Clonmel Excavations – 4*

Human Skeletal Remains – Emmet Street/ Kickham Street

By Catryn Power

The excavation

Prior to modern development, archaeological investigations were undertaken by James Stack at Kickham Street and Emmet Street in Clonmel, over a five-week period in April and May 1993. The site was located outside the medieval town wall and in the vicinity of Clonmel Gaol (Cleary, 1993). The primary purpose of the excavation was to locate medieval deposits and their relationship to the medieval town wall.

The first town defences constructed around Clonmel were probably in the form of an earthen bank and palisade built after the Bruce Invasion in 1315. By 1319 a grant was made available for the construction of a wall. It is generally thought that the medieval town walls of Clonmel fell into disuse sometime in the second half of the 18th century.

Earth-cut graves containing human skeletal remains were discovered on this extra-mural site. The skeletal remains were buried in an east-west direction. Finds, including clay pipes from the excavation, suggest that the skeletal remains were dated to the 17th/18th centuries A.D. A set of bone rosary beads was found wrapped around the fingers of one of these skeletons (103); the excavator suggests that this person may have been a priest. It is known that a number of priests were executed in Clonmel in the 16th and 17th centuries.

The human skeletal remains

A minumum number of at least nine individuals were represented in these skeletal remains (93D67). Seven of these were definite burials with large amounts of each skeleton present. However, the disturbed and fragmentary remains of an eighth skeleton (Skeleton 100) were also present. At least two skulls were represented by fragments from deposits 93E67:11 and 93E067:14, and with Skeleton 102. One of these skulls represented a ninth individual and a second may belong to Skeleton 101; it is not possible to be certain.

The six skeletons whose sex could be determined were all male. In a typical cemetery population one would expect to find the remains of women and children also, either complete skeletons or a few bones; no such evidence was found with this group. The explanation may be that the presence of an all male sample was coincidental.

On the other hand these individuals may have died during an epidemic and were buried away from the main graveyard, and as far from the townspeople as possible, for fear of contracting a contagious disease such as an outbreak of typhus or one of the "military sweats" etc. One would then perhaps expect the burials to be carried out hastily i.e. in a mass grave; but this does not appear to be the case.

*For Clonmel Excavations 1 and 2, see THJ 1995, pp. 152-174. For Clonmel Excavations 3, see THJ 1996, pp 175-178. For Introduction (by Patrick Holland) to series, see THJ 1995, p. 151. Editor, THJ. Alternatively they could be battle victims though no weapon injuries were present. Another suggestion is that they could be prisoners from the local gaol who were hanged; evidence of hanging would not always be present on the skeleton. They could also be prisoners who died during the serving of a gaol sentence, from some disease(s) which would not have manifested on the skeleton.

Ageing and sexing

In the immature individuals age was obtained from long bone development and growth as well as dental development. Age assessment on the older individuals was acquired using degenerative changes, including those on the teeth and pubic symphyses of the pelves. Identification of sex could be determined in six cases.

The pelves were present in four subjects, enabling sex to be determined. In the other two individuals it was possible to assign a sex from the skull.

Stature

Stature could be estimated for mature adults who had all long bone epiphyses, centres of bone growth at each extremity of long bones, fused. The lengths of the long bones of the lower limbs provide the most accurate assessment of height and were available for four adults. The stature estimation from a small number of males from Waterford City dating to the late 17th century/early 18th century ranged from 173-179cm, while the range from a larger group of the medieval males was from 153-177cm (Power, forthcoming).

The heights for these males from Clonmel varied from 163cm to 170cm and fall within the estimates for the medieval group. Although the number of individuals was small, the average height was 166cm, similar to that obtained for a 16th-19th century Scottish population from the Isle of Ensay (Miles, 1989). The average for 16th century Tintern, county Wexford (Ó Donnabháin, 1985) was somewhat higher. The mean for 17th/18th century males from Waterford City was 173.2cm, while that for the medieval males was 168.2cm (Power, forthcoming).

Genetic variations

These are traits which are inherited. Some of these morphological variations run in families; however, there was no clear evidence to suggest that this was the case and it would be inadvisable to infer family relationships within cemeteries until further research on their aetiology has been undertaken.

