

THE ROCK ENGRAVINGS AT PORT HEDLAND,
NORTHWESTERN AUSTRALIA¹

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ABSTRACT

Port Hedland is on the northwest coast of Australia. It is situated in an area of sandy plains covered with spinifex and scrub, rivers with sandy beds which run only in the wet season and whose deltas form extensive tidal flats along the coast. Great areas of the coast are covered with mangroves, whose dense growth is broken here and there by sand dunes. Bands up to 100 feet wide of rock engravings cover a total of about eight miles of low limestone ridges in the immediate vicinity of the township. The author spent seven weeks in 1958 recording the immense series of engravings, detailed study of which had become an urgent task because of the destruction of sections totalling about one mile in length of the main ridge by the industrial and residential expansion of the township. The fieldwork was financed by the Wenner-Gren Foundation for Anthropological Research.

The Port Hedland district was occupied by the Kariera and Ngarla tribes, both of which are now almost extinct. White occupation began in 1864, a smallpox epidemic killed many natives in 1865 and 1866, and the generally destructive results of white contact reduced them to less than 100 in each tribe by 1910. The majority of Aborigines now living at Port Hedland are southern Njangamada from the De Grey River, whose infiltration began in about 1910.

Five ridges, from one-quarter to almost four miles long, bear engravings. A census taken of two of them yielded a total of 7,051, and it is estimated that there are 15,000 or more engravings in the area. The plan of study adopted was to record to scale all obvious groupings and compositions, together with the densest assemblage of figures extending for 120 feet near an old well. Every separate motif and its variants were photographed and their range is illustrated.

Four techniques were employed. The simplest one consists of making shallow and narrow grooves in the rock; only one set of 20, up to a foot long, was recorded.

The commonest technique is the conjoined-puncture groove from one-fourth to three-fourths inches wide, and one-sixteenth to three-eighths inches deep. The whole of the outline, outline with interior design, linear design, and combined line and pecked figures were engraved with this technique. Several

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figures only were found in which the conjoined-puncture grooves had been abraded as well.

The important technique of pecking is represented by banded, partial and complete intaglios. There are two kinds of pecking, an early coarse one of large punctures which appears to be a carry-over of the use of the old conjoined-puncture technique, and a later one of fine pits and gashes often applied in layers to give depths of up to half an inch to the intaglios.

No stone implements were found on the sites or in the area that could be used in the above techniques. Experiments were conducted with whelk shells which produced perfect reproductions of the conjoined puncture and pecked figures, and as these shells are plentiful in the area, common in shallow middens on and beside the limestone ridges, they could have served the purpose of engraving tools.

The control of line, posture and anatomical details of the outline and pecked human and animal figures at Port Hedland agrees in general with sites of rock engravings and paintings elsewhere in Australia. The Minjiburu spirit figures are the most interesting artistically, with their beautiful line and poise of a dancer and actor, and the series forms an interesting addition to aboriginal art motifs as a whole.

Other human figures are shown in the usual front-wise position with the arms horizontal or upraised. The birds and fish are shown in profile, and the rays and other flat fish, and the lizards, from above. The fish and turtles are in swimming postures, portrayed as they were usually seen in the water. The animals are thus drawn in the posture in which the hunter sees them prior to throwing his spear or club. Some of the figures embody a nominal degree of animation and grace. The numbers of fingers and toes on both human and animal figures varies considerably.

Detailed study of the superimpositions revealed that definite phases of art existed during the past history of these sites, two prehistoric and one historic phases being distinguished. The abraded grooves cannot be considered in this chronology because they were not found in any of the superimpositions but they represent the earliest technique on the lower Murray River in South Australia.

The conjoined-puncture outlines are the earliest phase at Port Hedland. Predominant motifs among them are human figures and tracks, clutches of emu and other eggs, fish, sting ray liver, boomerang (in sets of up to five), clubs, hafted stone axes, sacred boards, circles and ovals. Rare and uncommon are mammals, birds, snakes, lizards, turtles, invertebrates, plants and important weapons like the spear, spearthrower and shield.

The outlines either developed into, or were contemporaneous with, similar figures with interior barred, striped, gridded, and broken line designs, curvilinear and dotted patterns, or a combination of these styles. Much the same frequency of subjects occurs in these styles, exceptions being a notable increase in the number of turtles in the barred style, and of shields in the striped and curvilinear styles.

In a second phase of engraving the figures are in the linear design style, predominant motifs being kangaroo-wallaby, lizard, emu and other bird tracks, snakes (often associated with a hole), meandering lines, barbed spearhead, pubic fringe, feather plume ornament, arc, sets of straight and sinuous lines, radiate, grid, concentric circle and spiral, cross and a series of indeterminate designs. In this phase hunting compositions of tracks, eggs and other items, but not the hunter or the game as a rule, are important.

In the third or pecked phase, believed to have survived until the coming of the whites, human, kangaroo and emu tracks, many of which are exceptionally big and deeply engraved, far outnumber all other subjects. Unusual subjects such as the marks made on the ground by a kangaroo sitting down, an emu sitting on its nest, and clutches of emu and turtle eggs are featured, while sting rays, lizards, snakes and banded designs are best represented among the other subjects. Human figures, mammals, birds and fish are rare in this phase.

A series of stone heaps, believed to be totem centers, are associated with the engravings. Potholes of all sizes in the limestone form an important feature of the engraved designs, as the hole of a snake or other animal, the mouth, breasts, and vagina of spirit figures, the mouth of an animal, symbolic waterholes frequented by emus and kangaroos, and totem centers.

The nature of the subjects changed from phase to phase. The concept that inspired the artists of the early outline phase is a complex of weapons, ornaments, sacred boards and marine animals associated with the Minjiburu spirit beings. According to early authorities, increase rites were carried out at the totem centers, and during these ceremonies it is probable that the lives of the Minjiburu spirits, who were probably of the creator kind and at least established the totem centers, were re-enacted.

The symbolism of the formal art motifs apparently still represented the same system of beliefs and rites in the Linear Design phase, as the evidence from Central Australian art and its function demonstrates.

The acquisition of pecking brought with it a small range of human and animal motifs, a reproduction of some of the linear motifs in the new technique, and a host of tracks. The old Minjiburu mythology apparently survived, as the engravings of human tracks around the old Minjiburu figures indicates. The Njangamada brought with them the Mungan-Bagadjimbiri mythology which gradually supplanted the old Minjiburu beliefs.

The phases of art revealed by a study of superimpositions at Port Hedland have significant implications for the whole continent of Australia. In technique, subjects and style the important Sydney-Hawkesbury outline engravings, those at Burra in South Australia, and other outline sites may be correlated with the outline phase at Port Hedland. The Linear Design phase is represented profusely among both engravings and paintings throughout northwestern Australia, central and South Australia, New South Wales and Queensland west of the Great Dividing Range, a distribution which represents

a widespread diffusion of these motifs from the northwest to the east and south-east of the continent. The pecked intaglios spread through the interior of the continent as a naturalistic art which overlies the Linear designs wherever both phases are present in the one site, as study of superimpositions in western New South Wales and the Flinders Range in South Australia establishes quite clearly. Pecking, however, spread as a stone working technique from the east into Western Australia and not from the northwest into the interior. Although the Outline and Linear Design phases are prehistoric in the northwest and other areas, it is important to note that the linear designs, with an emphasis on the concentric circle and spiral, sinuous lines, animal tracks and other motifs, survived among the Central Australian tribes as a ritual art.

Little data are as yet available about the antiquity of these various phases. In the Devon Downs cave on the lower Murray River in South Australia the abraded grooves have been linked with the middle or Pirrian layers 3,500 to 2,500 years ago, the outlines with the late Pirrian 2,500 to 1,500 years ago, and the linear designs with the late Murundian, all phases of the Tula culture. There is virtually no evidence at Port Hedland to indicate the antiquity of the engravings, but investigation of the shallow shell middens there may throw light on this problem.

Whether the engravings in any one of these phases were prehistoric or part of the living culture of the Aborigines appears to depend upon their location to some extent. The outline engravings of the Sydney-Hawkesbury district in eastern Australia probably survived as an active art until a late period, or until the coming of the white man, as they are the only type in the area. The linear design engravings are prehistoric in the northwest and the interior generally, including western New South Wales and Queensland, but they may have been an active culture element outside the distribution of the pecked type.

Much more research needs to be done on the precise range of subjects in each phase of engraving in various parts of Australia, and upon their distributions and antiquity. Interpretations could probably be obtained of some of the Port Hedland engravings from the few surviving Kariara and Ngarla natives in the area.

INTRODUCTION

In July and August, 1958, I spent seven weeks recording the remarkable series of rock engravings at Port Hedland. This work was financed by the Wenner-Gren Foundation for Anthropological Research in New York. It was inspired by Father E. A. Worms, who, like myself, was anxious to have made a detailed study of this important site, for both scientific and conservational purposes, because at the time of my visit the use of the main ridge (46a) beside the Highway for the One Mile native camp, the manganese cracking plant, and several quarries had already obliterated unrecorded sections of the engravings. Scientifically, the site is of fundamental importance in the study of aboriginal art and cultural history, and my study of the range and superimpositions of the techniques and motifs at Port Hedland has revealed a

clearer picture than was hitherto known about the archaeological history of rock engraving in the whole of Australia.

Port Hedland is a busy supply and shipping port on the northwestern coast of the continent. The estuary, a mile or so long, drains a vast network of mangrove lined shoals, channels, and islands, the biggest of the latter being Finucane. Low limestone ridges outcrop here and there on these islands. Extending inland from the estuary is a flat expanse of red sandy plains covered with spinifex grass and low scrub, which is invaded to the east and west by extensive tidal areas that are a mixture of sand and mud flats. This somewhat monotonous landscape is relieved on the coast by high sand dunes, and elsewhere by scattered limestone ridges which bear the engravings. At low tide coral reefs are exposed both in the estuary and along the coast. Here and there sandy bedded rivers, which flow in the wet season, spread their deltas where they meet the sea.

The seas and estuary abound in fish, turtles, dolphins and other marine life, dugongs were previously abundant and whales were occasionally stranded. In pre-white man days the plains supported a wide range of animal life in normal seasons. The environment was a comparatively pleasant, well stocked one for the coastal Kariera, in whose territory the engravings are situated, despite the extremes of climate that prevailed. The rainfall is only thirteen inches per annum, and the wet season months in the summer are very hot with temperatures frequently over the century. In the dry season supplies of fresh water were widely scattered and for this reason the spring at the Two Mile (deepened some years ago by Port Hedland Road Board into a well for the settlement natives), and the numerous holes in the limestone which held water after rain, were of prime importance in the economic life of the people. The availability of water and the suitability of the limestone for engraving, combined to make this area a center of petroglyphs in the Northwest where rock engraving was an integral trait in the aesthetic and ritual life of many tribes as Davidson's study (1952) has shown.

The engravings at Port Hedland are in the territory of the Kariera tribe according to Harper (1886, 291), Brown (1913, 143) and Tindale (1940, 204 map), but Clement (1903, fig. 1) and Petri (1960) place this township in Ngalla (Ngarla) territory. These two tribes together with the Ngaluma to the west were non-circumcizing, with a similar culture, way of life and environment, and many of the words in their languages are similar. The Kariera's country of 3,500 to 4,000 square miles was sub-divided into from 20 to 25 local group territories, each of 80 to 100 square miles in size, among the seven coastal groups (Brown, 1913, 144-5). The members of these groups lived by hunting and fishing, and by collecting plant foods (Harper, 1886, Richardson, 1886, Withnell, 1901, Clement, 1903). When a particular kind of food was abundant in one group's country other groups visited them (Brown, 1913, 146-7).

The country was occupied in 1864 by white settlers. An epidemic of smallpox decimated the native tribes in 1865 and 1866, when it is probable that active interest in their ritual and rock art was seriously affected by the loss of many of their totemic clan headmen. Gold and other mining activities from 1880 onwards further disrupted tribal interests. There were

100 Kariera left when Brown studied their social organization in 1910, and he, as the first anthropologist in the area, missed an invaluable opportunity of questioning the natives about the mythology and engravings. Most of the Kariera worked on sheep stations, the men as drovers, the women as servants. Like the Ngaluma and Ngarla, the Kariera tribe is virtually extinct today. The natives at Port Hedland are predominantly southern Njangamada who settled in this area after 1910, with a few Ngarla. They are interested in the Mungan (Bagadjimbiri) legend and its sacred boards (pulliwinna), but not in the rock engravings among which they have worn tracks that have obliterated figures, while the engraved part of the ridge near the Two Mile Camp is littered with broken bottles and refuse.

Literature. Richardson (1886) lived in the district from 1865 to 1876 but the only observation that he made on the rock art was of the occurrence of rude figures on stones. Cleland & Giles (1909, 46, figs. 1-3) gave them one paragraph and illustrated the large dugong (45) and design (VII). Campbell (1911) spent a day ashore from a ship, during which he recorded 34 figures along the main ridge beside the North West Coastal Highway. Basedow (1918, 1925) and Davidson (1936) both illustrated about 50 of the outline and other figures, merely mentioning the presence of the pecked ones. The Frobenius Expedition in 1938-9 (Petri & Schulz, 1951) concerned itself mainly with the outlines and linear designs of which they illustrated 20 figures. Like Worms (1954) they discussed the techniques and cultural significance of the engravings and compared them with Depuch Island and inland sites. Worms studied these engravings in 1931 and 1950, and thought there were no pecked figures there (1954, 1085), and Tindale recorded figures in 1953. Rose (1950) was interested in the significance of a six-toed human foot, but illustrated eight other outline and linear design figures. Elkin (1949) compared the outlines to those of the Sydney-Hawkesbury district engravings, as did McCarthy (1958, 20).

Informants. The time available in the field did not permit me to make exhaustive inquiries from the natives about the rock engravings. I met only one Kariera man, Captain George, who claimed to be 69. He worked on a manganese mine some 150 miles inland, and was making a brief visit to Port Hedland. He gave me a sacred board bearing the Garadjeri interlocking key design, and drew for me the clan design on his own board. He related an interesting but short myth about the Minjiburu spirit people and the sting ray, and is genuinely interested in the old mythology. He and Paddy Bolong, an old Ngarla man, Major Mackay and several of the other Njangamada, readily identified the obvious figures among the engravings, such as fish, animal tracks, weapons and artifacts, but they said they knew nothing about the designs, concentric circles and other obscure figures. It is probable that, if a group comprising Captain George, Paddy Bolong and other old Ngarla men, and also Kariera and Ngarla women, could be got together and taken along the ridges, some interesting information could be obtained about the engravings, but they are all old people and are the last of the natives from whom any data of this kind can be obtained at all. Such questioning would have to be done in the next few years because the old folk will not live much longer, and the mythology of these two tribes is not being passed on to the younger generation who are either immersed in the Njangamada mythology or just refer to all of this side of their life as old men's business.

Method of Study. It is estimated that in all, there is a carpet of engravings up to 100 feet wide and eight miles long in the five sites studied, and it was both impossible and unnecessary for me to record the whole of them to scale. I decided to photograph every motif and its variants and superimpositions, record to scale the densest and most interesting section (that near the Two Mile Well), various other groupings, and all compositions. One thousand 35 mm. photographs were taken, and from enlarged (4 x 3 in.) prints the designs were traced and classified. A census was made of sites 1 and 2, but time made it impossible for me to complete this aspect of the work in sites 3 to 5. An attempt was made to obtain as complete a record as possible of the full range of motifs, but it is realized that, in this vast assemblage of art and the varying conditions of light, some will have been missed.

SITES

The engravings at Port Hedland are made in ridges (Ia) of Tertiary limestone, sandy in texture, light to dark brown in color. Deep holes (Ic) eroded out by weathering agencies occur in large numbers and limit markedly the rock surface available for engraving. The ridges do not rise more than 15 ft. above the plain, but are up to 100 ft. wide. The sides slope gently up to the rounded top in most places, but here and there a rough steep face up to 10 ft. high is encountered. The following ridges bear engravings:

1. A very low ridge three-fourths mile long, which extends from the Road Board Depot along the front of, and a quarter mile beyond, the Native Hospital. It is the easternmost ridge and bears scattered engravings containing a high proportion of weathered outlines. A number of axe-grinding grooves (Id) and one seed-pounding hole (Ie) occur on this ridge.

2. This ridge begins a mile south of the jetty on the western side of the town. It curves in close to the western side of the North West Coastal Highway at the One Mile native camp, and runs beside this road to, and crosses it at, the Four Mile point. The ridge divides into several wide and flat topped parallel branches in this area. The figures are very scattered up to the first quarry (Ia), but a very fine series extends from here for half a mile towards the One Mile camp. There is then a blank area for about half a mile, but from a point opposite the Road Board Depot to the Manganese plant is another fine series in which the densest display extends from just north of the Two Mile Well to the road leading into the above plant. Of this display, 120 feet was recorded to scale (2-4) as were many groupings (6-10, 13, 15-21, 34-40, 96, 296) forming part of it. The remains of several Talu heaps of stones are to be seen in this area. The engravings become more scattered from the Manganese plant to the Four Mile, but many fine pecked figures occur among them on this part of the ridge, which becomes rough and potholed, with a steeper face fronting the road in many places. At the end of the westernmost sub-ridge, opposite the Four Mile, an elaborate Talu arrangement of stones (Ic, XVIIId-e) is to be seen.

e. A broad tidal flat, covered in parts by mangroves, separates the town from Kariara Island, on which two parallel ridges (46, Ia) from one-and-one-half to two miles long, and a third one-half mile long, are separated by

spinifex grass and tidal flats. This island can be visited by landing from a boat along the northern or western sides, or by walking across the tidal flat from the Four Mile end. The natives visit the area for fishing by walking across the mud and mangrove flat from the One and Two Mile camps. These ridges all bear very well preserved displays of engravings which include the pecked goannas (XIVa), bird and fish (XIIIb), a remarkable series of turtles (76-81), the whale (IXg), elaborate design (VIId), and a number of Minjiburu figures. A series of Talu heaps of stone (1c-e, XVII) were located on the furthest west of these ridges.

4. At the Old Boodarie Landing, several miles west of Port Hedland, and marked by a Trig. tower, engravings in excellent condition cover an area from 60 to 90 ft. wide and a quarter of a mile long, on a ridge which forms the southern bank of a mangrove lined channel.

5. On the opposite bank of the above channel, and a quarter of a mile west of the Landing, is another series of engravings in an outcrop of limestone forming part of a long low island. This series is notable for the long branching track-like grooves which run for 30 or more feet (XIIh) between the numerous potholes in the rock.

One or two additional series of engravings may occur on some of the other islands west of the Port Hedland estuary but I was not able to examine them. A search revealed none in the southern half of Finucane island.

Cockle and whelk shell middens up to a foot or so thick are scattered along and beside the limestone ridges in all sites. I made an extensive search of the surface of these shell deposits but could find no stone implements nor animal bones. Patches of the middens have been dug out for road filling near the town and native camps. Charcoal and shell for carbon 14 dating could be obtained from them, and the age of these middens would be useful data about the site.

SUBJECTS

Examination of the superimpositions revealed that the subjects and techniques are integrally associated. There are three techniques, comprising abraded and punctured grooves, and pecked, and these will form the major groups under which the styles of outline, outline with interior designs of various kinds, linear, pecked band and intaglios will be described. The motifs in the scale charts (2-10, 12-45, 88-93, 299-303) which are my original field charts, are not included in the classified diagrams (11, 47-75, 82-87, 94-295, 304-326). In referring to the illustrations, Fig. and Pl., have been eliminated throughout the text.

I. Abraded Grooves (1c)

Only one small series of about 20 of these grooves, less than a foot long and in a parallel series, was recorded. It is in site 1 and near the Native Hospital. This is the first record of these grooves in Western Australia, the nearest known locality being at Delamere in the Northern Territory (Davidson, 1936, 59).

II. Punctured Line: Outlines

Outlines.

Human beings. The twelve figures include one male, two females and the rest are sexless. Five (55, 59-60, 62, 300b, IB) of them are normal in type and up to 5 ft. tall. One is a headless oval-bodied figure (57) with two legs. A similar figure (4, right of middle) which has one leg and three toes was identified by Captain George as a Minjiburu man who came over the limestone ridge and whose head now wanders about near the Two Mile Well, and jetty. Both are about 2 ft. long. Another small figure (43) 3 ft. long, with upraised arms, has three fingers on each hand and three on each foot. Beside it is the speared buttocks of a man with well defined genitals. Other figures include a woman (38); a pair of men (26); a sexless figure which is probably a man (58) of normal human size; a broad powerful bodied man (56) with pointed head, large eyes, uneven arms and a pair of natural holes in his crotch which probably represent his testicles; and (60a) a small round head with eyes, mouth, two legs and no body. Fingers are shown on two of the figures, none has toes and eight have pairs of eyes. Both arms are upraised on two, and one on two others; they are either uneven in size or lacking on the remainder. One (62) has radiate hair or headband. The figures do not carry weapons or other objects nor wear ornaments.

The biggest figure (29) nearly 9 ft. long, has the pair of limbs on one side (with five fingers and toes) longer than the other pair (which lack digits). He has a pattern of seven parallel lines on his chest.

The human feet (4, 5, 63, IIa) vary from a few inches long to those 21 x 8-1/2 and 26 x 8 in. in size and from broad to elongate in shape. Some display a bunion-like projection. The big toe is often well defined. The toes range from four to eight, with no preference for any number such as the six discussed by Rose (1950). Several of these feet have one or more bars across them, one has a cross and a bar and several have a pair of eyes.

In the few human hands (65) depicted one has four and the other five fingers, the wrist is rounded, and the fore-arm is not shown. They are natural size. A human arm (2-A30B20) was said by Captain George to be that of a man that was killed, whose arm, leg and head were taken to camp.

Mammals. A curious long legged and short tailed animal (26, IVh) just over 3 ft. long, may be a kangaroo or wallaby in profile with no fore-legs. It has an opening in its stomach from which a line extends outwards, while inside a circular object is enclosed by the body cavity. It was thought by Worms (1954, Fig. E.5) to be a hatching seagull, the pothole being its nest. A dugong-like creature (34) 5 ft. 9 in. long, and a sperm whale (91) 8 ft. long, with the fibrous baleen crudely suggested, are the only other mammals in this style.

Birds. The most notable example is a well poised heron-like bird (68). Another figure (3-A24839, IVb) 6 ft. 6 in. long, lacking feet and wings, is heavier in build than the emu whose shape it resembles and it may depict a mythical bird. Fig. 66 is a similar but imperfect figure.

Birds' eggs are an interesting motif. Sets are shown with the birds' tracks (3-A6 B25, A23 B 19, 5-A3 B48, 67, 69-74, IVe, g), and in one instance the hunter's track, beside them. There is one track beside two clutches, six tracks beside four eggs, and thirteen extend in a line from three eggs. The legs of the sitting bird are shown beside several clutches. Most of the clutches are emu eggs although no definite figures of this bird are portrayed, but the number and size of the eggs indicate that other birds are represented.

Reptiles. A snake in an S-like coil (IVf), a coiled snake (IVi), and two straight ones (32) are the only ones recorded. There are four lizards, two of which (94 c, d) appear to be goannas, and two (94 b, e) geckos.

Turtles. The only example (75a) found is an unevenly balanced one in a swimming posture. The oval figure with two appendages (3-A30B46) may represent a turtle.

Fish. The fish constitute one of the biggest series among the outlines. The full range of the species represented is shown in Figs. 2, 3, 5, 6, 8, 82-3, 88-9, 93, IX a-c. They include threadfins (salmon), mullet, bream, groper, catfish, sunfish, skipjacks, sole or flounder and other species, thus including the common narrow and broad bodied food species obtainable by spearing, throwing a boomerang or club, netting and stranding. All are posed as though swimming, either in the profile or dorsal view. Most of them are single figures scattered through the general mass of the engravings. Two groupings of up to five species of fish occur (88-9) and one of two fish associated with a Minjiburu spirit (39). While the two eyes are usually big in some figures, no eyes are shown in many of the fish. One has a pair of gill slits (82, top right). Among the best portrayals are those shown in IX a-c. In this plate the fish engraved inside another one (IXd) and the turtle inside a fish (IXf), represent either aesthetic exercises on the part of the artist or a combination of his totems. No complete swordfish was recorded but several of their swords (86, VIIIe) 20 in. long form attractive motifs.

The skates (22, 83-bottom, 89) are rare, and to their simple outline may be added eyes, mouth and gill slits. One (Xb) is outlined around a pothole which may represent its anus or genital organ. Its liver is shown below this hole.

The sting rays (3, 5, 10, 22, 33, 85, a, c-d) vary considerably in size, from 6 in. to over 5 ft. long. They range from a simple oval or circle with a thin tail to those showing the posterior lobes (of the flukes) which probably represent the claspers at the base of the tail of the male ray. The eyes are unusually big on some figures and the breathing holes are infilled. While the majority represent the common rounded sting ray, the large diamond-shaped ray and the crescentic eagle ray are also depicted. The depressions made by the rays in the mud may be seen by the hundreds on the vast tidal flats along the coast as rays occur in great abundance in these waters. One ray (Xd) has been struck with three double barbed spears.

The liver is shown inside the body of some of the rays (Xa & others), and is a very common motif in itself (83, 84, Xi-j) varying widely in shape from broad and short to long and narrow. It is from 3 to 42 inches long. Campbell (1911, 103) identified it as a phallic symbol.

Invertebrates. The few portrayed comprise two jellyfish (95 a, c) of different species; carybdeid medusae or sea wasp (95b, 2-A23B18, as identified by Captain George who said it killed people in the water but could not be seen; a mangrove crab (95 d); and a four-legged starfish (VIIIc).

Plants. A broad stemmed plant 4 ft. long with pairs of leaves (VIIIg).

Weapons and other Implements. By far the commonest weapon is the boomerang (98a) scattered throughout all of the sites. It ranges from tiny examples 3 in. long to large ones 3 ft. long. Most of them are curved in shape, the curve varying from shallow to deep in relation to the length of the weapon, with rounded ends. One (3-A18B21) has a bladed end. Some are sharply angled with pointed ends. In width they vary from narrow to very broad in relation to length and some are waisted. The boomerangs are engraved singly; several together at odd angles among other figures; two crossing one another; and in parallel sets of from two to five (98a, VIa). Three pairs are shown in Fig. 5. An unusual type is a pair of short broad boomerangs (106h). It is obvious that there was considerable variation in the relative dimensions and shapes of the boomerangs in use in this period.

The club types include the sword club, distinguished by its narrow grip (98a, VIa); one with an oval head (Vd); the rounded-stick throwing club (99a); a bird headed type (99c); a curved or hooked form (99b); one with a conical head and a very short handle (99d); a straight, flat fish killing club (99g).

Most of the hafted stone axes (100 b-d, g) are short handled, with the head evenly balanced on the handle, but one (VI, 12 in. long) shows the blade attached to the side of the handle. One (100c) has the shape of the Yodda (1) axe.

Other objects in the outline style comprise spearthrower-like weapons (34, 108j); a somewhat similar figure (XI c-e) from the head of which one or two short lines project; and bullroarers on a line (27, 106d, 294). The line from one is connected with a pothole.

Indeterminate. These include a large figure with four toes (302); elongate fringed figure (2-A31B36); a large figure (3-A24B39); rectangle (4-A4B44); and a design (5-A3B32).

Ovals and circles. These (146-52) are scattered among the engravings at all sites. They may be pointed (151), tailed (168-9), in linked pairs (178-9) and a pair like a tied bow (181, 193), on lines (170, 173-4), fringed (187), have a dot in the middle (154, 157), or be in groups of up to four together (2-A20B28). The circles are quite commonly engraved around a pothole.

Remarks: The outlines comprise a narrow range of human and animal motifs, artifacts, circles and other figures. Among them the fish, sting ray, liver, circles, ovals and boomerangs form the predominant subjects.

¹The terminology of stone implements adopted in this paper is that of McCarthy, Bramell & Noone, 1946.

Outlines with Barred Interior Designs

Marine Mammals. These include the biggest figures among the engravings at Port Hedland. The large marine creature (2a) beside the Two Mile Well is 11 ft. long, with grooves 1-1/2 in. wide and 1/2 in. deep smoothed by weathering. As it has no tail, two sets of fins, and what appears to be an open mouth, it is difficult to identify. It is regarded as a dugong by the natives, several of whom had no hesitation in identifying it as such. A number of linear figures, which include a double-barred spear, fringes, snake and parallel lines, a barred figure and a pair of pecked kangaroo tracks, are engraved within its outline. A pair of well proportioned bottle-nosed dolphins 10 ft. long (2, 3) in line with one another, are prominent in the dense assemblage of figures near the Two Mile Well. Captain George said that two linear motifs inside one of these dolphins represent a weapon and charm against enemies in battle. Further south, in the same section and halfway between the Well and the Manganese plant, two large marine mammals (36, XVIe) are engraved at the base of the eastern side of the ridge. One is a poorly shaped bottle-nosed dolphin 17 ft. 3 in. long, with two bars across its body. The other one is a whale-like figure 11 ft. long, decorated with many bars, on which one bar and the tail or mouth have been re-engraved as pecked snakes, and a pecked fin has been added (or re-engraved) on one side. The two figures lie diagonally across one another and a pecked boomerang is engraved over the outline of the dolphin.

Birds. The only figure is that of a wading bird (88, IXc) neatly shaped and poised as though feeding.

Reptiles. A snake nearly 1 1/4 ft. long (16) and another incomplete and shorter one.

Turtles. Among the several figures that occur (75 S & W, 296a) one has the flippers set straight forwards and backwards. One, 92 x 45 in. in size, has a groove of conjoined and separated punctures 1/2 x 1/4 in. in size, and one has a single median bar (4-AiB16).

Fish. One or two bars near the head are common on the fish (83, IXc) of which a variety of species is shown. The sting ray livers (35, 84, 87) are similarly marked.

Invertebrates. The bent and sinuous figures (135-9) resemble earthworms.

Weapons. Transverse lines, varying from widely spaced to close together, form a common decorative design on many boomerangs (2-5, 98b, 106b, Va and others), and this motif on boomerangs has been recorded at Pimba, Flinders Range, South Australia (Hall, McGowan & Guleksen, 1951, pl. XXVI, fig. F). At Port Hedland the design is also to be seen on a round headed club (99f), sacred board (102, left), sword-like object (101b), shields (15, 26, 120-1), and a club (3-A6B14, VIIIf). One barred boomerang (197) has a line linking its ends, and attached to the line are two small club shaped pendants.

Indeterminate. These figures comprise various oval figures, with a single median or number of bars, and some have a single bar at right or other

angles (2-5, 13, 113). Some are pointed and two, about 3 ft. long (112, VIg) have oval appendages. One is a large elongate figure, like a body and head in profile (XIk), and one is triangular (281).

Remarks. The barred figures consist of a narrow range of marine mammals, birds, snakes, fish, weapons and indeterminate designs. The most notable are the large dugongs, dolphins and whale, while the unidentifiable figures include some interesting forms. Some of the Minjiburu spirit figures are decorated with bars across the chest. The predominant motifs are the boomerangs, turtles, circles and ovals, and designs.

Outlines with Striped Interior Design

Human beings. These include an interesting series of striped men (II, e, h) one of which has a striped body and single-line arms and legs bearing five digits and a rayed head, and the other has a striped body and broad limbs. A number of variations of this type was found (5-A19B15, 12-- across a gridded turtle, 24, 32, 47, 51-4). The finest example, near the Two Mile Well, is 12 ft. tall. He has long arms, with a spread of nearly 10 ft., and short legs, on which the digits are represented by the ends of the stripes. He has a neatly rayed head, no facial features or genital organ, and is holding a short handled bulbous headed club or axe in his right hand. On his right arm he is carrying an outline human figure, 5 ft. 6 in. tall, with two eyes, rayed head and no arms, whose body ends in a natural pothole, 3 in. dr., from which three thin legs extend. The line of the head of this figure is the continuation of the top line of the larger figure's arm. The latter hero was identified by Captain George as Murra-murra, a big man, who made all of the engravings but who ran away when the Mungan brothers (McCarthy, 1961) appeared at Port Hedland. No comment was made by Captain or by Paddy Bolong on the smaller figure, which may represent Murra-murra's wife, as with the cave paintings of the Lightning brothers (Davidson, 1936, frontispiece) and Jundurruna on Groote Eylandt (McCarthy, 1960, Fig. 2-A8B16) or it may represent a younger brother. It is probable that Murra-murra not only belongs to an older mythology than the Mungan brothers, because both informants were certain that this engraving is not of the latter, but that he belongs to the original creator spirit time of the Kariera tribe. It is difficult to decide which figures are associated with Murra-murra in this dense assemblage of engravings, and many, including a pecked human foot on his face, are superimposed on various parts of his body. In all about a half dozen other examples of this hero, all very old, faded and incomplete, were noted on this ridge and on Kariera island, including an armless one (13).

An interesting old group (32) opposite the Road Board Depot depicts one of these heroes, 9 ft. tall, on one of the flat rock surfaces in this area. The hero is imperfect, his body and traces of one arm only being visible. Associated with him are two outline snakes 10 ft. long, and fish, small sting ray, large sting ray's liver, 3 bird tracks, knobbed object, small oval (human foot?) vertical set of three boomerangs, and a shield-like figure. Some of these figures are either embodied in or superimposed on the hero, but as they are all faded and in the one style it is difficult to decide this point. The group offers further proof that Murra-murra belongs to

the old mythology. A file of four pairs and a single one of pecked oval tracks, probably the hind ones of the kangaroo, are superimposed on this old group.

One of the human feet, with five toes, is striped (64).

Fish. A sting ray (33) only.

Weapons and other objects. Boomerangs are again the commonest motif (3-A2B23, 98c, f) and there are sword clubs (Vi; 4-A2B10; 5-A12B41), spear-throwers (108, a, c, V, k), shields (5-A25B8, 12, 28, 107 a-e, 303) and sacred boards (102). One of the finest figures (VI f) is like a cornucopia in shape, and the stripes become long loops at the bottom. The long sets of three parallel sinuous lines, one of which is 18 ft. long (VIIg) may represent the human and/or opossum hair belt worn by initiated men. There is also an indeterminate striped figure (4-A5B16), and one (123) 12 in. long may be a coolamon.

Remarks. The striped figures consist of a narrow range of human figures and weapons among which the boomerang, shield and designs are the commonest. The only animal represented in this style is a sting ray. The most notable figures are the cult heroes and the large cornucopia-shaped one.

Outlines with Barred and Striped Interior Designs

This design occurs on boomerangs (3-A24B40, A27B10; 39; IVb, Vc, VIc) most commonly, spearthrowers (106b, 108b), shield (107k), hafted stone axe or club (100a), sacred boards (102, 299) and an indeterminate object (3-A12B2). The bars and stripes may be placed in even-sized panels, or from 1 to 3 bars may divide panels of stripes. Most of these figures are natural size.

Outlines with Gridded Interior Designs

Although this design is restricted to very few motifs, it is characteristic of the turtles from 10 in. to 6 ft. 6 in. long (6, 9, 13, 21, 75 c-n, p, v, 76-81, VIIIa, b, d, IXf) on which it represents and is derived from the plates of the carapace. From 1 to 4 stripes sub-divide the bars in the grid, but a single median bar is common. The latter is well demonstrated on a dugong (90) and a whale (IXg, 92) which has wide deep grooves, on Kariera island. Several sting rays (85) bear this design. Among other objects are boomerangs (98b, 296a) shields (2-A21B29), hafted axe (100f) sacred boards (102), and ovals (5-A21B13, 191, 297) several indeterminate figures (3-A8B7, 43, 130, 127a, XIj) and a large leaf-shaped figure (5-A25B2).

The grid is a common separate motif in the linear series.

Outlines with Curvilinear Interior Designs

Some of the finest and most carefully executed figures at Port Hedland are decorated with this attractive design, which always remains curvilinear and does not become the angular zigzag motif of the modern shields, spear

throwers and sacred boards. It is shown on two sting rays (5-A21B40, 85-top), the only animal so decorated; and particularly well on the boomerangs (3, 29, 98e), sword club (10, 108e, Vg), spear-throwers (3-A9B3, A1B15, 108, Ve), shields (2-5, Vg, from 8 to 36 in. long, the biggest being 42 x 14 in.), and sacred boards (5-A21B1, Vf). The design varies from a single curvilinear line (which may double back to form a second line) to three, four and ultimately an all-over pattern. Usually the lines are sinuous but in some instances the loops are exaggerated. As the illustrations demonstrate, the fine line work in the all-over patterns is very skilfully done and indicates a complete mastery of the technique and medium by the artists.

A comparable motif in the linear series is the looped track leading from a pothole (96 u-v, XIIe, i-j) which represents a snake or other creature.

The curvilinear line pattern is combined with diagonal lines on a boomerang (18); herringbone on a boomerang (98e); stripes on handle of club (99e); bars on a sacred board (102); bars across curvilinear pattern to form five panels (102, right); and sets of bars at the ends of a spearthrower bearing a curvilinear pattern (108g).

Outlines with Crescentic Interior Designs

This is an uncommon design, and was recorded on a bird (43) associated with three pairs of arcs; a fish (83) with the arcs and short crescentic lines in panels; several boomerangs (Va, 98c); bullroarer (33) with an all-over pattern of arcs and herringbone; half-axe 8 in. long, and in a line pattern on a boomerang (299).

Outlines with Various Interior Designs

On some figures many of the above design elements have been combined, as an elaborate pattern of arcs, irregular and curvilinear lines on the body and base on the apices of a sacred object (VIId); triple bars, fringe, chevrons and curvilinear lines on a large boomerang; looped pattern, segmented margin, curvilinear, barred, striped and irregular line pattern on short, broad boomerangs (106c); barred, diagonal, crescentic and short curvilinear line design on a boomerang (106e); bars, grid, and irregular line pattern on a boomerang (98e); herringbone and irregular pattern of short lines (98e); crossed line pattern on hafted axe blades (100e-f); pairs of eyes at each end, a set of parallel lines in the middle, and barred oval figure, on a sacred board (101a); oval on sacred board (102, left); barred at one end, oval in middle and pairs of lines at other end of sacred board (102); herringbone at one end and looped line pattern at other end of sacred board (106a); cross on shield (107p); parallel diagonal lines divided by transverse angled lines, with an irregular line pattern at one end, on a spearthrower (108k); coiled snakes on a sacred board (Vh); barred and short irregular line pattern on a sacred object (VIIIIf); irregular line pattern representing shapes of carapace plates on turtles (75 q, t); fish with pattern of body ridges (3-A16B1, A29B1, IXc) identified by Captain George as sharks but which resemble the threadfin or salmon; pair of transverse sinuous lines on shield (3-A29B23); snake or sinuous line on hafted axe blade (3-A5B19); barred lines and oval on boomerangs (3-A13B16, A3B36).

Remarks. This group of varied motifs indicates that the artists experimented with the design elements, either for personal aesthetic reasons or to represent specific clan or ritual patterns.

Outlines with Dotted Interior Designs

The sting rays (3-A6B44; 5-A17B1; 35, 85, III g, Xe-f) form the majority of the figures bearing a dotted surface. As the crescentic eagle-ray has a natural coloration of white spots on a brown surface it appears probable that this design had a naturalistic origin in this art. The eagle-ray figured by Campbell (1911) is almost worn away by people walking on it as it is now on a track. The dots vary from small well separated pits to larger ones close together.

Other figures bearing a dotted pattern are a turtle (75r), and the head of a dugong (90); a fish (83); right-angled figure (5-A22B36); oval 14 in. long (5-A20B18) and a shield (106g).

The eight dotted areas, without outline (293) are unidentifiable.

Dots are combined with stripes on a fish (IXe); a design 2 ft. long of a dotted and striped ovals on a line (XIc) and a rectangle (184).

The lizard track (2-5, 42, 91, 96s, IXi) consists of a sinuous line, from a few inches to over 20 ft. long, bordered by a row of dots (pits) on each side, often leading from a pothole and sometimes ending in a second one. As the tracks in the bush lead from one clump of spinifex grass to another it is probable that the potholes represent these clumps. The blue tongue (junguma), and other short tailed lizards (muju, etc.) make such tracks, and natives identified the engraved track by these two names.

There is one line of 5 circles 1-1/2 in. dr. (154) each with a dot in the middle, and a few odd ones were also recorded.

Designs in Circles and Ovals

A median line across a circle or oval (158-65, 297 and others) is common, and other designs include parallel bars, cross (10, 107p, 142); crosses in a pair of conjoined ovals (180, 297); fringe (2-A16B10); bow-like (200); grid (191); grid in a double circle (183); and various line designs (185, 192, 216).

The most elaborate rock engraving design (VIIe) yet recorded in Australia is enclosed by an irregular oval 2 ft. 6 in. long and 1 ft. 6 in. wide. It resembles a map with its short straight lines branching off longer ones, connected with curved lines and with the dots, ovals, barred oval and bird tracks embodied in the design which is well preserved. It was photographed in 1908 by Burton & Cleland (1909, Fig. 3). There are no designs in the portable art of this area as elaborate and complex as this one. A variant of the use of ovals in designs is the chain motif of which there is a fine example (XIId) 3 ft. long consisting of a series of ovals divided by a median line. The clusters (3-A24B17, 4-A3B24, XIIi, 207-8, 210-14, 216-27) consist of conjoined

ovals and rounded figures in a great variety of arrangements, no two being the same. Their significance is unknown but they are common in the Flinders Ranges and western New South Wales sites. The grouping together of foot-like figures and ovals (196) is a variant of the cluster motif.

IIb. Punctured Line: Linear Figures

These figures are those in which the punctured line does not enclose a body or space, and include stickmen, lizards, parallel and sinuous lines, arc, animal tracks, fringe, plume, spearhead and spear, grid, radiate and other miscellaneous figures, or designs such as the concentric circle and spiral and meandering patterns.

Human beings. A small number of stick figures less than a foot long occur (16, 48-9), that are difficult to distinguish between a man and a lizard. One (16) shows a man holding a boomerang.

Sinuous Lines and Snakes. These lines represent both snakes and tracks. The majority of them start at the edge of a pothole. They range from a few inches to over 30 ft. (XII f-j) long.

Snakes (2-5, 96c, f, m, q, XII i, j) are scattered among the engravings on all of the ridges. Many are connected with a pothole (4-A2B37). In some instances part of their body forms a circle around the pothole (96c, g); the snake extends from one pothole to another (96c); several snakes are connected to one or more potholes (96r, p. t) or one leads from a pothole into a coiled spiral (5-A5B47); some have a bird track on the distal end (30); and in one figure the snakes are engraved as a balanced sinuous pair (285). Snakes also occur as motifs in the lobes of the sting ray liver (17, 45). They are up to 8 ft. in length but are not as long as the pecked snakes.

The looped line or groove (96u, v, XII k) represents the track of an animal either from a hole or from a clump of spinifex. It is a variant of the meandering track (15, XII g, where it is 40 ft. long) which may become a zigzag (303) or wander over the rock surface for 27 ft. or more; one XII h is engraved for over 30 ft. between the many potholes in site 5, branching in several directions. This line may represent either the track of an animal or mythical hero. The track of the lizard (ixi) differs from the meandering line only in the addition of the row of dots along each side. Another variant (105, 296 a-b, VII h) is seen where the line (up to 15 ft. long) ends in a plume, or in two branches at each end (3-A19B8).

One of the most elaborate examples of sinuous lines consists of 5 parallel lines in a pattern 3 ft. long (271) and there are others from 10 to 18 in. long (260). Another set of 4 parallel lines 15 ft. long (VII g) probably represents a possum-fur or human hair twine belt.

Animal Tracks. The hind foot tracks of the kangaroo and wallaby, and the track of the emu, are to be seen everywhere, either singly, in pairs, in lines of from 2 to 12, and in groups around a pothole. The latter groups may be of mixed species. The tracks of the emu and other birds occur beside clutches of outline eggs (69, 71, 74, IV g). The bird tracks include those

of the native companion, seagull, duck, curlew and galah, as identified by my native informants. They readily distinguished between the kangaroo fore-paw and dingo tracks, stating that the latter usually has shorter digits than the five of the former, and between the turkey with three short toes and the native companion with three long toes.

Spears. The types portrayed include a small number of plain spears, those with a single barb or pair of barbs (one on each side of point), and a single row of barbs. The great majority are armed with a double row of up to 16 pairs of barbs, mostly closely but sometimes widely spaced. Another common type has double rows in reversed groups, in which a triangle, cross or oval may be incorporated (97, 196-7). A rare type bears a diamond between two crosses (97). In the engravings the complete spears are from 4 to 9 ft. long, and two, three (3-A21B24) and four (2, middle) occur together. They are typical of the range of spears from this area figured by Clement (1903, pls. II-III).

The spearheads, particularly the heavily barbed ones, are scattered throughout the sites, singly, in pairs and triples, and in groups of up to eight (31). Attractive arrangements include a neatly barbed spear across (Vc) or beside (106a) a decorated boomerang; several spearheads in a parallel set; one across a pair of outline boomerangs (106j); one beside a barred boomerang and bird track (106i); and five spearheads against a boomerang (33). An unusual arrangement is that of two barbed spears projecting from a pothole (5-A23B43). Captain George said that a lot of spearheads together represent a fight.

Apart from their importance in fishing, hunting and fighting, Harper (1886, 289) said that in the Ngarla tribe persons absent when a relative died were not allowed to speak until they underwent a naman ordeal in which spears were thrown at them from a distance of 20 yards.

The association of the barbed heads with the spear shaft among these engravings makes it quite certain that the barbed motif represents a spearhead and not a plant. It has diffused over a vast area of the continent as an engraving, and appears as a painting in the lower Murray river.

Pubic Fringe. The fringe is ubiquitous and of great variety of shape and size (2-5, 103, 245, 252-6, XIa-b, d), from 3 to 22 in. long. The small ones worn by men and the larger ones worn by women are shown. It is usually engraved singly, but series of as many as five together are not uncommon. Some are shown attached to the girdle. The Minjiburu heroes are shown wearing a fringe (11e, i, j, l, u, IIIf), or one is shown beside the hero (11g, III & III, d-e). Some unusual figures include a fringe attached to a girdle around a pothole (2-A28B8), and a fringe engraved on the inside face of (Vo) or from the edge of a pothole (252-3). One figure (114) looks like a gigantic fringe about 4 ft. long but it may represent a bush with long stems like a grasstree. Two unusual fringes (2-A20B19, A18B34) occur, and there is an indeterminate fringed figure (4-A1B5).

