

# A Leper Cemetery at South Acre, Norfolk

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*Castle Museum, Norwich*

*'In this Parish was an House of LEPERS, with a Church dedicated to St. BARTHOLOMEW. . . . The Place where the Church and House of Lepers stood, is now known by the name of Bartholomew Hill in SOUTHACRE, which lies on the Road from Swaffham to Castleacre, where some remains of a little Pedling FAIR is still kept on St. Bartholomew's Day, and here some People Digging lately for Stone, found several Humane Bones, Skulls, etc.'*

Blomefield (1769), III, 419.

ON 11 January, 1967, during the widening of the A1065 road at South Acre, Norfolk (O.S. Grid Ref. TF/81811304), the remains of twelve human skeletons were discovered. They lay immediately W. of the road at a depth of about 3-4 ft.; possible wall foundations were adjacent to the burials.

The area is still known as Bartholomew's Hills, though at an earlier date it was also referred to as the Land of Rachenesse. *The Red Book of Lynn* refers to the leper house at Racheneise in 1340 but we know little more about it than the brief details given by Blomefield. It was probably founded about the time of Henry II, and Knowles and Hadcock (1953)<sup>1</sup> suggest that it may have fallen into disuse after about 1350, perhaps as a result of the Black Death.

The recently discovered skeletons were all damaged by a mechanical excavator which removed their feet, or from some, their feet and lower legs. Of the twelve bodies exposed several were represented by only a handful of small fragments. Only five had intact skulls.

Their morphological appearance would be compatible with a date c. 1100-1350. In certain features, metrical and non-metrical, they resemble a group of medieval inhumations from Red Castle, Thetford (Wells, 1967). A few metrical details are shown in Table I (p. 243). The most interesting aspect of the South Acre skeletons, however, is the pathology they exhibit. Seven of them show evidence that can be interpreted as leprosy. In one the diagnosis is possible, in three it is probable and in three it is almost certain.

The outstanding studies of medieval leprosy have been made by Møller-Christensen (1953; 1961), who has established a triad of cranial signs which are diagnostic of leprosy when found in conjunction with certain changes in the

<sup>1</sup> For bibliographical references given thus see p. 248.

hands, legs and feet. The cranial signs are, *a.* absorption of the anterior nasal spine, *b.* absorption of the maxillary alveolar process, with loosening or loss of the incisor teeth, and *c.* osteitis affecting the palate, often with thinning or perforation of the bone, and osteitis of the conchae, vomer and other intra-nasal structures. The limb changes may involve osteitis, osteomyelitis or destruction of the metatarsals and phalanges of the feet; comparable changes in the hands; occasional osteitis of the tarsus; and very commonly periostitic changes in the tibia and fibula. Ankylosis of interphalangeal joints is also frequent.

Mention should also be made of *cribra orbitalia* or, as Møller-Christensen calls it, *usura orbitae*. It consists of a kind of porosity of the roof of the eye-socket and he found it in 44·3 per cent of 149 leper skulls excavated at Naestved. But it often occurs where no trace of leprosy is found and has also been observed in animals (Nathan and Haas, 1966). Its cause remains uncertain but there is evidence that for some unknown reason a high incidence of it is associated with leprosy.

Møller-Christensen (1961) divides the absorption of the anterior nasal spine, the absorption of the maxillary alveolar process, and *cribra orbitalia* each into three degrees of severity, I, II and III progressively. His classification is used here.

TABLE I  
Cranial measurements and stature

Inhumation	Sex	Cranial*				Stature† (approximate)
		Length	Breadth	Height	Index	
1	Female	175·2	130·3	121·7	74·4	1543 mm./5 ft. 0½ in.
8	Female	174·2	136·9	131·1	78·6	1606 mm./5 ft. 3¼ in.
9	Female	178·0	133·1	131·5	74·8	1522 mm./5 ft. 0 in.
10	Female	166·3	139·1	123·2	83·6	1573 mm./5 ft. 2 in.
12	Male	175·5	151·7	134·3	86·4	1684 mm./5 ft. 6½ in.

