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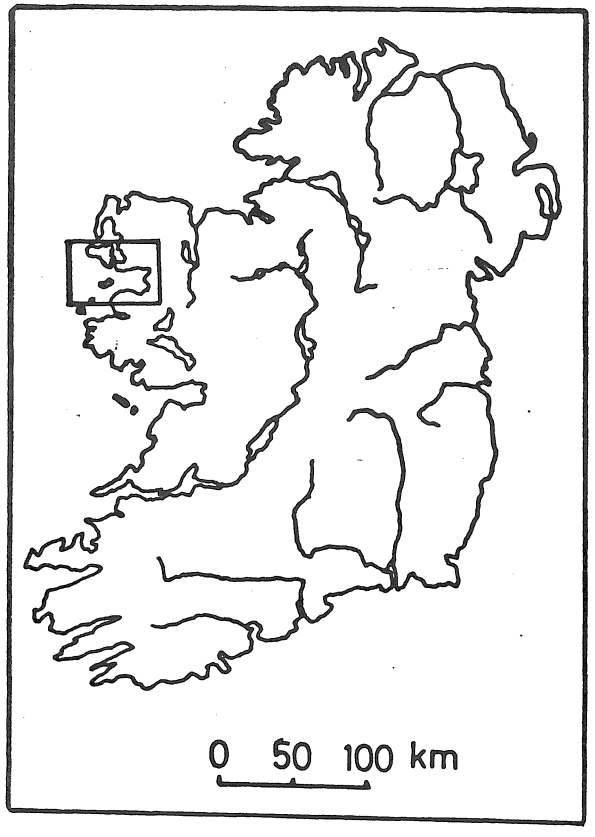
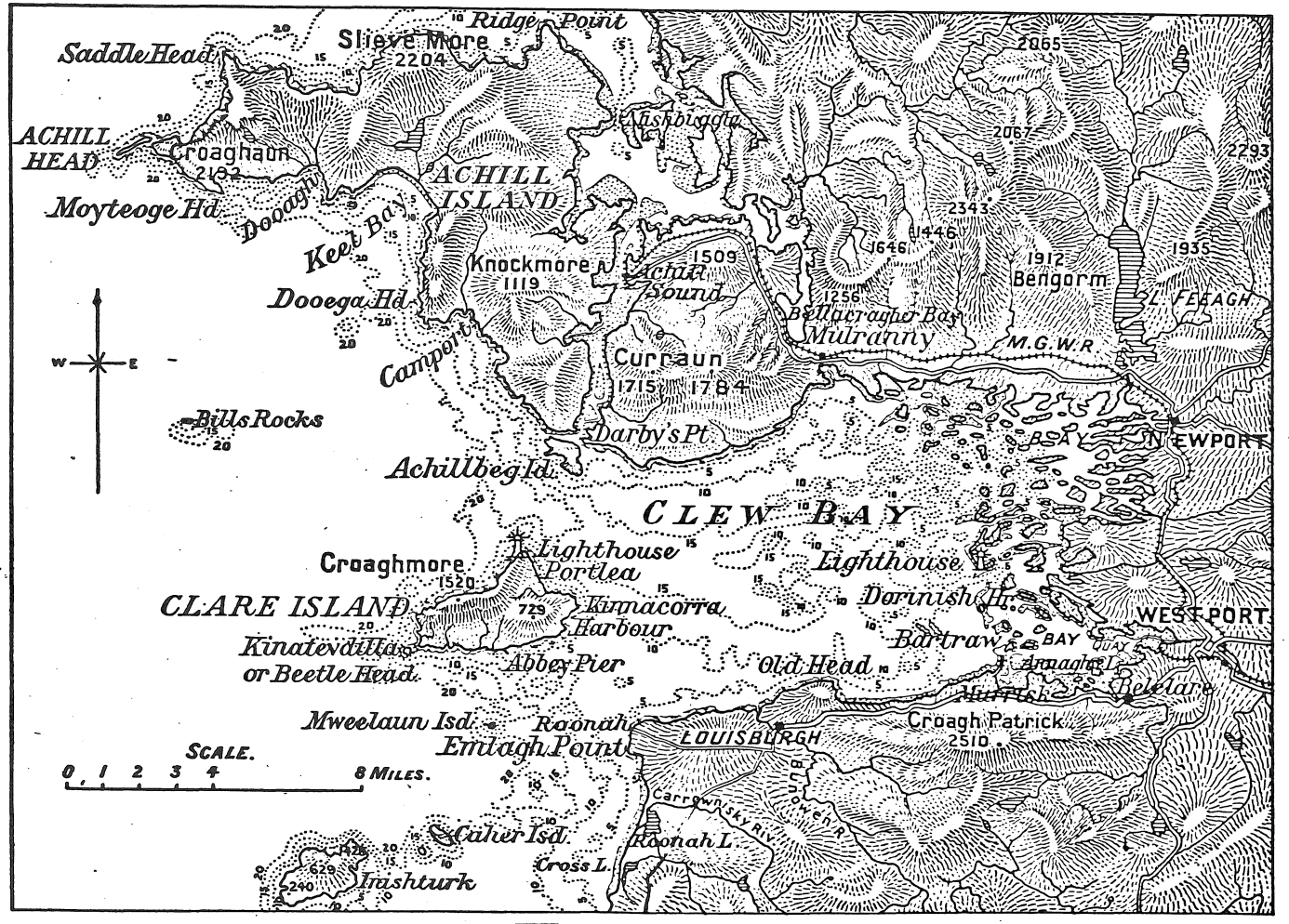
Coxon, P. 1982. A fieldguide to Clare Island, Co. Mayo. 25pp. Irish Association for Quaternary Studies.





CLARE ISLAND SURVEY.—PRAEGER: INTRODUCTION.

Location and detail (latter from Praeger, 1911)

IQUA.Clare Island,1982.A Preliminary fieldguide.

Dr Peter Coxon,TCD.

Contents:

1.Acknowledgements

I would like to thank many people for encouragement and advice especially the following;

Dr.G.Clayton(Geol.,TCD)for the use of palynological facilities,Prof.Phillips (Geol.,TCD)for access to unpublished work on the geology of Clare Island and for the use of photogrammetric equipment.Ms.Emma Dillon(Geog.,TCD)for research into aspects of the social and agricultural history.

Special thanks is due to my wife Catherine and Ms.Gina Hannon(Bot.,TCD) for their assistance taking the cores on the Island.

I am grateful to Stephen O'Connor for helping to copy this guide.

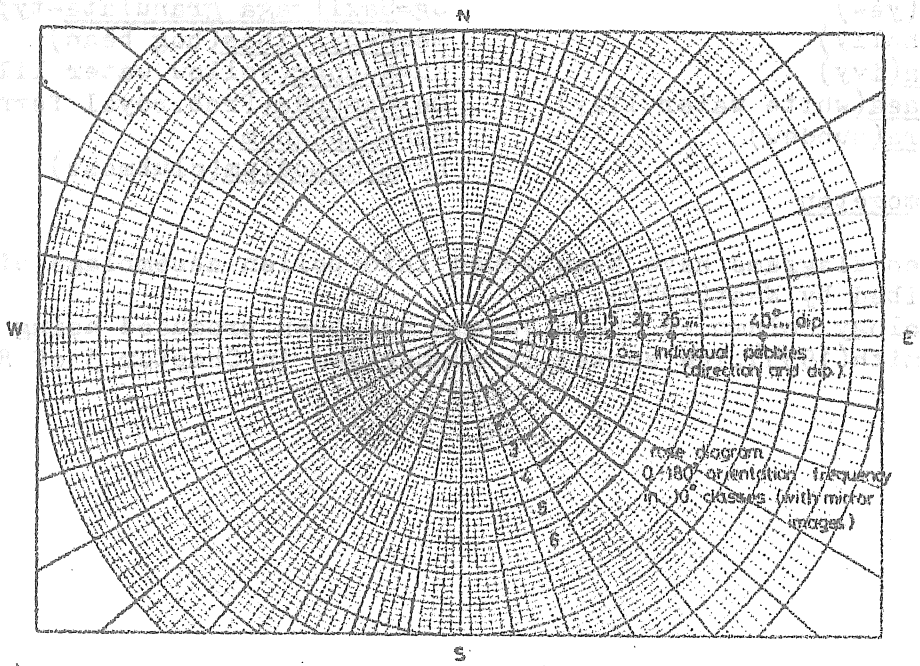
2.Brief notes on techniques and representation of results.

A.Till Fabric Analysis.

The methods and problems involved in till fabric analysis are well summarised by Andrews(1971).

For the purpose of this study sites were chosen within sediments of interest and 45-50 pebbles with a clear long axis were measured for dip and direction using a Suunto Compass Clinometer.Readings of direction and dip were made to the nearest 5°.

The results of these measurements are presented on polar co-ordinate plot paper.The dip and direction of individual pebbles has been plotted using an open circle on the diagram to represent each clast.To give a stronger visual representation the data has also been drawn as a rose diagram:



Further work on the tills and other sediments will involve pebble counts and the setting up of type localities etc. following the recommendations outlined in Hedberg(1976).

B.Pollen analytical techniques .

The tecniques employed here(preparation of samples,sediment description...)are well summarised by West(1977) and Birks and Birks(1980).

The sites investigated were sampled using a Livingstone Piston Sampler (Wright,1967).The sediments were prepared using standard techniques(West,1977, Bates et al,1978).The pollen counts are relative percentage ones.

The percentages used in calculations are as follows:

P = Total land pollen
P+A = Total land pollen plus aquatics
P+L.P. = Total land pollen plus lower plants

A + on the diagram indicates a value for that particular taxon of less than 1%

The pollen diagrams show only the major pollen types identified,much data has been omitted to save time and space.The taxa shown are as follows:

Betula(birch)
Pinus(pine)
Ulmus(elm)
Quercus(oak)
Alnus(alder)
Salix(willow)
Juniperus(juniper)
Gramineae(grasses)
Cyperaceae(sedges)
Calluna(Ling,heather)
Corylus-Myrica (This type is most probably hazel although opinion is divided as to whether the two taxa can be seperated(see Edwards,1982)
Myrica-Corylus(probably bog myrtle.)
Empetrum(crowberry)
Ericales(these are undifferentiated pollen tetrads of heath types)
Compositae liguliflorae(large group of herb types)
Artemisia(mugworts and wormwoods)
Filipendula(meadowsweet)
Plantago lanceolata(ribwort)
Plantago(undifferentiated plantains)
Rumex(dock)
Umbelliferae(large family of herbs)
Potamogeton(pondweed)
Myriophyllum alterniflorum(alternate flowered water-milfoil)

Abbreviations;

Fr=Fraxinus(ash)
Po=Populus(poplar)
Ta=Taxus(yew)
Il=Ilex(holly)
He=Hedera(ivy)
Ny=Nymphaea(white water lily)
Dr=Drosera(sundew)
Ru=Rumex
Pot=Potamogeton
Art=Artemisia
So=Saxifraga oppositifolia(purple saxifrage)
Sg=Saxifraga granulata-type (a saxifrage)
Me=Menyanthes(bog bean)
Nu=Nuphar(yellow water lily)
Os=Osmunda(Prob.royal fern)
Sph=Sphagnum
Ly=Lycopodium(clubmoss)

The pollen diagrams have been zoned into pollen assemblage biozones(p.a.b.) as described by West(1977).
The lithology column on the diagrams has been produced using the symbols of Troels-Smith(1955).The system is summarised in Chapter 3 of Birks and Birks (1980)

3.Clare Island;an introduction.

A.General

Clare Island(Cliara) is situated in the mouth of Clew Bay, Co.Mayo.The Island is some 4½ miles(7.24 km) long from east to west and about 1½ miles(2.4 km)wide.The island possesses 2 large hills,Knockmore(1520',463m) and Knocknaveen(729',222m).Other aspects of the morphology of Clare Island can be picked out on the figures in the guide(figs.2,3,and4).

There is not a great deal of evidence,documentary or otherwise regarding the early history of Clare Island.The Island's history is probably best known for its association with the pirate queen who upset Queen Elizabeth the First-Grace O'Malley(Granuaile,Grania Uaile...).It is believed that Grace and others of the O'Malley clan used the castle on Clare Island.

After Granuaile died in around 1601 the Island went over to Ulick Burke. Later in the 17th Century Clare Island was confiscated by the Crown and granted to and"English Adventurer".He was prevented from getting to the Island by a storm so he sold it to an O'Malley for 30 Guineas and a horse.

In the 19th Century Sir Samuel O'Malley mortgaged Clare Island to a London Insurance Company and the land was leased to a land agent.

The last private owner was James Mac Donnell whose nieces inherited Clare Island and sold it to the Congested Districts Board(one of their first buys) for £5486 in 1895.

The population of the Island has fallen from 1615 in 1841 to 168 in 1971.

(from various sources incl.McNally,1978)

B.Geology

The "hard rock" geology of Clare Island is very complex.The first survey was made in 1868 by R.G.Symes of the Geological Survey and a 1" map was published in 1879 showing the solid geology.In 1909 J.R.Kilroe resurveyed the area and a 3" map and memoir were published by Cole,Kilroe, Hallissy and Newell Arber(1914).An abbreviated version of the work was published by Hallissy in the Clare Island Survey(1914).The information on Fig.3 is from Hallissy(1914).

The information on the overlay to Fig.2 is from the most recent work on the solid geology carried out by Phillips(1965).

C.The Clare Island Survey.

The interest shown by naturalists during the 19th Century in isolated habitats appears to have prompted the detailed study of Clare Island during the early part of the 20th Century.Work by Forbes and Darwin amongst others had shown that the flora and fauna of isolated islands can be of great scientific interest.In Praeger's introduction to the Clare Island Survey (Praeger,1915)he stresses the importance of islands to the study of plant and animal dispersal as well as development of isolated communities.

The suggestion of a detailed survey of Clare Island was made in 1908. Clare Island was chosen because it was a compact size,it was convenient for access and it contained a variety of habitats for study(mountain,bog,shore, cliff...).Work on the Island was commenced in 1909 and the area saw visits by scientists every month throughout that year.Some work was also carried out on adjacent islands and the mainland for comparative purposes.

The secretary of the Survey,Praeger,clearly played a large part in the field expeditions being present on many of the trips.The scientists involved were too numerous too mention here(the work involved over 100 people).The scale of the project can only be appreciated by browsing through the material produced by these scientists.

The work was published as a series of papers which form Volume 31 of the Proceedings of the Royal Irish Academy.68 papers in all were published between 1911 and 1915(part 39 came in 2 parts).One part(Part 8,Peat Deposits) was not published.

4.The Quaternary history of the region.

