X																												
1310.....	C	5		X				X												2								1						MV ?	(39)	
1311.....	C	1		X	X				X										2																	
1312.....	T																																			
1313.....	T	1		X																1						1								McE? ?	(40)	
1314.....	C	1																																		
1315.....	T	?																																	M	
1316.....	T																																			
1317.....	C	1																																	MV?	
1318.....	C	2																																	MV?	
1319.....	C	1	X																																M? ?	(41)

(34) Step House.

(35) Chapin Gray jar with rim fillet.

(36) Tusayan Polychrome.

(37) Square kiva.

(38) Sherds are probably drift from Site 1303.

(39) PIII corrugated jar and McElmo B/W bowl. No sherds.

(40) Heavily smoked cave roof.

(41) Probably associated with early phase at Site 1320.

TABLE 10.—Site data—Continued

Site number	Location	Estimated number of rooms	Architecture										Pottery										Phase	Remarks										
			Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Ceremonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancos Gray	PII corrugated	PIII corrugated	Unidentified corrugated	La Plata B/W			Piedra B/W	Cortez B/W	Mancos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red	Exotic		
1320	C	29			X	X	X	X					4	1				4	9	20	1		2	22	2	3	58			A-MV	(42)			
1321	C	26			X	X	X	X					4						7	6				2			40			MV	(43)			
1322	C	8			X	X	X	X					2						2	3				7		4	10			MV	(44)			
1323	C	1 ²			X	X	X	X																			1			MV				
1324	C	2			X	X	X	X					2							X				1		2	42			MV	(45)			
1325	C	26			X	X	X	X					1							1				1						MV	(46)			
1326	C	1			X	X	X	X												4										MV				
1327	C	1																																
1328	C																																	
1329	T	1				X																									M?			
1330	T	5	X			X	X							3					7	30											A			
1331	T	5 ²				X	X							2	1			2		37				5		3					P-McE			
1332	T	7-10	X			X	X							11				4		20				12	1	4	13				M-McE			
1333	T	1-2				X	X											1		13				2							McE			
1334	T	3-5												7						1											A?			
1335	T		X																	1						1	1				MV			
1336	T	4		X	X															1				1							M?			
1337	T	4		X	X									6				7		49				28							A-M			
1338	T	2		X	X																			1							M?			
1339	T	2				X														15				1							M			
1340	T	1 ²				X														2											M?	(47)		
1341	C																																	
1342	T																																	
1343	C	2																																
1344	C	13	X	X		X		X						6				5		14			3	16	2	1	1	1				MV	(48)	
1345	C	2		X		X		X												7												A-McE		
1346	C	2		X		X		X																								MV		
1347	C	1				X		X												4				4		1						MV?		
1348	T	5-6																																
1349	T	1		X										2						30				2	1	1	14					MV		
1350	C	25				X	X	X	X	X			1							7	30				2	3	31					MV		
1351	T	1				X																										MV?		
1352	T																																	
1353	T	2				X																												
1354	C	1																		6												M?		
1355	C	20				X	X	X	X				2							8				8	1	5	22						MV	
1356	C	3				X														1													MV	
1357	C	4		X		X								1						11													MV	

(42) Ruin 13.

(43) Ruin 12.

(44) Ruin 11^{1/2}.

(45) Ruin 11. Several boxes of sherds of partially restorable PIII corrugated jars.

(46) Chaco B/W.

(47) Pictographs.

(48) Mancos b/w pitcher and PII corrugated jar.

TABLE 10.—*Site data—Continued*

Site number	Location	Architecture												Pottery										Phase	Remarks						
		Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Cermonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancos Gray	PII corrugated	PIII corrugated	Unidentified corrugated	La Plata B/W	Piedra B/W	Cortez B/W			Mancos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red	Exotic
1358	C														1					1							1			MV?	
1359	C					?																					1				
1360	T																										1				
1361	T																														
1362	C																														
1363	C																														
1364	C																														
1365	C																														
1366	C																														
1367	C																														
1368	C																														
1369	C																														
1370	C																														
1371	C																														
1372	C																														
1373	C																														
1374	C																														
1375	C																														
1376	C																														
1377	T																														
1378	T																														
1379	T																														
1380	T																														
1381	C																														
1382	C																														
1383	C																														
1384	C																														
1385	C																														
1386	M																														
1387	C																														
1388	C																														
1389	T																														
1390	M																														
1391	T																														
1392	T																														
1393	T																														
1394	T																														
1395	C																														
1396	C																														
1397	T																														

(49) Flat metate in place. Site probably associated with Sites 1362, 1364-68.

(50) Ceremonial center for Site 1368 immediately above it.

(51) Double House.

(52) Probably associated with Double House (Site 1385).

TABLE 10.—Site data—Continued

Site number	Location	Estimated number of rooms	Architecture										Pottery										Phase	Remarks								
			Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Cermonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancos Gray	PII corrugated	PIII corrugated	Unidentified corrugated	La Plata B/W			Piedra B/W	Cortez B/W	Mancos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red	Exotic
1398	T	8	X			X				7			1	2	1		1	9		19			5	22			1	1		A		
1399	T									6				1																		
1400	T	4				X	X																		1						M	(53)
1401	T	?				X	X			4								1	10	17				3		1				MV?		
1402	T	5	X		X					6										2			2	1			1			A, MV	(54)	
1403	T									9																						
1404	T																	1						2						M		
1405	T	55	X		X	X	X						2						1		9			1			11			MV		
1406	C	3				X	X													18			5							?		
1407	C	1				X	X																							?		
1408	C	6			X	X	X													1							1			MV		
1409	C																															
1410	C	1				X	X																								?	
1411	C	1				X	X	X																							MV	
1412	T	1				X													2		1			2						A?		
1413	C	1?				?								1						11				2						A	(55)	
1414	T	2			X	X													6		7			2						M?		
1415	C	6			X	X		X					1?						2		9			2		1		2		MV		
1416	T	4			X	X													14		39			2	19		2			A		
1417	T	7			X	X							1	2					14		26			4	31					A		
1418	T	2			X	X																								?		
1419	C	5				X													1		7			2			1			MV		
1420	C	1					X																							?		
1421	C	2				X	X												2		12				6					M	(56)	
1422	C				X	X																								?		
1423	C	1			X	X																								?		
1424	C	1			X																									?		
1425	C	1?	X			X																								?		
1426	T	10	X		X	X	X						1						1		7			16	36	1	12			MV		
1427	T	1	X			X													13	1										A-M		
1428	T	4	X		X																									?	(57)	
1429	C	1																	1		8			2	10					MV?		
1430	T	3	X			X																								M-McE	(58)	
1431	C	1																	1		7									M?		
1432	T	2	X			X																								A?	(59)	
1433	C	1					X																							MV	(60)	
1434	C	1					X																							?		

(53) PII corrugated jar

(54) MV sherd was most of a bowl. An early site re-used as a PIII burial place?

(55) Unidentified foreign sherd

(56) A small rock monument on a ledge on cliff

(57) Storage bin associated with Site 1426

(58) Deep sand fill covers old floor area

(59) McElmo b/w canteen and PIII corrugated jar

(60) Chapin Gray jar with fillet rim

TABLE 10.—Site data—Continued

Site number	Architecture												Pottery										Phase	Remarks									
	Location	Estimated number of rooms	Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Ceremonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancoos Gray	PII corrugated	PIII corrugated	Unidentified corrugated	La Plata B/W			Piedra B/W	Cortez B/W	Mancoos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red	Exotic	
1435.....	C	4	X				X								1				1		7			4	25							?	
1436.....	M	15-20		X			X								1	2			4		44			1	16	12	4			1		A-M	
1437.....	M	10																		2		4							1		M-McE		
1438.....	M	?																		1		9							5		MV		
1439.....	M	3?	X	X																												MV	
1440.....	C	3					X														1								2			MV	
1441.....	M	1					X																									?	
1442.....	C	5					X								1				1		1								2			MV	
1443.....	C	10					X				6				?				9	1	20			1	10				2			M-MV	
1444.....	M																	1			2												
1445.....	C	35			X	X	X	X	X	X					2					11	1								22			(64)	
1446.....	C	3			X	X	X	X	X	X					1				3		5								8			MV	
1447.....	C	1		X			X	X	X	X					1																	MV	
1448.....	C	26		X			X	X	X	X					1					1	9								26			M	
1449.....	C	48	X									X			3					2	7								33			(65) (66)	
1450.....	C	16					X	X	X	X					1						12								11			(67)	
1451.....	C	6					X	X	X	X					1					5												MV	
1452.....	M	15-20	X			X	X	X	X	X		X			1	6	1	11	19		14	2	2	50	51	3			3	20	4		P-MV
1453.....	M	15		X			X								1	2			10		7			11	63	8	2		6			A-MV	
1454.....	C	5					X	X	X	X																							MV
1455.....	C	6			X		X	X	X	X					1						16								4			MV	
1456.....	T	1					X																		1?								
1457.....	T	1				?					1	5																				?	
1458.....	M	?	X													8	X		1		3		X		2							P-A	
1459.....	M	1		X		X																										A	
1460.....	M										17																						
1461.....	T										1																						
1462.....	M										2																						
1463.....	M										2																						
1464.....	M	10-15		X		X													3		2		1		9								P-A
1465.....	C	14	X	X	X	X		X							3	26													2			MV	
1466.....	M	2		X																	12												P-A
1467.....	M	1													1	12			1		6		1	2	1							Mod.	
1468.....	M	3		X																													M
1469.....	M										3																						

(61) Escavada or Gallup B/W.

(62) Sherd area only.

(63) PIII corrugated jar.

(64) PIII corrugated jar.

(65) Daniels House.

(66) "Ruin 20 1/2," Square Kiva.

(67) Ruin 20.

(68) Escavada b/w, Padre B/W?, Ivie Creek b/w.

(69) Mesa Verde B/W bowl.

(70) First sherd collection lost, after note made of occurrence of types.

(71) Large firepit (?) and one-room house.

(72) Sweet lodge.

TABLE 10.—Site data—Continued

Site number	Location	Estimated number of rooms	Architecture										Pottery										Phase	Remarks								
			Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Cermonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancos Gray	PII corrugated	PIII corrugated	Unidentified corrugated	La Plata B/W			Piedra B/W	Cortez B/W	Mancos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red	Exotic
1470	M	5-10	X												18		3			2		1								P	(73)	
1471	M	?	X												3		2			1										A	(74)	
1472	M	4	X												1														2	P	(74)	
1473	M	1		X																3										Mp		
1474	C	?																		1										McE?	(75)	
1475	C																													Mod.	(75)	
1476	T	4					X													9										M	(75)	
1477	T	2	X	X																6										A?	(75)	
1478	M																													Mod.	(75)	
1479	M																															
1480	M																															
1481	B																															
1482	C	3		X				X																							MV	
1483	M	7					X													9										MV		
1484	B																															
1485	T																															
1486	T																															
1487	M	?	X																	1										P?		
1488	T																															
1489	T																															
1490	C	3					X													7										M	(76)	
1491	C																														LP?	(76)
1492	C	2		X		X														4										M	(76)	
1493	C																														LP?	(77)
1494	C	3																														
1495	M	3,4	X	X		X														3											?	
1496	T	3-5					X													1											McE	
1497	M																			17										McE?		
1498	M																															
1499	T	4	X	X		X	X		X											15										M		
1500	C	30		X	X	X	X	X												34										M-MV	(78)	
1501	M																															
1502	M	10-15	X																												P	
1503	M	?		X																											M	
1504	C	4	X																	12										M		
1505	C	1?																													A, MV	
1506	M	?	X																	2										LP		
1507	M																			1												

(73) Sherd area.

(74) Lino Gray.

(75) Sweat lodge.

(76) Test trench here revealed much charcoal, few chert rejects, no sherds.

(77) Test trenches through 3 feet of charcoal-bearing sand yielded 2 Chapin Gray sherds.

(78) Lancaster House.

TABLE 10.—Site data—Continued

Site number	Location	Estimated number of rooms	Architecture											Pottery										Phase	Remarks						
			Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Ceremonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancos Gray	PII corrugated	PIII corrugated	Unidentified corrugated	La Plata B/W	Piedra B/W			Cortez B/W	Mancos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red
1508	M	1		X		X				20								11	13					8						M	
1509	M																														
1510	T									10																					
1511	T									11																					
1512	T									12																					
1513	T									5																					
1514	T	4				X	X												1											M	
1515	C	1				X	X																							?	
1516	C	2				X	X											5	2											M	
1517	T	15				X	X							1				1	17											M	(79)
1518	T	4				X	X											1	13											M	
1519	T	2				X	X											5	4											M	
1520	T	?																6	13											A?	(80)
1521	C	1-5																9	6											M	(81)
1522	M	?				X											2	1	18											A	
1523	M	?																1	6											A?	(82)
1524	M	?																11	11											M	
1525	T	1				X	X											2	4											A?	(83)
1526	T									6																					
1527	T	2				X	X											1												MV	
1528	T	2				X	X																							MP	
1529	T	3																4	23											M	
1530	C	?																												?	(84)
1531	C	?																2	1											A?	(85)
1532	T	20				X	X						1					18	54											M, MV	
1533	T	6				X	X											11	18											A?	
1534	T									4																					
1535	C	1?																4												?	(86)
1536	T	1-2				X?												1	2											MP	
1537	M	?																2	3											?	(87)
1538	M	?								30								1	3											MP	(87)
1539	T																														
1540	T	10?				X				30								1	2											M	
1541	T	?																												A?	(88)
1542	M	?													15		1		3											LP	(88)

(79) Escavada B/W.
 (80) Chaco B/W. Sherd area only.
 (81) Smoke on cave roof; no structure.
 (82) Sherd area only.
 (83) Sherd area.
 (84) Heavily smoked, blackened cave roof.
 (85) Smoke and charcoal; no structure.
 (86) No structure; toehold trail in rock near cave, few sherds.
 (87) Sherd area.
 (88) Sherd area.

