PALEOBIOS 1983, Vol. I, N° 1 - 2, pp 69 - 90 / Lyon - France ISSN 0294-121 X

ANATOMICAL VARIATIONS AND PATHOLOGICAL CHANGES FROM URNFIELD AT SCHWISSEL, KREIS SEGEBERG, NORTH GERMANY. II. REPORT ABOUT CREMATIONS *

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RESUME

L'Auteur présente une étude des variations anatomiques et pathologiques rencontrées sur des vestiges humains incinérés, provenant du Champ d'Urnes (Age du Fer, période de La Tène) de Schwissel, Kreis Segeberg, Allemagne du Nord.

. Parmi les variations anatomiques, est particulièrement intéressant le **foramen supratrochléaire** rencontré chez 13 sujets (2 cas bilatéral, 2 unilatéral, pour les autres le doute subsiste étant donné l'absence chaque fois de l'os symétrique) répartis sur l'ensemble du cimetière. Les observations de M. Stloukal et de C. Wells, selon lesquelles cette anomalie anatomique se rencontre plus fréquemment chez la femme (environ dix fois plus) laissent supposer, avec vraisemblance, que le Champ d'Urnes de Schwissel était un cimetière féminin.

Les autres anomalies descriptives, en dehors de **l'os apicis** (8 cas) sont peu fréquentes. Au niveau du crâne **les wormiens** sont rares, de même que les **granulations de Pacchioni** (de petite taille quand elles existent). La **suture métopique** ne dépasse pas 1 %.

Pour les dents, les **perles d'émail** ont été rencontrées 2 fois, le **tubercule de Carabelli**, 1 fois.

En ce qui concerne le reste du squelette, l'Auteur note 2 cas de **patella bipartita**, 2 cas également, **d'ankylose congénitale des 2e et 3e phalanges du 5e orteil.**

. Les modifications pathologiques sont variées mais présentent en général une fréquence assez faible et n'atteignent jamais un état de gravité. Pour le crâne, on peut retenir 2 cas **d'amincissement du pariétal**, 10 cas de **cribra orbitalia** concernant des sujets jeunes ou féminins et un cas de **sinusite maxillaire.**

La denture montre une pathologie des plus classiques: **chute dentaire ante mortem**, avec **résorption alvéolaire** consécutive (surtout au maxillaire supérieur), **parodontose, abcès**, quelques cas **d'hypoplasie de l'émail.** Les **caries** sont rares car les couronnes éclatent à la chaleur du feu crématoire.

Le rachis présente quelques cas (rares) de **nodules de Schmorl**, de **spondylosis deformans** (2 cas), **d'anévrisme artériel** (6 cas possibles au niveau cervical).

La **pathologie arthrosique** est fréquente pour les os longs, sous forme de **hernie ou de protrusion** des cartilages articulaires. Par ailleurs les diaphyses montrent fréquemment des **lignes de Harris**, dont l'aspect en barreau évoque un "stress métabolique" lié à la famine hivernale. L'Auteur note un cas vraisemblable **d'ostéomyélite** du fémur. **Aucune fracture** n'a été rencontrée.

. 8 tombes renfermant des vestiges féminins adultes associés à des restes fœtaux ou de nouveau-nés à terme, laissent supposer qu'il s'agit d'incinération de jeunes femmes mortes en couche.

1 – INTRODUCTION.

This article appears additionally to our presentation held at the International Centennial Anthropological Congress at Budapest, 2 - 4 June 1981, dealing with the problem whether at urnfield Schwissel males or females or both sexes had been buried (I. Kuhl, 1981)

Our thanks and appreciations are extended to Prof. Dr. W. Remagen, Basel, for diagnosis of diseased long bone of cremation 767, to Dr. med R. Kamradek and Dr. med. Hoffmann for help in diagnosing and to assistance Mrs. W. Gosch for x-raying bones from Schwissel.

To Dr. med. R. Repkewitz and his assistance Mrs S. Hamann we are very thankful for special x-raying the spongy fragments of burial 300, 515 and 686.

For diagnosing changes in teeth thankful to dentist Dr. H. J. Harms.

For the again excellent photos and positives of radiographs, we are thankful to photographer Mr F.J. Schnitzler and his assistances Miss H. Mauderer and Miss Cl. Friese.

To Mrs M. Boecker we are very much thankful for

* In Memory of Johanes Schulte (9.8.1906 - 25.6.1981)

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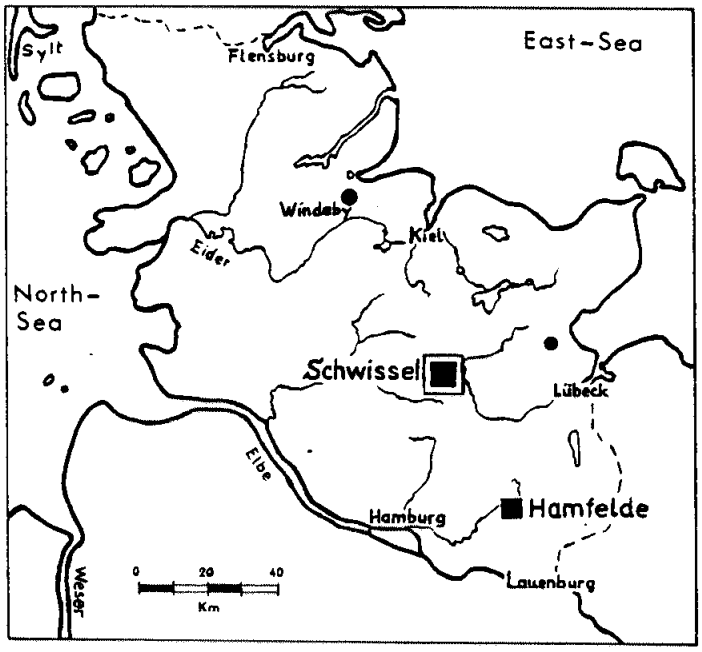
translation of our article into English and to Mrs Wuttke and to Dr. R. Perrot for translating the French summary.

In North Germany it was (with exception of landscape Dithmarschen, north of Elbe estuary) the custom for about eight hundred years between Late Bronce Age and Migration Period to bury males and females at separate cemeteries. As grave goods are usually parts of clothes, i.e. buckles, broches and needles, they are of no use in sexing. Only some ornaments may indicate a female.



PLAN I – Situation of Schwissel, Timmendorfer Strand (small point), Windeby and urnfield for males : Hamfelde

The urnfield at Schwissel (Plan I) is the largest known burial place of that kind in North Germany of Early Iron Age (La Tène Period). It has been used in the 5th century B.C. and for about four hundred years continuously, and then again in Roman Period, the 2nd century A.D. (1).

These facts about urnfield "Schwissel" inspired us to undertake anthropological research. So far we viewed about 50 % of the best preserved cremations of adults children and juveniles from all areas of the burial place.

This material permits for the time being a reliable diagram on distribution of different anatomical variations (epigenetic traits), pathological changes and their degree of severity seen.

In order to facilitate localisation of single graves within the cemetery plan we give the number of the plan section in paranthesis following the numbers of graves.

In **Part I** reporting on anatomical variations, in **Part II** on pathological changes, in **Part III** on miscellaneous cases and mysterious changes.

Some anatomical variations and pathological changes we found might be significant to this population.

2 – ANATOMICAL VARIATIONS.

2.1. Skull.

Os apicis : Develops genetically by additional ossification centres on top of the occipital bone. It is present in only a few cremations : 767 (K13), 1206 (J14), 1636 (H5), 1855 (D5) (Fig. 1).

Cremation 1636 (A) : doubtless female, early-middle matur. Here additionally another epigenetic trait is present : ankylosis of second and third of (?) fifth toe phalanges (Fig. 2/A).

Cremation 767 (B) : doubtless female, early matur. Here the apical bone is not preserved, but the shape of the upper part of the occipitale bone with an almost rightangular bend of the lambdoidal suture testifies that an apical bone was present. (Here additionally osteomyelitis is present) (Fig. 3).

Two further cases with fragmented apical - or occipital bone are found in cremations 1206 (J14) and 1855 (D9).

Wormian bones (Sutural bones) : They are relatively rare in cremations of Schwissel, sometimes one ossicle is preserved, in only few cases there are up to five of normal form and sizes (not pictured). In cremation 266 (K15) two sutural bones of extraordinary fir-tree form are present, location in the skull sutures it impossible by lack of adjacent fragments. Additionally 3 ossicles of normal sizes are preserved (Fig. 9, A, B).

Frontal suture : In contrast to general observations also the metopic suture is obviously rare in the population of Schwissel : in almost 400 cremations we found well preserved fragments of the frontal bone with crista frontalis, in only cases (1 %) frontal suture persisted : cremation 437 (K 15/16), 982 (H13) 1002 (G13) and 1747 (I10). (Not pictured). In cremation 1002 (G13) additionally Foramen supratrochleare is present.

Arachnoidale granulations : Generally pacchionic holes seldomly developed in skulls from Schwissel and are of small sizes. In two cases however we found perforations of the inner layer of the skull together with extended resorption of the spongy tissue :

Cremation 1703 (E7), middle to late adult female (not pictured)

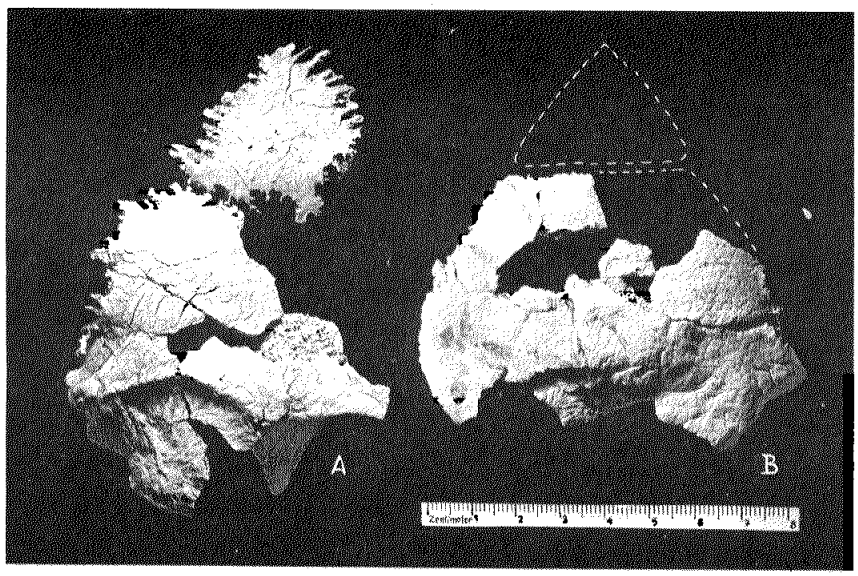


FIGURE 1 – Occipitale bones

in A with os apicis attached (1636), in B the angular shape indicating position of not preserved os apicis (767).

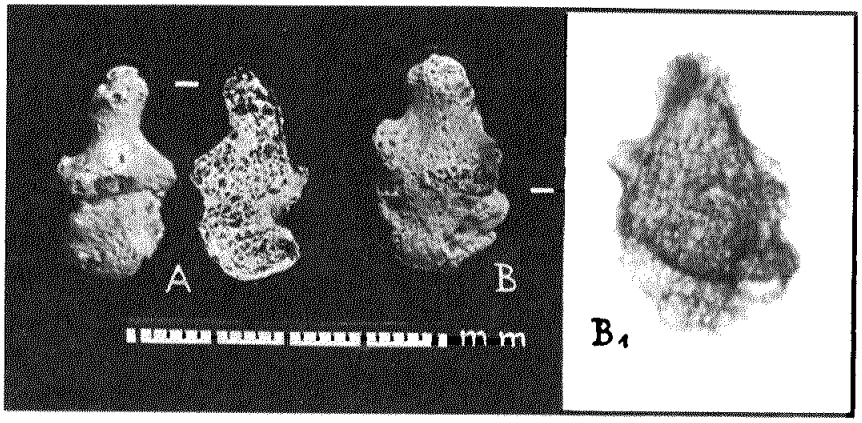


FIGURE 2 – Ankylosis of toe phalanges (of ? fifth toes) :

A) Cremation 1636 showing also plantar view with destroyed bony surface, leaving the spongy tissue showing up no partition in second and third phalangeal segments
B) In specimen 1701 plantar surface is preserved, here the radiograph (B1) is showing the same state

