

**WANDERER RIVER, LEWIS RIVER, AND MT.
OSMUND AREAS**

LYELL E.Z. EXPLORATIONS

57 – 146

LIST OF PLANS:

WANDERER RIVER – SPECIMEN LOCALITY

SKETCH MAP OF WANDERER RIVER INDICATING TRAVERSES

LEWIS RIVER – TRAVERSE TO NORTH

SKETCH MAP OF LEWIS RIVER- SPECIMEN LOCALITIES AND
TRAVERSES

SKETCH MAP OF LEWIS RIVER- SPECIMEN LOCALITIES AND
TRAVERSES - P 5a

SKETCH MAP OF LEWIS RIVER- SPECIMEN LOCALITIES AND
TRAVERSES - P 5b

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LYELL - E.Z. - EXPLORATIONS

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27th February, 1957

Report on Examination of the Wanderer River, Lewis River and Mt. Osmund Areas.

Dates of Examination: 26th January to 17th February, 1957.

Party Leader: K. C. Beck (Student)

Personnel Employed: R. A. Both (Student), R. St.C. Martin (Bushman)

Man Days in the Field: 63

The three areas studied present three entirely different problems and will thus be considered separately. As the areas may not be revisited for many years and the geologists in the party are due to leave L.E.E. before the end of the 1956-57 season, this report will attempt to present all the information gained with as much detail as is possible.

Wanderer River

Location of Base Camp: Mouth of Wanderer River.

Means of Transport: Helicopter, 8' Fibreglass Dinghy.

General Topography and Means of Access:

For the first $1\frac{1}{2}$ miles from its mouth, the river runs as a broad, sluggish stream through steep, densely wooded hills. Gums cover some of the hilltops and the consequent light undergrowth affords easy walking. The slopes and the river environs are covered with dense timber and undergrowth and movement is difficult except in the rare areas of flood flats. At the mouth, sand beaches and wavecut platforms present easy walking over good geological exposures except for the area near Pegg Creek where steep cliffs plunge into the sea. $1\frac{1}{2}$ miles from the mouth, the river rises rapidly and for $\frac{1}{2}$ mile a series of rapids and shingle beds below steep cliffs makes

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navigation difficult. The next three miles are but slightly sinuous and again the stream is broad (but full of snags). A dense break of bauera, manuka and larger trees (including Huon pine) prevents a clear view of the country but the impression is of less steep relief, at least to the north. Later the river, having flowed NW, turns to the SE and an area of rolling hills and button grass plains is encountered after leaving the still thickly scrubbed river banks. In this area, frequent log jams make river navigation impossible as the river moves above its more important tributaries and so becomes smaller.

Working Programme:

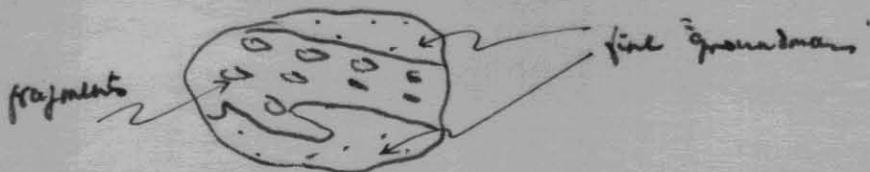
Delays due to the inability to carry a 12' dinghy in the helicopter and then to engine trouble caused the party to remain in the base camp from 26th January to 4th February. During this period, trips were made along the coast to Pegg Creek and to bush to the North (see map). One day was spent examining the Tertiary to the East of the fly camp (see map) and two days (6th and 7th February) in the river traverse by boat.

Geology:

Specimens LE227-LE236 were taken from the area near the mouth of the river. Here are found good outcrops of Dundas tuffs and lava flows with some dykes (Dundas?) and barren quartz veins (Devonian?), in places covered by a loose medium-pebble deposit. The attitude is fairly constant and strike 5° , dip 70° W, is typical.

The tuffs and lavas follow each other in rapid succession. A detailed section (LE227) of 20' across strike showed twelve distinct bands varying in stratigraphic width from 1' to 6'. Unfortunately the sequence and some of the specimens were lost while being transported across the river. The lavas in hand specimen are of intermediate to basic composition and commonly show feldspar phenocrysts in a finer crystalline groundmass. Occasional bands show autobrecciation, readily seen in the weathered surface (LE232). The tuffs present signs of having been deposited in water. They are typically fine, light grey in colour, and show clean but slightly

wedge-shaped and often slumped laminations of the order of 1-5 m.m. The contact between tuff and lava bands is sharp. LE235 contains tabular angular fragments of varied composition lying in rough planes in a fine-grained groundmass. It was found 300 yards to the north of the mouth on the western bank, not in situ, but from its position in the cliff face, almost so. It is almost certainly composed of volcanic material deposited in shallow water. LE230 is similar. This was found in the wave-cut platform 200 yards to the west of the mouth of Pegg Creek. A band of 30'+ poorly bedded tabular fragments in a finer groundmass roughly follows strike. Smaller and larger fragments interfinger and bands of the surrounding finer material also wedge in. This relationship is well shown in a large boulder (LE231) near the Wanderer mouth where the following relationship is seen:



In the traverse to the North of the base camp, rare outcrops obeyed the general regional attitude of the beds but extremely poor outcrop conditions meant that the occurrence of Dundas volcanics and tuffs could only be verified in the area by occasional surface remnants. Specimens LE234 were collected from widely scattered points in this area. They include a volcanic and a laminated and slumped tuff. Along the coast to the west of the Wanderer mouth, the same rocks are found. Rhythmic banding of the order of one inch between lighter and darker tuffs is well shown here and in places honeycomb weathering of the lavas is common. Corrugations are found on the bedding planes, their length roughly perpendicular to the strike. These probably represent movement after consolidation although the lineation follows the trace of a joint system and may represent weathering along this. An occasional pattern of intermittent parallel corrugation arranged on a diamond shaped lattice

suggests the former rather than the latter. The size (amplitude $\frac{1}{2}$ " , wavelength 1") is too large for ripple marks in fine material typified by thin laminations and sharp contacts. Shear cracks with a trace NW in the plane containing the strike and perpendicular to the bedding are found in some of the previously mentioned rhythmic bands and others and add to the evidence for movement. The jointing is irregular. In one area to the south of the Wanderer mouth, one joint plane strikes roughly EW, one 60° , both being approximately vertical. A few thin (1') dykes of lamprophyre (LE236), rich in biotite and pyroxene (?), are found to the west of the mouth of the Wanderer. At the mouth on the east bank, surface weathering along joints gives an erroneous impression of dykes. Along the coast to the south of the mouth are to be found a series of large-pebble deposits, they are all near the top of the cliff as it enters the scrub and begin at about 20' above sea level. In places joint pattern can be followed from unaltered Dundas through a weathered zone into the pebbles which appear to be the result of spherical weathering along the joint blocks. However, in other places, distinct laminations (of the order of 4") are found. Within each lamination the particles are of roughly the same size and type and the laminations appear to be horizontal (contrast 70° dip of Dundas) so that dumping of Dundas material by a river suggests itself. Some barren quartz veins were found but no mineralisation was seen in this area.

A shingle bank in the river at the fly camp site provided the specimens LE237. The pebbles range from about 1" to 4" maximum length and are typically well rounded. A laminated white micaceous quartzite is the common type but various sandstones, conglomerates, breccias and quartzites are found. With the exception of one red and white conglomerate which may be Owen, they all suggest a Pre-Cambrian age. The common colour is white (the percentage of silica in the bank is extremely high) with some yellow iron-staining. Some quartz veining (Devonian?) was found in the pebbles.

One slightly pinkish, dense quartzite showed weathered-surface outlines of current bedding. On the rolling button grass plains to the SE of the fly camp site were found loose pebbles mainly of the laminated white micaceous quartzite previously noted and occasionally of conglomerate, sandstone etc. Where the creeks entered the low hills, they cut into pebble beds (6'+) of the same material. This phenomena became more common towards the eastern end of the traverse where surface outcrops of pebbles were found. In one place, a loosely consolidated layer of silt with thin horizontal layers of coarse quartz sands was found in a creek section. Peaty material was strewn throughout this deposit. To the south of the fly camp site, abrupt changes in slope of the plains suggests small blocks tilted to the W; possibly a rejuvenation of an earlier pattern. This observation should be treated with caution.

The general impression of the region is that Pre-Cambrian terrains have supplied the material for Tertiary pebble deposits and that slight uplift (Koskinskan?) has led to some dissection of these.

The central portions of the river lie in an area of moderate relief. The high rainfall leads to thick vegetation and a deep soil cover and no rocks were found in situ for the greater part of the river traverse. Dumps of coarse sand (quartz with abundant muscovite and some biotite) were found where tributaries entered the main stream and the occasional shingle banks showed specimen similar to LE237 but no Dundas was found. LE239 (quartzite with micas and a queer box-worked quartzite) was found on a shingle 3 miles from the mouth where a tributary enters from the north.

The first Dundas found on this traverse was about 2 miles from the mouth. A fine grey green altered tuff, LE240, was found on the south bank of the river in the position indicated on the map. Its attitude was approximately strike 50° , dip 60° west. A little further downstream, a creek entered the river from the north and at its mouth, on a shingle bank, were found specimens LE241. They include quartzites

and conglomerates of the higher reaches of the river but tuffs and basic lavas of the Dundas are also present. Laminations and slump structures are well shown in the tuffs. One specimen is of special note. Layers of fine, dark green material and coarser olive green material occur as bands in a large boulder. Generally they occur as parallel bands with occasional thin wedges but jagged inlets occur and suggest a lava burrowing into semi-consolidated material and then breaking off. Some pyrite is seen in this specimen. The river then ran NS between steep cliffs for 200 yards, where a definite dip and strike was first recorded and LE242 (grey laminated tuff) was collected. Here were found movement ripples on the bedding plane and a faint development of shear joints. In the gorge, the shingles surrounding the rapids consisted mainly of laminated micaceous quartzite but near the south end altered basic lavas and tuffs (LE243) were found. The river then turns EW and LE244 (grey green volcanic) was found as a massive body with no visible dip and strike. This rock type and lack of planes was typical of much of the Dundas on this traverse. A blue-tinge quartzite began to show in the shingles. A green and white blotched volcanic (LE235) was seen and the alteration present adds to the geological significance of this area of sharply steepening river gradient, gorges and first appearance of Dundas. The rocks for a long stretch were mainly fine-grained tuffs, strikingly laminated in places with $\frac{1}{4}$ " bands of greys and greens. Some lavas, however, were found (LE286, LE249). In the final stretch of the river, the outcrops were poor but those available conformed with the material of the mouth and the gorge. Steep cliffs were seen near the hilltops but these could not be visited.