Davidson (1926, 1952) referred to this figure as a "rake" with the reservation that it may be a pubic fringe; the fact that one is worn by the Minjiburu heroes is conclusive proof of its purpose.

Grid. (3-A9B6, 10, 23, 104b, 109, VIh, VIIa, XVIg). The grid usually consists of parallel bars of more or less even length with a stripe down the middle, but in some figures the bars shorten toward the top to form a cone-shaped grid. Variants of the design are attached to one or two circles (109, bottom left). They are from 8 to 12 in. long.

The grid is either derived from the pattern on the turtle (75-81, VIII a-b, d) or forms a separate motif derived from a design (pointed or cicatrized) on the chests of the men.

The most elaborate example (VIh) is at the Boodarie Landing, and another unusual one (VIIa) has a striped triangle as a base. Several grid designs have scrolls and circles attached to the bottom (2-A27B11).

Plume. (2-A35B9, 4-A1B41, 23, 45, 104a, 300a-b, VIIg, XIh). The plume is often engraved in fine narrow grooves. Its shape is characteristic of the head or arm ornament in which cockatoo or other feathers are inserted into a gum mount (Clement, 1903, pl. V, fig. 3), triangular in shape, with a stick as a pin to hold the ornament in place.

In the engravings the plume may be attached to a long straight stick (IIIh) or arm (2-A6B24), and to meandering lines (105, 296a-b, VIIh) up to 15 ft. long. One line with a plume at each end may be a worm of the coral reef which lives in a long case and has a brilliantly colored fringe at each end.

Radiate. (2-A13B12, A19B10, 80, 228-48, VIIa, c, XIb). This multi-rayed figure is shown in a variety of forms. The lines may radiate from a common center (243-4), a semi-circular line (245), a circle (238-42), or a pothole (3-A26B7, 5-A1B38, A15B22, A3B29, 228-31). In the two latter varieties the design probably represents the tracks of ants or crabs from their holes, the circle where used representing the hole. In some figures (232-6) the lines radiate from a circular space and Captain George said the figure illustrated people sitting or lying around a fire. One (247) is not unlike a spider, and another (241) resembles a starfish. In one figure the radiate motif, combined with a diagonal cross of two lines, is attached to a stick, and there is a second figure of the radiate lines on a stick (3-A28B41). A most unusual and unique design is that (XIb) of a large six armed cross, each arm of which has from 2 to 5 rays on the end. One radiate figure (2-A36B27) was identified by Captain George as something that cannot be seen but which kills people in the salt water (the Carybdeid medusa or sea wasp).

Parallel Lines. Occasional sets of straight parallel lines (5-A13B28, 26, 250) from 2 to 12 in. long, occur, and Captain George said they represent cicatrices. They are similar to the bars engraved on the chests of the Minjiburu spirit figures. A variant (248) consists of a set of lines in the middle of two other sets at right angles to it.

Arcs. (3-A3B3, A7B37, A29B48, 258-60, 262-4). Sets of from 3 to 6 parallel lines varying from a crescent to a semi-circle (or half concentric circle), occur as single motifs. One set of three arcs is engraved beside a pothole. Opposed sets of arcs occur (5-A14B23) and one set (VIIf) consists

of two pairs of crescents 5 and 6 ft. long. They vary in length from 4 in. to 2 ft. Their significance is unknown. Davidson (1936, 60) was told by natives at Delamere that sets of parallel lines and arcs represented markings placed upon the bodies of men during ceremonies.

Cross. Small crosses occur occasionally and were identified as starfish by native informants.

Concentric Circles and Spirals. (2-A21B12, A27B39, 5-A19B4, A20B29, 26, 145, 209, IVh). Both motifs from a few inches to 18 in. in diameter, are well represented and vary from weathered and faded examples to those in a perfect state of preservation. They are commonly drawn (5-A11B32, Vm-n, DXh, XVIg) around a pothole. In the concentric circles there are from two to a dozen circles in the one figure. In one instance (2-A15B9) a pair of concentric circles is attached to a line. Several sting rays are decorated with a concentric circle on their bodies (85).

Whether the concentric circle and spiral are different ways of engraving the same figure is not known, although it is probable. The spiral centered on a pothole may represent a coiled snake as the figure in IVi suggests.

Miscellaneous. (2-5, 87, 115-6, 131-2, 183, 267-79, 287, 289-92, 297, VIIe, XIc). Many of the linear motifs cannot be classified or identified in any way, and most of them are unique. The simplest kind is a short straight groove said in one instance by Captain George to represent the sacred stick (in small bullroarers) worn through the hair at the back of the neck by the initiated men. One (290) is a slender loop around two shallow potholes, and it may represent an outline boomerang. They include open-ended ovals and rectangles, the V, a cross (265), branching figures (2-A36B28) with a solid circle at the end of one arm. One (132) is a branching design like a river delta, one (VIIb) resembles a dancing wand of a special and unique type, and one (295, beside the road leading into the northern end of the Manganese plant) is a symmetrical design done in a very fine pitting technique.

Remarks. It will be seen that some of the linear figures represent naturalistic subjects comprising men, snakes, lizards and animal tracks, others represent objects like spears, fringes, pubic aprons, plume ornaments and hair belts, and some like the grid, parallel lines, radiate, arc, concentric circles and spirals, and the numerous miscellaneous figures are unidentifiable. Just where they belong in the chronology will be discussed in a later section of this paper.

Minjiburu Spirit, Figures and Compositions (11, II-III)

The outstanding anthropomorph at Port Hedland is an intriguing spirit figure, portrayed like a ballet dancer, actor or puppet, of which examples were found scattered along all of the ridge sites. Only one was recorded on site 1, near the Native Hospital. Their outline style combined with pecked feet and hands makes them difficult to place in the classification adopted here as they embody features of two different phases of engraving. They are not crude as Davidson claimed (1952, 93) but are stylized and to some degree elegant in poise. Worms (1954, 1085) commented upon the admirable economy of line in these figures.

The Minjiburu are characterized by a single outline mostly straight but in a minority slightly convex on both sides, or the whole body may form a crescent-like curve. The head is formed by the body lines with a rounded top. A neck is present on only a few figures. The legs are formed by the end of the body lines, the arms are two similar single lines on all but a few examples. On two figures there are double lines, with hands, for the arms. The feet and hands, which vary greatly in size, are pecked triangles or ovals, on which there are from 2 to 6 toes or fingers. The number of digits may vary on the limits of the one figure. The arms project either horizontally, or just above or below this level, in most figures, but on some (11r) they are dropped well down or (11t) one is held up beside the face. In other figures the arms are joined in a line across the body (7, 11h, 299, IIIb), and in one (90) this line is a crescent joining the hands on top of the head. The legs are usually spread out, but (11e) they may be set very widely apart as though the figure is dancing, or (11j, IIIc) both may point in the same direction. The pose of the legs and feet suggest running or dancing.

The head varies remarkably. In some figures (11j, q, u, y, IIIa) there is no head and a straight line forms the top of the body at the shoulder level. One of these (11q) has a face on the breast under the point where the arms are attached to the body. The simplest form usually has a pair of eyes, but the latter may be lacking. The hair is rayed on twenty figures and apart from one (23) with a conical projection from its head no other form of headdress is worn. The mouth is either a single or double bar, or an oval, and is shown on a quarter of the figures. In one (11f) the mouth resembles an outline hafted axe. The nose, included in five, is shown as a vertical line (IIIId), a bird track (45, IIIe) oval on a line (11, a, e) and a snake-like line (11c). Unusual features are the ring on each cheek (IIIId), double mouth (11e), four eyes and mouth (11, 30, IIIf), three eyes (25), and the eyes on the side of the face (22, 25).

Breast decoration includes a large oval (11e, aa), a set of from 2 to 14, and 23, parallel horizontal or diagonal lines (3, 7, 11r, W, 11, 27, 29, 42, IIIf); a barred oval like a pearl shell (28), and loop from the side (301). A girdle is commonly worn, and a fringe is worn by 15 figures (11i & others). The genitals are clearly those of a male in 7 figures (11q, z, aa, 19, 22-23), and of a female (11a, b, e, f, h, j, k, m, s, t, v, w, x, y, z, ac, 15, 28, 39, 45, 299, 301, IIIId) in 23 in which the vagina is represented by a pothole in the majority. The sex is indeterminate where a fringe is worn, and is not shown in some figures. In only one case are a man and woman shown together (15, IIIa-b). It is surprising to note, therefore, if the interpretation of the pothole as the female vagina is correct, that the majority of these figures represent a spirit woman.

A very important feature is the fact that seven Minjiburu have been speared either with a plain or barbed spear (7, 27, 30) and some of them with several spears (14). In two the head only of a barbed spear is shown, in the others the complete spear. This indicates a mythology in which combats were common and the Minjiburu were sometimes killed. One (11t) appears to have been struck with a boomerang.

Exceptional Minjiburu include one (IIa) that consists of a long rayed triangle ending in a small pothole from which three legs bearing pecked feet extend; one in profile (IIc) with no legs, a single arm with a curious line across the neck, two eyes, and a rayed head; and one (IIId), lacking the head, is carrying a barred boomerang.

The combination of an outline style with pecked hands and feet indicates that (1) the idea of infilling the hands and feet was in existence prior to the intaglio period, or (2) that they were pecked in during the intaglio period when all of the other pecked feet were made, or (3) the Minjiburu figures were all made during the intaglio period.

I recorded all of the Minjiburu and associated figures in groupings to see if they would throw any light on the above problem of chronology and on the function of these interesting spirit depictions. They comprise the following groups:

1. Speared Minjiburu (7) with bird leg and track, pubic fringe, lizard track, two barbed spears, snakes from potholes, outline sting ray and tailed oval, and a pecked oval track. Between his legs is an unidentifiable pecked figure of hourglass shape.
2. Minjiburu (11r) with a clutch of outline emu eggs.
3. Minjiburu (12) with shield bearing curvilinear line design, two small circles, curvilinear line figure, two large barred oval figures, outline boomerang, large oval, hooked line, and five pecked human feet leading to the spirit figure.
4. Small incomplete Minjiburu (13) with roughly shaped outline boomerang beside a superimposed group of a gridded turtle, striped man, large outline figure, shield bearing curvilinear line design, outline boomerang, double oval, pubic fringe, set of 4 parallel lines, fish and ellipse. Six pecked human feet are scattered about the group.
5. On elaborately decorated Minjiburu (14) struck with plain spears on both sides of his body. The only nearby figure is an oval.
6. One of the most distinctive groups (15) recorded is an important one because it is separated from and not inter-mixed with other engravings. It consists of a male and smaller female Minjiburu, in which circles represent the breasts of the female, and a natural pothole her vagina. Associated with them are a striped and barred shield, 2 barred boomerangs, pubic fringe "hanging" from a pothole, elongate V, 2 pubic fringes, snake from a pothole beside which is a bent outline figure. On one side is a meandering line over 40 ft. long, which leads from the edge of a large pothole in which spinifex grass is growing. Nineteen pecked human feet form a pattern of one line leading across the male figure to the female, between whose legs is a pair of these feet, and a second line leading eastward along the side of the male figure who is facing toward them.
7. A male Minjiburu (19, IIIc) with a line of 4 pecked human feet crossing his body from head to feet.

8. A simple Minjiburu (20) beside a series of pecked intaglios comprising a pair of lizards in coitus, large emu track, pair of hind kangaroo tracks, pair of human feet pointing toward one another, pubic fringe and vertical pair of boomerangs. An outline fish and several lines are also present.
9. A male Minjiburu (22) with an outline skate. Between his legs are 3 tadpole-like pecked figures and 15 pecked human feet which either point to or lead in to the Minjiburu.
10. A male Minjiburu (23) with a pointed head. There are an ornament and a pothole on his breast. He is associated with an outline human arm, two pubic fringes, grid, radiate figure, feather plume ornament, and sets of 2 and 3 short straight lines. Leading in to the Minjiburu are 5 pecked human feet, and another one points downwards between his legs.
11. A Minjiburu (25) with a pothole that may represent the female vagina. It has 3 legs. Associated with it are a short broad boomerang-like figure, 2 sets of parallel curved to straight lines, circle, and lines of an old incomplete figure. A pecked human foot points downwards between the Minjiburu's legs, one on each side of him point in different directions and there is also a pecked mammal track with a long big toe.
12. An elaborately decorated Minjiburu (27), speared on both sides, associated with an outline bullroarer on a line from a pothole, flathead (?) fish, oval, set of 4 arcs, pair of open-ended cones, two-legged but headless figure which may be human, and a large barred boomerang. The only pecked figure is a pair of kangaroo hind foot tracks.
13. A female Minjiburu (28) with a pothole as the vagina and a barred oval ornament (pearl-shell?) between her two small oval breasts. She is holding a barred club (or hooked boomerang?) in the left hand. In a line leading towards the figure are three pecked and one outline human feet, and a set of one hind and one fore feet tracks on either side of the tail of a kangaroo.
14. A small Minjiburu (30), wearing fringe, struck with a plain spear. Associated with it are a set of arcs, 2 pubic fringes, outline human and fish figure, long broken curved line, ellipse with pair of eye-like dots, large boomerang with curvilinear line design and odd lines; below the Minjiburu is another series of figures comprising a barred boomerang, large curvilinear line boomerang (imperfect), 2 barbed spearheads, pubic fringe, snake with bird track on one end, and two other figures.
15. This elaborate group (33) includes two Minjiburu of radically different kinds. One is a square-headed male figure (IIIId) within whose outline several bird tracks and a pair of arcs are engraved. Beside it a fringe, 2 rounded line figures and a barbed spearhead. A human and 3 pairs of kangaroo hind tracks are pecked. There is a sinuous line and a pecked boomerang beside his head. A large striped sting ray, dotted eagle-ray, barred boomerang and lines form a set in one corner. In the middle of the group are 2 barred boomerangs, a line between 6 pecked human feet, 6 more of which lead past the side of the second Minjiburu, and there are also 2 spearheads, plume ornament, cross and odd lines. The second Minjiburu has an unusual double fringed decoration on its head and breast and within its outline are a pair of small circles and

an outline boomerang. A large pecked human foot is engraved over its genital organ from which a sinuous line leads to one side of the figure. Beside the latter are a pubic fringe, tailed circle, 4 small bird tracks, 2 small pecked human feet, long pointed oval, shield with curvilinear design, 2 sacred boards with line designs, set of pecked eggs among which are four tracks (probably representing a goanna robbing the nest), long barbed spears, pubic fringe, parallel lines, barred boomerang into which 6 barbed spearheads are pointing, outline boomerang and set of straight parallel lines. On the other side is a long snake from a pothole and a pair of pecked kangaroo hind and one fore paw tracks.

16. A small Minjiburu (34) wearing a fringe and high girdle with rayed head. It has a third but detached leg and foot. There is a large outline dugong and a linear figure beside its head, an oval across its body, a linear snake (from a small pothole) and an arc at the other end. On the body of the dugong are pecked figures of a human foot, 3 eggs, and beside it a snake from a pothole.
17. An incomplete Minjiburu (36 left) among a number of pecked and linear figures, and barred boomerangs.
18. A female Minjiburu (39) with a rayed head, a pothole surrounded by an oval line as the vagina, wearing a girdle and holding a linear bird-track like object in her left hand. Associated with her are two large outline fish and boomerang, small circle, barred and striped boomerang, pubic fringe, oval, and barred shield (?).
19. A Minjiburu (40) wearing girdle and pubic fringe, with a double outline on its head, the upper one with a pair of eyes. In one arm-pit is an outline conical object and 2 of short parallel lines. Associated with it is an outline boomerang and a gridded shield. On the other side of the Minjiburu's body are two half oval fringed figures. There are 6 small ovals, like eggs, around the above set of figures, and a shield with curvilinear design. Below is a circle with a pair of lines inside. On the other side of the Minjiburu are 3 pecked human feet in a line.
20. A small female Minjiburu (5-A14B36) with 2 sets of eyes, rayed head, and 6 and 7 fingers on well defined hands. A long sinuous snake from a pothole runs across its legs. Above one arm is a small oval. The pecked figures comprise 4 human feet, and on elaborate barred circle with a cross attached to it.
21. An armless Minjiburu (42) with one foot, 3 bars on its chest, and one eye. A line runs across its shoulders to form the left side of its body, turns inwards to form an oval with a pubic fringe on its stomach, and then extends out to one side. Associated with it is a barred club-like object, and a long lizard track on the left. On the right is a line running into a pair of pecked ovals and a human foot, with a pecked boomerang and 4 straight parallel lines, a barbed spearhead, barred oval pubic fringe, grid on a stick, and a linear figure.
22. A small female Minjiburu (45, IIIe) with a bird-track as a nose and 3 legs. An intaglio of a long tailed rodent or phalanger has been pecked between its legs. Associated with it is an outline sting ray liver (with a snake within its outline), 5 elaborately barbed spearheads, a

plume ornament, bird track and a pubic fringe on a girdle. The pecked figures comprise 5 human feet (4 of which point to the Minjiburu), a pair of kangaroo hind foot tracks beside a Mangrove crab, and a sword club.

23. This elaborate group (77) is one of the few in which the Minjiburu is so integrally associated with the other figures as to leave no room for doubt that they all belong to the same composition and to the one engraving period. Two Minjiburu are shown, both sexless. One has an oval armless body, with 3 oval ornaments on its head, 3 parallel bars on its chest and two outline legs. The other Minjiburu has a rectangular shaped body, 3 eyes, 2 bars for the mouth, one foot and one hand, 3 bars on the chest, and a girdle. This one has been speared twice in the chest with a barbed spear and in the body with a plain spear. The other Minjiburu has been speared in the leg with a plain spear, and appears to have been hit on the other leg with an outline boomerang. They have either been fighting a duel or have been attacked by enemies not shown. In the group also are an oval and gridded turtle on the left, and 3 bird tracks, snake, outline figure, striped oval, a large bifurcated line figure and a barred snake on the right.
24. Another remarkable group (81) in which a Minjiburu is so integrally incorporated with the turtles and other figures that there is no doubt that all of them, excepting the pecked tracks, belong to the original series engraved at the one time to illustrate one event. The sexless Minjiburu has 2 small circles for eyes, one of its legs is embodied in an ill-shaped gridded turtle, a third or middle leg ends also on the side of the turtle. Below and above the Minjiburu are 3 more turtles, all gridded, two of them being over 8 ft. long. The four figures form one line. From the bottom upwards are a shield with curvilinear line design, barred boomerang, outline club, outline animal, catfish (?), and 8 pubic fringes. There is a pattern of lines beside and to the right of the head of the Minjiburu outline and line of 4 more on the large turtle, outline club, 2 snakes, pair of outline boomerangs and a barred boomerang (over front fin of large turtle). The pecked figures comprise 3 emu and 5 human tracks, a pronged line and 2 circles.
25. This interesting composition (90) consists of 2 Minjiburu with a large gridded dugong 10 ft. 6 in. long, in a swimming motion, and with many pits around its eyes. Although in a dorsal view, another fin is included on the side. The figure is too long and slender to be a turtle. Other figures include outlines of sting ray's liver, fish, catfish (?), oval, barred boomerang, bent figure, circle and sting ray (latter two over dugong's outline and another outline figure over its tail), and a pecked snake. The bigger Minjiburu is a simple straight-sided figure with its joint arm, to which foot-like hands are attached, passing through the top of the head. The smaller Minjiburu resembles a child wearing a girdle.
26. A tall simple style of Minjiburu (299a) with rayed and eyeless head, across which the joint arm passes. One hand has four straight fingers and the other has seven opened fingers. It has a pothole for a vagina from which a snake extends to another hole outside the body. In the group are an open grid at the top, a pair of parallel lines at the

bottom and an elaborately decorated boomerang. The pecked figures comprise a line of human tracks leading from two directions to end between the Minjiburu's legs. An oval and circle also are present. A second line of emu and human tracks runs across the head of the Minjiburu. It is to be noted that some of the tracks in each line point forward and others backward.

27. A small female Minjiburu (301, IIIf) with rayed head, 4 eyes and a mouth, loop and bar on chest, a pubic fringe and a pothole for the vagina. There is a pecked human track between its feet. The figure is on a long rock surface bearing a remarkable pecked hunting composition of a goanna, almost 7 ft. long, struck on the chest by a boomerang; beside one of its hind legs is an arc, bird track, and either a human track or the leg of another goanna. Six very big human tracks, from 21 x 8 to 32 x 9 in. in size, and 8 small ones, lead towards and away from the goanna. The large tracks may represent the hunter and the small ones his wife.
28. A legless Minjiburu (IIIg) with rayed head, eyes, mouth and girdle, beside a large dotted sting ray whose tail is across his body. The Minjiburu has two outlines on its head, and a double outline for arms. Two pecked egg-like disks are included.
29. A small Minjiburu (3-A1B21) 10 ft. away from a large and impressive pair (3-A12B22-37). The bigger one of this pair, 8 ft. tall, has a rayed head, large round smoothed eyes, a vertical stroke for the nose, parallel bars for the mouth, grid design on the body, girdle and pubic fringe. It has one arm and a lopsided head, and has been struck on the body with a bifurcated and a barbed spears, and a third spear, barbed, with the head broken off, extends under the arm and may be his own weapon. The smaller outline Minjiburu has a girdle, and judging by its pose, could be throwing the barbed spear above it. I could obtain no information from any of the natives about this important and outstanding pair of spirit figures excepting the statement by Captain George that they are Minjiburu.

Discussion. The brief accounts obtained from the natives indicate that Minjiburu legends were important in earlier days. A Ngarla man told me that the Minjiburu were a water people a long time ago. Padingana was one of them. His wife, Ngabunbunna, stayed in the hill country of good water, and left two women in one place, and two women in another place. Two men found these women and made the first people. Two brothers named Clarke, mixed bloods, after inquiries ascertained that the Minjiburu were all women who danced in the Warrawagine and Nullagine districts where their feet marks may be seen in the rocks. They walked and camped all over the country. Captain George said that the long slender human tracks engraved as intaglios on the limestone ridges are those of the Minjiburu.

Njerburg (or Snowball, over 60 years of age) said that the Minjiburu belong to the sting ray clan, and this opinion was confirmed by the following legend related by Captain George, who was the first informant to mention these spirit people to me: The sting ray (3-A7B111 is the one about which the myth is associated) was a Minjiburu "mob" of blackfellows who came from the

other side of Willewa. They camped near the Two Mile Well on a night of the full moon when the sea came up all over the flats and surrounded the limestone ridge. They asked the Kariera people how to get away, and the Kariera showed them the way when the tide went out. Some of the Minjiburu returned to their own country and brought their women back to Port Hedland. There was a big quarrel over the women, and Widdagurri men from the Shaw river visiting Port Hedland won a fight against the Minjiburu and drove them away. A Njamal man then stole a Minjiburu girl. Upon his refusing to return her, the Minjiburu threatened to either light their poison fire and let the smoke blow over the Widdagurri and kill them all, or meet them in a fair fight. The Njamal man and the girl he had stolen went out and brought in all their allies from different parts of the country. The fight began and was being won by the Minjiburu with their kaili boomerangs and spears, when two left handed kaili throwers of the Widdagurri killed the headman, Wirrawundi, of the Minjiburu by hitting him on the forehead with a kaili. This fight took place on the flat ground near Peawah Hill (Muggalin), on the Mundabullagana side, from where the Minjiburu were driven into the sea. Their two dogs were turned into stones. A clever medicine-man of the Minjiburu then lifted the sea bottom out of the water and saved them, and the Minjiburu still live near the jetty at Port Hedland.

According to Withnell (1901, pp. 1-4) the Ngaluma and neighboring tribes believed in a common creator spirit being named Ghurker, whose wife gave birth to the first couple sent to populate the earth. He created the Talu totem centers and the increase rites. Another spirit was called Mulgarra who lived in both heaven and on earth, and there was an evil spirit called Juno (Richardson, 1886, 293). Whether the Minjiburu figures in the engravings represent any of these spirits I could not ascertain.

The twenty-nine groups described above, particularly 23-24, suggest that the Minjiburu figures belong to the early outline naturalistic phase of engraving, and further that in the intaglio phase the human tracks were added, so that the mythology relating to them was preserved throughout the period of engraving, or most of it, although the techniques employed changed. Both Captain George and the Clarke brothers story about them indicates that they came from the inland and their efforts to settle in coastal country were repulsed. The term Minjiburu was applied to both this kind of figure, to several unusual outlines (57) and to pecked figures (3, 37, XIII, c, f).

Turtle Compositions

1. A gridded turtle (9) surrounded by miscellaneous linear and outline figures, among which are snakes, pubic fringes, outline and barred boomerangs. The pecked boomerang, human track on the turtle, set of 4 eggs, one bird and 3 human tracks were added at a later date.
2. A large outline figure, a gridded turtle, a striped armless man, superimposed over one another in that order (13).
3. A pair of swimming turtles (21) 5-6 ft. long, probably mating, abraded over their deeply punctured outline.
4. A gridded turtle (76) just over 8 ft. long, which has an outline boomerang and other small linear figures on its body, a barbed spear on one

fin, and an elongate fish-like figure, which has been speared, projecting from its rump. The other figures comprise several barbed spearheads, snake, pubic fringe, and a barred boomerang. Added later to the series are 4 pecked human tracks outside the turtle and one inside one of its rear flippers. The barred boomerang has had its groove pecked.

5. A turtle (78) over 6 ft. long, with a median and transverse lines on its body, that has been struck with two barbed spears. There is an outline boomerang beside the turtle, and the pecked emu track on its body is the most recently engraved figure.
6. A gridded turtle (79) 8 ft. 6 in. long, struck with a barbed spear. There are 3 small sting ray's livers beside it. Three pairs of kangaroo hind foot tracks and 2 emu tracks are pecked on its body, and a snake from a pothole is pecked across it.
7. A poorly shaped, incomplete, gridded turtle (80) 6 ft. long, struck with a plain spear. On its body are a grid, 4 pubic fringes, radiate or fringed circle, shield with curvilinear design, shield with zigzag line design and a large ill-shaped outline figure. A barbed spear is also present. The pecked figures comprise 4 human tracks, a kangaroo hind track and an indeterminate figure all of which have been added at a later date than the other figures.
8. A barred turtle (296a) at the end of long meandering lines, some of which end in plumes.
9. Gridded turtle (6) engraved over an indeterminate outline figure, with a broad outline fish, barbed spearheads, pubic fringe, plume ornament, and pecked human track.
10. Two other sets (77, 81) are described as nos. 23-24 of the Minjiburu compositions.

Remarks. These compositions illustrate the spearing of turtles (as the detachable harpoon was unknown in this area) in three groups (78-80), a pair of swimming turtles (21), two turtles associated with Minjiburu spirit figures (77, 81), and turtles associated with miscellaneous figures. Most of the turtle figures are isolated engravings as are the majority of the fish and other animals in the Outline naturalistic phase. The numerical abundance of turtle engravings, especially on Kariera island, indicates that they were both an important source of food and a ritual totem.

IIC. Punctured Line: Outline and Pecked Combined

The only motifs in which the two techniques are combined are clutches of outline eggs bordered by the pecked legs of a sitting emu (3, 10, XIIIId) and the line of pecked human tracks along both sides of the barred snake (16, IVc). They indicate that the transition from the old outline to the later intaglio technique was a gradual process and not an abrupt one, a conclusion supported by the addition of a pecked fin to the whale (36), and the lines and groups of pecked feet associated with the Minjiburu spirit figures.

IIIa. Pecked Band

It is difficult to decide with many of the bird and kangaroo tracks, and some of the other figures in this category, where the line of demarcation lies between the linear and the pecked band. It is an arbitrary distinction with borderline figures that cannot be placed in either category, but numerous figures exist to establish the two major series.

Animals. These include a man hunting a snake (304a) numerous snakes (34, 79, 90, 96b, 304b-g), some from holes (3-A19B40, 5, 96h, one 19 ft. long (XIVc), and others 12 and 30 ft. long (300a-b). One is in a curved fold (XVI f), one is sinuous with well defined head pecked along the tail of a whale (36). One fish has three fins on a straight ended body (83). The sting rays include two with a barred cross on the body (304h); gridded body and pecked tail (304k); median band (304g) with dots on body and pecked tail (3-A24B21, 85); double circle on body (30, 41) and engraved around a pothole (305a, XIVf). There is one sting ray's liver (316).

Designs. The other banded figures are all designs of various kinds, including circles and ovals (152, 305a-b, 306-7); tailed oval (2-A1B46, 96k, 173); scrolls merging into a simple spiral (VII d); loop on line (173); barred ovals (128, 309, XIVf); tailed and barred oval with cross attached (5-A16B37); rayed oval (104f); y shape (5-A18B21); unidentifiable figures (310-3, 318-9, XIVg-h) and designs (196, 200).

Rare figures in this technique include a striped and bladed club 16 in. long (3-A6B13) similar to one from Ashburton in the Western Australian Museum; a hafted axe with a cross on the blade (100a); pubic fringe (20); radiates (16, 237, 241); grid of plant-like shape (104b); and grids (109). Figures of the Outline phase with unusually wide grooves are similar to the pecked band figures and some of the figures mentioned in this paragraph, may belong to the former category.

IIIb. Pecked Intaglios

Human figures. The three most important figures are all in the area between the Two Mile Well and the Manganese plant. A woman (XIII f) 3 ft. tall, with 3 toes on each foot, 4 fingers on each hand, and a pair of eyes, was identified by Paddy Bolong as a Minjiburu making opossum fur twine of which she possesses a considerable stock. Petri & Schulz (1951, fig. 3) thought this figure represented a man swinging a bullroarer on a long cord. Another one (37, XIII c), sexless, 4 ft. tall, but probably a man, is 150 yards from the woman on the same level of the ridge; he has 3 toes on each foot, 4 fingers on each hand, and two deeply pitted eyes. Beside him are four pairs of kangaroo hind foot tracks. Although this figure is shallow and difficult to discern, it can be seen that it is pecked over a spear shaft. A third large figure (3-A28B17) 3 ft. tall, in profile, has a rounded head and curved arm, and is also very shallow and difficult to distinguish.

The other human figures recorded are small, poorly shaped ones in various postures. They include a tiny man with long knobbed penis (2-A1B41,

which might be a lizard); two (298 a, c) with slits on the face, and several others (2-A2B4, 298q).

Human tracks. (323, IVa, c, Vb, XIIIb, XV) of great variety of shape and size are scattered among the engravings (2-5, 324-5) along all of the ridges. They represent all sizes from children to men and women, vary in shape from slender to wide, rounded to almost rectangular and from straight or convex sided, to those of natural shape even to a bunion on the side of the foot. Some of them are gracefully curved. The toes vary from 3 to 11 and the big toe may be clearly defined. These tracks are commonly associated with the Minjiburu spirit figures and are shown in many of the sets of figures recorded. The tracks run in lines both up and down the ridges, along the ridges, and towards Minjiburu figures and the Two Mile Well. They are engraved in a series of steps in some places, contrary to Davidson's claim (1952, 92) that they are all scattered about haphazardly. Many of them are part of hunting groups, and some are associated with snakes. Many appear to have no connection with other figures, and they do not form an over-all pattern on the ridges, as a glance at figures 2-5 will demonstrate. Captain George identified one set of a large and some small human tracks as those of a man chasing a woman; he dropped his spears, shown behind him, became involved in a fight (indicated by the shields and spears in front of him). He also said that the big and the broad tracks are those of Kariera men, and the long slender ones are of the Minjiburu.

The human hand (321), as elsewhere, is a rare motif.

Mammals. The only figures found comprise one (XIIIe) a foot long with a rounded face, humped back, uniformly long legs and straight tail (posed like an ox with horns) which is probably a dingo at bay; a whiskered mammal (2-A7B1) that might be an echidna; a pair of flying phalangers (XIVh, top), and another one associated with a Minjiburu; and other indeterminate kinds (2-A7B36, 298p).

The kangaroo's tail is shown as a rod (324a-e).

Birds. One of the most beautiful figures in the whole site is a small wading bird (XIIIb) in a group of fish and boomerangs fashioned in a delicate pecking technique probably by the one man at about the same time. It is the only bird intaglio recorded.

Eggs. The clutches of eggs display an interesting progression in technique, from the pecked legs of the sitting bird beside outline eggs (XIIIId) and pecked band eggs and legs (326b-c), to the fully pecked eggs (XIIIh) and legs (326d-g; XVIc). One set of eggs has a single leg beside it (32e) and the bird's tracks lead towards one clutch (325d). The clutches containing from 2 to 6 eggs are probably those of wading birds, which are abundant in this area, and of the plains turkey, and those with a dozen or so large eggs belong to the emu.

Some very large sets of small eggs are probably turtles (326i, n) but there are rows of eggs 1 to 1-1/2 in. in diameter (326j, l, m, XIIIa, g) that cannot be identified. The eggs (3) in a straight line of 3, set of 6,

and curved lines of from 3 to 9, were identified by Captain George as those of the snake with which they are associated.

Animal Tracks. Bird tracks of many sizes up to 10 in. long, shown singly, in groups and lines are innumerable, and are scattered among the engravings along all of the ridges. They are shown in a similar manner to the tracks left by birds on the tidal flats and in many cases no doubt represent them. The biggest and commonest are those of the emu (326p, s-x, XIIIj, XVf) and those of the native companion and plains turkey (300, in a line of four, 326W) are also common. Three linked tracks (326T) look like a leafy vine or plant. Kangaroo hind foot tracks (Vb) equally as big as the emu tracks, are also scattered among the engravings at all sites. Goanna tracks (324u) also occur.

Reptiles. The snakes vary from short ones a foot or so long to long sinuous examples (300a-b, 304a-f, XIVc) up to 17 ft. long, 1 to 2 in. wide, in some of which are several snakes head to tail. Snakes are often connected with a pothole, particularly in site 5, and in some cases join two potholes together. An interesting set (3) of snakes with their eggs, identified as the Red-tailed snake (ididjerri), Tiger snake (bai-a-mulla) or another snake (dunikulara) by Captain George and Paddy Bolong, represents the assistant totem or familiar of the sorcerer. He names the locality (usually a pastoral station nowadays) of the victim, and sends the snake out at night to either bite the person or glide by so that his body catches the tail of the snake; it is believed that if the intended victim rubs his skin with a gum leaf the snake will go away. The snakes are caught and trained when young to go as far as Marble Bar. The informants stated that the death adder was not employed.

The goannas are among the most elaborate of the pecked series. The longest ones (299, 301, XIVa) are from 5 to 6 ft. in size, and one pair appears to be mating. They are shown from above, with five digits on the limbs. Other lizards include a gecko (298n), a hill lizard (XVIId) also shown copulating (20), usually posed with the limbs spread out, and identified by a group of Njangamada men, and indeterminate species (3-A26B11, 4-A7B2, 298o, 318) up to a foot long.

Fish. There is one breamlke species (298j, XIIIb), two splendid sting rays (XIVb, e) of which one has the tail curved and the sting ray's liver (298k, 316).

Invertebrates. The only motif is the Mangrove crab. In one (45, XIVd) the main arms do not bear the claws, the legs are shown as two sets of parallel lines, and the swimming legs are also present. In the other one (298m) the swimming legs and two sets of four thick legs are shown and again the claws are not included.

Weapons. The boomerang (4-5, 320b-f) is the commonest motif and it may be curved (XVIa-b), angled (XIVi), in a row (XIVi), hooked (XVIh), or in pairs (3-A8B45, 20). Sizes recorded include 12 x 1, 2-1/2 x 3-1/2, 6 x 3/4, and 13 x 1 in. Clubs shown include the throwing stick (3-A21B33, A12B33, 5-A14B45 shown as a rod) from 7 to 15 in. long; sword (3-A19B23, 36, 45),

round headed (29, 320h, VIIId, XVIId, thrown at lizard), and a hooked stick (29) types.

Bars. Pairs of straight bars, 8 and 18 in. long (314).

Shapes. These include rounded, crescentic and other shaped intaglios for which there is no explanation (2, 29, 36, 299, 314-5, with 11 examples, 3, with 8 examples). The rounded to oval ones vary from 2 to 5 in. long.

Hunting compositions. There are many groups of figures which denote a hunt or the habits of an animal. They express perfectly and in a subtle way the idea of the artist even where he has eliminated all but the tracks of his subject--a simple kind of statement widespread in aboriginal rock art. They include the following:

1. A hunter following a kangaroo shown by a human foot beside the animal's hind feet (324j, XVa). Paddy Bolong said that such a composition represents the way of hunting in the Dreamtime that was explained to the young men as the proper way to hunt.
2. A kangaroo sitting down, shown by the impressions of the tail, hind and fore feet (324a-c, e, two sets, XVd, f).
3. Kangaroo moving along on hind legs and dragging its tail (XVi).
4. Kangaroo jumping along and stopping, shown by the tail between the hind feet, in 3 sets of tracks in a line, and then by a further 4 pairs of hind feet as the animal leaps away from danger (323h).
5. Kangaroo ambling on its four feet, as it feeds, shown by hind and fore feet tracks (324g, 325g).
6. Three kangaroos standing together (324 1).
7. Man following a small wallaby's track shown by the hunter's and wallaby's tracks (325p).
8. Man hunting a kangaroo, shown by the tracks of the sitting animal and of the man, and also his shield (325o).
9. Kangaroo hunted with boomerangs (325d) the hunter's tracks not being shown.
10. Man following a kangaroo whose 4 pairs of tracks are shown (37).
11. A pothole representing a waterhole frequented by kangaroos and emus, and visited by a hunter, shown by tracks only (XVi).
12. Kangaroo hind feet and emu tracks, with a radiate and other figures in a group (325j) of unknown significance.
13. Hunter beside an egg and a pothole with a circle engraved around it (325c), of unknown significance.
14. Emu speared on its nest, shown by the bird's tracks leading to the nest, the clutch of eggs, and a barbed spear (325b) but the hunter and his tracks are not shown. Kangaroo hind feet and tail are shown.
15. Hunter, shown by his track, at the nest of a sitting emu (326a).

16. Man hunting a lizard, shown by the lizard, hunter's tracks in a line and boomerang (XVc).
17. Goanna walking (323o) and stationary (323t, u), shown by tracks.
18. People tracking and killing a goanna with a boomerang, shown by the animal, weapon and human feet of various sizes which may represent a family's tracks (301).
19. Man hunting flying phalangers, the latter being shown with the hunter's tracks and throwing club (XIVh).
20. Man shown by three tracks hunting a bird which is flying (VIIc).
21. Man hunting and probably killing a snake (NC).
22. Birds' tracks, spear, plume ornament and pubic fringe in a group (325n) of unknown significance.
23. Tracks of animals including birds, shown by a long series of 20 pairs of impressions (XVg), and lesser series (3-4, 11, 17-8, 32, 37, 239, 303, 324k, 326o, q-x, XVI) and of lizard ? (324n) and echidna ? (324v).
24. Man with dog shown by one human and 4 dog tracks (324p), and man with dog shown by tracks and spear (325e).
25. Man's track beside one end of a pecked snake, the other end of which is near a hole from which a second pecked snake extends into a loop (5-A1B35). This group may represent a sorcerer with his snake familiar or assistant totem.
26. Hunters catching a crab, shown by the latter and by the hunters' tracks (325a). Kangaroo, goanna and emu tracks are also present.

Remarks. The artists were obviously interested more with the tracks than with the men and animals. They have shown consistently that the elimination of the main figures is a principle in their art, and by doing so were able to make a simple direct interpretation of the hunts and save themselves a lot of work. In the Sydney-Hawkesbury district of eastern New South Wales, the artists engraved life sized and bigger outlines of animals, hunters, weapons and tracks in their compositions, in contrast to the more simplified approach of the pecked phase in the northwest. In the outline period at Port Hedland a few examples of the spearing of fish (93, 302) are the only naturalistic attempts to portray hunts, a fact which no doubt inspired Davidson's claim (1952, 95) that compositions are rare in Western Australia. The Minjiburu and pecked hunting series demonstrate that compositions are not uncommon at Port Hedland.

IV. Compositions in Mixed Styles

1. Man tracking a snake, shown by a line of pecked human tracks along both sides of the barred snake (16, IVc). Captain George said the man followed the snake for a long distance but could not catch it. This is probably a ritual composition and is an example of the adding in the later pecked period of intaglio human tracks to a barred figure of an earlier period.

2. Group of pecked feet, barbed spearheads and bird tracks, identified by Captain George as a goanna and bird among trees (2-A33B23). The trees are represented by the same motif as the double barbed spear head here serving another purpose.

RANGE OF DESIGNS

I made an intensive study of sites with the aim of recording all possible motifs, but I either did not find the following figures published by, or disagree with, the identification of previous writers: Figs. 1 and 3, fishhooks on lines; 8, woman; 9, skate on fishing line (which is speared as shown in my Fig. 93); 10, spear on spearthrower; 11, pod on stalk; 12, leaf spray; 6, seal (a striped man in my Fig. 53); 32, design; 33, striped ovals (Campbell, 1911). Davidson (1936, 61-2; 1952, 95) basing his opinion on the description of the material culture and methods of fishing by Richardson (1886), Harper (1886), Withnell (1901) and Clement (1903), and upon their absence in museum collections, said that fishhooks did not occur at Port Hedland, and I support his view that Campbell's drawings and identification of fishhooks among the engravings incorrect, as are some of his other figures when compared with the actual engravings. Basedow (1918), Fig. 1 (12), lizard; 2 (5-6), design; (9), design; (9), woman; and in his additional third set (1925); Fig. 12 (33), the idealized feather plume ornament; and (42, 44) two human figures, are inaccurate drawings of Minjiburu spirit heroes. Worms (1954), D6, man and woman clinging together; D7, human figure; D8, man with long penis; E1, thread cross characteristic emblem of the Southwest culture; E3, speared kangaroo; and E4, spear (right). One cannot be dogmatic about the interpretation of rock engravings because the conditions of light at the time of recording may give one visitor a different opinion about the nature of a figure to that of another, and furthermore, in such an extensive display of engravings it would be easy to miss figures.

The following tables reveal some most interesting facts about the art of all three phases of engraving at Port Hedland.

Among the human figures the Minjiburu far outnumber the normal outline, striped and linear stickmen. The outline tracks of man are not uncommon.

There are only two mammals shown in the outline style, one definite bird and a dozen clutches of eggs, a few lizards, but an extraordinarily high number of snakes denoting a special ritual and magical interest.

Apart from the marine mammals like the dugong, dolphin and whale, each represented by a few large figures only, the fish are of considerable variety and form the most numerous group in the outline animals as a whole. The rays, which abound on the shallow tidal flats of the coast and estuaries, and their liver, form major motifs, as do the turtles and lizard track, thus indicating clearly that the local groups responsible for the outline art depended chiefly upon the sea for their sustenance.