The first account of the Quaternary geology of Clare Island is that of Cole et al(1914).Synge(1968,1977,1978)has summarised the glacial history of the Clew Bay area as follows:

3.	Newport Till (devoid of limestone) Roscahill Till(rich in limestone)	these deposits both represent a later readvance west down Clew Bay with widespread drumlin formation.
2.	Killadoon Till	Produced during the maximum of the last glaciation(Midlandian).Ice flowed north or slightly west of north across Clew Bay from Murrisk.This ice produced arcuate end moraines around Ballycroy west of Nephin Beg.The till contains shale and sandstone as well as granite from Corvookbrock.
1.	Erris Till	Extensive in lowlands of n.w.Mayo.Ice moved towards the north west leaving only the higher mountains uncovered.(Munsterian)

The work can be summarised in a table:

	General	Local Mountain
Midlandian glaciation	Ballycastle-Mulrany End-Moraine Newport till Roscahill till Killadoon till	Four stages of young corrie glacier development on Achill-Acorrymore moraines Annaffrin moraines in the Nephin Beg mountains
Last Interglacial	Cartron River deposits in Corrann?	
Munsterian glaciation	Belderg shelly till Erris till Gort Upper Solifluction gravel	Several stages of old corrie glacier development on Achill-Nakeeroge moraines
Gortian Interglacial	Gort polleniferous mud	

Synge 1978.

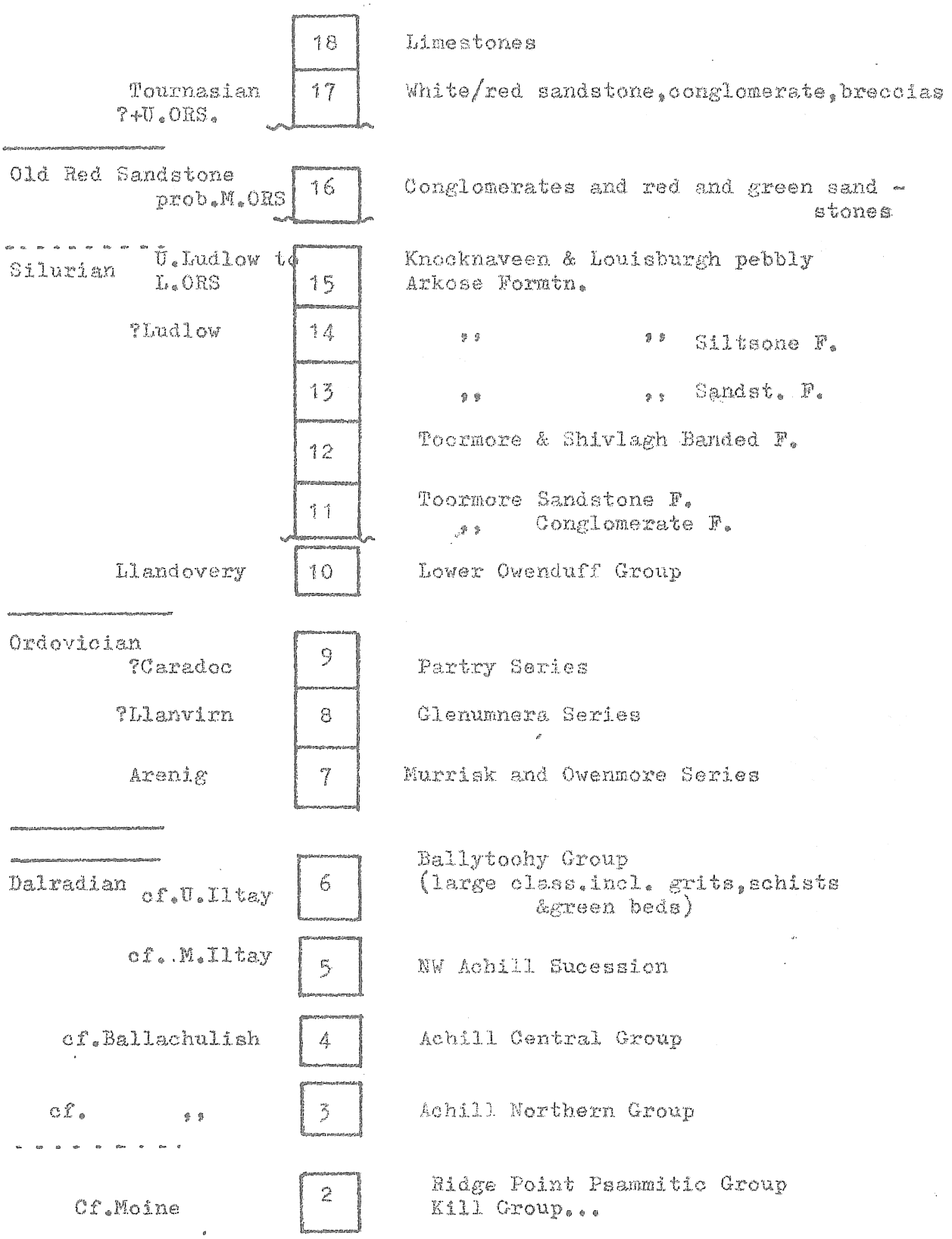
The work of the Clare Island Survey and the Geological Survey(Cole et al .1914,Hallissy,1914)revealed two till types on the Island.A lower limestone rich till and an upper till.This early work also recognised disturbed drift and hummocky ground as well as arcuate end moraines at Loughanaphuca.The 3" scale geology map has the drift geology marked on it in some detail(see Fig.3).

Hallissy(1914) also noted a possible land connection between Clare Island and the Louisburgh coast as the water is less than 60'deep (18.28m)at present.

KEYS TO THE FOLLOWING FIGURES(Figs.2+overlay,3 and 4)

Figure 2.
Contour map.Contours given in metres.
Overlay is the solid geology taken from Phillips(1965),map one.

key: (note key is to whole region.from Phillips,1965 with kind permission)



... ... Unconformity

·—·—·—·— High Angle Fault

Figure 3.
Fig.3 is the Drift geology as mapped by Hallissy (1914)

Key:

Peat

m Moraine

Δ Boulder Clay (although on the original map hummocky ground was differentiated Hallissy did not diff.the till types)

Drift modified by downwash

Figure 4.
Fig.4 is a map of major morphological features of Clare Island.The features were mapped from stereo-paired aerial photographs from the collection of the Geological Survey.

Key: (photographs are same scale as map)

