Reports of the

UNIVERSITY OF CALIFORNIA ARCHAEOLOGICAL SURVEY

No. 65

ROCK ART OF OWENS VALLEY, CALIFORNIA

Jay C. von Werlhof

University of California Archaeological Research Facility
Department of Anthropology
Berkeley

June 1965

REPORTS OF THE

UNIVERSITY OF CALIFORNIA ARCHAEOLOGICAL SURVEY

NO. 65

ROCK ART OF OWENS VALLEY, CALIFORNIA

Jay C. von Werlhof

UNIVERSITY OF CALIFORNIA ARCHAEOLOGICAL RESEARCH FACILITY
Department of Anthropology
Berkeley

June 1965

PREFACE

Jay von Werlhof, the author of the present report, worked as my aide between 1958 and 1960, organizing the very large collection of information on the petroglyphs and pictographs of California. As part of this activity he did some field-checking of sites. Earlier, while on the staff of the San Francisco Art Institute, von Werlhof had done a great deal of recording of large pictograph sites, and was therefore proficient in both field work and laboratory analysis of this type of information. In the summer of 1959 he carried out a detailed inspection and recording of the petroglyphs of Owens Valley, and in 1960 published a preliminary account of his findings. We now have the detailed report on the results of von Werlhof's field work during this period as well as the highly interesting computer analysis of the data done by Professor James Ford of the University of Southern California.

In the past ten years we have witnessed a significant reawakening of interest in prehistoric North American rock art. At the present time there are perhaps as many as thirty people seriously engaged in collecting data, analyzing these, and preparing them for publication. Methods of analysis and awareness of problems are developing rapidly, and it is anticipated that in another decade petroglyphs will be a significant element of prehistoric archaeological information backed by a solid body of published literature. Some standardization of terminology of elements is very much needed, and it is to be hoped that discussion and exchange of ideas at conferences will aid in realizing a systematic nomenclature. Also needed is work aimed at linking petroglyphs and pictographs with prehistoric technological complexes (i.e. cultures). Little of this has been done because most painted and pecked designs are not associated with habitation spots, but there must exist some sites where the two can be associated, and it is of the utmost importance that these be located.

The functions of petroglyphs also constitute a problem. Baumhoff and I have suggested (1962) that in the Great Basin pecked petroglyphs are associated with game migration trails and were fashioned at spots where the animals were hunted. J. Steward has suggested (1963:975) an alternative explanation which I do not find as probable but which should be tested. Von Werlhof has opted for the game migration trail association for most of the Owens Valley petroglyphs, but it is surely true that for other parts of the West, including California west of the Sierran crest, other explanations must be devised. It seems to me that the most interesting thing about petroglyphs is that we understand so little about

them—everything that concerns the subject is a problem—and it is therefore an exciting and challenging part of prehistoric culture to investigate.

Mainly, what we need are more published reports, preferably full recordings of the design elements for individual sites. The present paper is a long step in that direction and will serve as an exemplar of the type of data which we must have in order to make the kind of progress which we should make.

Robert F. Heizer

Berkeley, California

ACKNOWLEDGMENTS

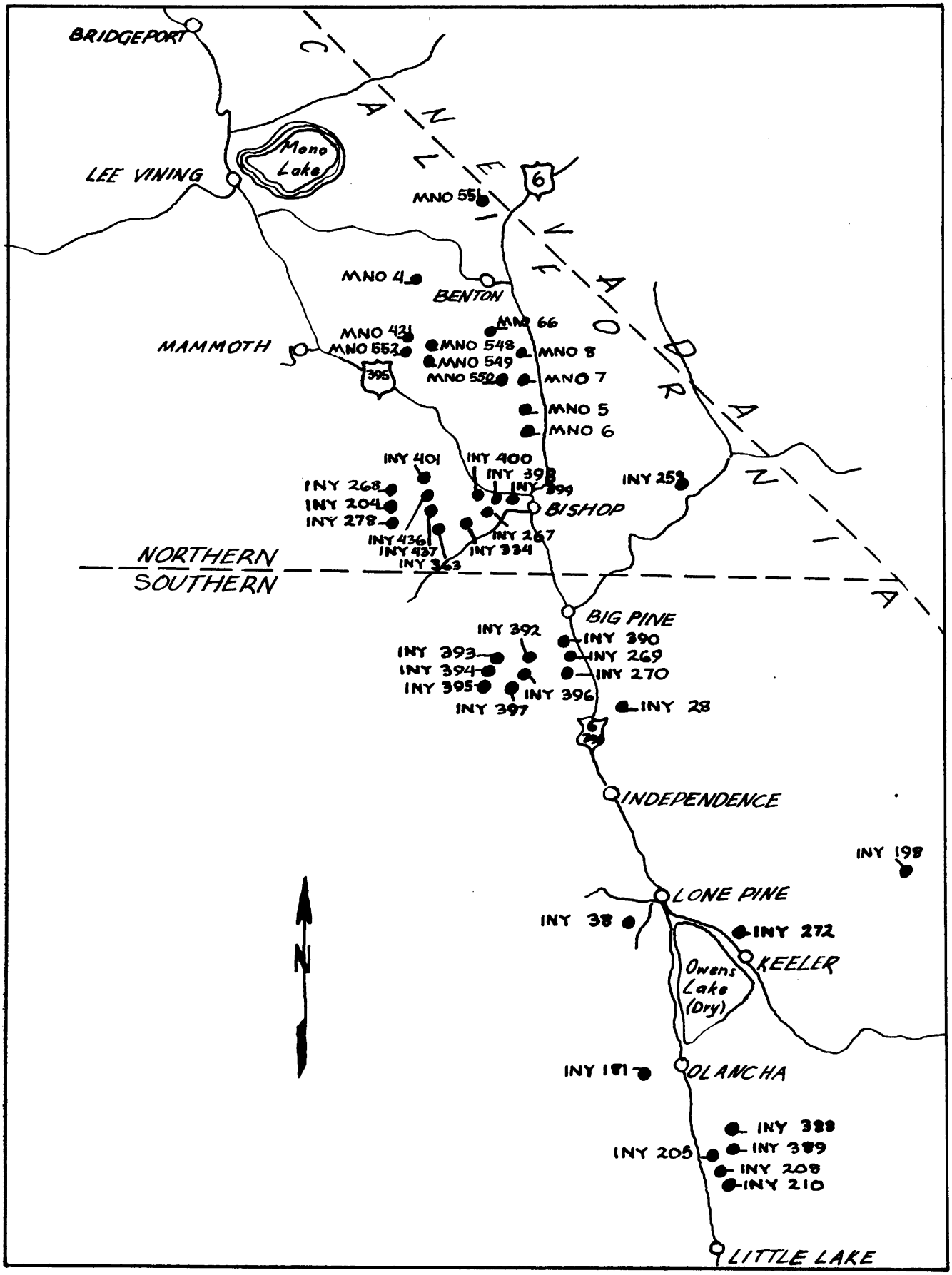
This report presents the results of an eight week field research program supported by the American Philosophical Society (Grant No. 288; von Werlhof 1960) and sponsored by the University of California Archaeological Research Facility. The materials presented here were gathered primarily by field observations although a variety of other sources were utilized and a number of persons gave assistance and encouragement during this undertaking.

I am especially indebted to Dr. Robert F. Heizer, Coordinator of the Archaeological Research Facility, who fortified his original suggestion for this study with his constant support. I wish to express thanks, also, to Davis Taylor who accompanied me as assistant in the field and trekked one hundred and sixty miles with me in search of known and conjectured petroglyph sites. Lorin Ray, of Bishop, devoted much time to showing us petroglyph sites in that area and directed us to other sites of unrecorded glyphs. Douglas Garton, Assistant in the California Fish and Game Department at Bishop, drew maps of known deer trails and winter grazing lands, and provided much local information on the Owens Valley herds. My brother, Norman von Werlhof, kindly drew the maps presented in this study. Others to whom I express appreciation are: Mr. Ray McMurray, Mr. Willis Smith, Mrs. Lucille Wilcox, and Mr. Jim Nettleton, of Bishop; Mr. R. Bramblete, Little Lake; Mr. Harvey Kruger, Walker Pass Station; Mrs. Christine Brown, Bodfish Store; Mr. Jim Nikilaus, Big Pine; Mr. J. W. Grobien and Mr. Mark Lacey, of Olancha; and Mrs. Lillian Hilderman of Keeler.

Lastly, a heavy debt is owed Dr. James Ford of the University of Southern California, who worked out the statistical methods for analyzing the data on petroglyphs and prepared most of the correlation charts contained in this report. A disruption in the computer program prevented Dr. Ford from presenting all the data on petroglyphs to the machines. What was accomplished, however, validates this method of analysis in the field of petrography, and Dr. Ford's pioneer efforts in this work have set a pattern in archaeological analysis for the future.

CONTENTS

LIST OF MAPS



Map 1. Location of Petroglyph Sites in Owens Valley Area

INTRODUCTION

Until Julian H. Steward's exploratory volume on the petroglyphs of California and the Great Basin appeared in 1929, there had been few serious attempts to systematically record and analyze the centuries-old aboriginal rock art which was found in the western United States. Even so, another thirty years were to pass before his work was picked up afresh and renewed interest in the study of petroglyphs was manifested. Steward accurately assigned three major styles to the petroglyphs of the Great Basin. Seeing differences not only in stylistic schemes but also in age, he established that three styles (later named by Heizer and Baumhoff, 1962, as the Great Basin Abstract Curvilinear Style, the Great Basin Abstract Rectilinear Style, and the Great Basin Abstract Representational Style) had developed through time in that sequence. But even Steward's examination of petrography failed to explain why these thousands of designs had been pecked so laboriously upon dense stone.

In the late 1950's Dr. Robert F. Heizer and Martin A. Baumhoff of the University of California at Berkeley applied their long field experience to the problem. Recognizing that important environmental factors might have been overlooked by Steward, they began a series of field investigations which required that known sites be revisited and all observable features within the areas noted. Gradually one feature came to be noted time and again as associated with petroglyph sites—the presence of game trails. Migratory deer and antelope trails and local trails of sheep were found neighboring the sites of aboriginal rock art. Other instances showed that where game trails were lacking, hunting blinds, corrals, stone walls, and box canyons were used in the ambush of strays. The purpose of the petroglyphs finally came into focus—in some way they had to do with the ritual of hunting. Exactly what their connection with the hunting ritual was remained uncertain, and at this point we are still unable to offer a definite answer.

This study on the petroglyphs of the Owens Valley area was undertaken for the purpose of adding more data to the existing material. While petroglyphs were believed to have been established as a part of the hunting economy in the Nevada area, it was not certain that this relationship was true for other areas as well. Even though the pre-Numic peoples of Owens Valley are archaeologically linked with other cultures, there was no justification in automatically assuming that the petroglyph-makers of central eastern California had devised glyphs with the same objectives as those of the Nevada tribes.

After gathering all available information contained in the files of the University of California Archaeological Research Facility at Berkeley, Davis Taylor and I hiked across the Sierra Nevada to the town of Bishop, in Inyo County, California. From that point we methodically explored northern Inyo and southern Mono counties for sites. Scaled drawings were made of each site and petroglyph face, and a sketch map was drawn of the surrounding territory. After a site was recorded, the area was carefully examined for about a square mile, and notations were made of any occupational evidence or subsistence possibilities. Bit by bit the evidence, plotted on U.S. Geological Survey maps, took on a pattern. When the pieces for the northern Owens Valley were in place, it was seen that the petroglyph sites from Round Valley, west of Bishop, followed the border of the Casa Diablo volcanic tableland along its southern and eastern borders and then worked northward through the winter grazing lands of Sierran herds into Nevada. A westward offshoot cut through the tableland to the meadows in Wildrose Canyon. This examination, in relation to deer habits, showed that the sites were concerned not only with migrating herds but also with deer in winter quarter habitats. Here, then, were suggested two different seasonal uses for the sites. A final analysis showed that for Owens Valley a nomadic human population had penetrated the area from Nevada—probably through the same migratory route used by the deer—and over a period of time had settled in the lowlands near the grazing animals. The Great Basin Curvilinear Style had been brought into the area by these people, and was first used along migratory trails where game had to pass through narrow draws or around obstacles. The greatest migrations in Owens Valley occurred in the north and involved not only long distances but also period of several months. Before taking up a sedentary life, however, the tribes or groups pushed southward after the migrations in the fall had ended.

Little Lake is over a hundred miles from the sites in northern Inyo County and is over 1500 feet lower in elevation. The winters were no doubt wetter and colder during the period when these migrations were going on—perhaps four thousand years ago or longer—than they are at the present time. The level of Owens Lake was then nearly 200 feet higher than its present level (Antevs 1952) and the area was not nearly as arid as it is today.

There was considerable movement between Little Lake and the area north of Bishop in those days of hunting. Positive relationships between the bases at Little Lake and those in the north are established by statistical correlations (see section on Tables and Correlations of Elements and Sites). Within the confines of Owens Valley the people rendering the Curvilinear style worked toward the middle of the valley,

setting up new hunting sites as the climate and population changed. Little cultural change occurred, however, in this period of time which gradually saw the valley utilized. Indications of a change are manifested by petroglyph sites located at the most strategic points in the valley, except in the very center—between Aberdeen (Iny-28) and Lone Pine (Iny-38). As far as I know there are no petroglyph sites within this forty mile area. The manifested change is stylistic and identified as the Great Basin Rectilinear Style.

Statistics show that this change was purely stylistic; however it is assumed that the meanings of the glyphs—whatever they might have been—remained the same. For example, the circle became a cross, and the grid oval became the grid rectilinear. However, all changes were not so definite and probably did not all occur simultaneously. The Rectilinear style is more simplified and fewer designs are employed. The techniques in pecking glyphs remained the same, but the Rectilinear style is more abundant at those sites which are in grazing areas rather than on migratory routes. This can be taken as suggesting that the people who were once highly mobile had become more sedentary.

The Great Basin Representational Style is even more restricted in distribution and placement. Except for a few sites (e.g. Iny-259) which are on migratory trails, the representational elements are located in the lowland areas where grazing animals congregate or can be driven into cul de sac positions (e.g. Iny-210, Mno-8, Iny-267). Not all of the possible sites are so utilized. The concentrations again, as in the case of the earlier Curvilinear, appear on the extremities of Owens Valley. On the north, south, east, and west borders of the valley the Representational style is most obvious. Even though there are fewer Representational style elements than Rectilinear, the majority of them occur in the north. This may represent a stylistic backlash, from south to north, and in the north the style appears in its most realistic form. At sites Iny-267 and Iny-398 animals are portrayed in striking detail, and at Mno-5 a drawing of a deer with an elaborate set of antlers and hooves, and measuring over two feet in length, is seen. This development marks the peak accomplishment in petrography, and the art seems, after this, to have died rapidly. A feeble resurrection was attempted in the scratch technique which spread from north to south, where it achieved an interesting level in representational drawings at Iny-389. This technique appears to have been short-lived and fairly recent, perhaps standing between the pecked Representational style and the pictographs of historic or late prehistoric times.

Pictographs are scarce in the Owens Valley area. There is some

evidence that the style was picked up from the Western Mono of Tulare County following their period of contact, 1300-1400 A.D. (Elsasser 1960). It would seem that this style was first tried in Owens Valley, probably by rubbing pigment into the grooves of petroglyphs (e.g. Iny-278), and finally by painting on free surfaces. That early attempts in pictography were made in relation to the hunting economy—as were the petroglyphs of an earlier time—seems probable (e.g. Iny-28), but certainly the later periods of rock painting as evidenced in remote spots would seem to have been beyond the sight of animals (e.g. Iny-399).

Though the specific function of the petroglyphs in the hunting ritual is not known, it is clear that the designs were placed in positions to be seen by animals. Possibly the aborigines believed that the elements would attract, or distract, the attention of the game and hence give the hunter an advantage in the chase. His weapons were weak at best, and any advantage at close range meant a better chance of varying the piñon diet. At each site it is obvious that the elements face in one general direction. There are some exceptions, such as the designs on top of tall boulders (Iny-267) or behind a wall (Mno-5). But the majority of petroglyphs, no matter what the style, face the direction from which animals would approach the site. Most of the sites along Owens Valley migratory trails were most advantageous to hunters meeting game as the herds came out of the mountains on their way to winter feeding grounds; few were placed to meet the return spring migrations. This is true of the Nevada sites on the eastern side of the White Mountains as well as in Owens Valley. Site Es-1 (in Nevada), for example, between the Davis Ranch and Trail Canyon, lies along a low malapais ridge divided by a migratory deer trail. Every one of the petroglyph elements faces the trail toward the mountains; not one faces the downward slope which the deer would traverse on their way back to higher country in the springtime.

In summary, our evidence suggests that the earliest petroglyph makers entered Owens Valley from Nevada through the pass in Mineral County. Sites in the Curvilinear style were situated along migratory trails in the northern portion of Owens Valley, and at Little Lake in the southern end where animals grazed in the milder winter climate. Quite nomadic, the people moved about within the valley, setting up new sites as their population grew. A stylistic change occurred as more settlements were established. This change instituted the simpler Rectilinear style and replaced some of the earlier designs. An emphasis on lowland hunting, which came gradually to replace the earlier emphasis on shooting migrating game, perhaps initiated this stylistic development. Increasing population numbers, plus a concentration of settlement in the north, marked the time of the appearance of the Representational style, which was more restricted in distribution.

This cultural backlash, from south to north, was the last important petrographic development. Except for a brief flurry of the scratch technique which spread rapidly throughout the valley, petroglyph-making came to an end. Contacts with the west side of the Sierra introduced pictographs, which technique, after a short trial in connection with the hunting ritual, was transferred to non-hunting practices.

Site designations in this report are those of sites registered in the files of the Archaeological Research Facility, University of California, Berkeley.

DESCRIPTION OF OWENS VALLEY SITES

Iny-28

Slightly northeast of Aberdeen, on an otherwise unbroken talus plain, is a volcanic hill known as Charlie's Butte. Iny-28 is at the flattened crown of the butte, amidst sporadic boulders and outcroppings which form an elongated figure eight pattern. The site is oriented along a northwest-southeast line, parallel to the Owens River which flows eighty-five feet below.

The site affords an uninterrupted view of the valley and the flanking mountain ranges. Ten miles to the west, and 8000 feet above, is the deer-crossing at Taboose Pass. The Taboose herd, which feeds in the valley from October to May, follows its migratory trail down Taboose Creek to the large stands of piñon (Pinus monophylla) on the Sierran slopes. Parts of the herd come farther into the valley to browse in the swale which extends for thirteen miles between Fish Springs and Blackrock Spring. Iny-28 is in the southern portion of this feeding ground. The owner of the Aberdeen Service Station reported in 1960 that the herd numbered about 3500. Doug Garton, Assistant at the Fish and Game Division in Bishop, said that while the deer migrations north of Bishop involve extensive east-west distances, the herds south of Bishop roam only a dozen or so miles.

At the top of Charlie's Butte, along the northwest perimeter, are four petroglyph surfaces which can be viewed plainly only from the southwest section of the top of the hill. The western perimeter contains a small rock shelter, barren of midden and artifacts. The opening to the shelter is partially blocked on its north side by a large boulder bearing two pictographs in human form. These red figures were obviously painted at different times, though in the same style. The design on the right side of the group is still bright, while the one on the left has faded considerably (Fig. 1b). The petroglyphs (Fig. 1a,c,d) reach much further back in time, being all but obscured by desert varnish.

Three stone circles occupy the southern perimeter of the top of Charlie's Butte. The southernmost circle is nearly 12 feet across while the two others measure about 8 feet. All are slightly more than 2 feet in height. The largest circle contains a small break, or opening, on the southeastern side. That the opening was an intended "window" can be inferred. An examination of the wall shows that dirt deposits and rock coloration are the same within the aperture as on the other rock surfaces. Also, loose boulders, which would indicate that the wall had been disturbed, are absent.

The four groupings of petroglyphs, behind and above the stone circles, are seen when the site is approached from a low draw on the southern slope of the hill. Experienced hunters say that if a choice of terrain is available, frightened deer will usually move to the higher elevation. Aborigines stationed in the boulder circles atop the butte, or in the rock shelter, would be in an advantageous position from which to ambush animals stirred into action by shouting Indians on the plains below. The function of Iny-28, although it is in the center of winter grazing land rather than along a migratory game trail, is interpreted as are other petroglyph sites in Owens Valley as a spot from which deer moving in one direction were shot by hunters. Other lowland sites in the valley also bear petroglyphs similar to those on trails, in gullies, and along passes. It is clear that the aborigines meant the designs to be seen by the approaching animals; it appears that the aborigines probably thought the petroglyphs would be seen and thus attract—or distract—the attention of the game, making easier the task of shooting the wary animals from close range.

For a half-mile west from the base of Charlie's Butte the sandy soil is rich in obsidian spalls and fragmentary projectile points. This industrial evidence probably marks activity performed in summer months when the deer were not present.

Iny-38

This site is bisected by Tuttle Creek Road near the mouth of Tuttle Canyon. The petroglyphs at Iny-38 (Fig. 1e,f) are Curvilinear in style and moderately covered with desert varnish. They appear only on the south side of the boulder facing the Tuttle Canyon migratory game trail. Tuttle Creek originates near Langley Mountain (14,042 a.s.l.) in the high Sierra, seven miles west of Iny-38, and feeds into the northern drainage basin of Owens Lake at Lone Pine. Nothing definite could be learned about a deer herd utilizing this route.

A group of pits is associated with this site (Fig. 1f). Potsherds of Owens Valley Brown Ware and obsidian chippings were found at the base of the large boulder containing the petroglyphs. The boulder is solidly balanced on two ends, forming a crude and breezy shelter underneath. Midden was not present, indicating that this site was not actually used for occupational purposes.

Iny-181

This pictograph site, one mile east of Sage Brush Flat and four miles southwest of Olancha, is on the western perimeter of an occupation zone comprising sites Iny-179, Iny-180, and Iny-351. Large collections of stone artifacts and obsidian tools have been gathered by local ranchers along Summit Creek which passes about 50 feet to the south of Iny-181. A portable metate fashioned from granite was found at the base of the pictoglyph rock.

Iny-181 is the only pictograph site in Owens Valley displaying multicolored designs. It lies farther west than any other pictograph or petroglyph site in the region under discussion. The style of painting is more strongly reminiscent of the painted art found on the rocks along the western edge of the Sierra in Tulare County than in Owens Valley. The designs are more elongated and more complex than those seen elsewhere in Owens Valley. The other pictograph sites, with the exception of Iny-204, tend to show isolated and horizontal designs. It is possible that Iny-181 represents an intrusive cultural element into the valley from the west; an aboriginal trail crosses Olancha Pass west of Iny-181 and follows the Kern River into the Springville-Porterville areas of Tulare County (Sample 1950). Another site that is styled more in the manner of the western Sierra than Owens Valley is located thirty-five miles south of Iny-181, on the western side of Walker Pass, three miles east of Cane Brake Inn.

Red and blood-red are the only colors represented at Iny-181 (Fig. 3a) which are also utilized in other Owens Valley pictographs. Purplish-red, orange, orange-red, orange-yellow, and black are common at Iny-181 and also in western Sierra pictographs. On the other hand, white, which is often found in Tulare County pictographs, is absent at Sage Brush Flat. In one historic Owens Valley occupation site Riddell (1951) found orange-yellow ochre.

The fading that has occurred at Iny-181 has affected all designs, indicating that the elements were painted at approximately the same time. While superimposition occurs, there is no clear style change within the series.

Residents at the present Longcroft Ranch, across Summit Creek from Iny-181 and Iny-351, state that deer traverse the creek during the fall and spring, crossing the mountains through Olancha Pass. That pictographs played a part in the hunting ritual of late Owens Valley Paiute is not conclusive; there are too few pictograph sites in the valley to establish this point. However, that some relationships existed, is suggested by instances of petroglyphs being filled with pigment. The stone at Iny-181 is granite, making paint the only practical art medium. If the site is directly related to hunting practices in a manner similar to that deduced from other Owens Valley art galleries, Iny-181 would have been utilized during the spring migrations. The southeastern orientation of the paintings make them visible only to game approaching from the valley side of the site.

Iny-198

This petroglyph site is 2.2 miles east of the Tin Mountain Road on the western slopes of the Cottonwood Mountains, toward the southeast corner of Saline Valley. Unusual summer conditions prevented a visit to the site at the time field investigations were being carried out. A few of the elements at the site are recorded from earlier photographs sent to the University of California Archaeological Research Facility (Fig. 2n-q).

Iny-204

A very unusual pictograph site, known locally as "Bloody Hands," is located near the mouth of Birchim Canyon nine miles west of Bishop and about four hundred yards southeast of Round Valley Store. The twenty-one red handprints and four pawprints (Fig. 3b-e) are on two southern exposures of volcanic breccia, and are easily visible from the roadway facing the site, 65 feet below.

The paintings are about equally faded, evidencing a common time of origin. In all discernible instances except one, the right hand was chosen to be modeled. Several factors suggest that individuals covered their right hands with wet pigment and pressed them against the wall. First, it is noted that the slant of the handprints extends from upper right to lower left—the position a right hand would naturally assume in pressing it forward from waist to shoulder height. Also, the one handprint which slants slightly the other way shows the thumb on the opposite side. In addition, the light-to-absent pigmentation in the palm areas might occur by this form of printing. Finally, the artistry of the handprints is more faithful in detail and proportion than that of the pawprints. The adherence to this degree of realism is observed nowhere else

in Owens Valley pictography. Compare, for example, the handprint at Iny-399 (Fig. 30a).

The rock at Iny-204 is part of a ten mile long extrusive east-to-west bluff which separates the Casa Diablo volcanic tableland to the north from the sloping Sierran talus apron to the south. The Owens River flows from the north through the tableland, and at Birchim Canyon bends eastward along the foot of the cliffs to Chalk Bluff eight miles away. The tableland and the valley slope gently in opposite directions until at Chalk Bluff, on the eastern end of the tableland, 200 feet separate the edge of the cliff from the banks of the river.

At Iny-204 a full panorama is afforded of Horton and Pine creeks which originate in the wilderness area 8000 feet above Round Valley and join at the mouth of Birchim Canyon. Directly south are the barren Tungsten Hills, and to the west the steep escarpment of Wheeler Ridge furrowed by a dozen run-off gullies in half as many miles.

Round Valley is a winter feeding ground for about 2500 deer living along Horton and Pine creeks. Some of the herd continue past Iny-204 on to the Casa Diablo tableland through Birchim Canyon, others turn down-river to share with herds from Bishop Pass the numerous gullies and draws that cut far into the volcanic mesa that reaches toward Wildrose Canyon.

Iny-205

Little Lake is an extremely dry, volcanic area about twenty-seven miles south of the Owens Lake drainage basin. While the escarpment of the Sierra is very steep directly west of Little Lake, the mountains rise only 4000 feet above the lake site. Springs and natural resevoirs are fewer in this region than to the north, and snows do not cling to the upper slopes as long. East of the lake is a vast stretch of barren land and dry lakebeds. Craggy volcanic peaks in the far distance form the southern reaches of the Inyo Mountains and the Argus Range. Little Lake is an artificial body of water formed by damming a narrow volcanic gorge which traps run-off water from the Sierra and the natural spring in the lakebed.

Iny-205 (Fig. 4a,b) is but one of five petroglyph sites at Little Lake. Iny-388 (Fig. 22a-l) and Iny-389 (Fig. 23a-n) are at the northeast corner of the lake area, and are generally distinct from the other three petroglyph centers in style, directional orientation, and technique. Iny-205, Iny-208 (Figs. 4c-i; 5a,b) and Iny-210 (Figs. 5c-p; 6a-h) are situated along the western shore of the lake.

Iny-205 contains two groups of petroglyphs in a rock shelter along the northwest shore of the lake. One of the groups (Fig. 4a) is Representational in style, showing an unfinished series of human and animal figures. The human figures are shown with bows and arrows. This motif is seen at only one other Owens Valley site—Iny-389, across the gorge. A frontal view—a universal mark of artistic advancement—is attempted on two animals. These two animals, and a third, are shown much larger than the other eight companions, a common primitive method for indicating some form of distinction rather than perspective.

Figure 4b is a rectilinear form of simple lines intersecting one another in an orderly manner.

This site, like the other two on the west side of the lake, is strewn with obsidian spalls and fragmentary projectile points.

Iny-205, known as the Stahl Rock Shelter, was excavated by M. R. Harrington of the Southwest Museum (Harrington 1948; Hamilton 1951). While the occupational features of the site are alleged to be ancient, the petroglyphs are probably much more recent. The desert varnish on these figures is quite light, and the Representational style is perhaps no more than 1000 years old (Heizer and Baumhoff 1962).

Iny-208

South of Iny-205 and following the western shore of Little Lake, Iny-208 (Figs. 4c-i; 5a,b) stretches intermittently 300 feet along the malapais rocks which border a volcanic tableland above. The petroglyphs are solidly blocked-in and darkened by desert varnish. Figure 4c and i show animals with extended torsos or necks. Details of hooves and frontal views are attempted on two animals (Fig. 4i) and distinctions are attempted between the horns of sheep(?) and those of deer.

While the majority of elements are in the Representational style, the drawings shown in Figures 4d-f and 5b are Curvilinear. It is perhaps significant that while these two styles are interspersed throughout Iny-208 there was no attempt to superimpose the later Representational style over the earlier Curvilinear, or even to place designs on the same rocks utilized by earlier petroglyph-makers.

Iny-210

This Little Lake site is on a low-level volcanic tableland above, and to the south of, Iny-208. The tableland rises slightly from north to

south along its 600 foot length, and east to west along its 225 foot width. The eastern side is bordered by a wall dropping into the lake, the north by box canyons, and the south ends of the tableland are partially filled with water. The north side is about 25 feet above the lake line while the south side is about 40 feet above. The western side of the site is marked by an abrupt malapais hill 50 feet beyond the box canyon on the south.

Near the box canyon on the north side is a boulder containing many pits and some grooves (Fig. 6c). For 200 feet south the area is profusely scattered with obsidian chippings and portions of projectile points. Near the center of the area are two bedrock exposures containing metate and mortar holes.

Along the southern 200 feet of the tableland are six random boulders which bear petroglyphs on their easternmost facings (Figs. 5k-m,o,p; 6b). Each of two other bedrocks near the southern box canyon contain a metate surface. The northeastern corner of the box canyon forms a knoll, and a stone circle exists between it and the canyon. At the enclosed end of the canyon, 100 feet west of the circle, are six groups of petroglyphs facing either side of a narrow draw leading from the bottom of the canyon (Figs. 5c-j; 6d-f).

One hundred feet from the draw leading out of the canyon, and against the malapais knoll on the western side of the tableland, is a large outcropping with a small cave underneath. Petroglyphs with pigment rubbed into the grooves are to be seen above the entrance (Fig. 5n).

The son of the property owner, R. Bramblete, said that he has seen underwater petroglyphs along both sides of the box canyon and across the gorge while skin diving several feet beneath the surface.

It would seem probable that at Little Lake petroglyphs entered into the natives' hunting economy. Animals driven along the narrow gorge would be diverted into the box canyons; while some would be trapped, others would attempt to escape up the draws and be shot. That deer were probably hunted at this site is shown not only by the glyphs but also by bones which were unearthed at a depth of 32 inches, near the stone circle.

The styles of petroglyphs on the west side of Little Lake are predominantly Curvilinear and Representational. Only where other surfaces seemed unavailable does the later Representational style mingle with the earlier Curvilinear.

Iny-211

The petroglyphs at the west end of the southern box canyon at Little Lake were reported originally as a distinct site. Our field research did not show the area to be separate from Iny-210, and it has been incorporated in the records of the latter site.

Iny-259

At its greatest girth the rugged White Mountain range in northeastern Inyo County is thirty-five miles wide. Deep Spring Valley, on the eastern side of the block, is a high sink ten miles long and two miles wide, surrounded by mountains. The valley is walled on the east end by Gilbert Pass (6475 ft. a.s.l.) and on the opposite end by Westgard Pass (7350 ft. a.s.l.). The mountains on the northern edge provide melting snow and many springs to nourish the valley. Since the valley drains gently from northeast to southwest, a large swale, fortified by deep springs, is maintained in the lower corner. Mountain sheep living on the sharp and narrow chain of arid mountains along the southern edge of the valley descend to the marshy holes for water following winter's thaw.

All thirteen creeks draining into Deep Spring Valley debouch from the northern side. The largest of the channels is Wyman Creek, originating twelve miles away, near Blanco Mountain (11,280 ft. a.s.l.), on the Inyo-Mono county line. A large flood plain exists at the mouth of Wyman Creek where it is joined by Crooked Creek. On the plain are the stone house ruins of early white settlers. Iny-259 lies two miles farther north on Wyman Creek.

This petroglyph site (formerly registered as UCAS Iny-151; Steward's 40 Pt) is made up of five boulders (Figs. 7a-k; 8a) on the north bank of the creek. The peckings are generally shallow and irregularly spaced. The facings are mainly west (upstream). Sam McCall, an instructor for several years at Deep Springs College on the south side of the valley, said that deer moved out of the higher country along Wyman Creek in October and crossed into Nevada near Oasis. As a hunting site, Iny-259 would have been used in the fall while the animals were moving eastward.

Vegetation is rather sparse in the valley. The 5800 foot elevation provides some forage for summer herds, but animals in this area would be compelled to keep moving to obtain subsistence. The winters are too harsh for Indian habitation. There is evidence of occupation at the site, but the natives probably moved in with the migrating animals and stayed only during the summer and fall.

The glyphs are mainly Curvilinear, very complex and detailed. One panel is in the Representational style (Fig. 7c). The human figures shown are solid and seem to be more akin to Nevada petroglyphs than local ones in Owens Valley. It is possible that Iny-259 was used by Nevada groups crossing from Gilbert Pass.

Iny-267

The Casa Diablo volcanic tableland, which gradually slopes from north to south, ends abruptly at the Owens River. At Chalk Bluff, near the eastern end of the ten mile long cliff lies Iny-267, about two hundred feet above the river.

Deer from Bishop Pass (11,989 ft. a.s.l.) follow the South Fork of Bishop Creek to the Owens River and cross on to the tableland heading north. Other herds cross Paiute Pass (11,409 ft. a.s.l.) fourteen miles farther north, and work down Birch Creek to the river. We examined this trail for a considerable distance into the Sierra slopes and noted that in some places it was worn down eighteen inches by constant use. The Fish and Game Division at Bishop reports that deer herds in the northern Inyo and southern Mono region travel longer distances and for longer periods of time than do the herds south of Bishop. The migrations in the north begin in the middle of October and continue for six to eight weeks as the deer move into their winter ranges. One range, covering roughly thirty-three square miles, includes Round Valley and the lower slopes of the Tungsten Hills. Another range, comprising about eighty square miles, forms a shallow crescent running from Chalfant Valley to Benton, Truman Meadows, and five miles into Nevada. An offshoot south of Benton penetrates Marble Creek into the White Mountains. The westward deer migration begins about the first of April, and though most of the animals are into the high mountains by June, there are some stragglers in meadowlands throughout the summer.

Iny-267 is the most extensive site along the Owens River (Figs. 8d-g; 9; 10; 11; 12a-f). The site is situated in a draw at the top of the cliff, 400 feet west of Chalk Bluff. The draw is 120 feet across at the cliff's edge and gradually narrows to 45 feet at the rear, while sloping upward. The rear is blocked by a stone wall fashioned of large random boulders. Beyond the wall the draw drops on to the volcanic tableland, and 150 yards northwest leads to another petroglyph site, Iny-400.

The majority of elements at Iny-267 are in the Curvilinear style, though a later Rectilinear style was utilized, in some cases being superimposed over the original work (e.g. Fig. 11o). The most recent glyphs, in the Representational style, portray deer almost exclusively (see esp.

Fig. 12f), and perhaps sheep. An insect (dragonfly?) is shown in striking detail (Fig. 9c). In some cases the representational forms are superimposed over the curvilinear designs (Figs. 8g; 9f,g; 10a-k). In two instances representational designs have been placed over the rectilinear forms (Figs. 10a; 12f).

At Iny-267 the designs include more crosshatching and enclosed gridwork than at any other Owens Valley site. The elements are simple and uncluttered, and show a sensitivity to spatial arrangement not usually present in regional petrography.

The care with which lines were arranged indicates that a sharp, pointed stone chisel was placed against the rock facing and then struck with a hammerstone. Misdirected peck marks, ordinarily seen on both sides of the main line being formed, are few at this site.

Near the west side of the cliff's edge the draw is fortified with a stone circle 8 feet in diameter. The floor was excavated to a depth of 18 inches and screened for artifacts. While none were found, a petroglyph did appear between 4 and 14 inches beneath the surface. Since only half as much desert varnish had accumulated on this glyph (Fig. 11h) as on other curvilinear designs, it is possible that the stone circle was constructed by a later people. It is improbable that this stone would have been utilized as a building stone by the same people who had pecked the "magic" design. It is doubtful that the design was pecked from within the stone structure, for it is at the bottom of the circle where it would have been difficult to work, and it faces north while all the other petroglyphs face in a southerly direction. This stone, therefore, was probably a random boulder when it was pecked by the natives, using the Curvilinear style. A later group, those pecking either Rectilinear or Representational elements, not having any particular fear of or faith in the work done earlier (as is often shown by superimposition) used this loose boulder as a building stone. The position of the stone, where approaching animals could not possibly see the pecked design, indicates the lack of respect the later group had for the earlier styled glyphs.

With the exception of the design on the boulder in the stone circle, the petroglyphs at Iny-267 are visible only when the draw is approached from the south. This indicates that it would have been used as a hunting site in the fall, during migrations to winter grounds. If Iny-400 is associated with Iny-267 as an occupation site, the villagers would not be seen by the deer approaching from the lowlands.

Iny-268

A breccia outcrop separates Iny-204 from Iny-268 and forms the southern border for the mouth of Birchim Canyon and Rock Creek. One hundred feet from the mouth of the canyon, and 100 feet from the north bank of the creek, is Iny-268 (Fig. 8b,c). The first of the three features encountered at this site is a cave shelter along the north ridge of the low canyon wall, about 10 feet above the bank of Rock Creek. A low wall composed of small flat boulders arcs across the opening. This walled shelter may be a hunting blind. Obscured pictographs can be seen on the west side of the opening, and a faded design in red can be discerned above. Seventy-five feet east of the shelter is a flat boulder, tilted from north to south, on which are pecked several curvilinear designs (Fig. 8b). The most unusual aspect of this petroglyph is the border, which is carefully pecked around the entire design and follows the line of the top of the boulder. This is the only petroglyph observed in Owens Valley which includes a border.

One hundred feet east of this petroglyph is a simple, rectilinear red pictograph on the north wall of the canyon (Fig. 8c).

It is probable that the cave-shelter was used as a hunting blind from which to shoot deer migrating through Birchim Canyon (see discussion under Iny-204).

Iny-268 has been variously reported as Iny-158 and Iny-266; it is Steward's 38 Pt Pc, "Tablet Stone."

Iny-269

Amidst a group of four malapais knolls, called Poverty Hills, stands Iny-269 (Steward's 39 Pt). The site is one mile south of Fish Springs and four and one-half miles north of Aberdeen. Lying two miles west of the Owens River, this site borders the extremities of the swale between Fish and Blackrock springs. The swale is fed by four creeks which converge in the Poverty Hills area—Red Mountain, Tinemaha, Fuller, and Birch—which is winter feeding ground for herds following the trails along the creeks.

In addition to the petroglyphs, associated features include a cave shelter, three stone circles, two stone walls, four discernible housepits, and an area of approximately 1600 square yards profusely covered with obsidian spalls and fragmented tools. Owens Valley Brown Ware sherds are found on the knolls and on the flat just to the east.

Like Iny-28, this site was probably more useful as an ambush point during winter grazing. There are no specific trails into the knolls themselves. The creeks flow to either end of the area and support the only substantial forms of vegetation in this otherwise open country. Birch, sycamore, willow, and aspen grow thickly along the banks, but not elsewhere. To avoid being seen by the deer, hunters probably hid behind the stone circles and walls, or in the shelter, all located on the highest points of the knolls. Straying animals, frightened into choosing a higher elevation, could be more easily shot as they sought the knoll. Unlike Iny-28, Poverty Hills are low-level, being about 30 feet higher than the surrounding terrain. The petroglyphs are rather close to the base and face away from it.