The weapons and sacred boards far outnumber the animals as a whole. Only 3 of the sacred boards are bullroarers attached to a cord. The outline

FREQUENCY OCCURRENCE AND RANGE OF SUBJECTS

Subject	Town to 1 Mile Camp	1 Mile to 2 Mile Camp	2 Mile Well to Mangan- ese Plant	Mangan- ese Works to 4 Mi. Point	Road Board Depot to Native Hospital	Totals
<u>I. Abraded Grooves</u>					<u>20</u>	<u>20</u>
<u>II. Conjoined Punctured</u>					<u>20</u>	<u>20</u>
<u>Outline</u>						
Human beings	7	1	3			11
tracks	11		25	2	12	50
hands		1	2	3	2	8
Mammals	1			1		2
Birds			1			1
Clutch of birds eggs	4		7		1	12
Clutch of birds eggs & tracks			2			2
Snake: coiled	1					1
Goanna		1		1		2
Turtle	3		2			5
Fish--narrow types	8		29	20	8	65
--broad types	2		20	7	7	36
--catfish		1			2	3
--skate	1					1
--sting ray	12	4	17	10	5	48
--sting ray liver	31	7	45	13	12	108
--sawfish saw			1			1
Invertebrates: Sea wasp			3			3
Plants		1				1
Boomerang--single	123	25	152	28	55	383
--parallel pair	6	2	10	1	3	22
--end to end pair		1	1			2
--crossed pair					2	2
--parallel three			2		1	3
--parallel four	1					1
--parallel five					1	1
Club--sword	2	1	8	3	2	16
--pole	1	1	1			3
--elongate oval head		1				1
Spearthrower		1				1
Shield	2	1	1		1	5
Container			1			1
Hafted stone axe			2			2
Sacred board	14	1	10	3	3	31
Bullroarer on line				2	1	3
Lozenge & tailed lozenge			2			2
Circles & Ovals--single	39	17	117	13	35	221
--around hole	3		3			6
--tailed	1	1	11	1		14
--linked pair	1	1	4	1	2	9

FREQUENCY OCCURRENCE AND RANGE OF SUBJECTS--continued

Subject	Town to 1 Mile Camp	1 Mile to 2 Mile Camp	2 Mile Well to Mangan- ese Plant	Mangan- ese Works to 4 Mi. Point	Road Board Depot to Native Hospital	Totals
<u>Circles & Ovals (cont.)</u>						
--double oval					1	1
--line of small circles			4			4
Rectangle					1	1
	274	69	486	109	157	1,095
<u>Outline with barred interior design</u>						
Human track	2					2
Marine mammals--dolphin			3			3
--dugong			1			1
Birds		1				1
Fish	2		2	2	1	7
Sting ray		1	2			3
Snake	1		1			2
Turtle	6	6	41	3	12	68
Invertebrates--beche- de-mer	2					2
Boomerang--single	38	7	53	15	5	118
--parallel pair	1		1			2
Sword club	2	1		1	1	5
Shield	1		1			2
Hafted stone axe				2		2
Sacred board	2		6		2	10
Circles & ovals	20	2	18		5	45
--linked			1			1
Designs	4		7		1	12
	81	18	137	23	27	286
<u>Outline with striped interior design</u>						
Human beings--man	1	1	2		1	5
--woman			1			1
Turtle					1	1
Fish			3			3
Boomerang--single	12	2	16	1	2	33
Sword club	3		1	1	1	6
Spearthrower				1		1
Shield	1		7	1	5	14
Container		2		1		3
Hafted stone axe		3				3
Sacred board	2		3	1	3	9
Designs	1		11	1		13
	20	8	44	7	13	92

FREQUENCY OCCURRENCE AND RANGE OF SUBJECTS--continued

Subject	Town to 1 Mile Camp	1 Mile to 2 Mile Camp	2 Mile Well to Mangan- ese Plant	Mangan- ese Works to 4 Mi. Point	Road Board Depot to Native Hospital	Totals
<u>Outline with barred and striped interior design</u>						
Hafted axe			2			2
			2			2
<u>Outlines with gridded interior design</u>						
Turtle		2	1		1	4
Sting ray			1			1
Boomerang	1	1	7	2	1	12
Parallel pair					1	1
Sword club					1	1
Designs	13	1	24	5	5	48
	14	4	33	7	9	67
<u>Outline with curvilinear interior design</u>						
Boomerang--single	4	1	8		2	15
--parallel pair			1			1
Sword club		2				2
Spearthrower	1		5			6
Shield	19		32	6	7	64
Sacred board	9		6		2	17
	33	3	52	6	11	105
<u>Outline with dotted interior design</u>						
Fish			1			1
Sting ray	4		6	3	1	14
Boomerang			1			1
Circles & ovals			1			1
Circles with one dot in middle	4		1			5
	8		10	3	1	22
<u>Outline with broken line interior design</u>						
Sword club	1					1
Sacred board	1					1
	2					2

FREQUENCY OCCURRENCE AND RANGE OF SUBJECTS--continued

Subject	Town to 1 Mile Camp	1 Mile to 2 Mile Camp	2 Mile Well to Mangan- ese Plant	Mangan- ese Works to 4 Mi. Point	Road Board Depot to Native Hospital	Totals
<u>Outline with cross</u>						
<u>interior design</u>						
Human track				1		1
Circles & ovals	1		1			2
	1		1	1		3
<u>Outlines with composite</u>						
<u>interior designs</u>						
Boomerang			2			2
Shield					1	1
Sacred board					1	1
			2		2	4
<u>Miscellaneous</u>						
Chain pattern		2				2
Cluster pattern		6	1	4		11
Wallaby tracks in circle			1			1
Fish with gill & ridge lines			2			2
Snake in circle		1				1
Bar in circle	1	4		5		10
Dotted areas	1	2	3	1		7
	2	15	7	10		34
<u>Figures in two techniques</u>						
Minjiburu spirits	17	2	20		1	40
Outline eggs and pecked legs	4		8	2		14
	21	2	28	2	1	54
<u>III. Conjoined punctured</u>						
<u>linear figures</u>						
Human beings			1			1
Kangaroo-wallaby tracks-- hind foot	159		159	37	2	357
Bird tracks	186	4	230	66	33	519
Echidna tracks	1		8			9
Snake	107	4	152	36	24	323
--from hole	50	2	56	24	6	138
--from knob	1					1
--from hole to hole	3			3		6
--and egg	1					1
Lizard	1				1	2
Meandering track from hole		4	10	4	5	23
Plume or claw on line	5		5		1	11

FREQUENCY OCCURRENCE AND RANGE OF SUBJECTS--continued

Subject	Town to 1 Mile Camp	1 Mile to 2 Mile Camp	2 Mile Well to Mangan- ese Plant	Mangan- ese Works to 4 Mi. Point	Road Board Depot to Native Hospital	Totals
Line mazes	10		6	3		19
Lizard track	16	3	27	27	2	75
--from hole	1	2		2		5
--from hole to hole				1	1	2
Spear & spearhead--plain	8		11	2	1	22
--single barb	11	1	6	3	1	22
--single row of barbs			3			3
--double row of barbs	129	12	186	42	15	384
--double row & reversed	5	2	23	1	1	32
Pubic fringe	187	10	267	69	48	581
Feather plume ornament	14	1	41	7	6	69
Girdle			1			1
Arc	3	5	10	2	2	22
Set of arcs	9		14	3	1	27
Set of straight parallel lines	7	1	21	2	2	33
--from hole	4		6	1		11
Set of sinuous parallel lines	31		17	5	1	54
Radiate	5		12		2	19
--around hole	1	1	3	1		6
--around circle	1	1				2
--on stick	1	1	1		1	4
Grid	13	1	24	5	5	48
Zigzag line	2	1				3
Designs	2		50	3	6	61
--around hole		1				1
Open ended oval & rectangle	4		32			36
Branching or plant-like	2	2	1		1	6
Cross	2		14	1	1	18
Opposed arcs			4			4
Circle in arc			1			1
Concentric U		1	3	1	1	6
Concentric circle & spiral	6	2	20		6	34
Double circle around hole	1		1			2
Double circle					1	1
Sting ray--double outline				1		1
--triple outline	1					1
	990	62	1,426	352	177	3,007
<u>IV. Pecked band and intaglio figures</u>						
Human beings--man		5	2	1		8
--woman			1			1
--hand			1			1
--track	185	31	514	24	185	939

FREQUENCY OCCURRENCE AND RANGE OF SUBJECTS--continued

Subject	Town to 1 Mile Camp	1 Mile to 2 Mile Camp	2 Mile Well to Mangan- ese Plant	Mangan- ese Works to 4 Mi. Point	Road Board Depot to Native Hospital	Totals
Kangaroo-wallaby tracks						
--hind	105	46	226	68	17	462
--forepaw	38	1	57	7	2	105
Mammal			3			3
Echidna	1					1
Bird (mostly emu) tracks	54	8	140	4	14	220
Emu legs	5		2			7
--& clutch of eggs			1	1		2
Kangaroo sitting down marks	6		3		5	14
--tail	1		21	3	2	27
Lizard	2	1	9			12
Lizards copulating			1			1
Snake	14		54	2	9	79
--from hole	2		13	2	7	24
--from hole to hole				1		1
Snake & eggs			2			2
Sting ray--banded & dotted			1			1
Sting ray			1	2		3
Sting ray--pecked band			1			1
Line of eggs	2		18		3	23
Line of deep pits			1			1
Crab			1			1
Boomerang--single	8	1	35	3	4	51
--parallel pair		1	6	2		9
--hooked			1			1
Club--bulbous head			3			3
--sword			1			1
Spear or spearhead--plain		1				1
--double barbed			2			2
Pubic fringe			2			2
Girdle			1			1
Feather plume ornament			1			1
Radiate			1			1
Pair of parallel bars					3	3
Banded designs		3	8			11
Arc	1					1
Circles--pecked band			30		1	31
Barred oval designs			9	1		10
Tailed circle or sting ray			3			3
Indeterminate shapes	1		50	1		52
	<u>425</u>	<u>98</u>	<u>1,226</u>	<u>122</u>	<u>252</u>	<u>2,123</u>
Axe groove	5	1	12	15	101	134
Milling hole					1	1
Grand total	1,876	280	3,466	657	772	7,051

boomerang far outnumbered all other kinds of weapons. Circles and ovals are a major motif, the majority being single ones, but some are engraved around a hole, others contain designs, and some are linked or tailed.

In the linear series the barbed spearheads, pubic fringes and animal tracks outnumber the remainder.

It is noticeable that the smaller motifs in both outline and linear series are engraved in the greatest numbers. This applies to the outline boomerang, a simple double curve easy to portray, and to the sting ray liver. In the linear series the animal tracks, snakes, lizard track, pubic fringe and barbed spearhead form a set in which there is no apparent ritual or economic relationship, but apart from being easy to engrave there might be special reasons in each case for their numerical abundance. The spearhead is an important weapon and an attractive motif, and the snakes are important in sorcery, but it is difficult to justify the huge number of pubic fringes and lizard tracks on any grounds other than simplicity of execution. The animal tracks have an obvious economic value, as they represent game commonly hunted, and the larger fish formed a major portion of the people's diet. It is possible, therefore, that the sting ray's liver had some magical virtue.

A few pecked band designs occur among which snakes and circles are common, but many of the linear motifs do not appear at all, or appear as unique figures, in this technique. Sting rays are the best represented of the animals.

In the pecked intaglio series only one fish, one bird, and a few sting rays were engraved, and subjects like goannas, clutches of eggs, rows of egg-like pits, and the tracks of people, kangaroos and emus became predominant. Thus the emphasis upon the sea as a source of food and artistic inspiration was supplanted by terrestrial motifs, as though the intaglio technique and its subjects came from the inland, with beliefs and rituals, and replaced the older existing practices of the Kariera. Otherwise, and there is no corroborative evidence to support this claim, the Kariera local groups were replaced by inland or eastern local groups. The diffusion of cults is well established for the Northwestern region and the spread of the pecking technique and its motifs are no doubt part of this cultural process.

ENGRAVED AND EXISTING MATERIAL CULTURE

In Clement (1903), Schmeltz described the material culture of the Port Hedland area, and Hambly (1931) has illustrated various objects from the Pilbarra district. It is obvious from a perusal of their illustrations that the range of artifacts was similar throughout the period of engraving to that of the present day, probably with additions not recorded among the engravings. It is further apparent that the decorative art on various objects changed considerably. The collection of specimens made by Clement does not include any decorated boomerangs, and the designs on the spearthrowers and message sticks are in the main parallel and opposed series of zigzags (some with rows of dots between the lines), interlocking key motif, lines of solid squares and rectangles, concentric diamonds, and a snake. In the Western Australian Museum,

and the Australian Museum, are additional designs on sacred boards of parallel zigzags and panels of stripes broken by sets of transverse bars; concentric circles and squares; and sets of sinuous parallel lines. Now most of these patterns are lacking in the decorated figures among the engravings, where the emphasis was on sinuous lines, curvilinear line (often in all-over patterns), panels of lines, and mixtures of design elements, but the herringbone is rare and the interlocking key does not appear at all, while the concentric circle and spiral occur only as isolated single figures. The Y-shaped figure painted on the chest and arms of men participating in ceremonies (Campbell, 1911, pls. 12-15, Basedow, 1918, pl. XIX) throughout northwestern Australia is not represented among the engravings. Petri and Schulz (1951), and Davidson (1952) were inclined to think that there was a closer comparison between the portable and rock art.

The stone axe offers another problem of identification. A kodja in the Rijks Museum from Nickol Bay has always been regarded as a stray from the Southwest as is another one in the Pitt Rivers Museum labelled Pidungu tribe, 60 miles from Derby (Davidson & McCarthy, 1957, 409). Massola (1960) has listed other kodja from the Northwestern Division, including Nickol Bay, and there appears to be no doubt that the implement was used right up the west coast and its hinterland for an unknown distance. It is stated by Clement (1903) that the engravings were made with the stone axe. His notes were fitted to his collection by Schmeltz and there was no kodja in the collection. The hafted axes among the engravings (100) could be either kodja or ground edge implements but one (VI) is probably the latter. The presence of axe sharpening grooves proves clearly that ground edge axes were used in this area but whether they were known during the outline phase of engraving is an archaeological problem yet to be solved.

Petri and Schulz (1951) said that the spiral and concentric circle are derived from the bullroarers and churinga traded from the Central Australian region across to the northwest, and thus had their origin in the former area. Davidson (1952, 104) was of the opinion that the engravings of this motif at Port Hedland and Yarri-Muccan, and the painting of it at Walga Rock, were not inspired by these traded objects but may represent crudely executed coiled snakes as part of the naturalistic art of the northwest. The former compare the zigzag design shield of the present with the curvilinear line shield of the engravings in their figs. 27-28, barred boomerangs in figs. 25-26 in both techniques, and a single spiral in the rock engravings with a line of them on a sacred board in figs. 21-22. In my chronology the spiral and concentric circle belong to the Linear Design phase of engraving and are therefore of archaic age. The fact that some of them are almost weathered away indicates a considerable age for the motif, too long for it to have been derived from the traded specimens. Davidson (1952, 104) said that these bullroarers and churinga were seldom recognized west of the de Grey river in 1939 but were widely distributed east of the above river late in the nineteenth century. Their diffusion forms part of a spreading of traits in every direction into New South Wales, Queensland, Northern Territory, South Australia, and Western Australia from the central Australian region, prominent among them being the fluted and hooked boomerangs, leilira knife, hafted tula adze, wananga and the above sacred objects. It appears to me that the spiral-concentric circle motif originally diffused from the northwest in prehistoric times, but during the

last century or so has been participating in a secondary reverse diffusion back to the northwest. I have argued previously (1939, 1953) that these motifs were originally introduced into Australia during the Bronze age whose products spread into Indonesia and whose art designs spread much further into Melanesia and eastern Polynesia.

Davidson (1952, 105) remarked that the essential features of cave paintings in Western Australia were derived from a north-easterly direction, that is, from the Kimberleys, with the major exception of the geometrical motifs; both pictographs and petroglyphs, he said, occupy a position peripheral to the regions of intensive development of art, and it could not be determined whether any widespread traits originated in the northwest or had had a foreign derivation. The chronology suggested in this paper demonstrates the possibility of the Linear Design phase having originated on the north-west coast, from the spread of the Bronze age or some other inspiration, and diffused into the interior and south of the continent.

The tables confirm Davidson's statement (1952, 90-1) that snakes are the most common motif in Western Australia, and that kangaroos, emus and lizards are rare in the rock art; reverses his claim that emu tracks are more commonly portrayed than kangaroos; agrees with him that marine life is prominent near the coast as we would expect it to be; supports his claim that certain animals, like the dingo, echidna, opossum, wombat, koala and platypus are uncommon motifs within their range of distribution. For the continent at large, if we accept the tracks of kangaroos and emus as evidence of the relative frequency of these animals as motifs, then we agree with his view that the snakes, kangaroos, lizards and emus are the most widely distributed subjects in rock art, but to it we add man as an universally important and common motif.

TECHNIQUES

One of the outstanding features of the Port Hedland site is the presence of four of the six previously defined techniques of rock engraving known in Australia.

Withnell (1901, 29) and Clement (1904, 9) both stated that there are engravings on every hill of suitably hard stone. The subjects they list are typical of the inland sites and they do not refer to Port Hedland. They said that the figure was drawn in chalk and then repeatedly hammered along the lines or within the outline. Neither say that they actually witnessed the operation, even though Withnell's description of it is generally considered to be what takes place. Clement, also, had access to Withnell's pamphlet. It should be emphasized that the outline and linear grooves consist of a series of conjoined or overlapping pits which are somewhat different to the result produced by "repeatedly hammering" along a line.

The implement used to produce the abraded grooves is not known.

The conjoined-puncture outline (If) is shown clearly in many of the plates. The punctures and grooves are from $1/4$ to $3/4$ in. wide, and in depth from $1/16$ to $3/8$ in. In condition they vary from those that are almost

indiscernible to others in a perfect state of preservation, and it is apparent that this technique was employed from a remote to a comparatively recent time period. No stone implements were found on the limestone ridges or near them and there are none among the shallow cockle and whelk shell deposits strewn all over these ridges.

Experiments were conducted with whelk shells. Many of these in the midden material on the ridge lack an inch or so of the pointed end. With such an implement the rounded pits or punctures were made relatively quickly in the limestone by striking the rock up to ten times in the one spot and then finally twisting the head several times. When a pointed or rounded piece of limestone, the only local rock available, up to 6 in. long, was used in the same way it broke up after a few blows and failed to produce more than a shallow bruising on the rock surface. A large piece would be too unwieldy to control.

It is considered that an implement under complete control would have to be used to make the pits, particularly in the outline figures with dotted interior (Xe-f) where the pits are spaced all over their surface. This applies also to the lizard track (IXi), and in the figures in which the grooves are very narrow like many of the highly decorated weapons and sacred boards. They could not be made with a ground-edge axe or with the kodja.

The whelk shell forms an ideal tool for this work. Thus with its point intact, or a tiny part of it removed, the narrow conjoined puncture in a figure like the starfish (VIIIc) could be made, and by removing various lengths from the point of the turret-shaped whelk the diameter of the pits could be controlled.

Although the whelk shell could be the instrument used at Port Hedland, Sydney-Hawkesbury and other coastal sites, it does not occur inland and does not explain how conjoined-punctured outlines were made in these sites. A considerable amount of work is involved in making the large figures and those with complex line designs. A high degree of skill is displayed in the latter, as II, V-VIII, XII and XVI demonstrate.

In several of the figures, such as the large turtle (VIIIb) the groove has been rubbed or abraded over the pits, but this additional process is rare in this site as a whole. These grooves are from 1 to 1-1/2 in. wide and 3/8 to 1/2 in. deep.

The intaglios vary considerably in technique (III, IXj, XIII-XVI). The earliest ones consist of large rounded pits, particularly in the hands and feet of the Minjiburu spirits, the general range of pecked figures, and in all of the bigger figures, and is the same technique as that used in the outline sting rays with dotted interior design.

In making the intaglios the artist began with scattered pits, not with an outline, the area being covered with dense layers of peckings to produce the final figure. Many pecked tracks are engraved on unused spaces of rock, in some instances placed carefully inside an older outline or between various other figures.

A finer technique was employed for what appears to be a later series of intaglios, as in some of the boomerangs, bird and fish (XIIIb), clutches of

eggs (XIIIh), sitting emus (XVIc), and club (VIIIId), all small figures. It consists of both tiny pits and cuts that may have been made with hafted stone implements of the pointed adze type.

The battering technique characteristic of inland sites (Worms, 1954), which is very crudely done in many figures (Stokoe, 1959, pl. II, b-c), was not employed at Port Hedland.

The following superimpositions were noted: those for which no plate or figure reference is given are recorded in unpublished photographs.

1. Outline with design over outline. Gridded boomerang meandering line (VIb); barred boomerang over large bird (IVb); boomerang with elaborate line design over oval (299); sawfish sword over oval (VIIIe); pecked human track over Minjiburu over gridded turtle (IIa); striped figure over gridded turtle over large outline figure (13); barred and gridded boomerang over dotted outline sting ray and ovals; elaborate crescentic and herringbone design over oval; barred boomerang over ovals; striped boomerang over oval; curvilinear design boomerang over snake; curvilinear line spearthrower over outline figure; gridded turtle over boomerang; striped shield over curved line; dotted fish over boomerang; large barred figure over boomerang; and a barred oval over oval (5-A18B10). Curvilinear design shield over lizard track (4-A2B26), over snake from hole (photo), zigzag shield over line figure; striped sword club over line figure (4-A2B9); sacred board with looped line design over outline sting ray.

2. Linear over outline. Spiral over meandering line (Vm); spiral over a striped boomerang and outline fish (Vn); barred and striped boomerang over dotted sting ray, outline sting ray and other outline figures; fringe over outline fish and other figures; set of shallow arcs over boomerang; barbed spearhead over pair of boomerangs, sinuous parallel line figure, oval and outline figure; radiate over barred oval; diagonally barred boomerang over outline boomerang.

3. Pecked intaglio over outlines. Pecked human foot over sword club (2-A9B7); fish (5-A20B43); human figure and boomerang (3-A31B17); boomerangs (XVc); indeterminate figures (5-A10B30); oval (2-A30B41, 3-A3B22, A16B22, XVIc); tailed oval (4-A6B37); Minjiburu spirit (11a, r, 33); and over fish, sting ray's liver and indeterminate figures.

Human figure over human figure, conical and other outlines (3-A28B18); snake over dolphin (36, XVIe); phalanger over oval (XIVh); lizard over fringed outline (2-A15B8) and over oval; lizards in coitus over Minjiburu spirit figure (20); goanna over indeterminate figure; indeterminate figure over foot of large man (29); emu eggs and legs over fish; turtle eggs over indeterminate figures; boomerang over fish (5-A20B44, XVIa); boomerang over other figures and fish; club over indeterminate figures (VIIIId); hooked boomerang over boomerang (XVIg); kangaroo tracks over eggs (3-A22B2), boomerang (3-A18B21), indeterminate figures (VIIIId), sting ray and other figures; kangaroo tracks and tail over dotted sting ray (3-A22B2); emu tracks over old group of indeterminate figures (8, XIIIj), and eagle-ray; Minjiburu's foot over outline figure.

4. Pecked intaglios over outline with design. Human track over fringed cluster design (4-A3B24), striped hero (3-A33B18), barred dolphin (3-A18B40), boomerang with crescentic line design (3-A13B15), gridded turtle (9); gridded turtle over striped human figure which is over large outline figure (13); gridded turtle over striped human figure (24); Minjiburu spirit figure over gridded turtle (IIa), barred boomerang, barred and striped boomerang, median striped boomerang, shield, striped shield, oval with arcs and line design in separate superimpositions.

Human figure over gridded turtle (2-A1B41); pair of boomerangs, eggs and indeterminate figure over dotted sting ray (3-A7B45); emu legs and eggs over barred sacred board and barbed spearhead (XVIc); emu eggs and legs over gridded boomerang; snake over gridded turtle (79); barred whale (36, XVIe), and barred boomerang (XVI f); snake's eggs over Minjiburu spirit figure (3-A16B32). Kangaroo tracks over curvilinear design shield (2-A20B30); dotted sting ray (2-A17B2); barred hafted axe (3-A6B13); striped hero (3-A31B20); striped human figure (32); gridded turtle (80); barred oval; and circle containing crosses. Emu tracks over barred dolphin (3-A18B41) and dotted sting ray.

Boomerang over curvilinear design shield (2-A14B42); dotted sting ray (3-A7B45); barred and striped design (4-A5B16); gridded turtle (9); barred whale (36, XVIe); and barred swordclub (XVI b).

Pecked band design over dotted figure (10); pecked shapes over barred boomerang (2-A15B46); and dotted sting ray (3-A7B45). Pecked barred boomerang over gridded turtle which is over two outline boomerangs and other figures (76).

5. Pecked over linear figures. Human foot over set of arcs (2-A6B18); barbed spear of Minjiburu hero (3-A14B27); line (3-A36B16); snake from hole (4-A2B14); grid (4-A6B20, XVIg); fringe (5-A20B42); and over fringe, snake, barbed spear (twice), and lizard track. Human figure over spear (XIIIc); bird over snake from hole; flying bird over radiate (VIIc); crab over set of parallel straight lines (XIVd); emu eggs and legs over barbed spearhead (XVIc); emu leg over line (3-A4B14); rows of eggs over two sets of arcs (VII f); eggs; snake over lizard track (2-A9B14), and spear (5-A10B6) and over fringe; kangaroo tracks over meandering lines (29) over set of arcs, fringe (twice), radiate and barbed spear; emu tracks and shape over spear (36); boomerang over fringe, bird track, barbed spear and shape; pecked shapes over barbed spearhead (Xd), linear figure (3-A29B10), snake (3-A30B36), fringe (4-A3B11) and grid (36); pecked and barred boomerang over barbed spear and fringe.

The numerous and consistent superimposition of the pecked intaglios over all other techniques as listed in groups 4 to 6 above, establishes without doubt that they form a distinct and the latest phase of rock engraving in this site.

It is apparent, also, from the superimpositions, that the outlines belong to the earliest phase. (The abraded grooves (Ic) are not considered here because they are not included in any of the superimpositions.)

The chronological position of the outline with design and the linear figures is not yet clearly established. There are 14 superimpositions of

outline with design over outlines, listed in group 1, but there are other groups (9, 13, 26, 32, 36, 77, 80, 81, 90) in which the outlines, and the outlines with the simpler designs like the barred, gridded and striped, are so intimately interwoven that we must accept them as belonging to the one period.

The Minjiburu spirit figures are difficult to place. They are outline figures with pecked feet and hands, and associated with them are many pecked human tracks. A number of them wear pubic fringes. In superimpositions they are found over a gridded turtle and over an outline figure, but under pecked intaglios. In certain groups (12, 34, 39, 40, 77, 81, 90) they are intimately associated with outlines and the simpler line design figures, so that they probably belong to the earliest phase.

There is, however, a series of outlines with line designs which include the parallel curvilinear line pattern on boomerangs, shields, spearthrowers and sacred boards, the many complex line designs on boomerangs (VIe), the elaborate design in the oval (VIIId-e), and sacred object (VIId) and line mazes (XIIe) which appear to belong to an intermediate period as they are superimposed over the outlines. The outline with dotted interior style is an early one as the following figures are superimposed over dotted sting rays: barred and gridded boomerang; pecked boomerang, eggs and other figures; pecked kangaroo and emu tracks (2-A17B2); pecked boomerang and shapes (3-A7B45); barred figures but not on a sufficient number of occasions to indicate that they are later than the latter series.

The problem is elucidated to a degree by a study of sites in other parts of Australia. The outlines occur at Burra in South Australia as tortoises and ovals (Biddle, 1925, Campbell, 1925), and in great profusion of naturalistic motifs, together with barred figures, in the Sydney-Hawkesbury district of eastern New South Wales. No techniques other than the conjoined puncture and abraded groove were employed in the latter area, where, remote from the northern corridors of outside influence and cultural development, we are able to define the early techniques, styles and subjects of engraving. In both areas, Port Hedland and Sydney-Hawkesbury, cult hero figures are associated with animals and weapons in the earliest phase of rock engraving. They are of the same period as the second series at Devon Downs in South Australia (Hale & Tindale, 1930, fig. 246). The elaborate line designs do not occur in the Sydney-Hawkesbury series, and would appear to be a local development in the north-west.

By applying the comparative method on a distributional basis to the sites in the south and central parts of the continent it is possible to isolate another and very important series of linear engravings. In Basedow's plates (1914, IIB, IVB, VB, VIB, VIIB, IXB, XA-B, XIII, XIVA) are shown many interesting superimpositions upon which he did not comment. His plates illustrate pecked intaglios of owls, human feet, lizards and other animals, tailed radiate figures, and an emu track, engraved over circles. In many of the Flinders Range sites (Mountford, 1928, 1935) plain circles are associated with emu and kangaroo tracks, barred, linked and tailed circles, arcs, branching and other figures which appear to form one of the earliest groups of motifs among the interior engravings generally.

A study of the superimpositions at Sturts Meadows by Professor N. W. G. Macintosh and the author in 1959 revealed that pecked intaglio lizard, emu and kangaroo tracks, and the human foot are engraved over radiate, cluster (4 examples), spiral, circle, linear man, and linear designs (5 examples). Basedow (1914, pl. XB) illustrated an intaglio emu track over a wheel design at Deception Creek East, South Australia.

My study of Depuch Island engravings (1961) revealed that the naturalistic outlines, with or without interior designs, are consistently overlaid by the spiral and allied motifs, and by the pecked intaglios, and that the latter are superimposed on the second group.

There is thus widespread continental data available to support the conclusion that the following sequence of rock engraving has been passed through in Australia:

1. Abraded grooves, corresponding to the first period at Devon Downs (Hale and Tindale, 1930, fig. 66).
2. Outline phase corresponding to the second period at Devon Downs (Hale and Tindale, 1930, fig. 246), represented by naturalistic figures in eastern New South Wales and Burra in South Australia, and by circles and allied figures in the Flinders Ranges and central Australia. This phase developed into a sub-phase with elaborate dotted and interior line designs. Whether this sub-phase was linked with the Linear Design phase at Port Hedland cannot at present be decided.
3. Linear Design phase which includes the spiral, concentric circle, grid, fringe, cluster and other designs occurring throughout the region from northwestern Australia to the Flinders Range, central Australia, western New South Wales, and eastward to west of the Great Dividing Range at Narrabri, north-eastern New South Wales, and Pigeon Hill, Queensland. It has survived as the sacred art in the rituals of the central Australian tribes. It is considered that the crocodile figure (Hale and Tindale, 1929, pl. i, fig. 1) of Panaramittee belongs to this intermediate phase as a cult design.
4. Pecked phase in which there are the pecked band and intaglio phases or techniques, and in which important sub-periods developed such as the Gurangara art at Abydos and Woodstock (Worms, 1954).

It will be seen that after the initial simple haphazard or arranged sets of abraded grooves, representative or naturalistic art appeared which developed interior line designs, but which was supplanted by a symbolic linear design art. The latter finally gave way to a return to realism allied with design in the pecked period in which the latest development in northern Australia is of human figures associated with the theme of reproduction (Worms, 1954). The latter phase did not diffuse to south-eastern Australia or South Australia. Animal tracks belong to both the Outline and Linear Design phases. Worms (1954, 1085-8) was thus correct in defining an "older stratum" at Port Hedland which he distinguished also, but less developed, in the inland sites at Abydos and Woodstock. The emphasis on sex, and the wide range of headdresses of both men and women, in the upper stratum art of the inland sites is not found in the older stratum. Worms placed the symbolic linear designs and motifs in the older

stratum, but in my view they form an intermediate phase of engraving. He said that emus, kangaroos, birds, insects and plants occur in great numbers in the older stratum at Port Hedland but as my table indicates, this is not so--there are no figures of emus (only their tracks in abundance), a doubtful one of a kangaroo (whose tracks are also numerous), several birds and plants but no insects.

The sequence revealed by the superimpositions has an important bearing on our interpretation of rock engraving in Australia as a whole. It provides criteria for distinguishing ancient portrayals from recent ones, until now (Davidson, 1952, 100) not apparent. Thus sites of engravings all over the continent, if the superimpositions are studied and the range of styles, techniques and motifs is considered, should conform in general to the above sequence or chronology, and the art history of each site will thus be revealed. It is obvious, further, that attempts to obtain interpretation of prehistoric motifs are foredoomed to failure. It is only the figures engraved in the latest technique in a site that we can hope to have interpreted by living natives. This is the reason why natives in the Flinders range told Basedow (1925, 299) that the carvings belonged to the Dreamtime. The relatively late spread of the pecking technique into the Flinders range sites explains the scarcity (Mountford, 1928, 340) of human and animal intaglios in this region. The occurrence of the linear design motifs in western and central New South Wales (west of the Great Dividing Range) is explained by the fact that they did not spread as far eastward as did the outlines but they spread further in this direction than did the pecked intaglios.

Thus the various complexes of techniques and subjects, so intimately linked in each phase and distinguishable generally from other phases, will have to be studied in detail in many more sites on the continent before it will be possible to demarcate the precise range of motifs and distribution of each complex, but their spread is a clear cut case of age and area diffusion in time and space, and it may be possible in the future for archaeologists to plot the distribution of each phase and ascertain its antiquity. The emu sitting on eggs motif is now recorded at Port Hedland (326f) and Mootwingee, western New South Wales, among engravings, and in the Gill range, central Australia (Spencer & Gillen, 1899, fig. 124-8, p. 616) among cave paintings, and illustrates well the links between motifs in this vast region from the northwest to the southeast of the continent as do most of the linear design motifs.

It can be claimed that the outline art of the Sydney-Hawkesbury district is one that survived as a living prehistoric complex in that area only because of its great distance from northern Australia and because the later and more advanced ideas did not diffuse over the Great Dividing Range. It seems clear, also, that from western New South Wales through central to northwestern Australia the Pecked Intaglio naturalistic art had supplanted the Linear Designs in rock engraving but that in a considerable portion of this vast region, especially the central area, the linear design art survived as the sacred art in ritual on the bodies of participants, on the ground, in waninga and nurtinja, and on the tjuringa and message sticks. The significance of the human and animal subjects in the pecked intaglios in this region is not known, though it is probably expressive of the totemic and allied spirit beliefs, nor is the

reason why they replaced the symbolic linear designs that previously represented them. Davidson (1952, 90) was of the opinion that the same narrow range of naturalistic subjects and the widespread similarities in styles and techniques of execution are among the most striking features of Australian art, for they demonstrate that the continent shares a basic art tradition. The chronology suggested in the present paper confirms this view, but before a full understanding of the total situation becomes apparent an accurate knowledge of the distributions of the various motifs will have to be ascertained.

The diffusion of the Linear Design and Pecked Intaglio phases of this rock art complex from the north and northwest into western Queensland, central and South Australia, and western New South Wales, appears to me to be part of the movement of culture revealed by the Tartangan, Pirrian-Mudukian, and Murundian culture phases on the lower Murray river (Hale & Tindale, 1930; Mulvaney, 1960). It is in contrast to the Bondaian and Eloueran culture periods of eastern New South Wales, which are linked closely with the outline rock engravings, and the concentric diamond and associated motifs on the weapons and carved trees of this region. As the latter series of motifs also occurs on some of the sacred boards and spearthrowers of northwestern Australia, together with a sky hero cult as in eastern New South Wales, there appear to be grounds here to support the idea that a band of ancient coastal and hinterland cultures extended from the southwest round the north to the southeast of the continent, and a group of inland cultures spread from the northwest. More recently, there has been an important diffusion of culture from the coastal region outwards in all directions, and this is still progressing.

One other point of interest is the carry over from one phase of rock engraving to another. Thus, although the Minjiburu spirits apparently belong to the outline phase, their ritual significance survived into the pecked intaglio period when numerous human tracks, usually leading toward the Minjiburu, were engraved near many of these cult figures. Some of the hill lizards (IXj) are partly pecked. A pecked fin was added to the whale (XVIe), and some of the pecked band designs are derived from the linear design period (109, 237, 241, 304-14, XIVf). Thus the break between periods at Port Hedland was not as sharp between the linear design and pecked intaglio periods as it was between the abraded groove and outline, and between the outline and linear design periods.

One problem raised by this chronological history of rock engraving is its relationship to the various bodies of mythology and ritual in different parts of the continent. It has been shown that the Minjiburu and related figures belong to the old and basic mythology of the Kariera, together with the striped hero Murra Murra. Both Captain George and Paddy Bolong identified the two large human figures as Minjiburu, indicating that this mythology was carried on even though the engraving techniques and methods changed from time to time. The Mungan brothers is the dominant mythology of the existing Njamal, Ngarla and southern Njangamada tribesmen now residing at Port Hedland, and is still important among the northern Njangamada (Piddington, 1932). As no engravings of the Mungan were indicated by my informants, to whom the main types of human figure were shown, we cannot associate any series of the motifs with them.

It is important to note that the Ullagubbera or Little Hawk men (Spencer & Gillen, 1927, I, 312-9) of the Aranda tribe in central Australia introduced the

four sections and circumcision with the Leilira-blade, thus equating their period with that of the Mungan. It is probable that the Linear Design art spread from the northwest into central Australia and further eastward and southward, with circumcision, and that the advent of the latter in the northwest was also accompanied by this art, the whole complex being introduced at an unknown date. Davidson (1952) has pointed out that in Western Australia the Linear Design art and pecked naturalistic art both spread westward and south-westward into the northern Murchison area, as Stokoe's paper (1959) also demonstrates.

It is difficult to decide where the diffusion of the outline and pecked techniques and motifs began in Australia. Neither has been recorded in Cape York and only a few pecked figures (McCarthy, 1960; Elkin, 1956, 232) are known in Arnhem Land. Much more detailed fieldwork is necessary to ascertain the distribution of the outline technique and motifs and their relationship to early painting styles. At the present time it appears probable that the outlines were either taken by migrating people or diffused through the tribes of the east and northern coasts of the continent from north-eastern Australia, or that they diffused from the Port Hedland area through the interior of the continent. This diffusion may be linked with that of tooth-avulsion, as this custom existed with outline engraving in the Sydney-Hawkesbury district.

The pecking technique did not originate on the north-west coast, as it spread through that region as a technique of engraving, for shaping stone axes and other implements (Davidson, 1952; McCarthy & Davidson, 1957). It was spreading through south and central Australia, and western New South Wales, as an engraving technique, but although it was employed throughout eastern Australia, including central and eastern Victoria, for shaping stone axes, it was applied to larger implements like millstones and mullers only in western Queensland, western New South Wales, and further west on the continent, a distribution that coincided more closely with that of pecked engravings. This differential application of the technique for various purposes is an interesting aspect of its total diffusion which appears to have been from north-eastern Queensland and Cape York (McCarthy, 1953). Once the technique was applied to rock engraving it became a medium to express ritual and belief and thus we find (Worms, 1954) the motifs of the modern religious cult of the Gunabibi-Djanba-Gurangara mythology depicted as crudely pecked but highly imaginative human figures in which the genitals and sexual intercourse are featured in the Abydos and other inland sites of the northwestern region. Worms defined this art as the upper stratum of engraving in the interior of the north-west but it did not penetrate to the coastal Port Hedland site.

ARTISTIC MERIT

The control of line, posture and anatomical details of the outline and pecked human and animal figures at Port Hedland agrees in general with sites of rock engravings and paintings elsewhere in Australia. The Minjiburu figures are the most interesting artistically, with their beautiful line and poise of a dancer and actor and the series forms an interesting addition to aboriginal art motifs as a whole. Other human figures are in the usual front-wise position with the arms horizontal or upraised. The birds and fish are

shown in profile, and the rays and other flat fish, and the lizards, from above. The fish and turtles are in swimming postures, portrayed as they were usually seen in the water. The animals are thus drawn in the posture in which the hunter sees them prior to throwing his spear or club. Some of the figures embody a nominal degree of animation and grace. The numbers of fingers and toes on both human and animal figures varies considerably. The art of this phase is similar in every way to that of the Sydney-Hawkesbury district and is the most ancient kind of representative art on the continent. The widely spaced bars on the dolphins and whale at Port Hedland are characteristic of the Sydney-Hawkesbury art.

Potholes of all sizes, and in some instances slight bulges, are commonly utilized in this art, as Worms (1954, 1087) pointed out. The holes, which vary from shallow depressions to many feet in depth, represent the eyes, mouth, breasts, and genital organ of the Minjiburu spirit figures; spirals, concentric circles, circles, radiate lines, and sting rays are engraved around them; they are linked to one or both ends of a snake to represent the lair of the animal, and one snake links three potholes; they form the middle of a starfish and represent its mouth; lizard and the long meandering tracks lead from one, sometimes to a second pothole from 6 to 20 ft. away, and stand for a lair, waterhole or clump of spinifex grass; tracks of emus, kangaroos and other animals, and of men and women, are concentrated around a pothole, indicating a favored hunting place at a waterhole frequented by game; a fringe is engraved either down the inside of or from the top edge of the outside of a hole representing an apron over a symbolic vulva; the curve of a boomerang is engraved around a pothole. It is obvious that some of these potholes were totem centers for increase rites, as Petri (1951) thought, and others were sacred places connected with the Minjiburu spirits.

Although the Linear Design art includes figures (VIId-g, VIIb, d-e, XIIe) of a highly decorative and to some extent imaginative nature, they are not organized on the level of the patterns on the central Australian tjuringa. The only comparable figure is one design (VIIe). The line work is typical of that incised on the sacred boards and bullroarers of Western Australia although the range of patterns differs considerably. Depuch Island is the only other known site of engraving in Australia that contains the outline with dots and linear designs (barred, striped, curvilinear, etc.) so lavishly displayed at Port Hedland.

Among the pecked figures there is more variety of posture, as illustrated by the goannas (299, XIVA); mammal (XIIIe); bird (XIIIB); sting rays (XIVb, e) and the lizards in coitus (20), but the number of naturalistic figures is somewhat limited. In general they are stiff in style and lack the animation and grace of similar subjects in this technique on Depuch island (McCarthy, 1961) and inland sites (Worms, 1954). Technically, some of the above figures are very neatly executed, the sting rays and bird being outstanding in workmanship.

STYLES

Those present include (1) outlines; (2) outlines with barred, striped, barred and striped, gridded, dotted, curvilinear and other line designs; (3)

linear and geometric figures, designs and tracks; (4) pecked band snakes and designs; (5) pecked intaglio or silhouettes.

The relationships of these styles are to be found in the cave paintings of Australia. They are predominant styles on Groote and Chasm islands, and in the early prehistoric phase of painting, prior to the Mimi stick figures and the X-ray phases, in western Arnhem Land (McCarthy, 1960), and they are common throughout eastern Australia (Davidson, 1936; McCarthy, 1958). The evidence available indicates that this corpus of art, together with silhouettes in the paintings and outlines in the engravings, spread across the north and down through eastern Queensland and New South Wales, mainly along the Great Dividing Range and coastal area. There are thus definite relationships between the engravings and paintings in these styles, just as there are in the Linear motifs in the interior of the continent, and the relationships are of cultural significance. There is no style in these early engravings that may be correlated with the silhouettes in the paintings, because outlines occur in both forms of art, just as the pecked intaglios, which belong to the latest phase of engraving, cannot be claimed to represent the early painting silhouettes.

FUNCTION

It is obvious that the concept that inspired the artists of the early outline phase is a complex of weapons, ornaments, sacred boards and marine animals associated with the Minjiburu spirit beings. The association of cairns of stones with the engravings, and the statements by Clement (1903) and Brown (1913) that these cairns were totemic centers, at which increase rites for the various totems were performed, indicates also that historical ceremonies were carried out, associated with the engravings, which re-enacted the life of the Minjiburu spirits who were probably of the creator kind and at least established the totem centers in Karijera country.

Brown (1913, 160-7) in his list of clan and local group totems, said there were no prohibitions against killing and eating the totem by totemites, and each clan had a number of totems. It is surprising, therefore, that he could find no kangaroo, emu or rain totems, although this might account for the absence of outline figures of these animals. Fish totems predominated among the coastal clans. He thought more plant totems existed than those he listed. Other notable absentees in his list are the dolphin, dugong, turtle, whale and echidna, all of which are represented, especially turtles and dolphins, in the early outline and outline with design phase of engraving.

The symbolism of the formal art motifs apparently still represented the same system of beliefs and rites in the Linear Design period, as the evidence from central Australian art and its function demonstrates.

The acquisition of pecking brought with it a small range of human and animal motifs, a reproduction of some of the Linear motifs, a reproduction of some of the Linear Design motifs in the new technique, some new designs, and a host of human and animal tracks. The old Minjiburu mythology apparently survived, as the engraving of the human tracks around the old Minjiburu figures indicates. It disappeared with the virtual extinction of the Karijera, Njamal

and Ngarla several decades ago when they were replaced by the Njangamada from east of the de Grey river who brought the Mungan-Bagadjimbiri brothers myth with them. As the Njangamada were not responsible for any of the engravings the characters in this myth are not represented in the galleries.

It is well known that non-native interpretations of aboriginal art motifs can differ markedly from that of the Aborigines. Davidson (1936, 59, fig. 2c) gives interpretations of pecked intaglios which bear out this point, especially the figure of the fish, bat's footprint, and the bird identified by natives. Identifications by Aborigines of the indeterminate figures at Port Hedland would no doubt surprise the student of this art in many of the interpretations.

ANTIQUITY

There is virtually no evidence at Port Hedland to indicate the antiquity of the engravings, apart from the shallow layers of cockle shells which may ultimately throw some light on the problem. Petri and Schulz (1951) believed engraving to be an active cultural trait in the Pilbarra district. Basedow (1918, 111) thought that, from weathered state, the engravings were very old and the work of a defunct aboriginal generation. The natives told him they were the work of an evil spirit (1925, 299). The fact that three phases of engraving have been passed through suggests that a considerable period of time has elapsed since engraving began on these limestone ridges. As there are both outline and linear figures almost weathered away and others well preserved, the earliest figures in each period have, as we would expect, disappeared entirely. It must be remembered, of course, that the whole surface of the rock, at least around an engraving, has to be worn away to the depth of the grooves before a figure will disappear, and it is for this reason that the deeply engraved ones in all periods will withstand the natural elements for a considerable period of time. The above situation might also indicate that the outline phase survived until a comparatively late time period, and that both the Linear Design and Pecked phases were of a shorter duration.

Tindale (1957, 40) has linked the abraded grooves, the earliest known engravings, with the Pirrian-Mudukian layers, 3,500 to 2,500 years ago; the outlines with the late Mudukian and early Murundian, 2,500 to 1,500 years ago; and the Linear Design with the late Murundian, from 1,500 years ago to the present time. The giant bird tracks belong to the Linear Design or Pecked Intaglio phases, and cannot, as he claimed (1951) be linked with the Tartangan culture. Thus the evidence and carbon 14 datings from Devon Downs indicate that rock engraving at Port Hedland has been carried on for some 3,000 years and probably much longer.

SIZES

The size of many figures has been given in the text and list of illustrations. That of the figures illustrated in the plates is indicated by either a match-box 2-1/4 in. long or by a camera lens cover 1-1/2 in. in diameter. Generally speaking, most of the subjects are engraved in their natural size. In the weapons the sword clubs are up to 29 in. long, sacred boards up to 33 in., and the boomerangs include those 4 x 2-1/2, 9 x 2, 12 x 3, 15 x 3-1/2,

17 x 2-1/2, 20 x 2, 22 x 5, 24 x 3, 30 x 5, 32 x 3-1/2, 50 x 10. Ovals are from 2 to 33 in., with one 72 in. long, and fish from a few inches to 4 ft. long.

STONE HEAPS

Clement (1903) stated that heaps of stones, rarely a single one, formed Tarlow centers where clan rites were carried out to increase foods. Brown (1913) called them Talu. The rites, in which both men and women participated where relevant, were led by the headman of the clans, and consisted of imitating the movements of the totem animals or the way in which the plant foods were collected and prepared. The weapons and other artifacts used in these activities were displayed. The names of different parts of the country were called out, and the heaps were struck with clubs or stones. As each clan had a number of totems it carried out these rites for each one of them at its respective totem center. Brown did not visit any of these sites. I found the remains of one heap between the Two Mile Well and the Manganese Plant, and believe that others along this ridge have been removed by residents for various purposes. I located a complete set consisting of round and long cairns, and a circle, at the end of a ridge near the Four Mile point where the engravings are very scattered, none being associated with the cairn. I also found a series of cairns on the ridges on Kariera island. All of them consist of small and large boulders up to 2 ft. long roughly thrown together. I could not, however, ascertain their totems because circumstances made it impossible to get the informants to them. Those on Kariera island are all on the back or western side of the ridges where there are few engravings. In one instance pecked human and emu tracks appeared to lead toward a Talu heap.

Clement (1903, 6) said that the rainmaker also built a cairn of stones or heap of sand as part of his rites, but as no one else was permitted to approach it it is probable that he performed his rites at some distance from the engraved ridges beside which the people appeared to camp.

CONSERVATION

Burton and Cleland (1909, 46), Campbell (1911), and Worms (1954) all commented on the destruction of these engravings by weathering agencies, construction of the railway to Marble Bar, people walking over ridges, and by quarries, buildings and vandals. In more recent times, the manganese plant and two native camps have hastened this destruction. Portion of the main ridge, site 2, was declared a Reserve some years ago. To prevent further damage to the galleries it is recommended that the following action be taken: (a) Fences constructed to form a pathway for the natives from the Two Mile camp to the Well to stop them from walking and driving vehicles over the important series of engravings at this spot; (b) The natives and whites be directed to use the available roads and not to wear tracks across and along the engravings on the ridges in the vicinity of the One and Two Mile camps; (c) No further quarrying be permitted, nor buildings or other works to be constructed in areas along sites 1 and 2 (ridges along both sides of the Great North Coastal Highway) where the engravings are well preserved, such work to be permitted only in areas where there are none or few engravings;

(d) Kariera island be declared a sanctuary for the preservation of engravings and stone heaps; (e) Notices be erected along sites 1 and 2 requesting visitors not to damage the engravings; (f) A pamphlet be issued by the local Road Board describing the engravings and their scientific and historic value, and appealing to residents and visitors not to damage them in any way.