Hummocky moraine and drumlins

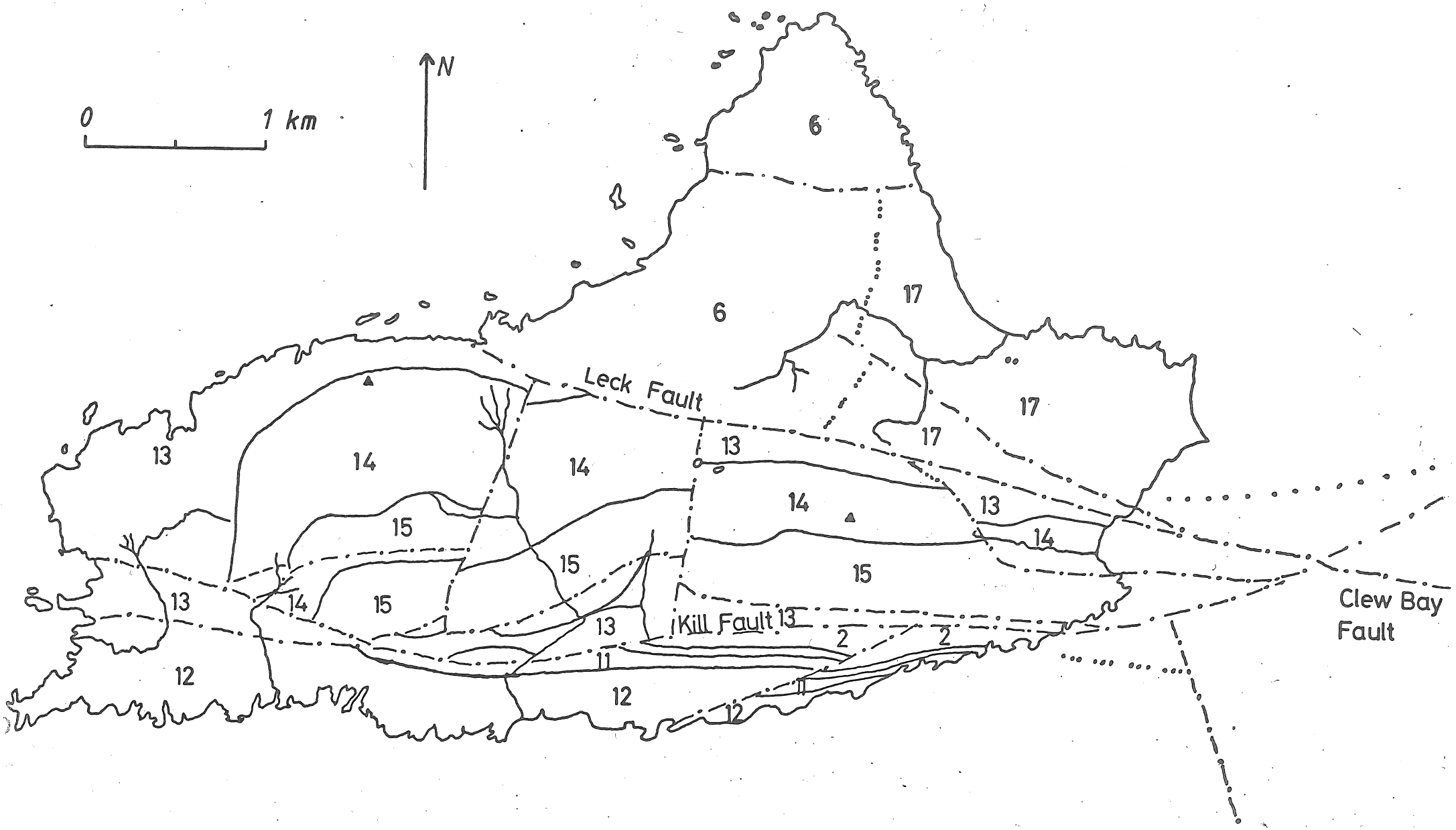
Major peat deposits

Two mountain areas

High ground between the two mountains

Δ

Areas of till deposition showing a raised flat surface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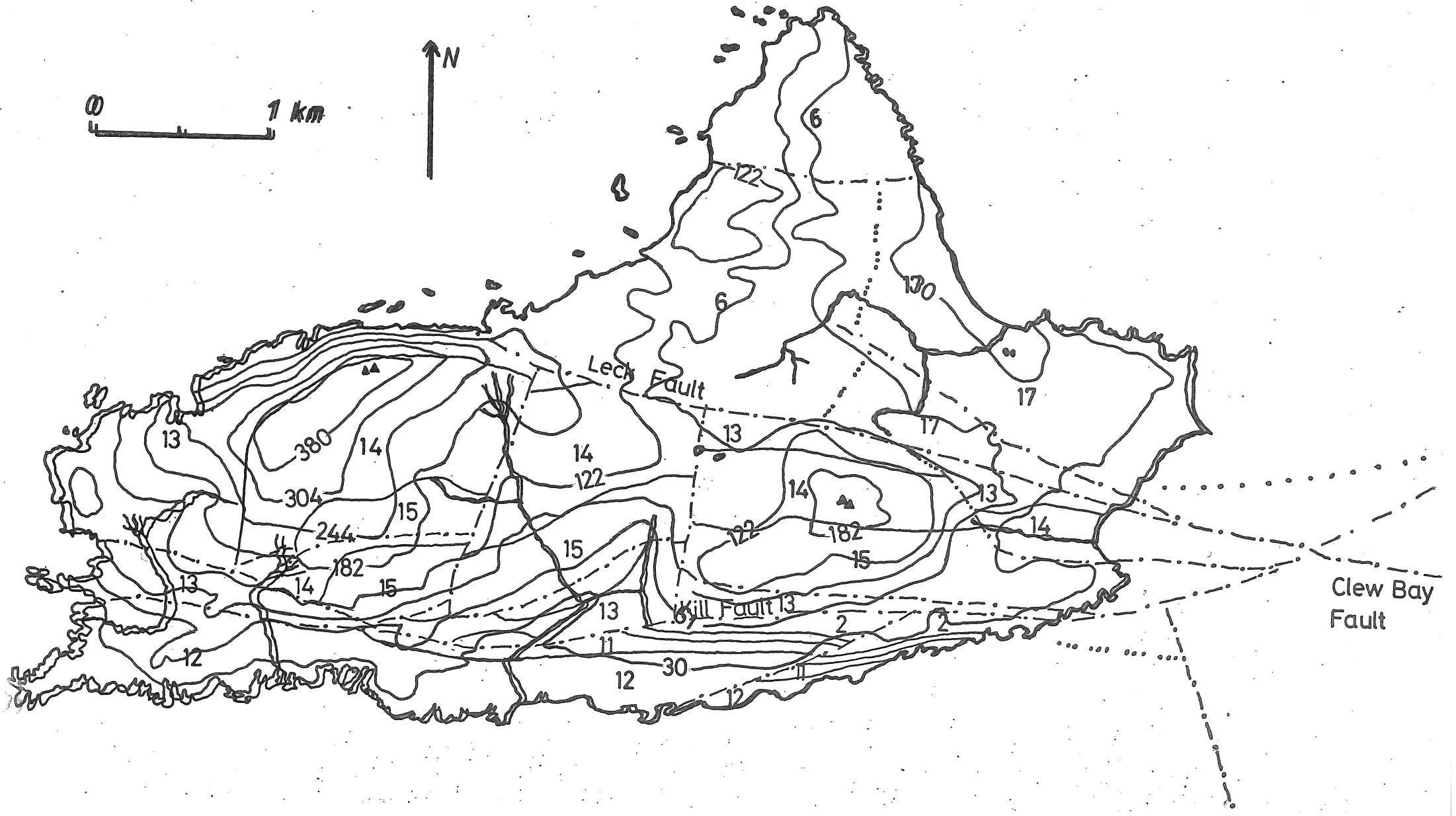
Clew Bay
Fault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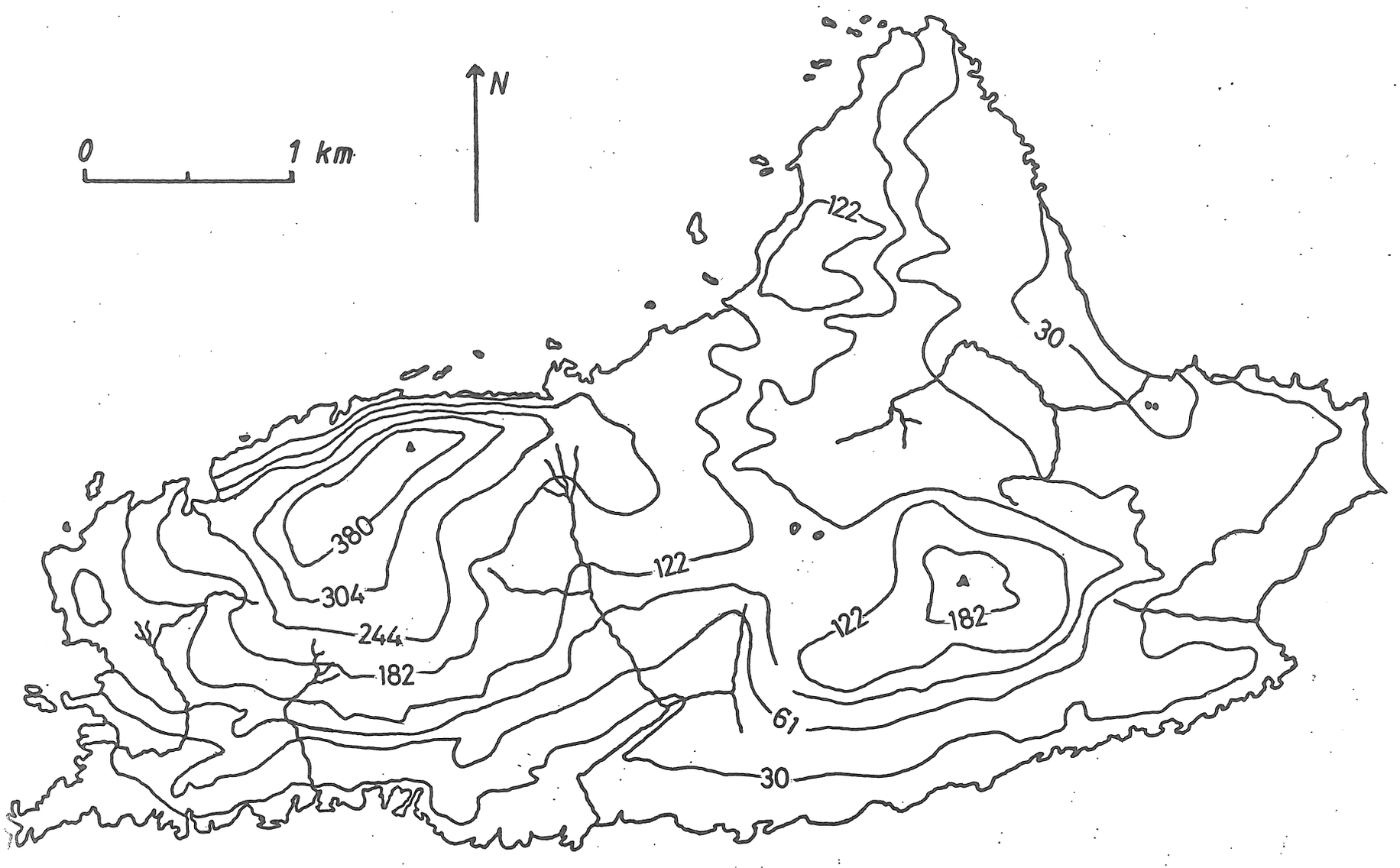
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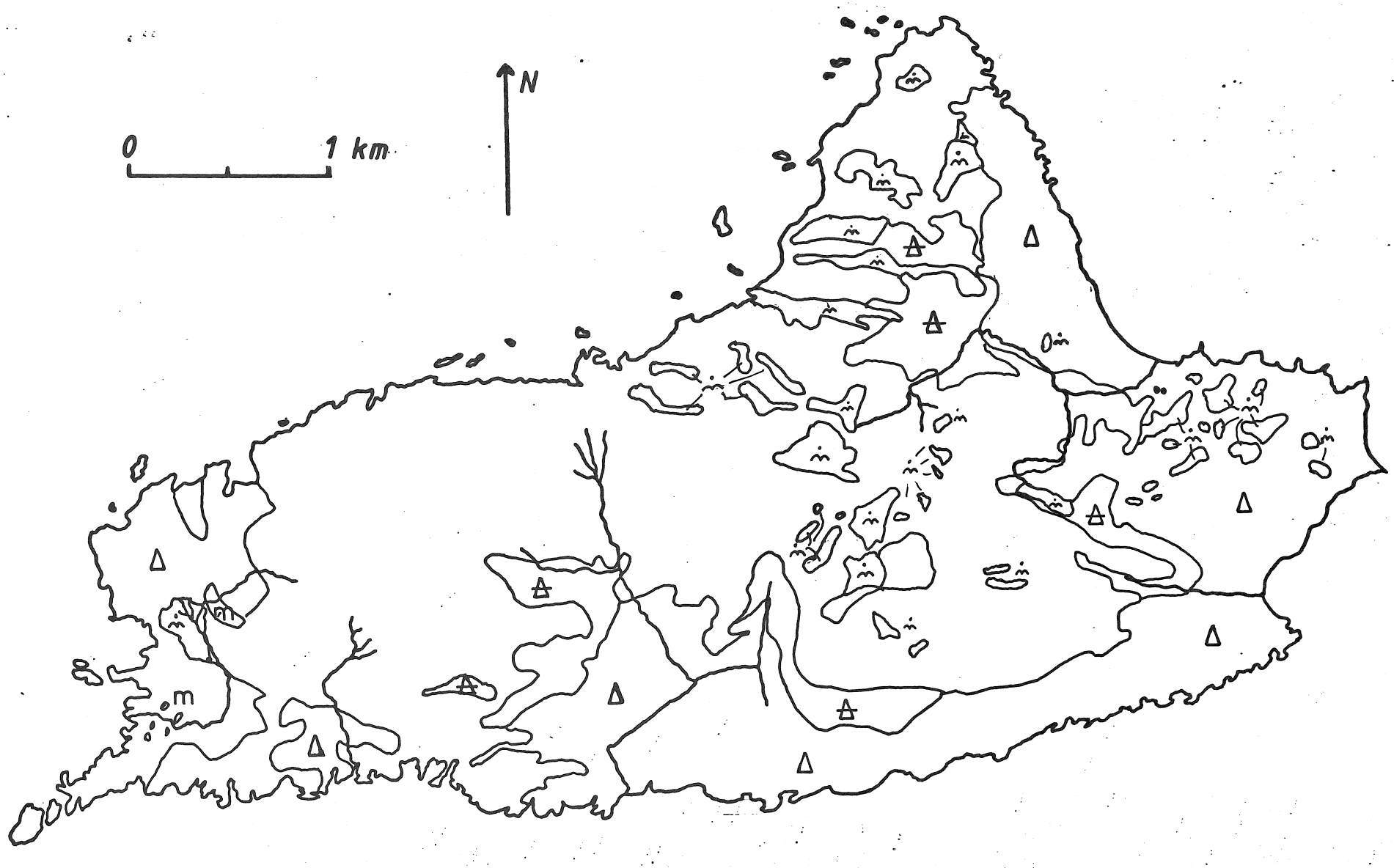
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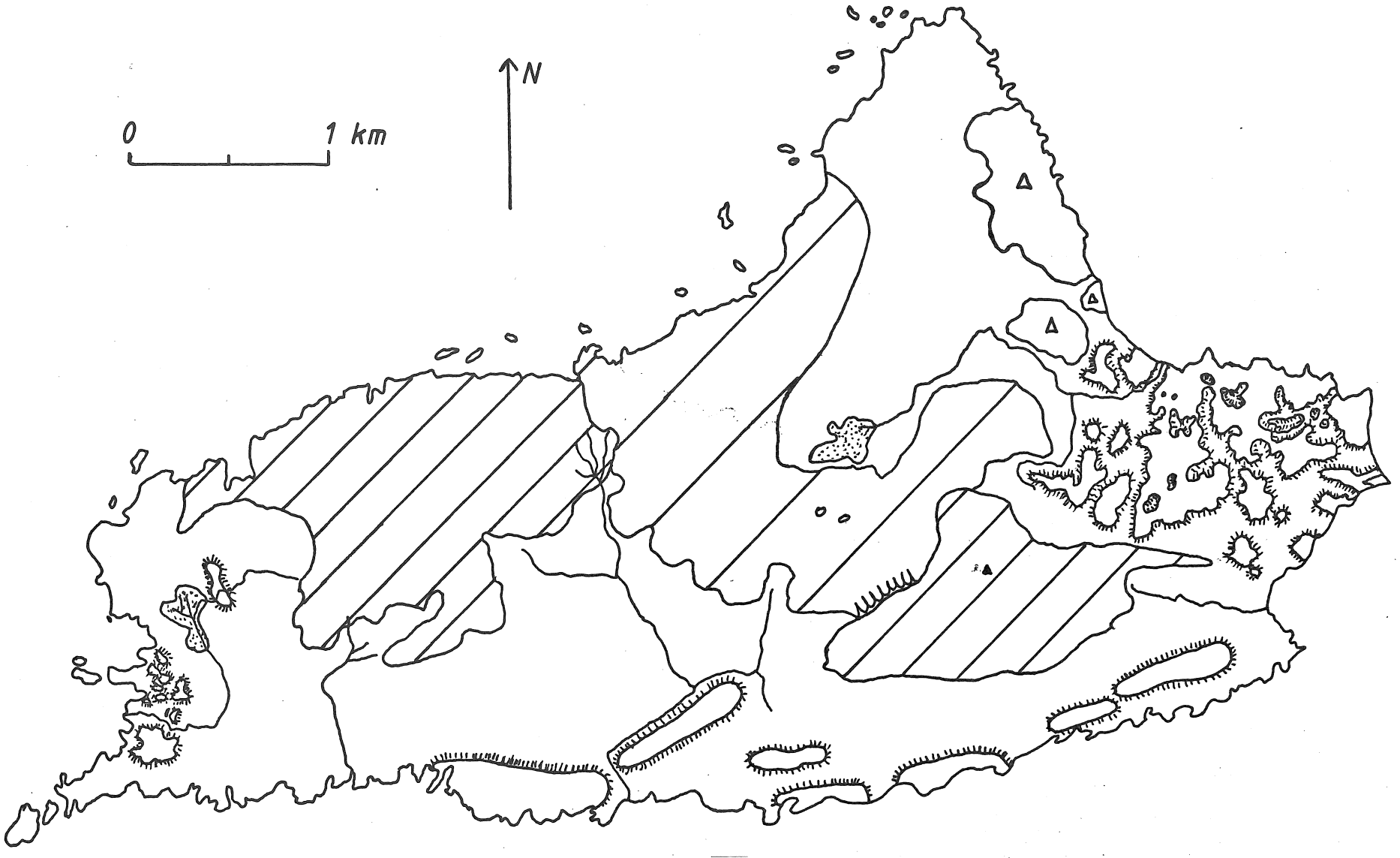
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5.Sites to be visited(the order may well change!)

Saturday 4th Sept. Locations are marked on fold-out map at back of guide.Numbers on map refer to SITES not stops. Both site and stop are given in these descriptions.

Stop 1.Grace O'Malley's Castle.
The castle is situated in a picturesque site commanding the bay.It was probably built in the late 16th Century.Later additions(e.g. the slated parts of the walls)have been made.Although the castle is not spectacular its association with Grania Uaile give it great interest.(For details of plundering etc.see Westropp,1911)

Stop 2.Section behind caravans(Site 2)
2-3m section in locally derived material.Very angular shattered red sandstone(?).Fabric of this deposit is shown on Page 12.The fabric suggests an orientation towards 260°.

Stop 3.Site 3a. Glen Townland.
This area is an ideal one to take in the effects of the Congested Districts Board(CDB).Rutledge-Fair(1892)painted a grim picture of Clare Island for the CDB.He suggested improvement of cattle,sheep and horse breeds, encouraging fishing,enclosing('striping')the "rundale"and erecting a barbed wire fence to divide holdings from adjoining mountain common.
The CDB bought the Island in 1895 for less than £1.00 per acre.(the board was a bit reluctant as the record of rent payments to the land agent were none too good(Micks,1925)).The CDB reapportioned the land into 77 new small holdings.The new tenants were able to purchase the land for annuities at 3 ¼ % payable for 68½ years.Apparently all went smoothly.Agriculture before the work of the CDB appears to have been in a poor state(McParlan, 1802)over the area of Mayo.On Clare Island the cultivation was all by spade work(Rutledge-Fair,1892)and sea-weed,shell fish and animal manure were used as fertilizer.
All around the Island,and here at site 3a,the small fields or rundale can be seen.The "lazy-beds" or built up rows can be clearly seen stretching up onto the high and exposed land.The rundale system(Buchanan, 1973)as we can see,had no permanent boundaries depending upon local systems. The small fields covering a great variety and quality of land were not very efficient crop producers.The CDB altered the farm boundaries to a great extent to give each farm(small-holding) a strip of land.This meant that each tenant now held a nucleated area of land and not one that was probably scattered.The CDB built 50 miles(80.5km)of stone walling on Clare Island, one wall seperating tillage from pasture is 5½' (1.67m)high and 5½ miles (8.85km)long.
Around site 3a we can see the CDB's stone walls crossing the old rundale boundaries.This alteration in the landscape can be observed by comparing the 6" maps published in 1839 and 1920.These maps are on Page 11. (note also the disappearance of a village in Glen Td.The census data for Clare Island is reproduced as Table 1,Page 15. The Famine(1845-1849) and emigration clearly had their effects on the Island's population.)

Also at site 3a there is a section in one of the balks or boundaries to the old rundale fields.This section shows a buried soil:

0-4cm	topsoil/grass sward
4-30cm	disturbed bank material
30-45cm	dark grey sandy soil with small pebbles. occasional dark brown mottling
45cm+	heterogenous deposit,prob.till/solifl.

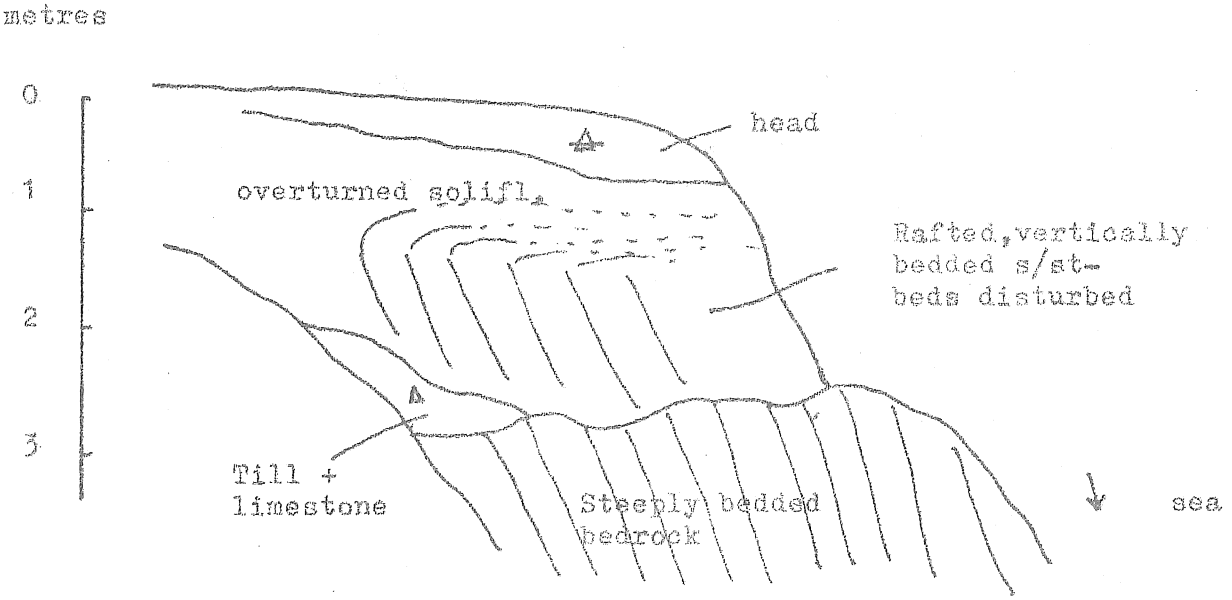
A sample taken from the buried soil horizon proved to be rich in pollen
The following taxa were present:
Betula(14%),Quercus(1%),Corylus(7½%),Salix(1%),Gramineae(18%),
Ericales(48%),Plantago lanceolata(2%),Potentilla(1%),Umbelliferae(3%)

The sample suggests the balk was built on a soil which was covered by a heath dominated vegetation(problems of relative pollen preservation should be considered).There is also evidence the vegetation was open with some shrubs and probably scattered trees.