The anomalies on the individuals from Clonmel were unlikely to have caused any physical problems for the individuals involved. Anomalies were evident in five men. One individual (Skeleton 104) had five anomalies, while three individuals (Skeletons 102, 105 and 106) had two anomalies each.

Inca bone

This is a large accessory ossicle, or bone, in the lambdoidal region of the occipital bone of the skull. It occurs when the centres of ossification of the interparietal part of the occipital bone fail to coalesce with the superior part of the occipital. Skeleton 102, a male in his early twenties, displayed one such bone.

Supra-condyloid process

A supra-condyloid process or supratrochlear spur is a small, roughly triangular and hookshaped exostosis which projects *ca*. 8mm above the medial condyle of the right humerus. It is an accessory ligamentous attachment site for the origin of the pronator teres muscle. It is found in 7 of 1000 living subjects (Schaeffer, 1942), and is an uncommon finding in most archaeological samples. One occurred on one individual from this Clonmel assemblage (Skeleton 102).

Sesamoid bone

This is an oval nodule of bone which occurs in a tendon. It is cartilaginous in early life and osseous in the adult. It occurs more commonly in males than females. Two sesamoid bones were found with the foot bones of one male (Skeleton 104).

Sacralization

A congenital condition that results in this case in the complete fusion of the most inferior lumbar vertebra (fifth) to the sacrum. This morphological variation had occurred in one male (Skeleton 104).

Foot anomaly

An anomaly occurred on one foot bone of one male (Skeleton 104), on the medial surface of the shaft of the second left metatarsal.

Wormian bones

A wormian bone is a separate bone or ossicle that persists in a suture, usually lambda. Three males (Skeletons 104, 105 and 106) from this Clonmel sample have these bones. As many as 6 bones were present on one skull (Skeleton 104).

Enamel variations

An interradicular extension of enamel was evident on one – a first mandibular molar (101), on a maxillary wisdom tooth of a second male (105) and on a mandibular wisdom tooth of a third male (Skeleton 106).

Fenestration

This defect reflects the presence of thinner than normal bone in the region. One occurred on the surface nearest the cheek of a maxillary second molar of one male (Skeleton 104).

Pathology

Enthesophytes

These are bony projections which are spike-like spicules or spurs of irregular ossification, where tendons and ligaments attach to the bone. They are caused by stresses or trauma or they may be age-related. The attachment of the Achilles tendon on the calcaneous bone, the heel, is a frequent site of involvement.

Enthesophytes were evident on the heels of three individuals (Skeletons 102, 103, and 104). They also occurred on other bones of two of these males: on the knee caps of Skeleton 102 and on the tibia immediately above the ankle of Skeleton 103. Violent muscle strain or the excessive demands of everyday labour may be responsible for the enthesophytes in this group of men from Clonmel.

Fractures

Two individuals (Skeletons 102 and 103) each had a fracture to the midshaft of a single rib.



Plate I – Osteophytes or bony projections on the margins of the vertebral bodies of the spine.



Plate II – Attrition had destroyed the enamel on the bitng surfaces, exposing the underlying dentine of these teeth, similar to that found on the Clonmel individuals.

One male (Skeleton 103) suffered a blow to the lower left back. The ribs are a common site of fractures. Fractures to the rib are caused by an accident such as a fall or a direct blow from interpersonal violence. These well healed injuries were also well aligned and would probably have healed without medical treatment.

Degenerative joint disease

Degenerative joint disease develops on the basis of ageing changes and degeneration of articular cartilage. Numerous factors play a role in the aetiology and development of the disease, including age, sex, loading stresses and trauma. The weight-bearing joints, such as the vertebrae, hips and knees, are the most frequently affected joints, though any joint can be involved.

The changes on the skeleton include osteophytes (Plate I), which are bony projections, at the joint margins, pitting or roughening of joint surfaces and, in severe cases, eburnation of the articular surfaces where loss of cartilage had enabled bone to move against bone resulting in a polished appearance. The spine is most often affected.

Osteophytes were seen in the spine of the oldest individual from Clonmel (Skeleton 103). This individual may have been unaware of the process. The left and right hands of two males (Skeletons 102 and 103) and the feet of one (Skeleton 103) were also affected by osteophytosis. Osteophytosis was not present in the younger individuals; its incidence seemed to increase with age.

