THE HUMAN SKELETAL MATERIAL FROM SWIFTERBANT, EARLIER NEOLITHIC OF THE NORTHERN NETHERLANDS: I. INVENTORY AND DEMOGRAPHY

Final Reports on Swifterbant I

Christopher Meiklejohn[1]) and Trinette S. Constandse-Westermann[2])

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1. Department of Anthropology, University of Winnipeg, Winnipeg, Canada.
2. Instituut voor Antropobiologie, Rijksuniversiteit Utrecht, Domplein 24, 3512 JP Utrecht, The Netherlands.

1. INTRODUCTION

This paper examines one aspect, the human skeletal material, from the Neolithic levels of sites near Swifterbant in the Oostelijk Flevoland polder of the Netherlands. These sites were first located in 1961 on the floor of the newly developed polder at a depth of 5-6 m below mean sea level (N.A.P.). They are located on river-bank dunes and natural levees of a prehistoric freshwater tidal delta system (fig. 1; see also van der Waals & Waterbolk, 1976). The skeletal remains were discovered in both site contexts, thought to be of general contemporaneity (see below). This paper will concentrate on the context of the finds, a complete inventory of discoveries, and preliminary demographic findings. A second paper, in preparation, will deal more explicitly with analytic aspects of these series and their place among contemporary northwestern European populations.

Material from the river-dune system has been recovered from two sets of excavations. For details of the local land division and the relationship of lots and excavations, see fig. 2. In lot H46 work by the Rijksdienst voor de IJsselmeerpolders (R.I.J.P.) was done in 1962 and in 1966 by the archaeologist G. D. van der Heide, following the initial discovery of archaeological materials in the summer of 1961. From 1971 on, this work was systematized under the Biologisch-Archaeologisch Instituut of the Rijksuniversiteit Groningen (B.A.I.). The work on lot H46 was joined in 1976 by an excavation crew from the University of Wisconsin. In all, three sites, designated S21 through S23, were excavated in this lot. In addition, river-dune sites in lot H34 were excavated between 1974 and 1978 by the University of Michigan. Again three sites, designated S11 through S13 were excavated.

Human skeletal material was recovered from all three sites in H46 and from one site (S11) in H34. Details of the discovery of the materials located between 1962 and 1976 have previously been reported (de Roever, 1976; Whallon & Price, 1976). This covers all material except that from S23 and one find from S11 which are reported here for the first time.

The presence of sites on the natural levees was discovered in the fall of 1961 (see van der Waals & Waterbolk, 1976). In 1964 and 1967 excavations were made by the R.I.J.P. in lot G42 (site S2). These excavations were continued by the B.A.I. in 1971 and from 1975 through 1978. In the neighbouring lot G43 three sites have been excavated by the B.A.I., the complex site S3/5 from 1972 through 1977, the smaller site S4 in 1974 and the remnant site S51 in 1978.

Human skeletal material in the form of a series of graves has been recovered from site S2, isolated fragments from S3/5. Details of the discovery of the finds through 1976 have been given by van der Waals (1977). Those of 1977 and 1978 are reported here for the first time.

The materials reported here have all been transported to the Instituut voor Antropobiologie of the Rijksuniversiteit Utrecht, which is their present repository and where the current study was performed.

2. THE FINDS IN GENERAL

2.1. Introduction

The material described here has been divided below into discrete units by lot and individual site. This is to avoid any initial pooling of possibly different temporal groups (see further below).

The three sites in lot H46 are located at opposite ends of a single L-shaped dune, S21 at the northeastern end, S22 and S23 adjacent to each other at the southwestern end. These three sites are the group that can be most readily pooled in the total complex. Remnants of a Mesolithic occupation are still *in situ*. Secondary deposits suggest that a Neolithic level with ceramics, now absent, has been present (see de Roever, 1976). Whether the burials are intrusive from this postulated layer, in an analogous fashion to H34 (see below) cannot be determined.

Though the material from H34 is also from a river-dune context, it differs in one important aspect from the H46 finds. The three sites sample a single dune, S11 to the northeast, S12 near the centre and S13 to the southwest. However, the skeletal finds in S11 are clearly intrusive to the occupation levels and, unfortunately, the burial pits extend to the truncated top of the site (Whallon & Price, 1976, *pers. comm.*).

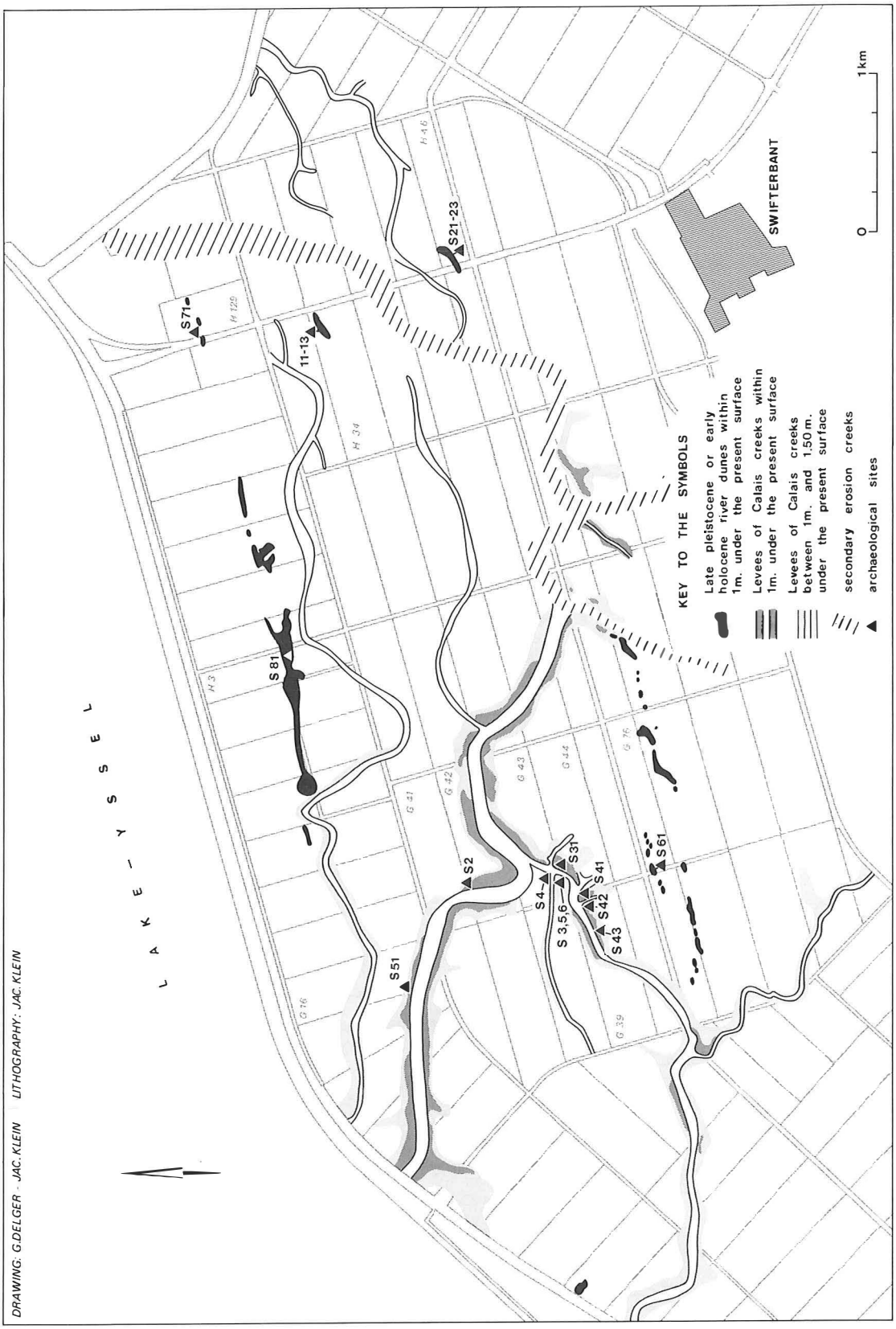


Fig. 1. Location of sites on river dunes (mesolithic-neolithic) and on natural clay levees (neolithic) in the Swifterbant area. Adapted from Ente.

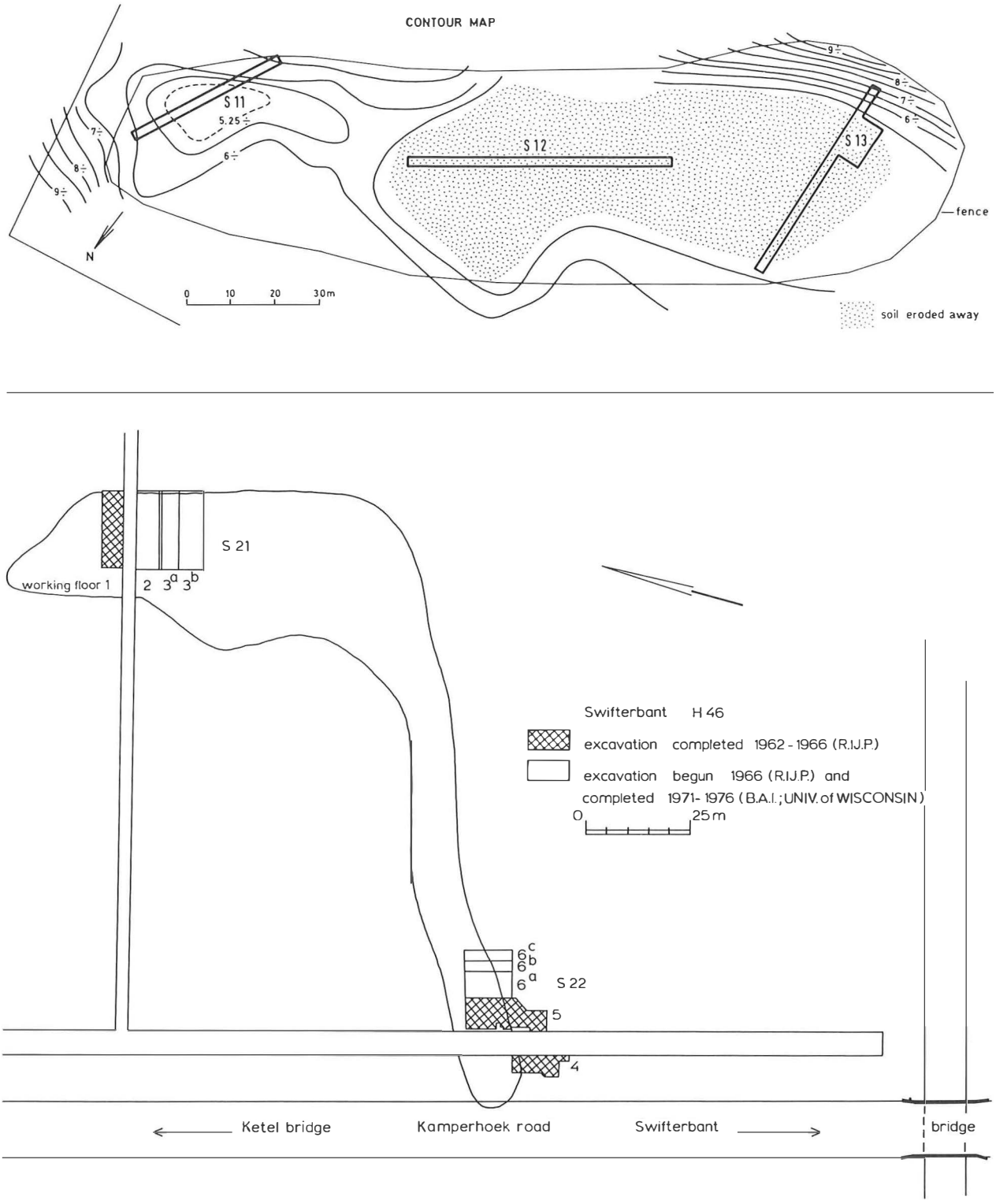


Fig. 2. Swifterbant. The river dune in the northeast corner of lot H34, as indicated by subsurface contours (top) and the river dune in lot H46 as indicated by the 1 m subsurface contour (bottom). The location of the excavation units S11, S12 and S13 in lot H34 (situation 1974) (top) and of S21 and S22 in lot H46 (bottom). The location of S23, adjacent to S22, is not yet indicated. After Whallon & Price (1976) and De Roever (1976).

The natural levee site G42 (S2) samples the northern end of an occupation on the eastern side of a major stream, the site G43 (S3/5) spans a local creek system further to the south. The nature of the finds relative to the occupation is similar to that of H46 (see below).

2.2. Dating of the material

As demonstrated elsewhere (Newell *et al.*, 1979) the contemporaneity of skeletal material and occupation remains is never to be assumed on an *a priori* basis. It is important to establish that there has not been intrusion from later levels. To fail to do so removes much of the value of the remains.

The delta system under examination lies several metres below the current standard datum N.A.P. As such, the system became inundated during the course of the general Holocene transgression (see e.g. Jelgersma, 1961; Mörner, 1969). The delta system itself appears to have developed in early Atlantic times (van der Waals & Waterbolk, 1976). Within this system, proceeding from dune formation in late-glacial and Preboreal time to a stable wooded landscape and then to a tidal system, both Mesolithic and Neolithic occupation has been recorded (de Roever, 1976). This occupation was ended by peat-formation and then by inundation. Indications arising from knowledge of the transgression suggest that the dune sites would have become uninhabitable after ca. 5000-4600 B.P. (Ente, 1976; de Roever, 1976). Similar considerations would apply to the possible date of occupation of the natural levee sites (van der Waals, 1977). However, the nature of the levee sites would indicate, that their occupation has been more intermittent than that on the dunes.

The situation of the sites on lot H46 has been described by de Roever (1976). The occupation of site S21 consists primarily of hearths and graves (full inventories of all skeletal materials are provided in the next section). The top of the dune has been eroded and was probably at ca. 4 m below N.A.P. The graves were in level B, consisting of varying light and dark sands below an erosion layer and were oval grey pits ca. 60 cm in depth. The nature of the section and the absence of clear uniformity of the artifactual materials makes it impossible to declare that the finds are stratigraphically secure in the level discovered. A probable *terminus ante quem* exists (see below) and the nature of bone preservation appears to assure that burials could not have occurred long before the inundation of the area, this latter condition being applicable to all of the Swifterbant sites (see below). A Neolithic age for the S21 finds seems secure but closer assignment is problematical.

Marked similarities with S21 are seen in site S22 (ibid.). Again, the dune surface has been eroded. However the culturally rich A1 lower layer is sealed by peat. Both Mesolithic and Neolithic occupation of the site is evidenced, but as above, the burials are almost assuredly late. All lay at depths above −5.25 m N.A.P. The situation at S23 is essentially the same as at S22, being immediately adjacent and to the east of the latter.

The absolute age of the finds in lot H46 needs some discussion. At S21 peat on the dune slope has been dated to GrN-5067 5610 ± 60 B.P. (3660 B.C. – uncalibrated and with the standard half-life of 5568 ± 30 years as are all dates referred to below) (de Roever, 1976; van der Waals & Waterbolk, 1976). This has been tentatively suggested as a *terminus ante quem* for the occupation of the dune sites, but its significance as such is subject to doubt (de Roever, 1976). No direct date for the Neolithic occupation itself is available. Charcoal samples from hearths on S21 have yielded dates of GrN-6709 7775 ± 40 B.P. (5825 B.C.) and GrN-6708 6670 ± 35 B.P. (4720 B.C.). A charcoal sample from a hearth on S22 yielded a date of GrN-6710 6875 ± 45 B.P. (4925 B.C.) (de Roever, 1976). All of these dates are clearly Mesolithic in age and must considerably predate the burials, as the Mesolithic levels of the Swifterbant sites are conspicuous by their *absence* of bone preservation. De Roever (*ibid.*) has noted the decalcified nature of the soils and suggests that the water-table would have needed to cover the skeletal material shortly after its interment for preservation to have occurred (? less than 500 years). This observation is partly supported by the already apparent degradation of the remains left *in situ* since the beginning of the draining of the polder in 1957. The sparse artifactual remains found in direct association with the burials do not contradict such a diagnosis. For the point of

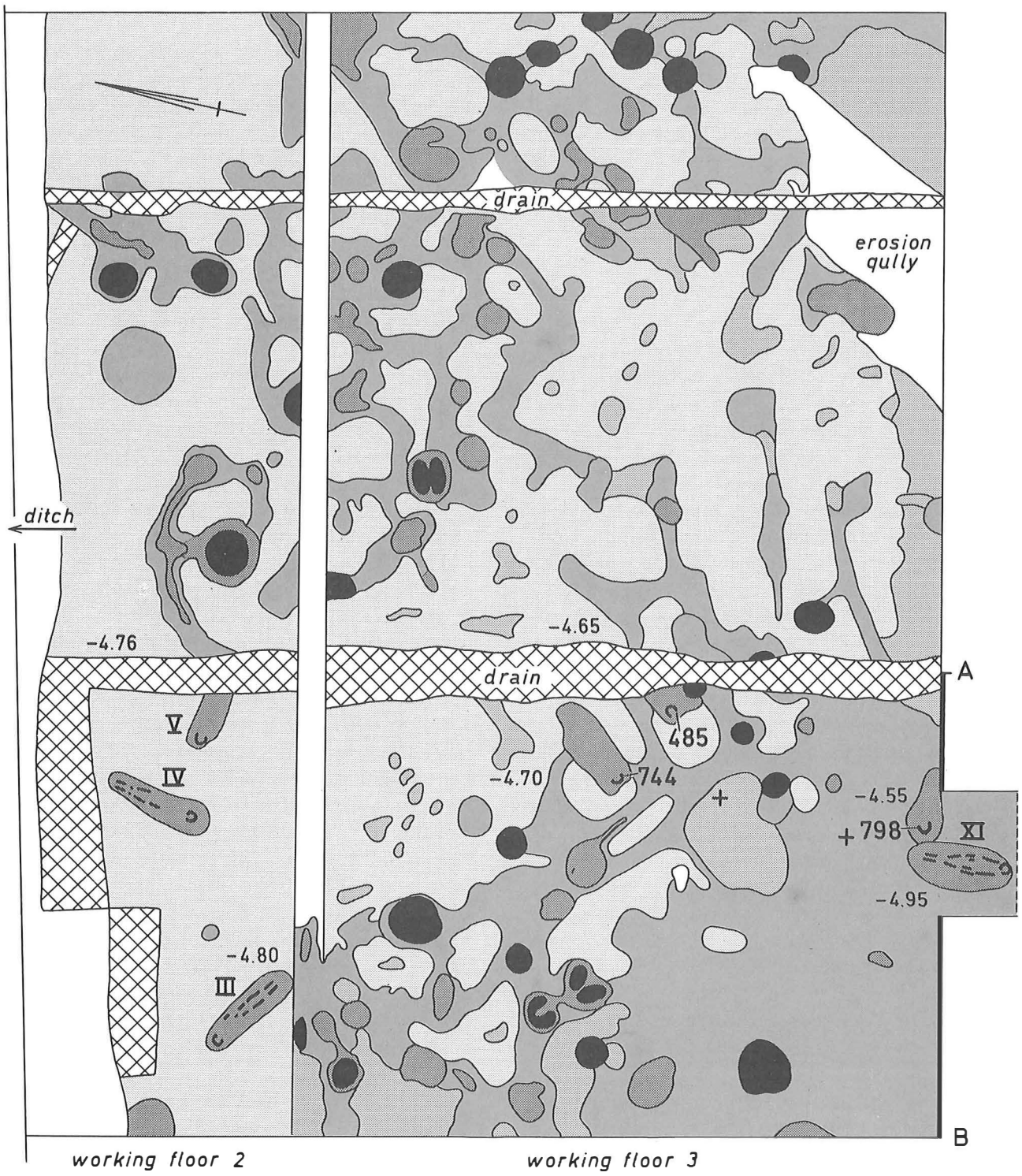


Fig. 3. Swifterbant, site S21. General plan working floors 2 and 3 (working floor 2: plan 1971, as excavated in 1966; working floor 3: 3rd level of excavation 1973; grave XI: plan completed in 1976). Numbers refer to graves and skeletal remains. Scale 1:100. Elevation indicated in m below N.A.P. After De Roever (1976).

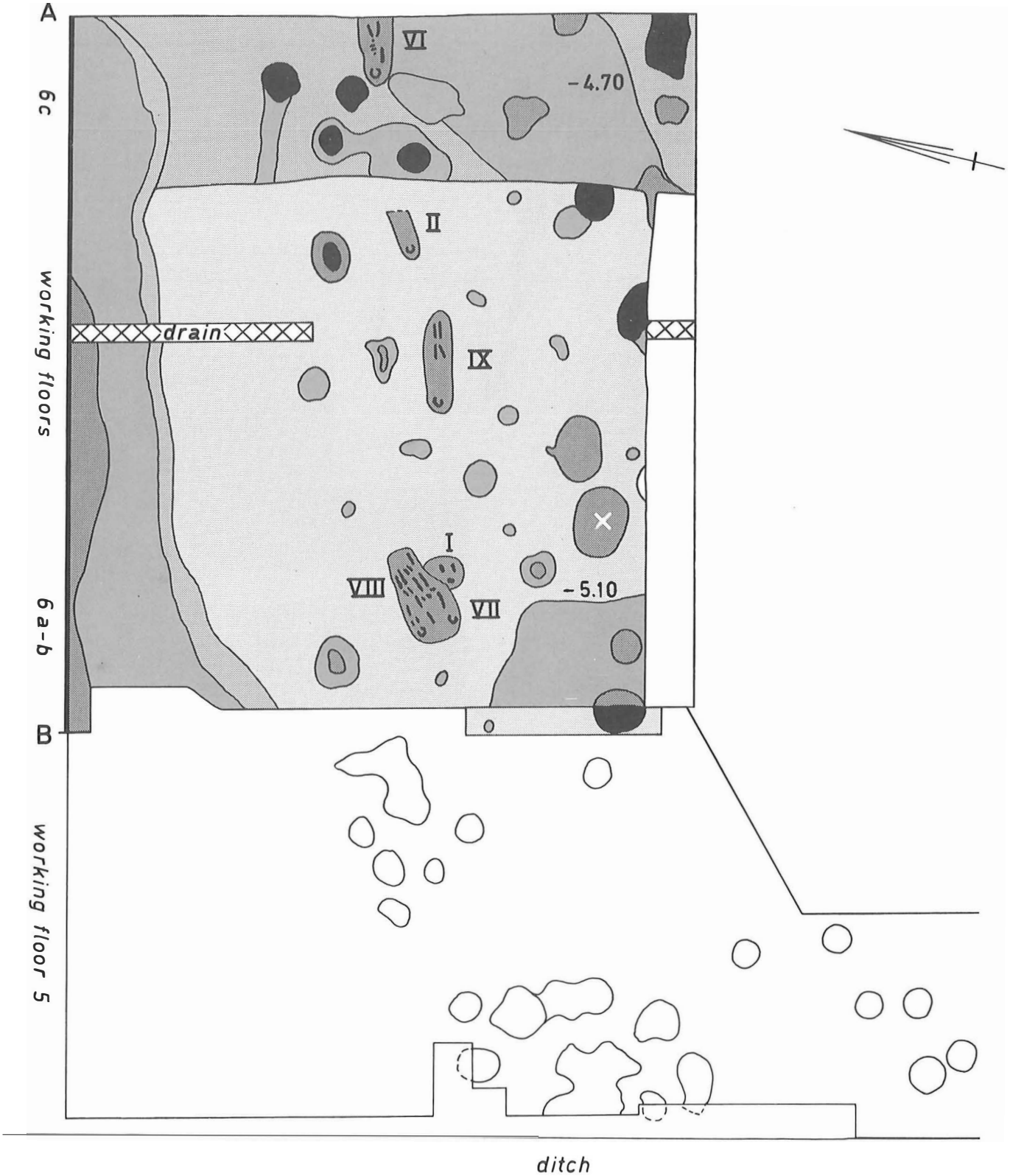
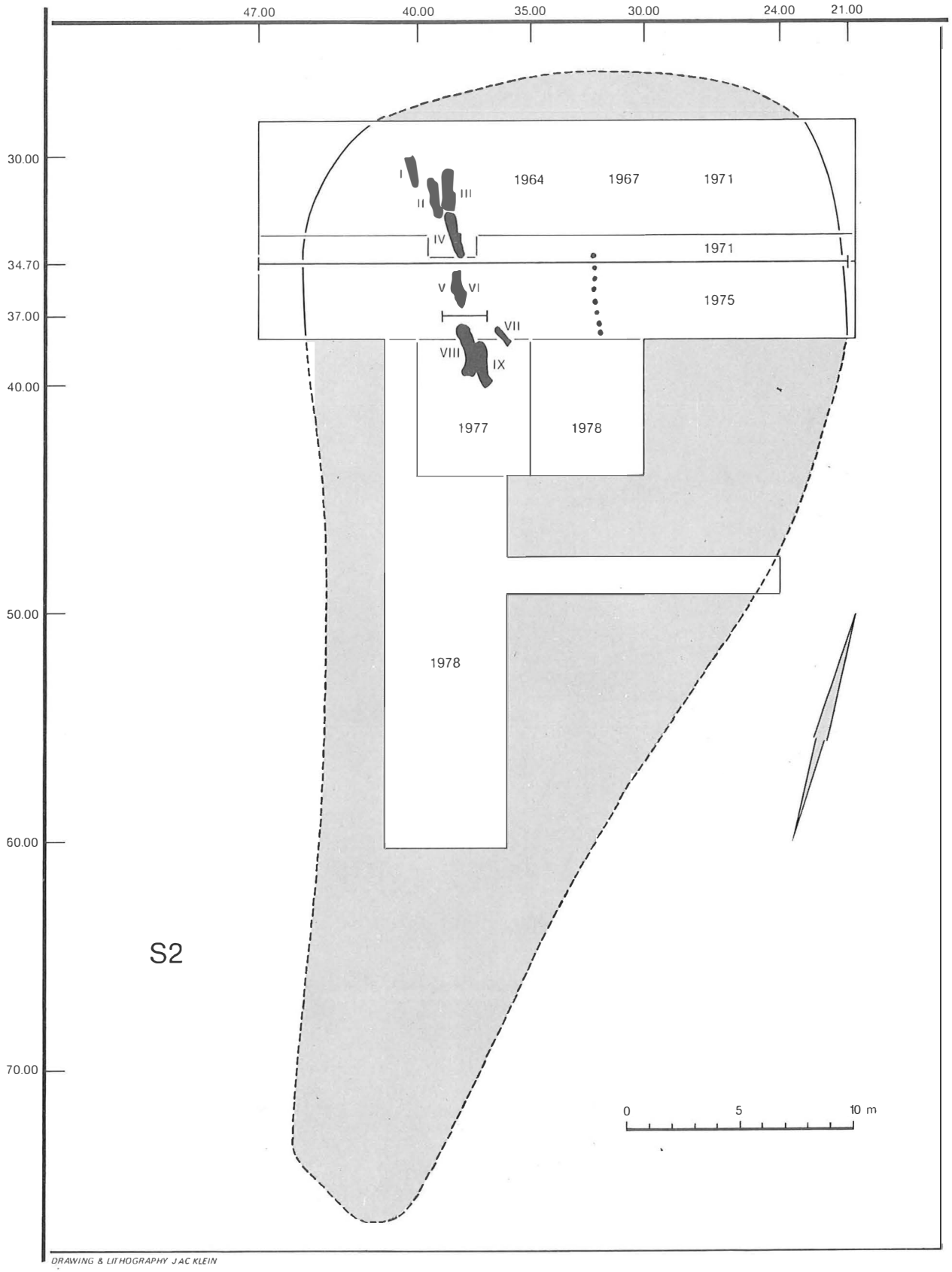


Fig. 4. Swifterbant, site S22. General plan working floors 5 and 6 (working floor 5: plan 1966; working floor 6a-b: plan 1971, at level of excavation 1966; working floor 6c: plan 1976, at higher level). Numbers refer to graves and skeletal remains. x indicates hearth from which sample for C14 date GrN-6710 (6875 ± 45 B.P.) has been taken. Elevations indicated in m below N.A.P. Scale 1:100. After De Roever (1976).