The lava boulders are nearly black, and the petroglyph lines show as a light to very dark brown. A few have blended almost completely with the desert varnish on the main surface of the boulders.

The general style at Iny-269 is Curvilinear, though Rectilinear is also present in both pecked and scratched techniques (Fig. 17e,h). The Representational style is absent. Pits (Figs. 12h; 13v,w; 16j) and pit-and-groove designs (Figs. 15n,o; 16g) are well represented.

The pecking technique employed at this site is generally quite crude. A single hammerstone was probably used, and poor marksmanship resulted in widely flared lines with thousands of misdirected blows. The more controlled technique of placing a pointed stone "chisel" against the rock surface and hitting it with a hammerstone was used at times. Figure 13m, for example, shows a well executed outline of a beginning curvilinear design. The unfinished product affords a good opportunity for studying the pecking technique.

Very complex patterns of Curvilinear meanders are shown in Figure 15h.

Iny-270

One-quarter mile southwest of Iny-269, on the south side of Tinemaha Creek and Red Mountain Road, is a volcanic cliff which forms the north side of a 200 foot high hill. A series of shallow benches form a trail reaching around the west side to the top. Along one of the benches, about 50 feet above the road, is a series of petroglyphs very similar to those at Iny-269.

The predominant style at Iny-270 (formerly Iny-162; Steward's 39 Pt) is Curvilinear (Figs. 18a-y; 19a-k), with some Rectilinear designs (Fig. 19e,h) and one Representational (Fig. 18n). Pits also occur at this site,

MAP 2

Site Areas at Poverty Hills (Iny-269)

on a boulder at the northeastern side of the hill (Fig. 19k). Pit-and-groove designs in a boulder (Fig. 18d) are rather shallow.

A burial was found on the north bank of Tinemaha Creek, and there is a large burial ground one-quarter mile due west of the hill. The area has been badly disturbed by machinery and vandals, and thousands of minute, brightly colored glass trade beads are found around the burial site.

On the northwest rim of the hill is a large stone circle. From here a commanding view of the entire valley sink is available, as well as the Prospect Hills to the west. A rock shelter on the bench, displaying petroglyphs, also provides a full view of the Poverty Hills area. This petroglyph site no doubt fitted into the function of winter hunting of the type discussed in connection with Iny-28 and Iny-269.

Iny-272

One mile west of Swansea, on the old northeast shoreline of Owens Lake, is Iny-272. A large marble outcropping provides the surface on which the petroglyphs were made, and it indeed proved an admirable stone on which to peck. The white man also appreciated the carving qualities of the marble, and through his mining operations at this site a large portion of the petroglyphs was destroyed. Mrs. Lillian Hilderman, long-time postmistress and resident at nearby Keeler, estimates that only ten per cent of the original site still remains.

In front of and below the main group of petroglyphs is a boulder containing twenty-two pits, averaging two inches in diameter.

The petroglyphs (Figs. 1g-m; 2a-m) generally face the southwest, toward a draw.

The Curvilinear style is dominant at this site, though a few Rectilinear forms are present. The Representational style comprises three mountain sheep, a human stick figure (Fig. 1g), and a possible insect (Fig. 2c).

There is no doubt that mountain sheep were important to the natives living in this extremely arid and rugged area on the eastern side of Owens Valley. Even with fresh water Owens Lake just below Iny-272 in prehistoric times, the surrounding area was barren and rock-covered as it is today (Antevs 1952). The petroglyph site borders a draw leading to the high ridges of the Inyo Mountains which separate the Owens and Saline valleys. Iny-272 is well situated as a hunting site.

Iny-278

About three miles east of Iny-204 and five miles west of Iny-267, between the Owens River and the Casa Diablo volcanic tableland, lies Iny-278. A large talus boulder which once rolled down from the cliffs above stands alone 100 feet from the cliff base. On this boulder and on a smaller one near the base of the cliff are petroglyphs in both Curvilinear and Rectilinear styles.

On the larger boulder are pits (Figs. 19l,m; 20a) of varying sizes, and bedrock mortars. The glyphs on this facing (Figs. 19n; 20a) tend toward an over-all spatial design of related elements in the Curvilinear style. The few Rectilinear glyphs seem to be more recent additions; desert varnish has not affected them to the degree shown in the curvilinear lines. The heavy dark areas seen in Figure 20a indicate where red pigment still exists in the pecked grooves. While the northern orientation of this facing protects these glyphs from the direct rays of the sun, and a slight overhang shelters them from the little rain that falls, the wind and sandstorms are damaging agents to the painted surfaces. The pigment was probably applied in historic times.

Three techniques were used in petroglyph-making at this site. The glyphs shown in Figure 20a were pecked with a pointed stone. The excellent control of line indicates that a stone "chisel" was placed against the boulder and then struck with a hammerstone.

The elements shown in the lower right of this facing (Fig. 19n) were done with a more crude technque. The many misdirected pecks show that a single hammerstone was used. While a solid line was eventually achieved by an onslaught of repeated blows, many of them fell to the sides of the intended line.

The third technique was employed on the smaller boulder near the cliff. The elements, facing those on the main boulder, are all straight lines (Fig. 20b) deeply scratched or gouged into the stone. Though the edges still show some sharpness, it is not clear to what extent the marks have been deepened by erosive agents. The instrument used was probably a hard stone which had been brought to an edge by rubbing it on another stone. The grooves are a general "V" shape and quite straight.

An area about 300 feet square, beginning 100 yards south of the large boulder, is profusely covered with obsidian chippings, many of which are sandblasted.

From Iny-278 a full view of the Tungsten Hills to the south and

the course of Horton Creek is available. Behind, the cliff rises about 100 feet and is furrowed by deep cuts into the tableland above. A discernible animal trail crosses on to the tableland east of Iny-278. The trail passes a dry lakebed on the volcanic plateau. The bed is about 300 yards across. That this was a large village site is evident from the number of bedrock metates around the shoreline. The site would be most useful as a village in the fall when grass seeds and Indian rice could be harvested. It is also at this time that meat would be obtainable from migrating herds. It is possible that Iny-278 was utilized as a hunting site and associated with the village along the lakeshore.

Iny-334

This Curvilinear style petroglyph site is an ambush point located in a draw 100 feet from the Owens River and on the cliffs bordering the Casa Diablo tableland. It is three miles east of Iny-278 and at the bottom end of the draw in which Iny-363 lies.

On the lower side of the site are three stone circles, and immediately above the site are two cave shelters. A series of talus boulders form a natural semicircular wall blocking the draw. On the wall, facing south, are the petroglyphs shown in Figure 20c-h. The glyphs are handsomely executed with care and precision. One group (Fig. 20g) has had paint rubbed into some of the pecked grooves.

The cave shelters show evidence of occupation, and behind the westernmost are nine bedrock metates. A portable metate fashioned of sandstone was found behind the other rock shelter. Obsidian chipping is widely scattered about the lower slope of the draw.

Iny-363

As mentioned above, a number of depressions and gullies cut north and south through the Casa Diablo tableland, forming creek beds in wet weather and trailways in dry. Iny-334 is in a draw at the end of one of the gullies. Iny-363 is one-quarter mile north of that ambush site, along the same gully. A large block of basalt was undercut by water flowing through the gully, and the rock slipped into the creek bed. Other portions of the tableland also fell away, piling a jumble of boulders around the block. The block itself dropped straight down, its flat top surface still horizontal. On this surface, 21 by 16 feet in size, the aborigines pecked a very complex series of petroglyphs (Fig. 21a). This is, without doubt, the most extensive single petroglyph surface in Owens Valley. While the three basic styles are represented

here, the dominant one is Curvilinear. It is perhaps of some significance that the Rectilinear and Representational styles are all in the lower left quarter of the rock's surface. Very little superimposition of the later styles occurs, indicating that the size, and to some extent the shapes, of their designs were determined by the spaces remaining between designs. Within the Curvilinear style, the most strikingly uniform feature is the solid circle, of which there are seventy-eight. Many of these are connected by a straight, curving, or wandering line.

A broken sandstone metate was found on the tableland 100 feet southwest of Iny-363, and a bedrock mortar nearby. One and one-half miles west of here, and one-half mile northeast of Iny-278, is a dry lakebed and a bordering village site. One hundred and fifty feet across the tableland east of Iny-363 is another wide gully, 35 feet deep, through which a game trail passes and along which two petroglyph sites are found (Iny-401, Iny-436). On the east rim of that gully is a third site (Iny-437).

Ray McMurray of Bishop, who has hunted on the tableland during deer season, reports having seen stone circles on most of the ridges above the gullies and depressed areas in this locality.

Iny-388

Northeast of Little Lake and east of the dry wash which once flowed with surplus water from Owens Lake, is a long ridge of jumbled malapais boulders. The ridge is divided east and west by a low draw separating Iny-388 and Iny-389. The draw leads on to a volcanic tableland overlooking the Little Lake area. Obsidian chippings appear in open places throughout the sites and on the west side of the dry wash.

The malapais boulders are rather light in weight, and any shift of terrain would produce a large movement of rocks. The boulders once formed a rimrock 300 feet above the dry wash, then fell into the chaotic jumble which now exists.

Iny-388 designs are shown in Figure 22a-j, in sequence from north to south. As can be seen in the illustrations, five techniques were employed in making the glyphs. For example, Figure 22a shows elements made by carefully hammering against a pointed stone placed on the boulder. A fully controlled set of lines was thus made without blurring by poorly aimed blows. Figure 22c and e show designs made by gouging the boulder with a sharp instrument. Figure 22h made use of a scratching technique, making superficial marks through the desert varnish with a very sharp

tool, perhaps of obsidian. While Figure 22f and i also show a scratching method, an attempt has been made here to develop a solid line with multiple scratches.

Figure 22h also shows the rudimentary method for preparing a solid design with the use of a pointed stone and a hammerstone. Carefully placed pecks outline the basic design, in this case a sheep or deer. While this element is unfinished, the one immediately above shows the completed work.

The fifth method employed at Iny-388 is that of rubbing a handstone against the surface of a boulder. The solid elements at the far right of Figure 22c and h were fashioned in this manner.

The tall bird seen in Figure 22f is the most detailed Representational drawing in Owens Valley, even showing the creature's eye. Though the rendering is detailed, the abstract qualities would not permit actual identification of the species.

The large number of Representational elements at Iny-388 and Iny-389—birds (cranes?), bird tracks, insects, frogs and other water animals, snakes, deer, sheep and other quadrupeds—is the most varied display of wild life forms in the petrography of Owens Valley. The styles and techniques, as well as the amounts of desert varnish, indicate the glyphs on this side of the lake are more recent than those on the western shore (Iny-205, Iny-208, Iny-210). Though some of the scratchings are nearly covered with desert varnish, this technique does not actually cut into the stone and in all likelihood the varnish would cover these more quickly than pecked surfaces.

Iny-389

South of the draw from Iny-388, site Iny-389 extends 200 feet along, and 150 feet up, the slope. Some of the boulders have shifted since the petroglyphs were placed, turning some designs face-over and breaking one of them in two. Since this situation was not noted at Iny-388, even though both sites are along the same slope, it can be inferred that Iny-388 was placed after earth movement had occurred and is thus taken to be more recent than Iny-389.

Most of the designs at Iny-389 (Figs. 22k,l; 23a-n) are abstract representations of long-legged birds. While similar in design to those at Iny-388, the birds at Iny-389 do not aspire to the detail noted at the other site. Bird tracks accompany most of the avian designs at Iny-389. Scratching is employed in only one design, and gouging is

absent entirely. This would seem to indicate that these two techniques, at least at the Little Lake area, were the most recently employed.

Only two quadrupeds are shown at this site (Figs. 22l; 23l) and one insect (Fig. 23n).

Iny-390

One-quarter mile northwest of Fish Springs is Iny-390, which fits into the Poverty Hills area and contains designs similar to those of nearby Iny-269 and Iny-270. The northern edge of the swale which extends thirteen miles between Fish Springs and Blackrock Springs is 75 feet east of this site. There are no obvious game trails in the immediate area. This site may have been used as a winter hunting area for deer browsing in the valley lowlands.

Iny-390 (Fig. 24a-h) covers a small area, 50 by 200 feet, amidst loose boulders between two volcanic hills. The designs do not include Representational forms, and are predominantly Curvilinear in style.

Two bedrock metate surfaces are immediately connected to the site (Fig. 24g), and five others are on a flat surface 50 feet to the northwest.

Iny-392

An isolated boulder containing pits is situated two miles northwest of Iny-270, on a sloping, rocky plain between Fuller and Birch creeks (Fig. 24i). One-half mile west is a bedrock with five metate surfaces. The migratory trails between these sites, which follow the creeks, are covered with scattered obsidian chips. Fuller Creek passes south of the Prospect Hills, Birch Creek passes to the north of the hills. Connecting the two is a dry wash which runs through McMurry Meadow and to the west of the hills. Iny-395 and Iny-396 are in the wash behind Prospect Hills.

The edges of the pits at Iny-392 have been smoothed by exposure to wind and rain. The stone is granite, an uncommon material in this region. Another granite boulder is on the south side of Prospect Hills, and on it also is found a series of pits (Iny-397).

Iny-393

Prospect Hills stand five miles due west of Poverty Hills and rise

1000 feet above the valley floor. There is a dry creek between the two most prominent hills, and highly polished boulders in the creek bed attest to the vigor of flash floods in the area. The dry wash empties on to the eastern slope of the hills and into Fuller Creek. At the mouth of the wash is a group of large boulders bearing Curvilinear petroglyphs (Figs. 24j,k; 25a,b).

The petroglyphs are visible only when inside the dry wash, facing east. If this spot was once used as an ambush point, it would have been useful in shooting game only as the animals emerged from the wash.

Iny-394

Up the dry wash, about 50 yards west of Iny-393, is a small group of scratched glyphs which stand on the north side of the ravine about 5 feet above the creek bed. The designs are simple, employing a few lines made by a sharp tool (Fig. 25c). There are no boulders in the immediate vicinity which could have served for the construction of hunting blinds or shelters.

Iny-395

Three hundred yards behind Prospect Hills is a dry wash 35 feet deep, 40 feet across, and running north to south between Birch and Fuller creeks. In forming, the wash cut through the western portion of two lava knolls separated by a low saddle. Above the waterline of the creek bed and below the rims of the knolls are two petroglyph sites. Iny-395, at the north end, contains a few simple Curvilinear and Rectilinear elements, widely spaced along a 100 foot section of wall (Fig. 25d-j).

Iny-396

Three hundred feet south of Iny-395 is an extensive and often complex series of petroglyphs. The six groupings of glyphs along the 400 foot ravine wall are all visible while moving north or south through the wash. Of all the Owens Valley petroglyph sites, Iny-395 and Iny-396 would afford the greatest utility for hunting game in the non-summer months. While these sites are not along a major game trail, they are on a tributary trail leading to McMurry Meadow one mile north and in the browsing area between piñon stands and valley grasslands. Few opportunities are afforded for deer to escape from the gully once they start moving through this petroglyph area. Stone circles and walls on the east rim of the wash probably hid the hunters who waited for game. From these features excellent views of the slopes to the west, and of the dry wash itself, are available.

Herds passing between Taboose Pass and The Thumb utilize the Poverty and Prospect hills areas. They cross Mather Pass (12,543 ft. a.s.l.) five miles west, and circumvent Mt. Bolton Brown (13,527 ft. a.s.l.), Mt. Tinemaha (12,543 a.s.l.), and Birch Mountain (13,660 ft. a.s.l.) as they descend across benches into the hill and valley areas.

The petroglyphs at Iny-396 (Figs. 25k-p; 26a-j; 27a-m; 28a-h') contain only two Representational figures (Fig. 27d,f). The rest are mainly Curvilinear, though some Rectilinear elements are also present.

Pecking out simple lines is the usual method employed for all the styles, but there are some variations. Designs pecked in very solid heavy lines are shown in Figures 26a,d,e,j; 27a-d,f,i. Gouging is shown in Figure 26g. Scratching was employed in a later period, working over many older designs (Figs. 26c,d,i,j; 27d,f,l; 28r,t). Some scratched designs were applied to surfaces not containing other petroglyphs (Figs. 26f; 27e,i; 28e'), but most scratching covered earlier work.

The designs that appear to be the oldest in the Poverty and Prospect hills area are shown in Figures 27a-m and 28a-g. These elements are all completely revarnished, and are indistinguishable in color from the rocks on which they were placed. It is of interest that these designs are also the ones most often superimposed by scratching.

The design in the lower right of Figure 28k employs both scratches and pecks, apparently made at the same time.

The elements shown in Figure 28n-v are very lightly pecked and scratched.

Iny-397

On the south side of Prospect Hills, one-quarter mile southeast of Iny-396, is a series of shallow pits on a granite boulder (Fig. 29a). The pits are on the southern exposure of the rock, facing an east-west dry wash which intersects that in which Iny-395 and Iny-396 are situated. Like Iny-392, this pitted boulder is in open terrain sparsely covered with low brush and tufts of grass.

Iny-398

About 2.2 miles northwest of the junction of Casa Diablo and Chalk Bluff roads is a depression in the tableland one-quarter mile wide and several miles long. On the west side of the depression is a volcanic

bluff about 40 feet in height. A migratory trail slopes from the tableland to the base of the depression. Where the trail touches bottom a petroglyph site extends 200 feet along the base of the bluff.

The designs (Fig. 29b-l) at this site are usually on the sides of boulders which would face deer approaching from the south. The pecks forming the designs are rather sporadic and poorly aimed. The best executed design, and probably the oldest is shown in Figure 29j. Erosion has deepened the grooved lines about one-half inch. An aesthetic composition is shown in Figure 29k—perhaps a family of deer. Note the forked horns of the middle figure.

The darkened areas in Figure 29b represent red pigment. Figure 29c is also a pictograph, but the original design is obscured by fading; only the lines which are still distinct are shown in the recorded drawing. Figure 29d and e are in a high, narrow rockshelter. The red pigment, shown in the drawing as a darkened area, is at the opening of the shelter, exposed to morning sun, and is too faded to precisely determine its design. The animal shown in the upper left of Figure 29f is the only pictograph of a deer recorded in Owens Valley. The dots in Figure 29h are also painted, as are the crossing lines within the two large circular designs in Figure 29i. The four lines at the lower left of Figure 29i are scratched. The rectilinear group in Figure 29h is crudely executed, the lines being but a single series of pecks.

Iny-399

Chalk Bluff curves northward one mile east of Iny-267, at the junction of Casa Diablo and Chalk Bluff roads. Three hundred yards northeast of this junction, in the upper slopes of a volcanic ridge, is a cave overlooking Fish Slough one-quarter mile east. While the opening is only 5 feet high, it is 15 feet wide. The roof is concave, meeting the floor 8 feet back. On the rear wall, and stretching almost the full length of the cave, is a group of pictographs (Fig. 30a). The elements are painted in red, and are well preserved. The designs are mainly rectilinear.

That the cave was occupied at one time is certain—an ash pit is visible in the center of the floor. A ceramic bowl and "wicker" basket are said to have been excavated from the deposits by Lucille Wilcox of Bishop, in 1934. Her son and a companion later discharged a quarter pound dynamite charge in the floor hoping to bring to light other artifacts, but none were uncovered.

A few random boulders stand near the opening to the cave, but it is

not clear whether they formed part of a wall across the entrance at an earlier period. No evidence was found that this site was linked to hunting activity.

Iny-400

This site lies 150 yards from the northwest end of the draw bisecting Iny-267. There is ample evidence that Iny-400 was an occupation area. Obsidian spalls and fragmentary projectile points extend 200 yards west of the site area. Owens Valley Brown Ware[1] sherds are found near bedrock metates and mortars at the site, and a few manos were observed. Meighan (1955) reports that the tableland was used by Paiutes for gathering Indian mountain rice (Oryzopsis hymenoides) and rice grass (O. miliacea). The seeds were roasted and ground to a flour. These foods were supposedly second only to pine nuts in importance.

A random boulder 6 feet high and 12 feet across forms the central point of Iny-400. The west side of the boulder contains one facing of petroglyphs (Fig. 30c) in Curvilinear and Rectilinear styles. On top of the rock are fourteen pits and four shallow mortars. The sides of the rock slope inward, forming a shelter. Conveniently, a flat bedrock extends over the entire floor area, and a few metate surfaces were fashioned in it.

Iny-401

Two hundred yards northeast of Iny-363, along the bottom of the east side of the ravine, is one Rectilinear petroglyph (Fig. 30d). The lines of this design are well formed, and the points of intersection are sharp.

Iny-436

One hundred yards north of Iny-401, on the same side of the ravine, is Iny-436 (Fig. 30e). This site contains one facing of pits which appear to be arranged in a specific pattern. This is the only series of pits observed in Owens Valley which seem to have an orderly scheme. The pits average between 2 1/2 to 3 inches across, and less than one-half inch in depth. These pits do not bear the characteristics of other examples of this unique style in petrography and probably are not identified with them.

---

[1] For a description and distribution of this pottery see Elsasser, 1960.

Iny-437

Four hundred yards north of Iny-436, on top of the east side of the ravine, are two curvilinear lines on a small boulder (Fig. 30b).

Mno-4

This site is at Watterson Meadow in the north end of Wildrose Canyon. A large drainage sink forms the meadowland, and the rugged hills on either side are moderately forested with piñon. The petroglyph site is situated in the midst of a large jumble of basalt 200 feet above the eastern side of the meadow.

The petroglyphs (Figs. 30f-p; 31a-i) are primarily drawn with disjointed lines going in unrelated directions. Though Representational designs of animals are absent in this site, there are hands or paw prints (Figs. 30h,p; 31e).

Only slight traces of revarnishing are noticed. The technique used in pecking probably involved a single hammerstone.

Most elements at this site face west toward the meadow, or south toward a trail that follows through a shallow draw at the end of the hill. Two hundred and fifty feet east of the draw is a small spring surrounded by an area strewn with obsidian spalls. The trail from the meadow ends at this spot, against a high basalt wall.

Conclusive evidence is lacking, but it is probable that Mno-4 is a site that was utilized in deer hunting. Large herds from the Mammoth Pass and June Lake areas, 25 miles to the west, cross the Benton Range by three main routes. One path is through Wildrose Canyon to Benton and Truman Meadow. Being nearly 7000 feet a.s.l., Mno-4 probably would have been most successfully employed as a hunting site during the late spring migrations when the animals moved back into the High Sierra country. These migrations usually occur between April and June, though slow-moving animals and strays continue to straggle through during the summer months. There is no evidence that aborigines partially supported themselves at this site by preparing pine nuts. Metates and mortars would have been used for this autumnal activity, and a wide search did not produce a single one. While the nuts might have been gathered here, the Indians apparently did not make this an occupation site after the summer season. It would seem probable that Mno-4 was a spring and summer site.

Mno-5

This famous petroglyph site lies along a narrow gap which joins Fish Slough and a dry wash leading to Chalfant Valley (Mno-7). At Mno-5 (Figs. 31j-n; 32; 33; 34a-e), 14 miles north of Bishop, a large group of basalt blocks are situated on the east side of the draw. Some deer from the Mammoth Pass herd travel south of Wildrose Canyon (Mno-4) through Chidago Canyon to Fish Slough. The winter grounds for this herd lies along a crescent that curves from Chalfant Valley to Benton and Truman Meadow, and northeast into Nevada. Portions of other herds wintering in Round Valley, west of Bishop, follow the Owens River and cross on to the volcanic tableland or browse north along Fish Slough. From whatever direction the deer come, Mno-5 is well situated as a hunting site.

This is one of the oldest petroglyph sites in Owens Valley. Designs in volcanic rock have been obliterated by erosion, or by the carving of new designs on top of older ones. Most of the elements at the site are in the Curvilinear style. The main face of each boulder is so completely pecked and repecked with designs that the entire stone is a mass of grooves. Figure 32 shows only those elements which are clearly discernible, and in no sense is it a complete recording of the rock.

It appears that other rock faces were utilized at Mno-5 only after this one was saturated with designs. No other stone is so fully covered. Curvilinear elements grouped into small spaces is one of the noticeable characteristics of older elements at this site. The more recent Rectilinear and Representational styles show a greater appreciation for space. That this is not a general trait of Owens Valley petrography can be seen by the tight grouping of rectilinear designs at Iny-398 (Fig. 29h) and the lack of spatiality in representational designs at Iny-210 (Fig. 6f).

A small rock shelter is situated 12 feet above and behind the main glyph area, from which a full view of the dry wash is commanded. Ten feet above the shelter a cleft rock displays, on two faces, the largest petroglyph designs at Mno-5. Utilizing each of the broken faces, the makers placed the glyphs opposite each other. Figure 33g and h show a circle 5 feet high, and a deer (or elk?) measuring 2 feet from nose to tail. As at Iny-267 (Fig. 12f), Iny-398 (Fig. 29k), and Mno-8 (Fig. 37f), an attempt was made in drawing this animal to show realistic antlers.

Mno-6

Four miles south of Mno-5 and one-quarter mile west of Fish Slough Road is a flat, isolated boulder, 22 feet long and 5 feet high, with petroglyphs along one side and end. The northeast end of the rock displays

a small group of Curvilinear designs (Fig. 34f) and on the west side are several others (Fig. 34h). On top of the boulders, near the southern end, are six bedrock mortars, placed along a near-straight line above another cluster of petroglyphs (Fig. 34h).

The surrounding terrain is level and sandy, with only an occasional clump of brush. No trails are observable in the immediate vicinity.

That the environment of Mno-6 was quite different in times past is indicated by the contents of a knoll on the homestead of Joe E. Riley, one mile southwest of the site, which has yielded mussel shells. Riddell reports (1951) that many sites along the Owens River have a considerable quantity of shell midden. The Riley place, however, is about seven miles from the river.

Mno-7

Mno-7 is located three miles south of Shealey in Chalfant Valley, along a sandstone bluff one-half mile west of Highway 6. A dry wash connects this site with Mno-5, two and one-half miles to the southwest.

Mno-7 is not only an extensive site (Figs. 34i-n; 35; 36a-j), but it also has what is probably the largest single petroglyph ever fashioned in the Great Basin Curvilinear style. One of the circles is slightly less than six feet in diameter. It is noteworthy that most of the large circles displayed at this site are almost perfect in form.

The designs in the sandstone bluff are badly weathered, making it difficult to determine the actual technique utilized in preparing the glyphs. It would seem, however, that pecking and scratching methods were both employed. The grooves in some curvilinear elements have eroded unevenly, probably due to irregular depths of pecks. The grooves in the rectilinear designs generally have more uniformly weathered surfaces, indicating that the lines were fashioned by scratching deeply into the stone wall with a sharp tool. Though this method approximates carving and probably antedates the superficial scratching observed on lava surfaces at other sites, it is classed here as a scratching technique. The only other Owens Valley site noticeably employing this type of "V" shaped groove is Iny-278 (Fig. 20b). The difference between these grooves and the scratched lines observed elsewhere is primarily in the depth of line. The relative softness of the stone at Mno-7 and Iny-278 lends itself more readily to cutting deeper lines than could be obtained by the same incisive movements on dense lava.

The first glyphs made at Mno-7 were undoubtedly Curvilinear in style. Figure 35b and d show Rectilinear elements superimposed over Curvilinear designs. It is observed, however, that most rectilinear petroglyphs were placed on a separate portion of the wall, at the southernmost end of the site. These are shown in Figure 36f-j.

The large circular designs shown in Figures 34k and 35a seem identified with the elongated "beaked" forms pecked alongside. Both kinds of designs have weathered uniformly, and appear to have been made by the pecking technique.

Above shallow talus deposits, the bluff is fractured along vertical and horizontal lines which form a surface of staggered, roughly shaped blocks and columns. Notches are cut along one edge of a tall sandstone block. This unusual 6 foot glyph appears to have been made by hammering against a sharp stone blade placed on the edge of the block (Fig. 36i). The notches are well spaced, and the indentations about equal in depth. Above the notched edge, and on the tableland, are several bird tracks (Fig. 36j) which were pecked into the well-varnished layer of lava.

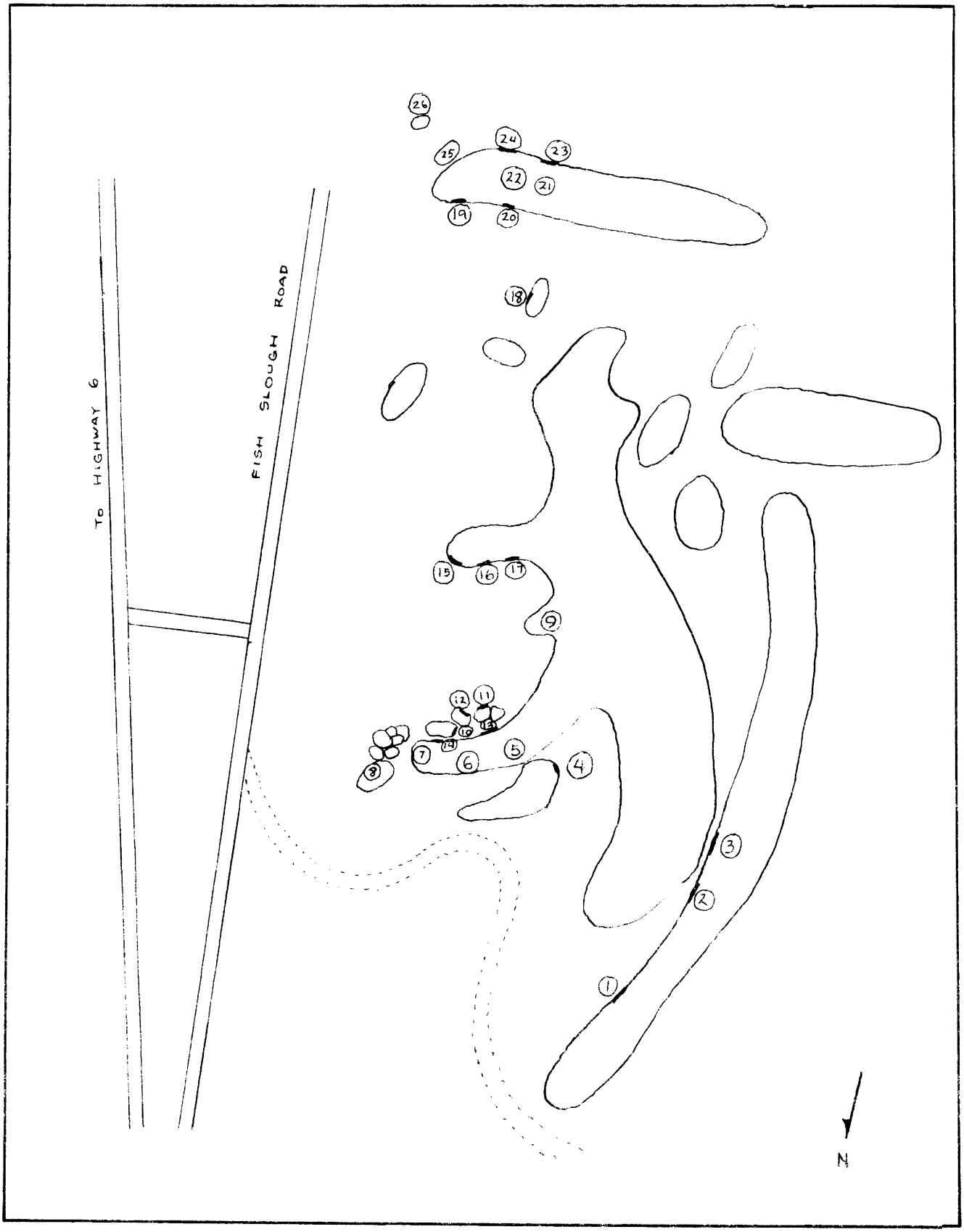
The dry wash in front of this site originates twenty miles to the north and ends at Owens River east of Chalk Bluff. Mno-7 is at the southern end of the wintering grounds for herds from the Mammoth Pass-June Lake areas. From here the feeding grounds extend northward to Benton and then northeastward through Truman Meadows into southern Mineral County, Nevada.

There is evidence of an Indian occupation site on the east side of the dry wash, slightly south of the petroglyph area. Obsidian and stone artifacts have been gathered on this sandy plain by local collectors.

Mno-8

From atop the highest point at Mno-8, site Mno-5 can be seen four miles to the south.

Of the twenty-six separate petroglyph groups at Mno-8, six face to the south, five to the north, five to the east, two are oriented to the west, and eight are on top of boulders. An aerial view shows that the facings are not as arbitrary as this description suggests. Two long outcroppings flank the north and south ends of a large, irregularly shaped block. Small coves are formed along the east wall of the central rock; these were perhaps used as animal traps. On the walls and on random



MAP 3

Locations of Groups of Elements at Mno-8

boulders which face them, petroglyphs occur. If a north-south line were drawn through the center of the site, all the petroglyphs would be found on the east side of the line. Whatever direction one faces within the petroglyph area, one is confronted by one or more of the design groups.

The distribution of glyphs at Mno-8 is similar to that at Iny-210, and both sites were probably used by aborigines hunting in the winter feeding grounds of Sierran herds. No known major game trails pass Mno-8, which probably served as a winter ambush spot. Occupational evidence consists merely of widely scattered obsidian spalls.

The petroglyphs (Figs. 36k-p; 37; 38; 39a-c) show considerable superimposition of the Rectilinear style on Curvilinear forms, and Representational figures placed over Rectilinear (e.g. Fig. 37g).

The three small circles at the bottom of Figure 37a are much older than the companion elements, the lines being eroded to a depth of three-quarters of an inch.

The antlers on the animal shown in Figure 37f, upper left, are apparently those of a deer and contrast boldly with those on the other figures. Similar distinctions are also noted at Iny-267, Iny-398, and Mno-5.

The "ladder, one pole" design seen at Mno-8 (similar to that shown in Fig. 37g) is the largest vertical rectilinear petroglyph observed in Owens Valley, measuring over 6 feet in height. It is not so unusual to see long rectilinear lines bisecting a petroglyph face (as at Iny-278, Fig. 20a; Iny-363, Fig. 21a) for most rectilinear styled glyphs are conceived along horizontal planes rather than vertical ones. Curvilinear designs often aspire to a vertical orientation, but it is unusual to observe a rectilinear glyph created in this direction.

The elements shown in Figure 37k are completely revarnished, and are noticeable only when shadows are cast into the grooved lines. Many elements and even whole facings could not be recorded at this site because of indistinct eroded or varnished lines and confused superimposition of designs. This problem was also encountered at Mno-5.

The hand and paw prints shown in Figures 38h-l and 39a-c are on the sides and top of flanking cylindrical rocks on the southern edge of the site.

Though Steward numbers this site as 35 Pt, his photographs show it to be also his 36 Pt.

Mno-66

This site, which contains a single, crudely executed petroglyph, is one-half mile south of Mno-8, on the east side of a draw (Fig. 39d). The glyph is primarily a series of short lines formed in the Rectilinear style. This site is referred to as Mno-191 by Meighan (1955).

Mno-421

On the Casa Diablo volcanic tableland, eight miles north of the Owens River and west of Mno-5 and Mno-6, are several sites located in a series of gullies. These cut the tableland along northwest to southeast lines, sloping from Chidago Canyon to Fish Slough and the Owens River. Part of the herds from southern Mono and northern Inyo counties cross the tableland during fall and spring migrations.

Mno-421 (Figs. 39e-i; 40a-f) is situated in a gully 15 feet deep and 15 feet wide, which cuts through the west side of a knoll. Along the gully is a large outcropping of sandstone and tuff. Boulders around the outcropping form an occupation shelter; bedrock mortars and metates, pits, and obsidian chippings are present. Three nearby cave sites, formed in tuff, also show evidence of occupational usage.

Throughout the area large tanks in sandstone boulders assure a constant water supply in this springless region of tableland. One such tank, popularly known as "soup pot," has been in use in recent years by shepherds moving their flocks northward. A large flat stone covers this two hundred gallon tank. On the underside of the heavy lid is inscribed "Indigo, 1913. Soup pot water Inyo Co USA God Trust This Water Here."

Figure 39e shows the most westerly of the petroglyphs at Mno-421, found on the south rim of the gully.

Fifty-five feet to the east, on the same side of the gully, is a tuff cave measuring nearly 6 feet high and 10 feet wide. On the west wall are the petroglyphs shown in Figure 39h. These elements are quite eroded by sand-bearing winds. The recess extends about 5 feet into the gully wall. Figure 39i shows petroglyphs on the rear of the cave, and Figure 40a depicts the elements found on the east wall. The heavy black lines in the recordings indicate the presence of red pigment. Outside the cave, on the east side of the entrance, is a small group of designs (Fig. 39g).

Across the gully from the cave is a small isolated petroglyph (Fig. 40b). Ten feet farther east is a series of individual designs

(Fig. 40c-f). Again, the heavy blacked areas shown in Figure 40f indicate red paint. Twenty-five feet farther on is the last petroglyph group at Mno-421. These elements are on the north side of the gully, between 2 and 6 feet above the dry creek bed (Fig. 39f).

Mno-548

Three hundred feet northwest of Mno-421, on the north wall of the gully, is a small group of badly eroded glyphs (Fig. 40j).

Mno-549

One hundred feet southwest of Mno-421, on the opposite side of the gully, is a small, oblique rock shelter. A large boulder hides the entrance from view. On the boulder is a petroglyph and an indistinct red pictograph (Fig. 40k). The capstone on the rock shelter contains three additional designs (Fig. 40l).

A random boulder fallen into the creek bed 20 feet northeast of the rock shelter shows five faint parallel lines (Fig. 40m).

Mno-550

Six-tenths of a mile south of Mno-8, on the east side of Fish Slough Road, is a small petroglyph group which faces a dry wash farther to the east (Fig. 40n). The peck marks in these curvilinear designs are crudely executed and indicate that they were formed by repeated blows with a single hammerstone.

Mno-551

Truman Meadow, on the California-Nevada border three miles north of Highway 6, is in the northern portion of the winter feeding ground for deer herds in southern Mono and northern Inyo counties. The meadow is one-quarter mile long and 200 yards across, surrounded by heavy stands of piñon.

Two miles southwest of the meadow is an extensive area where obsidian nodules were collected. Cracked boulders and large flakes of obsidian extend over a two square mile area. A random sampling at this site supplied 147 large flakes from a 10 by 10 foot surface area. Each flake is of sufficient size to fashion at least a 2 inch projectile point blank. Small chippings were few, indicating that this site was primarily used for obtaining the raw material from which to manufacture tools.

On the south side of the trail, at the narrow entrance to Truman Meadow, is a basalt block on which is seen a small group of pictographs (Fig. 40o).

Mno-552

Three hundred feet northwest of Mno-550 is a rock shelter formed by one large boulder leaning over another, blocked at the rear by several small stones. A low wall extends diagonally across the entrance. On top of the two large boulders which form the shelter are depressions capable of holding about fifty gallons of water each.

The shelter is along the same gully system as Mno-550, but in a tributary which branches northward. Mno-552 is on the east rim. A shallow recess at the base of the boulder which forms the right wall of the shelter contains a few complex glyphs (Fig. 40h). The rear of the shelter holds a single petroglyph (Fig. 40i).

The walls inside the shelter are blackened with soot, and the floor is sand mixed with charcoal. Ash pits penetrate into the floor to a depth of almost 24 inches, and contain a few tuff hearth stones.

North of the shelter is a jumble of boulders, the uppermost of which shows a petroglyph similar to the one outside the rock shelter (Fig. 40g). Red pigment partially fills the grooves.

This completes the descriptions of the forty-four sites recorded in Owens Valley. While there are many more petroglyph sites in Inyo and Mono counties listed in the files of the University of California Archaeological Research Facility, these are located principally outside the main area of Owens Valley, especially in northern Mono County and the eastern deserts of Inyo County. While it would have been desirable to include these and thus make available a full report on the petrography of the two counties, time did not permit more extensive research. However, the above sites do represent the total petroglyph universe known in Owens Valley itself.