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KARIERA VOCABULARY

Brown (1913) listed the Kariera names of the animal and other totems of the various local groups, and the following is an additional list of the names of animals and artifacts in this language:

Human:

Tracks	djinna
Hand	murra

Animals:

Hill kangaroo	pudjarri
Plains kangaroo	munguru
Kangaroo's hind foot	djinna
Kangaroo's fore paw	murra
Wallaby	djadumurra
Dingo	jugoro, mudjara, julongoina
Echidna	mungunja, djerribugga
Echidna tracks	djinna
Dolphin	njieritji
Dugong	njammuna
Whale	Kadarabugga
Emu	djanguma
Emu eggs	djimba
Native companion	jangirra
Galah	piljagu, ngakburra
Turtle	wala-di
Salmon or threadtail	ngurudjong, jiradjananga
Sting ray	kanu, moji
Death adder	nyuna
Tiger snake	walu
Brown snake	walu
Goanna	perigulla

Animals (continued):

Blue tongue lizard	junguma
Skink	kulgarli
Gecko	djugga-djuggara
Lizard track	muju

Artifacts:

Boomerang	wira
Sword club	panamura
Flat club	billing
Spears	kuljerra, pilara
Spear with double row of barbs	margunna
Spearthrower	walbarra
Shield	jandigiri
Sacred board	inma
Boys' tassel	dangila
Men's pubic apron	mindiljirri
Girl's pubic apron	mundiljirri
Feather plume ornament	muljamulja
Women's pubic apron	djerdi
Hafted stone axe	bulbu
Grid chest design	murra
Stick or bullroarer worn at back of neck	Djillabureba
Throwing stick	jurlogu
Knobbed club	tugurambi

EXPLANATION OF FIGURES

1. A. Distribution of the engraved ridges, marked 1 to 5, studied in the Port Hedland area. No. 1 is near the Native Hospital, 2 is the main ridge along the Highway, 3 are the ridges on Karijera island, 4 is the Old Boodarie Landing, and 5, the site on the island opposite the Landing.
- B. Sites in various parts of Australia mentioned in this paper, including 1, Depuch Island; 2, Port Hedland; 3, Gallery Hill and Wamerana; 4, Mt. Edgar or Mentheena; 5, Flinders Range; 6, Sturt's Meadows; 7, Mootwingee; 8, Sydney-Hawkesbury district; 9, Delamere.
- C. Talu stone arrangement near the Four Mile, also shown in XVIIId-e.
- D-E. Talu stone arrangements on the western ridge on Karijera island also shown in XVII b, h, i.
- 2-4. These diagrams form a complete scale chart of the densest section of engravings on the Highway ridge. It extends from the Two Mile Well for 120 ft. southward to a road leading in to the Two Mile camp. The figures of outstanding interest in these charts are as follows:
 2. (a) Outlines and outlines with designs: A pair of sting rays with concentric circle bodies, A15B9; human arm, A30B20; bottle-nosed dolphin 10 ft. long with indeterminate figures across it, A33B32; snake and boomerang,

A17B17; barred figures, A15B10, A20B29, A26B23, A35B32, A23B20; shield with unusual line design, A20B29; tailed circle, A7B15; four linked circles, A19B28-9.

(b) Linear: A variety of fringes (one with the loop of the girdle around a pothole, A29B8), plume head ornaments, radiates, grids, animal tracks, barbed spearheads and complete spears, a spiral and concentric circle are scattered through this area. The lizard track at the top is over 20 ft. long.

(c) Pecked: Whiskered mammal, A7B1; mammal, A7B35; tiny man, A1B41, A2B4; lizard, A15B8; and a looped design, A1B46. There are many small pecked shapes, and innumerable human, kangaroo, emu and other bird, goanna and other animal, tracks in this area. The tracks occur in lines and groups but do not form an over-all pattern.

Superimpositions: Pecked over outlines, A9B7, A15B8, A30B41, A31B35; pecked over outline with design, A1B41, A14B46, A13B42, A19B31; pecked over linear, A6B18, A14B46, A13B44, A8B43.

Axe grooves: A18-20, B25-27.

2a. This large barred marine mammal is 14 ft. long, and within its outline are a barred figure, snake, pecked emu and kangaroo tracks, barbed spearhead, fringes, and a pair of parallel lines. There are several indeterminate figures outside its body. The grooves are from 1 to 2 in. wide, 1/4 to 1/2 in. deep.

3. Adjoins Fig. 2 on left side, the Two Mile Well being situated near the lower right hand corner of the chart.

(a) Outlines and outlines with designs: Bottle nosed dolphin, A20B34; pair of Minjiburu spirits fighting with spears, A12B22-37; striped hero Murra Murra with another human figure on his arm in middle top of chart; dotted sting ray, A7B43; clutches of eggs, A6B25, A23B19, with pecked legs of sitting bird, A21B1, A4B15, A30B44; shields, A29B23, A17B30, A22B41; cluster design, A24B17; spearthrower or sacred board, A9B3; spearthrower with curvilinear design, A1B16; hafted axe with striped head, A2B18, and with line design, A5B19; barred and gridded ovals, A6B7, A15B30; pair of circles on line, A16B34; barred club A6B13; indeterminate figures, A12B2, A24B39, A30B40; and a number of fish, boomerangs and sword clubs.

(b) Linear: A variety of fringes, grids, bifurcated lines, arcs, snakes, barbed spearheads and other linear figures occur in this section, among which are radiate lines around a pothole, A26B7, and radiate lines on a stick, A28B41.

(c) Pecked: Human figure in profile, A28B18; banded sting ray with dotted body, A24B21; snakes with their eggs, A7B28, A19B40, A18B34; lizard, A26B11; sword club, A18B23; rods which may be throwing clubs or kangaroos' tails, A21B33, A12B33, and various indeterminate shapes. The tracks vary greatly in shape and size, and are arranged in many lines in this area. The human tracks include those of children and adults. Four lines of human tracks lead outwards towards the edges of the ridge, but the others are haphazardly placed as are many of the bird and kangaroo tracks.

There are lines of small bird tracks, A24B8; large emu tracks, representing a pair of birds, A4B17; two lines of wallaby tracks, A13B2, A31B44; two sets of goanna tracks, A6B37, A11B36; and a set of kangaroo hind and fore feet tracks, A17B38. Some of the sets, A25B21, men hunting an emu at a waterhole, and A30B27, men hunting kangaroos, are compositions.

Superimpositions: There are many examples of pecked over other figures in this area.

Figs. 2-3a. The outline of the dugong (2a) is from 1 to 1-1/2 in. wide, 1/2 in. deep, and rubbed smooth by abrasion; dotted sting ray (near Well) outline 1/2 in. wide, 1/8 in. deep; dolphins 3/4 to 1 in. wide, 1/8 to 3/8 in. deep; striped hero (faint) 1/4 in. wide, 1/16 to 1/8 in. deep; dolphins 3/4 to 1 in. wide, 1/8 to 3/8 in. deep; striped hero (faint) 1/4 in. wide, 1 Minjiburu spirit figure (large one), 1/4 to 1/2 in. wide, and up to 1/4 in. deep; spear 1 in. wide, 1/8 in. deep; salmon, 3/4 in. wide, 3/8 in. deep; most of the grooves vary from 1/4 to 3/4 in. wide, and up to 1/4 in. deep, and are of conjoined punctures.

4. This chart illustrates the figures at the top of the ridge above Fig. 3.

(a) Outlines and outlines with designs: Turtle, A1B16; cluster design, A3B24; shield, A2B25; Minjiburu, A4B29; striped sword club, A2B10; human tracks, A6B37, A4B43; barred oval, A2B2; tailed circles, boomerangs and several indeterminate figures also occur.

(b) Linear: These include the plume ornament, A1B41, sets of arcs, fringes, barbed spearheads, snakes and tracks.

(c) Pecked: Boomerangs, A6B16, A6B37; lizard, A7B24; eggs, A4B21; and various indeterminate shapes. The human tracks point in all directions, one at A3B11 is unusually large, and they form several lines. Others include a set of five and a pair of emu, two pairs and a few single kangaroo, tracks.

Superimpositions. These include pecked over other figures at A4B24, A6B16, A6B20, A6B37.

5. This chart illustrates a section of engravings on top of the ridge between the Two Mile Camp and the Manganese Plant. The interesting figures include:

(a) Outlines and outlines with designs: Human feet, A18B14, A14B28; clutch of eggs, A2B48; dotted figures, A20B18, A22B36; barred oval, A17B10; gridded figure, A25B2; striped figure, A25B8; striped sword club, A12B41; striped human figure, A19B14, A17B27; shield, A9B21; sting ray, A20B40; sacred board with curvilinear design, A21B1; gridded circle, A21B13; and a number of fish, ovals, circles and boomerangs.

(b) Linear: These include concentric circles, fringes, barbed spearheads, lizard track, snakes, set of arcs, parallel lines, and radiate figures. One set of the latter is centered around a pothole, A1B38; one of the snakes is coiled in a spiral beside a pothole, A5B47; and there are several designs and bird tracks.

(c) Pecked: Eggs, A17B6; boomerangs, A20B44, A11B41; kangaroo's tail or throwing club, A14B45; banded designs, A18B21, A16B37; Minjiburu spirit in middle of lines of pecked human tracks, A10B31; indeterminate shapes, A7B35, A17B41; human and emu tracks scattered throughout series.

Superimpositions: Pecked kangaroo tracks over a dotted sting ray. Most of the outline and linear figures have weathered outlines, $1/2$ to 1 in. wide and $1/16$ to $1/8$ in. deep. The pits on the small dotted sting ray are sharp edged ovals $1/2 \times 1$ in. in size, and $1/4$ in. deep, some circular ones being $1/2$ in. in diameter; the conjoined punctured outline of the big sting ray is from $3/4$ to 1 in. wide, $1/8$ to $1/4$ in. deep, one portion of the tail groove being 1 to $1-1/2$ in. wide. The pits on the body of this ray are both oval and circular, $1/2$ in. long, and close together.

6-10. Sets of figures in various techniques and styles.

6. A gridded turtle, with grooves from $1/4$ to $3/4$ in. wide, and large outline fish with grooves $3/4$ in. wide.
7. A speared Minjiburu spirit with a peculiar pecked figure between his legs, and beside him a set of bird's leg, fringe, lizard track, lines from pot-holes, and an outline sting ray, all well preserved, grooves of spears and Minjiburu $1/4$ to $1/2$ in., and others $1/2$ to $3/4$ in. wide, and from $1/8$ to $3/16$ in. deep.
8. An old set containing many imperfect figures over which a line of 5 emu and one human tracks have been pecked. The grooves of the outline and linear figures are from $1/4$ to $1/2$ in. wide, $1/8$ to $1/4$ in. deep, and many are weathered, those of the small pecked emu tracks are 1 in. wide, $3/4$ in. deep, the large ones up to $2-1/2$ in. wide, and 1 in. deep; the rubbed hole is $2-1/2$ in. in diameter and 1 in. deep;
9. Another old set of a gridded turtle, barred boomerang and other figures with grooves $3/4$ in. wide and $1/4$ in. deep, and of fringes $1/4$ to $1/2$ in. wide, all from $1/8$ to $1/4$ in. deep, over which human tracks and a boomerang have been pecked. The latter is covered with fine pits $1/4$ in. in diameter, $1/16$ in. deep.
10. The interesting figures in this set comprise the set of wavy lines, pecked snake from hole, pecked lines over dotted figure, outline sting ray, sets of arcs, spearthrower, outline eggs with pecked legs of emu, and striped oval. There is a canoe-shaped figure (top right) but canoes were unknown on the northwest coast. The conjoined punctured outlines vary from weathered and faded to clear and sharp grooves $1/4$ to $1/2$ in. wide, $1/8$ to $1/4$ in. deep, the groove of the concentric circle being the best preserved, $1/2$ in. wide and $1/4$ in. deep; the pecked snake and emu tracks have large punctures 1 in. in diameter and $1/4$ in. deep. All from the area between the Two Mile Well and the Manganese Plant.
11. Series of Minjiburu spirit figures, showing range of variation. One (k) was figured by Basedow (1925, pl. x1, fig. 1) and another (h) by Petri and Schulz (1951, Fig. 1).

12-15. Minjiburu spirits and the figures associated with them. In 13 most of the outlines are weathered and faint, those of the fish, oval, fringe and others are $1/4$ in. wide and $1/16$ in. deep, the parallel scrolls $3/8$ in. wide and $1/8$ in. deep, and the turtle 1 to $1-1/2$ in. wide, $1/4$ to $3/8$ in. deep with oval punctures $1/4$ in. long. In 15 most of the grooves are $1/2$ in. wide and $1/8$ in. deep, and the pecked human tracks are from

1/8 to 1/4 in. deep. Figs. 12-13, and 15, from the area between the Two Mile Well and the Manganese Plant, 14 from Kariera island. Figs. 14-15 figured by Petri & Schulz (1951, figs. 2-4).

16-21.

16. Barred snake, along which pecked human tracks are arranged on alternate sides; other figures include ovals, two fringes, gridded turtle, little man holding a weapon, bird tracks, snakes, radiate and indeterminate lines. All of the outlines are faint, 1/4 to 3/8 in. wide, and 1/16 in. deep, with the small snake 1/2 in. wide and 1/4 in. deep, the long pecked snake and bird track 3/4 to 1 in. wide and 3/16 in. deep, and the human tracks from 1/8 to 1/4 in. deep.
17. Line of kangaroo's hind foot tracks extending for nearly 40 ft., with hunters tracks and sting ray liver.
18. Pecked intaglio woman, 3 ft. tall, with boomerangs, snakes, outline human figure (top right), kangaroo and human tracks; the two boomerangs and design are well preserved with sharp outlines 1/2 in. wide, 1/8 to 1/4 in. deep, others are weathered grooves 3/4 in. wide, the pecked woman has coarse pits up to 3/8 in. deep, but is weathered on the body, and the tracks have finer pittings 1/4 in. in diameter.
19. Minjiburu spirit with grooves 1/2 in. wide and 1/8 in. deep, and line of pecked human tracks, weathered and faint, 1/16 in. deep.
20. Minjiburu spirit with grooves 1/2 in. wide and 3/16 in. deep, with a series of pecked figures of lizards in coitus, pair of boomerangs and fringe with grooves 1 in. wide and 1/4 in. deep, a large emu track adjoining a pothole, and a line of human tracks. The tracks and lizards are from 1/8 to 1/4 in. deep.
21. Pair of large gridded turtles, very well preserved, the grooves of the one on the left are 3/4 to 1 in. wide, 1/8 to 1/4 in. deep, smoothed by weathering, and of the one on the right 1 to 1-1/2 in. wide, 1/4 to 3/8 in. deep, smoothed by abrasion and by weathering. All from the area between the Two Mile Well and the Manganese Plant.

22-25. Figs. 22-23, 25 are described in the section on Minjiburu spirit figures. In 23 the grooves of the striped figures, which are faded, are 1/4 in. wide, of the Minjiburu 1/2 to 3/4 in. wide, 1/16 to 1/8 in. deep, and the pecked feet are from 1/8 to 1/4 in. deep. 24, an indeterminate striped figure, probably human, grooves 1/2 in. wide, 1/8 to 3/16 in. deep; 25, grooves mostly 1/2 in. wide, 1/4 in. deep, and tracks 1/8 in. deep. 22, grooves 1/2 in. wide, and from 1/8 to 3/16 in. deep. 22 is situated 150 yds. from the quarry north of the One Mile camp. 23-25 between the Two Mile Well and the Manganese Plant.

26-28.

26. There are two outline men with an oval, 4 boomerangs in the same style, lizard track, striped shield, large fringe, 2 ovals, concentric circle around pothole, barbed spearhead, a curious group of an outline kangaroo or bird with a spiral and a tailed concentric circle, and a line

of pecked kangaroo tracks. The grooves are old and weathered, $1/2$ to $3/4$ in. wide, $1/8$ to $3/16$ in. deep.

27-28. These figures are described in the section on Minjiburu spirits. All on Karijera island.

27. The grooves are $1/2$ in. wide, $1/8$ to $3/16$ in. deep, those of the set of arcs being $3/4$ in. wide and $1/4$ in. deep; the pecked tracks have pits $3/8$ in. wide and $1/4$ in. deep.

28. The grooves are $1/2$ in., with some up to $3/4$ in., wide, and from $1/8$ to $3/16$ in. deep, the pits in the pecked feet are from $1/4$ to $3/8$ in. wide and from $1/4$ to $1/2$ in. deep.

29-30.

29. Consists of a large outline man, 9 ft. tall, with a set of arcs, barbed spearhead, barred boomerang, oval and another figure; pecked figures of human and emu tracks, 3 clubs, barbed rod, and various shapes. The grooves are $1/2$ in. wide, $1/8$ to $1/4$ in. deep, and the pecked figures are $1/8$ in. deep.

30. Most of the grooves are from $3/8$ to $1/2$ in. wide, $1/16$ to $3/8$ in. deep, but a fish's tail is $1/4$ in., a fish $3/4$ in., and a snake from $1/2$ to $3/4$ in. wide, and the latter is $1/8$ to $1/4$ in. deep. This set is described in the section on Minjiburu spirits.

31-33.

31. Set of barbed spearheads; on Karijera island.

32. Old set of striped figure (human spirit ?) with spears or snakes, boomerangs, fish, sting ray, bent figure, oval, and sets of parallel lines; a line of 4 pairs of pecked tracks, probably kangaroo hind feet, cross the group; the grooves are faded and indistinct, $1/2$ in. wide and $1/16$ to $1/8$ in. deep, pecked tracks $1/8$ to $1/4$ in. deep; opposite the Road Board Depot.

33. A Minjiburu set, in which the large hero and the striped figure are weathered and indistinct, grooves mostly $1/2$ in. wide, $1/8$ to $3/16$ in. deep, eggs from $3/16$ to $1/4$ in. wide and $1/8$ in. deep, and pecked tracks from $1/8$ to $1/4$ in. deep; between the quarry and the One Mile camp.

34-40.

34. Described in the section on Minjiburu spirits. Grooves are $1/2$ in. wide, $1/8$ to $3/16$ in. deep; on Karijera island.

35. A large sting ray's liver, fish and dotted sting ray with 2 lines of pecked human tracks. The sting ray is closely pecked all over its surface; on Karijera island.

36. Unusually large figures of two marine mammals, a bottle nosed dolphin and a whale, 17 and 11 ft. long; snakes have been pecked on one end and portion of the outline and first bar across the body, a fin on the middle of one side, and boomerang over the outline of the whale. There is an imperfect Minjiburu (top left) and a pecked and disarticulated bird track

(bottom right) in the set. The grooves are $1/2$ in. wide, $1/8$ in. to $3/16$ in. deep, and the pecked feet from $3/16$ to $1/4$ in. deep.

37. The central figure is an intaglio man 5 ft. high, with a set of 8 pecked hind kangaroo tracks, and one human track, on one side; he is engraved over a plain spear, and there are linear figures of 5 crosses, pair of kangaroo tracks, and indeterminate linear figure and striped bat shaped figure between his legs; and a barbed spearhead, arc, bifurcated rod, dotted track, oval containing cross, and a fringe (left). The grooves are mostly $1/2$ in. wide, $1/8$ to $1/4$ in. deep, the fringe and sacred board are in a finer technique, with grooves $1/4$ in. wide, $1/8$ in. deep, and the pecked track is $1/4$ in. deep.
38. An outline woman 5 ft. 6 in. high with lines which either represent several snakes beside small potholes or an indeterminate design. The faded grooves are $1/2$ in. wide and $1/8$ to $3/16$ in. deep.
- 39-40. These are described in the section on Minjiburu spirits. In 40 many of the grooves are weathered and faint, those of the man are $3/4$ in. wide, $1/8$ in. deep, shield $1/2$ in. wide, $1/8$ in. deep, and the pecked hands and feet of the Minjiburu are $3/16$ to $1/4$ in. deep. 36-37, 39-40 are between the Two Mile Well and the Manganese Plant.

41-45. Figs. 41-42, 45 are described in the section on Minjiburu spirits.

43. Contains outlines of a small human figure, probably female, bird, male genitals on a set of speared human legs, sting ray's liver, oval, fish, outline figure with herringbone design (like a shield), bird with curved parallel line design, and pecked figures of a plume ornament, human hands and feet. On Kariera island.
44. Barred turtle and fish, portion of whale or other large marine mammal, an outline figure and a native companion's track. The grooves are $1/2$ to $3/4$ in. wide, $1/8$ to $3/16$ in. deep, but the turtle, boomerang and large fish are weathered and faint. Between the Two Mile Well and the Manganese Plant.
45. The grooves of the sting ray liver and bird track are $1/4$ in. wide, $1/4$ in. deep, of the Minjiburu spirit $1/2$ in. wide and $3/16$ in. deep. Between the Two Mile Well and the Manganese Plant.

Figures 41-42 on Kariera island.

46. A. Diagram of the two ridges, sites 1 and 2, near the township, showing the present distribution of the engravings and the sections destroyed.
- B. The three ridges on Kariera island. The triangles indicate Minjiburu spirit figures, the circles are Talu stone heaps, and the plate and figure numbers show the position of some of the interesting figures and groups in this area.

47-74. Figs. 47, 50-4 show the variety of striped, 48-9 the linear, and 55-62 the outline human figures; 63, human tracks; 65, human hands; 66, portion of a large bird; 68, bird; 67, 69-74, clutches of birds' eggs with tracks, and 64, striped human hand.

- 76-81. Sets of turtles and Minjiburu groupings on Kariera island. In 76 the grooves are 1/2 in. wide, 1/8 to 3/16 in. deep, but in the boomerang they are from 1 to 1-1/2 in. wide and 3/8 in. deep, and smoothed by weathering; the curved foot is the most recent pecking. In 80 the grooves are from 1/2 to 3/4 in. wide and 1/8 to 1/4 in. deep.
82. Variety of outline fish, some of which have barred designs.
- 83-84. Fig. 83 shows the variety of outline fish, some with dotted line designs, and 84, of sting ray livers.
- 85-87. Fig. 85, variety of outline, dotted and line design stingrays; 86, swords of sawfish; 87, sting ray livers.
- 88-93.
88. Group of outline fish, bird and sting ray's liver, with grooves from 1/2 to 1 in. wide, 1/8 to 1/4 in. deep; opposite the Road Board Depot.
89. Outline fish, sting ray's liver, boomerang and barbed spearhead; opposite the Road Board Depot. Grooves are 1/2 in. wide, 1/8 to 3/16 in. deep.
90. Described in the section on Minjiburu spirits. The grooves are 1/2 in. wide, 1/8 to 3/16 in. deep; on Kariera island.
91. Sperm whale nearly 9 ft. long, with lizard track, sting ray's liver, sting ray, sword club, fish, fringe, bird track, arc, pecked kangaroo tracks and boomerang. The grooves of the whale, tracks and club are weathered and faded, 1/2 to 3/4 in. wide, 1/16 to 1/8 in. deep, of other figures are fresh and sharp, 1/2 in. wide, 1/8 to 3/16 in. deep, and the pecked boomerang is 1/4 in. deep; on Kariera island.
92. Large dugong or whale 9 ft. long, with snake, grooves 1 in. wide and 3/8 in. deep; on Kariera island.
93. Fish struck with barbed spear, with very worn grooves due to being walked over as it is now on a path to the One Mile camp; just south of the One Mile Camp.
- 94-97. Fig. 94, outline lizards; 95a, c, jellyfish, b, sea-wasp, d, Mangrove crab; 96, snakes, and tracks, many linked with potholes. The tail of 96s has been converted into a lizard track; 97, spearheads with double rows of up to 18 pairs of barbs.
98. Boomerangs, showing outlines and the variety of line designs.
- 99-105. Fig. 99, variety of clubs; 100, hafted axes; 101, indeterminate sacred objects; 102, sacred boards; 103, fringes; 104, feather plume and similar ornaments; 105, indeterminate rayed lines and lizard.
- 106-8. Groups showing the way in which weapons are grouped together, including (a) spear and boomerang; (b) sacred board and 2 boomerangs; (c) 2 clubs and boomerang; (d) bullroarer and boomerang; (e) boomerang and spear-thrower; (f) sacred board and shield; (g) boomerang and shield; (h) 2 boomerangs; (i) boomerang, barbed spearheads and bird track; (j) barbed spears and pair of boomerangs; 107, variety of shields; 108, spearthrowers.

109-145. Fig. 109, variety of grid designs; 110-3, 117, 119-30, 133-42, 144, barred figures; 144, 132, branching line designs like plants; 116, striped and curvilinear design; 118, 131, striped figure; 143, indeterminate design; 145, concentric circles and spirals.

146-227. Variety of ovals and circles and of cluster and indeterminate designs.

228-95. Figs. 228-47, variety of radiate figures; 248, fringed design; 249-64, 274, parallel line and arc designs; 265-70, 272-92, 295, linear designs; 293, groups of pits and dots.

296-97. Figs. 296a-b consist of long meandering lines with a grid or plume at the ends, associated in one with a barred turtle, gridded boomerang, fringe, barbed spearheads, pecked human and kangaroo tracks. The grooves are 1/2 in. wide, 1/16 to 3/16 in. deep. Situated between the Two Mile Well and the Manganese Plant. 297. A series of oval and linear figures, additional to those photographed, noted while making a census of sites 1 and 2.

298. Pecked figures of (a-e) human; (f-h) birds; (i) indeterminate; (j) fish; (k) sting rays' liver; (l) ray; (m) mangrove crab; (n-o) lizards; (p) lizard or phalanger; and (q) indeterminate, probably human.

299-300.

299a. Described in the section on Minjiburu spirit figures; on Kariiera island.

299b. The most prominent figures are the pair of pecked goannas 5 to 6 ft. long, at the top, and the pair, either sleeping or in coitus, at the bottom. Other pecked figures include human, emu and kangaroo tracks, among which are linear barbed spearheads, bifurcated line, snakes, set of parallel lines, barred ovals, boomerangs, striped spearthrower or sacred board and others. The grooves are from 1/2 to 3/4 in. wide, and from 1/8 to 1/4 in. deep, the pecked figures from 1/8 to 1/4 in. deep, the goannas being the maximum depth; on Kariiera island.

300a. A pecked snake nearly 30 ft. long, with a short one at the end, with fringes, plume ornament, snake and lines; between the quarry and One Mile Camp.

300b. The outline man, 5 ft. tall, is surrounded by fringes, boomerangs and barbed spearheads, linear designs, barred spearheads, barred ovals and tracks, and on one side a short and long pecked snakes and line of native companion tracks. The outline grooves are 1/2 in. wide and 1/8 in. deep, the large pecked bird track 1 in. wide and 3/8 in. deep, and the snakes are from 1-1/2 to 2 in. wide and 1/4 to 3/8 in. deep; between the quarry and One Mile Camp.

301-3.

301. An unusually fine pecked group of a goanna 6 ft. long at the end of a line of human tracks some of which lead towards and others away from the animal. The pecking consists of rounded punctures or pits (not cuts) from 1/4 to 3/8 in. deep; on Kariiera island.

302. Pair of large outline fish, one speared; on Kariera island.
303. Pecked hand or foot on long right angled line, with fish, line of bird tracks, striped shield, zigzag line and indeterminate figures. The grooves of the fish, shield and bird tracks are $\frac{3}{4}$ in. wide, $\frac{3}{16}$ in. deep, and of the other figures $\frac{1}{2}$ in. wide and $\frac{1}{8}$ in. deep; opposite the Road Board Depot.

Other figures in this series not recorded comprise two sets of kangaroo hind tracks, snake, sting ray liver, outline boomerang, barred boomerangs, goanna, human tracks, and fringe in conjoined punctured technique with grooves $\frac{1}{4}$ in. deep. Some of the tracks are small and some big, and Captain George said they represent a man and a woman hunting the goanna which the man has hit with his boomerang. There is a small Minjiburu on the rock.

- 304-23. Range of pecked intaglios. Fig. 304, snakes and sting rays; 305-14, designs, indeterminate shapes; 316, sting ray's liver; 317, 319, indeterminate; 318, lizard or man; 320, boomerangs and clubs; 321, human hands, 322, eggs and design of linked circles like fruit on a vine; 323, human hands.

324. Pecked animal tracks. (a-e) kangaroo's hind and fore feet and tail; (f) kangaroo hind foot tracks; (g) line of kangaroo hind and fore foot tracks; (h) line of kangaroo's hind foot and tail impressions; (i) kangaroo hind foot tracks; (j) human and kangaroo hind foot tracks; (k) line of wallaby's hind foot tracks; (l-m) kangaroo tracks; (n) lizard track; (o) goanna track; (p) man and dog tracks; (q) indeterminate bird track; (r) man, bird, and animal tracks; (s-w) indeterminate tracks.

325. Hunting compositions. (a) Mangrove crab with emu, kangaroo and human tracks. (b) Kangaroo tracks and tail impression, with clutch of eggs and barbed spear; (c) human track and egg beside cupped circle; (d) boomerang with tracks of kangaroo; (e) tracks of a man with his dog and spear; (f) mixed group of pecked tracks superimposed over barred ovals, with fringe and bird tracks; (g) kangaroo hind and fore paw tracks, with linear figure possibly a barbed spearhead; (h) bird tracks and grid design; (i) human, bird and kangaroo tracks; (j) bird and kangaroo tracks, radiate and other figures; (k) bird, wallaby, kangaroo tracks with ovals; (l) bird tracks and oval; (m) boomerang and pair of kangaroo fore paw tracks; (n) bird tracks with barbed spearhead, plume ornament and fringe; (o) man and kangaroo tracks, with striped shield; (p) man and wallaby.

326. Eggs and bird tracks. (a-g) Clutches of eggs with legs of sitting bird, all but one being pecked; (l-n) turtle's eggs; (o) bird tracks; (p) large emu and human tracks; (q-x) emu and other bird tracks, among which the linked set (t) is unusual.

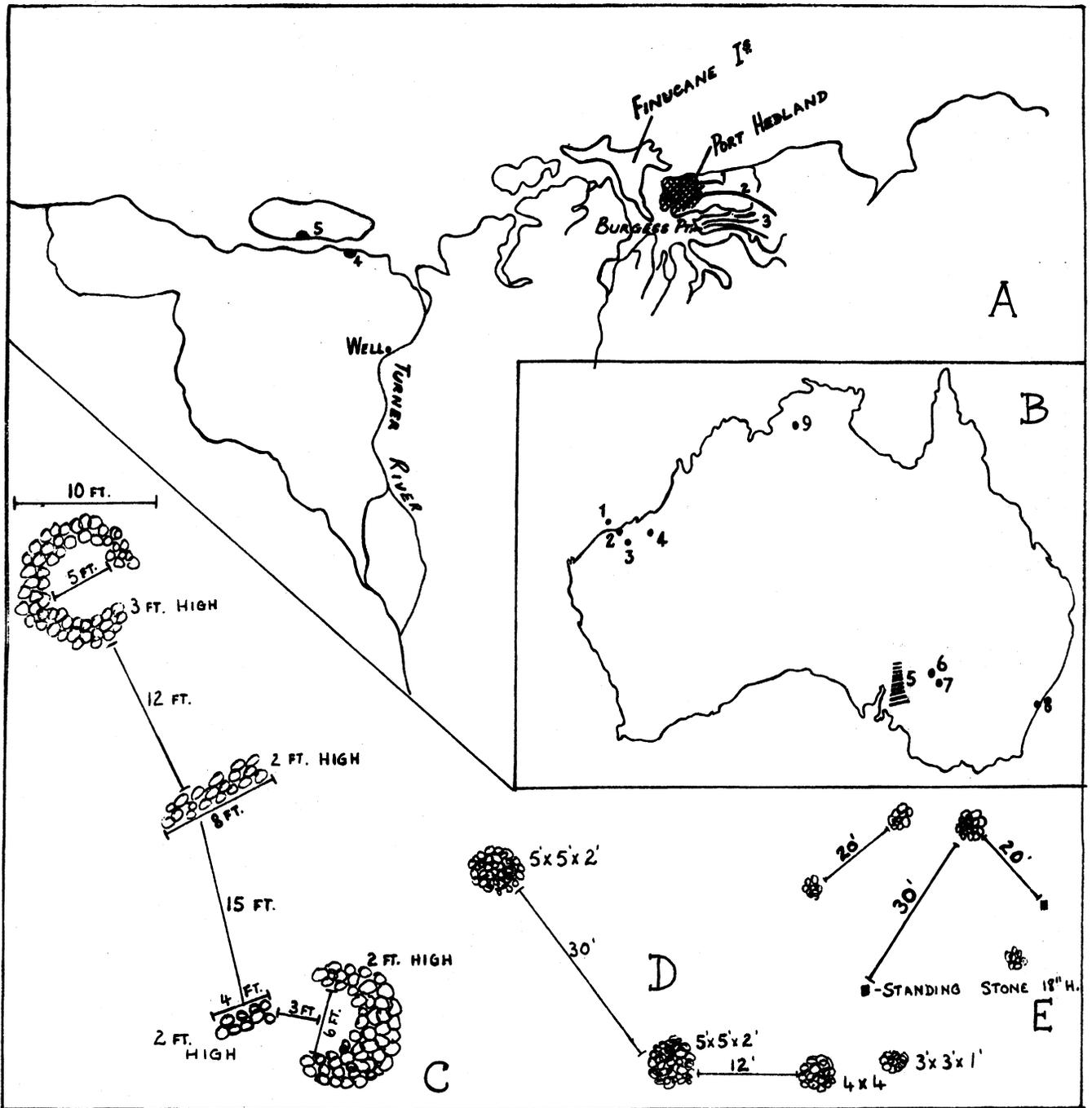


Figure 1



Figures 2a-2

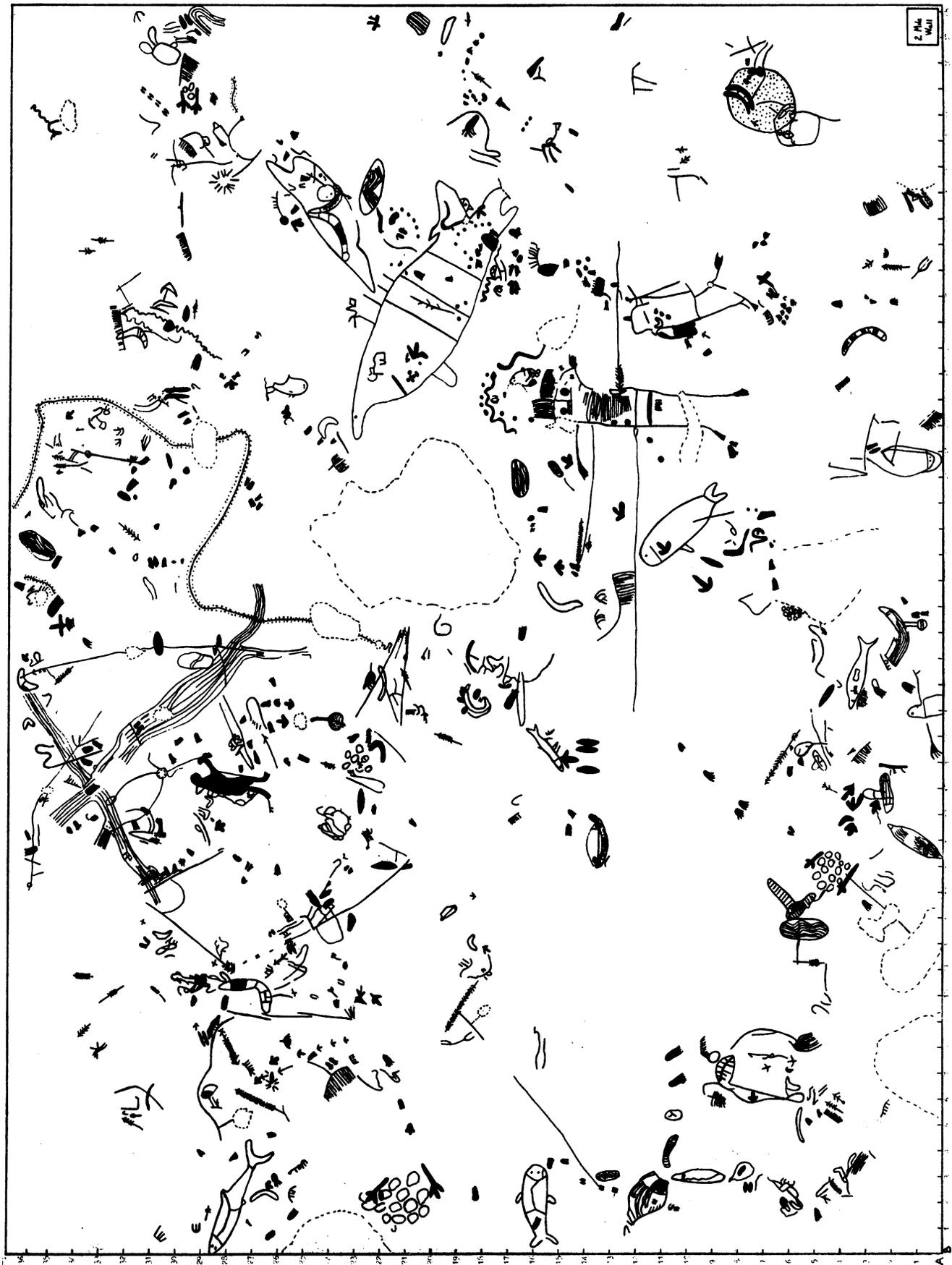


Figure 3

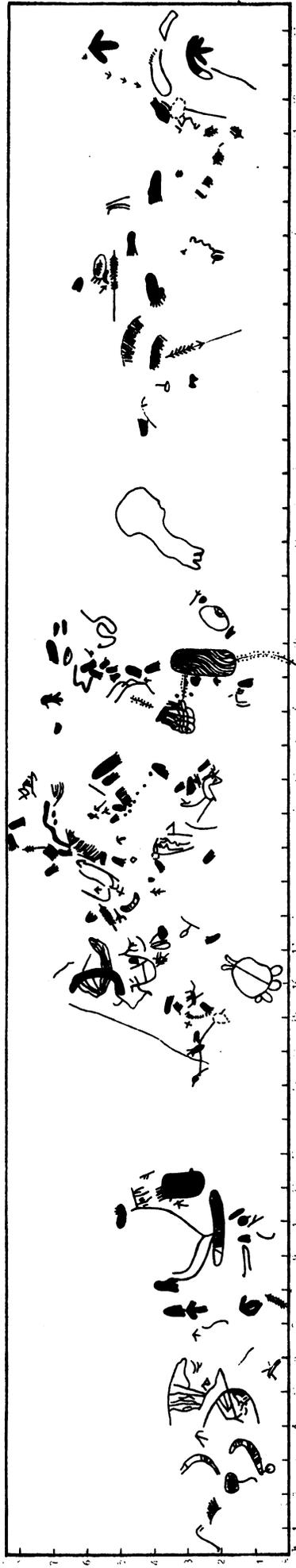
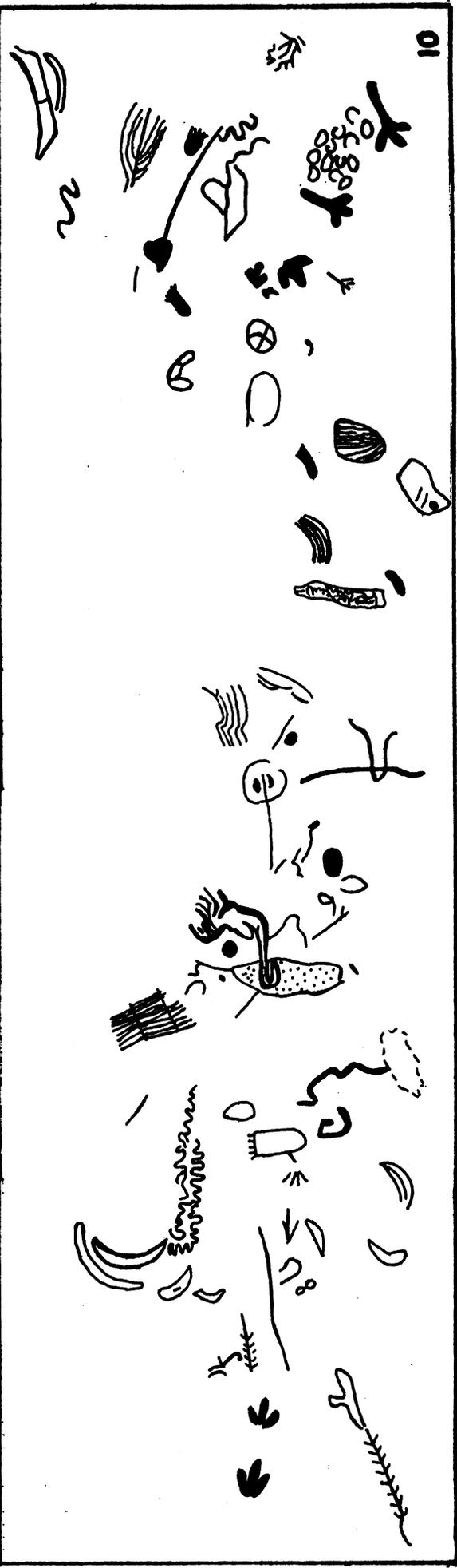
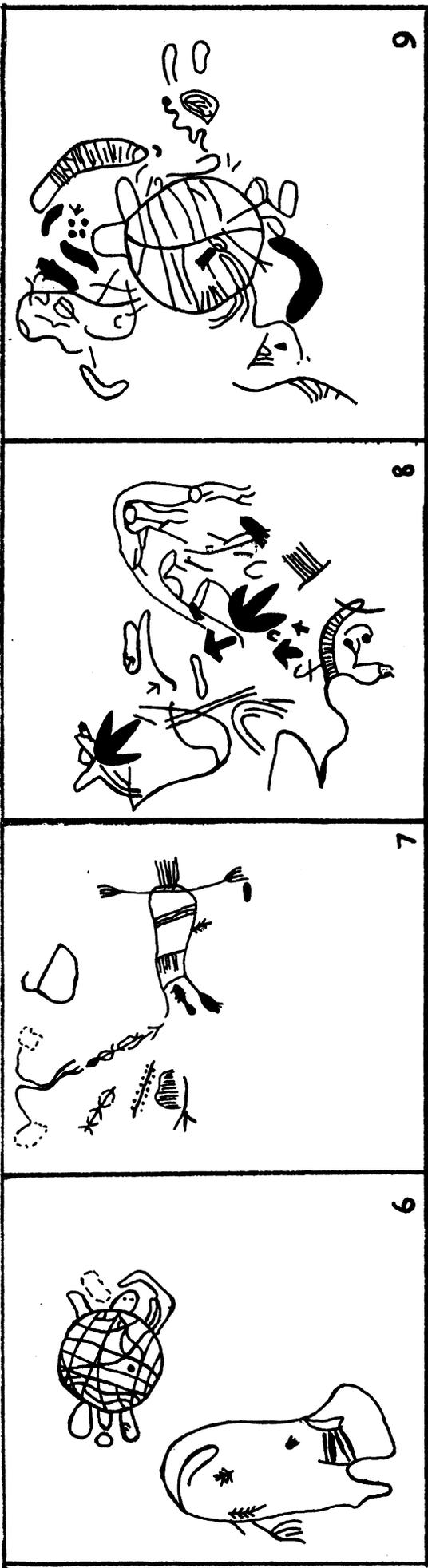