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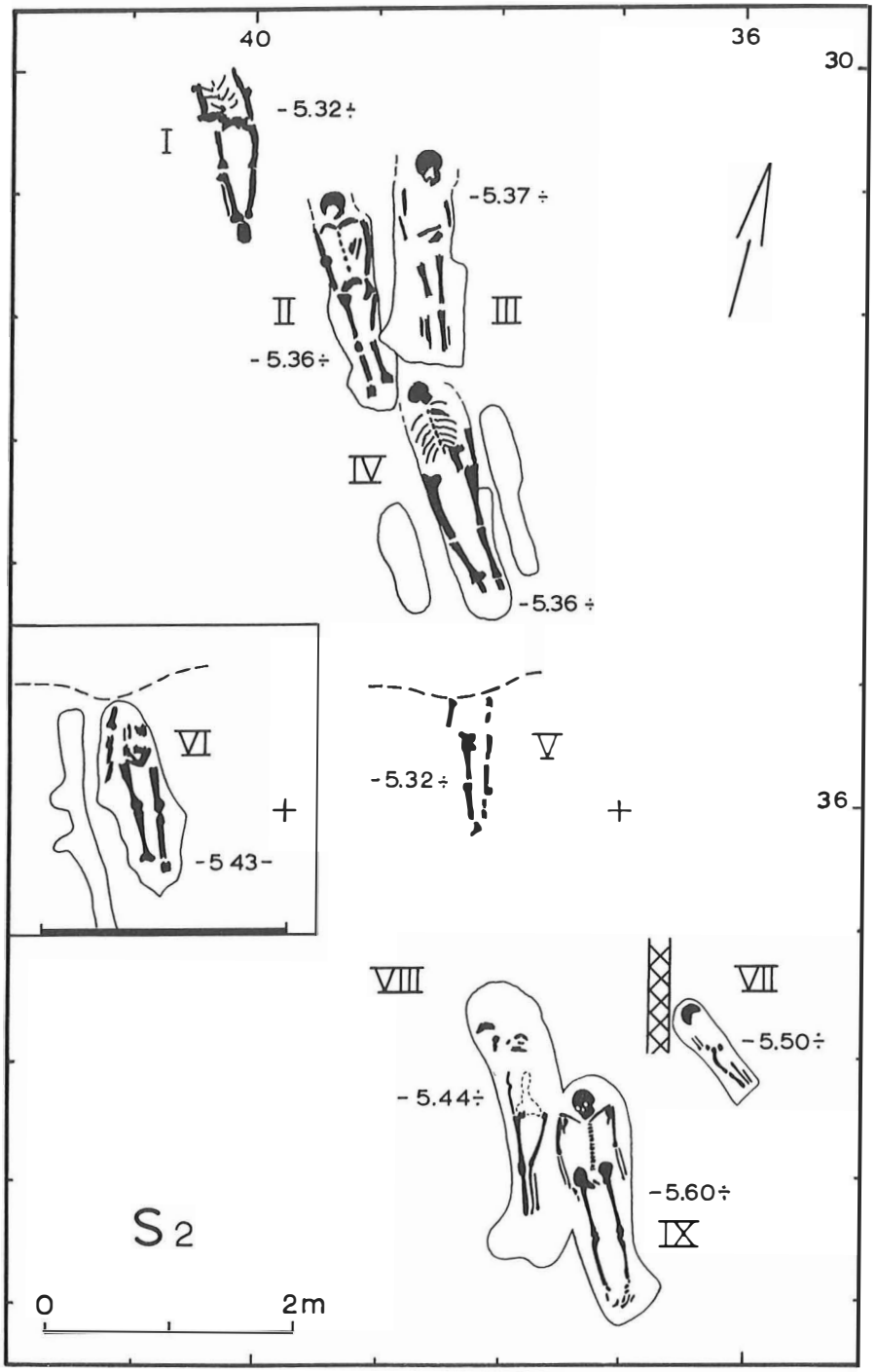

Fig. 6. Swifterbant, site S2, the cemetery. Depths indicated (in m below N.A.P.) refer to the deepest parts of the grave pits. Scale 1:50. Drawing B. van Dalen – J. H. Zwier.

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Fig. 5. Swifterbant, site S2. The outline is based on borings and the excavation. Location of the areas excavated in 1964-1978 and the cemetery. Drawing J. H. Zwier. Scale 1:200.

argument we conclude that the burials on H46 are of early Neolithic age, probably dating to the mid-4th millennium B.C. More accurate dating must await direct C14 determinations from the human bone.

The finds on lot H34 have been discussed by Whallon & Price (1976). As mentioned above only one of three numbered sites (S11) has yet provided skeletal material (in 1976), a skeleton and isolated teeth. On this site, sands of an erosion level overlie the A and B soil horizons of the dune in which the cultural materials occur. Postdepositional alteration of the dune is not apparent. An occupation spreads over an area of ca. 35 × 40/50 m. It includes material typical of both the Mesolithic and Neolithic, but separation into two occupations is not evident from the distributional pattern of the materials. Despite the fact that the site contains ceramics, there are no identified domesticates from the site (R. Whallon Jr., *pers. comm.*). The ceramics appear to have certain similarities to the Ertebolle complex of southern Scandinavia (ibid.). From these data it seems premature at present to fully identify this site as a terminal Mesolithic with ceramics, a very early Neolithic with essentially no preservation of domesticates or a site with both complexes in an apparently mixed horizon. At the present there are two C14 dates from the site, both of which antedate known coastal Neolithic sites in northwestern Europe by about 700 years. They are GrN-7214 6285 ± 45 B.P. (4335 B.C.) and GrN-7215 6330 ± 45 B.P. (4380 B.C.).

With both of the skeletal finds from S11 a definite burial pit was evident, slightly larger for the skeleton than for the isolated teeth. In the latter case, later disturbance is possible (R. Whallon Jr., *pers. comm.*). In both cases the surrounding soil in the pits was of a colour and consistency differing from the soil levels into which they were dug. The two were quite close together. Both, unfortunately, were truncated at the top of the A soil horizon and therefore both are almost certainly younger than the primary occupation and, presumably, the two C14 dates which can therefore be treated as a *terminus post quem*. It does not seem possible to indicate anything further than that the two burials may date from between the end of the fifth and the end of the fourth millennium B.C. The state of preservation might indicate that the full skeleton was buried later than the isolated teeth if indeed these originally belonged to an intact cranium (*fide* R. Whallon Jr., *pers. comm.* and see inventory). This is consistent with the possibility that the isolated teeth had originally been buried lower in the dune and were older. As with the finds on H46 there is virtually no possibility of their post-dating 3000 B.C.

The excavation of the sites on lots G42 and G43 has recently been discussed by van der Waals (1977). Site S2 on G42 is situated on the eastern side of one of the former major streams of the freshwater tidal delta of the Swifterbant region. The site has an area of ca. 24 × 50 m of which almost half of the northern side has been excavated. To date this is the only site in G42/G43 to yield full burials with complete skeletons.

In the S2 site a clear section is available (see van der Waals, 1977). Overlying a well-defined erosion surface are peaty Almere deposits and a level with shells of *Mya* underlying deposits of the Zuiderzee. Beneath the erosion surface lies unconsolidated clay, sealing the occupation layer, itself overlying compact levee clay. The total section has a thickness of ca. 1-1.5 m (for discussion of the Swifterbant sediments see Ente, 1976). The burials are near the base of the occupation layer, itself with a depth ranging up to 0.25 m. The burial pits showed up as clearly darker oval areas during the excavation of the occupation horizon (personally noted during excavation in 1977).

The stratigraphy of the burials is secure and the associated grave goods (ceramics, flint material, amber beads) are consistent with the remaining finds in the occupation level insofar as these have been analysed to date. Two C14 dates may support the contemporaneity of the burials and the occupation. Charcoal from the occupation level gave a reading of GrN-5443 5300 ± 40 B.P. (3350 B.C.) while a collagen date obtained from burial V/VI gave a reading of GrN-5606 5540 ± 65 B.P. (3590 B.C.). This range requires some comment. Since the burials are clearly situated within the relatively thin occupation layer, it is somewhat surprising that the date on the burial is, at first glance, 240 years earlier than that on charcoal from the occupation itself. Since the date on the human bone is from collagen, it is highly unlikely to be too old (see Brothwell & Burleigh, 1977). One hypothesis

is that during the occupation the site was originally covered with a material (reeds, etc.) that later compacted excessively giving credence to the idea of a shorter occupation than was actually the case (J. D. van der Waals, *pers. comm.*). The homogeneity of the burial practice and the clear alignment pattern of the graves argues strongly for the burials all being from a relatively short period of time (? within a century). The available dates and the comments above might suggest that all of the burials on site S2 fall within the time range 3400-3700 B.C. A definite conclusion concerning the relation between the graves and the occupation layer, however, should be postponed until the analysis of all evidence, including the occupational material, has been completed. The isolated finds from the site, exclusive of the burials, should all be contemporary with the graves as they were all recovered in the occupation horizon itself.

Finally scattered loose skeletal remains, primarily teeth, have been found in the complex site S3/5 in G43. To date no true burials such as occur at the other sites have been found there. The primary occupational area (S3) has an oval shape of ca. 38 × 20 m with the long axis along the ridge of the levee. This site is on a side stream to the main channel on which S2 is located and is about 500 metres to the south of the latter site. In general the stratigraphy of S3 is similar to that of S2, though the primary occupation layer is approximately three times as thick (0.75 m) (van der Waals, 1977). The greater thickness, together with the greater complexity of the occupation horizon, including various lenses and interbedding, suggests a longer overall period over which the occupation occurred. The isolated remains were scattered throughout the occupation horizon. A *terminus ante quem* exists for the unconsolidated clay which overlies the occupation in a C14 date for peat from immediately above the clay, GrN-7505 4955 ± 40 B.P. (3005 B.C.) (*ibid.*). This date is also crucial for all the other levee sites in the area. Five other dates are related directly to the occupation layer itself, though they do not demonstrate any clear stratigraphic ordering. They range from GrN-6896 5230 ± 40 B.P. (3280 B.C.) on *Fraxinus* charcoal from immediately above the top of the occupation layer to GrN-7043 5375 ± 40 B.P. (3425 B.C.) from a charred stick in a hearth in the upper portion of the occupation. These dates would still suggest a relatively short duration of occupation for the site, restricted to a few generations in all. The date on the occupation level at S2 suggests rough contemporaneity with S3.

Site S5 is continuous with S3 involving extension of occupation layers, and redeposited debris in the stream bed. No stratigraphy equivalent to that in S2 and S3 occurred but the deposits are sealed in the same way. Organic preservation was better than in the occupation sites, due certainly to the greater depth relative to the water table. Material discovered here in the late fall of 1977 proves to be among the best preserved finds of the Swifterbant series.

The above discussion provides some general bounds for the dating of the skeletal remains under discussion. The finds from S11 (H34) appear to be the only ones that may predate 4000 B.C. The other finds all appear to fall within the 4th millennium B.C. The evidence for the direct relation in age between the levee and dune finds is weak. If the *terminus ante quem* of 3660 B.C. (GrN-5067) for S21 is accepted, then the dune finds would appear to be earlier, generally from the first half of the fourth millennium, with the levee finds from the last half. However, the amount of direct C14 evidence is far from equal for the two groups and considerable caution should be exercised on this point. Despite the above cautionary tale the skeletal remains from Swifterbant would seem to be among the earliest directly dated Neolithic remains in western Europe, if not the earliest. Contemporary burials have been recovered in southern Scandinavia in Ertebolle contexts but these represent populations still involved in a hunting and gathering economy. A primary recent discovery of about the same date is seen in the cemetery site of Vedbaek-Bogebakken in Denmark, dated to the mid-fourth millennium B.C. (Albrethsen & Brinch Petersen, 1976; Albrethsen *et al.*, 1976). The finds on H34 may be only marginally later than the ritual burials at the classic Mesolithic late Tardenoisian sites of Téviec and Hoëdic (see Vallois & de Félice, 1977).

The Swifterbant series therefore fills a valuable gap in the study of contemporary populations with differing economic bases versus chronological study of populations using the same economic base near the Mesolithic/Neolithic boundary.

3. THE INVENTORIES

3.1. General remarks on the inventories

The following sections cover the listing and basic description of all the skeletal material recovered in the excavations at Swifterbant through the fall of 1978. These are divided into lot and excavation areas, so as to avoid the possible lumping of non-contemporary groups at this stage of the analysis. The order is as in the previous discussion, Lots H46, H34, G42 and G43. Where applicable, numbering is as in the preliminary archaeological reports (de Roever, 1976; van der Waals, 1977; Whallon & Price, 1976), with the exception that excavation area designations are added to the lot designation. Thus H46-III of de Roever (1976) becomes H46 (S21)-III.

In the following inventories a simple indication of those parts present is given. Analytic details will follow in another paper. The terms skull, cranium, calvarium and calotte are used in their technical sense (see e.g. Brothwell, 1972; Olivier, 1961), a calotte being the brain case without base, a calvarium being a brain case with base, a cranium being an attached brain case and face, and a skull being a cranium with mandible. In accordance with the accepted practice of identification of homologous mammalian teeth, the two premolars are referred to as PM3 and PM4. Other teeth are identified in the usual fashion as I, C and M, milk or deciduous teeth as i, c and m. In the dental diagrams only those elements are indicated which were found *in situ* in the maxilla or in the mandible and those loose elements which could be identified as to their exact position.

Skeletal and dental diagrams of all major pieces have been given. However, when only one or two bones or dental elements of an individual are present, diagrams have been omitted.

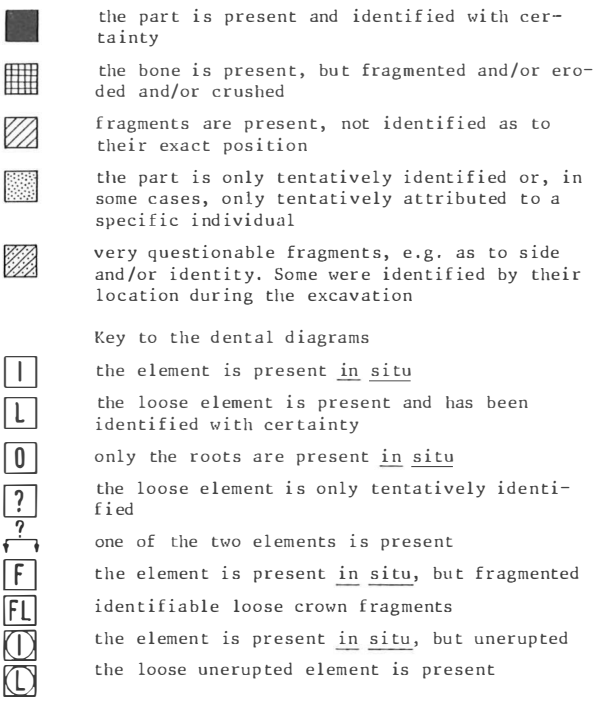


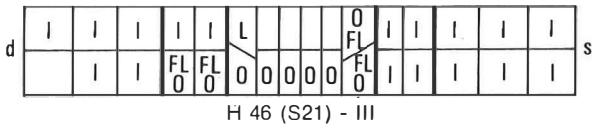
Fig. 7. Key to the skeletal and dental diagrams going with the inventories.

3.2. Inventory for lot H46 (S21, S22, S23, site unknown)

Material has been discovered in area S21 over the period 1962 through 1976. Ten finds of differing levels of significance occur. For the orientation of finds see fig. 3.

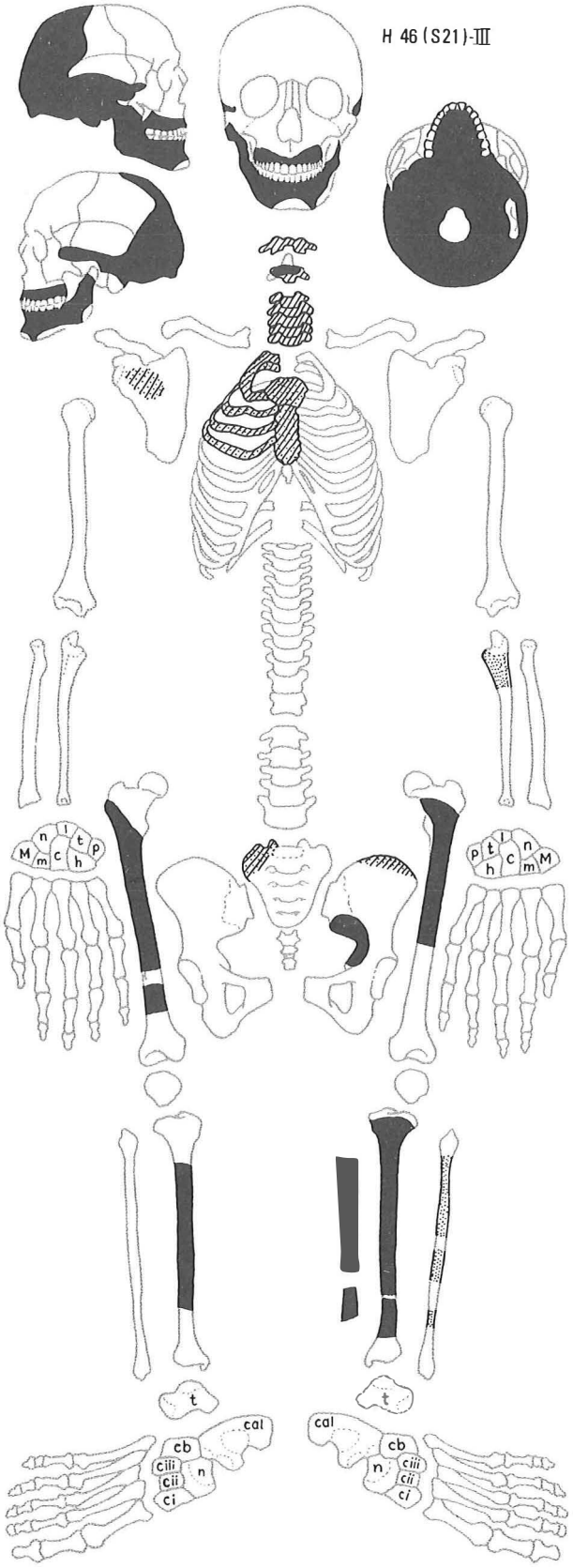
3.2.1. *The site S21*

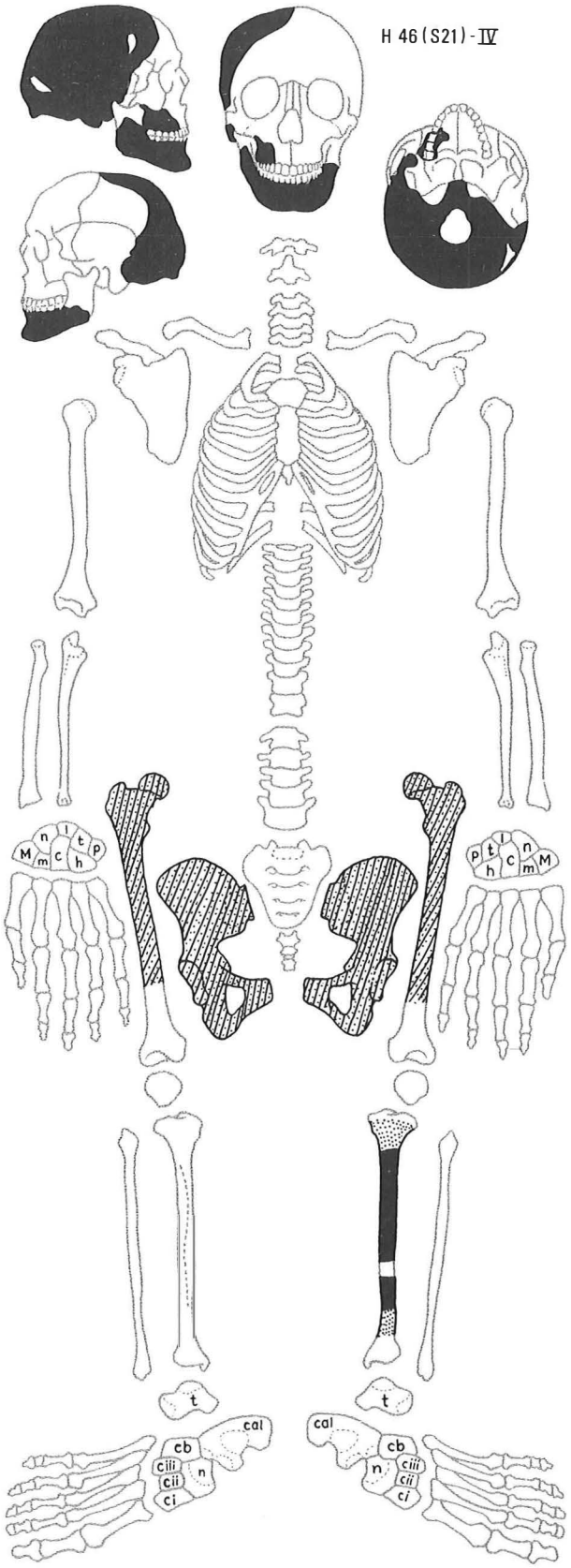
H46 (S21)-III – An oval grave pit and skull were located at a depth of −4.75 m below N.A.P. during the excavations of 1962-66. The skull was recovered. In 1971 skeletal remains were recorded at −4.85 m and recovered. The grave was oriented NW-SE with the skull to the NW. There were no obvious grave goods (de Roever, 1976). The burial consists of much of the posterior of a calvarium, a mandible and part of the postcranial skeleton. The major piece, the posterior of the calvarium, still with some adhering matrix, consists of the posterior portion of both the parietals, the right being more complete, the almost complete occipital, the basal portion of both the temporals, though with considerable damage to the left mastoid process and the left auditory region, and most of the body, the greater and the lesser wings of the sphenoid encased in matrix, together with the palatal region of the maxilla and the almost complete palatines. PM3 through M3 are intact on both sides. The mandible is complete except for the left coronoid process and part of the mental process. The right coronoid process and the left condyle both show erosion. Left PM3 through M3 and right M1 and M2 are intact. Roots for all the other teeth except for the right M3 are present. In addition a number of loose cranial fragments are available. The complete right upper canine crown and fragments of the left one are present, as well as fragments of mandibular left canine, right PM3 and PM4 and incisors.

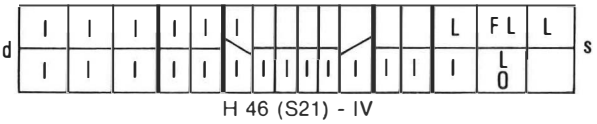


Only small fragments of the trunk and the upper limbs remain. These consist of a piece tentatively identified as the left ulna immediately distal to the coronoid fossa, fragments of cervical vertebrae including a complete body with parts of both the arches, a number of neural arches including that of the axis, and a number of poorly preserved pieces including fragments of one scapula, the ribs and the (?) sternum.

The pelvic girdle and the lower limbs are better represented. There are two fragments of the left innominate, one with the greater sciatic notch, and two small fragments of the sacrum. The femora are both represented by pieces of the diaphysis, the right by three (of which two possibly fit together), the left by one. A section was also found of the right tibial diaphysis. Diaphyseal fragments of two left tibiae were found, one apparently representing burial IV. However, their preservation prevents their being sorted out. Additional smaller fragments of the tibiae are present as are three fragments identified as the diaphysis of the (?) left fibula.