DESCRIPTION AND DISTRIBUTION OF ELEMENTS

The petroglyph population within the Owens Valley universe is categorized by styles. The most basic style observed here, as throughout the Great Basin, was named the Great Basin Abstract Curvilinear Style by Heizer and Baumhoff (1962). They also established that this style predated the Great Basin Abstract Rectilinear and the Great Basin Abstract Representational styles. Within these three styles, seventy-seven different designs or elements were observed in Owens Valley. Thirty of these belong to the Curvilinear style, thirty-two belong to the Rectilinear style, and fifteen belong to the Representational style. Each of the different kinds of elements under each style is described below, and the sites where each element is present are listed. As discussed in the section on Tables and Correlation of Elements and Sites, the presence or absence of each element at each site is of greater significance than the number of times each element appears at any site. Thus the presence of an element is of qualitative significance while the repetition of an element within any one site is not. Also, as discussed in the above mentioned section, there is a significance in the differentiation between the southern and northern sectors of Owens Valley. As shown in Map 1, the line that divides these sectors lies halfway between Bishop and Big Pine.

Elements in the Curvilinear Style (an example of the element described is indicated following classification)

1. Amoeba (Fig. 4e): This design, which resembles the general shape of the amoeba, occurs only in the southern sites of Iny-208, Iny-210, and Iny-393.

2. Arc Form Conjoined (Fig. 37b): This element is found only at the northern site of Mno-8, and appears as two crescents backed together.

3. Circle (Fig. 3a): The circle is the most basic of the curvilinear styled elements. Most of the other elements in this style are mere elaborations on the circle. This design is usually four to six inches in diameter. Though most of the circles are well drawn, there is a tendency for them to be slightly elongated along vertical planes. In the south this element is observed at Iny-181, Iny-208, Iny-210, Iny-269, Iny-270, Iny-389, Iny-390, Iny-395, and Iny-396. In the northern sector the circle is shown at Iny-259, Iny-267, Iny-278, Iny-363, Iny-398, Iny-436, Mno-4, Mno-5, Mno-6, Mno-7, Mno-8, Mno-421, Mno-550, and Mno-551.

4. Circle Bisected (Fig. 4a): This element is basically a circle with an inner line drawn from one perimeter side to the other. In some

cases, however, the line does not fully cross the inner part of the circle, and in a few instances it extends beyond the perimeter. The lines tend toward a vertical orientation. In the south this element is present at Iny-205, Iny-208, Iny-210, Iny-269, Iny-270, Iny-272, Iny-388, Iny-389, Iny-390, and Iny-396. In the north it is at Iny-267, Iny-268, Iny-278, Iny-363, Iny-398, Mno-4, Mno-5, Mno-6, Mno-7, Mno-8, Mno-421, Mno-550, and Mno-551.

5. Circle Chain (Fig. 1d): Two or more contiguous circles arranged in a horizontal or vertical sequence form this element. In the south the circle chain is at Iny-208, Iny-269, Iny-272, Iny-388, Iny-389, Iny-390, Iny-393, Iny-395, Iny-396. In the north it is present at Iny-259, Iny-267, Iny-363, Mno-4, Mno-5, Mno-8, Mno-421, and Mno-550.

6. Circle Cluster (Fig. 1d): There are several variations of this design which do not seem to be different in kind, so they have been grouped under the same label. Basically the element is composed of a group of circles gathered together, as a bunch of grapes. Some of the clusters contain a dozen circles, others only a few. In the southern sector they are present at Iny-28, Iny-208, Iny-269, Iny-270, Iny-272, Iny-389, Iny-390, Iny-393, Iny-396; and in the north at Iny-267, Iny-363, Iny-398, Mno-4, Mno-6, Mno-8, Mno-421, and Mno-550.

7. Circle Complex (Fig. 22e): As with the circle cluster, there are several variations in this design. It is primarily based upon a circle, and has inner lines which form differing patterns, such as a series of parallel straight or curved lines. Only two of these elements were observed in the south, at Iny-270 and Iny-396, but in the north they were seen at Iny-267, Iny-334, Iny-363, Iny-398, Mno-4, Mno-5, Mno-7, Mno-8, Mno-421, and Mno-551.

8. Circle Concentric (Fig. 20e): Two or more inner circles within a circle form a concentric pattern to make up this element. In the southern sector they are at Iny-28, Iny-38, Iny-198, Iny-208, Iny-269, Iny-270, Iny-272, Iny-389, Iny-390, Iny-396; and in the north at Iny-259, Iny-267, Iny-268, Iny-278, Iny-334, Iny-363, Iny-398, Mno-4, Mno-5, Mno-6, Mno-7, Mno-8, Mno-421, Mno-550, and Mno-551.

9. Circle Concentric Spoked (Fig. 32a): The element here is composed of a concentric circle with a series of three or more lines radiating from the hub to the perimeter. It was observed in the south at Iny-269, Iny-396; and in the north at Iny-259, Iny-268, Iny-363, Mno-5, Mno-7, Mno-8, and Mno-543.

10. Circle Connected (Fig. 37d): This element resembles the Circle Chain (Element No. 5) except that circles in this design are connected by lines rather than by contact with one another. Three or more circles make this element; two would be a Dumbbell (Element No. 16). Seen in the south

at Iny-269, Iny-270, Iny-272, Iny-388, Iny-389, Iny-390, Iny-393, Iny-396; and in the north at Iny-259, Iny-267, Iny-363, Mno-4, Mno-5, Mno-8, Mno-66, Mno-421, and Mno-552.

11. Circle Horned (Fig. 32a): A simple circle with two short lines extending from the upper portion of the perimeter establishes this element. It is displayed at two sites in the south: Iny-38 and Iny-388. In the north it is present at Mno-4, Mno-5, Mno-7, and Mno-8.

12. Circle Spoked (Fig. 34l): The basic part of this element is the circle, with three or more "spokes" extending from the hub to the perimeter. In the south they were observed at Iny-210, Iny-269, Iny-270, Iny-389, Iny-390, Iny-393, and Iny-396. In the north they were displayed at sites Iny-259, Iny-267, Iny-278, Iny-363, Mno-5, Mno-6, Mno-7, Mno-8, and Mno-421.

13. Circle Tailed (Fig. 1c): This element is a simple circle to which is attached a straight or curving line which extends from the bottom portion of the element. It is found in more than seventy-five per cent of the Owens Valley sites. In the south: Iny-28, Iny-38, Iny-181, Iny-198, Iny-205, Iny-208, Iny-210, Iny-269, Iny-270, Iny-272, Iny-388, Iny-389, Iny-390, Iny-393, Iny-395, Iny-396; in the north: Iny-259, Iny-267, Iny-278, Iny-334, Iny-363, Iny-398, Mno-4, Mno-5, Mno-7, Mno-8, Mno-66, Mno-421, Mno-550, and Mno-552.

14. Circle with Bar (Fig. 8g): One circle with a line extending through two sides of the perimeter make up this element. The Dumbbell (Element No. 16) and Circle Connected (Element No. 10) are extensions of this basic element. Found in the south at Iny-269, Iny-395, and Iny-396; in the north at Iny-259, Iny-267, Mno-7, and Mno-550.

15. Circle with Dot (Fig. 32a): This element is a simple circle with a dot in the center. It is seen in the southern sector at Iny-208, Iny-269, Iny-270, and Iny-396; in the northern sector at Iny-267, Iny-363, Mno-4, Mno-7, and Mno-8.

16. Dumbbell (Fig. 17k): Two circles connected by a bar form this design. Displayed in the south at Iny-38, Iny-208, Iny-269, Iny-272, Iny-388, Iny-389, and Iny-396; in the north at Iny-267, Iny-334, Iny-398, Mno-4, Mno-5, Mno-6, Mno-7, Mno-8, and Mno-550.

17. Form Indefinite (Fig. 29h): This is a Curvilinear style design which takes no particular shape; the continuous line from which it is made does not cross itself during its meander. None were observed in the southern sector; in the north they were seen at Iny-398 and Iny-551.

18. Grid Oval (Fig. 5i): In this element two or more intersecting lines within an oval design end at the perimeter, or two or more lines

parallel each other within the oval. In the south these were seen at Iny-208, Iny-210, Iny-269, Iny-270, Iny-272, Iny-388, Iny-389, Iny-395, and Iny-396; in the north at Iny-267, Iny-334, Iny-363, Iny-398, Iny-400, Mno-4, Mno-5, Mno-6, Mno-7, Mno-8, Mno-421, and Mno-549.

19. Lines Parallel Curved (Fig. 8d): Usually the lines in this curving design are less than twelve inches in length. Two lines are usually the basis for this design, though as many as five have been observed. Present in the south at Iny-28 and Iny-210; in the north at Iny-267, Iny-363, Iny-398, Mno-5, Mno-7, Mno-8, Mno-421, and Mno-548.

20. Lines Parallel Wavy (Fig. 2o): Unlike the element above, here the lines form two or more reversing curves; like the element above, two identical lines parallel to each other form the basic design. Only one such design was seen in the south, at Iny-198. In the north there were two sites where they appeared: Iny-437 and Iny-550.

21. Lines Wavy (Fig. 2q): This element is composed of a single wavy line, usually less than twelve inches in length. In the south at Iny-198, Iny-208, Iny-210, Iny-269, Iny-270, Iny-272, Iny-388, Iny-389, Iny-390, Iny-393, Iny-395, and Iny-396; in the north at Iny-259, Iny-267, Iny-278, Iny-363, Iny-398, Mno-4, Mno-5, Mno-7, Mno-8, Mno-421, Mno-548, and Mno-552.

22. Curvilinear Meander (Fig. 13o): This is the most complex element of all indefinite shapes within the Curvilinear style. It is composed of many lines wandering indiscriminately over a rock surface, intersecting one another, and generally ending against another line and so forming a closed or semi-closed design. Seen in the south at Iny-269, Iny-270, Iny-272, Iny-396; in the north at Iny-259, Iny-267, Iny-278, Iny-398, Mno-5, and Mno-8.

23. Oval Blocked (Fig. 6b): This rare element is primarily an oval or circle which is divided into areas by lines, some of which are pecked solid and form a blocked design encircled by an oval. In the southern sector it is seen only at Iny-210 and Iny-269, and is entirely absent in the northern sector.

24. Pelt (Fig. 4d): This design, which is common in pictograph form west of the Sierras (Fenenga 1960), is rare in Owens Valley. The design resembles an animal pelt which has been hung upon a wall. In the southern sector it is observed only at Iny-208, in the northern sector at Mno-8.

25. Plant Form, Abstract: Another rare Curvilinear design, this element resembles a form of unrecognizable plant. It was recorded only at the northern site of Iny-267.

26. Pits (Fig. 1f): Part of the Pit-and-Groove style, which antedates the petroglyph styles described herein, the pits occur more frequently than do the grooves. Pits are most frequently found in northeastern California (Fenenga 1960), but are also widely distributed in California and Nevada (Heizer and Elsasser 1953; Heizer and Baumhoff 1962). They are usually about two inches in diameter and about one-half inch in depth. Variations are found, however, in which the pits are as much as twelve inches across. In the southern sector these occur at Iny-38, Iny-210, Iny-269, Iny-270, Iny-392, Iny-397; in the northern sector at Iny-267 and Iny-278. The number of individual pits varies from sixteen at Iny-38 to one hundred and thirty-seven at Iny-269.

27. Rake Convoluted (Fig. 34m): This element resembles a rake with four to eight spikes, but is drawn in outline form by one continuous line. Found in the south at Iny-208, Iny-210, Iny-269, Iny-270, Iny-272, and Iny-396; in the north at Iny-267, Iny-363, Iny-399, Iny-400, Mno-4, Mno-7, and Mno-421.

28. Spiral (Fig. 32a): A continuous line is also used in this element which usually spirals in a clockwise movement from the center. It appears in the southern sector at Iny-210 and Iny-389; in the northern sector at Iny-267, Iny-334, Iny-363, and Mno-5.

29. Spread Eagle: Another rare design, this abstract form which resembles an eagle with spread wings occurs only in the southern sites of Iny-210, Iny-270, and Iny-272.

30. Sun Disc (Fig. 19b): Often called a "sunburst," this element does remind one of popular concepts of the sun. The usual design for the element is a circle with lines radiating around the outside from the perimeter. Found in the south at Iny-210, Iny-269, Iny-270, Iny-272, Iny-388, Iny-390, Iny-393, and Iny-396; in the north at Iny-259, Iny-278, Iny-334, Iny-363, Iny-398, Mno-4, Mno-5, Mno-7, Mno-8, Mno-549, and Mno-552.

Elements in the Rectilinear Style

31. Arrow (Fig. 37a): This element is shown as an arrow by itself; the arrows seen in the more complex Representational element of a man-with-a-bow-and-arrow are not included in this category. This element does not occur in the southern sector, and is seen in the northern sector only at Mno-5 and Mno-8.

32. Asterisk (Fig. 12k): This element is like the Circle Spoked (Element No. 12) without the circle. It appears in the south at Iny-269, Iny-272, and Iny-396; in the north at Iny-267, Iny-268, Mno-7, and Mno-8.

33. Bird Track (Fig. 36j): Bird tracks, resembling the letter "Y" are found primarily in the northern sector. They were observed in only two southern sites: Iny-269 and Iny-389; in the north they were seen at Iny-267, Iny-268, Iny-278, Iny-363, Mno-4, Mno-5, Mno-7, Mno-8, and Mno-421.

34. Chevron (Fig. 36h): A sequence of "V" shapes above one another form this design. This element is found in the southern sector at sites Iny-208, Iny-269, Iny-270, Iny-389, and Iny-396; in the northern sector at Iny-267, Iny-363, Mno-4, Mno-5, Mno-7, Mno-66, and Mno-421.

35. Cross (Fig. 18i): This element, which correlates with the circle in a +70 level of significance, has a broad distribution. In the southern sector it is found at Iny-181, Iny-208, Iny-210, Iny-269, Iny-270, Iny-272, Iny-389, Iny-395, and Iny-396; in the northern sector at Iny-259, Iny-267, Iny-334, Iny-363, Iny-398, Mno-4, Mno-5, Mno-7, Mno-8, Mno-421, and Mno-550.

36. Cross Hatch (Fig. 4b): While this unenclosed design is usually formed by oblique crosshatching, the lines sometimes form vertical and horizontal planes. In the southern sector this element is found at Iny-205, Iny-208, Iny-269, Iny-389, and Iny-396; in the northern sector at Iny-267, Iny-363, and Mno-7.

37. Dashes Radiating (Fig. 25c): Just as the Asterisk (Element No. 32) is like the Circle Spoked (Element No. 12) without the circle, so this element is like the Sun Disc (Element No. 30) without the sun. It occurs at only a few sites: in the southern sector at Iny-210, Iny-272, and Iny-394; in the northern sector at Iny-278, Iny-363, Iny-399, and Mno-8.

38. Diamond (Fig. 13a): This diamond-shaped element appears only in the southern sector, at Iny-269 and Iny-270.

39. Diamond Chain (Fig. 25c): A common design in western Sierra pictographs, this sequence of diamonds occurs in only one southern site, Iny-394, and one northern site, Mno-8.

40. Dots (Fig. 28l): One or more random placed dots form this element. When grouped the dots do not form a discerible pattern, unlike Elements Nos. 41 - 44. Observed in the south at Iny-269, Iny-270, Iny-272, and Iny-396; in the north at Iny-278, Iny-363, Mno-4, Mno-5, Mno-8, and Mno-550.

41. Dots Grouped (Fig. 28n): Dots which have been grouped into some form of pattern and which do not fit the characteristics of Elements Nos. 42 - 44 are in this category. Seen in the south at Iny-272 and Iny-396; in the north at Mno-5, Mno-8, and Mno-421.

42. Dots Continuous Rows (Fig. 33c): This element is composed of two or more rows of dots, paralleling each other. Seen in the southern sector at Iny-269; in the northern sector at Iny-398, Mno-5, and Mno-8.

43. Dots Continuous Series (Fig. 28r): Dots arranged along a generally straight line compose this element. Observed in the south at Iny-389, Iny-395, and Iny-396; in the north at Iny-278, Iny-334, Iny-363, Mno-4, Mno-5, Mno-7, and Mno-8.

44. Dots Linked (Fig. 15h): Dots which ordinarily would be classed as random but which are linked together by one or more lines are placed in this group. These appear in the south at Iny-210, Iny-269, and Iny-270; in the north at Mno-5 and Mno-550.

45. Grid Rectilinear (Fig. 11o): This element has its counterpart in the Curvilinear Style as the Grid Oval (Element No. 18). Instead of being enclosed in an ovular form, however, this element is enclosed in a rectangular form. In the south it appears at Iny-181, Iny-208, Iny-210, Iny-269, Iny-270, Iny-272, Iny-390, Iny-393, Iny-395, and Iny-396; in the north at Iny-267, Iny-278, Iny-363, Iny-398, Iny-401, Mno-5, Mno-7, and Mno-8.

46. Grooves (Fig. 20a): Though the Pit-and-Groove style is usually considered in combination, the relative rarity of grooves compared to pits in the Owens Valley region seems to necessitate a separate treatment. Grooves are found in the southern region at Iny-269 and Iny-270; in the northern, at Iny-278.

47. Ladder One Pole (Fig. 5i): A vertical line with several crossbars forms this element. It is found in the southern sector at Iny-210, Iny-269, Iny-270, Iny-272, Iny-388, and Iny-394; in the northern sector at Iny-398, Mno-7, Mno-8, and Mno-550.

48. Ladder Two Poles (Fig. 25g): Two vertical lines with connecting crossbars compose this design. It is located in the south at Iny-272, Iny-390, Iny-394, Iny-395, and Iny-396; in the north at only one site, Iny-267.

49. Line Straight (Fig. 29i): Straight lines unrelated to other lines are rare, but one appears in the northern sector, at Iny-398.

50. Lines Parallel Straight (Fig. 15a): A common element is formed by two or more straight lines paralleling each other. This element is a counterpart to the Curvilinear Lines Parallel Curved (Element No. 19) and Lines Parallel Wavy (Element No. 20). It appears at the southern sites of Iny-181, Iny-208, Iny-269, Iny-270, Iny-272, Iny-389, Iny-394, Iny-395, and Iny-396. In the northern sites it is seen at Iny-267, Iny-268, Iny-278, Iny-363, Iny-399, Mno-4, Mno-5, Mno-6, Mno-7, Mno-8, Mno-66, Mno-421, Mno-549, Mno-551, and Mno-552.

51. Line Zigzag (Fig. 19e): This Rectilinear element also has its counterpart in the Curvilinear design Lines Wavy (Element No. 21) and the Representational design of the Snake (Element No. 76). It is composed of a series of angular lines moving in a common direction. This is noticeably a northern design, being present in only two southern sites: Iny-269 and Iny-272. In the northern sector, however, it is seen at Iny-259, Iny-334, Mno-4, Mno-5, Mno-6, Mno-66, and Mno-548.

52. M Series (Fig. 18w): This element, as well as W T Series (Element No. 62), might be variations of the Line Zigzag (Element No. 51). One or more of the "M" designs are involved in this element. It is seen only in the southern sector, at Iny-208 and Iny-270.

53. Rectilinear Meander (Fig. 35b): This element also has its counterpart in the Curvilinear style, being a series of intersecting lines meandering over the face of a boulder, and usually joining to another line to form a quasi-enclosed design. These elements tend to become very complex and often form an element three feet or more in width and height. The distribution of the Rectilinear Meander is more limited than that of the Curvilinear Meander (Element No. 22). It is found at the southern sites of Iny-208 and Iny-270, and at the northern sites of Iny-398, Mno-4, and Mno-7.

54. Plant Form (Fig. 19h): This element resembles a tree or some other botanical form, and is basically composed of a vertical line with adjoining branches. It is not always clear that this element is distinct from the Ladder One Pole (Element No. 47) which at times also resembles a tree. Seen in the southern sector at Iny-210, Iny-270, Iny-272, Iny-388, Iny-389, and Iny-396; in the northern sector at Iny-268, Iny-278, Iny-363, Mno-5, Mno-7, Mno-8, Mno-421, and Mno-550.

55. Rain Symbol (Fig. 31c): This element appears basically to be like the Rake (Element No. 56) but has a parallel crossbar from which the spikes or teeth extend. Observed in the southern area at Iny-208, Iny-210, Iny-269, Iny-270, Iny-390, and Iny-396; in the northern area at Iny-267, Iny-268, Iny-278, Iny-363, Iny-398, Iny-400, Mno-4, Mno-5, Mno-6, Mno-7, Mno-8, and Mno-550.

56. Rake (Fig. 12o): This element resembles the Rain Symbol (Element No. 55) except that instead of having two crossbars this element has but one. Its wide distribution includes, in the southern sector, sites Iny-181, Iny-210, Iny-269, Iny-270, Iny-272, Iny-388, Iny-389, Iny-390, Iny-393, Iny-395, and Iny-396; in the northern sector, Iny-267, Iny-363, Iny-399, Iny-400, Mno-4, Mno-5, Mno-6, Mno-7, Mno-8, and Mno-421.

57. Rectangular Amorphous Pattern (Fig. 11k): This unstructured rectangular form has a counterpart in the Curvilinear Form Indefinite

(Element No. 17) though it has a much wider distribution. It is seen at the southern sites of Iny-208, Iny-269, Iny-270, Iny-272, Iny-389, Iny-393, Iny-395, and Iny-396; and at the northern sites of Iny-267, Mno-5, Mno-8, and Mno-552.

58. Rectangular Enclosed Design (Fig. 5j): This element contains within a rectangular form a variable design prepared from a series of straight lines, which does not correspond to the descriptive elements contained elsewhere within the Rectilinear Style. Found in the south at Iny-210, Iny-390, and Iny-396; in the north, at Mno-5 and Mno-8.

59. Tent (Fig. 39d): Shaped more like an umbrella tent, only one of these elements was observed in Owens Valley, at the northern site of Iny-421.

60. Triangle (Fig. 25o): This element, like the Diamond (Element No. 38) and Circle (Element No. 3) corresponds to the usually conceived shape brought to mind by its name. Only one was observed in the south, at Iny-396; in the north it occurs at Iny-278 and Mno-4.

61. Triangle Tailed (Fig. 31m): This element is like the Triangle (Element No. 60) with the addition of a short line extending from the middle of the base. This element has its counterpart, though not the same distribution, in the Circle Tailed (Element No. 13) in the Curvilinear Style. It is found only in the northern sites of Mno-4, Mno-5, and Mno-421.

62. W T Series (Fig. 29h): Only one of these designs was seen, in the northern site of Iny-398.

Elements in the Representational Style

63. Atlatl (Fig. 12j): It cannot be assumed that the atlatl was unimportant to the hunters of Owens Valley just because there are so few of these implements depicted in petrography. It was observed that few other means for hunting game were portrayed, such as bows and arrows. This element, composed of a straight line with a small circular knob at one end, is seen in the southern sites of Iny-38 and Iny-269, and in the northern site of Iny-363.

64. Biped (Fig. 26g): This element is usually rendered as an inverted "Y" with two feet. That it is symbolically a human figure is probable, but care was taken to leave off all distinct human characteristics. The design is seen in the southern sector at Iny-28, Iny-181, Iny-208, Iny-210, Iny-269, and Iny-396; in the northern sector at Iny-268, Iny-334, Iny-363, Mno-4, Mno-5, and Mno-8.

65. Deer (Fig. 12f): Animals drawn with sufficient care to distinguish between deer and sheep are not as common as the generalized animal shape. The figures that are clearly deer are not seen in southern sites, but do occur in the northern sites of Iny-267, Iny-398, Mno-5, and Mno-8.

66. Hands (Fig. 3e): The elements which could be distinguished as between hands and paws and feet are labeled as such. Hands are primarily seen in northern sites, at Iny-204, Iny-268, Iny-399, Mno-4, Mno-7, and Mno-8; in the south they were observed at Iny-270 and Iny-395.

67. Human Figure (Fig. 1b): This category distinguishes between the stick figure, which is obviously human, and the full-bodied human figure. Human figures shown in two-dimensional drawing are to be seen at the southern sites of Iny-28, Iny-181, Iny-205; and at the northern site of Iny-259.

68. Human Stick Figure (Fig. 4a): This figure, shown without a round head, is observed only in the southern sites of Iny-28, Iny-181, and Iny-205.

69. Human Stick Limbs (Fig. 8b): These drawings are characteristically of a stick with fingers or toes. In the southern sites they were observed at Iny-181 and Iny-395; in the north, only at Iny-259.

70. Human with Bow (Fig. 4a): Again in stick figure form, this element is rendered in profile. It can be seen only at the southern sites of Iny-205 and Iny-390.

71. Insect (Fig. 9c): It is possible that other figures pecked on rocks symbolize insects, but the only ones specifically recognized as such are included in this category. In the south they were noted at Iny-181 and Iny-393; in the north, at Iny-267.

72. Lizard (Fig. 20c): Characteristically drawn from the top view, the lizard is definitely recognized in the southern site of Iny-269, and in the northern site of Iny-334.

73. Mountain Sheep (Fig. 1g): Animal drawing seems to have become highly stylized in Owens Valley petrography, and it is possible that some of the full-bodied forms herein labeled mountain sheep were intended to typify some other species. Since some deer could be distinguished from the more stylized animals with two backward sweeping horns, the latter are being included in this category for the sake of placement. The mountain sheep form is found in both sectors of the Owens Valley. In the southern sector it is recorded at Iny-198, Iny-205, Iny-208, Iny-210, Iny-269, Iny-270, and Iny-388; in the northern sector it occurs at Iny-267, Mno-5, Mno-7, and Mno-8.

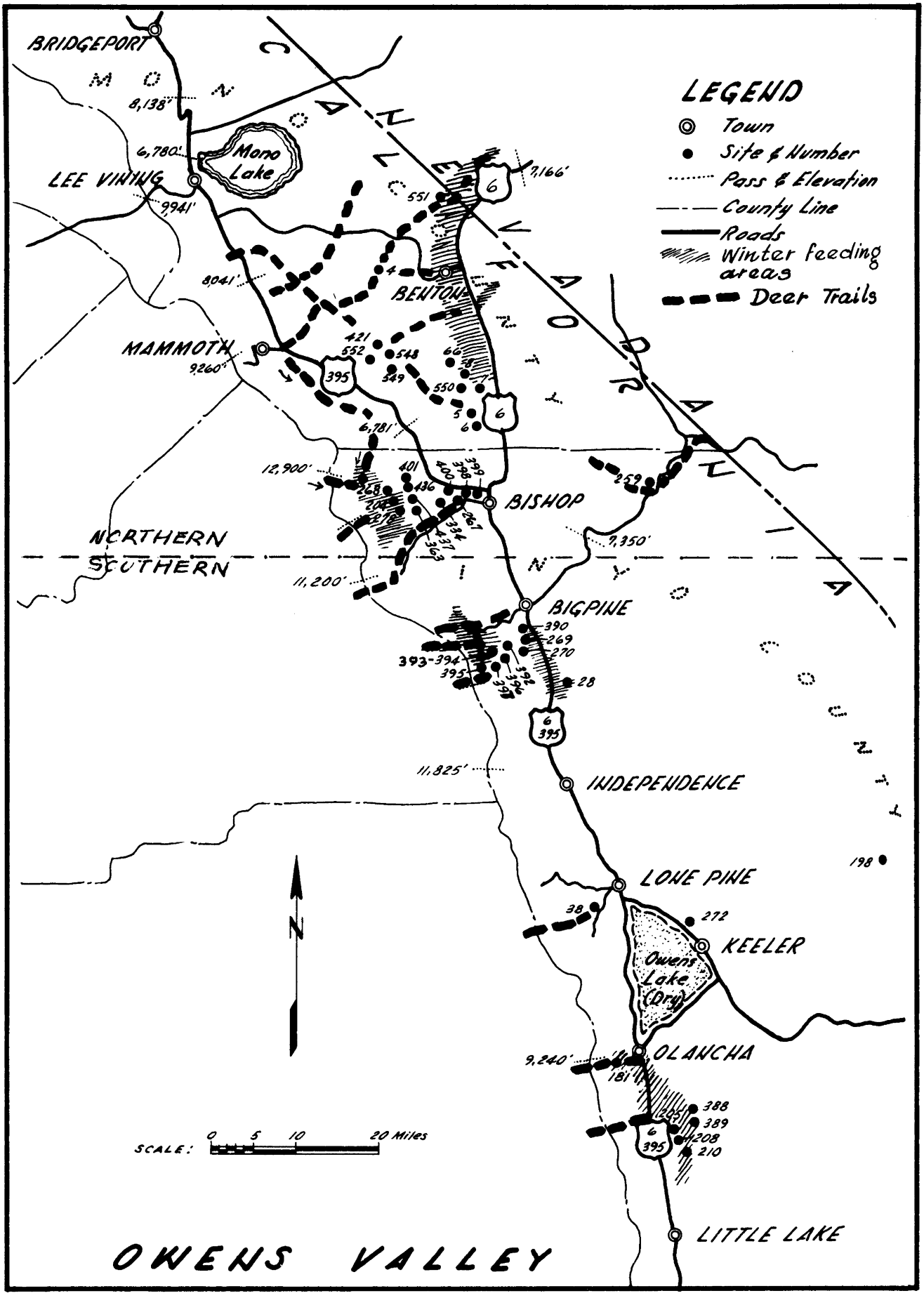
74. Paws (Fig. 39a): Paws are usually drawn with elongated palms and four short fingers or toes. While generally found in the northern sector, at sites Iny-204, Mno-4, Mno-7, and Mno-8, one set was observed at the southern site of Iny-396.

75. Quadruped (Fig. 4a): Animals which could not fit into either the Deer (Element No. 65) or Mountain Sheep (Element No. 73) categories are included here. In the south they occurred at Iny-205, Iny-208, Iny-210, Iny-388, and Iny-389; in the north at Iny-267, Iny-268, Mno-4, and Mno-8.

76. Snake (Fig. 1a): Of all the Representational elements this figure has the widest distribution. It is differentiated from the Lines Wavy (Element No. 21) by the inclusion of a "head" at one end. In the southern sector this figure was noted at Iny-28, Iny-208, Iny-269, Iny-270, Iny-272, Iny-388, Iny-390, and Iny-396; in the northern sector at Iny-267, Iny-334, Iny-363, Iny-399, Mno-4, Mno-5, Mno-6, Mno-7, Mno-8, and Mno-421.

77. Stick Figure (Fig. 3a): A stick form which did not fit into any of the Rectilinear or Representational figure groupings is included in this special category. Its diversity in appearance is great, but it generally conveys the impression that it "represents" something. This element is found in the southern sites of Iny-181, Iny-210, and Iny-388, and in the northern sites of Mno-4, Mno-5, Mno-7, and Mno-550.

The elements generally described above fit most of the forms Heizer and Baumhoff report in their Prehistoric Rock Art of Nevada and Eastern California (1962), and the reader could profit by a comparison of distribution of elements between Owens Valley and Nevada. It will be seen that a heavy concentration of Curvilinear glyphs occurs in the elbow of Nevada's western border, the area from which we believe an early penetration into Owens Valley must have come.



MAP 4

Sites, Deer Trails, Feeding Areas, etc., in Owens Valley

INDEX TO ILLUSTRATIONS

[Unless otherwise indicated a standard, unmarked scale representing one inch to one foot has been adopted]

INDEX TO ILLUSTRATIONS [cont'd.]

[Unless otherwise indicated a standard, unmarked scale representing one inch to one foot has been adopted]