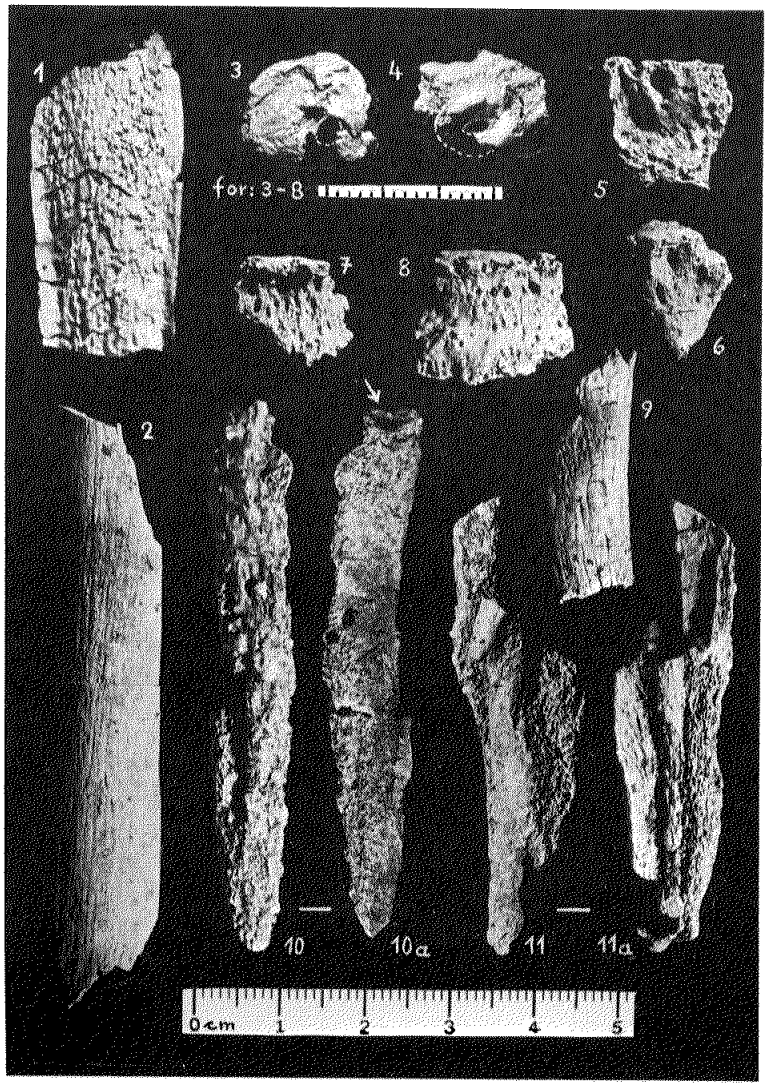


FIGURE 3 -- Cremation 767, young mature female, suffering with osteomyelitis

For comparison :
1) Normal bone, inner vault. 2) Normal bone, outer surface.
3 + 4) Two fistulae 4) Surrounded by bony prominence
5 - 8) Remnants of vertebrae showing marginal osteophytes (spondylosis deformans) and mild deformations of vertebral vaults, especially in 8)
9) Fragment of long bone showing normal, smooth surface and beginning of diseased surface.
10 + 10a) Example of pathologically deformed bones, two aspects, at one end a not penetrating cavity (arrow).
11 + 11a) Another fragment showing pathological changing and sclerotic formation of bone substance

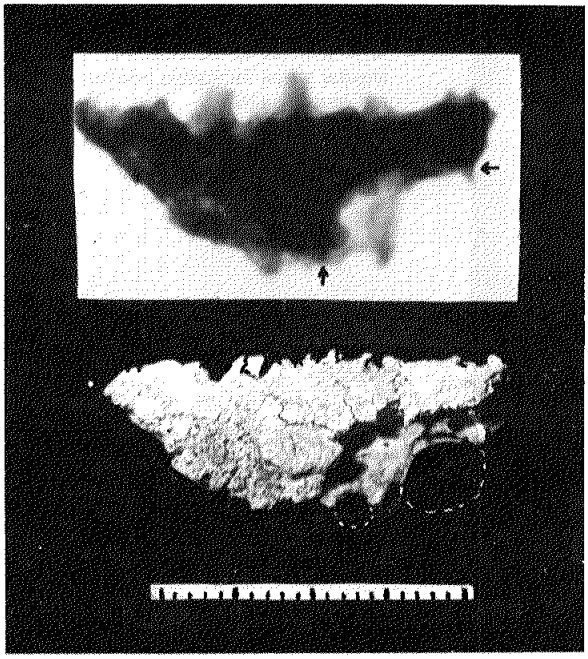


FIGURE 4 – Fragment of parietal bone with partly destroyed outer layer showing the diploe eroded by a larger arachnoid granulation (?), penetrating the inner layer of the vault (see openings completed with dotted lines). Radiograph shows the sharp limitation of this erosion (see arrows). Each stroke of the measure tape indicates one millimeter.

Cremation 1232 (K140 : early mature female (Fig. 4)

Here additionally abscesses and alveolar resorption in upper jaw and degenerative changes in mandibular fossa of temporal bone present (Fig. 5, I + J).

Overcrowding : It is seldomly found in jaws from Schwissel.

Cremation 1355 (L19) : Slight overcrowding occurs in preserved left maxilla between canine and first premolar (Fig. 5, G + G1).

Mild overcrowding causing resorption of inner vault of left maxilla by pressure of root of first premolar is present in cremation 1447 (J18), adult female (Fig. 5 F).

Torus mandibularis :

Cremation 418 (JK 15) : in a fragment from beginning of ramus, right side, below the end of the mylohyoid line a smaller torus is present. As radiograph proves, it consists of compact bone (Fig. 5, N).

Teeth :

Enamel pearl : In only two cremations we found an enamel pearl :
Cremation 460 (M15) (Fig. 6, row B, D).

In this cremation of an early adult female, additional skeletal remnant skeletal remnants of a mature (?) baby are present (I. Kühl, 1983 b).

Tuberculum carabelli : Could be found in only one cremation : 1325 b (J17), child of middle infans I age (Fig. 6, row A, F + F_1)

2.2. Vertebrae.

No variations observed.

2.3. Extremities.

Foramen supratrochleare :

In fragments of distal ends of humeri of thirteen cremations we found doubtless parts or remnants of this anatomical variation. This number is fairly high because cremations only present a portion of the skeleton and ends of joints consisting of delicate spongiosa are seldomly so well preserved as to give reliable findings.

Cremation 32 (J14), bilateral

Cremation 126 (K14), only right side preserved.

Cremation 487 (J15/16), only left side preserved.

Cremation 695 (M16), only small fragment present

Cremation 838(J13), bilateral

Cremation 1002 (G13), only one side present (additional sut. frontalis present).

Cremation 1125 (E12), For supratrochleare developed **unilateral** . left side without, right side with Foramen.

Cremation 1244c (K14), For supratrochleare developed **unilateral** : left side without, right side with foramen.

Cremation 1309 (N18), only left side preserved

Cremation 1540 (E10), only left side preseryed

Cremation 2025 (F 3)

Cremation 222 (N23), only right side preserved

Cremation 2224 (N23)

Cases for comparison :

Timmendorfer Strand, Urn 66

Wendeby, Kreis Eckernförde, bog-corpse I : unilateral . left side with, right side without for. supratrochleare.

Two of the findings from urnfield Schwissel are pictured : Cremation 1540 and 838 (Fig. 7, A B).

Investigation shows that foraminae found are of low and oval shape 7,2 - 10,2 mm broad. In 1540 it is 7,8 mm broad, 4,4 mm high. (**Shrinkage** by the cremating fire must be taken into consideration !).

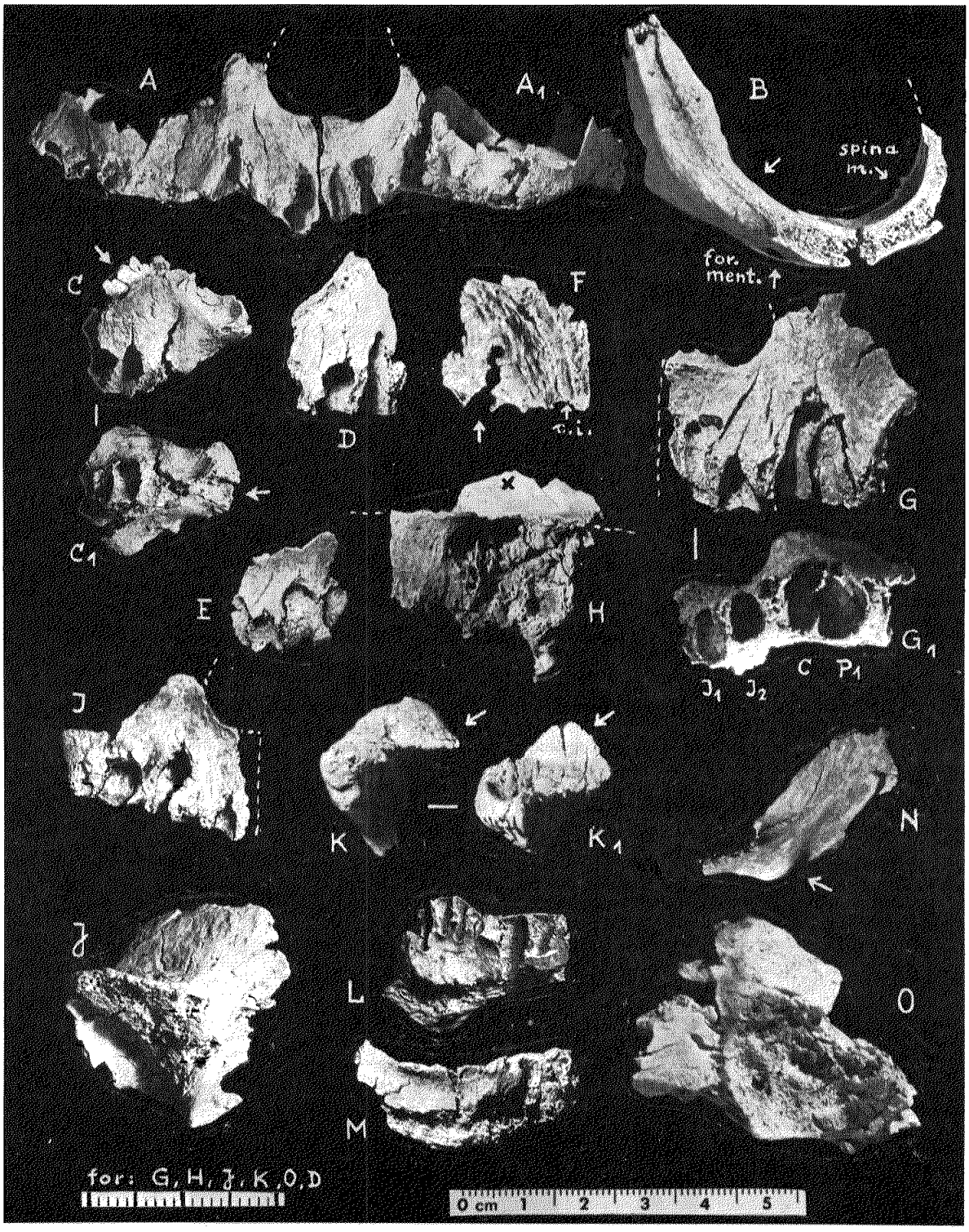


FIGURE 5 — Parts of jaws with alveolar resorption, parodontosis and abscesses

A - D and E, I. A + A1) Crem. 1487, maxilla.
B) Mandibula, view against remodelled alveolar process, see arrow, molar region. The anterior part is broken off.
C) Crem. 528 : left maxilla showing extensive toothloss. Remnant of nasal floor preserved (arrow). C1) Specimen turned, showing aspect of alveolar process.
D) Crem. 2310 : fragm. of left maxilla showing abscessing cavity.
E) Another fragm. of maxilla showing abscessing cavity.
F) Crem. 1447, left maxilla with mild overcrowding of canine and first premolar, inner vault, showing eroded part of vault by one root of P1 (arrow) (Canalis incisivus preserved : c.i.)
G) Crem. 1355 : left maxilla with overcrowding of canine and first premolar G1) Alveolar aspect.
H) Crem. 224, fragment of maxillary antrum (with extent sinusitis. Floor of nasal cavity partly preserved (x)
I +J) Crem. 1232. I) Right maxilla with osteolithic cavities (abscesses ?) in alveolii of C and P1. Severest extent of abscesses (?) we found in crem. of Schwissel. J) Area of fossa mandibularis showing degenerative changes.
K + K1) Crem. 1476, Proc. articularis mandibulae with arthrotical lipping at crown of process K) Lateral aspect. K1) Aspect from below showing triangular form of lipping.
L) Crem. Nb. ? Fragment of lower jaw showing parodontosis
M) Crem. 363 : edentulous part of lower jaw, with remodelling of alveolar process to a rim.
N) Crem. 418 : Torus mand. at posterior part of right mandible (see arrow)
O) Crem. 2205 : degenerative changes in fossa mandibularis (from this cremation also fig. 14/17).