Stop 4.
Site 4.Ooghgubamonemeen.
This site shows a head or solifluction deposit composed of local rock types.Some clasts are striated.The deposit may represent a reworked till.The fabric(Page 12) is clearly oriented downslope. (280°)

Site 4a.Ooghkeel.
Lower in the cliff the bedrock is grooved and striated (250°).The lower deposit in the section is a till containing limestone clasts.The fabric of the deposit is shown on Page13 and the clasts appear oriented towards 290-300° although there is a spread of readings.

Stop 5.Site 5.Oomernakineel.
This site shows a landslip .The interesting section contains a slip of almost horizontally bedded sandstone(?) over till which contains limestone.Subsequent solifluction at the surface has turned over the slipped sandstone beds at the top.There is a 'head' deposit covering the sequence;



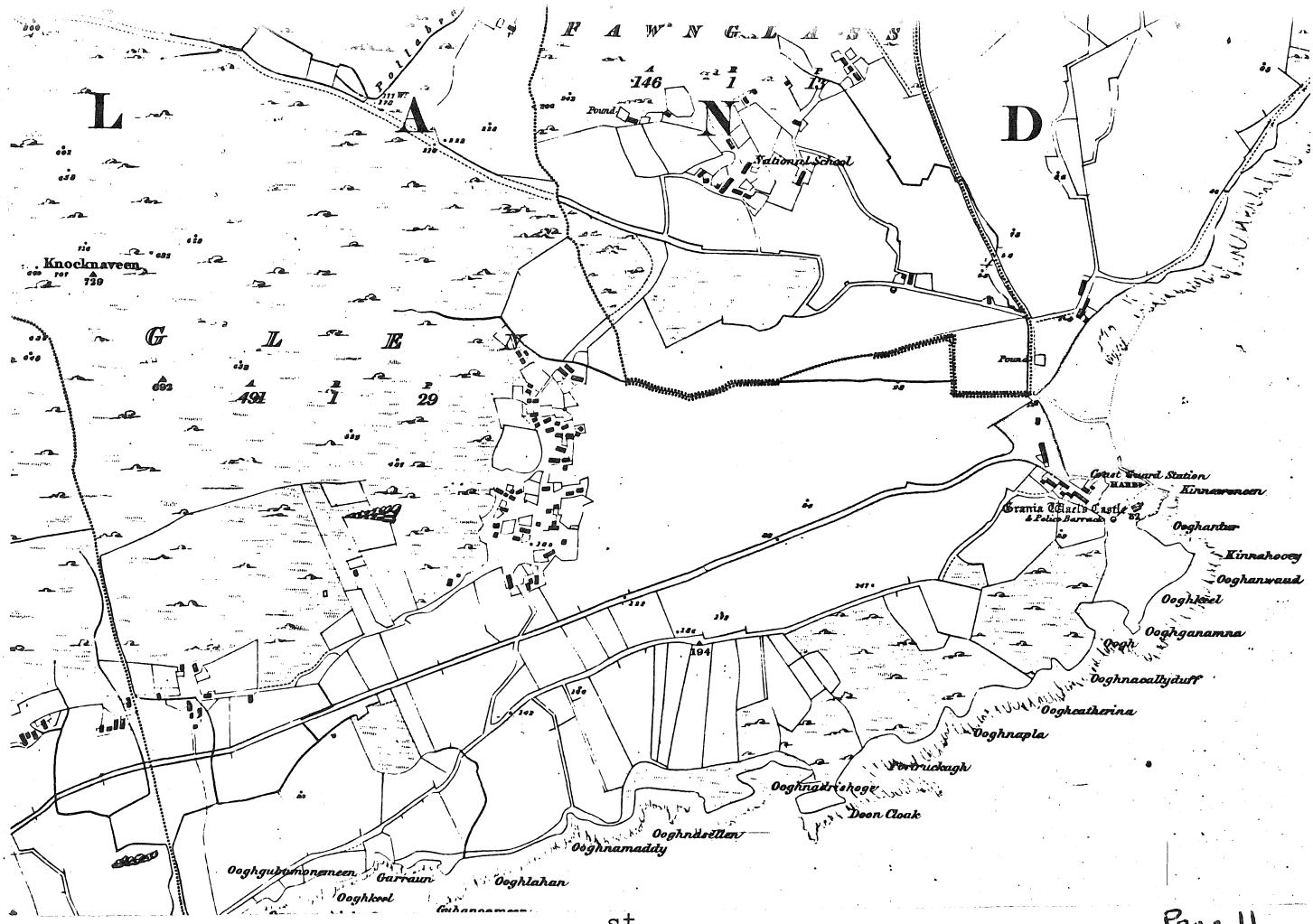
Stop 6.Site 6a.
Ice-moulded bedrock.15-20m long,5m wide.

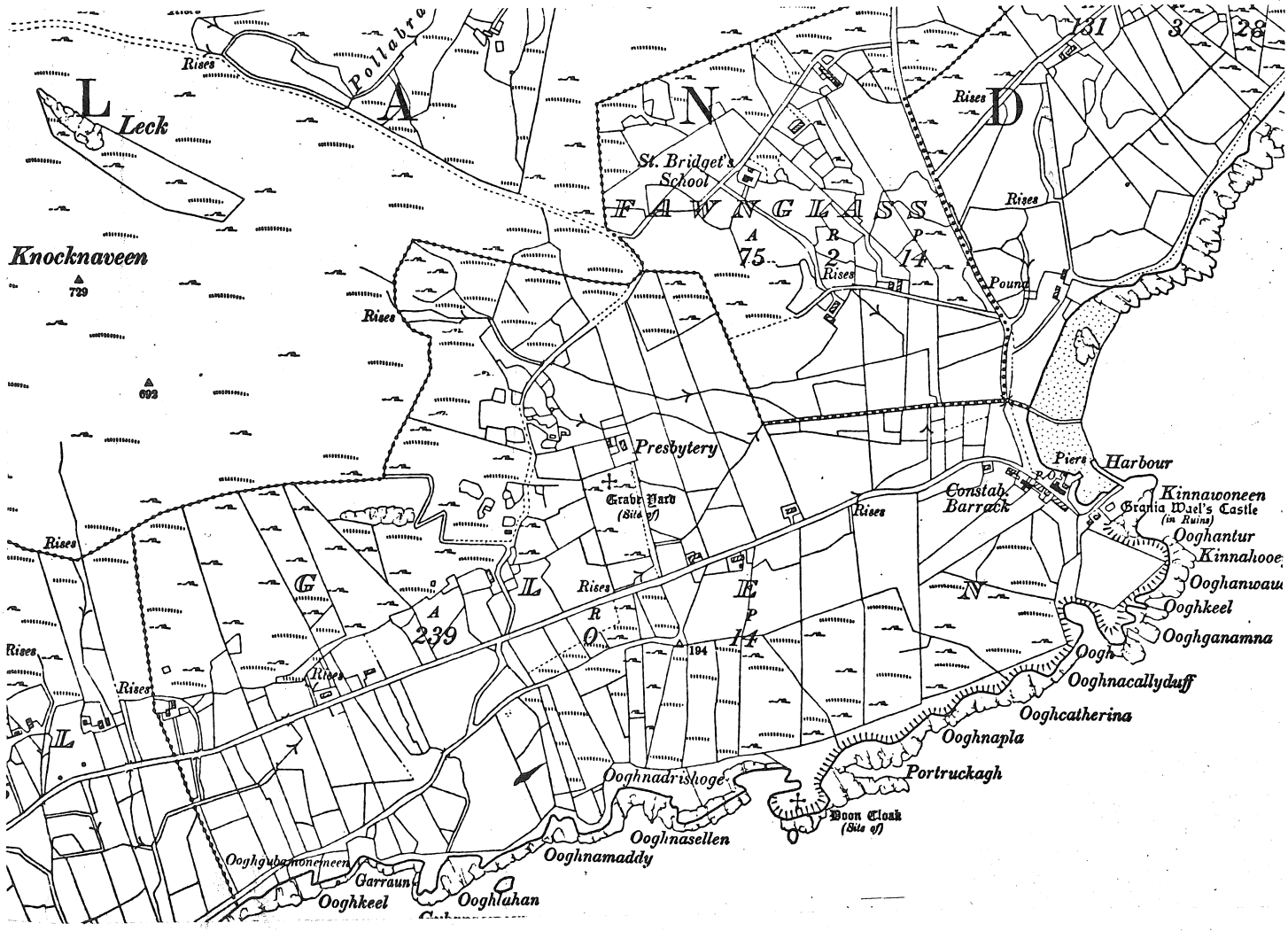
Stop 7.Site 6.Barnasallagh
4-5m of lodgement till.Till contains limestone,red,grey and green sandstones,red shale and a variety of quartzite.The matrix is grey with a pink/red tinge.The fabric of this till is shown on Page 13.The fabric indicacates movement towards 290°.
The steeply bedded siltstone(?) at this site and along the southern shore appears to have a bench cut along its upper extent.
30m to the sw at this site a section shows'head' and overturned

Ordnance Survey 6" maps. Upper map 1st series 1839

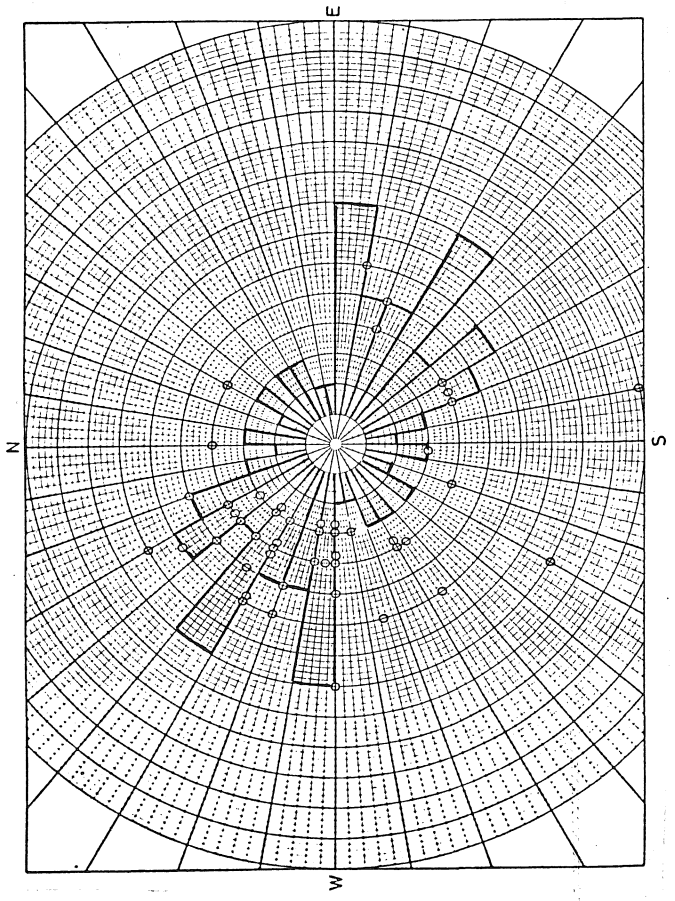
Lower map, Mayo Sheet 86 1920 edition (revised 1915)

note effects of Congested Districts Board and Famine.