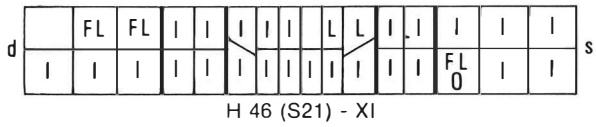


H46 (S21)-IV – An oval grave pit and the remains of a complete skeleton were located at a depth of −4.75 m N.A.P. during the excavations of 1962-66 and the skull was recovered. The remainder of the skeleton was recorded and excavated in September 1971. The grave was oriented N-S with the skull to the S. There were no specific grave goods (de Roever, 1976). The burial preserves the posterior of a calvarium, a mandible and very fragmentary postcranial remains. The largest piece is the partly deformed calvarium, with considerable erosion of the surface. It includes the almost complete occipital, the complete right parietal, the right temporal except for the anterior of the squamous plate, a small part of the posterior of the right frontal adjacent to the parietal, the uppermost corner of the right greater wing of the sphenoid and the posterior portion of the left parietal and the left temporal, the latter missing both the mastoid and the auditory regions. There are also additional small fragments of the calotte. In addition, a fragment with the alveoli and a small section of the palate of the right side of the maxilla has PM4 through M3 intact, C and PM3 are contained in an attached but dislocated piece. The mandible is represented by the complete body, the base of the left ramus and the lower half of the right ramus. Left I1 through M1 plus the root of M2, and right I1 through M3 are mostly intact. Additional teeth and tooth fragments include the left lower M2, further enamel fragments of the left lower M1, the complete crowns of upper left M1 and M3 and enamel fragments of (?) upper left M2. Very small and friable fragments are referred to both of the innominates and both of the femora. One of the left tibial fragments found with burial III also belongs here.

H46 (S21)-V – An oval grave pit and the remains of a complete skeleton were discovered during the excavations of 1962-66. The grave was oriented WNW-ESE with the skull to the WNW. In 1971 the bottom of the pit was recorded at −4.78 m N.A.P. There were no associated burial goods (de Roever, 1976). The condition of the burial precluded the excavation of any material and nothing could be preserved for further study.

H46 (S21)-X – This find was also made in the 1960's. All that remains is a fragment of molar crown, not further identifiable, and two further fragments of tooth enamel.

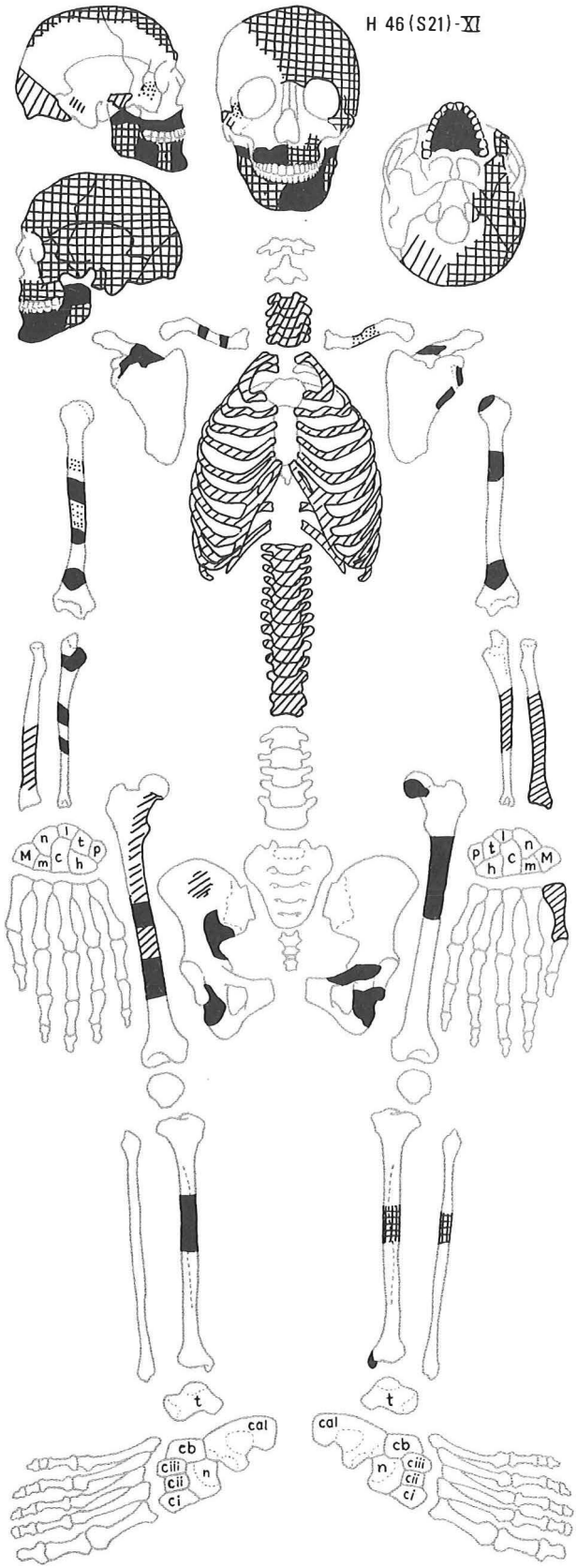
H46 (S21)-XI – The northern half of an oval grave was recorded at a depth of −4.45 m N.A.P. in 1973. The remains of a skeleton were recorded in 1976 at a depth of −4.95 m and recovered. The grave was oriented N-S with the skull to the S. There were no associated grave goods (de Roever, 1976). The burial consists of a somewhat distorted and fragmentary skull and the postcranial skeleton. The skull is thin-walled and encrusted with preservative and closely adherent matrix. The cranial portion consists of a calotte crushed from top to bot-



H 46 (S21) - XI

tom and angulated to the right side as a result of *in situ* pressure. The right side is heavily damaged. Present are the left part of the frontal including the brow ridges and the nasal root, the right medio-posterior of the frontal, the complete left parietal and the medial portion of the right parietal, the occipital from lambda to the posterior margin of the foramen magnum, including a small part of the left occipital condyle, the majority of the left temporal and the posterior portion of the right temporal, though with destroyed mastoid, the upper portion of the left greater wing of the sphenoid and the almost complete left zygoma. Attached to the above is the majority of the palate and the alveoli. The lower border of the nasal opening is present as are the roots of both of the zygomatic processes. Right I_1 through PM_4 and left I_2 (loose) together with PM_3 through M_3 are present. The mandible is largely complete but the bone is quite friable. Damage to the body is restricted to the right periodontal margin. Both of the condyles are lost and the coronoid processes and the gonial angles are damaged. The right dentition is complete, the left complete except for M_1, represented only by the roots. Loose fragments include a partial right zygoma, fragments of the orbital margins of the maxilla, small pieces of the frontal, small pieces of the mandible, the loose canine crown from the left side of the maxilla, fragments of two further molar crowns, probably of the right maxillary M_1 and, certainly, M_2, and crown fragments probably of the left mandibular M_1.

The postcranial skeleton is rather fragmentary. The vertebral column is represented by fragments from the cervical and the thoracic regions, including one identifiable cervical body. There are small fragments of the ribs. The right clavicle is represented by two fragments of the diaphysis, the left by two smaller fragments. Fragments from both of the scapulae include the right proximal portion of the acromion, together with the root of the glenoid fossa and part of the adjacent supraspinatous fossa, and a left proximal portion of the acromion and the upper part of the axillary border. Portions of both of the humeri are present, the right with two fragments of the central diaphysis, a third fragment of the distal diaphysis and the olecranon fossa, plus smaller pieces, the left with a fragment of the distal diaphysis from just proximal to the olecranon fossa, a piece of the diaphysis including the deltoid tuberosity, and the head, with an attached fragment of the glenoid fossa of the scapula. Pieces from the ulnae and radii are difficult to separate. Three pieces are from the right ulna, two of the diaphysis and one of the proximal diaphysis and the lower margin of the proximal extremity, including the crushed radial articulation. A number of pieces, including two of the distal diaphysis, are almost certainly from the right radius, and four fragments from the diaphysis and a piece with the damaged distal epiphysis are from the left radius. Other fragments come from both of the radii and the left radius and/or ulna. The only hand bone is a fragment of shaft and other pieces



from the left first metacarpal.

There are a number of pieces of the pelvis. Identifiable from the right side are a piece with the greater sciatic notch, and adjacent parts of the iliac plate, a separate large fragment of the iliac plate and a fragment of the ischium with the adjacent edge of the acetabulum. From the left side are a large fragment of the ischial portion of the acetabulum and the upper portion of the ischial body, and a fragment of the ischium and pubis including the acetabular margin. Portions of both of the femora are present, the right with two large pieces of the diaphysis and several smaller fragments, the largest including the distal portion of the neck and the trochanters, the left with a large fragment of the shaft showing some crushing and running distally from the neck and the trochanters, together with a fragment of the femoral head and the neck. A number of pieces of the tibiae include a large fragment of the right diaphysis, a crushed piece of the left diaphysis with an adherent portion of the fibula and smaller fragments including the left malleolus.

All postcranial bones have been sent in for a C14 analysis.

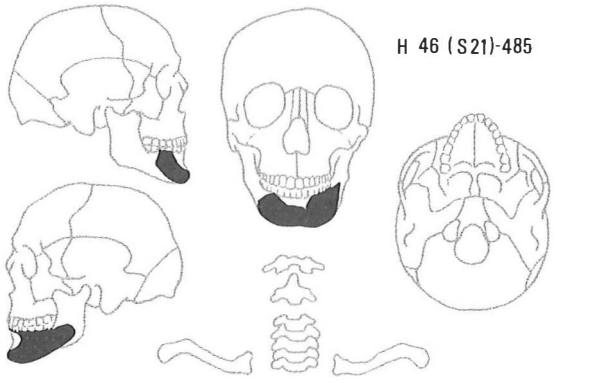
H46 (S21)-152 – During the excavation in 1971 an isolated tooth was recovered from the occupation layer at a depth of −4.51 m N.A.P. It was 1 m north of H46 (S21)-798 (see below) (de Roever, 1976). It has not been seen.

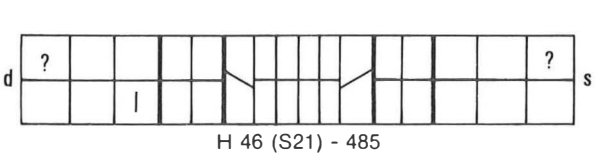
H46(S21)-188 – During the excavation of 1971 two isolated teeth were recovered from the occupation layer at a depth of −4.54 m N.A.P. They were 1.60 m south of H46 (S21)-744 (see below) (de Roever, 1976). The find consisted of a left upper premolar crown and a left lower molar crown, probably of M1.

H46 (S21)-485 – During the excavation of 1973 this find was made at a depth of −4.58/4.62 m N.A.P., in a remnant pit or fragment of an animal burrow, partly cut away by a recent drain (de Roever, 1976). It consists of a distorted mandibular fragment and some teeth. The former consists of a portion of the body on either side together with the heavily eroded chin. It contains an intact right M1. A further six isolated tooth crowns were found, one fragmented premolar, two probable upper M3's, one right upper M1 or M2, one lower molar and fragments of another molar.

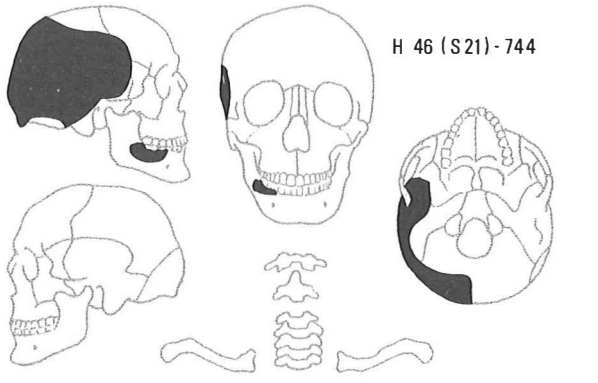
H46 (S21)-744 – A subrectangular grave pit was discovered in 1966 and further excavated in 1973 at a depth of −4.64/4.70 m N.A.P. No postcranial remains have survived. The pit was oriented NE-SW with the skull to the SW. There were no associated grave goods (de Roever, 1976). Preserved were a calotte, mandibular fragments and loose teeth. The major piece is the fragmentary right side of a calotte represented by most of the squama and parts of the petrous portion of the right temporal including the condyle, but with the mastoid damaged and without the zygomatic root, most of the lower part of the right parietal, a portion of the right half of the upper part of the occipital, and a possible part of the right greater wing of the sphenoid. There are also additional small cranial fragments.

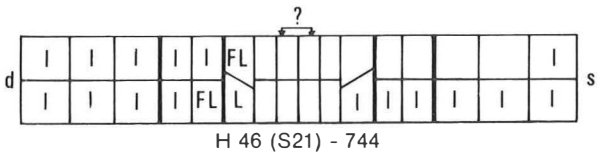
Together in the matrix but without any remaining bone were the left mandibular C through M3. In association with the above were a broken incisor crown, namely of an upper I1, unidentifiable as to side, the loose crown of the lower right canine and assorted enamel fragments including part of a further incisor. A fragment of right mandible contains PM4 through M3. Also found in the matrix, but without any remaining bone, were the right maxillary PM3 through M3. Additional to the above were crowns of the loose fragmentary upper right canine, the right lower PM3 and a reduced three-cusped M3, which should be upper left, together with additional unidentifiable tooth and enamel fragments.





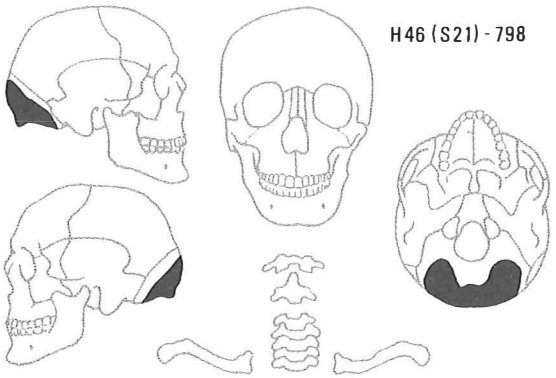
H 46 (S21) - 485





H 46 (S21) - 744

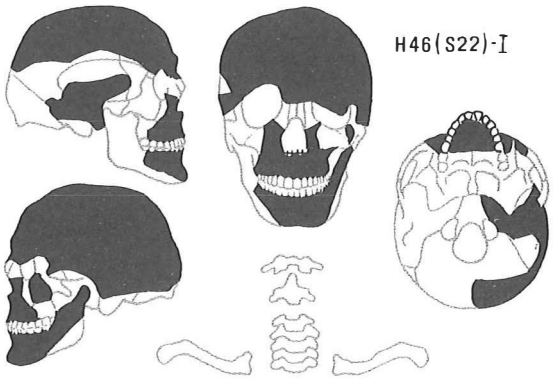
H46 (S21)-798 – In 1973 these isolated fragments of a calotte were recovered from the culture layer near the northern extremity of H46 (S21)-XI at a depth of −4.55 m N.A.P. (de Roever, 1976). The finds were a damaged fragment of the upper portion of the occipital plus further unidentifiable vault fragments.

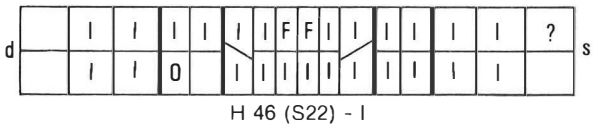


3.2.2. *The site S22*

Seven separate finds have been made in site S22 of lot H46. Two of these (VII and VIII) are a paired burial. Materials from this site were found during the period 1966 through 1971 (fig. 4).

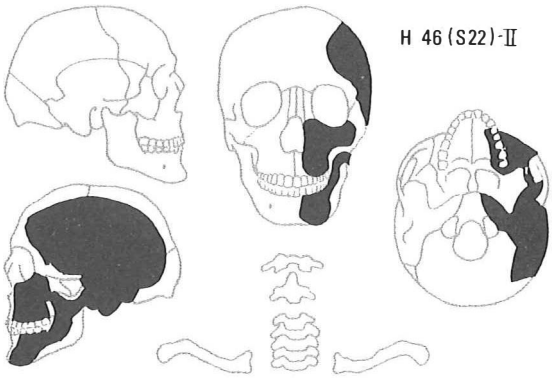
H46 (S22)-I – This isolated piece was recovered from a round pit in 1966, adjacent to the paired grave H46 (S22)-VII/VIII, at a depth of −4.86/4.96 m N.A.P. There does not seem to be any association with an apparent Mesolithic hearth discovered at a lower level in 1971. A jet pendant was recovered from the find in the laboratory (de Roever, 1976). The find consists of an unreconstructable fragmentary skull. The largest piece is a calotte consisting of the major portion of the frontal, the complete left parietal and most of the right parietal, the left half of the upper part of the occipital, and portions of the squamous and the petrous regions of the left temporal. Small portions of the right greater wing of the sphenoid, the upper parts of both of the nasals and a fragment of the ethmoid are attached. The piece is partially crushed and warped. Two further major pieces are present, the right temporal lacking both the parietal border and the mastoid, and the major part of the maxilla including the dental arcade. The latter piece still has adhering matrix. The nasal spine is eroded. I1 through M2 are present on both sides, though both I1's are broken. There is also an isolated (?) left M3. The mandible retains most of the left body and the ramus though lacking the gonial angle and the anterior of the right body. Led I1 through M2 are present together with the right I1 through C, PM4 root, M1 and M2. Additional fragments include part of the (?) left zygomatic, a fragment of the right temporal including the posterior portion of the condyle, and fragments of dental enamel. See fig. 10.

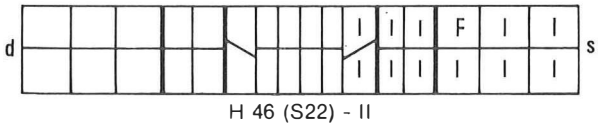


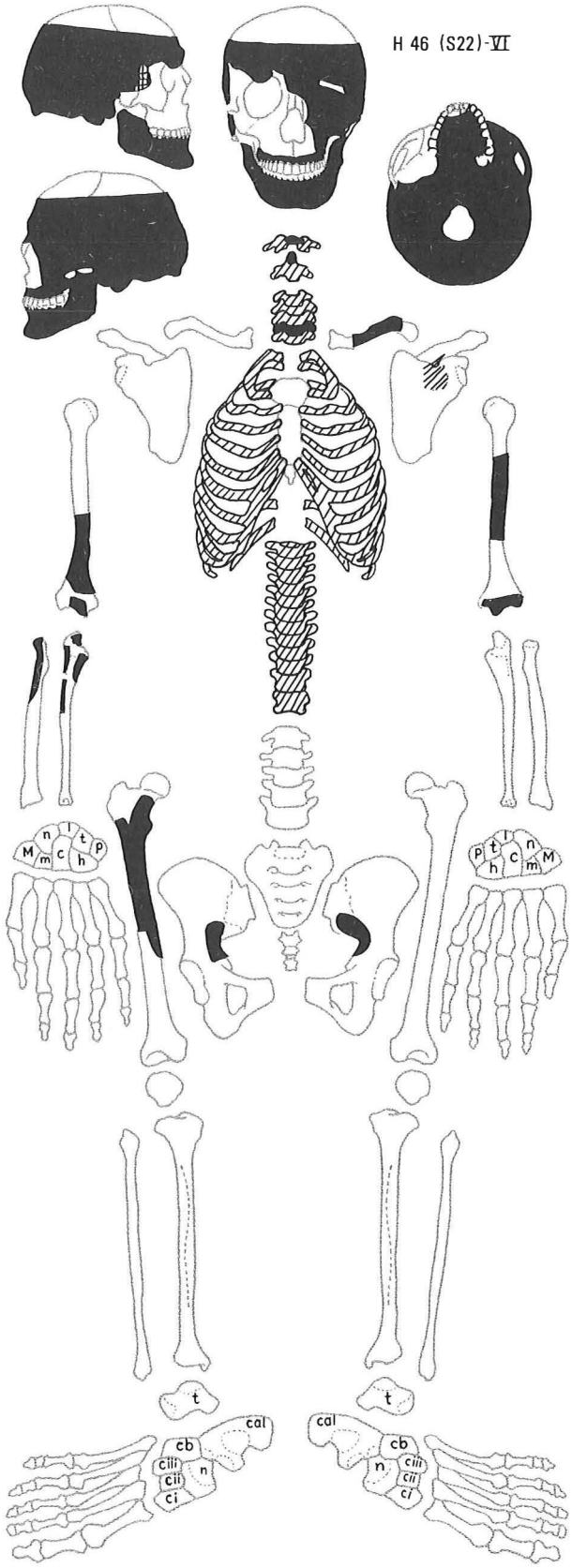


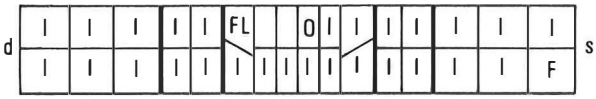
H46 (S22)-IIIX – A loose upper right M2 found in the ditch near burials I and IX is from the occupation layer but cannot be confidently associated with either of these finds (*contra* de Roever, 1976). In view of the degree of attrition, an appurtenance to burial I is improbable.

H46 (S22)-II – This skull was recovered in 1966, apparently from an oval grave pit, though this was not verifiable in later work in 1971. The remains were at a depth of −4.77 m N.A.P. The pit was apparently oriented NE-SW with the skull to the







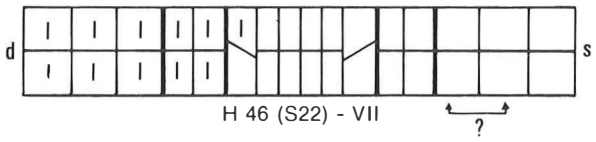


H 46 (S22) - VI

SW. There were no grave goods (de Roever, 1976). The find consists of fragments of the left side of a skull in moderate condition. The largest piece consists of part of the frontal from behind the brow ridges, part of the parietal, though not extending to the mid-line, the almost complete temporal, a small fragment of the occipital adjoining the temporal and the parietal, and the upper part of the greater wing of the sphenoid. A separate piece consists of the majority of the facial portion of the maxilla and the zygomatic. C through M_3 are present, the crown of M_1 is broken. Most of the left body and the ramus of the mandible are present though without the gonial angle and much of the posterior border of the ramus. C through M_3 are intact. In addition, there are small fragments of the cranium and of dental enamel.

H46 (S22)-VI – This skeleton was discovered in an oval grave pit in 1971. The top of the skull was recorded at a depth of −4.65 m N.A.P. with the skeleton at −4.77 m. There were no grave goods. The grave was oriented ENE-WSW with the skull to the WSW (de Roever, 1976). The burial consists of a skull with the apex of the vault and the right side of the face missing, together with a partial postcranial skeleton. The frontal is complete except for the right lateral supraorbital region and the apex. The parietals are complete except for the apex. The occipital and the left temporal are complete. The right temporal lacks the zygomatic root and the surrounding area of the anterior squamous plate. The sphenoid is present but lacks both of the pterygoid plates and shows considerable damage to the right greater wing. The maxilla is represented by the largely complete palate, the left dental arcade, and a portion of the left facial region adjoining the complete left zygomatic. The palatine is largely complete and the roots of the nasals are present. The root of left I_1 is present, the crown destroyed after analysis; left I_2 through M_3 and right PM_3 through M_3 are intact though some are damaged. Additional fragments include a loose styloid process, a small fragment of molar crown, a damaged upper right canine and a number of enamel fragments. The mandible is complete except for the right coronoid process and the condyle. All of the teeth are present though left M_3 is in very bad condition.