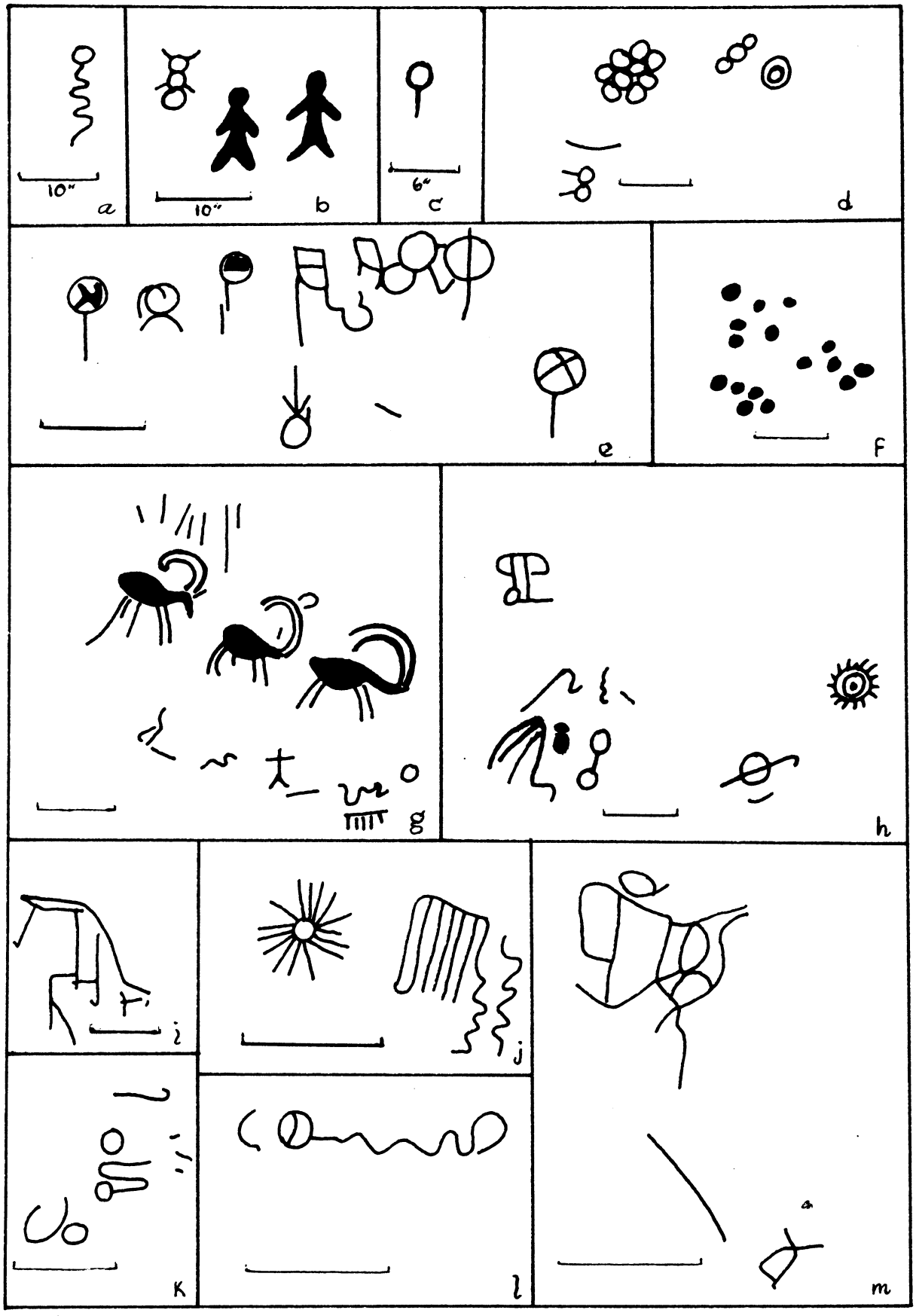


Figure 1

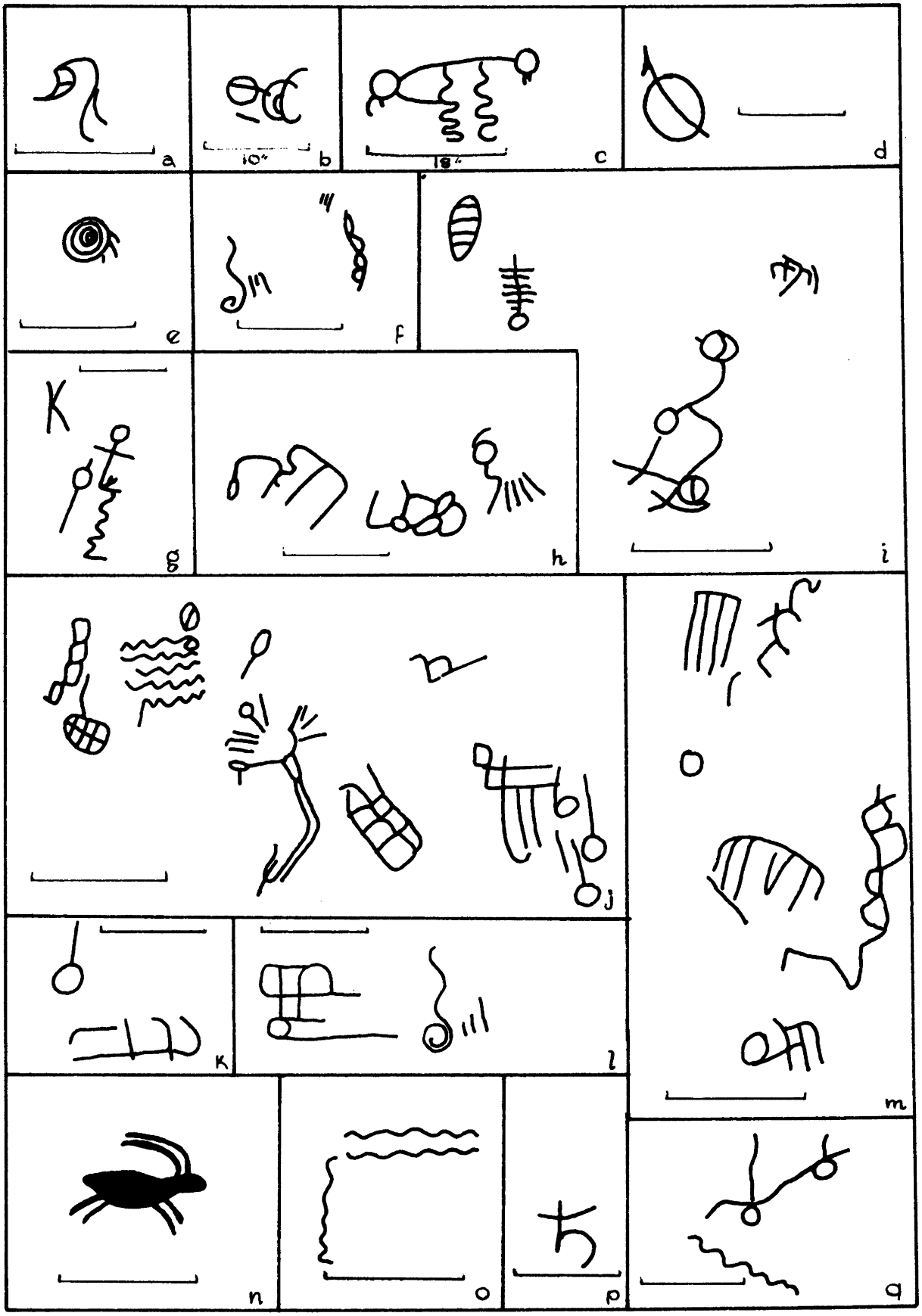


Figure 2

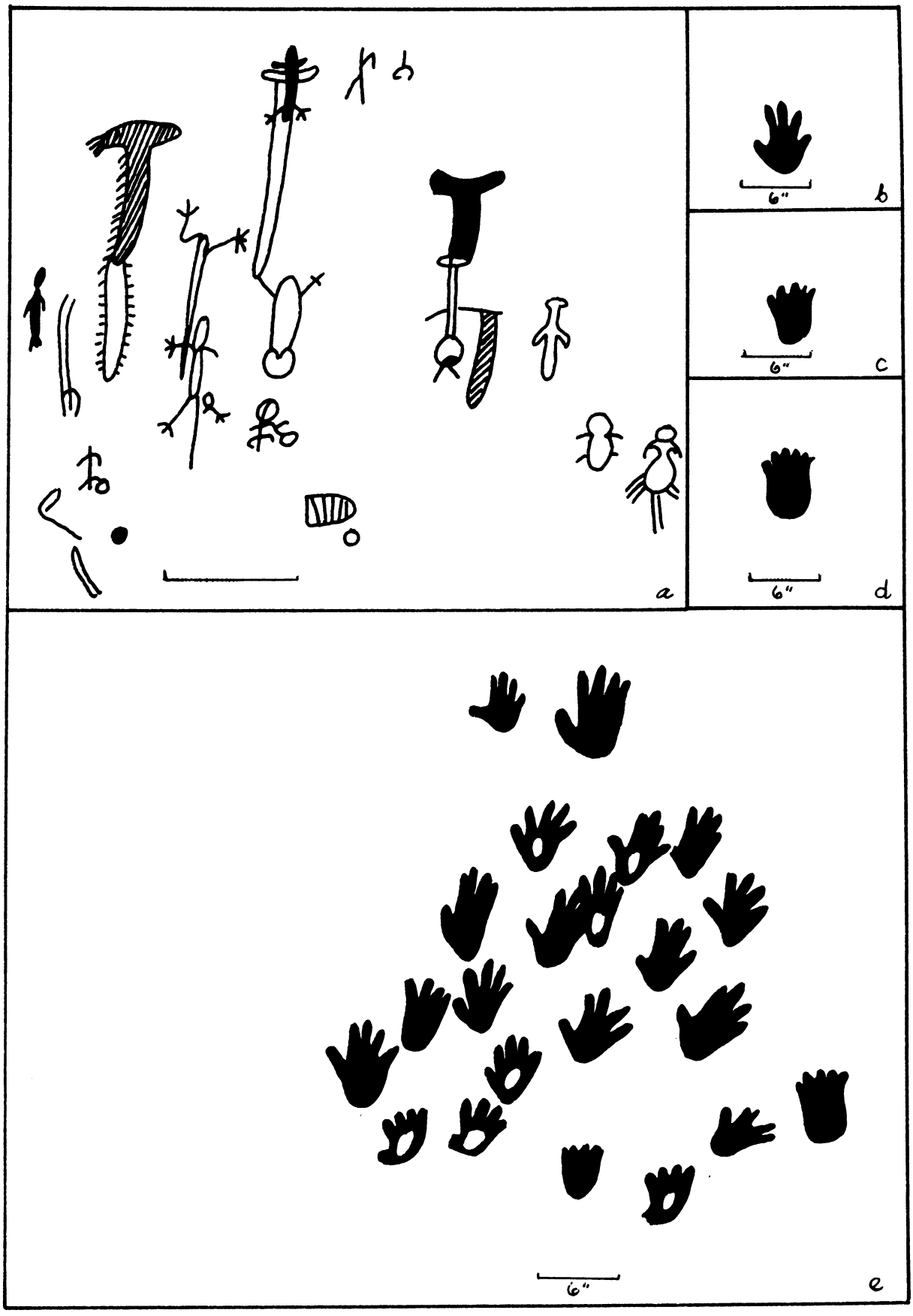


Figure 3

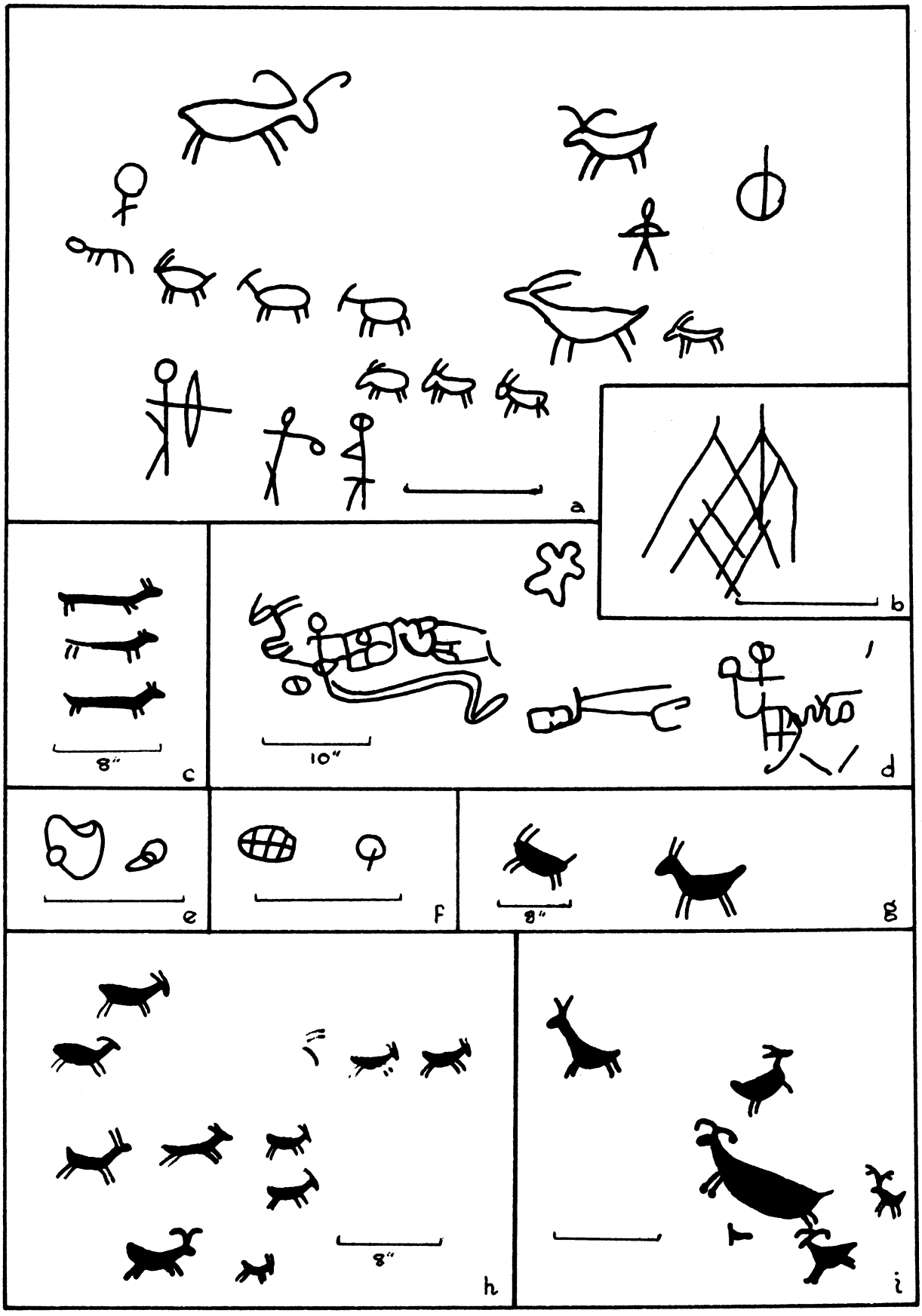


Figure 4

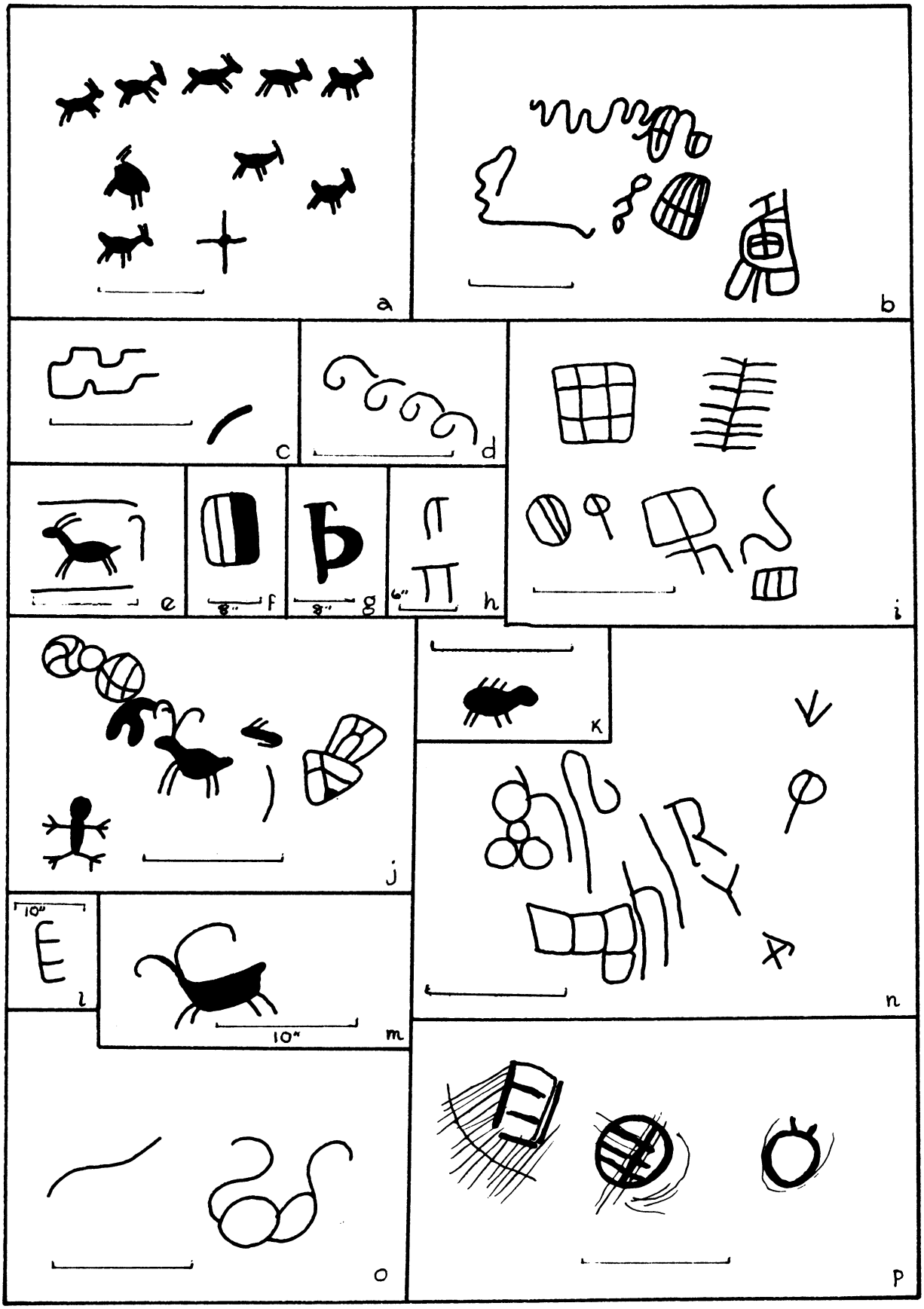


Figure 5

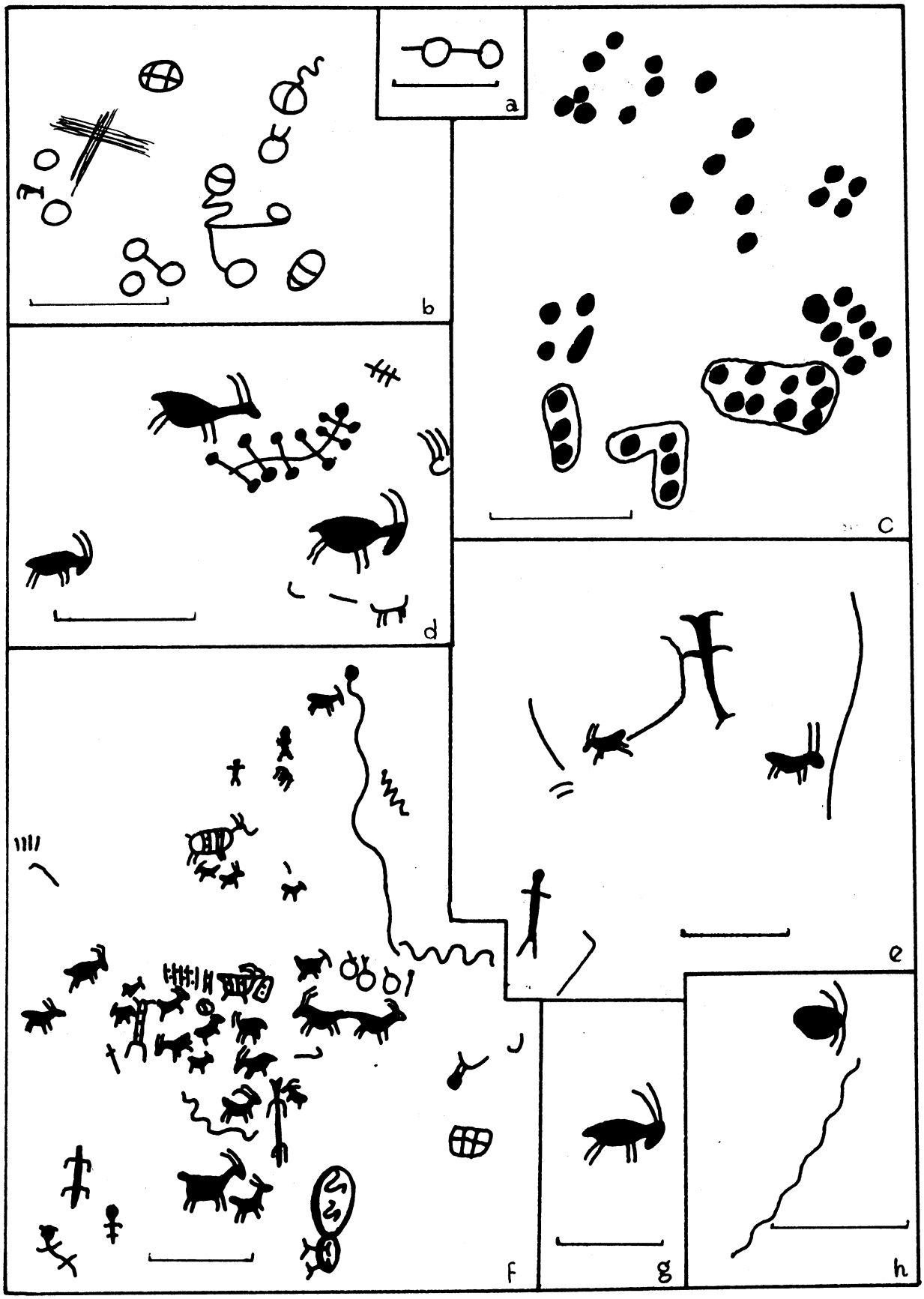


Figure 6

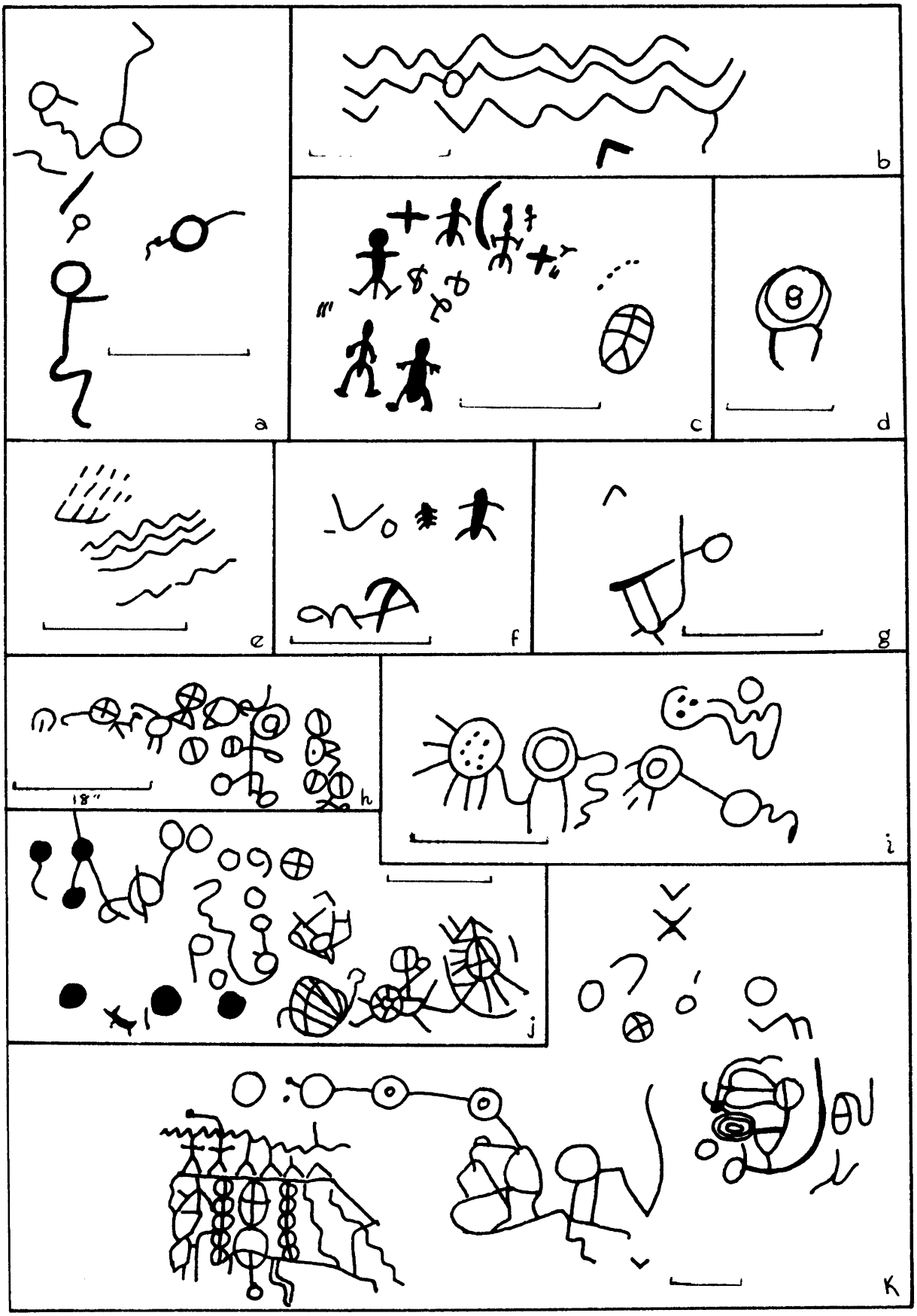


Figure 7

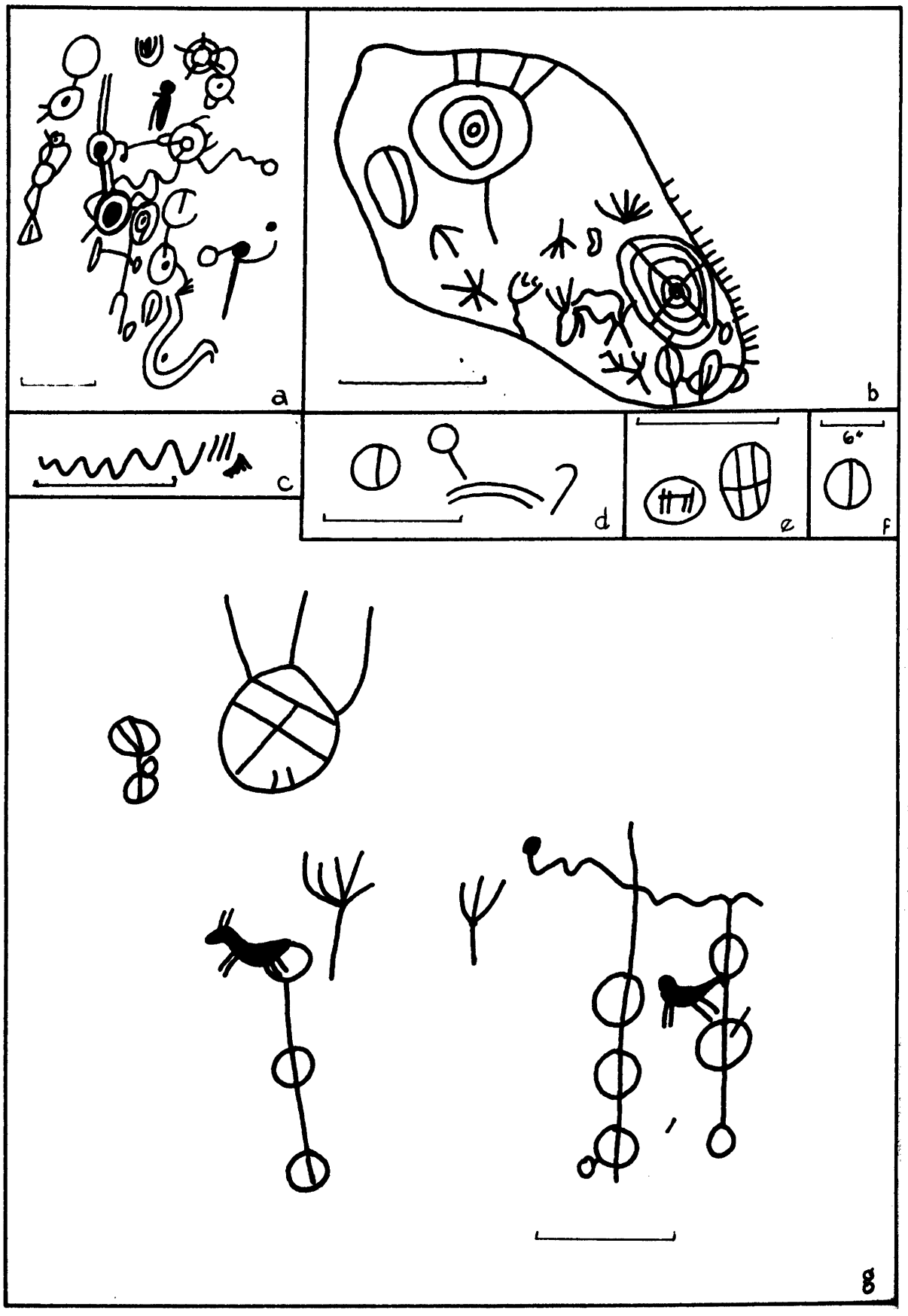


Figure 8

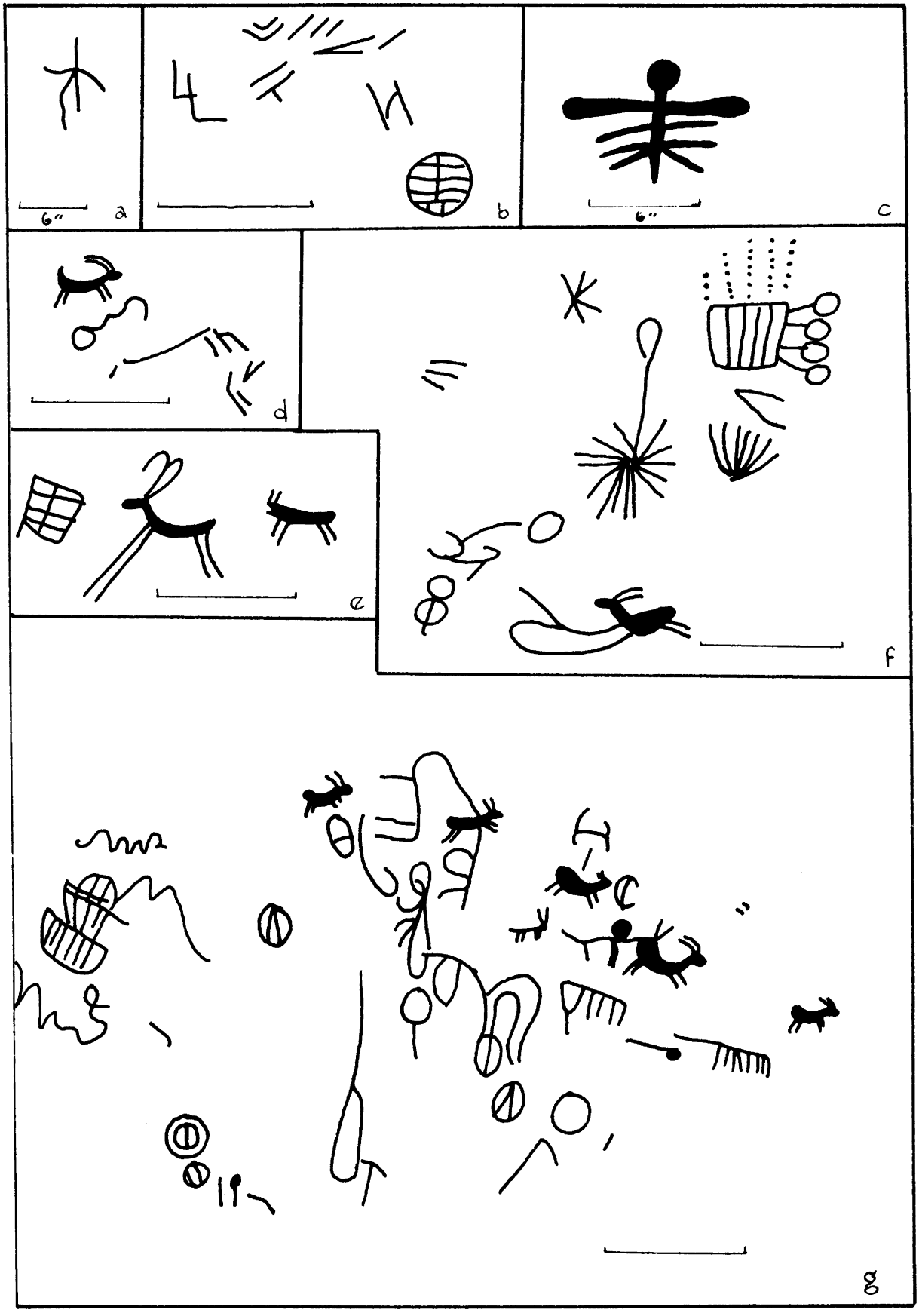


Figure 9

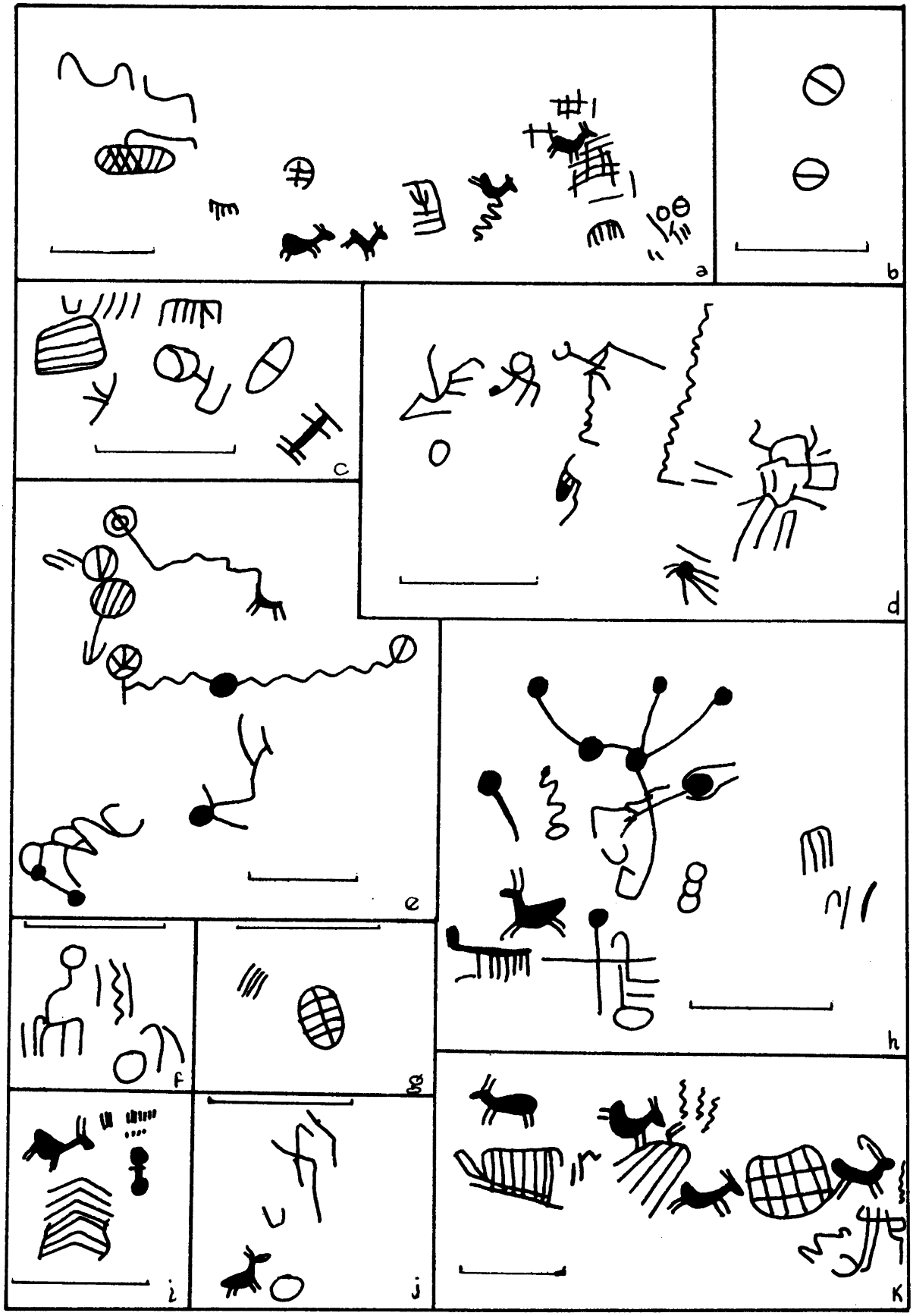


Figure 10

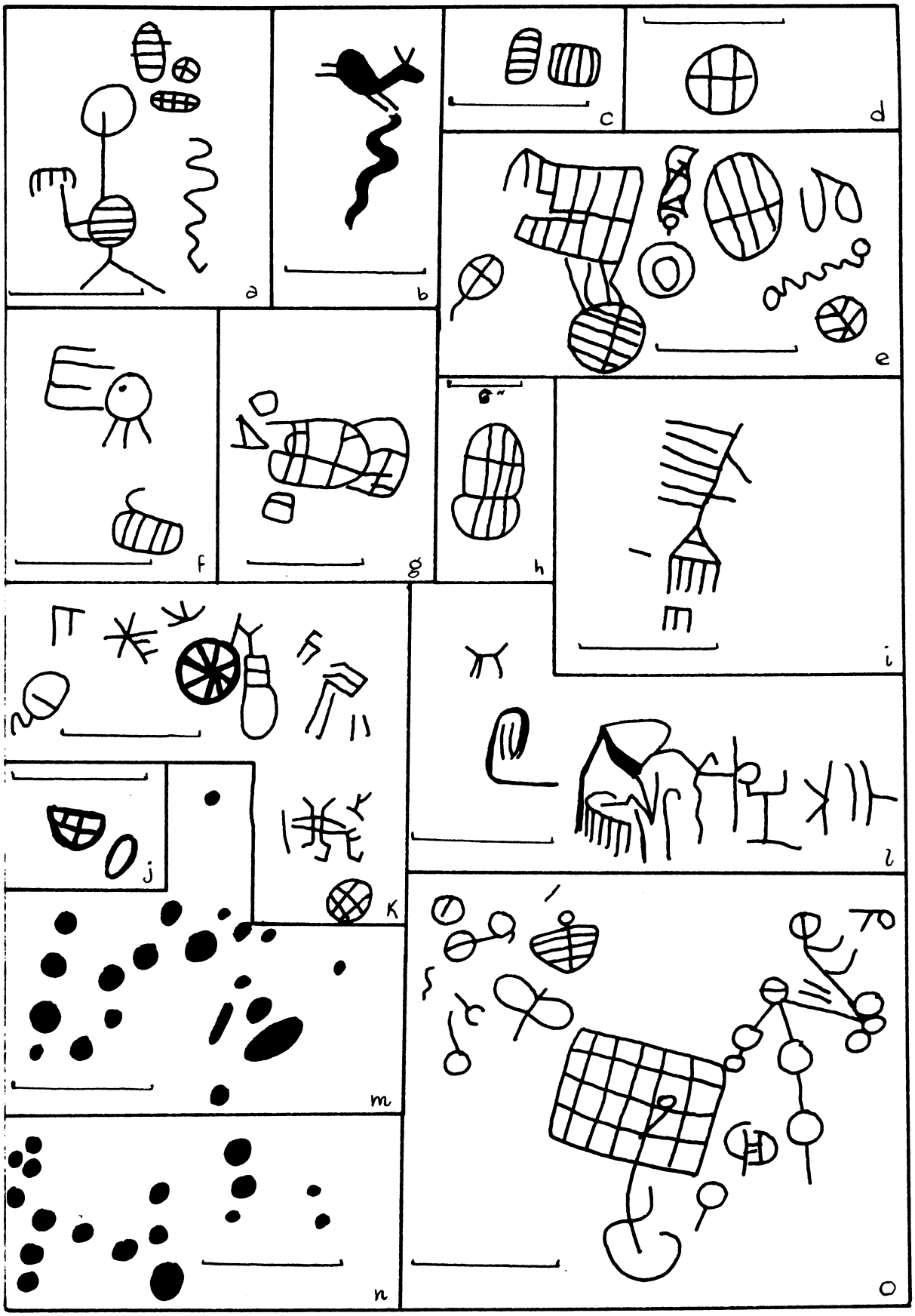