Lewis River

- Location of Base Camp: South of first main scrub, 4 miles up Lewis River.
- Means of Transport and Access: Helicopter.
- Topography: Wide areas of dissected button grass plains with occasional patches of scrub in the rivers and creeks. Steep cliffs in the Lewis River.
- Working Programme: Three traverses were made in this area. On 9th and 10th February, a traverse was made along the river from its mouth to the base camp. On 11th a traverse was made to the east over the button grass plains to the area of South Broken Hills. On 13th February, a traverse was made to Mt. Osmond, covering a wide expanse of the country to the NE and NW of the base camp.

Geology:

Good exposures of Pre-Cambrian (?) rocks are found at the mouth of the river. The attitude is fairly constant and strike 350° , dip 55° West is quite typical. The rocks are ill-defined gneisses and other metamorphic types (LE250). They contain porphyroblasts of quartz which are often arranged to give distinctive compositional bands (roughly strike 330° , dip 85° West) which contrast strongly with massive green groundmass. Barren quartz veins occur, occasionally edged with green, powdery patches (serpentine?), and sometimes tectonically folded. Joints are irregular. One area shows strong joints, strike 0° , vertical; and strike 0° , dip 30° West, but a vague vertical East-West system seems to be the constant trend. The latter is often the locus of erosion. Some monoclinial flexing (interpreted as a west limb structure) occurs but is often equivocal. A small patch of large pyrite crystals exists. This, however, soon goes under sand and it is impossible to trace out its relation with regard to the bedding.

In the hills above the river, the rock is weathered to a white colour and the quartz porphyroblasts stand out in a fashion which was to be seen right along the river. Massive quartz pebbles, probably erosion remnants of the previously

007

noted quartz veins, occur on the hills near the mouth of the Lewis and throughout the whole of the area covered. The rock type changed gradually as the mouth of Stony Creek was approached. This was a characteristic of the Pre-Cambrian rocks in the Lewis River area; although individual hand specimens seem quite unrelated, in the field transitional modifications are seen and the attitude of the beds remains approximately constant. It is thought that specimens LE250 to LE286 inclusive with the exception of LE252, LE260 and LE278, may represent metamorphic and/or metasomatic modifications of one fairly constant sedimentary sequence and this bias was retained as a working hypothesis throughout the traverse. Opposite the mouth of Stony Creek the rock has changed to a gneiss with slightly wavy compositional banding roughly following the bedding (LE251 of strike 5° , dip 80° West). The East-West joint pattern now begins to be more prominent. However, local joints of variable attitudes are often well developed. What is interpreted as a different sedimentary band has given rise to an 18" concordant band of faint green, fine-grained rock. A few hundred yards to the east of Stony Creek, the rock gives way, without any change in topographic expression, etc., to a granite (LE253, a coarsely crystalline equigranular rock consisting mainly of quartz and feldspar with faint traces of ferromagnesian). In the cliffs opposite the entrance of Stony Creek and again half a mile to the east are found small dykes of dark, fine-grained crystalline material (LE252, LE260). The former occurs as a small swarm of tabular bodies (strike 240° , dip 45° South) up to a foot thick and in all totalling 6'. Some pyrite occurs in this body. Fracture trends, strike 10° and dip 85° west, in the dyke can be traced out into a vague compositional banding in the gneissic country rock and wedges of gneiss appear within the dyke. The granitic material continued as a constant band with slightly more green biotite and some pyrite (?) (LE254) and occasional finer facies (LE255), possibly representing initially finer sedimentary material. It is in this

area where the river makes an S-bend with a roughly North-South section that many significant changes occur. One of the most important is that the colour of the rocks changes to green and that the degree of alteration seems to be greater (LE257). Coarser and finer facies (LE259) occur within small areas. In the North-South section just mentioned was found an interesting sequence of rocks (LE256). Within 15 ft. across an East-West direction on a river-worn platform the rocks changed from a schist to a granitic rock. No evidence was found to give a safe interpretation of this but it is significant that the bands conformed to the regional bedding trends. A few hundred yards to the East, feldspar began to appear in the porphyroblasts and for a short distance became quite prominent (LE263) but then gave way to quartz alone. It was in this area that the granitic material re-appeared (LE261). The dark green biotite and pale green tinges (alteration of feldspars?) tempt comparison with the Mt. Darwin granites. This granite was accompanied by small patches of light green fine felsic material. Minor quartz veins were found in this area. For this area, two specimens (LE258 and LE264) are interesting. The former shows large quartz and feldspar crystals while the latter, taken from either side of a well defined plane, show similar large quartz crystals in a coarse-grained and in a fine-grained rock. As the river runs from an area of heavy timber into one of rolling button grass down to the waters edge, the zone of feldspar porphyroblasts becomes quite pronounced (LE262) although quartz is still present in large grains. The rock is still dark green in colour due to disseminated material in the groundmass. In LE265, an embayment of darker material into lighter material may provide significant results with a thin section study. In this area bedding was very vague if seen, but a plane, roughly striking 345° and vertical, was occasionally seen. A vague joint striking EW persists. A trace of the previously noted dyke rock was seen as was some barren quartz veins but no sulphide mineralisation was found. In the region between specimens LE262 and LE266 (see map) shearing became more pronounced and