The postcranial skeleton is very incomplete. Fragments of the cervical vertebrae include isolated transverse and spinous processes, one largely complete vertebra, the posterior arch of the atlas, the dens and two fragments of the body of the axis. There are further fragments representing the thoracic vertebrae and the ribs. The shoulder girdle is represented by the diaphysis of the left clavicle and a fragment of the left scapula including the base of the spine. There are three fragments of the right humerus, one of the diaphysis proximal to the olecranon fossa, one of the trochlea plus one other small piece, two fragments of the diaphysis of the left humerus, which probably fit together, and a further piece with the left lateral

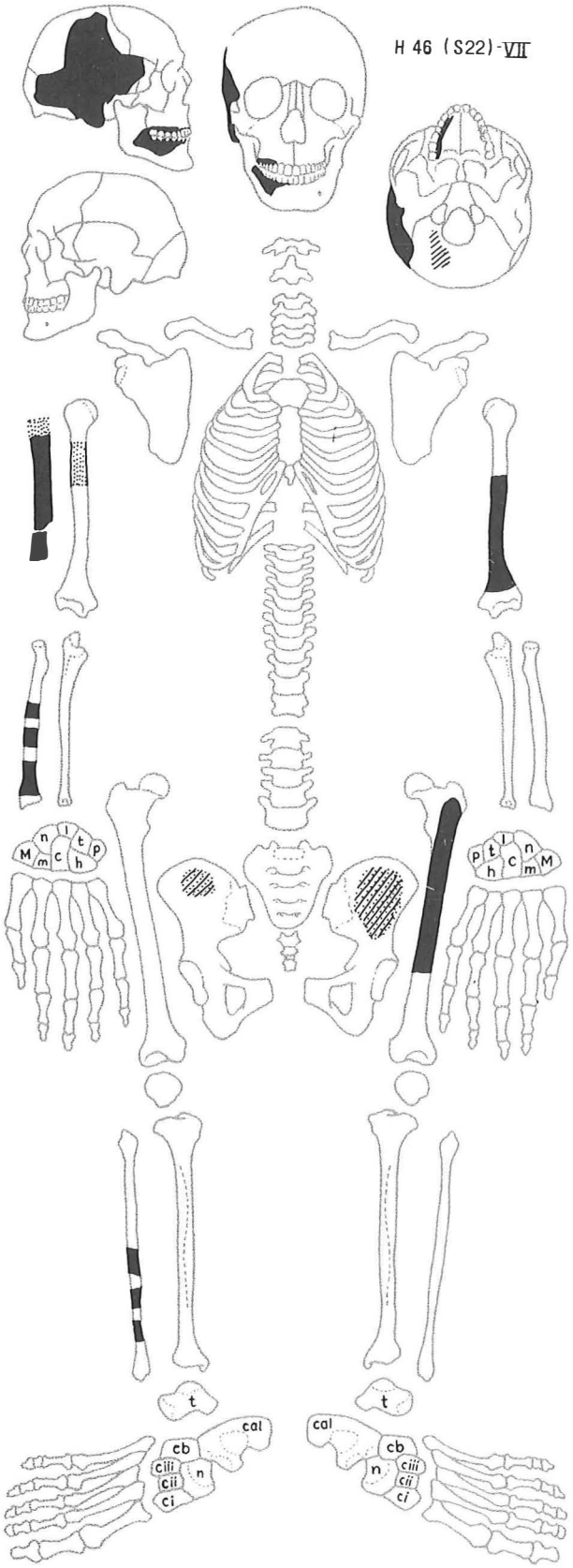


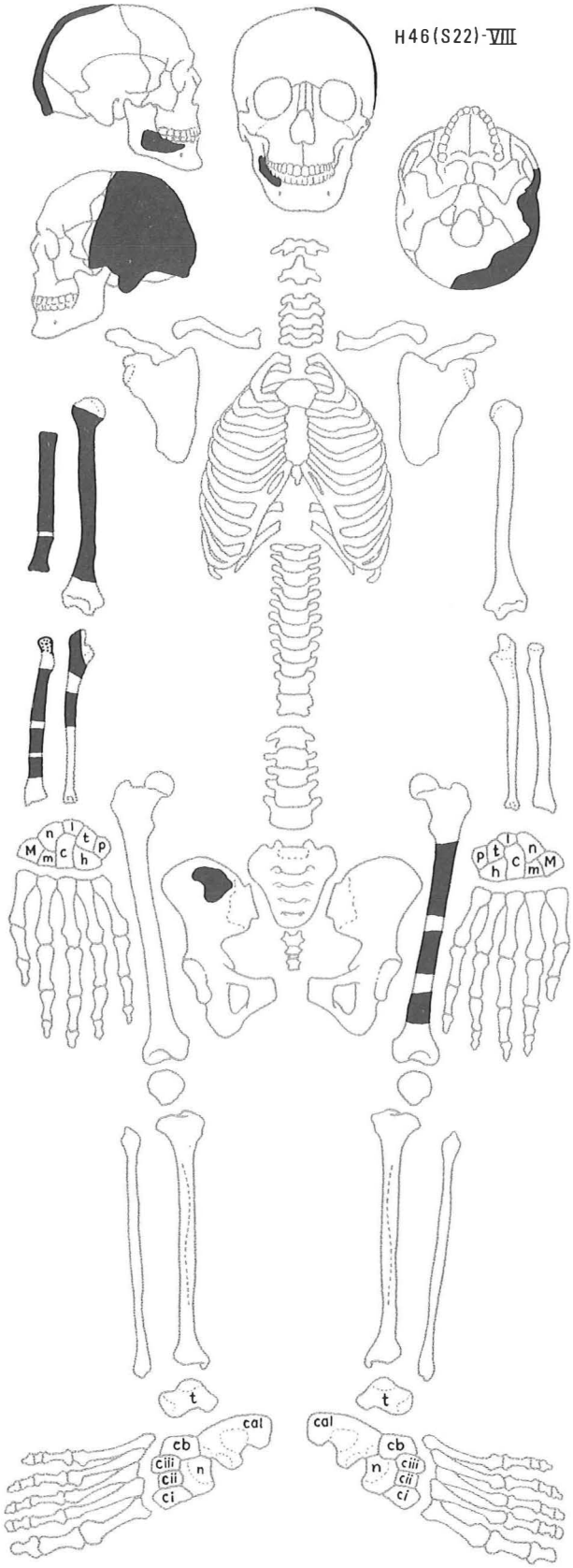
epicondyle and the adjacent olecranon fossa. There are a number of small fragments of the right ulna, mostly proximal, and a fragment of the right proximal radius.

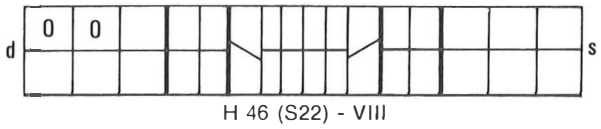
The pelvic girdle and the lower limb are represented by fragments of both of the ilia including both of the greater sciatic notches, together with a diaphyseal fragment of the right femur including the inferior surface of the neck and part of the lesser trochanter (see fig. 12).

H46 (S22)-VII – This is one of a double burial (with H46 (S22)-VIII) discovered in a single broad oval grave pit in 1971. The pit was detected at a depth of – 5.07 m N.A.P. with the burials themselves at a depth of – 5.20/5.24 m. Both were oriented NE-SW with the skulls to the SW. There were no grave goods associated with burial VII (de Roever, 1976). This very incomplete skeleton consists of fragments of the calvarium, the maxilla, the mandible and the postcranial skeleton. The largest piece consists primarily of the outer side of the right calvarial wall including the lateral portion of the parietal, the temporal squama including the mastoid process, and small adjacent portions of the sphenoid and the occipital. A second fragment is of the posterior of the right occipital, probably immediately adjacent to the foramen magnum. There are, in addition, small fragments of the parietals. There is a fragment of the right maxillary arcade with C through M3. A fragment of the right mandibular arcade and the anterior corner of the ascending ramus contains PM3 through M3. An additional loose tooth is identified as left lower M1 or M2. There are also additional enamel fragments, some of them of molars.

The postcranial remains are from scattered places throughout the body. From the left humerus there is a fragment of the diaphysis from just proximal to the olecranon fossa. A shorter diaphyseal fragment is from the (?) right humerus. There are three small fragments from the distal part of the diaphysis of the right radius. Three pieces are from the ilium and there is a section of the left femoral diaphysis from just distal to the trochanters. Finally, three fragments are identified as from the fibula. (See further below – skeleton VIII).







H 46 (S22) - VIII

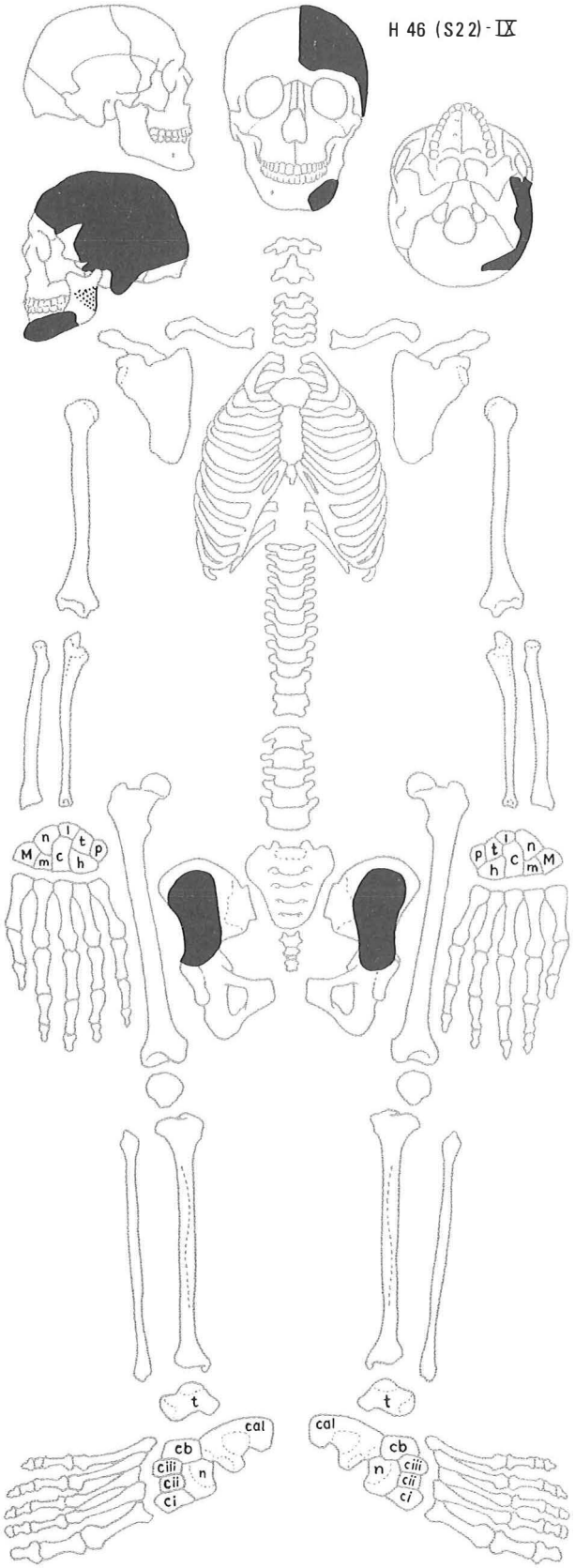
H46 (S22)-VIII – Details of the discovery are noted above with H46 (S22)-VII, with which it formed a double inhumation. With skeleton VIII were two transverse arrowheads, one near the throat and one between the right radius and ulna. Unfortunately their exact nature remains enigmatic (de Roever, 1976). The burial consists of a portion of a calotte, a possible fragment of a mandible and postcranial remains. Association of the cranial and the postcranial remains is problematic, as some mixture with burial VII appears to have occurred. The partial calotte consists of most of the left parietal, the damaged squamous portion of the left temporal including the zygomatic root, the external auditory region and the outer table of the mastoid, most of the left of the posterior of the occipital and a very small midline section of the right parietal. The mandible is possibly represented by a damaged and deformed fragment tentatively identified as the right posterior body.

The postcranial remains are fragmentary and the duplication of parts of the right humerus indicates mixture with burial VII. Both humeri consist of diaphyseal fragments and are of differing robusticity. There are, in addition, two fragments of the right ulna, one diaphyseal, the other with portions of the olecranon process and the coronoid fossa. There are three fragments of the radial diaphysis and a crushed fragment of the proximal head of the (?) right radius. From the lower limb and the pelvic girdle are a fragment of the right iliac plate and three pieces of the left femoral diaphysis.

H46 (S22)-IX– In 1971 a narrow oval grave pit with a skeleton was recovered. The pit was recorded at a depth of −5.14 m N.A.P., the skeleton at −5.23 m. The grave was oriented ENE-WSW with the skull to the WSW. There were no associated grave goods (de Roever, 1976).

The individual is represented by a partial calotte, a mandible and pelvic fragments. The major piece is the left side of a calotte, incorporating the left half of the frontal from behind the brow ridges, the majority of the left parietal, the lateral wall of the left temporal, and a small part of the posterior of the left side of the occipital. A fragment of the left body of the mandible lacks any surviving alveolar bone. There is also a fragment of the (?) left ascending ramus. Other small pieces include a fragment of the lesser wing of the sphenoid. Six loose tooth crowns were found, some very fragmentary. All of them are molars. Four of these are unidentifiable, of the two others one is an unspecified lower molar, the other a further unspecified left upper molar.

The postcranial skeleton was represented solely by fragments of the pelvis including a fragment of the left ilium with part of the acetabulum, and a fragment of the right ilium.



3.2.3. *The site S23*

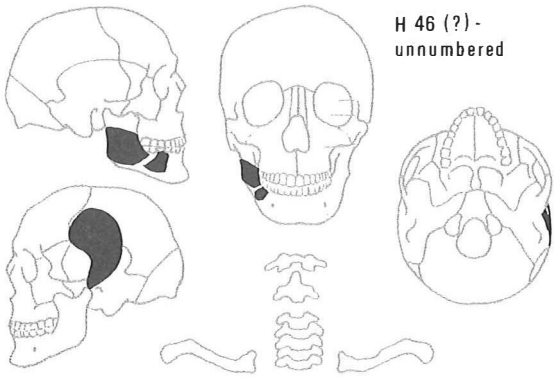
This site was excavated by the University of Wisconsin under T. Douglas Price in 1976. The site is essentially an extension of site S22 (see de Roever, 1976). Only one poorly defined grave was uncovered.

H46 (S23)-XII – During the excavations of 1976 a grave pit was discovered at a depth of −5.84 m N.A.P. It was oriented E-W. No grave goods were recovered (T.D. Price, *pers. comm.*).

This is a very fragmentary burial. Some of the pieces appear to be calcined. The only identifiable pieces were a fragment of a long bone diaphysis, tentatively identified as from a humerus of moderate thickness, and a radial diaphysis.

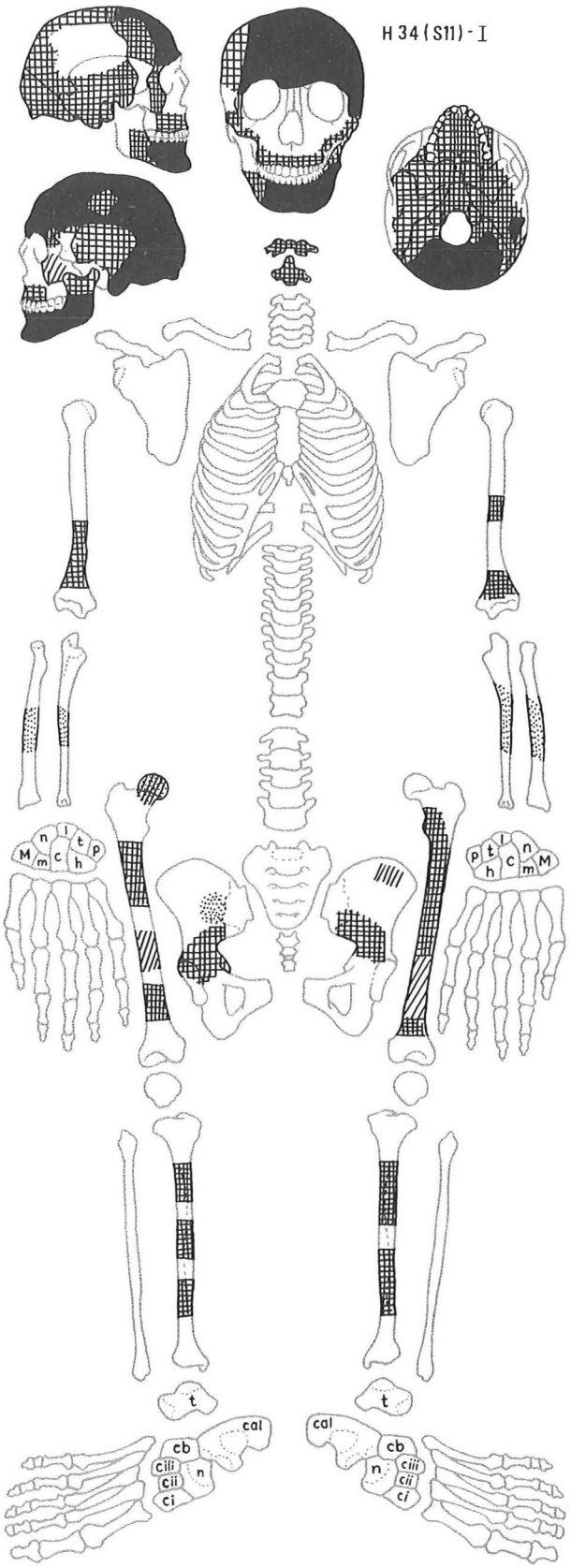
3.2.4. *Site unknown*

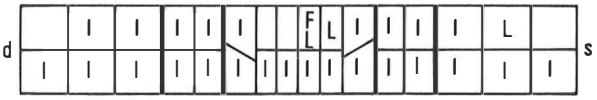
The material inventoried immediately below was obtained from excavations on lot H46 in the 1960's. However, no record is available of their excavation and their site location is unknown. For this reason these finds should be treated with considerable caution. The fragments may belong to two different persons, dependent upon the identification of a deciduous tooth (see below).



H46 (?)-unnumbered – Three fragments are identified as from the skull of a young individual. The major piece consists of the squamous portion of the left temporal together with the adjacent parts of the parietal and the base of the petrous portion of the temporal. Other fragments were in association. A fragmentary posterior of the body of the right mandible and the adjacent ascending ramus includes an erupting M_3. A second associated piece of the right body contains M_2, the dentine of M_1, and the root of PM_4.

Loose dental elements are primarily from the permanent dentition, except for a deciduous molar which, however, is





H 34 (S11) - 1

only tentatively identified as such. Other crowns represent a reduced upper M3, probably in the process of erupting, an upper M1 or M2, a lower M1, four premolars (2 upper and 2 lower), an upper and a lower canine and incisor fragments.

3.3. Inventory for lot H34 (S11)

3.3.1. *The site S11*

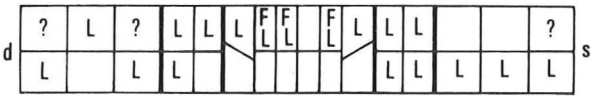
Human skeletal material was discovered on H34 by the University of Michigan team in 1976 (see Whallon & Price, 1976). As already discussed, these finds have no obvious connection with those from H46 besides the fact that they are also from a dune site.

H34 (S11)-1 – During the excavation of 1976 a grave pit was discovered at a depth of −5.05 m N.A.P. The burial was located at −5.39 m N.A.P. It was oriented WNW-ESE with the head to the WNW. There were no grave goods (R. Whallon Jr., *pers. comm.*).

The burial consists of a cranial and postcranial skeleton in very friable condition. The cranium is crushed laterally and the face is displaced to the right side. The right side is heavily damaged. The cranium is represented by the major part of the frontal save for the right margin, the complete left parietal and the medial portion of the right parietal, the complete but slightly damaged left temporal and the badly eroded right temporal, the complete but damaged and distorted occipital, the majority of the worn and damaged sphenoid, the palatal portions of the maxilla and the palatine, the fragmentary right zygoma, and the uppermost portion of the nasals. Right C through M2 and left C through M1 are *in situ*. Left I2 and M2 are loose, while left I1 is represented by loose fragments. The mandible has an intact body, but both rami are damaged. The right condyle and the right coronoid process are both absent. Both are present on the left side but in bad condition. All of the teeth were present. Further small fragments are present from both the right side of the calotte and the mandible.

The postcranial skeleton is very fragmented, eroded and friable. All that remains of the vertebral column are fragments of the atlas and the axis. The right humerus is represented by the distal half from the region of the olecranon fossa, the left by two fragments, one of the central diaphysis and one distal piece including the olecranon fossa. Very small fragments come from the ulnae and radii of both sides.

There are four fragments from the pelvis, equivalent pieces from the right and left sides, both including the greater sciatic notch and the adjacent acetabular margin, a piece of the left iliac plate, and a further fragment. There are three fragments of the right femoral diaphysis, plus fragments of the head and the neck and other small pieces, two large fragments of the left femur, one including part of the head and the neck and other very small pieces. There are three pieces of the right tibial diaphysis and two of the left diaphysis. No further bones were identifiable (see fig. 13).



H34 (S11)-42 – A small oval pit was uncovered in 1976 at a depth of −5.02 m N.A.P. with the remains located at a depth of −5.18 m N.A.P. It was oriented N-S. There were no associated grave goods (R. Whallon Jr., *pers. comm.*).

The feature is represented entirely by loose dental crowns and enamel fragments. Two canines, seven premolars and eight molars are complete or nearly so. In addition there are fragments of at least two incisors, a further canine and at least one molar. Other enamel fragments cannot be readily identified. Tentative identification of the loose crowns and fragments includes maxillary right I1, both maxillary I2's, maxillary right and left canines, upper PM3 (both), upper PM4 (both), lower PM3 (left) and PM4 (both), 3 upper molars (right M3 and M2, or M2 and M1, left (?) M3), 5 lower molars (left M1 through M3, right M1 and M3). It should be noted that all of the teeth recovered are consistent with a single individual as was apparent during the original excavation. The teeth were found in anatomical position, clenched together. All that remained of the bone was a dark stain with no preservable pieces (R. Whallon Jr., *pers. comm.*).

3.4. Inventory for lot G42 (S2)

3.4.1. *The site S2*

Site S2 has yielded the remains of nine skeletons in various conditions plus additional loose finds, mainly of teeth. Fragments of a skull, noted at the end of the inventory of skeleton V, may belong to this site but the circumstances that surround them do not permit this to be fully ascertained. Only the obvious grave goods are recorded as such. The flints and small potsherds, found with many of the burials, can be considered either as grave goods or as accidental grave filling (fig. 5 and 6).

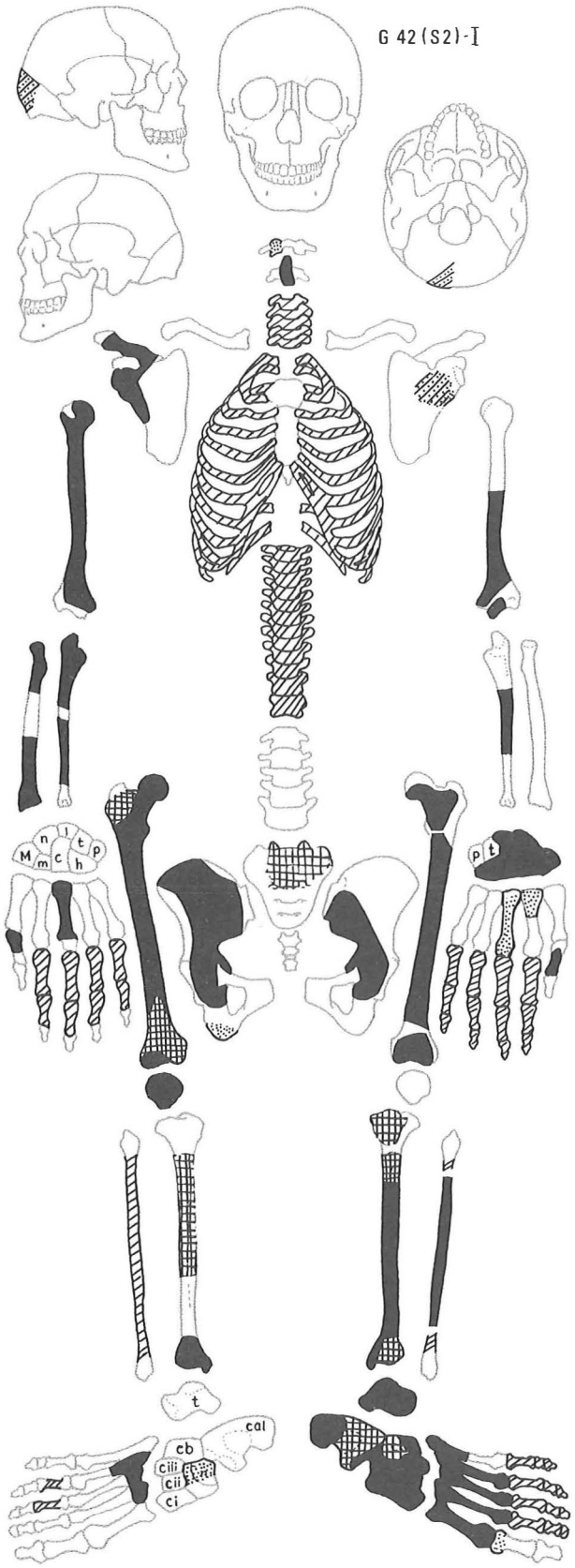
G42 (S2)-1 – This skeleton was discovered during the early excavations of van der Heide in 1964. The whole skeleton was removed *en bloc* and taken to the Schokland Museum in the Noordoost Polder. The lowest point of the (?) grave was recorded in 1964 at −5.32 m N.A.P. There were no obvious associated grave goods. The remains were transferred in 1976 to Utrecht. The skeleton was oriented NNW-SSE with the head to the NNW, a similar orientation being found in all of the skeletons from S2 (van der Waals, 1977).

This skeleton is almost totally made up of postcranial remains. The only cranial fragment is a piece of the neurocranium tentatively identified as the occipital with part of the lambdoid suture. Associated notes indicate, however, that the attribution of this piece to the skeleton is not fully clear (see also van der Waals, 1977). A loose tooth was also found, identified as an upper premolar. This is clearly identified with the skeleton (ibid.).

Both the upper and lower limbs are reasonably complete, the trunk not as much so. The rib cage and the vertebrae are largely represented by small fragments. The only clearly identifiable pieces were the (?) right lateral body of the atlas, the body and dens of the axis and fragments of vertebral arches from both the cervical and thoracic regions. No lumbar vertebrae were obviously present.

The upper limb is moderately well represented. The shoulder girdle is very fragmented. A piece of the right scapula contains the glenoid cavity, the damaged acromion and the upper axillary margin. Other very small fragments and unidentifiable remains are attributed to the left scapula. The right humerus is almost complete save for the greater tubercle of the head and the articulatory portions of the distal epiphysis. The left humerus is represented by the lower half of the diaphysis to just proximal to the olecranon fossa, plus the loose trochlea in poor condition. Two fragments of the right ulna and two of the right radius are present. Both of the proximal epiphyses are intact. A small section of the shaft of the left ulna is all that remains of the other forearm. The right hand is represented by a metacarpal lacking the distal epiphysis, the proximal half of the proximal phalanx of the pollex and five further fragments of phalanges, none distal. The left hand is represented by all the carpals except the triquetrum and the pisiform, two metacarpals and phalangeal fragments, including the distal half of the proximal phalanx of the pollex. Three sesamoid bones were found from this hand.

The pelvis and lower limbs are quite complete. A large part of the right innominate includes most of the iliac blade with the greater sciatic notch, and the upper body of the ischium. A smaller piece of the left innominate includes a part of the iliac blade with the sacro-iliac articulation and the greater sciatic notch, and a small piece of the proximal ischium. There is also a poorly preserved fragment of the sacrum including parts of the first two segments. The right femur is almost complete though with damage to the trochanters and the distal portion of the shaft. The left femur is represented by three pieces, a major portion of the diaphysis from the lesser trochanter to the popliteal triangle, a proximal fragment with the damaged neck and the trochanters, and the major part of the distal epiphysis with considerable erosion to both of the epicondyles. The

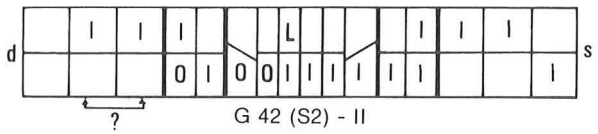


right tibia is represented by a damaged portion of the diaphysis and a fragment of the distal extremity including the medial malleolus, the left by the major portion of the shaft and the distal extremity, the latter quite eroded on the anterior surface, plus the damaged medial part of the proximal epiphysis. The right fibula is represented by a number of small fragments, the left by a large section of the diaphysis plus small fragments. There is an almost complete right patella. Other small fragments include pieces of the tibia or the fibula and a separate ischial tuberosity. The right foot is represented by a tentatively identified fragment of the right navicular, three fragments of proximal metatarsals probably representing toes two, three and four and two phalangeal fragments. The left foot is far more complete and has all of the tarsals, although the calcaneus is in fragments and the cuboid incomplete, all five metatarsals, all but number five complete, the (?) proximal part of the proximal phalanx of the hallux and ten further phalangeal fragments. A group of unidentifiable bones referred to as foot fragments may represent the badly broken up right foot.

