COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF NATIONAL DEVELOPMENT.

BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS.

RECORDS.

1962/136

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STRUCTURAL GEOLOGY OF PALAEOZOIC ROCKS, COOKTOWN. 1:250,000 SHEET AREA, QUEENSLAND.

by

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STRUCTURAL GEOLOGY OF PALAEOZOIC ROCKS, COOKTOWN 1:250,000 SHEET AREA, QUEENSLAND.

SUMMARY

Four definite fold systems have been recognised in the Lower Palaeozoic sediments of the Cooktown area. The earliest fold system (B_1) consists of tightly compressed folds with vertical axial planes and roughly horizontal axes trending north. These folds have determined the regional strike of the area. The second fold system (B_2), with steep axial planes having a variable trend, is superposed on the steeply dipping limbs of the B_1 folds. This fold system is represented in the Cooktown area only by small mesoscopic folds. The third fold system (B_3) is developed throughout the area, and consists of large, macroscopic, steeply plunging folds with steep axial planes striking between north and north-west, and a strong axial plane slaty cleavage that is especially well developed in the east of the area, where it has a tendency to transpose the bedding. The last fold system (B_4) has a restricted occurrence in the south-east of the area, where the S_3 cleavage of the B_3 folds has been folded about horizontal north-west axes.

Two blocks of Permian sediments and volcanics have been down-faulted into the folded Lower Palaeozoic sediments. The major folding within these Permian blocks has been about northerly trending axes, probably directly controlled by the fault movements. With the exception of that on the Palmerville Fault, movement along the other fault planes within the area has not been determined. The sense of vertical movement on the Palmerville Fault can be determined for various stages of its history, and it appears that one or more reversals of movement have occurred.

INTRODUCTION

This report describes the structures of the Palaeozoic sediments of the Cooktown 1:250,000 Sheet area. It is based on field work done during the 1961 field season, which extended the work done in the Mossman Sheet area in 1960 into the adjacent Cooktown area.

The regional structures in the Palaeozoic sediments of the Cooktown area are direct continuations of those in the Mossman area immediately to the south, described in a previous report (Amos, 1961), and the same style of deformation and the same fold systems are found in both areas.

PREVIOUS WORK

There are no references on the structures of the Palaeozoic sediments of the Cooktown 1:250,000 Sheet area. Most of the previously published reports have been concerned with the Annan River Tinfield, the coal seams in the Permian at Oakey Creek and Little Kennedy River and in the Mesozoic sandstones at various localities, and the sporadic gold mining near Cooktown and near the McIvor River. None of these reports have anything to say about the structure of the sediments, either locally or on a regional scale.

Two references relating to the Mossman 1:250,000 Sheet area immediately south of the Cooktown area have some bearing on the Cooktown structures, as the Palaeozoic sediments continue across both areas, and the structures in the Cooktown area are continuations of those in the Mossman area. The first of these two reference (de Keyser, 1961) gives a general account of the geology of the Mossman area and includes a brief description of the Palaeozoic structures; the other reference (Amos, 1961) deals exclusively with the structures in the Palaeozoic sediments. Other references to the structures of the Mossman area are mostly brief and not very accurate; a full reference list is given in both the references already mentioned.

STRUCTURE

Three broadly defined periods of folding were detected in the Mossman area in 1960. In 1961, during work on the area close to the common boundary between the Mossman and Cooktown Sheet areas, a fourth period of folding was discovered; this fol ding has affected a belt of rocks about 12 miles wide extending from south of the Daintree River in the Mossman area to north of Spring Creek in the Cooktown area.

TERMINOLOGY

In the report on the structures in the Mossman area the periods of folding were classified as the First Fold Period and the Second Fold Period; the Second Fold Period included two distinct fold periods whose time relationships were not clear at that stage. The relationships of all these folds is now better known, and, with the addition of a further period of folding, it is felt that a new nomenclature is needed. The new nomenclature is consistent with the almost standard pattern of nomenclature used in recent years in descriptions of complexly folded areas.

Planar fabric elements are designated by the letter S, fold axes by the letter B and lineations by the letter L. The original sedimentary bedding is S_1. The four fold systems are B_1, B_2, B_3, and B_4, in chronological order, the oldest being B_1.

B_1 folds.

B_1 folds are large folds with roughly horizontal axes trending north or north-north-west. The limbs of these folds are consistently steeply dipping, and the hinge areas are small. There is an axial plane slaty cleavage (S_2) developed in the core of the folds, but this cleavage is rarely visible on the limbs. There is no lineation associated with these folds except a poor one (L_1) in the core. Mesoscopic B_1 folds are rare.

The B_1 folds are the First Folds described in the report on the Mossman area. They are difficult to detect, but they are responsible for the regional north-north-west strike and steep dips throughout the Mossman and Cooktown areas, and they have exerted a controlling influence on all subsequent fold orientations.

B_2 folds.

Large open folds with a broad hinge area superposed on the steeply dipping limbs of the B_1 folds. The axial planes of these folds are vertical, and trend east, north-east, and north; the fold axes plunge steeply at angles from 50^o to 90^o. The angle and direction of plunge are controlled by the intersection of the axial planes and the steeply dipping limbs of B_1 folds. No new cleavage or lineation has been observed associated with these folds. In view of the widely differing trends of the axial planes, it is possible that more than one fold system has been classed together as the B_2 fold system.

B_2 fold movements were best developed in the west of the Mossman Sheet area, where they formed folds measuring up to four miles from crest to trough, but in the Cooktown area B_2 folds are much less common, and they appear to be restricted to mesoscopic structures.

B_2 folds were included in the Second Fold Period in the Mossman area report.

B_3 folds

B_3 folds are large, tight, similar folds with relatively small hinge areas. The axial planes of these folds strike north, north-north-east, or north-north-west, and the axes tend to plunge steeply, mostly at angles from 50° to 90°. These folds are associated with a strong axial plane slaty cleavage (S_3) that dips at 75° to 90° either side of the vertical. Partial transposition of the bedding by this cleavage has taken place. A lineation (L_2) is developed parallel to the intersection of the S_3 cleavage and the bedding, and therefore parallel to the fold axes.

The B_3 folds were included in the Second Fold Period in the Mossman area report.

B_4 folds.

B_4 folds are open, right-angle folds in the S_3 cleavage, with nearly horizontal axes trending north-west. The folds have one gently dipping limb and one steeply dipping limb with the regional orientation of the unfolded S_3 cleavage; the folds are large kink folds. A poorly developed strain-slip cleavage (S_4) is parallel to the axial planes of the folds, which have a slightly variable orientation, and dip gently south-east, north-west, or south-west in different areas. A poor lineation (L_3) resulting from the intersection of S_3 and S_4 is parallel to the fold axes.

S_1 is the original sedimentary bedding.

S_2 is the vertical slaty cleavage developed in the cores of the B_1 folds.

S_3 is the vertical slaty cleavage parallel to the axial planes of the B_3 folds.

S_4 is the strain-slip cleavage parallel to the axial planes of the B_4 folds.

L_1 is the lineation parallel to the axes of the B_1 folds.

L_2 is the lineation parallel to the axes of the B_3 folds.

L_3 is the lineation parallel to the axes of the B_4 folds.

FOLD SYSTEMS.

The B_1 Fold System.

The B_1 folds are the earliest folds found in the Cooktown and Mossman areas. They have been largely obscured by later deformations but their existence throughout the area is indicated by the steeply dipping bedding attitudes that pre-date the B_2 and B_3 folds.

In the Cooktown area the B_1 folds are only directly detectable in the west, in a belt about 5 miles wide adjacent to the Palmerville Fault (Fig. 1). The Palmerville Fault forms the western boundary of the Palaeozoic sediments, bringing them into contact with the Precambrian basement to the west. This resistant basement block has had a stabilising influence on the sediments nearby in both the Cooktown and Mossman areas, and fold movements later than the B_1 folds have had less influence on the B_1 structures here than elsewhere. Within this belt close to the fault the bedding of the Palaeozoic rocks strikes parallel to the fault, and dips steeply eastwards; a plot of the S-poles obtained on a traverse across the sediments 2 miles south of "Fairlight" Homestead yields a partial girdle about an axis that plunges at 51° towards 004° (Fig. 2). This shows only a slight divergence from the plunge of an exposed B_1 fold in the Mossman area, which plunges at 5° towards 170°.

A few fold closures can be detected on the aerial photographs of this area, but in general the beds dip steeply eastwards without much evidence of folding. This is to be expected in folds with narrow hinge areas, steeply dipping limbs, and almost horizontal axes. The scarcity of mesoscopic folds and lineations associated with these B_1 folds makes it more difficult to detect their orientations.

The B_2 Fold System.