and vertical joints striking 70° and 110° were measured. The joints, however, change rapidly. On the hills above the river, the same rock types persist but have been leached to a white colour. LE266 represents finer grained varieties. A knotted rock consisting mainly of quartz and slightly altered feldspars (LE267) was found where the river entered the scrub. The scrub heralded the appearance of a zone of rocks with some quartz porphyroblasts and a sheared linear groundmass (LE268). In this area a pronounced joint, strike 105° , dip 40° North, is encountered. Ferromagnesian, possibly including chlorite, give the rocks a decided green colour. Some shearing was noticed and a strong lineation was often evident (LE270).

To the south east of the camp site a traverse, to within 3 miles of South Broken Hills, by R. Both showed the following.

The country consisted of a featureless button grass plain, and, due to the lack of aerial photographs, localities of specimens can only be given approximately. The positions of the specimens (LE279-LE287) are shown on the sketch map of the area.

In a creek on the southern edge of the scrub about one mile south of the camp, the rock (LE279) is similar to that in the Lewis River near the camp. It is a white, equigranular rock with predominant quartz. The strike is unknown, but two joint directions are shown at 20° and 140° .

To the east of this locality the quartz content decreases with a corresponding increase in feldspar, which is present as porphyroblasts (LE280).

The ground is covered with loose quartz with some quartz in situ. The presence of this quartz appears to be due to the weathering away of rock around the more resistant quartz veins.

Further east across the button grass plain the rock has been sheared (LE281). Feldspar is still predominant, with the quartz content still high. Strike 340° , dip 85° West. Outcrops here are common, but very weathered, and in most places surrounded by loose quartz.

The outcrops are much less common to the east, and the rock shows less shearing. Quartz is again present as porphyroblasts (LE282).

A distinct difference in the character of the rock was seen in the next outcrop. The rock is well sheared, and shows a schistose structure. Fine-grained quartz porphyroblasts can be seen (LE283). Strike 340° , dip 85° West. In a small creek near this specimen (LE283), prospecting revealed traces of gold. One washing produced between fifty and sixty "colours".

Going east the country becomes slightly undulating as the plain gives way to shallow valleys and small creeks. In some places the loose quartz material has become consolidated to give a quartz conglomerate (LE284). The pebble size varies from $\frac{1}{8}$ " to 1". This conglomerate is surrounded by loose quartz.

Iron staining is present in the rock further east. The staining is in patches (LE285a) and the rock is well sheared. Strike 330° , dip 75° West. The outcrops are very sparse.

Shearing is almost absent in the rock east of this. The rock here is very similar to the first specimen collected (LE279). Quartz porphyroblasts are present in an equigranular rock. Quartz veining is common, and the veins out across the beds almost perpendicular to strike.

East of this rock type is a similar, finer-grained facies. Shearing is more pronounced and the felspar content has increased slightly (LE287). The strike is still 330° and dip 75° West. This marks the eastern extremity of the traverse. The country is still gently undulating, although the valleys become slightly steeper. A timbered patch is situated approximately two hundred yards east, and the Lewis River is about one mile north. South Broken Hill is approximately three miles to the north-east.

The traverse to the North was mainly on button grass plains and so all specimen locations are necessarily approximate. Outcrops were extremely rare

011

and yielded very little information on attitude. The rock cover was mainly of residual massive quartz with occasional patches of weathered rocks similar to those found on the Lewis River traverse. LE271 was found about 1 mile from the base camp on a bearing of 60° . A slight NS horizontal lineation and a change of texture suggestive of old sedimentary banding are of interest. An EW vertical joint is quite prominent. A finer grained facies of this, highly weathered, appears further to the north. In a creek section this same rock type reappears but the fresh surface shows a faint greenish tinge. Here the rock appears massive. LE272, a similar type was found a mile further on to the west of the scrub surrounding the Hudson River. Two planes are seen, both striking about NS, one dipping east and one west. LE273, a linear green rock, was found in this area. This is similar to a specimen from the Dundas of the D'Aguilar Range.

As the rock in the more southerly areas is of Pre-Cambrian age, it seems possible that the zone of alteration encountered roughly coincides with the Pre-Cambrian-Cambrian boundary. This brings in the possibility that some of the rocks were originally volcanics containing enough felsic material to readily alter to the previously noted granite. The fact that the Mt. Darwin granite is of Cambrian (?) age is significant, and is the general agreement in attitude with the Dundas of the Wanderer River.