Schmorl 's nodes

Schmorl's node is a depressed lesion on the inferior or superior surfaces of the vertebral body caused by prolapse of the intervertebral disc material. Schmorl's nodes occurred in the spines of four individuals: (Skeletons 102, 103, 104 and 105). Its incidence shows an increase with age.

In all of these men the lower thoracics were involved, while in the older individuals the presence of Schmorl's nodes had increased to include the upper lumbar vertebrae. This degenerative disc disease results from trauma from such activities as a fall from a height, lifting heavy loads etc., in particular during the adolescent period. Metabolic disorders and degenerative disease may also have been responsible.

Periostitis

Periostitis results from inflammation of the periosteum as a result of direct trauma, infection that has travelled to the bone through the blood (e.g. syphilis), scurvy and a host of other factors. Four individuals of all ages (Skeletons 101, 102, 103 and 106) have areas of reactive new bone on one or more long bones. Trauma was not associated with any of these lesions.

The tibia is generally the most frequent site for such non-specific periosteal lesions; this was also the evidence from Clonmel. Its occurrence on the long bones was usually bilateral. The bilateral occurrence and frequency on the tibia were findings which were similar to those from Waterford City (Power, forthcoming). At Clonmel the femur was the second most common long bone to be affected, followed by the fibula. Periosteal lesions occurred on the sacrum and right ilium and left ischium of one individual (Skeleton 102) and on the left clavicle of another (Skeleton 106). Small patches of periostitis were associated with the eruption of the maxillary wisdom teeth of one man (Skeleton 105).

Scurvy is one suggested aetiology for these lesions. Scurvy is a deficiency of ascorbic acid (vitamin C). A lack of fresh foods, meat, fruit and vegetables would have resulted in a serious deficiency of vitamin C. Scurvy would have been a common occurrence in 17th/18th century

Clonmel. Premortem tooth loss and periodontal destruction are some of the characteristics associated with scurvy.

In the individuals with periosteal lesions three had lost teeth during life and one of these had alveolar recession. However, the tooth loss could have been caused by dental caries. Another possible causative factor is syphilis or treponemal disease, which was prevalent in Ireland during the period that these men existed.

Periostitis is a frequent finding in human skeletal groups and it cannot be satisfactorily explained. It is not possible to ascertain the cause of the periosteal remodelling in the five cases from Clonmel, except that direct trauma was not involved.

Porotic skull lesions

Superficial porosity of the cranium was seen on four individuals (Skeletons 102, 104, 105 and 106). This lesion is frequently seen in archaeological skeletal remains but its aetiology is unknown. The cause may have been due to a chronic nutritional defect or general ill-health. One of these individuals also had cribra orbitalia, or porosis, on the orbits (the roof of the eye sockets). Cribra orbitalia is widely believed to have its aetiology in iron deficiency anaemia perhaps related to infectious disease or nutrition.

Cysts

Two cysts were present on one bone from the left foot of one subject (106).

Dental pathology

Attrition

The factors contributing to attrition are varied and include the occlusion of the opposing teeth, the quality of the teeth and abrasives in the diet. Attrition in four of the eight individuals with teeth had destroyed the enamel on the biting surfaces, exposing the underlying dentine (Plate II). In the other subjects attrition was milder and had resulted in rounding of the enamel on the cusps. Attrition seems to have increased with age. An abrasive diet containing tough unrefined cereal foods was probably responsible.

The amount of wear seen on these individuals was not as severe as that seen on the medieval population from Waterford (Power, forthcoming), perhaps reflecting some refined foods in the diet by the end of the 17th century, though the diet was still considerably tough.

Calculus

Dental calculus is caused by mineral deposition in bacterial plaque adhering to inadequately cleaned teeth. It occurred in all except two subjects with teeth. It was present in mild amounts on the teeth of three individuals and deposits were severe in two mouths.

Calculus can act as a tissue irritant and helps maintain the inflammatory process of gum disease. Deposits were associated with the two individuals with periodontal disease. Calculus was severe in the oldest subject.

Dental caries

Dental caries is an infectious disease which results in the progressive destruction of tooth structure caused by microbial activity on the tooth surface. Caries occurred on 13 teeth in three individuals, with a total of 14 cavities between them. Pulp exposure was associated with caries in eight teeth in the three individuals. Caries experience, as expressed by the proportion of carious teeth to the total number of teeth present, was 10.7%.