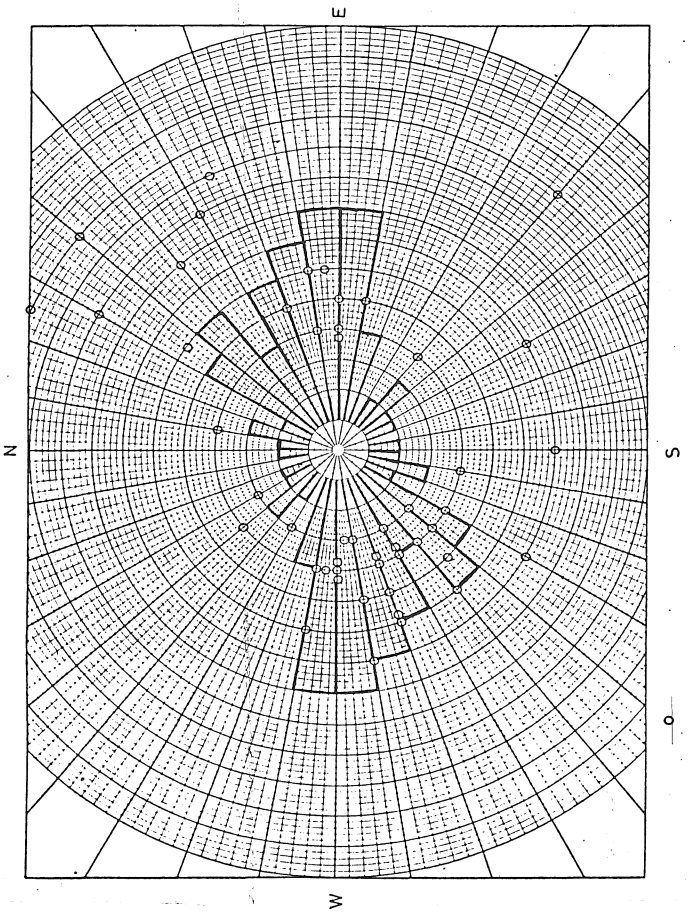




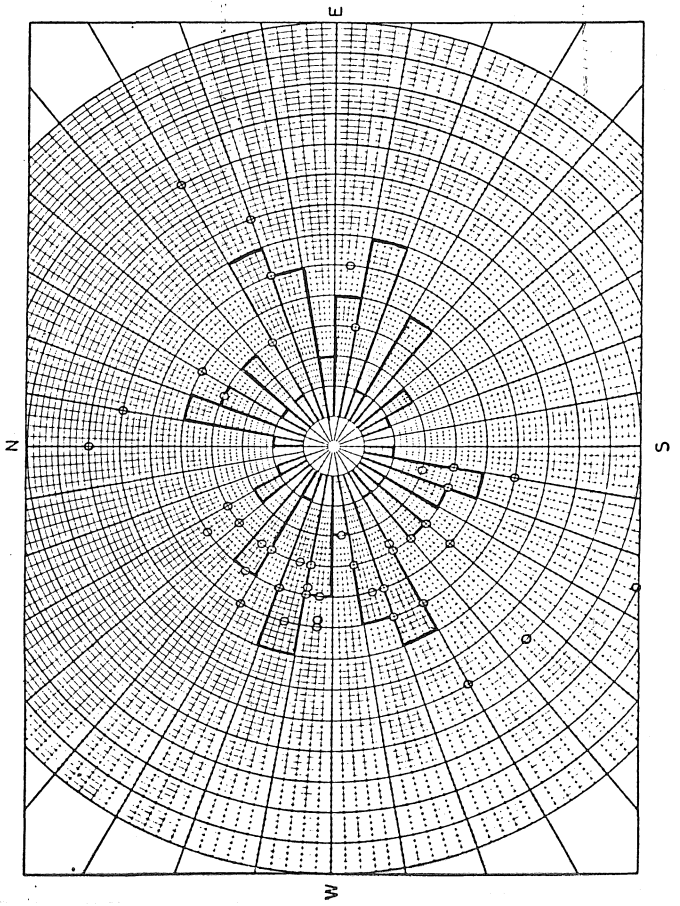
Site 1.n.e.end of beach,below hotel



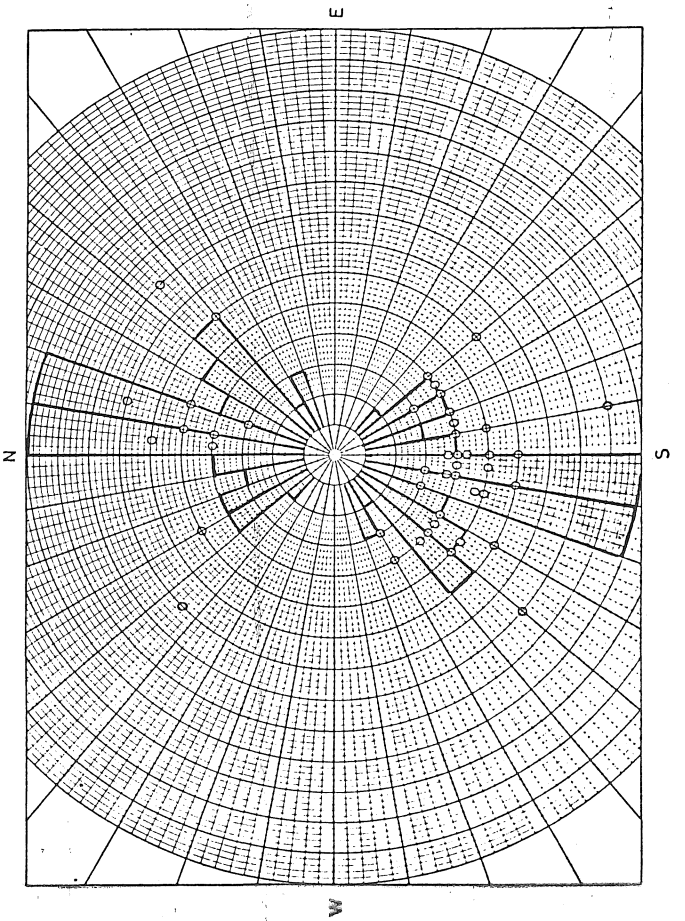
Site 2.Section behind caravans



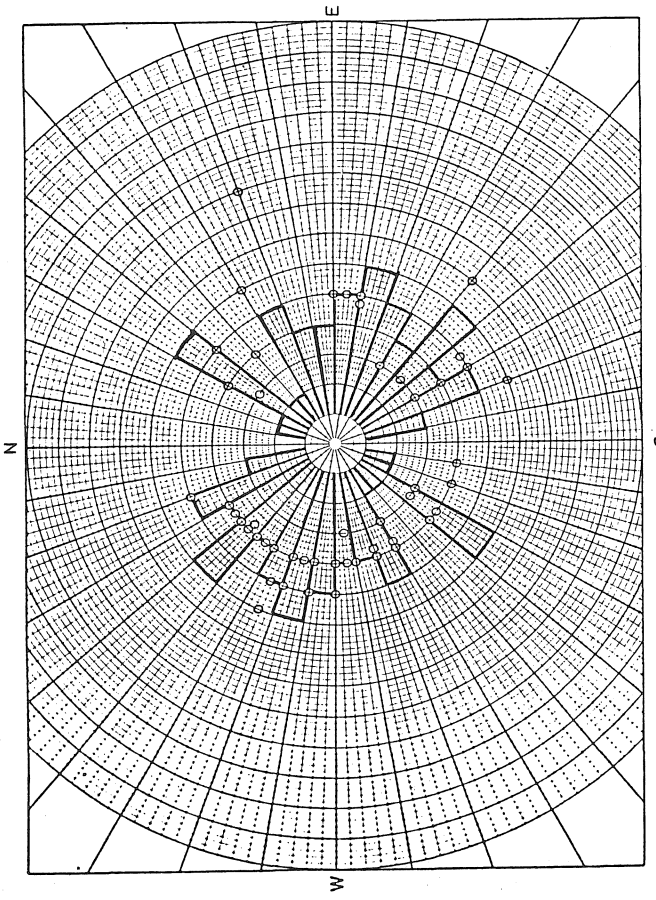
Site 1a.Cliff section between hotel and Kinnacorra



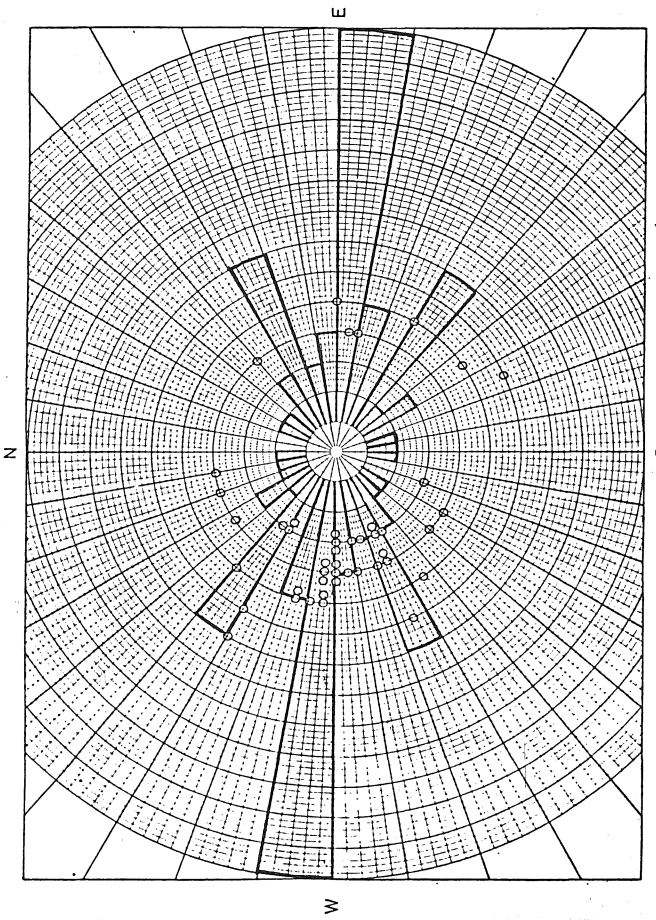
Site 4.Ooghgubamonemeen.Head deposit.



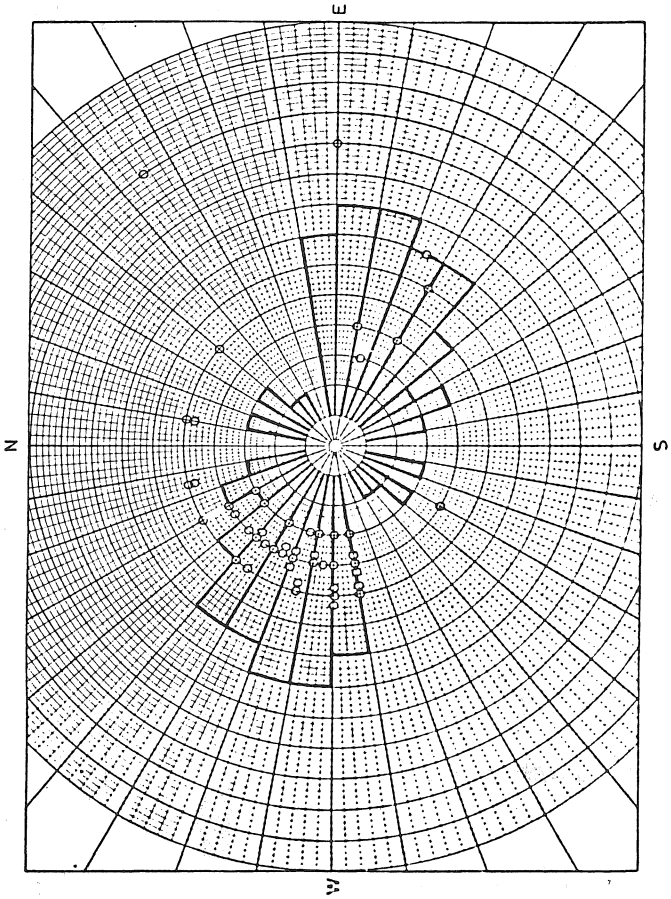
Site 4a.Ooghkeel.Limestone(lower)till



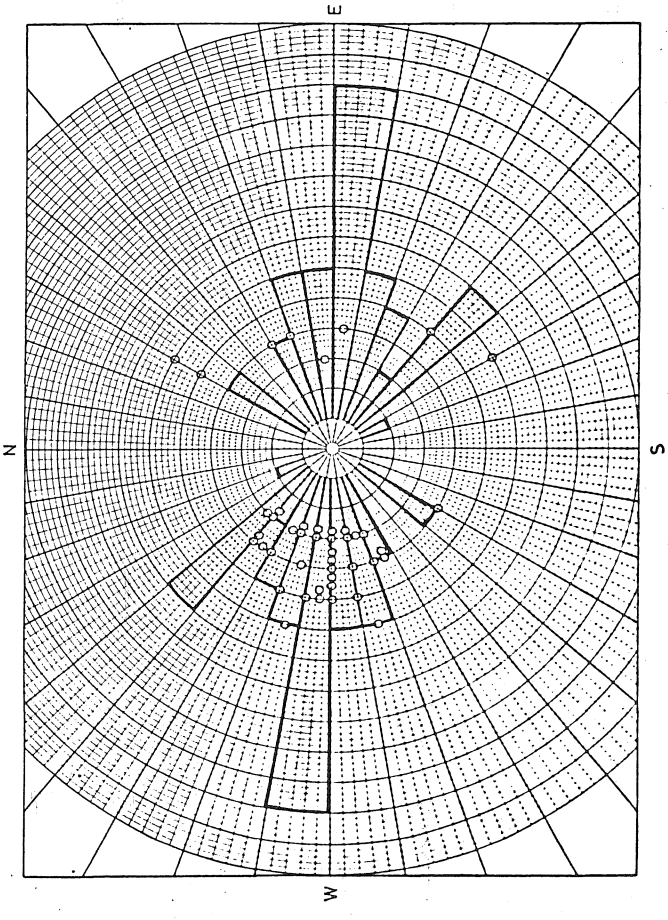
Site 7.Peter Salmon's Cove



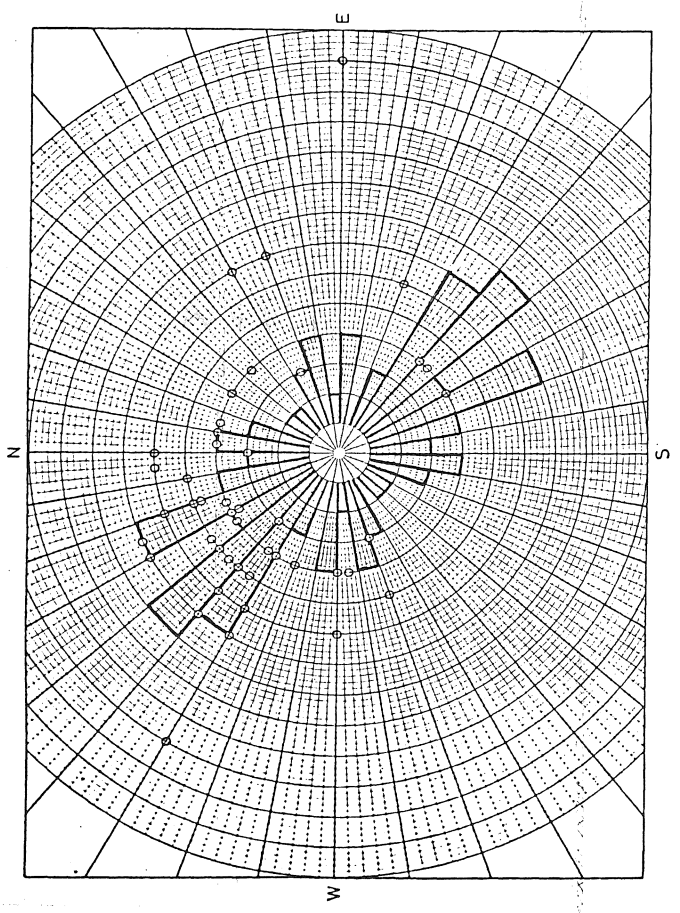
Site 6.Barnasallagh



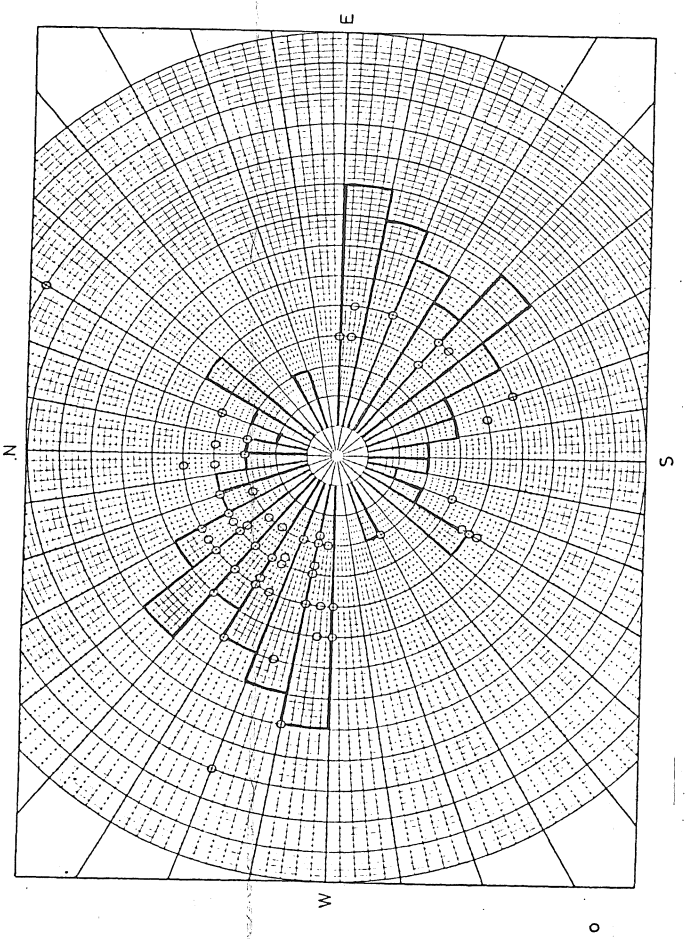
Site 8b.Portacoolia.



