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# THE GLACIAL RECORD IN SOUTHERN COUNTY DUBLIN, EIRE

*By* PETER HOARE

(Department of Geography, Cambridgeshire College of Arts and Technology, Cambridge CB1 2AJ, England)

ABSTRACT. Early work by Farrington at the northern end of the Leinster mountains established a framework for glacial episodes throughout Ireland. The recent excavation of a small pit in commercial gravel workings in southern County Dublin has confirmed the relationship between four of the five events described by Farrington.

RÉSUMÉ. *Les souvenirs glaciaires dans le sud de County Dublin, Eire.* Un précédent travail dû à Farrington à l'extrémité Nord des montagnes de Leinster a établi les grandes lignes des épisodes glaciaires à travers l'Irlande. Le forage récent d'un petit puits dans une carrière commerciale de gravier, dans le sud de *County* Dublin, a confirmé les rapports entre quatre des cinq épisodes décrits par Farrington.

ZUSAMMENFASSUNG. *Der Ablauf der Eiszeit im südlichen County Dublin, Eire.* Farringtons frühere Untersuchungen am Nordende der Leinster Mountains schufen ein Gerüst für eiszeitliche Geschehnisse in ganz Irland. Die jüngst erfolgte Grabung eines kleinen Schachtes in einer Kiesgrube des südlichen County Dublin hat die Beziehungen zwischen 4 der 5 von Farrington beschriebenen Ereignisse bestätigt.

THE five glaciations that are now known to have influenced southern County Dublin and northern County Wicklow, Eire, were identified and placed in order by Farrington (1944); he summarized his findings in the *Journal of Glaciology* (Farrington, 1949). This sequence has recently been confirmed (Hoare, 1975, unpublished) but the status of the intervals between events remains to be firmly established.

5. Glenasmole (Athdown) ice cap.
4. Dublin (Midland General) ice sheet.
3. Brittas (Brittas) ice cap.
2. Irish Sea (Eastern General) ice sheet.
1. Slievethoul (Enniskerry) ice cap.

(Names in parentheses are those given by Farrington.)

Much of the evidence for the stratigraphy comes from the Brittas area of south-west County Dublin; a single exposure in Ballinascorney townland (061212)* illustrates the relationship between the first four of these events. The site is a trial gravel pit at approximately 270 m O.D. near the eastern margin of the Ballinascorney–Aghfarrell delta of Dublin glaciation age. There can be few such diminutive sections which have yielded so much detail concerning former glacial episodes.

*The Slievethoul and Irish Sea glaciations.* A brown (7.5YR 4/4 on the standard soil colour chart of the Fujihira Industry Company, Tokyo, Japan) stony till laid down by the Irish Sea ice sheet occupies the lowest part of the excavation (bed A, Fig. 1; Table I). It is at least 1.4 m thick and, although the base is not seen, Lower Palaeozoic bedrock crops out immediately to the south suggesting that the total depth does not greatly exceed this figure. Till samples which appear to be fresh do not react with dilute hydrochloric acid and no shell fragments occur. (A calcareous shelly till forms the lateral equivalent of this deposit in northern and central County Dublin.) The material nevertheless possesses a colour and fracture characteristic of Irish Sea glaciation till.

The green shale, siltstone, greywacke, and grit fragments (Table I) were derived from the local bedrock. The Leinster granite erratics were incorporated from drift carried northward into the area by the Slievethoul ice cap. The nearest *in situ* granite to the Ballinascorney exposure occurs 2.8 km to the south-east and there is no other route by which these particles may have been moved into the area. Granite erratics form the only evidence of this early local glaciation in southern County Dublin; till and outwash gravel dating from this event may be seen in coastal sections in County Wicklow (Farrington, 1944; Synge, 1964). The absence of Carboniferous erratics from the till of Irish Sea Basin provenance demonstrates how effectively they were "diluted" by locally derived material. Fabric

* Grid references lie within sub-zone O of the Irish National Grid.



