

The inter-, late- and post-glacial shorelines, and ice-limits
of Lorn and eastern Mull

Volume II

Illustrations

J.M. Gray



Maps and Diagrams



FIGURE 1.1 Situation of the study area.

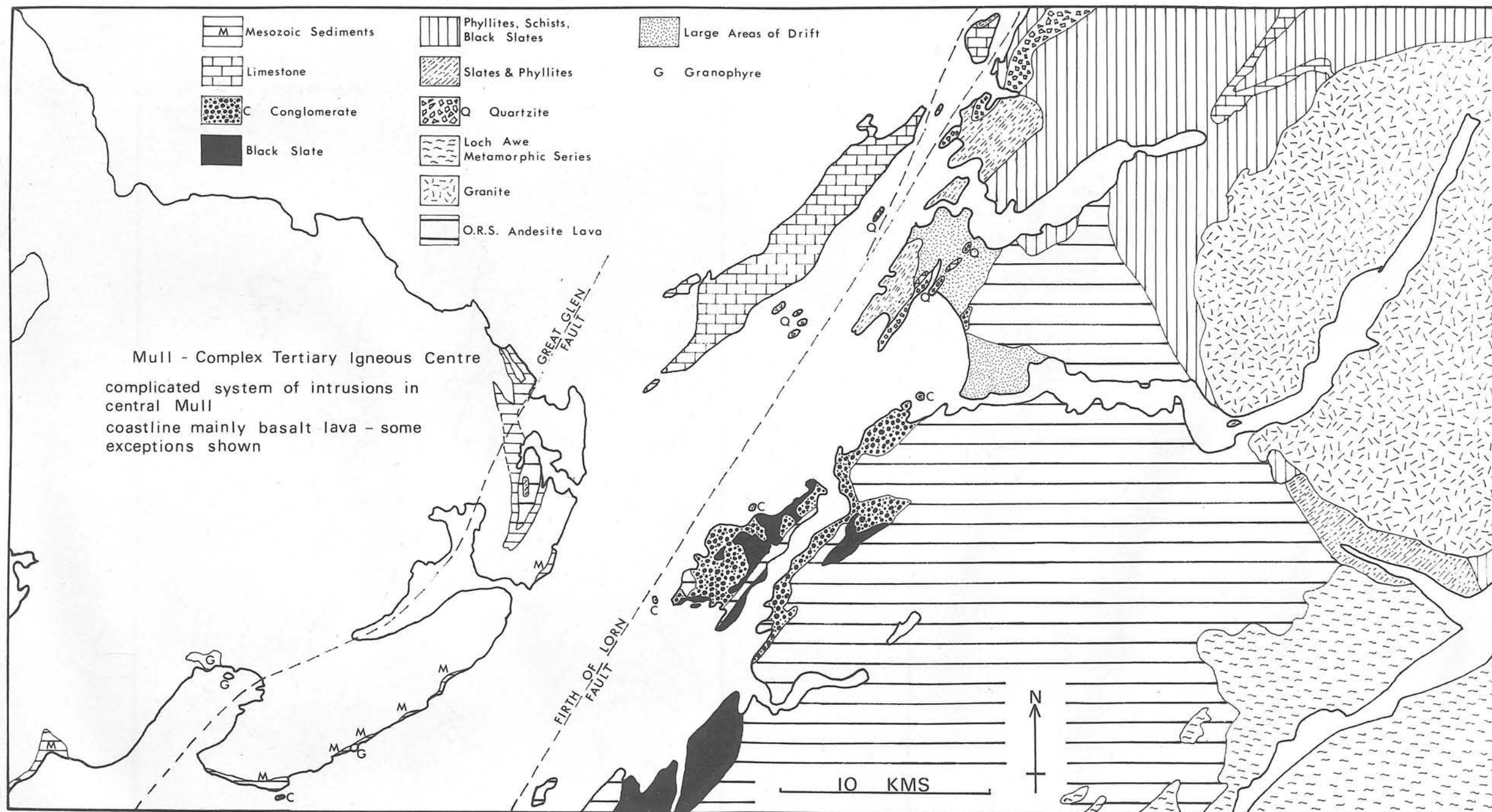


FIGURE 1.3 Generalised solid geology.

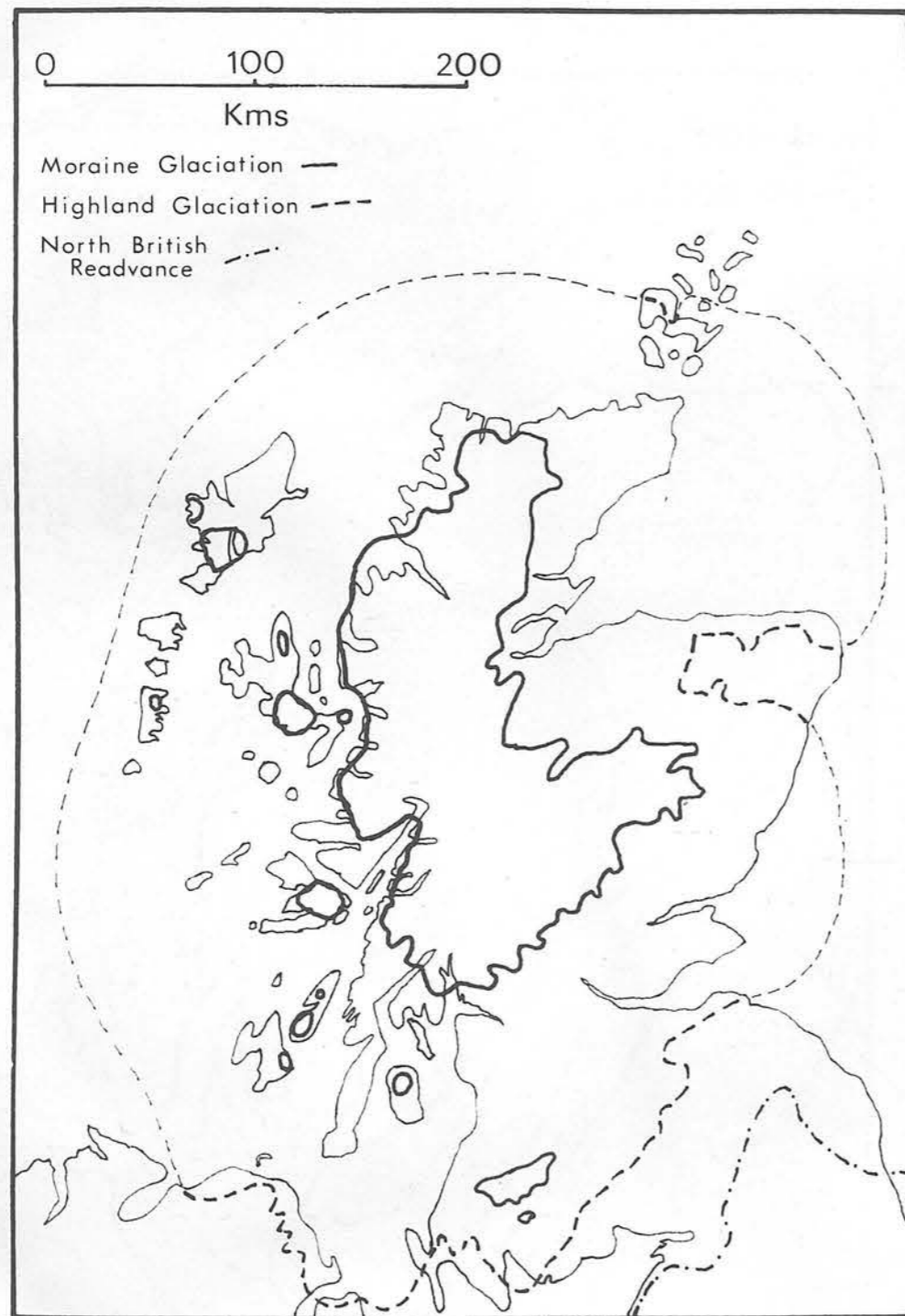


FIGURE 2.1 Scottish late-glacial ice-limits of Charlesworth (1955).

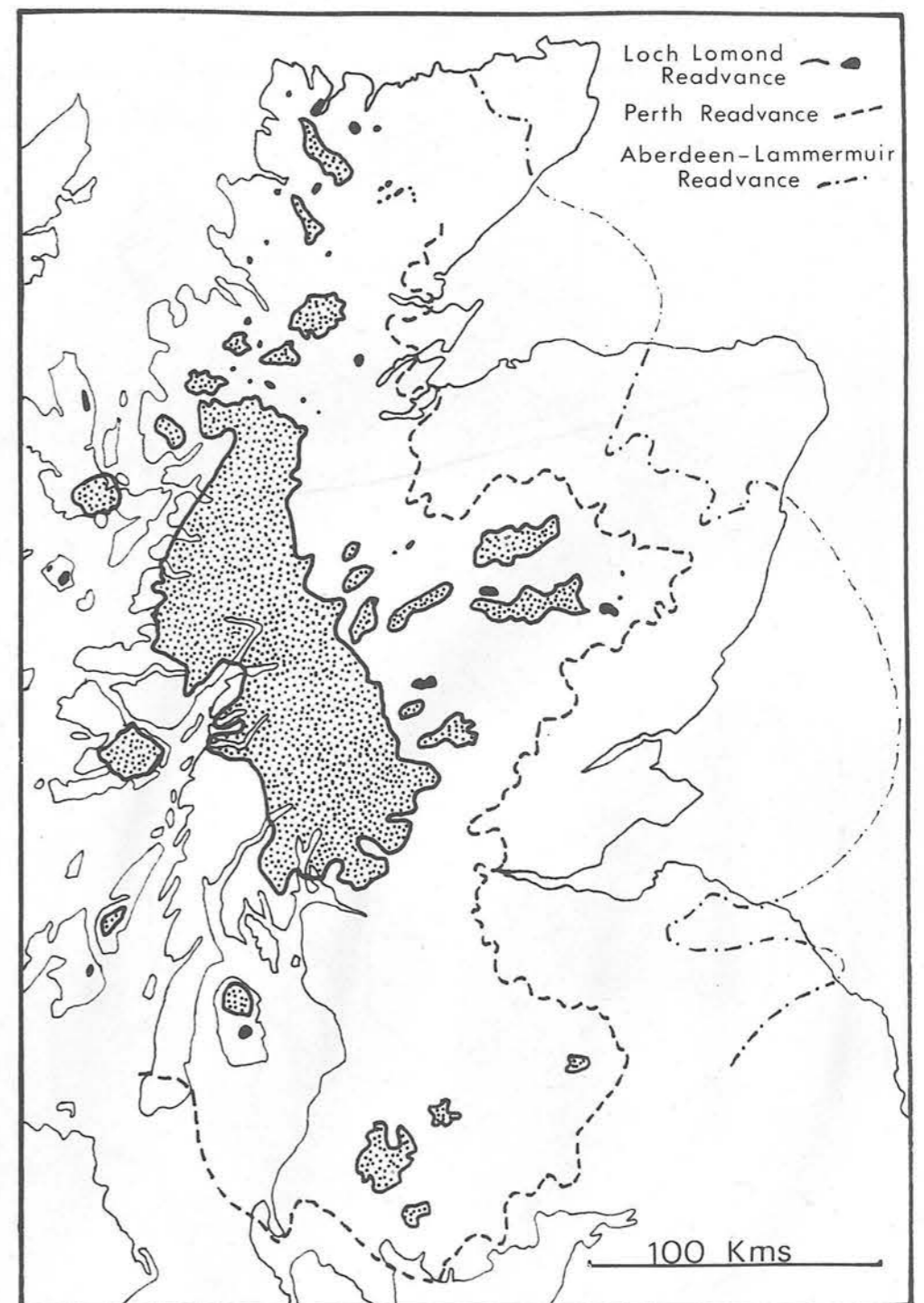


FIGURE 2.2 Scottish late-glacial ice-limits of Sissons (1967b).

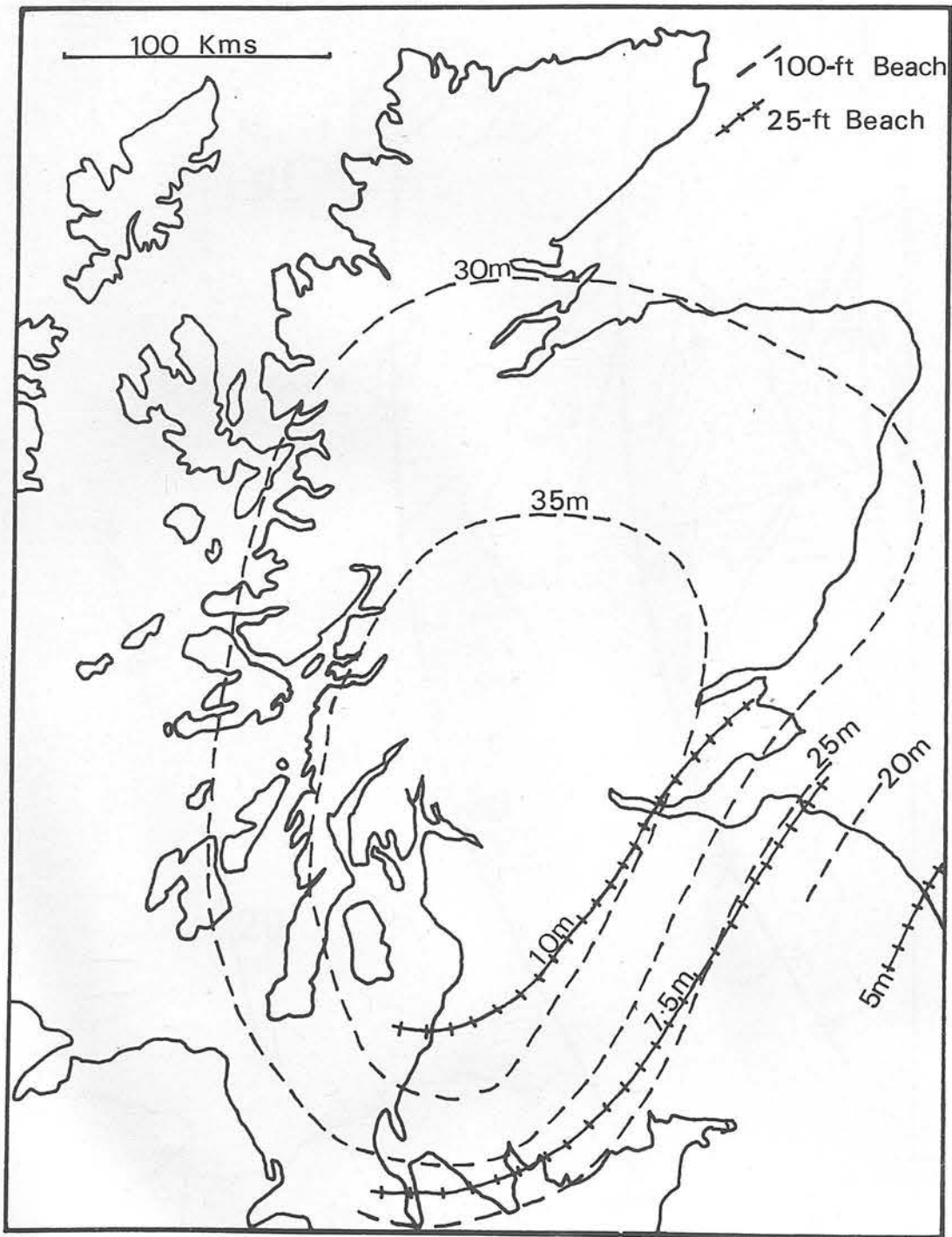


FIGURE 2.3 Raised shoreline isobases (in metres) of Donner (1963).

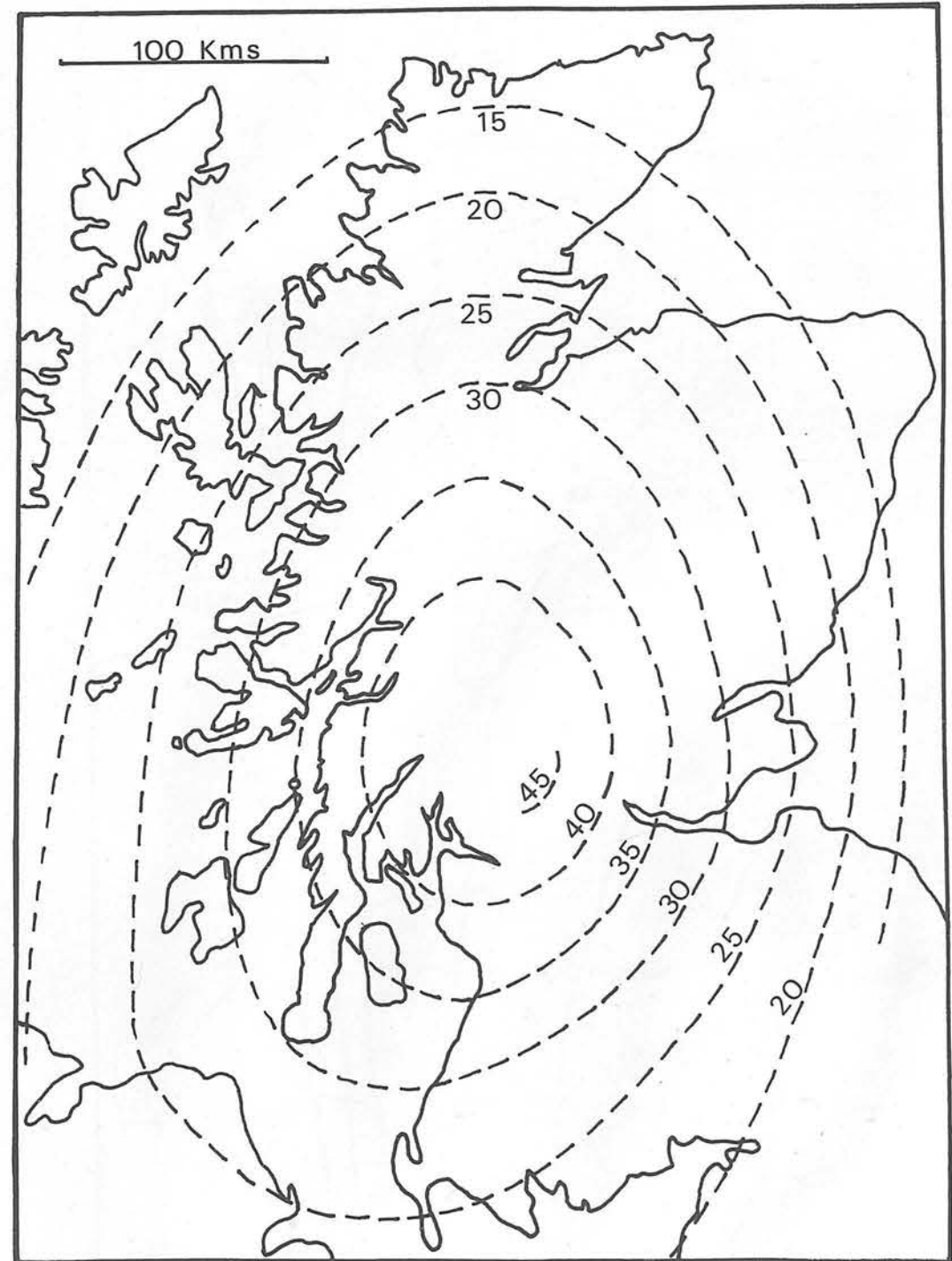


FIGURE 2.4 Isobases (in feet) for the Main Post-glacial Shoreline of Sissons (1967b).

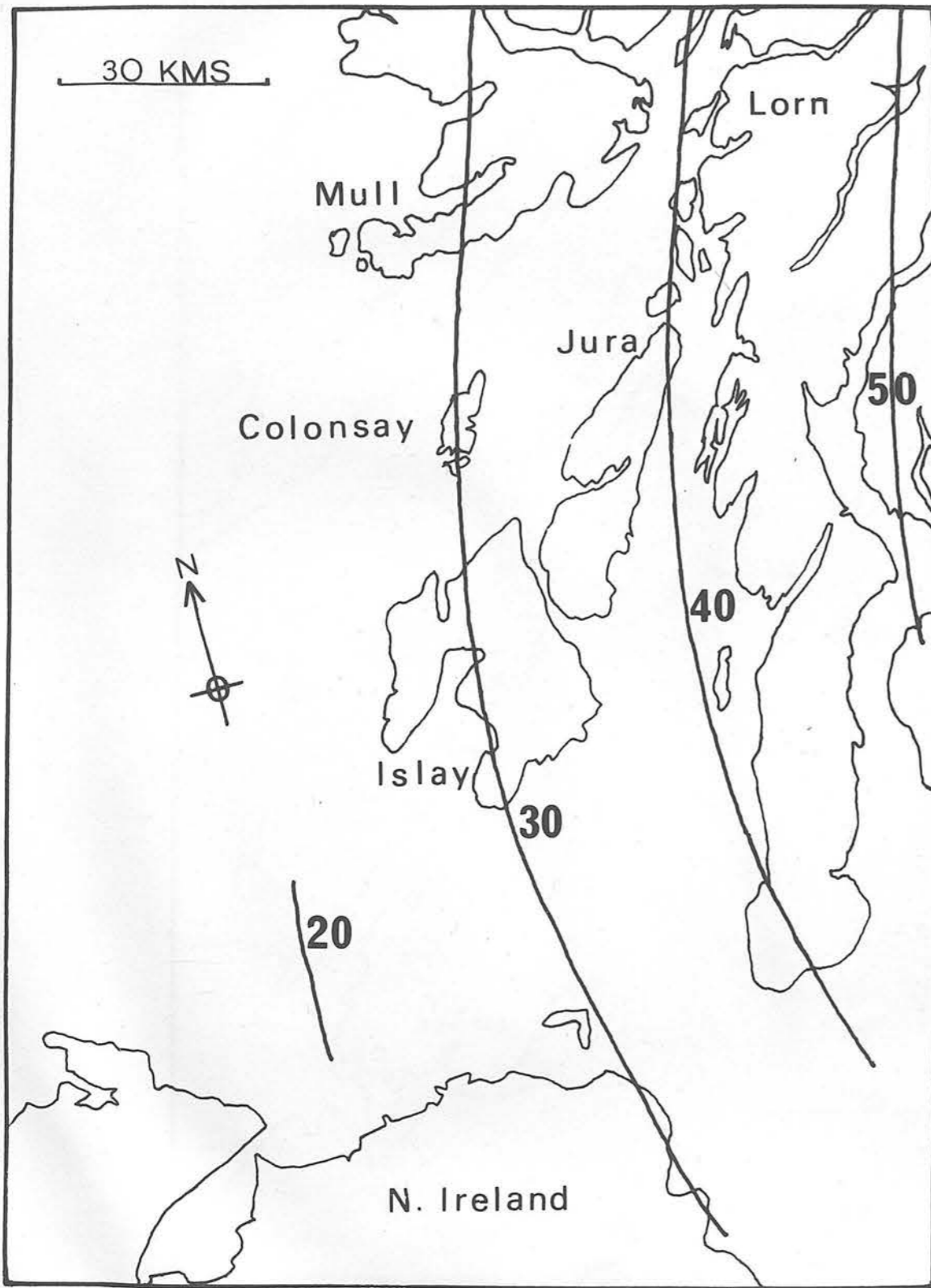


FIGURE 2.5 Isobases (in feet) for the Main Post-glacial Shoreline of Synge and Stephens (1966) in S.W. Scotland.

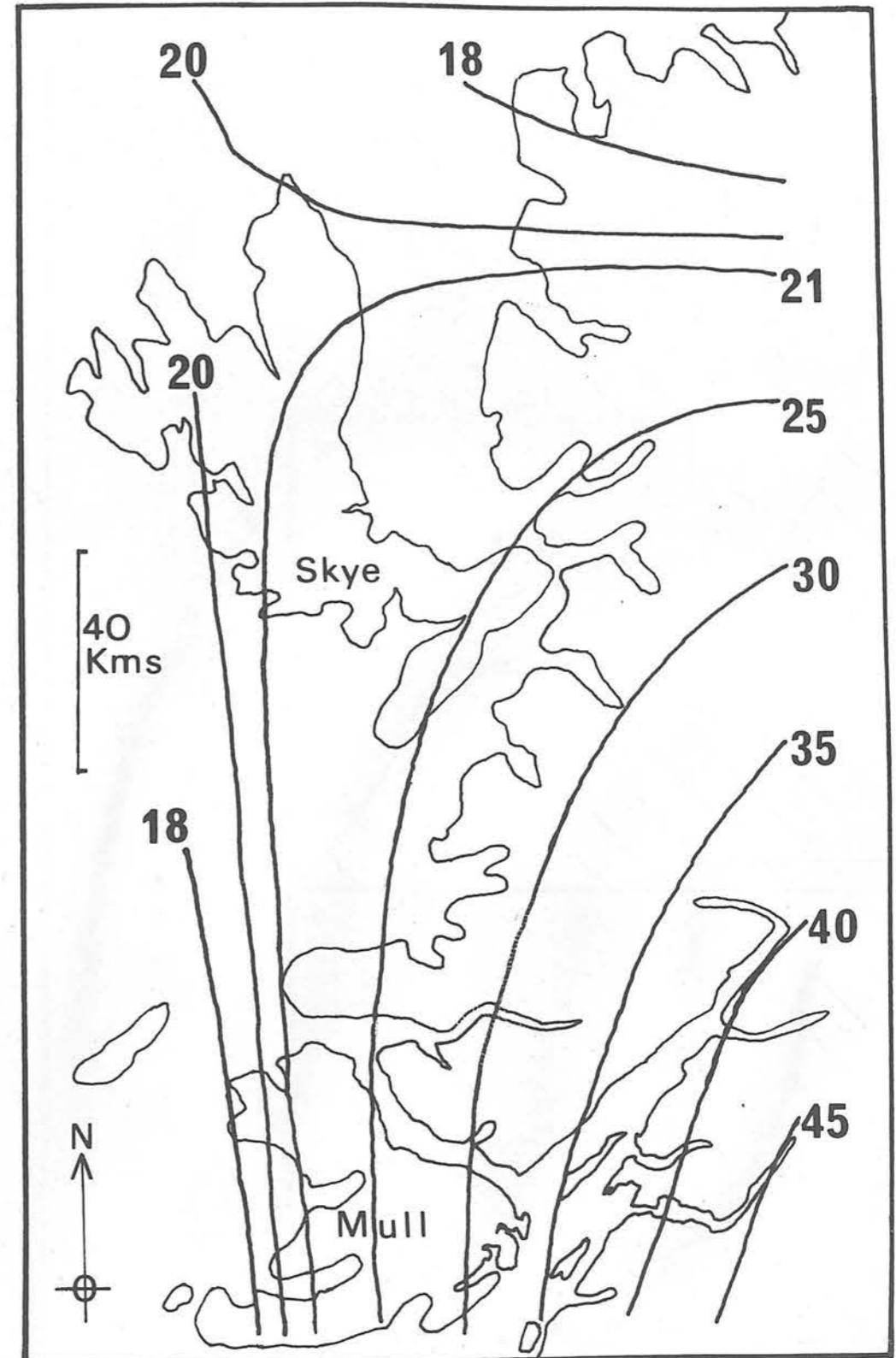


FIGURE 2.6 Isobases (in feet) for the Main Post-glacial Shoreline of McCann and Chorley (1967) in W. Scotland.

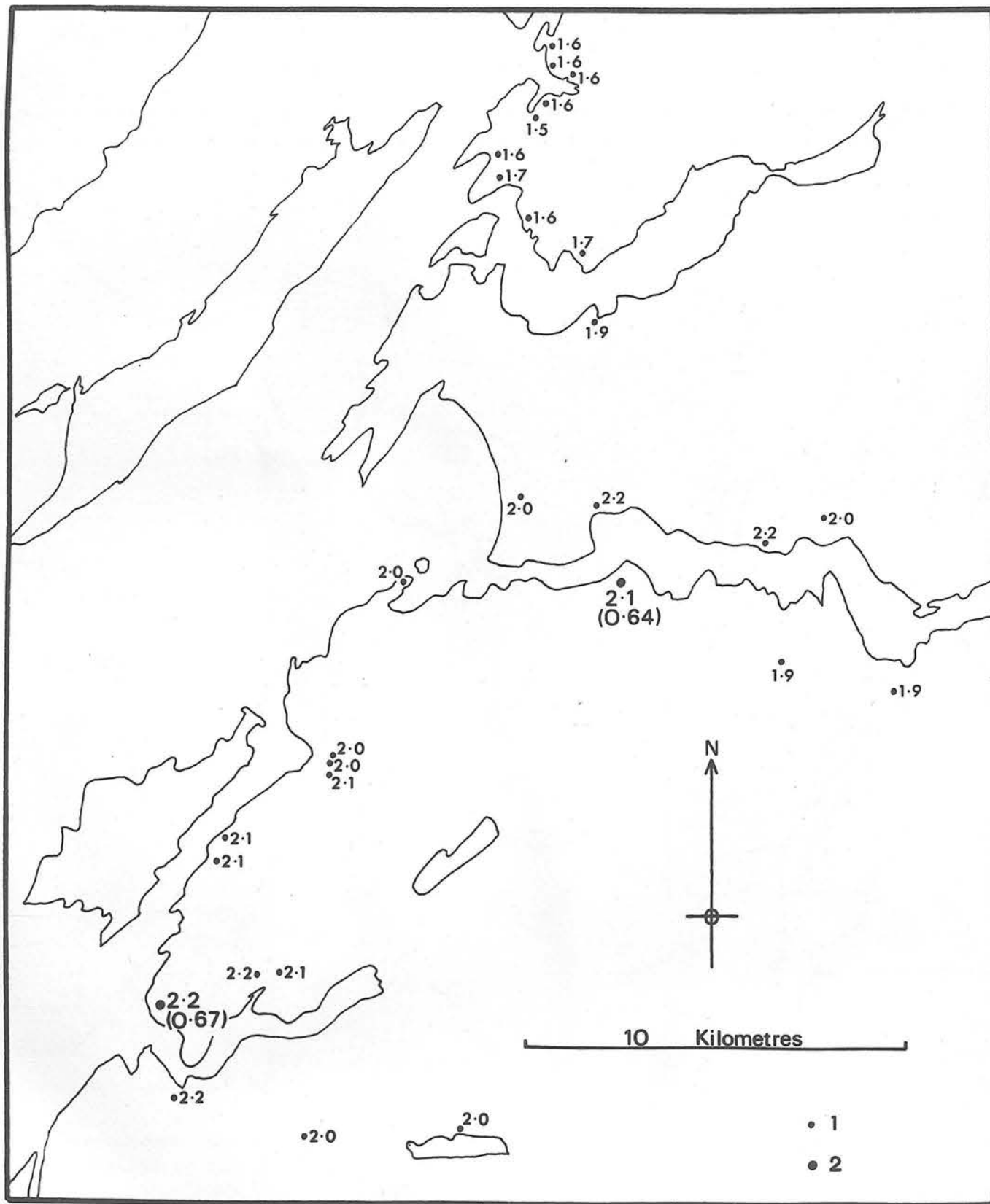


FIGURE 3.1 Newlyn/Liverpool bench mark height differences in Lorn.
 1. Height in feet of O.D. Newlyn bench mark altitudes above O.D. Liverpool values. 2. Heights in feet and metres added to the two O.D. Liverpool bench mark altitudes to convert them to O.D. Newlyn.