The B_2 folds reached their maximum development in the west and south of the Mossman area, but are poorly represented in the Cooktown area. In the coast exposures south of Cooktown some mesoscopic open folds with east-trending vertical axial planes are superposed upon steeply dipping bedding of the B_1 folds, and are cut incongruently by the S_3 cleavage of the strong and more uniformly B_3 fold system; they are therefore considered to be part of the B_2 fold system (Fig. 3). They plunge steeply in various directions, depending on the attitude of the bedding prior to their formation.

The B_3 Fold System.

Macroscopic folds.

The B_3 folds and the associated S_3 cleavage are the most obvious structures in most of the Palaeozoic sediments. In the west the B_3 folds are well displayed on the aerial photographs as large steeply plunging folds commonly measuring four or five miles from crest to trough (Figs. 1, 4). Eastwards the folds become less easily visible on the photographs and on the ground, but the S_3 cleavage becomes stronger and more uniformly distributed until it is the dominant fabric element in nearly every outcrop.

A large synclinal B_3 fold in the south of the area, on Earls Creek about 16 miles south-east of Laura, has limbs that dip almost 80° to the south-west and to the east-south-east, and a beta-diagram of the bedding indicates a fold axis that plunges at 70° towards 170° (Fig. 4.). This is quite typical of all the large and small B_3 folds.

Mesoscopic folds.

In general mesoscopic B_3 folds are not common in association with the large macroscopic B_3 folds, though they do occur. Mesoscopic folds are more numerous in the east, where the S_3 cleavage is more intense. In the coast exposures south of Cooktown, where the bedding has not been obliterated, folds of two generations are common. The earlier folds are B_2 folds, cut across incongruently by the S_3 cleavage; they are sometimes apparent as curved traces of bedding on the S_3 cleavage planes (Fig. 5). The younger folds are B_3 folds - tight similar folds with the S_3 cleavage parallel to their axial planes. These folds plunge steeply, but not in any preferred direction; their axes are parallel to the intersection of the bedding and the S_3 cleavage (Fig. 5).

S_3 cleavage.

The S_3 cleavage is the dominant fabric element in the east of the area, and can be seen particularly well in the coast exposures. It is an approximately vertical slaty cleavage that strikes between north and north-west. The cleavage shows a fairly wide variation in trend in both the Cooktown and Mossman areas, and this variation is quite evident even in the coast exposures alone. The bedding along the coast dips at angles of over 60°; the intersection of the bedding and the S_3 cleavage plunges steeply, and is marked by a strong limeation on the bedding and cleavage surfaces (Fig. 6).

Transposition of bedding.

In many places along the coast and inland the S_3 cleavage has disrupted the bedding, dividing the more sandy beds into lenticles with their longest axes parallel to the intersection of bedding and cleavage. This is an early stage in the transposition of the bedding by the S_3 cleavage to form a new lithological lamination parallel to the cleavage. Stages in this process can be observed at various localities (Fig. 7).

Transposition of one lamination to another is observed in many areas of superposed deformations; in the case of bedding it can take place by either the division of the bedding into discrete lenticular fragments by the cleavage and the flattening, elongation, and drawing-out of these fragments in the cleavage planes, or the very tight folding of the bedding and the shearing out of one of the limbs of the folds (Fig. 7). Another example of transposition is the superposition of a strain-slip cleavage on an earlier slaty cleavage, and the gradual development of the strain-slip cleavage into a new claty cleavage.

In some localities in the Cooktown area and more particularly in the Mossman area, the transposition of the bedding has not proceeded entirely along these lines. Deformation has a more brittle character in the centre of the area than in the east, and this has had the effect of halting the transposition in its early stages. Over quite large areas, in rocks consisting of thin sandy beds (mostly 12" thick, or less) alternating with slaty beds, the S_3 cleavage has disrupted the sandy beds into discrete lenticles. Instead of these lenticles of sandy material being continuously deformed, eventually to form a new lamination, the fragments have retained their individual ellipsoidal outlines, and have taken no further active part in the deformation. This has resulted in a type of tectonic "conglomerate" in which isolated fragments of sandy rock are totally enclosed in a cleaved pelitic matrix and therock frequently resembles a deformed sedimentary conglomerate. These "conglomerates" have been called shear-zones in the Mossman area, where the largest single development of this type was at least 5 miles wide and ten miles long. The reason for this departure from the usual process of transposition seems to have been a considerable difference in physical properties between the sandy and pelitic beds in the conditions under which the S_3 cleavage formed at the shear-zone localities.

The B_4 fold system.

The B_4 fold system has a localised distribution. It is found in an area of uncertain extent, between the Daintree River in the Mossman Sheet area and Sporing Creek, a tributary of the Granite Normanby River in the Cooktown sheet area; it may extend some distance north and south beyond these rivers. The eastern limit of the B_4 folding has been established at both the Daintree River and Sporing Creek, and the belt of folding extends at least 12 miles westward from this limit, but the western limit has not been precisely established.

The B_4 folds are mesoscopic and macroscopic kink folds in the S_3 cleavage, with one steep limb approximately parallel to the regional dip and strike of the S_3 cleavage, and one gently dipping limb. The sub-horizontal limbs of some of the macroscopic folds measure up to 300 feet between turn-overs. The limbs are generally planar, and the hingeareas are narrow and angular, but not fractured (Fig. 8). A poor strain-slip cleavage is developed parallel to the axial planes of the folds, which dip gently at angles of up to twenty or thirty degrees either north-east, south-west or east. The fold axes are nearly horizontal at the Daintree River, and trend north-west; northwards the plunge of the axes steepens till they plunge at about 30° north-west at Sporing Creek.

Within the area of B_4 folding the bedding is preserved in some places, and in other places it has been partly or completely transposed (Fig.7). In some places where the bedding has been preserved it is folded into small B_3 folds whose axial planes are parallel to the S_3 cleavage, and in some exposures these small B_3 folds can be observed folded about B_4 axes. In other exposures steeply dipping bedding is folded about B_4 axes and B_3 folds are not visible. There is a well developed L_2 lineation on the S_3 cleavage planes parallel to the B_3 fold axes, and this lineation has been folded with the cleavage about the B_4 fold axes.

The Nob Point - Indian Head folds.

The rocks of Nob Point are interbedded sandstone and shale, the sandstone beds having an average thickness of about 18 inches to 24 inches. The rocks are cleaved, but not strongly, and they present a relatively undeformed appearance which contrats markedly with the strongly cleaved sediments in closely adjacent areas in which the bedding has been obscured or obliterated by the intense development of the S_3 cleavage.

The northernmost exposures of Nob Point display a simple anticline (Fig.9) which plunges 24° to the south, and has a vertical axial plane. The limbs dip 50° to 70° east and west. The fold measures about 15 feet from crest to trough. South of this fold along the Nob Point coast exposures there are no more mesoscopic folds until near the southern end of the exposures, where a small mesoscopic fold plunges 35° to the south. Immediately south of the northern fold the bedding dips south at 20° to 30°, but southwards the strike swings and the dip steepens until the beds at the southern end of the exposures dip at 50° to 70° to the west-south-west. The poles to these bedding planes, when plotted on a stereogram fall in a girdle about an axis that corresponds to the mesoscopic fold axis at the northern end of the exposures, and it therefore appears that the whole of the bedding in the Nob Point exposures is folded cylindrically about an axis that plunges about 24° to the south (Fig.9). A profile of this fold constructed by projection of the bedding parallel to the fold axis on to a plane normal to the axis shows that the Nob Point exposures are situated in the steep western limb and the hinge area of a single large fold (Fig. 9).

Throughout the Nob Point exposures the bedding is regular and very little deformed. Cleavage, though present, is not a dominant structure, and in the north it is so poor that it is almost impossible to see; it strikes north-north-west and dips very steeply either east or west (Fig. 9). There is no indication of incipient transposition of the bedding by the cleavage in these exposures.

Indian Head is the next headland south, 1½ miles from Nob Point. The bedding in the Indian Head exposures is invariably steep, dipping at 70° to 90°, and the strike ranges from north to west-north-west. There are no visible mesoscopic folds. A stereographic plot of the bedding poles clearly illustrates the distribution of the bedding in two partial girdles about axes that plunge 80° west and 75° east (Fig.10). When this plot is superimposed on the plot from Nob Point it is seen that the partial girdles from Indian Head both start from intersections with the Nob Point girdle, and that the steeply plunging axes of the Indian Head girdles are so oriented as to lie within the steep flanks of the Nob Point fold. This suggests that the Indian Head structures are the result of folding superposed on the steeply dipping beds of the Nob Point fold. If this is correct, the two axes defined by the partial girdles define the axial plane of the later folding, which must include both of them, and must therefore be vertical and strike due west (Fig. 10).