G42 (S2)-II – This find was also made by van der Heide in 1964, the cranium being excavated and sent to Utrecht at that time. The remainder of the grave was excavated in 1971 with its base recorded at −5.36 m N.A.P. There were no associated grave goods (van der Waals, 1977).

The individual consists of the posterior of a calvarium including most of the base, fragments of the facial skeleton, the mandible and the moderately complete postcranial skeleton. The calvarial fragment includes the posterior half of both of the parietals, the almost complete occipital, and the almost complete petrous portions and base of the squamous portions of both of the temporals. Further parts of the left temporal squama and the greater wing of the sphenoid appear to be embedded in a section of attached matrix. A fragment of the maxilla consists of portions of the alveolar arch and the palate with intact PM^4 through M^2 on both sides. The right I^1 is loose. Identifiable cranial fragments include the superior medial corner of the left orbit, the frontal process of the left zygomatic, a portion of the body of the right zygomatic, and a fragment of the base of the right pterygoid plate. The mandible is complete except for the absence of both of the coronoid processes and the lateral half of the left condyle. Teeth present are right I_1, roots of I_2 and C, PM_3, root of PM_4, and loose M_1 or M_2, and left I_1 through PM_4, and M_3.

The shoulder girdle is represented by the major portion of the left clavicle with slight damage to the sternal end and lacking the acromial extremity, the central portion of the shaft of the left clavicle and the loose but damaged sternal extremity. Two small fragments are from the spine and/or the glenoid area of the scapula (side ?). The right humerus is represented by most of the distal half though the anterior of the trochlea is damaged and the capitulum is absent. A fragment of the neck and head is also present. The left humerus is represented by the major portion of the shaft with the attached medial part of the trochlea and the medial epicondyle. The right ulna is complete except for the distal extremity. The left ulna is represented by the proximal half. The left radius is largely complete but is in poor condition and is missing the anterior of the proximal

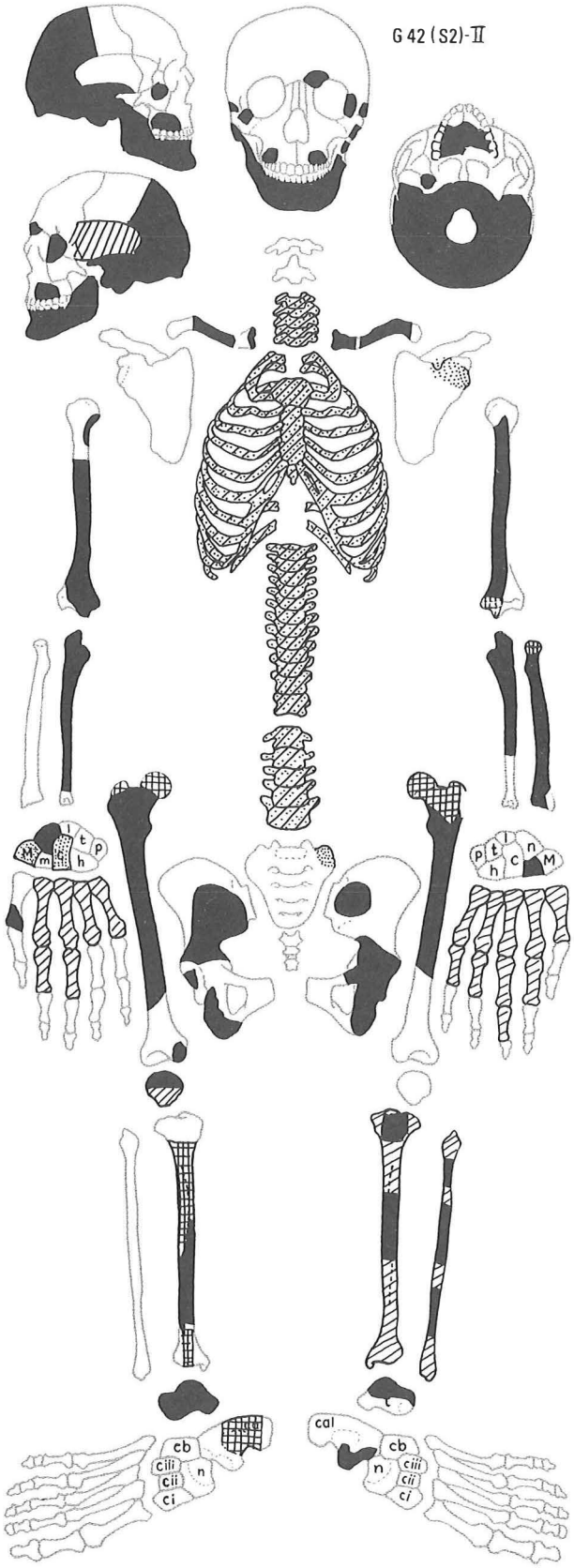


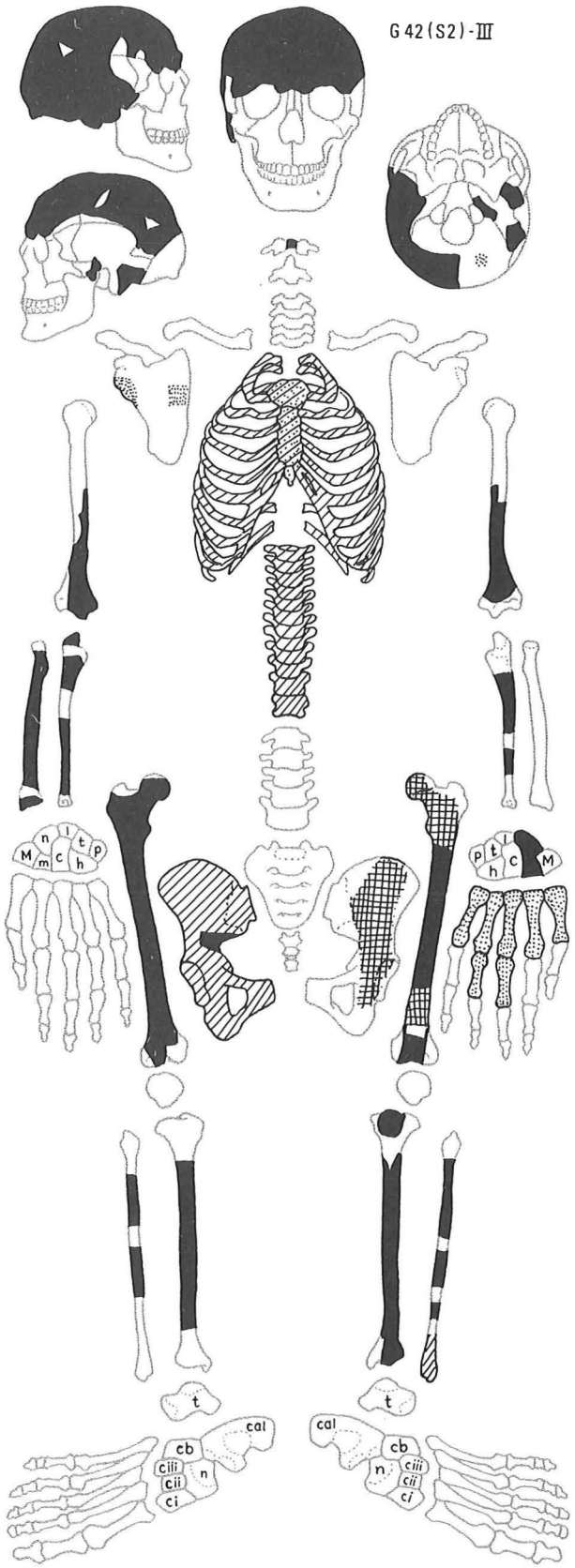
head and the lateral part of the distal head. The right hand is represented by the navicular, six metacarpal fragments including the distal extremity of I, and two phalangeal fragments, the left hand by the lesser multangular, five metacarpal and five phalangeal fragments. A capitate and a greater multangular may be from either side. The general region of the trunk is represented by seven vertebral fragments, the most complete a (?) thoracic arch, a number of small fragments including ribs, some still in the matrix, and a small fragment of the (?) left sacral ala.

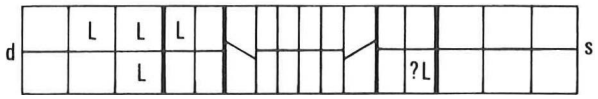
The pelvic girdle is represented by part of both of the innominates. The right fragments include a section of the iliac plate with the sacro-iliac articulation, the greater sciatic notch and the acetabular rim, two further acetabular fragments, and most of the ischial tuberosity. From the left are three fragments, a crushed piece with most of the acetabulum, the ischial tuberosity and the superior portion of the pubic ramus, a small ischial fragment, and a fragment of the ilium. Both of the femora are complete except for their distal extremities. There is damage to the right greater trochanter and to the anterior part of the head. The anterior part of the left proximal extremity and the upper shaft have been sheared off. There is also a small fragment of the right medial condyle. The right patella is represented by the upper half and two further fragments. There is a badly damaged shaft of the right tibia including the central part of the distal extremity. All that remains of the left tibia and fibula is a number of small fragments including, however, a damaged section of the proximal tibial epiphysis, a fragment of the tibial shaft and three fragments of fibular shaft. From the right foot comes a badly crushed fragment of the calcaneus and the fairly complete talus though with the medial surface destroyed; from the left foot a partial talus, a fragment of the calcaneus with the sustentaculum tali and portions of the neck and the trochlea. Additional postcranial fragments could not be identified (see fig. 11).

G42 (S2)-III – This third find made by van der Heide in 1964 also saw the cranium transferred to Utrecht at that time with the skeleton excavated in 1971. There were no grave goods and the maximum depth of the grave was −5.37 m N.A.P. (van der Waals, 1977).

The individual is represented by a heavily reconstructed calotte, cranial fragments, teeth and the partial postcranial skeleton. The calotte consists of the major portion of the frontal including the brow ridges, both of the parietals though heavily fragmented, the right half of the upper part of the occipital, most of the squama and part of the petrous of the right temporal, including the zygomatic root, the auditory meatus and the mastoid. Other cranial fragments include a small section of the posterior of the left temporal with the upper posterior part of the mastoid and the supramastoid area, a small portion of the left petrosal including the internal carotid foramen, a frag-







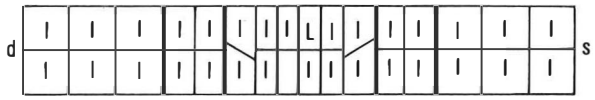
G 42 (S2) - III

ment of the (?) left (?) occipital, a fragment of the anterior of the left temporal condyle and the zygomatic root, a fragment of the right zygomatic process of the maxilla with the zygomatic suture and a small portion of the orbital floor, the complete right mandibular condyle, and a fragment of the left condyle. Six loose teeth were also present, identified as right upper PM^4, M^1 and M^2, lower right (?) M_1, (?) left lower PM_3 or PM_4 (probably the last), and an unidentifiable root, probably of a molar.

The upper limb and the pectoral girdle are partially present. Two fragments of the scapula are identified as the (?) right lower portion of the glenoid fossa and the adjacent axillary margin, and a fragment of the spine and the vertebral margin (side ?). The right humerus is represented by a portion of the distal shaft including the partial trochlea and the medial epicondyle, the left by a portion of the distal shaft including the olecranon fossa together with a further small fragment. There are three fragments of the right ulna, a distal part of the shaft, a fragment proximal to the former and running to just below the coronoid process, and the proximal part of the olecranon process, and two fragments of the shaft of the left ulna. The right radius is represented by the major part of the shaft and a fragment of the distal extremity. The left hand is represented by the navicular, the lesser multangular, metacarpals still in the matrix and two proximal phalanges. An additional phalanx cannot be identified to side. The vertebral column is represented by the anterior and the posterior arches of the atlas. A number of further fragments from the thorax include ribs, (?) sternum and vertebrae.

The pelvic girdle and the lower limbs are slightly more complete except for the feet which are absent. The right innominate consists of a number of fragments in poor condition, one piece with the greater sciatic notch and the adjacent region, the rest with no information. The left consists of a badly crushed piece including much of the iliac blade, part of the acetabulum and the upper part of the ischium. Both femora are largely complete, the left with a badly damaged proximal epiphysis, the anterior and posterior surfaces of the head, the trochanteric area and the distal epicondyles all badly eroded and with considerable damage to the anterior of the shaft just above the distal epiphysis; the right with the proximal part of the head and the greater trochanter damaged and only a fragment of the lateral condyle to represent the distal epiphysis. The right tibia consists of the major part of the shaft, the left tibia of the shaft and the damaged distal epiphysis, plus fragments of the proximal epiphysis and the shaft. The right fibula is represented by two fragments of the shaft, the left by small fragments.

G42 (S2)-IV – The final find made by van der Heide in 1964 was handled in the same manner as the latter two. There were no grave goods. The base of the grave was at −5.36 m N.A.P. Lateral drains were discovered on both sides of this skeleton



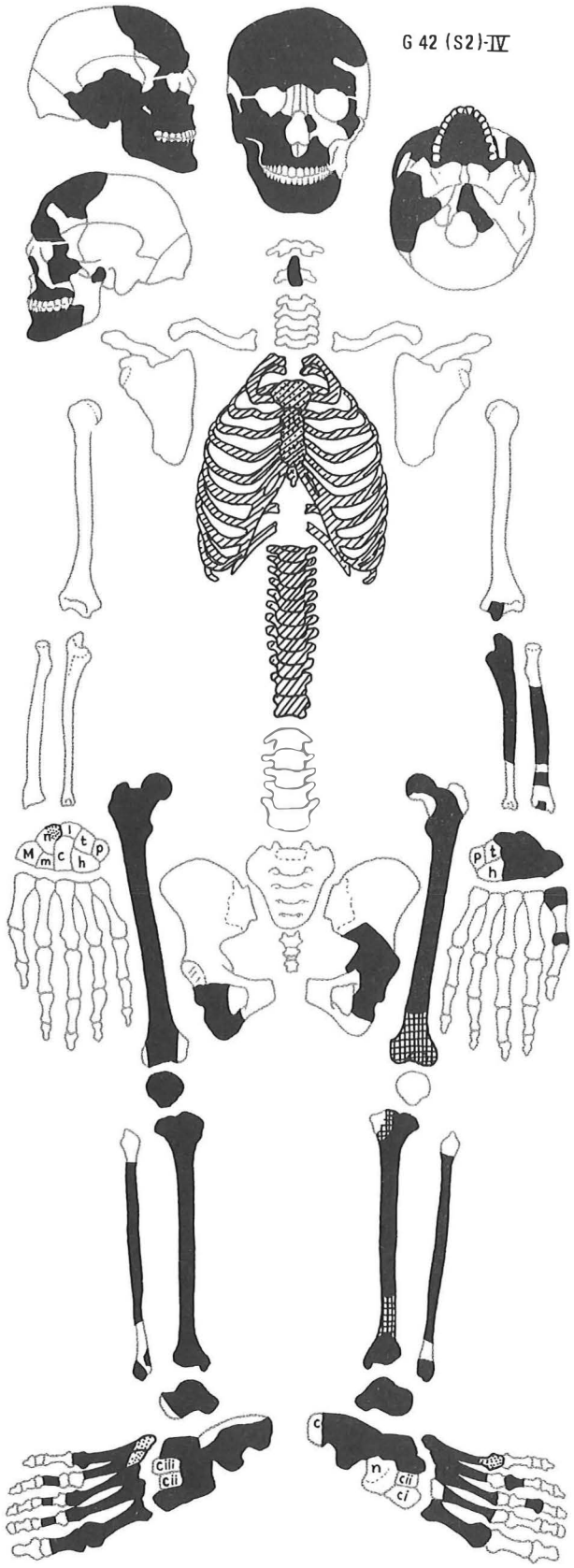
G 42 (S2) - IV

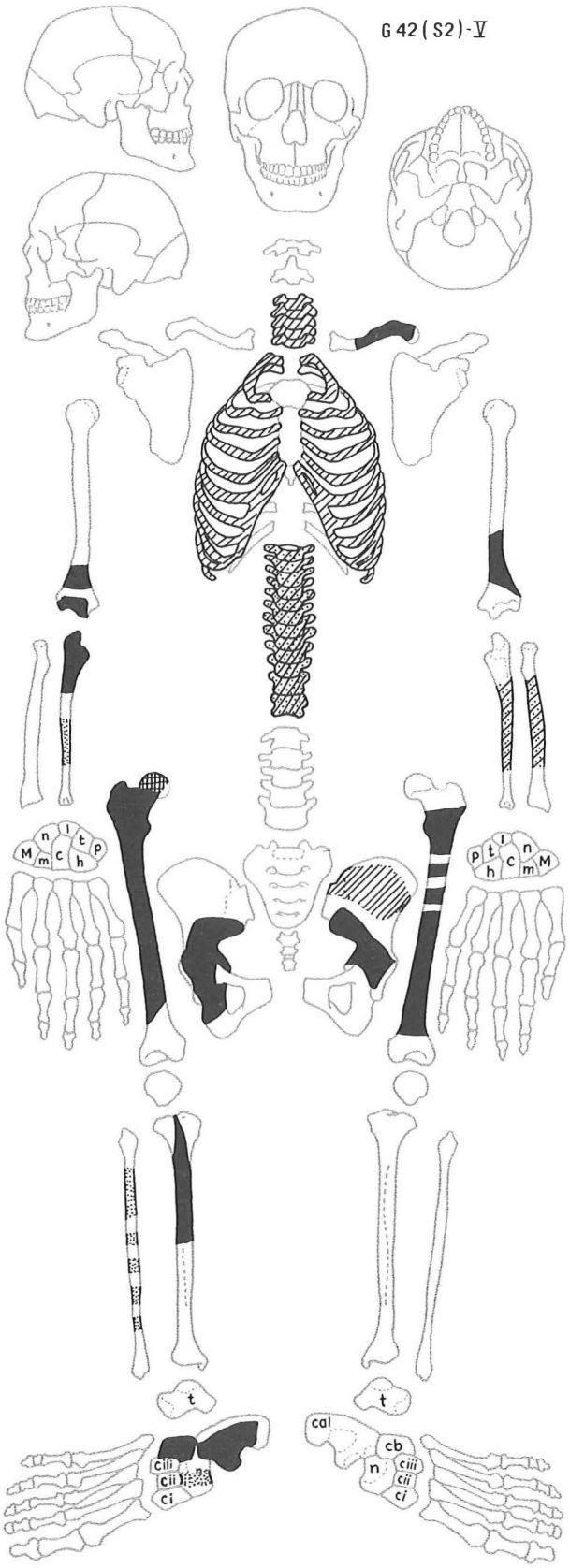
(van der Waals, 1977).

The skeleton is represented by the anterior facial and the basal elements of a cranium, the mandible and the partial postcranium. The cranial elements show variable states of damage and reconstruction is not possible. The frontal is largely complete save for damage to the left crown. A largely complete right temporal lacks only the uppermost parts of the squamous plate and the innermost parts of the petrosal. A laterally crushed facial fragment consists of the almost complete right maxilla, the right zygomatic, the alveolar and the palatal portions of the left maxilla and part of the palatine. It contains the complete dentition except for the left I1 which is present but loose. Further pieces appear to represent both the cranium and the mandible. Identifiable among these were a complete left zygomatic, the left two-thirds of the basisphenoid including the occipital condyle, and the complete left mandibular condyle. The mandible is complete on the right side except for damage to the tip of the coronoid process. The left body is present. The dentition is complete except for the right I1.

The upper limbs and the thorax are very incomplete. No remains of the shoulder girdle survive. The humeri are represented by a fragment of the left trochlea. Two fragments of the shaft and one of the distal epiphysis represent the left radius and a large portion of the shaft and the proximal epiphysis come from the left ulna. A large number of very fragmentary pieces from the thorax represent the ribs, the thoracic vertebrae and (?) the sternum. Some pieces remain in the matrix, including parts of right ribs 3, 4 and 6 to 8 and of left ribs 5, 6 and 8 to 11. The dens and body of the axis were the only identifiable portions from the cervical region. The left hand is represented by the lunate, the capitate, the navicular, the greater and the lesser multangular, and proximal and distal fragments of metacarpal I. A further fragment is tentatively identified as the right navicular.

The lower limbs are more complete. The right innominate is represented by the major portion of the ischium and two acetabular fragments, the left by a fragment extending from near the lower border of the sacro-iliac articulation to the acetabulum and the upper part of the ischium. Both femora are largely complete. The right has some damage to the posterior of the proximal head and the lesser trochanter; its distal extremity is squashed and missing both of the epicondyles. The left has damage to the head, and most of the posterior part of the proximal extremity is destroyed, moreover there is erosion of the anterior distal surface, the articulations and the epicondyles. The right patella is complete except for erosion on the distal inner surface. Both tibiae are largely complete. The right shows slight erosion of the anterior part of the proximal head, damage to the posterior-lateral region distal to the head, and some anterior damage above the distal extremity. The left shows anterior damage above the distal extremity and some erosion of the proximal extremity. The major portions of both



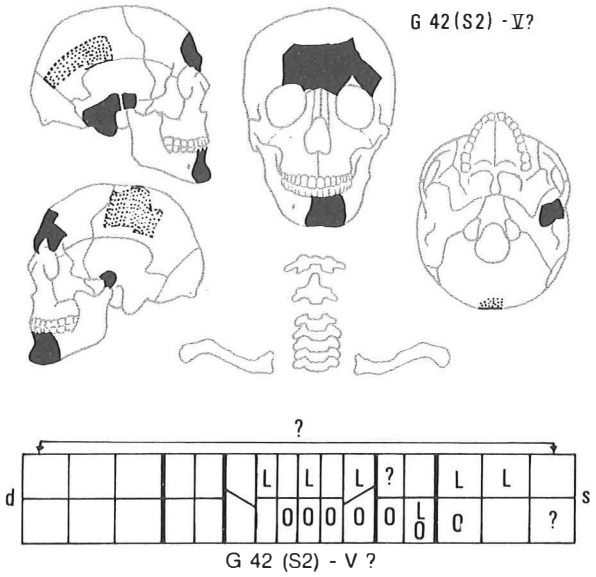


fibular shafts are present, together with fragments from the distal epiphyses of both, including the right tibial articulation and the left malleolus. Other very small fragments can be generally referred to the right limb. The right foot is represented by the largely complete but crushed calcaneus, the talus, complete except for damage to the head, the damaged navicular and cuboid, the cuneiform I, the complete metatarsals I to III, the shaft of IV and the shaft and the distal head of V, a loose metatarsal base (IV or V), the proximal phalanx I and three other phalangeal fragments. The left foot is represented by the calcaneus lacking the heel, the talus with damage to the medial surface, the cuboid, the cuneiform III, the complete metatarsal I, the shaft of II, the majority of III to V except for the distal heads, one loose distal head, the distal half of one phalanx and the proximal half of another (see fig. 9).

G42 (S2)-V – This burial was apparently uncovered during geological work in the winter of 1971-72. Sometime later a skull was clandestinely removed in the mistaken impression that it was a pot (see van der Waals, 1977). Cranial finds were later returned to Groningen. In 1975 the remainder of the skeleton was excavated with a maximum depth of −5.32 m N.A.P. It is not clear whether this burial was in the same grave pit as the succeeding find or buried into the top of it. Grave V was 0.50 m to the north of Grave VI. Obvious burial goods were recovered in the form of small amber beads in the region of the head and neck (ibid.). The fragments of the skull, together with teeth, that were returned to Groningen, are included at the end of the inventory of this grave. The preservation of the bone appears to be different from the rest of the skeleton (pers. observation, C. M.). This causes the identification of the bone to be somewhat in doubt and inclusion of the derived data to be considered as problematic.

The remains recovered in 1975 are represented by a single canine tooth, identified as upper right, and parts of the postcranial skeleton. The upper extremity and the thorax are incomplete. The left clavicle is represented by most of the shaft and the lateral epiphysis except for the tip. No scapular material was identified. The right humerus is represented by a small fragment of the shaft just proximal to the olecranon fossa, plus the posterior half of the distal epiphysis including the trochlea, part of the lateral epicondyle and the olecranon fossa. From the left is a piece of shaft, just proximal to the olecranon fossa. The right ulna is represented by a piece with the proximal epiphysis and half of the diaphysis, together with other fragments. A second piece of diaphysis may belong to either side. A number of other small fragments are simply identified as from the forearm. The thoracic region is represented by a large number of fragments from the ribs, the cervical and (?) the thoracic vertebrae.

The lower limbs are more complete. A fragment of right innominate includes the base of the ilium and the lower iliac plate, the upper ischium and part of the acetabulum. There are also other additional small fragments. The left is represented by a fragment of the lower part of the ilium and a part of the acetabulum, plus two fragments of the iliac plate and a number of small pieces. The right femur is represented by the major part of the shaft and the proximal head, though the head is



damaged and the neck distorted. The left femur is represented by a large piece of the shaft running proximal from the popliteal triangle, a smaller fragment of the proximal shaft, two further shaft fragments and some scraps. From the right tibia is a damaged proximal head and part of the shaft, from the (?) right fibula a number of shaft fragments. The right foot is represented by a fragmentary calcaneus, the cuboid and a (?) navicular fragment.