\* According to technique of Martin (1957) for maximum values.

† According to formulae of Trotter and Gleser (1952; 1958).

### THE SKELETAL REMAINS

The following is a brief account of the pathological changes found in the South Acre skeletons:

#### *Inhumation 1*

Female. Age 25–35. Small and lightly built. For cranial measurements and stature see Table I, above. The intact skull shows:

Absorption of the anterior nasal spine—II.

Absorption of the maxillary alveolar process—II.

Osteitis of the superior and inferior surfaces of the palate, with thinning and perforation of the bone (PL. XXVII, A).

*Cribra orbitalia* is not present. Nine metacarpals and three phalanges survive. They are normal macroscopically but show leprous osteitis multiplex cystica radiologically. Unfortunately all bones below the knee are missing.

By themselves the facial changes would not give an absolute proof of leprosy but when the evidence as a whole is taken into account the diagnosis becomes almost certain.

A few other abnormalities occur in this body. An unerupted supernumerary maxillary right incisor is present. Both mandibular 1st molars had a large caries cavity with an abscess cavity round the roots of the teeth which had drained through the lateral wall of the jaw. Each 2nd molar had a small cavity at its point of contact with the M1. Calculus was extensive on most teeth.

#### *Inhumation 2*

? Male. Age 18–20.

This consists only of a damaged parietal and frontal bone; a damaged mandible, a fragment of pelvis and some splinters of femur. The frontal bone shows: Cribra orbitalia—II. The right 1st and 3rd molars had abscess cavities round their roots which drained through a large sinus on the external face of the bone.

#### *Inhumation 3*

? Female. Adult.

This is much damaged, all large bones being splintered and the skull severely smashed and defective. The important bones diagnostically are the left talus, which shows a finely pitted periostitis, and the left calcaneus, with severe osteitis and periostitis as shown by its coarsely pitted, striated and granular surface. Part of a fibular shaft survives with marked periostitic roughening; so too does a fragment of tibia. Of the hands 7 metacarpals and 7 phalanges remain. One terminal phalange shows dubious smoothing of the ungicular process as described by Møller-Christensen. Two other phalanges, a proximal and a middle, are ankylosed in about 100° flexion and thus reveal a picture that is highly characteristic of leprosy (PL. XXVII, B). No metatarsals or toe phalanges survive.

Again the evidence falls short of absolute proof of leprosy but in the context of the series it can be rated as almost certain and is reinforced by radiological changes in the fingers suggestive of early osteitis multiplex cystica.

Other abnormalities in this burial include: Cribra orbitalia—II; and a 4th lumbar vertebra with the developmental anomaly of a detached neural arch.

#### *Inhumation 4*

Female. Age ?17–20.

This consists of a couple of dozen broken, but partly reconstructible, skull fragments and an atlas.

Part of the left maxilla survives and shows marked osteitis of the inferior surface of the palate, pitting of its superior surface and marked irregularity indicating infective sinusitis, on the floor of the antrum. The palate also appears to be thinning somewhat near its middle point. The changes are very characteristic of leprosy and, although no more of the skeleton survives to give further evidence of the disease, we must regard leprosy as a possible—even probable—diagnosis. But it must be remembered that various infections such as chronic rhinitis might perhaps give this appearance.

Other pathological conditions here include caries of the 1st and 2nd molars, with a periodontal abscess cavity around the 1st which discharged on to the external surface of the bone.

Cribra orbitalia is absent.

#### *Inhumation 5*

This consists of almost nothing but a dozen tiny fragments of an adult cranial vault.

*Inhumation 6*

Female. Adult.

This consists of a damaged frontal bone, a few other cranial fragments and some small scraps of pelvis, scapula, ribs and femur.

The frontal fragment showed: Cribra orbitalia—II.

*Inhumation 7*

This consists of about a dozen small splinters of long bone.

*Inhumation 8*

Female. Aged 22–24. The skeleton is almost complete except for the absence of foot bones. For cranial measurements and stature see Table 1, p. 243.

The skull is metopic and shows:

Absorption of the anterior nasal spine—I.