Figure 11

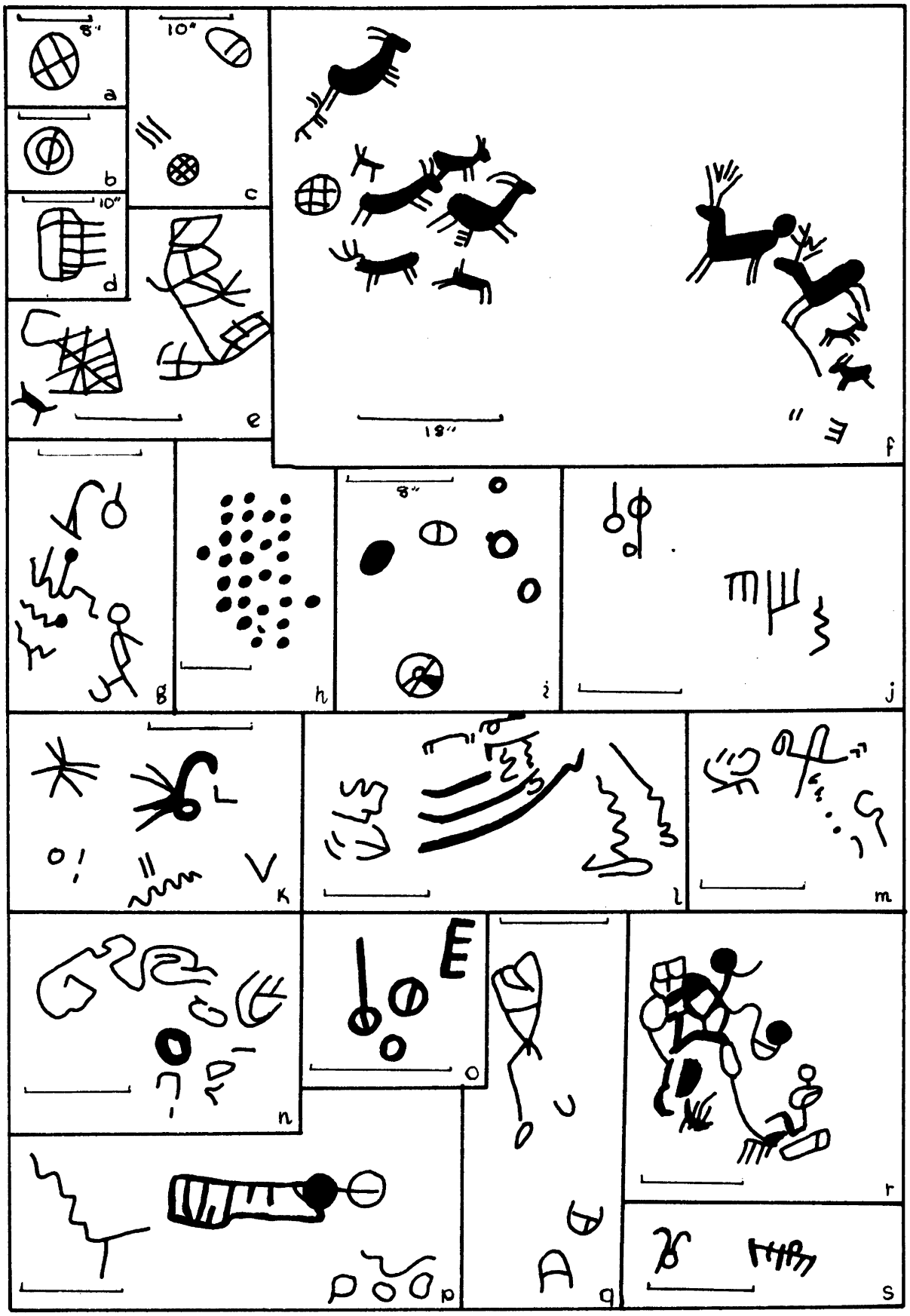


Figure 12

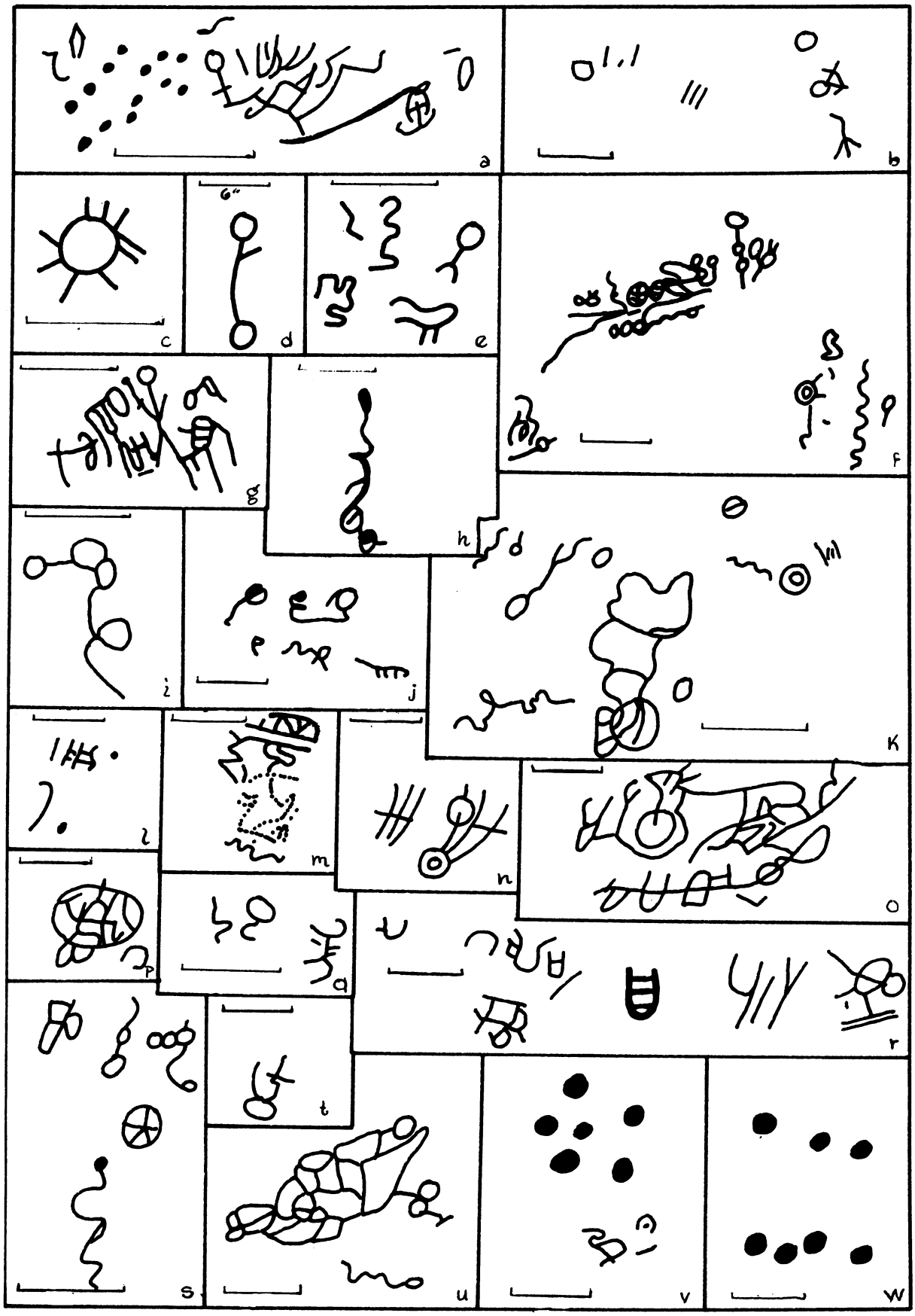


Figure 13

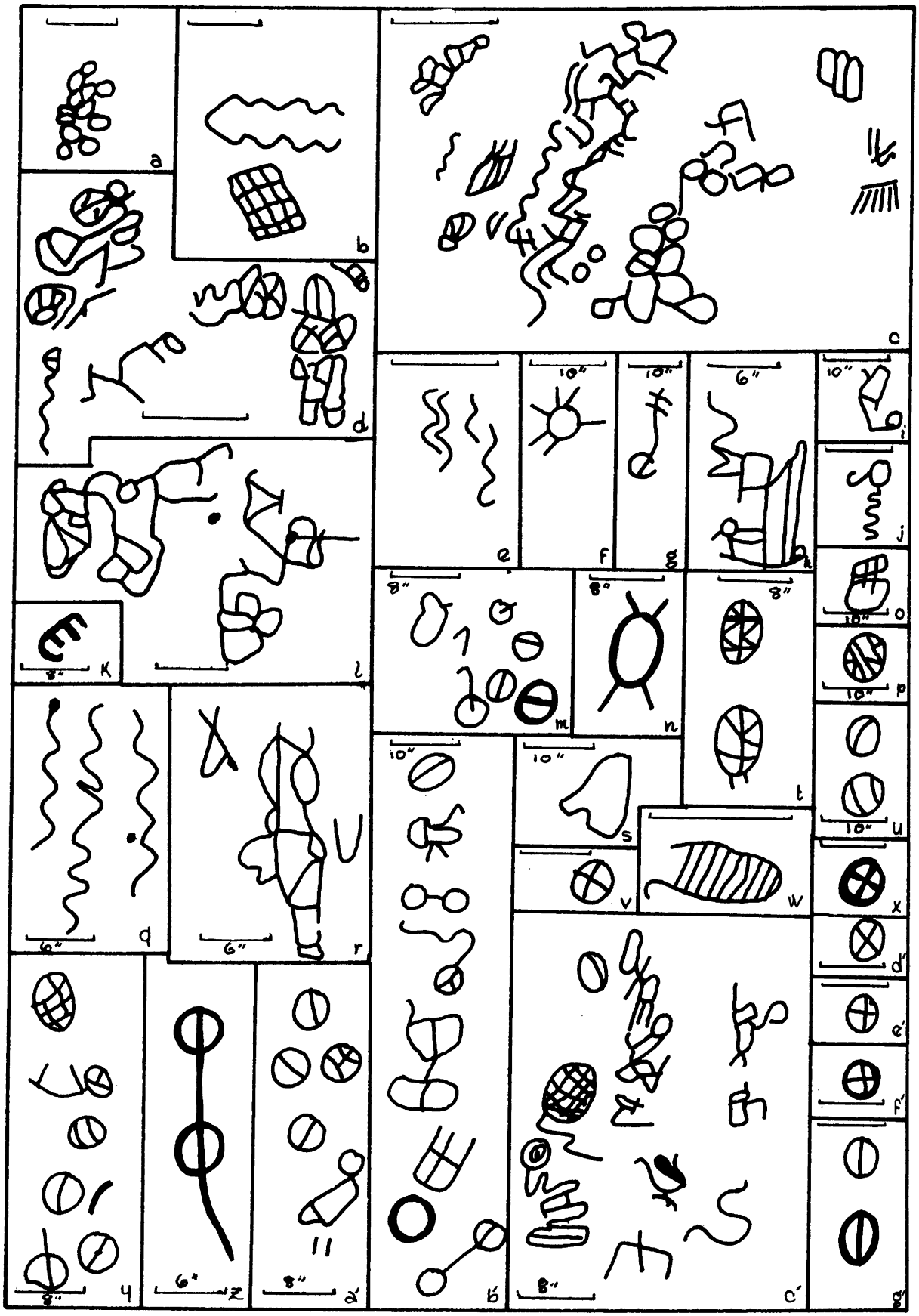


Figure 14

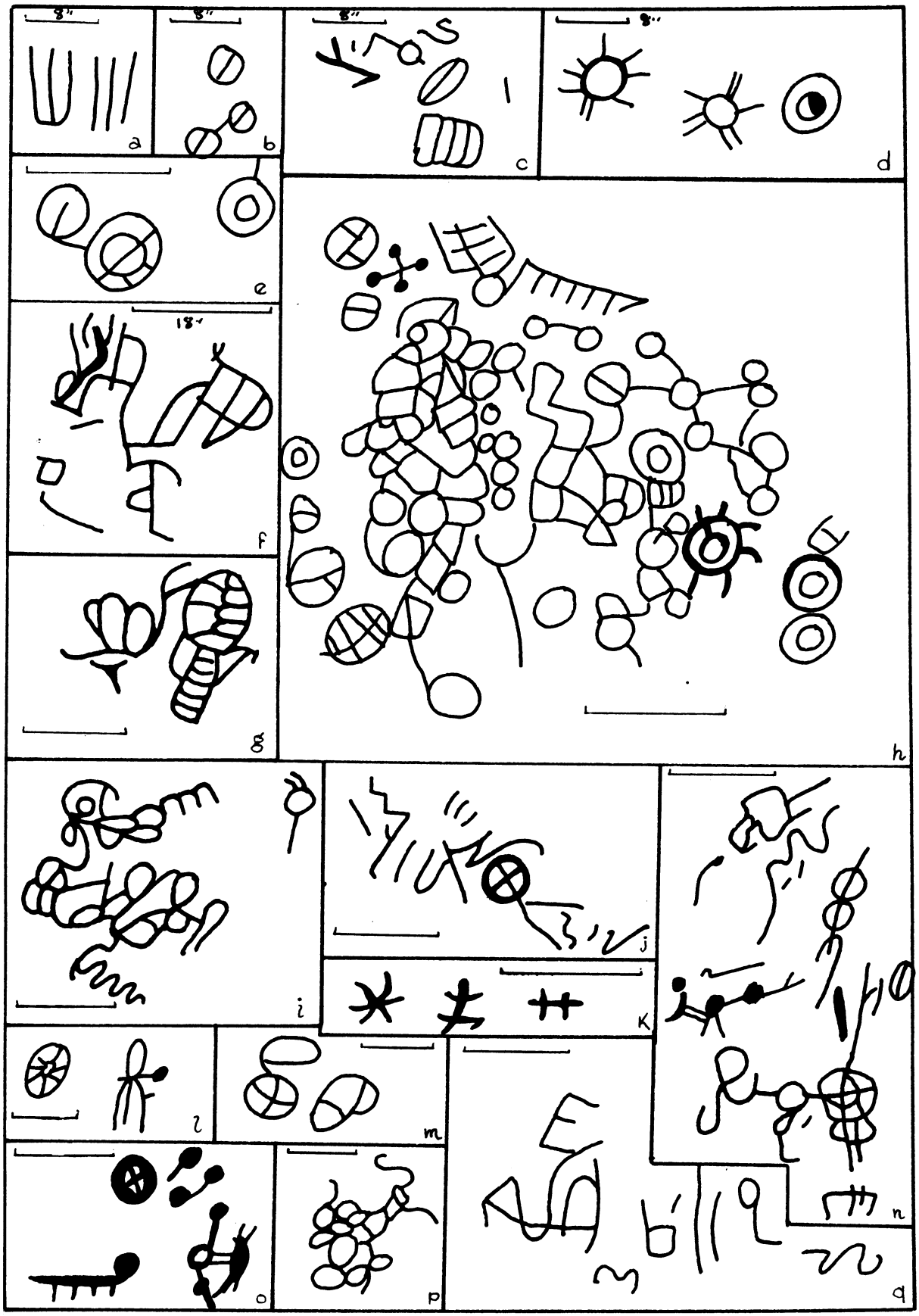


Figure 15

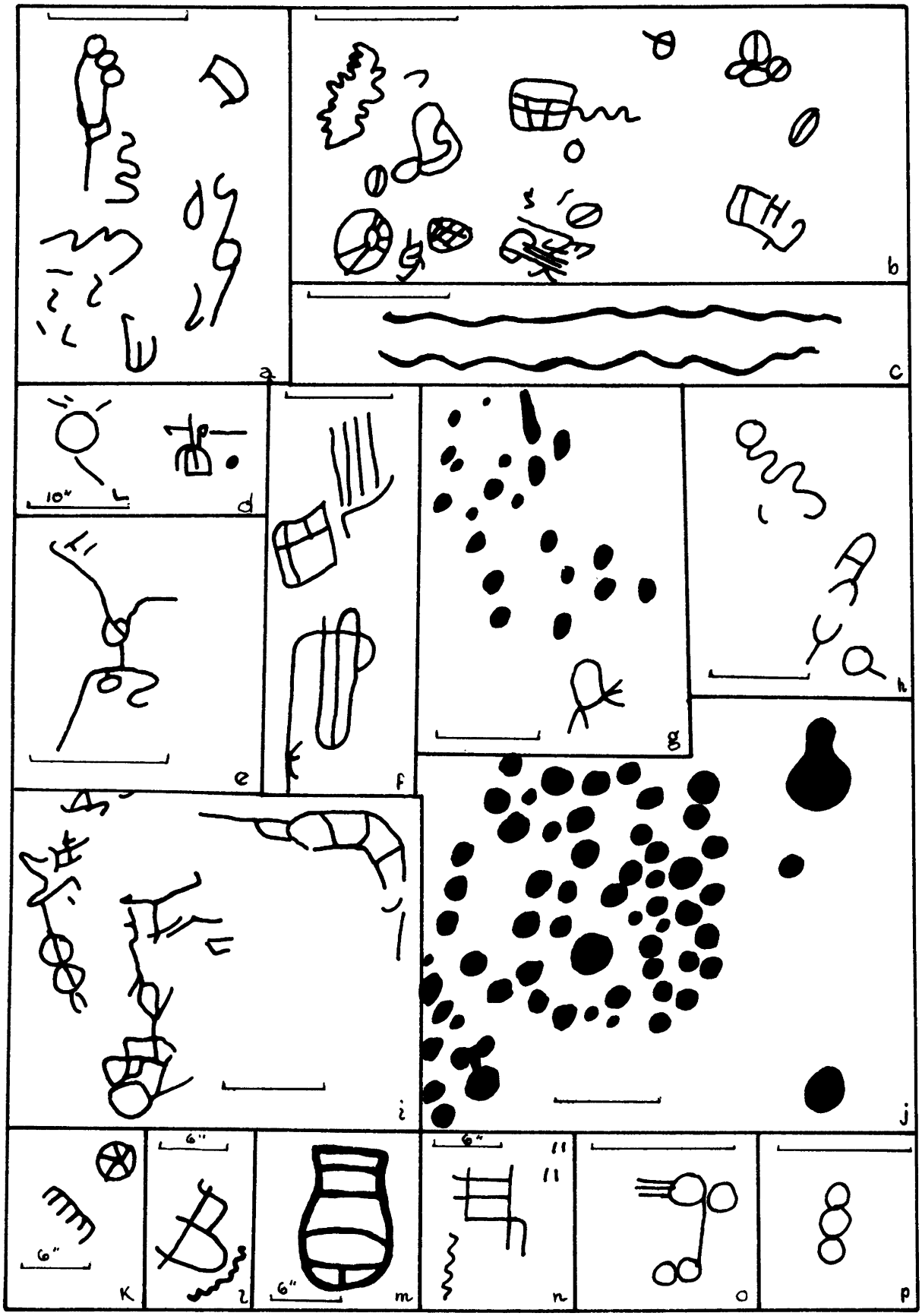


Figure 16

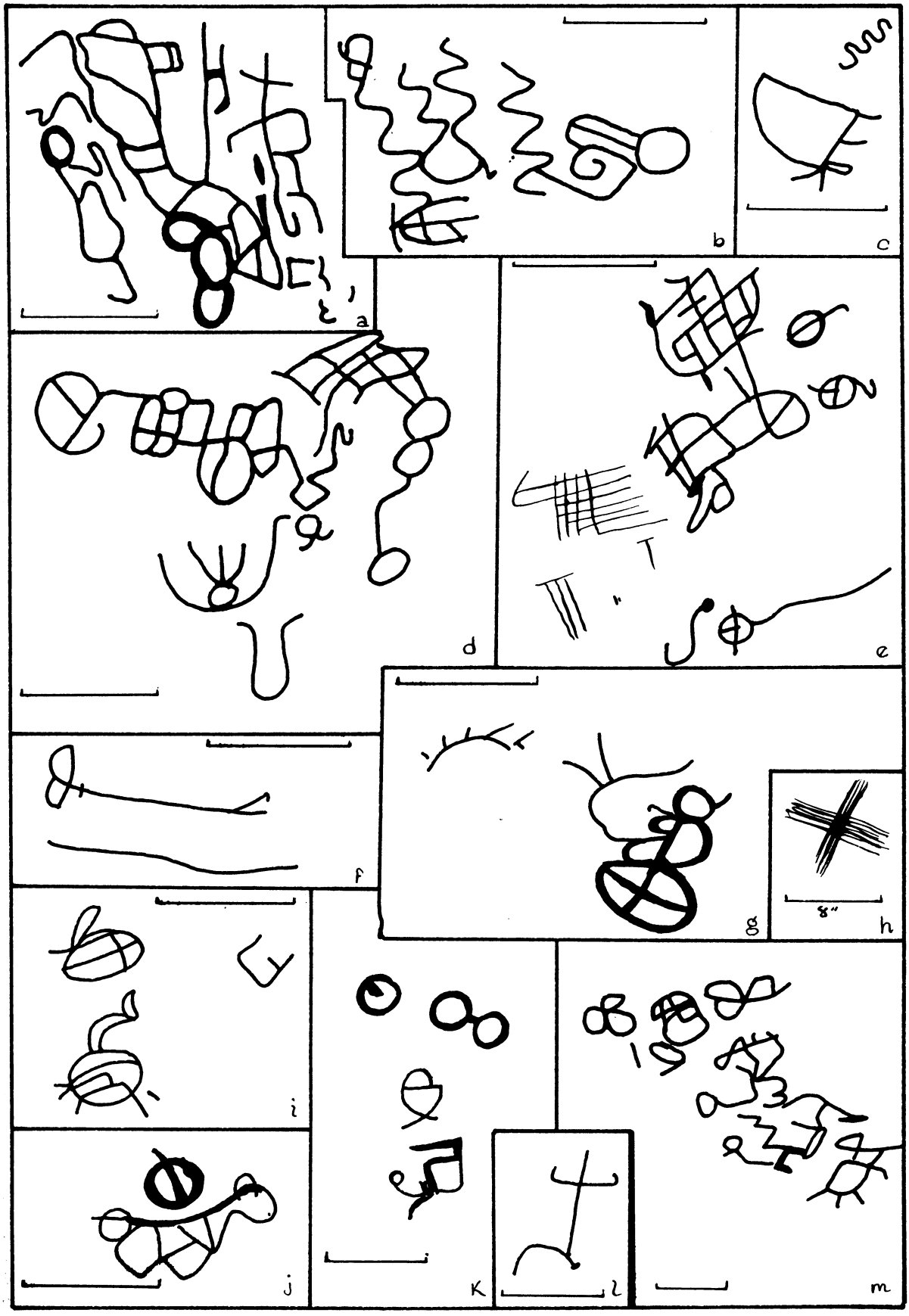


Figure 17

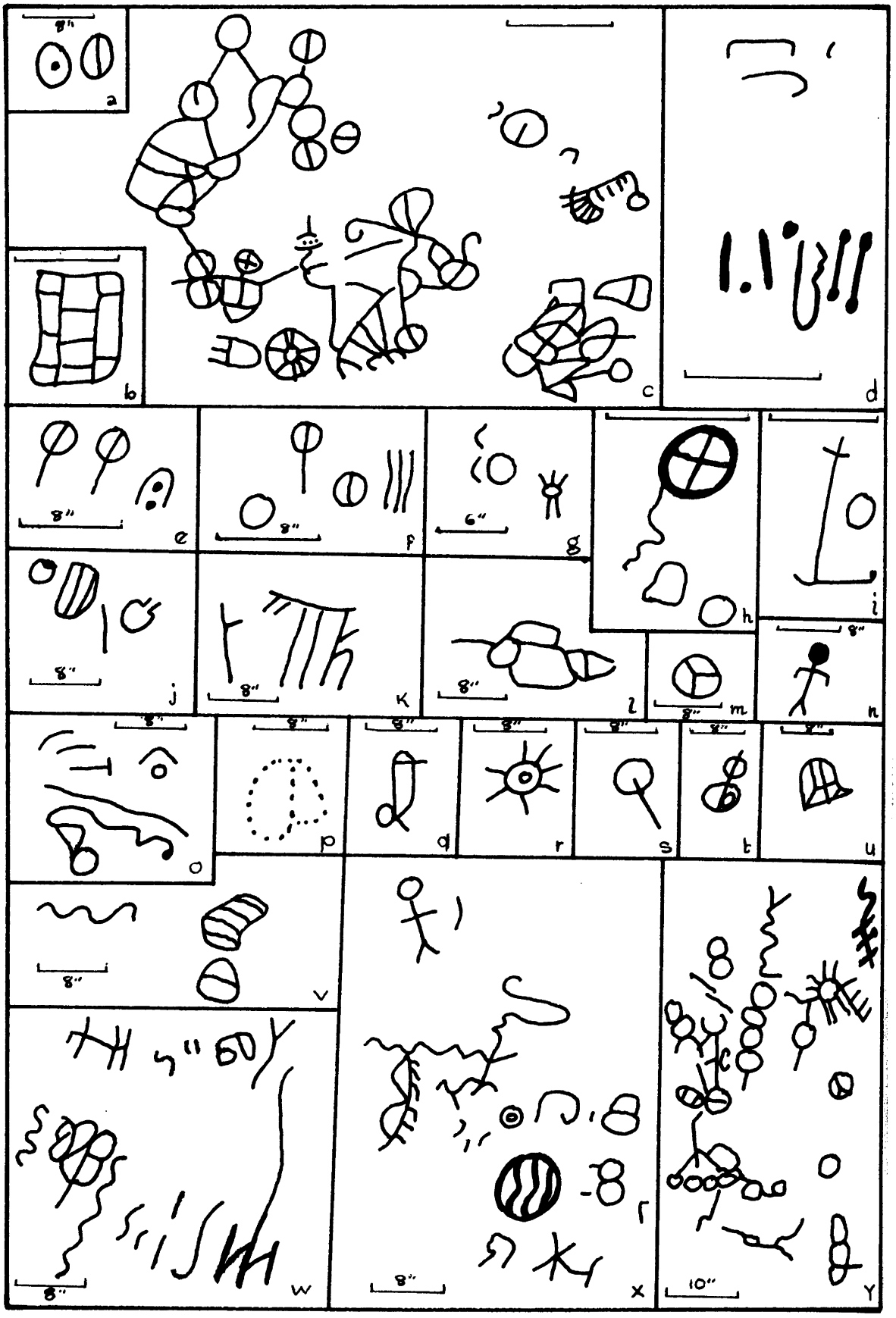


Figure 18

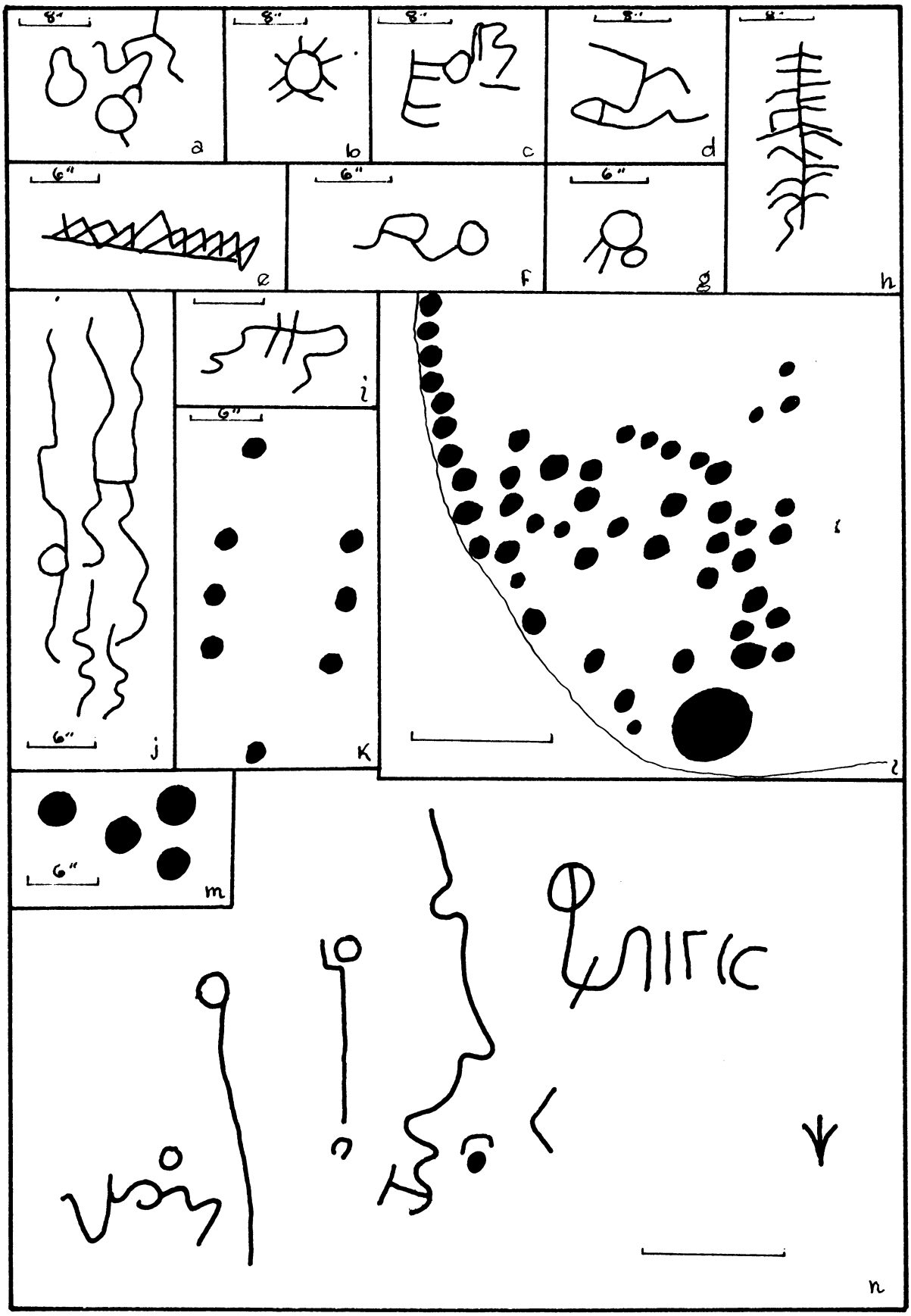


Figure 19

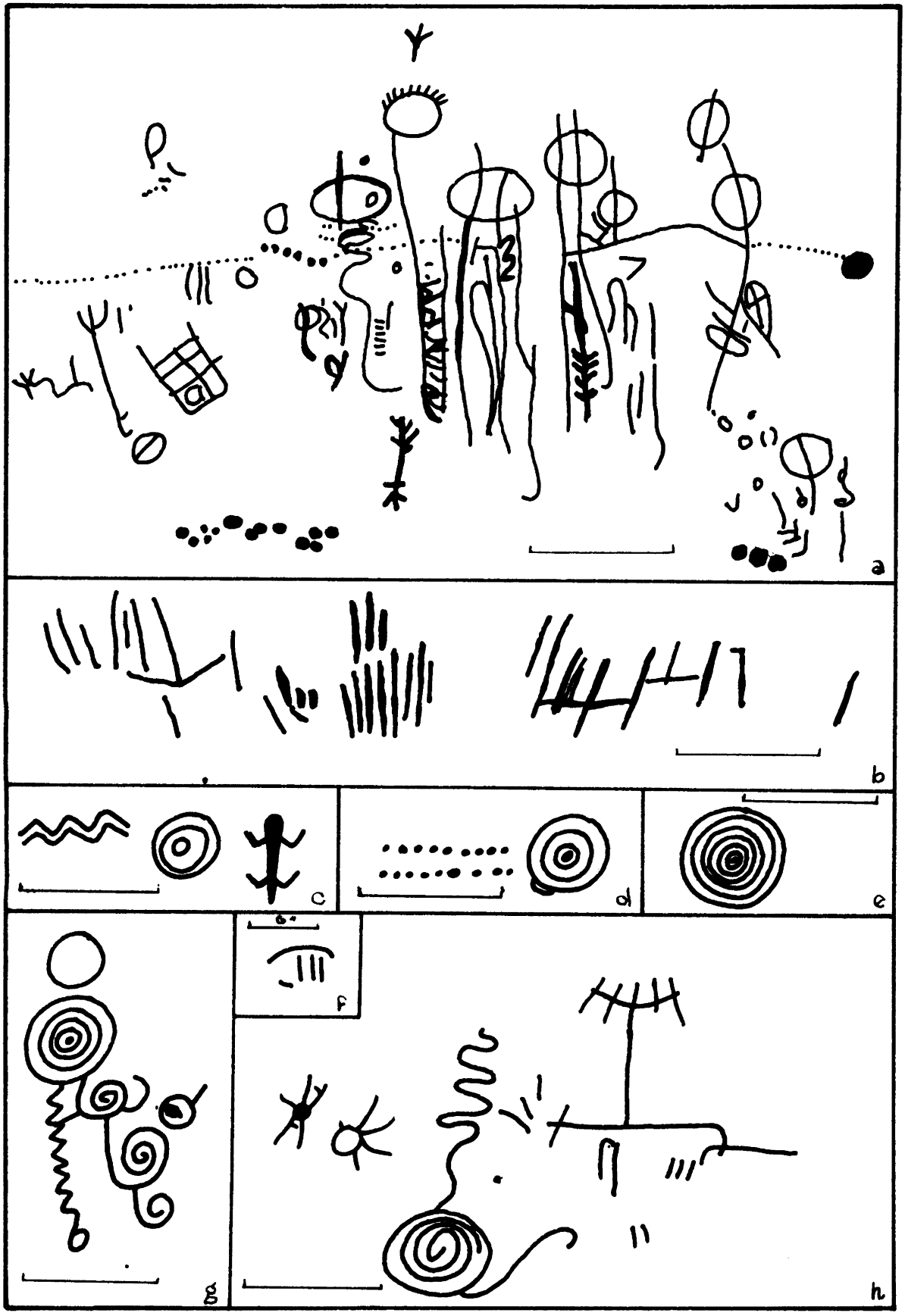


Figure 20

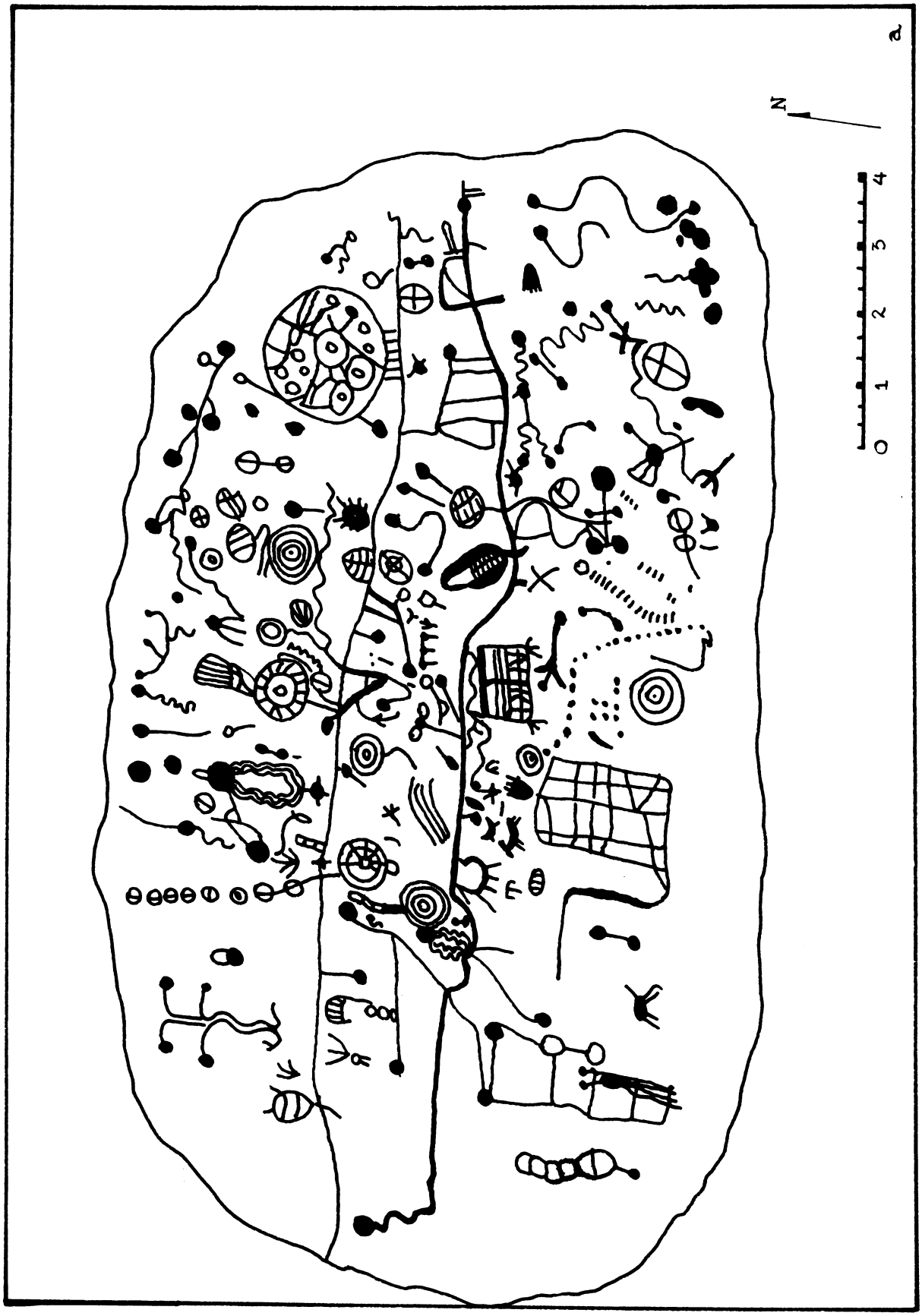