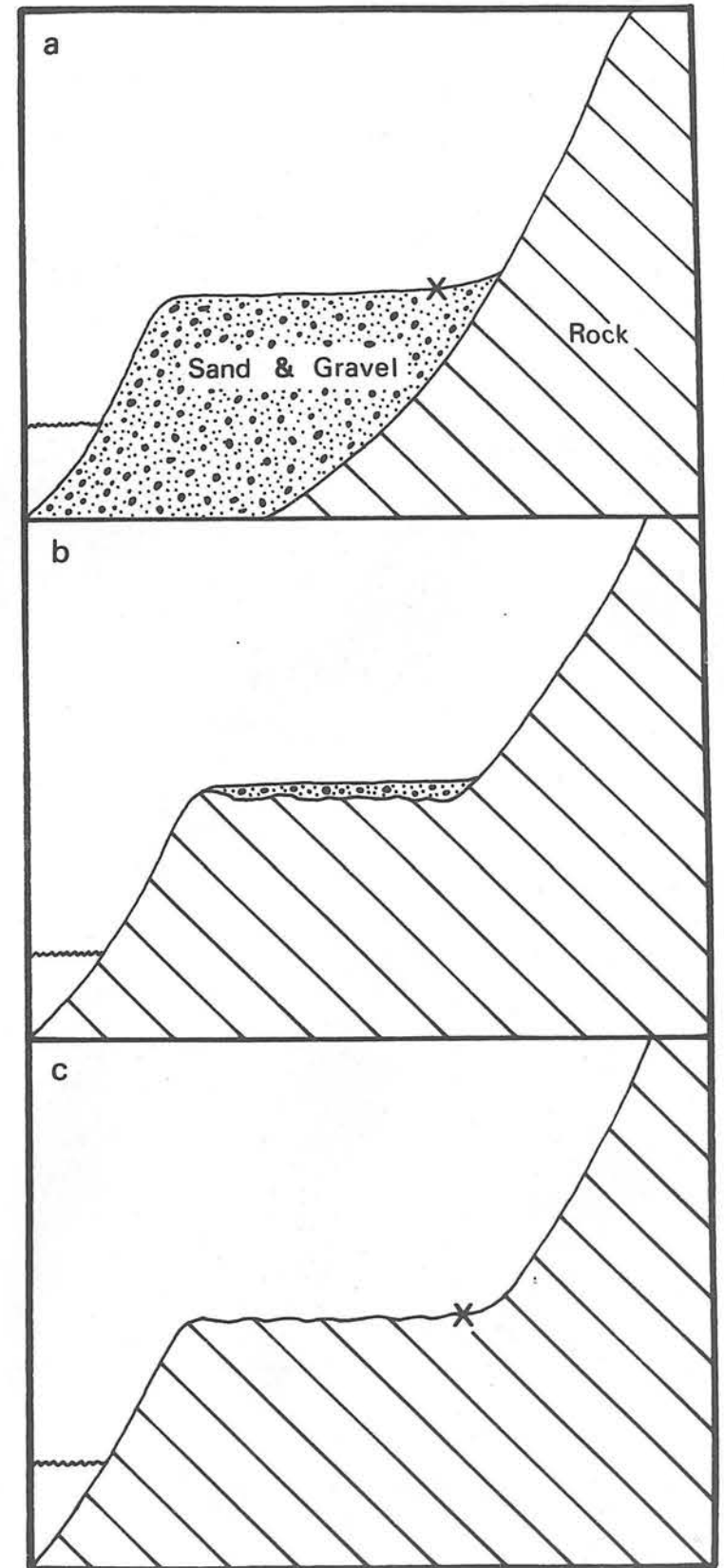


FIGURE 3.2 Simplified profiles of raised beaches and rock platforms showing where shorelines were heightened (X).
 a. raised beach b. marine deposits veneering rock platform - not heightened as raised beach or rock platform c. rock platform.

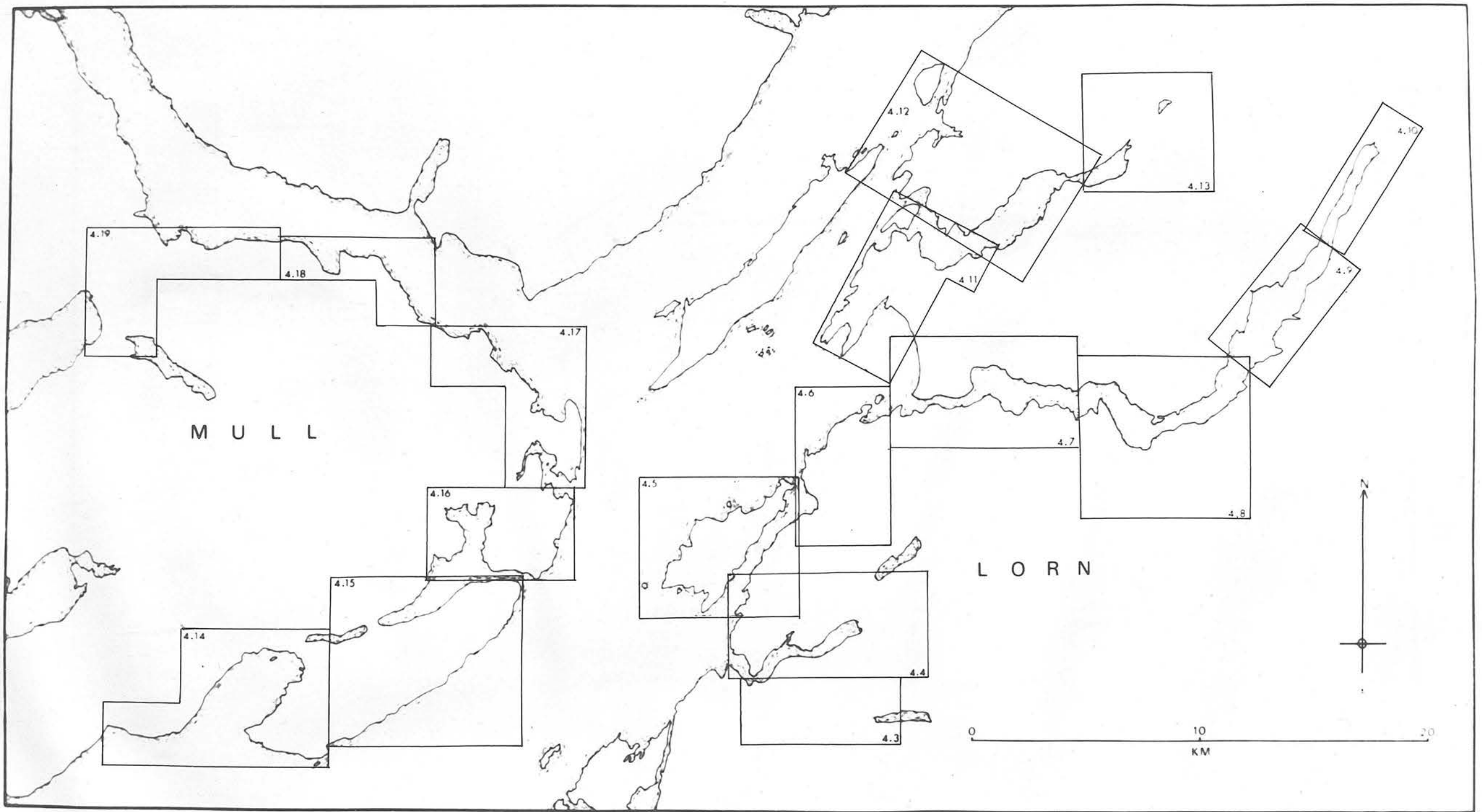


FIGURE 4.1 Areas covered by the detailed maps (Figs. 4.3-4.19).

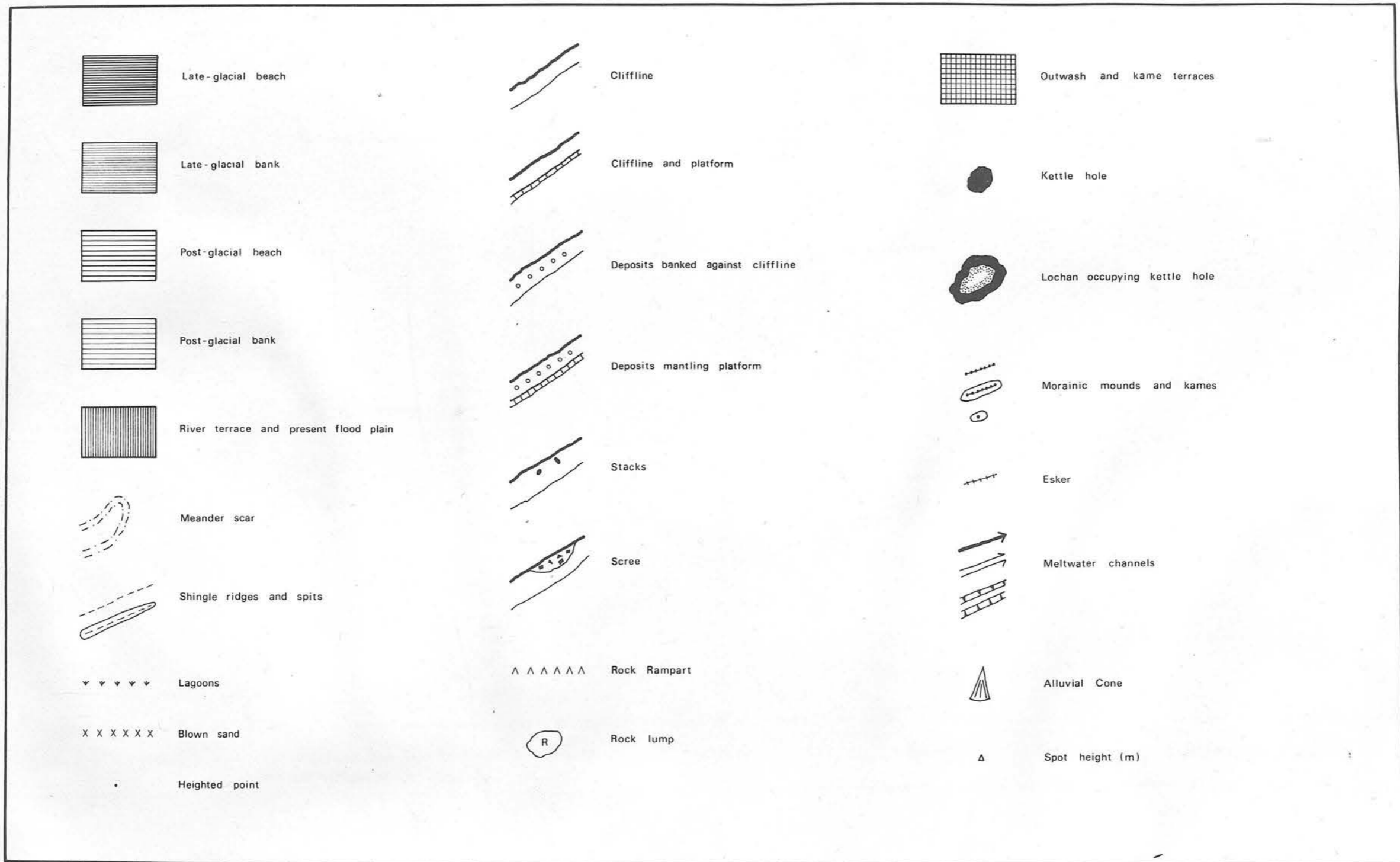


FIGURE 4.2 Symbols used on the detailed maps

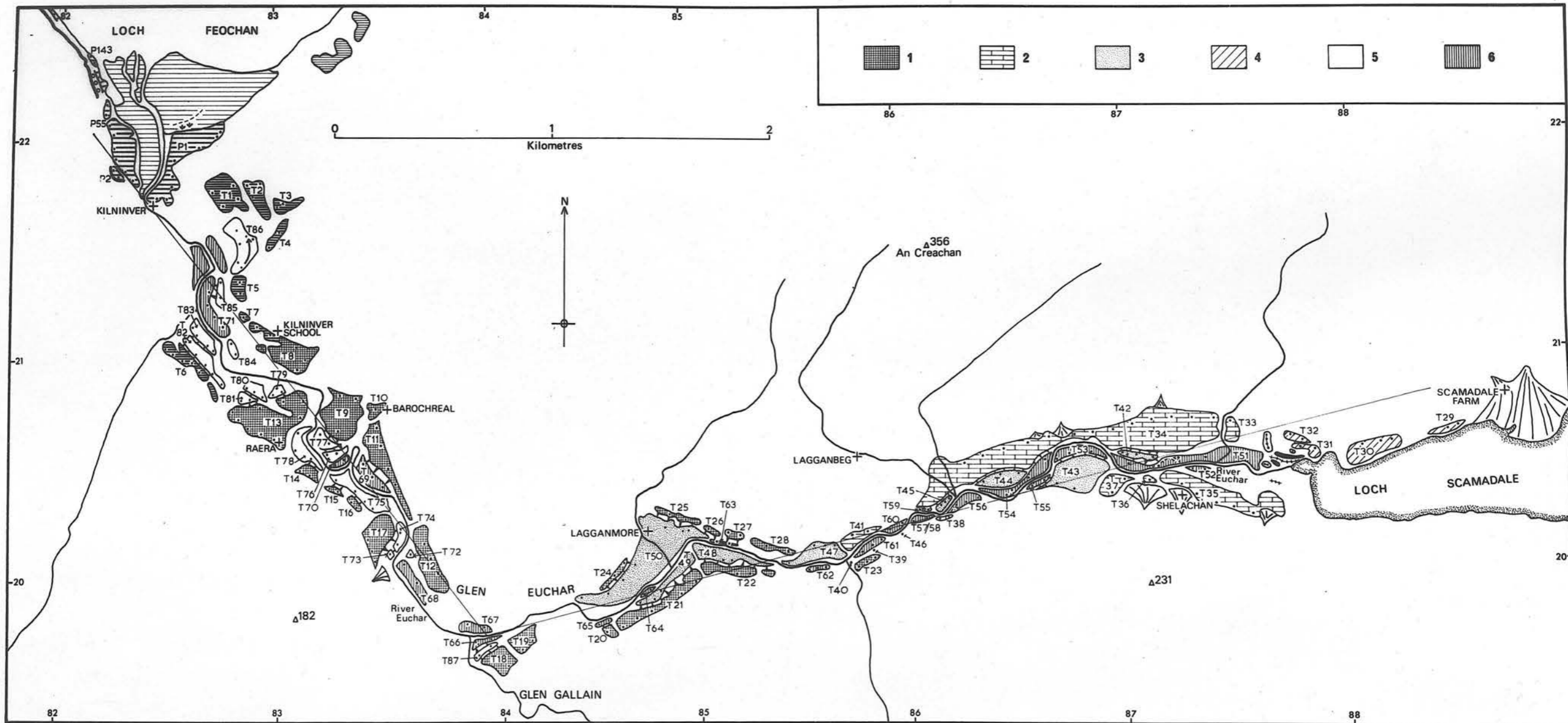


FIGURE 4.3 Glen Euchar 1. Terrace X 2. Terrace Y 3. Terrace Z 4. Kame terraces 5. Uncorrelated terraces 6. Present flood plain :
 Other symbols as Fig. 4.2

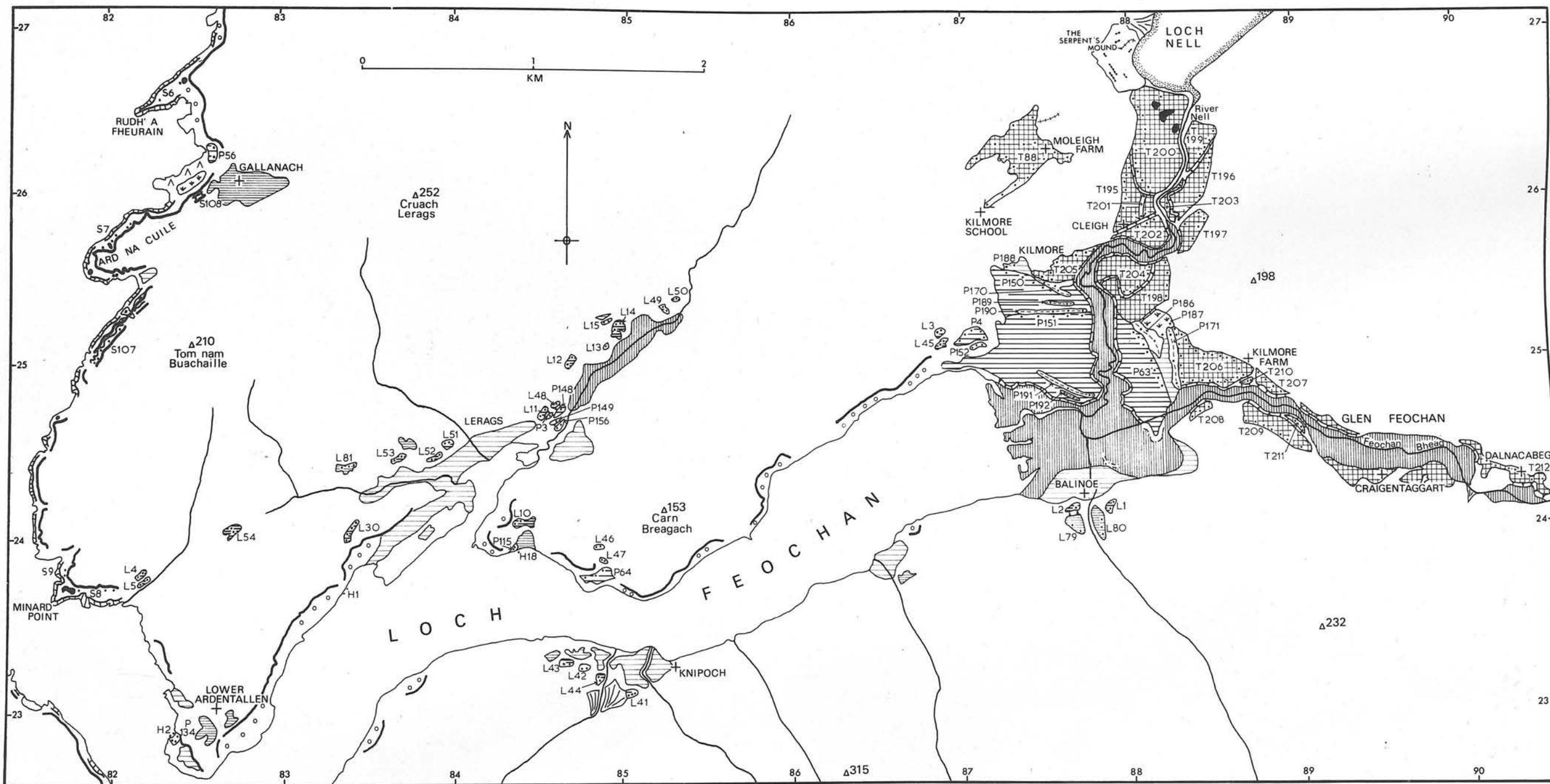


FIGURE 4.4 Loch Feochan

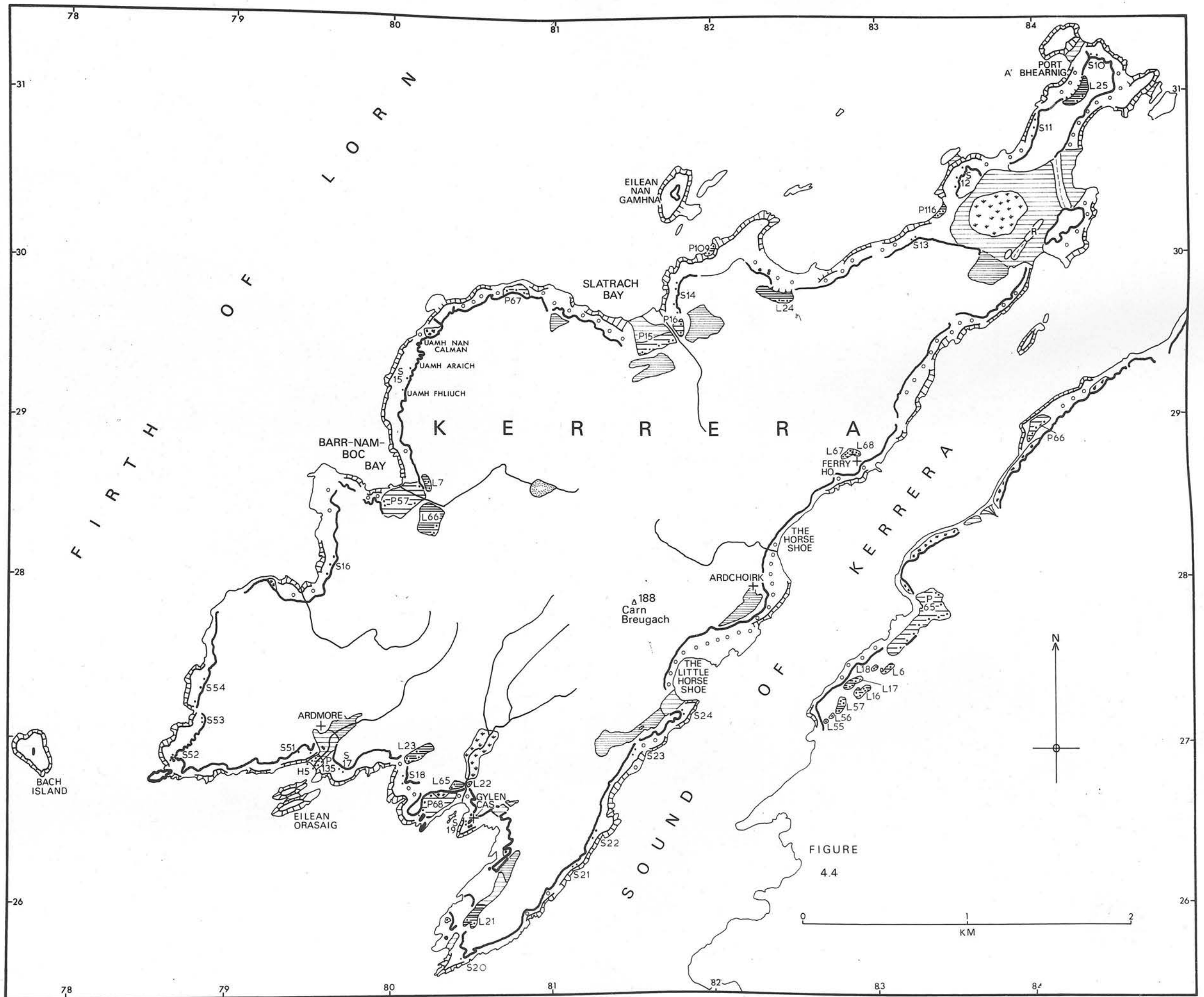


FIGURE 4.5 Kerrera

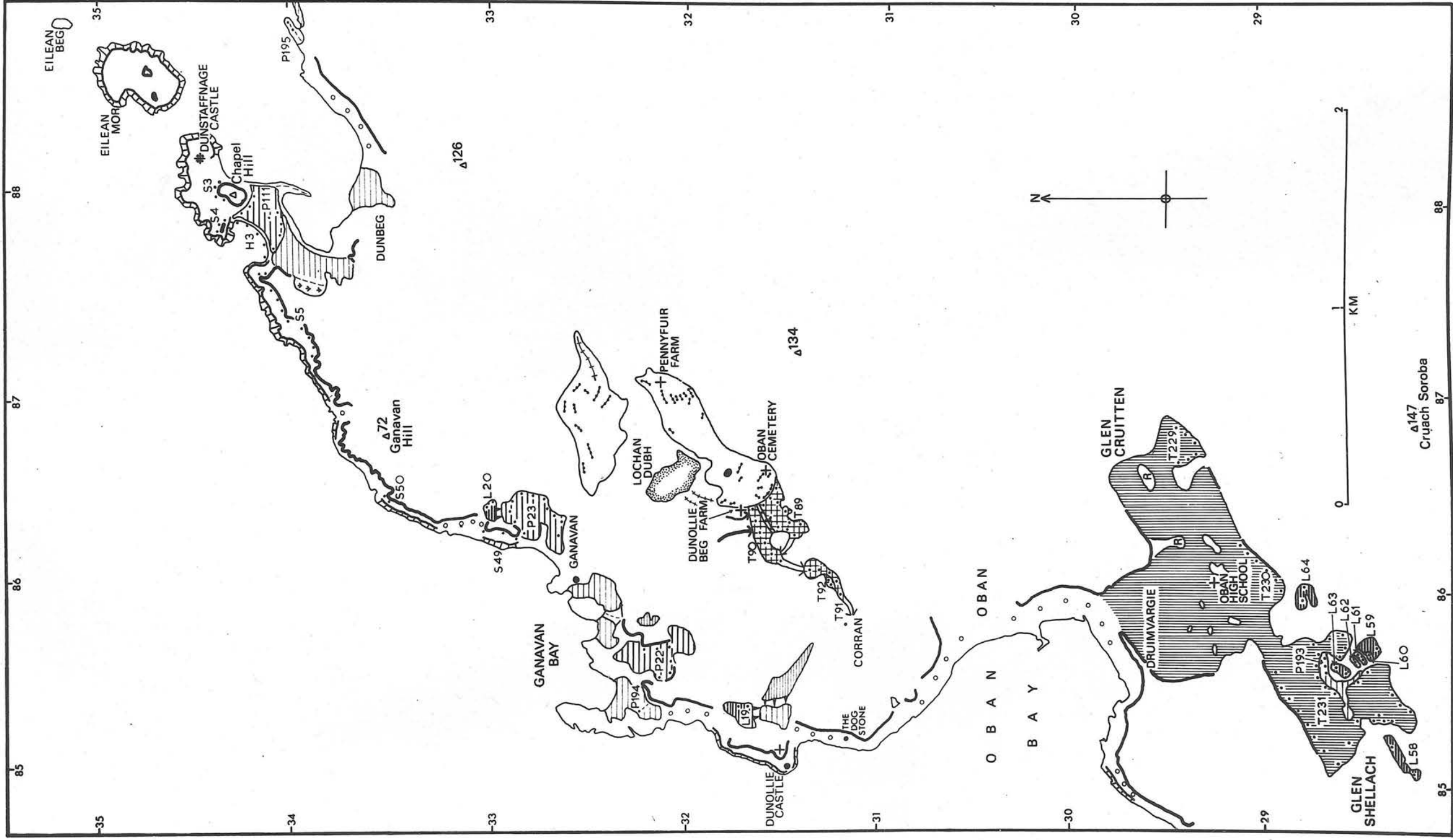


FIGURE 4-6 Oban

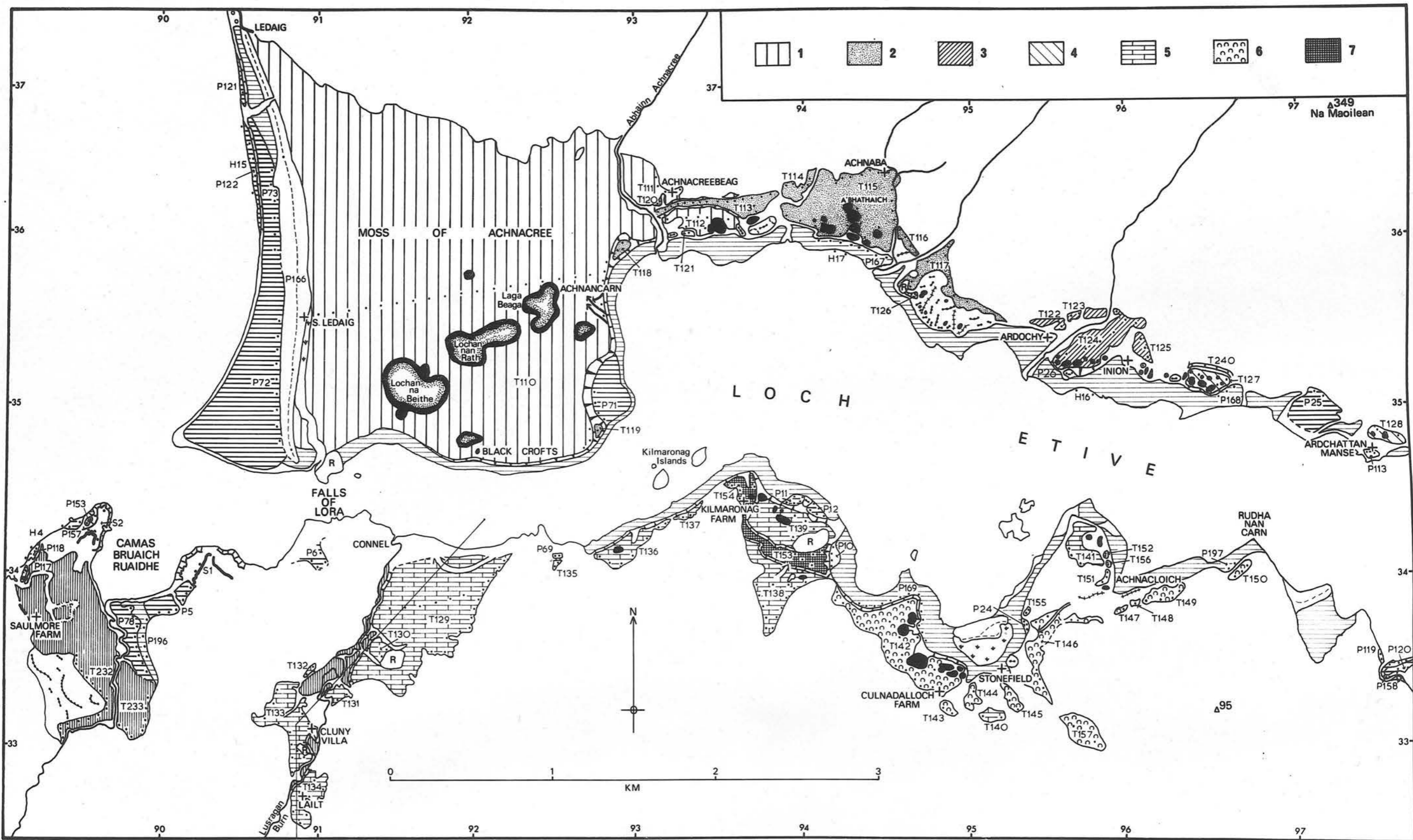


FIGURE 4.7 Lower Loch Etive 1. Achnacree Terrace 2. Achnaba Terrace 3. Inion Terrace 4. Other terraces on the north side of Loch Etive 5. Connel Terrace 6. Culnadalloch Terrace 7. Kilmaronag Terrace Other symbols as Fig. 4.2