Absorption of the maxillary alveolar process—II (PL. XXVIII, A).

Osteitis of the palate, which is thin and perforated.

Thickened and osteitic nasal conchae (PL. XXVIII, A).

There is also a pitted, granular area of bone lining the sockets of the maxillary right incisors.

Part of a fibula and both tibiae show periostitic thickening and pitting, appearances which are extremely common in leprosy (PL. XXVIII, B). Five metacarpals and sixteen phalanges are present but appear to be normal.

Cribra orbitalia is absent.

The maxillary left 1st premolar has rotated through an angle of 90° in the jaw.

The facial and lower leg pathology taken together make the diagnosis of leprosy almost certain and this is again reinforced by the radiological changes in the fingers.

*Inhumation 9*

Female. Age 30–40. For cranial measurements and stature see Table 1, p. 243.

The skull is intact and shows:

Absorption of the anterior nasal spine—III (PL. XXVIII, C).

Absorption of the maxillary alveolar process—II.

Osteitis of the palate and of the nasal conchae.

Cribra orbitalia—II.

The distal extremity of the right tibia shows periostitic roughening.

No hand bones survive. From the feet a cuneiform, two metatarsals and a phalange remain. The cuneiform is lightly pitted and roughened. The facial lesions together with the periostitic tibia and cuneiform make the diagnosis of leprosy almost certain.

A few other pathological conditions are present. All molars, the maxillary premolars and the right canine had been lost during life but have left traces of old abscess fistulae.

In the spine, which is complete, early osteophytosis is present on the upper and lower margins of the body of L4 and on the upper margin of L5. Early osteoarthritis occurs bilaterally on the costal facets of the transverse processes of T6, T7 and T8 and on the right transverse process of T9.

*Inhumation 10*

Female. Aged 23–24. For cranial measurements and stature see Table 1, p. 243.

Most of the skeleton remains though much damaged apart from the thoracic and lumbar spine. The feet are absent but from the hands 6 metacarpals and one phalange survive. Both tibiae show the 'graining' or roughness suggestive of periostitis and this

feature, in conjunction with the evidence of the other skeletons, indicates that this may possibly have been a leper, although no evidence of this has developed in the skull and a radiograph of the few surviving hand bones is unhelpful.

A few other pathological lesions are present. The skull shows first-degree cribra orbitalia in the right orbit, second-degree in the left. The maxillary right 1st molar is carious; together with the 2nd molar it had an abscess cavity around the roots which discharged on to the external surface of the bone. Small Schmorl's nodes occur on all vertebrae from T5 to T9. Mild osteochondritis (anterior epiphyseal dysplasia) is present on the upper margins of T11, T12, L2 and L4.

#### *Inhumation 11*

Male. Aged 35-43. Very powerfully built.

The skull is missing. The vertebrae survive from C4 to L5 inclusive, also the bones of the arms. One metacarpal is the only hand bone and the feet are absent. Without skull, hands or feet no evidence of leprosy was found.

Other pathological conditions include: a fracture in the distal fifth of the right ulna; early osteoarthritis of the right elbow joint (trochlear margin of humerus, head of radius and margins of ulna); also of the left ulna; and on the sacral and iliac surfaces of both sacro-iliac joints. It is severe on both bones of the right acromio-clavicular joint. In the spine osteophytosis is present on the upper margins of the bodies of T5, T8, T9, T11, T12, L3, L4 and L5; also on the lower margins of C6, T5, T6, T7, T8, T10, T11, L2, L3 and L5. Osteoarthritis is present bilaterally at the inferior posterior intervertebral facets on the bodies of C4, C5, L3, L4 and L5 and at the superior facets of C5, L4 and L5; also on the sacrum. Superior and inferior costal facets are affected bilaterally on T5, T6, T7 and T8; also the inferior facets of T4 and the superior facets of T9.

The L5 has a detached neural arch.

#### *Inhumation 12*

Male. Aged 25-35. Strongly built. For cranial measurements and stature see Table 1, p. 243.