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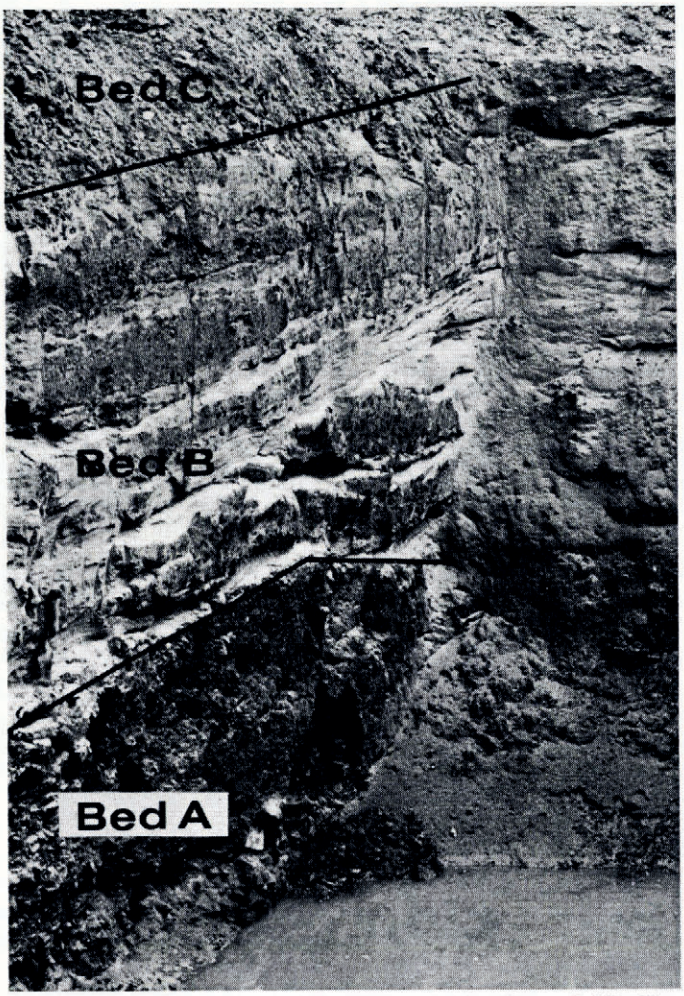


*Fig. 1. The section in Ballinascorney townland, southern County Dublin, Eire.*

TABLE I. PERCENTAGE LITHOLOGICAL COMPOSITION OF THE BEDS

| | *Bed A* | *Bed B* | *Bed C* |
|---|---|---|---|
| Phyllite | 66.9 | 10.0 | 13.4 |
| Local shale, siltstone, greywacke and grit | 12.3 | 5.6 | 24.7 |
| Leinster granite | 16.0 | 76.4 | 19.5 |
| Carboniferous limestone and chert | Nil | 2.1* | 23.4 |
| Carboniferous black mudstone | Nil | 0.5 | Nil |

* Exclusively chert.

analyses, striae and erratic carriages throughout County Dublin indicate that the ice sheet advanced from the north-east (Hoare, 1975, unpublished).

*The Brittas glaciation.* The till is overlain by up to 2.1 m of granite-rich fluvioglacial sand (bed B) associated with the northerly expansion of the Brittas ice cap; the contact between beds A and B is sharp but slightly irregular. There is no weathering profile in the upper part of the till, although a thin (8–10 cm) layer of pebbles represents the re-worked top of bed A. The sand is current bedded throughout but with highly variable foreset directions. Material coarse enough to determine lithological make-up

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is almost completely absent but the composition of gravel from a nearby exposure (064215) is shown in Table I. The chert and black mudstone erratics were derived from Irish Sea glaciation till in the area (although bed A at the Ballinascorney site would not have been able to provide them).

Bed B is equivalent to sand and gravel mounds in the Brittas area which mark the maximum extent of the Brittas ice cap. The distribution of granite erratics related to those found in bed A shows that the earlier Slievethoul glacier advanced beyond this limit.

*The Dublin glaciation.* The granite sand is sealed beneath approximately 4.2 m of predominantly fine-medium calibre gravel (bed C) deposited as a delta in Glacial Lake Blessington at the height of the Dublin glaciation (Farrington, 1942, 1957; Hoare, 1975, unpublished). Beds B and C are separated by a clearly defined junction. The gravel is generally moderately well graded but is locally poorly sorted. The maximum diameter of fragments is about 18 cm; layers of washed sand and gravel also occur. A lobe of the Dublin ice sheet pushed south-westward through the Ballinascorney col (0722) from Glenasmole (0823) and delivered the gravel into the pro-glacial lake at about 280 m O.D. Morainic mounds north of Ballinascorney House (068220) record the farthest extent of this diffluent ice; they are banked against low andesite knolls which control much of the local relief. The moraines are equivalent to bed C in the Ballinascorney section. Directional indicators associated with the Dublin ice sheet show that it advanced from the north-west.

Evidence for the Glenasmole glaciation is very limited in County Dublin and does not occur in the Brittas area.

The sequence of glaciations at the northern end of the Leinster mountains was originally unravelled as the result of the extensive and meticulous work of Farrington (1934, 1942, 1944, 1949, 1957). The somewhat fortuitous exposure of three horizons in a single small pit within the area, which was so important in Farrington's pioneering studies, has allowed the first four of these events to be confirmed.

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