Figure 21

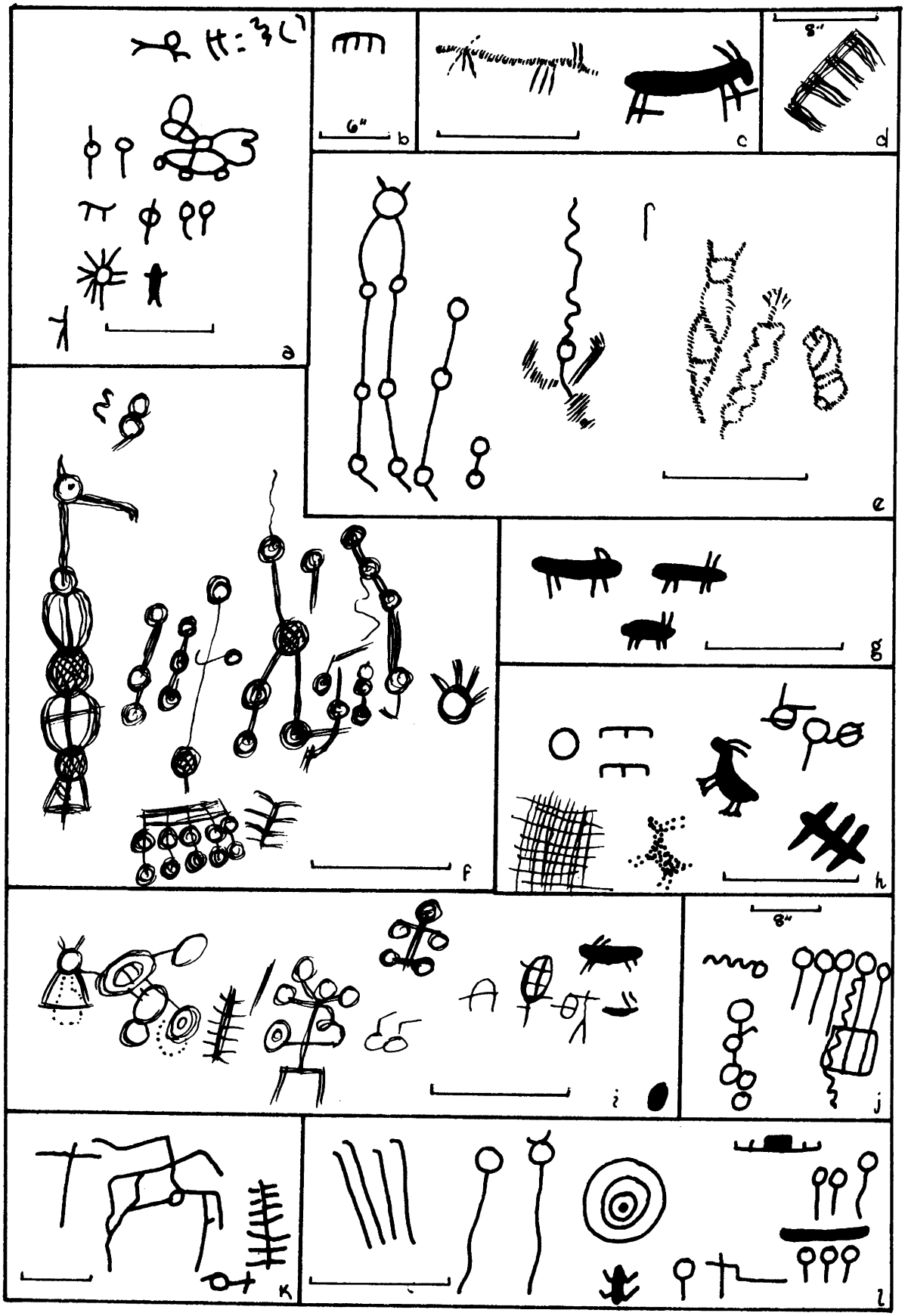


Figure 22

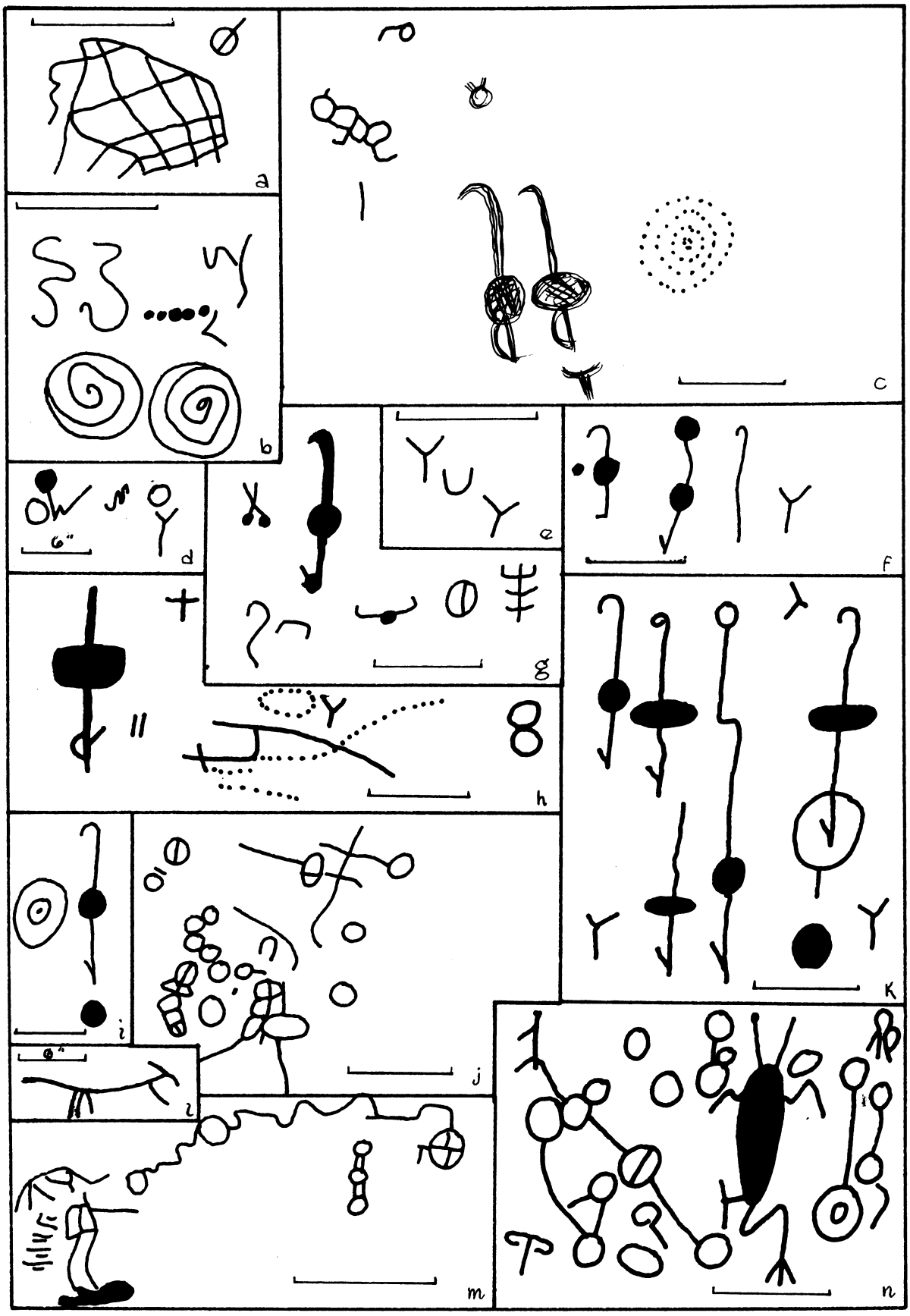


Figure 23

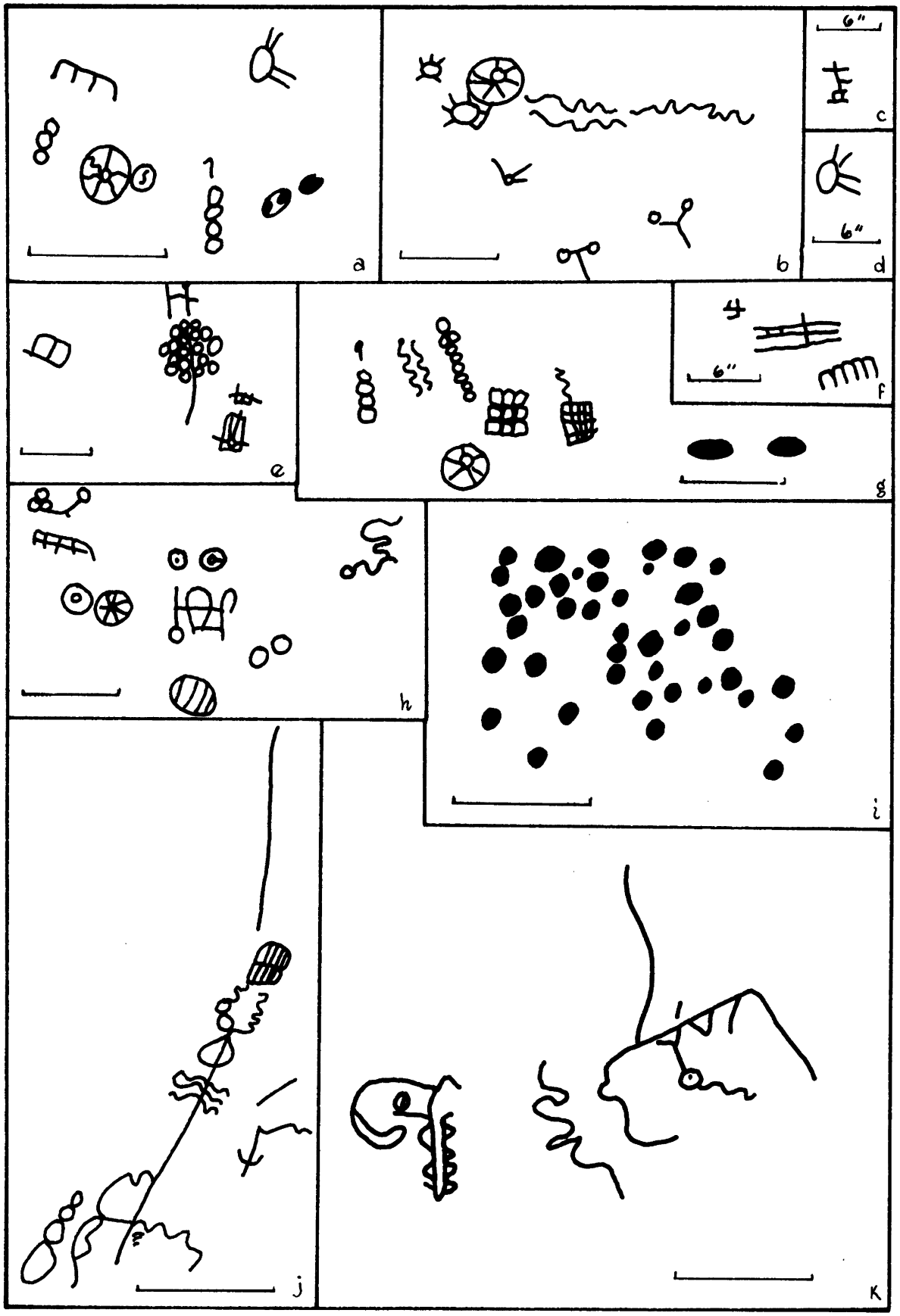


Figure 24

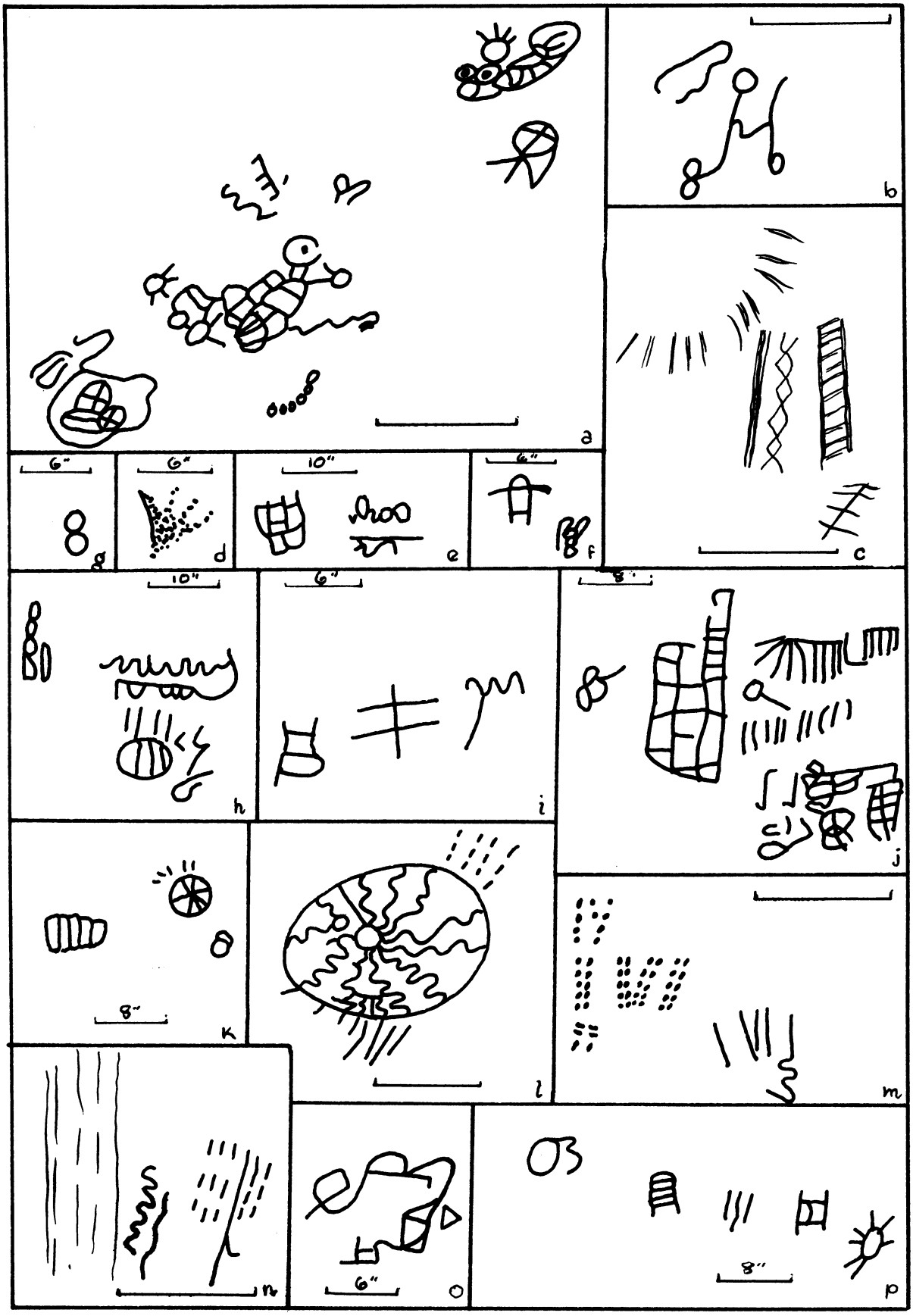


Figure 25

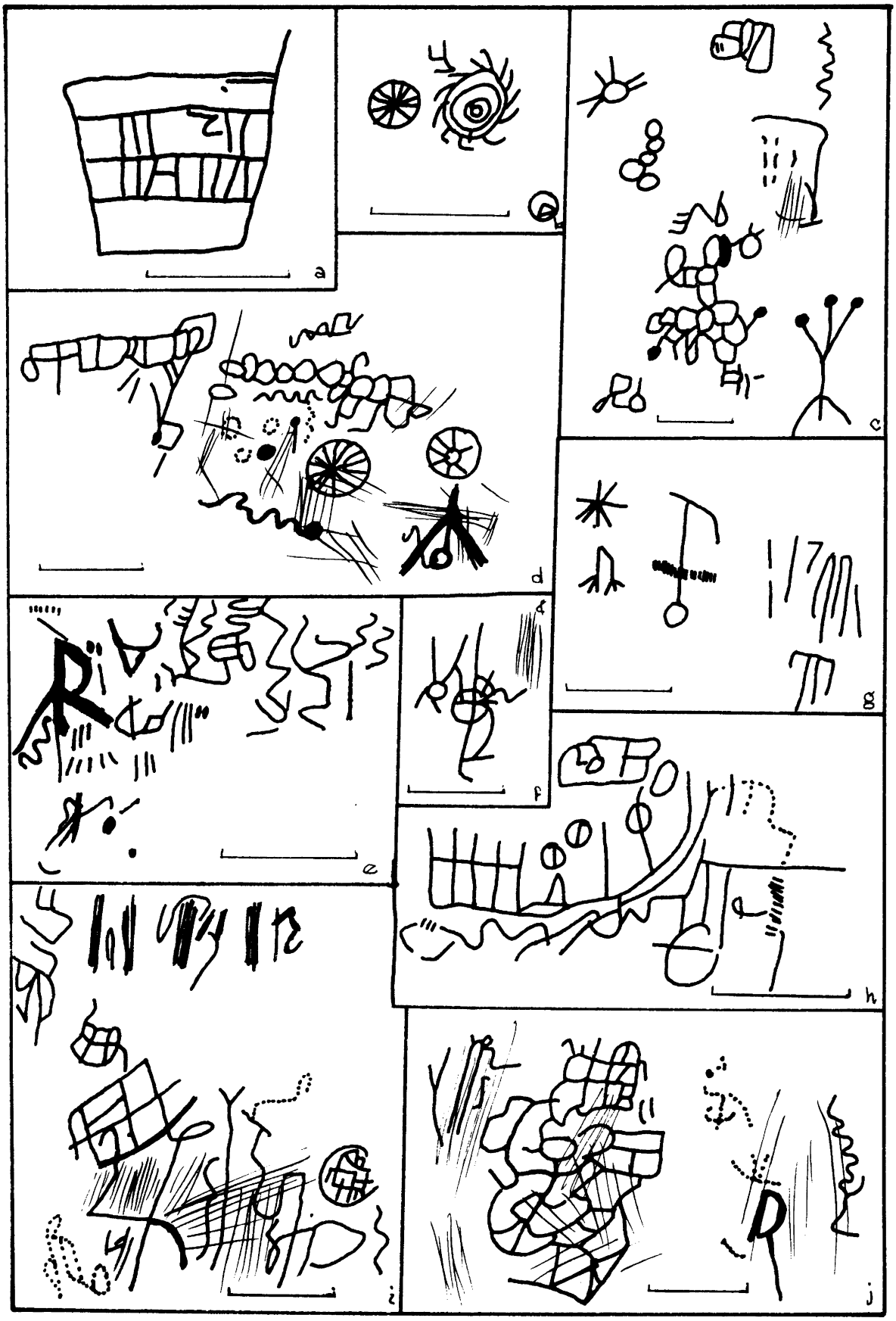


Figure 26

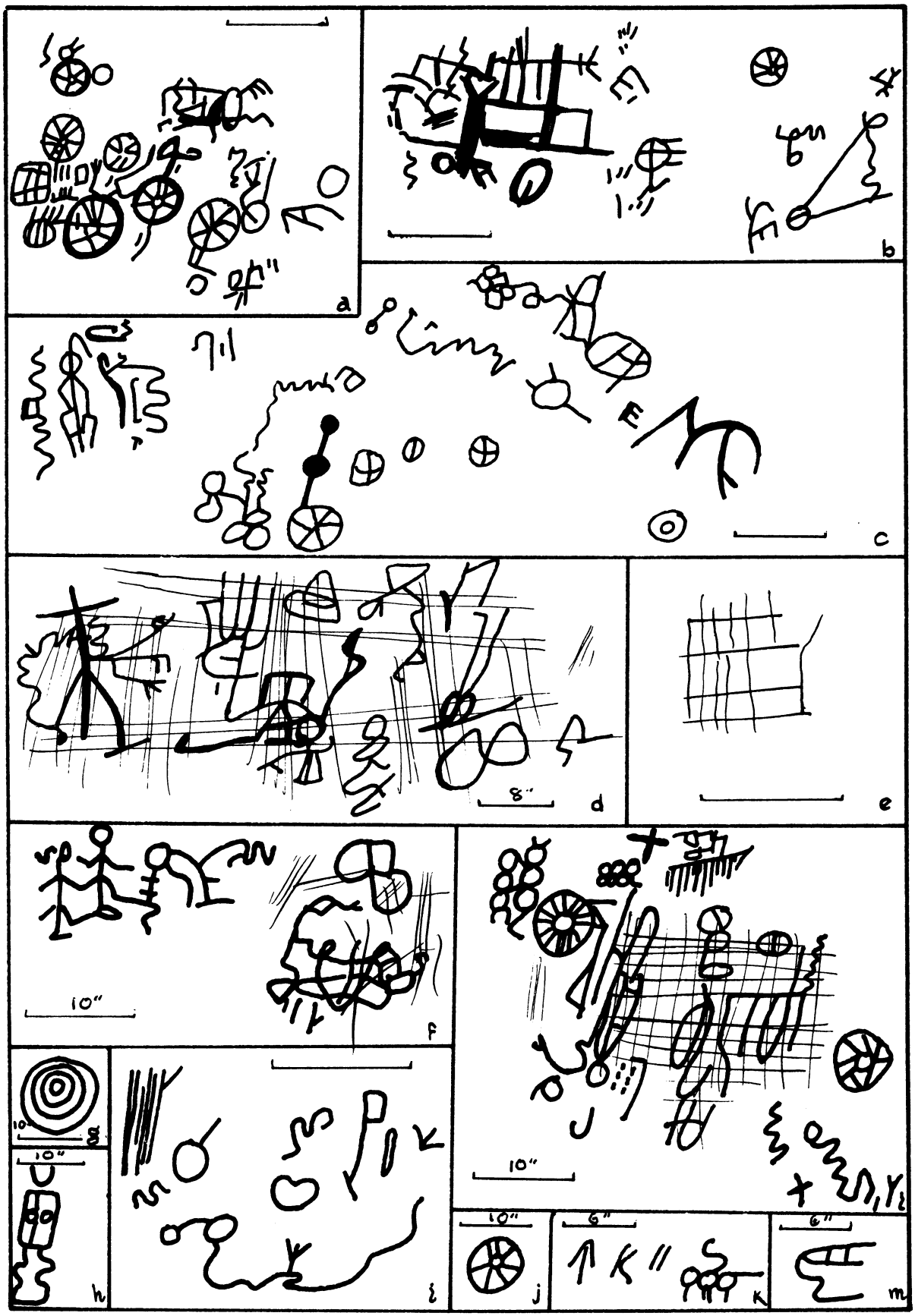


Figure 27

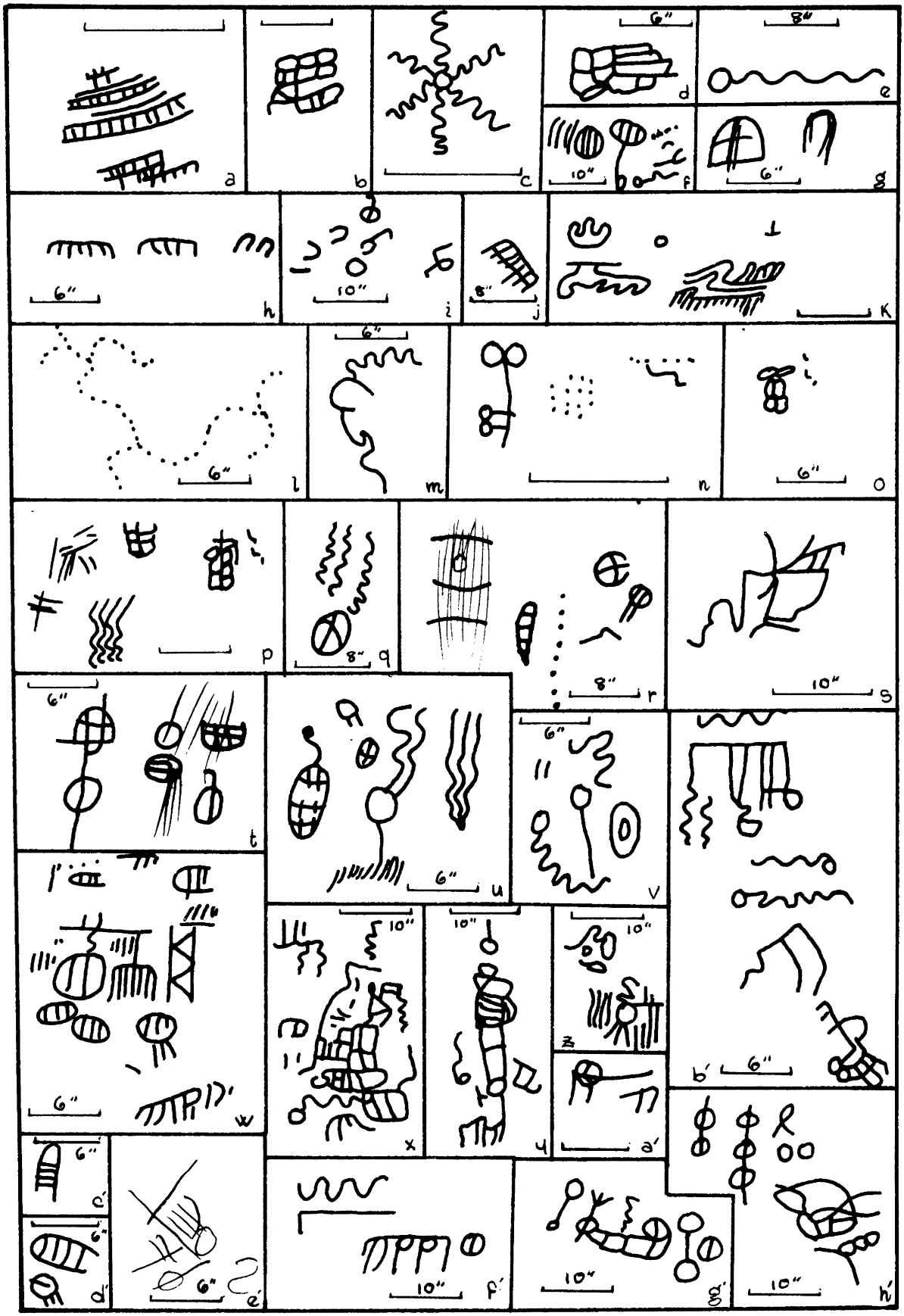

a
b
c
d
6"
e
8"
f
10"
g
6"
h
6"
i
10"
j
8"
k
l
6"
m
6"
n
o
6"
p
q
8"
r
8"
s
10"
t
6"
u
6"
v
6"
w
6"
x
10"
y
10"
z
10"
a'
b'
6"
c'
6"
d'
6"
e'
6"
f'
10"
g'
10"
h'
10"