A metopic skull, the spine, pelvis and some limb bones survive. The skull shows:

Absorption of the anterior nasal spine—I.

Absorption of the maxillary alveolar process—I.

Slight osteitic pitting on the anterior part of the floor of the nasal fossa and also on the vomer. The conchae have been destroyed. There is slight periostitic 'graining' on both tibiae and well marked ridging from periostitis of both fibulae. Nine metacarpals and five phalanges survive, also four metatarsals, but none of these bones appear to be abnormal macroscopically although the radiograph of the phalanges suggests early osteitis multiplex cystica, such as occurs in leprosy. The facial and leg lesions combine to suggest probable leprosy.

Other pathological lesions include: Cribra orbitalia—I; caries of the maxillary right 2nd premolar and the mandibular left 2nd premolar and 1st molar. This molar was surrounded by an abscess cavity which drained through the lateral face of the bone.

A few other bones not belonging to this body were present in the remains. They include the left ischium of a new-born baby.

## DISCUSSION

Of the twelve inhumations represented at this site four (nos. 2, 5, 6 and 7) consist of only a handful of damaged bones that are worthless for diagnosing leprosy. Of the remaining eight the skull is badly damaged in no. 3, severely

damaged and deficient in no. 4 and absent in no. 11. No. 9 has one tarsal, two metatarsals and a phalange, no. 12 has four metatarsals, no. 3 has two tarsals. No other foot bones survive. Hand bones are absent in no. 9, deficient in all the rest—especially of phalanges.

Yet despite this lack of anatomical features which are important in the diagnosis of leprosy the disease is thought to be possible in one case, probable in three and virtually certain in three more. The fact that in such fragmentary skeletons support for this diagnosis can be found in seven out of the twelve (and in every case where the skull survives, even though damaged) gives a mutually supporting context in which each case is rendered more probable, perhaps to the extent of almost certainty. All the abnormalities used to sustain the diagnosis are typical of the disease and common in it. To suppose that they were, in fact, produced by a combination of several other diseases—chronic rhinitis, sinusitis, varicose ulceration of the legs, ankylosis of a fractured finger, frost-bite or diabetic gangrene, etc.—would be diagnostically clumsy when all can be subsumed under one diagnosis. The geographical association with a known leper house must also, on *a priori* grounds, add some weight to the diagnosis, though this should not be over-emphasized, because the exact situation here is uncertain and, moreover, there is evidence that either by design or accident patients who were not lepers were at times admitted to leper hospitals.

It is especially unfortunate that the road widening machinery removed almost all the foot bones since these can greatly help the identification of leprosy.

As already mentioned, the significance of *cribra orbitalia* remains uncertain (Wells, 1964) but it was present in 6 out of 9 cases (66·7 per cent) where the orbital roof survived for inspection.

Of the remaining pathology we may note the osteoarthritis of no. 9, a female aged 30–40, and of no. 11, a powerfully built male aged 35–43. The presence of extensive spinal changes in these persons suggests that they led active, vigorous and hard-working lives for a good many years before the arthritis began to develop. From this it might be inferred that when the woman (and if the man) finally contracted leprosy the disease ran a fairly rapid course since neither seems to have survived much beyond the age of 40 years.

In the jaws, or loose, 143 teeth survive of which 10 (7·0 per cent) are carious, an incidence in no way exceptional for the medieval period. But in the seven persons whose jaws survive wholly or in part twelve sinuses from discharging periodontal abscess cavities can be identified and each individual has at least one. This is a somewhat high incidence which may be due to the deterioration of oral hygiene as a result of the leprosy invasion of the tissues of the mouth. There is a subjective impression that the degree of dental attrition is less than is usually found in East Anglian medieval groups. If this is reliable it may imply that these persons sought to spare their tender, ulcerating mouths from the pain of crunching rough food and ate, as far as possible, a softer diet.

The finding of two metopic skulls among eight where it could have been recognized is not exceptional though it might hint that there was a moderately close genetic relationship between these people. This suggestion is made much more

probable by the presence of two examples of detached neural arch, a finding that might even imply that the persons concerned were closely related members of one family.

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