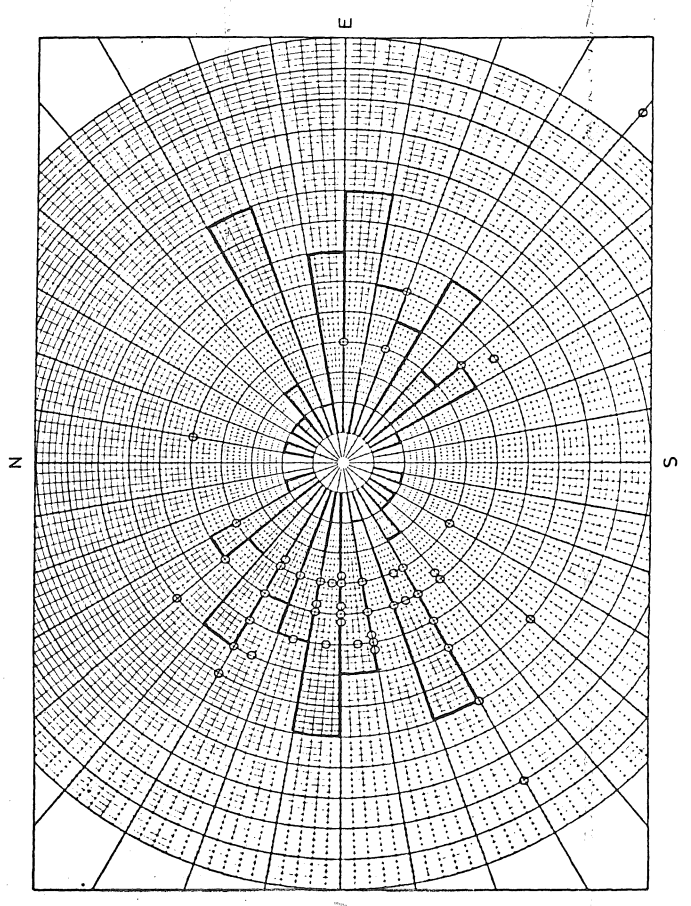
Site 10a.Moraine ridge,Capnagower (w of Kinnacora)



Site 13.Lacknaccanny



Site 10b.Upper till,Capnagower (nw of Kinnacora)



Site 18.Moraine,Maum Td.

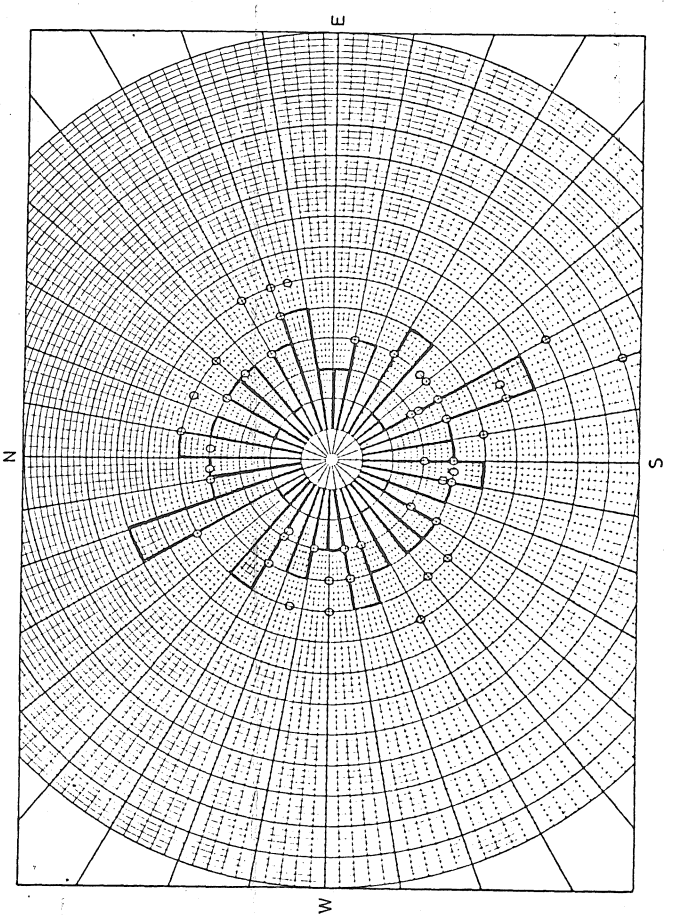


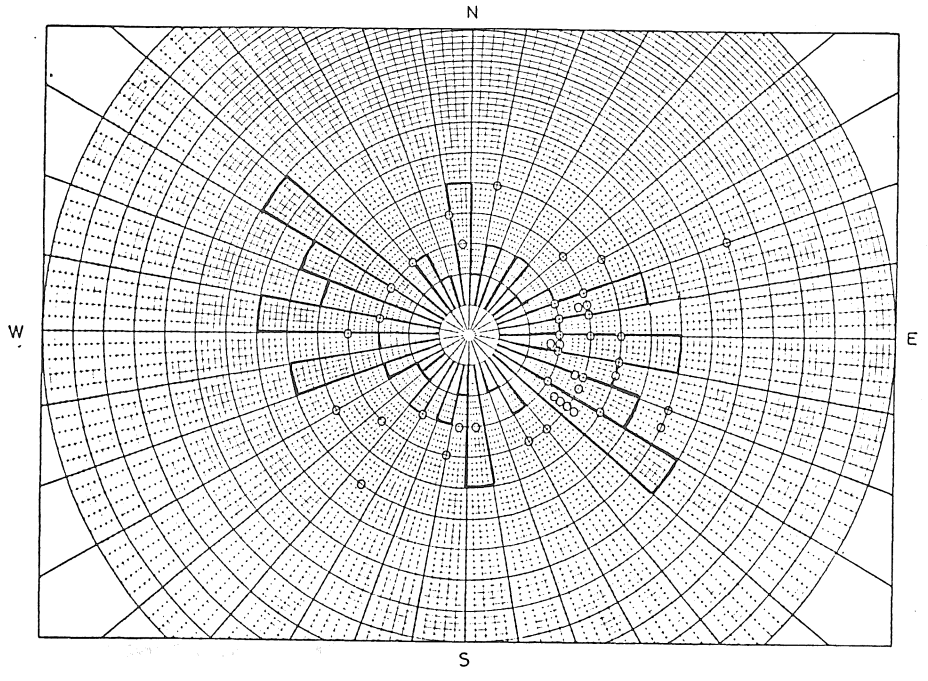
Table 1.

Census data.Clare Island,Kilgeever(Civil)Parish,Murrisk Barony,Clare Island District Electoral Division and Westport Poor Law Union.
(from Parliamentary Papers)

Townlands	1841	1851	1861	1871	1881	1891	1901	1911
Ballytoohy Beg	47	19	18	21	24	33	25	36
Ballytoohy More	226	48	72	35	57	41	47	26
Bunnamonaun	189	129	134	73	70	57	51	0*
Capnagower	125	70	45	44	38	30	49	40
Fawnglass	96	36	31	35	34	40	33	24
Glen	333	177	153	105	149	135	92	91
Kill	213	151	106	48	82	74	88	56*
Lecarrow	218	84	90	85	101	84	66	0*
Maum	68	10	23	17	24	23	11	11
Strake	100	21	44	31	42	40	28	176*

*These fluctuations are due to alterations in Townland boundaries.

Site 20.Promontory to west of Ooghganny(local till)



siltstone beds as at site 5.Here the siltstone beds are interdigitated with layers of angular,broken siltstone cobbles.

Stop 8.Site 7.Peter Salmon's Cove.

5-6m of lodgement till with a matrix composed of pinkish-grey clay-sand.Clasts are subangular-subrounded and consist of limestone,red, grey and green sandstone,green and red siltstone and grey quartzite.The fabric for this site(7) is shown on Page 13.The fabric shows an orientation towards 280-290°.

Stop 9.Site 8a.Portnakilly.

This stretch of the coast exhibits some large rock surfaces eroded to whale-back forms by ice.Although the erosional forms are oriented(and striated)towards 265-270° the bedrock also contains structural orientation.

Stop 10.Site 8b.Portacoolia

Hallissy(1914,in Cole et al.)noted 3 sets of striae at this site. These were oriented;240°,300-305° and 195°.

The lodgement till contains limestone and the fabric(Page 13) shows an orientation towards 280-290°.

Observations of the striae suggest that they vary greatly in direction and even appear to curve.This makes any interpretation based on their orientation awkward.

Summary of South coast sections.

The southern coast of the Island appears to be covered by a variable thickness of till(containing limestone).This till is overlain in places by solifluoted deposits.The till can be seen to form drumlin mounds in places(Figure4,Page 9)

The fabrics of this limestone containing till show an ice movement towards the west(280-290°)when the till was deposited.The till,with its associated drumlins,probably belongs to the Roscahill Till defined by Synge(1978).

The solifluction and slips lying on the till are clearly the product of later events.

Hallissy(1914)observed large granite boulders(ca.½-1 ton)300' up the southern slopes of Knockmore.This granite was thought by him to have originated from Corvockbrock .Further work on the tills including detailed pebble counts should show whether any of the tills are comparable to the Killadoon Till known to contain granite.Obvious problems such as the reworking of clasts might cause confusion.

***walk to site C.

(brief descriptions of 2 sites not on our route:

Site 19.

This site consists of another balk or boundary to a rundale field(see site 3a,stop 3).Again a buried soil underlies a field boundary.

section:

0-20cm	disturbed soil(forming low mound)
20-40cm	humified peat,some plant fragments
40+cm	heterogenous deposit,cf.head.

A pollen sample from the peat contained the following taxa(figures in brackets = %P): Betula(2),Pinus(+),Ulmus(+),Alnus(+),Corylus(3), Salix(1),Gramineae(22),Ericales(38) Plantago lanceolata(16),Plantago(11), Umbelliferae(3½).

Herbs=55%P

Site 20.Ooghanny.

Local material forming a till(?).Possible fabric orientation towards 90-130°(Page 15).This deposit may represent a local ice advance from the western end of the Island.

).

Stop 11.Site C.Loughanaphuca.

Hallissy(in Cole et al,1914)described the small parallel curved ridges at Loughanaphuca as moraine ridges representing successive stages of retreat of a local glacier.

The small arcuate end moraines at Loughanaphuca are only a few metres high and ca.20m long.They are surrounded by much larger hummocky moraine complexes which occur at the western end of the Island(Fig.4,Page 9).The larger moraines appear to be the product of ice which accumulated in a large corrie on the western slopes of Knockmore.Although this corrie is not as spectacular as some along the Achill coast it is still impressive.It is possible that the smaller end moraines at Lo. are the deposits left by a retreat of a tongue of ice stretching from the Knockmore area.

Behind the Lo. end moraines,within a wide enclosed valley, there is a large flat area covered with large boulders.This area probably represents a lake floor at a period when the moraines dammed the valley.

During July 1982 several cores were taken from behind the last of the moraines to be deposited.One core proved the following sequence:

0-54cm	Fibrous plant remains,mostly roots
54-58cm	Fibrous plant remains,becoming finer
58-79cm	Fine detritus with roots penetrating
79-95cm	Plant detritus with some larger plant frags.
uneven boundary	
95-98cm	Grey-grey/blue clay with sand
98+cm	Boulder/bedrock(?)

Pollen was extracted from part of this core(50-95cm) and a preliminary diagram produced-Figure A,Page 17.

The diagram shows that the basal clay is rich in the pollen of Gramineae and Ericales.The sediment lying on this clay contains a pollen assemblage rich in Salix(willow).Following this Salix assemblage Corylus and then Plantago and Gramineae are dominant.

The lower deposits in this core probably depict a local representation of the transition from Late Glacial to Post Glacial.

**discussion!

Stop 12. Site E.

North of Loughanaphuca the moraines rise up towards a large bog.A core taken from this site proved 2½metres of coarse peat (large plant fragments,roots and woody material) with 50cm of blue-grey clay at the base.This material has not been analysed yet .

Site 22.

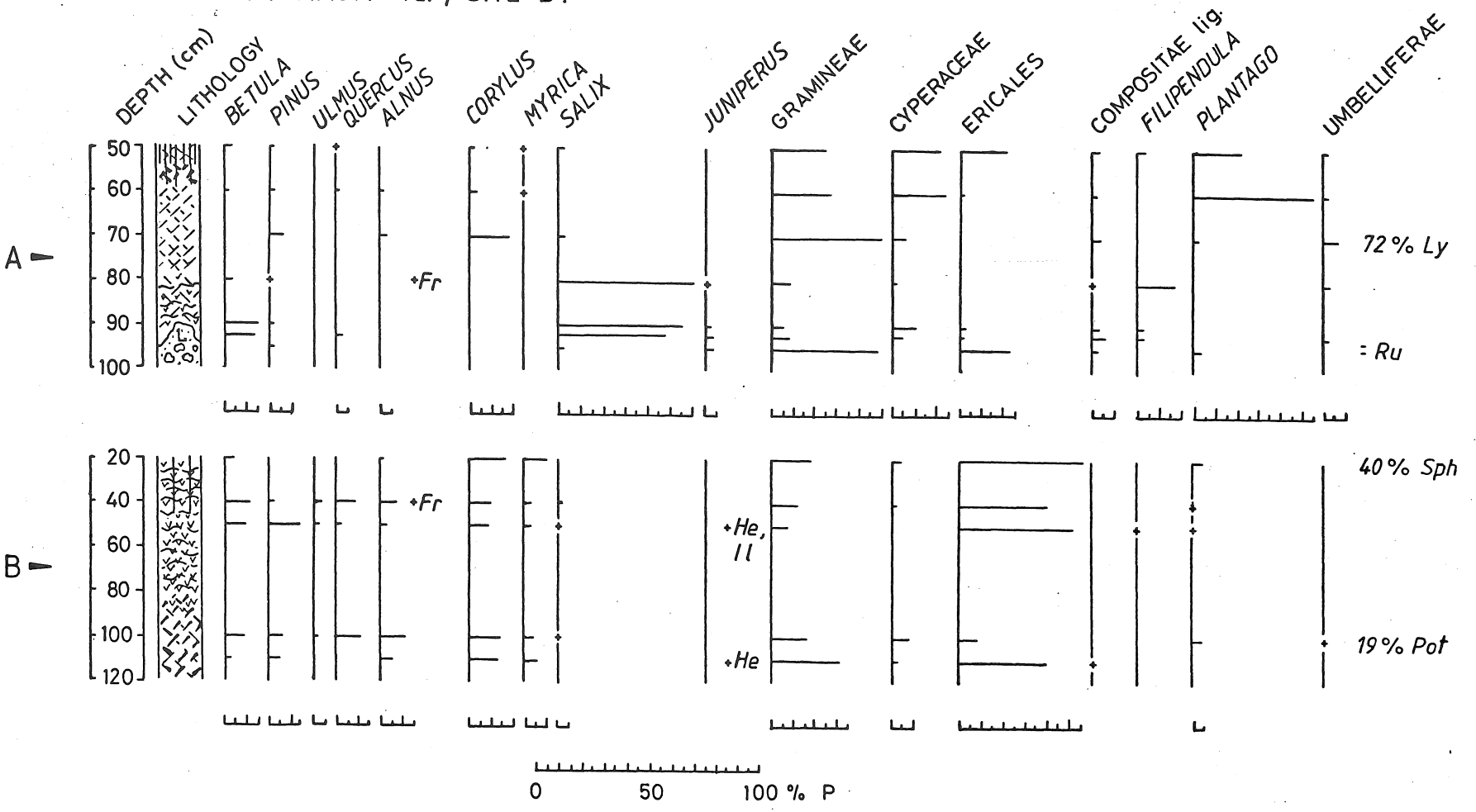
Corrie on western side of Knockmore.The corrie contains a moraine which is cut through by a stream showing some sections.