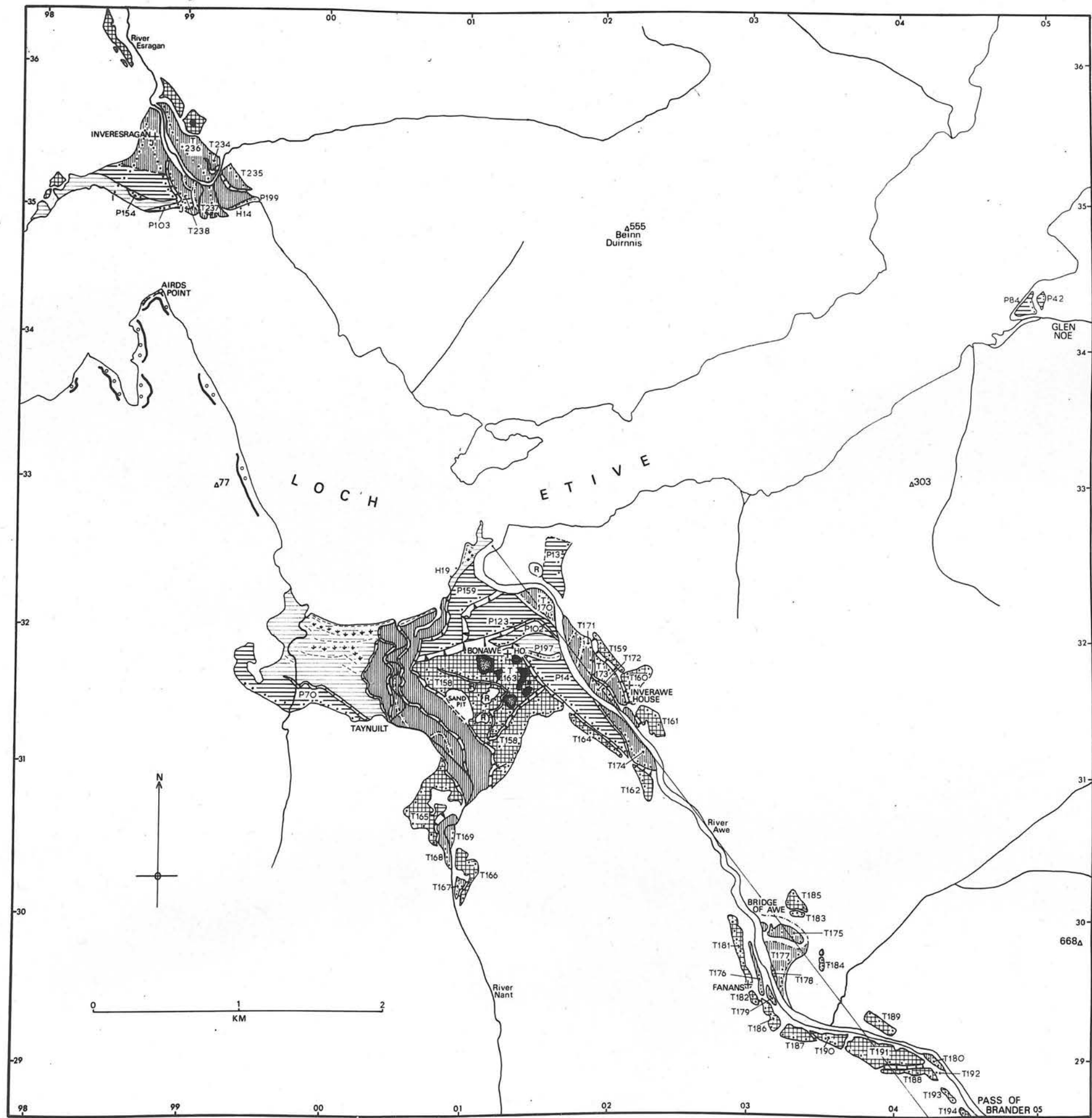


FIGURE 4.8 Middle Loch Etive

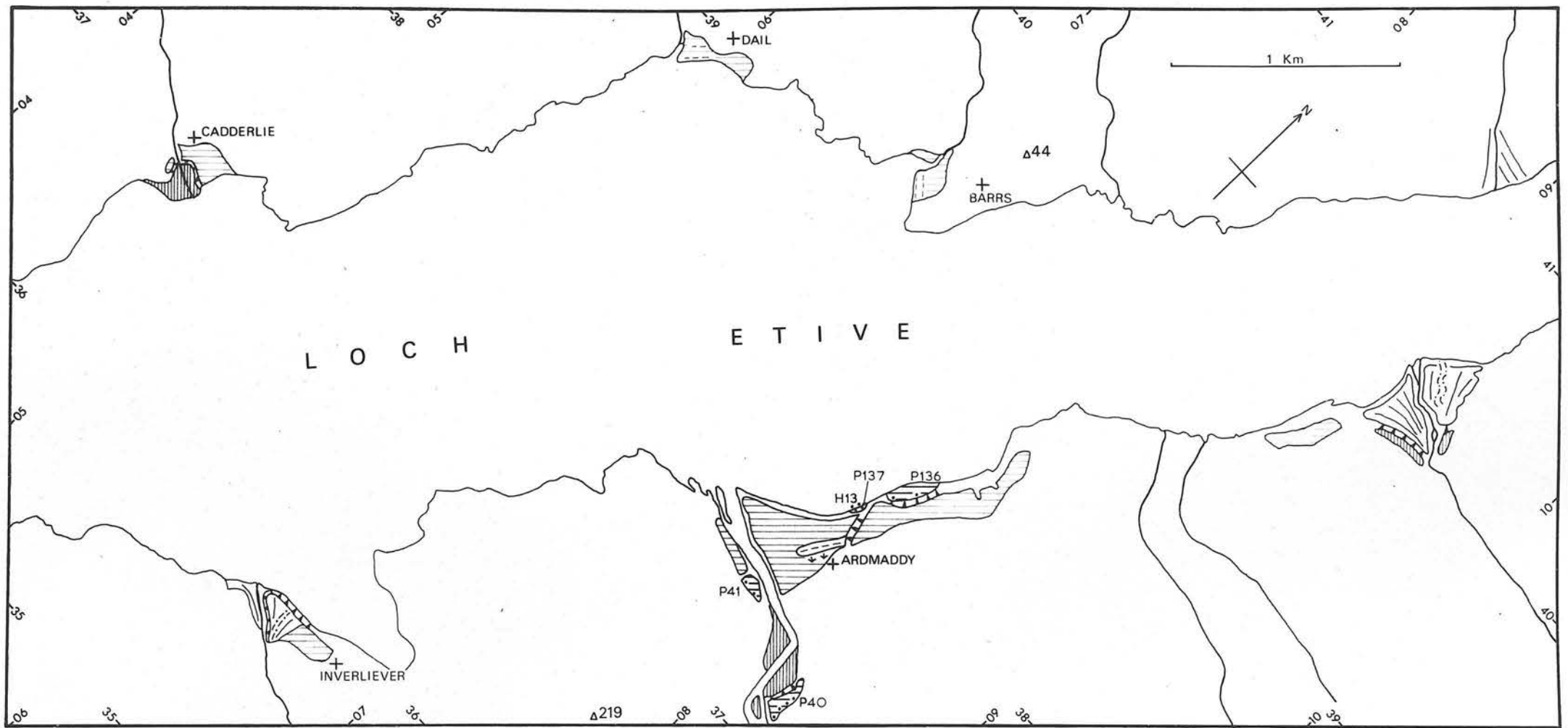


FIGURE 4.9 Upper Loch Etive

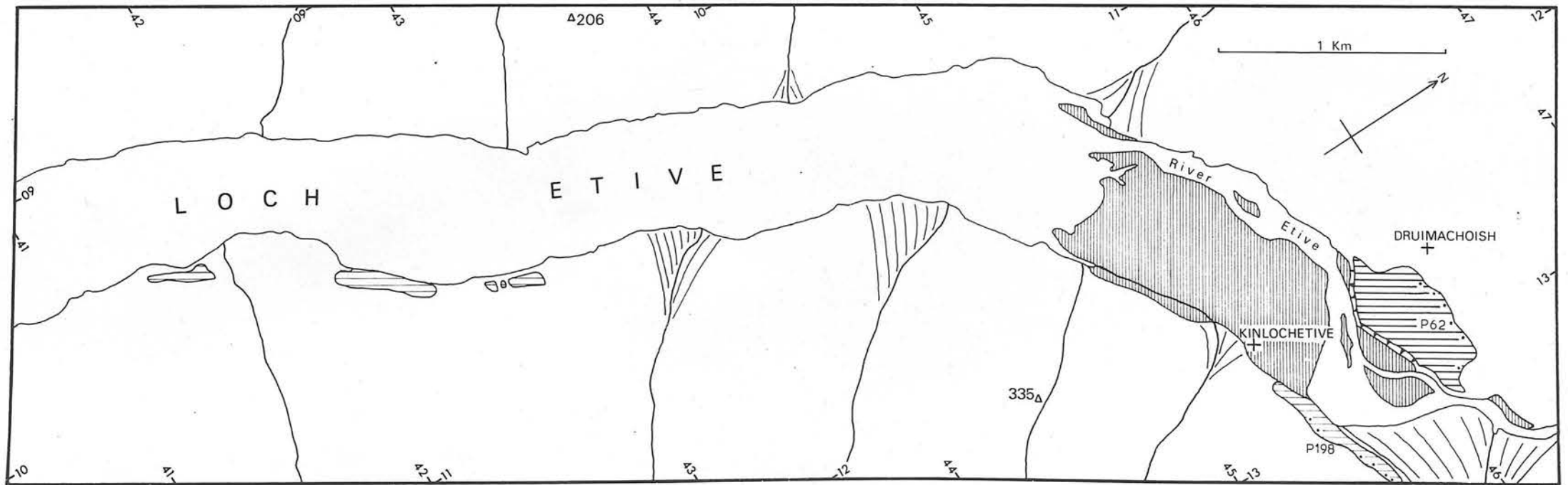


FIGURE 4.10 Head of Loch Etive

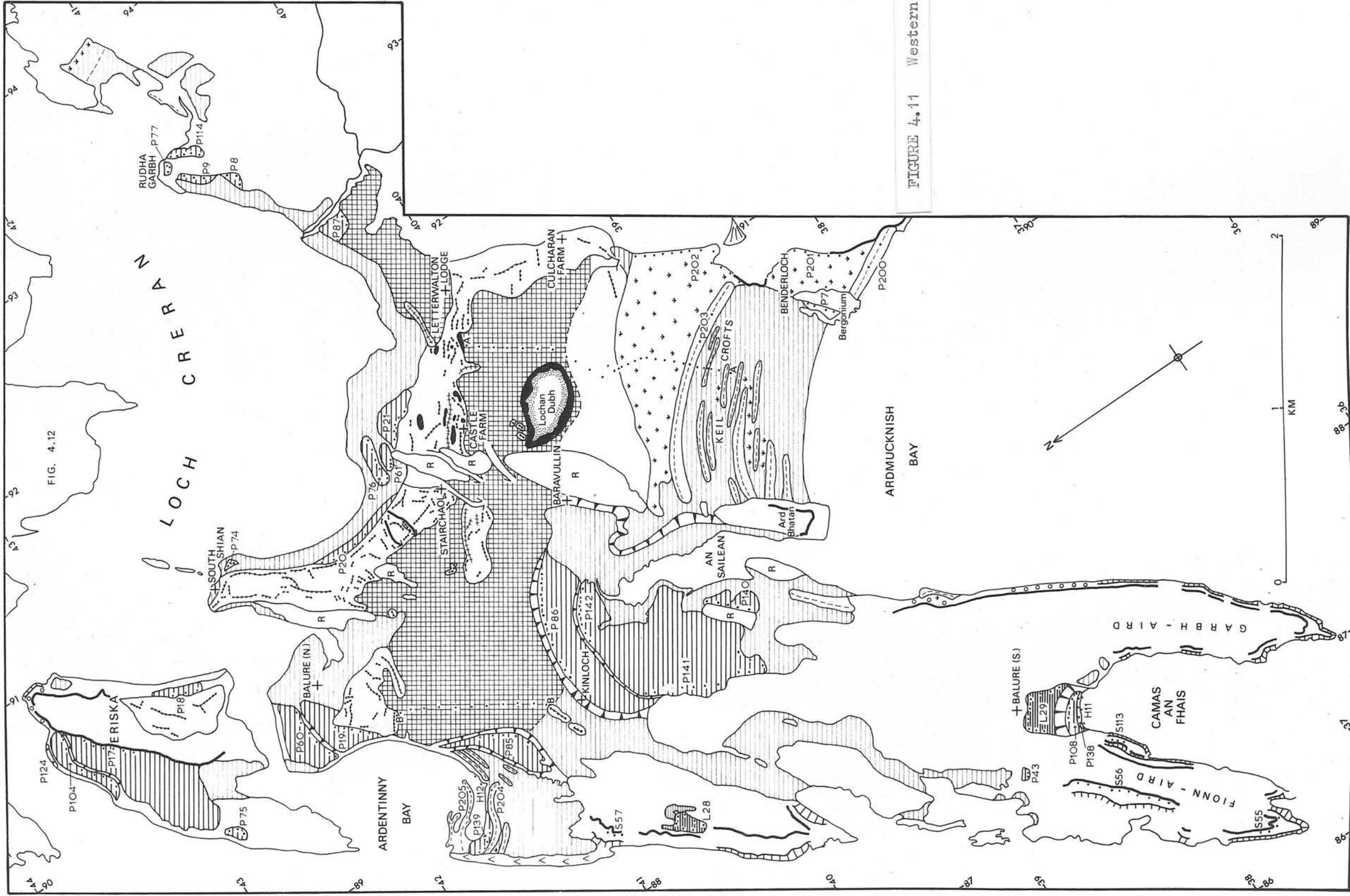


FIGURE 4.11 Western Banderloch

FIG. 4.12

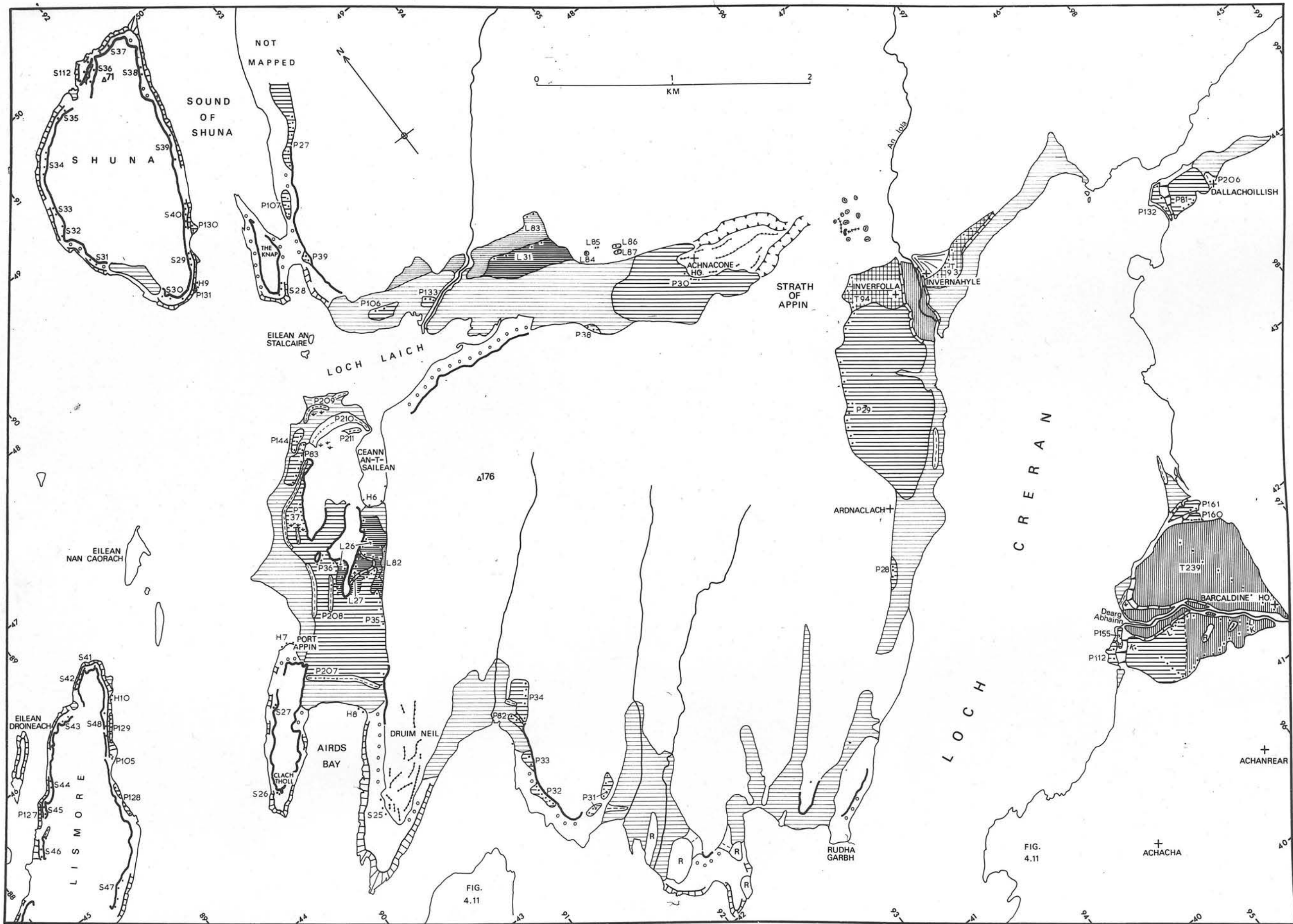


FIGURE 4.12 Appin

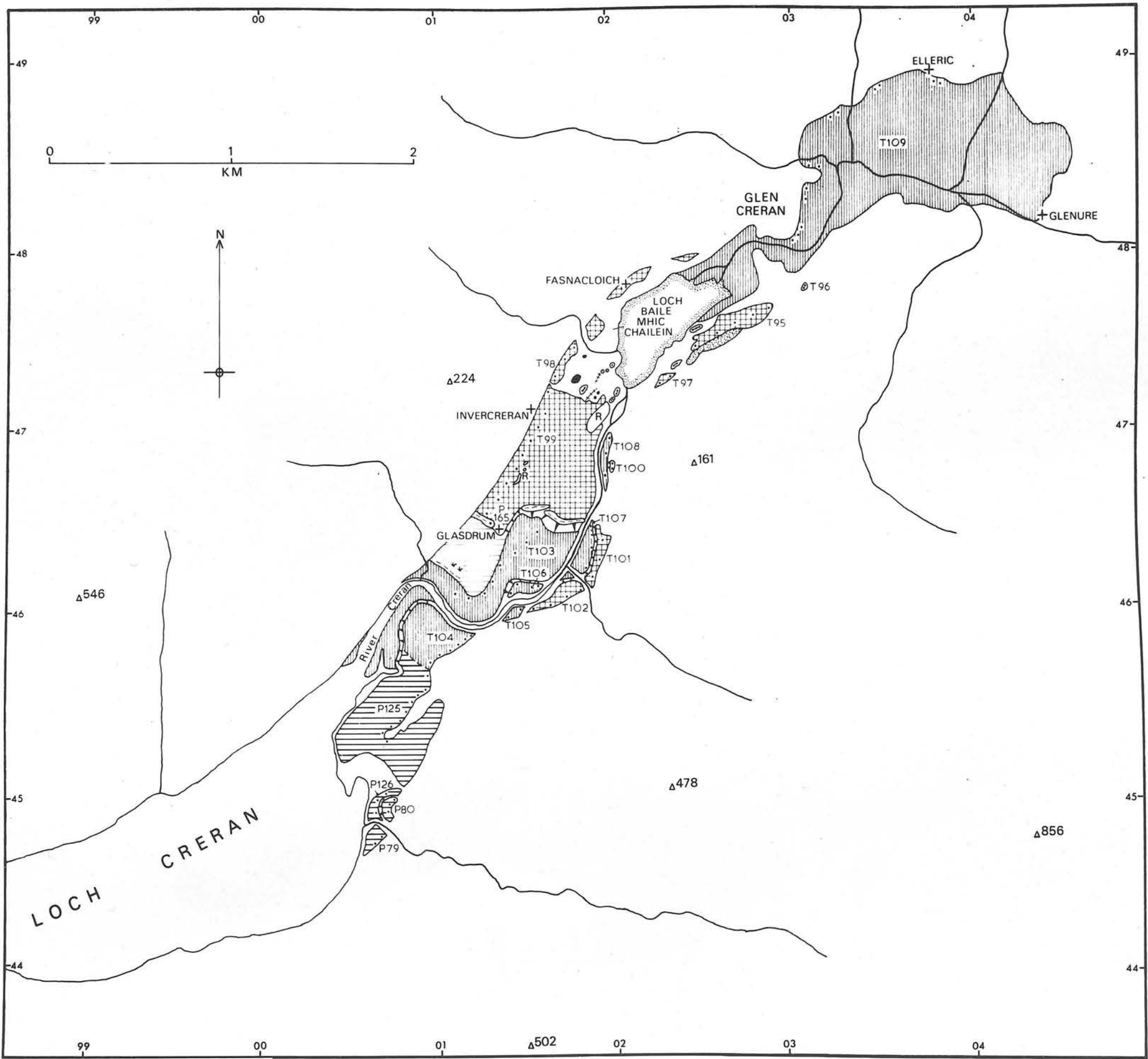


FIGURE 4.13 Glen Creran

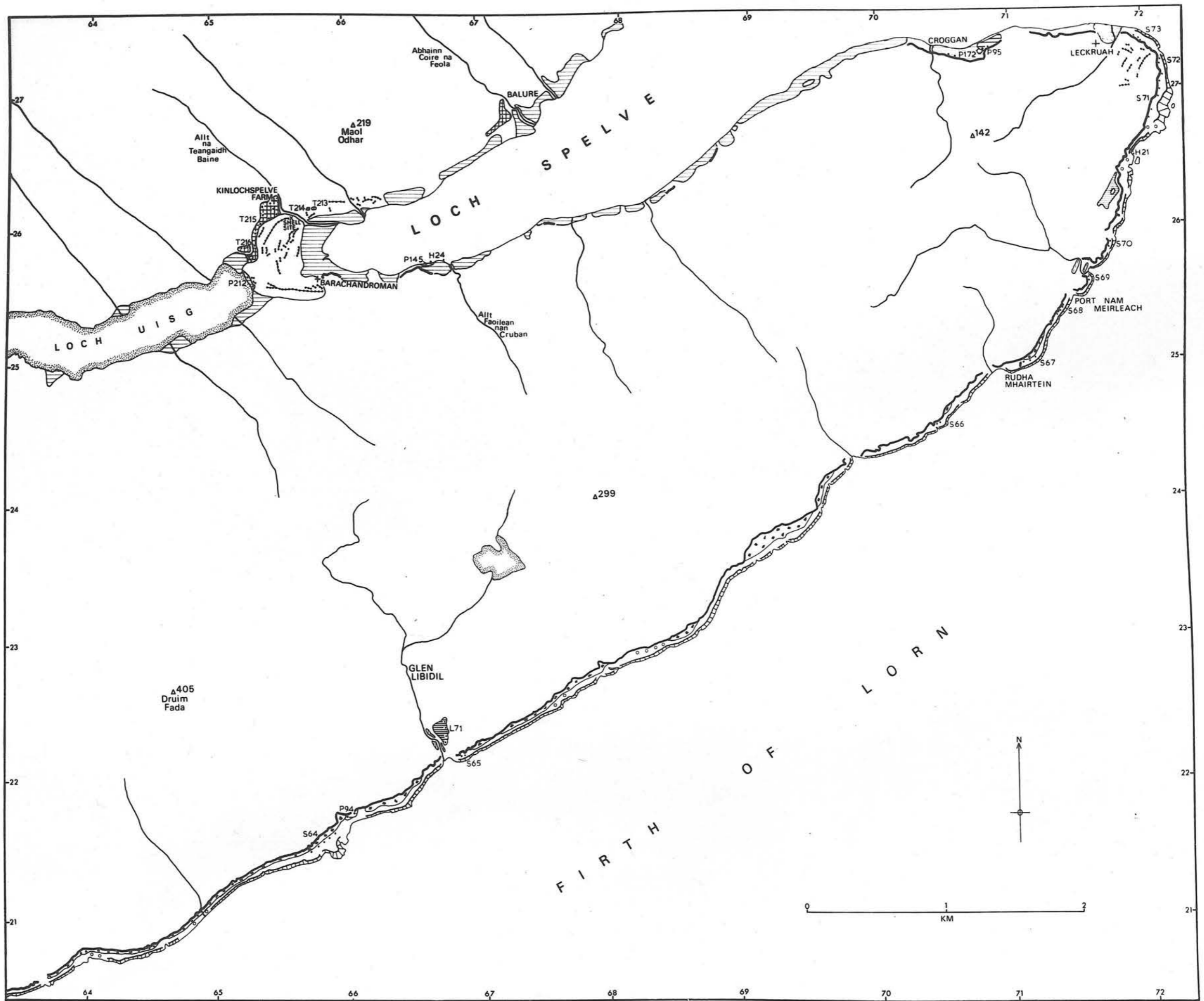


FIGURE 4.15 Croggan and South Loch Spelve



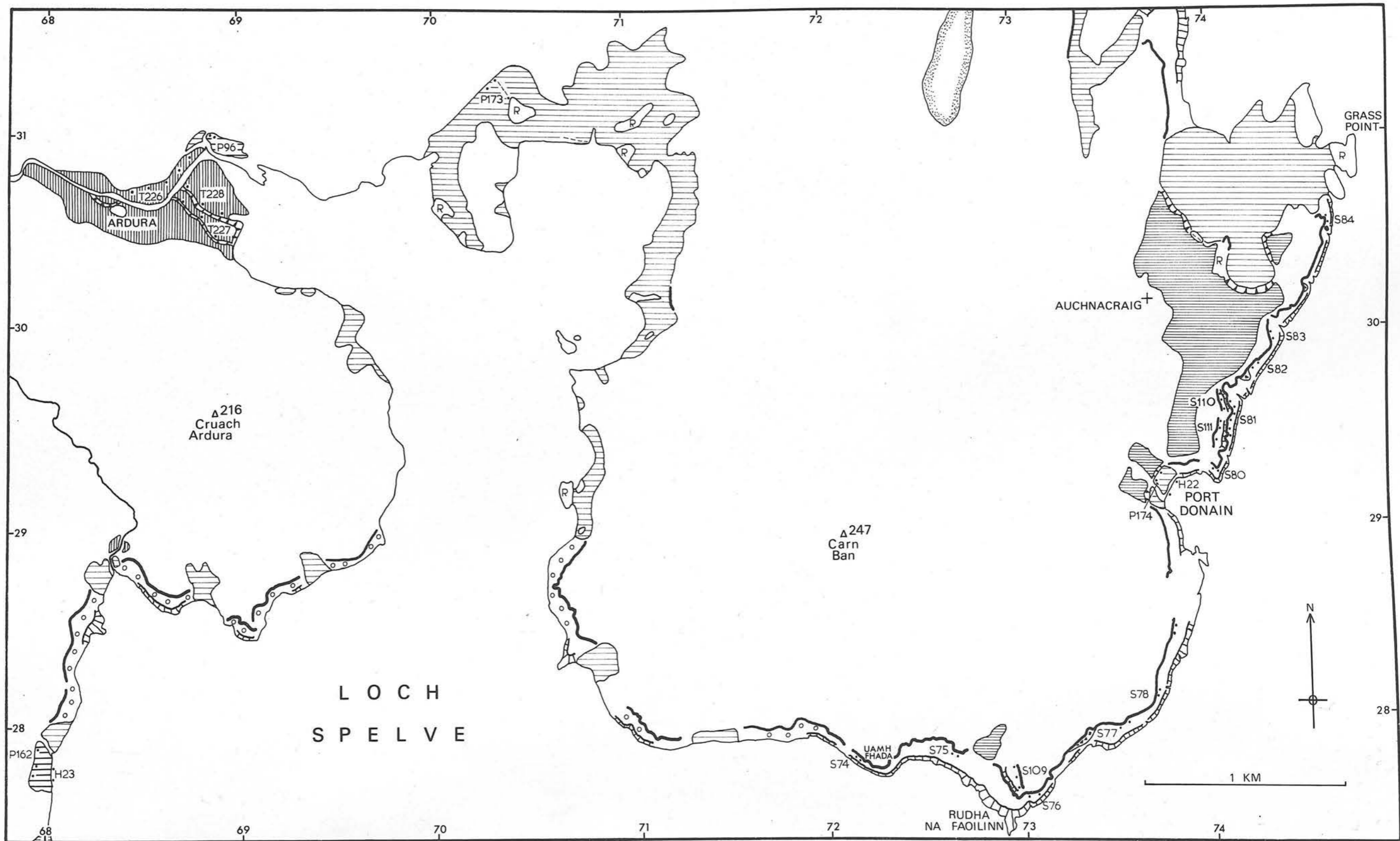


FIGURE 4.16 North Loch Spelve

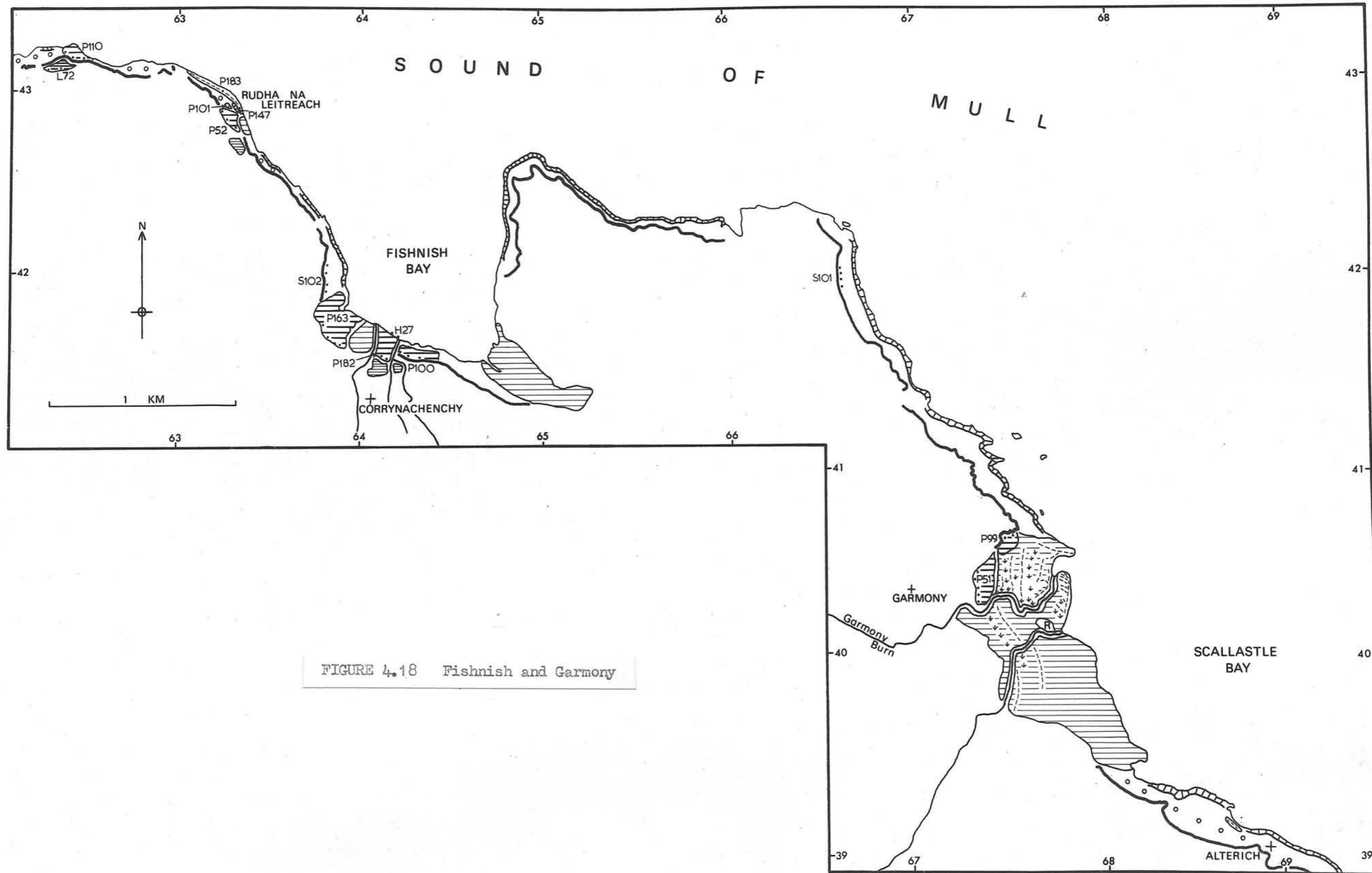


FIGURE 4.18 Fishnish and Garmony

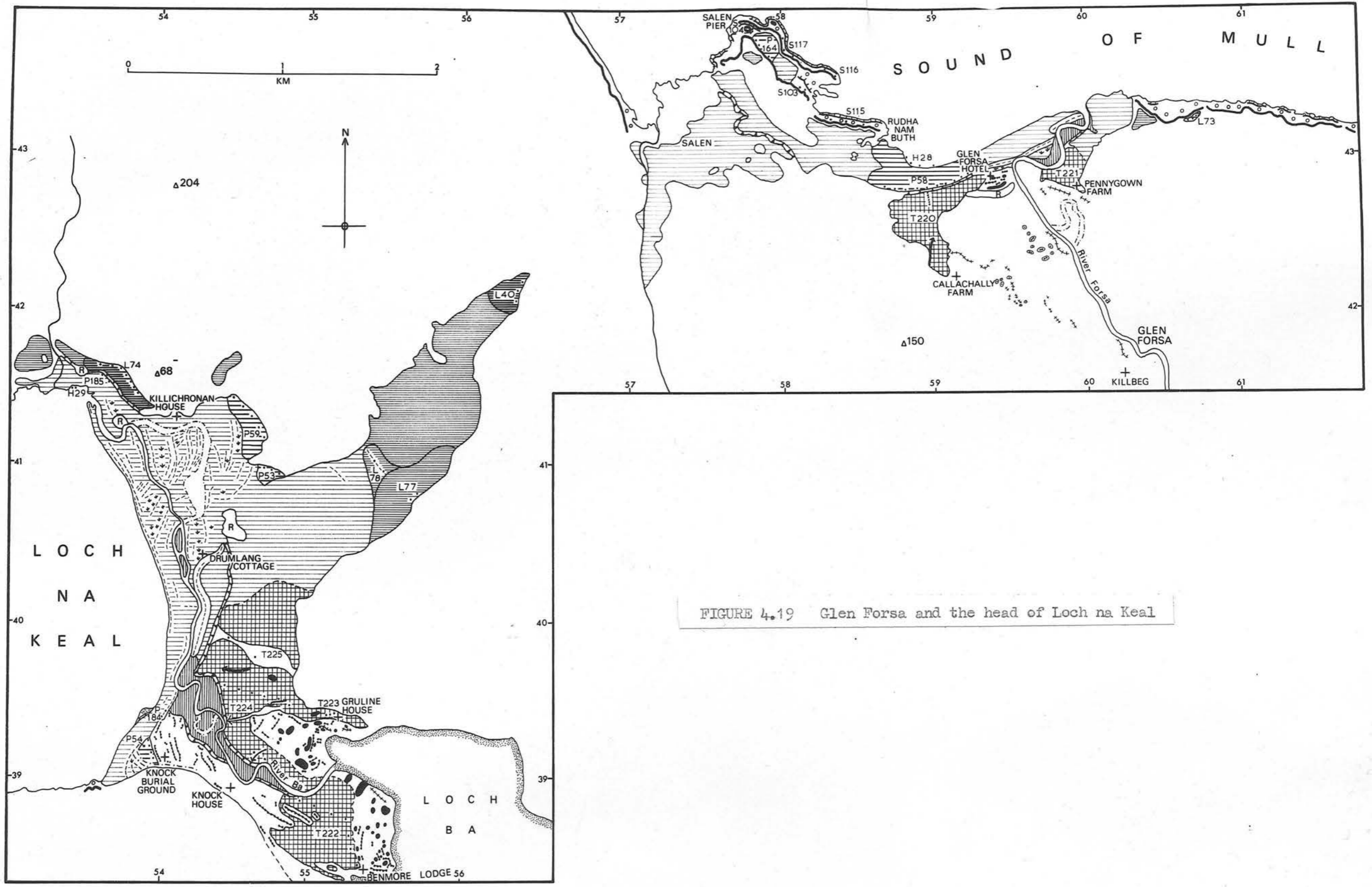


FIGURE 4.19 Glen Forsa and the head of Loch na Keal

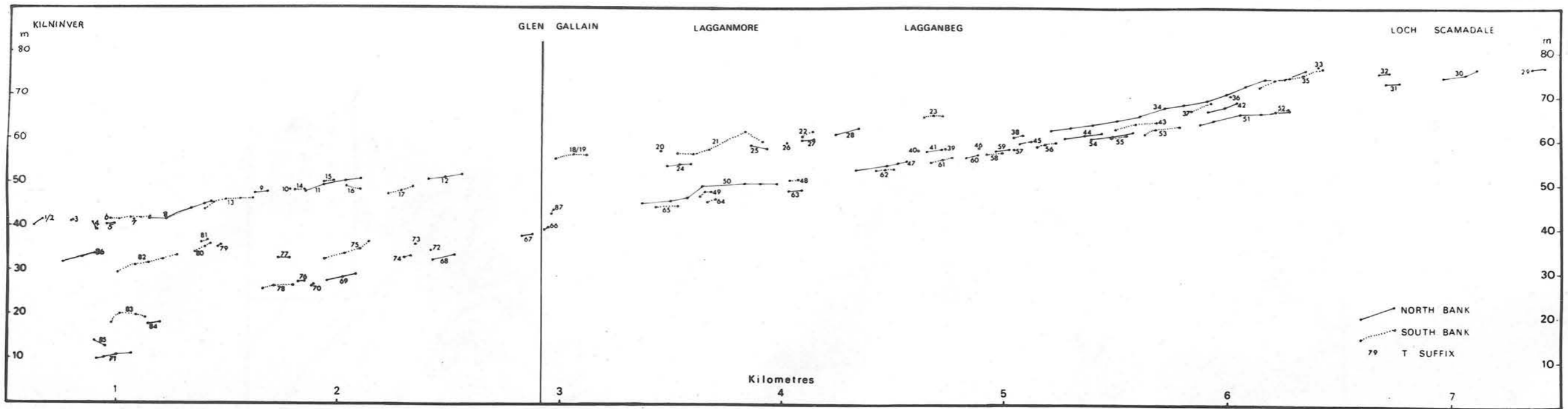
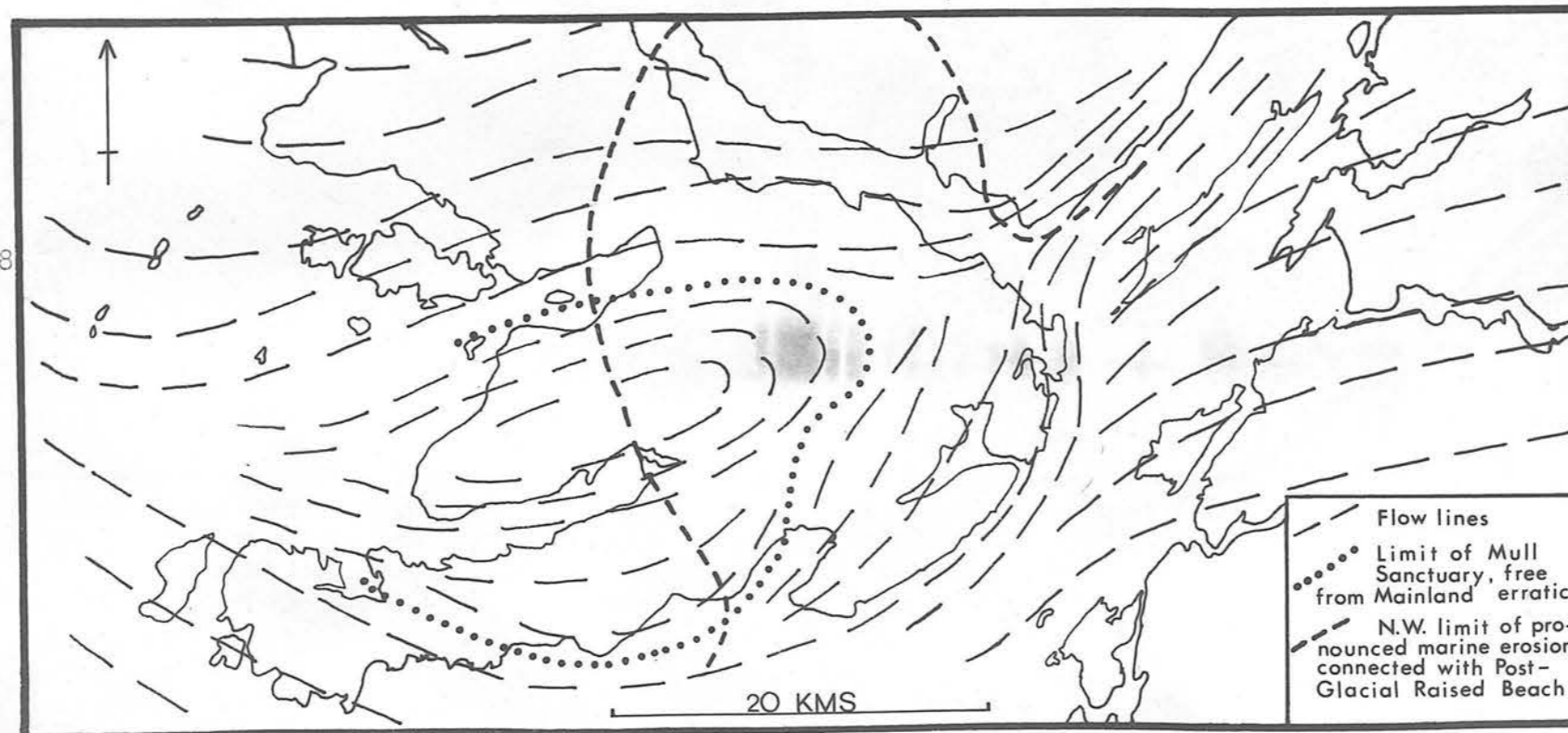