The following dental and cranial material was presented to the B.A.I., Groningen, as noted above. The dental material consists of two incisors, one canine, two premolars and four molars. These are identified as upper left I_1, upper right I_2, upper left canine, lower left PM_4, upper (?) left (?) PM_3, upper left M_1, upper left M_2, upper M_3 and lower left (?) M_3. After reconstruction ten cranial fragments were left. These are a fragment of a frontal from above the orbits and including a small portion of the orbital rim and roof and the nasal root, a fragment of the neurocranium identified as (?) left (?) parietal and a second identified as (?) right (?) parietal, a fragment of a left temporal condyle and a zygomatic root, a fragment of a right mastoid process, a fragment of a right zygomatic root of a temporal, a very small piece of an (?) occipital, two further fragments from the neurocranium and a portion of a mandible, including the anterior of both sides of the body and the chin plus the roots of right I_1 and left I_1 through M_1.

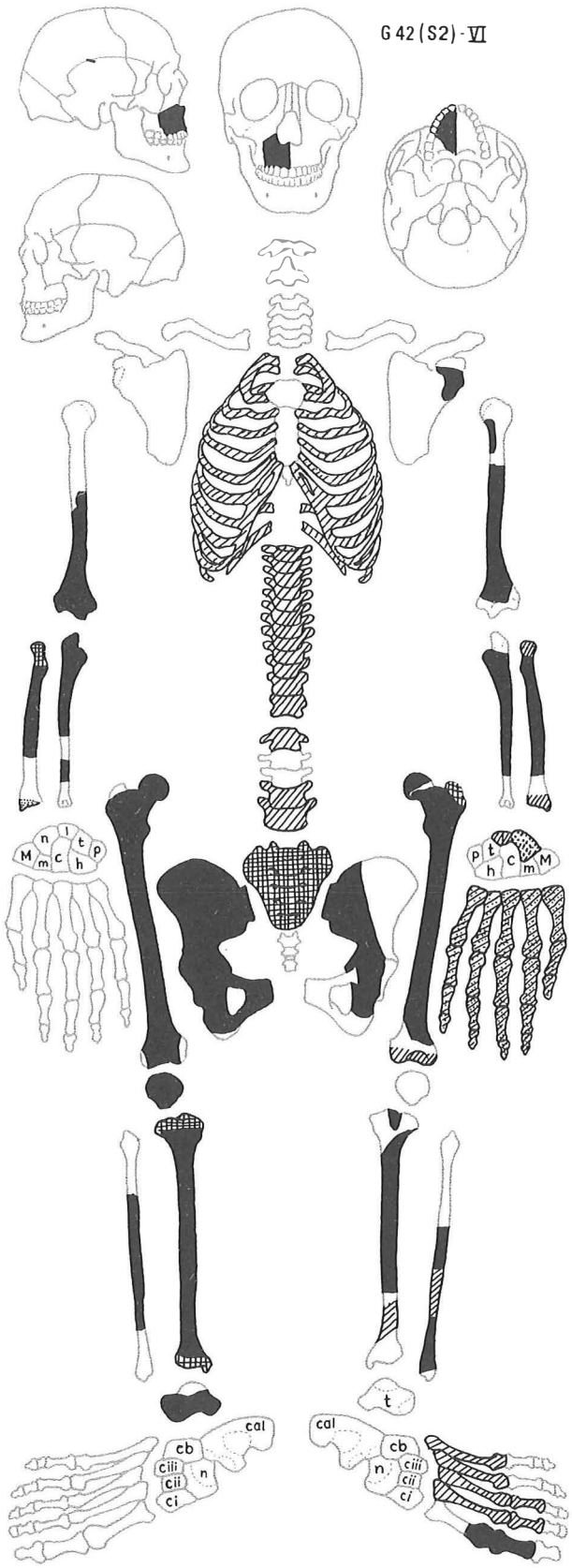
G42 (S2)-VI – In 1975 this skeleton was recovered from below the level of skeleton V with a maximum depth of −5.43 m N.A.P. Whether both skeletons were in the same pit is not known. There is some reason to assume that most of the cranial portion of this burial was destroyed in the period 1971-1973. No obvious grave goods were recovered but a lateral drain was discovered to the west of the burial (van der Waals, 1977).

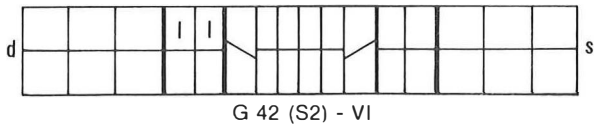
The skeleton is represented by a maxillary fragment and postcranial remains. The former consists of the right alveolar region and the palate. PM_3 and PM_4 are intact and the sockets are present for I_1 through C.

A fragment of the left scapula with the roots of the scapular spine and of the coracoid process and a small portion of the axillary border represents the shoulder girdle. The upper limbs are more complete. The right humerus is represented by the distal half of the shaft and the epiphysis, the left by most of the shaft running proximal from the middle to the olecranon fossa, a small fragment of shaft, probably from the posterior surface of the foregoing, and a fragment from just distal to the proximal head including a portion of the neck. From the right ulna is the proximal head and half of the shaft plus an additional fragment of the shaft, from the left a piece of the shaft running distal from the coronoid process. The right radius consists of a major portion of the shaft with the damaged proximal epiphysis plus other small fragments, the left radius of a shaft including the radial tuberosity plus loose fragments of both of the epiphyses. An additional fragment of a distal epiphysis may be either right or left. Fragments from the left hand include three pieces of carpal including the (?) navicular and the lunate plus fragments of the metacarpals and/or the phalanges. There are a number of rib fragments and fragments of vertebrae including a lumbar vertebral arch and five small thoracic pieces. Other very small fragments are identified as coming from the general rib/scapula/humerus area.

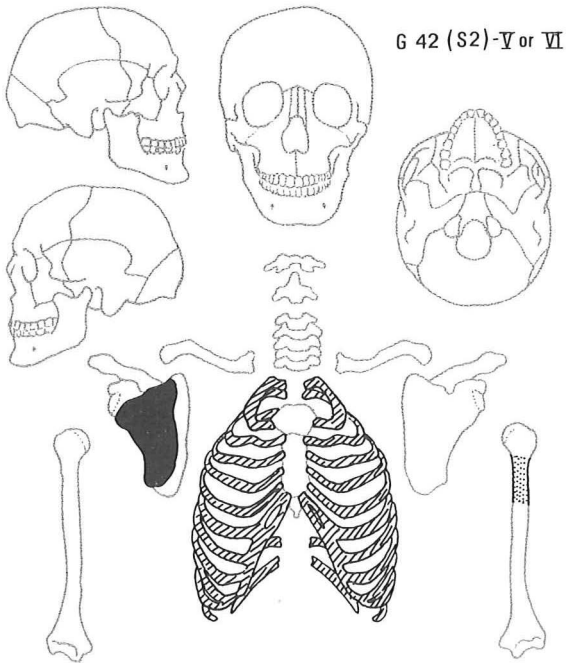
Of the pelvis and the lower limbs many remains are present. A large section with attached matrix includes the almost complete right innominate with damage to the ischial tuberosity and the pubic symphysis, attached by the sacrum to the medial half of the left ilium and the left ischium, and lacking the tuberosity. The sacrum is in poor condition. Fragments of the lower lumbar vertebrae also appear to be present. The left femoral head is attached. The right femur is almost complete except for damage to the trochanters and erosion of both of the epicondyles, the left complete except for the head, noted above, and the distal extremity. The trochanters are badly damaged. Other small fragments belong to the distal extremity. The right patella is complete except for damage to the internal medial surface. The right tibia is complete except for damage to the anterior surface of both of the extremities. The left is represented by a major portion of the shaft plus a fragment of the proximal epiphysis including the tuberculum and other very small fragments. The right fibula is represented by a major fragment of the shaft, the left by a fragment of the distal end with the epiphysis badly crushed, plus other small shaft fragments. The right foot is represented by the badly damaged partial surface of the talus, the left foot by metatarsal fragments including the distal I and four other pieces, the proximal half of proximal phalanx I and two other phalangeal fragments. Other very small pieces were not identifiable.

G42 (S2)-VI/VI – Additional pieces excavated with burials V and VI could not be clearly associated with either burial though all belong to one or the other. A large piece still in the matrix comprises most of the infraspinatous fossa of the right scapula plus the base of the spine and axillary margin running from the level of the glenoid fossa, plus attached underlying ribs. A fragment of the proximal humeral shaft cannot be iden-





tified to side. There is also a fragment of the shaft of a fibula, three rib fragments and further small fragments including bits of vertebrae and part of a phalanx.



G42 (S2)-VII – The northernmost part of this grave pit was uncovered during the excavations of 1975. The bottom of the pit was at a depth of −5.42 m N.A.P. (van der Waals, 1977). remains were left *in situ* at that time, and were excavated later (in September 1977) and transported directly to Utrecht. There were no clearly associated grave goods.

The burial was in generally poor condition. No cranial remains were recovered. The upper limb is represented by bones from the right side only. From the right humerus are two fragments, one a small piece of the distal shaft, the other consisting of most of the distal epiphysis and lowermost part of the shaft to just proximal to the olecranon fossa. Other small unidentifiable fragments were recovered from this region during the excavation. The right ulna is represented by a fragment of the shaft running from just distal to the coronoid process. Other unidentifiable fragments probably represent this bone. The right radius consists of two, probably adjacent, small fragments of the shaft and other unidentifiable fragments. From

the upper skeleton the only other remains are two very small fragments from the general region of the left rib cage.

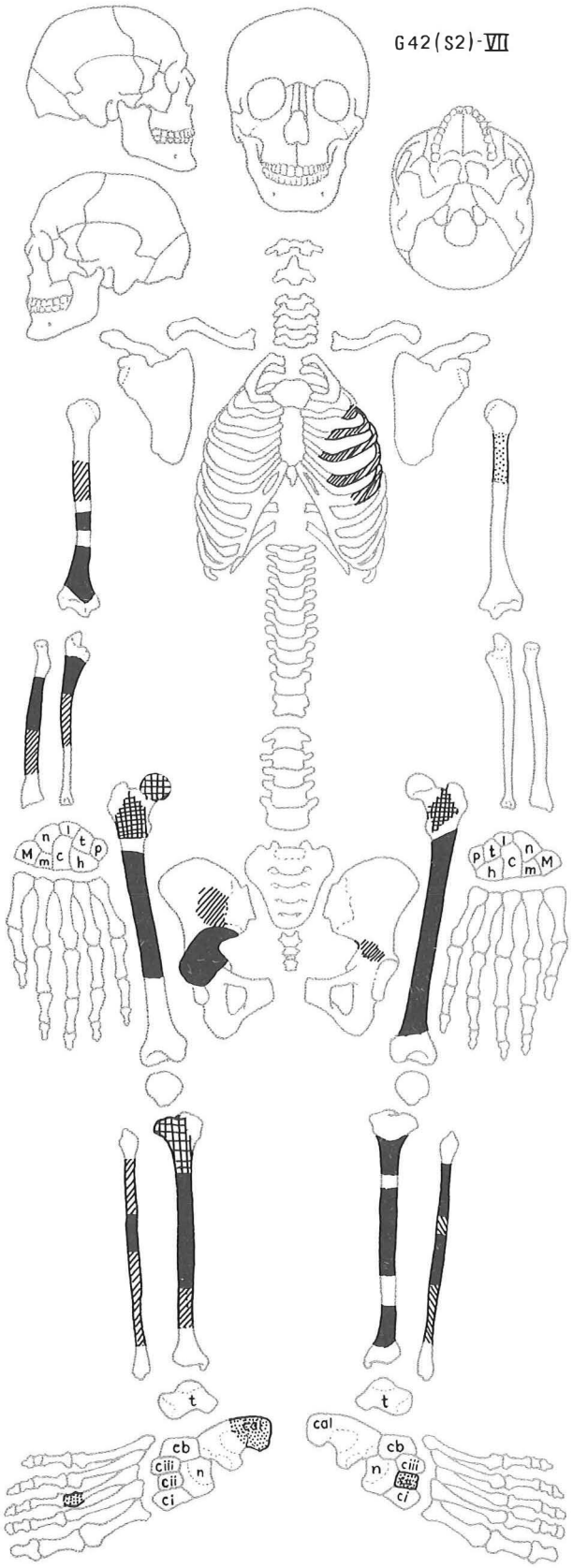
The remains of the pelvic area and the femora could not be fully separated. From the right side is a piece of the lowermost portion of the ilium including the base of the greater sciatic notch with the attached but fragmentary caput of the femur. An adjacent crushed fragment of the femur probably includes the major portion of the neck but is in very poor condition. The femoral shaft is represented by one large and two smaller pieces which could be glued together. Finally there are a number of small unidentifiable fragments from the general region of the right pelvis. The left side is more poorly represented. The pelvis is represented only by very small fragments. From the femur are a piece comprising the crushed region of the neck including the base of the lesser trochanter, and a largely complete shaft.

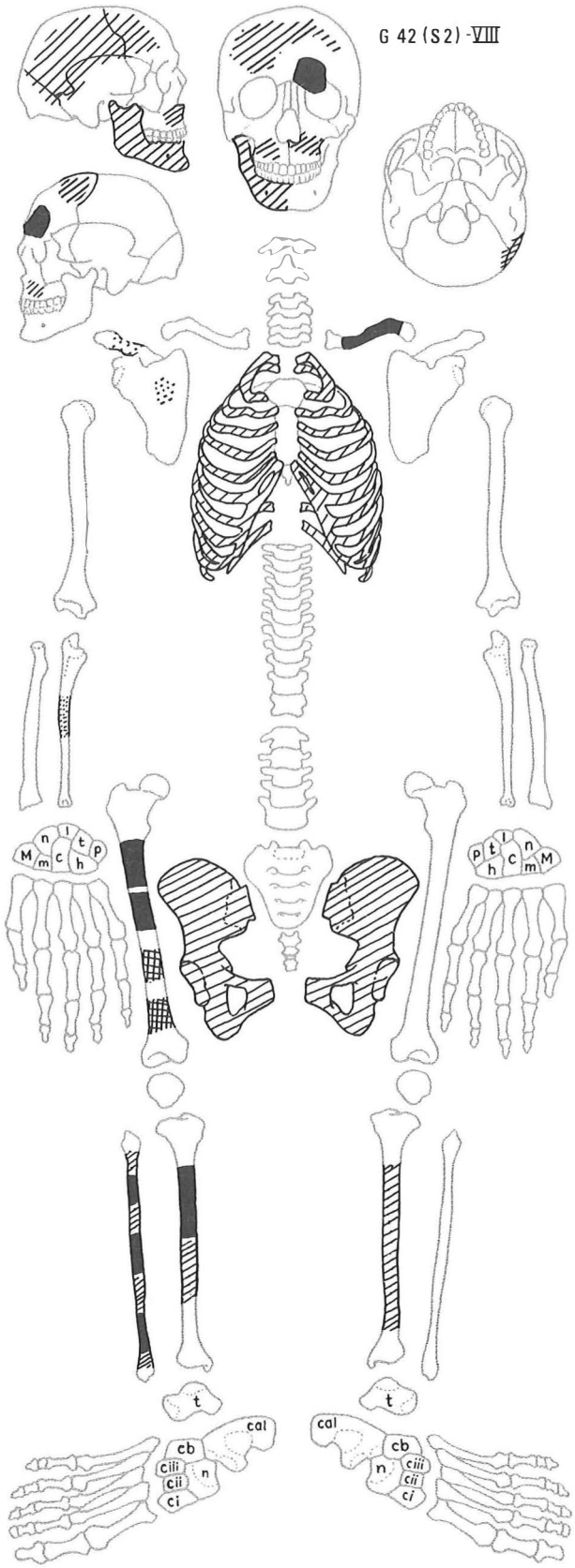
The remainder of the finds represents both tibiae, fibulae and the feet. From the right tibia comes the majority of the shaft, which fits to the damaged lateral part of the proximal epiphysis, plus two additional smaller fragments. The shaft is crushed in the proximal region. There are three moderate to large fragments of the left tibial shaft, the largest of which is from the central area. None of them are apparently directly adjacent to each other. The right fibula is represented by one moderate and five smaller fragments of the shaft, the left by two moderately sized fragments and a number of very small pieces. The feet are minimally represented. We were able to identify the posterior of the (?) right calcaneus in poor condition, the (?) left second cuneiform in slightly better condition, and the distal head or capitulum of a metatarsal (? side and number).

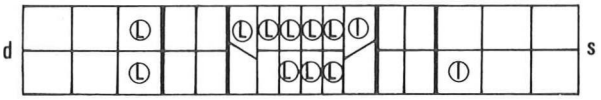
G42 (S2)-VIII – The northernmost part of this burial pit was also uncovered during the summer of 1975, the base of the pit being recorded at −5.39 m N.A.P. (van der Waals, 1977). Some bones were excavated at that time for identification purposes, the remainder being left *in situ*. In September 1977 the remainder of the material was excavated and transported to Utrecht, the majority of it *en bloc*. There were no associated grave goods with the find.

This burial was in very poor condition, except for the dental elements, though parts representing several portions of the body were identified. The cranial region is represented by small fragments. A number of small pieces appear to represent the right part of the vault. Also from the right side are a considerable part of the maxilla with attached dentition, and the body and ramus of the mandible, also with the dentition. Other unidentifiable fragments are from the general region of the right maxilla and mandible. From the left side comes a fragment of the maxillary body with exposed sinus, and fragments of the left frontal, the largest piece with the upper border of the orbit and evidence for a still patent metopic suture.

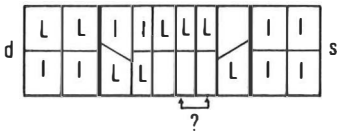
The dentition is represented by both erupted and unerupted deciduous and permanent teeth. From the right mandibular quadrant we recovered erupted i2, unerupted I1, erupted c, m1 and m2, and unerupted M1, from the left mandibular quadrant we recovered erupted i1 or i2, unerupted I1, erupting I2,







G 42 (S2) - VIII



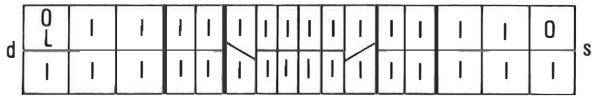
erupted c, m1 and m2 and unerupted M1. From the right maxillary quadrant come erupted i1 and i2, unerupted I1 and I2, erupted c, unerupted C, erupted m1 and m2 and unerupted M1, from the left maxillary quadrant come erupted i1 and i2, unerupted I1, I2 and C, erupted m1 and m2.

The shoulder girdle is represented by three pieces, all excavated at the time of the original discovery in 1975. These are the major part of the shaft of the left clavicle (see van der Waals, 1977: 14), a fragment of scapula including the base of the acromion and showing the absence of the acromial epiphysis, and a fragment of the scapula blade. Neither scapular fragment was identified to side. The only fragment from the upper limb is a tentatively identified fragment of the shaft of the ulna (? side). Fragments also come from the rib cage.

From the lower limb and pelvis come several fragments. Four fragments of which two are crushed come from the right femoral shaft. One moderately sized and three smaller crushed fragments come from the right tibia and a number of small fragments represent the left tibia. There are a number of small to moderate fragments from the right fibula. Finally there are fragments, probably from both sides of the pelvis, and other unidentifiable fragments from the general region of the pelvis, femora and feet.

Finally, three fragments of rib, apparently representing an individual older than a child were included in the remains apparently excavated in 1975. Their relationship to this fragmentary child's burial is enigmatic, there being no other evidence of association with an adult burial.

G42 (S2)-IX – This previously unreported burial was uncovered during the final cleaning of burial VII in September 1977. It was lying in parallel with the above but obviously deeper, at about – 5.60 m N.A.P., to the east and very slightly to the south. Its exact depth could not be determined, due to its removal *en bloc*. Burials VII and IX are marginally intersecting but it cannot be determined which of the two is younger. All evidence seems to preclude a double burial. Associated with the burial were 5 amber beads of small to moderate size and pierced. These were in a chain-like form across the forehead. In addition a pierced unpolished almost square ornament of gray pebble was located in the vicinity of the right ear. On the chest was a pierced boar's tusk, with an indication of a probable second perforation. This burial is the best preserved



G 42 (S2) - IX

of all the finds from G42 (S2) (fig. 8).

The cranium is represented primarily by two larger pieces. A now reconstructed partial calvarium is in good condition. It consists of the largely complete frontal, both of the parietals, the upper two-thirds of the occipital from just behind the foramen magnum but not including the point opisthion, and the posterior of the squamae, the mastoids and the tympanic portions of both of the temporals. The face is represented by a second major piece, consisting of the lower part of the maxillae, including up to the lower margin of the nasal opening, both complete alveolar processes and the complete palate, apparently including a small fragment of the (?) palatine. I1 through M2 are present on both sides, together with evidence for the roots of both M3's and a loose molar which is probably right M3.

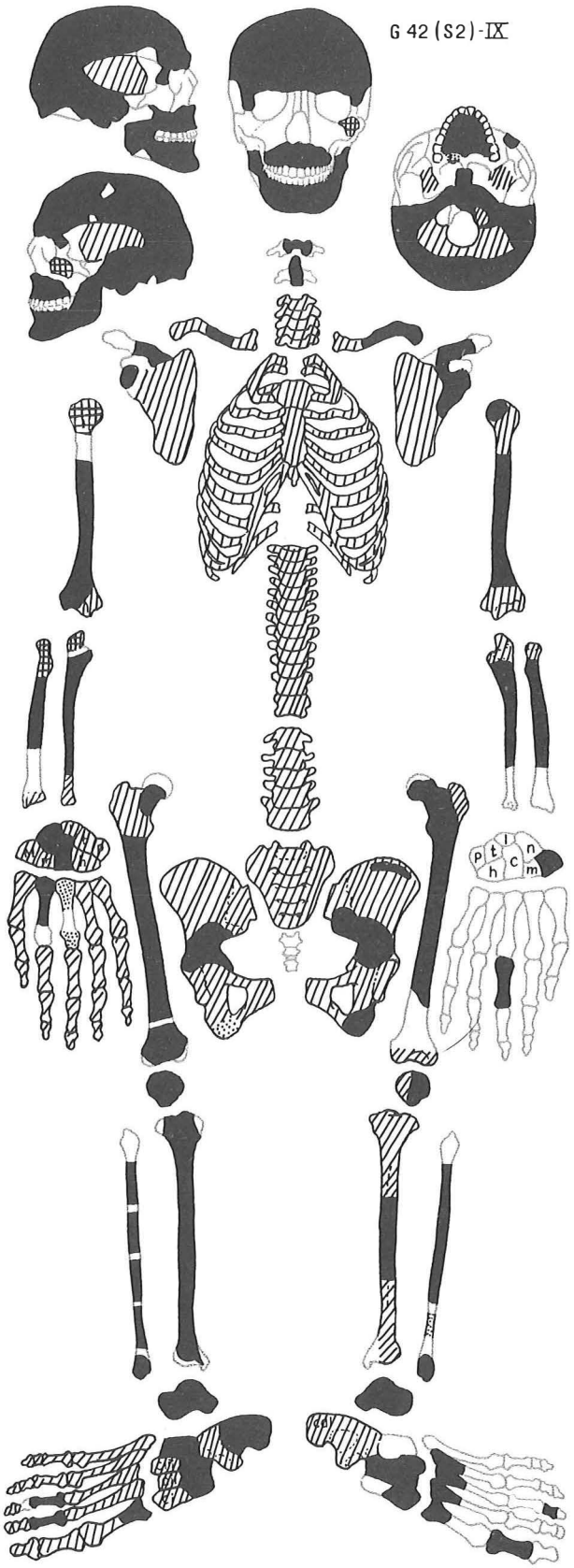
A number of smaller cranial fragments are present which cannot be attached to either of the above two pieces. These are, the major portion of the basioccipital and a portion of the right margin of the foramen magnum, though with the occipital condyle destroyed; fragments of the greater wing of the sphenoid; a portion of the basisphenoid with the sella turcica and the dorsum sellae intact; additional fragments from this region including both of the foramina ovalia; the fragmentary body of the left zygomatic; fragments representing both of the frontozygomatic sutures; further small fragments from the temporals and the occipital, including the complete left mandibular fossa.

The mandible was recovered with its full dentition intact. The body is largely complete though there is slight damage to the right side. The right ramus lacks both the condyle (which is present but loose) and the coronoid process. The left ramus is missing the coronoid process. In addition the base of the right ramus is absent.

The shoulder girdle is represented by portions of both of the clavicles and both of the scapulae. There are four small fragments of the right clavicle, and the lateral two-thirds of the left clavicle in good condition, including the lateral epiphysis plus additional small fragments. The right scapula is badly fragmented, but there are fragments including portions of the glenoid fossa and the scapular spine. The left scapula is represented by a fragment which includes the glenoid fossa, the upper part of the lateral border and the root of the acromion, together with further small fragments of the acromion and the body.

The vertebral column and the rib cage were in a poor state of preservation. A number of fragments from this general region could not be identified further. Identifiable were fragments of cervical vertebrae, including portions of both the atlas and axis, together with fragments of lumbar vertebrae and the sacrum.

Most parts of the upper limb were represented. The body of the right humerus is in good condition from the deltoid tuberosity to the distal head. It has the capitulum but lacks the



trochlea. In addition there is the damaged proximal head and distal fragments, including a portion of the medial epicondyle and the trochlea. The left humerus is represented by a large fragment of the body in good condition, extending from the deltoid tuberosity to just proximal to the distal extremity. The proximal head is also present, though loose and in poor condition, as are very small proximal and distal fragments. Both ulnae are represented by large fragments of shaft in fair condition, starting just distal to the proximal head. From the right side there is also a fragmentary head, consisting of the olecranon process. From the right radius is a moderately sized section of the central shaft, plus a damaged proximal extremity including the radial tuberosity, together with other proximal fragments. The left radius is represented by a major portion of the body, including the radial tuberosity. There are also small fragments that may represent either the ulna or the radius on both sides. The right hand is represented by a complete capitate and a navicular, the proximal head and shaft of metacarpal II, together with the proximal head and body of a further unidentified metacarpal and the distal head of a third. Additional small fragments represent the other carpals and metacarpals and the phalanges. The left hand is less complete, represented by only the complete multangular and a complete proximal phalanx.

