The Palynology of Ringneill Quay, a New Mesolithic Site in Co. Down, Northern Ireland

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THE PALYNOLOGY OF RINGNEILL QUAY, A NEW MESOLITHIC SITE IN CO. DOWN, NORTHERN IRELAND

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(The Queen’s University, Belfast)

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INTRODUCTION

Evidence of the interaction of the post-glacial eustatic rise of sea-level and the isostatic uplift of the land is abundant along the northern and eastern coasts of Ireland. The evidence consists of wave-cut platforms, washed rock-surfaces, cliff lines, submerged peat, and raised beaches. The "25-foot" beach is the best known of these on account of its clear exposure and frequent association with kitchen-middens of Mesolithic age (Movius, 1940b; Mitchell, 1947; 1949b; 1956b). On the north-east Irish coast up-to-date information on the dating (Jessen, 1949) of the raised beach is available only for Co. Antrim, where Movius (1937; 1940a; 1940b; 1942) carried out detailed excavations at Larne, Glenarm, and Cushendun. While the facies of the Mesolithic known as the Larnian derives its name from the first of these sites, it is nevertheless around the Cushendun site that most discussions on the dating and development of the complex revolve. At Cushendun, peat and lagoon clays interbedded among the raised beach gravels allowed the site to be investigated pollen analytically and related to the framework suggested by Jessen (1949) for the late Quaternary period in Ireland.

On the Co. Down coast Movius (1940b) investigated one site in detail; this was Rough Island, which is at the head of Strangford Lough. There typologically Early Larnian flakes were identified, and a kitchen-midden was found overlying the 25-foot beach. Since no polleniferous peat or clay occurred on the site, the dating and correlation of its strata were based on the marine fauna and artifacts. In the circumstances these may not provide unequivocal dating. Thus, Mitchell (1949a) has suggested that Movius' division of the Larnian into an Early and a Late phase—typologically distinct—may be ambiguous. Small implements, typologically Early Larnian, were produced perhaps even late in the sequence, where the supply of flint happened to be inadequate for the larger tools of Late Larnian character.

In the light of these facts it is very agreeable to record that during the past few years several opportunities of examining raised beach sections on the Co. Down coast have occurred, and on each occasion polleniferous horizons were found. This paper provides an account of one of these sites, the raised beach at Ringneill Quay, near Comber (Fig. 1). The site, which is only a few miles from Rough Island, was first recorded in 1904 by Seymour of the Geological Survey. In 1935...
Fig. 1. Map of the coast of north-eastern County Down showing the position of Ringneill Quay, Ardmillan and other Mesolithic sites. The inset map shows sites closely associated with the investigations of the post-glacial beaches by various authors sited in the text.

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FIG. 2. Map showing in detail the geography of the Ringneill Quay area. Also sections A-B through the raised beach.
it was examined briefly by Movius who concluded that it contained a kitchen-midden with charcoal, shells, and flint tools. A recent examination of the deposit has been made by Stephens and Collins (1960) who describe the topography and stratigraphy in detail, and discuss archaeological affinities with other Irish sites.

**Physical Setting and Stratigraphy**

Rough Island and Ringneill Quay lie in the upper end of Strangford Lough, a thirty-mile-long shallow tidal area enclosed by the Ards peninsula. The lough, which runs north and south, opens to the sea only by a narrow strait at the southern end, so that high-tide inside the lough lags behind that on the outer coast by two hours, and neap and spring tides in the vicinity of Rough Island and Ringneill Quay are about two feet lower than at a corresponding position on the outer coast.

Ringneill Quay is in a protected position, being separated from the main lough by a curving chain of islands—actually submerged drumlins—which, at the present day, are joined together by man-laid causeways (Fig. 2). The sole entrance to the inner bay at Ringneill Quay is now through a narrow channel two miles to the south.

At the point of excavation the gravels of the raised beach were lying against a drumlin. Beneath them was found a layer of tightly packed shells, which were themselves resting on thin beds of grit and sand, containing charcoal and bones. This debris is believed to indicate an occupation horizon. Below this horizon there was an irregularly and finely layered or bedded lagoon clay. This lagoon clay may be attributed to the early stages of the eustatic rise in this area.