TABLE 10.—Site data—Continued

Site number	Location	Estimated number of rooms	Architecture										Pottery										Phase	Remarks								
			Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Cermonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancos Gray	P-II corrugated	P-III corrugated	Unidentified corrugated	La Plata B/W			Piedra B/W	Cortez B/W	Mancos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red	Exotic
1543	M	?	X							4					32					1	1	3?						1		LP?-P	(89)	
1544	M	1									?				1			1		8	1?		2	3			1			M?		
1545	M	1																						1						M?		
1546	M	1																		1										A?		
1547	M	1		X											1					1				7						P-A		
1548	M	5	X												23		1		2		4	1	2		1					P		
1549	M	?	X												32					3												
1550	C	2					X								1					5				1						M?		
1551	C	1					X																							M		
1552	M	5	X												32							1		3						P-A		
1553	M	20	X				X								66	10	4	7		9	1	5	2	10			1	35		P-A		
1554	M	3	X												38					2	2?							1		P		
1555	M	15?	X	X											77	4					5							16		P		
1556	M	3?	X	X											16					2			1							P		
1557	M	8?	X	X											7															P-A		
1558	M	2?	X	X											3	1		5		16		10	5					1		A	(90)	
1559	M	2?	X												43	4			1									2	1	P		
1560	M	1?					X								26					2			1	2						M	(91)	
1561	M	1	X												10					2				4						A?		
1562	M	10?	X	X											33	1				4			1				2			P-A		
1563	M	?	X												12			2		11				8						P-A		
1564	M									5																						
1565	M	5?	X	X											3			1		1										P-A?		
1566	M	20-30	X												16		1			12	1	1	1	9						P-A		
1567	M									12																						
1568	M									3																						
1569	M	8-10	X			X									4					3				5						A?		
1570	M	2?	X												3									2						A?		
1571	M	10	X	X											17					2	2		1	1						P-A		
1572	M	8	X												2					1			1	3						P-A		
1573	M	12	X				X				X				8		14	25		21		15	58				1	5	1	A-M	(92)	
1574	M									5																						
1575	M									11																						
1576	M									4																						
1577	M	1-10	X	X											15					6			2	6	1			1		A?		
1578	M	10	X												10									9	1					P?		
1579	M	2					X								1			2		5							2			M?		
1580	M																													Mod.	(93)	
1581	M																															

(89) Intrusive sherds from hill above.

(90) Red Mesa B/W.

(91) Some sherd intrusion from Site 1553.

(92) Klatuhlanna B/W.

(93) Forked-stick hogan.

TABLE 10.—Site data—Continued

Site number	Location	Estimated number of rooms	Architecture										Pottery										Phase	Remarks									
			Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Ceremonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancos Gray	PII corrugated	PIII corrugated	Unidentified corrugated	La Plata B/W			Piedra B/W	Cortez B/W	Mancos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red	Exotic	
1582	M	2	X			X									12	1		3		8				2						P-M			
1583	M	3	X												30			4		4				2						P-A			
1584	M	8	X												25	2		4		10		2	5							P-A			
1585	M																																
1586	T																																
1587	C	3													5			1		26		1	7	1		4				M-MV	(94)		
1588	M																																
1589	M	1																6		8			2							M	(95)		
1590	M	8	X			X	X								10	1		28		73			6	27					1	P-M			
1591	M	10	X				X	X							2	15	2	3	31		26		2	44	91				6	5	P-M	(96)	
1592	M																																
1593	M	1													1			2		1				2							M?		
1594	M	3					X											1		5				3							M		
1595	M	25-30				X	X								3			12	1	1			9	76	13	6					A-McE		
1596	M	5-10	X			X	X								2	4	1	2	18	7	3		27	82					1	P-M			
1597	M	5		X		X									1	3	1	15		6			10	90						A	(97)		
1598	M	8	X			X									10			1		1	3		1	6					1	P	(98)		
1599	M	2	X			X									1			2		2				3							M?		
1600	M	1				X	X																								M?		
1601	M			X																													
1602	M																																
1603	M	6				X									1	15		19		47			4	58	1						A-M		
1604	M	1	X			X									4		1							1							A		
1605	M	10	X			X									10					8			1	1							A		
1606	M	1	X			X																	2	2							A?		
1607	M	3		X		X	X								9					5			2	2							A?		
1608	M																																
1609	M	?	X												4		2	6		6	1	1	2	5							P-A	(100)	
1610	M	25					X								2	4	1	23		9	1		7	42	4						P-McE	(101)	
1611	M	5	X															2		3											A?		
1612	M	1					X								1			1								1							
1613	M	15-20	X												23	1		1		2											P	(102)	
1614	M	10	X												5								2	1							P	(102)	
1615	M	15	X												14			2		1											P		
1616	M	7	X			X									49	9							3									P-A	(103)

(94) Masonry reservoir at base of cliff.

(95) Long groove packed in sandstone of arroyo bottom.

(96) Red Mesa B/W, and unidentified sherds of Chaco series.

(97) Kana'a b/g.

(98) Some intrusion of sherds from Sites 1596-7.

(99) Large firepit.

(100) Firepit?

(101) Snowflake B/W.

(102) Sherd drift from ridge above.

(103) Sherds do not reflect it but small masonry house is built on top of early pueblo.

TABLE 10.—Site data—Continued

Site number	Location	Estimated number of rooms	Architecture										Pottery										Phase	Remarks									
			Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Cermonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancos Gray	PII corrugated	PIII corrugated	Unidentified corrugated	La Plata B/W			Piedra B/W	Cortez B/W	Mancos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red	Exotic	
1617.....	M	9	X				X ²								31		2	6		28		1	1	10						1	P-A	(104)	
1618.....	M	3	X				X ²								16			4		5				3		1					M?		
1619.....	M	8	X												1 ² 122	13	1		7	7	3	5	2	6					7		P-A		
1620.....	M	4	X												37	3		13		13									1		P-A		
1621.....	M	6	X												7	1			4												P, MV		
1622.....	M																																
1623.....	M	5	X				X								45	1		7		4		1	1	1					5		P-A		
1624.....	M	5													8	1		12		27		1	2	21							P-M		
1625.....	M	1					X ²								2																?		
1626.....	M	15	X	X		X	X								1165	13		5		6	2	3	1	2					8		P-A		
1627.....	M	4	X												16	1			5		5										P-A		
1628.....	M	3	X				X								7			1		7		1	1								P-A, MV		
1629.....	M	15	X												3					5								1			P-A?		
1630.....	M	15	X				X								30		2			7	1		2								P-A		
1631.....	M	30	X	X			X	X							1 ² 27	3		23		38	1	3	6	43				4	9		P-M		
1632.....	M	10	X		X										25	2		5		3			1	7		1					P-A		
1633.....	M	8	X			X	X								1	8	1		11		4	1	1	5	45				6		P-M		
1634.....	M	2	X																													P?	(105)
1635.....	M	6	X	X		X									8																P		
1636.....	M										1																					A?	
1637.....	M	5	X																1												P		
1638.....	M	6	X												5																	P	
1639.....	M	8-10	X												20			4		15					5						P-A		
1640.....	M																																
1641.....	M										2																						
1642.....	M	15-20	X												4	1	1			2												P-A	
1643.....	M	2	X			X	X								6					2		1	1									P-A	
1644.....	M	2	X												60	4				2									1		P		
1645.....	M	12				X									1	3	2	16		3		2	15	77		1					A-M		
1646.....	M	3	X												63	4				1									1		P		
1647.....	M	5	X												66	11													1		P		
1648.....	M	4	X												89	5				2		1	1						2		P		
1649.....	M	2	X			X									4			6				1		4				1				P-A	
1650.....	M	8	X				X								32	2	16			3			5								P-A		
1651.....	M	25-30	X		X										1	5		1	23		3	1	2	6	55	2	3		1			P-McE	(106)
1652.....	M	3		X		X	X								6			1		3												M	
1653.....	M	8	X												12	1				13	1	1	3	67							P-A		
1654.....	M	10	X		X		X								1	5		30		5		1	1	13	67							A-M	
1655.....	M	35	X	X		X	X								44		1	5		10	4	1	1	7								P-A	

(104) Red Mesa B/W.

(105) No sherds collected.

(106) Escavada B/W. Sherds from Site 1632 cover house site.

TABLE 10.—Site data—Continued

Site number	Location	Estimated number of rooms	Architecture										Pottery										Phase	Remarks									
			Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Ceremonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancos Gray	PII corrugated	PIII corrugated	Unidentified corrugated	La Plata B/W			Piedra B/W	Cortez B/W	Mancos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red	Exotic	
656	M	2	X	X											16					2											P	(107)	
657	M	8	X	X											6					1											P	(107)	
658	M	14	X			X									6		2	1		5											A		
659	M	2	X												1					3							1				A		
660	M																														A		
661	M	4		X		X									1			1													A		
662	M	1	X												1								1								A		
663	M																																
664	M	35	X	X		X									2	67	15	1	1	1		2	3	3					18		P		
665	M	2	X	X		X									1	19	1					1	2						6		P		
666	M	2	X	X											83	3						1	2						1		P		
667	M	1	X	X		X									30	1	3	3	13	15	1	1	1	2							P-A	(108)	
668	M	6	X												19	1	4	17	24	2	3	2	3	14					1		P-A	(109)	
669	M	4					X	X									1	2	15	1			1	1	2	10	14				A-MV		
670	T	15					X	X	X	X					1				6	1	15			3	25	2	5	14		1	M-MV	(110)	
671	T	30		X	X					X					2				8	1	14			1	32	8	2	7	1	2	M-MV	(111)	
672	M	2	X	X																	2										P-A		
673	M	6	X													18			1				1	2							P-A		
674	C	2		X		X																		1							M?		
675	M	1	X	X		X									10	1															P		
676	M	50	X	X		X	X								222	21	3	1	3	6	8				7	1			17		P-A	(112)	
677	M		X	X											3						3												
678	M	5				X	X										2	8		1			1	6							A	(113)	
679	M	10				X									11				9	20	2	3	6	54	1			4			A		
680	M	1	X			X	X																										
681	M	3				X	X	X		X					3				6	5								9			M? MV		
682	M	1					X								2				2												A		
683	M																																
684	M	17	X			X	X				1				14		2		12	8			3	22					2		A		
685	M	15	X	X		X	X								10	3	1	10	2	1									1		P-M		
686	M	3		X		X	X								3				3	2		1	1	1							A?	(114)	
687	M	5	X			X	X								3				8	15			1	26	1						A-M		
688	M	6	X												19																P-A		
689	M	8	X				X								3				14	11			3	16				1			A-M		

(107) Sites 1656-7 are one; in error they were staked at each end of long Pl house.

(108) B/W of Chaco series.

(109) Large masonry reservoir with two small house units nearby.

(110) Pueblo b/f.

(111) Tusayan b/r and Red Mesa b/w.

(112) Firepit.

(113) Some sherds probably intrusive from Site 1676.

(114) Lino Gray.

TABLE 10.—Site data—Continued

Site number	Location	Estimated number of rooms	Architecture											Pottery								Phase	Remarks								
			Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Ceremonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancos Gray	PII corrugated	PIII corrugated	Unidentified corrugated			La Plata B/W	Piedra B/W	Cortez B/W	Mancos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red
1690	M	6				X	X						1	3				11		15			4	35						M	
1691	M	8				X	X						1					6		1			14	62	1				1	A-M	
1692	M									7				6				7		9				3						A	
1693	M	12	X			X																								A	
1694	M	2	X	X																										A	
1695	M		X																											?	(115)
1696	M									12				1																P?	
1697	M	1	X											1						2				1						A	
1698	M	7	X											1				3		2				1						M	
1699	M	2				X	X													2										M	
1700	M	5	X				X							2				12		13			1	19						A-M	
1701	C	1				X	X											1		2				2?						M?	
1702	C	2																												?	
1703	C	3				X	X																	3?						M	
1704	C	2				X																								?	
1705	C	?																												LP-P?	
1706	C	6				X	X			X				3				9						7						M	
1707	C	3		X		X	X																							M?	
1708	C	1																						1						?	
1709	C	3						X																						MV	
1710	C	?				X		X						1?																?	
1711	T	1				X	X																							?	
1712	T	1				X	X													8				1			1			MV	
1713	T	1				X																								?	
1714	C	3				X	X																	1						McE?	
1715	C	4				X	X							1						2							7			MV	
1716	T									1																					
1717	C	6		X		X	X		X					1?	1			4	2	11		1		18	2	43				P, M-McE	
1718	C	2				X	X													2										?	
1719	M	1				X	X																							?	
1720	M	2				X								2				2		8				2	7	1		1		A	
1721	M	6	X																	4										?	
1722	M	4					X							1																M	
1723	M	6	X			X								5				1		6	1									P-A	
1724	M	10												1	21	2		16		25							2			P-McE	
1725	M	4	X			X	X							7				1		1				1						P-A	
1726	M	2	X			X																								MV	
1727	M	?	X	X		X																								MN	
1728	M	1																												MV?	(116)
1729	M	3	X				X													3								6		MV	

(115) Large firepit.

(116) Sherds have heavy, MV paste with Mancos design in mineral paint.

