

A Viking-age Grave at Donnybrook, Co. Dublin

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With a study of the sword by R. A. FARRAR, R. A. HALL,

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RECOGNITION IN THE Castle Museum, Nottingham, of a 'lost' sword from a Viking-age warrior's grave excavated at Donnybrook, Co. Dublin, in 1879, has prompted a re-assessment of the burial, which is discussed in relation to other Viking-age burials in the 'Irish Sea province'. Detailed metallurgical analysis of the sword, undertaken during conservation, has provided important information about the techniques of its construction, and has demonstrated the potential of a variety of analytical approaches.

IN 1879 Sir William Frazer presented to the Royal Irish Academy an account of discoveries made during the levelling of a mound at Donnybrook, approximately 4.8 km. SE. of the Viking-age and later medieval nucleus of the city of Dublin.¹ The mound was found to contain an interment accompanied by a group of weapons including a sword, and also the remains of an estimated 600 to 700 other people. A subsequent note by Frazer provided a few additional details which add little of fundamental importance to the information originally given.² Despite a few minor and obvious lapses which are noted below, Frazer's accounts are reasonable by the standard of their day, although at several points his description is not as precise as might be wished. The excavation, which initially involved the digging of a trench some 30 ft. (9.1 m.) wide through the mound from N. to S., generally proceeded without any expert archaeological supervision, although the site was visited at intervals by various local antiquaries. This circumstance, combined with the fact that the objects recovered from the site were later dispersed without record, may account for the scant attention the burial has since received. Coffey and Armstrong did not mention the grave in their publication of the cemetery material from Islandbridge/Kilmainham in 1910,³ and by the time that Johannes Bøe visited Ireland in 1926 to gather information for his *corpus*, *Norse Antiquities in Ireland*, most of the objects listed by Frazer were thought to be lost. The exceptions were a spindle whorl, a fragmentary bone comb and a fragment of a flint flake with some charcoal, housed in the National Museum of Ireland (Accession numbers SA 1900: 29, 1900: 30 and 1900: 41 respectively).⁴ Recently,

however, the writer recognized the sword in the collection of the Castle Museum, Nottingham, and conservation work in the laboratory of the Department of Archaeology, University of Southampton, has revealed details which warrant its republication together with a re-assessment of the entire find.

THE MOUND AND ITS CONTENTS

Frazer refers to the mound which contained the skeletons as Mount Erroll, a name which occurs on Irish Ordnance Survey maps drawn both before Frazer's investigation and after the subsequent house building and road making which markedly altered the area (FIG. 1). The precise location of Mount Erroll is not, however, plotted, and the name refers in these instances to an area rather than a specific feature. However, the published site plan (FIG. 2) does not accord with maps of either period in the disposition of Sea View Terrace and the 'old disused road' running off it. Also, Frazer states that the mound was E. of Seafield (*sic*) Terrace, and S. of the disused road, but comparison with his plan clearly shows that one of these directions must be wrong. The later remark that children's bones were found on the E. of the mound suggests, after further comparison, that the mound was indeed S. of the disused road, and the key to unravelling the muddle may be that in drawing the plan, Frazer accidentally inverted it before annotation.

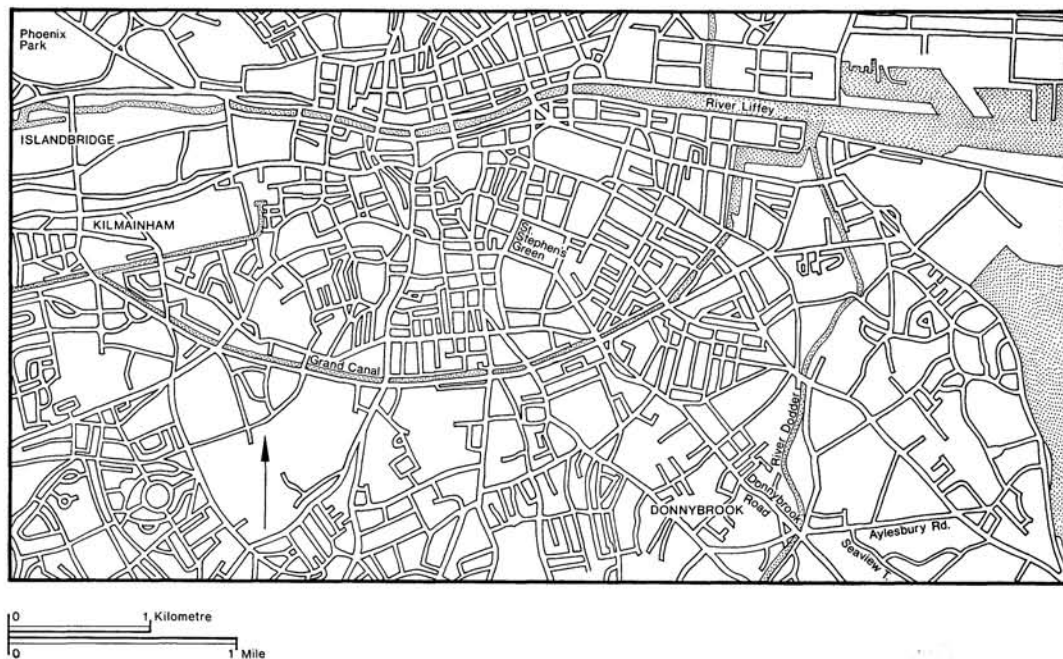


FIG. 1
CENTRAL DUBLIN AND DONNYBROOK SUBURB
showing modern street plan in vicinity of former site of Mount Erroll