About 4 miles to north of the base camp traces of pyrite mineralisation were found over a small area in a rock characterised by abundant ^{quartz}/porphyroblasts (LE274). Iron staining which accompanied this covered a very small area. In this area a vague direction (330° - 340°) was noted. LE275 from this area is characterised by large, clear quartz porphyroblasts. The traverse continued to the north of the most westerly patch of NS scrub from the Hudson. A faint green finer grained facies was occasionally noted. At a point 1 mile ENE of Wart Hill, more

material similar to that of D'Aguilar Range was collected. A faint direction, strike 330° , dip 50° West, was measured and both this and the general rock type was confirmed by observation at a point between Mt. Osmund and Wart Hill and a mile to the east. Observations made on Mt. Osmund will be described in a later section. On a quick trip back to base over Wart Hill, similar rock types and attitudes (averaging strike 315° , dip 75° West) were observed (LE277).

Mt. Osmond

The report on this area will be brief as only one day was spent in reconnaissance.

Although a conglomerate (Owen?) and Dundas altered tuffs were found, poor exposures prevented any safe conclusions being drawn as to the structures of the region.

(a) The South End

The south end of the range is capped with, and probably consists entirely of, conglomerate. This is mainly a coarse pebble conglomerate consisting almost entirely of pebbles of quartz of the order of 2" in length. Patches of coarse micaceous quartz sandstone appear but wedge out rapidly so that a dip and strike cannot be measured. One reading, strike EW, dip steep North, may be bedding. In general, the pebbles form most of the conglomerate and matrix is often virtually absent. One plane, strike North, dip 50° West, is quite common and splits the outcrop into layers of the order of one foot but the conglomerate is too featureless to hazard the guess that it corresponds to similar laminations following the bedding in the conglomerate at Mount Lyell. Another plane, striking East and dipping at about 60° to the South is seen and in some places, shears in the quartz pebbles follow this.

(b) The North End

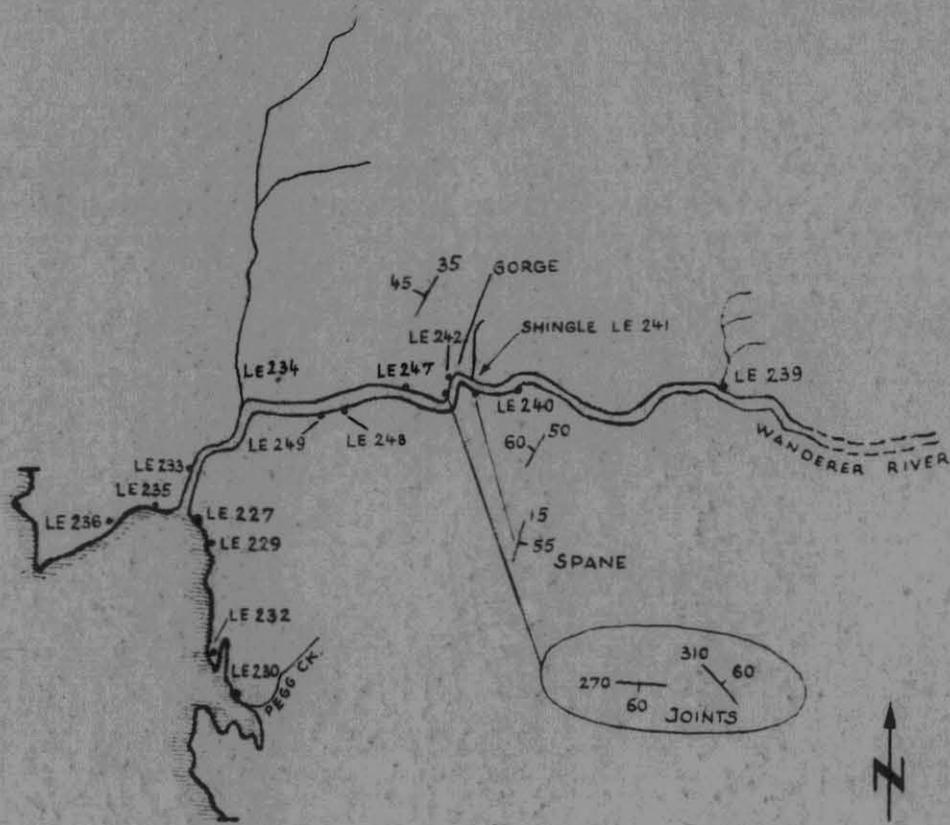
Both the conglomerate (with its various facies) and Dundas outcrop on the Northern end of the range. From the interbedded sandstones, the conglomerate strikes roughly East-West and dips to the North. The Dundas shows an East-West high angle shear but various thin bands show that it strikes roughly North-South with westerly dips. This is quite well established. On this end of the range the conglomerate is limited to the top of the range. It is difficult in places to tell whether or not it is in situ but it appears that near the brow the Dundas and the conglomerate outcrop

within the general area of each other. Poor outcrops and a close similarity between the weathered sandstone facies and the Dundas makes reconstruction of the evidence difficult, but it seems that there is an unconformity dipping down to the east and following the slope of the hill. As no Dundas is found to the south of the range and the conglomerate appears further to the east on the southern end than the north, the saddle in the centre may be the expression of an east-west fault.