TABLE 10.—Site data—Continued

Site number	Location	Estimated number of rooms	Architecture											Pottery										Phase	Remarks								
			Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Ceremonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancos Gray	PII corrugated	PIII corrugated	Unidentified corrugated	La Plata B/W	Piedra B/W			Cortez B/W	Mancos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red	Exotic	
1730	M	3	X																	1				13	1	1	26			MV			
1731	M	6	X				X	X												5				3			1			MV			
1732	M	5	X				X	X												3				3						MV			
1733	M	6				X													1		2			1						M?			
1734	T	3		X		X	X												6		6		1	5			1			P-A			
1735	T	1				X	X											18		11		4	29							M			
1736	T	2				X	X																								M		
1737	T	1				X	X																								?		
1738	C	1	X	X																1				2						A?			
1739	M	1																															
1740	M	6					X																								?		
1741	M	1				X	X																								MV		
1742	M	2				X																									MV		
1743	M	4	X			X																									MV		
1744	M	4	X																												A		
1745	M	2	X	X			X																								MV		
1746	M	5		X		X																									A		
1747	M	2				X	X																								M?		
1748	M	1				X																									A?		
1749	M	10	X			X																									A?		
1750	M	4				X	X																								A?		
1751	M	7				X	X																								A?		
1752	M	5	X			X																									A		
1753	M	9				X																									A-McE		
1754	M	3	X				X	X																							A-M		
1755	M	6		X		X																									A?		
1756	M	4	X	X		X																									P-A		
1757	M	3	X	X		X																									A?		
1758	M	3	X			X																									M?		
1759	M	3																															
1760	M	3		X			X																								A		
1761	M																																
1762	M	8	X																												P-A		
1763	M	4				X																									?		
1764	M	4	X	X			X																								A?		
1765	M	3	X	X			X																								M?		
1766	M	3	X	X																											A?		
1767	M																																
1768	M	1				X	X																								?		
1769	M	1				X	X																								A		
1770	M	5	X				X																								P-A		
1771	M	3																													A		
1772	M	?		X																											P		

TABLE 10.—*Site data*—Continued

Site number	Location	Estimated number of rooms	Architecture										Pottery										Phase	Remarks								
			Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Ceremonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancoas Gray	PII corrugated	PIII corrugated	Unidentified corrugated	La Plata B/W			Piedra B/W	Cortez B/W	Mancoas B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red	Exotic
1773	M	15		X		X				10				1	4			15		12		17	39							A-M		
1774	M	10	X	X		X								1	1	2		9		10		21	21					2		A		
1775	M	2	X												3			2		2		2	7							A		
1776	M	?	X												7					2		2	2							P	(117)	
1777	M	?	X												13					1		1	1					1		LP or P	(118)	
1778	M	2	X		X									1	1								1							A?		
1779	M																															
1780	M	10				X		X			X		1?	4	4			21		17	1	2	11	8			4		2	A-McE	(119)	
1781	M	5	X			X	X?	X?				1?	46	2	1					1	1	1	2					1		P-A		
1782	M																													?		
1783	M									6																						
1784	M									15																						
1785	M	6				X									27					1	1	2						1		P-A		
1786	M	8	X	X		X	X								32					10	3	2	3							P-A		
1787	M	2				X	X	X							6					3								3		P-A		
1788	M	3				X	X								2				1	24			3				1	14		MV		
1789	M	4				X											1	5		8		1	4							A		
1790	M	3		X		X	X								15				1											P-A	(120)	
1791	M	5				X	X	X				1?	12					3		5			1?							A		
1792	M	3				X	X						9							4			1				1	3		A, MV		
1793	M	15	X			X	X						115							2	2?	2?							1	P	(121)	
1794	M					X	X	X			X											2	7							MV		
1795	M	8		X		X	X					1	30	2				14		23	1	2						1		P-A		
1796	M	3		X		X	X						2					1		1	2		2							P-A		
1797	M	2		X		X	X						9							1	1	1								LP or P, M		
1798	M	18	X		X	X							52							3	4	2	5					1		P-A	(122)	
1799	M	1				X							6					5												?		
1800	M			X																										?	(123)	
1801	M	8	X			X	X	X				1			1			12		8		4	27	8	21					M-McE		
1802	M																															
1803	M	1																													Mod.	(124)
1804	M	2																2		1			2							M		
1805	M	4	X	X									39								1	1								P		
1806	M																															
1807	M	3													1																M?	
1808	M	2	X												12																P	
1809	M	5	X												39							2									P	

(117) Pithouse depression. Sherd drift from Site 1776.

(118) Pithouse depression. Sherd drift from Site 1774?

(119) Tusayan b/c.

(120) Restorable PII corrugated jar.

(121) Lino Gray.

(122) White Mountain Red Ware.

(123) Firepit.

(124) Brush hogan.

TABLE 10.—Site data—Continued

Site number	Location	Estimated number of rooms	Architecture											Pottery											Phase	Remarks						
			Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Ceremonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancos Gray	P-II corrugated	P-III corrugated	Unidentified corrugated	La Plata B/W	Piedra B/W	Cortez B/W			Mancos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red	Exotic
1810	M	12									X			2	3				9		21	1	1	1	22	8	2	10			A-MV	(125)
1811	M	2		X											3			3		12				1	2		2			M, MV?		
1812	M																										1?			?		
1813	M																													A		
1814	M	5		X			X?			8	X		1?		2			3		18				2	3		2			?		
1815	M	1		X			X											3		11				1						A?		
1816	C	1		X			X																							?		
1817	M	1		X			X																							A?		
1818	M	1	X	X			X								1															?		
1819	M	1	X	X			X																									
1820	M	3	X												20							1		2						P	(126)	
1821	M	8	X	X											37					2		2		6						P-A		
1822	M	5	X	X											45					2		1	2							P-A		
1823	M	8	X	X			X								9				3		22		4	10						P-A		
1824	M	10	X	X			X								76				1		1	6	1?	2				1		P		
1825	M	8	X	X			X								25				1		1	2								P		
1826	M	7	X	X			X	X							4				14		33		14	36				1		A-M		
1827	M	10	X	X			X								28				5				3							P-A		
1828	M	2		X											6				1		9		5	4						A?		
1829	M																															
1830	M	2				X									7						1									A?	(127)	
1831	M	1	X	X											2									1?								A?
1832	M	?				X?									2									1								A?
1833	M	2				X	X				X?				6	1					12						3			P, MV		
1834	M																													Mod.		
1835	M	1		X		X																								?		
1836	M																													?		
1837	M	2	X																													A?
1838	M	1				X									3					1		1	1				1			?		
1839	M	?	X																											?		
1840	M	2																												Mod.	(128)	
1841	M	?		X											1															?		
1842	M	?	X	X											8					4		1								A	(129)	
1843	M	?	X	X											32						1	1?								P		
1844	M	15	X	X											50					2	1						1			P-A		
1845	M	8	X	X											16					3										P-A		
1846	M	3	X	X											6					5								1		P-A		
1847	M	4				X									15	2				5	1	2	1							P-A		
1848	M	8													8					5										MV		
1849	M	10	X				X								1					19							9			P		

(125) Firepit.
 (126) Nordenskiöld's Camp Number Two.
 (127) Nussbaum's Camp, 1928?
 (128) Firepit.
 (129) Probably some sherd intrusion from Site 1845.

TABLE 10.—*Site data—Continued*

Site number	Location	Estimated number of rooms	Architecture											Pottery										Phase	Remarks						
			Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Ceremonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancos Gray	PII corrugated	PIII corrugated	Unidentified corrugated	La Plata B/W	Piedra B/W			Cortez B/W	Mancos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red
1850	M	4	X		X?										19						2	1		2						P	
1851	M	6	X	X											16					6	3	27	1	1	11		9			P	A-M, MV
1852	M	3	X	X	X										2															?	
1853	M	6	X	X	X										1															A?	
1854	M	1		X	X										53	2					2									P	
1855	M	2	X																											?	
1856	M	2																												M	
1857	M	1													2	1				3			2								
1858	M			X																										?	
1859	M	2	X?																												
1860	M			X											1				1				1							A	(130)
1861	M	1	X																											?	
1862	M	4	X																	2										A?	
1863	M	2	X			X									55					1										P	
1864	M	5			X										45						2									P	
1865	M																														
1866	M	1				X													3	13						17				MV	
1867	M	5	X												4															P	
1868	M	2		X																1										?	
1869	M	?	X												73	2						2		1						P	
1870	M	1	X	X											4					1			2	16						A	(131)
1871	M			X																										?	
1872	T	3	X			X							X						4	17		1	3		1	4				M, MV	(132)
1873	T	?													1		1			2		1	1		1	1				?	
1874	T	1																												MV	(133)
1875	T	2			X	X									1					24	1	2	26	3		5	1			A-McE	
1876	M	2			X	X									1					1										M?	
1877	M	1				X																								?	
1878	M	1																	1											M?	
1879	M	2				X									7		1			3			1							A?	
1880	C	1											X						1		6			1		10				MV	
1881	C	4																												MV?	
1882	C	10											X							5					1	2				MV	
1883	C	3				X?																								MV	(134)
1884	C	1			X																									?	
1885	C	24																												MV	(135)
1886	M	10					X	X							1		2			4	21						12			A-M	
1887	M	25					X	X							1					13		2	12							M-McE	

(130) Firepit or small storage bin.

(131) Sherd area.

(132) Sherd area only.

(133) Sherd or Puerto b/r.

(134) PIII corrugated jar.

(135) Square kiva.

TABLE 10.—Site data—Continued

Site number	Location	Estimated number of rooms	Architecture											Pottery										Phase	Remarks							
			Spall and adobe	Slabs	Dry wall	Rough masonry	Scabbled masonry	Finished masonry	Double wall	Retaining wall	Check dam	Tower	Ceremonial only	Storage only	Kiva	Chapin Gray	Moccasin Gray	Mancoos Gray	P II corrugated	P III corrugated	Unidentified corrugated	La Plata B/W	Piedra B/W			Cortez B/W	Mancoos B/W	Wetherill B/W	McElmo B/W	Mesa Verde B/W	San Juan Red	Exotic
1888.....	M	30				X	X	X						1				3	1	3			1	29	1		1				M-McE	
1889.....	M	2				X	X	X										1		7			5	1							McE?	
1890.....	C	20			X	X	X	X		X				1					1	8			2				1				MV	
1891.....	M	12				X	X	X ²						1				11	1	12	1		10	31							A-McE	
1892.....	C	7				X	X	X ²						1					2	16			4	35					1		MV	
1893.....	M	8				X	X	X						2			1	11		11			4	35							A-McE	
1894.....	C	2				X	X	X										3	1	15											McE?	
1895.....	C	15		X		X	X	X						?																	P	
1896.....	C	5				X	X	X							2		1	2		16			9	3		3		2			M-McE	(136)
1897.....	C	4				X	X	X										1		6							7				MV?	(137)
1898.....	C	2				X	X	X										1		2				1							M-McE	(137)
1899.....	M	8				X	X	X						1				7	1	12			3	36	5		1				M-McE	(137)
1900.....	M	25	X			X	X								25	1				1				4							P	
1901.....	M	2					X	X	X		X			1?																	MV	
1902.....	T	8					X	X		X				1				1	1	15			4	16		4	24		2		MV	(138)
1904.....	T																															
1905.....	M	4					X																								McE?	
1906.....	M	2	X			X														12			5	1							?	

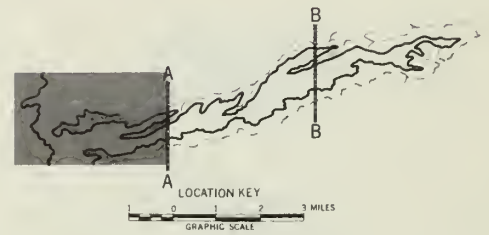
(136) St. John's Polychrome.
 (137) Sites 1898-9 probably part of same community.
 (138) unidentified b/f.

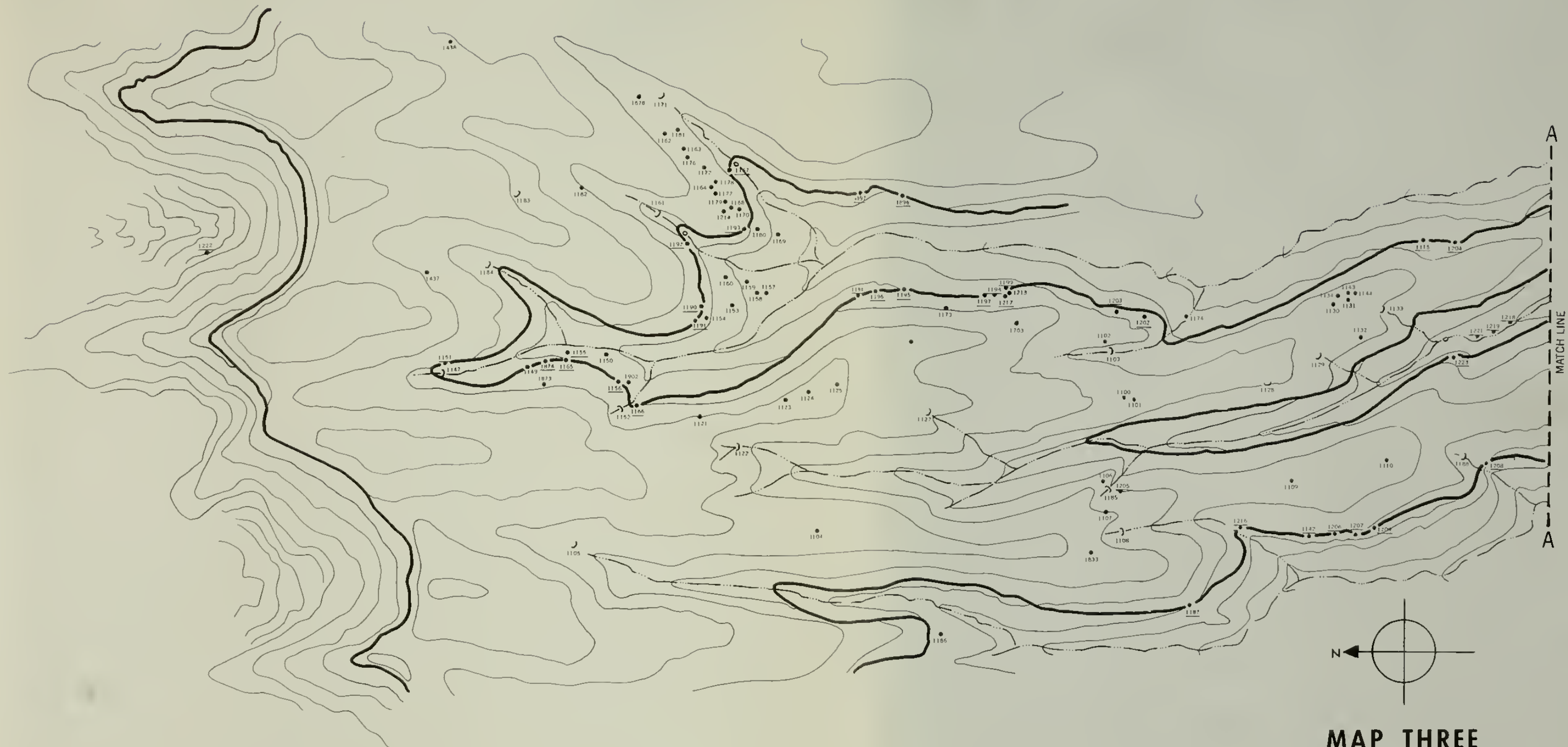
MAPS—WETHERILL MESA SURVEY

MAP 3 • SECTION 1

ARCHEOLOGICAL SITES

WETHERILL MESA



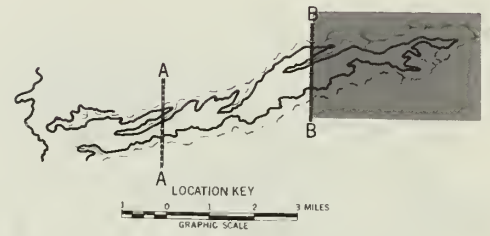


MAP THREE **ARCHEOLOGICAL SITES** **WETHERILL MESA**

- CLIFF EDGE AT MESA TOP
- WATERCOURSE
- CAVE SITES—UNDERLINED
- 100 ft. CONTOUR INTERVAL
- SPRING
- TERRACE SITES



MAP 3 • SECTION 3 ARCHEOLOGICAL SITES WETHERILL MESA



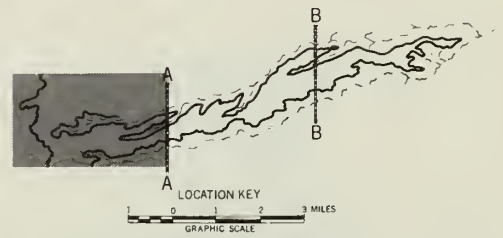
B
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 MATCH LINE
 1900
 1834
 13
 B