Signal Tower.

Good view.

A. CLARE ISLAND. LOUGHANAPHUCA, CORE 2

B. CLARE ISLAND. MAUM Td., SITE B.



****

Sunday 5th September. (please note the wave cut rock surfaces are very slippery if wet)

Stop 13. Site 1. n.e. end of bay.

The till sections along this stretch of the coast are variable. On closer inspection a variety of deposits (other than till) may prove apparent.

Within the 2-3m till section clasts are angular/subangular and rounded in either a pebble matrix or sand. The clasts include red sandstone, quartzite, red conglomerate, coarse grey sandstone, green sandstone, siltstone and some granite.

The till fabric (Page 12) shows an orientation towards 300°.

Stop 14. Site 1a. Cliff between Hotel and Kinnacorra.

Till composed of angular/subangular cobbles and boulders in a sandy matrix. There is some sorting within the matrix and laminations within sandy horizons suggesting a degree of mass flow within lodgement (?)

Content: grey and red sandstone, vein quartz, coarse sandstone, brown and white quartzite, red conglomerate and siltstone.

A fabric (Page 12) shows a general westerly orientation but is well scattered.

The sea along this part of the shore has cut sections through some of the moraine ridges prevalent in the n.e. corner of the Island.

Stop 15. Site 10a. Kinnacorra

Section in moraine ridge. Shows a core of till overlain by large angular boulders in a pebble and sand matrix (possibly melt out on lodgement till below)

The till fabric suggests an ice movement (in the lower till deposit) towards 310° (Page 14). Clasts include: red sandstone, quartzite, quartz, conglomerate, micaceous sandstone, breccia and gneiss.

Stop 16. Site 10. Kinnacorra

Impressive storm beach at eastern end of Island. Encloses a small salt marsh.

Stop 17. Site 10b. upper till, Capnagower.

Angular/subangular cobbles and boulders in a sandy-pebble matrix. Predominantly quartzite & sandstone (prob. local (?))

The fabric of the till shows clast alignment towards 270° (with scatter to 240°) - Page 14.

Stop 18. Site 11. Carricknaportaun

Very high cliff section (ca. 15m). At base 2-3m of limestone rich lodgement till. This is in turn overlain by till rich in sandstone, quartzite....

Awkward access and no desire to stand below the cliff led to the lack of a fabric from this site.

This cliff section shows clearly the juxtaposition of the lower limestone (rich) till and the upper till. The bipartite till succession was well known to Hallissy who described it in 1914.

Stop 19. Site 12

This site displays the limestone rich till at the base of the section and 3m of upper till. Here the upper till contains a poorly sorted channel deposit with occasional angular clasts. The upper till itself is composed of angular clasts of sandstone and quartzite.

Stop 20. Site 13. Lackaccanny

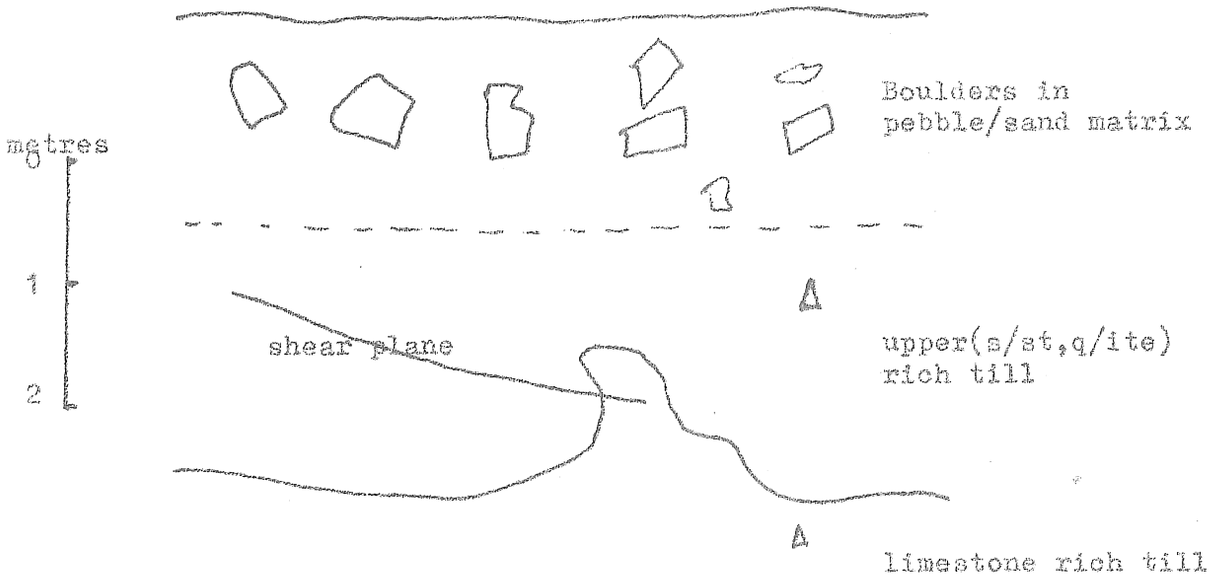
Clear junction between the lower limestone rich till and the upper sandstone/quartzite rich till. At this site it is possible to

note that the upper till appears to be composed of 2 distinct facies;

ii.An upper deposit of large angular boulders
i.A lower deposit of cobbles/boulders in a sandy-clay matrix
(cf.melt-out and lodgement)

The lower limestone rich till appears to contain shear planes along these sections.A fabric from the lower till is shown on Page 14.It suggests an orientation towards 300°.

Stop 21.Site 14



This section shows the general succession of the tills along the n.e. coast.

upper till	-	angular boulders in coarse matrix sandstone and quartzite pebbles/cobbles/boulders in sandy matrix
lower till		predominantly limestone pebbles/cobbles and occassional boulders in a clay rich matrix

The limestone till thickens towards the n.w. and there appear to be a large number of variations within the till structure.

Stop 22.Site 15 Intermoraine stone accumulation.

This site offers a view of the large area of hummocky moraine (composed of the upper facies of the upper till(see site 14)).The moraine complex was mapped from 1:30,000 aerial photographs and this mapping is reproduced on Figure 4,Page 9.The landscape is typical for hummocky moraine topography.

At this site the large angular boulders lying on the surface of the moraine have moved under the influence of gravity to line intervening morainic hollows.This has produced accumulations of boulders,here in a line. /...

These boulders appear stable at the present day(note lichen growth) and were probably mobile under periglacial conditions.

The high cliffs along this section are mainly composed of the lower(limestone rich)till .

Stop 23.Site 17. Portlea.

Another storm beach.Possibility a storm has breached a CDB wall,hence the beach is active.

Summary of sections.

To make any firm observations furtherwork characterising the tills(especially their clast geology)would be necessary.However it is possible to make some general points for discussion.

i.There are 2 distinct till types apparent in the eastern sections.

ii.The lower till contains limestone and is probably the same age as the till along the southern coast(compared to the Roscahill Till on P.15/i)

iii.The upper till contains little or no limestone and can be compared to the Newport Till.(eg on stone content and comparison with other sites in region.)

iv.The fabrics do not appear to show intertill variation, however further study would help.It is possible that ice flow was affected by the mass of Clare Island situated in its path.

v.The hummocky moraine of upper till suggests a melting of dead-ice in situ.

***weather dependant walk to Lighthouse.

The triangular shaped area(Ballytoohy More)to the north of the Island is composed of rocks of the Ballytoohy Group(6 on overlay to Figure 2,Page7).In this area there are a succession of notable east-west ridges and valleys cut in bedrock.The ridges coincide with bands of pebbly psammite or chert,the valleys with phyllite and faults (Phillips,1965).

Large areas of till deposits cover the n.e. part of this triangle (Figure 4).These tills reach a thickness of > 20m along the coast.

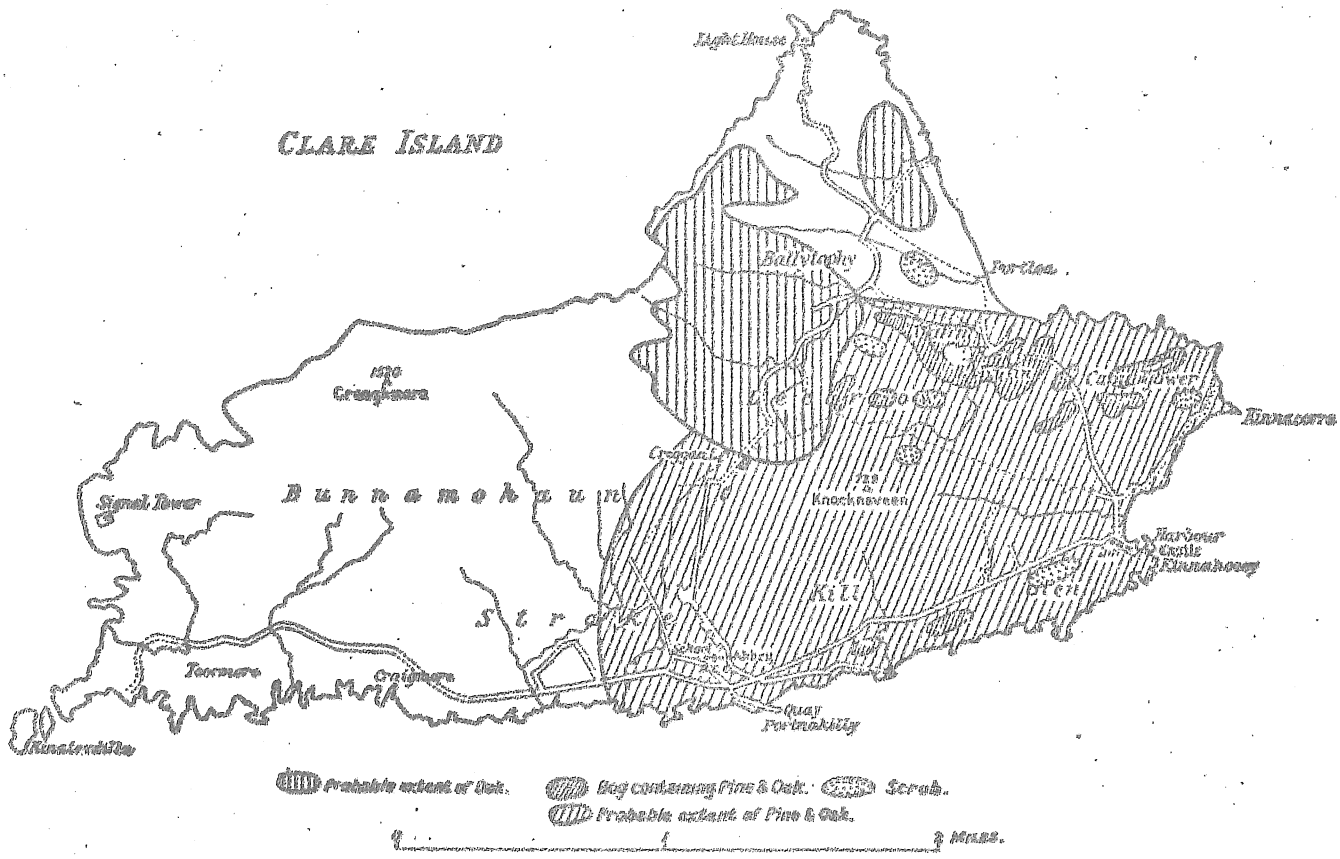
Stop 24.Site 8.Maum Td.

At this site a cut bog provides excellent exposure of the peat growth in Maum Td. and the fossil pine stumps(bog-deal)found at a few points on the Island.The fossil remains of tree species were studied by Forbes(1914)and a map he constructed of the possible former extent of trees and shrubs on the Island is reproduced over the page.Forbes' paper is worth referring to because he made many observations regarding the fossil flora.Praeger,1914 and Hallissy,1914,also made observations on the peat deposits but unfortunately Lewis did not contribute his section which was to be devoted entirely to the subject.

Referring to the pine stumps McParlan(1802)commented;

"Growing woods on these mountains and islands is generally thought impossible.I must beg leave to differ with those who think so because I see in situations of this county the most exposed to western storms, roots and trunks of trees which certainly had grown where they now lie dead.

If the necessary parts of the banks and mountains (were) wooded the bay of Westport could easily exceed anything of the kind in Europe,the Bay of Naples not excepted"



Clare Island, showing areas with scrub and bog timber.

CLARE ISLAND SURVEY.—FORBES: TREE-GROWTH.

from Forbes(1914)PRIA,31

Clare Island contains a large percentage cover of peat deposits, (See Figure 3,Page 8) although the peat is in many places disturbed by extensive cutting.

The peats vary in location and type.Further work would allow a detailed description of the peat types and their distribution spatially and temporally.The main classifications are as follows;

i.Blanket peat on mountains and high ground.
ii.Peat growing in structural bedrock depressions and hollows in the hummocky moraine topography.

The latter peat is found at all levels(including the top of Knockmore)and varies in depth reaching in places > 4m.

Maum Td. contains a large area of low ground surrounded by higher areas of hummocky moraine and solid rock.Peat has accumulated in this lowlying area although in this Century much of the ground has been drained.On the map depicting the sites(rear of guide) a lake(Lough Avullin)can be seen in Maum.This lake is now almost entirely overgrown and as we can see at site B the peat,except in the lower areas,is dry.Site B itself is within walls built by the CDB.The deposits at the site suggest the accumulation of fen peat (detritus) under wet conditions followed by considerable tree growth when the ground was drier.Subsequently wet conditions returned at the site and peat began to grow again.

One section at the site proved the following;

0-50cm Coarse peat containing plant remains and Sphagnum
50-90cm Woody peat containing tree stumps and some Sphagnum
90-110cm Coarse and fine plant detritus
~~↓ below surface 110-280/310 plant detritus on bedrock/till.

Samples for pollen analysis were taken from parts of the section and a pollen diagram produced-Figure B,Page 17.
The pollen diagram shows little change throughout its extent.One interesting point is the low % values of pine pollen.Clearly the bog surface was covered by ericaceous plants and was fairly open.

The pine trees here as at other sites were destroyed by changing climatic conditions and the growth of the bog surface.At site B a raised profile to the bog surface can be imagined by observing the wall at the eastern end of the field.Clearly some considerable depth of peat (perhaps 1-2m)has been stripped off the surface of central parts of the bog.

Stop 25.Site 18.

This small section in the hummocky moraine shows the large angular boulders(incl;sandstone,quartzite,conglomerate,breccia,red sandstone...) similar to those at the coastal sections.A fabric from this deposit (Page 14)is very scattered.The deposit probably represents melt out of debris from ice.

Stop 26.Site A

Site A is one of a number of fairly large intermorainic hollows. The hollow is currently drained but the water table in the peat is clearly high.The surface deposits above the water table level have been disturbed and cut.These hollows provide basins for the build up of detrital organic matter and fen peat.