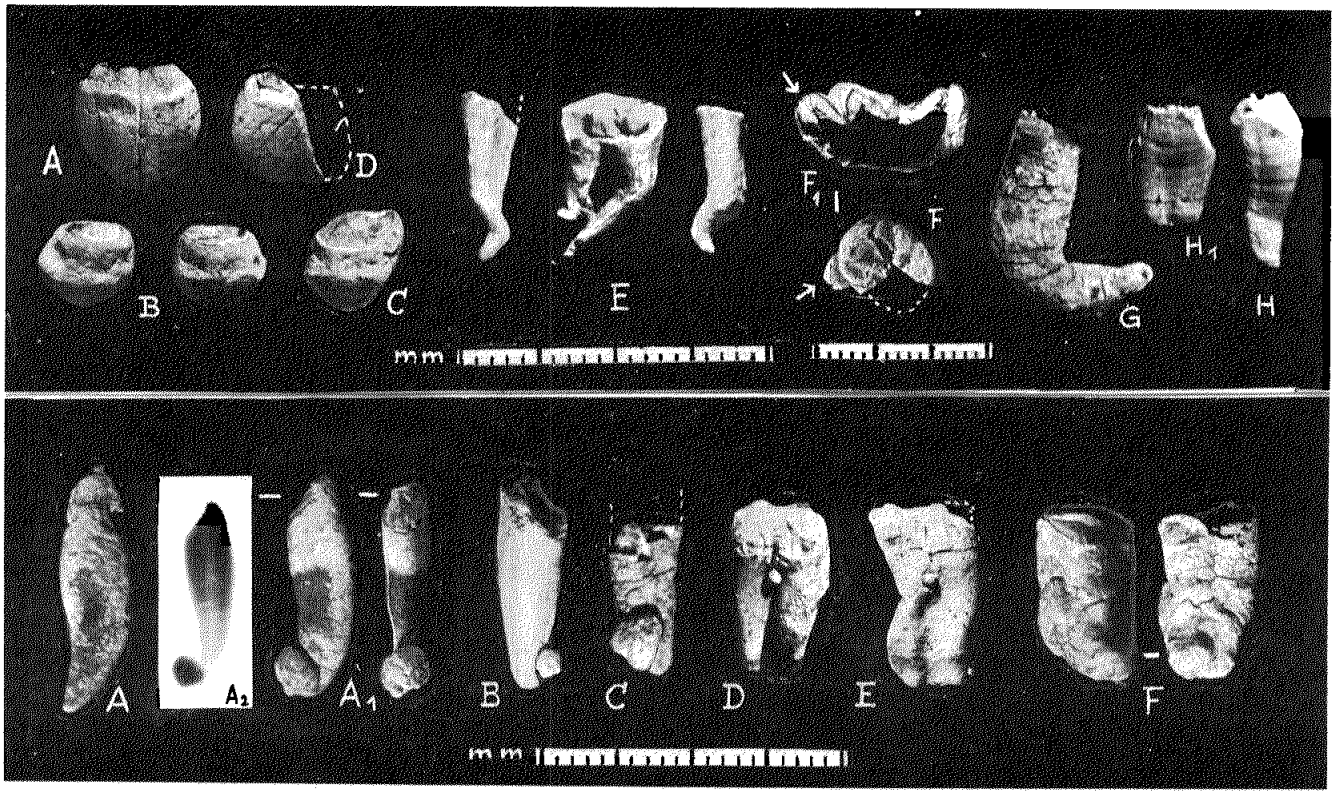
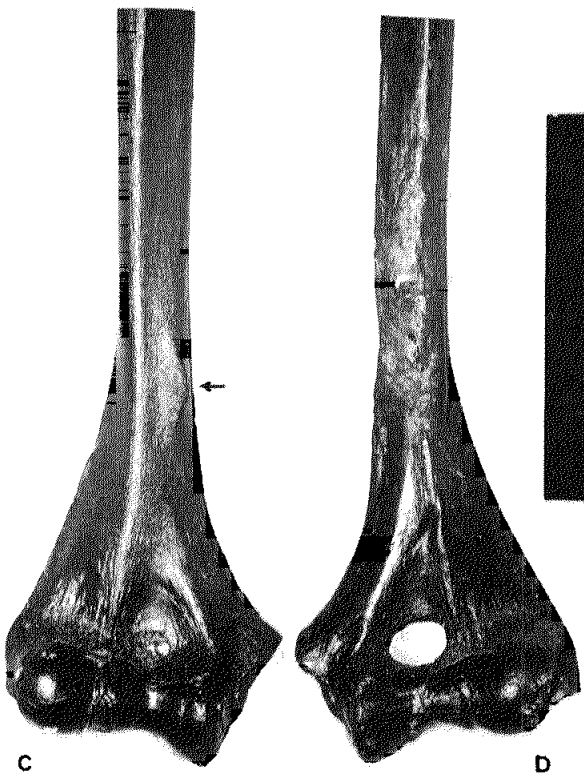


FIGURE 6 – Teeth

Row A. A-D) Crem. 2177 : upper (A), lower (B) canines and (C) premolar showing enamel hypoplasia. (D) upper incisor without hypoplasia.
E) Crem. 678 : two incisors and one molar with developmental disturbance of root growth (from this crem. also fig. 13, I_1-I_4).
F) Crem. 1325 b, molar with tuberculum carabelli (arrow). F1) Enlarged lateral aspect.
G) Crem. 865, maxillary canine, developmental disturbance : root is grown in right angel.
H + H1) Crem. 300 : roots showing lines of disturbances : H) Incisor with completed root growth, H1) Root growth incomplete.

Row B. A-A2) Crem. 1701 : A) Incisor with normal root. A1) Incisor with clot of cementum at tip of the root. Two aspects. A2) Radiograph show the clot consists of compact substance.
B + C) Two roots with similar formations (C : Crem. 1913)
D + E) Two examples with enamel pearl (D : cremation 460)
F) Crem. 1284, a maxillary canine, heavily clubbed by cementosis. Two aspects.



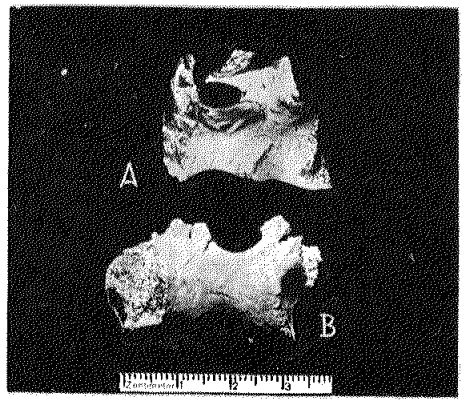


FIGURE 7 – Foramen supratrochleare :

A) Cremation 1540 B) Cremation 838
C) For comparison and as example for unilateral occurrence of the foramen both humeri of bog-corpse from Windeby, North Germany (with for. in left humerus !).

We predominantly found only the distal end of one humerus, seldomly fragments of both humerii. In cremations 32 and 838,1 found bilateral foramen supratrochleare, in cremations 1125 and 1244c unilateral, both of the right humerus, as can be seen by remnants of membraneous layer of olecranon fossa. (For the foramen supratrochleare in humerii of Schwissel generally is situated **immediatelly** above the trochlea).

The possibility of unilateral occurrence is ascertained by the bog-corpse Windeby we showing well preserved humerii with broad oval foramen on the **left** humerus contrasting with findings in skeletons from Schwissel. (The right humerus from Windeby I corpse does not definitely show whether its small holes are due to breakage or are small multiple foraminae (Fig. 7, C). We also found foramen supratrochleare in cremations from the suggested female cemetery of Gross Timmendorf, Kreis Ostholstein, i.e. Urn 66.

Findings of supratrchlear foramen entered on the cemetery plan shows that this anatomical variation occurs in all sections of the cemetery. As to the frequency of this phenomenon in males and females. Calvin Wells found in North Elmham Park (Anglo-Saxon), Great Britain, an occurrence of foramen supratrochleare 10 times more often in females than in males (C. Wells, 1980, Table 37, p. 264 : men 2,1 % out of 96 humerii, women 20,4 % out of 88 humerii). M. Stloukal told us that he found in his material (Czechoslovakia) the foramen supratrochleare much more frequently in humeri of **female** than of male skeletons. These facts are of special interest to us, for the urnfield at Schwissel is supposedly for females only ! It seems by international findings with high certainty the foramen supratrochleare to indicate a female skeleton.

Patella partita :

Two patellae of exceptional shape we have not seen in any other cremation so far are a surprise : they are "Patellae partitae" in their most frequent variation (R. Martin and K. Saller, 1957-1966, p. 572, fig. 263).

Cremation 594 (I16)

Cremation 1915 (D9) (in this cremation also arthrosis is present) (Fig. 8)

So far we did not find reports on frequency of this variation in males and females.

Ankylosis of toe-phalanges :

Congenital ankylosis of the second and third phalanges of the fifth (?) toes we found twice : (Fig. 2, A, B).

Cremation 1636 (H5). Here also another epigenetic trait is preserved : Os apicis (Fig. 1, A, early to middle adult female).

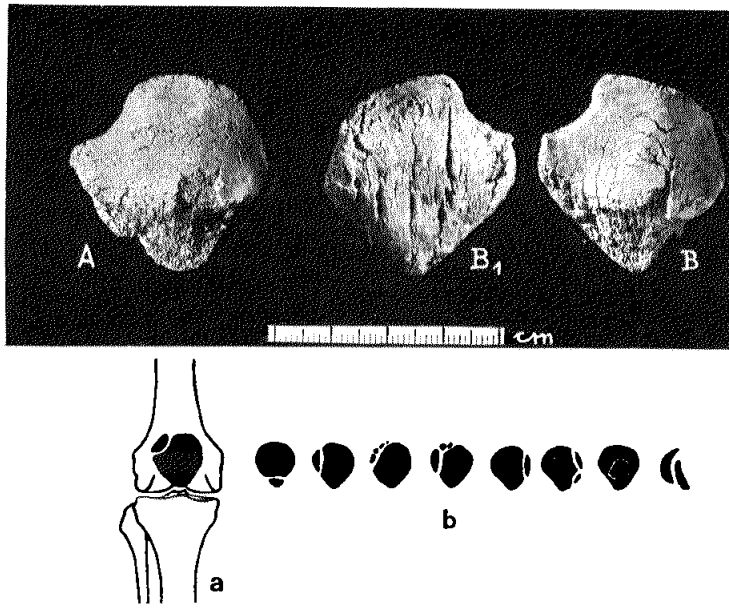


FIGURE 8 – Patella partita. Two left patellae .
A) Cremation 1915.
B) Cremation 594, posterior aspect,
B1) Anterior aspect, showing no marked ridges for muscle attachments.
The drawing below show variations with most frequent (a) and rare (b) types. (Taken from : Martin/Saller).

Cremation 1701 (E7) . (Mature female ?). Here additionally deformation in root of an incisor is present (Fig. B, A and x-ray).

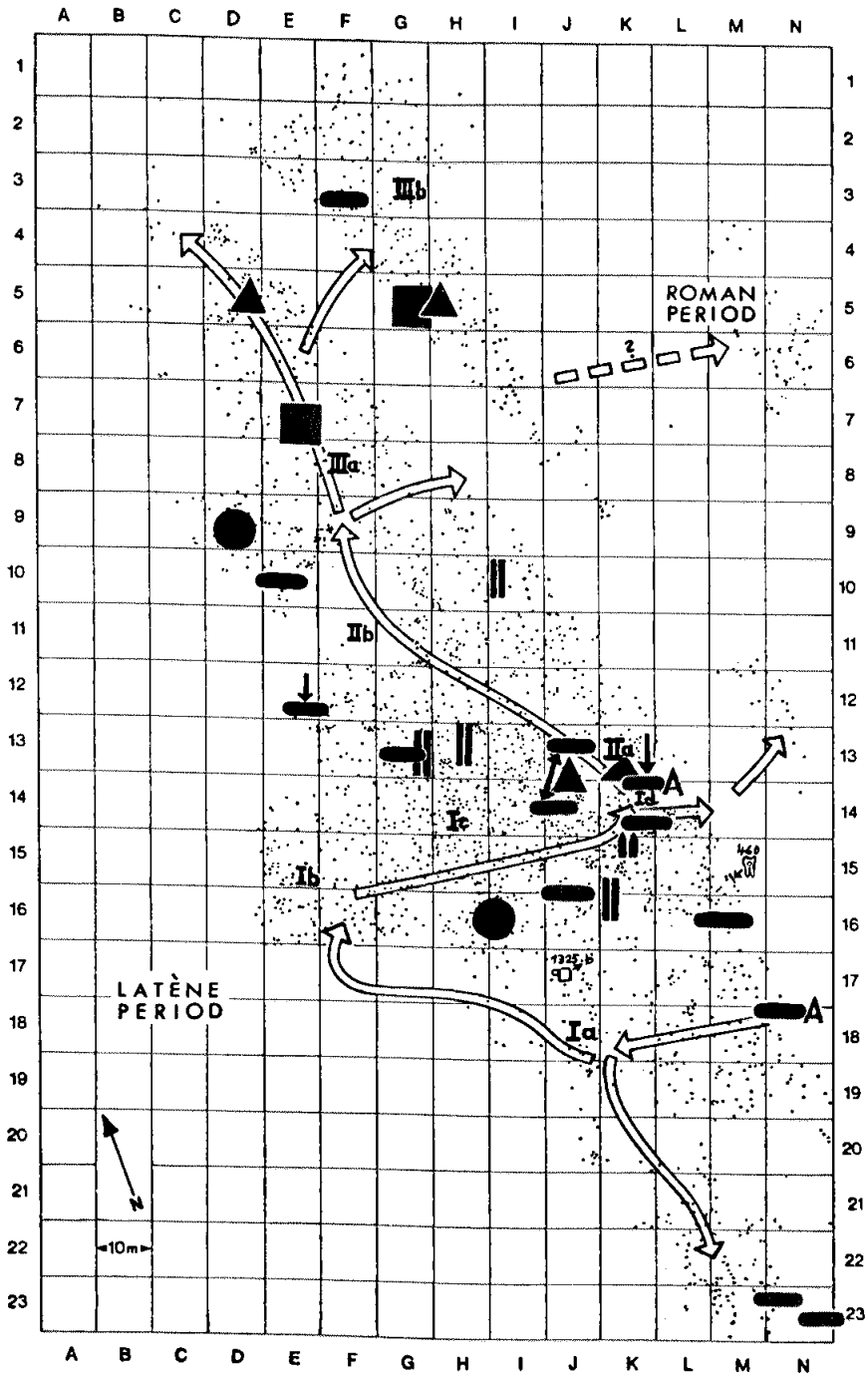
Distribution of various epigenetic traits on the cemetery (plan II) shows some extraordinary details as well under consideration that so far evaluation is not yet completed :

1) The foramen supratrochleare is inspite of a relatively low number (13) distributed across the whole cemetery.