FIGURE 4.20 Height/distance diagram of the Glen Euchar terraces.

4.21

FIGURE 4.21 Ice flow lines and other information of Kynaston et al. (1908 and Bailey et al. (1924).



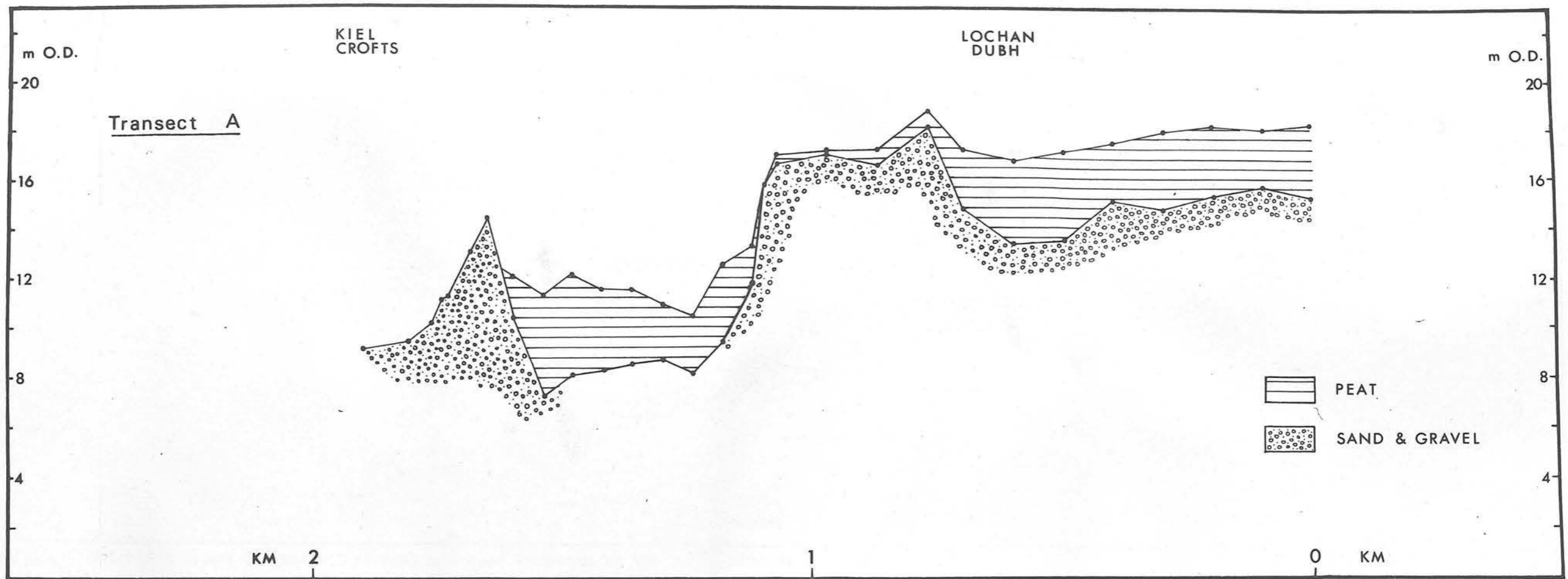


FIGURE 5.2 Transect A.

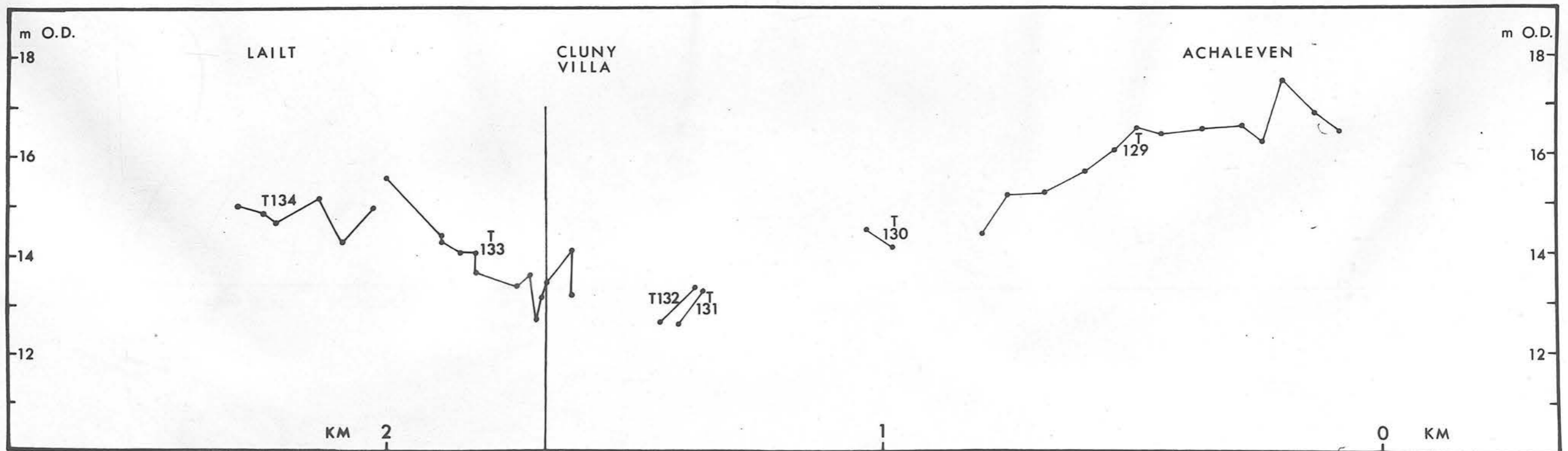


FIGURE 5.3 Height/distance diagram of the Lusragan valley terraces.

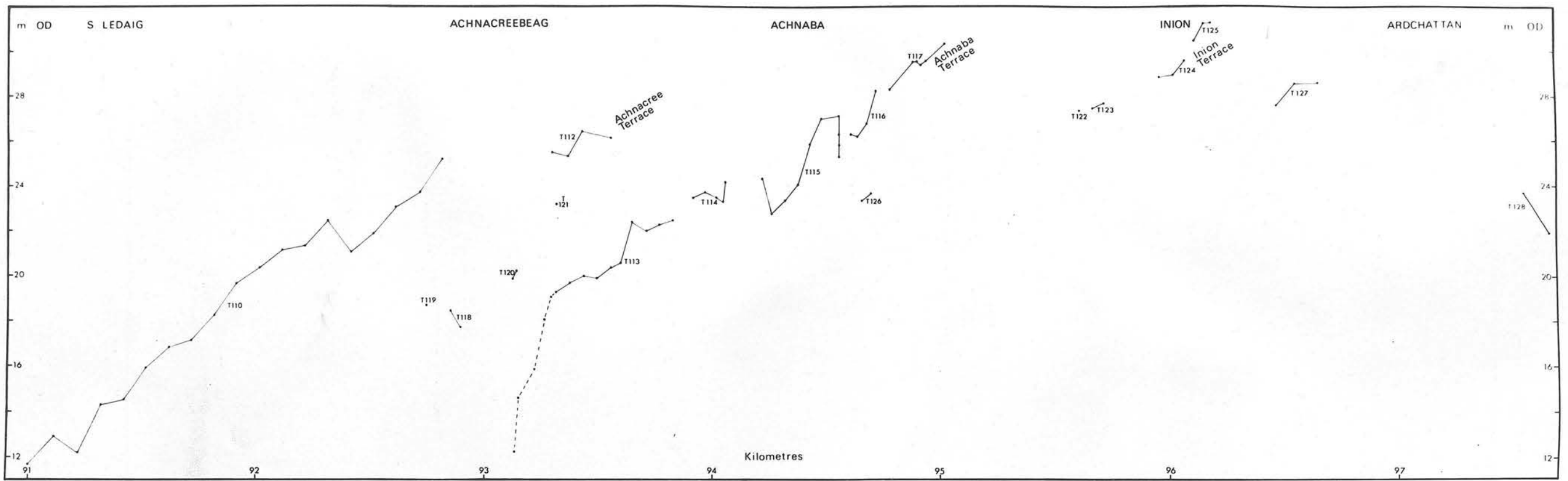


FIGURE 5.4 Height/distance diagram of outwash and kame terraces on the north side of Loch Etive.

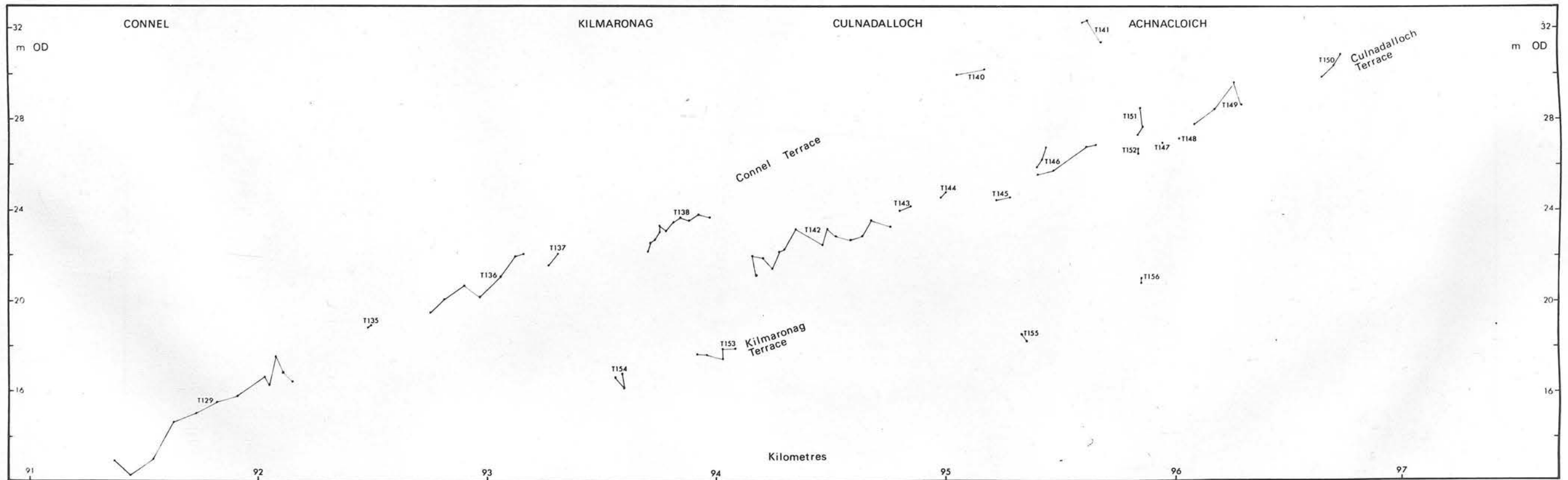


FIGURE 5.5 Height/distance diagram of outwash and kame terraces on the south side of Loch Etive.

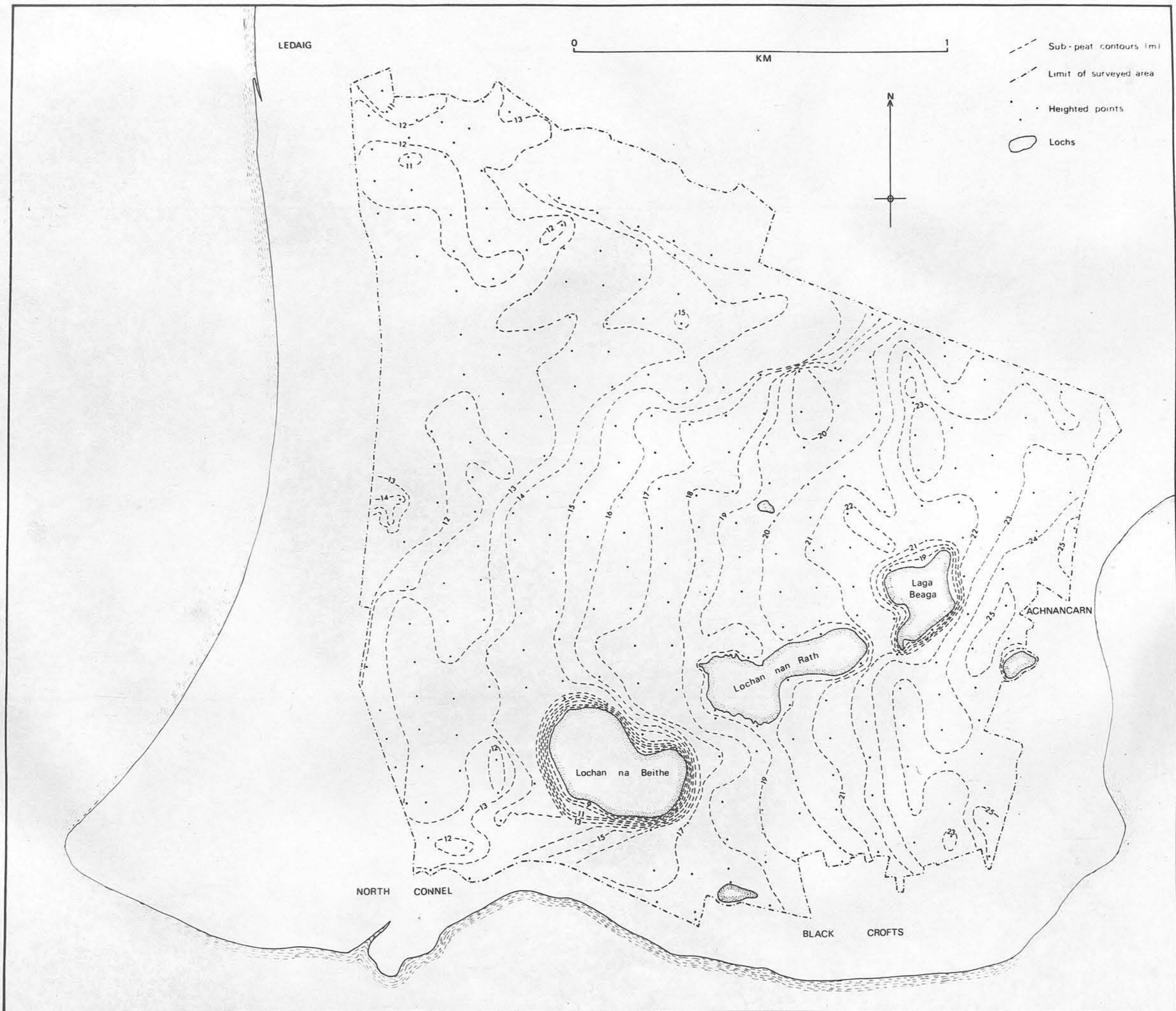


FIGURE 5.6 Sub-peat contours on the Achnacree outwash spread.

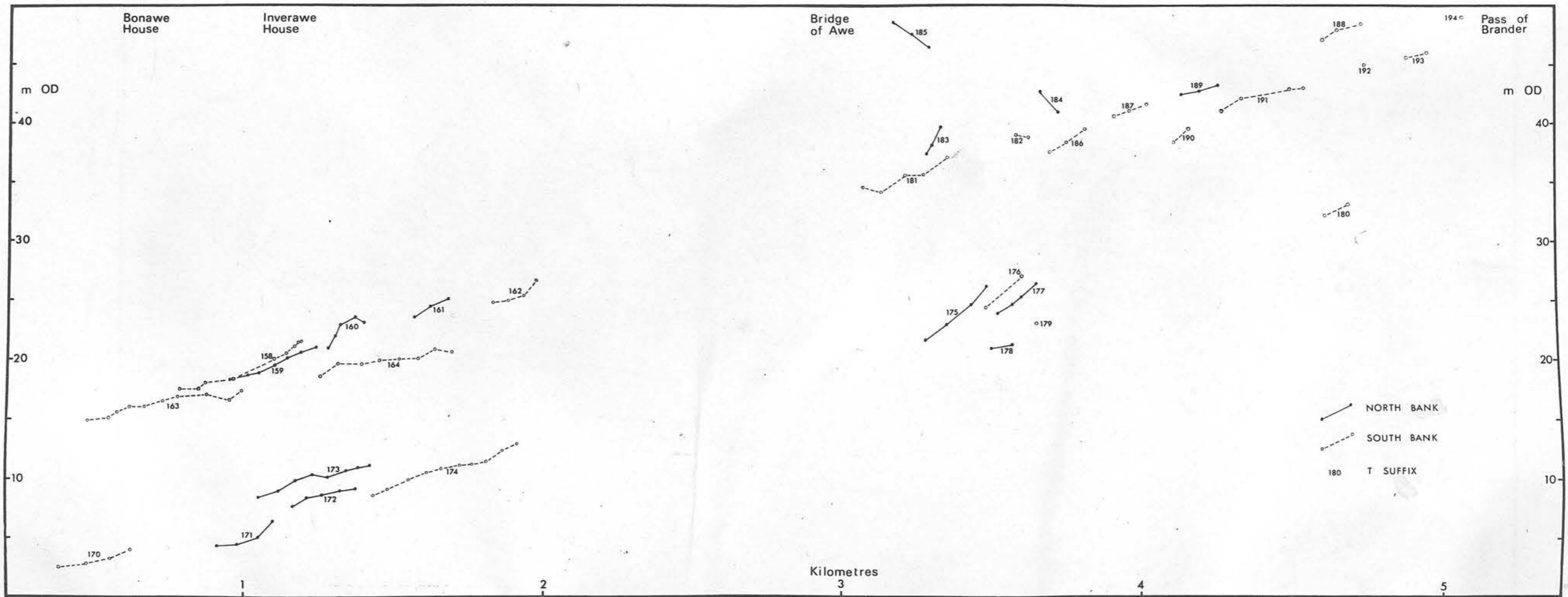


FIGURE 5.7 Height/distance diagram for the Awe valley terraces.