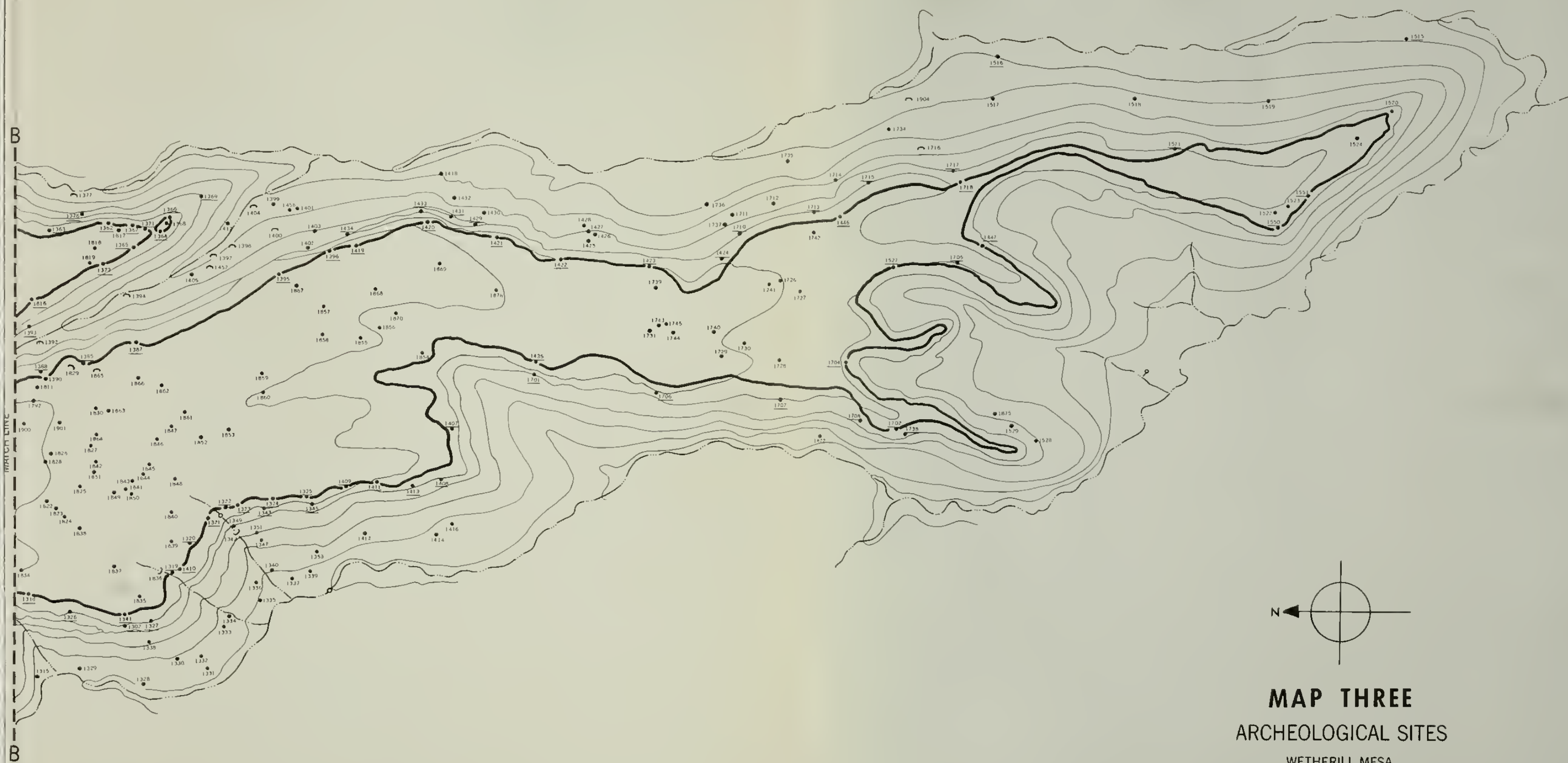


MAP 4 • SECTION 1

AGRICULTURAL TERRACES

WETHERILL MESA





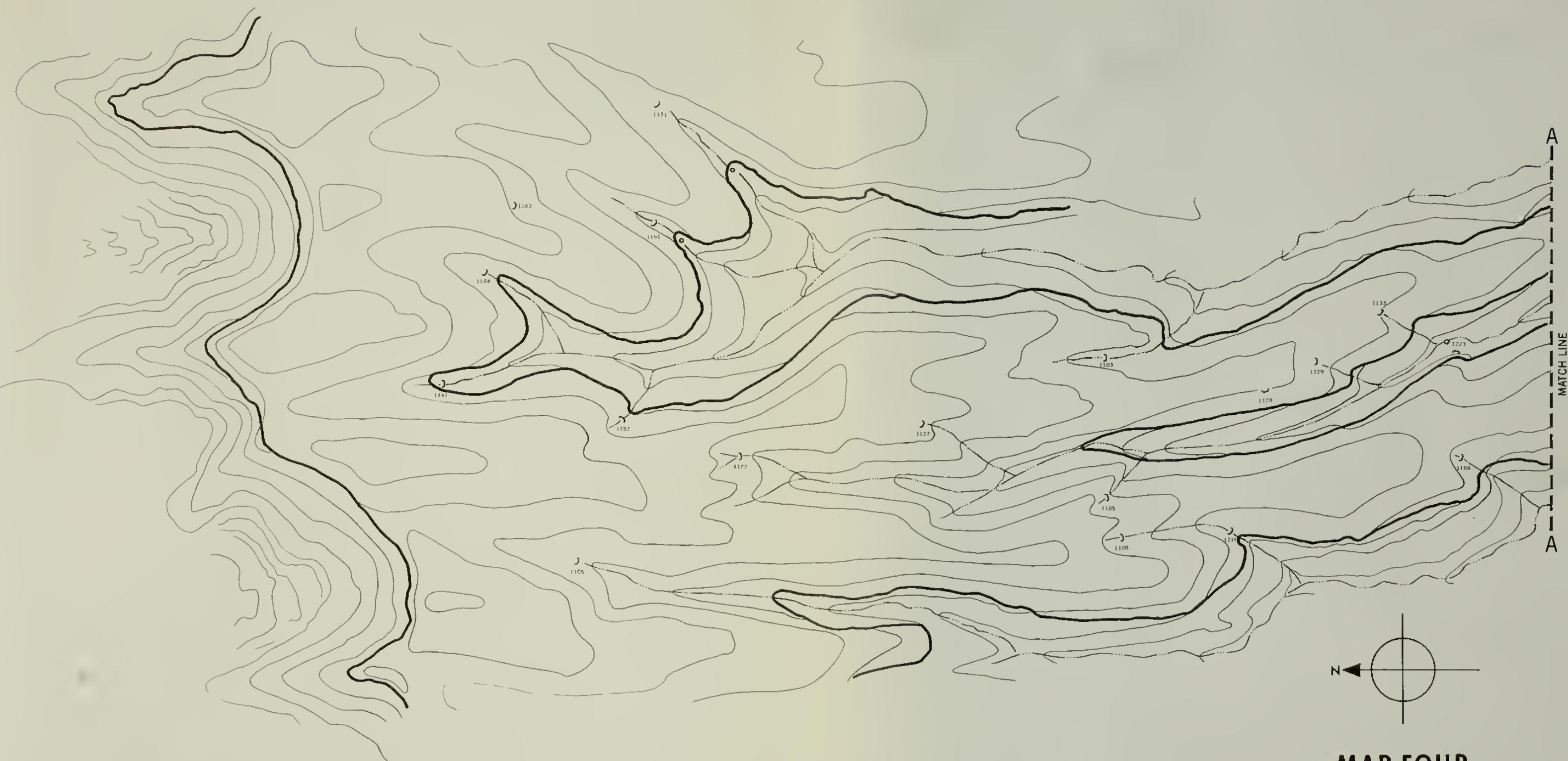
MAP THREE
ARCHEOLOGICAL SITES
WETHERILL MESA

- CLIFF EDGE AT MESA TOP
- - - WATERCOURSE
- 1500 CAVE SITES—UNDERLINED
- 100 ft. CONTOUR INTERVAL
- o SPRING
-) TERRACE SITES