2) Inspite of the fact that most cremations contain fragments of the frontal bone with well preserved crista frontalis (about 400), we only found the **frontal suture in 1** % of the cases and in noticeable distribution in the central section of the cemetery (Ic - IIa).

3) We found **os apicis** and **patella partita** in the mid dle and younger sections of the cemetery.

4) The individuals with **ankylosis of phalanges of toes** are seen only in the younger section of the cemetery.



PLAN II

Distribution of anatomical variations/epigenetic

- ▲ Os apicis (767, 1206, 1636, 1855)
- ‖ Sutura frontalis (437, 982, 1002, 1747)
- ▬ Foramen supratrochleare
- ● Patella partita (594, 1915)
- ■ Ankylosis of toe-phalanges (1636 1701)
- ‖ Small and fir-tree like sutural bones (266)

3 – PATHOLOGICAL CHANGES.

3.1. Skull.

Thickened bones of the vault of the skull.

Cremation 440 (H15), late adult, sex unknown.

In an urn rather to small for an adult a very incomplete mass of cremation material. The occipital bone is particularly large showing porous structure of the outer layer as is usual in aged individuals and not peculiar to cribra pariatalia. The bony structure forms thick layers near the sutures, having a thickness of up to 6,7 mm, the flattened area (Planum occipitalis) 2,5 - 4,2 mm. These measurements are generally large for cremations and also women of Schwissel. The remnant of the temporal bone the root of the zygomatic arch is a pronounced protuberance, stronger as usually in male skulls ! The upper layer of the mastoid process is unusually rough : it appears entirely covered with small conical tips (Fig. 9, G). The preserved fragments of long bones are normal in appearence.

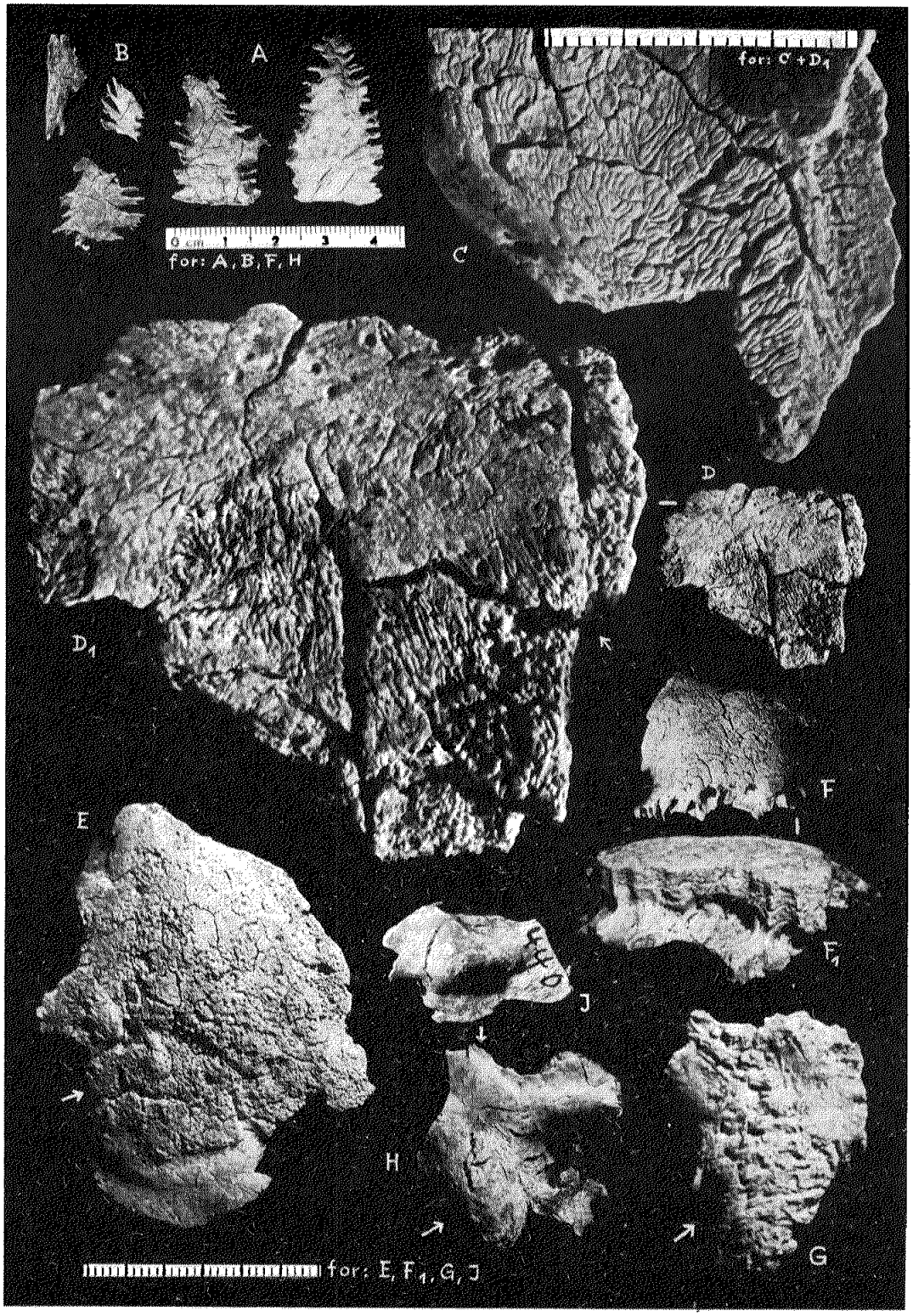


FIGURE 9 – Skull vaults

A) Two fir-tree like sutural bones and
B) Three ossicles of normal size. Cremation 266.
C) Cremation 678, tabula interna of parietale, enlarged, showing crowded fine lines. Cracks by heat are running transversaly them, as also in.
D) Cremation 1432. D1) Enlarged. Attend to mild discoloration of these areas. (At right side these lines are ending gradually see arrow).
E) Cremation 1323, vault of parietal bone, tabula externa pathologically changed, arrow pointing to area with marked sclerotified bone.
F - G + J) Cremation 440 : Fragment of parietal bone, tabula externa. F1) Lateral aspect with suture and thickened tabula externa (enlarged). G) Mastoid process with abnormal roughened surface (arrow). H) For comparison mastoid process showing normal surface (for females) (arrow) and normal extent of root of the zygomatic arch. J) Remnant of temporal bone of Cr. 440, showing abnormal protruding root of this arch.

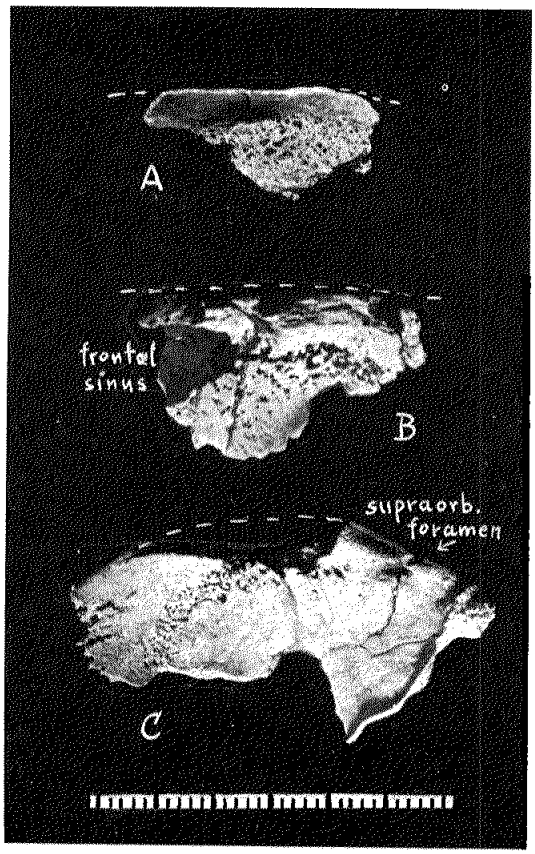


FIGURE 10 – Three cases of cribra orbitalia

A) Cremation 222, the most severely case from Schwissel
B) Cremation 890.
C) Cremation 1667. B + C show the normal extent of cribra orbitalia in cremations from Schwissel.

Diagnosis not established. There appears to be a type of hyperostosis of the skull only.

Cremation 1323 (K18), mature female.

Also in this case a relatively small amount of cremation but in a large urn. The preserved large fragment of the parietal bone is thickned : 7 mm. Here the external layer is partially changed and the diseased area is in part well protruding from the normal outer layer of the skull bone (Fig. 9, E). In the middle section of the thickening there is distinct evidence of partial sclerosis. Diagnosis is not established. Perhaps an inflammatory process causing transformation of bone substance.

Cribra orbitalia :

In few cremations light cribra orbitalia was found (Hengen grade 2 - 3) but we **never** found cribra **parietalia.**

Three cases out of ten are given in picture fig. 10. In cremation 222 found the most severely marked porosity of the orbital roof.

Til now found cases of cribra orbitalia :

Cremation 190d (J14), middle adult female (?)
Cremation 222 (G14), infans II
Cremation 460 (M15), young adult female
Cremation 638 (H16), infans II
Cremation 782 (J14), spates infans II
Cremation 804 (J13), middle adult female
Cremation 890 (H12), middle adult female
Cremation 1253 (M18)
Cremation 1667 (G7), middle matur female
Cremation 1710 (H9), matur female.

Jaws :

The only case of sinusitis we found in cremation 224 (F14). Fragment of upper jaw with pronounced deformation of the base of the maxillary antrum (Fig. H).

In the **jaws** there are pathological changes of advanced age : extensive **tooth loss** and alveolar resorption are seen in upper jaws from cremation 528 (G15), 589 (G15) and 1487 (G10). Only incisors remained in their sockets.

Almost identical, extensive toothloss is found in upper jaws of cremation 2205 (J20) (Fig. 5, A, and cremation 1232 (K14). Total tooth loss and alveolar resorption are seen in the preserved part of upper jaw of cremation 1769 (E6) (Fig. 11, E : the fragment is slightly turned, arrows point to changes in alveolar process). In the mandible few teeth remained as is shown in fig. 11 F.

Generally the lower jaws seem to be less afflicted.

The only fragment of the mandible with complete dental loss and remodelling of senile mandible we found in cremation 363 (H15 (Fig. 5, M). Signs of **parodontosis** are seen on the fragment of the left upper jaw from cremation 515 with the anterior surface of alveolii resorbed, only tips of roots remained covered. The left parts of the vault look porous (additionally : septa interalveolaria between I1 and C measures 2mm, between C and PM1 : 3,3 mm (Here, no overcrowding).

Alveolar abscessing is surprisingly evident in fragments of upper jaws only and appear to moderate extent. Abscess formations is found predominantly in frontal teeth perforating towards the **vestibulum.**

Cases : Cremation 515 (I16), 528 (G15), 589 (G15), 844 (I13), 1232 (K14), 1310 (M18), 1769 (E6), 2310 (N7).

Case 1232 show the severest stage of abscess formation in a woman of Schwissel (Fig. 5, J).