Figure 4



Figure 5



Figures 6-10

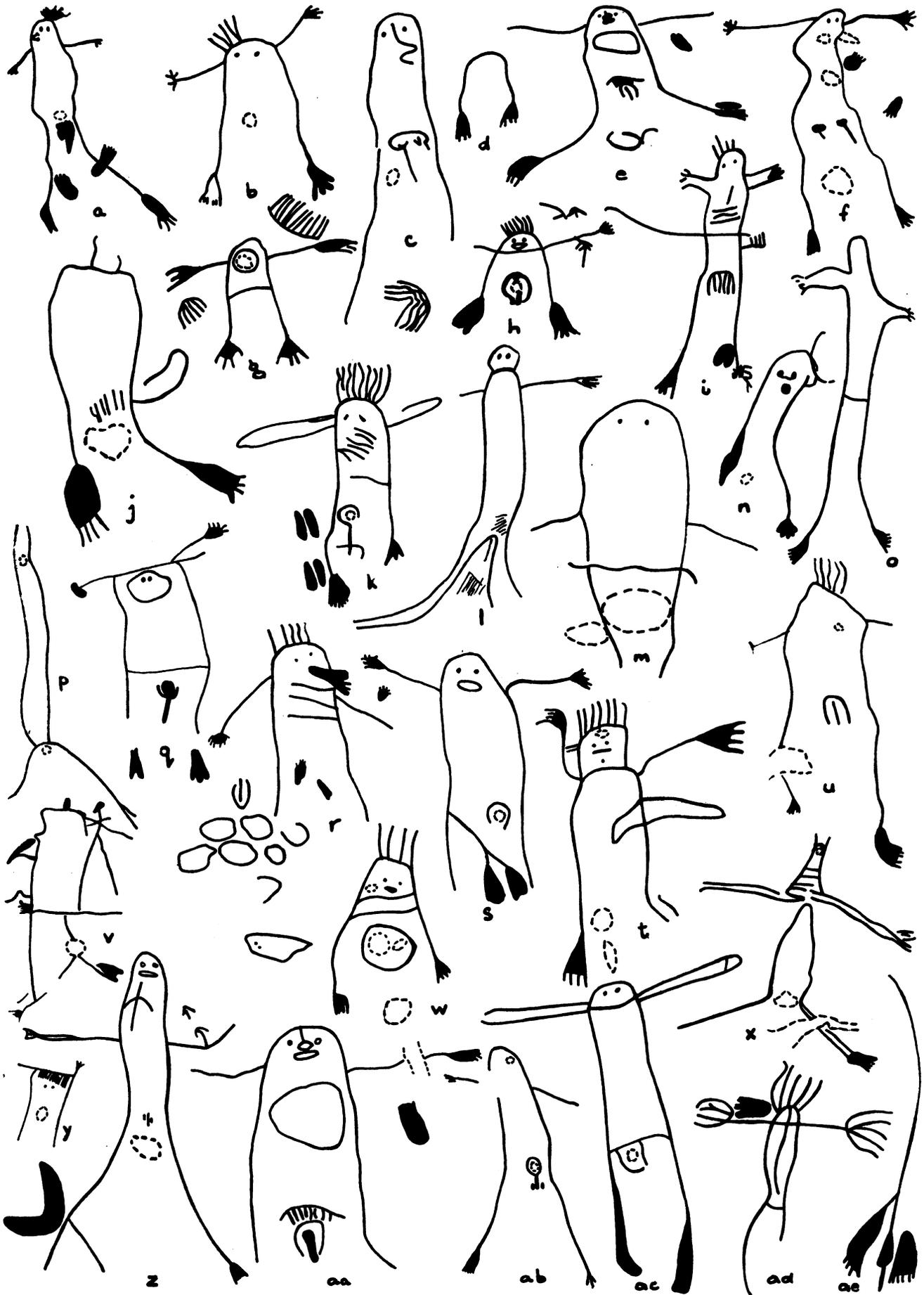
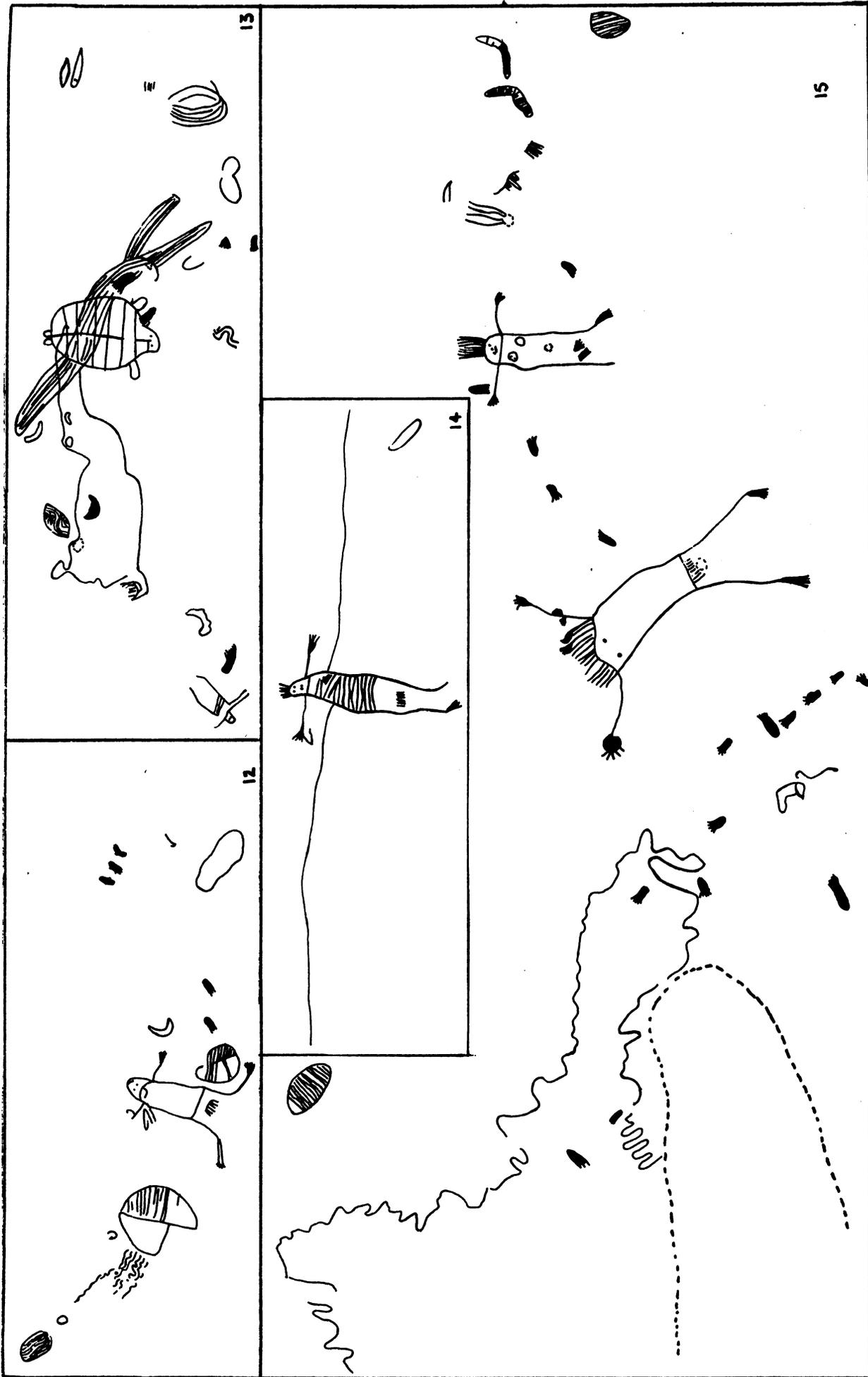
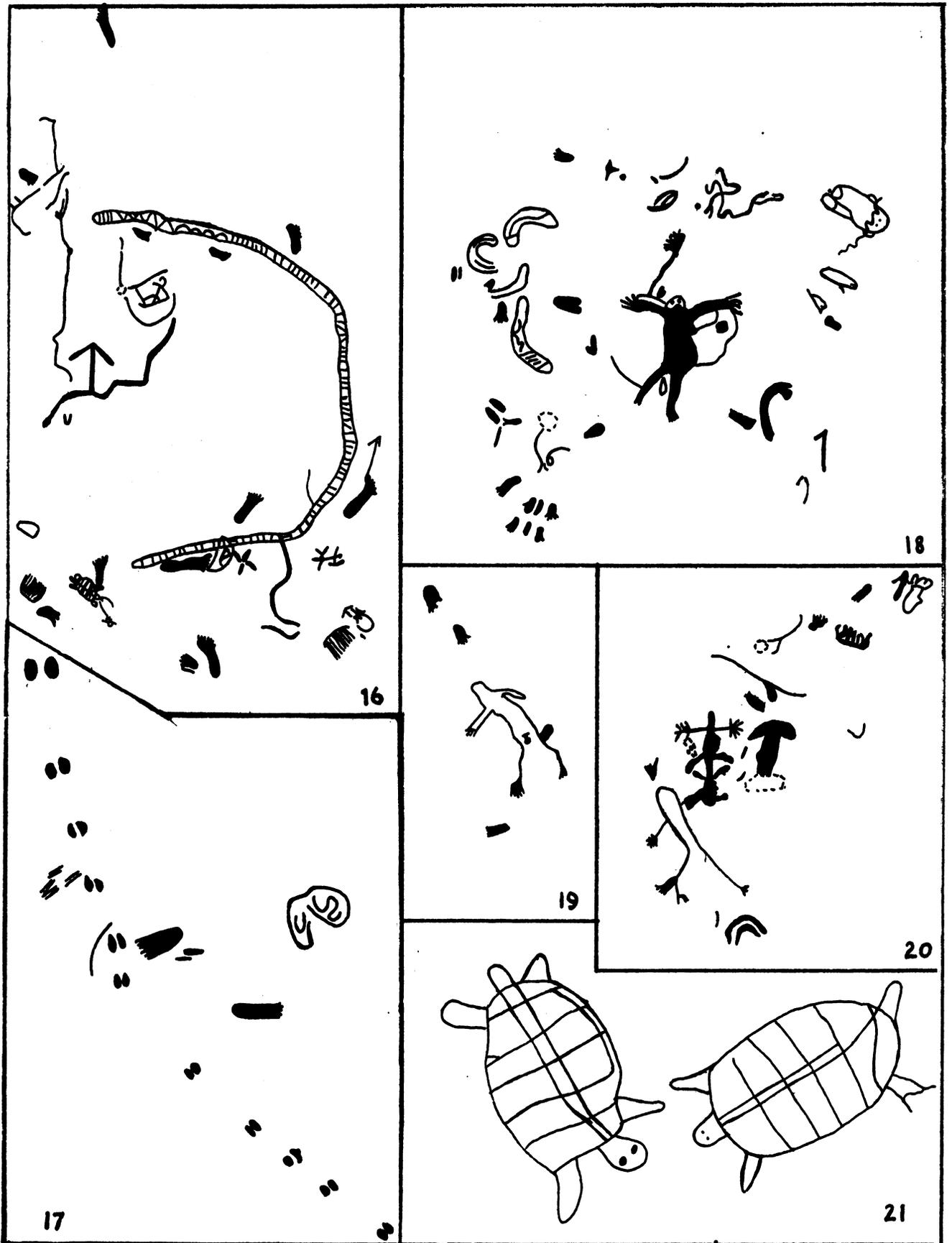


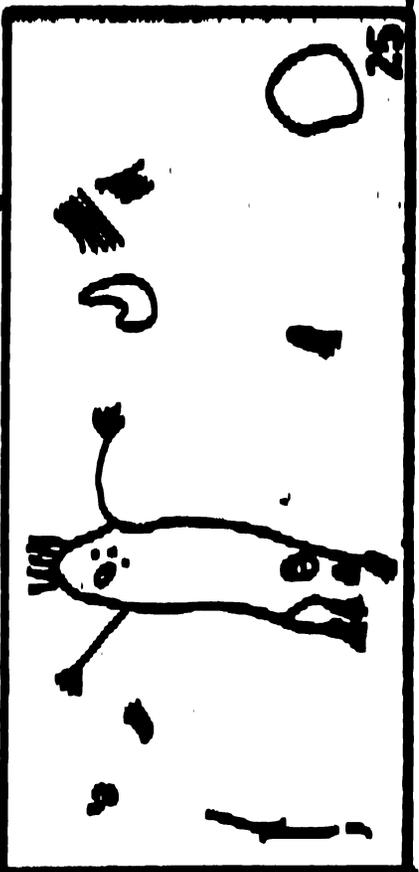
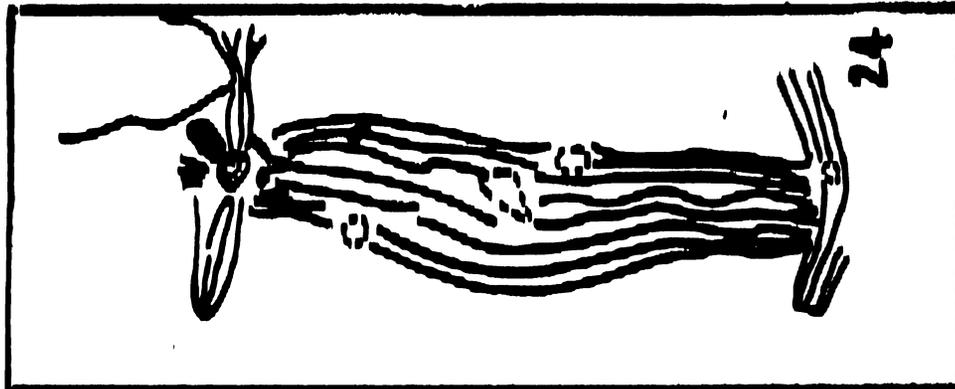
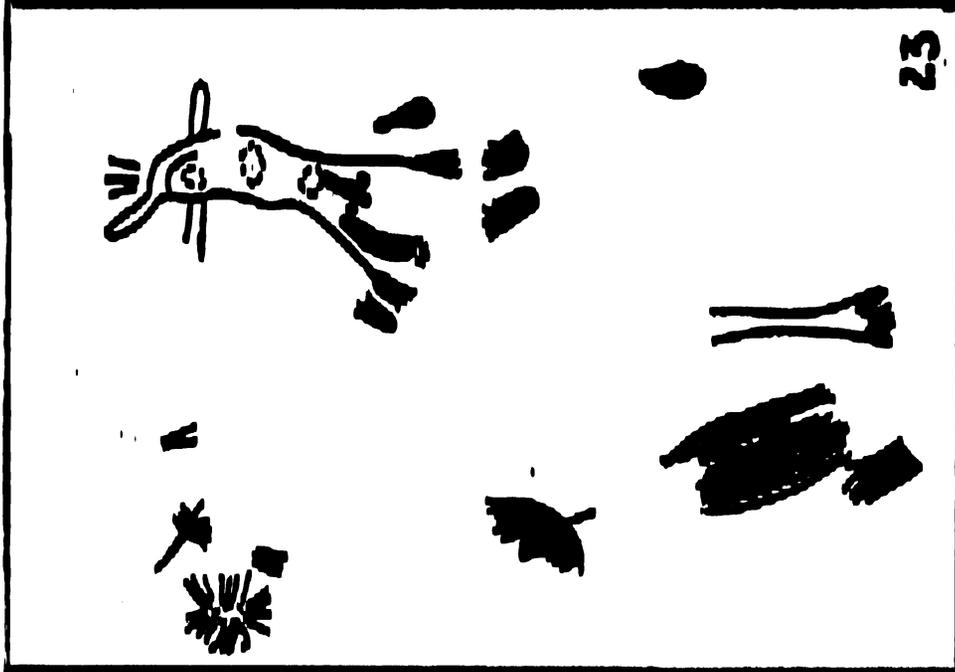
Figure 11



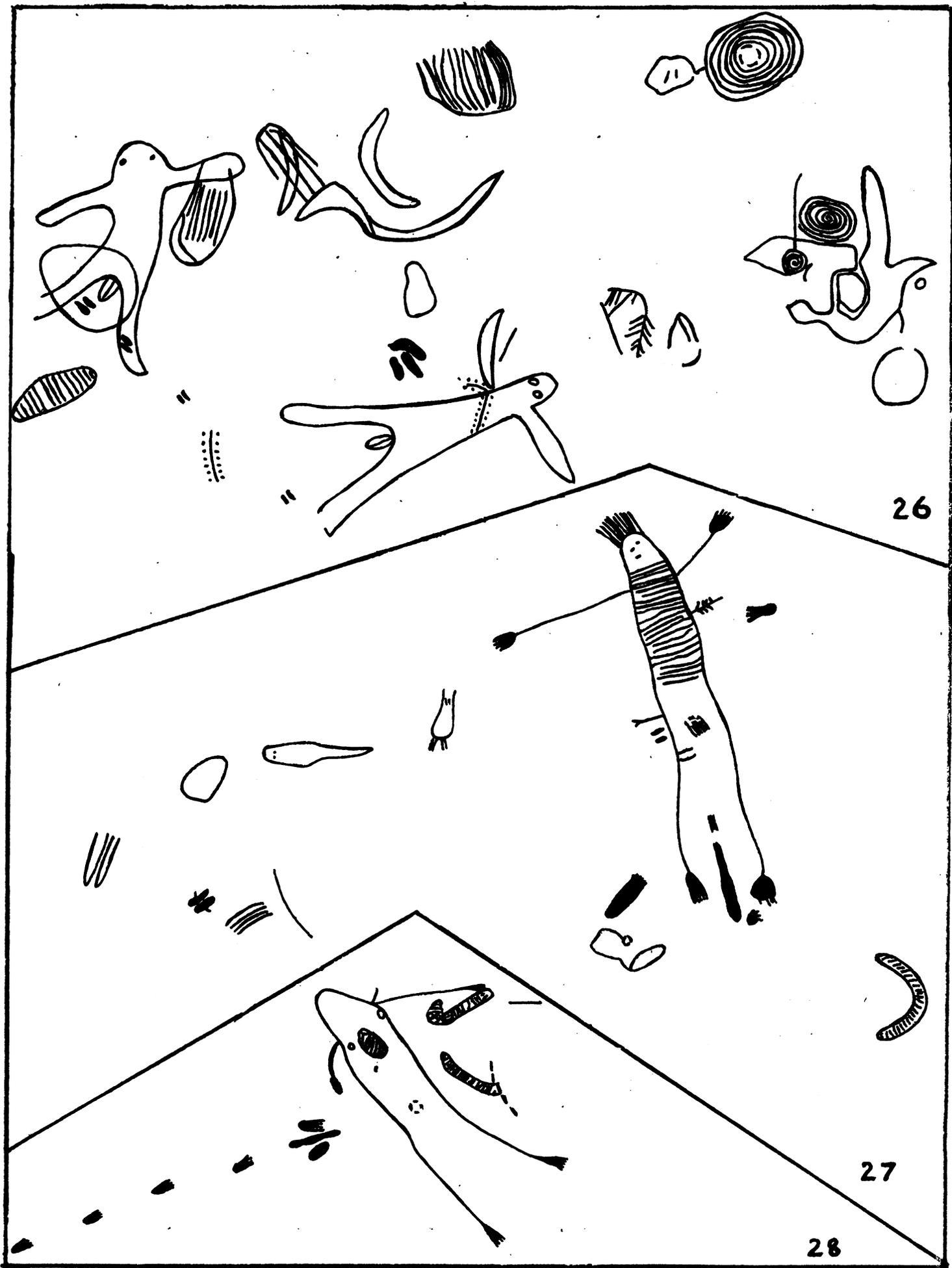
Figures 12-15



Figures 16-21



Figures 22-25

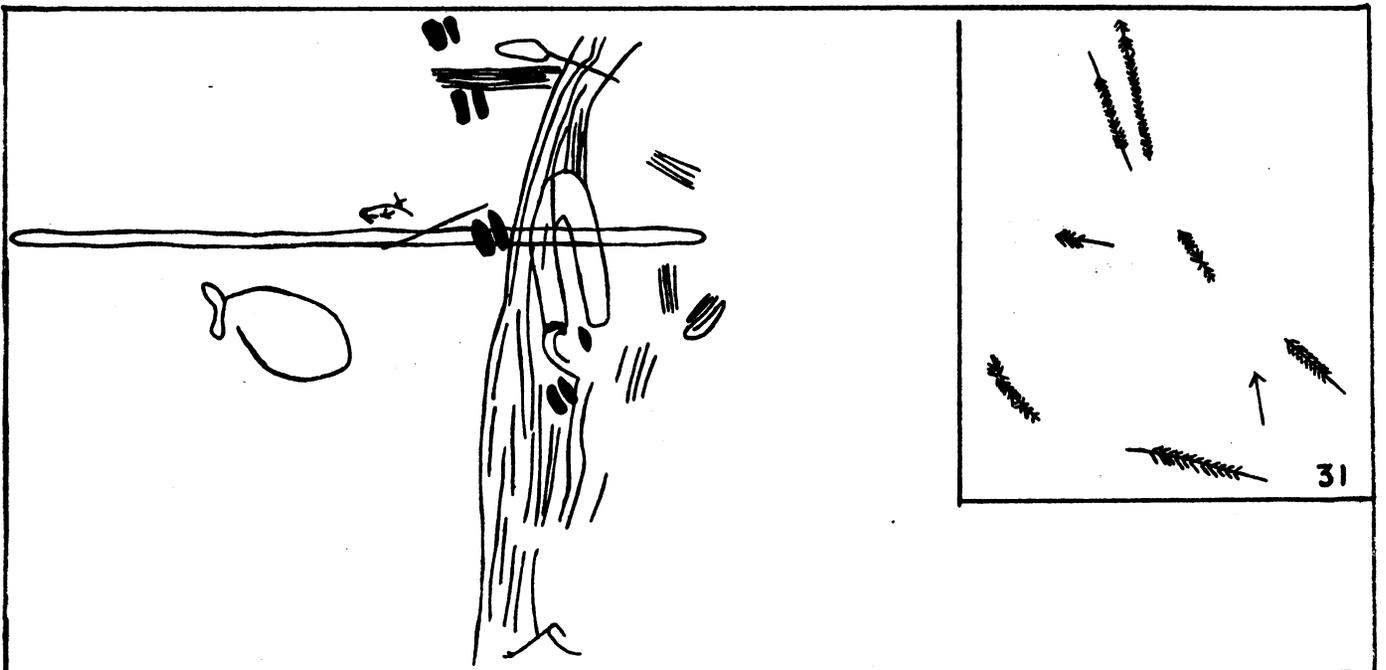


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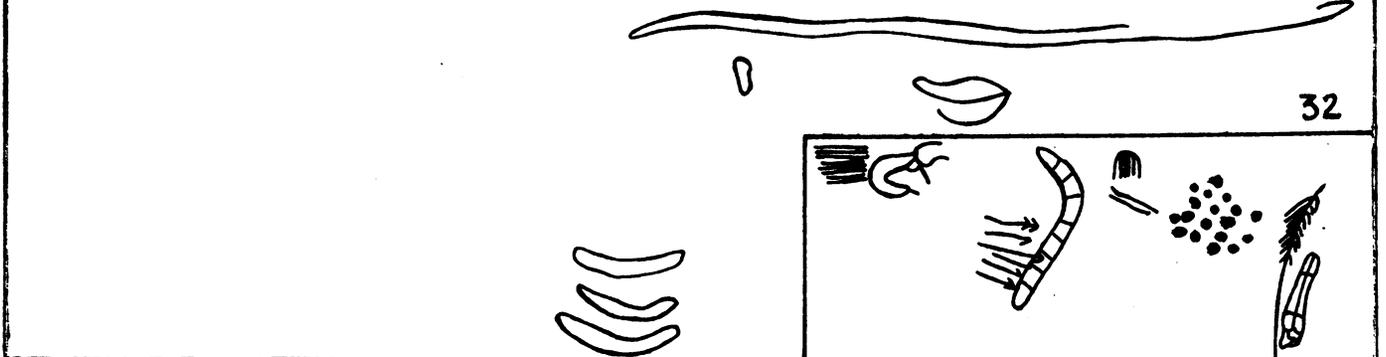
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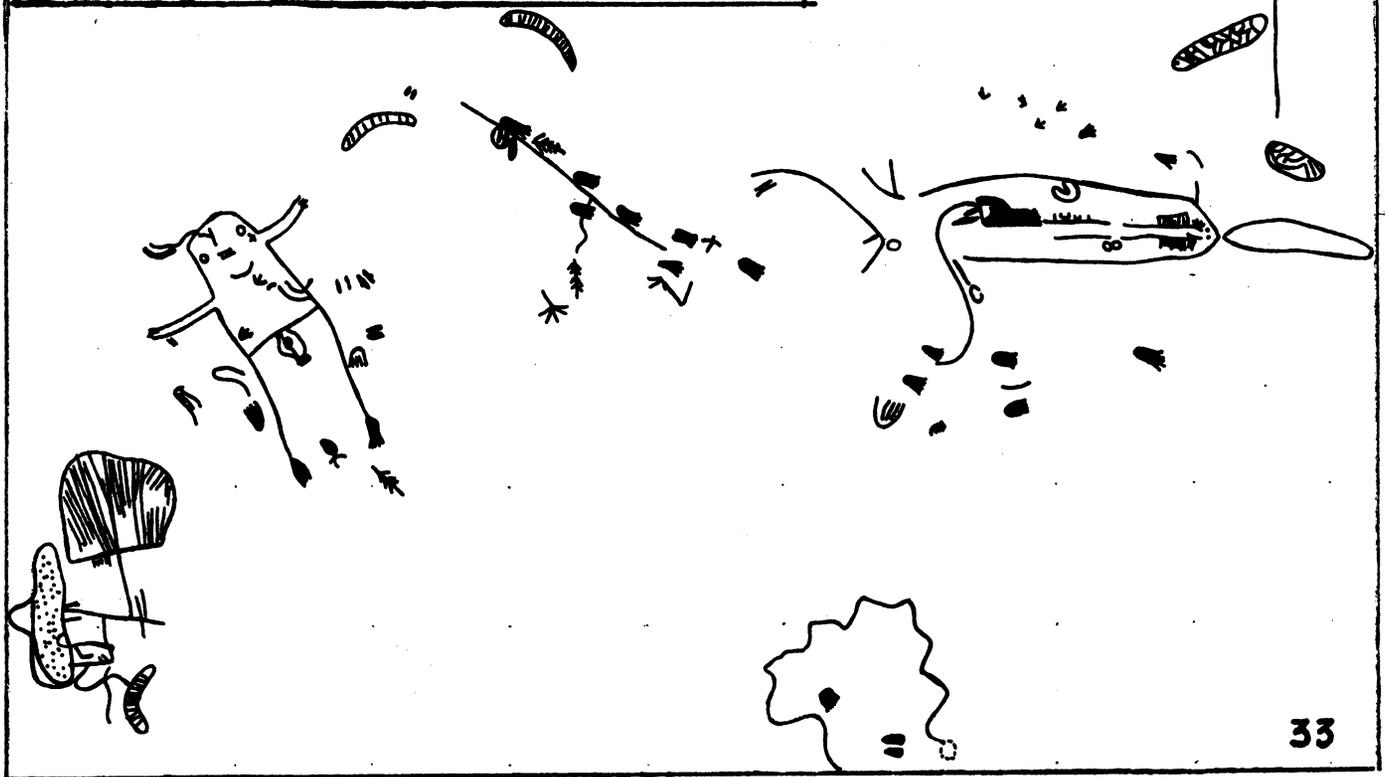
Figures 26-28



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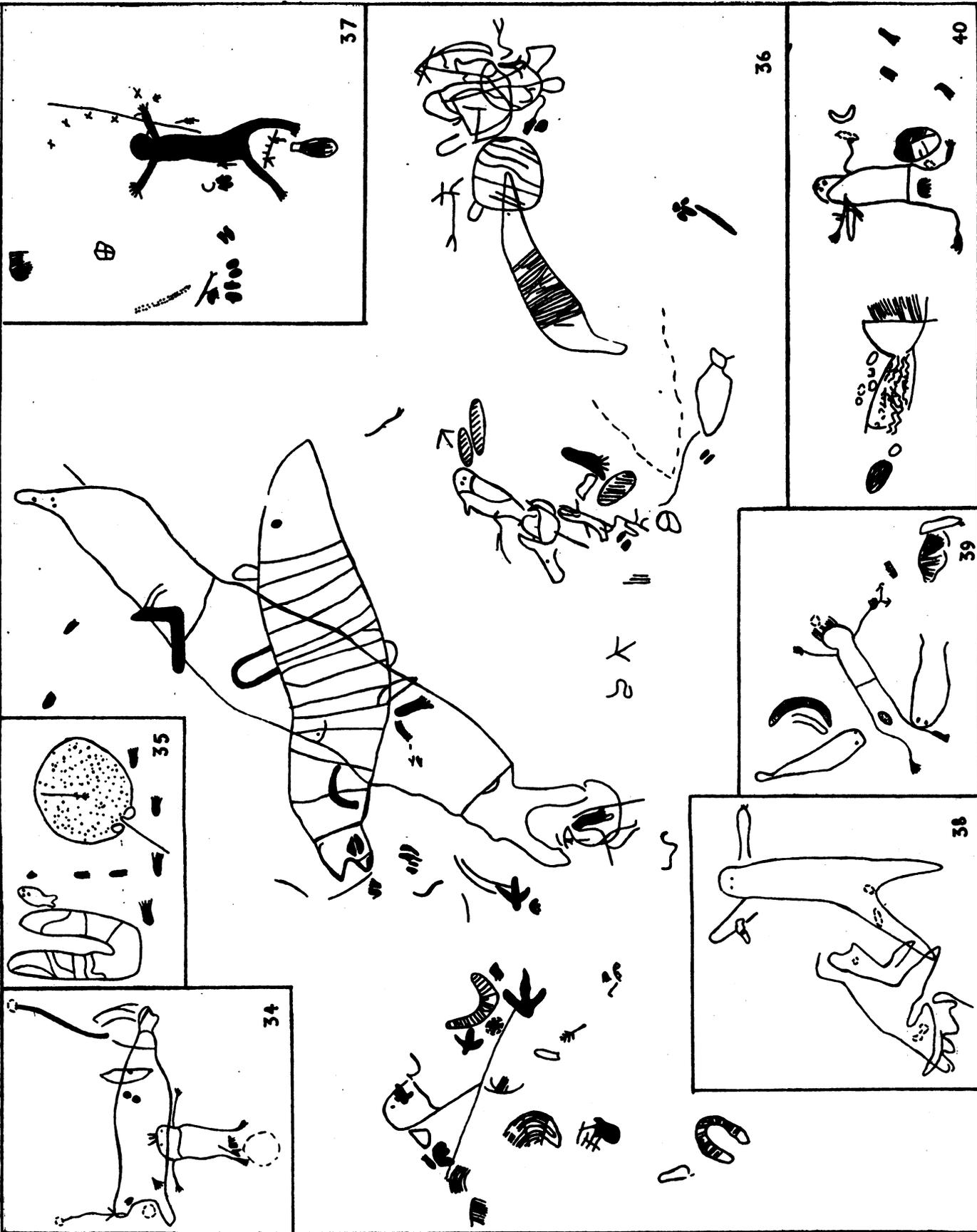


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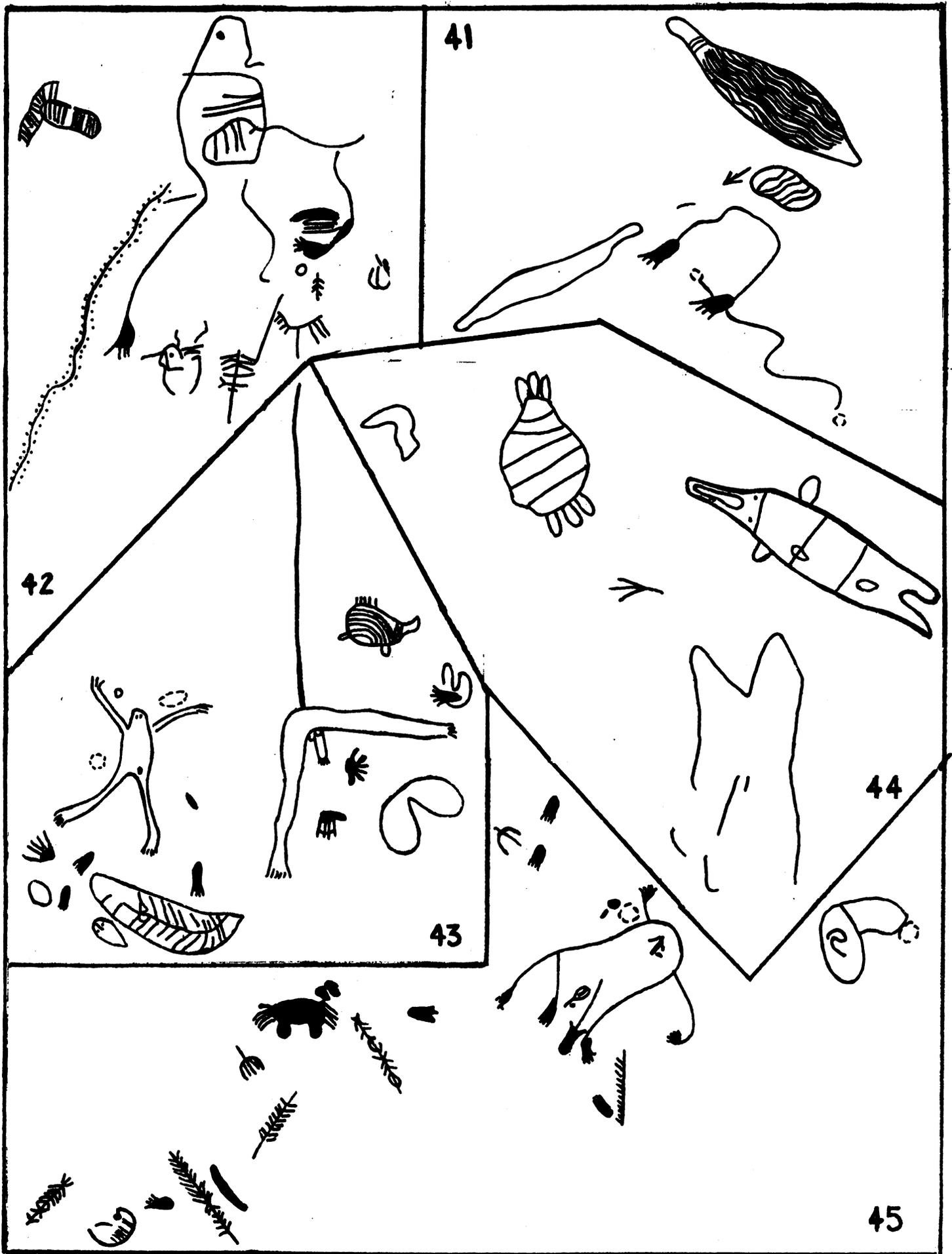


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Figures 31-33



Figures 34-40



Figures 41-45.

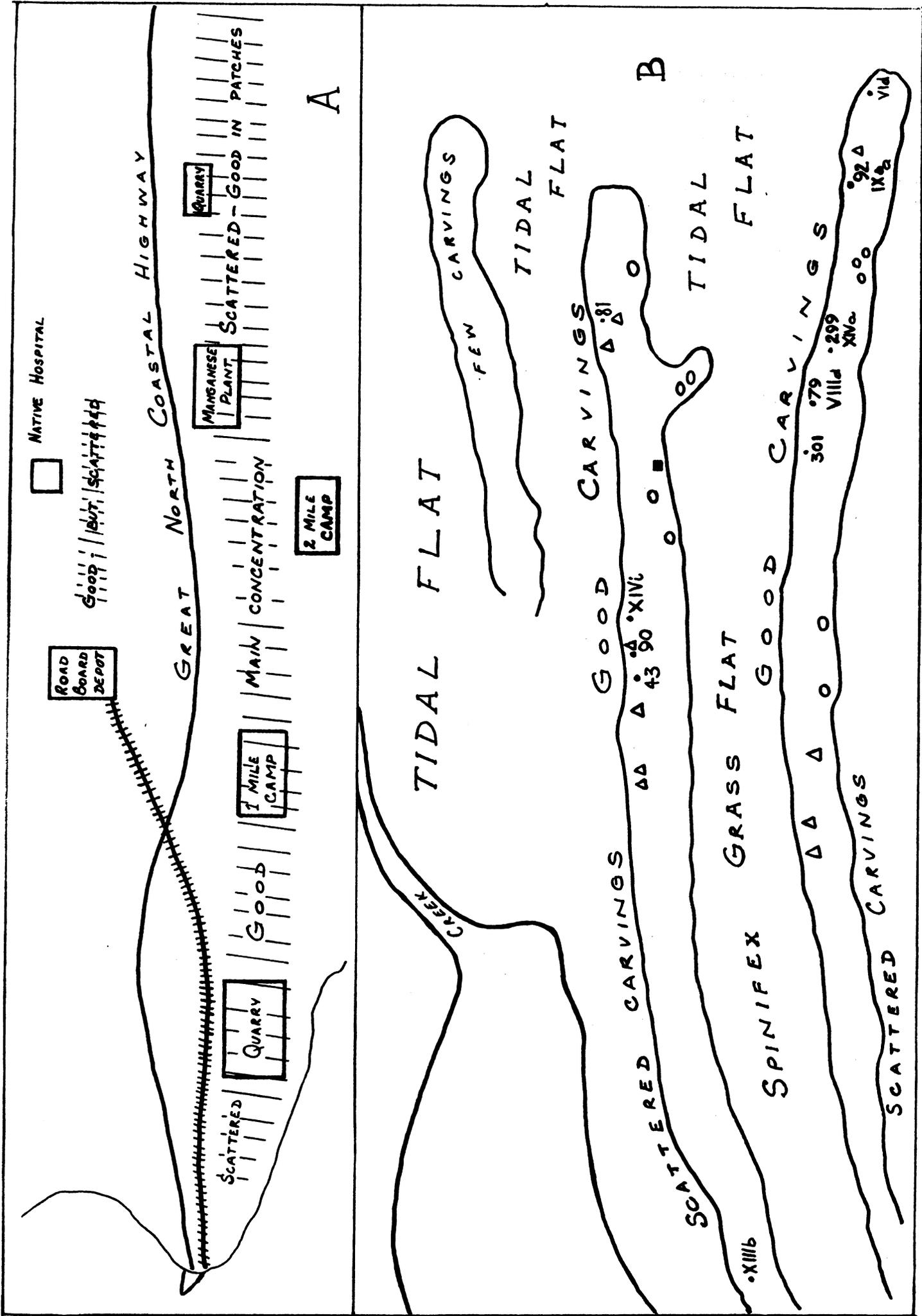


Figure 46



Figures 47-74

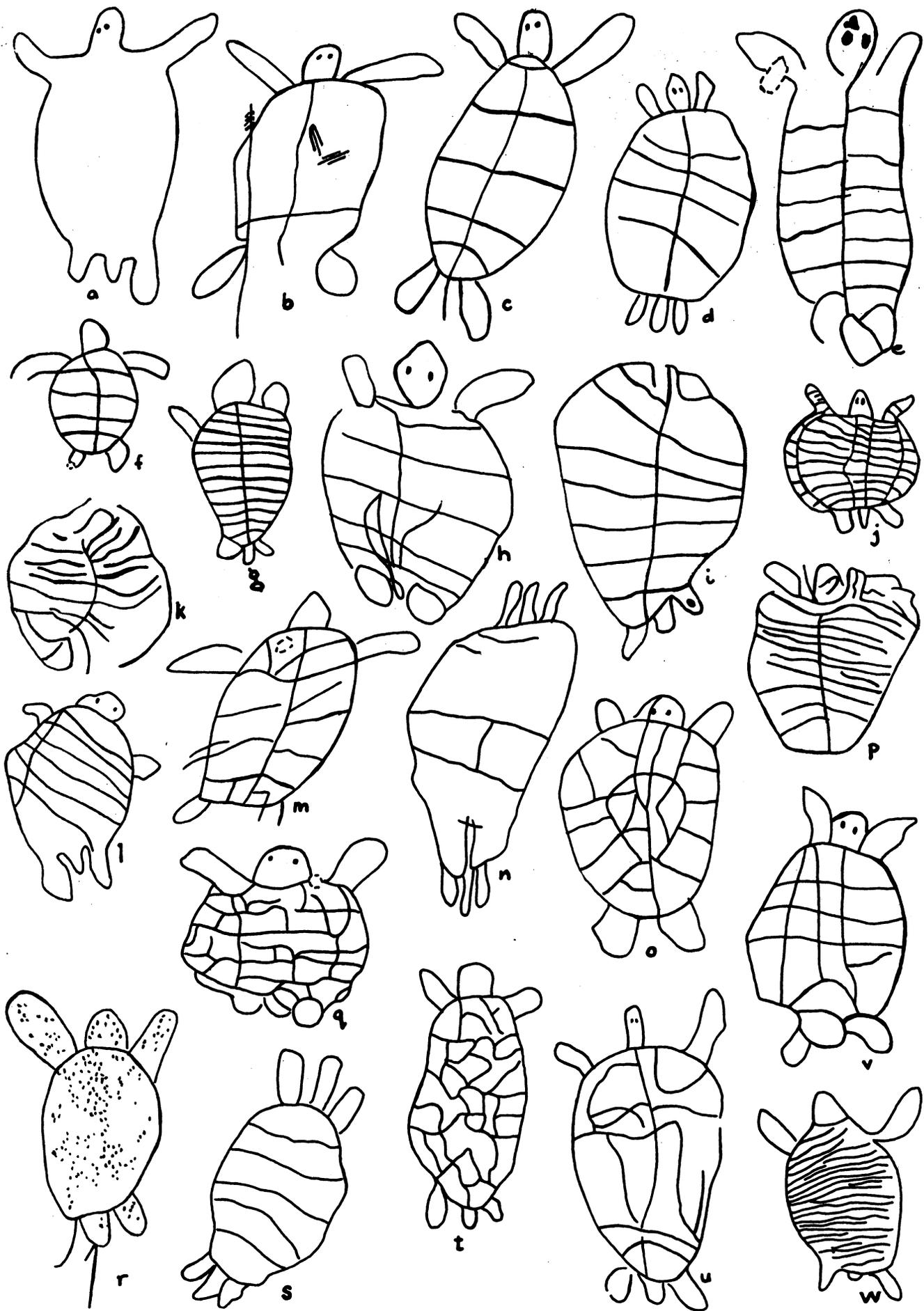
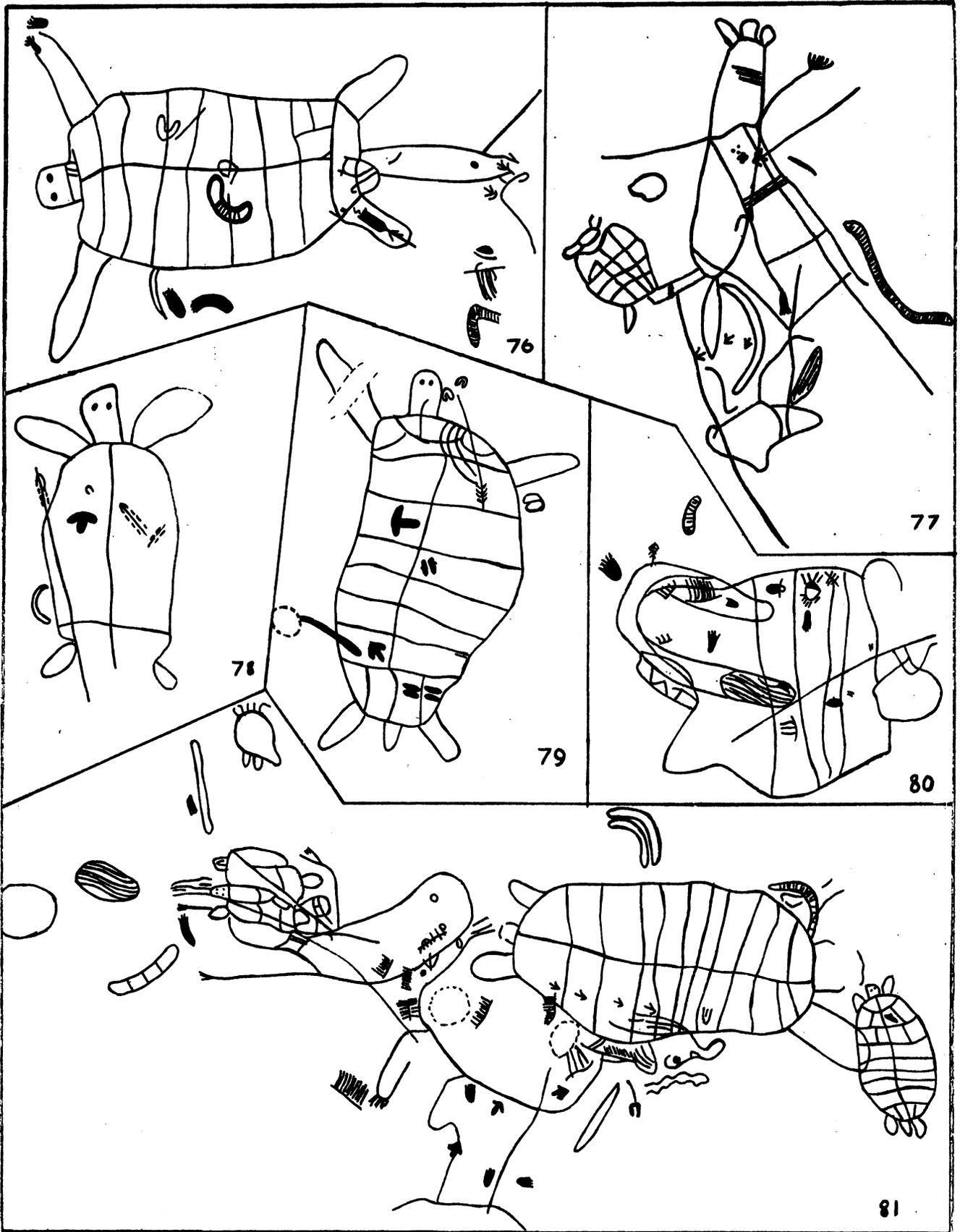