Further evidence of superposed folding is provided by the cleavage. The cleavage, though not strongly developed, is closely oriented in the Nob Point fold, but in the Indian Head exposures the cleavage shows a spread of orientation as great as that of the bedding (Fig. 10). This would be the expected situation in superposed folding. No new cleavage is formed in the Indian Head exposure.

The fold at Nob Point is unusual in so far as it shows evidence of only one deformation. The orientation of the fold, which plunges gently south and has a vertical axial plane, is compatible with the fold's being part of either the B_1 or B_3 fold systems. In either case there is at present no obvious reason why the rocks at this locality should have been affected by only one of these fold movements and not the others. Because the fold is associated with only a very poorly developed slaty axial plane cleavage, and because it appears that at Indian Head this fold may have been refolded by a later fold with an east striking vertical axial plane, the Nob Point fold is tentatively correlated with the B_1 fold system and the superposed fold at Indian Head is correlated with the B_2 fold system.

DOWN-FAULTED PERMIAN BLOCKS.

There are two down-faulted blocks of Permian sediments, coal, and volcanics within the Hodgkinson Formation in the Cooktown area. One lies in the Palmerville fault zone, 8 miles north of Palmerville, on the Little Kennedy River; the other is in the Oaky Creek area, 18 miles west of Cooktown.

Oaky Creek Permian.

A down-faulted block of Permian sediments, and volcanics extends northwards from the Kings Plains area to the south Branch of the Endeavour River. The southern end of the block disappears beneath the superficial deposits of Kings Plains, and does not crop out again further south; the northern end of the block passes underneath the extensive cover of Jurassic sediments just north of the Endeavour River. The total length of the block is 16 miles, but there is a four mile gap in the outcrop west of Oaky Creek, due to later faulting, which divides the block into a northern and southern outcrop (Fig. 11). The maxium width is about a mile. The two outcrops are somewhat different and will be described separately.

South Oaky Creek Permian.

The rocks of the southern outcrop are well exposed over a distance of about four miles, from Oaky Creek south to a point about a mile south-south-east of The Brothers. South of this exposures are poor. The Permian rocks occupy a strip about a mile wide, trending north, and separated from the Hodgkinson sediments on either side by two marginal faults (Fig. 11). The Hodgkinson rocks are strongly cleaved and in places reduced to shear-zones; several bands of chert form prominent ridges. No macroscopic folds can be recognised in the Hodginson, but the bedding is steep and trends a few degreess west of north.

The Permian rocks have a dominantly northerly strike, and are strongly folded; however, they are very little cleaved, and have a very fresh and underformed appearance compared with the Hodgkinson sediments. The succession falls into three recognizable divisions: a lower sequence of thinly bedded sandstones with a thin coaly layer; a middle sequence of green, cream, and white rhyolites and agglomerates; and an upper sequence of sandstone, shale, carbonaceous shale, thin volcanics and coal seams. Neither the top nor the bottom of the succession is visible, and folding and faulting renders it difficult to estimate the exposed thickness of the sedimentary sequences. The volcanic sequence has a thickness of 600 to 900 feet in the middle of the outcrop, probably thinning southwards and possibly thickening slightly northwards. The Permian terminates northwards against a north-north-east trending fault on Oaky Creek.

A cross-section across the outcrop of Permian rocks east of The Brothers shows that the sediments in the east dip steeply, at over 80° , either east or west. Westward the angle of dip dacreases, and the rhyolites in the volcanic sequence dip west at angles from 70° to 50°. On the western margin of the rhyolites the sediments show a decreasing angle of dip westwards until the beds are horizontal. At this point faulting interrupts the horizontal beds and brings them into contact with Permian sediments folded on a mesoscopic scale about axes that plunge at 6° to 18° to the south. Further exposures westward are poor, but the dip is generally eastward at 30° to 60°. A beta-diagram of these bedding orientations yields a beta-maximum that plunges parallel to the macroscopic fold axes, indicating that the rocks are all folded cylindrically about the same southerly plunging axes. The distribution of dips suggests that a synclinal axis exists west of the rhyolites.

The northern end of the rhyolites is faulted against sediments which are folded about axes that plunge from 30° to 50° to the south (Fig. 11). These folds persist northwards to the point where the Permian is terminated by the north-north-east fault. This wide distribution of fold axes with a gentle or moderate plunge to the south indicates that the major structual component of the downfaulted block is a macroscopic fold or folds about southerly plunging axes parallel to the length of the block. The angle of plunges decreases from about 40° in the north to 10° opposite The Brothers.

South-east of The Brothers a subordinate band of rhyolites and sediments that dip at 70° to the north-west trends south-west from the eastern margin of the Permian block and meets the southerly trending band of rhyolites already described. The structural relationships are not clear; the southerly trending band of rhyolites continues uninterrupted through the junction, which suggests a fault may separate them (Fig. 11). The steep north-westerly dip of the rhyolites and sediments in the subsidiary belt is incompatible with the southerly plunging folds that dominate most of the down-faulted block, and it is clear that there is some structural complexity here which is not yet explained.

North Oaky Creek Permian.

The northern outcrop of the Permian is separated from the southern outcrop by 4 miles of Hodgkinson sediments. It differs from the southern outcrop in that it consists entirely of acid colcanics. The volcanics are folded about axes which in the south plunge 10° north, and in the centre of the outcrop plunge 15° north-north-east. The dips are mostly steep, commonly vertical, and the strike is generally between north-north-west and north-north-east. As no marker horizons are visible the actual form of the folds is indeterminable. In the south the volcanics terminate against two north-east trending faults, and in the north they pass beneath the Jurassic sandstone cover.

Conclusions.

The Permian has been down-faulted into the Hodgkinson by movement along the two parallel marginal faults. The structure within the down-faulted block is dominated by a major fold whose axis trends parallel to the length of the block. As the beds are more or less horizontal in the centre of the block and steepen toward the margin until they are nearly vertical, it seems likely that the fold is a result of the faulting movements, and that the beds were dragged up by movement along the fault planes. Later movements on north-east faults have disrupted the down-faulted block.

Little River Coal Measures

A down-faulted block of Permian sediments and coal occupies a lenticular strip 12 miles long and about 1 mile wide, 8 miles north of Palmerville. It is bounded on the west by the main Palmerville Fault, which separates it from Mesozoic sandstone overlying Precambrian, and on the east it is separated by a subsidiary fault from sediments and volcanics of the Chillogoe Formation.

Exposures in this downfaulted block are very poor, and there is no clear evidence of the structure within it. The beds mostly dip steeply, and strike north-north-west, but considerable variations occur. A beta-diagram of all the bedding yields numerous maxima which are of no significance in determining any possible fold axes. It seems, therefore, that the bedding is not folded cylindrically about a single axis throughout the block.

FAULTING

General

Very little can be said about the faulting in the Cooktown area. Nearly all of the faults trend between north-north-east and north-north-west, and, judging by the straightness of their traces, they are mostly steeply dipping. In the absence of any marker horizons the displacement along the fault planes cannot be estimated. Some of the faults are closely parallel to one or other of the limbs of the large B_3 folds (Fig. 4), which suggests that they might be para-contemporaneous with the B_3 folding.

The marginal faults of the Oaky Creek Permian block are assumed to be complementary normal faults, as the block between them has been dropped down to form a graben. These faults strike approximately north; the north-east striking faults which interrupt the outcrop of the Permian block are younger. This is the only definite age relationship between faults known on the Cooktown Sheet.

Palmerville Fault.

The Palmerville Fault trends north across the western edge of the area, from Palmerville, in the south, to the Kennedy River, where the fault disappears beneath the superficial cover of loose sand and alluvium. This segment of the fault is only a small part of the total length of the fault, which can be traced 300 miles south from Princess Charlotte Bay to beyond Mount Garnet.

The fault separates Palaeozoic sediments on the east from the Precambrian basement on the west. As the Palaeozoic sediments are assumed to be underlain by basement rocks similar to those west of the fault, there has been at some period a considerable vertical displacement on the fault, down on the east side relative to the west side.

The deep-water turbidite sequence of the Hodgkinson Formation which makes up the bulk of the Palaeozoic sediments does not extend westward as far as the fault, but is replaced by the shallow water shelf sediments of the Chillagoe and Mount Garnet Formations adjacent to the fault. The narrow outcrop of these formation trends parallel to the fault and immediately adjacent to it for a distance of at least 230 miles south from the Kennedy River. It follows from this that the fault is positioned approximately along the margin of the Palaeozoic basin of sedimentation, and evidence found further south (Mossman and Atherton 1:250,000 Sheets areas) indicates that the fault was active during sedimentation and in fact controlled the margin of the basin - periodic vertical adjustments along the fault plane accommodated the sinking of the basin to the east.