In contrast in cremation 844 (I13) an osteolythic

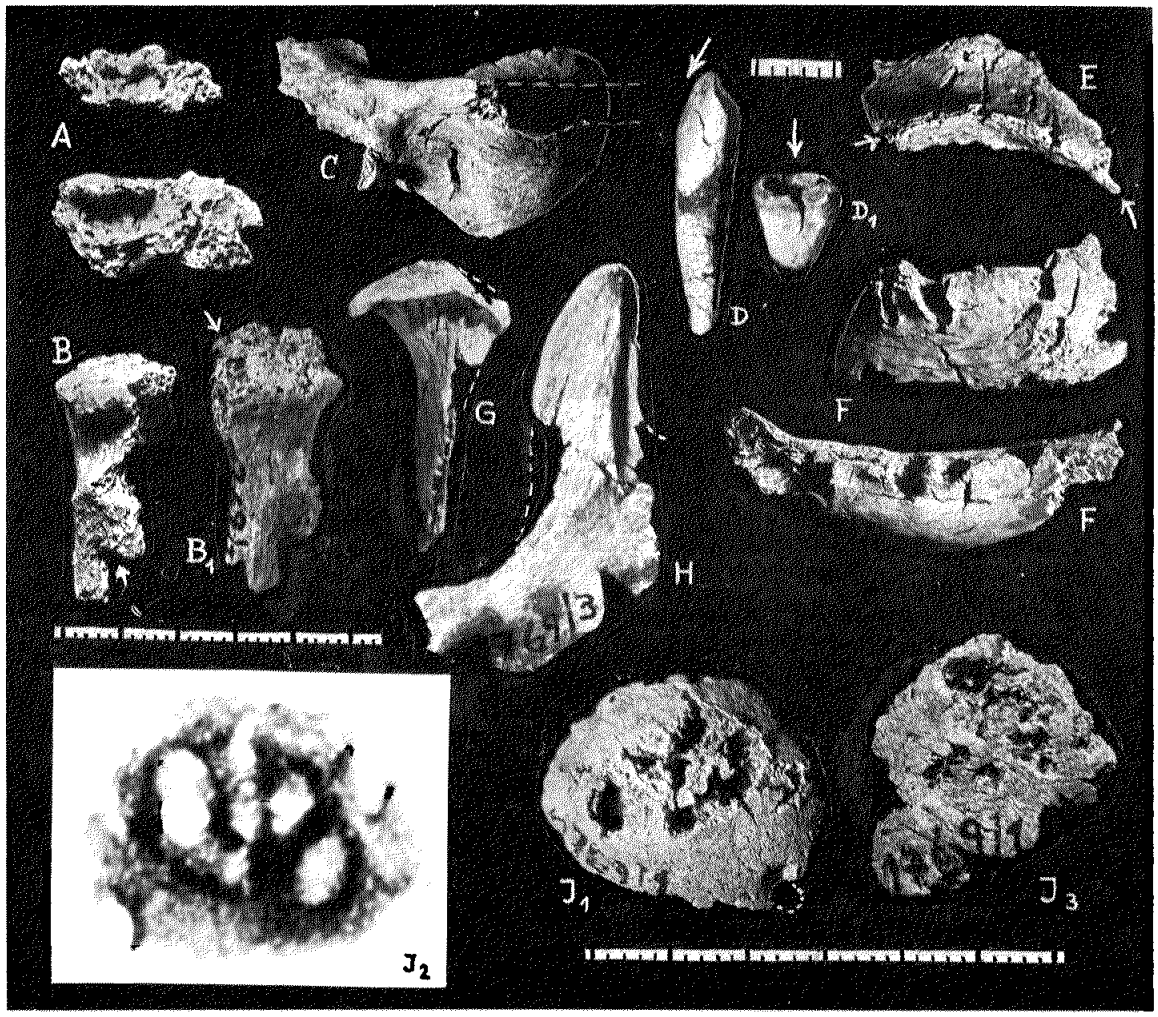


FIGURE 11 – Cremation 1769, senile female

Collection of some preserved fragments, relevant for determination :
A) Two remnants of vertebrae showing spondylosis deformans
B + B1) Proximal radius with progressive senile athrophy. Two aspects, in B) surface of tuberositas radii, in B1) surface of capitulum radii is seen.
C) Fossa mandibularis of right temporal bone showing no degenerative changing.
D) Two teeth, incisor very obliquely worn (in direction of the arrow), D1) Another with caries down to the root (see arrow).
E) Edentulous left upper jaw, the fragment is slightly tilted for photographic purpose : arrows pointing to remodelled alveolar process.
F) Two fragments of lower jaw, some alveolii remaining
G) Processus articularis mandibulae, severely athrophied head, crown flattened.
H) Processus muscularis mandibulae, r., not deformed
I - I2) Fragments of heads of long bones (caput femoris ?) with signs of progressive cox arthrosis. The sclerotic borders are well seen in the radiograph I2.

process (7 mm in diameter) was found in the right maxillar, first molar, perforated into the buccal cavity. Probably the same process took place at the vestibulare root. But this cavity is 5 mm in diameter with an outward deflected ridge.

Arthrosis :

A triangular lipping is seen at anterior border of crown of articular process of mandible in cremation 1476 (G11) (Fig. 8, K, K1). Degenerative change of mandibular fossa is found in cremation 2205 (J20) (Fig. 5, 0 : late adult (matur female).

Teeth.

Etiologically one can distinguish two types of dental changes :

1) Developmental disturbances. Examples showing :

Enamel hypoplasia in middle infans I child, urn 2177

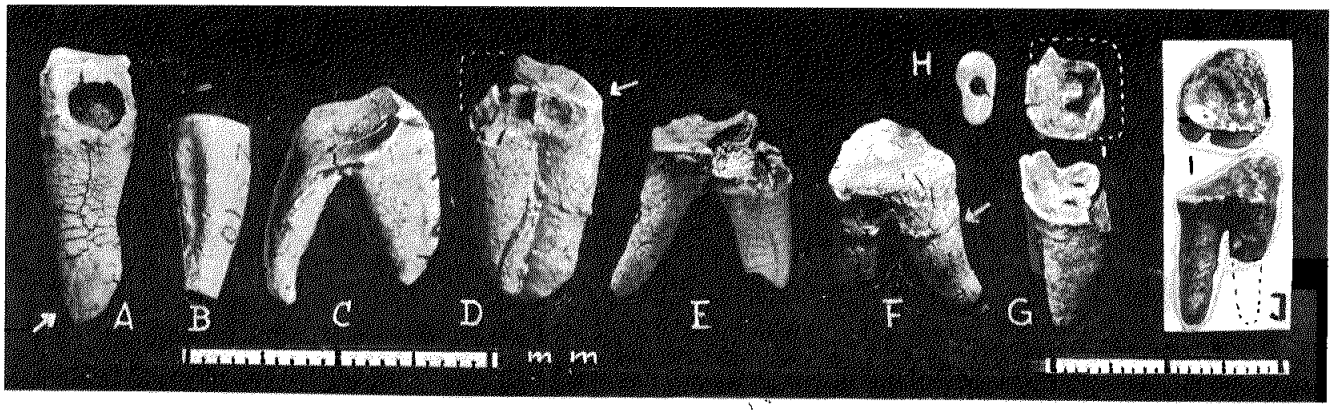


FIGURE 12 – Toothwear and caries in different cremations

A) Maxillary canine with large cervical caries and slight cementosis at last third of the root (see arrow). Here end the cracks caused by the cremation heat because of the compact substance of cementum.
B) Crem. 2310, a heavily worn premolar, almost reaching the bifurcation
C) Crem. 1667, heavily worn molar
D) Crem. 1667, obliquely worn premolar with moderate caries (arrow) and irregularities of cementum at root surface.
E) Crem. 386, heavily worn molar, attrition partly destroyed severe carious lesion
F) Crem. 289, heavily worn molar with ridges running transversaly round the outer areas of the root : supposed remnants from broken off calculus ?
G, H, I) Advanced attrition, in G + H till opening of the pulp.
G) Crem. 515.

FIGURE 13 – Vertebrae

A + B) Crem. 1261, epistropheal body and body of cervical vertebra with cavities at left side, surrounded by bony edges.

C – C4) Crem. 515, epistropheus with extent cavity, different aspects : C1, from posterior ; C2, same aspect, radiograph shows : presence of bony layer surrounding the cavity ; C3, aspect from below ; C4, aspect from anterior.

D) Crem. 532, enlarged remnant of atlas with fovea dentis and largest cranial osteophytes found in cremations from Schwissel

E) Crem. 528, posterior aspect of epistropheus with cranial osteophytes

F, F1) Crem. 876, mature female. Larger portion of lumbar vertebra with compressions fracture, arrow pointing to remnant of compressed vault. F1) Smaller vertebra showing marginal rolls caused by spondylosis deformans, as is also present in more and larger vertebrae of this spine

G, G1) Crem. 249, late adult female. Remnant of larger vertebra with marginal osteophytes, indicating normal extent of spondylosis deformans in women of Schwissel

H, H2) Crem. 833, late adult female. H) Cranial surface of upper sacral segment showing a larger Schmorl's node near facies pelvina (see arrow). H1) Fragment of vertebra, showing loss of spongy structures without defining layer of compact bone. H2) Rib with osteoarthritic lipping at articular tubercle

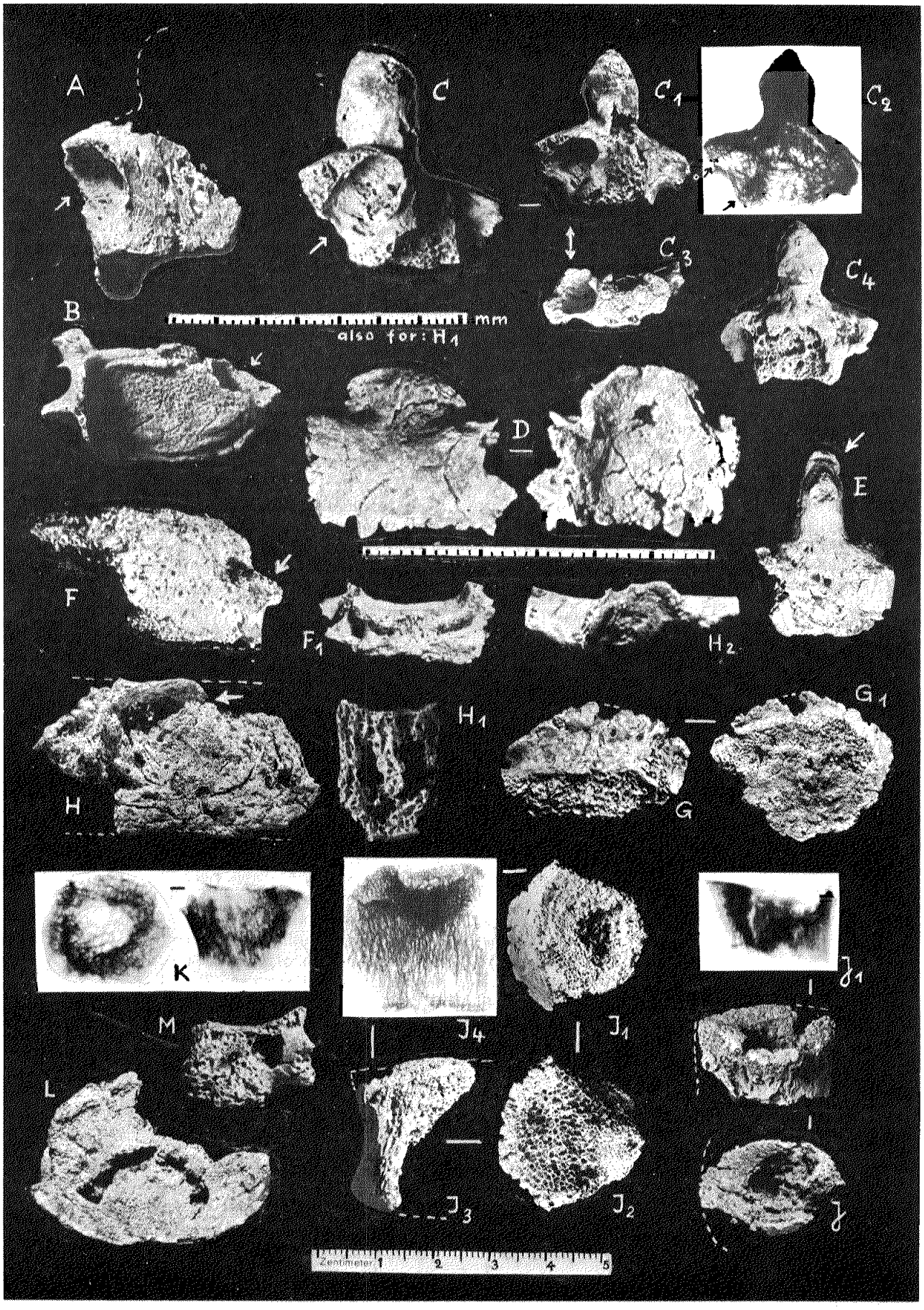
I1 - I4) Crem. 678, remnant of larger vertebra with large Schmorl's node : I1) from above, I2) from below, showing densed spongy tissue surrounding the cavity , I3) lateral aspect showing form of depression. I4) ventral aspect : radiograph show density of the bone surrounding the depression.

J, J1) Crem. 311, adult female. Remnant of vertebra with larger cavity, two aspects. J1) Radiograph shows surrounding layer of densed bony sustance.

K) Extreme large Schmorl's node, cavity within larger than at the surface. Both radiographs show surrounding densed bony structure.

L) Crem. 885, middle to late adult, sex unknown. Lumber vertebra with curved Schmorl's node. (see also fig. 17, B);

M) Crem. 1703, middle to late adult female. Cervical vertebra with globular loss of spongy tissue, the cavity surrounded with layer of bone.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(K20). (Fig. 6ı, A, D). Here are also distinct Harris lines seen (I. Kühl, 1983 a).

Disturbance in root growth showing 3 incisors (2 pictured) and one molar of cremation 678 (E16), young to middle adult female (Fig. 6A, E). Here also central parts of both parietals show crowded very fine lines of unknown etiology (Fig. 9, C). (I. Kühl, 1982)

In cremation 865 we found for the first time a root grown in right angel (Canine of maxilla) (Fig. 6A).

Fragments of maxilla are not preserved.

In three cremations we found pearllike growth of cementum at the tip of the root of three incisors : Cremation 1701 (E7), mature female. Cremation 1107 (F13), middle adult female. Cremation 1913 (C9), mature female (Fig. 6 B, A2, B, C).

2) Changes due to advanced age seen in Fig.

The root of a maxillary premolar clubbed by cementosis, not developing prior to age 30 years. Cremation 1284 (N19) late adult female (Fig. 6 B/F).

In cremation 1284 a maxillary canine is afflicted by approximal cervical caries and slight cementosis at last third of the root (Fig. 12, A).

Crowns are frequently severely and obliquely worn, sometimes down to the opening of the pulp or to the previously developed cervical caries. Examples are given in fig. 12).

In tooth of cremation 1667 (G7), there is oblique tooth wear as well as moderate caries (arrow), left part of the crown secondarily destroyed, root slightly roughened by very small irregularities of the cementum (Fig. 6, C, D).

Progressive caries down to the root are seen in cremation 1769 (E6), senile female (Fig. 1, D1).

From the female of cremation 2149 (M11) several teeth are present, as frequently is observed in cremations of Schwissel, but this late matur woman is the most afflicted with caries : out of 15 teeth 7 show caries, mostly in advanced stages. Additionally osteolytic cavities resulting from apical abscesses (?) are developed.