Figure 75



Figures 76-81

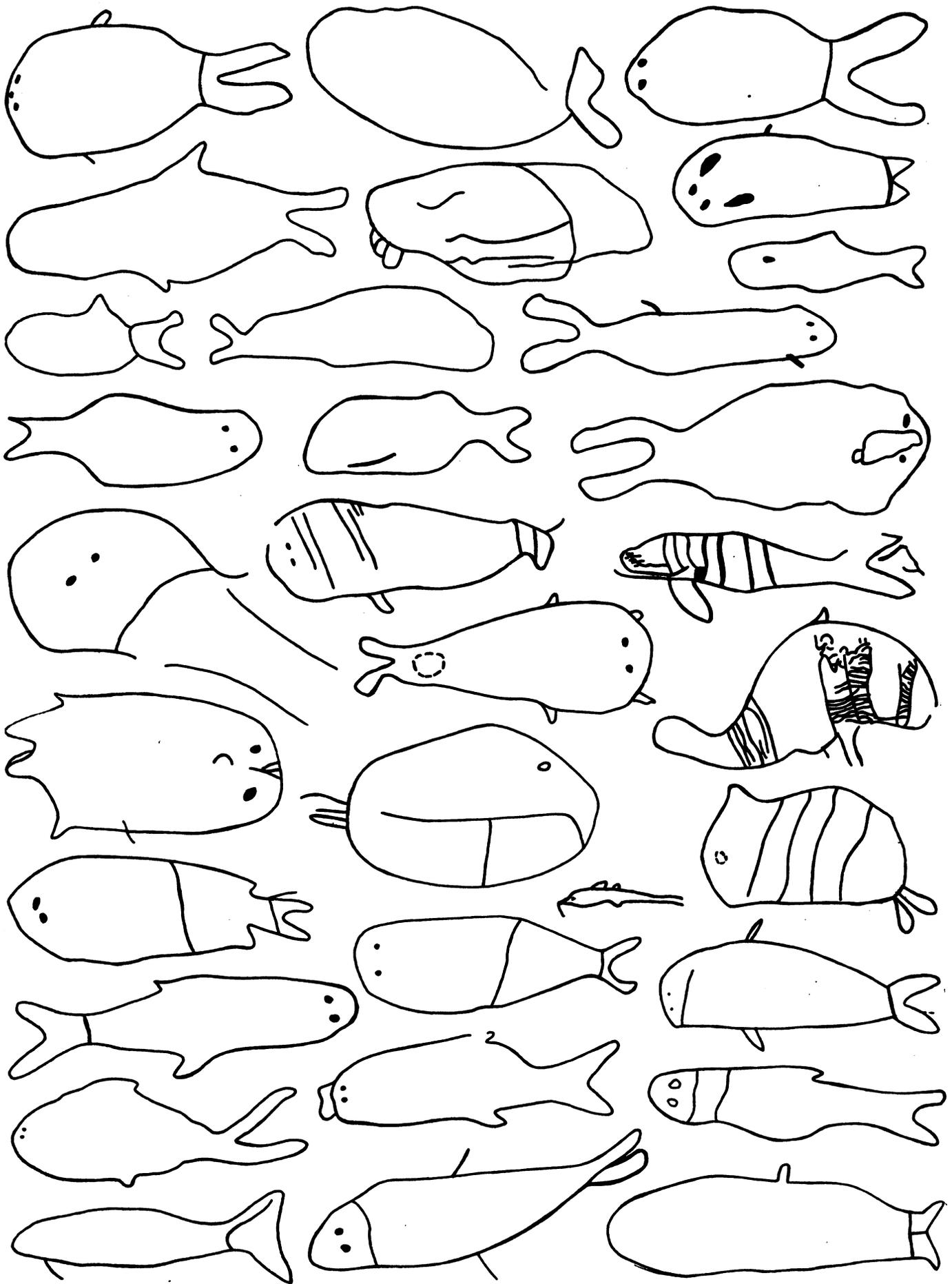
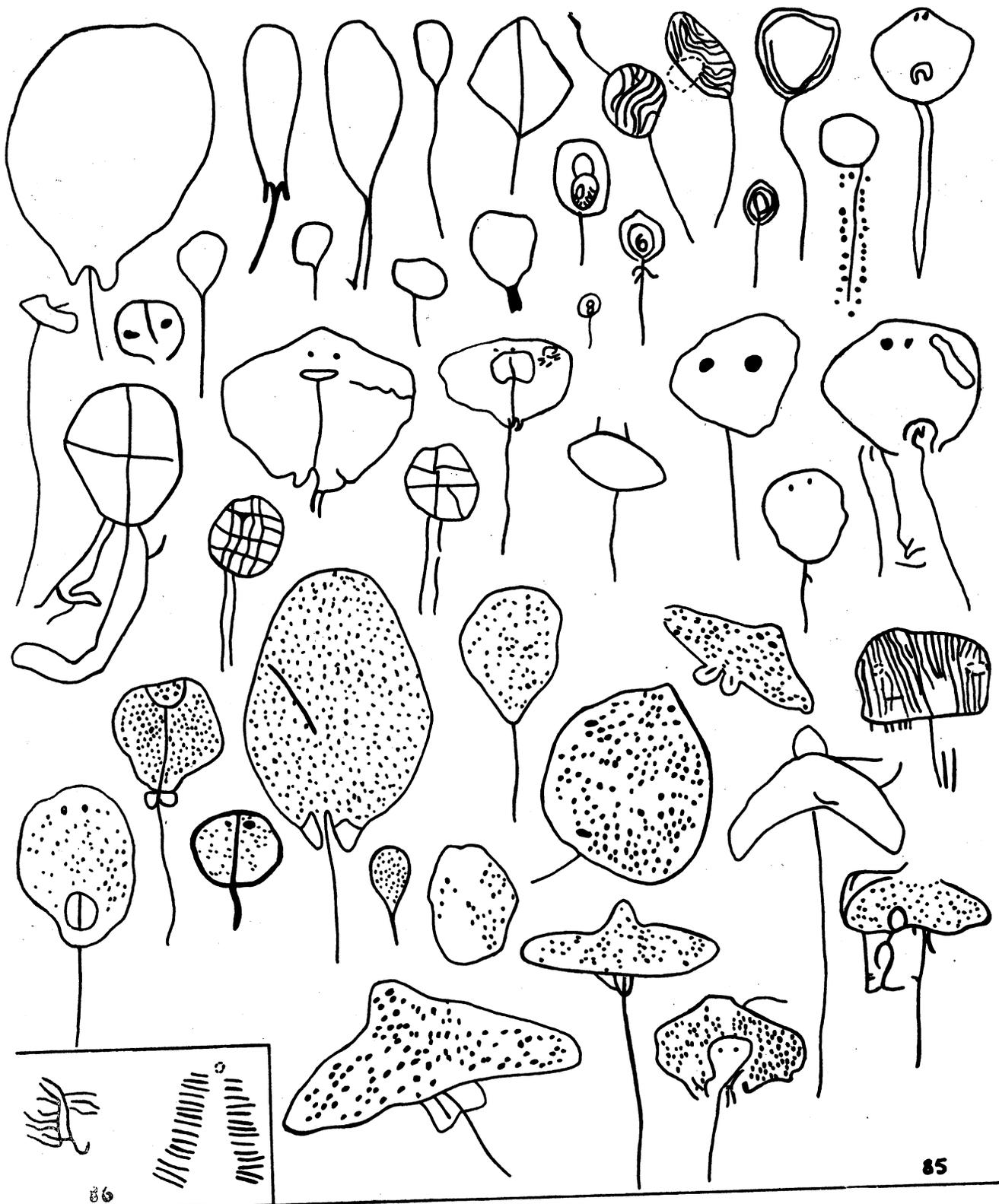
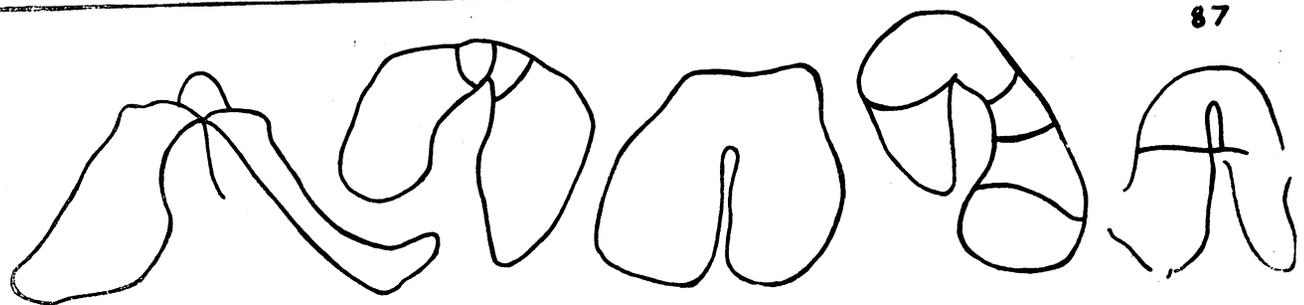


Figure 82



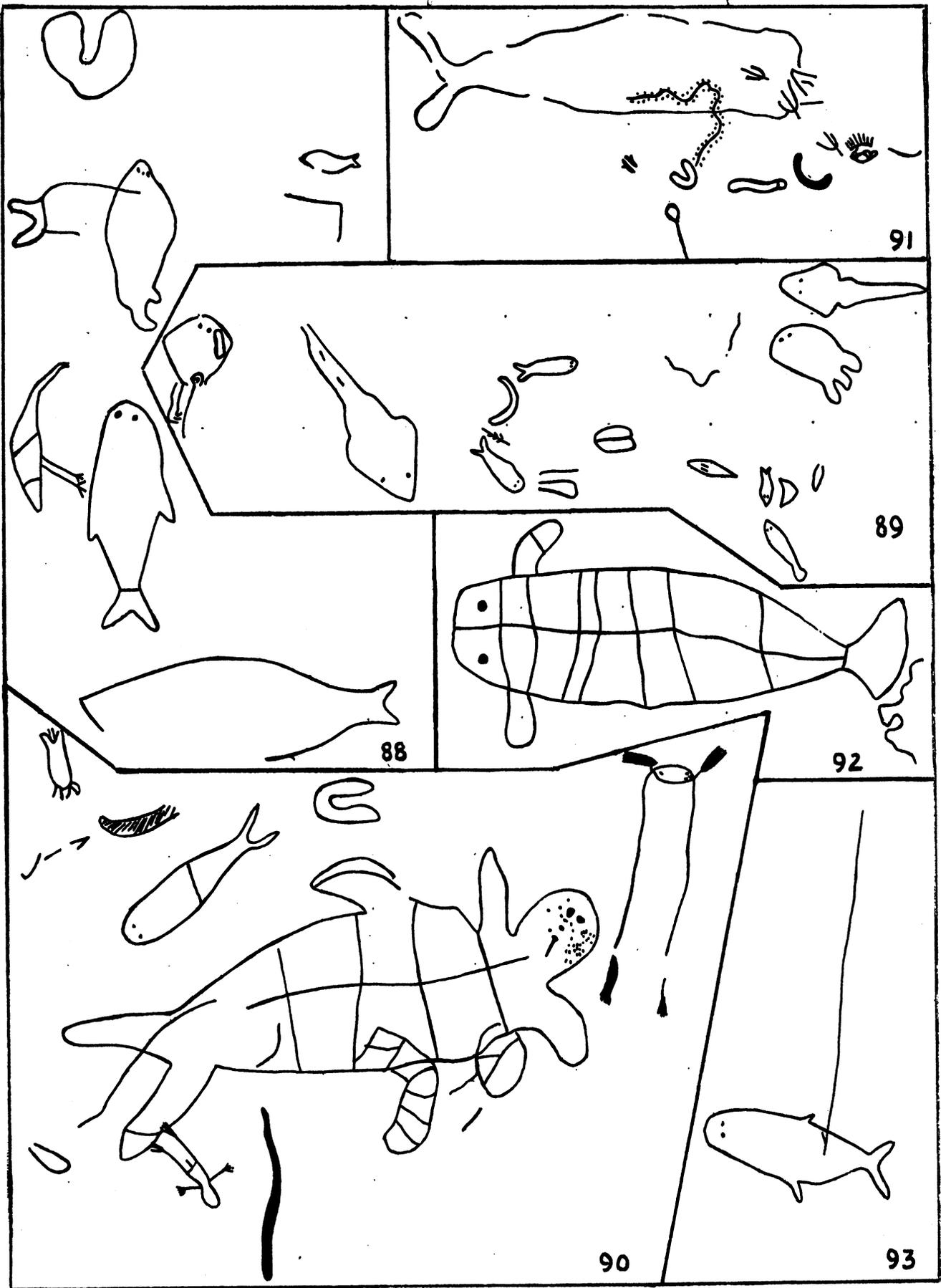
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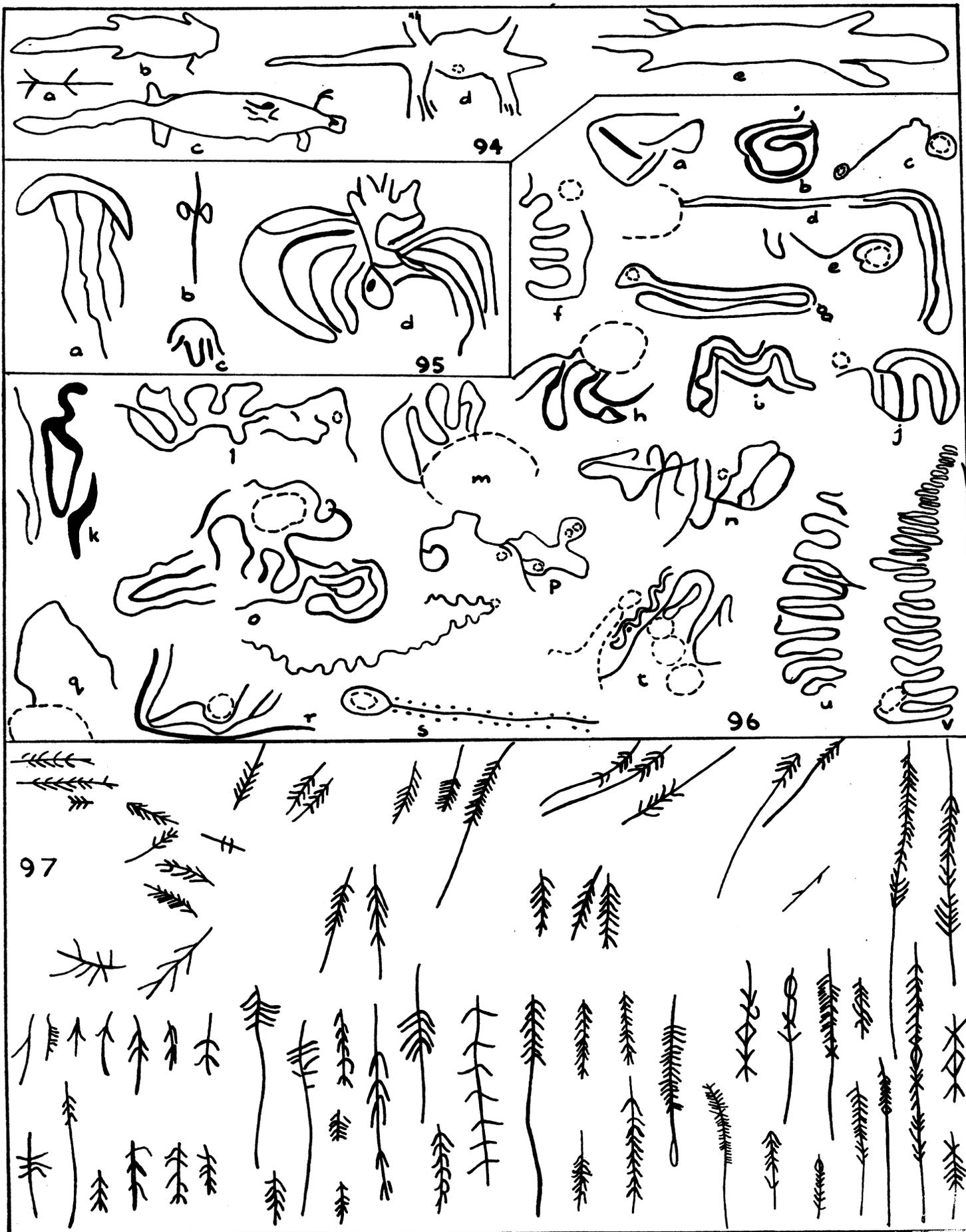


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Figures 85-87



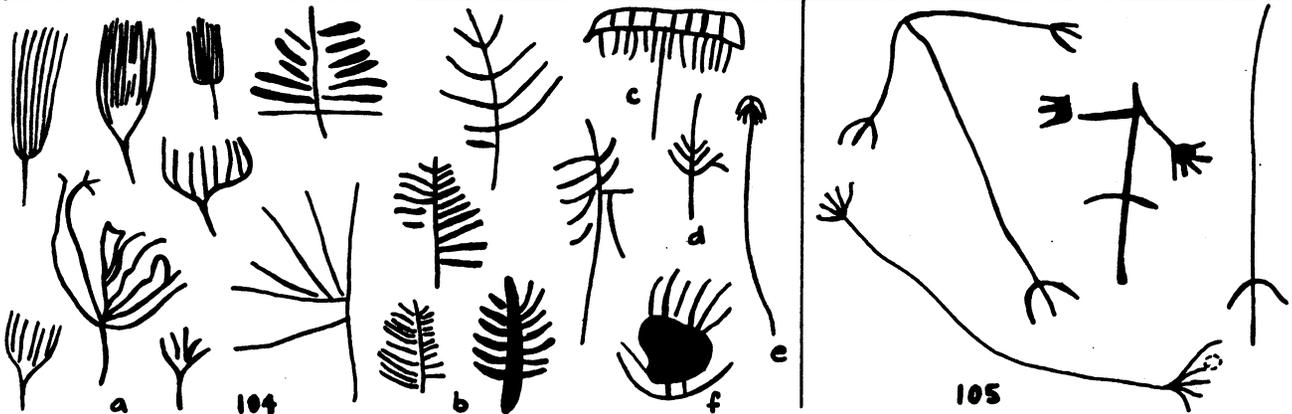
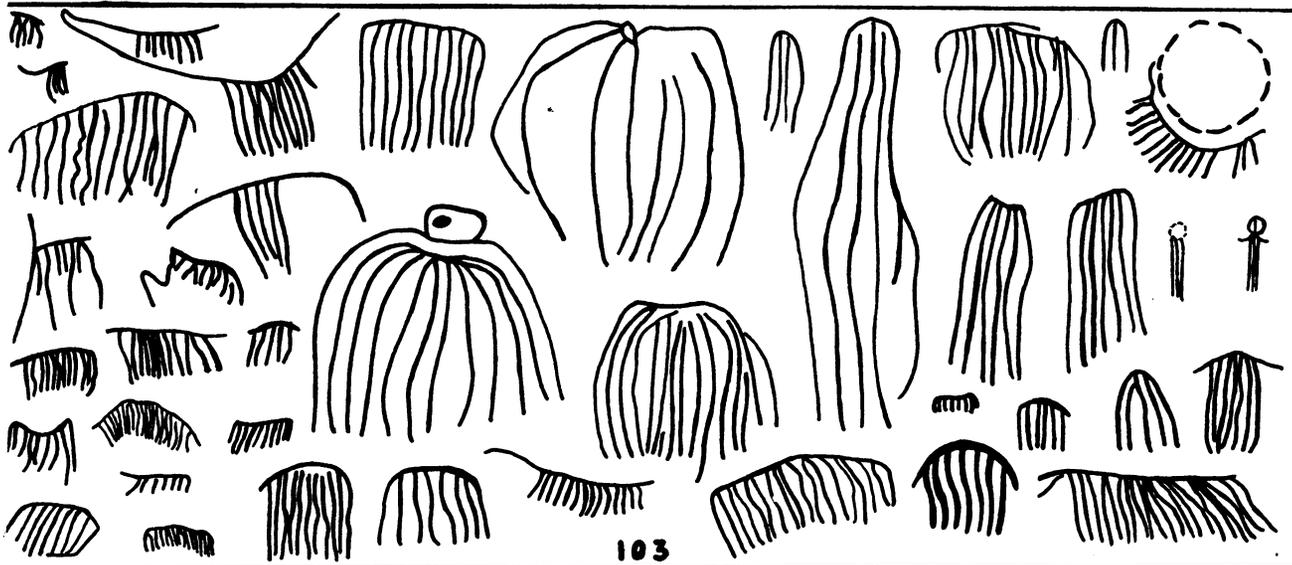
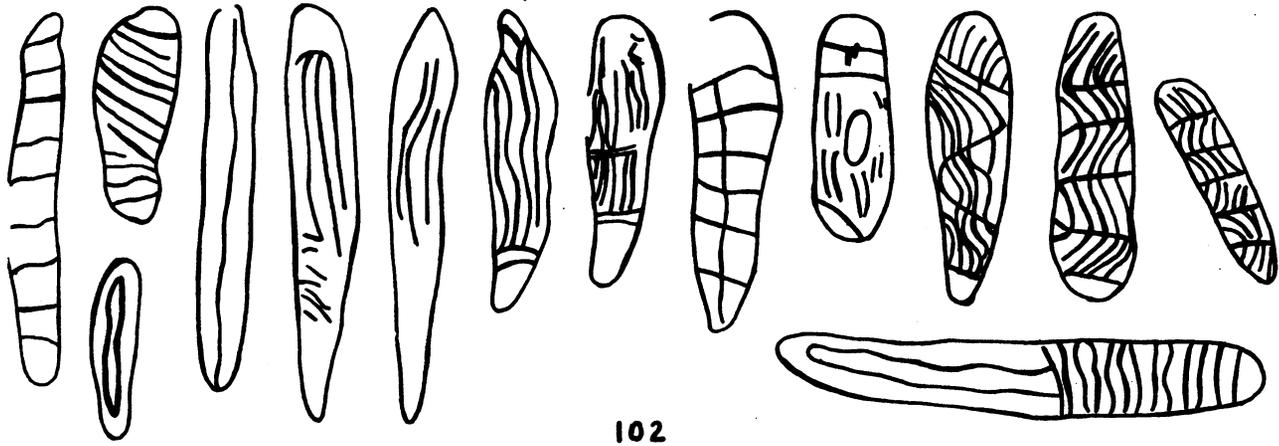
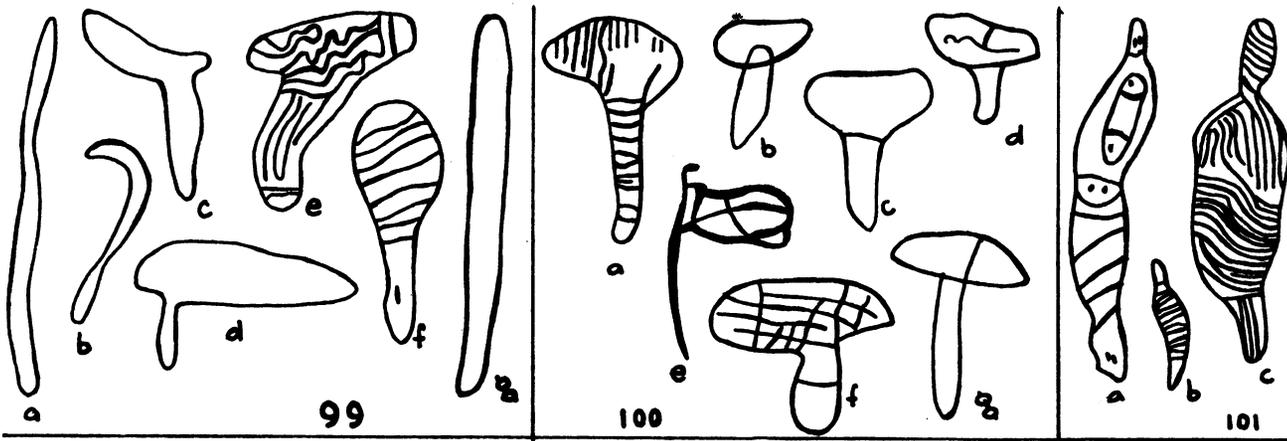
Figures 88-93



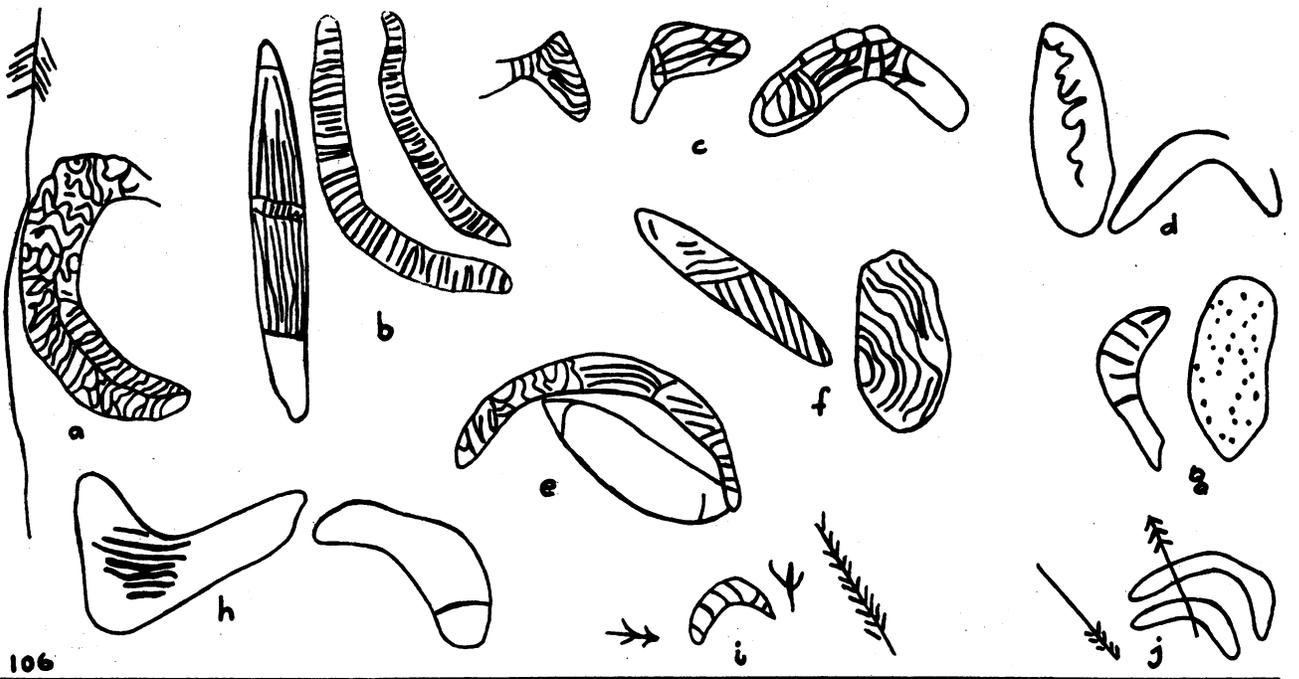
Figures 94-97



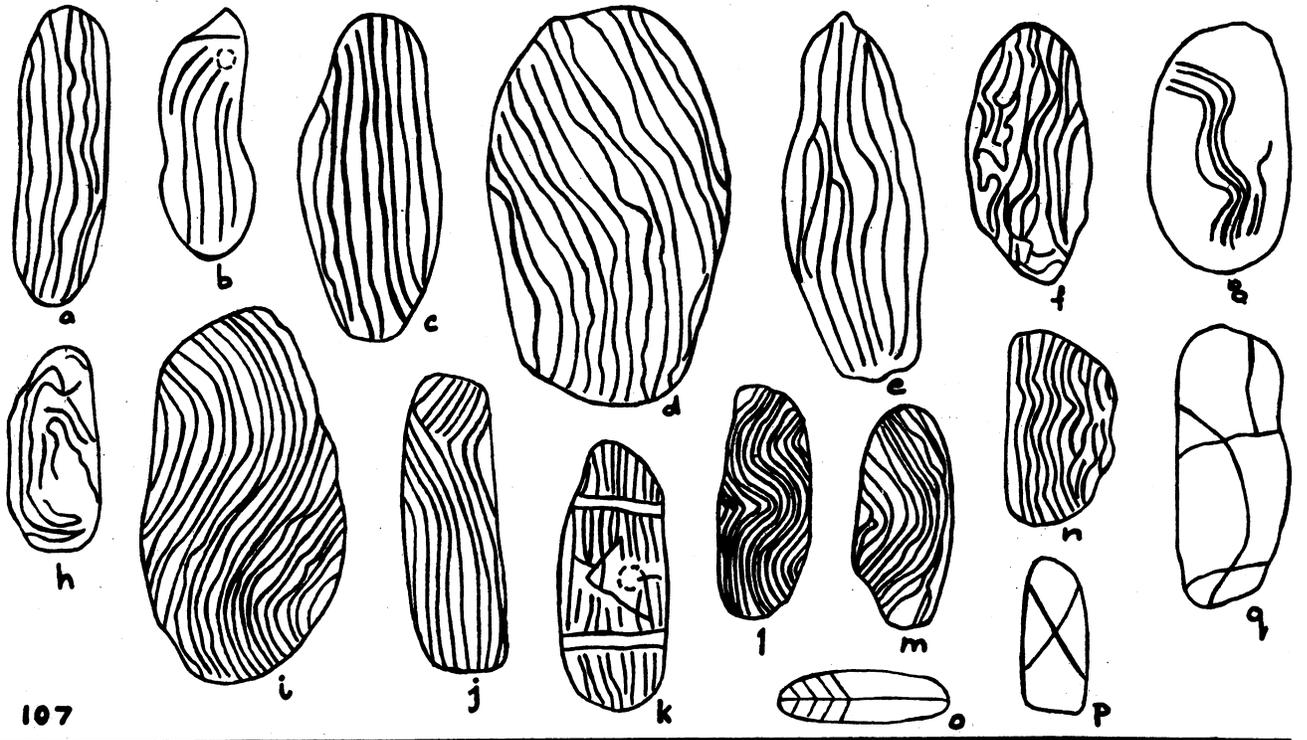
Figure 98



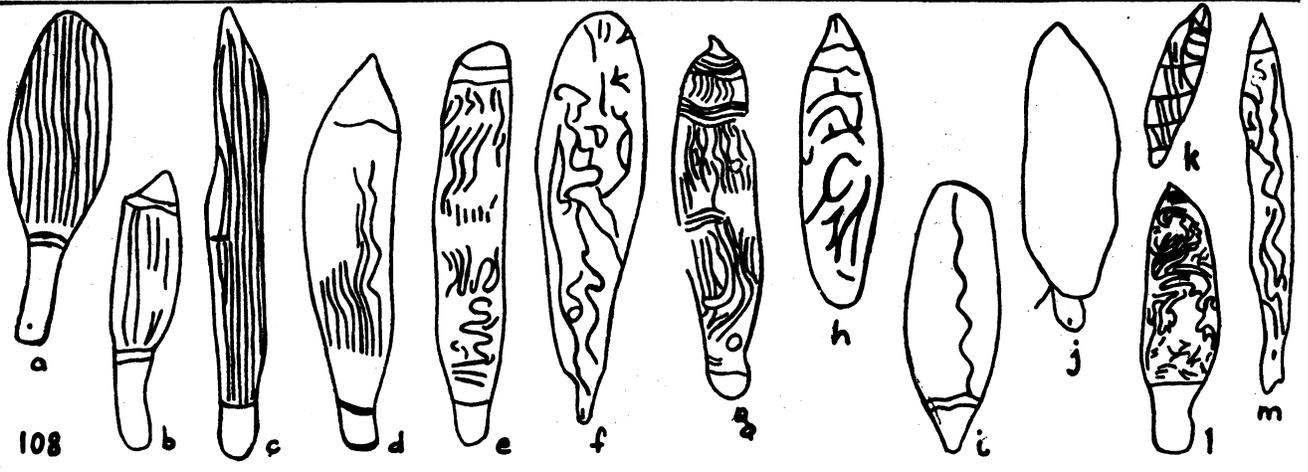
Figures 99-105



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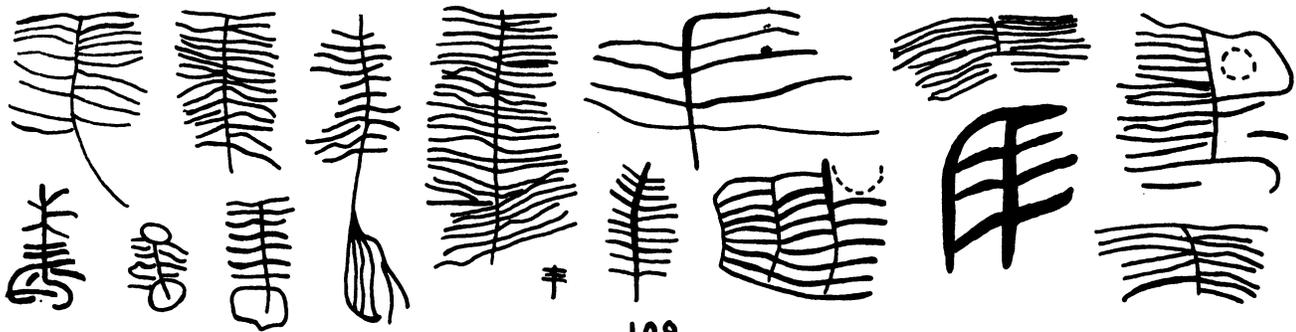


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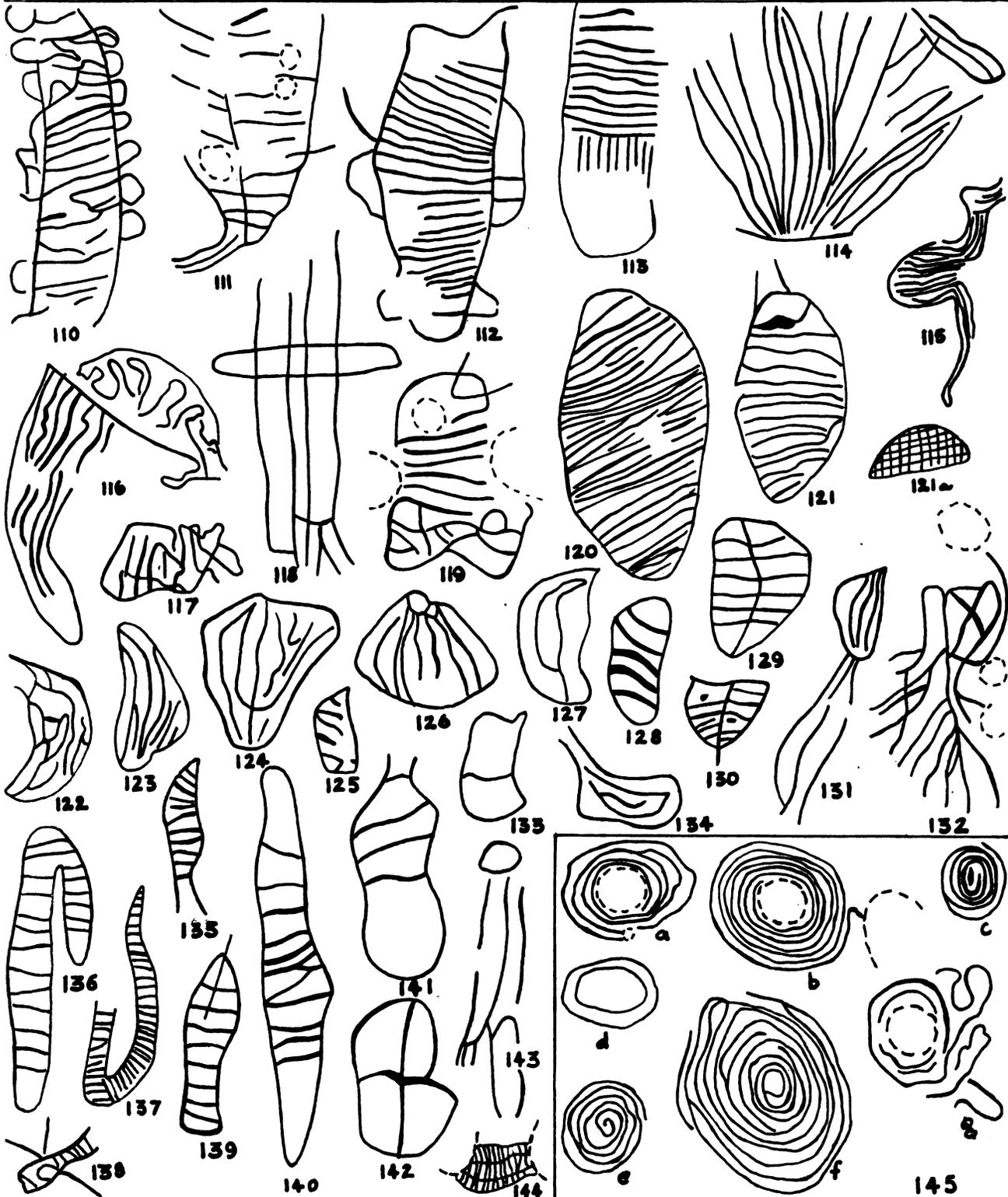


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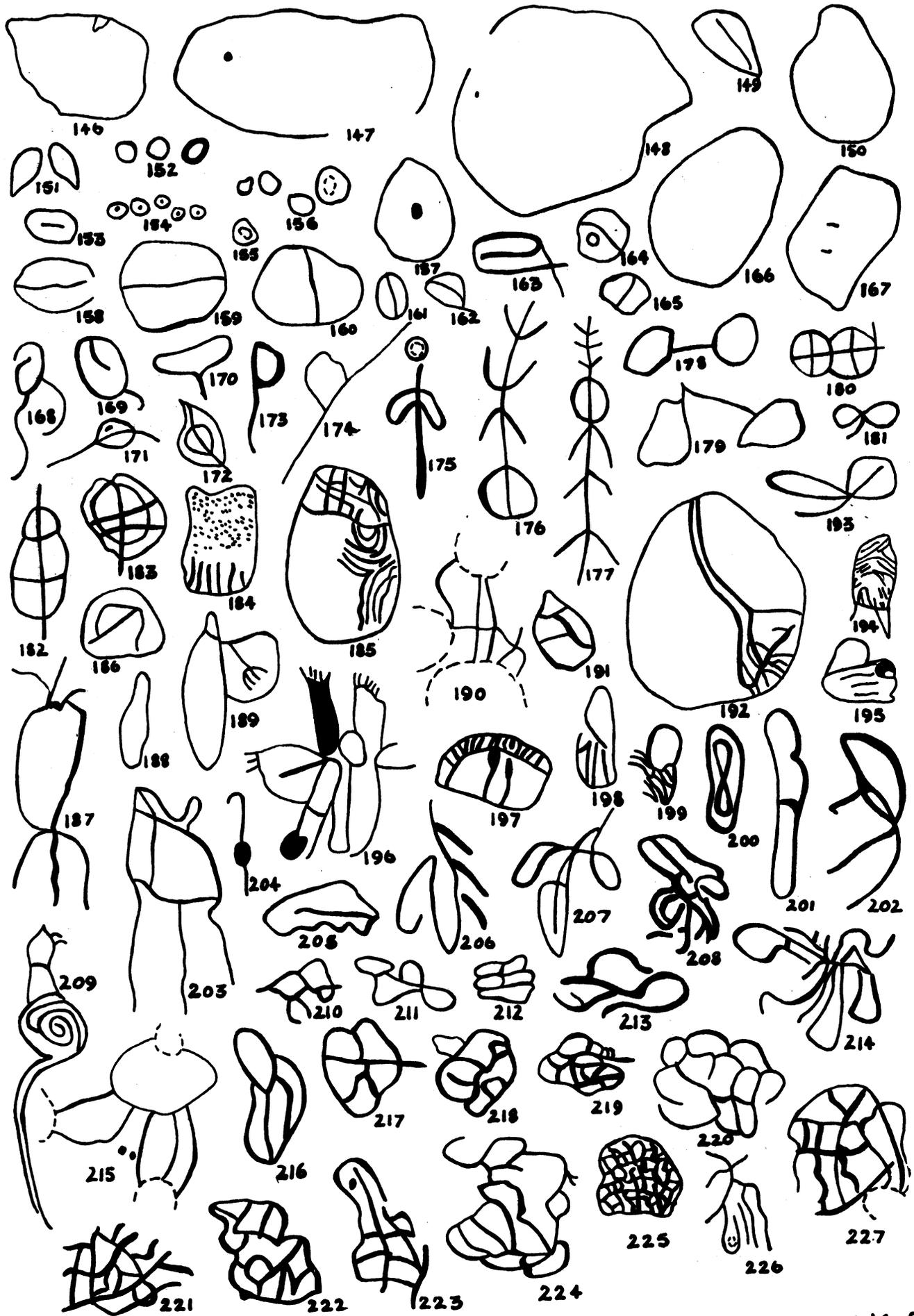
Figures 106-108



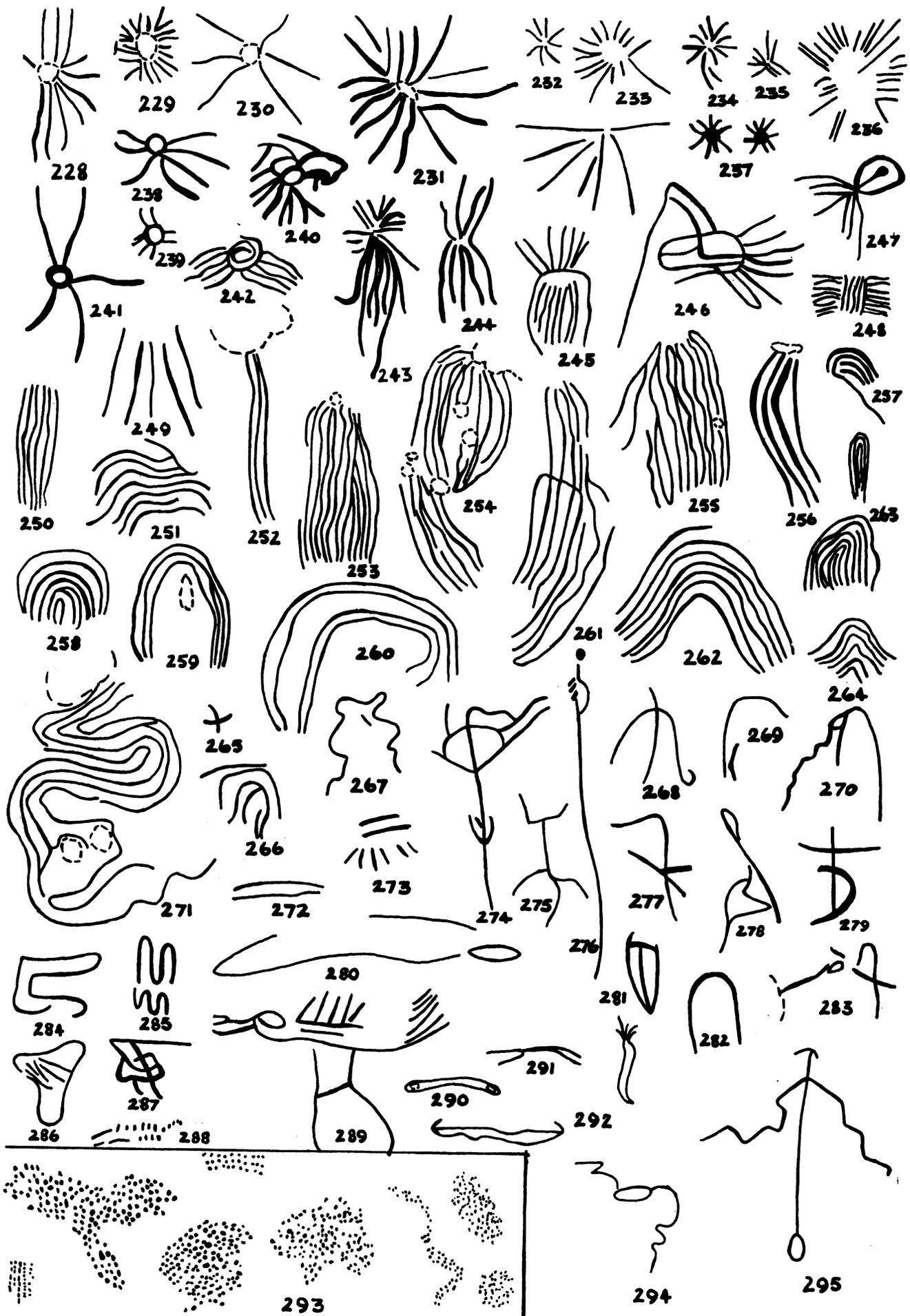
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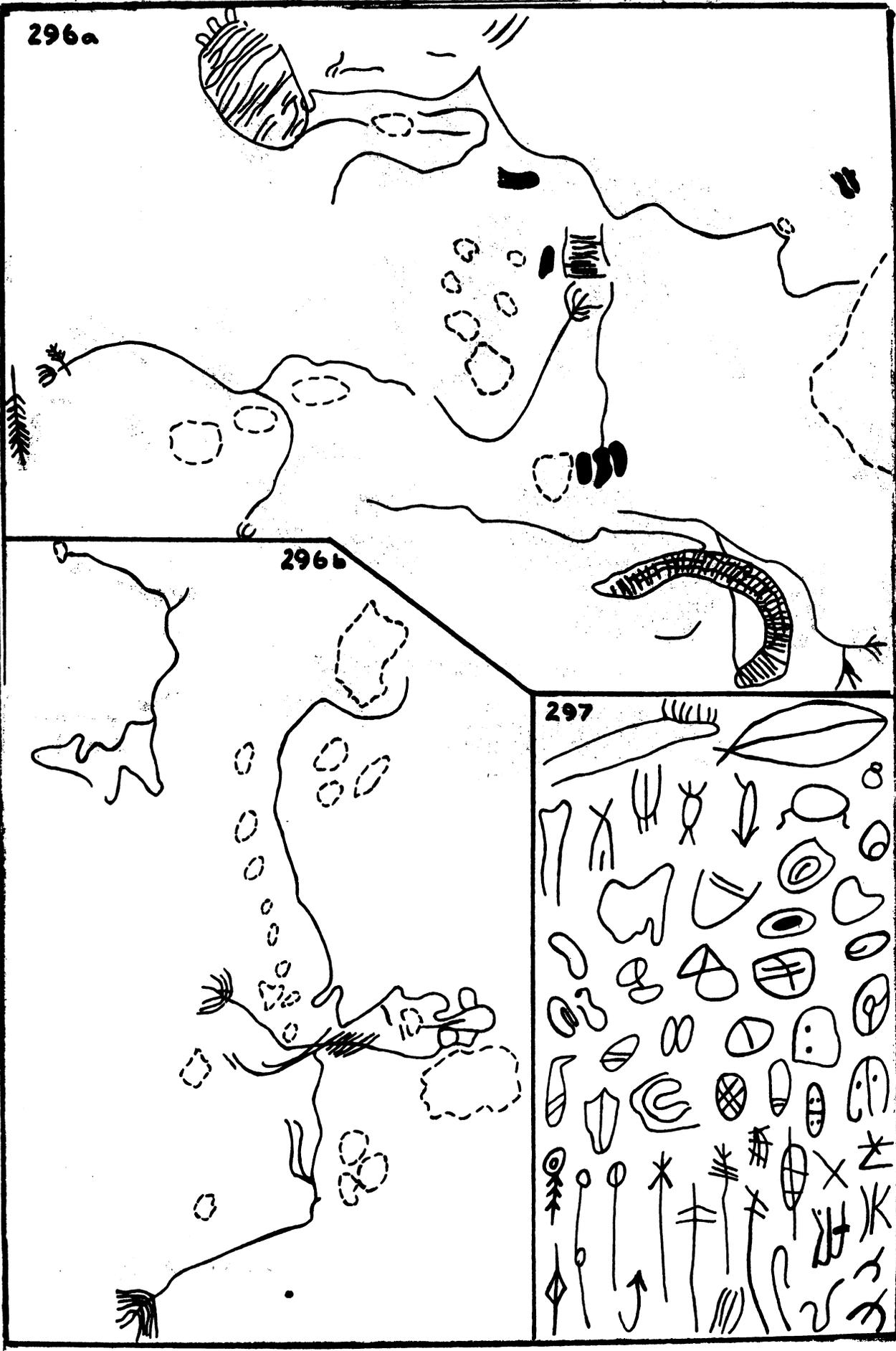
Figures 109-145