MAP 4 • SECTION 2
AGRICULTURAL TERRACES
WETHERILL MESA



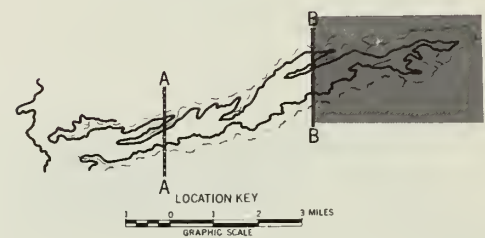


MAP FOUR
 AGRICULTURAL TERRACES
 WETHERILL MESA

-  CLIFF EDGE AT MESA TOP
-  WATERCOURSE
-  100 FT. CONTOUR INTERVAL
-  SPRING
-  TERRACE SITES



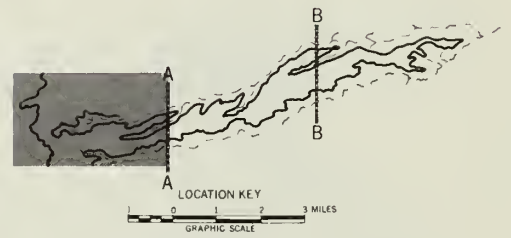
MAP 4 • SECTION 3
AGRICULTURAL TERRACES
WETHERILL MESA

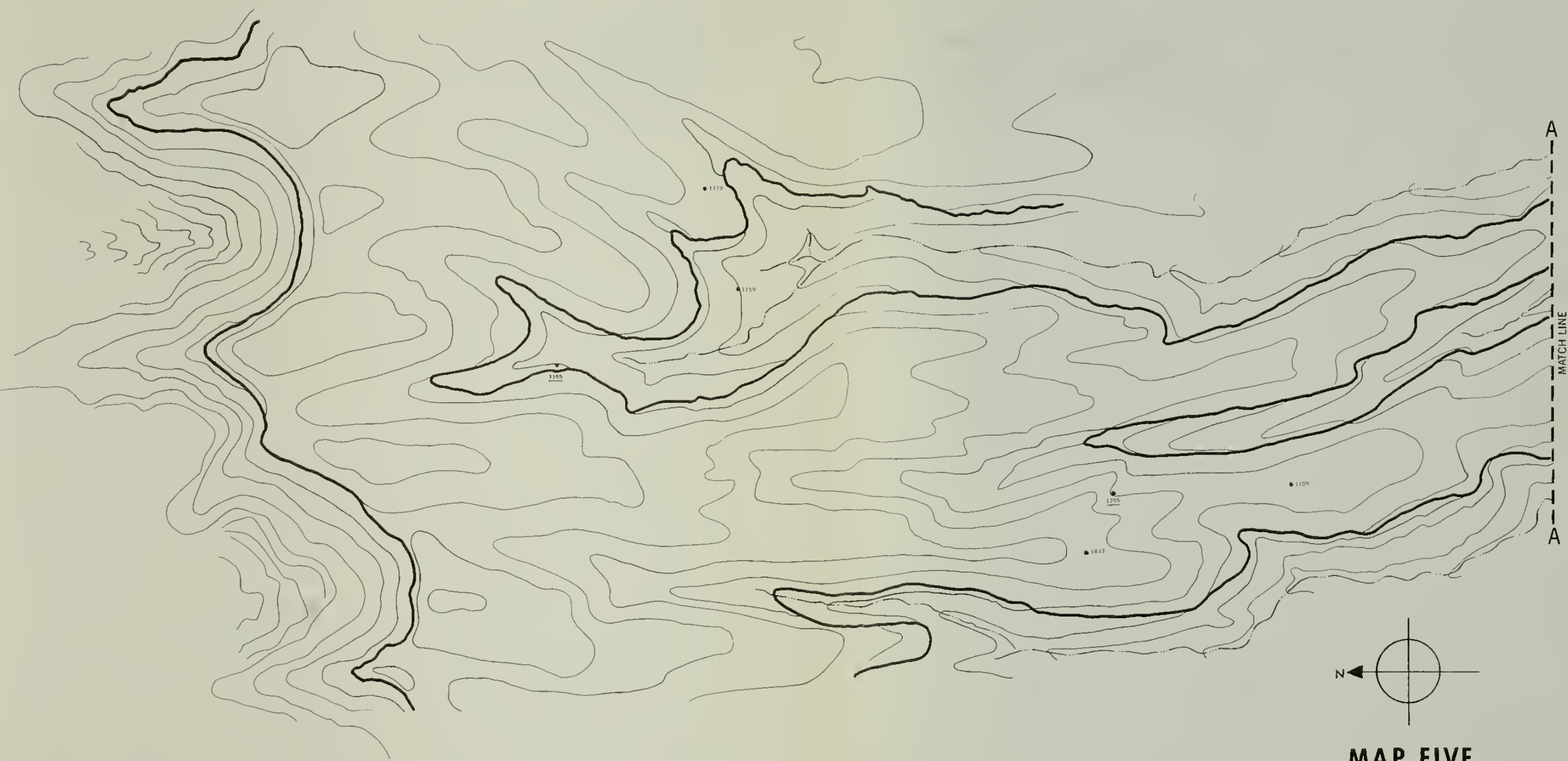


MATCH LINE



MAP 5 • SECTION 1
LA PLATA AND PIEDRA
PHASE SITES
WETHERILL MESA



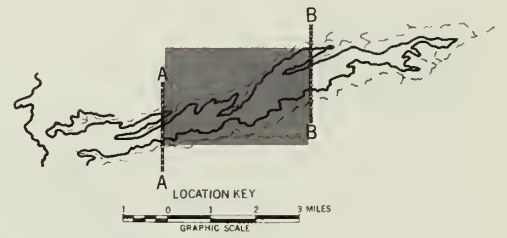


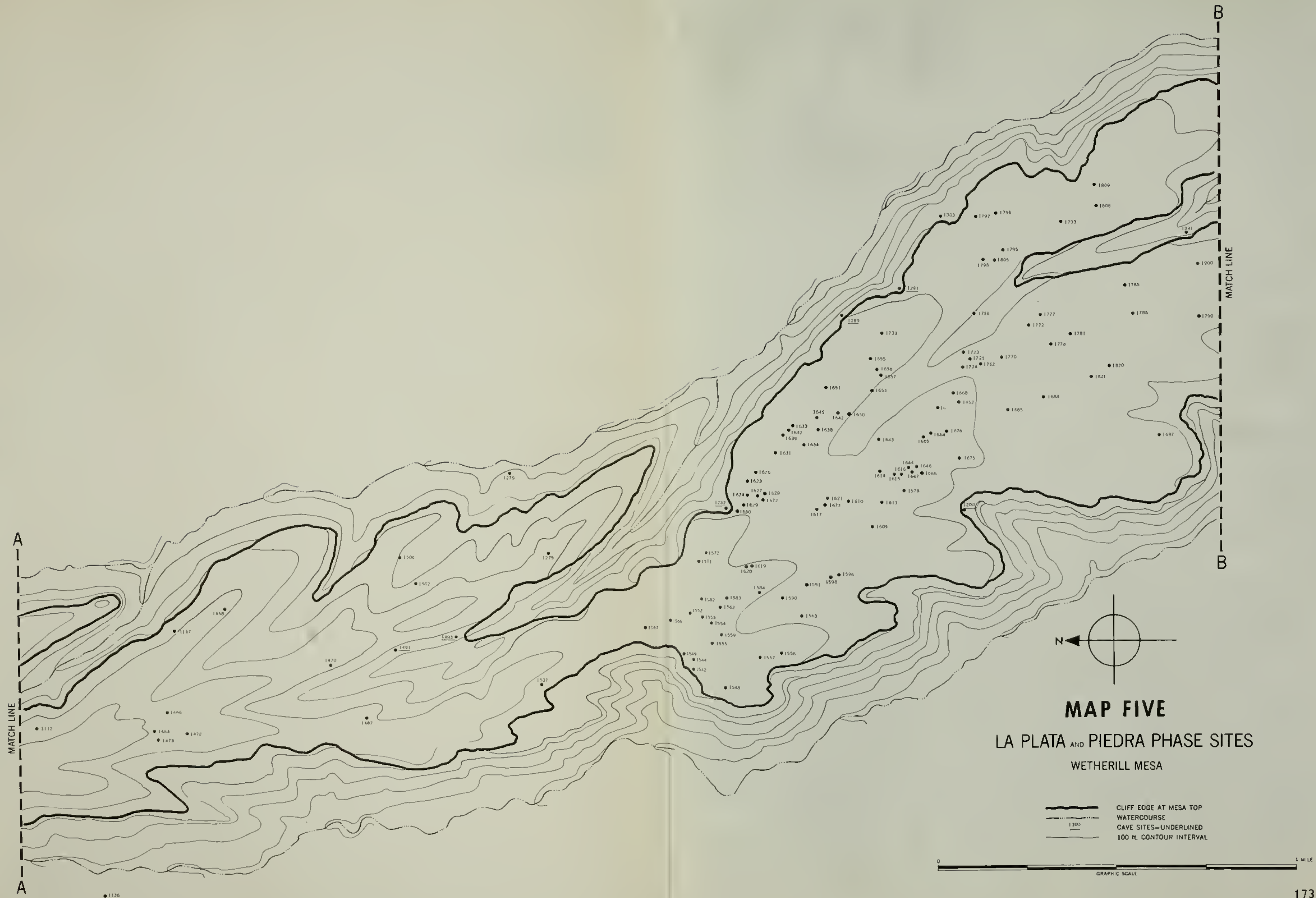
MAP FIVE
LA PLATA AND PIEDRA PHASE SITES
WETHERILL MESA

CLIFF EDGE AT MESA TOP
WATERCOURSE
CAVE SITES—UNDERLINED
100 ft. CONTOUR INTERVAL

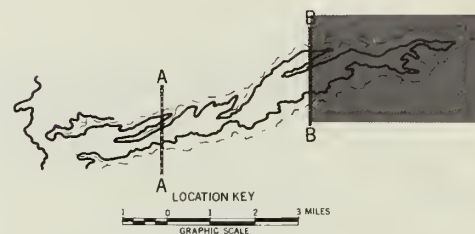


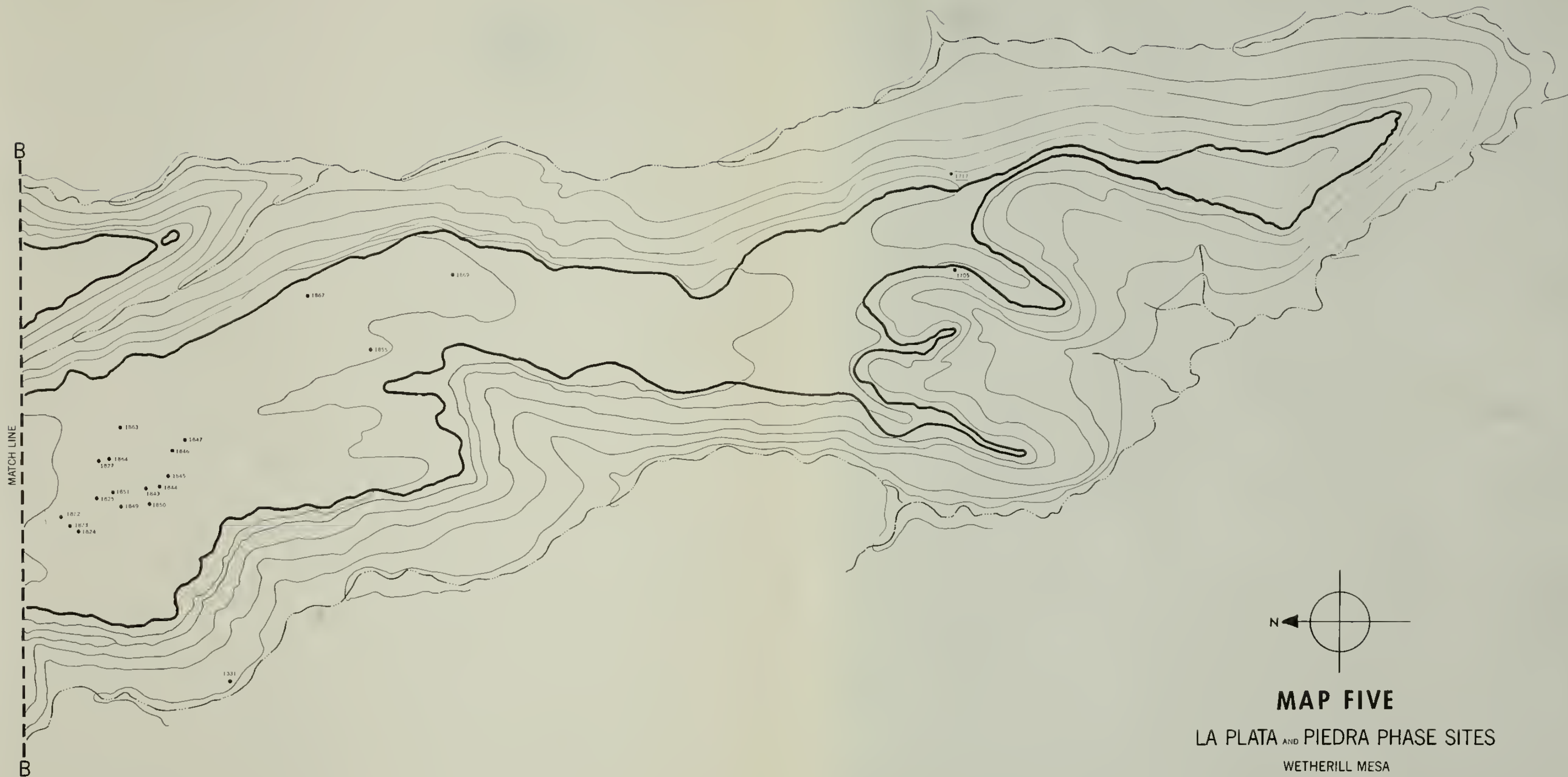
MAP 5 • SECTION 2