At the Little Kennedy River the Palmerville Fault and a subsidiary fault on the east side have let down between them a block of Permian sediments 12 miles long and 1 mile wide. The Permian sediments of this block are in faulted contact with the Palaeozoic sediments on the east and with the Precambrian basement and the overlying Mesozoic sandstones on the west (Fig. 12); this implies a reversal of movement on the western fault after the deposition of the Mesozoic, bringing the Permian back up far enough to be in contact with the Mosozoic. This movement of east side up relative to the west side is also displayed in other areas where the base of the Mesozoic sandstone on the east side of the fault if higher than on the west side. The displacement seems to have been of the order of 100 - 200 feet.

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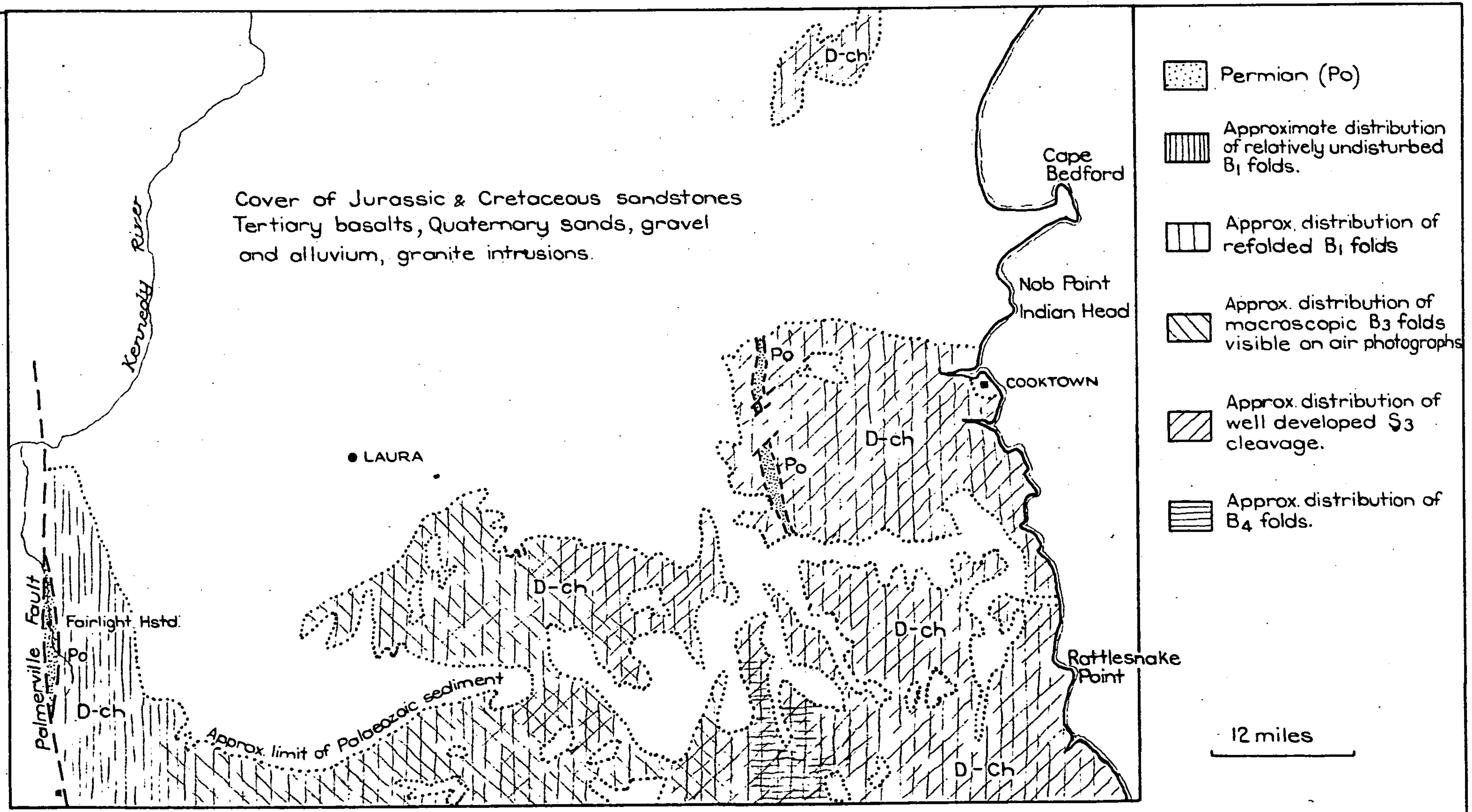


Fig. 1

To accompany Record No 1962/136

Bureau of Mineral Resources
Geology and Geophysics

APPROXIMATE DISTRIBUTION OF THE PALAEOZOIC SEDIMENTS
IN THE COOKTOWN 1:250,000 SHEET AREA

D55/13/6

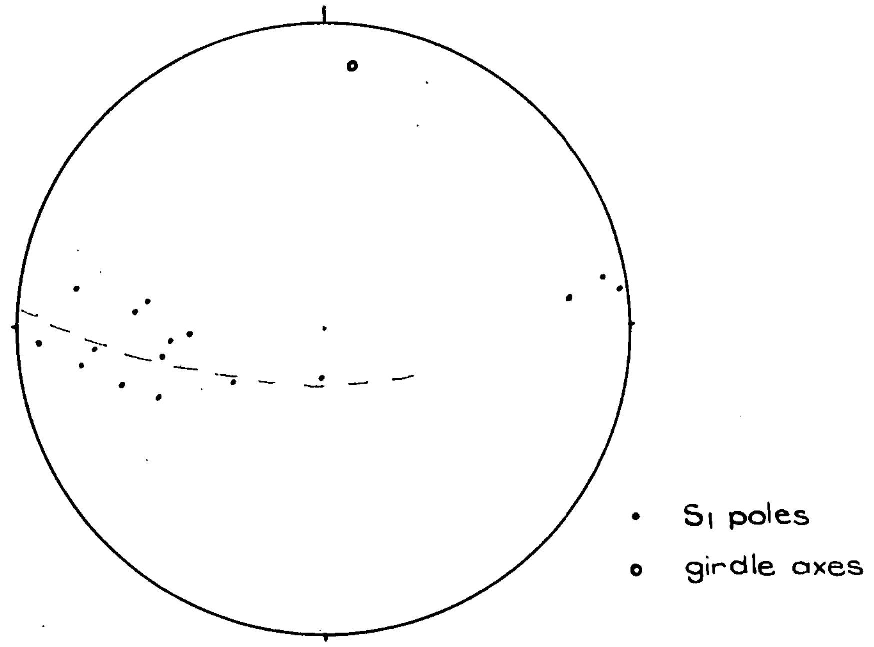
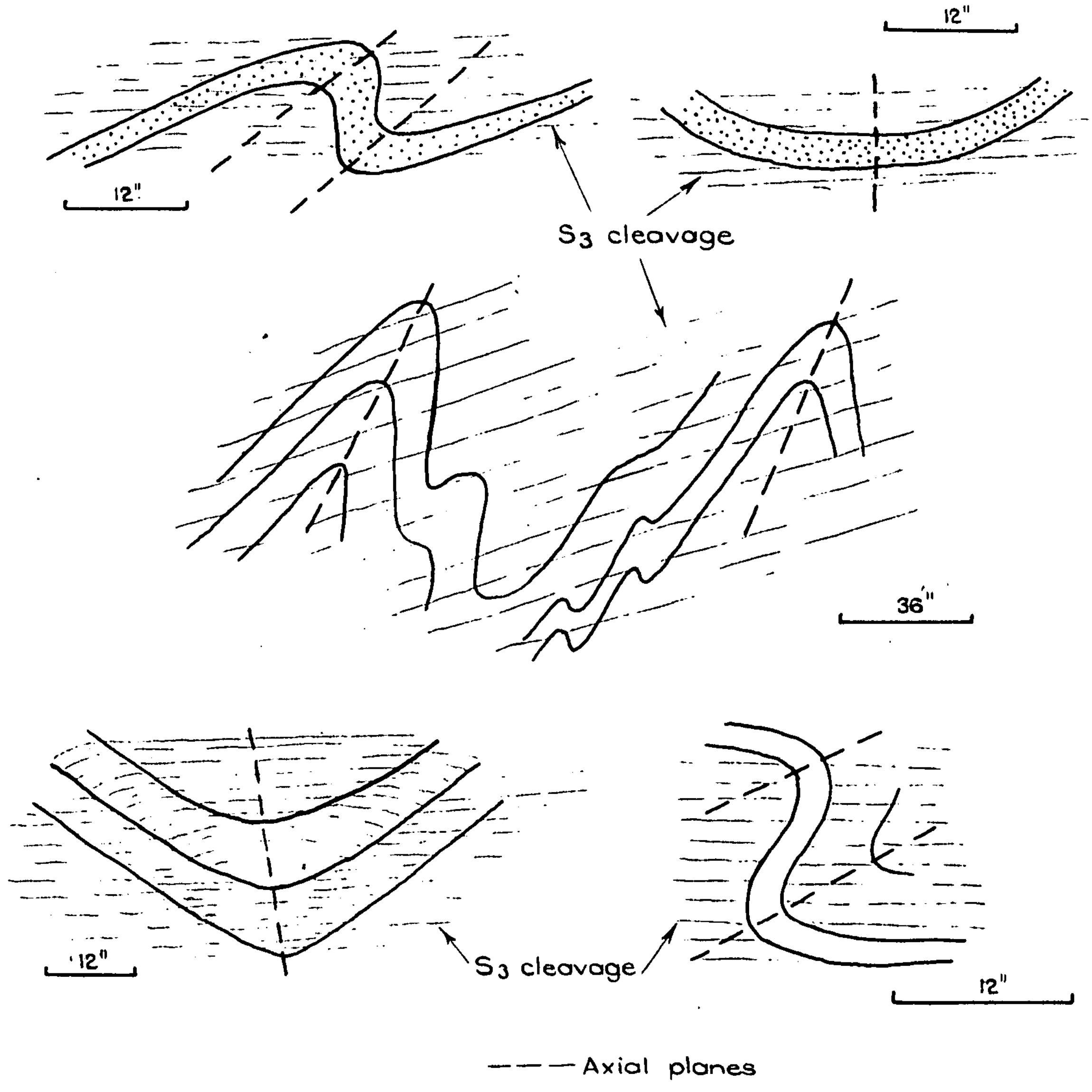