Figures 146-227



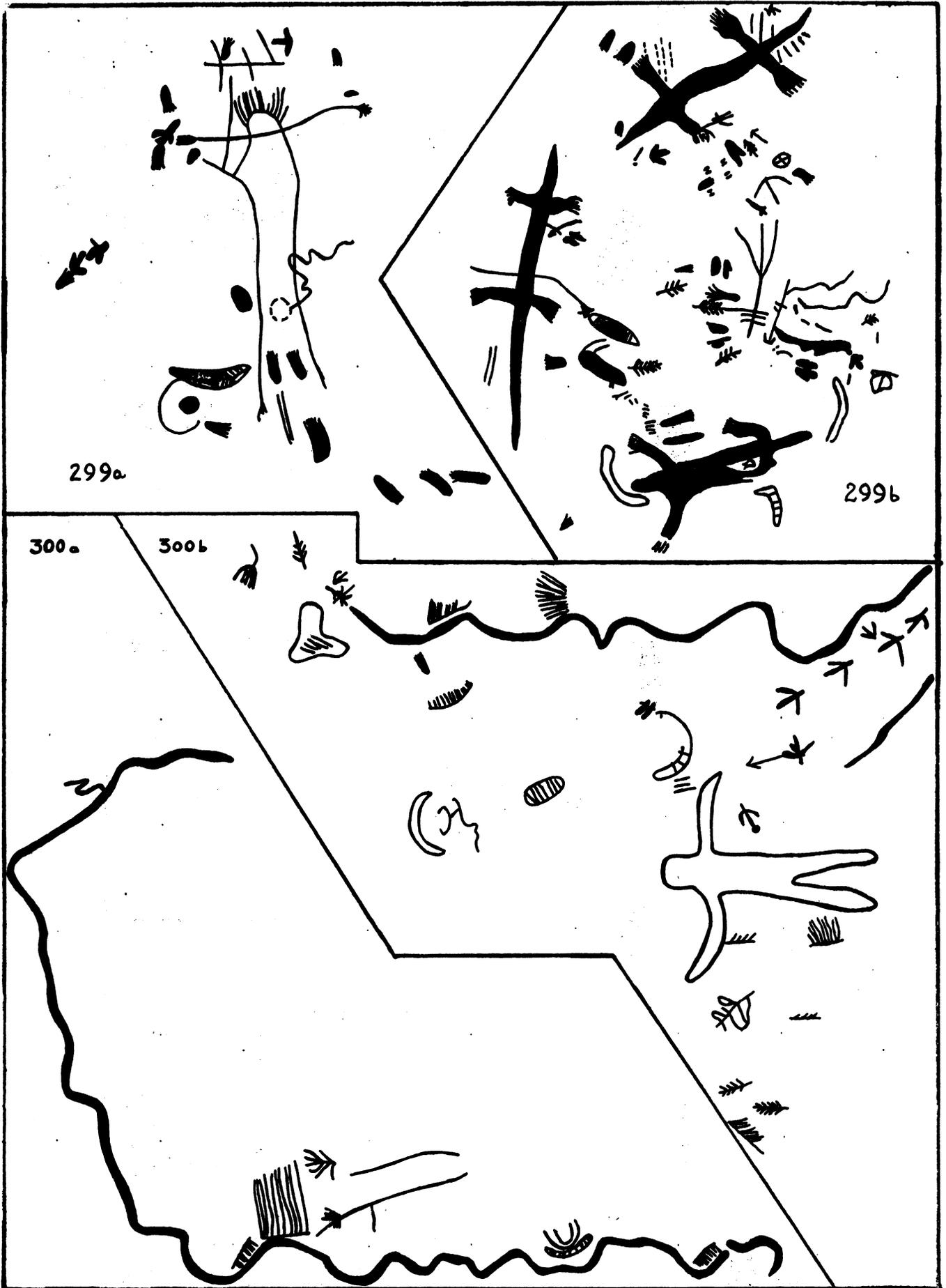
Figures 228-295



Figures 296a-297



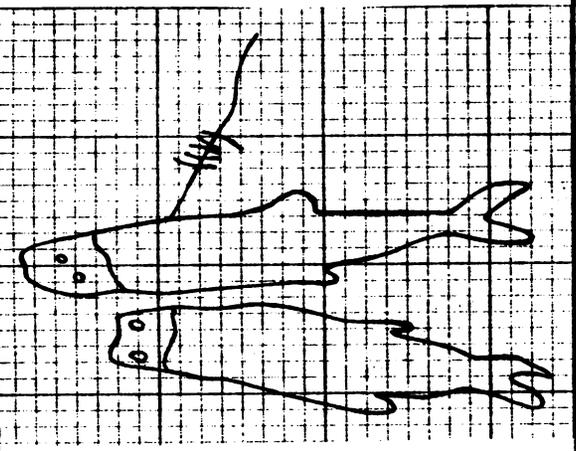
Figure 298



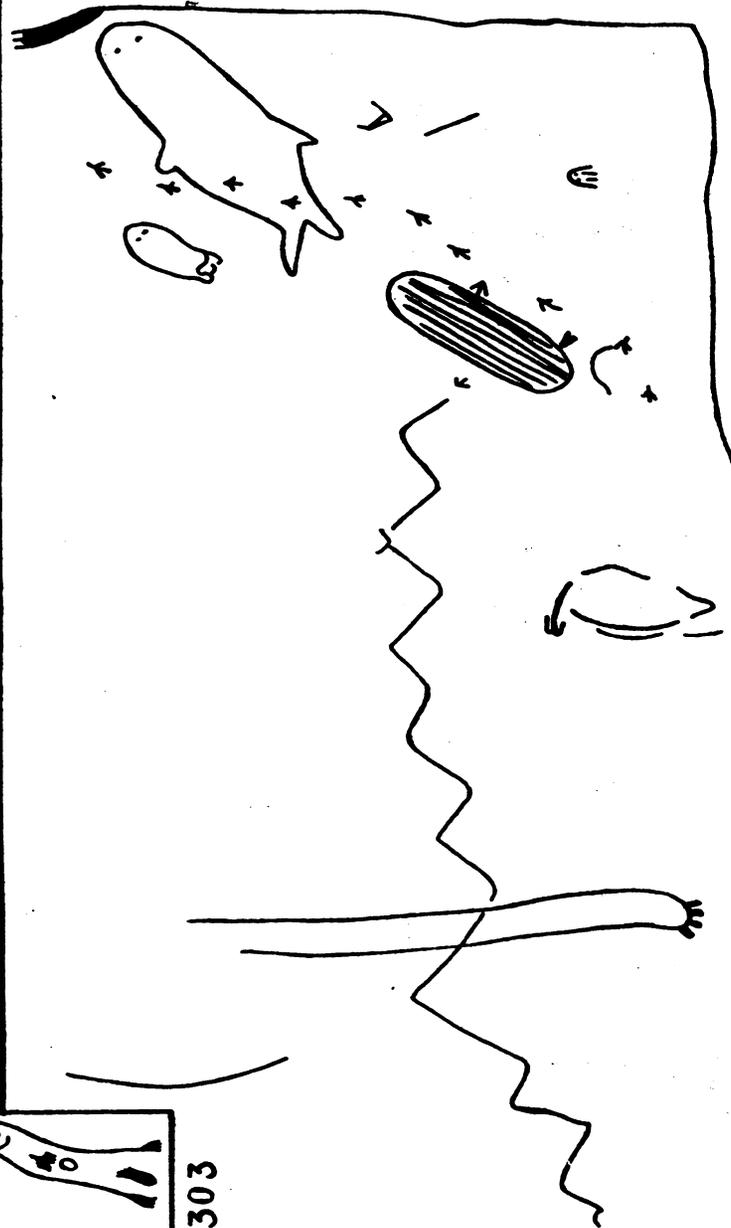
Figures 299-300



301

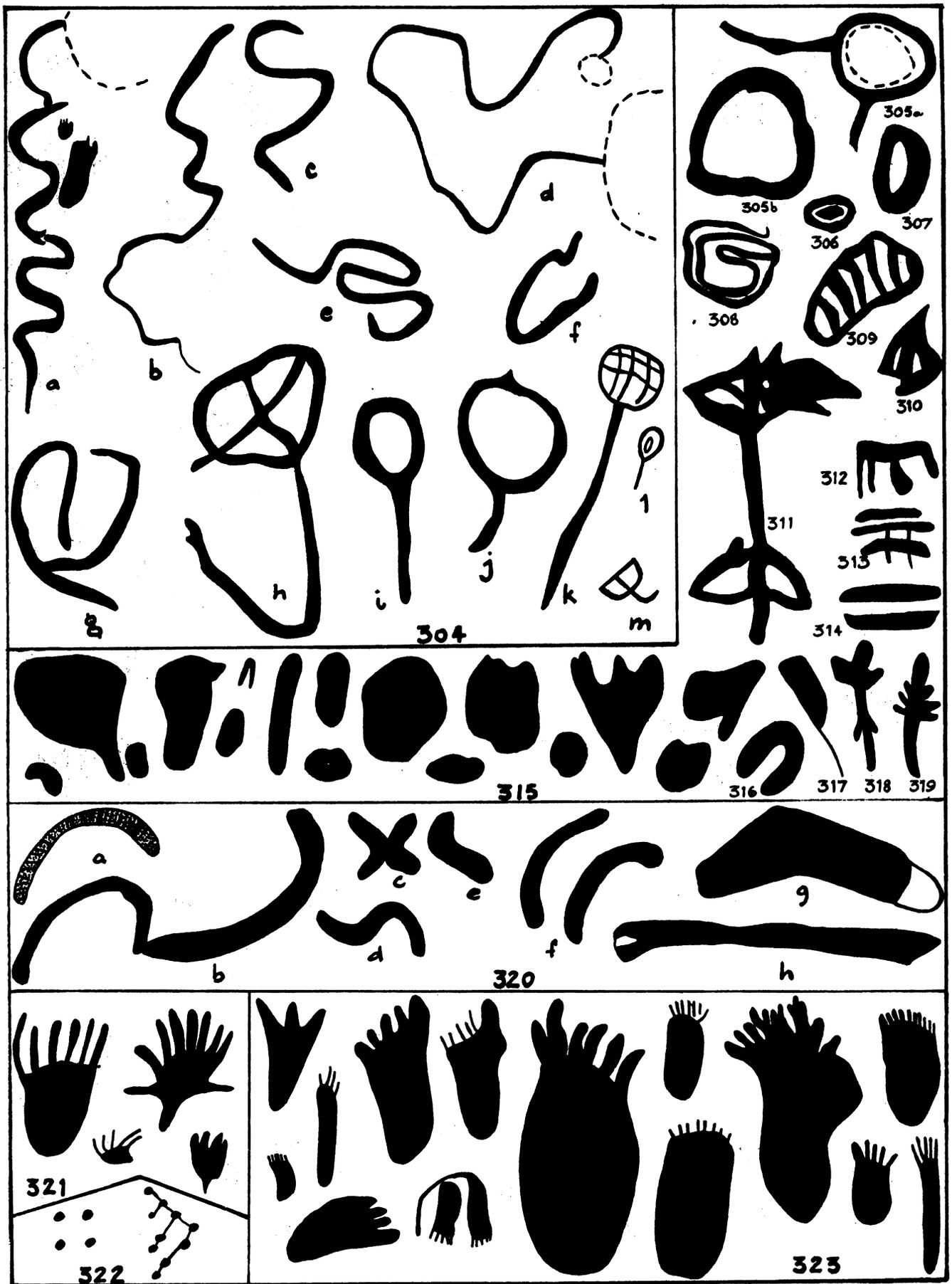


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303

Figures 301-303



Figures 304-323



Figure 324.



Figure 325



Figure 326

EXPLANATION OF PLATES

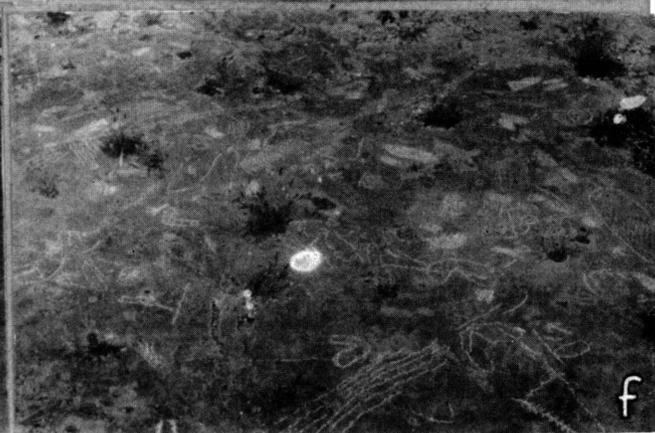
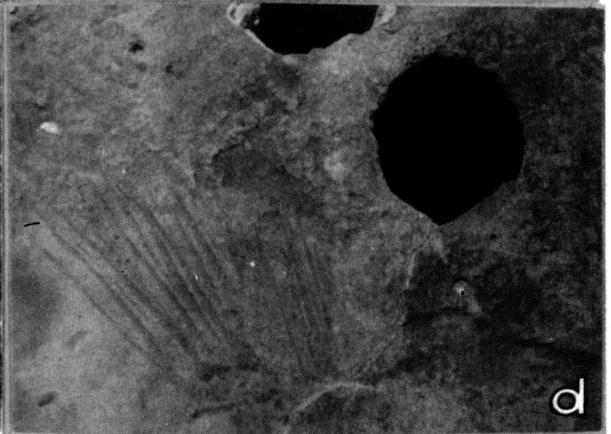
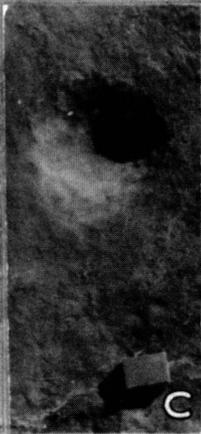
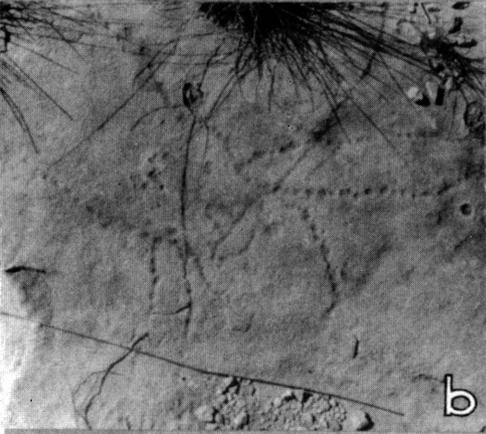
- I. (a) View across spinifex grass flat from the middle to the western ridge on Kariera island. (b) Portion of the rock surface shown in Fig. 4, showing clumps of the introduced Duffie grass which have supplanted the native spinifex in the potholes on most of the ridges; (c) Abraded grooves in site 1. (d) Axe grinding grooves in site 1. (e) Mortar or pounding hole in site 1. (f) Minjiburu spirit figure which illustrates perfectly the punctures, both separated and conjoined, forming the grooves of the Outline and Linear Design figures.
- II. (a) Pecked human foot engraved over an unusual Minjiburu spirit figure which is over an old gridded turtle figure, site 1. (b) Small human figure. (c) Unusual type of Minjiburu figure with one arm, no legs, and rayed head; (d) Minjiburu carrying barred boomerang. (e) Small striped human figure. (f) Indeterminate figure, probably human. (g) Figure of a woman 4 ft. high north of the Two Mile Well in site 2. The grooves are narrower and sharper than normal at Port Hedland, and the style is completely different to that of any other human figure recorded. It is suggested that this figure was done by Afghan camel drivers who camped at this site many years ago. (h) Striped Minjiburu spirit. (i) Outline human figure.
- III. (a-h). Minjiburu figures described in the section dealing with these spirits.
- IV. (a). Pecked human track engraved inside an outline one. They bear 3 and 8 toes respectively. (b) Large bird-like figure 6-1/2 ft. long, circle, pair of barred and striped boomerangs, and other figures, near Two Mile Well; (c) Portion of barred snake and pecked human tracks, between Two Mile Well and Manganese Plant. (d) Emu tracks beside potholes. (e) Clutch of outline eggs. (f) Snake. (g) Line of bird tracks leading to a nest of three outline eggs on which the bird is sitting, near Two Mile Well. (h) Kangaroo-like figure in Outline, with plain and concentric circles, between Road Board Depot and Two Mile Well. (i) Coiled snake around pothole.
- V. (a) Two sacred boards bearing a parallel line design, a smaller one with parallel diagonal lines arranged in panels, and a barred boomerang engraved around a pothole. Portion of a pecked emu's leg and clutch of eggs protrude into the bottom left hand corner. Kariera island. (b) Pair of pecked human tracks, with 7 and 5 toes, showing how one has been compressed into a narrow space beside potholes, also pecked impressions of a kangaroo's hind foot, fore paw and tail, and a boomerang with a single sinuous line pattern. At the bottom is a double fringe attached to a small circle (girdle?). (c) A beautifully arranged still-life of a barbed spear lying across a striped and barred boomerang, site 2. (d) Curved club-like figure. (e) Spearthrower with parallel curvilinear line design. (f) Sacred board with looped track-like design similar to that shown in Pl. XIIj extending from a pothole. (g) Shield with parallel curvilinear line design. (h) Pair of spearheads with double row of barbs. (i) Striped sword club. (j) Sacred board with simple scroll line

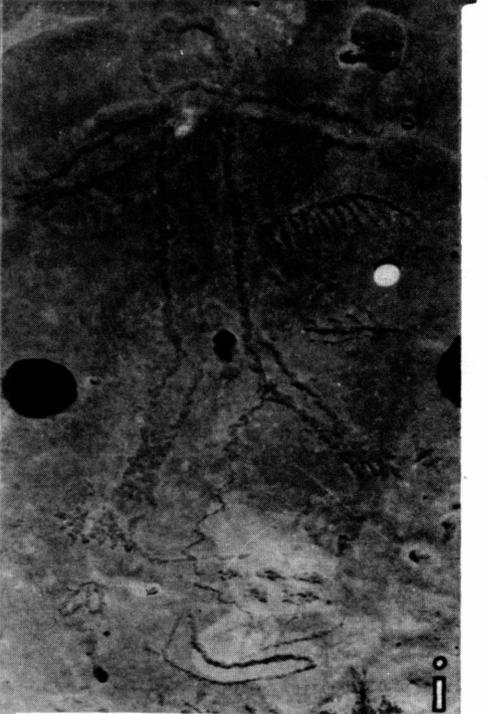
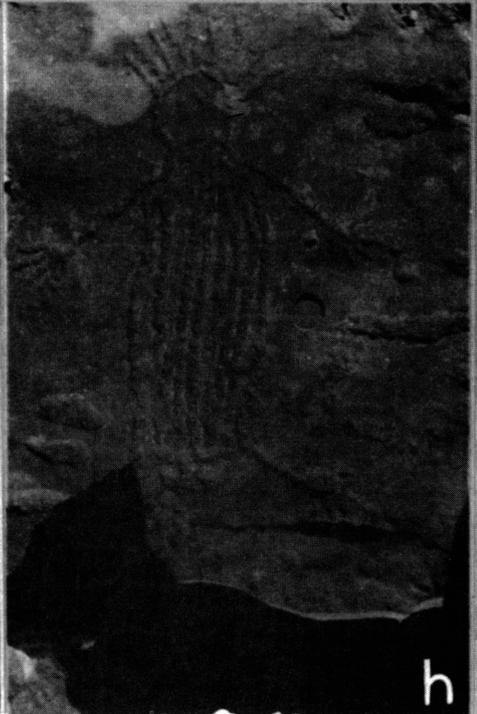
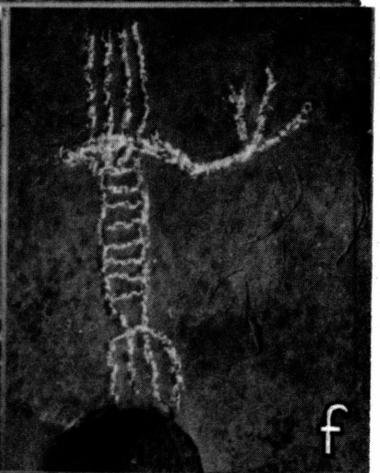
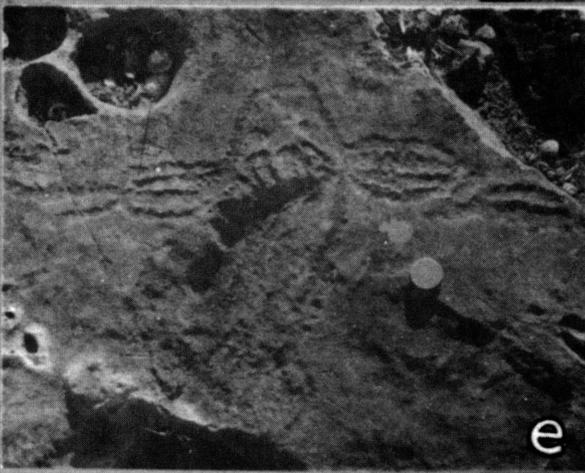
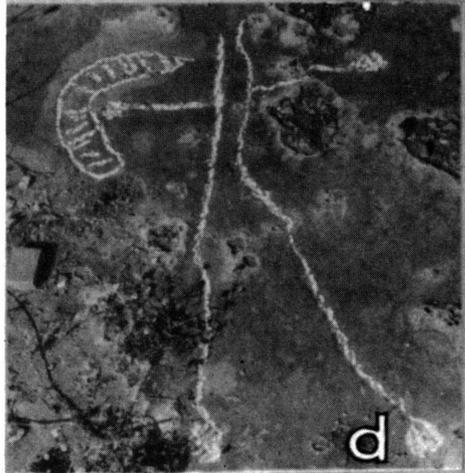
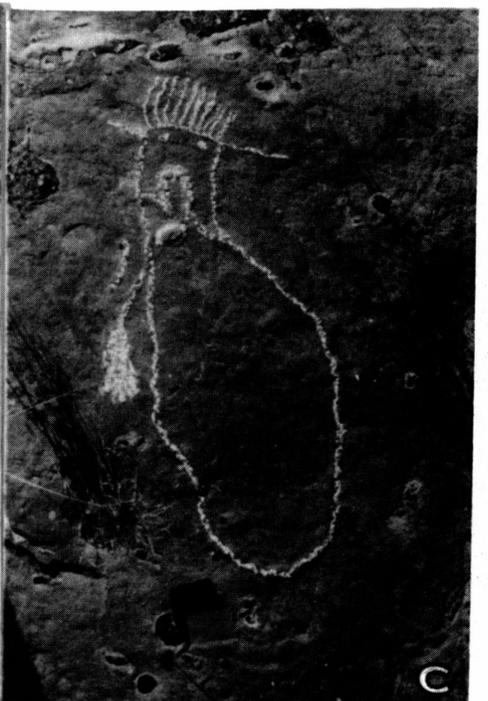
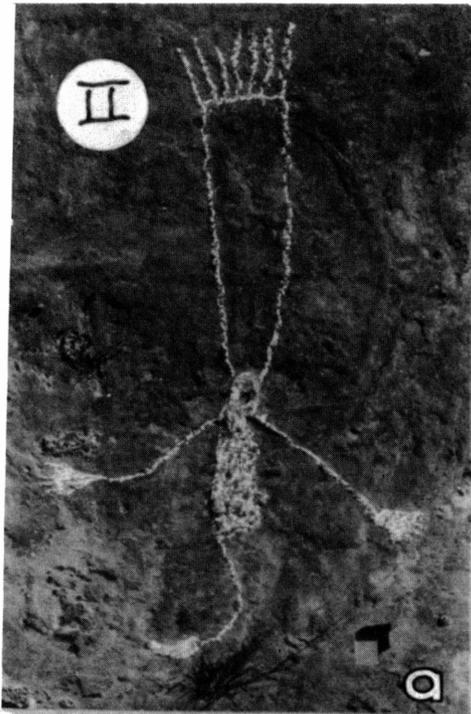
designs. (k) Spearthrower with parallel line designs. (l) Hafted ground edge axe. (m) Concentric circle, with weathered grooves, engraved around a pothole. (n) Spiral engraved around a pothole and over a looped track-like design. (o) Fringe engraved down the inside of a pothole.

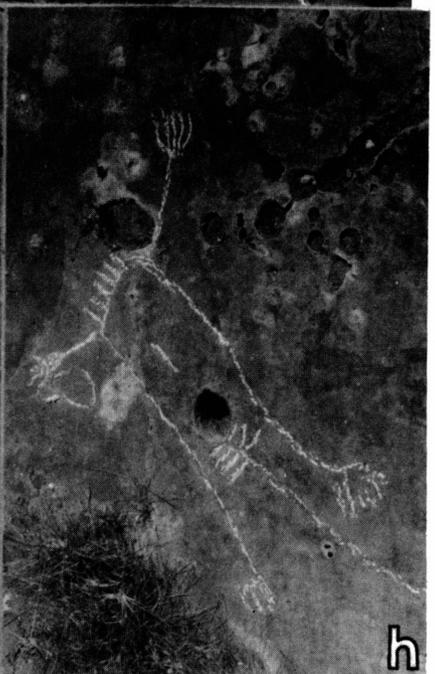
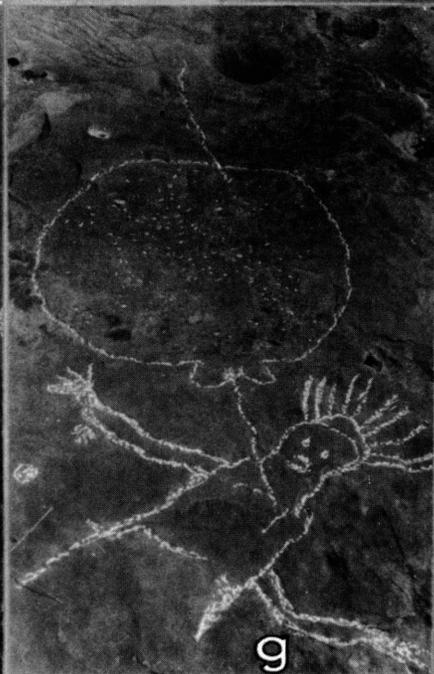
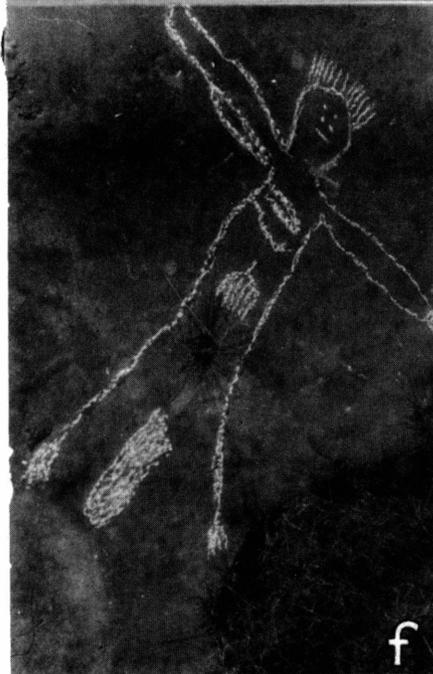
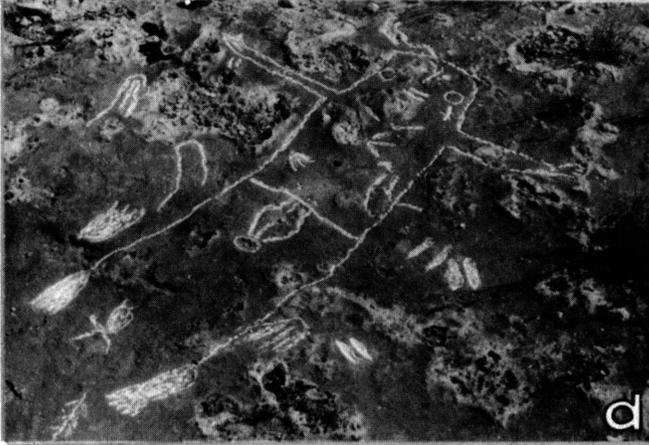
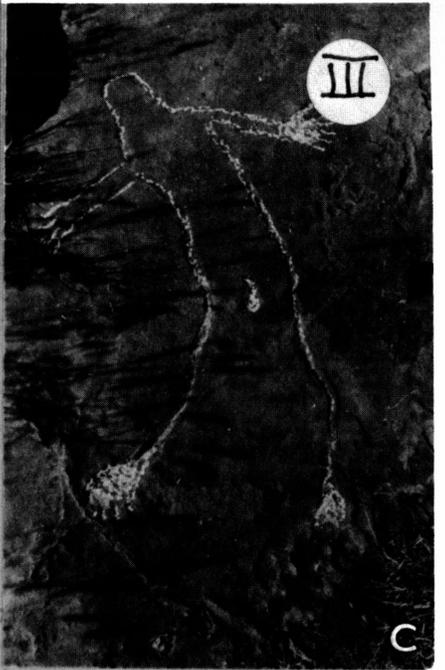
- VI. (a) Vertical set of five outline swords and boomerangs, with traces of a sixth one in site 2. (b) Large gridded boomerang engraved over outline figures, between Two Mile Well and Manganese Plant. (c) Barred and striped boomerang, between Two Mile Well and Manganese Plant. (d) Elaborately decorated ceremonial object of unknown significance, at southern end of last ridge on Kariera island. (e) Outline sword club, with large boomerang decorated with a curvilinear and barred line pattern. (f) Striped indeterminate figure, between Two Mile Well and Manganese Plant. (g) Barred figure with loops, of unknown significance, near quarry north of One Mile Camp. (h) Complex grid designs, Old Boodarie Landing.
- VII. (a) Grid design with striped base beside a radiate figure, between Two Mile Well and Manganese Plant. (b) Wand-like figure, Kariera island. (c) Three pecked human tracks, and a large pecked bird track or flying bird engraved over a radiate figure centered on a small pothole, and connected to a second pothole. (d) Elaborate scroll design, between Road Board Depot and Two Mile Well. (e) Elaborate line design within an oval, between Road Board Depot and Two Mile Well. (f) Rows of egg-like pits engraved over a pair of opposed multi-line arcs, also a pecked oval shape, Kariera island. (g) A sinuous figure over 15 ft. long of four parallel lines. It ends abruptly at both ends, and no attempt is made to indicate a snake's head or tail, and it may therefore represent a belt of human or opossum twine. Between quarry and One Mile Camp. (h) Branching design ending in fringes or plumes at the end of each arm, between Two Mile Well and Manganese Plant.
- VIII. (a-b) Gridded turtles, one in a conjoined punctured technique, the other one abraded over the punctures, both between the Two Mile Well and the Manganese Plant. (c) Starfish in a very fine punctured line technique. (d) Portion of a very large turtle engraved as though the rock is intended to represent its body. Prominent in the foreground is a pecked club with a spheroidal head; Kariera island. (e) Sword of sawfish. (f) Ceremonial object bearing line design. (g) Plant-like figure 4 ft. long, between Road Board Depot and Two Mile Well. (h) Barred and striped hafted axe or club, near Two Mile Well.
- IX. (a-b) Outline fish near Two Mile Well. (c) Outline fish and bird, opposite Road Board Depot. (d) Pair of outline fish, one engraved inside the other, site 5. (e) Sunfish with dotted interior. This figure is close to the northern side of the Manganese Plant and is in imminent danger of destruction as the Plant's work area expands. (f) Gridded turtle engraved inside a large outline fish; gridded whale 9 ft. long; Kariera island. (g) Outline fish beside a concentric circle engraved around a pothole. (h) Lizard track leading to or from a pothole, Site 5; small female Minjiburu-like figure identified as a hill lizard good to eat by young Njangamada men visiting the Two Mile camp.

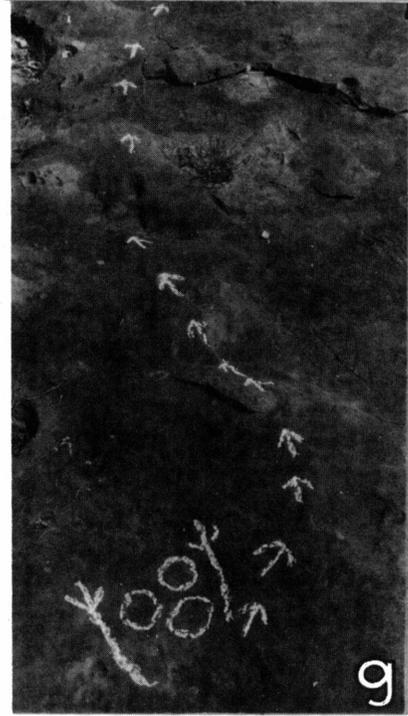
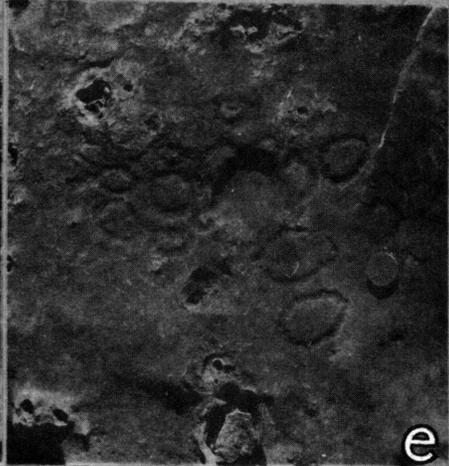
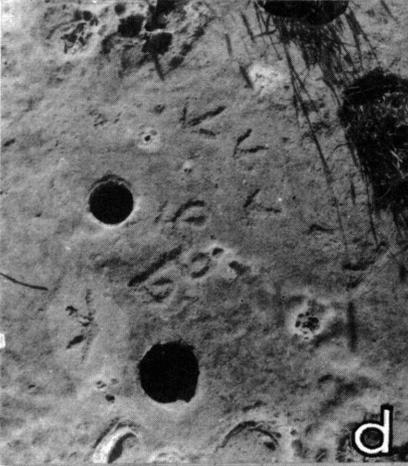
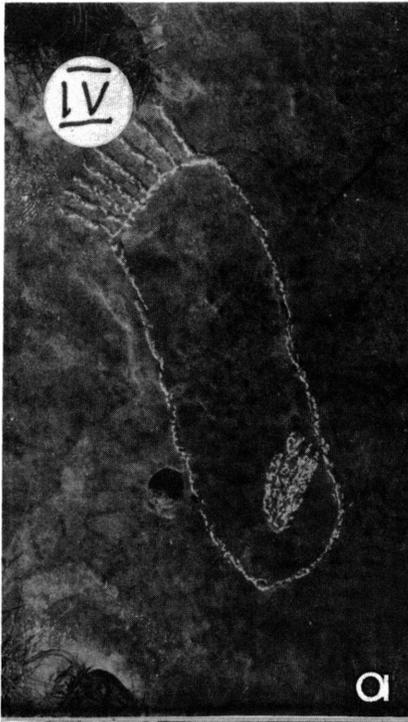
- X (a) Outline sting ray showing liver in body. (b) Outline sting ray or skate whose posterior end is engraved around a pothole, and whose liver is engraved below the tail and outside the body. A pair of pecked human tracks also shown. (c) Large outline sting ray, with liver engraved outside body, and a set of arcs engraved across its tail. (d) Outline sting ray struck with three barbed spears. A large outline boomerang is engraved beside it, and a pecked human track in the middle is engraved over one of the spear heads. (e) Dotted eagle ray and liver; Kariiera island. (f) Dotted sting ray, between the Two Mile Well and the Manganese Plant. (h-k) Barred and outline figures of the sting ray's liver.
- XI. (a) Pair of fringes, Old Boodarie Landing. (b) In this set of figures, among which fringes are prominent, is an elaborate radiate figure (left of middle), near the Two Mile Well. (c) Striped and dotted ovals attached to a line, of unknown significance. (d) Chain-like pattern, with an outline boomerang, fringe, and snake from a pothole, between quarry and One Mile Camp also figured by Petri & Schulz (1951, fig. 27). (e) Oval figure. (f) Cluster design. (g) Oval with median stripe, between Two Mile Well and Manganese Plant. (h) Plume ornament. (i) Cluster design. (j) Gridded figure. (k) Barred figure, near quarry north of One Mile Camp.
- XII. (a) Portion of a series of tracks, including one of the lizard, linking a number of potholes. An outline boomerang also shown, Site 5. (b) Linear design, probably an animal's track or the track of a spirit being between the Road Board Depot and the Two Mile Well. (c) Linear design, possibly related to snakes. (d) Meandering tracks linking potholes in Site 5; they run for over 30 feet. (e) The chalked-in figure is an elaborate linear design originating in a looped track, another example of the latter is shown unchalked. (f) Long meandering track joining potholes, between Two Mile Well and Manganese Plant. (g) Long meandering track running for over 30 feet between and linking potholes, Site 5. (h) Snake joined to a pothole. (i) Looped track joined to a pothole.
- XIII. (a) The line of deep pits is the most important figure in this set, in which a pecked emu track, linear native companion or turkey tracks, and a bent rod are shown; Kariiera island. (b) One of the finest sets of pecked figures in the Port Hedland series comprises a pair of boomerangs, bird and fish engraved in a very fine pitting technique at the northern end of Kariiera island. (c) Pecked man 5 ft. high and other figures, between Two Mile Well and Manganese Plant. (d) Clutch of outline emu's eggs with the pecked legs of the sitting bird, between Manganese Plant and Four Mile point. (e) Pecked mammal of indeterminate species, between Two Mile Well and Manganese Plant. (f) Pecked woman, 3 ft. high, making opossum fur twine, between Two Mile Well and Manganese Plant. (g) Rows of pecked eggs, with a pair of animal's tracks in foreground; Kariiera island. (h) Barred boomerang engraved around a pothole, beside which are two clutches of pecked eggs and an emu's track; Kariiera island. (i) A pair in line of very big pecked emu tracks, between Two Mile Well and Manganese Plant. Note how they are engraved over the outline figures.

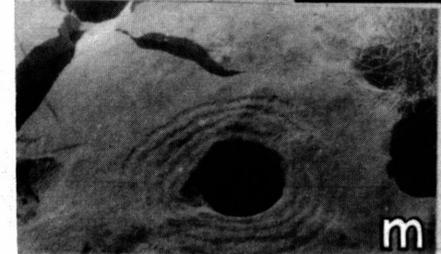
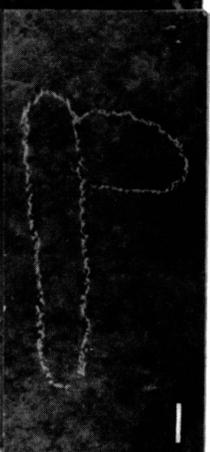
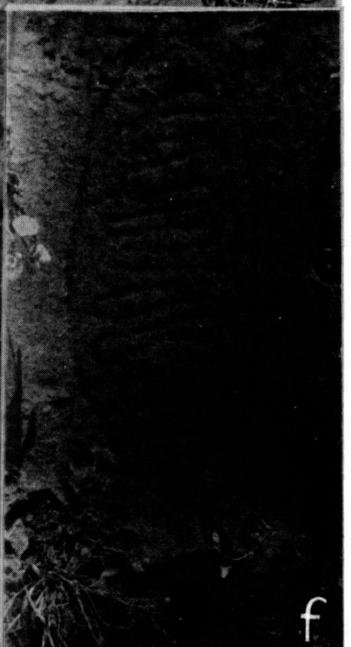
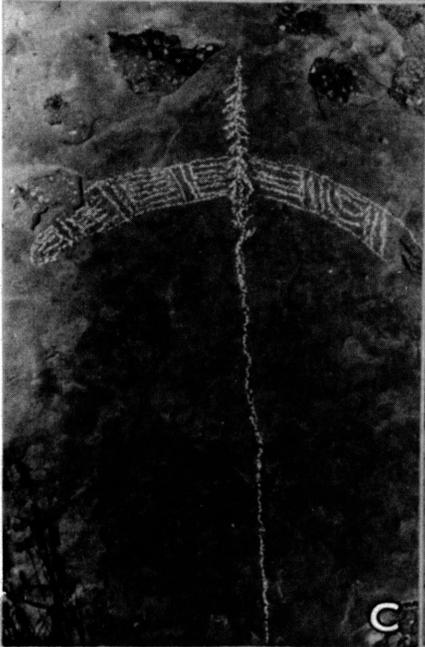
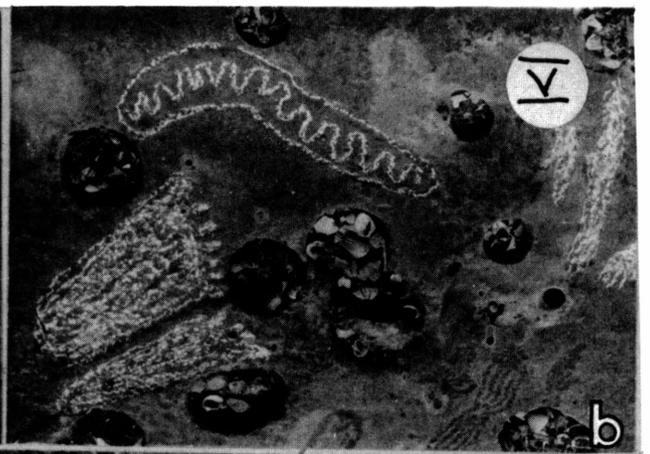
- XIV. (a) Pecked goanna 5 ft. long; Kariera island. (b) Pecked sting ray, between Manganese Plant and Four Mile point. (c) Pecked snake 19 ft. long, between quarry and One Mile camp. (d) Pecked crab and pair of kangaroo's hind foot tracks engraved over set of parallel lines. Barbed spearhead also shown; Kariera island. (e) Pecked sting ray, between Manganese Plant and Four Mile point. (f) Barred oval, and sting ray around pothole, in pecked band technique, and pecked human track, Site 5. (g) Elaborate pecked band design; Kariera island. (h) Set of 3 pecked lizards or flying phalangers, with pecked human tracks, pecked bar, 2 pecked band designs, lizard track and open ended oval, between Two Mile Well and Manganese Plant. (i) Set of 3 pecked boomerangs in coarse pitted technique; Kariera island.
- XV. (a) Portion of line of hunter's track beside the hind foot tracks of a kangaroo, south of Four Mile point. (b) Converging lines of pecked human tracks, between quarry and One Mile Camp. (c) A hunting scene in pecked intaglio technique comprising human tracks leading to a hill lizard, and the boomerang of the hunter thrown at the lizard; Kariera island. (d) Pecked impression of a kangaroo sitting down showing the tail, hind and fore foot tracks, near Two Mile Well. (e) Large coarsely pecked human track showing bunion on foot. (f) Pecked impression of a kangaroo sitting down, showing tail, hind and fore foot tracks. The small track beside may represent that of a young animal with the mother. A pecked emu track and snake also shown. (g) A long line of 20 pairs of wallaby or kangaroo hind foot tracks beside a pecked snake, between quarry and One Mile Camp. (h) Pothole, representing a waterhole frequented by the emu and other birds and animals, and visited by a hunter whose large pecked track is shown with a smaller one of his child or wife. A groove is engraved around the pothole. (i) Another example of the kangaroo track, showing the hind feet beside the tail dragged along the ground, and also a line of bird tracks, between quarry and One Mile Camp.
- XVI. Superimpositions (a) Pecked boomerang over outline fish. (b) Pecked boomerang over barred figure. (c) Pecked set of sitting emu on clutch of eggs with pair of hunter's tracks, over barred sacred board or spearthrower, barbed spearhead and fringe; Kariera island. (d) Pecked hill lizard and club thrown at it over outline fish, near Two Mile Well. (e) Dolphin 17 ft. long and whale 11 ft. long, in barred style, with pecked snakes, boomerang and fin engraved over them, between Two Mile Well and Manganese Plant. (f) Pecked snake over barred boomerang. (g) Pecked human tracks over grid design, concentric circle around pothole, fringe and pair of lines also shown, between Two Mile Well and Manganese Plant. (h) Pecked hooked boomerang, between Two Mile Well and Manganese Plant.
- XVII. (a) Set of pits 1/2 to 3/4 in. wide in group as though representing turtle's nest; Kariera island. (b-c) Two heaps of stones, and line of stones leading to a heap; Kariera island. (d-e) Talu site of circle of boulders and stones on the ridges on Kariera island.