LA PLATA AND PIEDRA
PHASE SITES
WETHERILL MESA



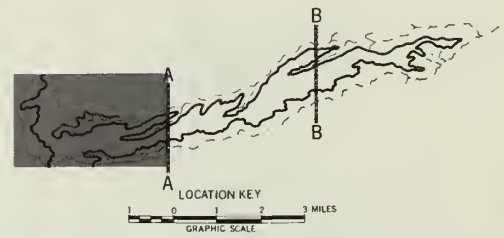


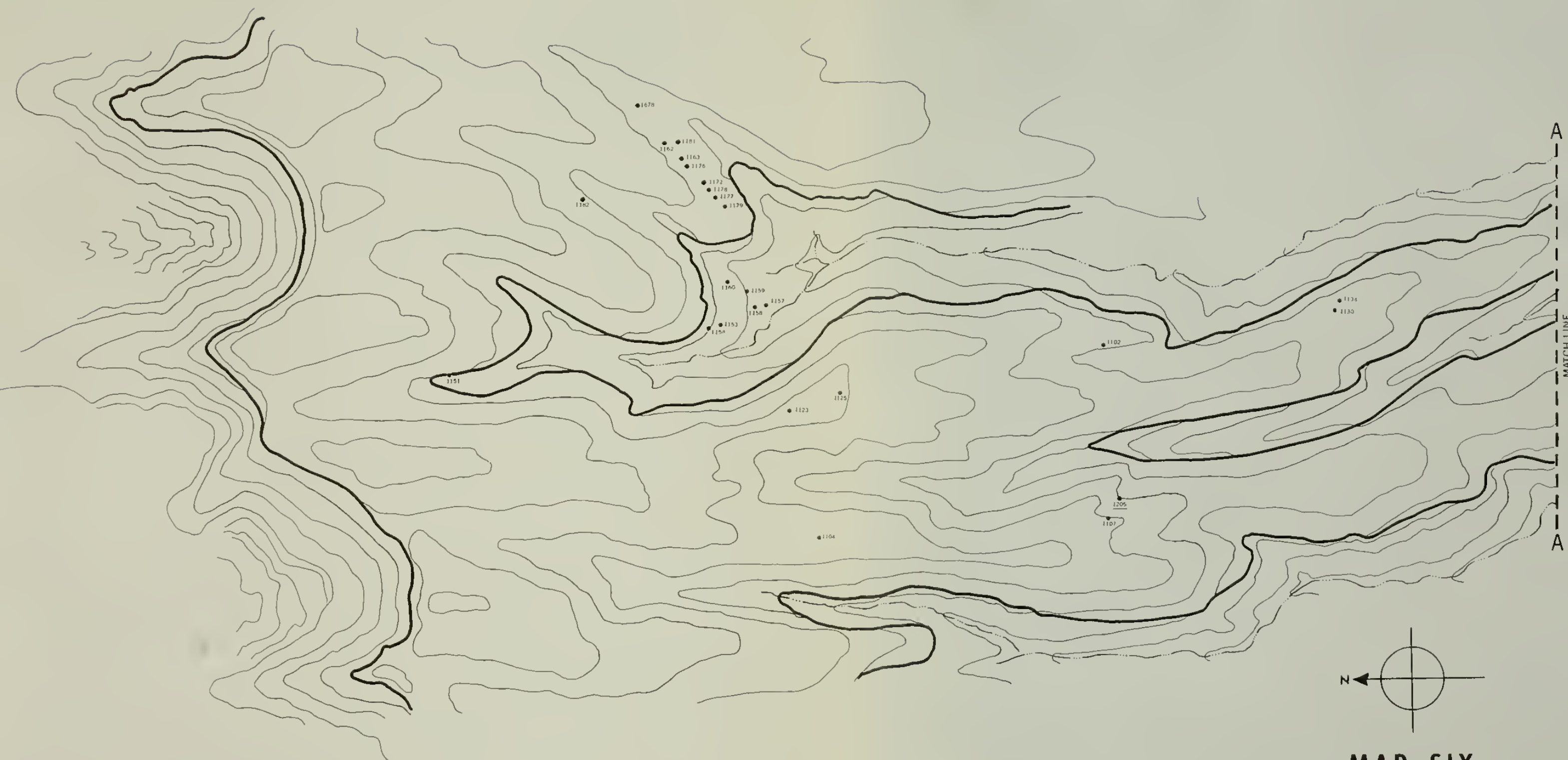
MAP 5 • SECTION 3
LA PLATA AND PIEDRA
PHASE SITES
WETHERILL MESA





MAP 6 • SECTION 1
ACKMEN PHASE SITES
WETHERILL MESA



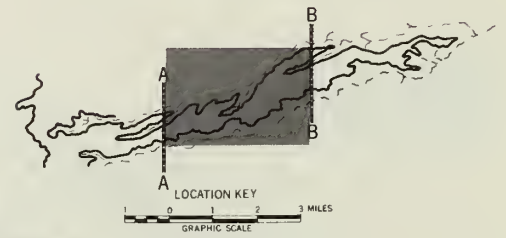


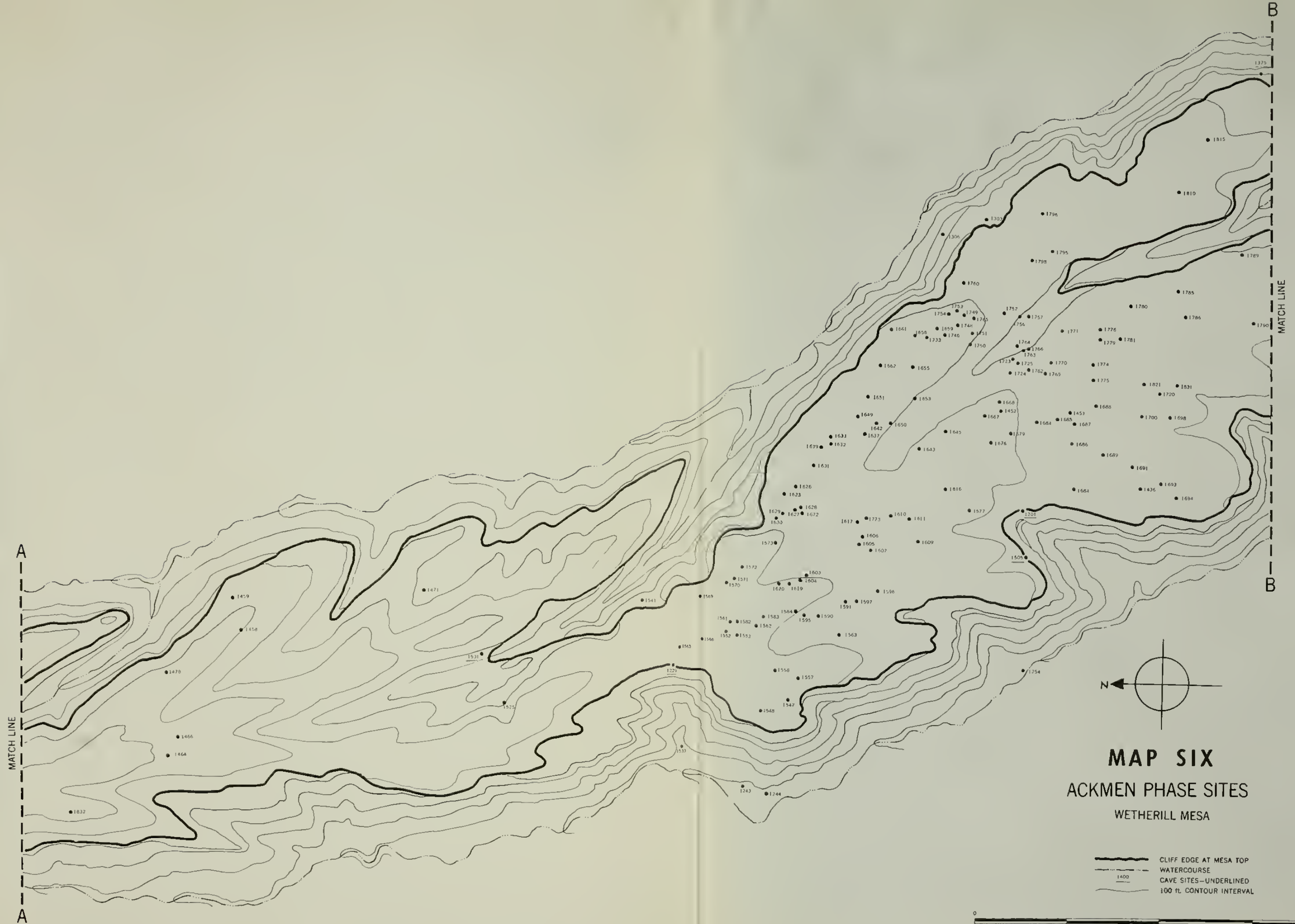
MAP SIX
 ACKMEN PHASE SITES
 WETHERILL MESA

CLIFF EDGE AT MESA TOP
 WATERCOURSE
 CAVE SITES—UNDERLINED
 100 FT. CONTOUR INTERVAL

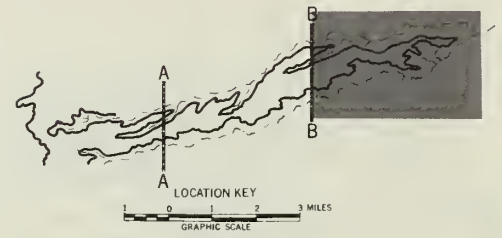


MAP 6 • SECTION 2
ACKMEN PHASE SITES
WETHERILL MESA

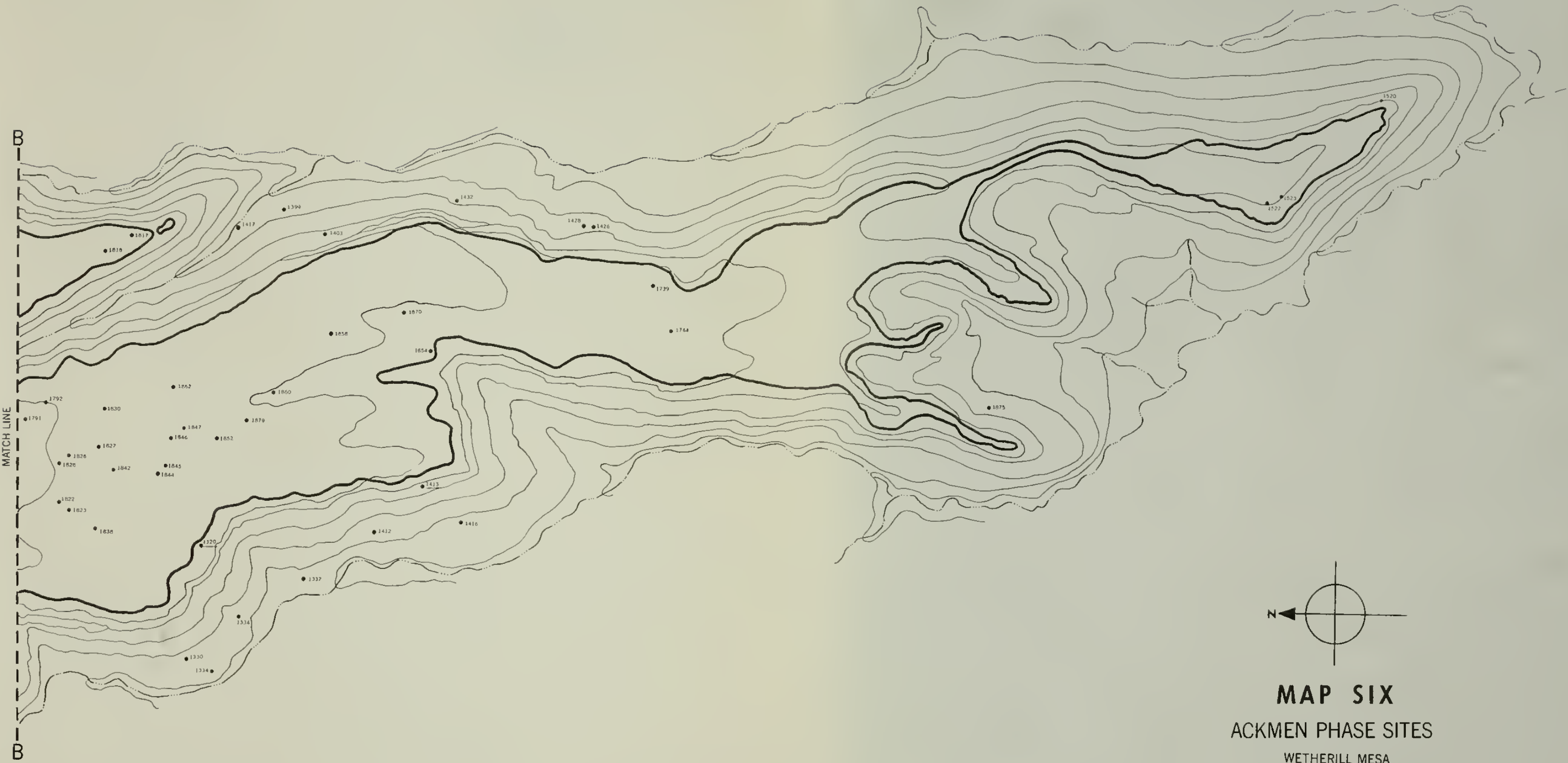




MAP 6 • SECTION 3 ACKMEN PHASE SITES WETHERILL MESA



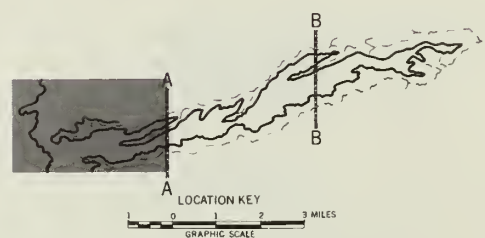
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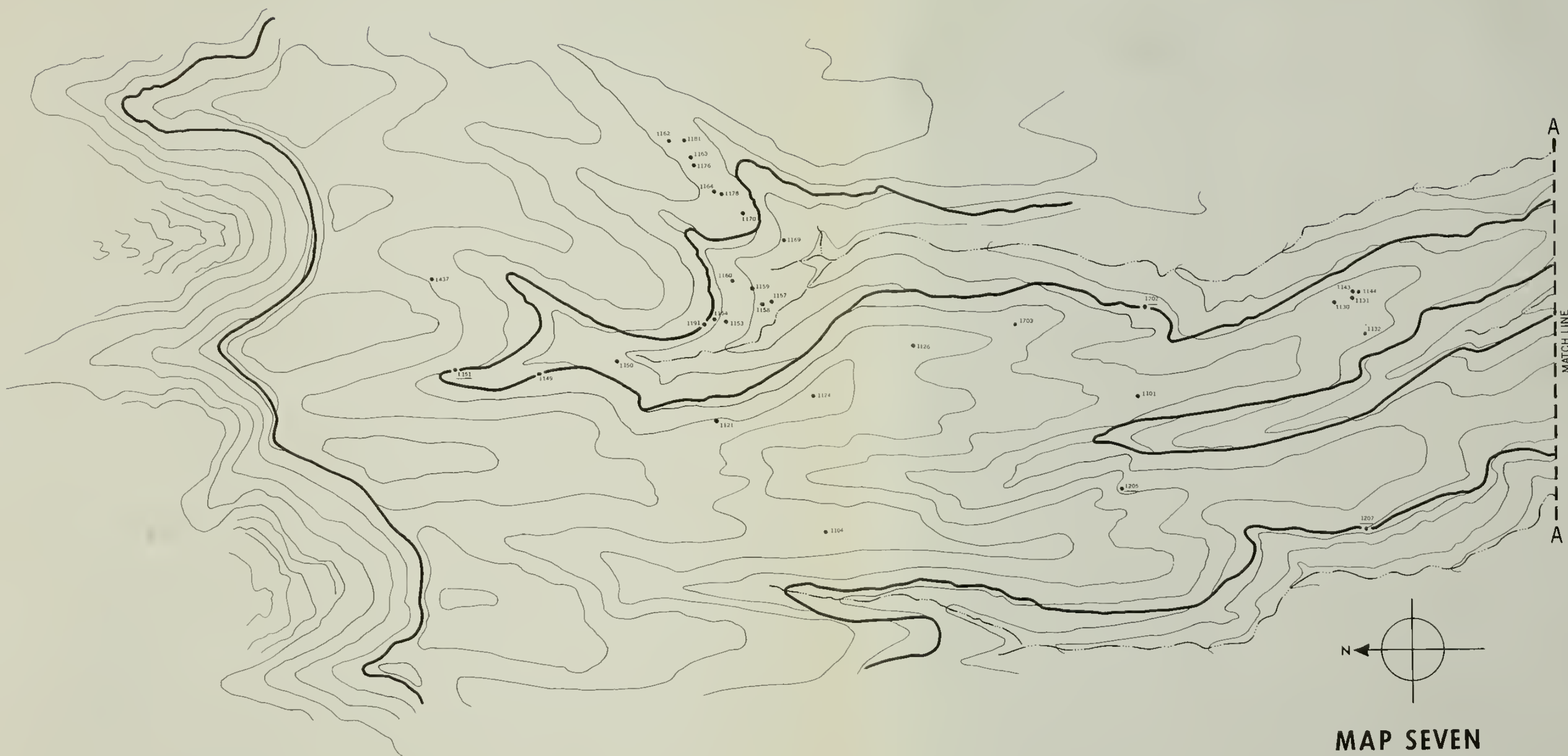