The right innominate is less complete than the left. From the right comes a reconstructed fragment of the lower part of the ilium, including the base of the greater sciatic notch and the uppermost border of the acetabulum. Further fragments from this side are unidentifiable. From the left side come a number of pieces; a fragment of ilium with the base of the greater sciatic notch and part of the sacral facet; the fragmentary ischium with the ischial tuberosity; further small fragments of the ilium; the iliac crest; further portions of the acetabulum.

All portions of the lower limb are represented. The major part of the right femoral diaphysis is present in good condition. A separate piece contains both distal condyles, though both are damaged. There is also a fragment with the base of the head and the neck, and small fragments from both the proximal and distal regions. A single large remnant includes most of the left femoral shaft in good condition together with the damaged acetabular head and the neck. The greater trochanter was present as a small separate piece. The right patella is complete, the left being represented by most of its left half and additional fragments. The right tibia is largely complete though in two pieces. There is a complete shaft together with the damaged distal extremity. The proximal head is a separate damaged piece which fits to the shaft. The left tibia is in poorer condition. The shaft is represented by one moderate and several smaller pieces, there being other small pieces including fragments from probably both the tibial and femoral condyles. There are four shaft fragments, the distal extremity and further small pieces from the right fibula, a large piece of shaft in good condition, further small shaft fragments and the distal epiphysis from the left fibula. Both feet are partially present. From the left side comes the largely complete talus, fragments of the calcaneus, half of the navicular in fair condition, all three cuneiforms in good condition, the proximal halves of four metatarsals, including metatarsal I, the proximal phalanx of the hallux, and one medial phalanx. From the right side come the damaged but largely complete talus, the slightly damaged posterior half plus fragments of the calcaneus, the slightly damaged cuboid and navicular, the damaged base of metatarsal I, two complete proximal phalanges, together with further fragments of the metatarsals, phalanges and (probably) the cuneiforms.

G42 (S2)-V? – A small fragment found in April 1974 during cleaning of the 35 m line of the excavation is tentatively associated with skeleton V. The piece is from a humerus (? side).

G42 (S2)-61 – This loose find was made in (?) 1975. It is a largely complete permanent upper M1 or M2 (probably the latter) with three roots, some fracturing of the crown and erosion of the root tips.

G42 (S2)-1355 – This fragment was located in the occupation layers in 1975. It is the heavily worn crown and base of the root of a left lower permanent I2.

G42 (S2)-1483 – This find from the 1975 excavations consists of a heavily worn three rooted upper left M1.

G42 (S2)-1569 – This loose find was also made in the occupation levels in 1975. It is the major part of the central diaphysis of a left femur, quite gracile in form.

G42 (S2)-1887 – This isolated find consists of the heavily worn and eroded crown with a single surviving root of a lower molar, probably the left permanent M1. It was also found in 1975.

G42 (S2)-1949 – This heavily worn tooth with damaged crown from the excavations of 1975 is a right permanent upper I2.

G42 (S2)-1952 – This further find from the 1975 season is a left upper M3 with damaged roots.

G42 (S2)-1961 – Also from the 1975 excavations is this very worn, large left lower permanent canine.

G42 (S2)-2543 – This find from 1977 is a complete three rooted left upper permanent M2.

G42 (S2)-2587 – From the 1977 excavations comes this almost complete two rooted left lower permanent M3.

G42 (S2)-3527 – This isolated find from the excavations in 1977 is (possibly) a fragment of the tuber calcanei. This find is grouped with further material of an apparently non-human nature (including a problematic proximal phalanx which appears to be too straight for a human foot, too narrow for a hand – *G42 (S2)-3305*).

G42 (S2)-3665 – This isolated find from the excavations in 1977 is the incompletely formed unerupted crown of a left upper permanent M1.

G42 (S2)-3670 – This find from 1977 consists of two fragments of crown from a right lower deciduous m1.

G42 (S2)-900016 – This find from 1975 consists of a largely complete but worn left upper permanent (?) M1. The identification is based on the degree of distal wear.

G42 (S2)-901259 – This find from the excavations of 1978 is a worn probably lower permanent M3.

G42 (S2)-901260 – This find from 1978 is a broken fragment of the crown from a deciduous upper incisor or canine.

G42 (S2)-901261 – This find from the 1978 excavations is a considerably worn premolar, probably the upper right PM4. Apparently in association was a small vertebral fragment, probably cervical.

G42 (S2)-901262 – This 1978 find is a heavily worn and damaged, though largely complete, lower premolar.

G42 (S2)-901263 – This find from the excavation of 1978 is a heavily worn lower right permanent M1.

G42 (S2)-901264 – This find from 1978 is a heavily worn right lower permanent I1 with broken root.

G42 (S2)-900067 – This isolated tooth reported in tabular form by van der Waals (1977) could not be located. It is reported together with the finds numbered 1355, 1483, 1569, 1949, 1952, and 1961. The other pieces noted above as loose finds are reported here for the first time.

3.5. Inventory for lot G43 (S3)

3.5.1. *The site S3*

This designation applies to the main site S3 and its extension. The main site S3 has been extensively excavated by the B.A.I. over five full field seasons since 1972. In the late fall of 1977 an extension trench was dug into the deposits of a stream which separated it from the site S4 which had been dug in 1974 (see van der Waals & Waterbolk, 1976; van der Waals, 1977). Materials were found in both the main site and the extension, though all of them fall into the category of loose finds within the occupation levels or the discarded cultural debris. The manner in which the site was dug was designed to test whether a further grave-site was present. This appears to be precluded. Hearths as found here were conspicuously absent in S2. With one exception (see below) these finds are reported here for the first time.

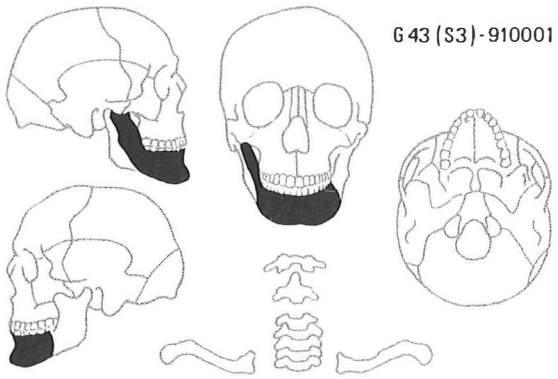
G43 (S3)-8951 – This number refers to remains excavated in 1973. They include a premolar tooth (no more closely identified though probably upper) and additional fragments of dental enamel.

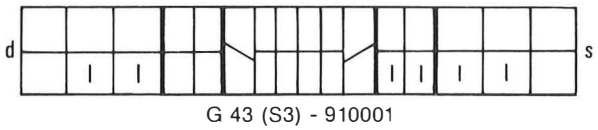
G43 (S3)-28905 – This find from the 1975 field season consists of two fragments making up a heavily worn left upper deciduous m2.

G43 (S3)-29065 – This 1975 find is a heavily worn molar crown with eroded roots. Its identification as human is in considerable doubt.

G43 (S3)-42438 – This find was made in 1976. It is the loose crown of a right upper deciduous m12.

G43 (S3)-907220 – This heavily worn crown and top of the root found in 1977 is from an upper deciduous right i1.





G 43 (S3) - 910001

G43 (S3)-910001 – This find was made during the digging of the extension trench into the creek bordering S3 in the fall of 1977. It is among the best preserved finds (together with the next find) from the Swifterbant complex. It consists of the almost intact mandibular body with the anterior root of the left ramus and the anterior half of the right ramus (though the coronoid process is missing). It contains the empty sockets for right I1 through PM4 and left I1 through C. The surviving teeth are right M1 and M2 and left PM3 through M2. Both M3's are congenitally absent. This can be visually demonstrated on the left side and has been confirmed on the right side by X-ray.

G43 (S3)-910114 – This find was made at the same time as number 910001 (immediately above). It has been briefly de-

scribed and figured by Clason & Brinkhuizen (1978). It consists of the largely intact diaphysis of a right tibia with both epiphyses missing and the extremities apparently gnawed. This find will be more specifically discussed below.

G43 (S3)-980000 – This find was made in 1974. It consists of a deciduous maxillary left i1, shed during natural loss. It is considerably worn.

G43 (S3)-980001 – This find, also from 1974, is a deciduous mandibular right m1, probably also shed during natural loss. It shows relatively slight wear

G43 (S3)-980002 – This further find made in 1974 contains two well-sized molar fragments and smaller enamel bits. Both are lightly worn, the enamel showing only wear facets. It is not clear whether one or more individuals are involved.

G43 (S3)-980003 – In 1974 also a left maxillary molar fragment was found, with light to moderate wear.

G43 (S3)-980004 – A (?) lower premolar, not further identified, was also found in 1974. It shows extreme wear.

G43 (S3)-980005 – This find from 1974 is an upper right deciduous i2, showing considerable wear.

G43 (S3)-980006 – The 1974 excavations also yielded a deciduous maxillary m2. The element was shed during natural tooth loss. It shows strong wear.

G43 (S3)-980007 – This last find from 1974 is a deciduous upper left i1, considerably worn and lost during shedding.

4. ASSESSMENT OF AGE AND SEX

4.1. Introduction

The Swifterbant materials have yielded surprisingly thin primary evidence for the assessment of age and sex. Not a single pubic symphysis has remained intact. The long bones are in such condition that no statement can be made about the structure of the spongiosum. In most cases neither endocranial nor exocranial suture closure can be accurately determined. Therefore such combined methods of determination as those recently proposed by Sjovold (1975) are not applicable and demographic statements are at best first approximations. Age has been primarily determined, where possible, on external suture closure and dental wear, the former having wide margins of error, the latter being dependent upon the local dietary adaptation. It should be noted, however, that the majority of the series consists of adults and that few individuals show characteristics usually associated with extreme age, such as excessive dental wear, dental loss and degenerative bone disease. The general age-sets used below are given with the following rough limits in mind: young adult (20-35 yrs.), middle-aged adult (35-55 yrs.), mature adult (55 + yrs.).

Assessment of sex has been based upon available cranial and postcranial morphology. Three categories of assurance are provided in the section below. Category 1 indicates that agreement of all observable characteristics occurred and that these characteristics were of a marked and obvious nature. Category 2 indicates that most characteristics are in agreement but that full assurance is not possible. Category 3 indicates that the assessment is based upon very limited data and is therefore subject to a considerable margin of error. Assessments of sex were made twice, the second time by both the authors.

The following section is organized in the same order as the inventory above.

4.2. Age and sex of the remains of lot H46

4.2.1. *The site S21*

H46 (S21)-III – Adult male (3). Tooth wear is light to moderate and suggests a young adult. The general robustness of the cranium and the size of the mastoids suggest a male though the greater sciatic notch is broad. A robust female cannot be fully discounted.

H46 (S21)-IV – Adult female (2). Tooth wear is moderate but cranial sutures cannot be assessed. A young to early middle-aged adult is suggested. Muscle markings, general robusticity and the thickness of the bones, together with the size of the mastoids, suggest a female.

H46 (S21)-X – Adult. The dental elements are permanent and the individual is therefore adult. No assessment of sex is possible.

H46 (S21)-XI – Adult female (1). Features of the cranial and postcranial skeleton are in agreement. The general robusticity, brow ridges, mastoids, parietal bossing and greater sciatic notch are all of the female form. Those sutures that are visible are open. Dental wear appears to indicate a later young to middle-aged adult.

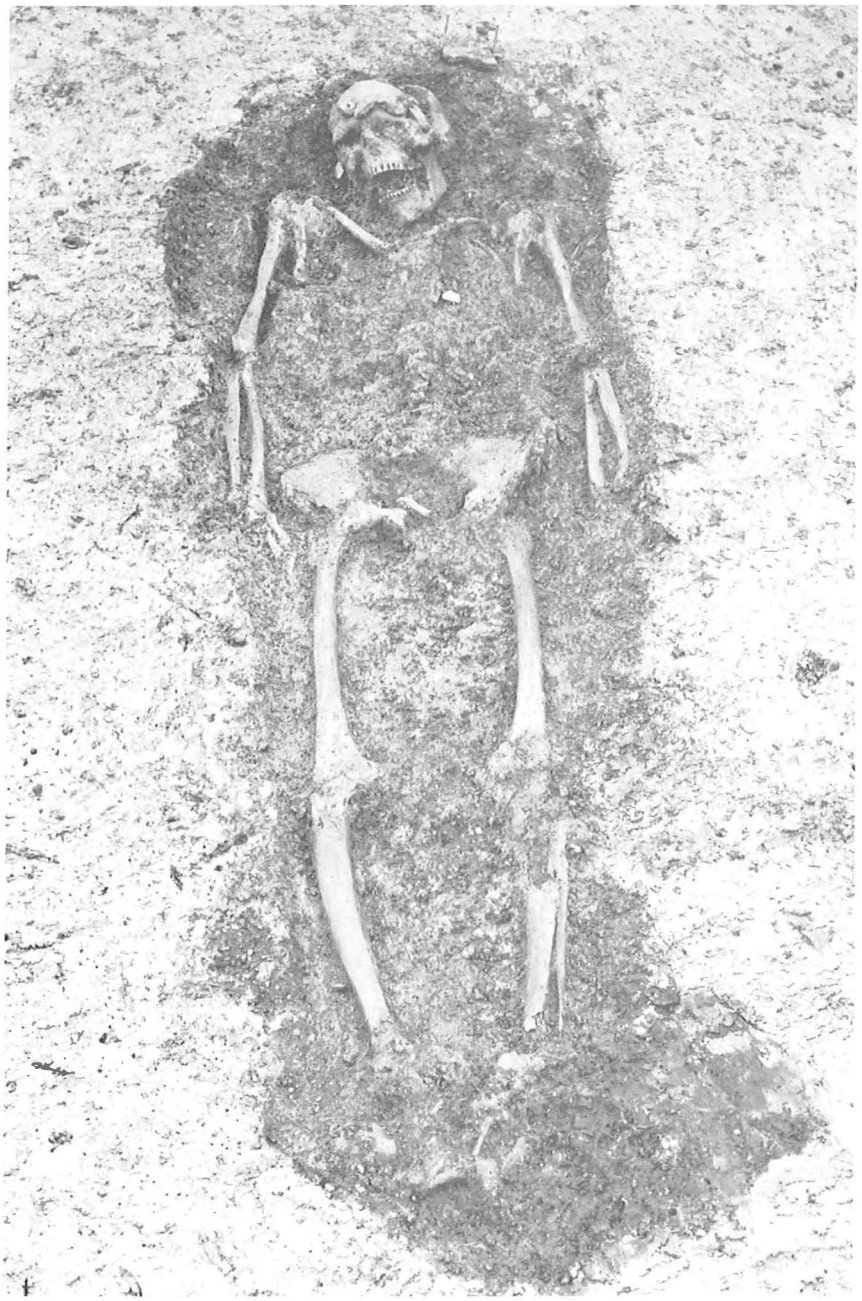


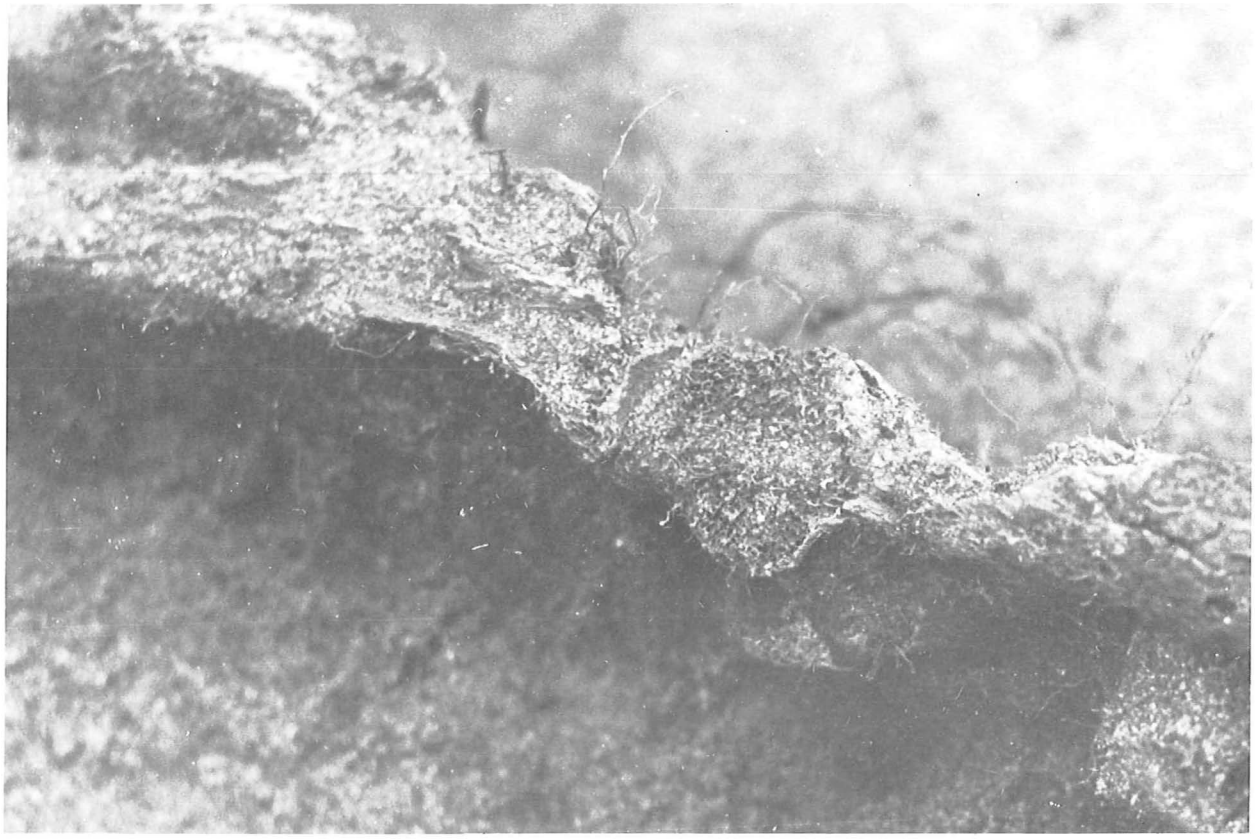
Fig. 8. Site S2, lot G42. Skeleton IX, the best preserved of the series, *in situ*. Photograph F. W. E. Colly, B.A.I., Groningen.

Fig. 9. Site S2, Lot G42. Skeleton IV in the course of preparation. Photograph G. Jansen, Instituut voor Antropobiologie, Utrecht.

Fig. 10. Site S22, lot H46. The skull of skeleton I in the course of preservation in the laboratory; note the jet pendant. Photograph G. Jansen, Instituut voor Antropobiologie, Utrecht.

Fig. 11. Site S2, lot G42. Right knee of skeleton II *in situ*, showing the rather poor state of preservation. Photograph G. Jansen, Instituut voor Antropobiologie, Utrecht.

Fig. 12. Site S22, lot H46. Right elbow of skeleton VI *in situ*, showing the very poor state of preservation. Photograph G. Jansen, Instituut voor Antropobiologie, Utrecht.



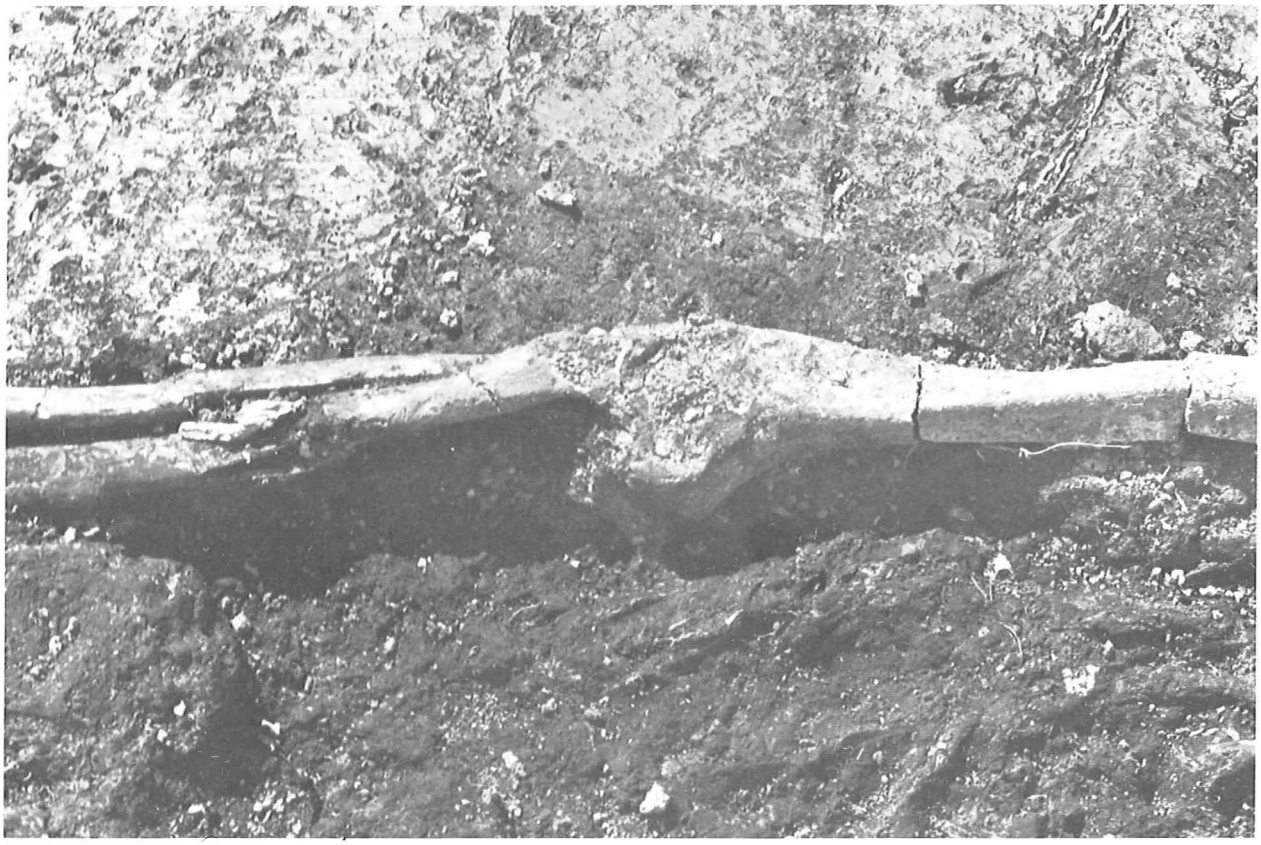


Fig. 13. Site S11, Lot H34. The skeleton *in situ*. Photograph W.R.K. Perizonius, Instituut voor Antropobiologie, Utrecht.

Fig. 14. Site S2, lot G42. The skeletons II (top-left), III (top-right), and IV (bottom) *in situ*, upon their exposure during the 1971 excavations. The heads had been recovered in 1964. Photograph G. Jansen, Instituut voor Antropobiologie, Utrecht.

H46 (S21)-188 – Adolescent or young adult. The relatively slight wear of the elements points to an adolescent or young adult. It is not possible to determine whether one or two individuals are involved.

H46 (S21)-485 – Adult. All of the teeth are permanent and the wear is consistent with other individuals identified as young adult. No assessment of sex is possible.

H46 (S21)-744 – Adult. All of the teeth are permanent and the wear is slight to moderate. A young adult seems clear. Size, robusticity, muscle markings and parietal bossing are all moderate. A gracile male or moderately robust female appear to be of equal probability.

H46 (S21)-798 – Adult male (3). The remains are extremely fragmentary. However, development is complete and the bones present are robust. A tentative diagnosis of male seems reasonable.

4.2.2. *The site S22*

H46 (S22)-I – Adult female (3). Though the skull is moderately robust, a comparison with others in the series suggests a diagnosis of female. Brow ridges, muscle markings and vault thickness are in agreement. An assessment of a reasonably gracile male cannot, however, be excluded. Tooth wear is moderately strong and suture closure is considerably advanced. A middle-aged to early mature adult is probable.

H46 (S22)-II – Adult female (3). The individual is very fragmentary but the general lack of robusticity and the size of the mastoids suggest a female. The tooth wear is moderate suggesting a later young to early middle-aged adult.

H46 (S22)-VI – Adult female (1). Features consistent with a female individual are the slight to moderate brow ridges, mastoids and muscle markings, sharp upper borders of the orbits, broad greater sciatic notch and generally gracile postcranial skeleton. The sutures appear to be open but dental wear is quite marked and a middle-aged individual is indicated.

H46 (S22)-VII – Adult female (2). Not all of the features are in agreement. The mastoids are large but no additional cranial markers are evident. The postcranial skeleton is, however, markedly gracile and a diagnosis of female therefore appears to be reasonable. Dental wear is slight and a young adult is suggested.

H46 (S22)-VIII – Adult male (2). The cranial remains present show a large mastoid and supramastoid crest, considerable bone thickness and a marked inion. A male seems apparent. Association of the dental and postcranial material is problematical, however. Some of the dental remains are heavily worn, others only moderately so. The postcranial remains show some of considerable robusticity, the duplicate pieces less so. The burial thus includes an adult male and parts of a more gracile individual, which presumably belong to VII. The one individual is at least middle-aged, the younger pieces being associated with VII.

H46 (S22)-IX – Adult male (3). The general robusticity and size of the mastoids suggest a male. No postcranial evidence can be assessed. The dental wear is moderate to marked but suture closure cannot be scored. A middle-aged adult appears to be present.

4.2.3. *The site S23*

H46 (S23)-XII – Adult or adolescent. The size of the remains from this burial suggests either an older adolescent or an adult.

4.2.4. *Site unknown*

H46(?) – unnumbered – a) *Adolescent.* Permanent teeth in the collection include erupting M3's. Most elements have light wear and an age of 14-17 is suggested.

H46(?) – unnumbered – b) *Child?* The possible deciduous molar may represent a second individual. However, milk elements can be retained in adults if PM4 is not present.

