

Bioarchaeology of Two Oneota Burial Sites:
13AM43A and 13AM103, Allamakee County, Iowa

Edited by
Robin M. Lillie
Bioarchaeologist
and
Lara K. Noldner
Bioarchaeology Program Director

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Osteological Methods

The osteological analysis follows the guidelines developed by the Paleopathology Association (Buikstra and Ubelaker 1994). Osteological inventories were compiled. Cranial metrics were taken following the methods in Howells (1973), Bass (1995), and Moore-Jansen et al. (1994). Cranial nonmetric observations were based on definitions in Finnegan (1972) and El-Najjar and McWilliams (1978). Postcranial metrics were taken following Bass (1995) and Moore-Jansen et al. (1994). Postcranial nonmetric traits were scored using the definitions in Finnegan (1978). Dental attrition was scored using the coding method developed by Hinton (1981). Dental metrics were taken using the guidelines and landmarks defined by Goose (1963). Dental nonmetrics were recorded following the descriptions provided in Bass (1995). Enamel hypoplastic defects were measured using the procedures outlined by Goodman et al. (1980). Age estimates were based on one or more of the following methods: dental attrition (Hinton 1981); dental development (Moorrees et al. 1963a, 1963b), palatal suture closure (Mann et al. 1991); morphology of the auricular surface of the innominate (Lovejoy et al. 1985); epiphyseal closure (Krogman 1962); subadult diaphyseal length (Ubelaker 1989); and the presence or absence of age-related osteological change. Sex was estimated based on sexually dimorphic metric and nonmetric characteristics defined in Bass (1995). Stature was estimated using formulae applicable to Mongoloid males (Trotter 1970) modified by Byers (2008) for Mongoloid females. Pathological descriptions and possible etiologies utilized information in Ortner and Putschar (1985) and Mann and Murphy (1990).

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Analysis of Human Skeletal Remains from Flynn Cemetery, 13AM43A, Allamakee County, Iowa

Robin M. Lillie

Human skeletal remains from 13AM43A represent 38 individuals, 21 adults and 17 subadults all either excavated or collected following disturbance to the site by road construction equipment in 1958. Seven females, four possible females, three males, two possible males, and five individuals of indeterminate sex were identified among the adult remains. Age estimates for the 17 subadults included eight infants, three children, three older children, and three juveniles one probably female. Osseous pathologies included degenerative changes to the joints, cribra orbitalia, possible porotic hyperostosis, lytic lesions, cranial synostosis, possibly slight dislocation of the humeral heads, and healed fractures. One adult cranium may have had a perimortem fracture on the right parietal. Four adults and two subadults had remains displaying periostitis. One of these, an adult of indeterminate sex, also had stellate-like lesions on the cranium along with lytic lesions. This may have been a case of treponemal disease. The other three adults displayed an array of periostitis and lesions suggestive of pulmonary tuberculosis. The dentition was characterized by carious lesions, antemortem tooth loss, dental calculus, and enamel hypoplastic defects. Dental crowding and rotation was also noted. Evidence of cultural modifications included cranial deformation, asymmetrical femoral torsion, and antemortem enamel chipping. Cultural affiliation of the remains is Oneota.

The following report describes the burials and human skeletal remains excavated from 13AM43, the Flynn Cemetery. Initially, the site was recorded only as one site but was subsequently divided into three parts (13AM43A, 13AM43B, and 13AM43C) to distinguish three separate Oneota/protohistoric burial locations in close proximity to each other. Areas 13AM43A and 13AM43C both are located in the SE¼ of Section 34, T100N, R6W, Allamakee County, Iowa; 13AM43B is located in the same area but also extends into the SW¼ of Section 34 (Figure 1). In 1958, all three burial locations were disturbed by road construction. The site was also looted at this time. Three archaeological excavations were conducted at 13AM43A following the road construction disturbance. Two were undertaken by Robert Bray, then at Effigy Mounds National Monument (EMNM), along with local avocational archaeologists. These were carried out in September and November, 1958. The third excavation occurred on October 18 and 19, 1958, and was conducted by Reynolds Ruppé of the State University of Iowa (now University of Iowa) along with some of his students.