This was slightly higher than that of 8.8% for the medieval group from Waterford City, while it was lower than 13.6% for the 17th/18th century group from the same site (Power, forthcoming). In the 17th century the addition of refined sugars and flour to the diet had resulted in a greater caries frequency both at Clonmel and Waterford.

Periodontal disease

Periodontal disease is a chronic condition in which the alveolar bone supporting the teeth is gradually lost as a result of bacterial infection. The teeth become loose and are eventually lost when the supporting structures are destroyed.

Periodontal disease was present in two individuals (Skeletons 103 and 105) and was associated with poor oral hygiene in the form of deposits of calculus, which would have irritated the gums and any inflammation. It was evident as infrabony pocketing around some of the sockets in these subjects. Some of the teeth lost during life may have been lost as a result of periodontal disease, though in most cases dental caries was more likely to be the cause.

Antemortem tooth loss

Teeth are lost during life due to dental caries, attrition, periodontal disease or trauma (Plate III). Three subjects of differing ages lost teeth during life. As many as eight teeth were lost in one man (Skeleton 102) aged in his early twenties. One tooth was lost in a teenager (Skeleton 106), and the oldest man (Skeleton 103) had lost three teeth antemortem. Each of these three men had several carious teeth. In these cases dental caries was most probably responsible for the premortem loss of teeth.

Abscess cavity

This sinus formation results from inflammation at the apex of a tooth root. The majority of these usually result from dental caries or severe attrition; both can lead to infection of the tooth pulp cavity when it is exposed. One man (Skeleton 102) in his early twenties suffered from an abscess associated with a maxillary wisdom tooth. This tooth had not been attacked by caries but the tooth in the adjacent socket had been lost during life, most probably due to infection caused by caries; the infection would have then spread to the wisdom tooth. Caries was prevalent in his mouth and at least eight teeth had been lost during life, all probably as a result of caries.

Hypoplasias

These are horizontal grooves resulting from a disturbance in the development of the enamel. Factors responsible for these defects during the development of the teeth include fever such as measles and chicken pox, disease and nutritional deficiencies (especially Vitamins A and D). These occurred in eight individuals, all of those with teeth.

All defects occurred in early childhood, between the ages of 2-6/8 years and one of these individuals had defects also in later childhood, between 10-12 years. Childhood illnesses may have been responsible for these hypoplastic stresses; however, other diseases and nutrition may also have produced these defects.

Cause of death

It was not possible to determine the cause of death of any of these individuals (Plate IV). Many of the fatal diseases which affected past Irish populations leave no imprint on bones. Bony changes would not have developed on individuals who died from acute diseases. Those who survived the acute stages of the disease developed the chronic form, and can sometimes be identified skeletally.

Death from infectious disease occurred frequently in the 17th century, when these individuals from Clonmel lived. Epidemics of influenza with pneumonia were widespread and responsible for many deaths, while dysentery, smallpox and tuberculosis also competed for victims. Plague and typhus accounted for many deaths. Typhus was a disease of overcrowding and of poverty. It was endemic among rat populations and sometimes spilled into the neighbouring human population with catastrophic consequences. It was carried by lice.

The cause of death is usually impossible to determine from skeletal remains unless irrefutable evidence exists such as an unhealed head injury. No such injuries were present on these individuals from Clonmel. It was not possible to determine from the skeletal remains if these individuals suffered a death from war, violence or an accident, or if they had been hanged. If they represent prisoners from the local gaol, they may have died from outbreaks of infectious disease in a prison which may well have been overcrowded and ideal for the spread of contagion.

Summary

This small population sample shows evidence of dental disease, including caries, periodontitis and abscess formation. Evidence from the dentition indicates that large amounts of starchy carbohydrates, tough abrasive cereals and some porridges were consumed. Dental hygiene was poor. Pathological stresses occurred frequently in early childhood.

A heavy workload probably resulted in trauma to the spine and torn ligaments on the knee and ankle joints. Degenerative disease was also present in some hand and foot joints. Other trauma in the form of fractures to the ribs also occurred. Possible anaemia-related pathologies were present.