K. C. Beck

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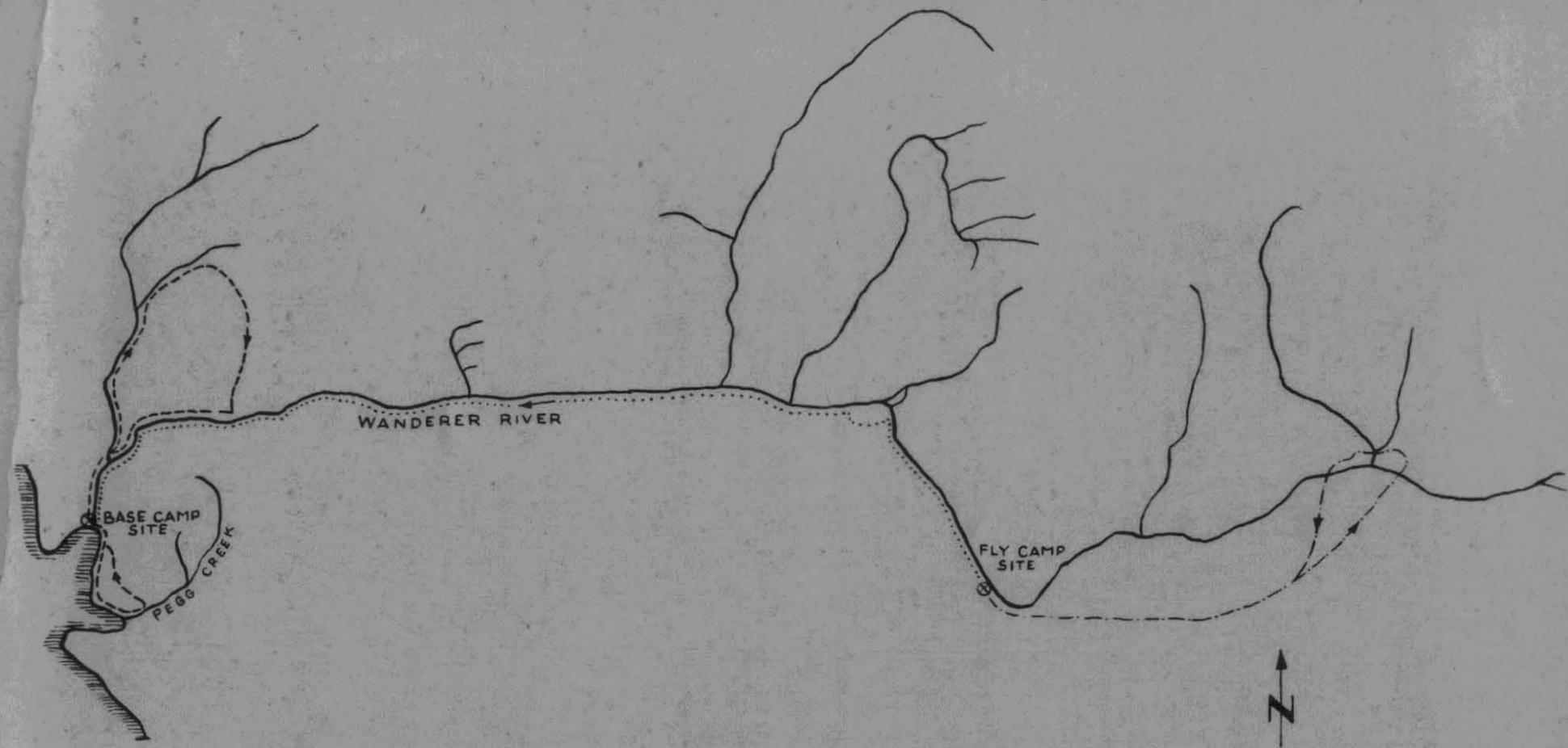


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WANDERER RIVER - SPECIMEN LOCALITY

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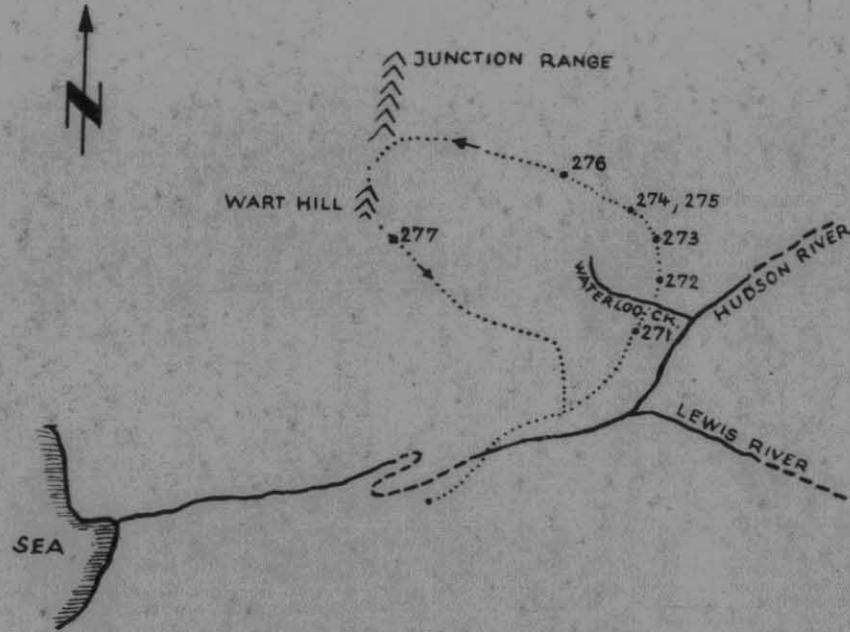
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SKETCH MAP OF WANDERER RIVER INDICATING TRAVERSES