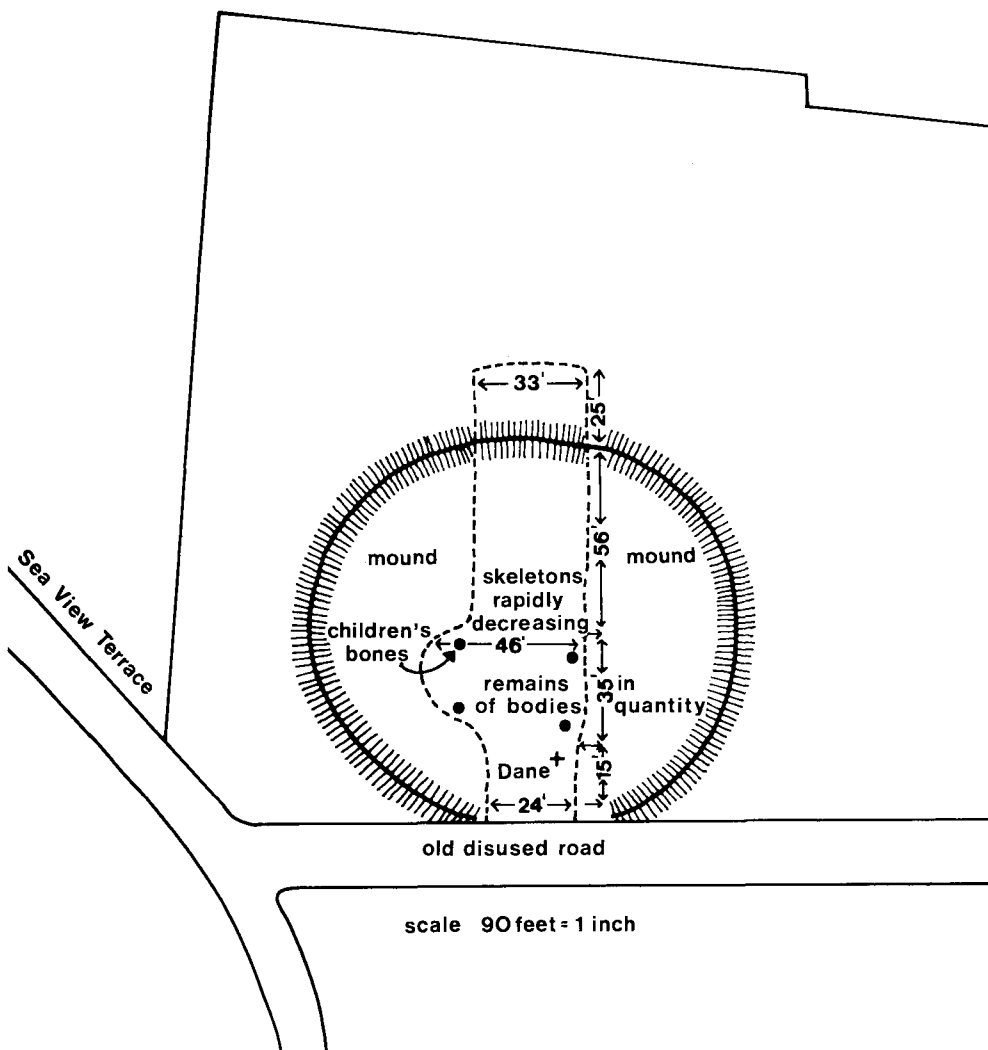


FIG. 2

MOUNT ERROLL, DONNYBROOK, CO. DUBLIN

Frazer's plan of 1879 excavation (after Frazer 1879, p. 32)

Viewed upside down, his plan of the road layout bears a much closer relationship to contemporary reality, and the mound, W. of Sea View Terrace and S. of the disused road, would then have lain within what is called Danesfield on the 1936-7 revision of the Irish Ordnance Survey's map of Dublin.

Whatever the correct explanation for the discrepancies over precise position, the mound can be located to within 90 m. It stood just over 1.6 km. from the sea-shore, on a slight spur approximately 270 m. above the R. Dodder. The appearance of the mound and the layout of its contents can be reconstructed from

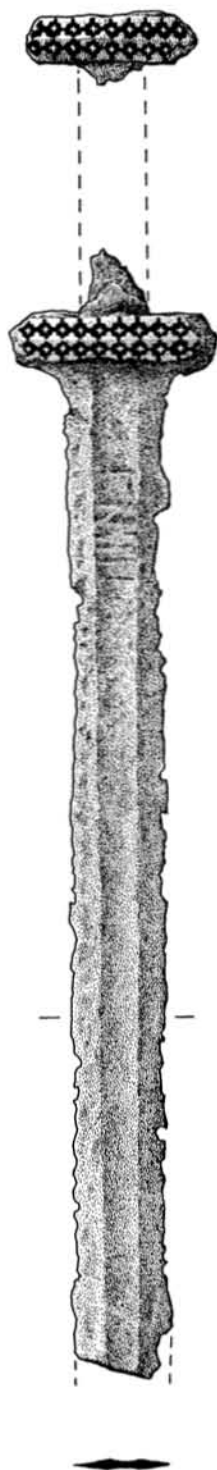


FIG. 3

SWORD, NOTTINGHAM CASTLE MUSEUM T 608

Provenance here attributed to Mount Erroll, Donnybrook,
Co. Dublin. Sc. 1:4

Frazer's initial report; details are scattered rather haphazardly throughout his text, but the majority of relevant points are made on pages 30-4. Before work commenced, the mound appeared as a distinct, widespread, flattened elevation, approximately circular in shape, with a diameter of about 100 ft. (30 m.). Its maximum surviving height of 3 ft. (90 cm.), which sloped away most markedly to the E., was made up of 8 in. (20 cm.) of soil at the surface, 12 in. (30 cm.) of 'covering', and 16 in. (40 cm.) of darker clay containing bones at the base. The 'covering' is later (p. 39) described as 'debris', including cut animal bones, charcoal, shells and stones, and compared by Frazer to a domestic refuse heap. Further objects from this layer are described below. The mound was disturbed to some extent by tree roots, and one side was slightly truncated by the disused roadway. The underlying soil was a yellow argillaceous clay, and an old turf line was clearly visible in section in the trench side.

About 15 ft. (4.5 m.) inside the truncated edge of the mound a skeleton lay supine on the original ground surface, with its skull to the N. Death had apparently been caused by a blow which had pierced the skull's frontal bone. A sword lay on one side of the body and a spearhead on the other, and later three iron arrowheads were found in the clay close to the position of the burial. As these were the only weapons recovered from the mound apart from an iron dagger blade (*sic*) found associated with the mass grave, it is probable that the arrows were originally associated with the sword and spear. An unaccompanied interment lay beside each of the warrior's feet.