Skeletal inventory

93E067:11

These remains consisted of one right rib, seven mandibular teeth and the left part of a mandible containing sockets from the central incisors through to the wisdom tooth. These bones may have belonged to 93E067:14 or to another individual. Attrition was severe, resulting in dentine exposure and it also suggests an age of at least the early twenties. Mild deposits of calculus adhered to some of the teeth. Developmental defects in the form of hypoplastic grooves took place on one tooth at the age of 4-6/7 years.

93E067:14

These remains consist of a fragment of the frontal bone of a skull. They may belong to 93067:11 or to Skeleton 101 or to another person.

Skeleton 100

These remains consisted of a skull, part of the right maxilla, two teeth, a rib fragment, some hand bones, two cervical vertebrae and the proximal phalanges of each big toe. It was not possible to determine if all of these bones belonged to the one subject; however, a minimum of one person was represented. They were mature young adult bones, probably aged in the late teens/early twenties. Identification of sex could not be determined. Hypoplastic defects on the teeth indicated that some illness or deficiency occurred between the age of 3-6/7 years.



Plate III – A healed or resorbed tooth socket following the loss of a tooth during life.



Plate IV – Skeleton 103.

Skeleton 101

These remains consisted of a complete skeleton in very good condition, a male aged between 14-16 years. One interradicular enamel extension was present on a mandibular first molar.

Patches of periosteal new bone occurred on the shafts of each tibia and femur. Mild attrition was seen on the teeth. Mild deposits of calculus were evident on some teeth. Hypoplastic defects occurred on five teeth at some time between the age of 2-7/8 years.

Skeleton 102

These remains consisted of a complete skeleton in good condition but very fragmented, a male aged in the early twenties. Stature estimation: 163 cm. An inca bone was evident on the skull at the junction of the lambda and sagittal sutures. A supra-condyloid process was present on the shaft of the right humerus.

Enthesophytes have developed on the posterior surface of each calcaneous and on the anterior and superior surfaces of each patella. A well healed fracture was evident on the midshaft of the left twelfth rib. Osteophytosis affected the left and right hands. Schmorl's nodes occurred on the lower thoracic and upper lumbar vertebrae. Patches of periostitis occurred on the anterior surface of the second to fourth sacral bodies, on the lateral surface of the right ilium, the anterior surface of the left ischium, and on the shaft of each tibia and femur. Porotic lesions affect the frontal, parietal and occipital bones of the skull.

Attrition had resulted in dentine exposure on most teeth. Calculus deposits were mild. A total of seven carious cavities occurred on six teeth. Periodontal disease was present. Eight teeth have been lost during life and resorption occurred at the base of ten other teeth which was probably present during life. One abscess cavity occurred at the base of the socket of a maxillary wisdom tooth. Hypoplasias on ten teeth indicated that these defects occurred during the age of 2-6/7 years.

The distal left femur exhibited an area of green copper salts staining on its posterior surface, almost the size of the condyles. This indicated that a metal artefact was in contact with the left knee at the time of burial.

The right part of a frontal bone belonged to a second individual was present with this subject. It could have belonged to Skeleton 101 or to another person.

Skeleton 103

These remains consisted of a complete skeleton in very good condition, a robust male aged at least in the late thirties to early forties. Stature estimation: 166 cm.

Enthesophytes occurred on the internal surface of the left tibia immediately above the medial malleolus and on the posterior surface of each calcaneous. An old well-healed fracture was evident on the midshaft of the twelfth left rib. Each shoulder joint was affected by osteophytosis and osteoarthritis. Osteophytosis also occurred on the first and second metatarsal of each foot and on phalanges from each hand. The middle and lower thoracic and the lumbar vertebrae were affected by osteophytosis. Schmorl's nodes have developed on the lower thoracic and lumbar vertebrae. The shaft of each tibia, the right fibula and right clavicle were affected by periostitis.

Severe attrition had resulted in dentine exposure on all teeth. Severe deposits of calculus were present. Carious cavities occurred on four teeth, resulting in loss of a total of three crowns. Periodontal disease had resulted in bone loss and pocketing around the molar teeth. Three teeth have been lost during life. Hypoplasia occurred on one tooth during the age of 4-6/7 years.

The ventral surfaces of the bodies of the third and fourth lumbar vertebrae and the dorsal surface of the spinous process of the second lumbar exhibited green copper salts staining. This indicated that a metal artefact was encircled around the lower back at the time of burial.