3.2. Vertebrae.

Schmorl's nodes of usual forms and sizes are strikingly rare in this population, i.e. cremation 885 (I13) (Fig. 13, L), but in few cremations fragments of vertebrae show larger and deeper depressions : 311(H15) 364 (G15), 686 (H16), 833 (I14), see Fig. 10, H-K. Radiographs prove : these holes are not caused by postmortem damage, for they are surrounded by reactive bony substance.

Cremation 686 of a juvenile shows normal, shallow nodes in few vertebrae, but also a fragment of a larger one with a deep depression, surrounded by dense **spongy** tissue (Fig. 13, J4, lateral aspect). Here also Harris'lines are present, see report III.

In cremation 311 the fragment of a larger vertebra shows a depression with irregular outline and distinct edging of dense bony substance (Fig. 13, J1).

The specimen of cremation 364 show an almost cherrylarge hole with greater diameter within than at the surface of the vertebra and less pronounced wall layer (Fig. 13, K, radiographs).

From cremation 833 the upper sacral segment shows a larger Schmor's node adjoining facies pelvina (Fig. 13, H).

In his research about skeletons of North Elmham Park Calvin Wells also found less Schmorl's nodes in **females** : 1,8 nodes per woman, 6, 7 nodes per man (1980, p. 269).

Here we are joining cremation 1515 (F9) of a mature female, in connection with partly structural loss of spongy tissue in vertebra of cremation 833 (Fig. 13, H1). In 1515 two fragments of vertebrae show similar cavities without defining layer of compact bone. In this cremation already osteoarthritic lesions at the brim of the acetabulum (ischium) had developed.

Arterial aneurisms ?

A rare phenomenon is to be seen in few epistrophei and lateral parts of cervical vertebrae : they show depressions of globular form with diameter of about 6 - 7 mm with a sclerotic edge and with vault of reactive compact bone. They appear at **left** side of these vertebrae, that means, where the ascending artery to the skull is passing.

These cavities are probably caused by so called arterial aneurisms, which eroded the bony substance of the vertebra by pressure of the strong pulsation of arterial blood, causing round holes (Fig. 13, A, B, C). The regular form of these holes are caused by the **sacular type** of the aneurism (2).

Vertebrae with this lesion are found in cremation . 67 (J14), late adult to young matur female (?). Here also Harris' lines are present. Cremation 190d (J14), middel adult female (?), here also mild cribra orbitalia present. Cremation 515 (I16), late adult female (Fig. 10, C) (3).

Cremation 687 (H16), middle adult female. Here also mild cribra orbitalia present. Cremation 1244 C (K14), early juvenile, female ? Here also Foramen supratrochleare present. Cremation 1261 (L14), mature female (Fig. 13, A, B).

Spondylosis deformans.

Relatively often mild to moderate spondylosis deformans had developed, mostly in cervical vertebrae and lower end of spine. One example is given in fig. 13 G (Cremation 249 (L15), late adult female). The woman of burial 876 (I13) suffered severely by extensive spondyl. def. in cervical and lumbar vertebrae, and compressions fracture of a lumbar vertebra.
This vertebra is heavily damaged intra vitam and postmortem (Fig. 13, F and F1).

Spondylarthrosis.

Changes, due to this degenerative process very often occur in connection with the before mentioned spondyl. deformans. Spondylarthrosis of the atlanto - epistropheal joints is only sometimes found, of slight degree, an example is given in fig. 13, E. A singular large osteophyt developed on the cranial border of the fovea dentis in cremation 532 (G15), mature female (Fig. 13, D).

Spondylarthrosis of vertebral joints is more often found than osteoarthritic lipping on the transverse articular facets of costae. The pictured example derived from cremation 833 (Fig. 13, H2) (I. Kühl, 1983, 6).

3.3. Extremities.

Also in these bones changes due to childhood and old age are found :

1) Harris lines are often to be seen in the spongy tissue of remnants of long bones. Distances between them are often scalelike, pointing to annual "late winter famine" (I. Kühl, 1983 a).

Pathological changes in long bones are seen almost entirely consisting of arthrotic changes of parts forming the structure of joints (e.g. thick protrusions or herniated articular surfaces containing hardened cartilage). See an example of arthrosis of a finger joint, cremation 386 (H15), mature female (Fig. 14, 4). Here also cranial osteophytes of dens epistropheus are present. Degenerative lesions of different degree we also found in articular surface of two radial heads: Cremation 257 (HJ 15), mature (?) female (Fig. 14, 3). Here also alveolar closure in maxilla and mandible, spondylarthrosis and lipping of crown of processus articul. mandibulae present. Cremation 1366 (K18, 19) late adult female (Fig. 14, 2).

Distinct degenerative changes are seen in a trochlear end of a middle phalange. Sclerosis and lateral osteophytes are seen on the radiograph (Fig. 14, 9 - 9b, cremation 1872).

The severest degree of arthrosis we found in crematio 1487 (G10), latest mature female. There are thick protrusions on caput humerii and hernation of major trochanter. The radiograph shows distinct sclerotic edge (Fig. 14, 13 a - 16). The knee joint also shows arthrophatic changes : sharp osteophytes on the anterior edge of facies patellaris of the distal end of the femur as well as of the lower articular surface of the patella (Fig. 14, 15 + 16). Here also extent teeth loss and remodelling of alveolar process in maxilla and mandible present (Fig. 5. A +B).

The cremation of an elderly woman of burial 771 (K13), late(st ?) matur female, shows cartilage nodes herniated into the lateral end of a larger long bone and deformation of trochanter minor : it is flattened with lateral protruding edges (Fig. 14, 7 + 8).
Additionally it is of interest that in this woman all skull sutures are fully open, the sutural edges are merely thickened (Fig. 14, 6).

Another part of the skeleton afflicted by degenerative changes is the articulation surface of the innominate bone with a dimpled surface of tuberositas iliaca (Fig. 14, 12, burial 719 (K16), mature female). Here also spondylosis def. of cervical vertebrae present.

In cremation 296 b (J15) a fragment of a long bone with spongy end is preserved, showing a rounded cavity, the vault consisting of smooth compact bony tissue (see fig. 14, 10 and 10a, radiograph). The distal end of femur from grave 2205 (J20), late adult to (?) matur female (?), shows distinct isolated loss of structure without defining layer of compact bone in the spongy tissue bilateral of the epiphyseal line. This type of change is found in few elderly individuals.

Secondary sclerotic deposit on inner layer of a fragment of a larger long bone is perhaps due to a smaller locally confined disease process (Fig. 14, 18).

The exostosis seen in the fragment of a larger long bone of cremation 49 (J14), middle to late adult female (?) 19 mm long, comblike, is a singular incidence. The exostosis is situated on the outer wall, near the joint end. The exostosis runs in direct straight line towards the shaft slighty curving towards the joint end. It has a slightly broadened base. Both sides of it are showing ridges in the direction of muscles. Perhaps these are ossified muscular attachments (Fig. 15, A). Here also fragment of a molar present, with the lower third of the root bended (Fig. 15, 8).

Special attention is given to following cremations :

Cremation 767 (K13) (Fig. 3, Fig. 1, 8).

This urn is heavily damaged, having reduced content of cremation of an young mature female (see protuberantia occ. externa at fig. 1, 8), showing also shape pointing to os apicis : here also spondyl def. present with mild deformation of vertebral vault.

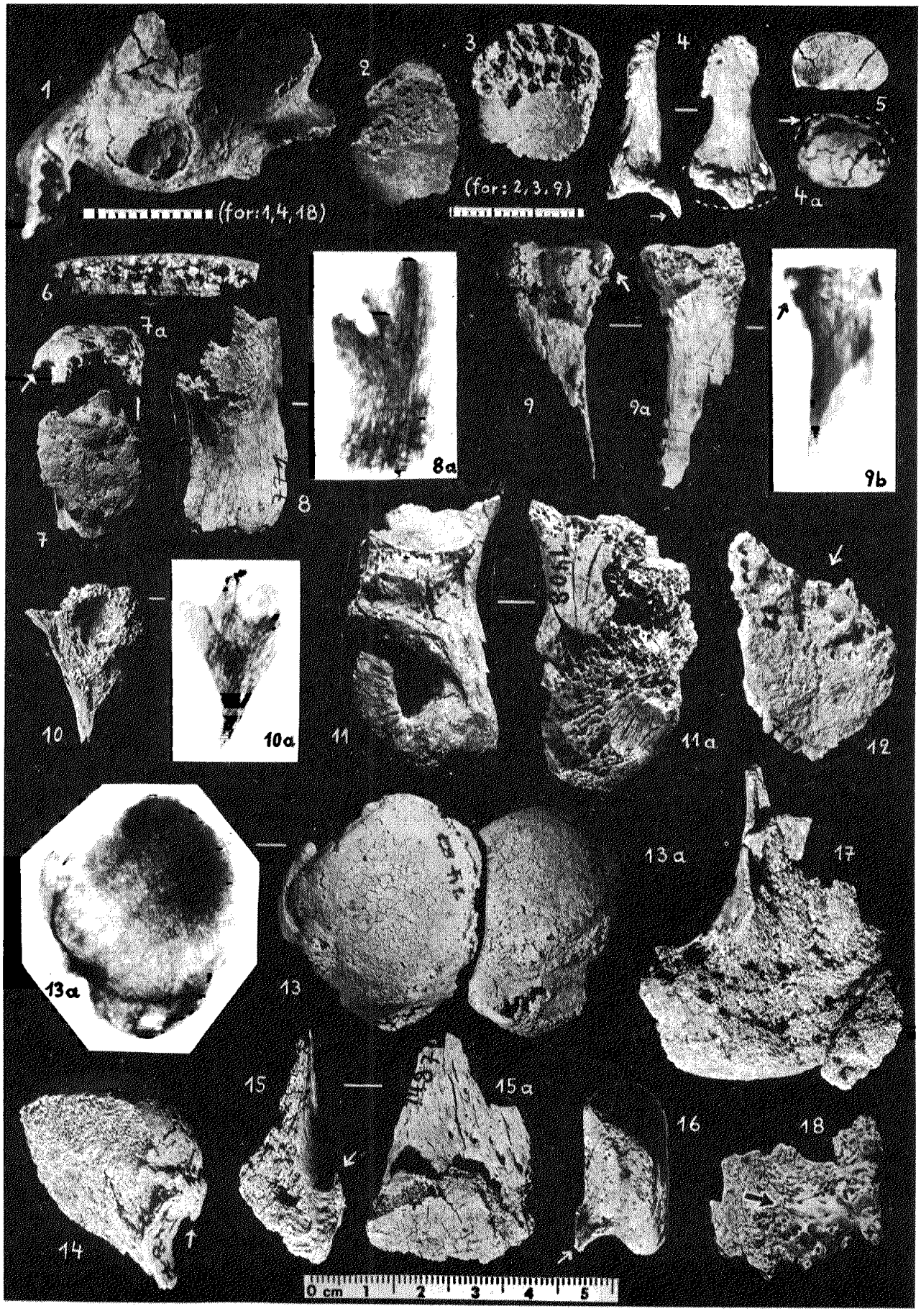
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FIGURE 14

1) Crem. 827, middle to late adult female. Fragment of atlas with small oval tumor of brownish colour below articular surface for condyles of the skull. On the right the tumor is separated from surrounding bone by a small cleft. There is also a cleft running through the middle of the exostosis.
2) Crem. 1366, late adult female, fragment of radial head showing moderate degenerative changes.
3) Crem. 257, mature female (?), fragment of head of radius showing severe arthritic lesions.
4) Crem. 386, mature female. Third phalange showing osteoarthritic lipping. Two aspects. 4a) Articular surface showing extent of lipping
(5) Normal articular surface for comparison.
6 - 8a) Cremation 771, late(st) mature female. (6) Skull bone, lateral view of open suture, see layers of thickened inner vault (7) Trochanter minor, flattened with lateral protruding edges. View from above (7a) Lateral aspect, see extent of deformation (arrow). (8) Fragment of larger longbone with lesion, caused by cartilage nodes herniated into the vault. 8a) Radiograph shows : this lesion occurred intra vitam, for it is surrounded by compact bone layer.
9 - 9b) Crem. 1872, mature female (9, 9a) trochlear end of middle phalange showing osteoarthritic lesions at latera part. Volar and dorsal aspect. (9 b) Radiograph shows condensed bone and osteophytes.
10) Crem. 296 b, adult female. Fragment of long bone with cavity surrounded by vault of smoth bone layer. See radiograph.
11) Crem. 1408, middle adult female, tuber ischium : dented area in the middle of the tuberosity surrounded by roll of compact bone. (11 a) Dorsal aspect of the ischial tuberosity is of normal appearence
12) Crem. 719, mature female, fragment of articulation surface of the innominate bone with degenerative dimpling of the preserved part of tuberositas iliaca (arrow).
13 - 16) Crem. 1487, latest mature female, (13) caput humeri showing degenerative osteo arthritis : marginal protrusions, and lesions by joint mice at tuberculum maius. Two aspects. (13 a) Radiograph. (14) Caput femoris shows marginal roll and sharp edge. (15 - 15 a) Anterior part of distal end of femur showing large and sharp osteophytes on anterior edge of facies patellaris. (15) lateral, (15a) anterior aspect. (16) Patella, lateral aspect showing extension of osteophytes at inferior border of articular surface (from same individual fig. 8/A, A_1 + B).
17) Crem. 2205, late adult to matur female (?), distal end of femur shows distinct isolated loss of spongy tissue without defining layer of compact bone (from same individual fig. 8,0). (18) Remnant of long bone with small area of secondary sclerotic layer (arrow).