The sword (Castle Museum Nottingham, Accession number T 608) was acquired by Nottingham Corporation as part of a donation of assorted objects given by W. J. Thompson in the mid-1950s, and has been on display since 1964 (FIGS. 3, 4; PLS. XV, A, B). Two labels on a wooden block to which it was attached give the following information: *Lot 35. Found in the Old City, Dublin, 1880. Dr. Frazer collection. Bought at Glendinings Sale Abt 1936. Viking Sword. Very valuable and rare.* It is not known who wrote this label, but as the writer was uncertain about the precise date of the sword's purchase, his attribution of it to the Old City, Dublin, rather than Donnybrook, which is 3 miles away immediately outside the modern city boundary, and his statement that it was discovered in 1880, the year after the investigation at Mount Erroll, need not weigh heavily against the equation of Nottingham Castle Museum T 608 with Frazer's sword from Donnybrook. The sword's unusually elaborate decorative scheme corresponds with that illustrated in Frazer's report (FIG. 5), as do its dimensions, and there is little room for doubt that this is the Donnybrook sword. It has not proved possible to trace its history between 1879 and 1936, or to discover details of its sale in 1936, as Glendining's records were destroyed in the second world war. So far as can be ascertained no other objects from the mound are in the Castle Museum's collection.

The form and more particularly the decoration of the sword place it in type D of Petersen's classification,⁵ of which only twenty-one examples are now recorded, with a distribution centred on Norway but extending throughout Scandinavia to eastern Europe and the British Isles. Even if the received dating of these swords to the 9th rather than 10th century can be accepted, it is possible that such an

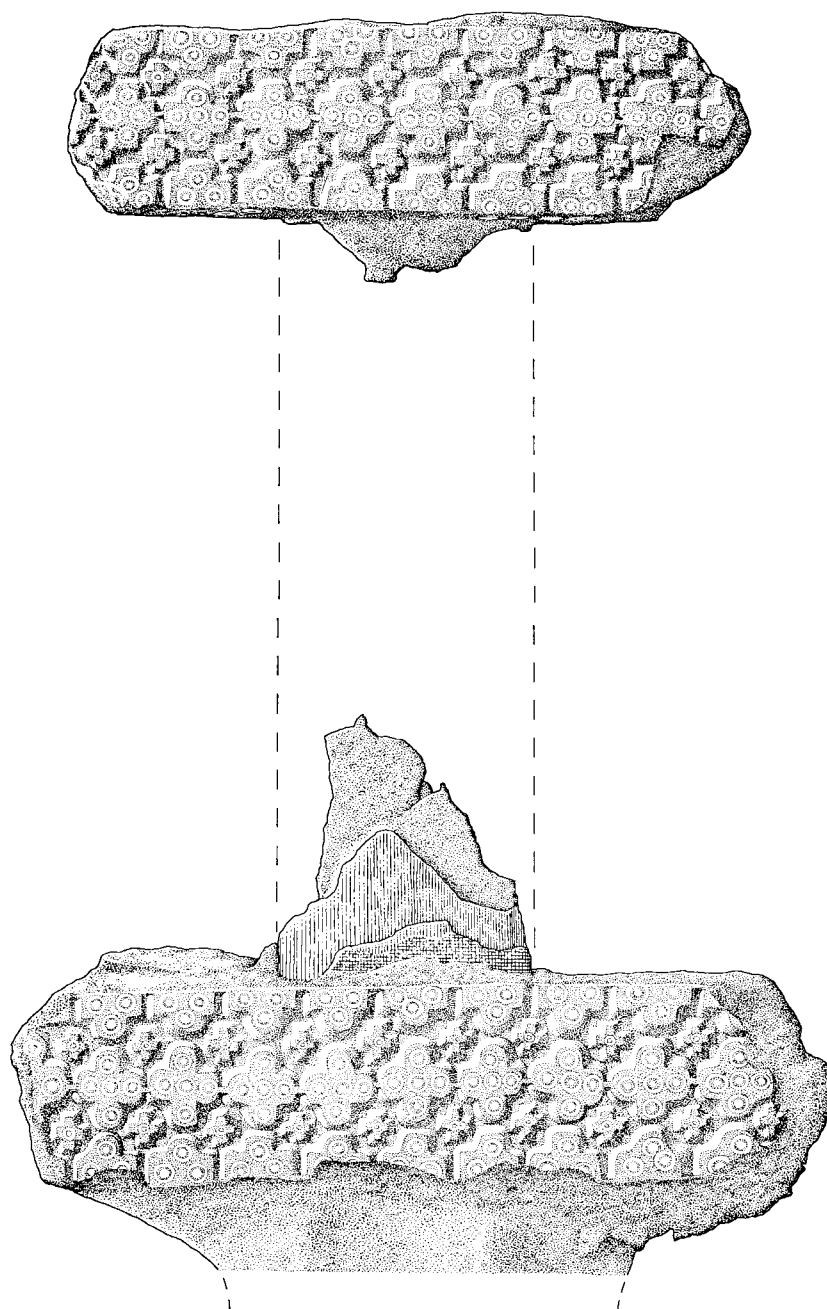


FIG. 4
SWORD, NOTTINGHAM CASTLE MUSEUM T 608
Detail of hilt. Sc. 1:1

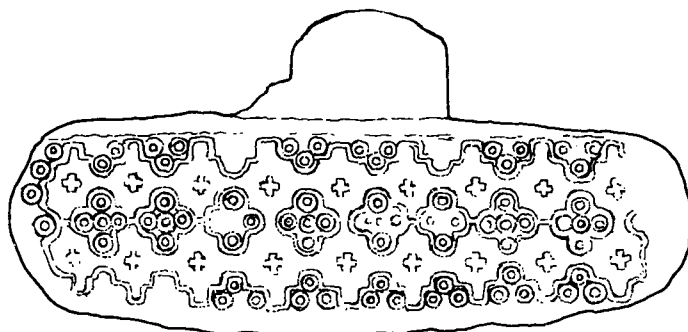


FIG. 5

SWORD FROM MOUNT ERROLL, DONNYBROOK, CO. DUBLIN

Detail of hilt, after Frazer (1879), Fig. 3.

elaborate product as the Donnybrook hilt was treasured over a long period, the blade being renewed if necessary. The internal evidence from the Donnybrook grave is of no help in this quandary, and these uncertainties limit the use of the sword in providing a date for the burial to the basic provision of a *terminus post quem* of c.800.