Skeleton 104

These remains consisted of a complete skeleton in very good condition, although some bones showed some breakage. Male aged in the twenties. Stature estimation: 166 cm. The fifth lumbar vertebra was sacralized. An anomaly occurred on one foot bone; on the medial surface of the shaft of the second left metatarsal the articular surface immediately above the base was not in its correct anatomical position but projects outwards. There were six wormian bones on the lambda suture. Two sesamoid bones were found with the foot bones. A fenestration was evident on the cheek surface of the alveolar bone comprising the socket of the maxillary left second molar.

Enthesophytes had developed on the posterior surfaces of each calcaneous. Schmorl's nodes affected the lower thoracic and lumbar vertebrae. Porotic lesions were obvious on the parietal and occipital bones of the skull. Severe attrition had resulted in some dentine exposure on most teeth. Deposits of calculus were mild. Hypoplastic lines took place on thirteen teeth at some time between the age of 2-6/7 years.

Several bones, some belonging to a young adult, of a second individual were mingled with this skeleton; these include some foot and arm bones.

Skeleton 105

These remains consisted of the upper half of a skeleton in good condition, a male aged in the late teens/early twenties. Three wormian bones occurred on the lambda suture. An interradicular enamel extension was evident on the maxillary right wisdom tooth.

The lower thoracic vertebrae were affected by Schmorl's nodes. Patches of periosteal new bone occurred on the alveolar bone around the erupting maxillary wisdom teeth. Porotic lesions occurred on the frontal and parietal bones of the skull.

Some teeth had dentine exposure due to attrition although most teeth were rounded by wear. Calculus deposits were mild. Periodontal disease was evident in the form of pocketing. Hypoplasia was present on fourteen teeth and occurred between the age of 2-8 years and again between 10-12/16 years.

The left part of a frontal bone from the skull of a second subject was present with this skeleton.

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Skeleton 106

These remains consisted of the upper half of a skeleton in a very fragmented condition, in particular the cranium and vertebrae. A possible male aged in the late teens. Stature estimation: 170 cm. Two wormian bones were present on the lambda suture. The mandibular left wisdom tooth displayed an interradicular extension of enamel.

The shafts of each tibia and fibula and the left femur and left clavicle displayed periosteal new bone. Porotic lesions occurred on the parietal bones of the skull. There were two possible tiny cysts on the talus of the left foot; these were circular in nature. One was on the articulating facet for the tibia and the second occurred on the facet for articulation with the navicular; porosity being associated with the latter.

Mild attrition was evident on all teeth, resulting in rounding of the tooth cusps. Calculus deposits were mild. Three carious cavities involved pulp exposure of the crowns of three

molars, very little enamel and dentine remained. One tooth was lost during life; resorption occurred in the socket of another molar but it was not possible to determine if this tooth was lost during life. The lower half of one crown was affected by hypoplasia which occurred during the age of 4-6/7 years.

Some bones of a second individual were mingled with this skeleton, these include foot and long bones; some of these belong to a young adult.

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I would like to thank James Stack, Ballinlonig, Dromcolliher, Co. Limerick, for unpublished information on the excavation of this site.

The stone contain wall, complete with lowers, bettlements, mechicolations and gitte, would have stood behand the curthers defences (Thimes Vol. 1, 1211, Howevers a town wail wan residulity no ultimate protection. Freq was a major fast, as much at the multicyal wallod town would have been of wood and thatch.

Maps, complete with "fown walks". In 1779 a consider and doi: the fouries of the Ordentice Starway is http://www.second.com/ordentice/second of Interable workmanship" (Linkombe 1780). for the second start is the inhebition of antices in the first wands during the stops by Inchigoin of the town in 160 the inhabitions retained to the firsts for article (Unigoto 1965).

The first plan of the woll at Cashel was detern by liev. Wyne Jackson (1949, 24-5) (Figure 1], based on the O.S. maps and the Corporation minutes. The wall is roughly hear shaped, surrounding an area of 14 barranes. The encode was a single wall, with five gates and several possible turners. The determs may have included a tend and incase cally converten would provible turners. The determs may have included a tend will with incase cally converten would provide the second second field partners in 1,500 metros to length.

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