In early and mid-Boreal times fresh-water streams flowing between the drumlins around about Ringneill Quay presumably carried their load of silt far out into the lough. Later, however, sea-water must have surged inland along these channels and reached and flooded the interdrumlin hollows. Probably the electrolytes in the sea water precipitated the silt of the streams so that lagoon clays were deposited among the hollows and along the stream channels. Later, the greater proportion of such clays must have been washed away and only those protected by sand and shingle brought in by the rising tides were preserved. Thus, their preservation has been dependent undoubtedly on a gradually rising sea-level depositing gently, and first of all, beds of light-grade material over which the heavier and coarser material of the beach proper was thrown.

Close-lying samples of the lagoon clay were collected for pollen analysis from points in cuttings A1 and B which were opened by Stephens and Collins. The detailed stratigraphy at the two sampling points was as follows:

<table>
<thead>
<tr>
<th>Cutting A1</th>
<th></th>
<th>ft.</th>
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<tbody>
<tr>
<td>Soil (Deposit 9)</td>
<td></td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>Boulder beach (Deposit 8)</td>
<td>4 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shellbed (Deposit 7)</td>
<td>1 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sand, a few shells, charcoal, and bones (Deposit 6)</td>
<td>1 6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pebbly, bouldery deposit with sand, charcoal, bones, and flints (Deposit 5) .. .. .. 2 4
Red sandy clay; discontinuous (Deposit 4) .. .. 2-3
Dark grey clay (Deposit 3) .. .. 1 1
Grey sand with a few shells (Deposit 2) .. .. 3
Red, sandy silt (Deposit 1) .. .. not bottomed

Cutting B  ft.  ins.

Black, shelly soil (Deposit 9) .. .. .. 11
Boulders and shingle (Deposit 8) .. .. .. 9
Shelly sand and some shingle (Deposit 7) .. .. 11-12
Sand, shells, and charcoal (Deposit 6) .. .. 1 0
Sand, shells, shingle, and charcoal (Deposit 5) .. .. 2-3
Red clay (Deposit 4) .. .. .. 2-3
Dark grey clay with shells (Deposit 3) .. .. 9-10
Dark grey sand with shells (Deposit 2) .. .. 8
Red-brown, sandy silt (Deposit 1) .. .. not bottomed

As well as the samples of lagoon clay for pollen analysis, larger samples of this deposit were examined for macroscopic sub-fossils. Fruits of Betula pubescens and Ruppia were found, and a few seeds of Atriplex hastata or patula. It was impossible to say conclusively to which species the Ruppia fruits belonged. Both R. spiralis and R. maritima occur inside Strangford Lough at the present day (Stewart and Corry, 1938). R. spiralis grows near Comber (Gunning and Pate, 1957) which is a few miles from Ringneill Quay, while on the opposite shore of the lough, close to Kircubbin, R. maritima has been found. No other stations for this last-mentioned species are known in Co. Down, but R. spiralis occurs near Holywood.

The presence of Ruppia in the lagoon clay indicates the tranquil conditions under which the clay must have accumulated; Ruppia grows only in sheltered bays and lagoons which are kept salty by the periodic ingress of the tide. It avoids open coast and areas scoured by tidal currents.

There is no special significance in the occurrence in the clay of seeds of Atriplex hastata or patula. Jessen (1949) mentions A. hastata from a Zone VI deposit at Cushendun, Co. Antrim, and classes it as a foreshore plant associated with “seaweed beaches.” The difficulty of reliably distinguishing between the seeds of A. patula and A. hastata has been noted on several occasions by other workers.

**The Pollen Diagrams**

The samples were given a preliminary treatment with dilute hydrochloric acid to remove traces of calcium carbonate. The remaining procedure for the isolation of the pollen was as outlined by Faegri and Iversen (1950) for clayey material. In each sample the pollen was in excellent condition.
Fig. 3. Pollen profile of the grey lagoon clay exposed in section A1 at Ringneill Quay, Co. Down. Percentages calculated on a Basic Sum including all tree pollen, except hazel and willow.
Fig. 4. Pollen diagram of the grey lagoon clay exposed in section B at Ringneill Quay, Co. Down. Percentages calculated as Fig 3.
For every sample never less than 150 tree pollen, excluding hazel, were counted, and generally this Basic Sum—on which the percentages were calculated—exceeded 200. The practice of excluding hazel has been strongly criticized (Faegri and Iversen, 1950) and discussed (Mitchell, 1956). Since all pollen diagrams relating to the marine transgression in the British Isles have been based on calculations excluding hazel from the Basic Sum, this also has been the procedure for Figs. 3 and 4.