Fig. 2 POLES TO BEDDING PLANES FROM TRAVERSES OF B_1 FOLDS 2 MILES SOUTH OF FAIRLIGHT HSTD

Bureau of Mineral Resources Geolog and Geophysics To accompany Record No 1962/136 D55/13/7



MESOSCOPIC B_2 FOLDS WITH INCONGRUENT B_3 CLEAVAGE

Fig. 3

Bureau of Mineral Resources To accompany Record No 1962/136 D55/13/8

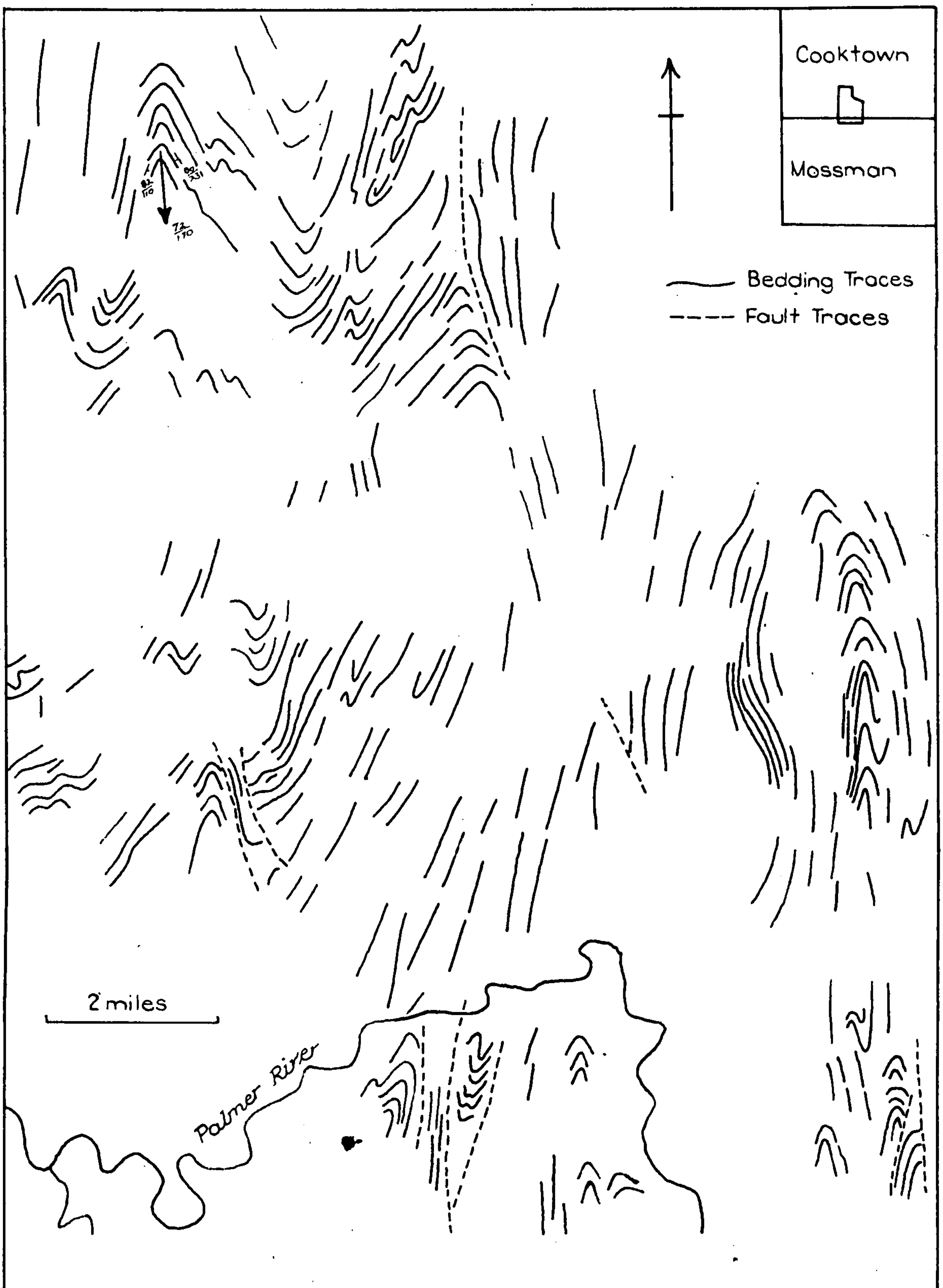


Fig 4 MACROSCOPIC B_3 FOLDS BEDDING TRACES VISIBLE ON AERIAL PHOTOGRAPHS

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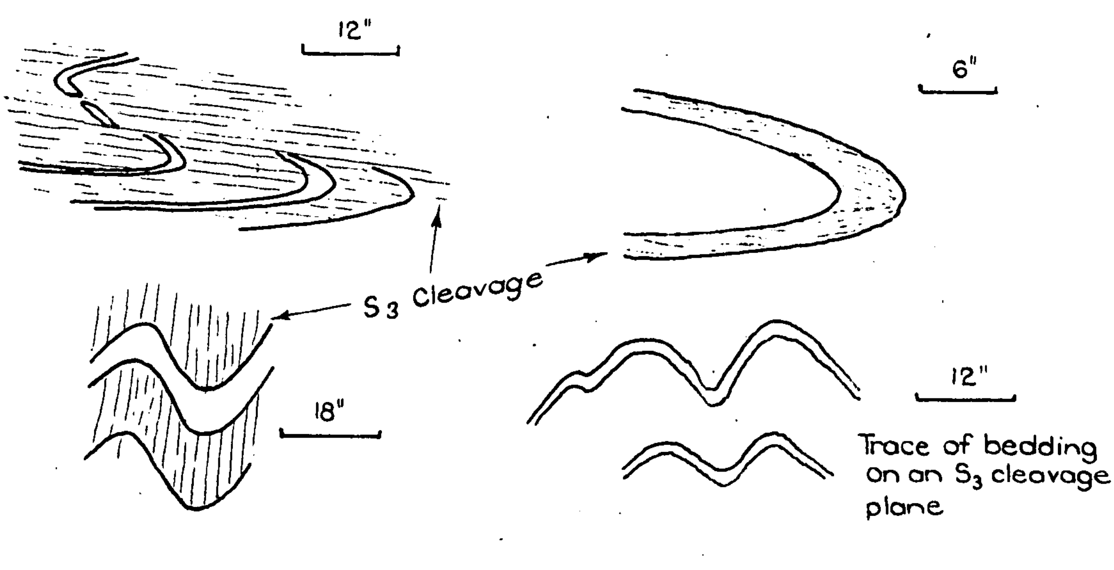