This lot contains 135 g pathologically changed fragments of a larger long bone (femur ?), also small irregular bony masses and two pieces, showing fistulae (4). Fistulae (Fig. 3, 4) is surrounded by bony prominence just as shown on the photograph 29 A by R.T. Steinbock, it shows at the left side adjoining a cloaca (1976, p. 69).

Cremation 1769 (E6) (Fig. 11)

It consists of the skeleton of a senile female with certainty the oldest woman of the urnfield at Schwissel and found in the younger (La Tène) section of the cemetery. Old age leads to some consequences : the alveolar process of maxilla is already totally athrophied and changed to a bony rim, (Fig. 16, E). Gert-Horst Schumacher shows extension of such resorption (1980, combined drawing 105, p. 128). Only in the mandible some teeth remained (F). In D preserved teeth are seen : one tooth is worn and polished in almost vertical manner, another tooth is destroyed by progressive caries down to the root. Also the articulating heads of mandible are deformed (G), as well as head and tuberosity of proximal radius (B). In contrast : not deformed by old age is the shallow mandibular fossa and the muscular process of the mandibular ramii (H). Of special interest are remnants of heads from larger long bones (femur ?), showing in parts deep, groovelike crypts with edges surrounded by sclerotic borders (I), caused by bits of hardened cartilage, so called "joint mice" (5). Supposed diagnosis : Cox arthrosis. This disease caused painful walking.

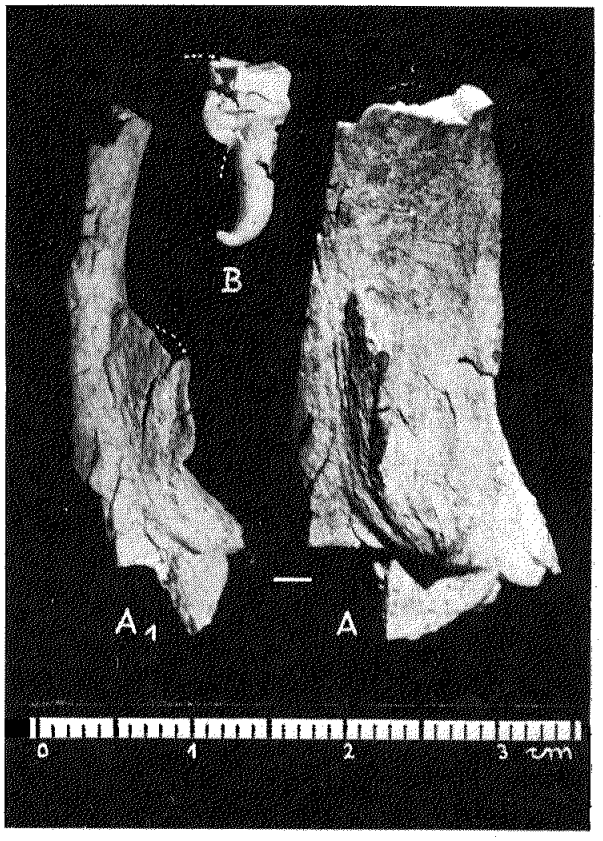
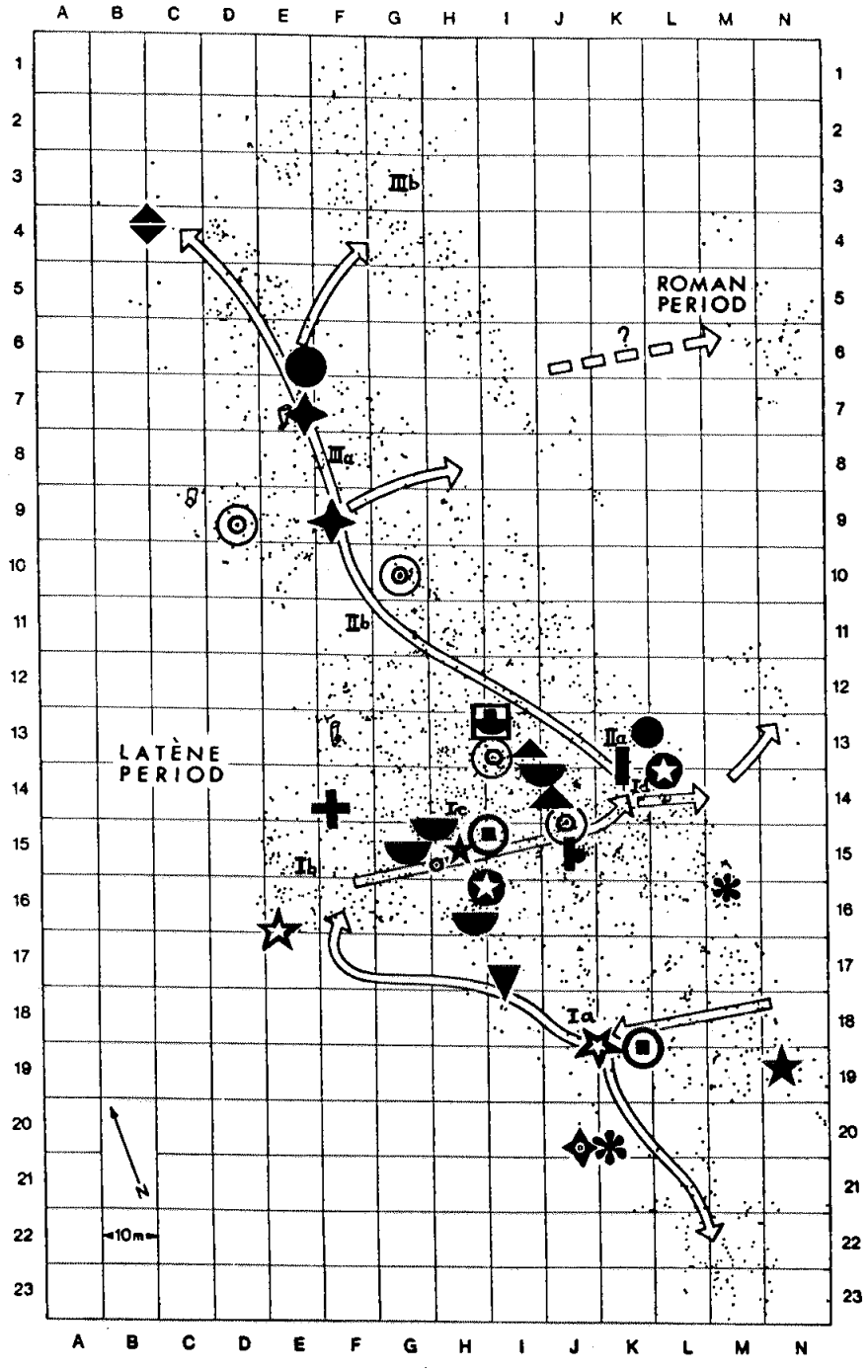


FIGURE 15 -- Cremation 49, middle to late adult female (?)

A) Fragment of long bone with comblike exostosis (slightly damaged, see completing dotted line on A1) lateral aspect. B) This aspect shows the exostosis is running slightly curved towards the joint end. It has a slightly broadened base.



PLAN III

Distribution of some pathological changes

- ★★ Thickened vaults of skulls (440, 1332)
- ☆ Concentrations of lines at tabula interna (678, 1432)
- ✚ Sinusitis (224)
- ✱ Enamel hypoplasia (2177)
- ✪ Arterial aneurisms (?) (515, 1261)
- ▬ Schmorl's nodes (311, 364, 686, 833)
- ▲ Atlas exostosis (827)
- ✦ Rarefication of spongy tissue of vertebrae (833, 1515, 1703)
- ⬇ Compressions fracture (876)
- ⊙ Arthrosis in capitulum radii (257, 1366)
- ◦ Arthrosis in phalangy (386)
- ◎ Arthrosis (167, 885, 1487, 1915)
- ▼ Deformed tuber ischium (1408)
- ✧ Rarefication of spongy tissue of femur (2205)
- ✱ Coarse spongy tissue (300)
- ▲ Comblike Exostosis (49)
- ▶ Cavity in the spongy tissue in one long bone (296 b)
- ● Old woman with severe arthrosis (771)
- ● Oldest woman of the urnfield (1769)
- ▮ Osteomyelitis (767)
- ◆ Arthritis in phalangeal trochlea and secondary sclerotic layer in long bone (1872)
- Root of tooth with clot of cementum

4 – MISCALLENEOUS and MYSTERIOUS CHANGES.

Apart from anatomical variations and well known pathological changes (Plan III) Schwissel shows some phenomena of hitherto unknown etiology.

Skull bones, usually tabula interna, show impressed lines, parallelaand branching. The surrounding surfaces are smooth, arterial grooves are hardly discernible.

Cremation 678 (E16), young to middle adult female, shows in both parietal middle regions these lines across a larger and in the inner aspect of frontal bone various smaller areas (Fig. 9, C) (I. Kühl, 1982).

Cremation 1432 (J 18/19), middle to late adult female, contains a parietal fragment with sagittal suture showing two sharply defined areas with these lines in close proximity. Enlargement of this area shows particularely in the right segment a gradual diminuation of these "lines" (Fig. 9, C).

These formations are exceptional, because they do not appear generally and only in singular skulls in different areas. It is possible that these changes are

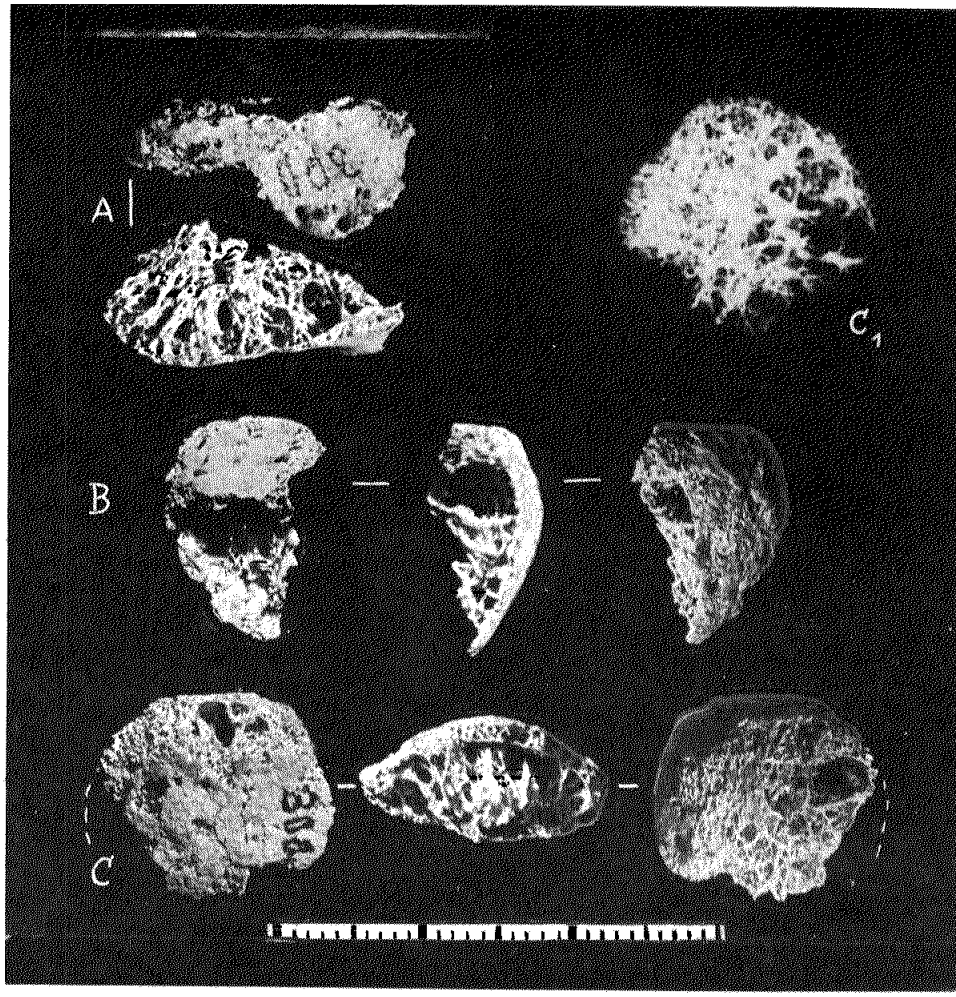


FIGURE 16 – Cremation 300, child, infans (9 - 10 years of age).

A) Distal end of femur (?) and both patellae (B + C) show abnormal coarse spongy tissue C1) Radiograph of better preserved patella. (Each stroke at the measure tape indicates

caused by cremation, on the other hand it might be unlikely because the obvious cracks due to heat frequently are seen running transversely to those lines. It is possible that a process intra vitam is going rise to such changes by cremation heat, which might show up an otherwise invisible structural change of the bony surface.

Cremation 827 (I13), middle to late adult female, shows a fragment of atlas, right portion near spinal canal with a small oval tumor between the articular surface for the condyles of the skull and foves dentis. On the right the tumor is separated from surrounding bone by a small cleft. There is also a cleft running through the middle of the exostosis. The tumor show brownish colour in contrast to the surrounding whitish bone of the atlas. Another peculiarity are mild convex areas on the innervault of the skull, not seen in other skeletons (this cremation also contained skeletal remnants of an almost mature foetus (I.Kühl, 1983, b).