The general character of the pollen profiles in Figs. 3 and 4 is similar. Woodland conditions appear to have been relatively stable, although the hazel curve fluctuates vigorously in the upper part of Fig. 3, and similar but not identical fluctuations are seen in the lower part of Fig. 4. These fluctuations need not indicate synchronous events, nor is it wise to seek parallels for them in published material elsewhere in the region. A lagoon clay, by virtue of its mode of deposition, must be expected to contain irregularities which will distort the pollen curves. These need have no foundation in climatic circumstances but are probably the reflection of occasional disturbances of the clay strata by exceptionally high tides. For these reasons the zoning of the diagrams must be sought in their general character rather than in subsidiary and possibly entirely fortuitous phenomena.

This general character of the diagrams leaves no doubt, if we accept it at its face value, that the lagoon clay accumulated during Zone VI of the Boreal period. Since deposits of marine origin frequently contain unnaturally high amounts of pine pollen, the more precise assignment of the clay to a sub-zone of Zone VI is necessarily approached warily. Perhaps, however, the relatively low values of hazel are sufficiently trustworthy to remove the material from the vicinity of the Boreal hazel maximum of Sub-zone VIa, and to indicate that Sub-zone VIb or VIc, possibly the latter, is the correct choice.

It is perhaps only right to note here that the Upper Lagoon deposit at Cushendun was placed by Jessen (1949) in Sub-zone VIc. But the two sites should not be drawn into too close comparison on the basis of the pollen evidence, for the recognition of sub-zones, particularly in such material, is full of hazards. Moreover, the difficult stratigraphy at Cushendun and the synthetic character of the pollen diagram there leave room for further investigation.

**DISCUSSION**

The lagoon clay at Ringneill Quay is overlain by sandy layers (Deposits 4, 5, and 6) containing shell, charcoal, and bones. Movius suggested that these layers represented a kitchen-midden, presumably, similar to that uncovered by excavation at nearby Rough Island. We must consider first of all if this interpretation of these layers is acceptable in the light of the most recent evidence; when that point is established we may discuss whether or not these layers may be regarded as of approximately the same age as the lagoon clay.

Movius' proposal to classify Deposits 4, 5, and 6 as kitchen-midden is questioned by Stephens (1960) who believes that the only conceivable midden at Ringneill Quay is Deposit 7 which overlies the beds in question. But Deposit 7
contains few flints, no charcoal, and no bones. Furthermore, if its high content of shells is regarded as diagnostic of a kitchen-midden, it must not be overlooked that many of the shells have both their valves intact. Stephens, perhaps quite rightly, sees this as evidence of deposition under entirely natural conditions, probably between low and high-water marks during the transgression. If this interpretation is correct then the occupation level—but not necessarily kitchen-midden—is limited to the thin beds, Deposits 4, 5, and 6; these lie between the shellbed and the lagoon clay. The beds, as already mentioned, are rich in charcoal and bones, and in some cuttings flint flakes were found.

Apart from the presence of charcoal, bones, and flints, further evidence for regarding these layers as an occupation horizon is the number of large stones or boulders lying within the thin, discontinuous layer of red sandy clay which is Deposit 4. Unless we accept Stephens' suggestion that these boulders represent a hearth, partly disarranged, they are out of place since deposits 4, 5, and 6 appear to have been laid down under rather gentle conditions as the sea-level rose. It is possible that the thin layer of red clay may actually be the oxidized surface of the lagoon clay, which was roasted below the hearths. Further evidence of gentle submergence in connexion with these deposits is provided by the unrolled appearance of the bones, and the condition of the charcoal. The bulk of the latter was as tiny fragments wedged among the stones, and none was rounded or weathered, and surely this would have been its condition if it had been washed backwards and forwards along the beach.

Having accepted that Deposits 4, 5, and 6 represent an occupation-horizon it immediately becomes very important to establish their age. May they indeed be regarded as the same age as the underlying lagoon clay? A conclusive answer to this question will eventually be available since samples of the charcoal have been sent for C 14 assay. In the meanwhile, however, some less definitive evidence must be considered.