The spearhead (FIG. 6, *a*), appears from Frazer's illustration to have had a relatively long socket, cracked or broken in its upper part, and a shouldered blade without a prominent mid-rib. Its total length was just over 40 cm. It does not correspond very closely to any of the types described by Petersen,⁶ but a closer parallel is provided by the spearhead from the warrior's grave at Larne, Co. Antrim.⁷ It has been suggested that similar spearheads from the Viking-age grave at Ballateare on the Isle of Man may be Celtic forms,⁸ but the lack of any wide-ranging survey of contemporary Irish weapons renders this claim difficult to substantiate. It is not possible to date the Donnybrook spearhead to within a century with any confidence. None of the three arrowheads which in all probability came from the same deposit survive or were illustrated by Frazer.

The very presence of grave goods in a burial dating after c.800 A.D. represents a custom foreign to the Christian practices of Ireland at that time, and the objects indicate that the skeleton was that of a Scandinavian of the Viking period. The majority of the other bodies in the mound lay within an approximately circular area described by Frazer as having a 'circumference' of 34 ft. to 40 ft. (10.35 m. to 12.20 m.). This must be an error, as the 600 to 700 bodies could not have been contained within such a small space; a diameter of 34 ft. to 40 ft. is more plausible, and agrees with the dimensions given on the site plan. This focal area was slightly N. of the centre of the mound, although skeletons were recovered sporadically for a further 15 ft. (4.5 m.) to the S. Observation at various points showed that there were three layers of skeletons,⁹ and a more detailed inspection at the eastern side of the area demonstrated that the lowest layer rested

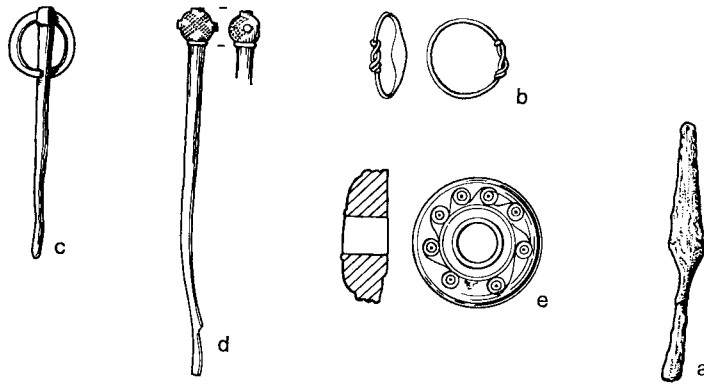


FIG. 6

MOUNT ERROLL, DONNYBROOK, CO. DUBLIN

objects from *a*, main burial; *b*, mass grave; *c-e*, mound; after Frazer (1879), Figs. 2, 4-7

on the original ground surface and was arranged with some care into two closely-spaced rows, with the heads to the W. and feet to the E.¹⁰ Above was a layer of skeletons apparently thrown down at random. The topmost layer was characterized by being mainly composed of the remains of young people. However, skeletons of both sexes and of all ages from the foetus to senility were present in the grave. Some bones bore marks of violence, and as there were several piles of skulls at a distance from any bodies, the impression gained was that the mass grave resulted from a 'cleaning-up' operation after an indiscriminate massacre.¹¹

In the mass grave were found a dagger blade (*sic*), two bronze finger rings, two iron arm rings, and another bronze ring of 5 cm. circumference.¹² A small broken ringed-pin was lying on the original ground surface, and a bigger ringed-pin of similar type, 10 cm. long, was found "in the soil of the mound". A spindle whorl¹³ and a fragment of pottery not described in any detail¹⁴ came from the layer of 'debris', as did some charcoal.¹⁵ The precise find spots of a bronze pin 9.5 cm. long, which had a spherical head ornamented with three circular projections and a brambled saltire motif, fragments of a bone comb,¹⁶ a flint flake,¹⁷ and miscellaneous bronze and iron fragments,¹⁸ are not given.

DISCUSSION

The date of the mass burial cannot be closely defined on the evidence of the objects found associated with the bodies — Frazer's descriptions of these are laconic, only one is illustrated, and the apparent simplicity of all their forms allows them to be bracketed only within an extremely wide chronological range. The bronze wire of the illustrated finger ring (FIG. 6, *b*) is knotted at the back, and it has a small undecorated bezel. Two bronze finger rings found unstratified during the excavations at Lagore crannog, Co. Meath, a site dated between the 7th and 10th centuries, incorporate similar features. One has a bezel, in this case

decorated with a simple incised cross motif;¹⁹ the other has a sliding knot.²⁰ Thus both characteristics of the Donnybrook ring may be paralleled in the early historic period. While the other objects were not firmly associated with the mass grave, they form an homogeneous chronological group which strongly suggests that they are neither residual from earlier activity in the vicinity, nor intrusive. The loop-headed ringed pin (FIG. 6, *c*) found on the original ground surface, and which had its ring broken by the workmen on discovery, belongs to a group found in contexts which range in date from the 6th to the 12th century, with a *floruit* in the Viking period.²¹ The second pin, from the soils of the mound, was described as similar.

Of the remaining objects, whose precise location within the mound is uncertain, the most important for chronological purposes is the bronze pin with brambled head (FIG. 6, *d*). This belongs to O'Rahilly's *Class I: semi-brambled-headed types*, in her discussion of the pins from the 1962-72 excavations at Dublin.²² From a total sample of 532 pins, the 9 pins of this type were generally found in the lower, 11th-century levels then exposed, and O'Rahilly suggests on the basis of both the brambling and their characteristic protruberances that they derive from the 9th and 10th-century thistle brooches. This may be correct, although further information as to whether they occur in earlier levels at Dublin would allow a more reasoned judgement to be made. At present it seems safe to say only that the type was produced in or before the 11th century.