MAP 7 • SECTION 1

MANCOS PHASE SITES

WETHERILL MESA



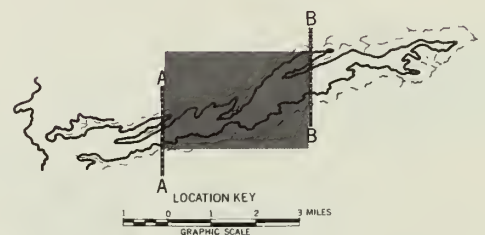


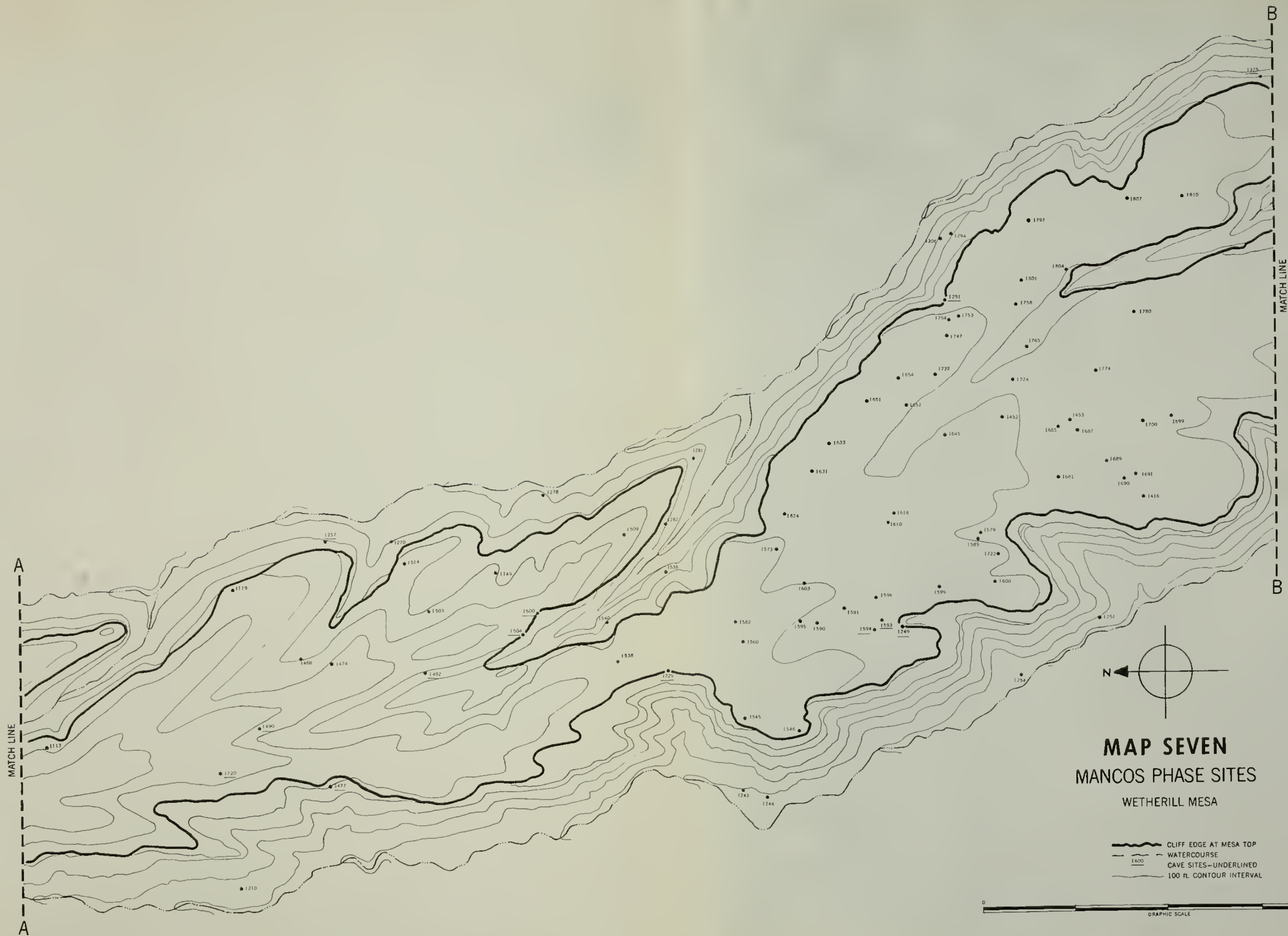
MAP SEVEN **MANCOS PHASE SITES** **WETHERILL MESA**

——— CLIFF EDGE AT MESA TOP
 - - - - - WATERCOURSE
 1600 CAVE SITES—UNDERLINED
 100 FT. CONTOUR INTERVAL

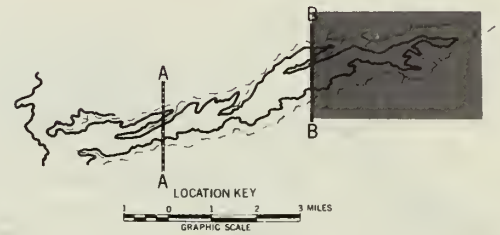


MAP 7 • SECTION 2
MANCOS PHASE SITES
WETHERILL MESA

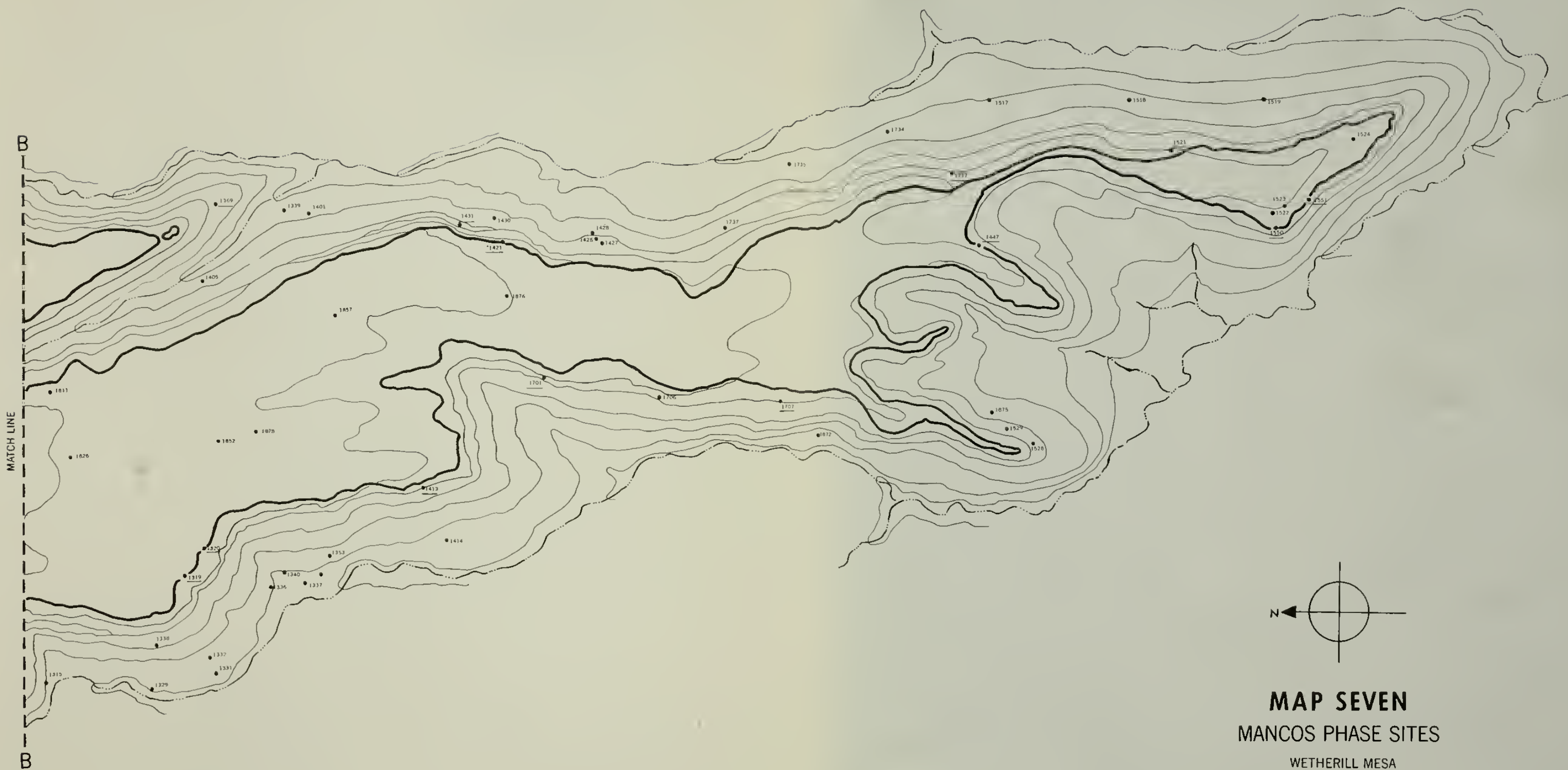




MAP 7 • SECTION 3 MANCOS PHASE SITES WETHERILL MESA



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MATCH LINE

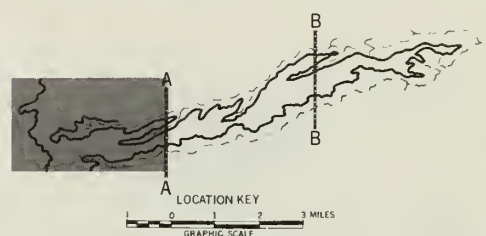


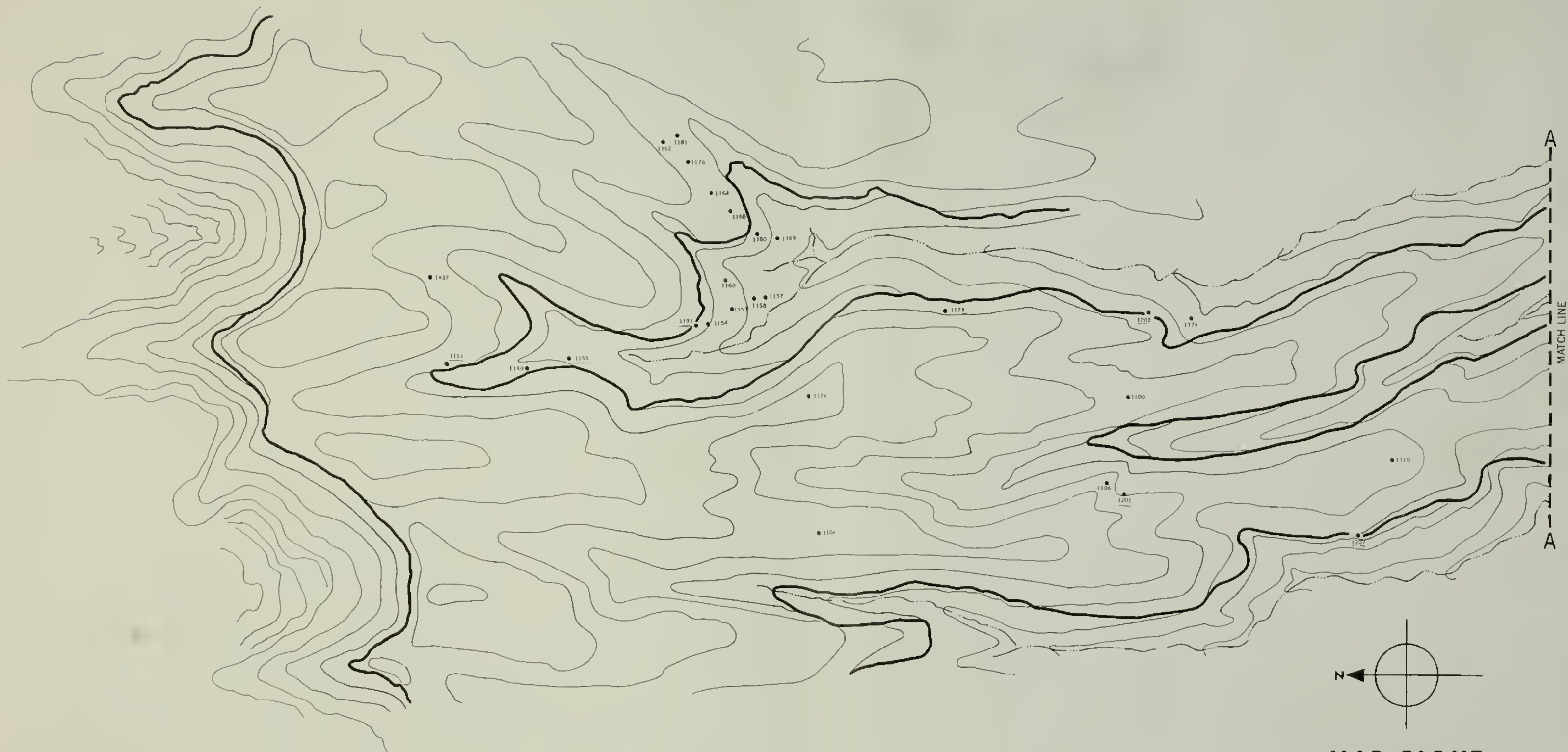
MAP SEVEN
MANCOS PHASE SITES
 WETHERILL MESA