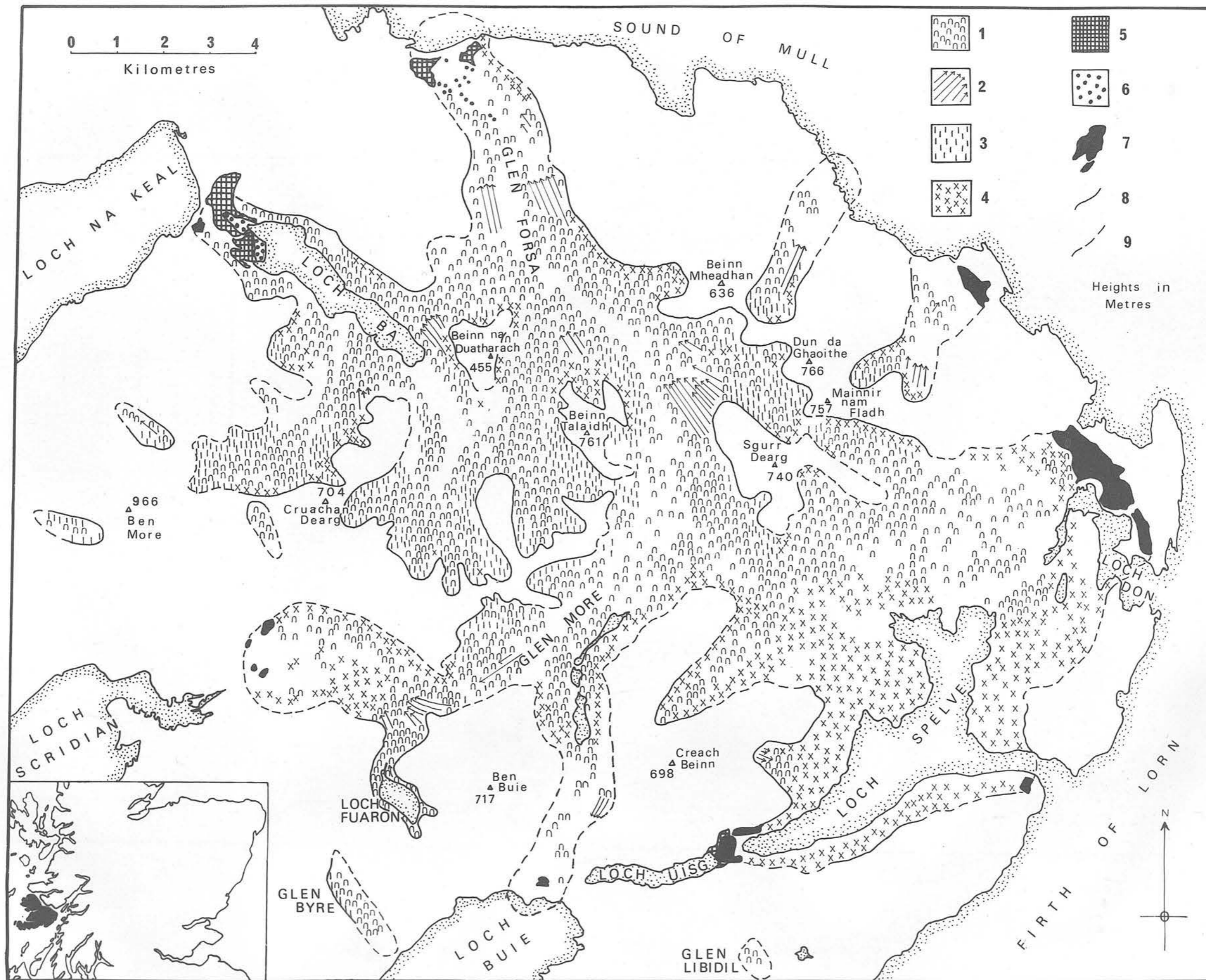


FIGURE 6.1 Moraines, thick drift deposits and ice-limits of southern Mull. 1. Hummocky moraines 2. Fluted moraines 3. Deeply gullied drift 4. Drift plastered rock 5. Outwash 6. Kames, kettle holes and eskers 7. Terminal moraines 8. Upper limit of thick drift where this is clearly defined 9. Upper limit of thick drift where this is not clearly defined.

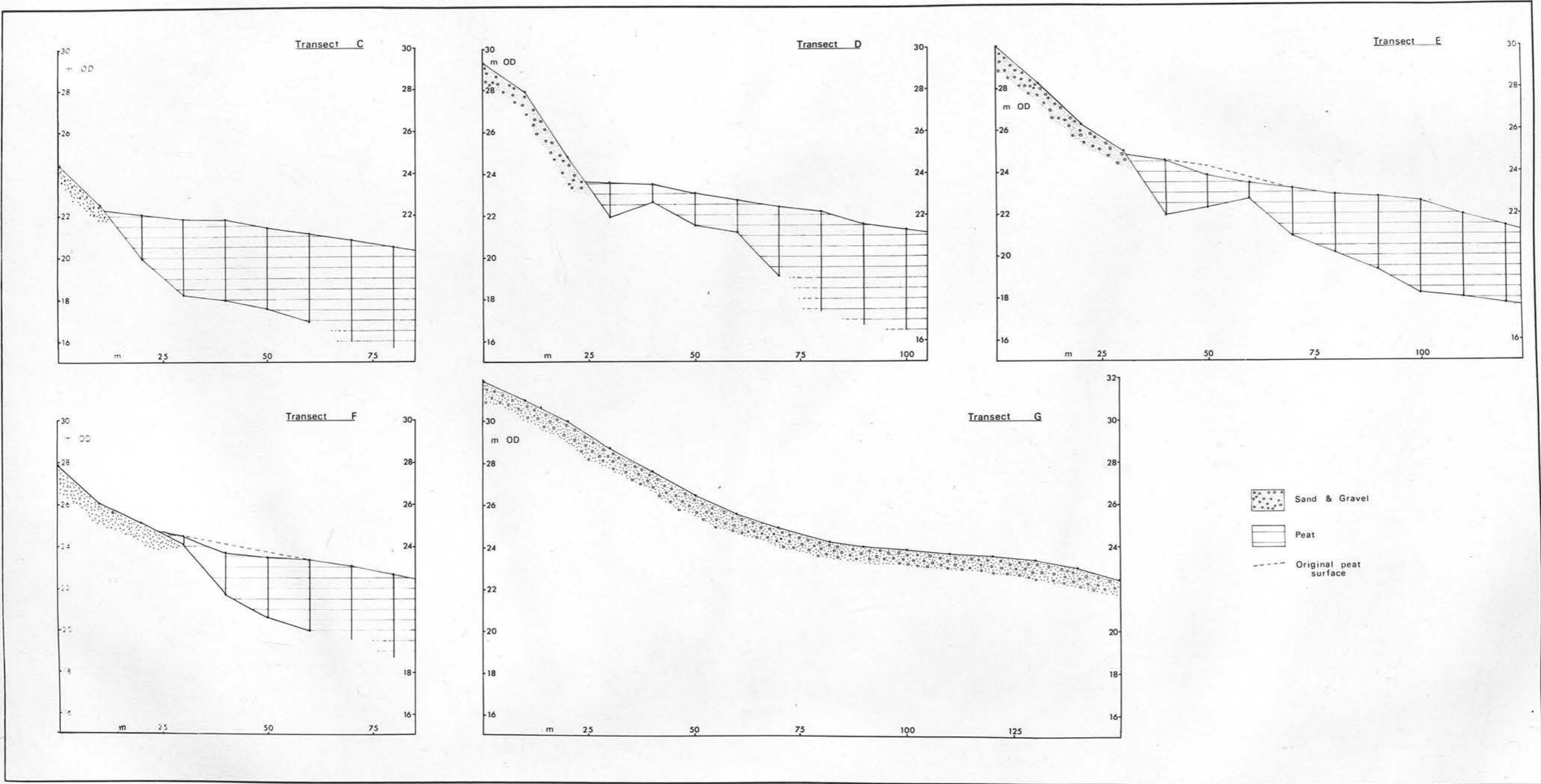


FIGURE 6.2 Transects C-G.

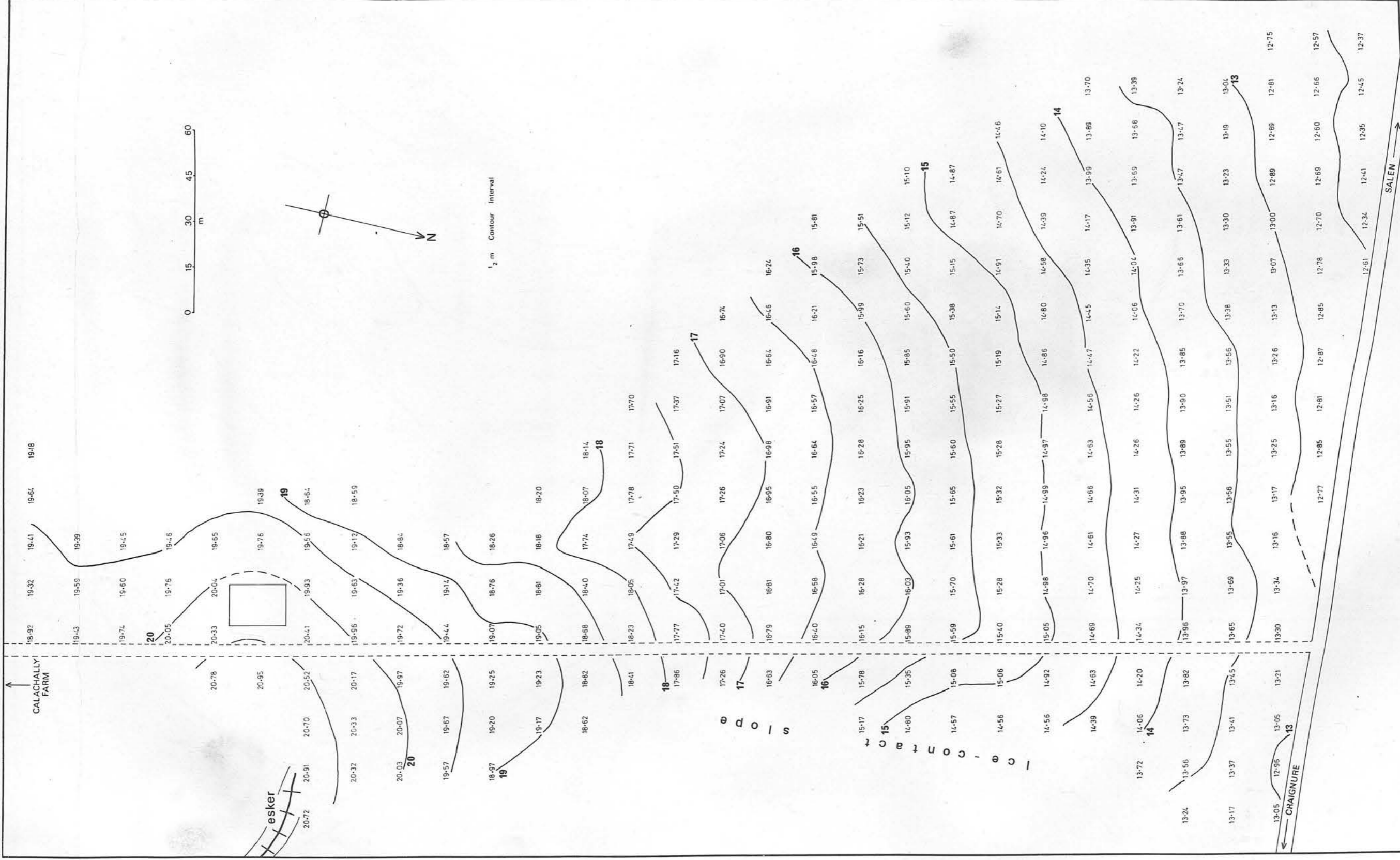


FIGURE 6.3 Gridded heights and contours on the Callachally Terrace. The heightened points are indicated by the decimal points.

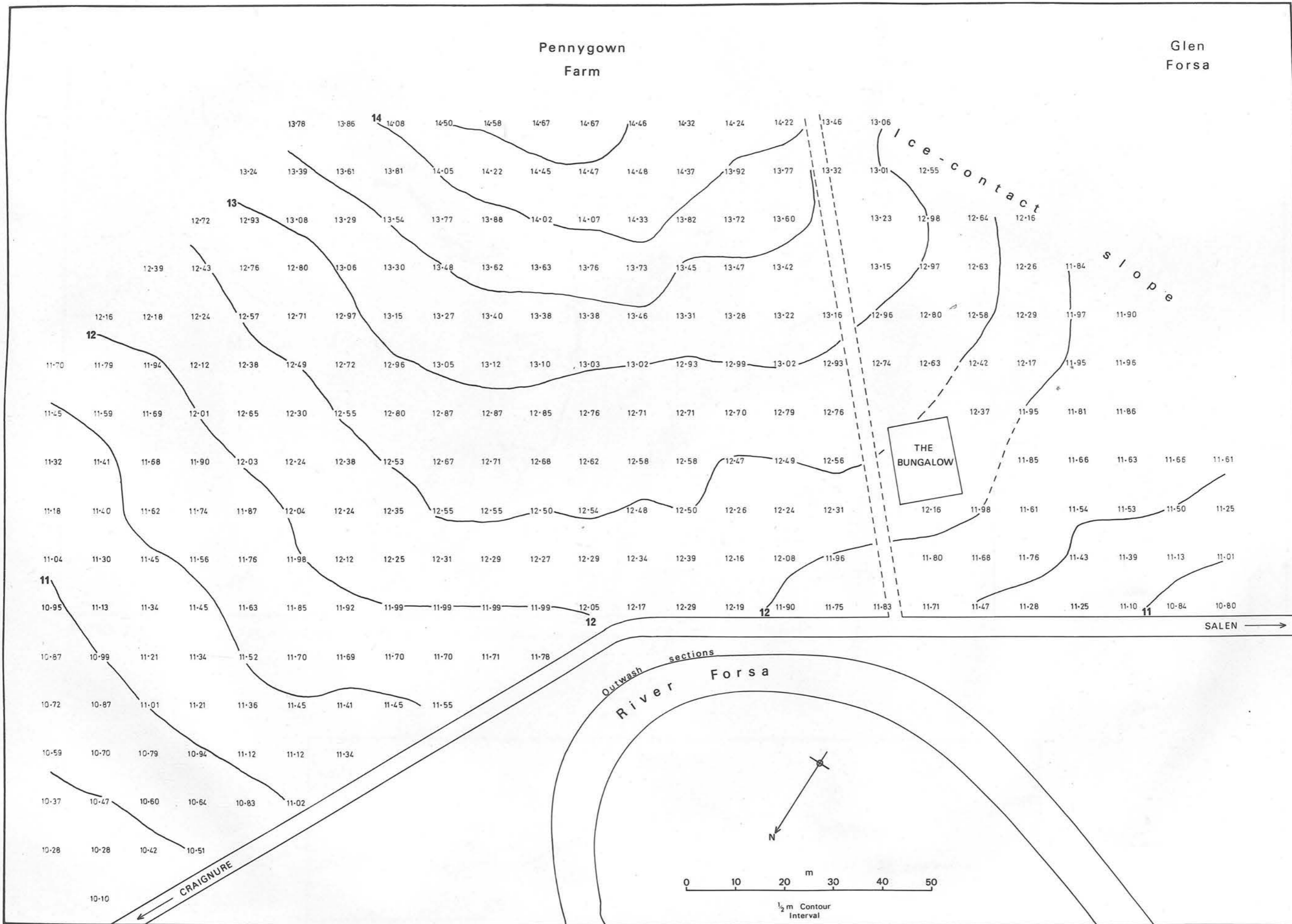


FIGURE 6.4 Gridded heights and contours on the Pennygown Terrace. The heightened points are indicated by the decimal points.

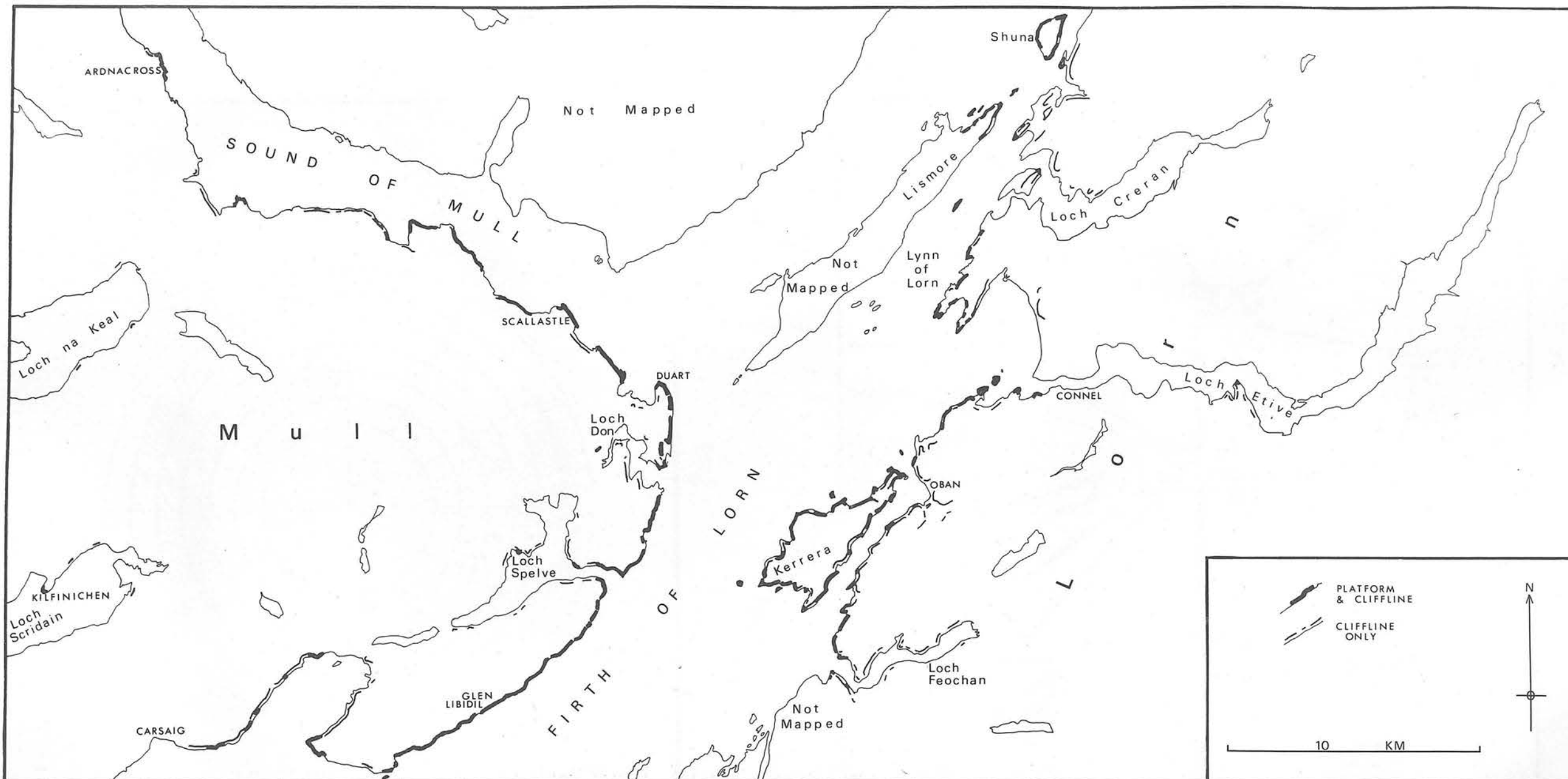


FIGURE 7.1 Distribution of raised cliffs and rock platforms in Lorn and eastern Mull.

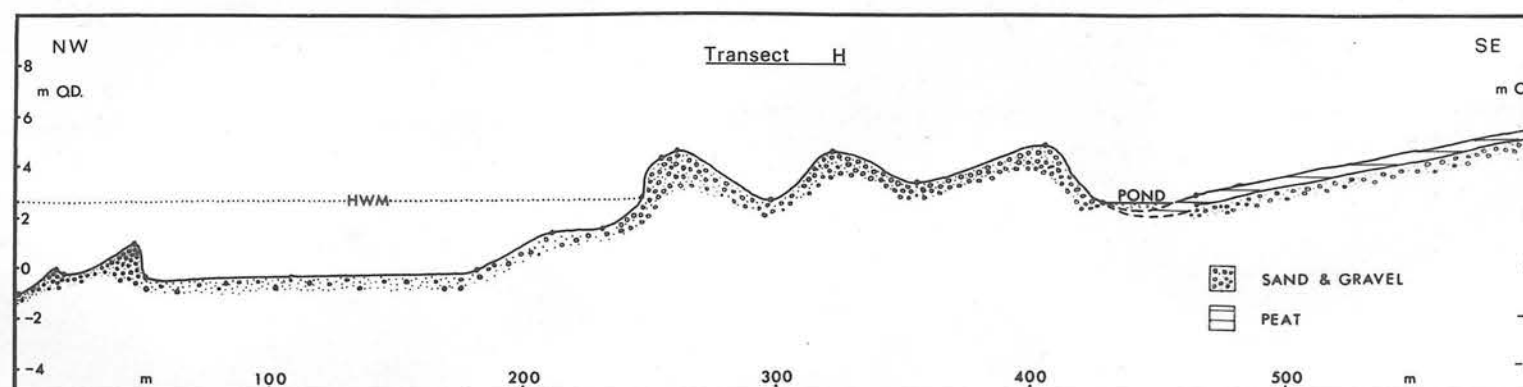


FIGURE 8.1 Transect H.

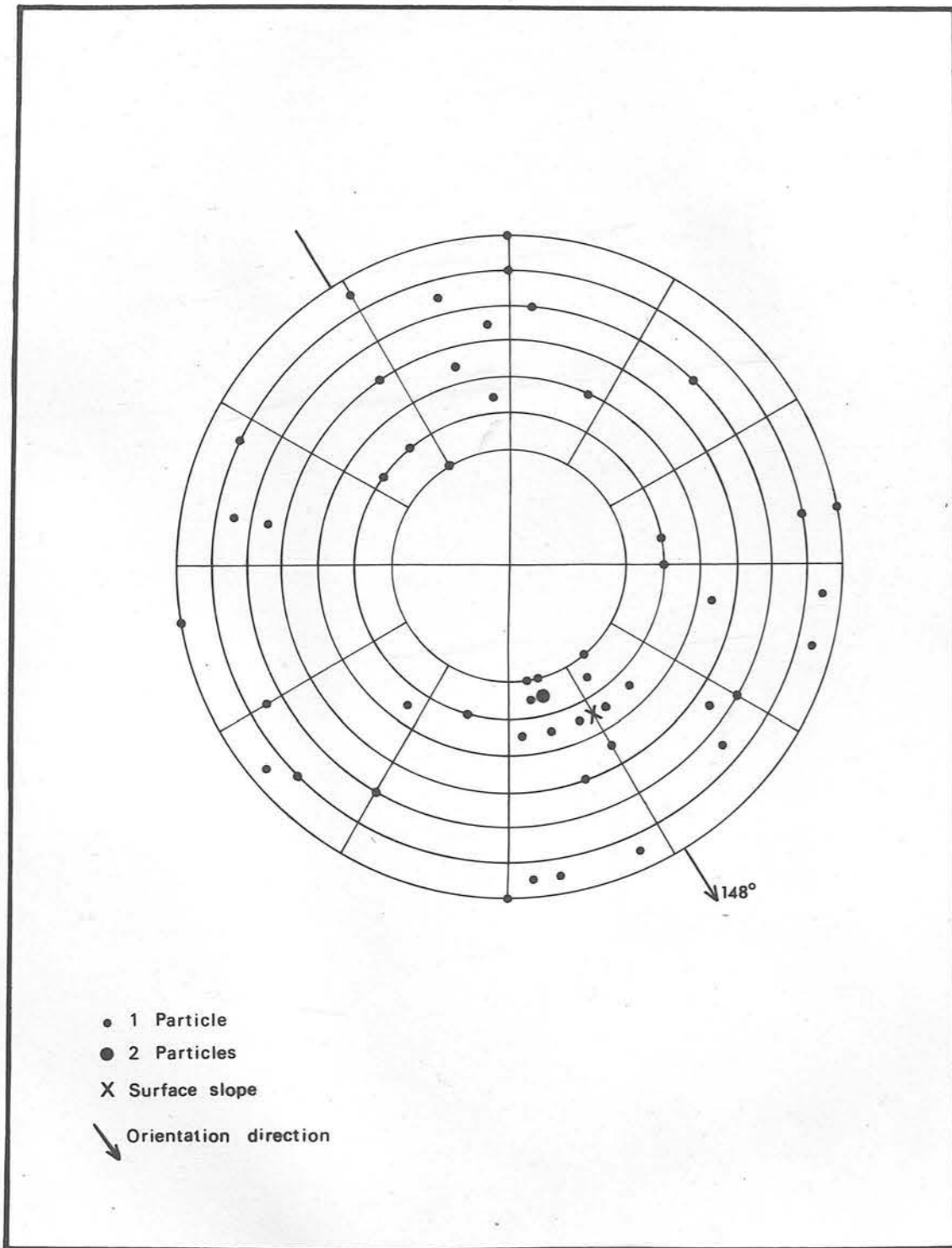


FIGURE 8.2 Stone orientation and dip diagram for drift opposite the Glen Cruitten Quarry shell site.

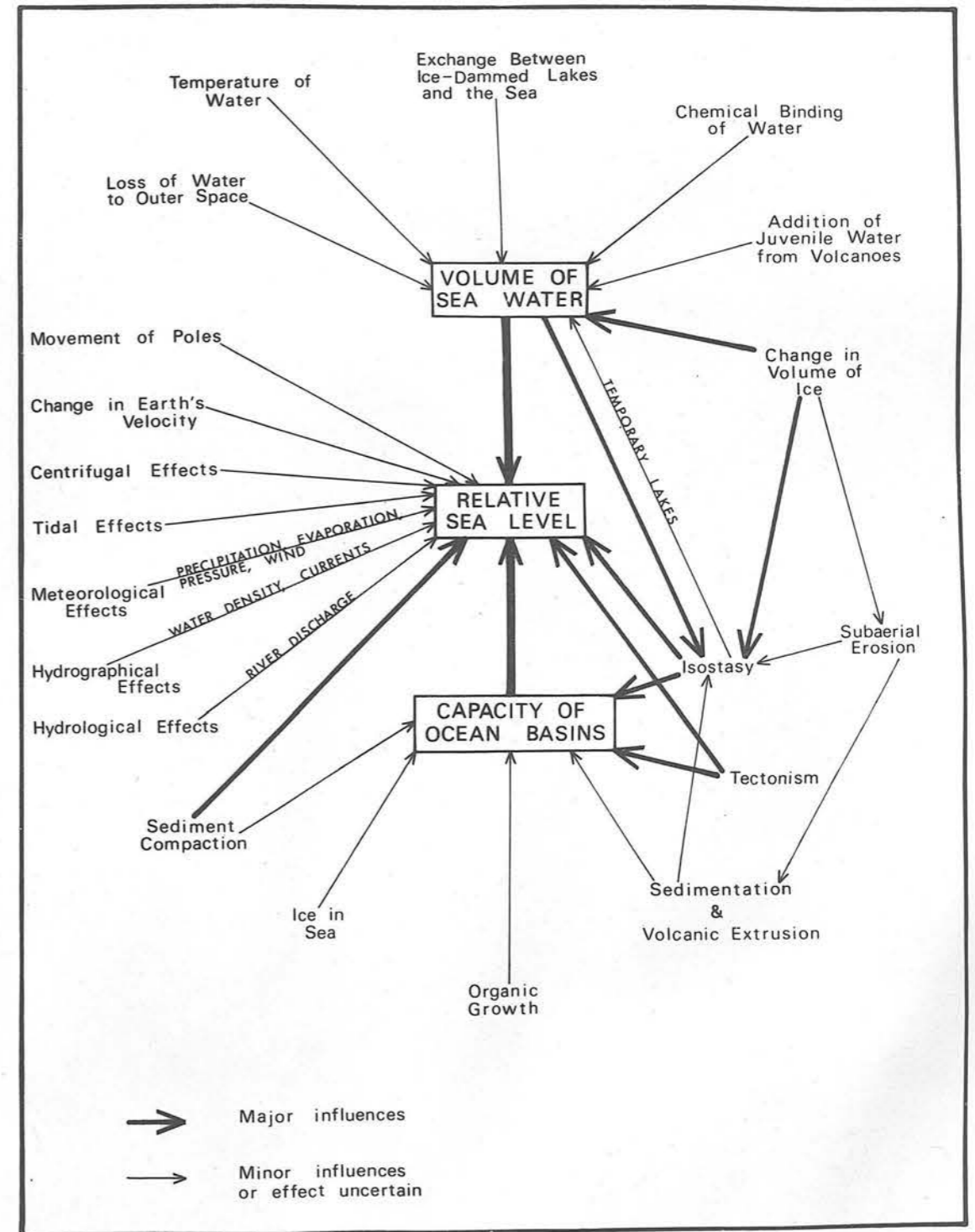


FIGURE 9.1 Model of the factors influencing the relative level of the sea.

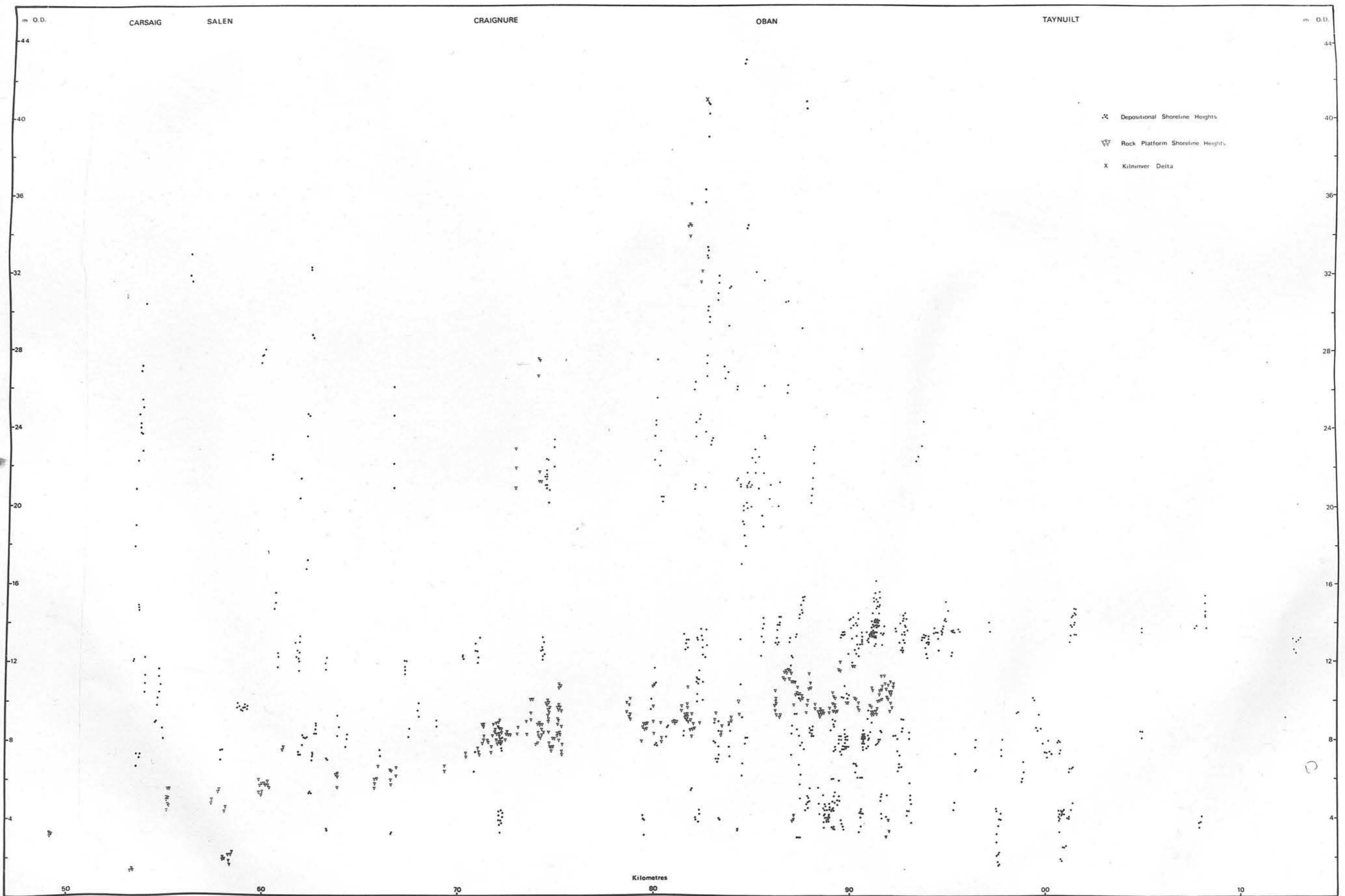


FIGURE 10.1 Equidistant diagram (E-W) for all shoreline heights.