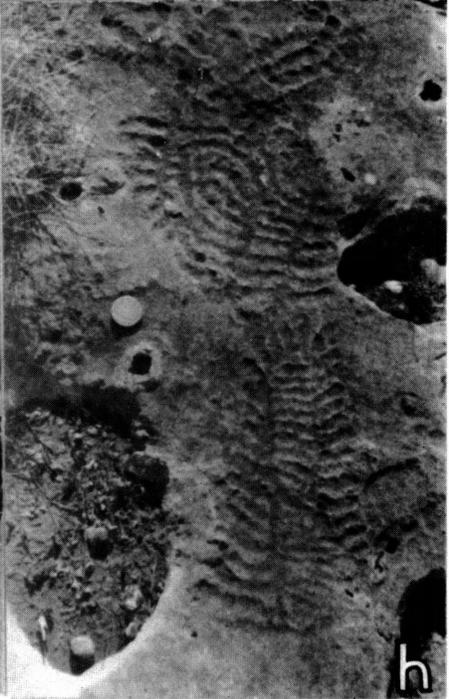
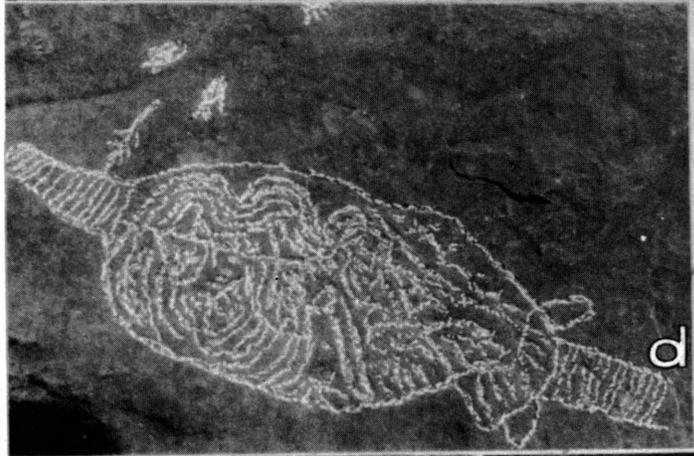
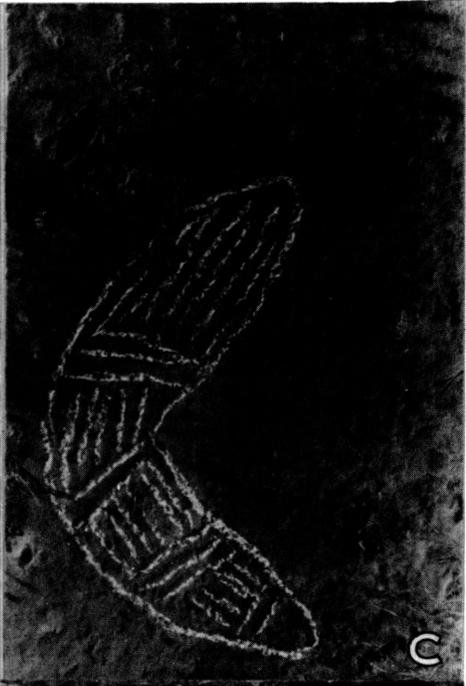
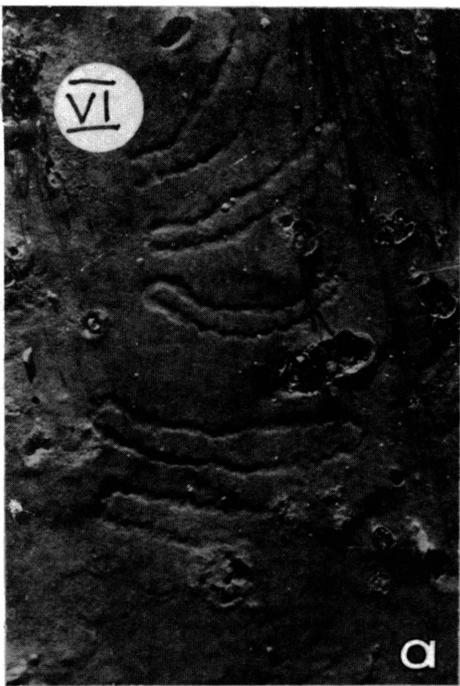


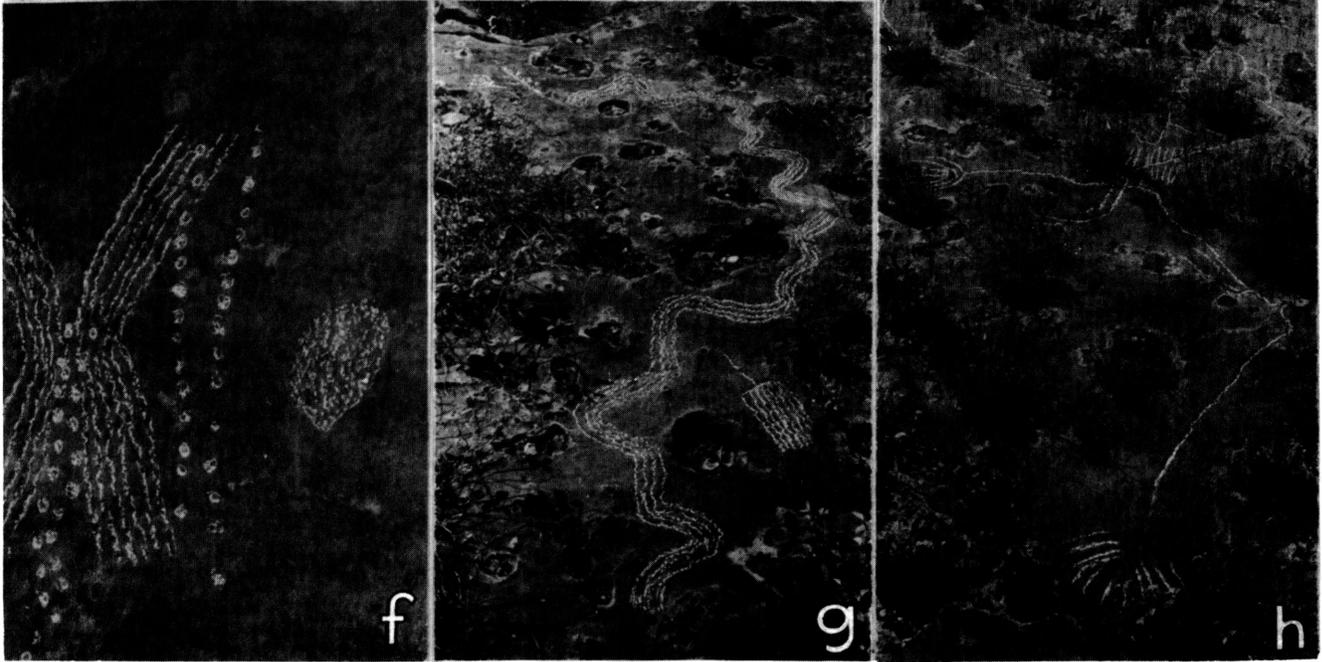
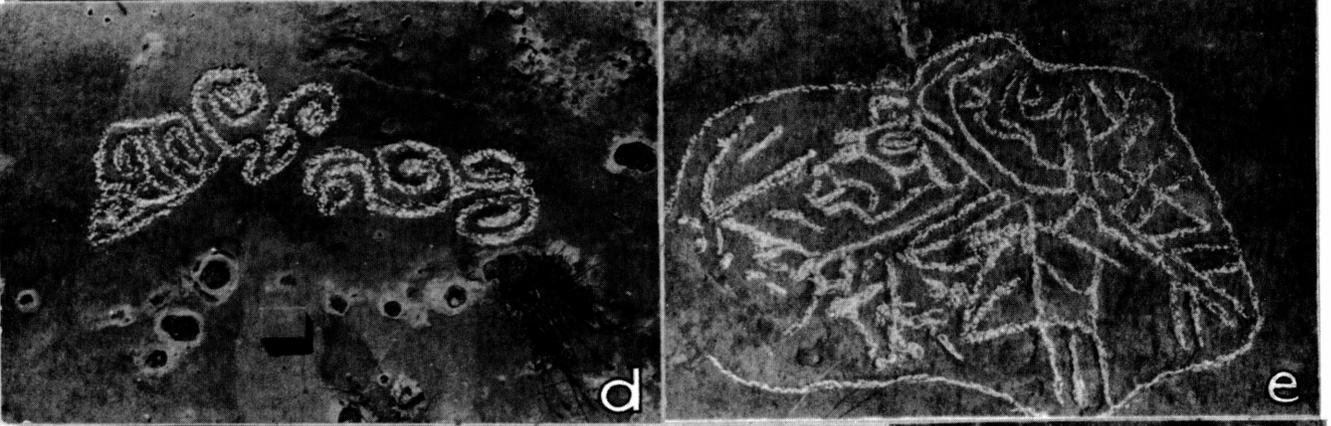
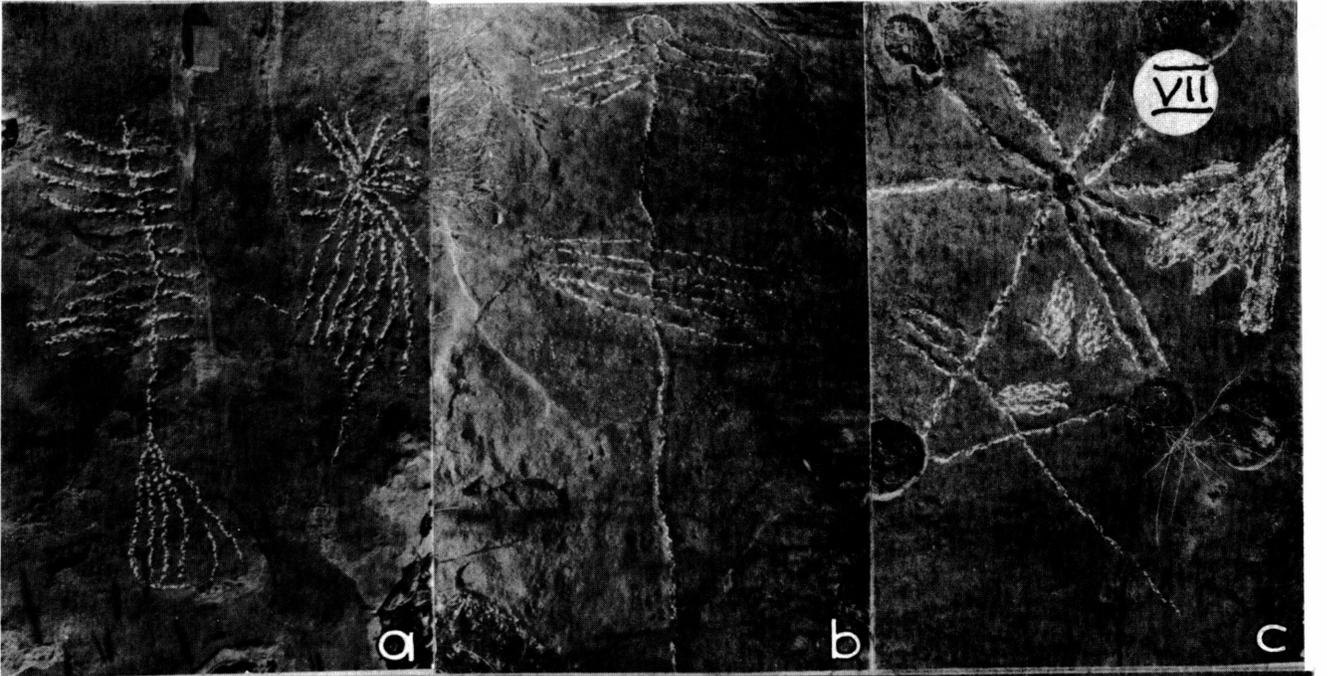


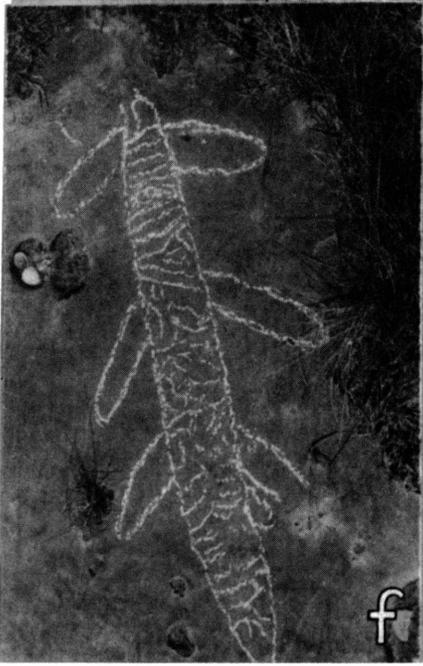


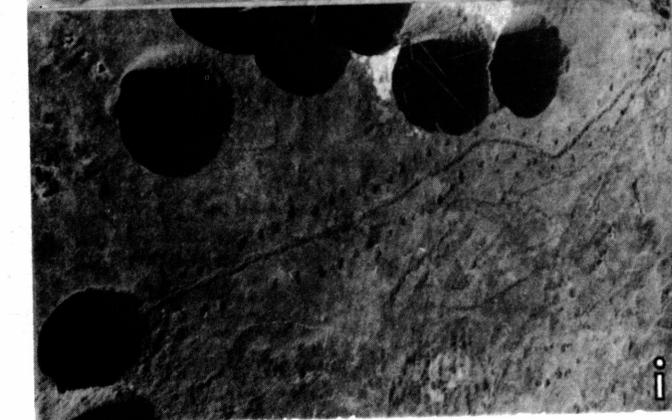
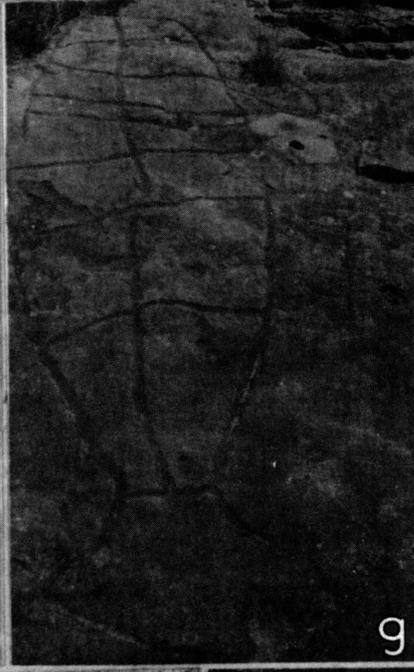
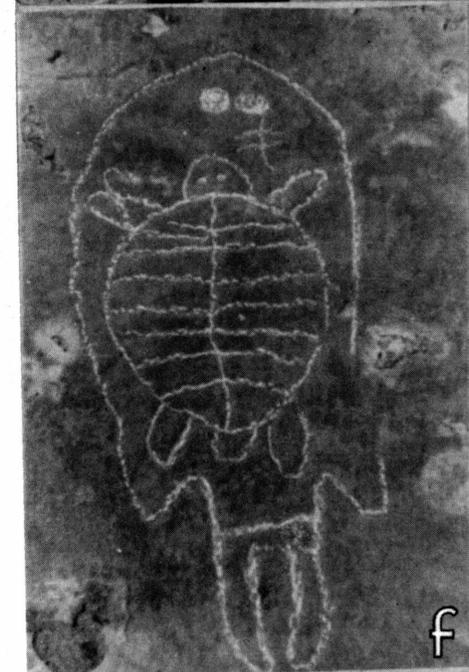
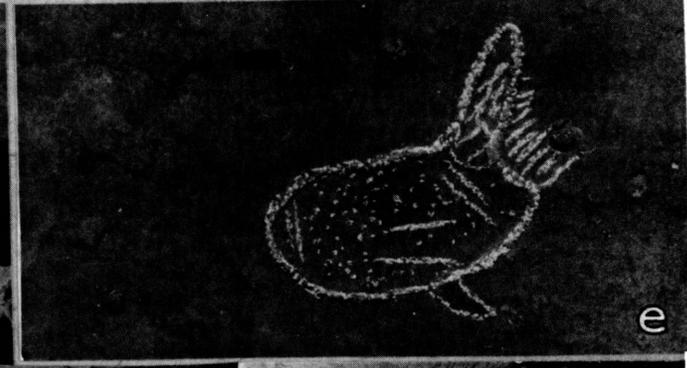
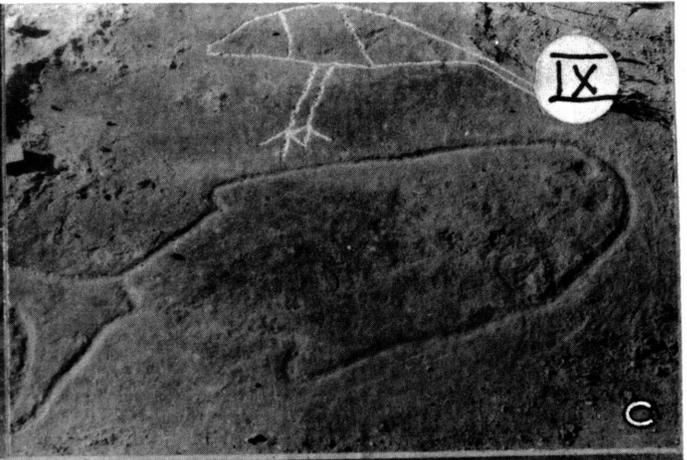


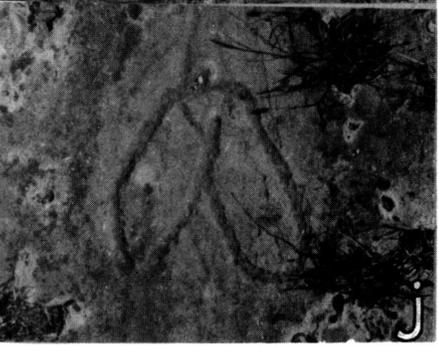
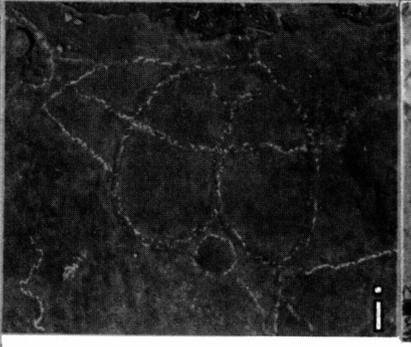
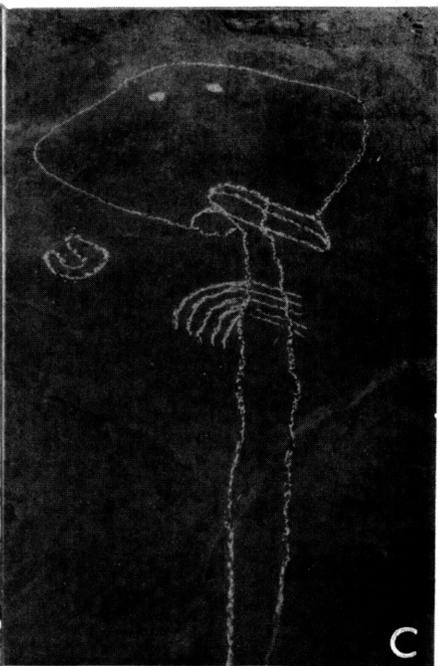


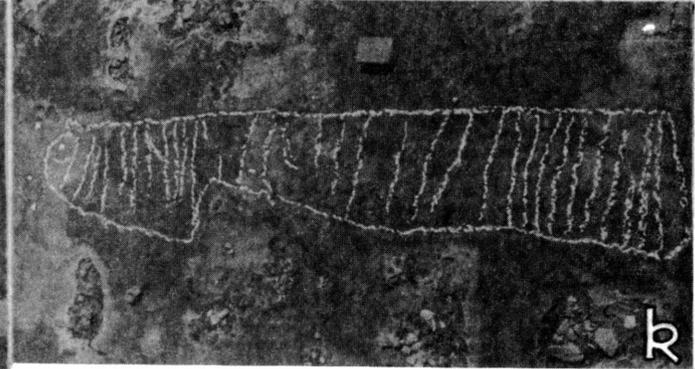
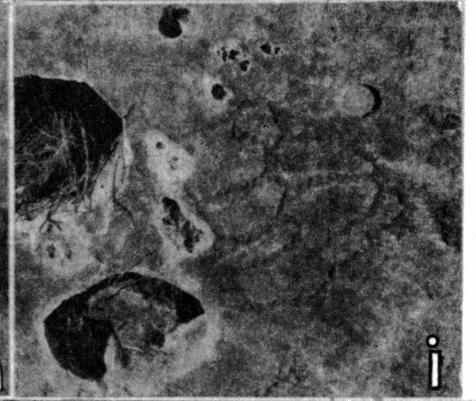
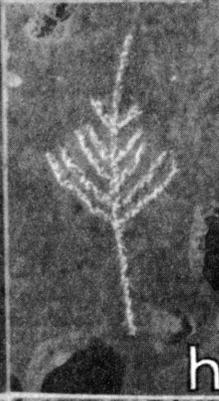
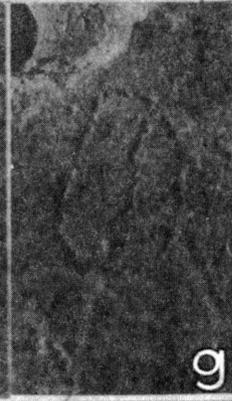
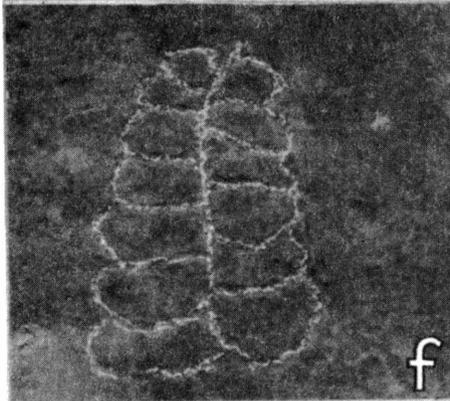
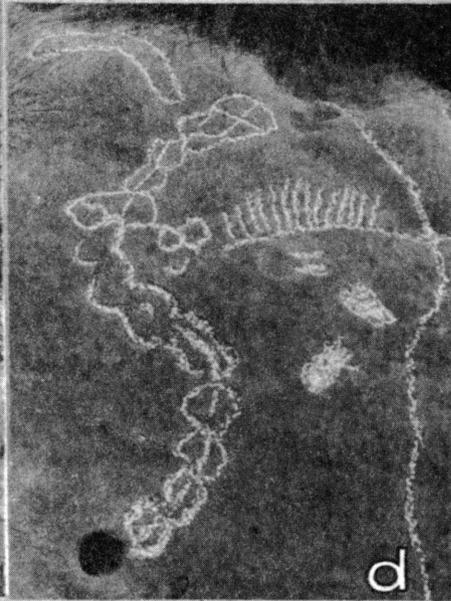
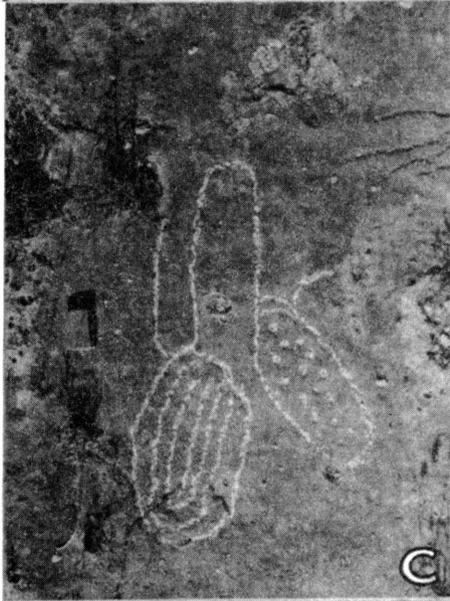
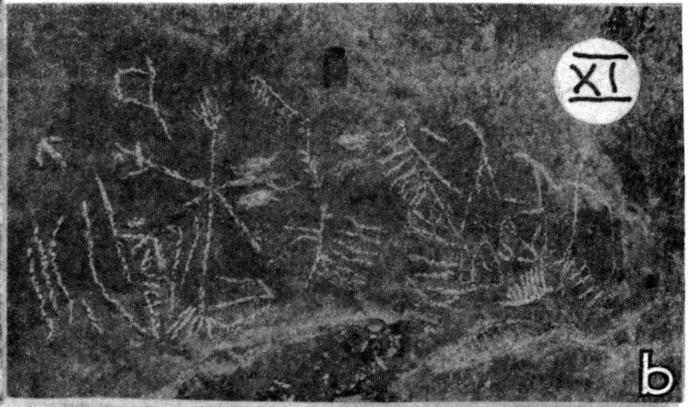
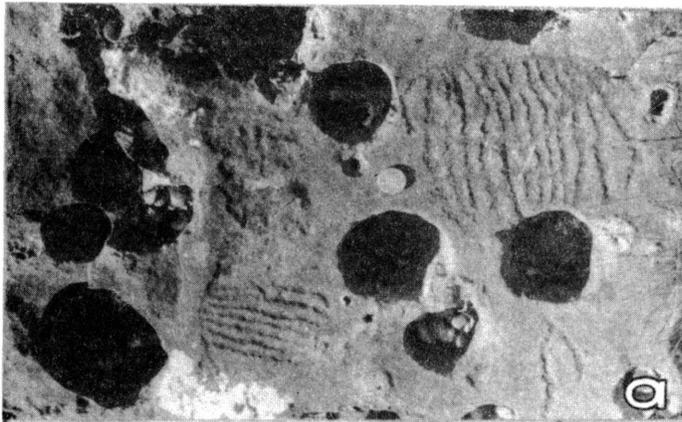


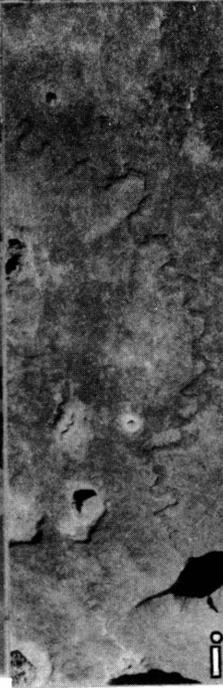
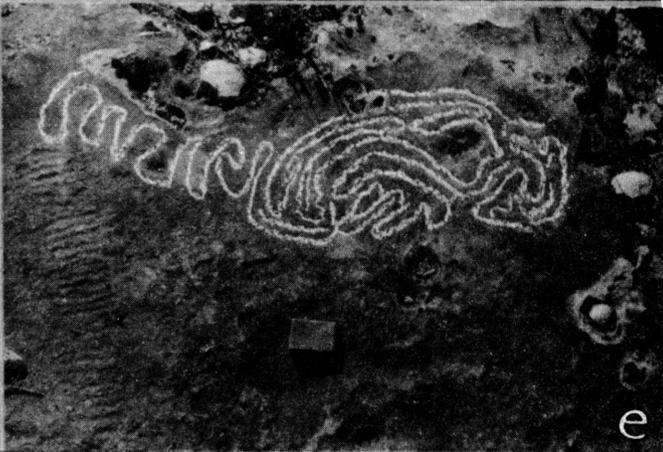
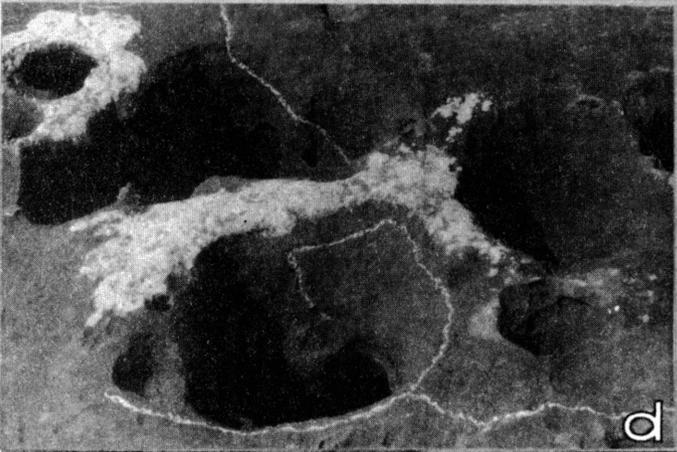
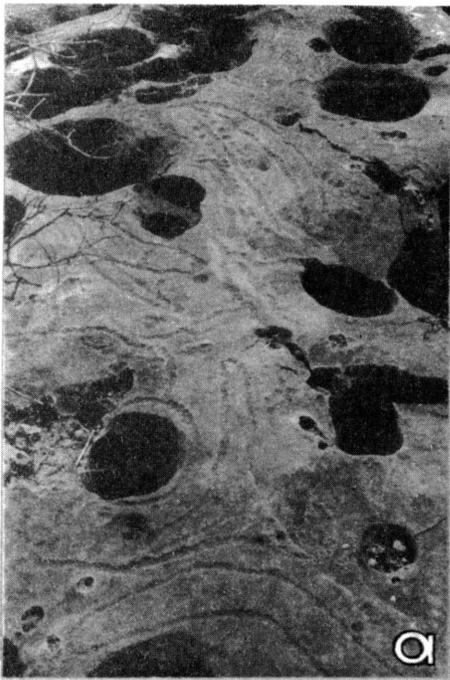


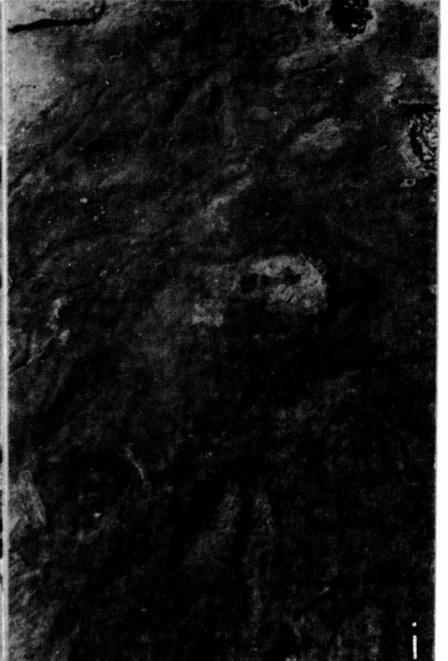
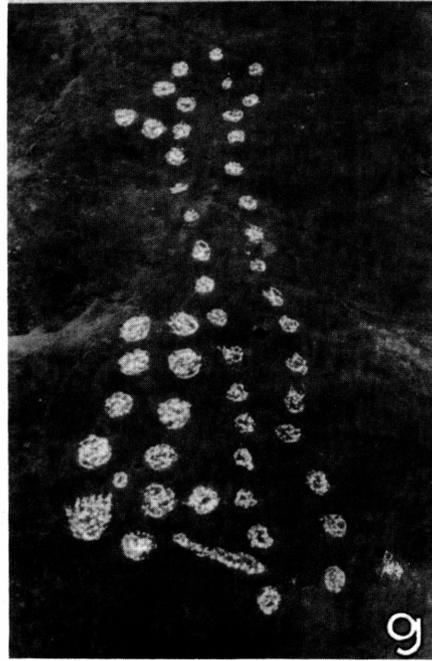
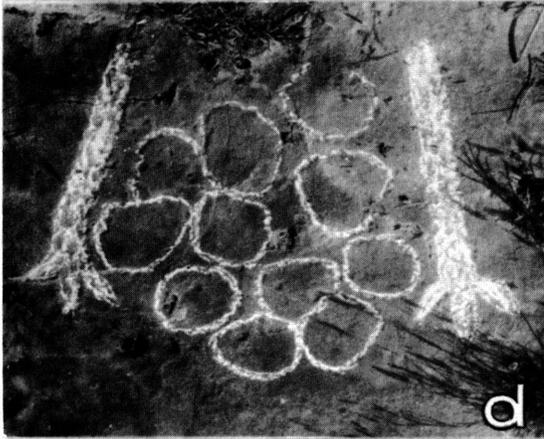
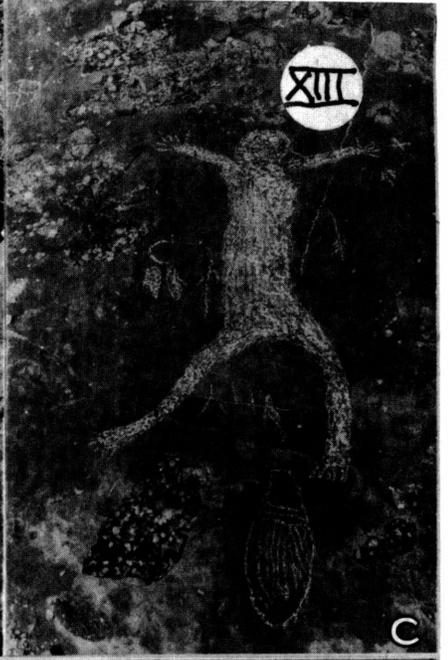


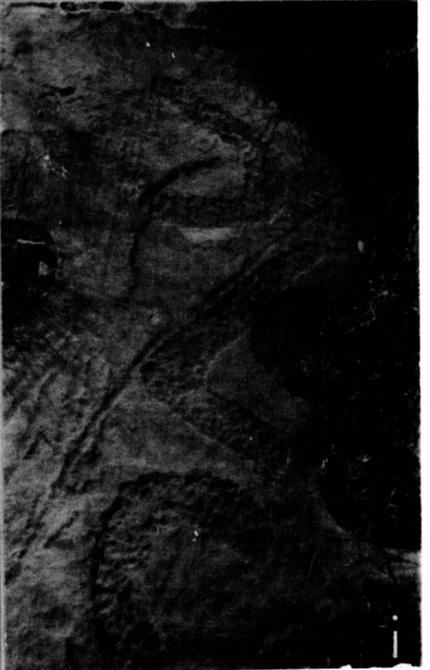
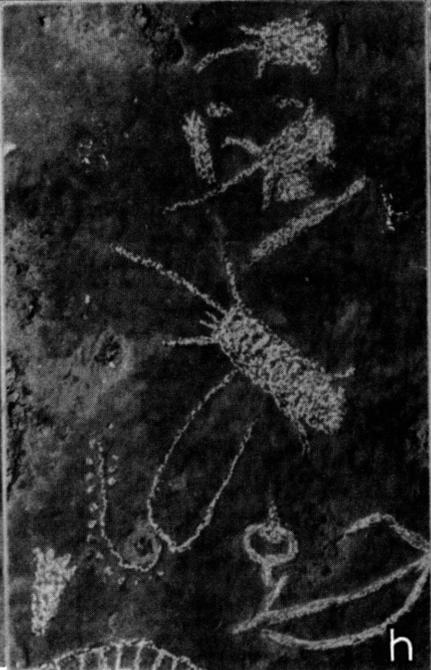
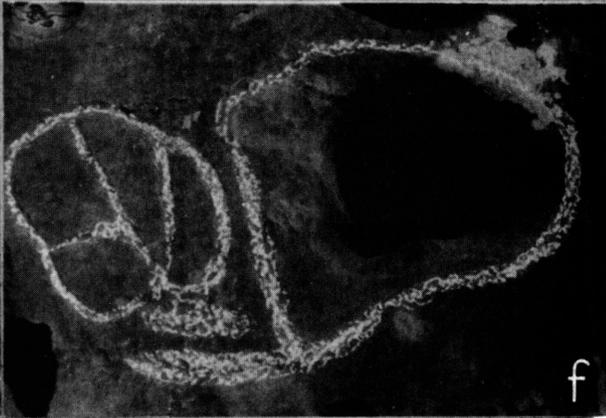
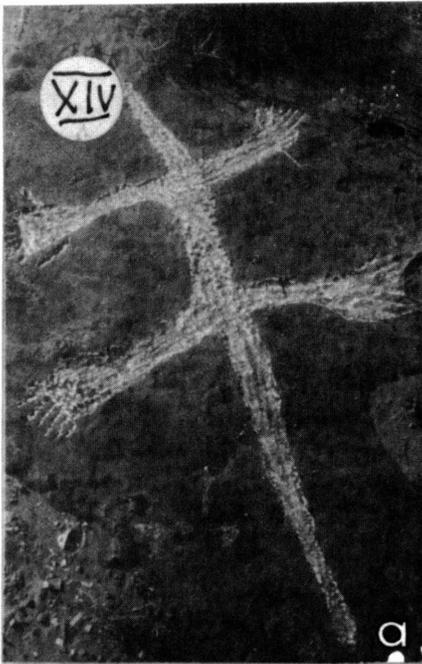


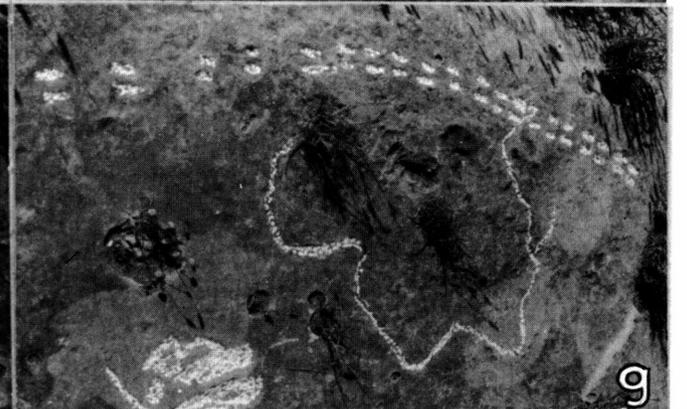
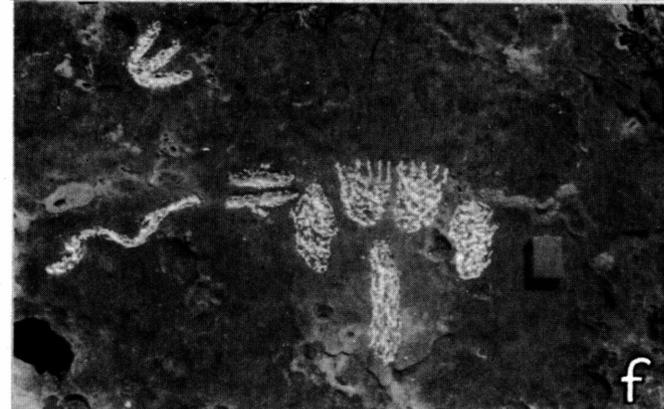
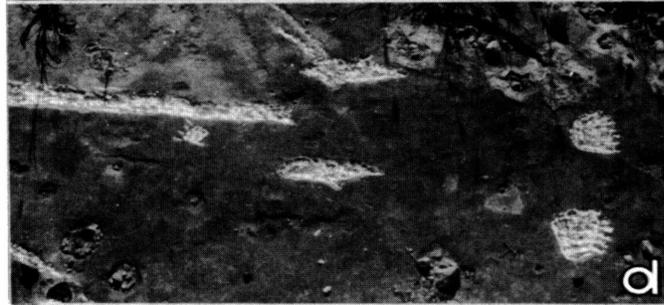
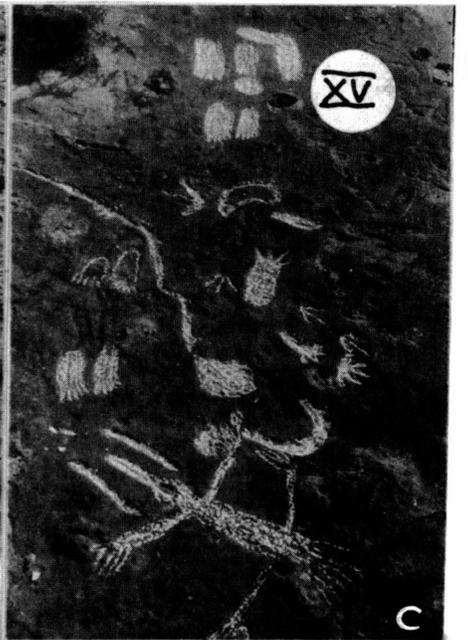


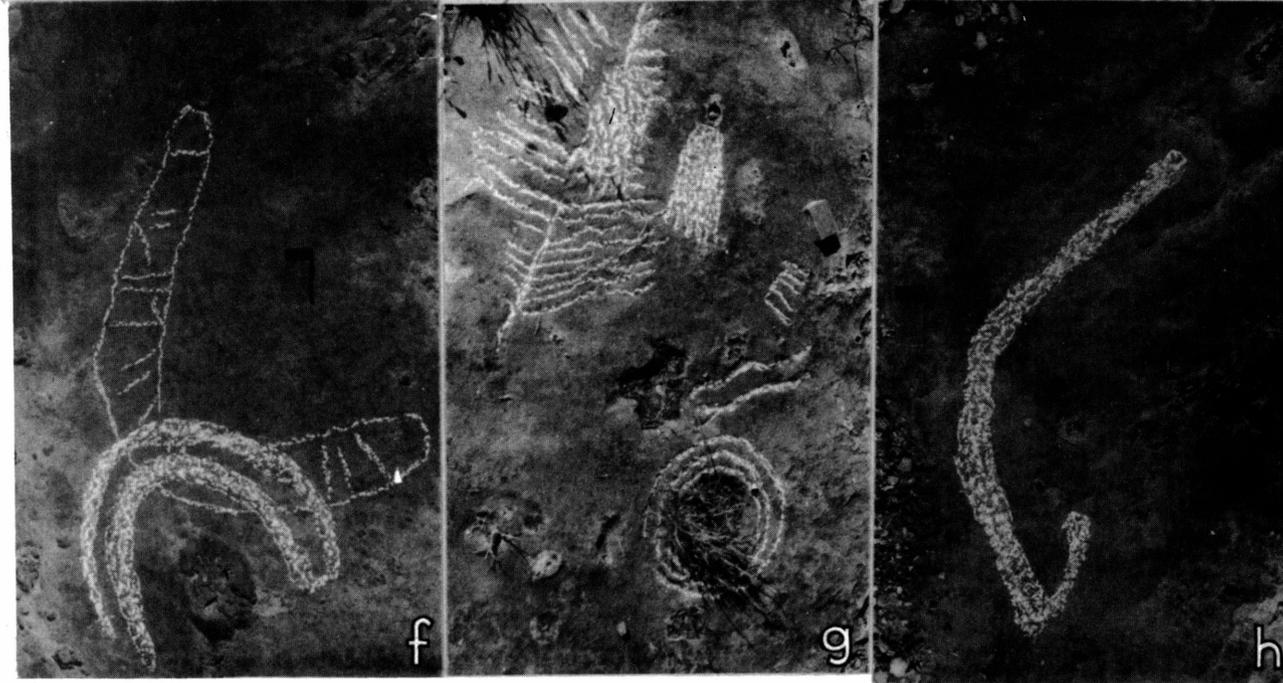
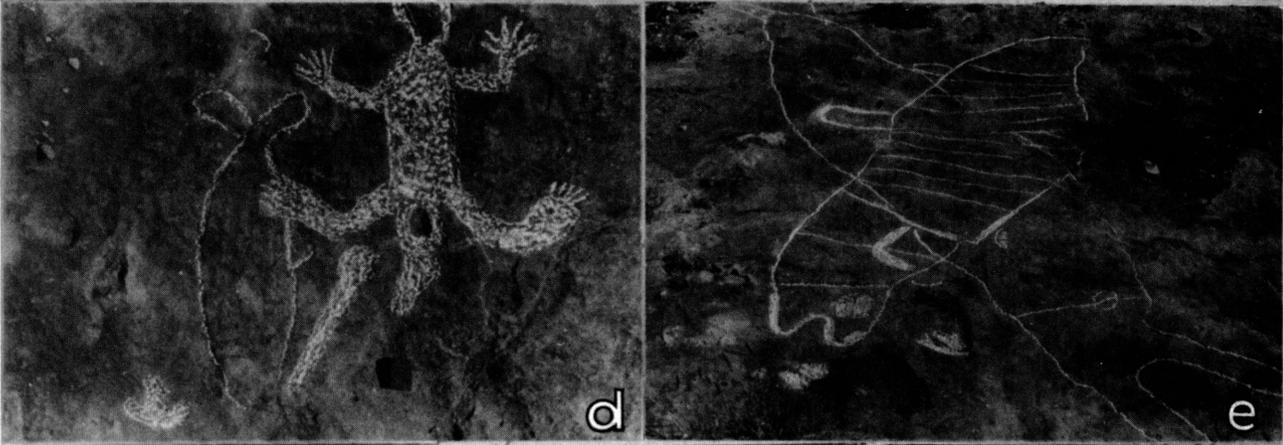
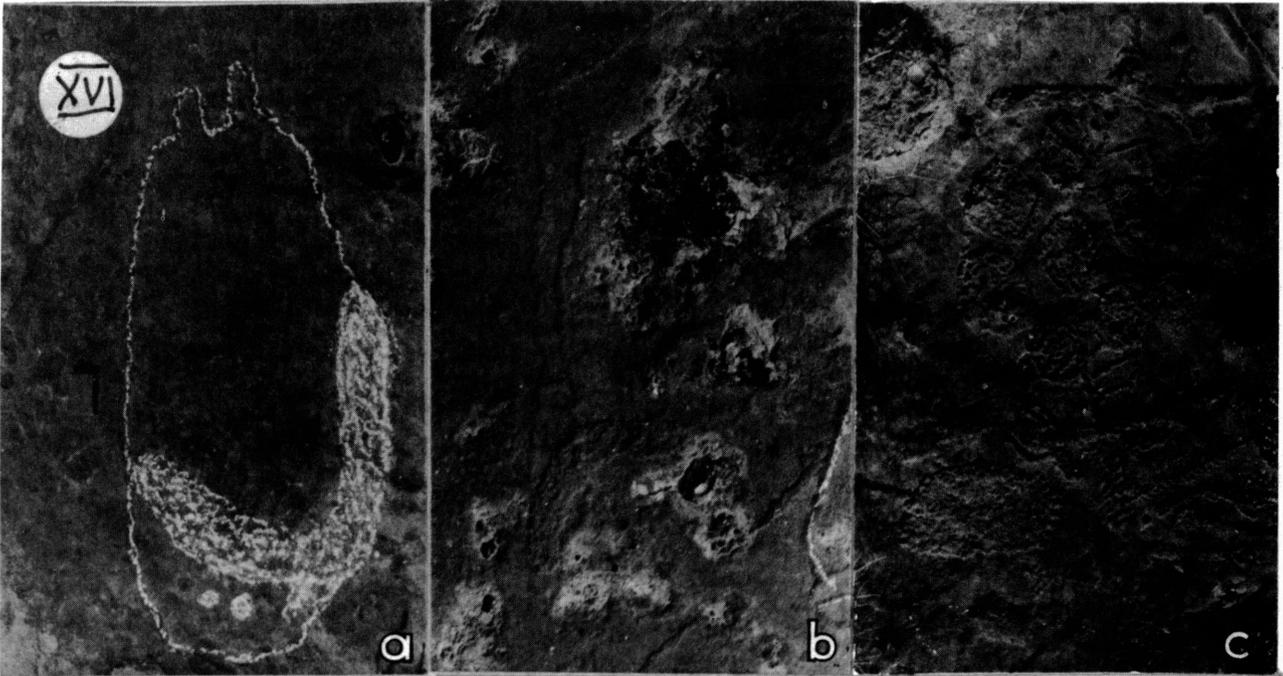


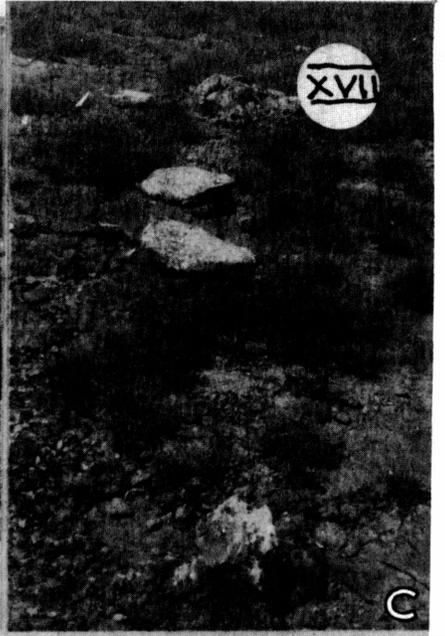
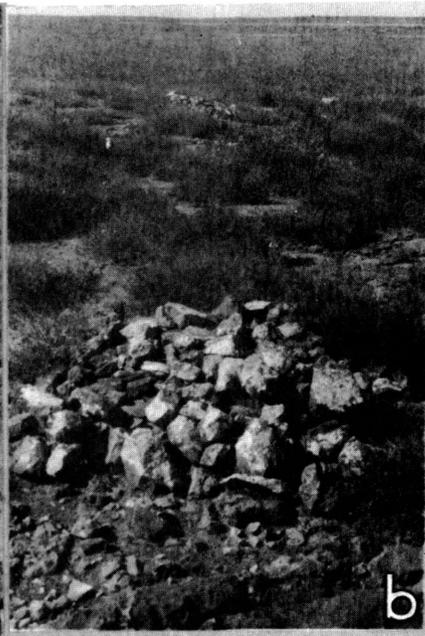












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