It is unknown exactly when the human skeletal remains from the Ruppé excavation were transferred to the University of Iowa Office of the State Archaeologist (OSA) Burials Program. A burial project number was probably assigned in the mid to late 1970s; an estimated date was assigned to the burial project number (University of Iowa, Office of the State Archaeologist [UI, OSA] 1977). Remains from Bray's two 1958 excavations were transferred to the OSA Burials Program in 1994 from the University of Missouri-Columbia (UI, OSA 1994). Additional human skeletal material, probably associated with one of the 1958 excavations, was located in the collections of the Archaeology Laboratory at Luther College, Decorah, Iowa, and transferred to the OSA Burials Program in 1995 (UI, OSA 1995). All these remains were inventoried, reported

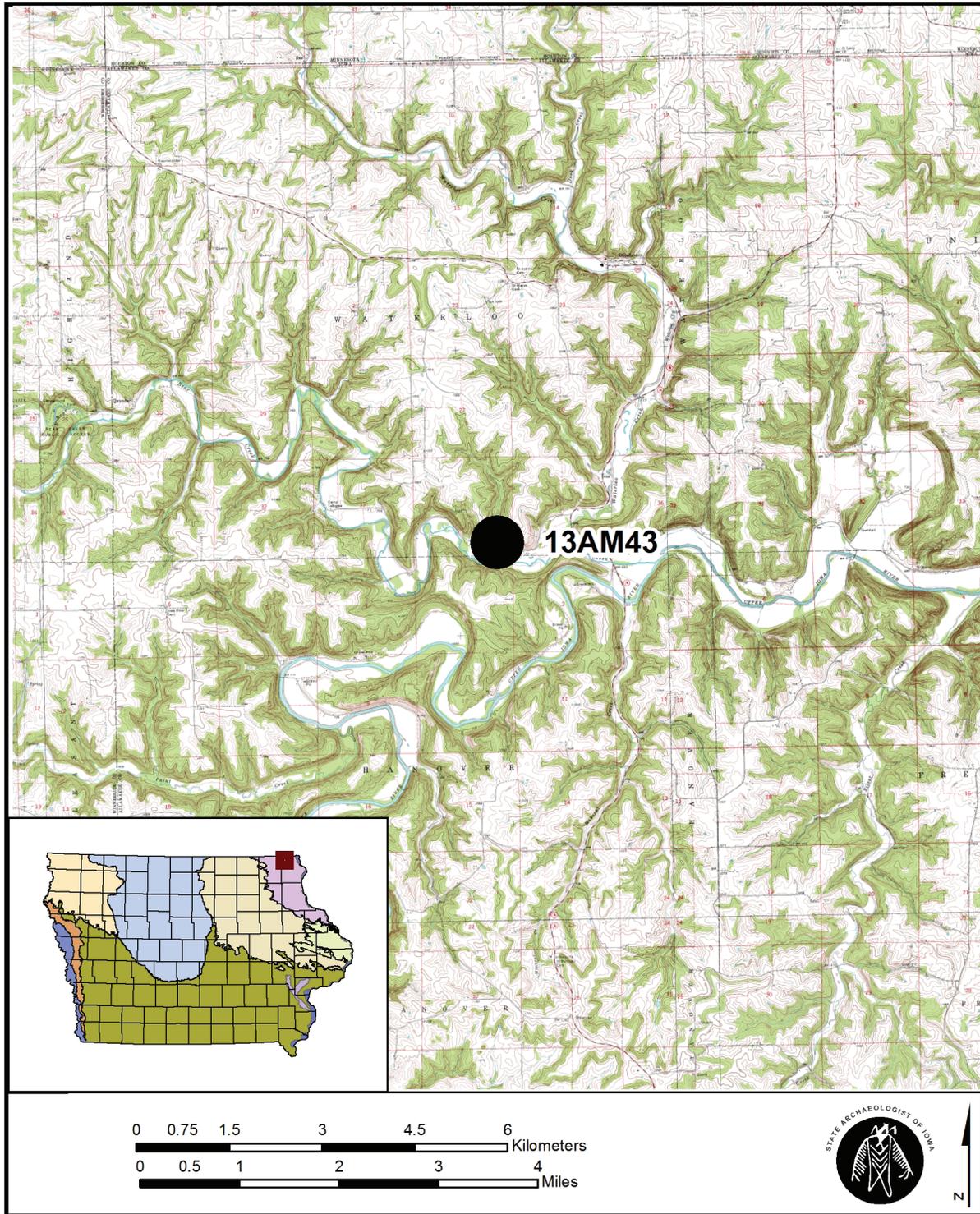


Figure 1. Location of 13AM103 in the NW¼, Section 1, T99N, R5W, Allamakee County, Iowa. Map based on USGS Waukon NW, Iowa, (1968) 7.5' series quadrangle map, scale 1:24,000. Figure map at scale 1:100,000 due to confidentiality of burial site locations.

for NAGPRA compliance, and reburied in 1997 in a cemetery designated for the reinterment of Native American remains in Iowa. In 2015, a few skeletal elements were brought to EMNM by a private citizen. This individual wished to donate the remains. Personnel at EMNM facilitated the transfer of the remains to the Allamakee County Historical Society and then to the OSA (UI, OSA 2015). A newspaper article (The Waukon Democrat 1958) included with these remains suggests they were probably from the 1958 excavations or related burial disturbance at 13AM43A. To date, no report has been published on any of these remains from the Flynn Cemetery.