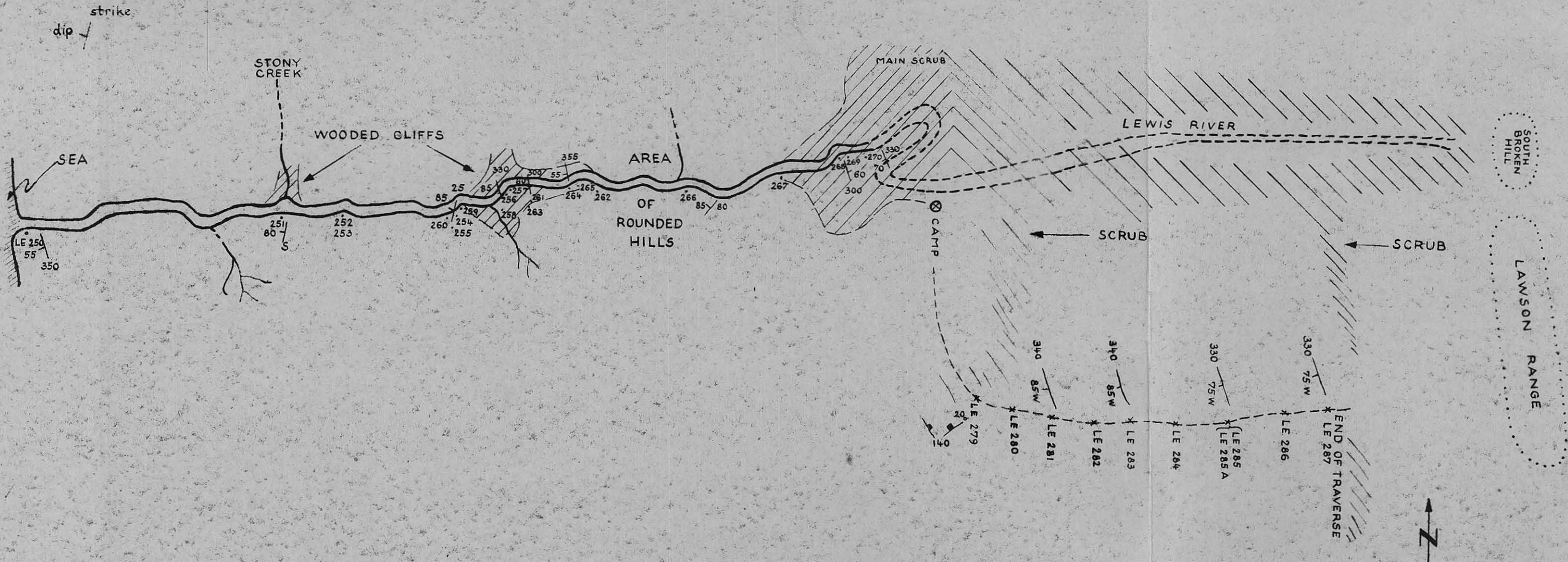
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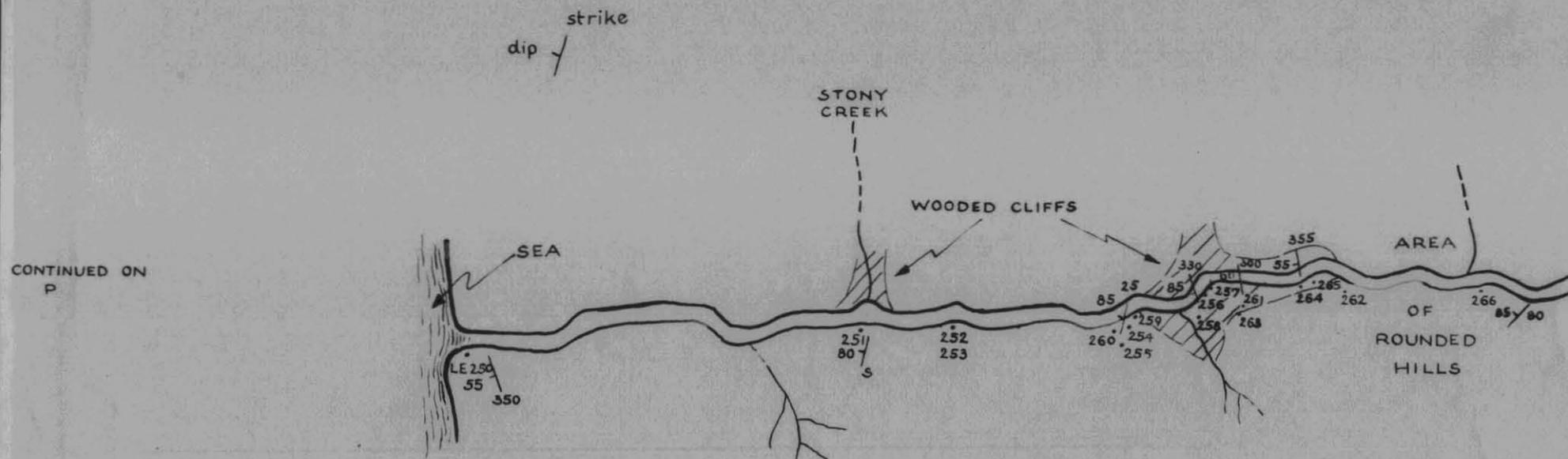
LEWIS RIVER - TRAVERSE TO NORTH