There is no cause for supposing that there was a considerable time lag between the deposition of the lagoon clay and the overlying deposits. Therefore, provided the upper surface of the clay is intact or represents its original surface, it is fairly reasonable to assume that the occupation-horizon may also be dated to approximately the late Boreal. Had there been a considerable interval before the occupation-horizon was deposited one would expect to discover in the upper centimetre or so of the clay, an increase in the abundance of alder pollen and possibly the appearance of pollen of Plantago lanceolata. But neither of these features has been observed, although samples of the clay brecciated with charcoal were examined.

But we must state that Mrs. Jope, who has identified the bones from layers 5 and 6, finds it difficult to attribute these to the Mesolithic period. She believes that the assemblage, on account of its content of sheep or goat, is more compatible with semisettled Neolithic people, rather than with Mesolithic strand-loopers. The identification of sheep or goat rests on a sternal vertebra from Deposit 6 in Cutting A2 and is only, as Mrs. Jope emphasizes, a very tentative identification.
It is very possible it may belong to pig, in which case a Mesolithic date would be acceptable.

Lastly, we have to consider how the pollen evidence from Ringneill Quay assists in establishing the date of the maximum of the marine transgression on the Co. Down coast. It is absolutely clear from the present evidence and from other data, unpublished and under press (Morrison and Stephens, 1959), that the greater and most rapid portion of the eustatic sea-rise was within the Boreal period. Towards the close of this period the eustatic rise and isostatic land uplift entered a state of balance or dynamic equilibrium and during this time the raised beaches were formed, being elevated subsequently as the two processes went out of step. For Ireland there is almost no evidence bearing critically on the timing of the last ten feet or so of the eustatic rise, but studies from England and Wales support the view that it culminated about the end of the Atlantic period. Nothing has appeared during the course of the present investigation to suggest that we should not accept this statement as applying also to the Co. Down coast.

But it is only right to state here that Mitchell (1956) is of a different opinion. He believes that the maximum of the transgression fell as late as somewhere in the Sub-Boreal period. This conclusion is based on his excavation at Sutton, Co. Dublin, where the raised beach kitchen-midden—which it appears was contemporaneous with the maximum of the transgression on the Co. Dublin coast—contained a Neolithic, polished stone axe. Neolithic artifacts are known also from the raised beaches on the north-eastern Irish coast, but there they have never been found within the actual beach horizons but always on top of the beach, and buried only by the layer of humus or soil which has accumulated between the time of the transgression and the present day. Thus we are faced by a dilemma; on the one hand Mitchell’s evidence is entirely unambiguous, and on the other hand there is yet no good reason for believing that beach formation on the north-eastern coast took place as late as Neolithic times. Reconciliation of these two contrasts—actually only apparent contrasts—is, however, quite simple.

Sutton appears an exception to the general ruling simply because it is in a southerly position where isostatic recovery was of less magnitude than farther north. Thus, on the Co. Down coast in the north the height of the top of the raised beach is between 25-33 ft. O.D., while on the Co. Dublin coast heights ranging from only 21-25 ft. O.D., have been measured (Stephens, 1957). Even more illustrative of the contrast in isostatic recovery is the fact that forty miles or so south of Sutton no certain trace of the raised beach has been found. In view of these facts it seems quite possible that at Sutton the balance between eustatic and isostatic movements broke down later and less abruptly than farther north. Sutton, therefore, fulfils the dictum that the raised beach is not of uniform age along its length but is youngest in the south and oldest in the north.

The need for caution has been very evident throughout this discussion and emphasizes the need for much more research. This might very profitably be carried out along the Co. Down coast since the Post-glacial deposits of the inter-drumlin hollows backing the coastline might provide critical stratigraphical evidence. Among objectives to be borne in mind is the possibility of finding
conclusive evidence for a late eustatic transgression in Romano-British times. Godwin (1943) has recorded this elsewhere in the British Isles, and it is tempting to relate this event to the 17 ft. O.D. notch which Stephens records at Ringneill Quay. A notch, possibly the product of the same episode, is recorded in Movius’ sections at Rough Island, and there it is at a height of 22 ft. O.D., according to levelling done by Stephens. At present neither of these notches can be dated at all closely since they are not associated with archaeological or polleniferous material.

ACKNOWLEDGMENTS

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