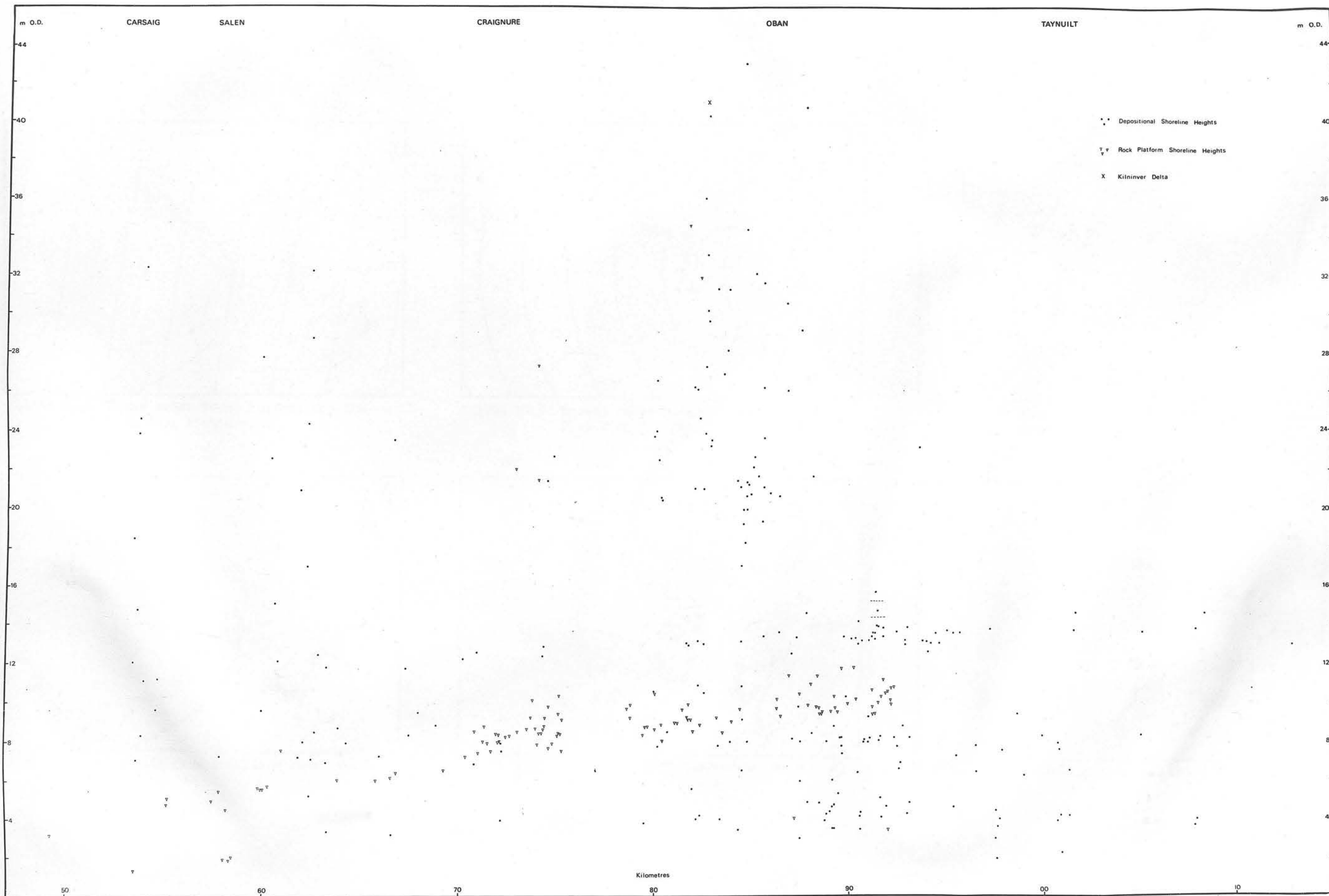


FIGURE 10.2 Egdistant diagram (E-W) for the fragment height averages.

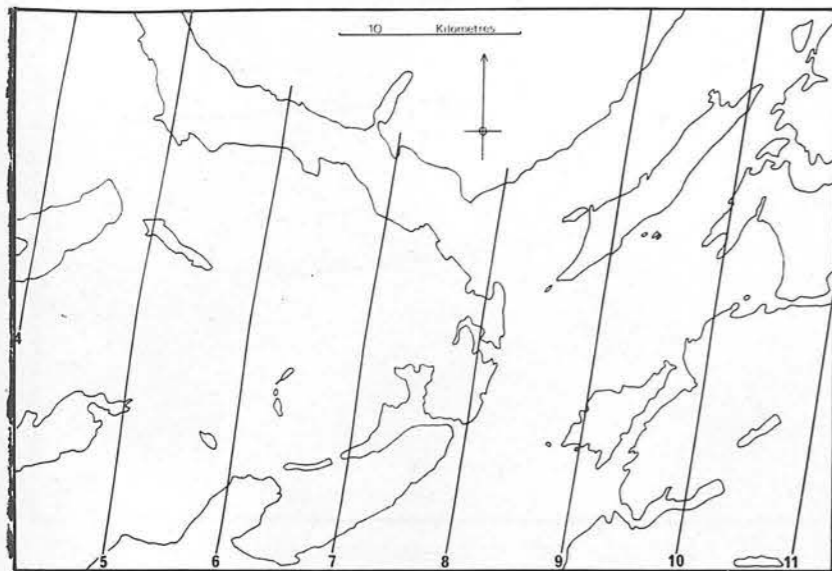


FIGURE 10.3 First order trend surface for the Main Rock Platform.

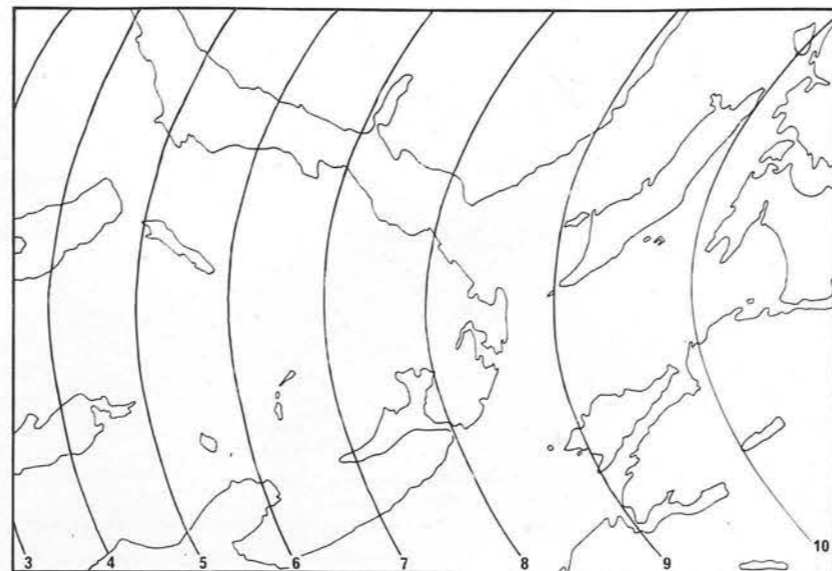


FIGURE 10.5 Second order trend surface for the Main Rock Platform.

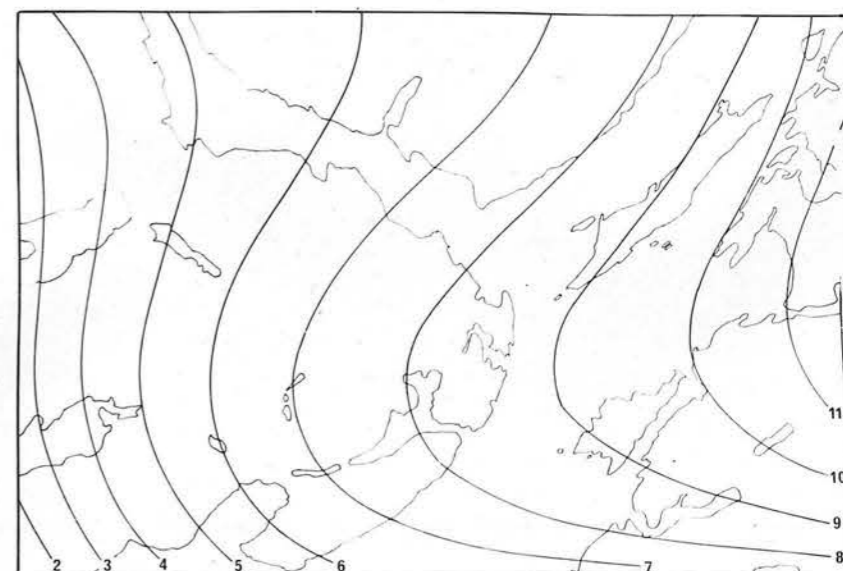


FIGURE 10.7 Third order trend surface for the Main Rock Platform.

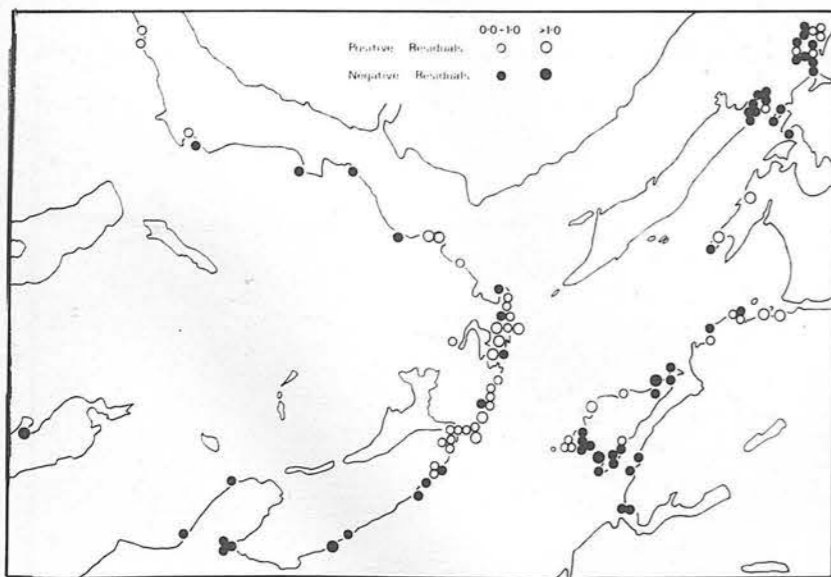


FIGURE 10.4 Residuals from the first order surface.

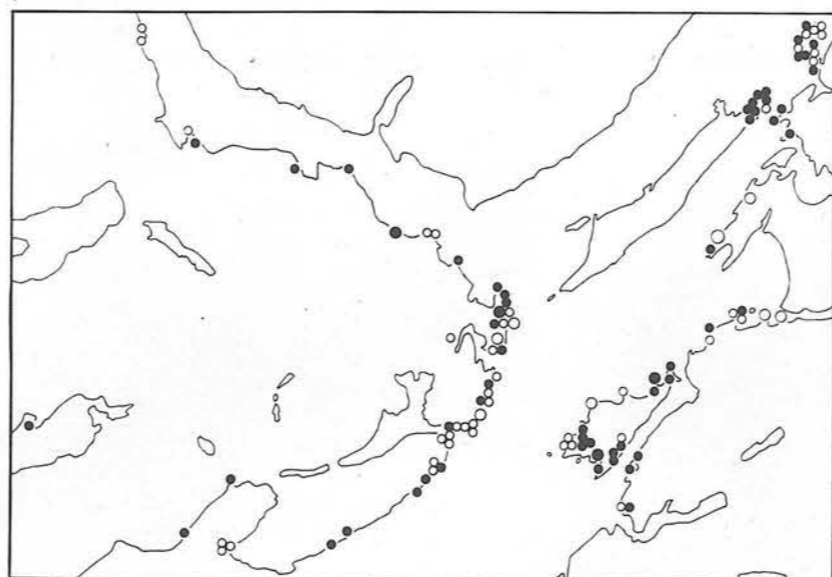


FIGURE 10.6 Residuals from the second order surface.

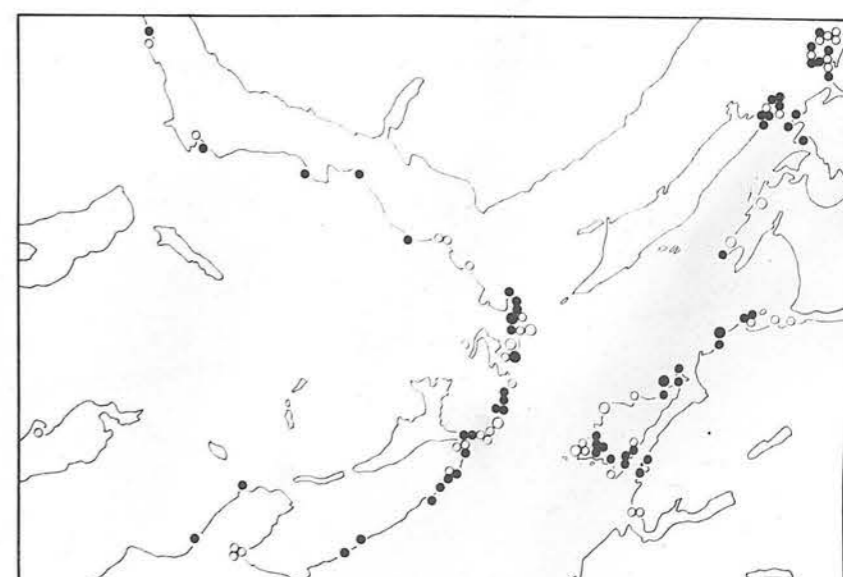


FIGURE 10.8 Residuals from the third order surface.

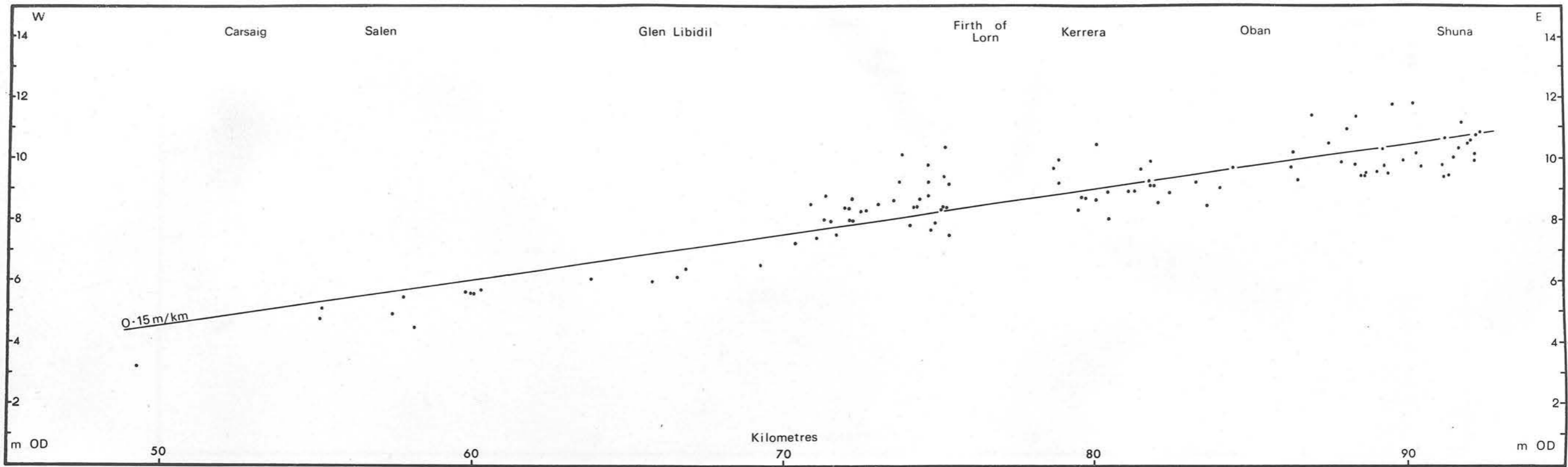


FIGURE 10.9 Regression line for all Main Rock Platform fragment height averages.

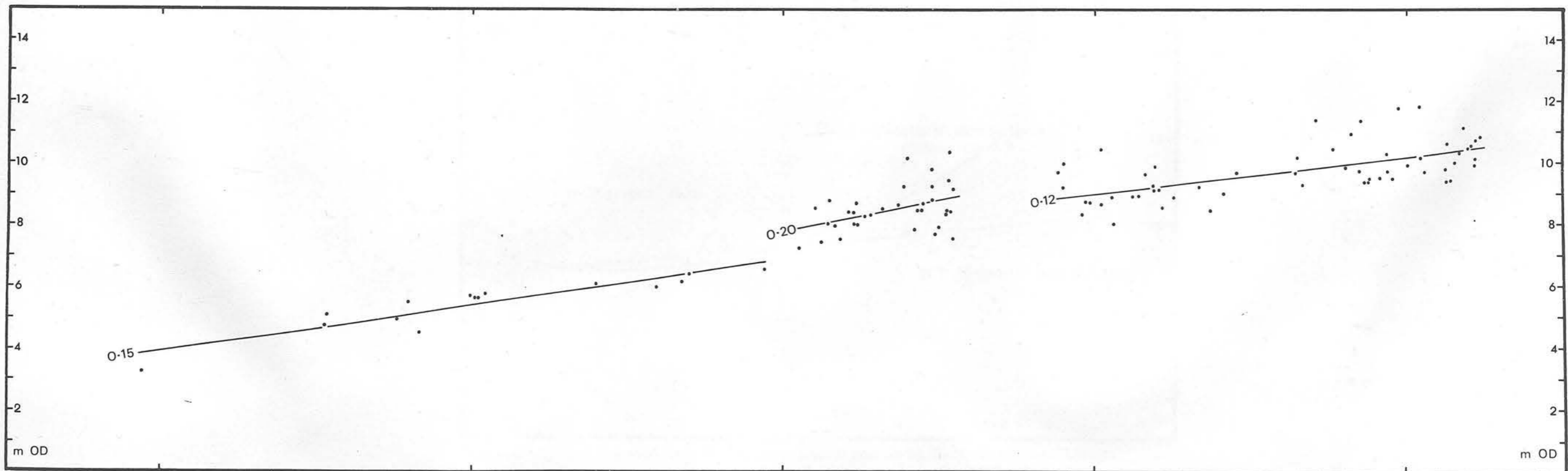


FIGURE 10.10 Regression lines for Main Rock Platform fragment height averages in three parts of the study area. Gradients in m/km.

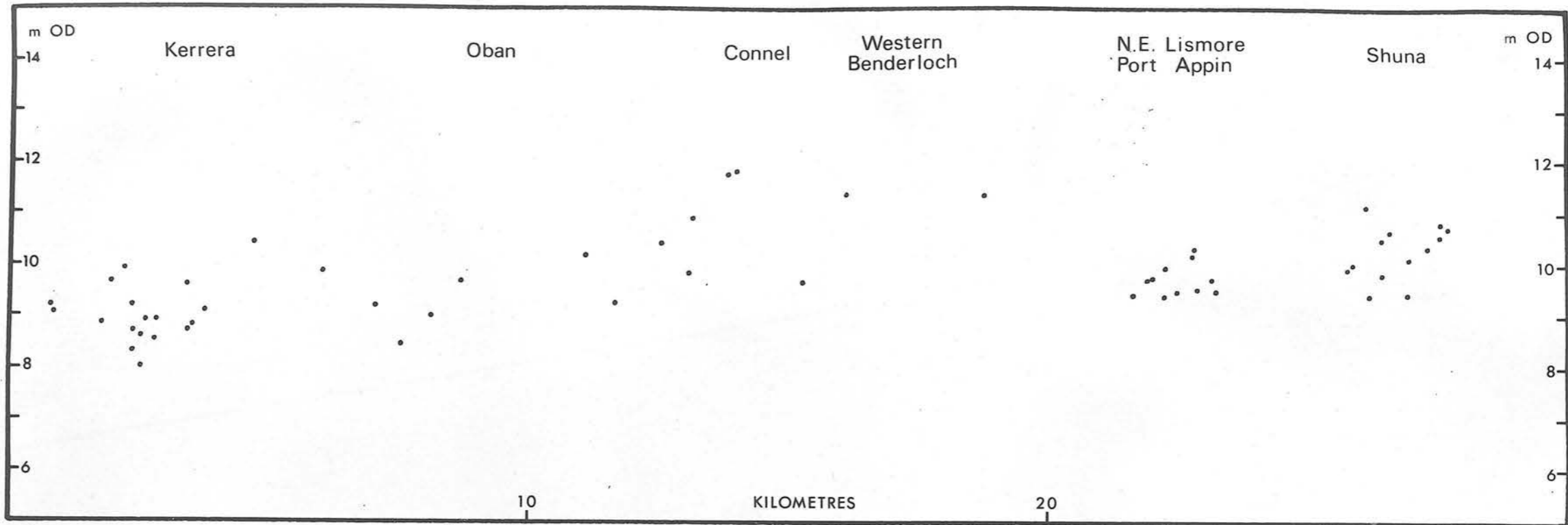


FIGURE 10.11 Equidistant diagram ($E60^{\circ}N-W60^{\circ}S$) for the "mainland" Main Rock Platform fragment height averages.

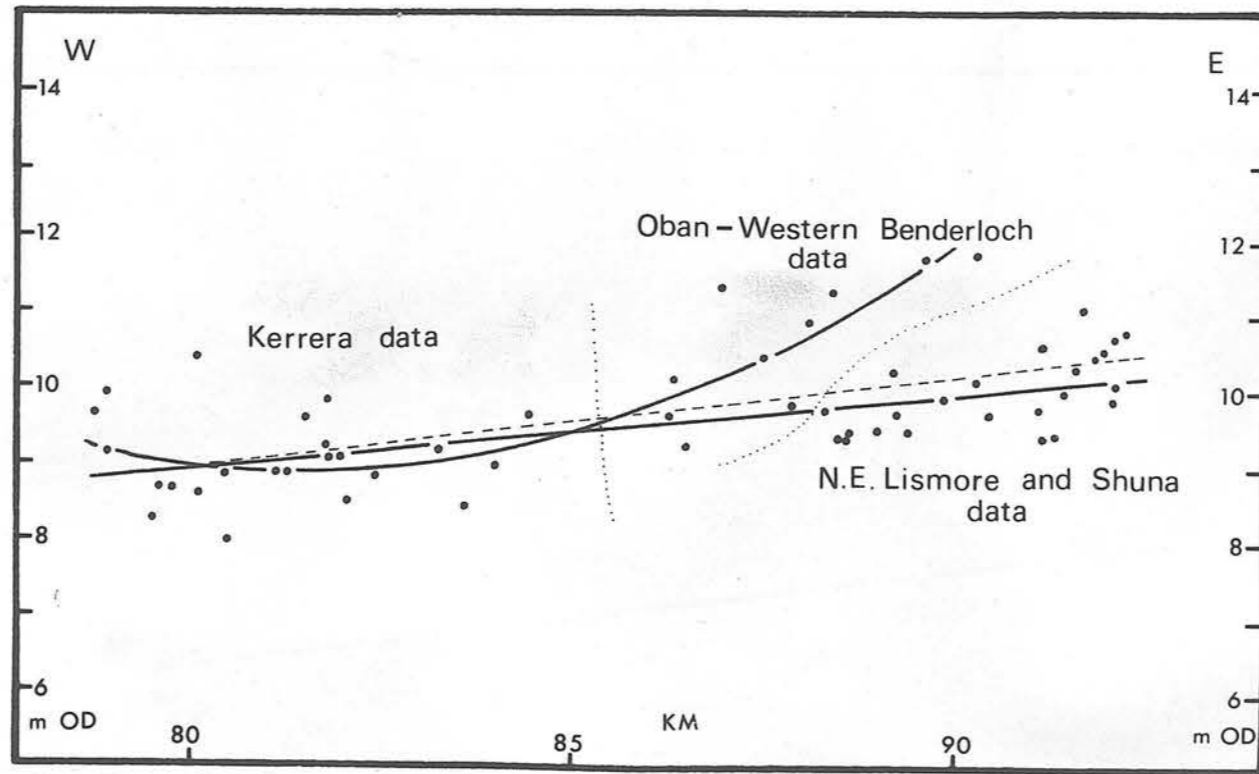


FIGURE 10.12 Regression lines and curve for Main Rock Platform height averages in all (dashed line) and parts of Lorn.

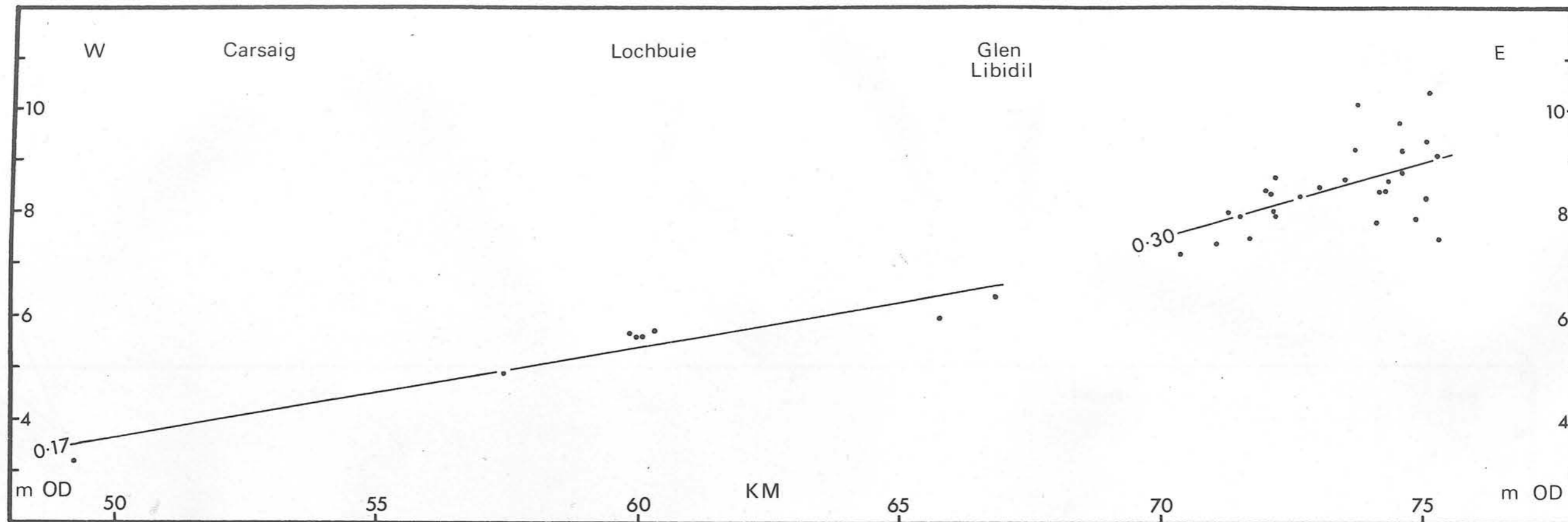


FIGURE 10.13 Regression lines for Main Rock Platform fragment height averages east and west of grid line 70 on S. Mull. Gradients in m/km.

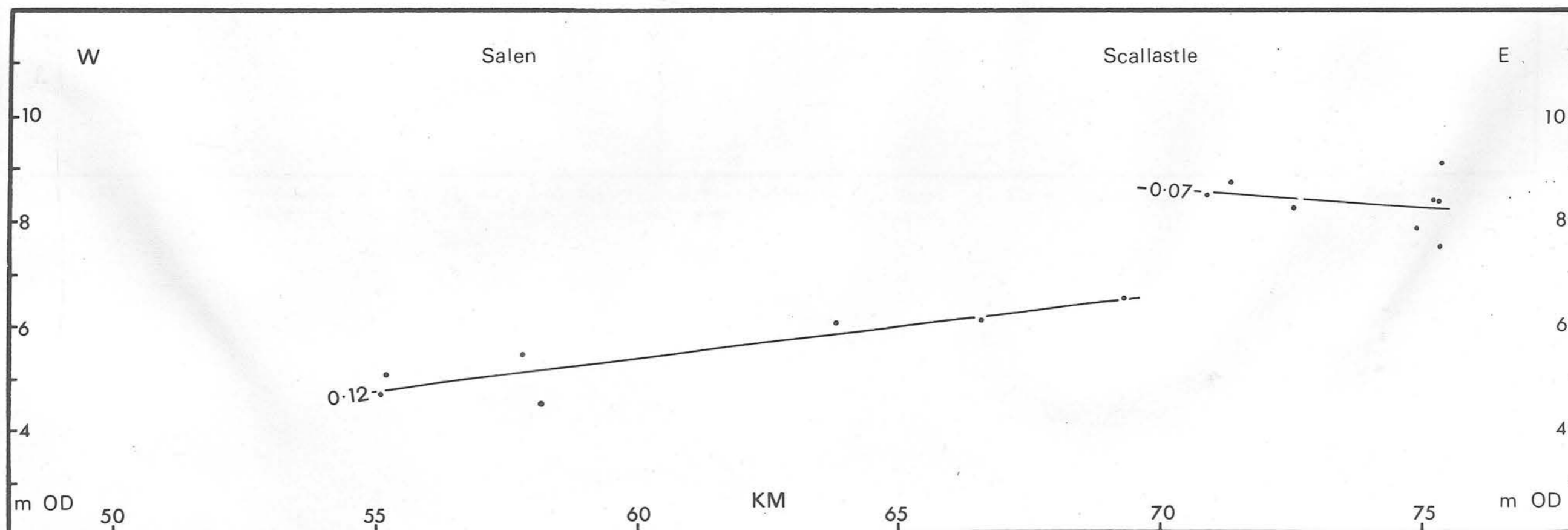


FIGURE 10.14 Regression lines for Main Rock Platform fragment height averages east and west of grid line 70 on N. Mull. Gradients in m/km.