2 metres to the south of the bridge a coring proved 520cm of deposits on rock/till.The core was sampled for pollen and described although this work has been preliminary only because of the limited time available

	Sediment:
0-47cm	Coarse herbaceous peat(roots/stems...)and detritus
47-200cm	Coarse homogenous herbaceous peat
200-305cm	Very coarse detritus and occasional wood fragments
305-360cm	Finer detritus,some clay
360-378cm	Gradually coarsening herbaceous peat and wood frags.
378-426cm	Coarse herb.peat and detritus,wood frags.
426-460cm	Gradual transition into yellow/grey sticky marl.Contains mud and organic bands .5mm thick
460-461cm	Yellow-grey clay
461-474.5cm	Light yellow mud with organic bands
474.5-475.5cm	Light grey mud
475.5-490cm	Marl with organic bands
490-491cm	Dark grey clay
491-494cm	Olive green clay and detritus
494-500cm	Olive green clay and sand

The deposits record ;
v.Growth of bog plants in situ(0-200cm)
iv.Inwash of detritus and probable rise in water level(200-360cm)
iii.Peat filling depression and in situ plants(360-426)
ii.Filling of lake with organic detritus(426-460cm)
i.Open water deposition with $CaCO_3$ present.

The analysis of 32 samples for pollen gave the results shown on the 2 pollen diagrams-Pages 23 and 24

The diagram on Page 24 is a detail of the lowermost sediments to show the Late Glacial-Post Glacial transition more clearly.

The pollen assemblage biozones are as follows;

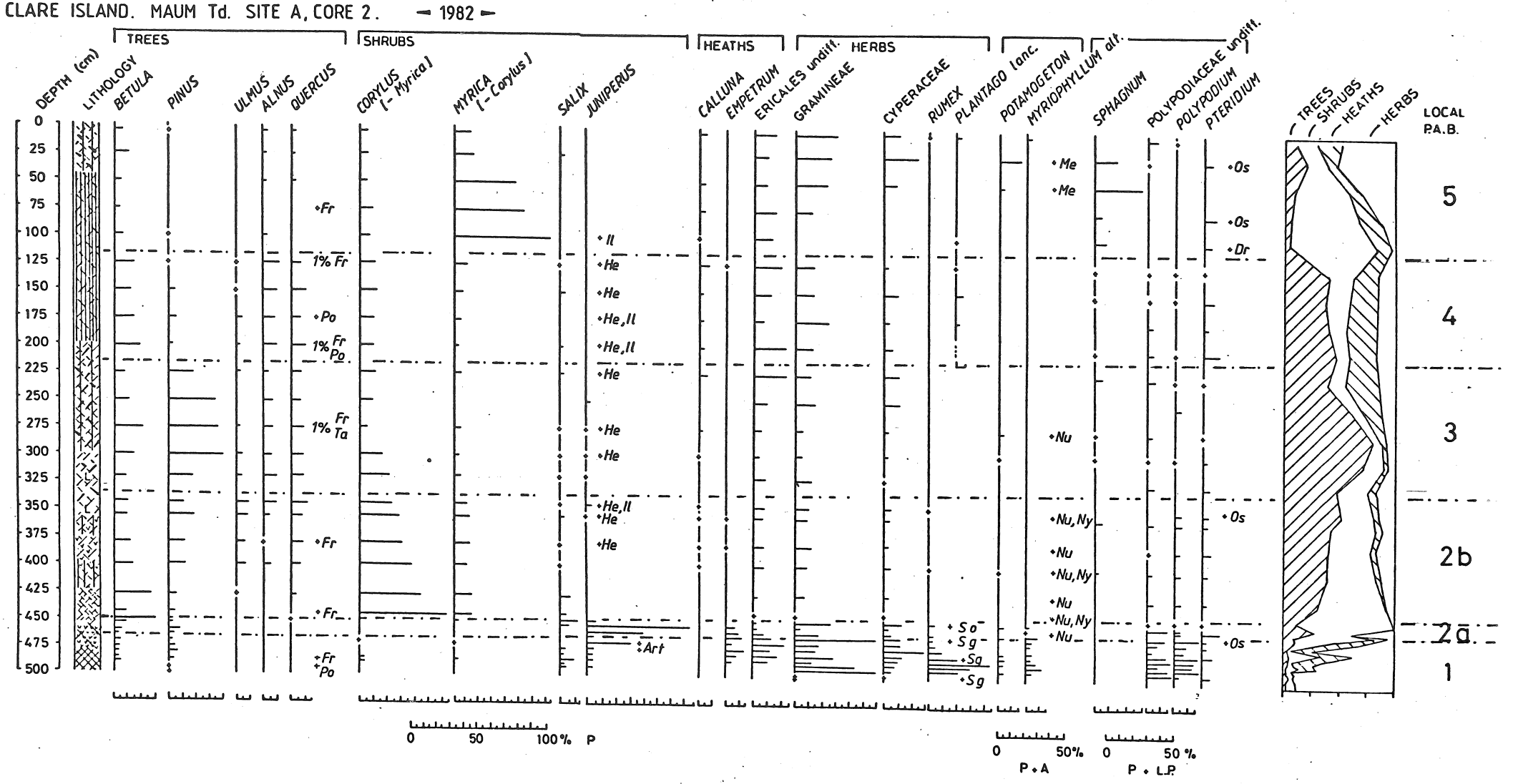
Local p.a.b.	assemblage
5	Myrica-Gramineae-Cyperaceae
4	Betula-Alnus-Quercus-Gramineae
3	Pinus-Betula
2b	Corylus-Betula-Pinus
2a	Juniperus-Betula
1c	Gramineae-Juniperus
1b	Rumex-Gramineae
1a	Gramineae-Rumex

Although more detailed sampling will prove very interesting the core appears to contain a good Late and Post Glacial record.

Some points of note are;presence of Ulmus(elm)and its curve,the presence of alder,Pinus curve .

Points for discussion regarding the pollen diagram include

1.Dating the recorded events on the diagram
2.Correlation with other work
3.Man's influence on the Island's vegetation
4.Problems of facies change and pollen deposition


CLARE ISLAND. MAUM Td. SITE A, CORE 2. — 1982 —
TREES
SHRUBS
HEATHS
HERBS
DEPTH (cm)
LITHOLOGY
BETULA
PINUS
ULMUS
ALNUS
QUERCUS
CORYLUS (- Myrica)
MYRICA (- Corylus)
SALIX
JUNIPERUS
CALLUNA
EMPETRUM
ERICALES undiff.
GRAMINEAE
CYPERACEAE
RUMEX
PLANTAGO lanc.
POTAMOGETON
MYRIOPHYLLUM alt.
SPHAGNUM
POLYPODIACEAE undiff.
POLYPODIUM
PTERIDIUM
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TREES
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2a
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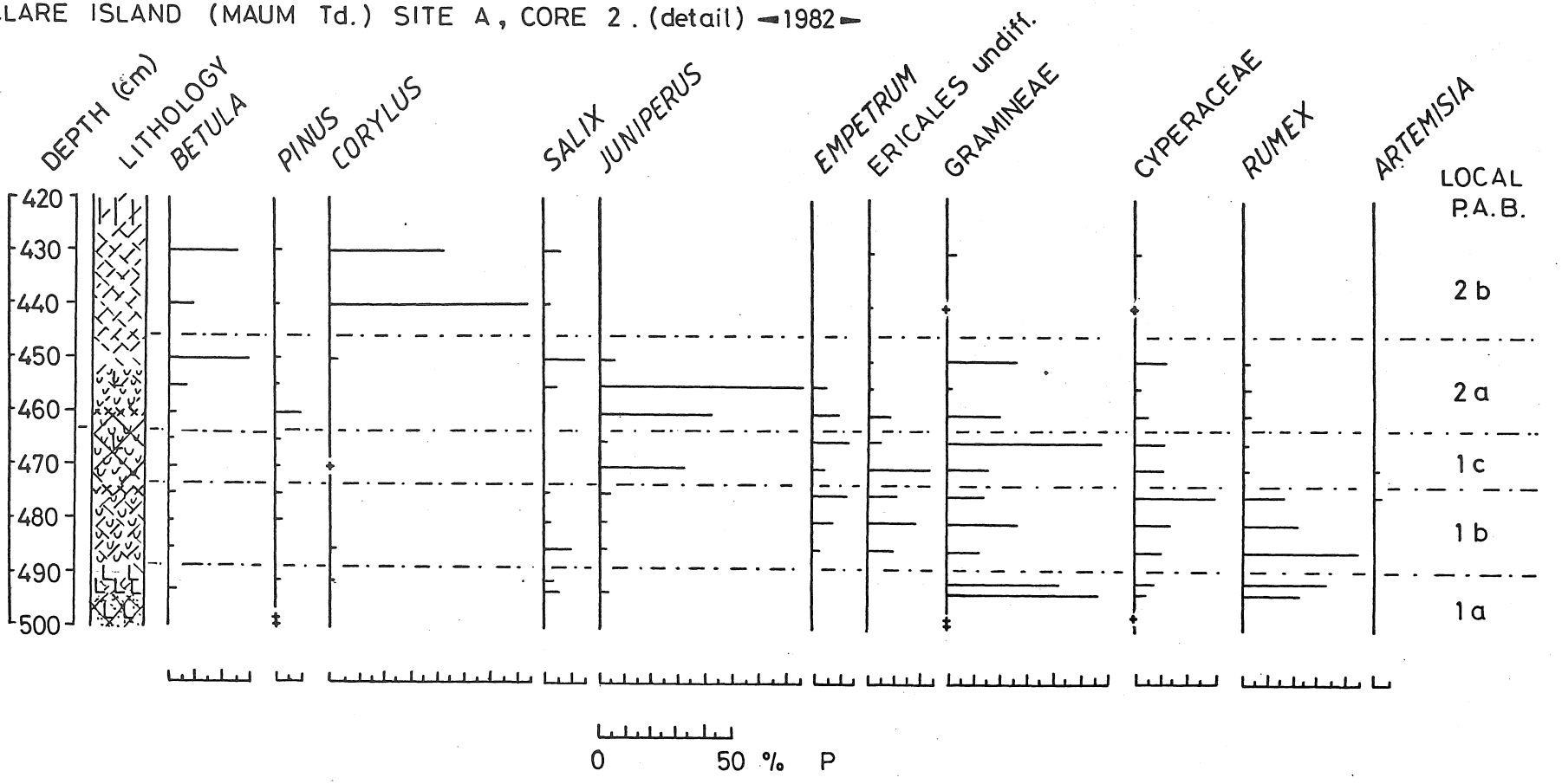
CLARE ISLAND (MAUM Td.) SITE A, CORE 2. (detail) ◄1982►



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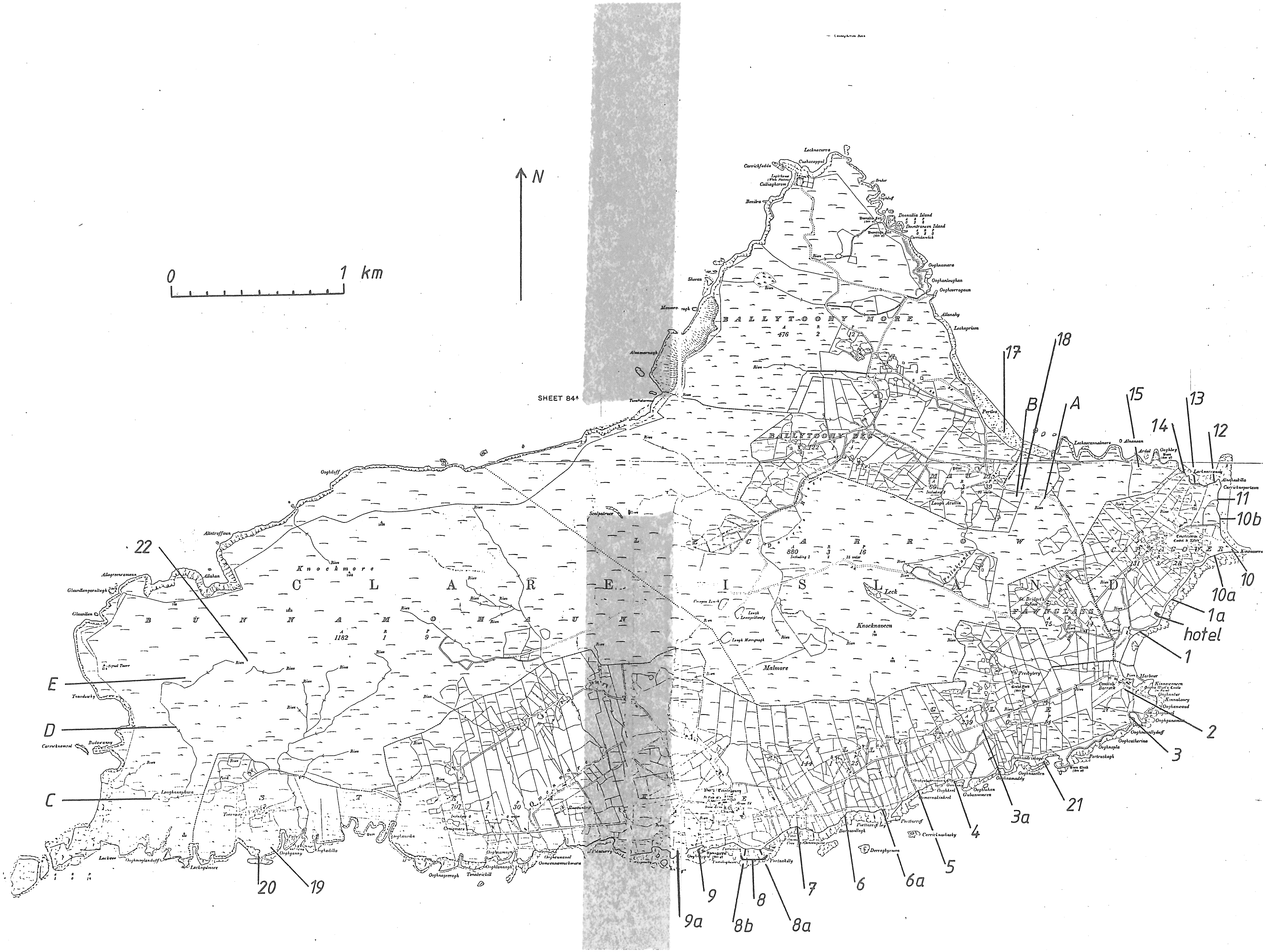

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15th September 1982

Additional notes made after the field excursion:

1. Site 8. The tills(diamictons(?)) along this section contain evidence of flow(?) horizons. Possibly interesting in terms of drumlin genesis.

2. Sites 11,12,13 and 14.
In the guide I described a lower till along these sections which I proposed was a limestone rich till. In fact this lower till only appears to contain some limestone clasts and is predominantly made up of sandstone and quartzite. The 'upper till' is almost certainly decalcified 'lower till' although certain facies changes are apparent.
This important point means that there is no clear till division and is very relevant to the summary on page 19.

These points are just 2 of many made by the fieldtrip participants. Further work on Clare Island should clarify these and other problems.