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SKETCH MAP OF LEWIS RIVER - SPECIMEN LOCALITIES AND TRAVERSERS

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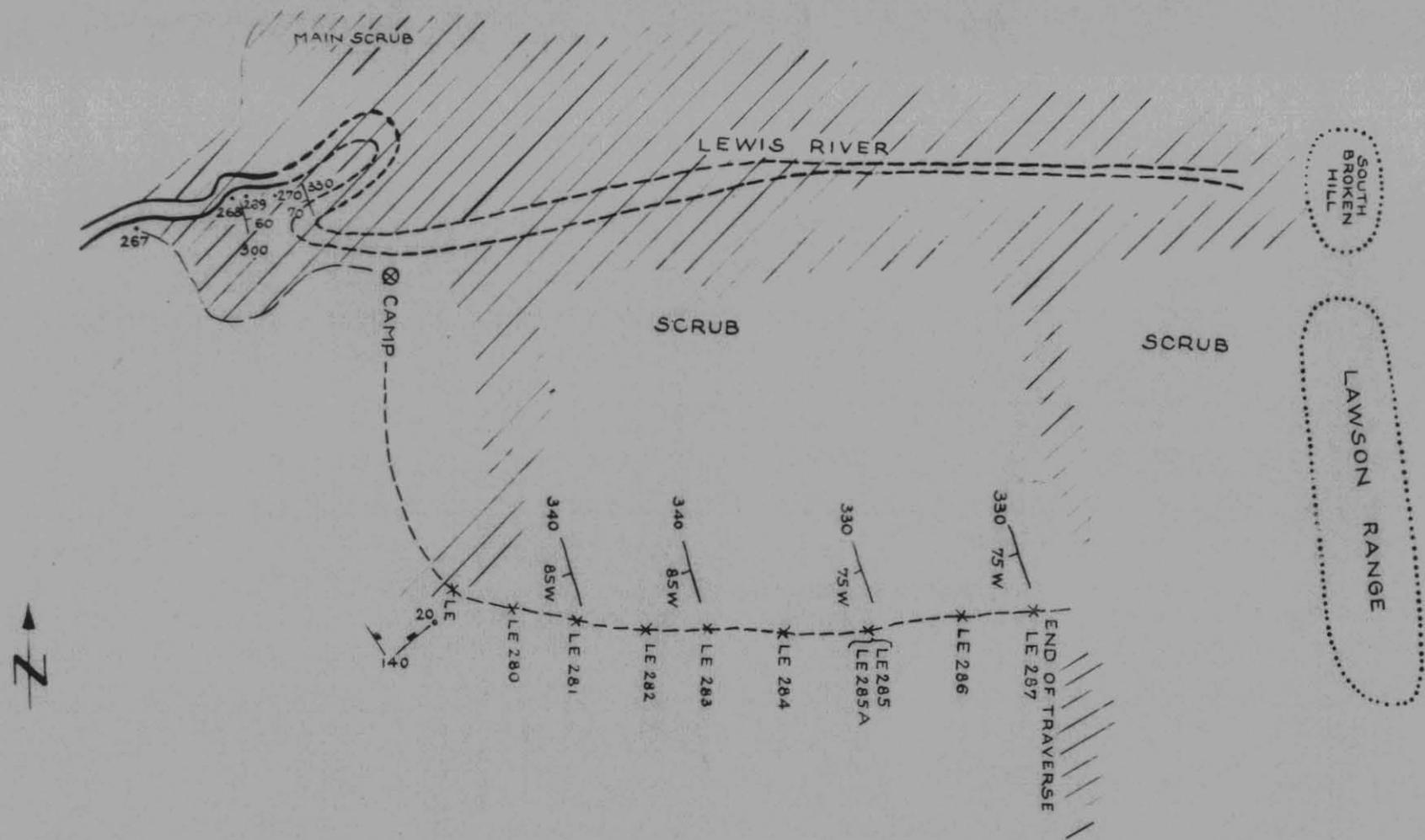
Sketch-Map of Lewis River West - Specimen Localities and Traverses

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February 1957

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Sketch-Map of Lewis River East - Specimen Localities and Traverses

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February 1957

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