We also want to draw attention to the deformed ischial tuberosity from grave 1408 (I 17) middle adult female, which is without parallel, and hitherto undiagnosed. Thickening surrounding the dented area consists of compact bony substance as shown by x-ray (I. Kühl, 1983 a). The dorsal aspect of the ischial tuberosity is of normal appearance (Fig. 14, 11 +11 a).

Cremation 300 (M16) (Fig. 16).

Child, infans II, appr. 9 - 10 years of age by dental status. For a child a relatively large weight of cremation : 370 g, including parts from all skeletal regions. The patella and a fragment of a lower end of the femur (?) are conspicuous on account of coarse spongy tissue. No explanation or diagnosis hitherto.

Fragments of proximal ends of humerii from graves 885 (I 13) and 1915 (D 9) show a roughened sclerotic prominent ridge, runiing immediately below the head of the humerus horizontally round the shaft of the preserved portion. Above the ridge the exposed spongiosa of the shaft near caput humeri shows strong vertical beams of spongy tissue. Surely these are particularely strong attachment areas for tendons causation for this strengthening is not known (Fig. 17).

In cremation 885, middle to late adult female, are

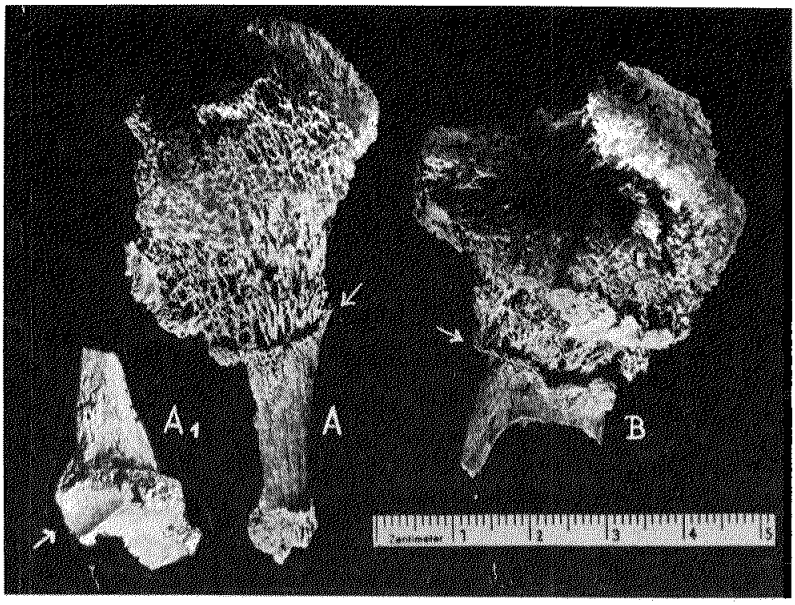


FIGURE 17 – Proximal ends of humerii

A) Cremation 1915, mature female. A roughened sclerotic prominent ridge running immediatelly below the caput horizontally round the shaft of the preserved portion (arrow).

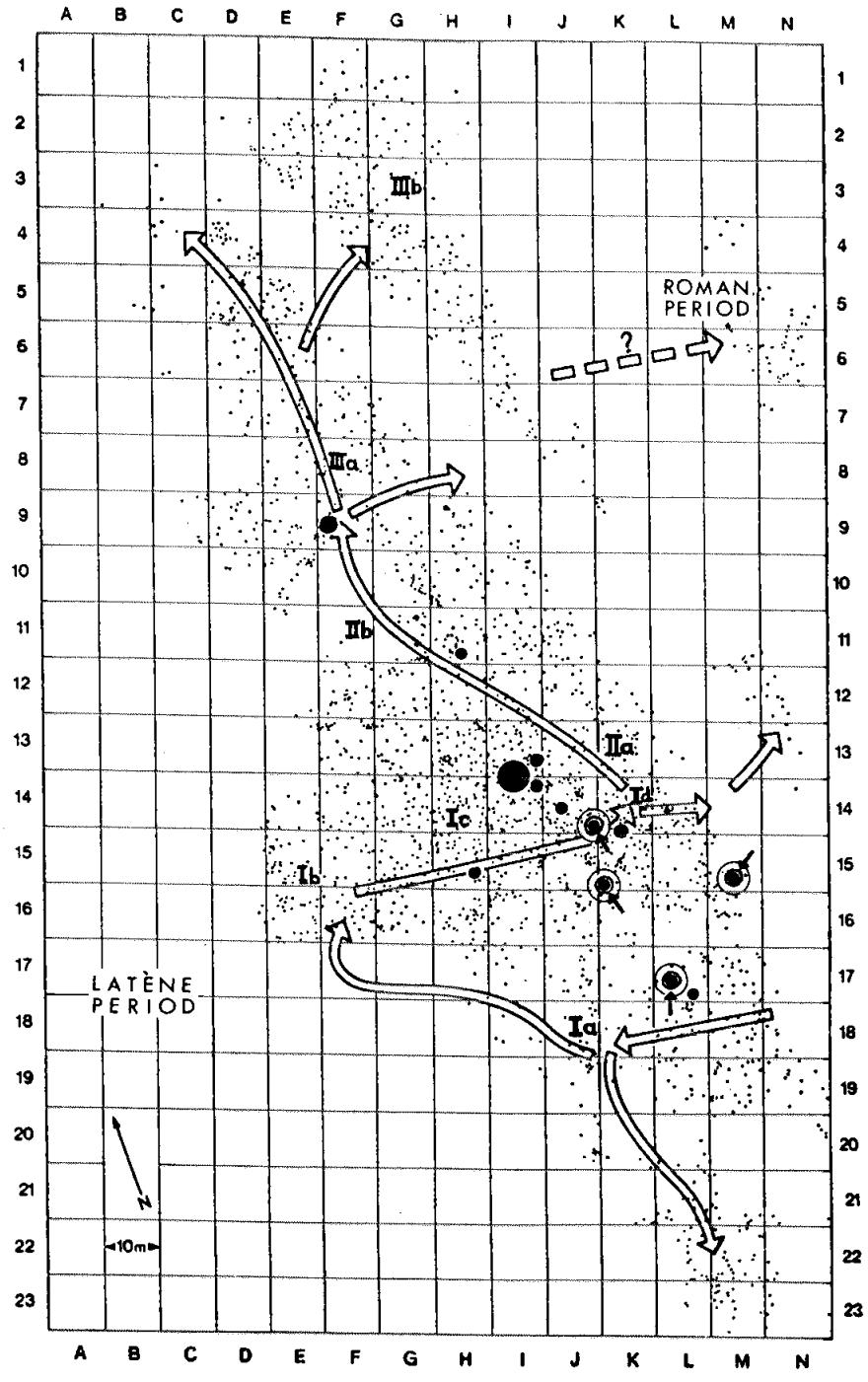
A1) Distal end of radius showing arthrotic effect at incusura ulnaris capitulum ulnae.

B) Cremation 885, middle to late adult, sex unknown. Proximal end of humerus, showing same sclerotic prominent ridge running round the shaft as cremation 1915 (From same individual see Fig. 13. L).

PLAN IV

Distribution of supposed mother-child cremation

- Two individuals in one urn.
- Each individual in own urn
- Burial 853 a.



also Schmorl's nodes, arthrosis, spondylarthrosis, spondylosis deformans, in cremation 1915, mature female arthrosis including the levelled out incisura ulnaris of the distal end radius (see fig. 17, A1). Finally we want to draw attention to a particular aspect of pathology : in 8 graves of Schwissel we found apart from skeletal remnants of adult females also foetal fragments (twice), and almost mature neonates. Different facts suggest that these were women, who died due to complications of birth (I. Kühl, 1983, b) : distribution of these cremations on the urnfield shows a significant frequency in the middle section of it (Ia, Id, IIa), (plan IV).

5 – CONCLUSIONS.

Results obtained so far on distribution of **anatomical variations** on the cemetery shows that foramen supratrochleare is evenly distributed across the whole urnfield. Observations by M. Stloukal and C. Wells that these occur much more frequently in females than in males (C. Wells : 10 x 1) support the suggestion that the urnfield of Schwissel was a **female** cemetery.

Perhaps the foramen supratrochleare is determined in the long run as a indicator for sexing.

All the other epigenetic traits show up in concentrations, and some appear exclusively (plan II). We found 4 examples (1 %) of **sutura frontalis** only in the middle section of the cemetery. **Os apicis** and **patella partita** are distributed evely across the field, **ankylosis of phalanges of fifth toes** by contrast only in the most recent section of the cemetery.

Exceptional is the entire lack of varieties in the oldest section of the cemetery (so far), apart from the typically female **foramen supratrochleare**, in spite of frequent finding of most complete cremations.

Because the likelihood of findings particular portions of the skeleton in a cremation depends on its bulk, weight and size of fragments, we plan for a final publication 1) to define weight categories and 2) to categorize by found skeletal elements pertaining to a discussed trait and pathological changes and to mark especially changes (e.g. plotting all distal ends of humeri and marking all with foramen supratrochleare).

Because **pathological changes** reflect also a degree of socio economic stress (H. Grimm, R. Perrot, C. Wells, etc...) we not only mention changes found but also their degree of severity and their distribution across the urnfield.

Apart from changes due to advancing age there are also singular cases of rare diseases of special causation. These include **thickening of skull vaults** (Fig. 9, E, F), **osteomyelitis** (Fig. 3), also the **porous spongiosa** of patelli and distal ends of femurs of the child age 9 - 10.

The conditions of jaws and teeth : **dental loss** and **abscesses** (osteolytic processes) are found almost exclusively in upper jaws and are gemerally of slight degree. **Parodontosis** is also seen. **Hypoplasia** or **developmental disturbances** in growth of dental roots is rare.

We found **enamel pearls** twice, **tuberculum carabelli** once. **Caries** are only rarely found in cremations, because dental crowns generally break away exposed to the heat of a cremation fire. Caries of tooth neck are found in molars and also frontal teeth, particularly severely affected is the woman from grave 2149 :15 preserved teeth show 7 afflicted with caries.

Fossa mandibularis is generally unchanged, also in the oldest woman of the cemetery (most recent section of the cemetery). It is roughened in the woman grave 2205 from the oldest section of the cemetery (late adult to mature female). Here in distal end of femur also structural loss.

The spinal column shows **Schmorl's nodes, spondylosis, spondylarthrosis** of atlas-epistropheal joint of slight to medium degree of severity (4 deep herniations have been mentioned). A compression fracture of a lumbar vertebra, also showing severe spondylosis deformans is mentioned from cremation 876. Disease of long bones is rare. **Harris'lines** occur in young skeletons frequently (I. Kühl, 1983 a).
Signs of arthrosis of joints are rare and slight, only severer in 771, 1487 and 1915.

On a larger long bone is a comb-shaped exostosis (cremation 49, fig. 13).

A singular case is the obvious osteomyelitis of the femur (?) of the women from grave 767.

We also mention such phenomena which so far could not be diagnosed, e.g. those concentrations of fine lines in circumscribed areas on tabula interna of the skull (cremation 678 and 1432, fig. 9) also a deformed ischial tuberosity (1408, fig. 14, 11 + 11 a), and exostosis of atlas (cremation 827, fig. 14, 1).

We pointed out supposed mother-child cremations as a pathological speciality (I. Kühl, 1983 b) (distribution : Plan IV).

The **distribution** of some pathological changes seems to indicate some special aspects : changed skull bones were found in the oldest part of the cemetery, as well as **hypoplasia of enamel** in teeth (cremation 2177, fig. 6, A, C), **porous spongiosa** (cremation 300, Fig. 16), **spongy rarefication** cremation 2205, fig. 14, 17), **arthrosis** of capitulum radii (cremations 257 and

1366, fig. 14, 2 + 3). Very pronounced **Schmorl's nodes** in the middle section of the cemetery, plan III (cremation 311, 364, 686, 833).
In contrast the severe arthropathic changes of the large joints of the limbs are found predominatly in the most recent section of the cemetery. Similar distribution show teeth with clots of cementum at tips of their roots (Fig. 9, row B). In the middle and oldest sections of the cemetery the supposed mother-child cremations were found. Their distribution and that of deep Schmorl's nodes seem, with the exception of cremation 833, excluding each other.

At the end of this work we have to mention pathological changes or anatomical variations which could not be seen : exostosis of ear and frontal sinus (as e.g. in cremations of urnfield Wissing) and Torus palatinus or mandibula (with the exception of a small torus of mandible below the region third molar-ramus, that means the end of linea mylohyoidea).

There are no fused vertebrae or bridging spondylosis deformans. Further there were neither hints about fractures or signs of nonaccidental trauma.

Obviously these individuals buried at Schwissel are a female population generally with usual aging processes without signs of severe disease or special stresses. Signs of severe illnesses recongnizable by skeletal changes occur only seldomly.

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(1) 2400 of supposed 3000 graves had been excavated, mainly 1956 - 1959.

(2) Aneurism : a tumor produced by the local dilation of an artery, usually the result of chronic inflammation of the wall which weakens it (Two types : 1) Fusiform, and 2) Secular form).

(3) See tooth wear, Fig. 12 C, J.

(4) Diagnosis by M. Remagen (Basel) : all of these particles are fragments of bones showing chronic supurating osteomyelitis with denseness and thickening of bone and tubular and groove-like structures forming sinusses. If changes in this long bone are resulting from osteomyelitis it is of cause thinkable that this individual was a times or lastingly a sick person in need of continued care.
A chronic supurating osteomyelitis can in the long run be lethal due to other conditiones developing, i.e. amyloidosis or generalised sepsis.

(5) See also radiograph (I_2) it proves the pits are not caused by postmortem damaging.

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