Figure 28

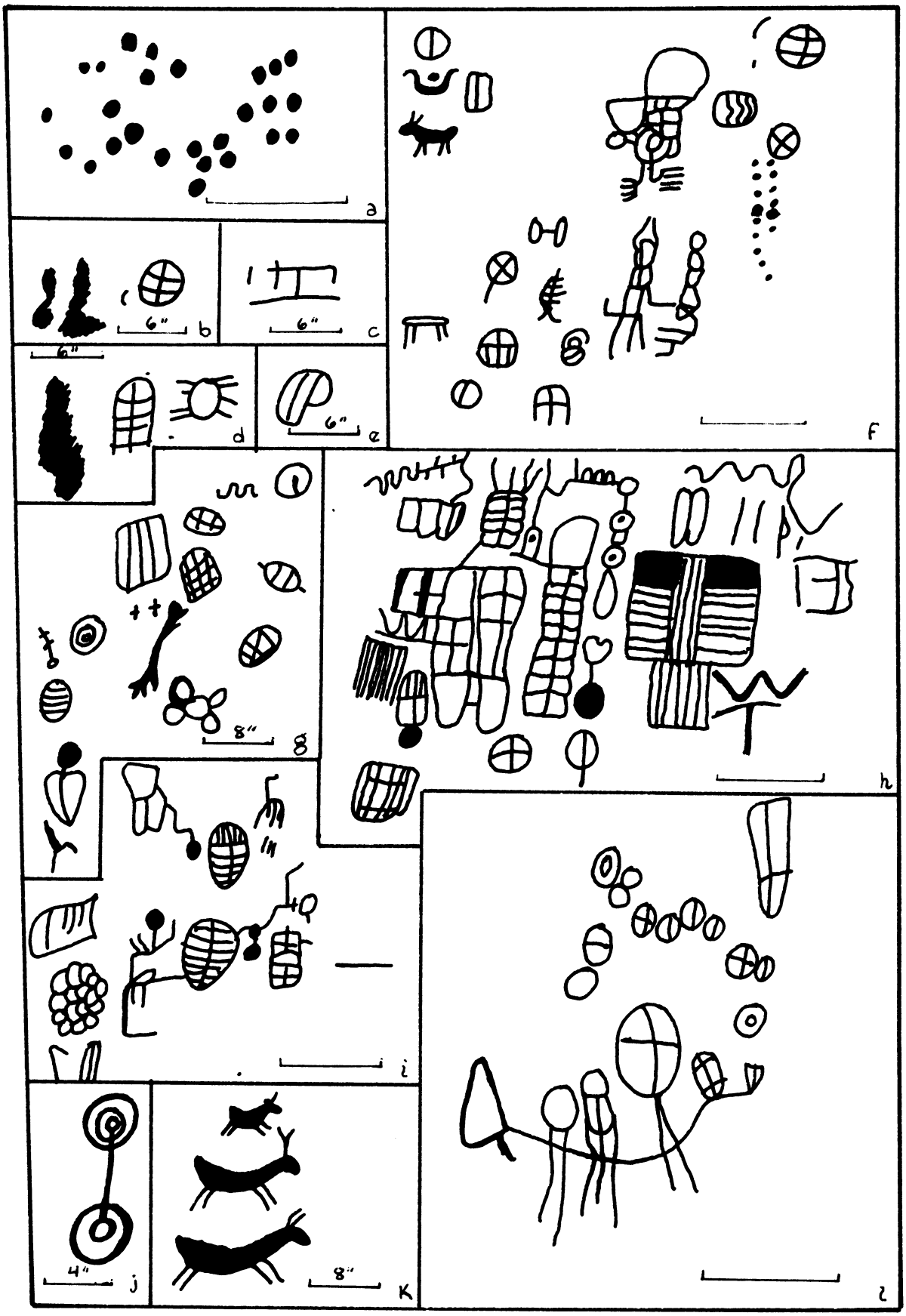


Figure 29

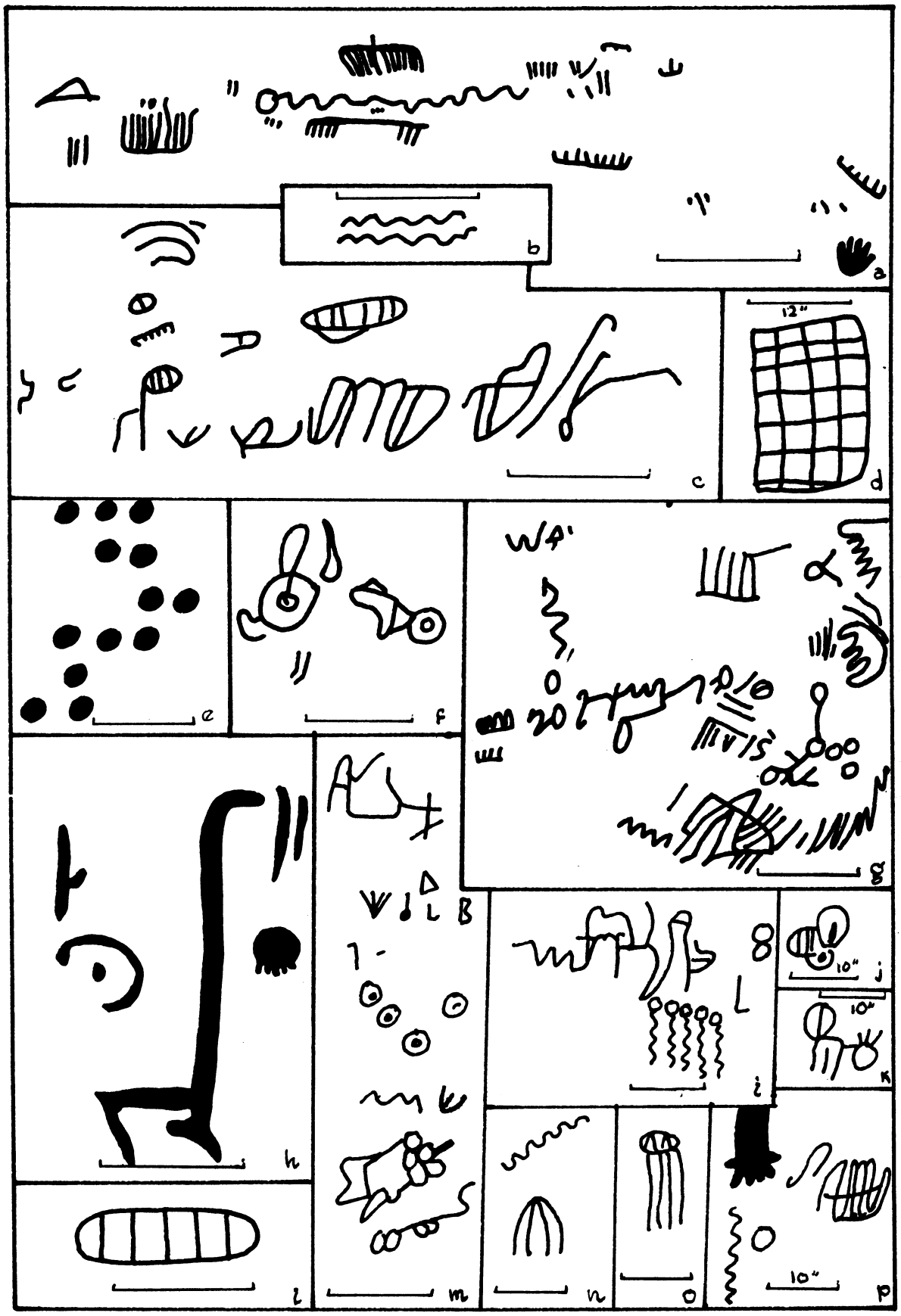


Figure 30

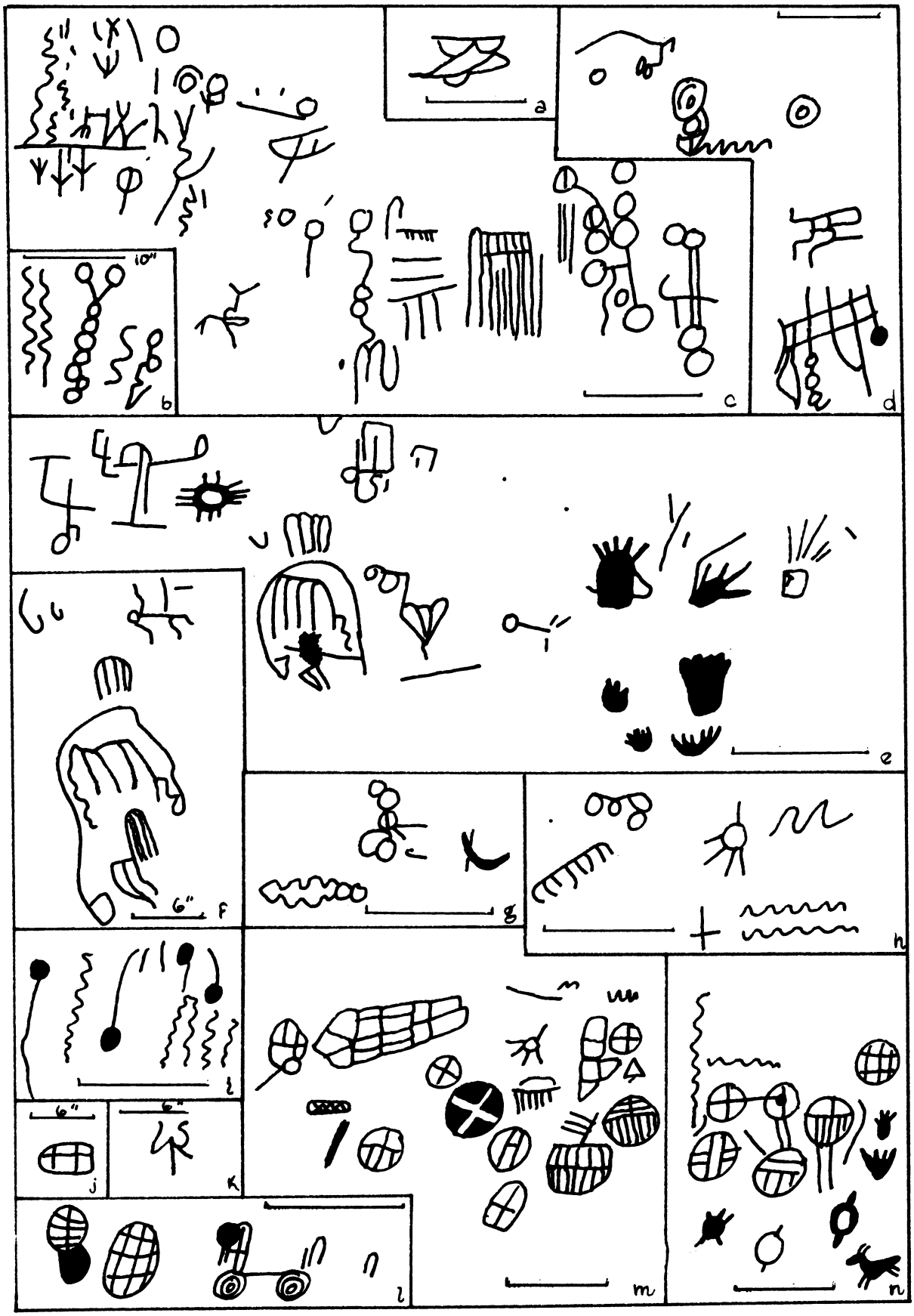


Figure 31

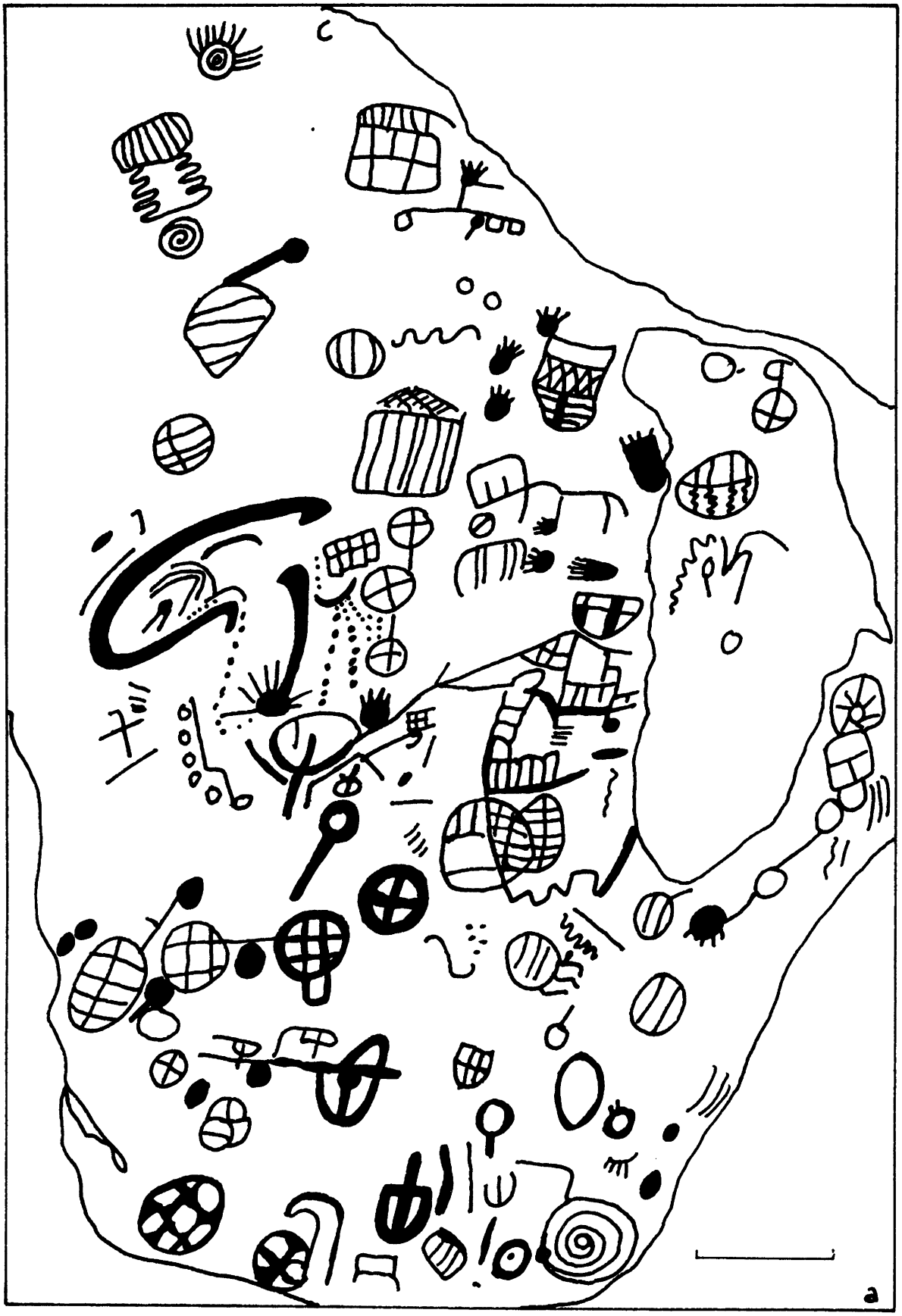


Figure 32

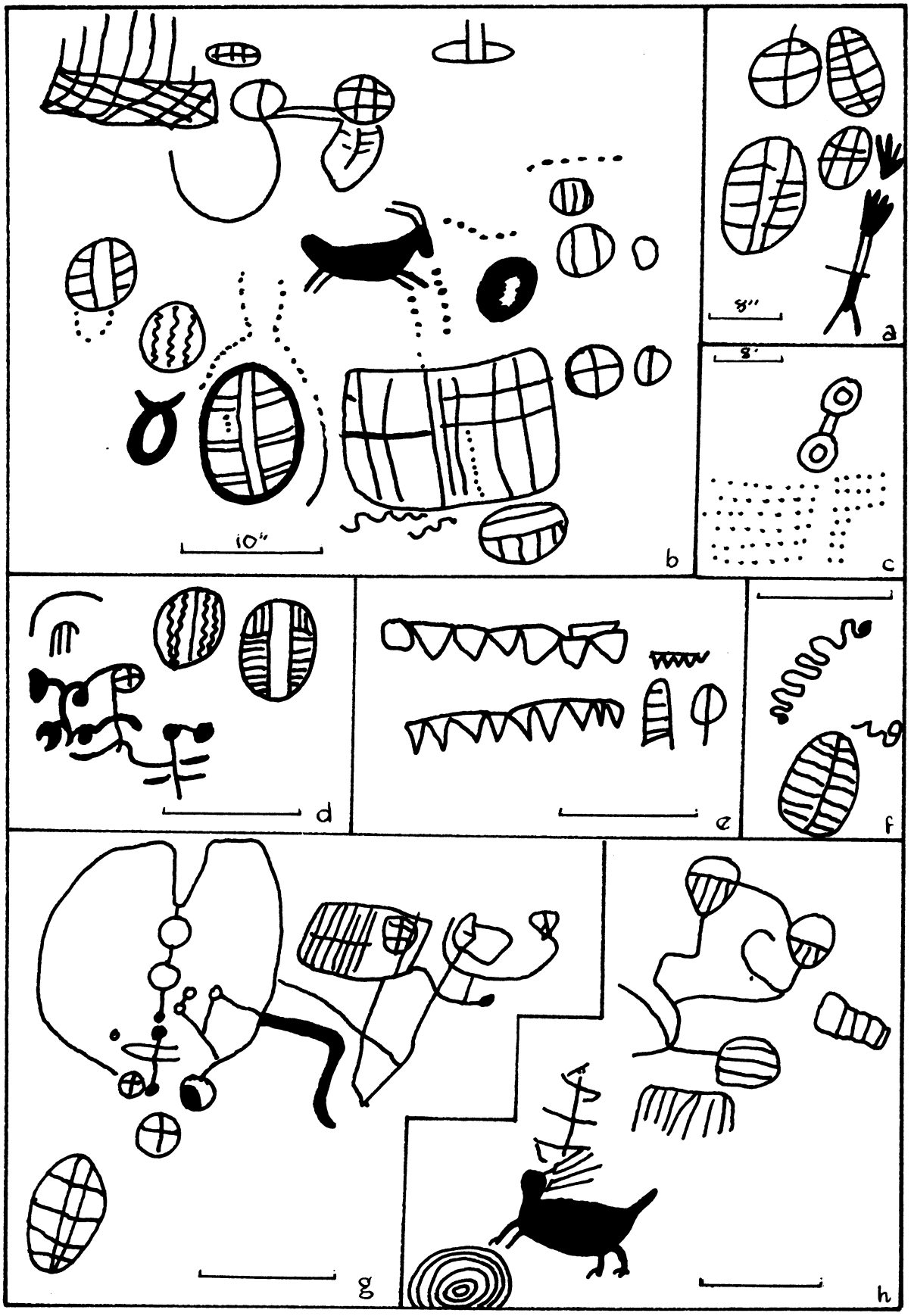


Figure 33

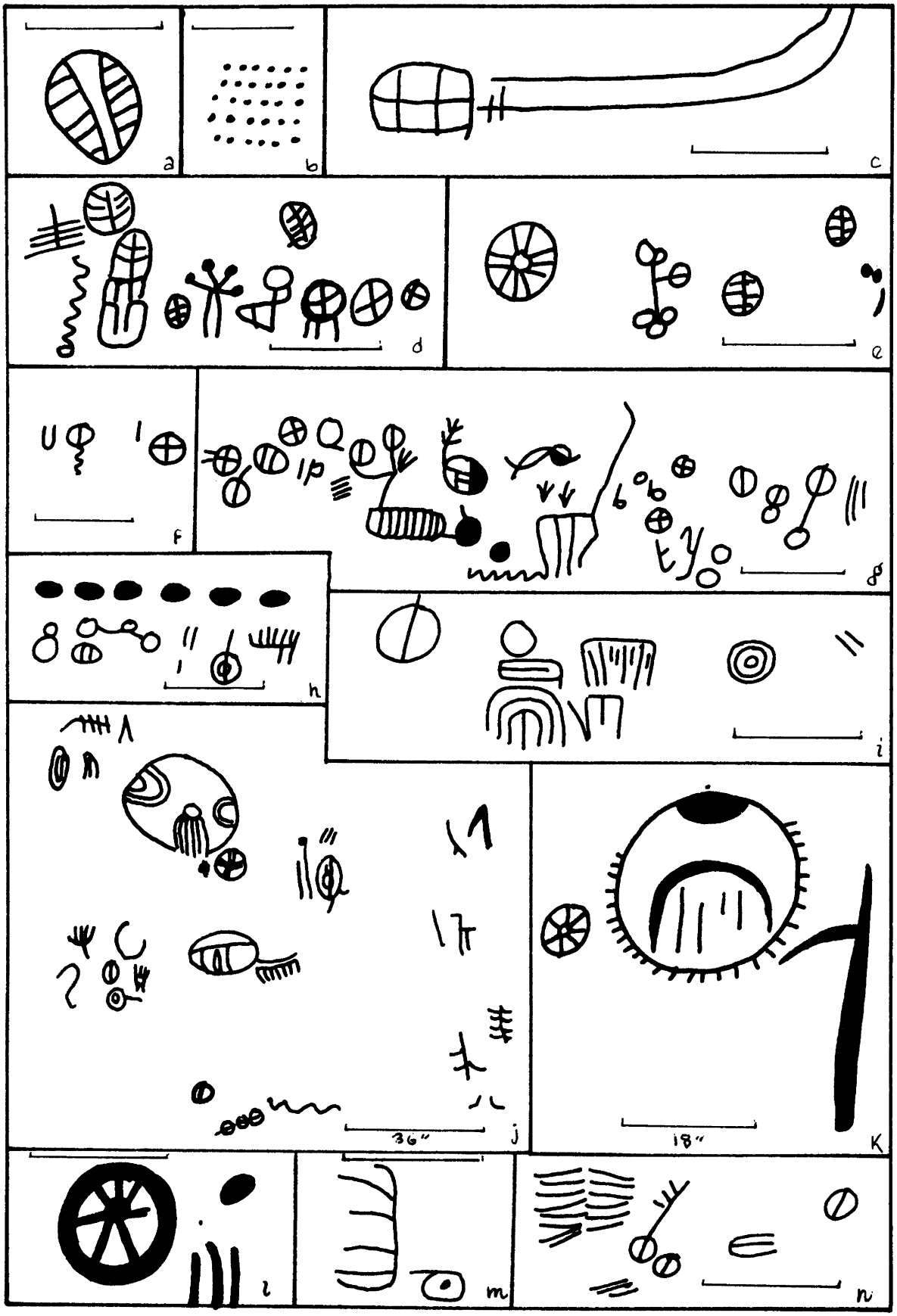


Figure 34

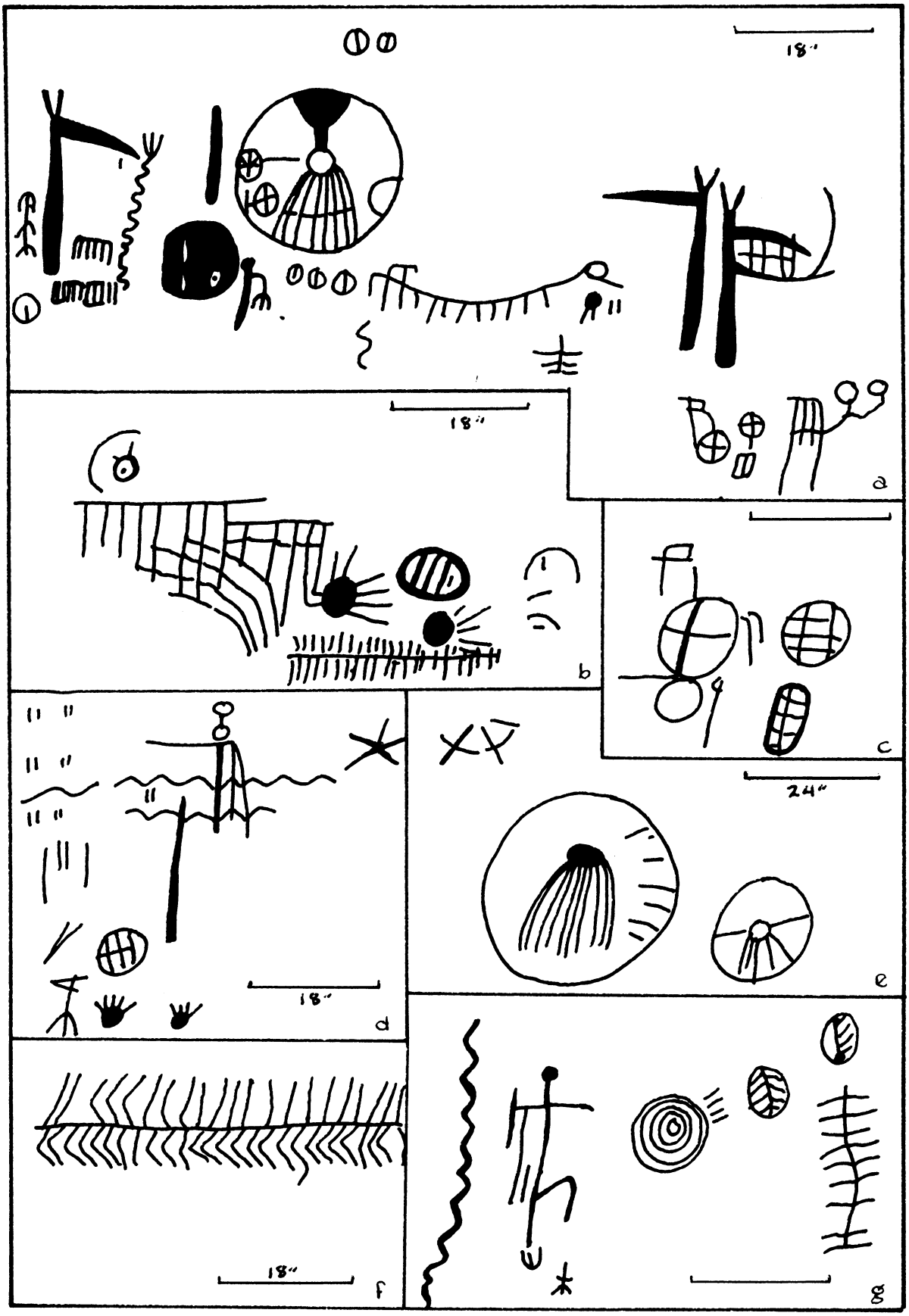


Figure 35

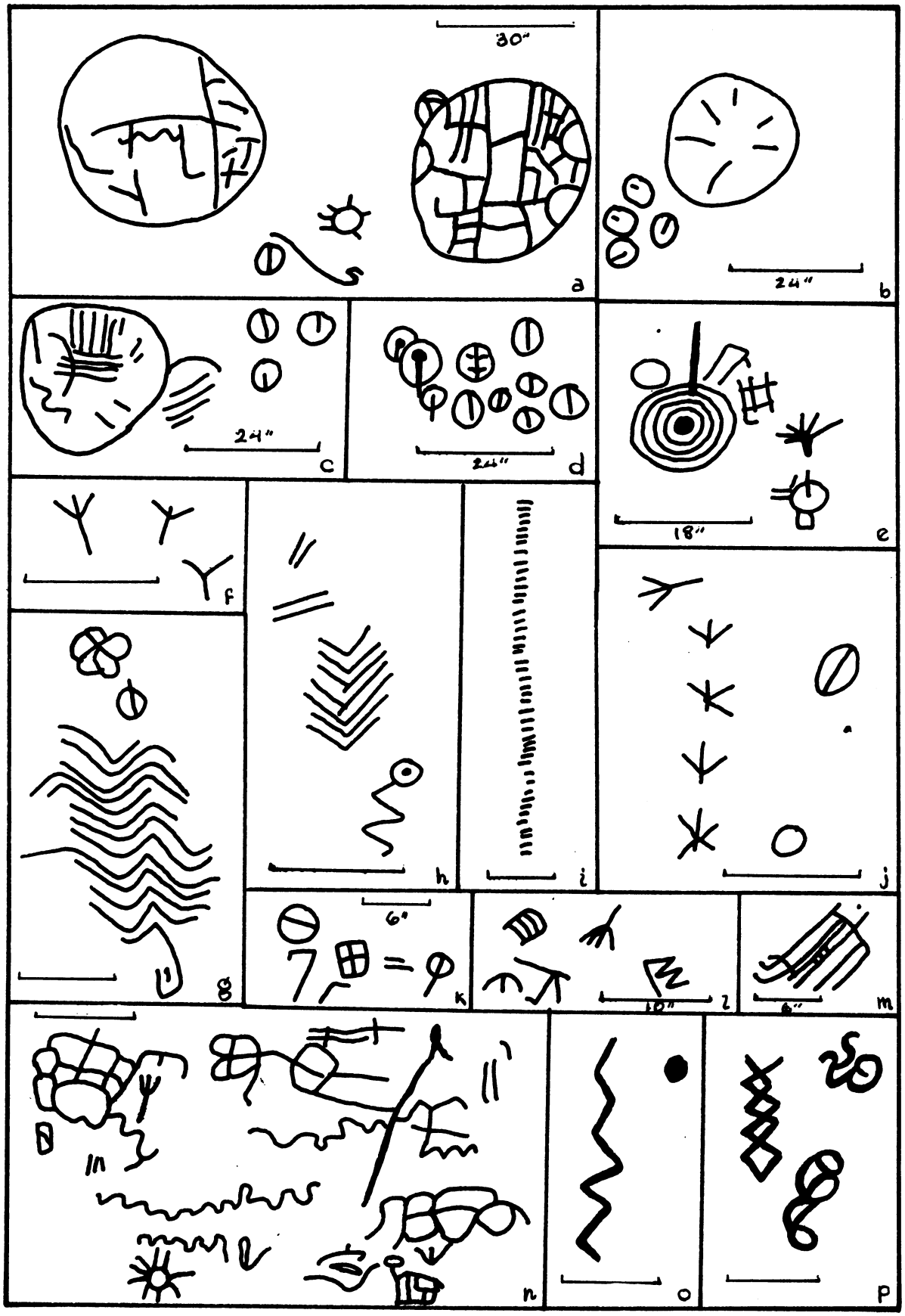


Figure 36

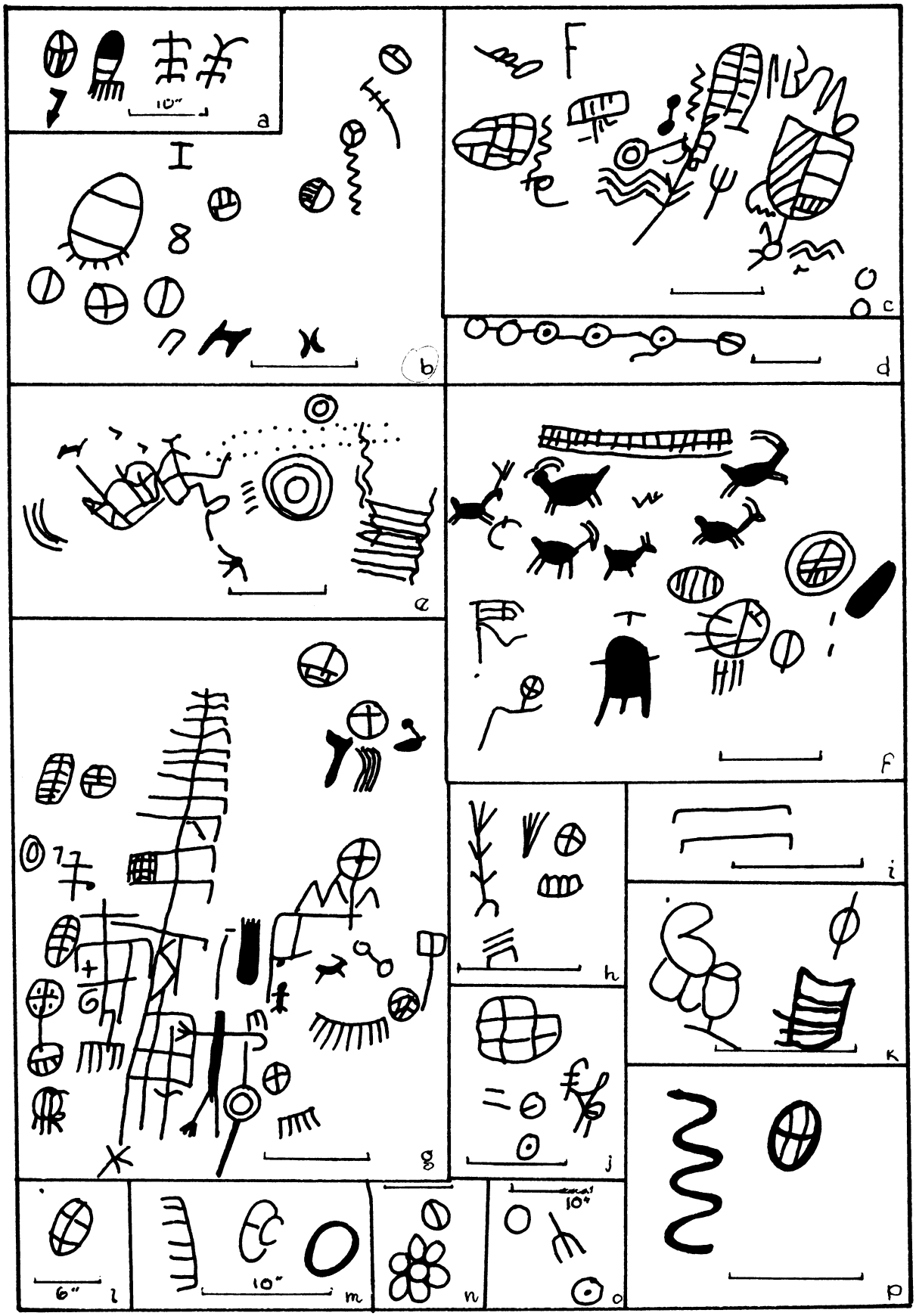


Figure 37

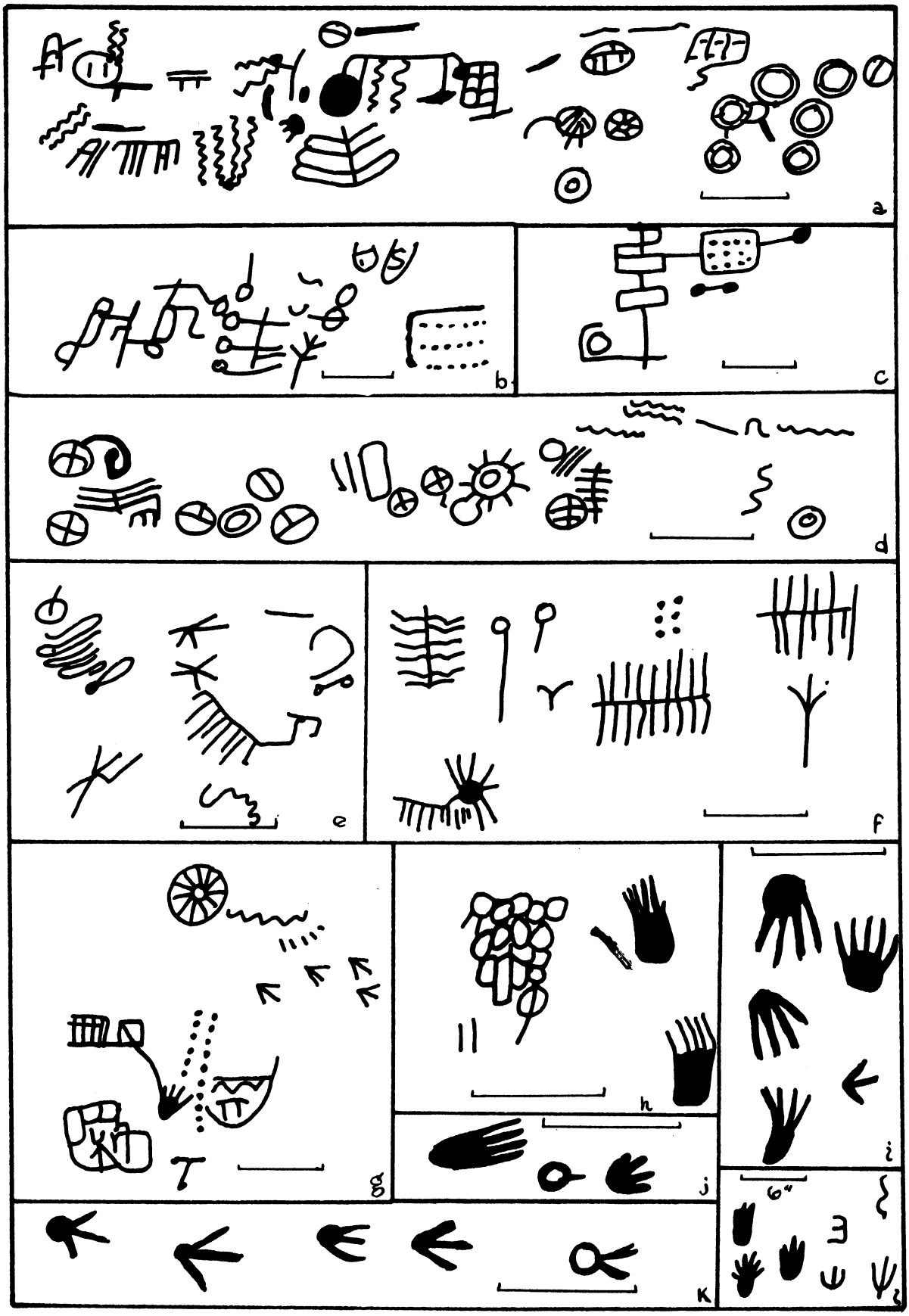


Figure 38

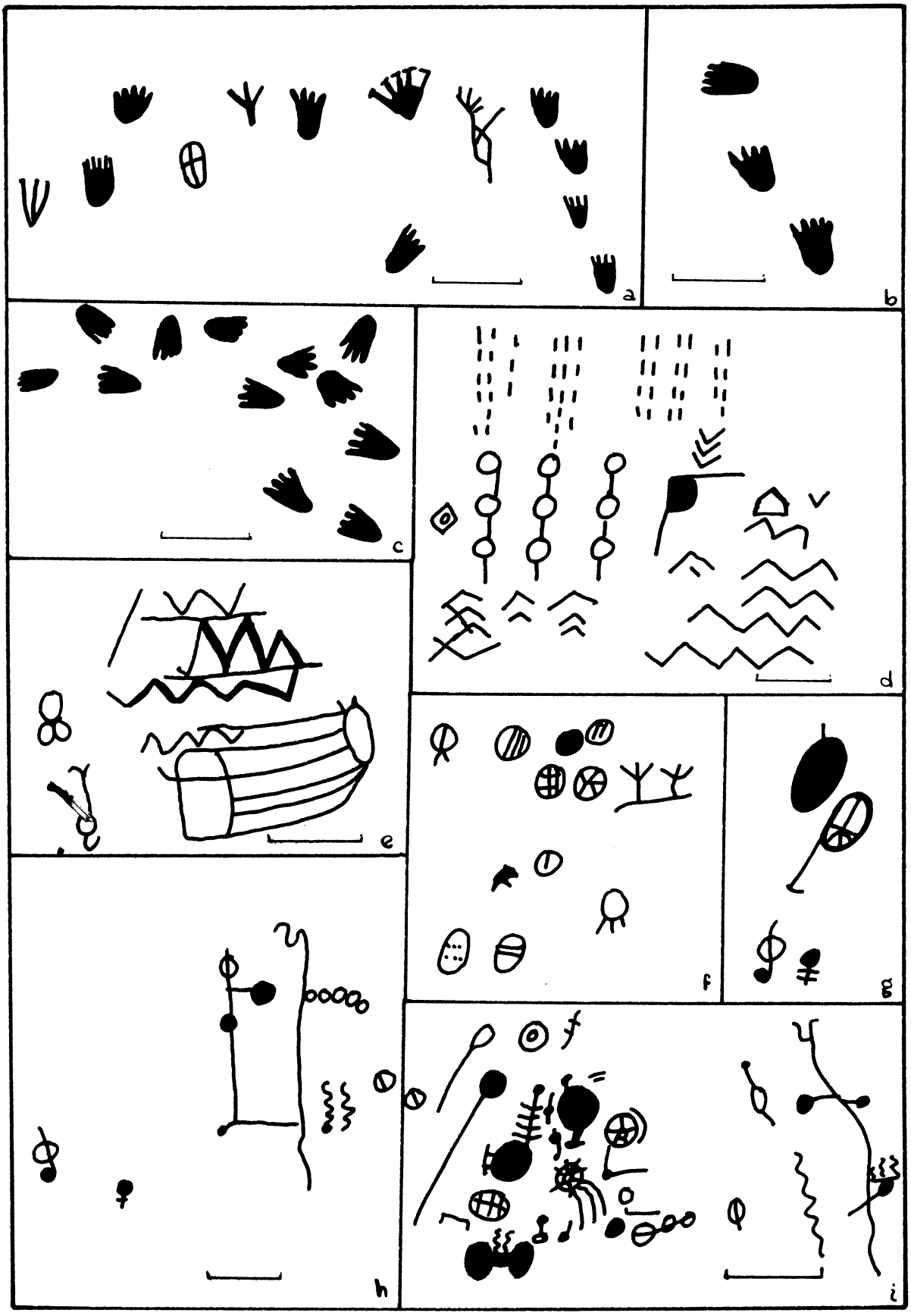


Figure 39

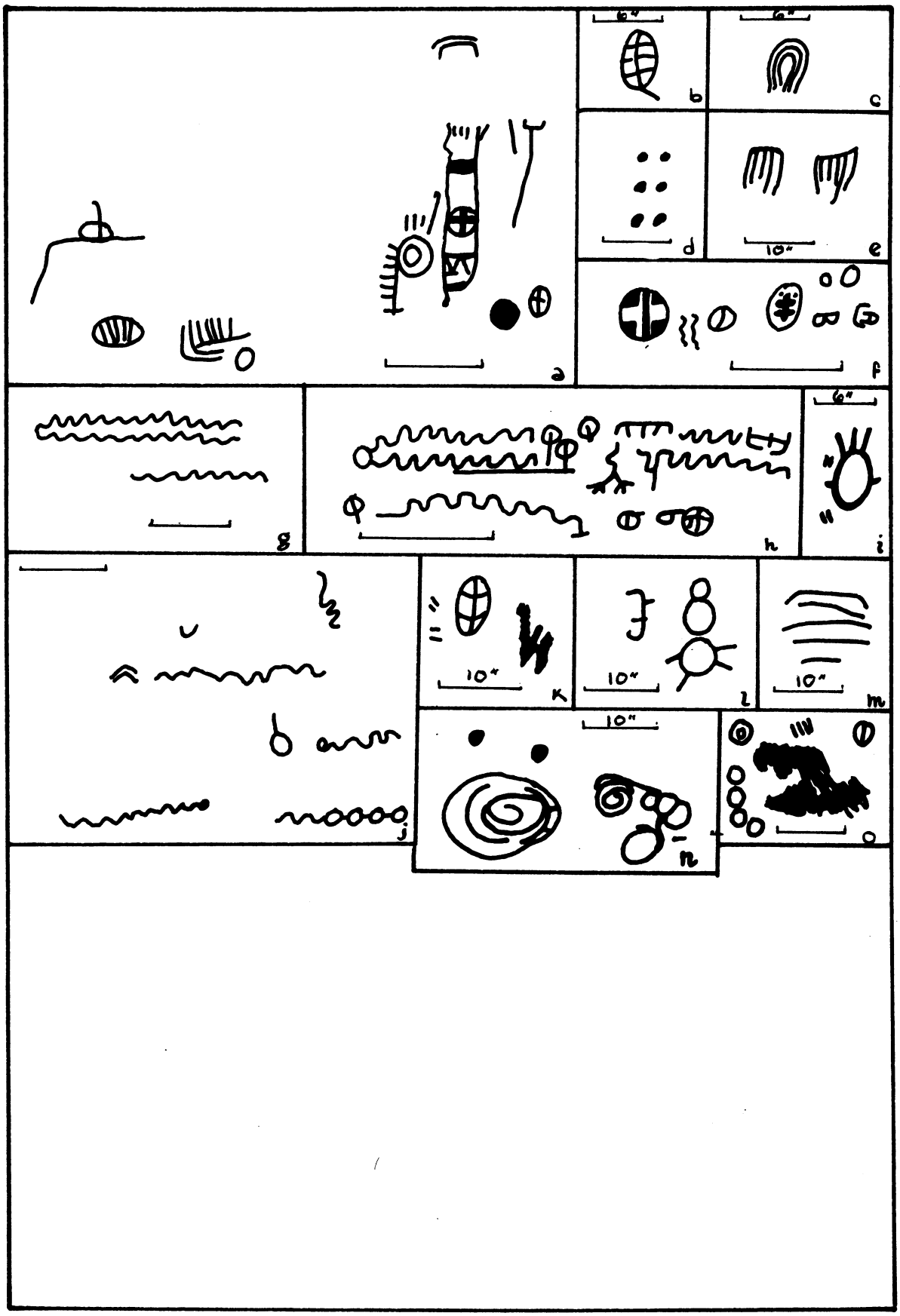


Figure 40

TABLES AND CORRELATIONS OF ELEMENTS AND SITES

A total of forty-four sites was observed, of which nineteen were in the southern sector of Owens Valley and twenty-five in the northern sector. In all, 3,352 separate elements were observed, of which 1,841 were recorded at the northern sites and 1,511 at the southern sites. Each of these elements was characterized as being Curvilinear, Rectilinear, or Representational in style. Table 1 shows a cross classification of the frequencies of each of these three classes of elements in each of the two sectors. It is a contingency table to determine if a true difference exists between the northern and southern sectors. If there were no differences between the two sectors, the results "obtained" and the results "expected" would be the same. The resulting differences, however, show a dissimilarity between the two sectors.

TABLE 1A

Actual Count of Elements Obtained in Both Sectors and Within Each Style

Sector	Curv.	Rect.	Repr.	Total	Per cent
North	1066	502	273	1841	54.9
South	984	374	153	1511	45.1
Total	2050	876	426	3352	

TABLE 1B

Expected Results Obtained by Multiplying a Sector Total by a Style Total, and Dividing by Grand Total

Sector	Curv.	Rect.	Repr.	Total
North	1126	481	234	1841
South	924	395	192	1511
Total	2050	876	426	3352

TABLE 2

Breakdown of Total Number of Elements in Each Style for Each Southern Site
[The Median Equals the Tenth Largest Number in Each Row]

Site No.	Iny 28	Iny 38	Iny 181	Iny 198	Iny 205	Iny 208	Iny 210	Iny 269	Iny 270	Iny 272	Iny 388	Iny 389	Iny 390	Iny 392	Iny 393	Iny 394	Iny 395	Iny 396	Iny 397	Total	Median	Per cent
Curv.	7	24	2	6	2	30	74	335	82	77	33	56	30	36	10	--	9	139	32	984	51.8	65.1
Rect.	--	--	7	--	1	16	18	125	30	39	6	15	7	--	3	5	12	90	--	374	19.7	24.8
Repr.	4	1	10	1	15	59	6	22	5	10	9	1	2	--	1	--	3	4	--	153	8.1	10.1
Total	11	25	19	7	18	105	98	482	117	126	48	72	39	36	14	5	24	233	32	1511	79.5	100.0

TABLE 3

Breakdown of Total Number of Elements in Each Style for Each Northern Site
[The Median Equals the Tenth Largest Number in Each Row]

Site No.	Iny 204	Iny 259	Iny 267	Iny 268	Iny 278	Iny 334	Iny 363	Iny 398	Iny 399	Iny 400	Iny 401	Iny 436	Iny 437	Mno 4	Mno 5	Mno 6	Mno 7	Mno 8	Mno 66	Mno 421	Mno 548	Mno 549	Mno 550	Mno 551	Mno 552	To-tal	Me-dian	Per cent
Curv.	--	26	167	7	90	11	118	44	1	3	--	13	2	85	149	28	111	138	5	34	4	3	15	7	5	1066	42.6	57.9
Rect.	--	11	64	9	38	4	38	14	10	4	1	--	--	56	51	8	55	101	6	12	1	3	9	4	3	502	20.1	27.3
Repr.	25	5	70	3	--	5	13	3	2	--	--	--	--	30	11	1	21	80	--	1	1	--	2	--	--	273	10.9	14.8
Total	25	42	301	19	128	20	169	61	13	7	1	13	2	171	211	37	187	319	11	47	6	6	26	11	8	1841	73.6	100.

In Tables 1A and 1B, 2, and 3, the total numbers of observed elements are recorded. Since the same element may be repeated at a single site, these numbers are greater than the actual number of different kinds of elements. Tables 4 and 5, below, for the southern and northern sectors respectively, show the number of different kinds of elements in each style for each site. Each kind of element is given a value of one regardless of the number of occurrences of the element at the site.

TABLE 4 - Southern Sector

Site No.	Iny 28	Iny 38	Iny 181	Iny 198	Iny 205	Iny 208	Iny 210	Iny 269	Iny 270	Iny 272	Iny 388	Iny 389	Iny 390	Iny 392	Iny 393	Iny 394	Iny 395	Iny 396	Iny 397	Total	Median	Per cent
Curv.	5	5	2	4	2	13	14	18	16	14	9	12	11	1	8	--	6	18	1	159	8.4	49.7
Rect.	--	--	4	--	1	9	8	18	14	14	3	8	5	--	3	5	7	16	--	115	6.1	35.9
Repr.	3	1	5	1	4	4	4	6	3	2	4	1	2	--	1	--	2	3	--	46	2.4	14.4
Total	8	6	11	5	7	26	26	42	33	30	16	21	18	1	12	5	15	37	1	320	16.8	100.0

TABLE 5 - Northern Sector

Site No.	Iny 204	Iny 259	Iny 267	Iny 268	Iny 278	Iny 334	Iny 363	Iny 398	Iny 399	Iny 400	Iny 401	Iny 436	Iny 437	Mno 4	Mno 5	Mno 6	Mno 7	Mno 8	Mno 66	Mno 421	Mno 548	Mno 549	Mno 550	Mno 551	Mno 552	To-tal	Me-dian	Per cent
Curv.	--	11	20	4	9	7	18	12	1	2	--	1	1	15	17	8	16	20	2	13	2	3	9	4	5	200	8.0	50.2
Rect.	--	3	13	5	10	3	12	8	3	2	1	--	--	12	17	5	13	18	3	9	1	1	6	1	2	148	5.9	37.2
Repr.	2	1	4	3	--	4	4	1	2	--	--	--	--	7	5	1	6	8	--	1	1	--	--	--	--	50	2.0	12.6
Total	2	15	37	12	19	14	34	21	6	4	1	1	1	34	39	14	35	46	5	23	4	4	15	5	7	398	15.9	100.

TABLE 6

Summary of Data for All Sites Appearing in Tables 4 and 5

Sector	Curv.	Rect.	Repr.	Total
Results Obtained				
North	200	148	50	398
South	159	115	46	320
Total	359	263	96	718
Results Expected				
North	199	146	53	398
South	160	117	43	320
Total	359	263	96	718

Any discrepancies between the "obtained" and "expected" results are probably mainly attributable to field observation errors.

In the field a total of 77 different elements was observed, of which 30 were Curvilinear, 32 were Rectilinear, and 15 were Representational in style. To obtain some measure of relationship between kinds of elements, it was necessary to work only with those elements which occurred in from forty to sixty per cent of the sites. This reduced the analysis to 17 kinds of elements. For each of the pairs of elements (136 paired combinations out of the 17 kinds of elements), a contingency table has been prepared:

		Element A	
		Present	Absent
Element B	Present	a	b
	Absent	c	d

a = number of sites at which Elements A and B were present,
b = number of sites at which A was absent and B was present,
c = number of sites at which A was present and B was absent,
d = number of sites at which Elements A and B were absent; then,

N = (a+b+c+d) = 44, the total number of sites observed.

From these data, ϕ coefficients were computed:

$$\phi = \frac{|ad-bc|-N/2}{\sqrt{(a+b)(c+d)(a+c)(b+d)}}$$

This form includes Yates' Correction for continuity; therefore the values may be slightly low.

These ϕ coefficients may be interpreted roughly as correlation coefficients. As a rough rule of thumb, the following table might be applied:

TABLE 7

Range of ϕ and Strength of Relationships

0 - .20	Almost negligible
.20 - .40	Definite but small
.40 - .50	Moderate
.50 - .70	Substantial
.70+	Very strong

TABLE 8

Identification of 17 Kinds of Elements
Observed in Owens Valley

Element No. in Tables	Classification Name
3	Circle
4	Circle Bisected
5	Circle Chain
8	Circle Concentric
10	Circle Connected
12	Circle Spoked
13	Circle Tailed
16	Dumbbells
18	Grid Oval
21	Lines Wavy
30	Sun Disc
35	Cross
45	Grid Rectilinear
50	Lines Parallel Straight
55	Rain Symbol
56	Rake
76	Snake

Given, that the sites shown in this study represent the petroglyph universe of Owens Valley, Table 9 supports the proposition that there is some general factor operating about each of the elements, and that the individual elements do not have a random or specific meaning unrelated to the group. In no case is the presence of one element associated with the absence of another. In the following table $\emptyset = \sqrt{X^2/N}$. There are positive relationships in all instances.

TABLE 9

Relationships of 17 Elements Listed in Table 8

	3	4	5	8	10	12	13	16	18	21	30	35	45	50	55	56	76
3	-	.58	.44	.64	.29	.55	.40	.36	.50	.50	.29	.70	.57	.32	.53	.46	.29
4	.58	-	.34	.55	.38	.45	.40	.45	.50	.58	.29	.43	.38	.41	.62	.37	.39
5	.44	.34	-	.40	.53	.38	.27	.48	.32	.43	.25	.49	.25	.25	.20	.45	.63
8	.64	.55	.40	-	.25	.42	.44	.52	.37	.54	.25	.47	.25	.36	.49	.14	.44
10	.29	.38	.53	.25	-	.53	.35	.34	.37	.47	.40	.26	.21	.29	.16	.50	.40
12	.55	.45	.38	.42	.53	-	.36	.26	.43	.45	.40	.40	.53	.26	.48	.55	.34
13	.40	.40	.27	.44	.35	.36	-	.37	.44	.50	.55	.57	.35	.21	.22	.41	.25
16	.36	.45	.48	.52	.34	.26	.37	-	.52	.26	.25	.50	.25	.36	.38	.37	.53
18	.50	.50	.32	.37	.37	.43	.44	.52	-	.50	.46	.59	.46	.32	.51	.64	.64
21	.50	.58	.43	.54	.47	.45	.50	.26	.50	-	.47	.51	.38	.32	.43	.37	.29
30	.29	.29	.25	.25	.40	.40	.55	.25	.46	.47	-	.36	.40	.10	.16	.32	.31
35	.70	.43	.49	.47	.26	.40	.57	.50	.59	.51	.36	-	.50	.33	.40	.45	.36
45	.57	.38	.25	.25	.21	.53	.35	.25	.46	.38	.40	.50	-	.29	.48	.50	.31
50	.32	.41	.25	.36	.29	.26	.21	.36	.32	.32	.10	.33	.29	-	.34	.37	.29
55	.53	.62	.20	.49	.16	.48	.22	.38	.51	.43	.16	.40	.48	.34	-	.45	.35
56	.46	.37	.45	.14	.50	.55	.41	.37	.64	.37	.32	.45	.50	.37	.45	-	.51
76	.29	.39	.63	.44	.40	.34	.25	.53	.64	.29	.31	.36	.31	.29	.35	.51	-

As completed, Table 9 shows the results after the formula for Yates' Correction for continuity was applied to the initial formula $\phi = \sqrt{X^2/N}$, the combined formula for which is shown on page 95. The significant values for ϕ for one degree of freedom are:

ϕ = .25 at the .10 level of significance
ϕ = .30 at the .05 level of significance
ϕ = .39 at the .01 level of significance

These values are true, given that the sites and elements observed represent the petroglyph universe of Owens Valley.

In establishing the relationship between the sites, only those sites which contained 40 - 60 per cent of the 17 elements were selected for analysis. Of the 44 Owens Valley sites observed, 10 qualified for this examination; of the 10 sites, 5 were in the southern sector and 5 in the northern sector. Considering the fact that there are 25 sites in all in the northern sector, and 19 sites in the southern sector, the proportionate discrepancy shown in this selection is borne out by Table 1.

In the analysis of site relationships the same formula was used as had been applied to the elements. Again, a contingency table was first prepared:

		Site A	
		Present	Absent
Site B	Present	a	b
	Absent	c	d

a = number of elements present at A and B,
b = number of elements absent at A and present at B,
c = number of elements present at A and absent at B,
d = number of elements absent at A and B; then,

N = (a+b+c+d) = 17, the number of elements.

From these data Table 10 was prepared, using for ϕ coefficients:

$$\phi = \frac{|ad-bc|-N/2}{\sqrt{(a+b)(c+d)(a+c)(b+d)}}$$

For purposes of comparison the southern and northern sites are presented in their respective sectors. The same rule for interpreting strength of relationships between elements (Table 7) can be applied to sites.

TABLE 10

Relationship of Sites

		Southern Sector					Northern Sector				
		Iny-208	Iny-210	Iny-388	Iny-389	Iny-395	Iny-259	Iny-278	Iny-398	Mno-6	Mno-421
Southern Sector	Iny-208	-	.03	.06	.14	.17	.11	.04	.24	.03	.10
	Iny-210	.03	-	.01	.03	.17	.08	.26	.51	.10	.07
	Iny-388	.06	.01	-	.04	.05	.05	.29	.09	.24	.12
	Iny-389	.14	.03	.04	-	.17	.17	.04	.04	.03	.69
	Iny-395	.17	.17	.05	.17	-	.06	.05	.05	.08	.30
Northern Sector	Iny-259	.11	.08	.05	.17	.06	-	.05	.05	.33	.30
	Iny-278	.04	.26	.29	.04	.05	.05	-	.39	.13	.12
	Iny-398	.24	.51	.09	.04	.05	.05	.39	-	.01	.12
	Mno-6	.03	.10	.24	.03	.08	.33	.13	.01	-	.08
	Mno-421	.10	.07	.12	.69	.30	.30	.12	.12	.08	-

TABLE 11

Pairing of Each Element Within the Five Ranges of Relationship Strengths Shown in Tables 7 and 9

[The strengths of relationships are arranged in columns, and elements are paired according to strength of relationships]

	Strength of Relationship				
	0-.20	.21-.40	.41-.50	.51-.70	.70+
Element No. 3		3 to 10	3 to 5	3 to 4	
		3 to 16	3 to 13	3 to 8	
		3 to 30	3 to 18	3 to 12	
		3 to 50	3 to 21	3 to 35	
		3 to 76	3 to 56	3 to 45	
				3 to 55	
Element No. 4		4 to 5	4 to 12	4 to 3	
		4 to 10	4 to 16	4 to 8	
		4 to 13	4 to 18	4 to 21	
		4 to 30	4 to 35	4 to 55	
		4 to 45	4 to 50		
		4 to 56			
		4 to 76			
Element No. 5	5 to 55	5 to 4	5 to 3	5 to 10	
		5 to 8	5 to 16	5 to 76	
		5 to 12	5 to 21		
		5 to 13	5 to 35		
		5 to 18	5 to 56		
		5 to 30			
		5 to 45			
		5 to 50			
Element No. 8	8 to 56	8 to 5	8 to 12	8 to 3	
		8 to 10	8 to 13	8 to 4	
		8 to 18	8 to 35	8 to 16	
		8 to 21	8 to 55		
		8 to 30	8 to 76		
		8 to 45			
		8 to 50			

TABLE 11 [cont'd.]

	Strength of Relationship				
	0-.20	.21-.40	.41-.50	.51-.70	.70+
Element No. 10	10 to 55	10 to 3	10 to 21	10 to 5	
		10 to 4	10 to 56	10 to 12	
		10 to 8			
		10 to 13			
		10 to 16			
		10 to 18			
		10 to 30			
		10 to 35			
		10 to 45			
		10 to 50			
		10 to 76			
Element No. 12		12 to 5	12 to 4	12 to 3	
		12 to 13	12 to 8	12 to 10	
		12 to 16	12 to 18	12 to 45	
		12 to 30	12 to 21	12 to 56	
		12 to 35	12 to 55		
		12 to 50			
		12 to 76			
Element No. 13		13 to 4	13 to 3	13 to 30	
		13 to 5	13 to 8	13 to 35	
		13 to 10	13 to 18		
		13 to 12	13 to 21		
		13 to 16	13 to 56		
		13 to 45			
		13 to 50			
		13 to 55			
		13 to 76			
Element No. 16		16 to 3	16 to 4	16 to 8	
		16 to 10	16 to 5	16 to 18	
		16 to 12	16 to 35	16 to 76	
		16 to 13			
		16 to 21			
		16 to 30			
		16 to 45			
		16 to 50			
		16 to 55			
		16 to 56			

TABLE 11 [cont'd.]

	Strength of Relationship				
	0-.20	.21-.40	.41-.50	.51-.70	.70+
Element No. 18		18 to 5 18 to 8 18 to 10 18 to 50	18 to 3 18 to 4 18 to 12 18 to 13 18 to 21 18 to 30 18 to 45	18 to 16 18 to 35 18 to 55 18 to 56 18 to 76	
Element No. 21		21 to 8 21 to 16 21 to 45 21 to 50 21 to 56 21 to 76	21 to 3 21 to 5 21 to 10 21 to 12 21 to 13 21 to 18 21 to 30 21 to 55	21 to 4 21 to 35	
Element No. 30	30 to 50 30 to 55	30 to 3 30 to 4 30 to 5 30 to 8 30 to 10 30 to 12 30 to 16 30 to 35 30 to 45 30 to 56 30 to 76	30 to 18 30 to 21	30 to 13	
Element No. 35		35 to 10 35 to 12 35 to 30 35 to 50 35 to 55 35 to 76	35 to 4 35 to 5 35 to 8 35 to 16 35 to 45 35 to 56	35 to 13 35 to 18 35 to 21	35 to 3

TABLE 11 [cont'd.]