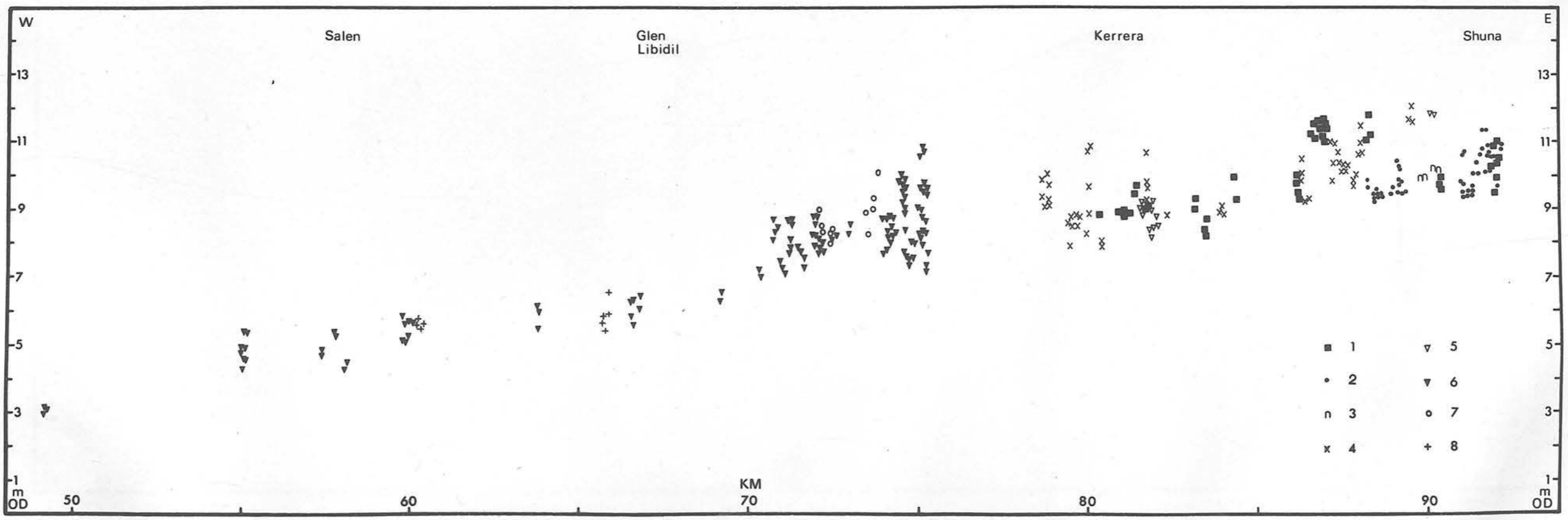


FIGURE 10.15 Equidistant diagram (E-W) for all Main Rock Platform heights plotted by lithology. 1. Slate, schist and phyllite 2. Limestone 3. Quartzite 4. Conglomerate 5. Andesite 6. Basalt 7. Mesozoic sediments 8. Granophyre.

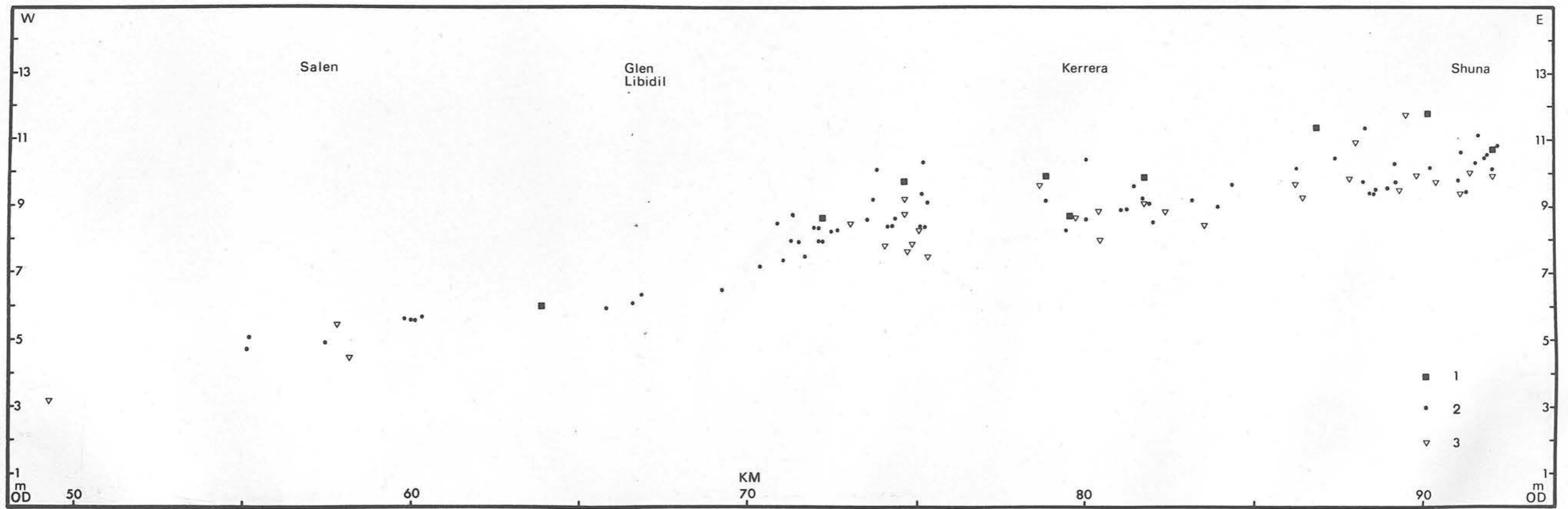


FIGURE 10.16 Equidistant diagram (E-W) for the Main Rock Platform fragment height averages plotted by coastal configuration.
 1. Bays 2. Straight coasts 3. Headlands.

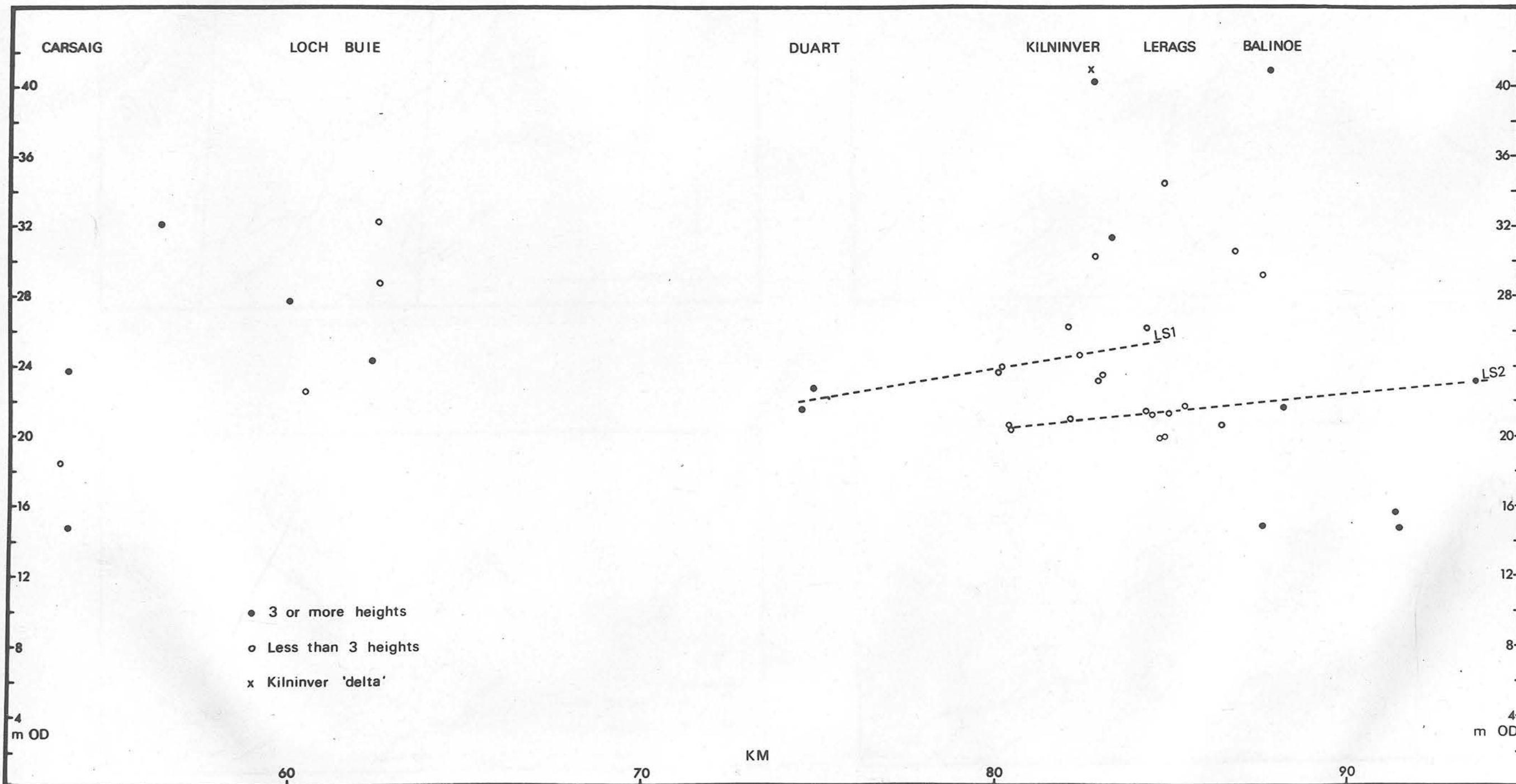


FIGURE 11.1 Equidistant diagram (E-W) for well and moderately-well developed late-glacial shoreline averages.

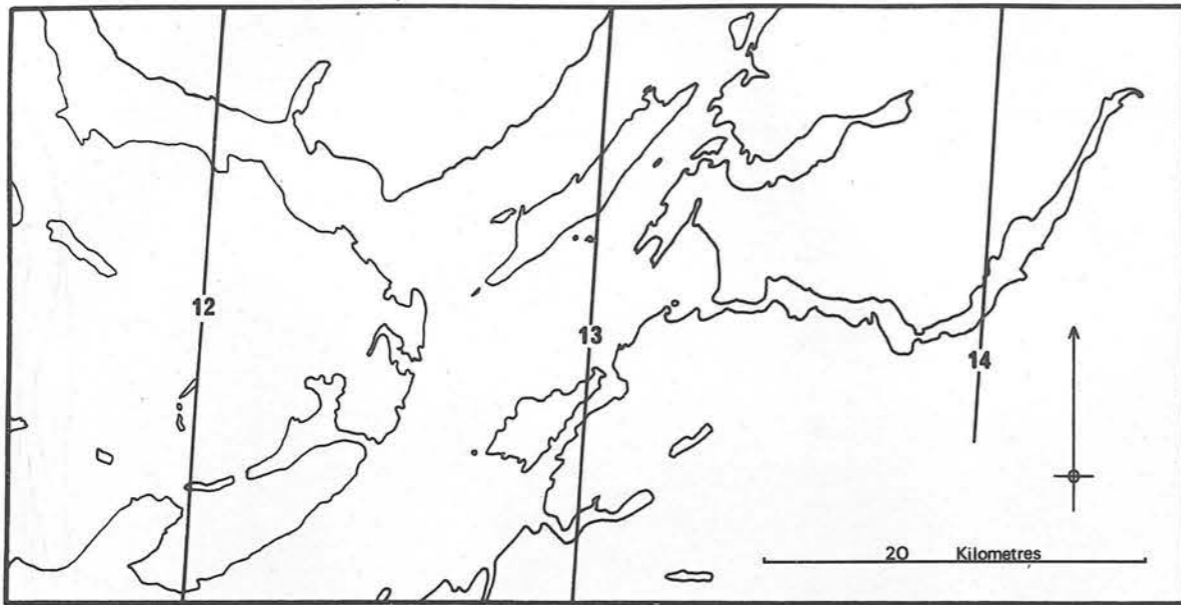


FIGURE 11.2 First order trend surface for the Main Post-glacial Shoreline.

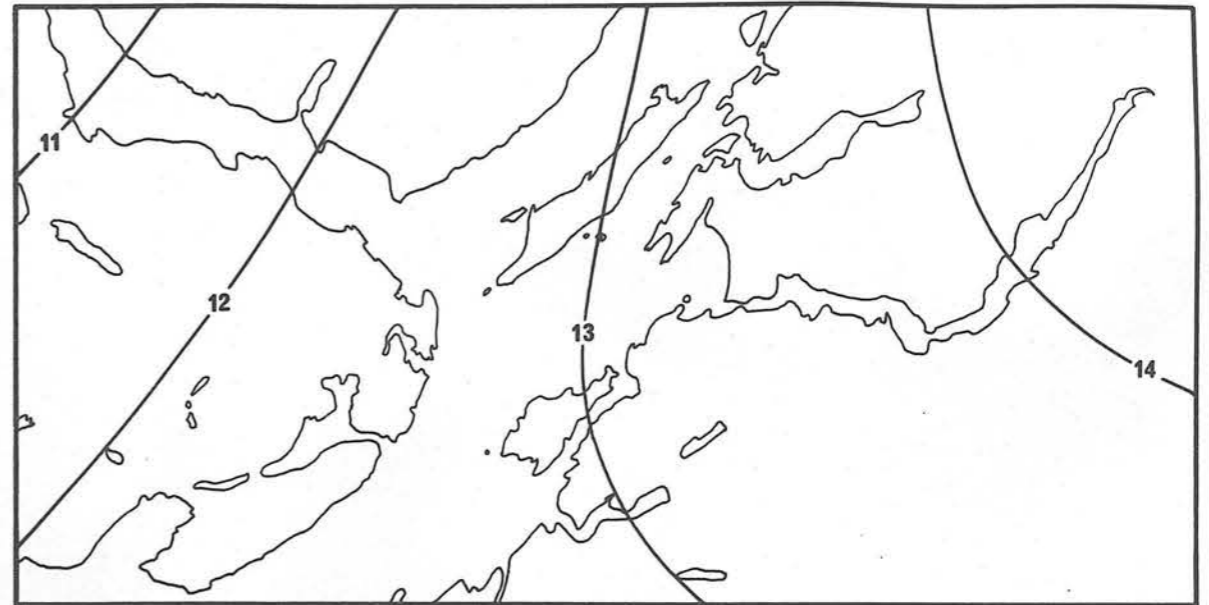


FIGURE 11.4 Second order trend surface for the Main Post-glacial Shoreline.

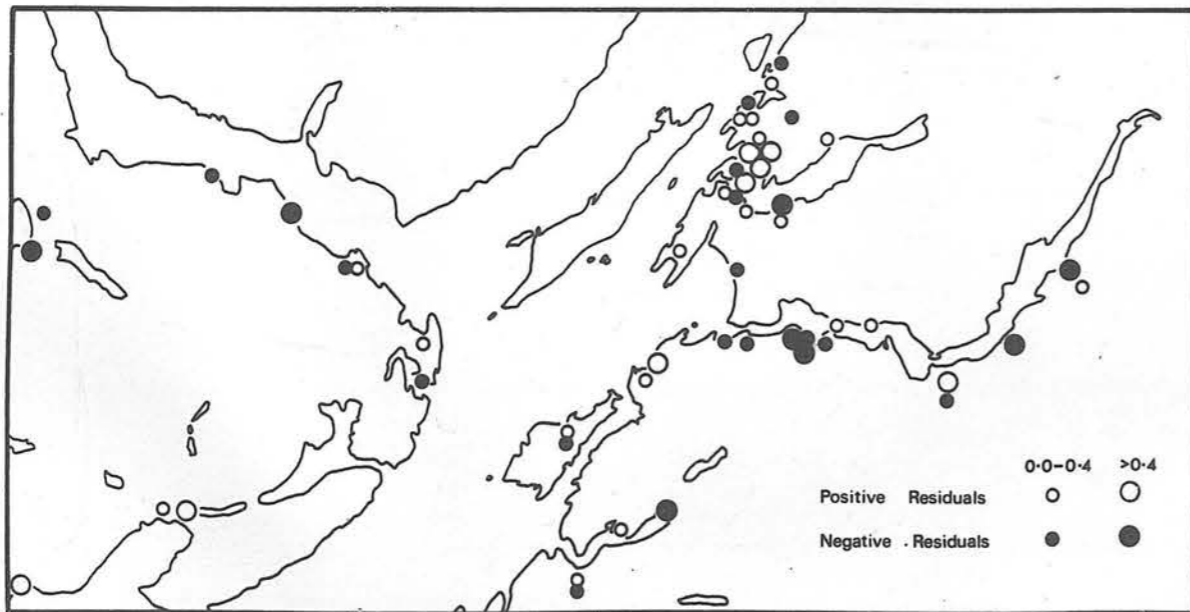


FIGURE 11.3 Residuals from the first order surface.

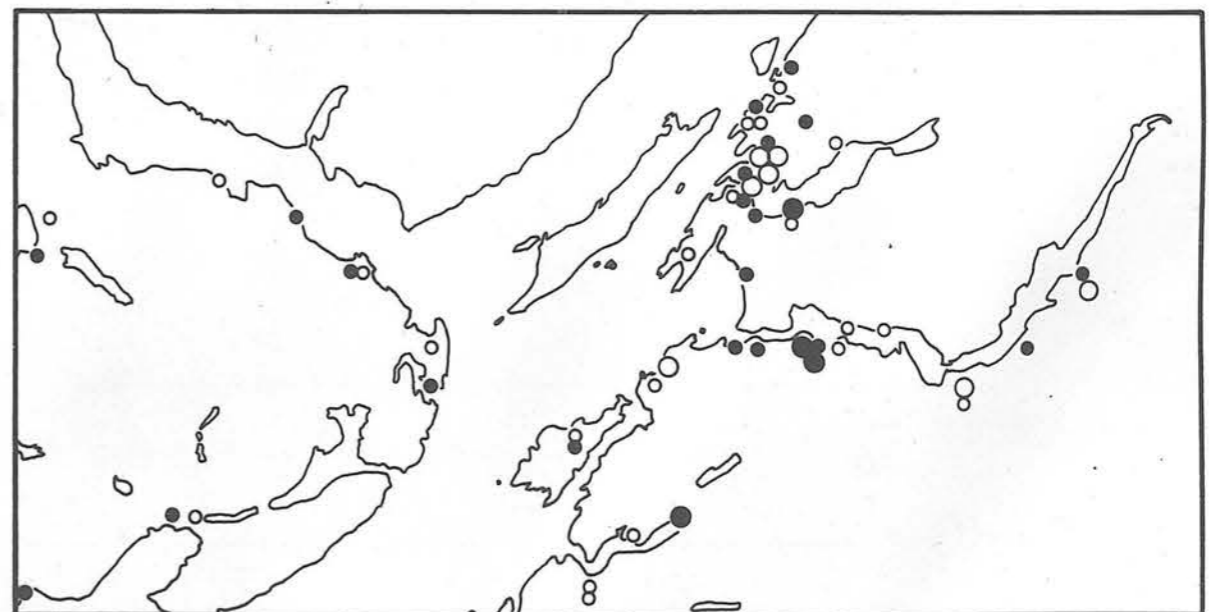


FIGURE 11.5 Residuals from the second order surface.

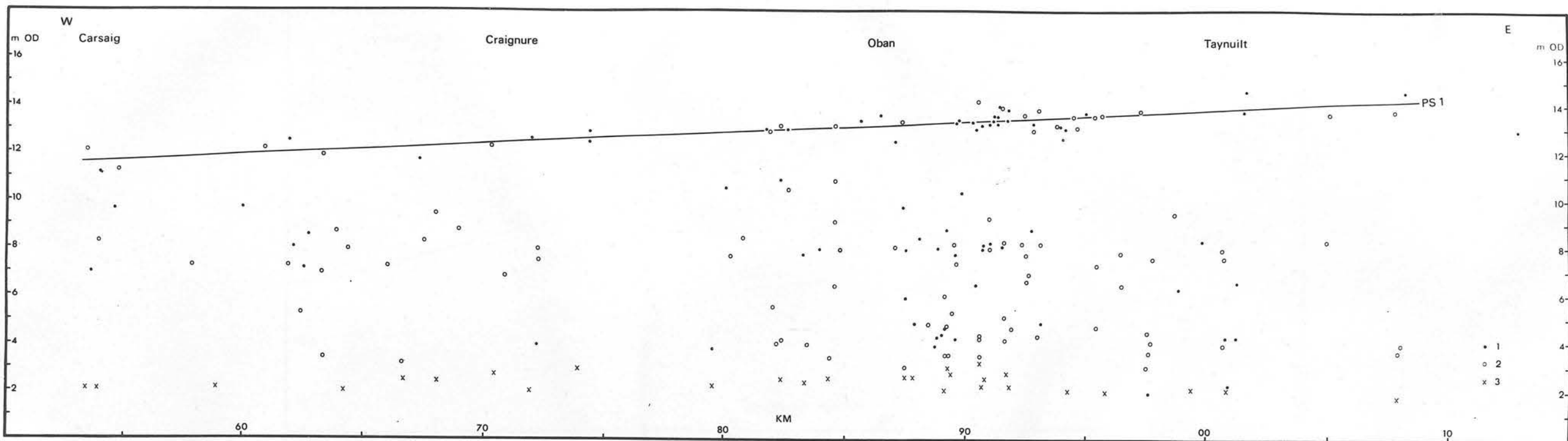


FIGURE 11.6 Equidistant diagram (E-W) for all post-glacial fragment height averages and the regression line for the Main Post-glacial Shoreline.
 1. Four or more heights 2. Less than four heights 3. High water mark.

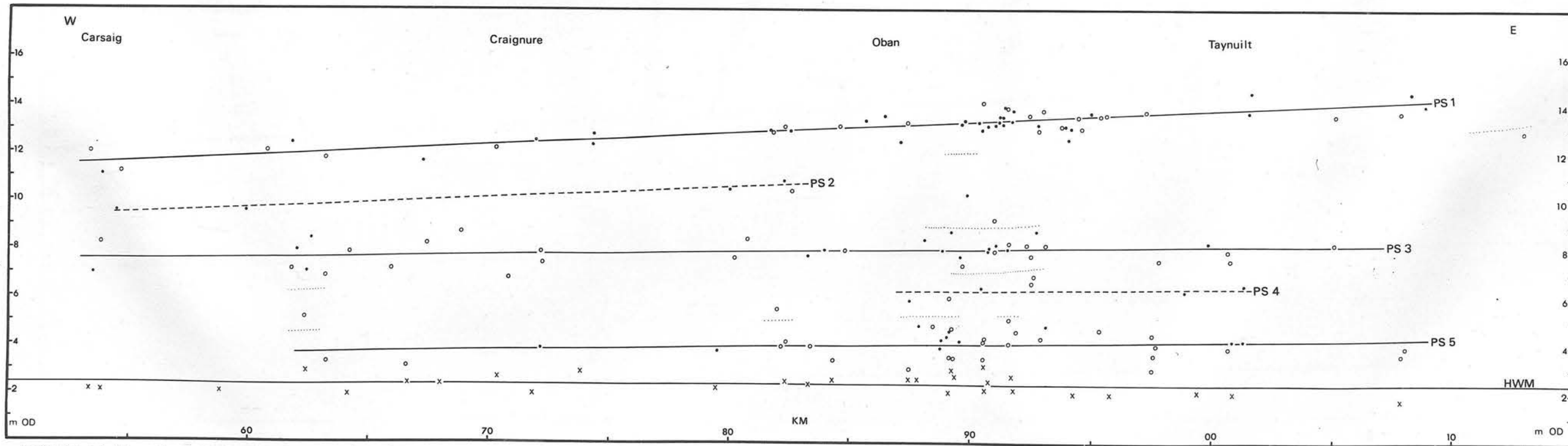


FIGURE 11.7 Equidistant diagram (E-W) for the undiscarded post-glacial fragment height averages and regression lines for the post-glacial shorelines.
 Symbols as Fig. 11.6.

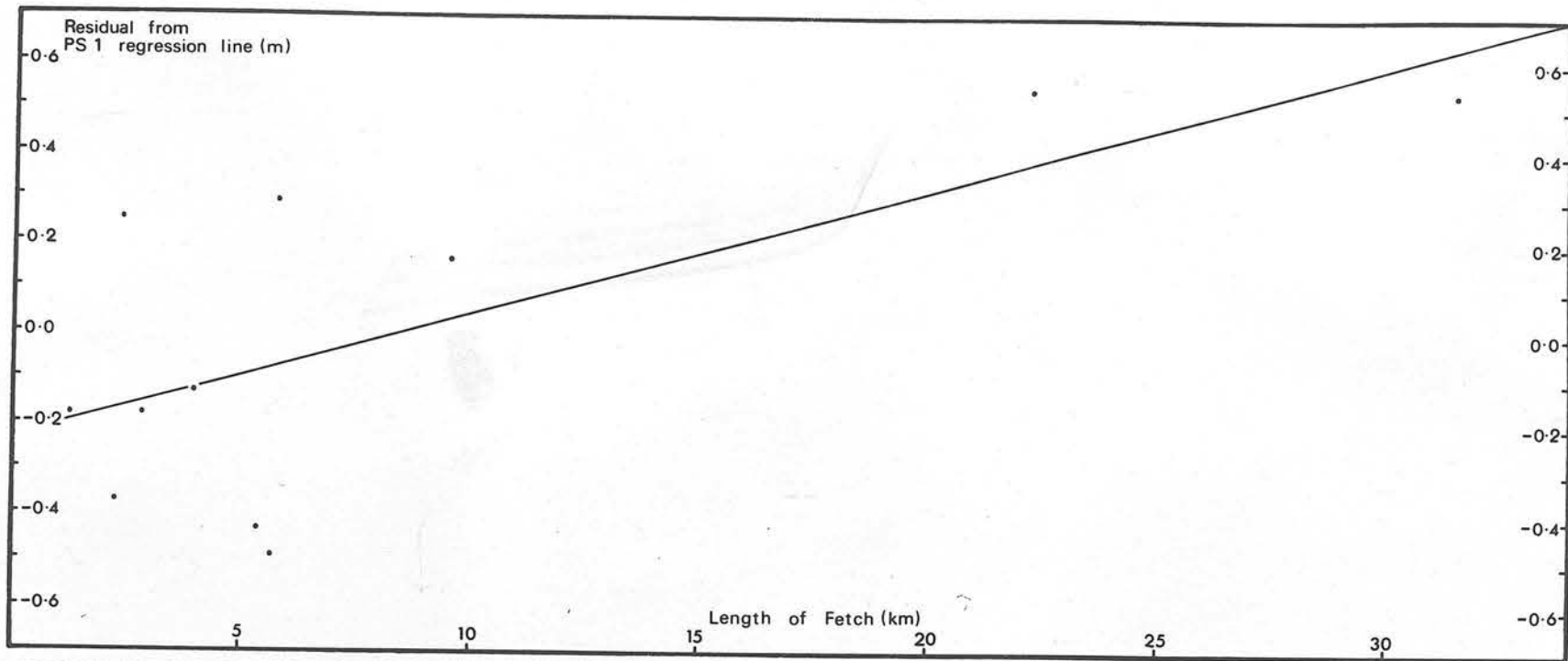


FIGURE 11.8 Residuals from the Main Post-glacial Shoreline regression line plotted against length of fetch.

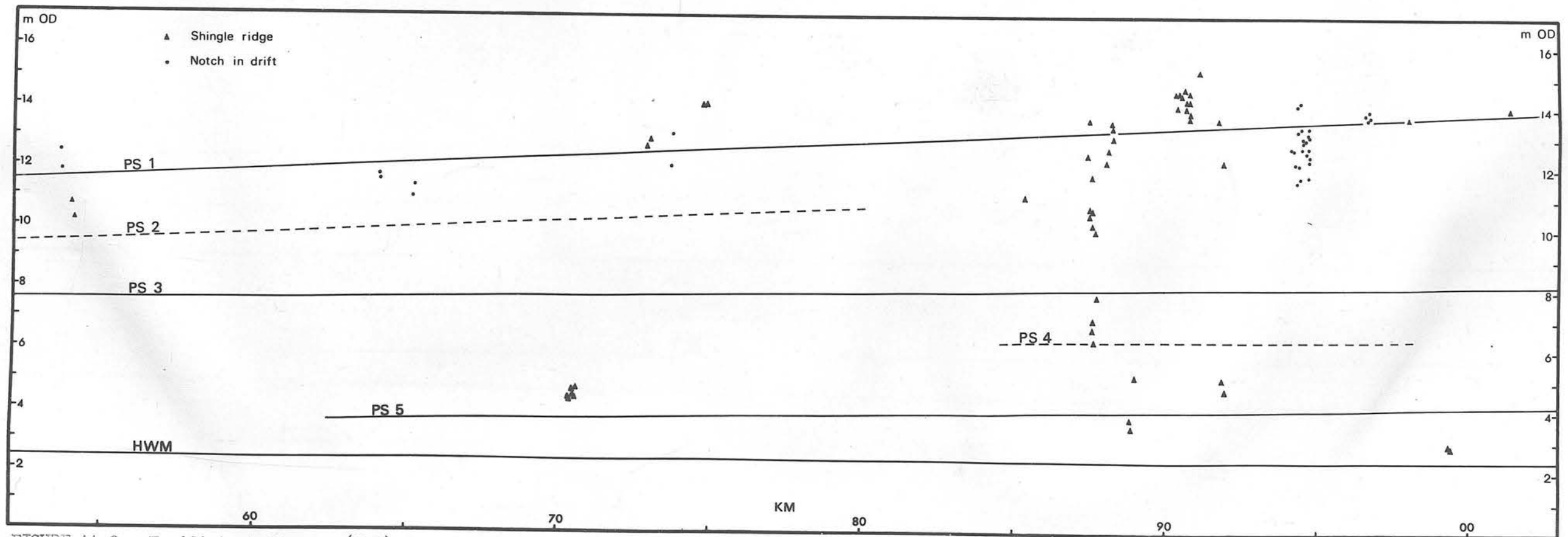


FIGURE 11.9 Equidistant diagram (E-W) for all heights on shingle ridges and notches in drift, superimposed on the post-glacial shorelines.