Fig 5 MESOSCOPIC B_3 FOLDS

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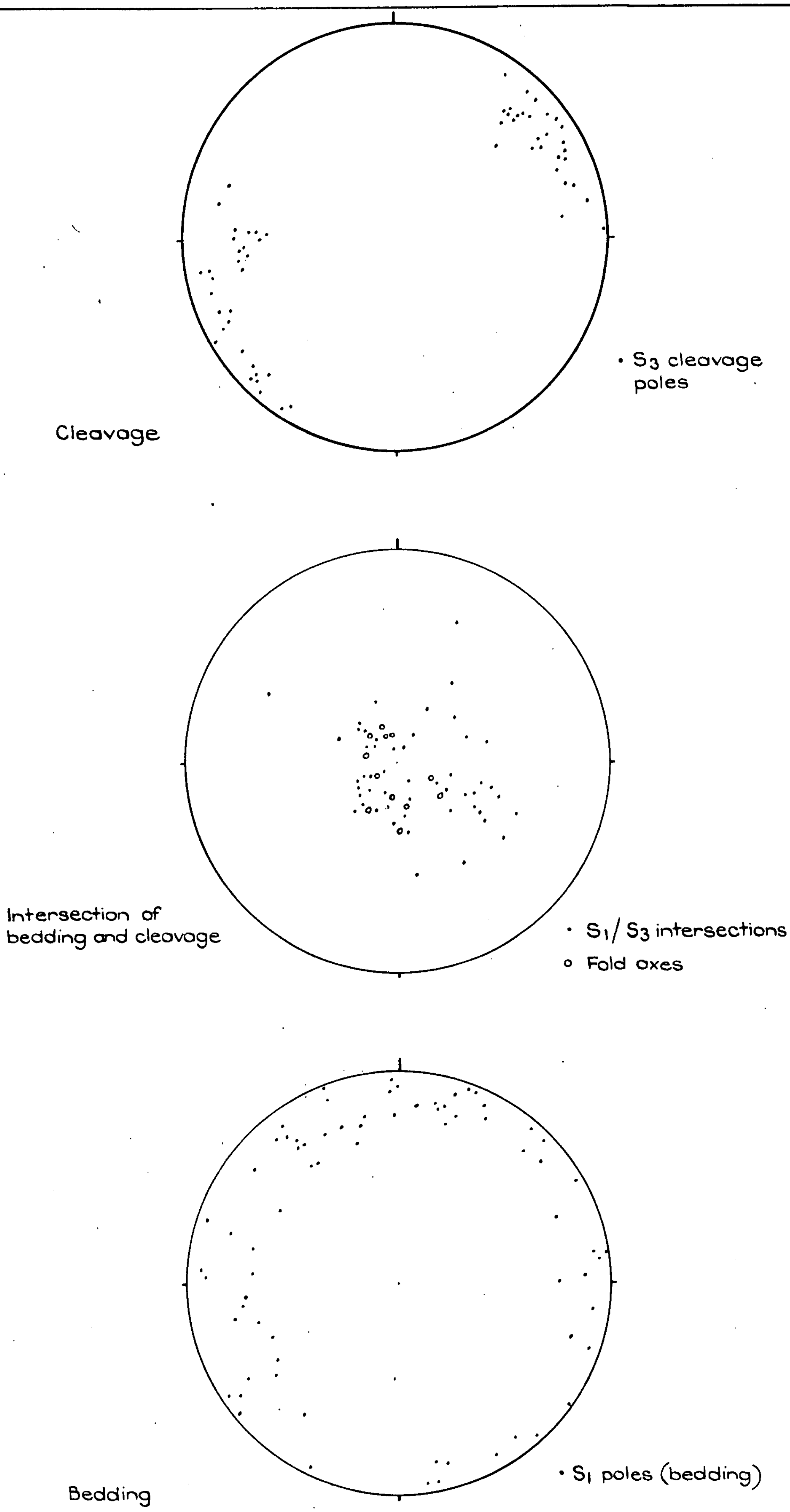

STEREOGRAMS OF OBSERVATIONS FROM THE COAST EXPOSURES BETWEEN COOKTOWN AND RATTLESNAKE POINT

Fig 6

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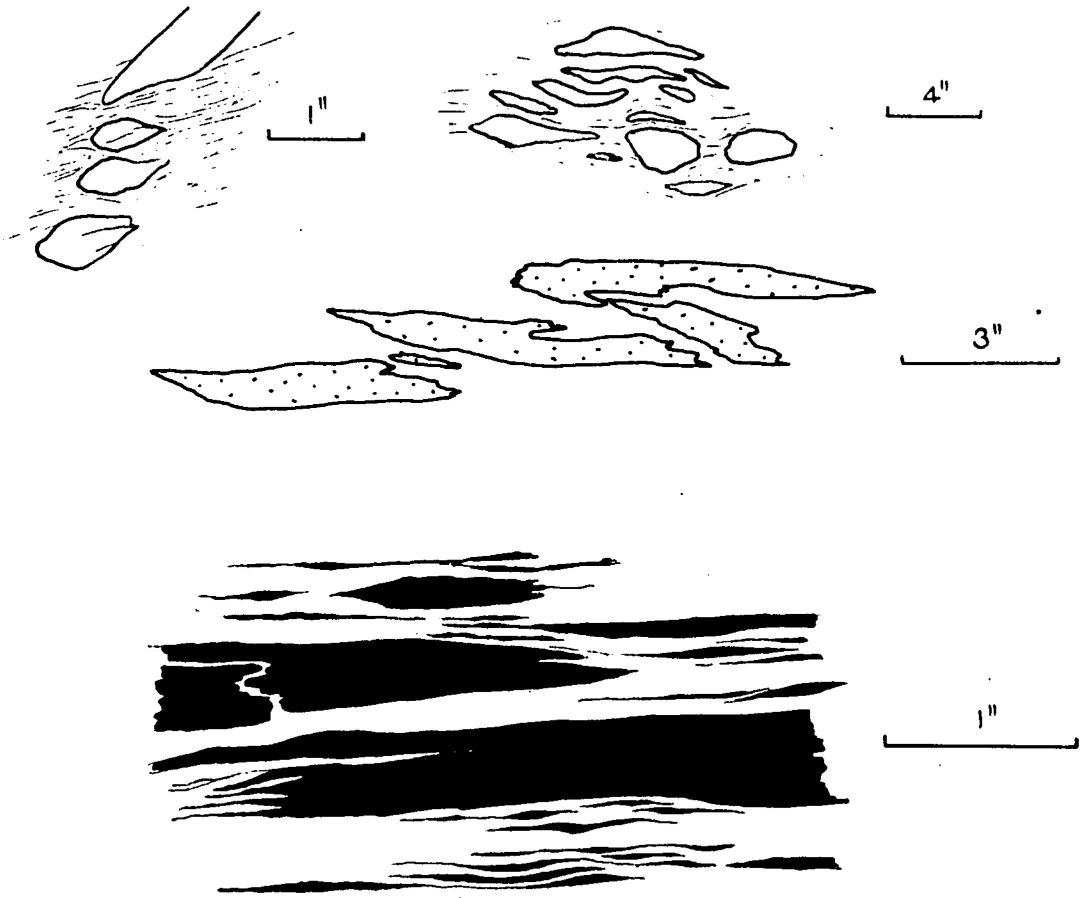

Fig. 7 STAGES IN THE TRANSPOSITION OF BEDDING COOKTOWN AREA

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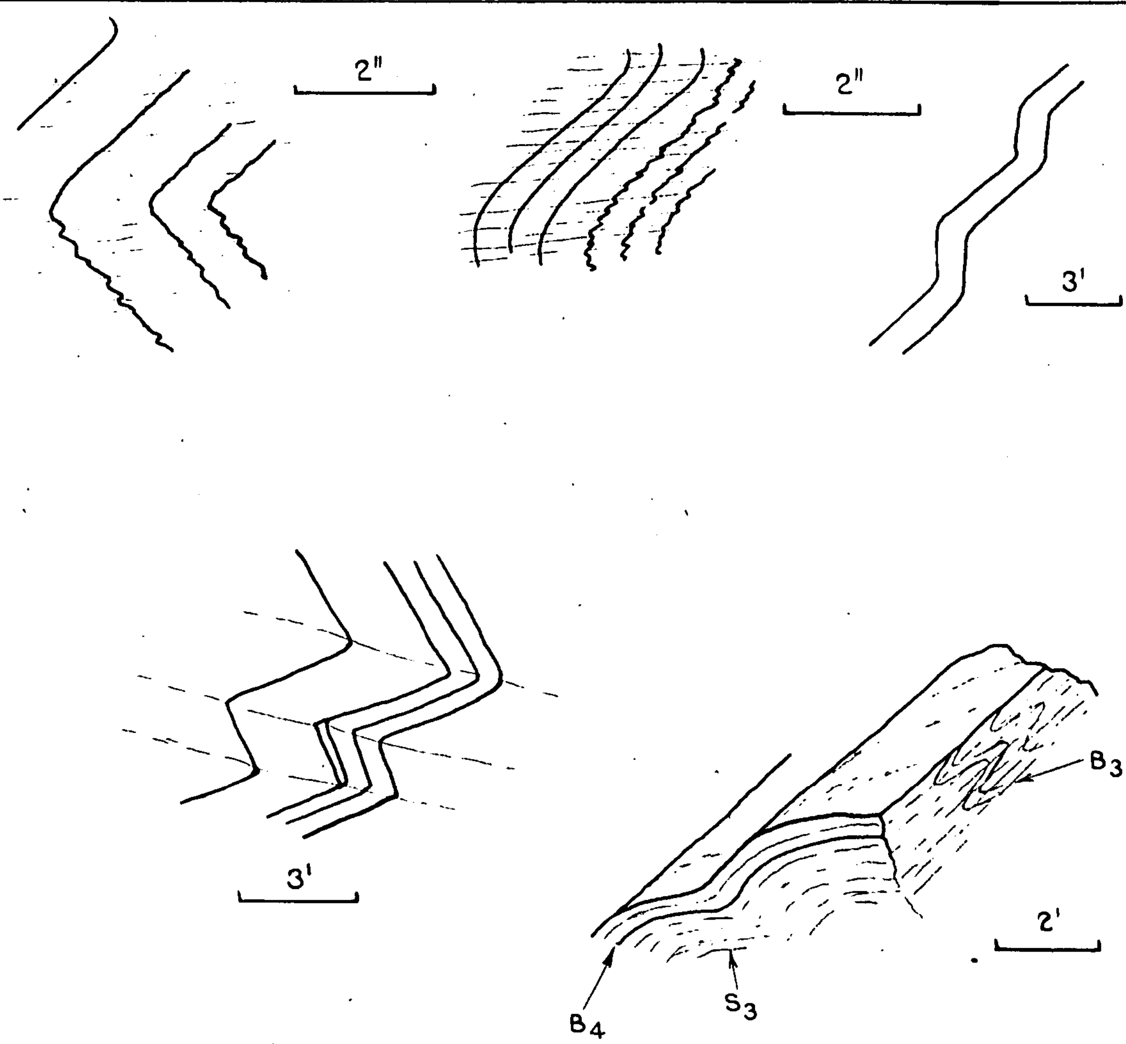