The only other illustrated object, the decorated spindle whorl (FIG. 6, *e*), cannot be dated with any precision, although whorls with very similar decoration from ring-fort I at Garryduff, Co. Cork, dated to the period 650-750,²³ and an unstratified old find from Lagore crannog²⁴ once more suggest a date in the early historic period for the Donnybrook mass grave, without allowing greater exactitude.

Two objects do stand out as being possibly residual — the pottery sherd and the flint flake. However, flint flakes, retouched as strike-a-lights, have been recorded in early historic contexts at Lagore²⁵ and at Ballinderry II crannog, Co. Westmeath.²⁶ The pottery sherd is more problematical: the greater part of Ireland was, excluding imports, aceramic during the early historic period, the exception being the hand-made 'Souterrain ware' which has now been found at over ninety sites of this era in NE. Ireland. Ryan has recently reassessed the tradition,²⁷ and has produced a distribution map which shows that while the southernmost find of the type at present known comes from S. of Dublin at Killegar, Co. Wicklow, there is only one other findspot S. of the Co. Armagh border. Thus the Donnybrook sherd could be contemporary with the remainder of the finds from the mound, its findspot being unusual, although not impossible so, in relation to the known distribution of the only native ware of the period. Alternatively it could be a residual sherd, or even a contemporary import.

The discovery presents several other points of interest, the most important being the chronological relationship between the warrior's burial and the mass grave. Frazer thought that they were contemporary, arguing that the bones were on the same level and were all covered by the same clay.²⁸ It may also seem

significant that both the warrior and some of the other skeletons bore signs of violent death. Frazer concluded that the mass grave resulted from a piratical incursion by Vikings who left their victims and one of their own number to be buried by the Irish.²⁹ The temptation to assume that all the injuries were received in a single engagement near the place of burial is alluring but unlikely to be correct: the mass grave seems to represent native Irish dead alone, rather than the mixed casualties of battle between Irish and Vikings, since if this were the case rather more Scandinavian dead might reasonably be expected. Rather the evidence points to the mass grave being the result of an indiscriminate massacre.

Frazer's theory also disregards the fact that the warrior's burial is according to Scandinavian tradition, and as it is extremely improbable that the mass burial represents a secondary, native, use of a pre-existing mound, the two remaining possibilities are that either the warrior's burial was inserted into a pre-existing mass grave, or that the warrior was buried by his compatriots, who included the other bodies in the mound, perhaps representing a terrible vengeance extracted for the death of their fellow countryman. The evidence both for the relative and absolute dating of the mass grave and the warrior's burial is not sufficiently precise to provide a sure solution to the problem. Instances of the re-use of mounds for secondary Viking-age burials are not infrequent: within the British Isles this is known to have happened at Tote, Skeabost, Isle of Skye³⁰ and at Claughton Hall, Lancashire.³¹ However several factors combine to indicate that all the occupants of the Donnybrook mound were laid to rest at one time, and under Scandinavian supervision.

First Frazer's record that the warrior's skeleton was covered by the same clay which sealed the mass grave may be taken to indicate that there was no obvious sign that his body had been inserted into the dirty clay which formed the base of the mound, although, as with his other information gained at second hand, it is not an unimpeachable testimony. Secondly, although it is clearly of early historic period date, the fact that the mass burial is contained in a mound and not in a grave is suggestive of a non-Christian origin. Finally some aspects of the structure of the mound are paralleled in Viking-age burials of Scandinavians on the Isle of Man. Most critical is the composition of the middle layer of the Donnybrook mound, which contained charcoal, an assortment of animal bones amongst which were those of horse, cow, sheep, pig, dog and possibly wolf, mollusca, and burnt stones.³² There is no obvious reason why the entire mound should not have been composed of the dirty clay of the basal layer, which was presumably dug in the vicinity, perhaps from an encircling ditch, and this debris is easier to explain if interpreted as the result of part of the funerary ritual. Somewhat similar deposits are recorded from the burials at both Balladoole and Ballateare, although with the difference that in these cases the bones, which represented a similar range of livestock, were cremated.³³ However, such a minor variation in ritual is not necessarily of great significance in view of the wide range of burial customs recorded in Viking-age contexts.

The rite of the accompanied interment is itself of interest, the more so because of the general lack of information about Scandinavian Viking-age graves in Ireland,

where none has yet been scientifically excavated. The circumstances of the Donnybrook excavation do not permit certainty, but there does not appear to have been a cist or setting of stones around the body. Nor was there any trace of a coffin, although the initial overlooking of the arrowheads which probably were associated with the burial does not lend confidence to this assertion, since a coffin would have been physically represented at most by a few rusted iron fragments. The orientation of the body with the head to the N. is close to that of the Larne grave,³⁴ but orientation seems to have been of little significance in Viking-age burial ritual, and there seems no body of evidence to support Shetelig's assertion that the normal Scandinavian burial rite in Ireland placed the head to the W. in the Christian manner.³⁵

The final feature of the burial which merits attention here is the relationship between the warrior's grave and the two bodies found at his feet. Frazer did not see these skeletons *in situ*, nor indeed after they were disinterred, but on the basis of reports from the workmen he clearly believed that the three interments formed a group separate from the mass grave. He is remarkably insistent on this point, repeating the assertion three times, and in one instance states his opinion that "the female remains found buried at his feet are additional witness to the esteem in which his followers held him, and the penalty exacted for his loss".³⁶ His belief that the skeletons were those of women rested on statements made by the workmen that they were of small size; no grave goods were found with them to confirm or refute this proposition.