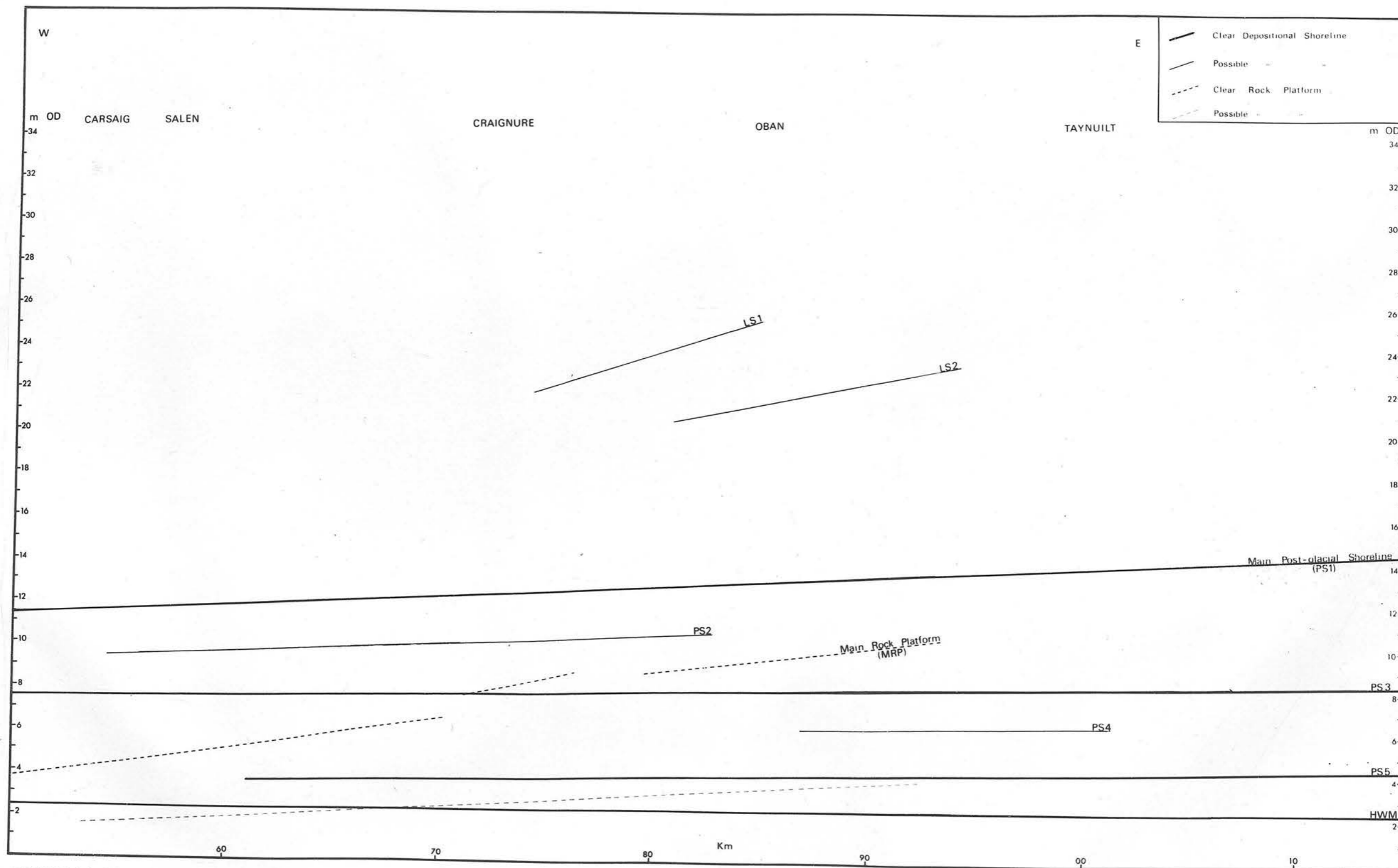


FIGURE 11.10 Composite equidistant diagram for the shorelines of Lorn and eastern Mull.

Plates



PLATE 1 Lower Loch Etive. Note in particular the disturbed water of the Falls of Lora below Connel Bridge, the kettled Achnacree outwash plain (left), the steep slopes on the north side of the loch (left) compared with the low, hummocky, andesite lava terrain on the south side (right), the twin peaks of the granite Ben Cruachan in the distance and the rock knob island Eilean Mor in the foreground. Photograph : Aerofilms.



PLATE 2 Dissected outwash terraces of Terrace X,
Raera, Glen Euchar.
Photograph : Murray Gray



PLATE 3 The Baron's Cairn, Achmacree Moss.
Photograph : Murray Gray



PLATE 4 Circular kettle hole in kame terrace,
Achnaba. Photograph : Murray Gray



PLATE 5 Varved clay, Lusragan Valley.
Note in particular the ripple
marks in the lighter beds.
Photograph : Murray Gray



PLATE 6 Topset and foreset beds,
Taynuilt Sand Pit.
Photograph : Murray Gray

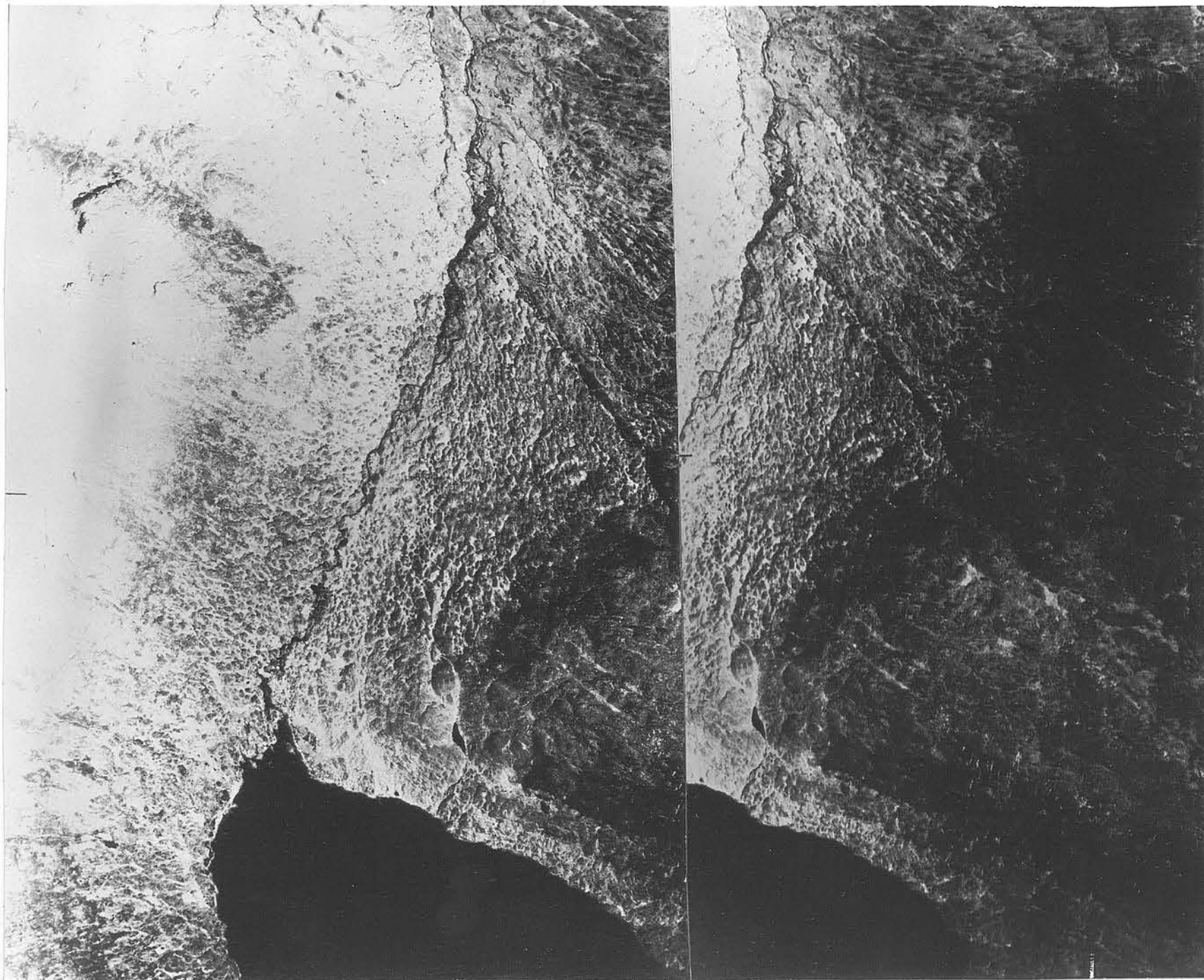


PLATE 7 Hummocky moraines in Glen Fuaron (the valley of the hundred hills). The stereo pair shows the moraines leading northwards from Loch Fuaron (bottom) to Glen More (top) where fluted moraines are also developed. Ministry of Defence (Air Force Dept.) photograph : Crown Copyright reserved.

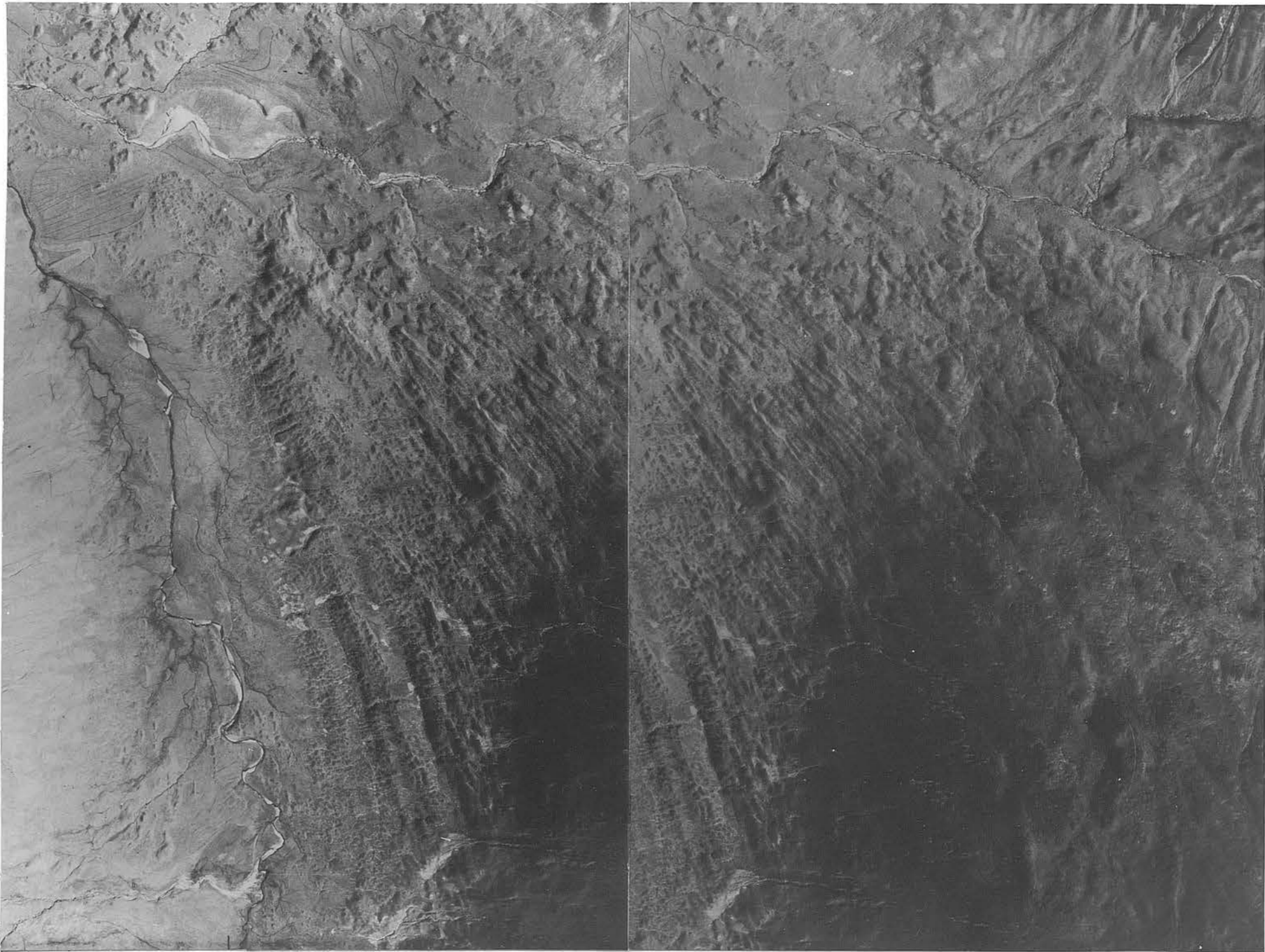


PLATE 8 Fluted moraines on the north-west spur of Sgurr Dearg. The stereo pair shows convergent drift lineations indicating that convergent glaciers moved towards the top left from the valley of the Abhainn an t-Sratha Bhainn (right) and Glen Forsa (left). Between the dark area of outcropping rock on Sgurr Dearg (bottom right) and Glen Forsa, the fluted moraine consists of lineated hummocky moraines rather than the continuous morainic ridges of the central part of the photograph. Ministry of Defence (Air Force Dept.) photograph : Crown Copyright reserved.

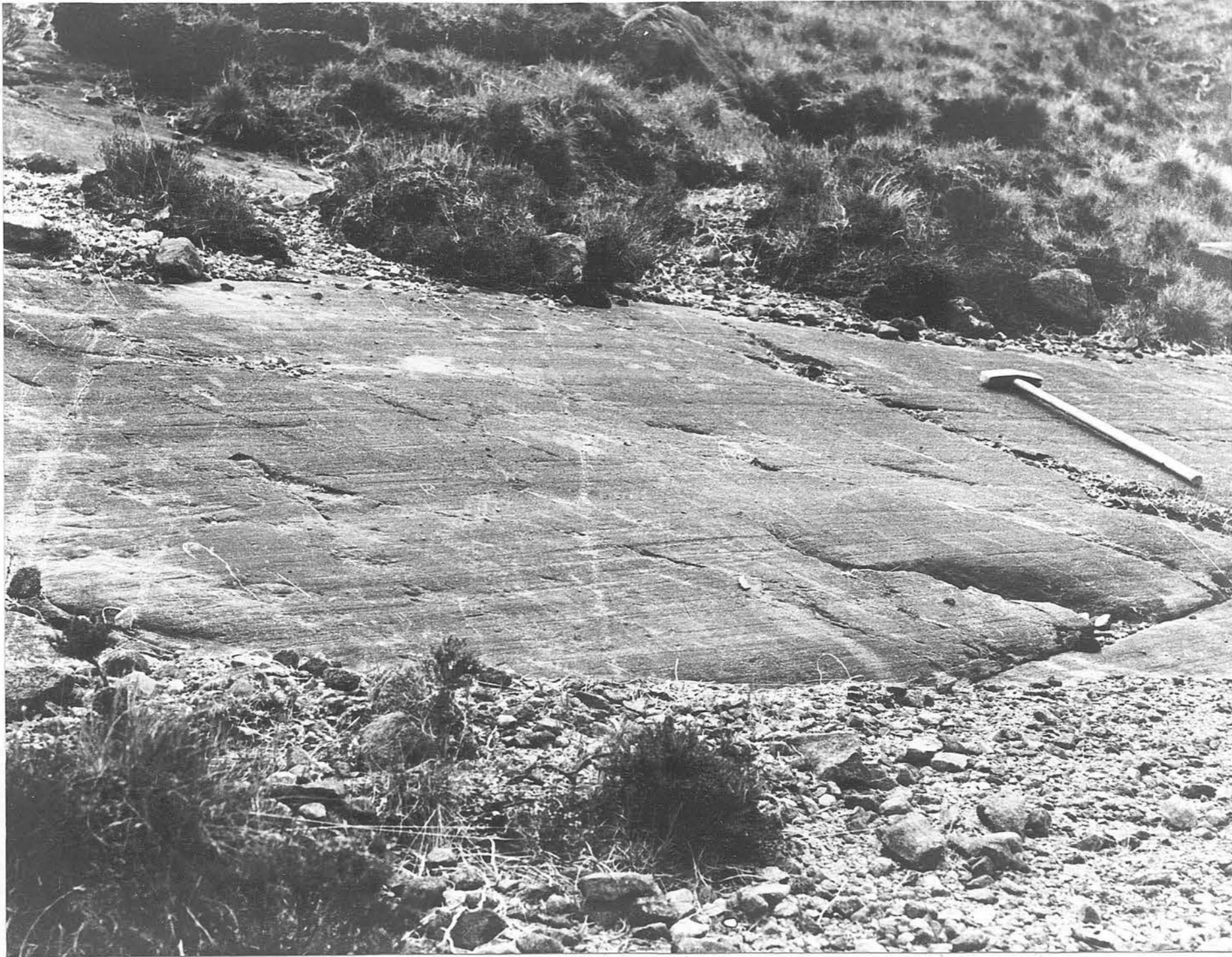


PLATE 9 Striated rock surface in Gleann a' Chaiginn Mhoir, Mull. The striae indicate down valley movement of ice. Institute of Geological Sciences photograph : Crown Copyright reserved.

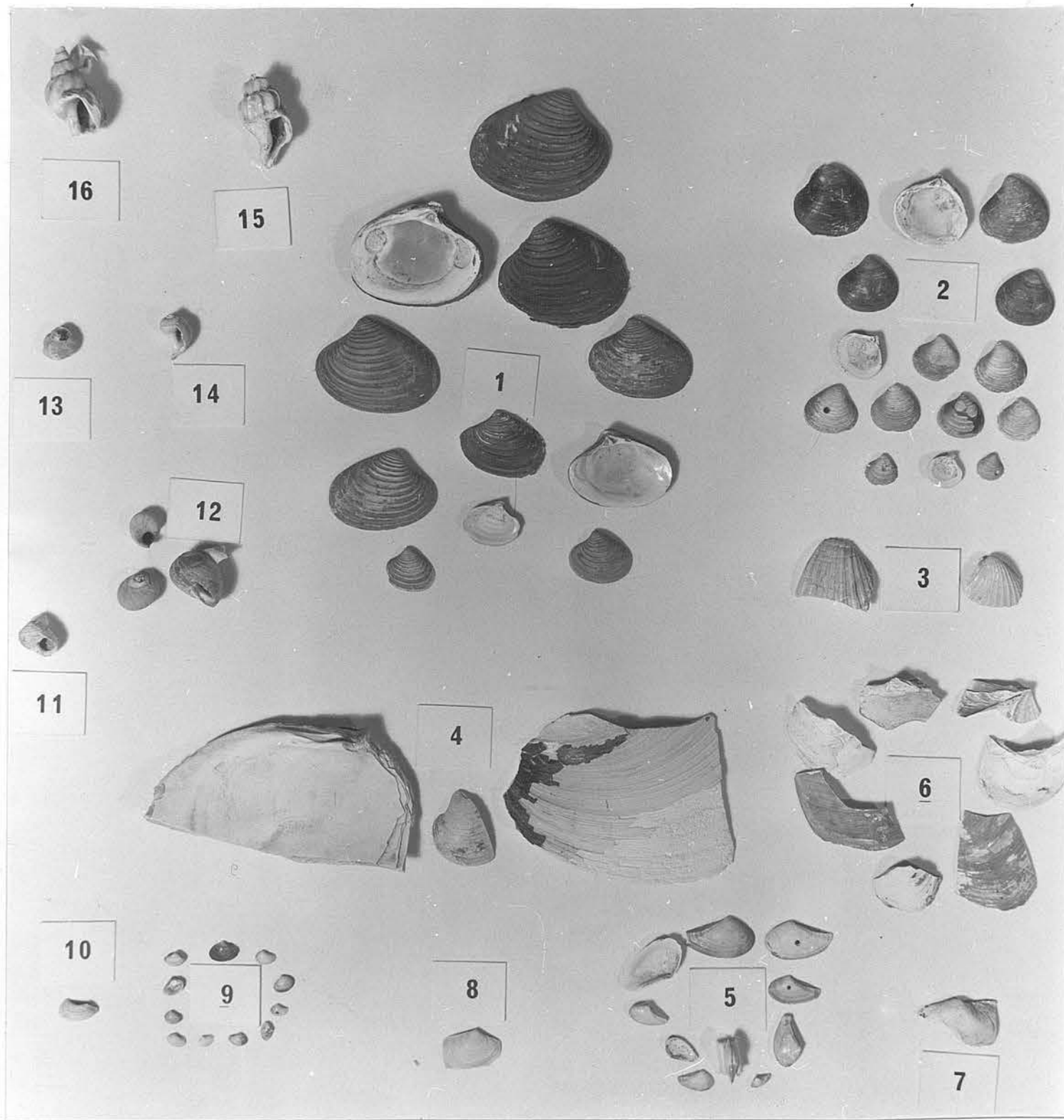


PLATE 10 Mollusca from the Kinlochspelve Moraine.

1. *Tridonta elliptica* (Brown)
2. *Tridonta montagui* (Dillwyn)
3. *Acanthocardium* sp.
4. *Arctica islandica* (L.)
5. *Nuculana pernula* (Muller)
6. *Mya truncata* (L.)
7. *Arenomya arenaria* ? (L.)
8. *Tellinacea*
9. *Portlandia philippiana* (Nyst)
10. *Trochidae*
11. *Littorina littorea* (L.)
12. *Littorina littoralis* (L.)
13. *Littorina saxatilis* (Olivi)
14. *Lunatia pallida* ? (Broderip & Sowerby)
15. *Trophonopsis clathratus* (L.)
16. *Buccinum undatum* L.

Photograph : Richard Gillanders



PLATE 11 Front slope of the Loch Don Sand Moraine
and peat flat in front.
Photograph : Murray Gray



PLATE 12 Platform and cliffline north
of Port Donain.
Photograph : Murray Gray



PLATE 13 Rock platforms and scree slopes south of Ard na Cuille. Institute of Geological Sciences photograph :
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PLATE 14 The rock knob island Eilean na Gamhna (The Shepherd's Hat). Institute of Geological Sciences photograph :
Crown Copyright reserved.



PLATE 15 The rock knob island Eilean Mor. Photograph : Murray Gray

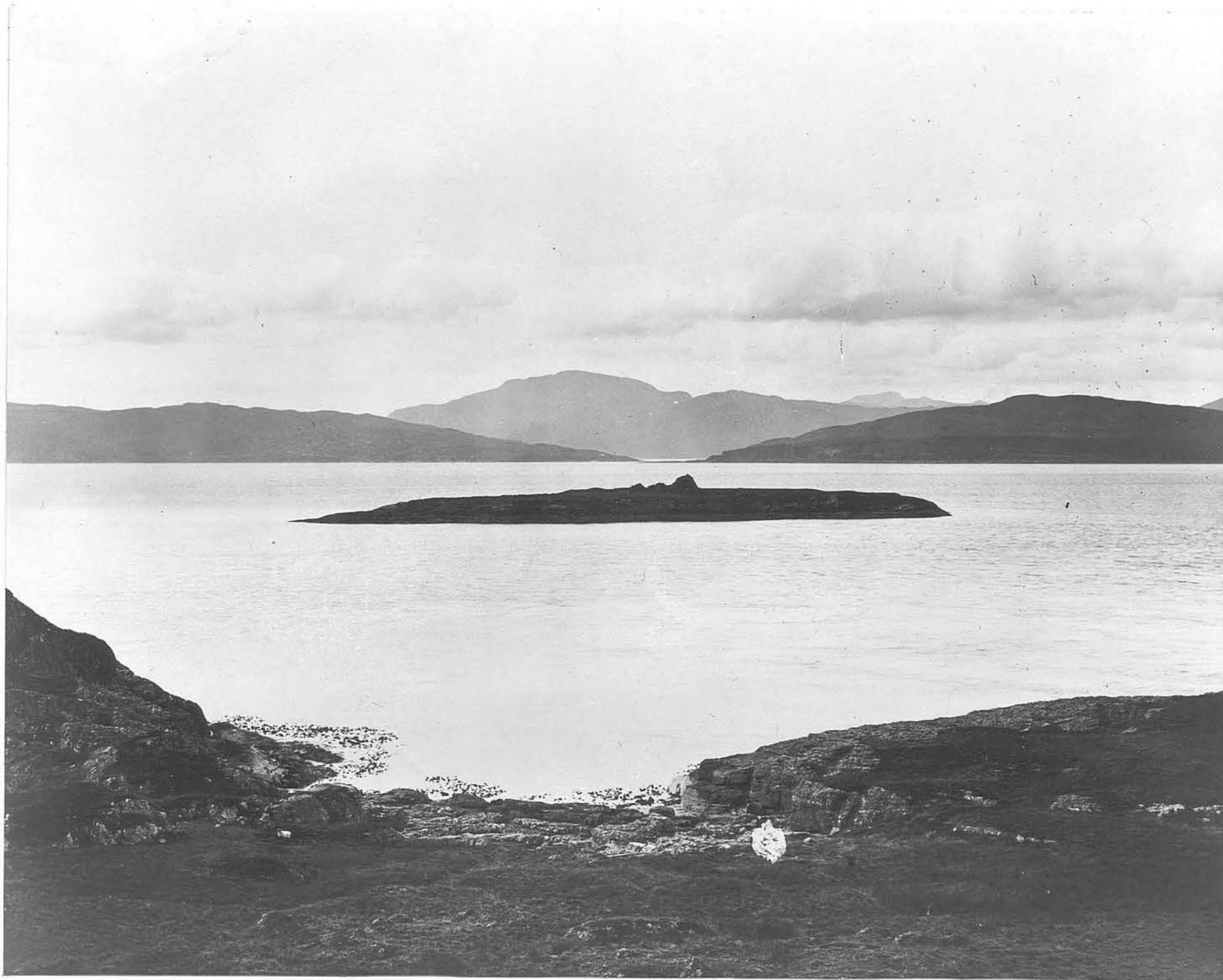


PLATE 16 The rock knob island Bach Island (The Dutchman's Cap). Institute of Geological Sciences photograph :
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PLATE 17 Vertical cliff, Port Donain.
Photograph : Murray Gray

PLATE 18 Degraded cliff, Duart Castle.
Photograph : Murray Gray



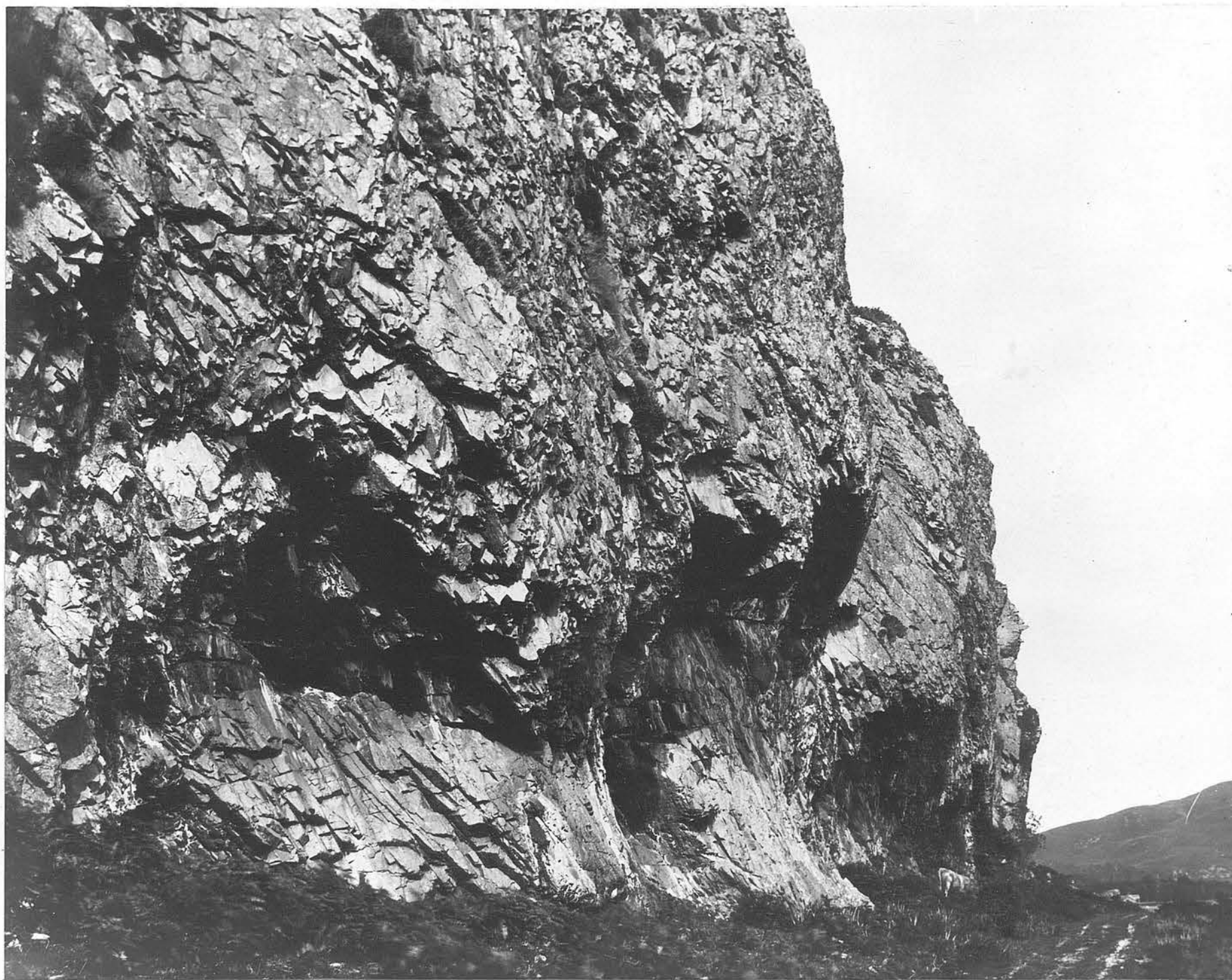


PLATE 19 Irregularly undercut, granophyre cliff, Loch Buie. Institute of Geological Sciences photograph :
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PLATE 20 Smoothly undercut, conglomerate cliff, Dungallon. Institute of Geological Sciences photograph :
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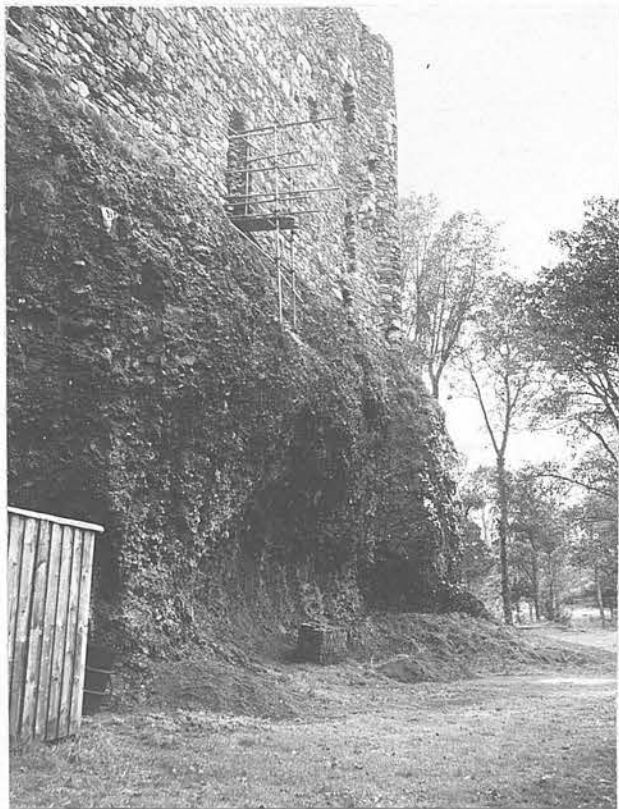


PLATE 21 Undercut conglomerate cliff,
Dunstaffnage Castle.
Photograph : Murray Gray



PLATE 22 The cave Uamh Fhada.
Photograph : Murray Gray



PLATE 23 The natural arch Clach Tholl, Port Appin.
Photograph : Murray Gray



PLATE 24. Natural arch developed along fault in cliffed conglomerate headland below Gylen Castle, Kerrera.
Institute of Geological Sciences photograph : Crown Copyright reserved.



PLATE 25a Geo eroded along dyke.
Photograph : Murray Gray



PLATE 25b Dyke stack, Ardmore,
Kerrera.
Photograph : Murray Gray



PLATE 26 Dyke headland, Black's Memorial Lighthouse.
Photograph : Murray Gray

PLATE 27 Undercut, conglomerate stack (The Dog Stone), Oban.
Photograph : Murray Gray





PLATE 28 The stack An Dunan.
Photograph : Murray Gray



PLATE 29 Section in gravel pit by Balure (N.).
The spade handle marks the transition
upwards from fluvioglacial to marine
deposits. Photograph : Murray Gray



PLATE 30 Shingle ridge below high water mark,
Scallastle Bay. Photograph : Murray Gray