	Strength of Relationship				
	0-.20	.21-.40	.41-.50	.51-.70	.70+
Element No. 45		45 to 4 45 to 5 45 to 8 45 to 10 45 to 13 45 to 16 45 to 21 45 to 30 45 to 50 45 to 76	45 to 18 45 to 35 45 to 55 45 to 56	45 to 3 45 to 12	
Element No. 50	50 to 30	50 to 3 50 to 5 50 to 8 50 to 10 50 to 12 50 to 13 50 to 16 50 to 18 50 to 21 50 to 35 50 to 45 50 to 55 50 to 56 50 to 76	50 to 4		
Element No. 55	55 to 5 55 to 10 55 to 30	55 to 13 55 to 16 55 to 35 55 to 50 55 to 76	55 to 8 55 to 12 55 to 21 55 to 45 55 to 56	55 to 3 55 to 4 55 to 18	
Element No. 56	56 to 8	56 to 4 56 to 16 56 to 21 56 to 30 56 to 50	56 to 3 56 to 5 56 to 10 56 to 13 56 to 35 56 to 45 56 to 55	56 to 12 56 to 18 56 to 77	

TABLE 11 [cont'd.]

	Strength of Relationship				
	0-.20	.21-.40	.41-.50	.51-.70	.70+
Element No. 76		76 to 3 76 to 4 76 to 10 76 to 12 76 to 13 76 to 21 76 to 30 76 to 35 76 to 45 76 to 50 76 to 55	76 to 8	76 to 5 76 to 16 76 to 18 76 to 56	

TABLE 12

Presence or Absence of Each of the 17 Elements
at Each of the 10 Sites

	Southern Sector					Northern Sector				
Element No.	Iny-208	Iny-210	Iny-388	Iny-389	Iny-395	Iny-259	Iny-278	Iny-398	Mno-6	Mno-421
3	x	x	-	x	x	x	x	x	x	x
4	x	x	x	x	-	-	x	x	x	x
5	x	-	x	x	x	x	x	-	-	x
8	x	-	-	x	-	x	x	x	x	x
10	-	-	x	x	-	x	-	-	x	x
12	-	x	-	x	-	x	x	-	x	x
13	x	x	x	x	x	x	x	x	-	x
16	x	-	x	x	-	-	-	-	x	-
18	x	x	x	x	x	-	-	x	x	x
21	x	x	x	x	x	x	x	x	-	x
30	-	x	x	-	-	x	-	x	-	x
35	x	x	-	x	x	x	-	x	-	x
45	x	x	-	-	x	-	x	x	x	-
50	x	-	-	x	x	-	x	-	x	x
55	x	x	-	-	-	-	x	x	x	-
56	-	x	x	x	x	-	-	-	x	x
76	x	-	x	-	-	-	-	-	x	x

x = present - = absent

TABLE 13

Proportionate Distribution of Element Styles in the Petroglyph Universe of Owens Valley

A. Distribution of styles by percentage of total number of elements, 3352 (Table 1A)

Representational Style	12.7 per cent	426 elements
Rectilinear Style	23.2 per cent	876 elements
Curvilinear Style	61.1 per cent	2050 elements
Total		3352 elements

B. Distribution of styles by northern and southern sectors

	Northern (per cent)	Southern (per cent)
Representational Style	64	36
Rectilinear Style	57	43
Curvilinear Style	52	48

C. Distribution of total number of elements by sectors

Northern (per cent)	Southern (per cent)
54.9	45.1

TABLE 14

Relationship of Sites Based on Strength of Relationship Figures Shown in Tables 7 and 10

[Arrows indicate interrelated sites]

.50+ Relationship (Prime Sites)

Iny-210 ⟷ Iny-398 Mno-421 ⟷ Iny-389

Iny-208 Iny-395 Iny-259

.20-.50 Relationship (Secondary Sites)

Iny-278 ⟷ Iny-388 ⟷ Mno-6

Relationship Between Southern and Northern Sites

Southern		Northern
Iny-210	⟷ Iny-398	
Iny-208	⟷ Iny-259	
Iny-388	⟷ Iny-278	
Iny-389	⟷ Mno- 6	
Iny-395	⟷ Mno-421	

Iny-259 and Mno-421 form the only direct relationships between two northern sites; all other relationships are between northern and southern sites.

Sites Represented in Table

Northern	Iny-398 = Casa Diablo Road
	Iny-259 = Wyman Canyon
	Iny-278 = Owens River
	Mno- 6 = Fish Slough Road
	Mno-421 = Casa Diablo Tableland
Southern	Iny-208 = Little Lake
	Iny-210 = Little Lake
	Iny-388 = Little Lake
	Iny-389 = Little Lake
	Iny-395 = Prospect Hills

TABLE 15

Presence and Absence of Elements in Prime and Secondary Sites

A. Elements present in all .50+ Prime Sites:

Circle Forms	Grid Oval	Lines Wavy	Cross
3	18	21	35
4			
13			

B. Elements absent in all .50+ Prime Sites:

Circle Forms	Sun Disc	Grid Rect.	Lines Parallel Straight	Rain Symbol	Rake	Snake
5	30	45	50	55	56	76
8						
10						
12						
16						

Strength of relationships of elements present in all .50+ Prime Sites:

.21-.40	.41-.50	.51-.70
4 to 13	3 to 13	3 to 4
	3 to 18	3 to 35
	3 to 21	4 to 21
	4 to 18	13 to 35
	13 to 18	18 to 35
	13 to 21	21 to 35
	18 to 21	

Using the .51-.70 strength of relationship as the most basic relationship, the .51-.70 column represents the primal relationship of elements in Owens Valley and the primal elements in the petroglyph population. The chart which follows shows at what prime sites these related elements occur.

TABLE 15 [cont'd.]

Sector	Related Elements					
	3 to 4	3 to 35	4 to 21	13 to 35	18 to 35	21 to 35
Southern	Iny-208	Iny-208	Iny-208	Iny-208	Iny-208	Iny-208
	Iny-389	Iny-210	Iny-210	Iny-210	Iny-210	Iny-210
		Iny-389	Iny-388	Iny-389	Iny-389	Iny-389
		Iny-395	Iny-389	Iny-395	Iny-395	Iny-395
Northern	Iny-278	Iny-259	Iny-278	Iny-259	Iny-398	Iny-259
	Iny-398	Iny-398	Iny-398	Iny-398	Mno-421	Iny-398
	Mno- 6	Mno-421	Mno-421	Mno-421		Mno-421
	Mno-421					

Sites containing all of the basic, or primal, relationships are:

Southern Sector, Iny-208 (Little Lake)
Northern Sector, Mno-421 (Casa Diablo Tableland)

All of the Prime relationships are absent in all of the Secondary sites, taken as a total group. The charts below show the occurrence of Prime elements in individual Secondary Site relationships.

Prime Elements Present in Related Secondary and Primary Sites

Related Sites	Prime Elements	
Iny-208 to Iny-398	3, 4, 13, 18, 21, 35	Elements present in all relationships: 3, 13, 21; absent in all relationships: none
Mno-421 to Iny-259	3, 13, 21	
Mno-421 to Iny-395	3, 13, 18, 21, 35	
Iny-210 to Iny-278	3, 4, 13, 21	

Prime Elements Present in Secondary Sites Related Only to One Another

Iny-388 to Mno-6	4, 18	Element present in all relationships: 4; absent in all relationships: 3, 35
Iny-388 to Iny-278	4, 13, 21	

TABLE 15 [cont'd.]

Strength of relationships between Primary and Secondary sites based upon presence of all 17 elements:

Related Sites	Strengths of Relationships, .20-.70		
	.20-.40	.41-.50	.51-.70
Iny-208 to Iny-398	4 to 13	3 to 13	3 to 4
	4 to 45	3 to 18	3 to 8
	8 to 18	3 to 21	3 to 35
	8 to 21	4 to 18	3 to 45
	8 to 45	4 to 35	3 to 55
	13 to 45	8 to 13	4 to 8
	13 to 55	8 to 35	4 to 21
	21 to 45	8 to 55	4 to 55
	35 to 55	13 to 18	13 to 35
		13 to 21	18 to 35
		18 to 21	18 to 55
		18 to 45	21 to 35
		21 to 55	
		35 to 45	
		45 to 55	
Mno-421 to Iny-259	3 to 10	3 to 5	3 to 8
	3 to 30	3 to 13	3 to 12
	5 to 8	3 to 21	3 to 35
	5 to 12	5 to 21	5 to 10
	5 to 13	5 to 35	10 to 12
	5 to 30	8 to 12	13 to 30
	8 to 10	8 to 13	13 to 35
	8 to 21	8 to 35	21 to 35
	8 to 30	10 to 21	
	10 to 13	12 to 21	
	10 to 30	13 to 21	
	10 to 35	21 to 30	
	12 to 13		
	12 to 30		
	30 to 35		

TABLE 15 [cont'd.]

Related Sites	Strengths of Relationships, .20-.70		
	.20-.40	.41-.50	.51-.70
Mno-421 to Iny-395	5 to 13	3 to 5	3 to 35
	5 to 18	3 to 13	3 to 45
	5 to 50	3 to 18	3 to 55
	13 to 50	3 to 21	13 to 35
	18 to 50	5 to 21	18 to 35
	21 to 50	5 to 35	18 to 56
	21 to 56	5 to 56	21 to 35
	35 to 50	13 to 18	
		13 to 21	
		13 to 56	
		18 to 21	
		35 to 56	
Iny-210 to Iny-278	4 to 13	3 to 13	3 to 4
	4 to 45	3 to 21	3 to 12
	12 to 13	4 to 12	3 to 45
	13 to 45	12 to 21	3 to 55
	13 to 55	12 to 55	4 to 21
	21 to 45	13 to 21	4 to 55
		21 to 55	12 to 45
		45 to 55	
Strength of relationships between Secondary Sites related only to one another, based on presence of all 17 elements:			
Iny-388 to Mno-6	4 to 10	4 to 16	16 to 18
	4 to 56	4 to 18	18 to 56
	10 to 16	10 to 56	
	10 to 18		
	16 to 56		
Iny-388 to Iny-278	4 to 5	5 to 21	4 to 21
	4 to 13	13 to 18	
	5 to 13	13 to 21	

TABLE 16

Frequency of Distribution and Occurrence of all 17 Elements
in Northern and Southern Sectors
[See Table 8 for identification of elements]

		Southern Sector					Northern Sector					
Style	Element No.	Iny-208	Iny-210	Iny-388	Iny-389	Iny-395	Iny-259	Iny-278	Iny-398	Mno-6	Mno-421	Totals
Curv.	3	3	2	-	12	2	5	4	3	5	7	43
	4	1	5	4	14	-	-	11	11	7	4	57
	5	3	-	4	1	1	2	-	-	-	1	12
	8	1	-	5	3	-	2	1	5	1	2	20
	10	-	-	6	2	-	1	-	-	1	2	12
	12	-	2	-	1	-	2	1	-	6	1	13
	13	5	3	11	9	3	4	1	4	-	1	41
	16	2	-	1	7	-	-	-	-	1	-	11
	18	5	2	1	1	1	-	-	8	5	6	29
	21	5	2	2	3	-	4	1	3	-	4	24
	30	-	1	2	-	-	2	1	1	-	-	7
Rect.	35	3	2	-	2	1	2	-	2	-	2	14
	45	2	4	-	-	3	-	1	5	2	-	17
	50	2	-	-	4	2	-	18	-	3	1	30
	55	4	4	-	-	-	-	1	1	-	-	11
	56	-	3	4	1	3	-	-	-	1	2	14
Repr.	76	6	-	1	-	-	-	-	-	1	1	9
Totals		42	30	41	60	16	24	40	43	34	34	364

TABLE 17

Distribution of Curvilinear and Rectilinear Styles Based on 16 Elements, Shown in Total Frequency and Percentages [This chart omits the Representational Style which is negligible diagnostically]

A. Distribution of Curvilinear and Rectilinear styles by sectors:

	Southern (number)	Northern (number)	Total (number)
Curvilinear Style	138	131	269
Rectilinear Style	51	44	95
Totals	189	175	364

B. Distribution of Curvilinear and Rectilinear styles in percentage of total element distribution in Owens Valley:

Curvilinear Style	71.1 per cent
Rectilinear Style	28.9 per cent

C. Distribution of Curvilinear and Rectilinear styles by sectors showing percentage of each style:

	Southern (per cent)	Northern (per cent)	Total (per cent)
Curvilinear Style	51.4	48.6	100.0
Rectilinear Style	54.1	45.9	100.0

ANALYSIS OF DATA FROM TABLES

Tables 1A and 1B show that a difference in element styles does exist between the northern and southern sectors of Owens Valley. This difference does not become apparent until the 17 diagnostic elements are examined in relation to the 10 prime sites (p. 98). The examination at once reveals that curvilinear elements are concentrated in greater strength in the southern than in the northern sector, unlike the actual and anticipated strengths shown in the tables which are based on all 77 element styles found in all 44 Owens Valley sites. Later innovations of all styles during periods of sedentary occupation in the valley are strongest in the northern portion of the area. Originally, however, the Owens Valley was occupied by a group who, it is believed, infiltrated into the area from Nevada. This early nomadic group apparently entered the valley from the north and proceeded through Wyman Canyon, following the deer herds. Each of the five prime sites in the northern sector is most directly related to southern sites by the early curvilinear style rather than the later rectilinear style. This shows that the migrants first focused their attention on the game trail sites of the north, and later concentrated on the Little Lake area, principally at the far opposite end of the valley which was a center of winter grazing.

Though adaptable to mountain conditions, deer are principally lowland grazing animals. Climatic changes forced them to search for adequate food supplies at higher elevations during the summer months. Studies have shown that the Owens Valley has undergone a climatic change in the last 4000 years (Antevs 1952), and it is probable that western Nevada has been influenced by the same factors that gradually dried Owens Valley. Deer moving out of the Nevada country for higher grazing land migrate through Gilbert Pass from the Oasis region (Wyman Canyon, Iny-259) and across the Casa Diablo volcanic tableland from the Nevada region east of Truman Meadow (Mno-551). It is precisely along these routes that the prime sites in the northern sector of Owens Valley occur. The southern prime sites, which correlate directly with the northern ones, are located in areas suited to winter grazing. Sites Iny-208 and Iny-210 appear to be the oldest, followed by Iny-388 and Iny-389. Site Iny-395, on the border of the southern and northern sectors, is a transitional site from which a number of lowland petroglyph locations appear to stem, for example Iny-269, Iny-270, and Iny-28.

The most basic Curvilinear design is the circle (Element No. 3). The most basic Rectilinear design is the cross (Element No. 35). These elements correlate most strongly of all paired elements (.70+). It is

probable that the rectilinear style gradually came to supplant the curvilinear, almost element for element, among the same cultural groups. Superimposition of rectilinear designs over the earlier curvilinear ones often adds to the completeness of elements, as at Iny-278. While this is not always true (e.g. Mno-5 and Mno-8), there is a tendency for the rectilinear elements to work more harmoniously with the curvilinear rather than with the representational style. The great variations of the curvilinear design of the circle are principally attributable to the addition of rectilinear lines, such as circle bisected, circle spoked, circle tailed, circle with bar, circle horned, and grid oval. Most curvilinear elements have a rectilinear counterpart, such as lines wavy and lines straight, curvilinear meander and rectilinear meander, spoked circle and asterisk, sun burst and dashes radiating, oval grid and rectilinear grid, waved line and zigzag, etc. That there is a direct relationship between the two styles is borne out by Table 15.

Of all the styles, the Representational remains uncorrelated with others. The distribution of this style, primarily with designs of animals, is confined to lowland grazing areas, though an exception is found at Iny-267. Even here, as pointed out in the site description, the orientation of the site is equally suitable for trapping animals during grazing periods and for shooting them during migration. The Representational style found in the winter grazing areas seems to have been adapted by a sedentary group with villages established nearby. After earlier nomadic bands settled in Owens Valley their attention appears to have been directed more to a particularistic outlook; total abstract designs gave way to a form of realism. This no doubt occurred rather late, perhaps in the last one thousand years. Not only is a sophistication seen in drawing but also in the methods of drawing—designs are more carefully hammered in the rocks, probably by using a pointed stone placed against the rock surface which was then struck with a larger stone, giving more accurate control of lines.

The larger proportion of Representational style petroglyphs in the north over the south is primarily due to the ability of this area to support a larger population and to the more sizable herds of deer moving into the north during migrations. The prime sites and elements show that the earlier concentrations were toward the south, and the focus gradually was transferred to the north in a migrational backlash.

The most recent of the Owens Valley techniques for preparing designs on rock are scratching and painting. Since the scratching technique overlays all others and is everywhere observed in Owens Valley, it is attributable to a late period and probably represents the last attempts to fashion petroglyphs. There is nothing comparable to this form of petrography in

the western Sierra, and it probably represents a technique which followed the Representational style and was employed prior to cultural contacts with the Western Mono. These contacts date from approximately 1300-1400 A.D. (Elsasser 1960); it is possible that the scratching technique stands in time between the Representational style and this contact point.

Pictographs are not common in Owens Valley, but they do occur on the western side of the Sierra where soft rock suitable for petrography is unavailable. Some link between petroglyphs and pictographs is suggested by the presence of pigment in older pecked designs. The fact that pigment does not exist in representational styled petroglyphs indicates that painting was not introduced by those practicing this form of pecking. There are no known instances of scratching being superimposed over a painted surface, and this supports the idea that scratching was the last indigenous form of Owens Valley petrography. Perhaps traders returning from the western side of the Sierra, or Tulare County Indians venturing into Owens Valley, introduced this medium to the eastern valley. The older paintings appear as pigment rubbed into pecked grooves while in the more recent forms paint was applied directly on unadorned boulders. Rectilinear and Representational styles, more like Tulare County work than adapted forms from earlier Owens Valley petroglyphs, are the more common forms.

The gradual dying out of petrography in Owens Valley was very likely tied to the concentration of people in the lowlands. Hundreds of occupation sites along the Owens River attest to the gradual peopling of the territory. Such a concentration would require smaller bands to hunt game in the hills during the winter months, or in the mountain areas during the summer. Most of the sites along natural draws and trails show that nearly every available opportunity for ambushing migratory animals with the aid of petroglyphs had been utilized. The art probably halted as the population of Paiute Indians filled the valley grazing lands.

DEER TRAILS AND PETROGLYPH SITES

Mr. Douglas Garton, Assistant in the California Fish and Game Department at Bishop, using a map of Inyo National Forest, California and Nevada (1951 edition), delineated known migratory deer trails in southern Mono and northern Inyo counties, and the winter feeding grounds of herds in this large area. Information for the southern portion of Inyo County, obtained from local hunters and inhabitants, while not detailed or complete was helpful in establishing the relationship between deer habits and petroglyph site locations.

The deer of the Owens Valley are of the species Odocoileus heminous. It is possible that other species were present at the time of the early petroglyph makers in the valley since there has been a major change in animal population even during historic times. Hall (1946), for example, states that no specimens of deer are now found in the White Mountain area of southern Esmeralda County, Nevada. Yet at site Es-1, between the Old Davis Ranch and Trail Canyon, there is a curvilinear petroglyph site, clearly on a migratory trail leading from the White Mountains to piñon and grazing territory. Evidence at the site, such as petroglyph orientation, indicates that this had been an ambush point for shooting game in the fall while the migrating animals were on their way to lowland winter locations.

That deer are conservative animals is well known. Once a migratory route has been established successive generations will follow it, giving observant aborigines precise clues as to where the ambush sites should be located. In spite of major modern disruptions of game trails, such as highways, posted warnings of "Deer Crossing" attest to the persistence of these animals in following ancient routes. "Logical" routes are not always the ones followed by herds moving from one locality to another. In their seasonal movements they often travel over more difficult terrain and for longer distances than appear necessary to us. The Mammoth Pass herd, for example, splits to the north and south of Wildrose Canyon in Mono County, and only a small number of the animals trek through the easier canyon pass leading to winter grounds east of Benton. Trails in the eastern slopes of the Sierra are often seen to be worn more than a foot deep by the passage of large herds.

The deer of northern Owens Valley travel long distances between the Sierra and the winter grounds of eastern Mono County and western Nevada. The plateaus in this area are less than 5000 ft. a.s.l., enabling the deer to move more slowly on this long march, browsing as they move. Not all members of a herd cover the entire distance, stragglers or strays are found along the way into the winter or summer months. The meadowlands deter many animals, and there is some game to be hunted in northern Owens Valley throughout the year.

This fact could account for the gradual settling of early nomadic hunters in the northern area, and for the change from sites along migratory trails to those in grazing area. The tables in this study confirm that the stylistic changes in Owens Valley petroglyphs occurred in prime sites and with prime elements, with the changes most noticeable in the northern part of the valley. In this area the sites multiply in the grazing zones as the Curvilinear style changes to the Rectilinear. The

overall pattern of site distribution shows a heavy concentration in the north following the even distribution between north and south in the early formative period. Likewise, the overall distribution of elements (see Table 1A) shows the bulk of all styles to have been eventually concentrated in the northern portion of the valley. Tables 2 and 3 show that while the Curvilinear style was dominant in the south, it later lost ground to the Rectilinear style in the north. The changes from a southern curvilinear to a northern rectilinear orientation for Owens Valley (Table 13) were no doubt due to the presence of deer in the northern sector during most of the year rather than only during the migratory seasons. This condition probably enabled the population in the north not only to grow but also to become more stable and less nomadic.

When the maps of the deer trails were compared with the maps of the petroglyph locations, it was seen that in every instance the glyphs were located along the trails or in the winter grazing areas. Though some game trails occurred where petroglyphs were not observed, the glyphs do not exist where game movement is absent. This observation is not conclusive for arid regions inhabited by sheep (e.g. Iny-198, Iny-272). With the exception of site Iny-259 in the White Mountains, the sites relating to deer movements are concerned with Sierran herds.

There is a strong tendency for the Representational style to occur in the areas of winter feeding grounds rather than along game trails. The Curvilinear and Rectilinear styles occur in both areas, indicating that the later Representational style evolved principally in a nonseasonal hunting area. An exception to this is Iny-259, east of Owens Valley, and possibly a summer visiting site for Nevada Indians. This site of representational and curvilinear glyphs is environmentally unsuitable as a winter grazing area.

The Representational style and the scratching technique in making petroglyphs were late innovations. Being more abundant in the lowland grazing areas than along migratory trails, they are more often identified with occupational sites than are curvilinear and rectilinear styled designs. It seems certain that the later petroglyph makers were more sedentary than the earlier groups.

The occurrence of pictographs in Owens Valley is too infrequent to establish conclusions about this art in relation to deer movements. The largest number of instances of pictograph occurrence is in connection with rock shelters and cave sites. Though the pictographs are much better preserved in these protected areas, it is clear that pictographs were recent additions to rock art.

PIT-AND-GROOVE STYLE OF PETROGLYPHS

Heizer and Elsasser (1953) and Heizer and Baumhoff (1962) assume that the pit-and-groove style is a type of petroglyph. The distribution of the pit-and-groove in California and Nevada coincides generally with the Curvilinear style. This assumption, however, allows for extensions of the pit-and-groove into areas where the later style did not follow, indicating that while the styles were probably concerned with the same general purpose (i.e. hunting), the pit-and-groove complex was far enough removed in time to have prospered in a different climatic environment. Areas which were arid by the time the Curvilinear style was expanding were milder when first inhabited by petroglyph makers. Thus we find only the pit-and-groove style in northern Eureka County, Nevada.

The pit-and-groove style has the widest distribution of rock art; in some areas it is the only style present. In other regions (e.g. Tulare County, California) this style is shared only with pictographs. In Owens Valley it is coincident with one or more of the other petroglyph styles.

Being of such wide distribution and employing only two kinds of elements, the meaning that this style had to petroglyph makers must have been more generalized than that of the other styles. Whether the number of pits or grooves in a boulder had more significance than the number of designs at a site containing other styles is not known. It is possible that the two indentations, which were pecked, ground, or gouged in rock, stood for all the meanings within the other styles. Table 7 shows that the individual elements within the Curvilinear, Rectilinear, and Representational styles do not have a random or specific meaning unrelated to the group. This indicates that petroglyphs moved through a progressive development from general to particular meanings, from pit-and-groove to Curvilinear to Rectilinear and, finally, to Representational styles. That the latter style is highly particularistic in the meaning of elements is indicated by the "snake," which significantly correlates only with four other elements (Table 11).

Distribution in Owens Valley and Nevada

The distribution of the pit-and-groove style of petroglyph in this region follows a natural basin route from southern Inyo County into the sinks and river systems of northern Nevada. It is especially noted that the style is alone in northwestern Eureka County; the other styles of petroglyphs did not penetrate into this more arid area inhabited by sheep (Ovis canadensis). It is likely that the pit-and-groove makers lived in a period of different climatic conditions than our own. The style is not

limited to migration routes of animals, indicating that when these petroglyphs were created it was unnecessary for hunted animals to seek food in the higher elevations during the summer months since they could thrive in lowland areas throughout the year.

This placement and distribution pattern of the pit-and-groove style parallels that observed in Tulare County, California. It is therefore probable that the creators of this unique and simplified form of petroglyphs lived in the wet and cool climatic period of perhaps 7000-5000 B.C. It is also noteworthy that this is the only style of petrography observed in Tulare County; all other forms of rock art in this area are late pictographs of the historic or protohistoric period.

While the concept of visual perception in art is controversial, it is assumed that artists portray what they "see." Viewers who consider structural detail as important to form and function tend to include these in their art, rendering particulars into a style of "realism." Representational art aspiring to realism clearly distinguishes those factors which turn a general form into a particular object. A few early representational petroglyphs are recognized only as quadrupeds, and might be deer, sheep, coyote, antelope, etc. The later representational forms clearly differentiate species. Poor artistry is not suspected of being the contributory factor in these different presentations for it is assumed that one draws what one sees as significant. If all organic material is seen only as food, for example, an artist drawing a deer would hardly care whether that animal's characteristic features are shown. That such characteristics were not important to the petroglyph makers at one time but became important later is obvious. The whole development of this art moves from general to particularistic perceptions, the late period representational style showing clearly the most detailed and particularistic drawing.

While the pit-and-groove style does, then, present a general rather than a particular meaning, the outlook of these petroglyph makers was probably also rooted in life-at-large, and they developed a simple, standardized cultural pattern. The variations which do occur with the pit-and-groove style are not numerous, but they are extreme. While most pits average about two inches in diameter and about one-half inch in depth, an occasional pit will span eight or even twelve inches and be up to six inches in depth (Iny-278, Fig. 19l); other pits have been observed grouped within a larger pit (Iny-210, Fig. 6c). Some pits are placed on the side of a boulder (Iny-397, Fig. 29a), or completely cover the top surface (Iny-392, Fig. 24i). It is not apparent, however, that any significance is attached to this variation. The placement of the pits does not correspond in significance, for example, to the directional facing of petroglyphs. Grooves also show variations. They sometimes accompany pits, but pits exist alone more often than do grooves. Grooves usually connect pits although in some instances they exist as long, deep scars.

APPENDIX

PETROGRAPHY AS ART AND MAGIC

All art analysis is ultimately psychological, expressed in terms of the observer as well as the artist. This fact raises difficulties. Our own preconceptions of form and function in art are conducive to the perplexity we feel in viewing aboriginal petroglyphs. We cannot "see it" as art, for petrography violates our own developed standards of style. Since nothing is known ethnologically of the petroglyph makers, the problem is confounded. No living Indian has ever shed any light on our understanding of petroglyphs; all those who have been interviewed disclaim any familiarity with rock art.

But of the three factors in art analysis—the art, the viewer, and the artist—we at least have the first two for examination. If there is a direct and significant relationship between art and the artist, it should work both ways. Given an objective attitude, the viewer should be able to learn something about the artist by the work being viewed. Without such preparation, viewers have called petrography the "scribblings of children" and hence outside the proper realm of "authentic art" (Worringer 1953). It is apparent that there is a certain perceptual kinship between primitive art and child's art (Arnheim 1954), but it is a mistake to label their productions as synonymous. The peculiarities of child's art result from the psychological process of stripping characteristic detail from the memory image of an object (Gombrich 1960). The adult, however primitive, does not lack the full processes of perceptualization, and what he "sees" is what has become important to him and his society (Gipson 1950). That the styles of Owens Valley petroglyphs were repeated without change over the span of centuries was not due to the backward mentality of the aborigines but to the conservation of a form which had become functionally satisfying, and had been passed along with the teaching of cultural values.

Petrography was a carefully taught art, practiced by a delegated tribesman—probably the shaman—as indicated by the few differences noted in designs. There is no evidence of a rock wall being used as a practice "scratch pad." The trainee must have been given precise instruction before being allowed to peck out elements. Over the centuries, two thousand and fifty elements in the curvilinear style were pecked, but only thirty different kinds of elements were created. Of these, only seventeen appear in forty to sixty per cent of the sites. There was little individualistic tampering with the accepted form. That an accepted function had also been established is inferred from the consistent placement of petroglyph sites in similar physical environments. Form and function were as conjoined in petrography as in "authentic art."

Though every style in world art seems to find its form and function through a faithful rendering of nature, each people has to work out its own conception of what that is (Riegl 1927). Symbols are often created to stand for observed objects of interest as well as unperceived forces and relationships in nature. The basic symbol universally devised in the early pictorial production of art is the circle. A new style can be developed from this point only by the introduction of the straight line. Combining circles and lines establishes the essential form of an intended representational figure (Schaefer-Simmern 1950). The evolution from the generalized, symbolic pictorial form to the particularistic representational form is not due to an advancement in mental capacity of the aborigines but to a more confident involvement with the realities of the natural world. Though hunters view their environment, they do not find themselves clearly in it. In the art of Lower Paleolithic Europe it is rare to find a human figure (Burland 1959), just as in Owens Valley the hunter is seldom portrayed. Neglecting to draw himself might indicate a fear the aborigines had of being depicted (Hirn 1900).

Unlike the confident noble savage in romantic literature, the Indians lived in constant fear. The use of symbols rather than representational pictorializing reflects in large part a hiding from the uncontrollable forces of reality (Saarinen 1948). The rise of the representational style points to a relaxation from the eras of previous tension as a more stable and secure life developed in the lowland grazing areas of Owens Valley where meat was available throughout the year. That this style expressed the native's sense of growing power over the unknown is suspected also in the realization that pictorial representations alone are able to distinguish between what something is and what it is not. A sign or symbol can only point to something that is not actually present itself (Bernheimer 1961).

Though the representational style achieves a remarkable development in Owens Valley, the portrayal of humans does not qualitatively compare with the drawing of animals. When the hunter does appear he is as a semisymbolic stick figure. Exceptions to this are shown in the late pictographs at Iny-28 and Iny-181. There the styles are akin to Tulare County forms, and show the human figure in solid-bodied frontal views. Lacking, however, are the characteristics by which one man could be differentiated from any other, or even from a woman. More particularistic are the figures at Iny-259 which are not only frontal views but also remove any question as to sex. This rendering, again, is more akin to outside influences and is much like those observed in Nevada. While weapons and the techniques of killing prey enter into the art of Neolithic people (Rothschild 1960), only two Owens Valley sites (Iny-208 and Iny-390)

depict men with bows and arrows with any clarity, and only at the sites of Iny-38, Iny-269, and Iny-363 are atlatls shown

The fact that direct relationships between designs are not attempted in the curvilinear and rectilinear styles raises the possibility that aboriginal concerns about causal connections were absent or avoided. Only at the mixed stylistic site of Iny-278 does there seem to be any attempt to show a relatedness of elements. This is not characteristic of the later representational style, and at several sites some orderly arrangement of animals is definitely attempted. A sense of causal connection is ultimately involved with an interest in forces, time, and motion. The lack of schematic designs and story-telling in the earlier styles of petroglyphs indicates that an attitude which would lead to an interest in the relationship of objects was lacking.

Art styles change when the intentions of artists change (Wolfflin 1899). A cultural change manifests itself in a stylistic change through the close ties between a society and its interpreter. The long periods of time which witnessed the perpetuation of an homogenous style in Owens Valley art probably saw no significant change in tribal ways. The form and content, which is the warp and woof of style, would reflect cultural change (Stern 1898), but art followed the same stereotyped patterns through an unknown number of centuries.

In just what meaningful way the aborigines identified petroglyphs with their hunting ritual has not been established. It is certain, however, that it was intended the animals see the designs. Whatever the aborigines believed transpired at this encounter between animals and petroglyphs must have given the natives some satisfying assurance that the hazards of living could successfully be met. It is likely that some form of magic is involved in the function of petroglyphs. How the intervention of magic relates to desire and accomplishment is still controversial to those who have closely studied the problem of primitive thought. It is likely, however, that some simple factor, rooted in consistent animal behavior, is involved in petrography. The fact that the art was practiced for perhaps five thousand years denies the proposition that the success of petroglyphs in a hunting economy was dependent upon chance. It also denies that petroglyphs were a form of sympathetic magic which assumes that wishes are fulfilled by supplying substitutes. Finally, the continuum of petroglyph-making denies that the designs were induced to mystically ensure the presence of game. If magic were called upon to provide game, the hunter would have nothing to blame should he not bring home the prize. That magic might have been utilized to produce an emotional effect for conserving the morale of hunters is probable, but it is highly

unlikely that this magic was involved with petroglyph making. The reliance upon magic as a means for developing and conserving morale is a universal human trait (Collingwood 1938), but the function of petroglyphs in Owens Valley seems more directly involved with the practicalities of obtaining game.

It is likely that observant hunters noted how easily animals are distracted visually. Weak bows required hunters to be at very close range, enabling them to observe animals in tense situations. When frightened, animals seldom run from a source of danger until it is brought into vision, or its relative position is determined. Being visual objects, glyphs would attract—or distract—the attention of alerted game while the hunter was readying his aim. The principle of glyphs, then, while psychologically sound, was probably shrouded with spiritual awe and left to the shaman to work out in visual form. As mentioned above, all art analysis is ultimately psychological. The interpretation of particular elements in petrography is probably lost along with the symbology of the makers. That general rather than particular meanings were attached to the elements in the earlier periods is plausible by the particularism of later representational designs. The few designs that were employed in the styles that developed indicate that success was immediate in the functionalism of petrography, which was interpreted to mean a right formula had been established.

BIBLIOGRAPHY

Antevs, Ernst
1952 Climatic History and the Antiquity of Man in California. Univ. of Calif. Arch. Survey, Report No. 16:23-31. Berkeley.

Arnheim, Rudolf
1954 Art and Visual Perception. University of California Press, Berkeley and Los Angeles.
Deals with the visual image and the growth of child's art from the point of Gestalt psychology.

Baumhoff, M. A., R. F. Heizer and A. B. Elsasser
1958 The Lagomarsino Petroglyph Group Near Virginia City, Nevada. Univ. of Calif. Arch. Survey, Report No. 43:II. Berkeley.

Bernheimer, Richard
1961 The Nature of Representation: a Phenomenological Inquiry. H. W. Janson, ed. New York University Press, New York.
Discusses art and magic, and how the representational style expresses man's sense of power over the unknown.

Burland, C. A.
1959 Man and Art. Studio Publications, New York.
Delves at considerable length into the image of prehistoric peoples about themselves and their world.

Collingwood, R. G.
1938 The Principles of Art. Clarendon Press, England.
Devotes considerable thought to the relationship of magic to primitive art. Anti-Freud and Jung for their failure to establish the need of emotional stimuli in primitive and modern magical art.

Elsasser, Albert B.
1960 The Archaeology of the Sierra Nevada in California and Nevada. Univ. of Calif. Arch. Survey, Report No. 51. Berkeley.

Fenenga, Franklin
1960 Petroglyphs in California. In R. F. Heizer and M. A. Whipple, The California Indians: a Source Book. University of California Press, Berkeley. Pp. 195-198.
Summarizes the broad distributional areas of style.

Gipson, J. J.
1950 The Perception of the Visual World. Boston.
The basic perceptual theory of Gipson is that the general progress of learning is from the indefinite to the definite, from the general to the particular.

Gombrich, E. H.
1960 Art and Illusion: a Study in the Psychology of Pictorial Representation. Bollingen Series, 35, No. 5. Pantheon Books, Kingsport Press, Tennessee.
A masterful examination on the philosophy and history of art styles.

Hall, E. R.
1946 Mammals of Nevada. University of California Press, Berkeley and Los Angeles.
The standard treatise on the mammalia of Nevada and eastern California.

Hamilton, A.
1951 Exploring the Past: America's Oldest Houses. Natural History, Vol. 60:361-364.

Harrington, M. R.
1948 America's Oldest Dwelling. Southwest Museum, Masterkey, Vol. 22:5:148-152.

Heizer, Robert F. and M. A. Baumhoff
1962 Prehistoric Rock Art of Nevada and Eastern California. University of California Press, Berkeley and Los Angeles.
The most detailed and thorough examination of western petrography yet published.

Heizer, Robert F. and A. B. Elsasser
1953 Sacred Rain Rocks of Northern California. Univ. of Calif. Arch. Survey, Report No. 20:33-38. Berkeley.
The first investigation of the pit (pit-and-groove) style rocks in California.

Heizer, Robert F. and M. A. Whipple (eds.)
1960 The California Indians: a Source Book. University of California Press, Berkeley and Los Angeles.

Hirn, Yrjo
1900 The Origins of Art: a Psychological and Sociological Inquiry. Macmillan Publ. Co., London and New York.
Finds magic as a specific power to the aboriginal mind and not just an emotional preparation for a practical activity. Magic in art is a common activity universally engaged.

Langer, Susanne (ed.)
1958 Reflections on Art. Johns Hopkins University Press, Baltimore.
Paul Stern's essay "On the Problem of Artistic Form" discusses the nature of form and content in art, and the relationship between the two. He finds them as different expressions of a common idea.

Meighan, Clement W.
1955 Notes on the Archaeology of Mono County, California. Univ. of Calif. Arch. Survey, Report No. 28:6-28. Berkeley.

Riddell, Harry S.
1951 The Archaeology of a Paiute Village Site in Owens Valley. Univ. of Calif. Arch. Survey, Report No. 12:14-28. Berkeley.

Riegl, Alois
1927 Die Spatromische Kunstindustrie Nach Den Funden In Osterrach-Ungarn. 2d ed. Vienna.
A careful analysis of visual perception in ancient and primitive art, concluding that individual objects rather than group relationships were the prime concerns of early art.

Rothschild, Lincoln
1960 Style in Art: The Dynamics of Art as Cultural Expression. Thos. Yoseloff, Publ., New York and London.
Analyses the portrayal of subject matters in primitive art, and interprets these psychologically.

Saarinen, Eliel
1948 Search for Form: a Fundamental Approach to Art. Reinhold Publ., New York.
Examines the typology of stylistic development in art, and interprets the typology psychologically.

Sample, L. L.
1950 Trade and Trails in Aboriginal California. Univ. of Calif. Arch. Survey, Report No. 8. Berkeley.

Schaefer-Simmern, Henry
1950 The Unfolding of Artistic Activity: Its Basis, Processes, and Implications. Foreword by John Dewey. University of California Press, Berkeley and Los Angeles.

Stern, Paul
1898 Einfühling und Association in Der Neuern Asthetik. Ein Beitrag zur Psychologischen Analyse der Asthetischen Anschauung. Hamburg and Leipzig.

Steward, Julian H.
1929 Petroglyphs of California and Adjoining States. Univ. of Calif. Pubs. in Amer. Arch. and Ethnol., Vol. 24:2.

1933 Ethnography of the Owens Valley Paiute. Univ. of Calif. Publs. in Amer. Arch. and Ethnol., Vol. 33:3.

1963 Review of: R. F. Heizer and M. A. Baumhoff, Prehistoric Rock Art of Nevada and Eastern California. American Anthropologist, Vol. 65:975.

von Werlhof, Jay
1960 Petroglyph and Pictograph Sites in Western [Eastern] California and Southern Nevada. Yearbook of the American Philosophical Society, Philadelphia. Pp. 575-579.

Wolfflin, Heinrich
1899 Die Klassiche Kunst. Munich.
Studies on the relationship of society and art.

Worringer, Wilhelm
1953 Abstraction and Empathy: a Contribution to the Psychology of Style. Michael Bullock, trans. Routledge and Kegan Paul, London.
Worringer's work was inspired by late nineteenth century accounts of anthropologists.