Fig. 8 MESOSCOPIC B_4 FOLDS FOLDING S_3 CLEAVAGE S_1 BEDDING AND B_3 FOLDS

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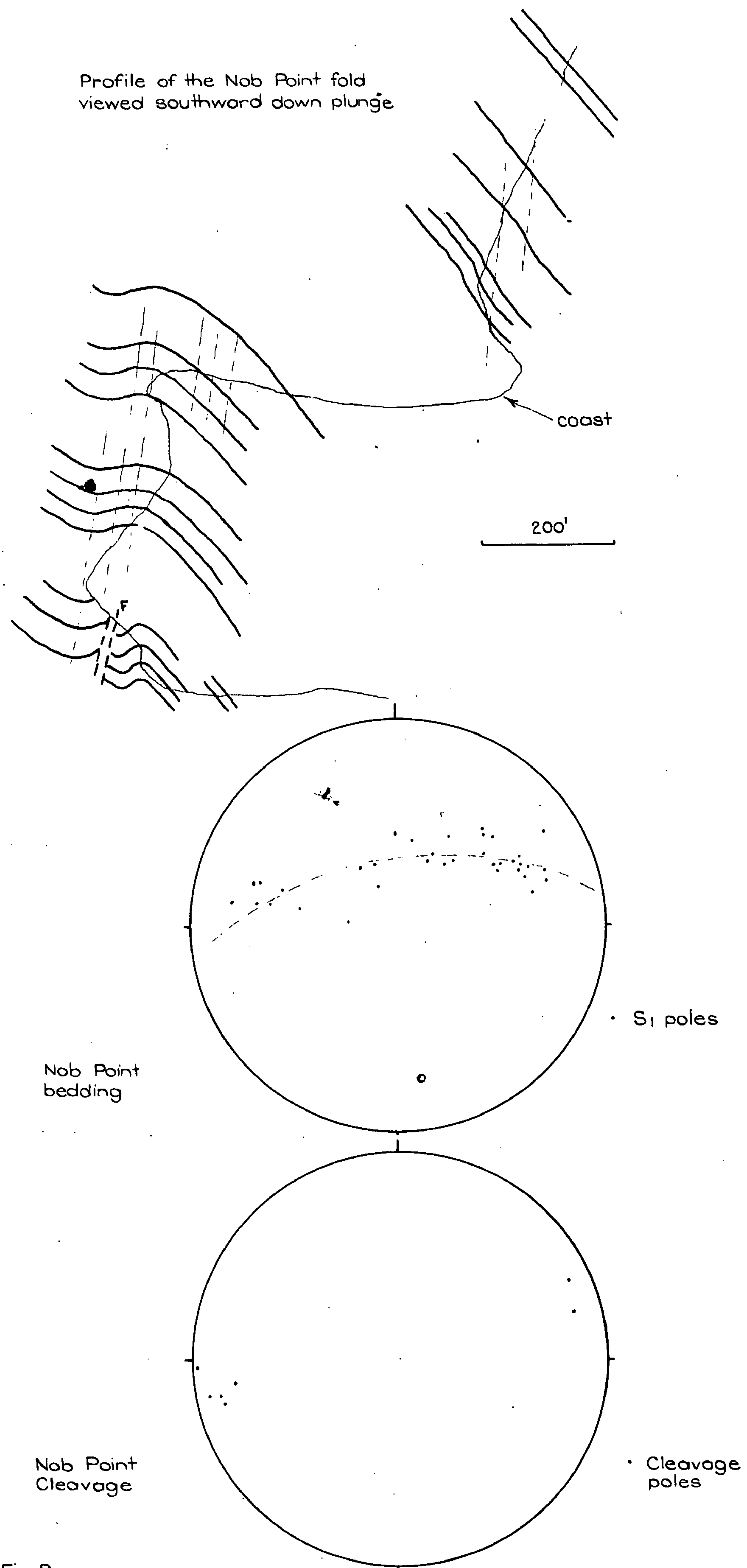

Fig. 9

NOB POINT FOLD

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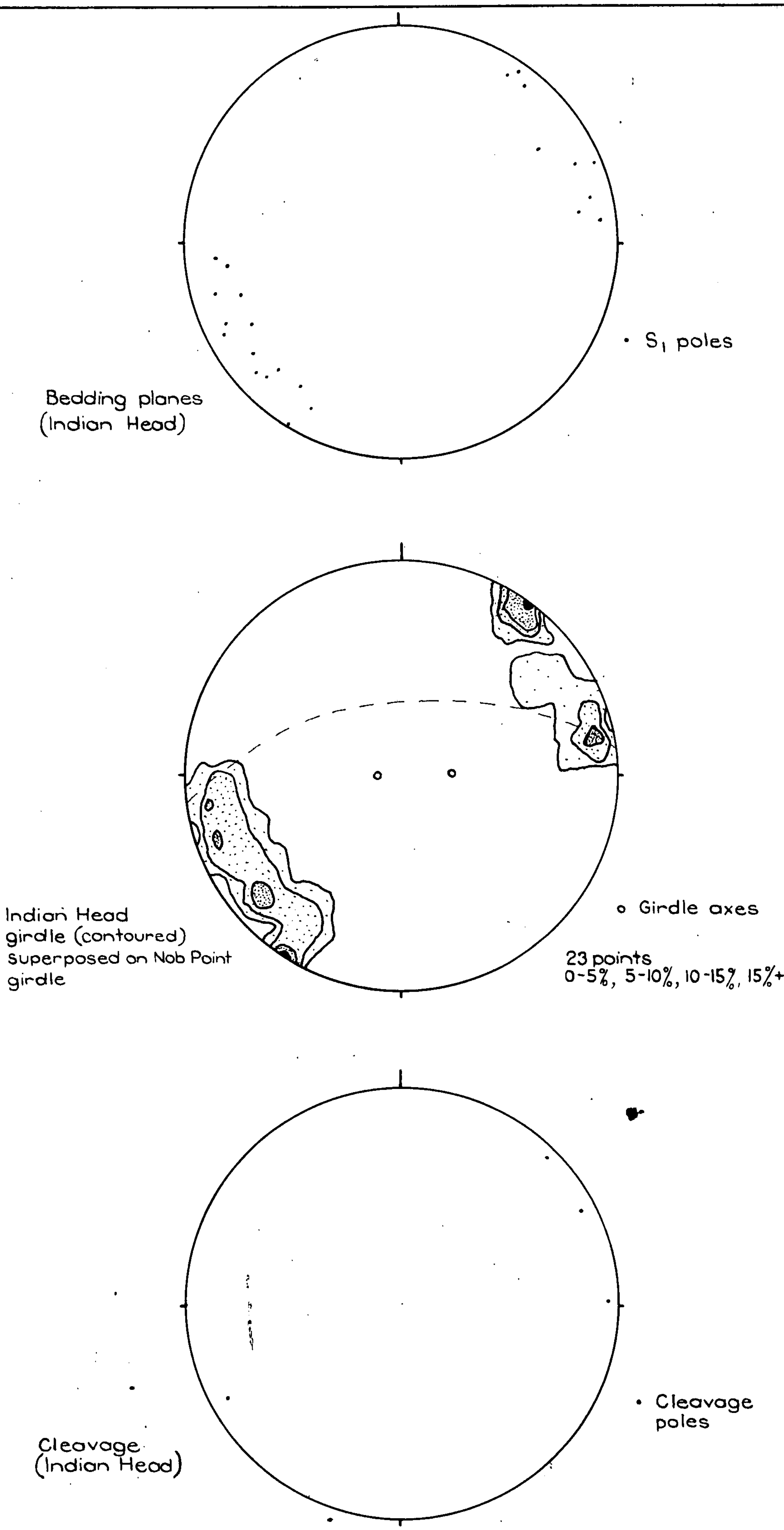