- CLIFF EDGE AT MESA TOP
- WATERCOURSE
- CAVE SITES—UNDERLINED
- 100 ft. CONTOUR INTERVAL



MAP 8 • SECTION 1
MCELMO PHASE SITES
WETHERILL MESA



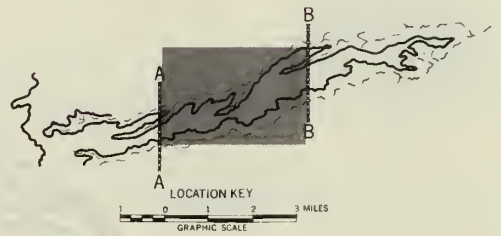


MAP EIGHT **McELMO PHASE SITES** **WETHERILL MESA**

~~~~~ CLIFF EDGE AT MESA TOP  
 - - - - - WATERCOURSE  
 1700 CAVE SITES—UNDERLINED  
 100 FT. CONTOUR INTERVAL



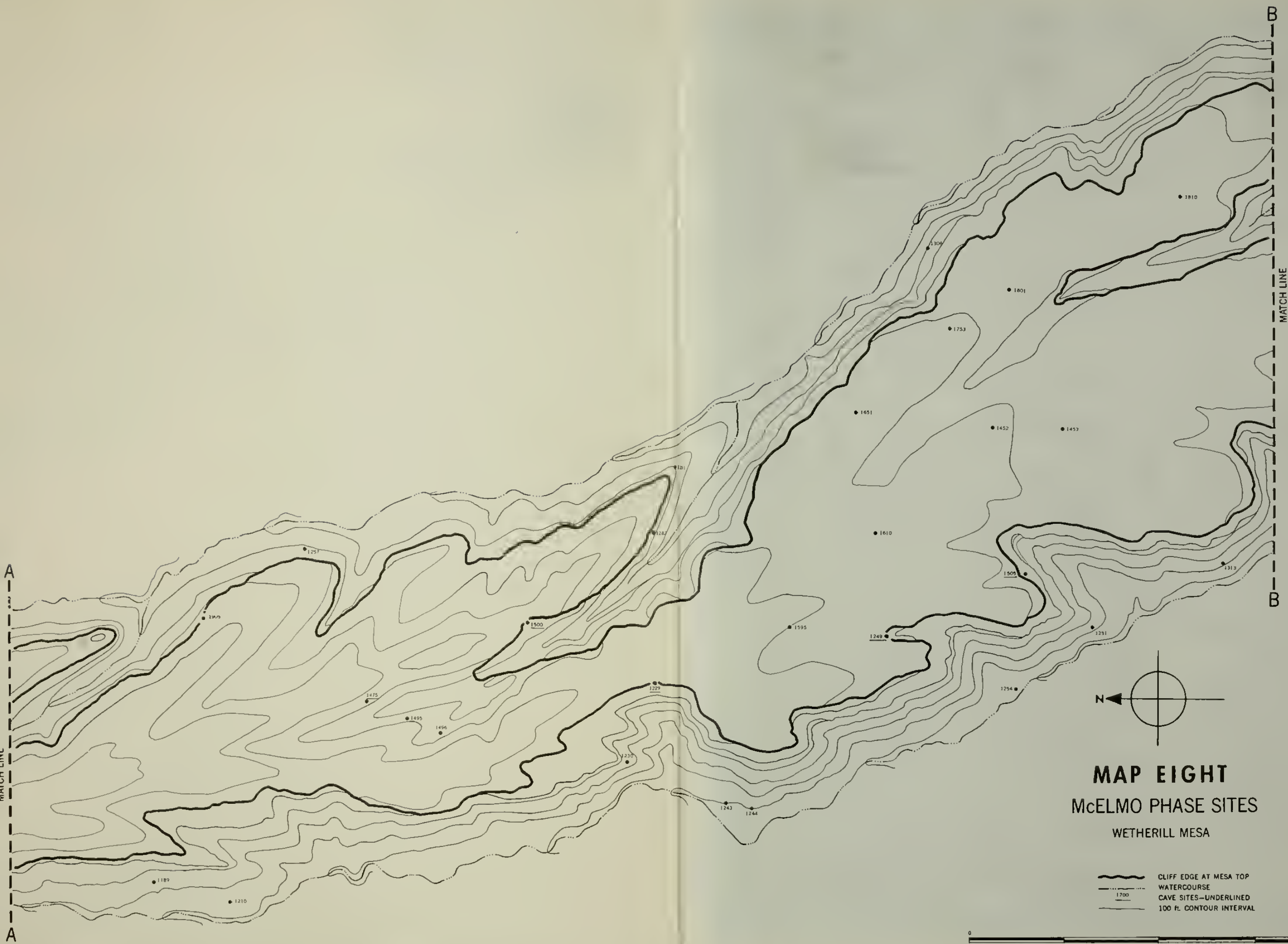
# MAP 8 • SECTION 2 MCELMO PHASE SITES WETHERILL MESA



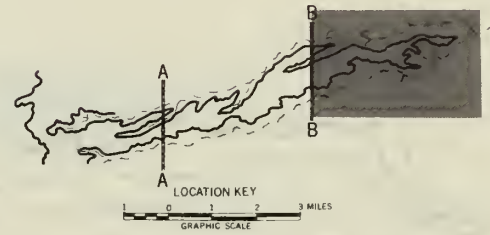
THIRTY-THREE

WETHERILL MESA

SECTION 2



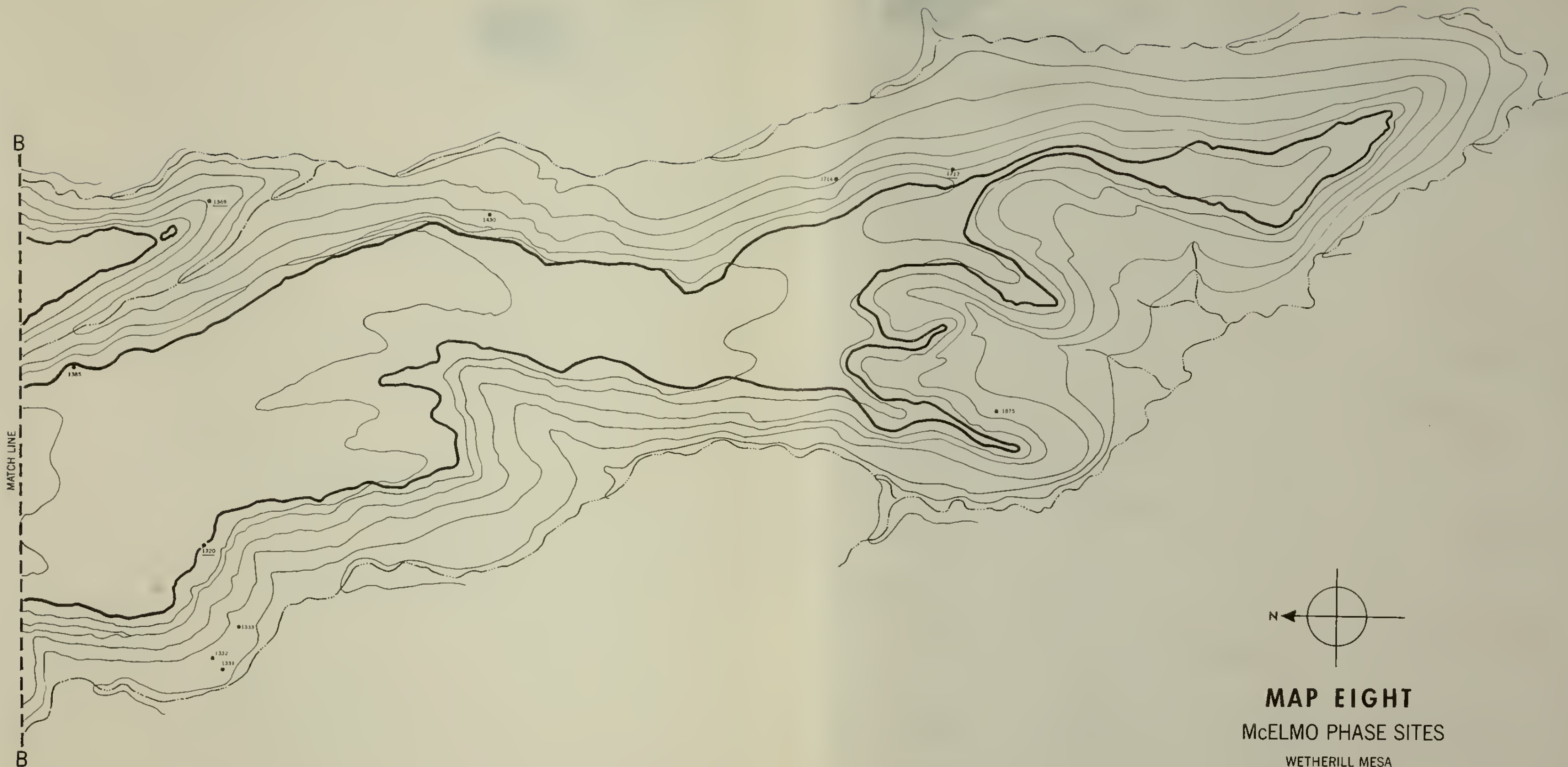
# MAP 8 • SECTION 3 MCELMO PHASE SITES WETHERILL MESA



MATCH LINE

THOIR 4AM  
SITE 20471 0M15M  
with 1000m

THOIR 4AM  
SITE 20471 0M15M  
with 1000m

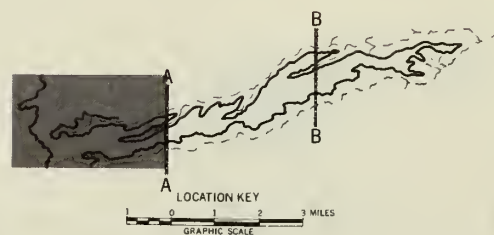


**MAP EIGHT**  
**McELMO PHASE SITES**  
**WETHERILL MESA**

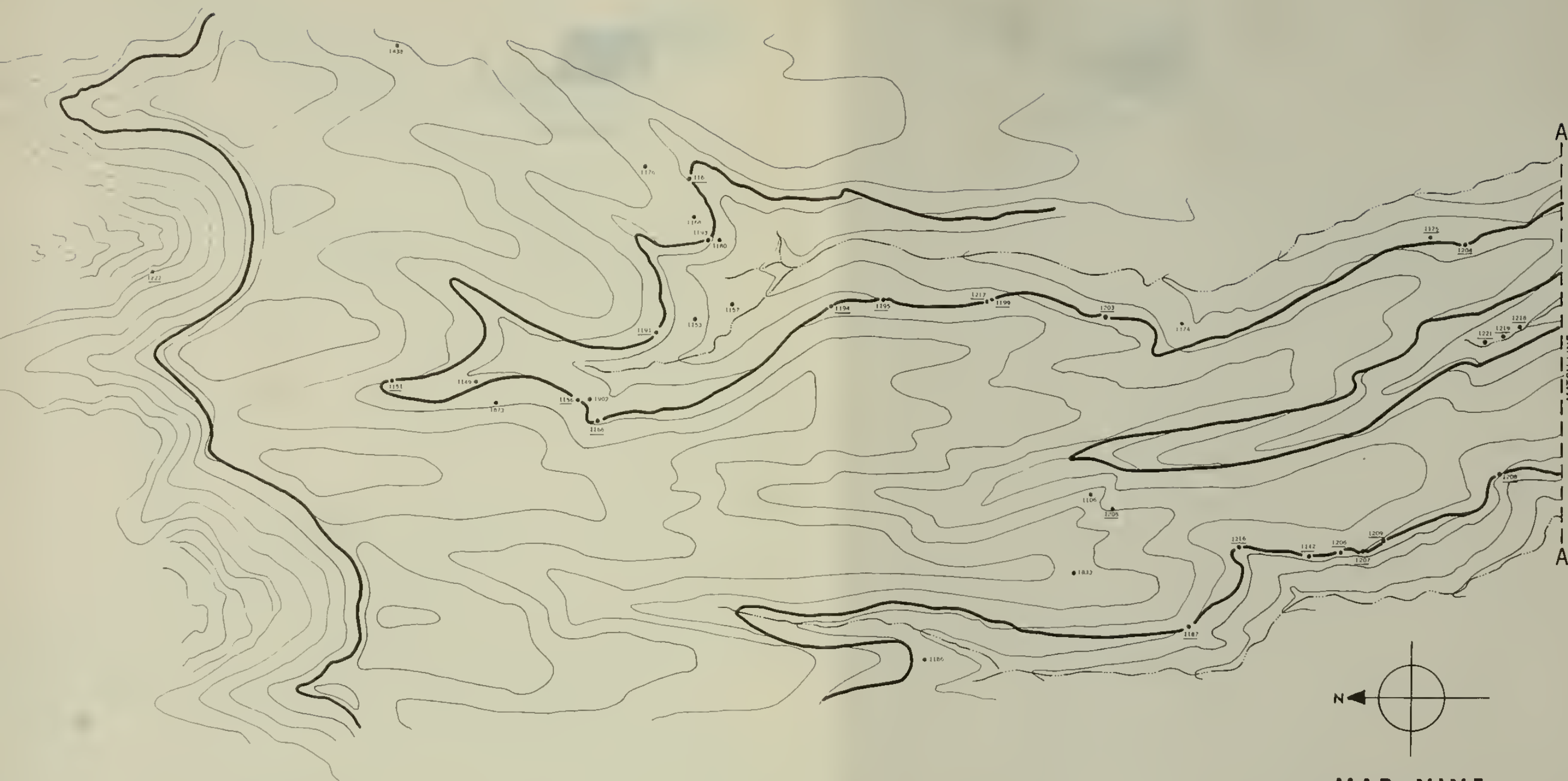
CLIFF EDGE AT MESA TOP  
 WATERCOURSE  
 CAVE SITES—UNDERLINED  
 100 FT. CONTOUR INTERVAL



# MAP 9 • SECTION 1 MESA VERDE PHASE SITES WETHERILL MESA



MAP 9AM  
MESA VERDE PHASE SITES  
WETHERILL MESA

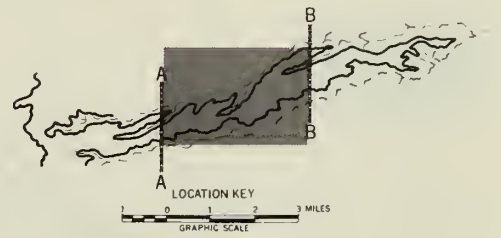


# **MAP NINE** **MESA VERDE PHASE SITES** **WETHERILL MESA**

——— CLIFF EDGE AT MESA TOP  
 - - - - - WATERCOURSE  
 1100 CAVE SITES—UNDERLINED  
 100 FT. CONTOUR INTERVAL

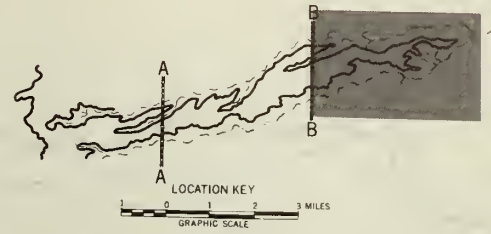


MAP 9 • SECTION 2  
MESA VERDE PHASE SITES  
WETHERILL MESA





# MAP 9 • SECTION 3 MESA VERDE PHASE SITES WETHERILL MESA



B  
MATCH LINE  
E