4.3. Age and sex of the remains of lot H34

4.3.1. *The site S11*

H34 (S11)-I – Adult male (2). The general robusticity of the individual suggests a male and can be seen in the cranial muscularity, brow ridges, mastoids and orbital margins. The greater sciatic notch is, however, broad. The diagnosis of male appears reasonable despite the latter point. Suture closure cannot be scored but moderate dental wear suggests a later young to middle-aged adult.

H34 (S11)-42 – If the teeth all belong to one individual, the elements present and the amount of wear are consistent with a young adult.

4.4. Age and sex of the remains of lot G42

4.4.1. *The site S2*

G42 (S2)-I – Adult female (1). Only the postcranial skeleton is present. The greater sciatic notch was very broad and a preauricular sulcus was present. The long bones were of moderate gracility and the breadth of the femoral head was hyperfeminine (see Acsádi and Nemeskéri, 1970:91). No assessment of age was possible.

G42 (S2)-II – Adult female (2). Suture closure of the vault suggests middle to mature age, a diagnosis supported by the dental wear. The cranium is moderately robust in terms of the

mastoids, occipital rugosity, bone thickness, etc. General postcranial robustness was noted but the femoral head is feminine, the greater sciatic notch broad and a preauricular sulcus present. A robust female is tentatively suggested.

G42 (S2)-III – Adult male (2). Moderate dental wear and open sutures indicate a young to late young adult. Moderately sized brow ridges, muscularity, mastoids and supramastoid crests are present, the forehead is sloped and the upper borders of the orbits are rounded. The postcranial structure, including the greater sciatic notch, can be interpreted as a male, though of only moderate robusticity. Separation of S2-II and S2-III is difficult and depends to a large degree upon which characteristics are weighted heavily.

G42 (S2)-IV – Adult male (1). The sutures are open and dental wear is moderate to marked suggesting later young to early middle age. The cranial material is the most robust of the series, as seen in the brow ridges, general muscularity, the mastoids and the supramastoid crests, and in bone thickness. The mandible and postcranial skeleton are robust, the breadth of the femoral head hypermasculine. There is an acute greater sciatic notch and no preauricular sulcus. The diagnosis seems assured.

G42 (S2)-V – Adult female (2). The postcranial skeleton is very gracile and the greater sciatic notch female. The thickness of the cranial material and moderate brow ridges are partly in disagreement but the former evidence is hyperfeminine for this series. The problem of associating the cranial and postcranial material was discussed earlier. Assessment of age is not possible.

G42 (S2)-VI – Adult male (2). Dental wear is slight suggesting a young adult. Postcranial robusticity is moderate and the greater sciatic notches are sharply angled, strongly suggesting a male though a lightly built one.

G42 (S2)-VII – Adult female (3). There is no basis for assigning an age to this postcranial skeleton other than undifferentiated adult. None of the remains are particularly robust suggesting a female, in agreement with indications of a broad greater sciatic notch.

G42 (S2)-VIII – Child. This fragmentary burial must essentially be aged on the basis of tooth eruption. The presence of elements and the condition of development of M1 suggest an age of ± 5 years.* The only other relevant information lies in the apparent presence of a metopic suture, usually fused by the age of $\pm$ 2 years. The latter evidence is weak given the condition of the remains, in considerable disagreement with the dental remains and may simply indicate a persistent suture.

G42 (S2)-IX – Adult male (2). The sex of this skeleton must be assigned on cranial evidence since no information could be obtained from the postcranial skeleton in this regard. The cranial evidence does suggest a male in general by being a large cranium, having moderate to large brow ridges, rounded upper borders to the orbits, moderate occipital rugosity, a marked central frontal eminence and a robust mandible. Slightly discordant are the small mastoids and noticeable parietal bossing. However, a male seems reasonably clear. Age is based on suture closure, still open, and moderate to marked dental attrition. A late young to early middle-aged individual is suggested. The associated grave goods are concordant with the diagnosis of male.

G42 (S2)-61 – Adult. Wear suggests a diagnosis of late young to middle-aged.

G42 (S2)-1355 – Adult. Wear is consistent with a diagnosis of middle-aged.

G42 (S2)-1483 – Adult. Heavy wear suggests a middle-aged to mature adult.

G42 (S2)-1569 – Adolescent or *Adult female* (3). The bone is apparently fully developed. Its gracility suggests a female though a diagnosis of adolescent of unknown sex is possible.

G42 (S2)-1887 – Adult. The heavy wear on this tooth suggests a mature adult.

G42 (S2)-1949 – Adult. This tooth shows damage, obscuring an assessment of wear, though tentative assignment would indicate at least middle age based on this characteristic.

G42 (S2)-1952 – Adult. Moderate wear on this tooth suggests a diagnosis of later young adult.

G42 (S2)-1961 – Adult. This heavily worn tooth is probably from a mature adult.

G42 (S2)-2543 – Adult. The moderate wear on this tooth suggests a diagnosis of young to later young adult.

G42 (S2)-2587 – Adult. Wear on this tooth is as in S2-1952 suggesting a later young adult.

G42 (S2)-3527 – No diagnosis of age or sex is possible.

G42 (S2)-3665 – Child. The state of development of this unerupted molar crown indicates an age of $\pm$ 4 years.

G42 (S2)-3670 – Child. This erupted and worn deciduous crown indicates an age of older than 3 but less than 12 years. The wear would suggest placement in the later part of this range (at time of normal loss?).

G42 (S2)-900016 – Adult. Wear on this element suggests an age of later young to middle aged.

G42 (S2)-901259 – Adult. Very heavy wear on this tooth suggests a mature adult.

* An x-ray revealed that the actual age was $3\frac{1}{2}$-4 years.

G42 (S2)-901260 – Child. This erupted deciduous tooth may indicate an age of from 1 to 10 years (less than ca. 8 if an incisor). Its wear cannot be assessed.

G42 (S2)-901261 – Adult. This heavily worn tooth would seem to indicate an age of middle-aged to mature.

G42 (S2)-901262 – Adult. This heavily worn tooth, as in the immediately preceeding case, gives a diagnosis of middle-aged to mature.

G42 (S2)-901263 – Adult. This very heavily worn tooth suggests a mature adult.

G42 (S2)-901264 – Adult. This heavily worn tooth suggests a middle-aged to mature adult.

4.5. Age and sex of the remains of lot G43

4.5.1. *The site S3*

G43 (S3)-8951 – Adult. This tooth provides no further diagnostic information.

G43 (S3)-28905 – Child. This heavily worn deciduous tooth would appear to represent a stage near its natural loss at ± 10-12 years.

G43 (S3)-42438 – Child. This moderately worn deciduous tooth suggests a slightly younger age than S3-28905 with a probable range of 5-10 years (maximum possible range: 2-12).

G43 (S3)-907220 – Child. The state of development of this deciduous tooth suggests an age of ± 6 years.

G43 (S3)–910001 – Adolescent female (2). Some wear on the M2 of this individual suggests an age of late adolescent. The congenital absence of M3 prevents a diagnosis of maximum age. The acuteness of the alveolar upper margins as well as their complete lack of any resorption phenomena suggest an age around 16. The extreme gracility of the specimen suggests a female.

G43 (S3)-910114 – Adult. This piece of fully developed bone cannot be more closely assessed.

G43 (S3)-980000 – Child. This deciduous element has been naturally lost by a child of ± 6 years old.

G43 (S3)-980001 – Child. The child who naturally lost this deciduous element was ± 9 years old.

G43 (S3)-980002 – Adolescent or young adult. These lightly worn molar fragments belonged to one or two adolescents or young adults.

G43 (S3)-980003 – Adult. The light to moderate wear on this element points to a young adult.

G43 (S3)-980004 – Adult. This extremely worn molar probably belonged to a mature adult.

G43 (S3)-980005 – Child. The considerable wear of this deciduous incisor points to a child of ± 6 years old.

G43 (S3)-980006 – Child. This strongly worn second molar has probably been naturally lost by a child of ± 10-11 years old.

G43 (S3)-980007 – Child. Another child of ± 6 years old will have naturally lost this deciduous incisor.

5. CONCLUSIONS

The purpose of the present paper has been to provide the detailed inventories and preliminary demographic data concerning the human skeletal material from the Swifterbant area sites excavated between 1962 and 1978. Detailed analysis of these finds and comparisons with other relevant materials will be presented at a future date. For this reason the remarks tendered below will be brief and should be considered as provisional.

A summary of the sex and age assessments for all sixty six units or finds is presented in Table I. It should again be stressed here that some of these attributions are based upon minimal data, not all of which are concordant within individual units. With these limitations in mind, a cumulative sex and age structure can be prepared as seen in Tables II and III.

These cumulative results can lead to some preliminary conclusions. There is some evidence from those sites which have yielded several burial units, of different average ages at death. There thus seems to be a gradient of decreasing age at death from S2 to S22 to S21. There are several possible explanations for this observation. It may simply be an error based on small sample size. This is suggested by Chi-Square results that were run on the age distributions within these three sites on individuals identified as Young Adult through Mature Adult. Separation between the three sites was not significant ($X^2 = 10.34$, d.f. = 8, P = 0.75-0.90). From these results it is suggested that the apparent difference in age at death noted in Table III is not significant but is an artifact of the relatively small sizes of the individual samples.

Notwithstanding this apparent conclusion, a glance at Table III does suggest another difference

which requires examination. The age of the isolated adult teeth generally seems to be higher than that of the "complete" individuals. Since the ages of the latter individuals have been assigned for the greater part on the basis of dental attrition it is interesting at this point to investigate the significance of this apparent phenomenon. A Chi-Square test run on the ages of the isolated teeth in S2 as compared to those of the burials on that same site turned out negative ($X^2 = 4.00$, d.f. = 4, p = 0.50-0.75). Further studies and a sizable sample would be required to determine whether, in fact, detectable differences in attrition patterns between loose teeth and those still located *in situ* in the individual maxillae and mandibulae do exist.

Following the preceeding conclusion we can then suggest that the average age at death among the adults of this or these population(s) is in the range of Older Young Adult to Middle-Aged Adult. In absolute terms, and assuming that we have correctly assessed the age groupings of the samples, this would be an age of 30 to 45 years. This figure can be compared with such figures as those provided by Weiss (1973) for average life expectancy at age 15, his E(15). In these terms the E(15) of our sample is 15 to 30 years, very similar to the range provided for pre-urban skeletal populations by Weiss ($\bar{X} = 19.3$, range = 12.3-28.7, n = 27). Within this light the figures presented for the Swifterbant sample seem to be within the expected limits, although the range in the Swifterbant material seems to be somewhat wider (see Table III). The poor preservation of the postcranial skeleton in the Swifterbant depositional environment unfortunately prevents a more precise age assessment of the adults and, therefore, closer comparison to preceeding Mesolithic populations and contemporary and succeeding Neolithic populations in this respect.

A further question of interest appears, especially in the case of the materials recovered from site S2, assuming, tentatively, a contemporaneity between the burials and the occupational level (see above, 2.2). As can be seen in the site plans for the various Swifterbant sites, the S2 skeletal remains give the appearance of a more obviously ordered grouping than is seen in any of the other sites (S21: fig. 3, S22: fig. 4, S2: fig. 5). Moreover, the burials on S2 appear to be tightly circumscribed. The area uncovered at either end of the apparent row of burials is at least three times as great as the distance between any two burials in the row. This became increasingly clear during the excavations on this site in 1977 and 1978. From this consideration it seems reasonable to ask whether the burials recovered represent the total number of adult deaths during the occupation of the site. Van der Waals (pers. comm.) has suggested, on artifactual and depositional grounds, that the total occupation of S2 was probably rather limited in time.

Brothwell (1973) has provided some estimations of mortality for the British Neolithic period. He suggests that survival into adulthood (over 20) would have been limited to between 40% (based on relatively complete Aegean data) and 70% (based upon the more limited British samples) of the population. On theoretical grounds the first of these two figures is more likely to be within the correct range (*ibid.*). As in the series of finds reported here, the British Neolithic series are marked by an under-representation of sub-adult individuals. With some indication of the percentage of the population within the adult range, it is then reasonable to look at mortality schedules. Crude death rates for samples comparable to this one are not easily obtained. However, examination of modern crude rates (see de Jong, 1972) suggests that an overall rate of 20/1000/annum is near the world-wide median. This, interestingly, is near the reported figures for relatively unacculturated Eskimo populations of the Alaska North Slope (W. Morgan, pers. comm.). If we use this figure and the previously suggested figures for adult survivorship we can estimate an *adult* crude death rate of between 8/1000/annum and 14/1000/annum. These very tentative estimates permit us to calculate annual adult mortality rates of from 0.16 to 0.28 persons/year for a group of size twenty, and 0.4 to 0.7 persons/year for a group of size fifty. These group sizes appear to be compatible with early Neolithic populations.

S2 has yielded eight adult burials. Using the mortality estimates calculated above it is possible to indicate that the minimum time required to explain this number of adults, and assuming no aberrant pattern of mortality, would be 11.4 years (70% of the population represented, Group Size = 50). The maximum time would be 50 years (40% of the

TABLE I Summary of sex and age assessment

	Male	Female	Unknown sex	Child	Adolescent	Adolescent or young adult	Young adult	Young to middle aged adult	Middle aged adult	Middle aged to mature adult	Mature adult
H46(S21)-III	X	–	–	–	–	–	X	–	–	–	–
H46(S21)-IV	–	X	–	–	–	–	–	X	–	–	–
H46(S21)-V	–	–	X_1	–	–	–	–	–	–	–	–
H46(S21)-X	–	–	X_1	–	–	–	–	–	–	–	–
H46(S21)-XI	–	X	–	–	–	–	–	X	–	–	–
H46(S21)-188	–	–	X	–	–	X	–	–	–	–	–
,,	–	–	X	–	–	X	–	–	–	–	–
H46(S21)-485	–	–	X	–	–	–	X	–	–	–	–
H46(S21)-744	–	–	X	–	–	–	X	–	–	–	–
H46(S21)-798	X_1	–	–	–	–	–	–	–	–	–	–
H46(S22)-I	–	X	–	–	–	–	–	–	–	X	–
H46(S22)-I/IX	–	–	X	–	–	–	–	–	X	–	–
H46(S22)-II	–	X	–	–	–	–	–	X	–	–	–
H46(S22)-VI	–	X	–	–	–	–	–	–	X	–	–
H46(S22)-VII	–	X	–	–	–	–	X	–	–	–	–
H46(S22)-VIII	X	–	–	–	–	–	–	–	X	–	–
H46(S22)-IX	X	–	–	–	–	–	–	–	X	–	–
H46(S23)-XII	–	–	X_1	–	–	–	–	–	–	–	–
H46(?) unn. a	–	–	X	–	X	–	–	–	–	–	–
H46(?) unn. b	–	–	X?	X?	–	–	–	–	–	–	–
H34(S11)-I	X	–	–	–	–	–	–	X	–	–	–
H34(S11)-42	–	–	X	–	–	–	X	–	–	–	–
G42(S2)-I	–	X_1	–	–	–	–	–	–	–	–	–
G42(S2)-II	–	X	–	–	–	–	–	–	–	X	–
G42(S2)-III	X	–	–	–	–	–	X	–	–	–	–
G42(S2)-IV	X	–	–	–	–	–	–	X	–	–	–
G42(S2)-V	–	X_1	–	–	–	–	–	–	–	–	–
G42(S2)-VI	X	–	–	–	–	–	X	–	–	–	–
G42(S2)-VII	–	X_1	–	–	–	–	–	–	–	–	–
G42(S2)-VIII	–	–	X	X	–	–	–	–	–	–	–
G42(S2)-IX	X	–	–	–	–	–	–	X	–	–	–
G42(S2)-61	–	–	X	–	–	–	–	X	–	–	–
G42(S2)-1355	–	–	X	–	–	–	–	–	X	–	–
G42(S2)-1483	–	–	X	–	–	–	–	–	–	X	–

	Male	Female	Unknown sex	Child	Adolescent	Adolescent or young adult	Young adult	Young to middle aged adult	Middle aged adult	Middle aged to mature adult	Mature adult
G42(S2)-1569	-	X_1	-	-	-	-	-	-	-	-	-
G42(S2)-1887	-	-	X	-	-	-	-	-	-	-	X
G42(S2)-1949	-	-	X	-	-	-	-	-	X	-	-
G42(S2)-1952	-	-	X	-	-	-	X	-	-	-	-
G42(S2)-1961	-	-	X	-	-	-	-	-	-	-	X
G42(S2)-2543	-	-	X	-	-	-	X	-	-	-	-
G42(S2)-2587	-	-	X	-	-	-	X	-	-	-	-
G42(S2)-3527	-	-	X_2	-	-	-	-	-	-	-	-
G42(S2)-3665	-	-	X	X	-	-	-	-	-	-	-
G42(S2)-3670	-	-	X	X	-	-	-	-	-	-	-
G42(S2)-900016	-	-	X	-	-	-	-	X	-	-	-
G42(S2)-901259	-	-	X	-	-	-	-	-	-	-	X
G42(S2)-901260	-	-	X	X	-	-	-	-	-	-	-
G42(S2)-901261	-	-	X	-	-	-	-	-	-	X	-
G42(S2)-901262	-	-	X	-	-	-	-	-	-	X	-
G42(S2)-901263	-	-	X	-	-	-	-	-	-	-	X
G42(S2)-901264	-	-	X	-	-	-	-	-	-	X	-
G43(S3)-8951	-	-	X_1	-	-	-	-	-	-	-	-
G43(S3)-28905	-	-	X	X	-	-	-	-	-	-	-
G43(S3)-42438	-	-	X	X	-	-	-	-	-	-	-
G43(S3)-907220	-	-	X	X	-	-	-	-	-	-	-
G43(S3)-910001	-	X	-	-	X	-	-	-	-	-	-
G43(S3)-910114	-	-	X_1	-	-	-	-	-	-	-	-
G43(S3)-980000	-	-	X	X	-	-	-	-	-	-	-
G43(S3)-980001	-	-	X	X	-	-	-	-	-	-	-
G43(S3)-980002	-	-	X	-	-	X	-	-	-	-	-
,,	-	-	X	-	-	X	-	-	-	-	-
G43(S3)-980003	-	-	X	-	-	-	X	-	-	-	-
G43(S3)-980004	-	-	X	-	-	-	-	-	-	-	X
G43(S3)-980005	-	-	X	X	-	-	-	-	-	-	-
G43(S3)-980006	-	-	X	X	-	-	-	-	-	-	-
G43(S3)-980007	-	-	X	X	-	-	-	-	-	-	-

1 - The age of these specimens is unclear other than as indeterminate adult.

2 - Neither the sex nor age of this specimen is clear.

TABLE II Sex Structure by Site

Site	Male	Female	Adult or adolescent of unknown sex	Individual of unknown age and sex	Child
H46(S21)	2	2	6	–	–
H46(S22)	2	4	1	–	–
H46(S23)	–	–	1	–	–
H46(?)	–	–	1	–	1
H34(S11)	1	–	1	–	–
G42(S2)	4	5	15	1	4
G43(S3)	–	1	6	–	8
Total	9	12	31	1	12 or 13

TABLE III Age Structure by Site
(the numbers in parentheses indicate those individuals that are only represented by an isolated tooth)

Site	Child	Adolescent	Adolescent or young adult	Young adult	Young to middle aged adult	Middle aged adult	Middle aged to mature adult	Mature adult	Indeterminate[1]	Total	Average Adult Age
H46(S21)	–	–	2 (2)	3	2	–	–	–	3	10	Older young adult
H46(S22)	–	–	–	1	1	4 (1)	1	–	–	7	Early middle aged adult
H46(S23)	–	–	–	–	–	–	–	–	1	1	–
H46(?)	1? (1)	1	–	–	–	–	–	–	–	1 or 2	–
H34(S11)	–	–	–	1	1	–	–	–	–	2	Older young adult
G42(S2)	4 (3)	–	–	5 (3)	4 (2)	2 (2)	5 (4)	4 (4)	5	29	Middle aged adult
G43(S3)	8 (8)	1	2 (2)	1 (1)	–	–	–	1 (1)	2 (1)	15	Middle aged adult
Total	12 or 13	2	4	11	8	6	6	5	11	65 or 66	

[1] All individuals in this category are adult, except one from S2, who may also be younger.

population represented, Group Size = 20). In presenting these figures with considerable trepidation, and on the still questionable assumption of year round occupation we can suggest that if all the adult deaths in the population occupying S2 are represented in our sample, the period of occupation of this site should not greatly exceed fifty years. So, at an initial glance the skeletal material provides some supportive evidence for this same conclusion reached on archaeological grounds.

Brothwell (op. cit.) has also suggested that the British Neolithic data support a heightened female mortality pattern in the 20-24 year age interval. This has been reasonably interpreted as the direct consequence of child bearing. Our data do not show this pattern. While the average age of the male individuals from all the sites was in the late young to early middle-aged region, the average female burial age was closer to middle-aged adult. In addition, only one of seven female burials compared to three of eight male burials which were identifiable as to age were in the young adult category. We cannot interpret this evidence further than simply indicating that we have no evidence of heightened mortality in females at the expected age of greatest fertility.

We can be far more emphatic when we indicate that none of the sites with burials appears to be attributable to an activity pattern that involves only males or only females. Where sex could be assigned with any degree of confidence in those sites with more than one burial, both sexes appear to be represented. Unfortunately the general conditions of preservation seem to preclude any meaningful interpretation of the presence or absence of children's remains. It is thus most unclear whether the obvious difference in evidence between the sites in H46/H34 and those in G42 noted in Table II is the result of differential preservation of remains related to soil conditions, or of absence of children in the groups inhabiting the former sites. As already indicated, Brothwell has suggested that British Neolithic sites have a deficit of children's burials. Even where preservation is ideal in relative terms, children's burials may be underrepresented as seen in burial sites from the preceeding late Mesolithic at Téviec and Hoëdic in Brittany (Péquart *et al.*, 1937; Vallois & de Félice, 1977) and at Vedbaek-Bogebakken in Sjaelland (Albrethsen & Brinch Petersen, 1976; Albrethsen *et al.*, 1976).

Comparison with these slightly earlier or even possibly contemporaneous sites (especially the latter) also reveals that the sites reported here have minimal evidence for extensive ritual in their grave offerings. As pointed out in the inventories, very few of the burials are associated with clearly identified grave goods. The most extensive associated goods were found with G42 (S2)-IX, a male. Other individuals with probable grave goods were H46 (S22)-I, a female, H46 (S22)-VIII, a male, and G42 (S2)-V, a female. From this no pattern of status differentiation based on sex can be assessed.

The matter of differential recovery of isolated bone fragments and teeth on the various sites raises a set of possible questions, most of which cannot yet be answered. The discovery of isolated teeth in particular is most obvious on sites S2 and S3. The absence of any such finds is most obvious at sites S11 and S22. The apparent total absence of isolated finds on S11 may possibly be accounted for by the earlier age of the site. This would give further credence to the belief that the two burial units recovered there were intrusive, after the primary occupation of the excavated site. The lowered amounts of isolated material on S21 and S22 compared to S2 and S3 may represent a preservation gradient existing between the river-dune and natural levee sites. This coincides with the differential preservation of children's remains and the observation made in the course of the present laboratory study that the remains from the S2 and S3 sites were generally better preserved and more complete.

The distributional pattern of isolated bones on the Swifterbant sites is most interesting, given the very broad distribution of loose skeletal fragments and teeth in sites from the preceeding Mesolithic period in western and central Europe (Meiklejohn *et al.*, in prep.; Newell *et al.*, 1979). Most of the isolated finds at Swifterbant are teeth, save for H46 (S21)-485, a fragment of mandible, H46 (S21)-798, calotte fragments, G42 (S2)-1569, a fragment of femur, G42 (S2)-3527, a possible fragment of calcaneus, G43 (S3)-910001, a mandible, and G43 (S3)-910114, a partial tibia. The composition of this sample of isolated remains is compatible with the distribution of isolated body parts previously noted for 18 Scandinavian Mesolithic sites with such finds. It is interesting to note the conspicuous ab-

sence in all of these sites of bones from the trunk and either the shoulder or pelvic girdle (Meiklejohn *et al.*, in prep.). No full interpretation of this distribution is obvious at this point save suggesting, as previously, that these remains do not simply appear to be the remains of disturbed burials.

From this line of thought we can proceed to the last area we would like to mention briefly. In a recently published preliminary report on the faunal remains from the Swifterbant site (Clason & Brinkhuizen, 1978), specific attention is paid to the presence of possible gnawing and cutting marks on the specimen G43 (S3)-910114. An indirect suggestion is made that cannibalism is involved. We presume that this is related to the fact that the find was isolated, separate from any burial, in addition to its condition. Since the analysis of possible patterns of human interference in the Swifterbant collection is still in progress, we do not feel able to give answer to this problem. However, we do feel that some comments are in order. It is especially important to note that evidence of human interference in the Swifterbant collection is not apparently confined to this specimen. It has also been tentatively identified on the mandible G43 (S3)-910001, and, as previously alluded to (van der Waals, 1977: p. 7), may be present both on loose skeletal material and on that from at least one of the graves on G42 (S2). There may well be further cases. Its presence both on loose bones and on bones from an obvious burial suggests that the interpretation may be considerably more common-place than cannibalism. Further work would be necessary to determine whether defleshing of skeletons is involved or simply the loosening of joints, etc. While not totally discounting cannibalism, we would say that the evidence points no more obviously in that direction than in several others. We should point out that the supportive evidence for an interpretation of cannibalism (viz. the Dyrholmen site in Denmark in particular) has been examined closely by one of us (T.S.C.-W.) who has found the evidence both for cannibalism and, indeed, for human interference not completely satisfactory.

6. ACKNOWLEDGEMENTS

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T.S.C.-W. was responsible for the preparation of the initial inventory made in 1976 and has since been involved in constant cooperation in the continued process of identification and analysis and in the discussion of the conclusions. C.M. was responsible for the preparation of the final inventories, initial identification of age and sex, and the initial preparation of the conclusion to this paper. C. M. and T.S.C.-W. take responsibility for the theoretical thrust and conclusions presented here.

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