Despite the uncertainties of the discovery, the circumstantial evidence raises the macabre possibility that, as Frazer suggested (presumably without knowledge of Scandinavian parallels), the two burials at the warrior's feet represent a case of ritual murder. Instances of this are well attested in historical sources, the best-known account, though one perhaps not typical of such occurrences in western Europe, being that of the Arab traveller Ibn Fadlan who witnessed a Scandinavian funeral on the R. Volga in 922.³⁷ Quite a large number of simultaneous male and female burials of Viking-age date have been recorded in Norway, but serve mainly to confuse the issue. Shetelig listed forty-four such graves,³⁸ but as twenty-three of them involved cremations and the majority of the remainder were not scientifically excavated, there is no firm indication that any of the graves represents anything more than a simple case of virtually simultaneous death through disease, although 'suttee', suicide on the wife's part, cannot be totally ruled out. This double grave tradition is represented in the British Isles by a single example at Santon Downham, Norfolk.³⁹

Much rarer are cases where an accompanying burial seems certainly to have been of a person of inferior social status, and where there is therefore a correspondingly greater possibility that this person was killed ritually as an offering to the dead, almost in the category of the more usual grave-goods. In Scandinavia there are, for example, probable instances at Oseberg⁴⁰ and several at Birka,⁴¹ but more important for comparison with the Donnybrook burial is the occurrence of this rite in the Isle of Man, which, as demonstrated above, provides an illuminating parallel for at least one other aspect of the Irish grave. At Ballateare the upper

parts of the mound contained the skeleton of a woman aged between twenty and thirty, who had been killed by a blow on the head. No grave goods accompanied her body.⁴² A female skeleton was also recovered from the boat burial at Balladoole, and had apparently lain alongside the male burial.⁴³ It was represented only by a fragmentary skull and four bones, and no grave goods were found with it, suggesting, as at Ballateare, that the woman may have been of little social consequence, and ritually slaughtered. Thus ritual murder was practised by Scandinavians living in the Irish Sea area during the period *c.* 850–950, and it is possible that the skeletons by the warrior's feet at Donnybrook represent another instance of this phenomenon.

THE SWORD

(*By* R. A. FARRAR, R. A. HALL, A. G. S. KLINGELHOFER *and* D. LEIGH)

The sword is represented by two fragments, one incorporating the major part of the blade, the lower guard and part of the tang, and the other being the upper guard.

THE BLADE

The surviving portion of the double-edged blade is 54 cm. long, narrowing in width from 6 cm. below the lower guard to 5 cm. at the point where it is broken (FIG. 3; PL. XV, A). There is a central fuller 2.5 cm. wide. One side of the blade clearly shows traces of the seatings for an inlay (FIG. 7). x-radiographs demonstrate that the blade was inlaid on both sides, the inlay commencing 5.5 cm. below the lower guard (PL. XVI, A). None of the inlay itself, which may have been of plain

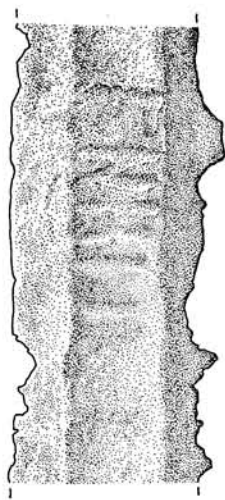


FIG. 7

SWORD, NOTTINGHAM CASTLE MUSEUM T 608

Detail of seating for inlay on blade. Sc. 1:2

iron billets or pattern-welded strips, survives, and the high degree of surface corrosion renders the x-radiographs largely unintelligible. In an attempt to clarify the inlay, a further series of photographs of the x-radiographs was taken with equidensity film, and the most informative of these is published here (PL. XVI, B). Although the extremities of several seatings are clearly visible, their central portions are largely lost in corrosion. However, the x-radiograph appears to show part of a trellis pattern on one side, a motif frequently found on blades inscribed with a variation of the name *ULFBERHT*.⁴⁴ This does not help to localize the production centre, since a variety of workshops are thought to have used such inscriptions, and it must be stressed that this identification of the seating is extremely tentative. However, *ULFBERHT* blades have previously been found in Ireland — examples are known from Islandbridge/Kilmainham, Co. Dublin⁴⁵ and Ballinderry, Co. Westmeath.⁴⁶

x-radiographs show that the blade was not pattern-welded, and metallographic study demonstrates that it is of the piled and carburized type.⁴⁷ A sample, extending from the edge to the centre of the blade, was removed from the broken end for metallographic and electron microprobe analysis. It is worth noting that the sample took four hours to remove using a hand-saw and a carborundum slurry, and this is a good measure of the toughness of the blade. The blade was analysed at the centre and the edge for elements frequently found in Anglo-Saxon and Viking-age ironwork.⁴⁸

TABLE 1
PERCENTAGES OF ELEMENTS FOUND IN THE DONNYBROOK SWORD BLADE
by electron microprobe analysis

	C	P	S	Si	Mn	Al	Ni	Co	As
Centre	0.2	0.02	0.01	ø	0.01–1.0	<i>tr</i>	<i>nd</i>	<i>nd</i>	<i>nd</i>
Edge	0.3–.4	<i>tr</i>	<i>tr</i>	ø	0.1	<i>nd</i>	0.2–.3	<i>nd</i>	<i>nd</i>

tr: has less than 0.01%.

nd: not detected.

ø: silicon not specifically determined as it would be difficult to compare with previous values, since analysis technique values include slag which is extremely heavy in silica.

The microstructure of the blade consists of: *i*, a substantial core of fine-grained ferrite crystals with the usual pearlitic distribution of carbides; and *ii*, pre-eutectoid ferrite and tempered martensites towards the edge (PLS. XVII, A, B). These structures suggest a quenched and tempered blade and are consistent with the measured hardnesses of 250 DPN at the centre to 520–550 DPN at the edge, and with the carbon contents of 0.2% at the centre and 0.3–0.4% at the edge as measured by the microprobe analyser. If a significant amount of case carburizing had occurred, the carbon content at the edge might be expected to be nearer 0.8% carbon and the hardness value to be 850 DPN+. The lower values found suggest therefore that the slight increase in carbon may have been derived from a desire not to decarburize the blade during heat-treatment, rather than from a deliberate attempt to carburize the blade.

This type of structure would have produced a tough, flexible sword with a keen cutting edge. The original iron of the blade appeared to be relatively free of inclusions and the amount of slag was minimal. The slag, when examined by the electron microprobe analyser, was found to consist primarily of aluminosilicate with only traces of manganese, sulphur, phosphorus and iron, instead of the expected manganese aluminosilicate.

In addition to the low sulphur and phosphorus contents (TABLE 1), the amount and type of slag inclusions in the blade suggest that the ore used was of high grade. It is not possible at the moment, however, to suggest a source for the sword because relatively few metallographic and microprobe analyses of early medieval sword blades and archaeological ore samples are available for comparison. In recent years Dr Lena Thalin has analysed a group of Swedish sword blades and reported compositions high in nickel (Ni) and cobalt (Co) or in cobalt alone:⁴⁹ these high concentrations were not found in the Donnybrook sword, a fact which suggests a difference in origin.