Fig. 10 INDIAN HEAD FOLDS

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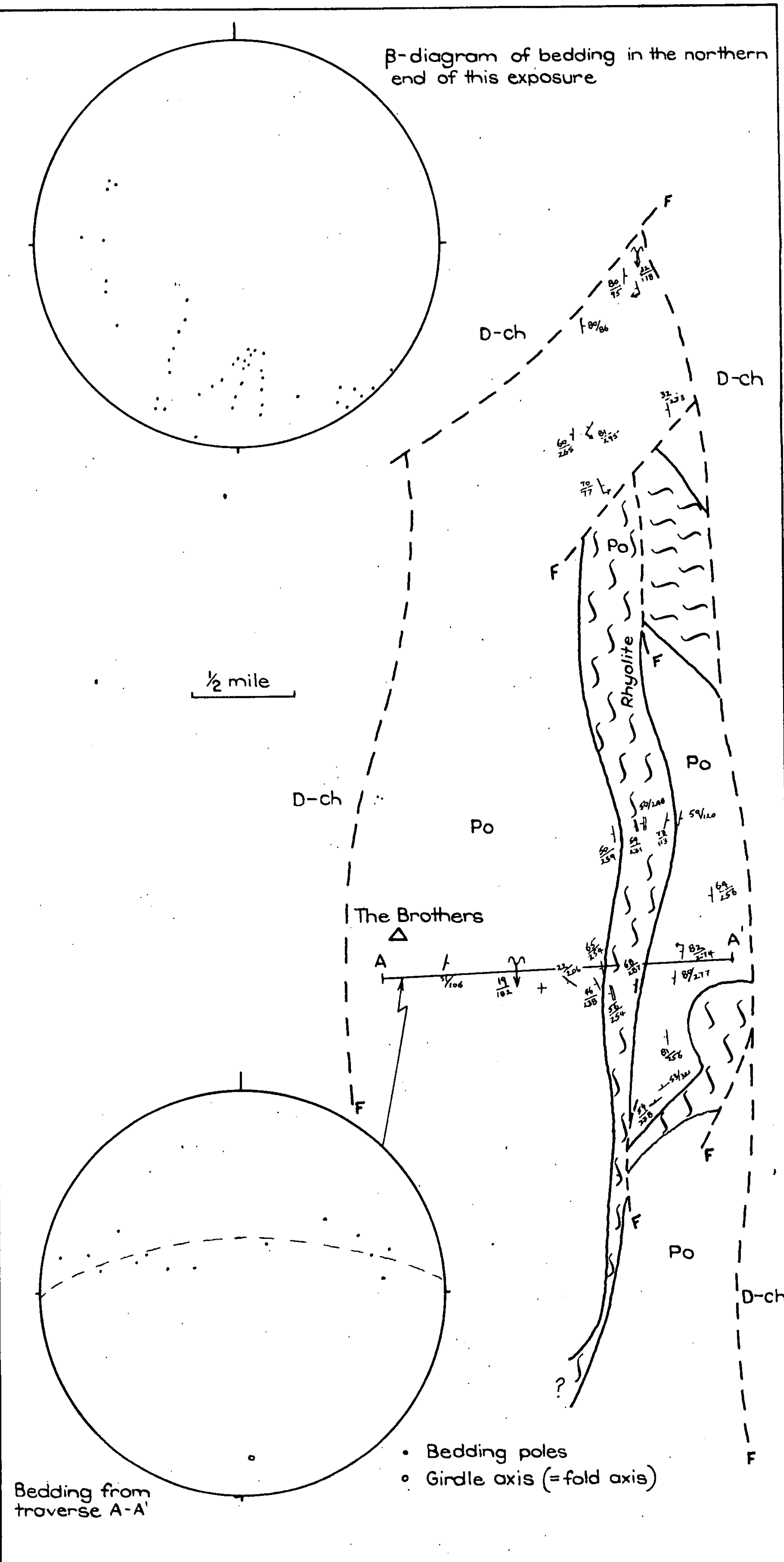

Fig 11

OAKY CREEK PERMIAN, SOUTHERN EXPOSURE

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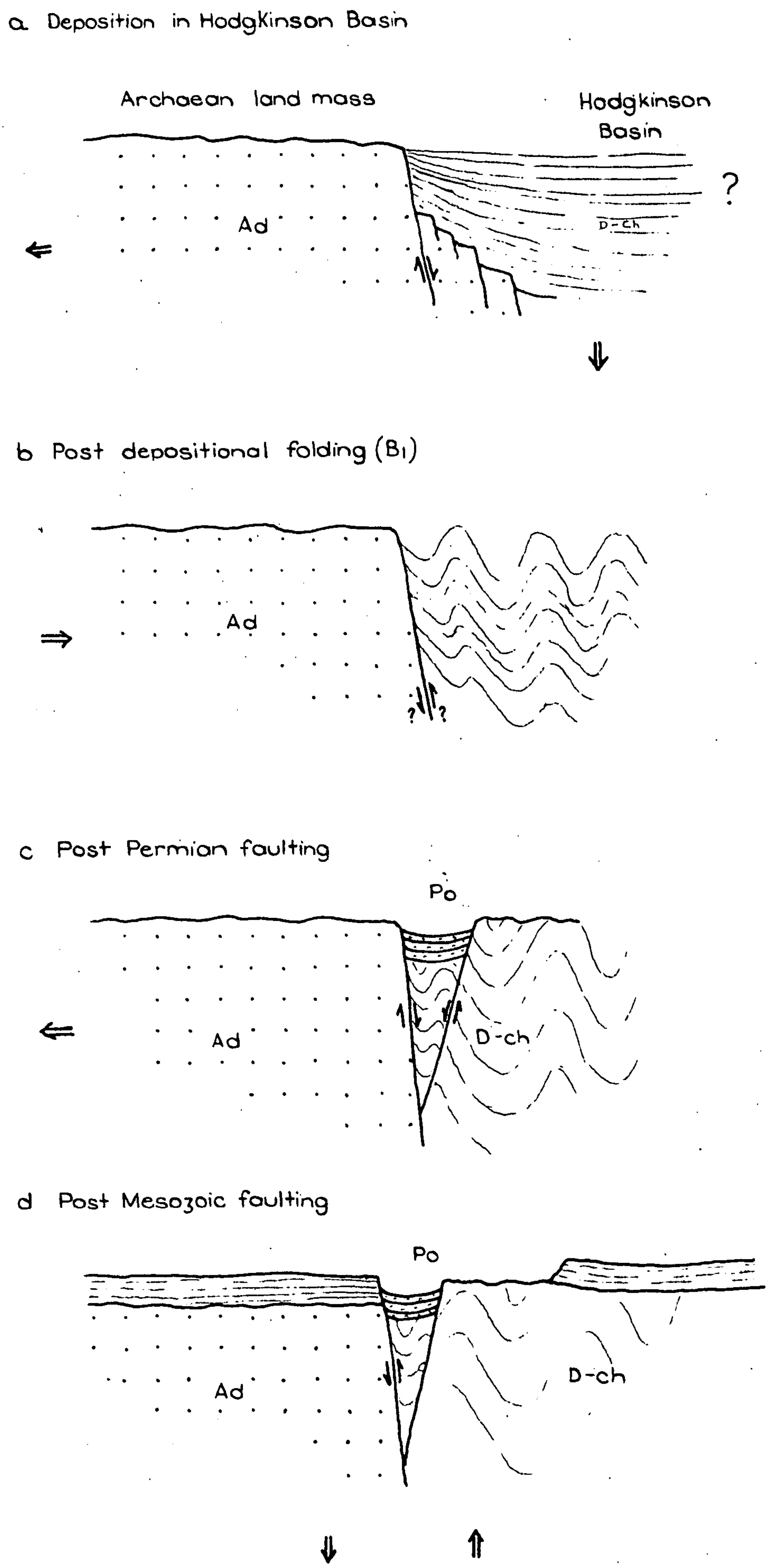

The cross sections are entirely diagrammatic
The inclination of the faults is hypothetical

Fig. 12 PALMERVILLE FAULT MOVEMENTS

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