THE HILT

The hilt survives as two separate guards, with small fragments of the tang remaining on each (FIG. 4; PL. XV, B). The guards bear similar decoration and appear to be of similar construction: x-radiographs show that they have simple iron cores of non-composite construction. They are near-elliptical in plan and have a six-sided cross-section, with a median ridge on each lateral face. The lower guard measures 10.8 by 3.6 by 2.8 cm., and the slightly smaller upper guard 8.9 by 2.9 by 2.6 cm.

The original construction of the hilt is somewhat problematic. On the upper surface of the upper guard (FIG. 8, *a*) there are two small depressions, each with a diameter of approximately 0.6 cm., and each centred approximately 1.5 cm. from the end of the guard. The underside of the guard (FIG. 8, *b*) has symmetrically placed discoloured and corroded areas 1.8 cm. from each end. These are interpreted as the only surviving vestiges of the attachments for a pommel-knop, and their positions suggest that the attachments penetrated the guard at a slight angle. It is impossible to be certain whether rivets or a curved rod were used since the decorative plates on the lateral faces of the guard prevent a better interpretation of the x-radiographs. Comparison with other swords of this type suggests that the missing knob would have been of trilobate form.

No trace of decoration occurs on the upper surface of the upper guard, but its three other surfaces are all embellished. Below 0.2 cm. of corrosion, the lower surface was found to be ornamented with a random but closely spaced scatter of ring and dot motifs, of which twenty-five survive. In most cases the rings and dots were both made of brass, but in two instances silver dots occur. The upper and lower surfaces of the lower guard are too corroded to yield any information about possible decoration.

The basic decorative scheme on the lateral faces of both guards is provided by a brass plate hammered into a decorative network forged into their iron cores,

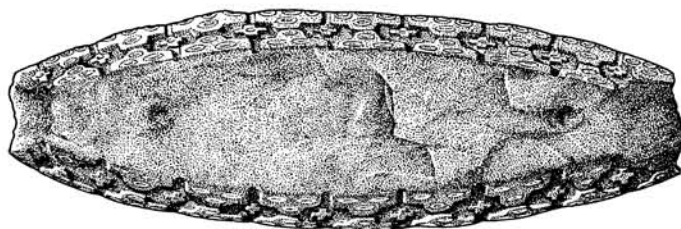
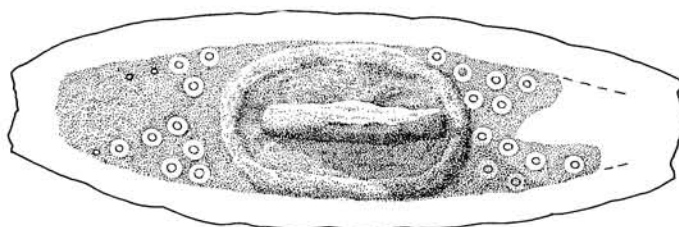
**a****b**

FIG. 8

SWORD, NOTTINGHAM CASTLE MUSEUM T 6o8

Details of top (a) and bottom (b) surfaces of upper guard. Sc. 1:1

thus forming a relief design⁵⁰ (FIG. 4; PL. XV, B). At some points corrosion apparently started beneath the brass and forced the plate to disintegrate. The effect is of a row of inter-connected equal-armed crosses lying along the median ridge, with similar but truncated motifs in rows immediately above and below. Smaller equal-armed crosses occupy the depressions between their larger counterparts.

Silver ring and dot motifs were applied to both large and small crosses. On the large crosses, one is placed centrally and one in each of the four arms; on the truncated crosses three rings and dots appear. The small crosses have one centrally placed ring and dot. In all cases the dots are exactly central, but within the large crosses the rings sometimes overlap. Furthermore, there are at least two instances in the surviving fields of decoration where the usual scheme has been ignored. Near one end of the central row on one side of the upper guard only four rings and dots appear instead of the usual five, whilst one of the truncated crosses in the lower row on one side of the lower guard has four rings and dots instead of three. These aberrations are not noticeable except on detailed examination, and they do not mar the overall magnificent appearance of the hilt. The sword's construction testifies to technical virtuosity of a high standard. The Donnybrook sword ranks amongst the finest products of Viking-age weaponry yet discovered within the British Isles.

The method by which the ring and dot motifs were applied can be reconstructed on the evidence of observations made during conservation work. It is probable that the rings were made of silver wire, which was wound around a rod once, clipped, and then hammered into a previously impressed circle. The dots would have been applied in the same manner, by hammering on short clipped sections of the silver wire. Slight depressions in the brass surface indicate where the inlay is missing.

Samples of both the brass and silver were taken from the upper guard and examined metallographically and with the electron microprobe analyser. The brass plate was found to be an α -copper brass (90% copper, 10% zinc) with a homogeneous zinc distribution and traces of lead and tin. The metal has a fine grain structure and the presence of numerous twin bands suggests that it had been extensively cold-worked and annealed (PL. XVII, C). The silver-coloured material is a fine-grained, silver-based eutectic (72% silver, 28% copper), with traces of zinc, tin, and lead (PL. XVII, D). Being a eutectic with a melting point of 780°C. it would have been extremely easy to draw into wire and shape into the required ring and dot decoration.

THE GRIP

A fragment of the tang 2.3 cm. wide protrudes for 3.4 cm. above the upper surface of the lower guard, and another fragment 0.9 cm. long remains below the lower face of the upper guard (FIG. 4; PL. XV, B). The corrosion line on this face demonstrates that the grip was originally 3.2 cm. wide, and remains of wood with a textile covering on the lower stub testify to its construction.

NOTE ON A WOOD SAMPLE FROM THE GRIP, *by* D. WILLIAMS

Precise identification is difficult because of the small amount of wood available for sampling, and because at some time since its discovery the wood has been impregnated. However, the thick-walled tracheids visible in transverse section indicate that the wood is from a member of the conifer family.

NOTE ON THE TEXTILE REMAINS, *by* J. W. HEDGES

On the grip of the sword, abutting the lower guard, a very small area of replaced textile can be seen. This projects some 3 mm. from the guard for a distance of 7.5 mm., but it can be seen clearly in the corrosion and it would seem that originally the cloth went most, if not all, of the way around the grip at this point.

The area available for examination was small but it could be seen that the number of warp and weft threads per centimetre is almost equal and approximated to twenty. This latter feature makes me suspect strongly that the textile was a linen, for in woollen textiles of this period there is characteristically a great discrepancy between the count of the warp and the weft.

THE SCABBARD

Near the lower guard traces of a wooden scabbard remain, although its construction is indeterminate, and small patches of fibrous appearance adhere to the surface of the blade. These probably represent an inverted animal skin, most

probably a sheepskin lining to the scabbard. Linings of this type are known on swords from pagan Saxon graves, for example at Finglesham, Kent, and also occur in continental graves.⁵¹ Viking-period scabbards from Ballateare and Cronk Moar, Isle of Man, share a more complex form of construction, with an outer leather sheath covering a textile lining over a wooden strip, which itself encased a further textile layer around the blade.⁵² It is of course possible that there were originally additional outer layers to the Donnybrook scabbard, traces of which have not survived.

Throughout this discussion there has been no attempt to categorize the Donnybrook sword. Whilst it clearly belongs to class D in Petersen's typology,⁵³ attention has been drawn to the diversity of this group as regards both decoration and technique of ornamentation.⁵⁴ It has been variously suggested that swords of this general type were produced in Scandinavia, in the Viking-age colonies in the British Isles, and in mainland Europe; in the present state of study such a classification means little.

It is the sword blades which are most susceptible to detailed metallurgical analysis of the type recorded here, but many further such analyses will be necessary before more definite pronouncements can be made on the problem of a source or sources for the blades of D-type swords. Furthermore, in each instance the decorated hilt, which is the basis of Petersen's typological classification, may have been produced at a separate workshop from the blade, and although there are a number of hilts comparable to the Donnybrook example in the simple geometric motifs employed in their decoration, the widespread distribution of these throughout western Europe allows no conclusion to be made concerning their point or points of origin.

One way out of this *impasse* may be by further metallurgical analysis of the decorative inlays; for should characteristic and easily distinguishable alloys appear regularly in combination, hilts bearing them might perhaps be classified as emanating from a single workshop, whose location might be indicated by comparison with other decorated and inlaid metalwork of more locally restricted types.

APPENDIX

CONSERVATION OF THE SWORD

(By A. G. S. KLINGELHOFFER and D. LEIGH)

Conservation of the Donnybrook sword was undertaken at the Department of Archaeology Laboratory, University of Southampton, in 1975. Several difficulties in treatment were encountered, mainly arising from an earlier partial attempt at conservation. Some of the decorative surfaces of the upper and lower guards had been partly cleaned of iron corrosion products by grinding and buffing and then all surfaces had been waxed. The blade had been cleaned almost down to the metal surface and coated with graphite, but this presented little problem as it appeared to be stable. Treatment of the guards is here described.

Working from the x-radiographs it was possible to clean the upper and lower surfaces of the guards using both silicon carbide powder in an Airbrasive unit and a

Vibrotol engraver. This work revealed the dot and circle motifs on the underside of the upper guard and vestiges of the holes for attachment of the knop.

Having removed the wax from the decorative surfaces it was necessary to remove the remainder of the extremely hard iron corrosion products. A combination of techniques was used in rotation in order to first soften and then release these products; all work was done under a stereo-microscope in order to avoid damaging the thin and often fragile brass and silver decoration. Small quantities of Detarol in 10% solution served to soften the rust where contact with the nobler alloys could be avoided. Elsewhere, a localized process of electrochemical reduction was employed. A paste made of 10 gm. oxoid agar, 2 gm. zinc powder, 20 ml. glycerine and 2% of a 10% (w/v) solution of caustic soda was applied carefully to selected areas and then dried in place under infra-red heating. In this way any dangers which might have arisen from longer term contact were avoided. The paste could be easily peeled off when dry, and the corrosion, if not completely freed, could be mechanically removed more easily. Final overall cleaning was achieved with the Airbrasive unit (glass beads) followed by gentle brushing with a glass-bristle brush.

The lower guard could not be completely cleaned since in places the wax and corrosion were all that held the decoration in position.

After cleaning in distilled water to remove chemical residues, the guards were treated with 3% (w/v) benzotriazole in industrial methylated spirit, and lacquered with Incralac (an acrylic co-polymer in toluene). What remained of the graphite on the blade was removed. The blade was then washed in distilled water, dried and impregnated with Cosmolloid 80H, a microcrystalline wax, to enhance both its stability and visual appearance.

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NOTES

- ¹ W. Frazer, 'Description of a great sepulchral mound . . .', *Proc. Royal Irish Acad.*, 2nd series, II (1879-88), 29-55.
- ² Idem, 'The Aylesbury Road sepulchral mound', *ibid.*, 116-18.
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- ⁵ J. Petersen, *De Norkse Vikingesverd* (Oslo, 1919), 70 f.
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- ⁷ T. Fanning, 'The Viking grave goods found near Larne, Co. Antrim in 1840', *Jnl. Royal Soc. Antiq. Ireland*, c (1970), 74.
- ⁸ G. Bersu and D. M. Wilson, *Three Viking Graves in the Isle of Man* (Soc. Med. Archaeol., monograph series, 1, London, 1966), 57, reiterating a proposal originally put forward by Bøe (op. cit. in note 4, 26).
- ⁹ Frazer (1879), 37.
- ¹⁰ *Ibid.*, 34.
- ¹¹ *Ibid.*, 36-7.
- ¹² Unless noted otherwise, all these finds are listed, *ibid.*, 50-1.
- ¹³ Described by Frazer as being of "baked earthenware", but registered in the National Museum of Ireland as bone: the object was not available for examination.
- ¹⁴ Frazer (1879), 39.
- ¹⁵ *Ibid.*, 38-9.
- ¹⁶ Frazer (1882), 118.
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- ²⁵ *Ibid.*, 179.
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