The following report is based on data collected in the 1980s and 1990s. It is presented in the order in which the remains were transferred to the OSA Burials Program. Table 1 contains the osteological inventory. Cranial metrics are presented in Table 2. Cranial nonmetric observations are presented in Table 3A (Ruppé excavation) and 3B (Bray excavation). Table 4 contains the adult postcranial metrics, with the subadult postcranial metrics in Table 5. Postcranial nonmetric observations are given in Table 6A (Ruppé excavation) and 6B (Bray excavation). Table 7 presents the dental inventories and pathologies. Table 8 contains the dental metric data. Enamel hypoplastic defect measurements are in Table 9.

1958 Ruppé Excavations of the Flynn Cemetery and Osteological Analysis

Unfortunately, few notes survive concerning the excavations conducted on October 18 and 19, 1958, by Professor Reynolds Ruppé and his students (Charlie Keller, Jim Scholtz, Jim Anderson, John Vincent, Pat Bryan, Judy Glezen, and Hester Davis) (Davis 1958:2). She refers to Bray as having excavated 18 burials in September (Davis 1958:2). The Ruppé crew found 10 burials, 3 almost complete, 7 partial. One was nearly complete and placed on a “mat” with copper beads, and one was a child (Davis 1958:2-3, Ruppé 1958). A typed report titled “Report on 13AM43 Burials” with no author indicated (UI, OSA 1977) appears to document the burials after they were excavated and at the time of laboratory analysis. Information contained in these documents that could be linked to the human skeletal remains is presented along with the skeletal analysis for those remains. At least 11 burials were excavated, numbered 1 to 3, 4a, 4b, and 5 to 10.

From Ruppé’s field notes, it appears likely that the site was heavily disturbed, with human skeletal remains on the surface and in disturbed burial contexts as well as partially intact burials. However, few specifics are delineated in the field notes.

The following information from the field notes could not be linked to any of the remains. On October 19, 1958, excavation was conducted on a burial (no number) containing the remains of more than one individual, where portions of the skull were found over the head of a femur. About two feet south of the scattered skull bones was the mandible with teeth in situ. An upper body was partially articulated but disturbed. This included a mandible, ribs, scapula, clavicles, vertebrae, radius, etc. Also included in this burial were two femora and tibiae and the “pelvis.” Five long bones were uncovered. In what appears to describe a separate burial, Ruppé uncovered what he thought was a burial pit edge. However, two long bones were underneath that area. No artifacts were recovered. The burial was oriented with the head towards the south.

Concerning Burial 4a, bone fragments were found while “going down” to Burial 4b, an infant. Additional notes concerning Burial 4b indicate it was found “in the course of going down to burial #10.” Burial #5 was uncovered first; 4a and 4b are approximately at the same level; Jim’s burial [no number given] was at approximately the same level with 4a and 4b; and Burial #10 (excluding skull) was 12–18 in below 4b. Burials 4a and 10 may have been confused during the original laboratory labeling. Burial #5 included three bone fragments (two from innominates), two blue glass beads, and a fragment of charcoal.

The anonymous laboratory report includes brief inventory summaries for burials labeled 1, 2, 4a, 5, 7, possibly 8, and 9. Some of these burial numbers could be assigned to the following analyzed remains. Artifacts noted along with the general osteological inventories included beads, chert “chips,” bone tools with Burial 4a, and beads with Burial 5.

In 1985, osteological data was collected on the 13AM43A remains (UI, OSA 1977) from the Ruppé

excavations by Shirley J. Schermer (then of the OSA) and Douglas Owsley (then at Louisiana State University). The remains were then loaned to Owsley and subsequently moved by him to the Smithsonian Institution in Washington, D.C. While at the Smithsonian Institution, metric and nonmetric data was collected by Richard Jantz. The 13AM43A remains were returned to the OSA for NAGPRA compliance and repatriation in September 1997. Additional data was collected by the author just prior to their reburial in 1997. It should be noted that some information was not recorded in 1985 or subsequently, such as the exact location and size of all lytic lesions, fractures, the extent of periostitic bone deposition, and some dental data. A few of the teeth that were recorded as present in 1985 were missing when the remains were returned to the OSA.

The coding system used to identify each individual was developed based on stamped ink labels on the remains, such as “25-2.” The “25” indicates the OSA accession number. The second part is the catalog number. When remains of more than one individual with the same stamped label were identified, a numeric suffix was added to distinguish the individuals, e.g., “25-2-01” and “25-2-02.” The individual identification labels were established during analysis of the remains in 1985. Where possible to determine, the remains are linked to Ruppé’s burial numbers.

CATALOG NO. 25-1 (RUPPÉ’S BURIAL 4B)

This skeletal material was not included with the rest of the 13AM43A remains that had been on loan to the Smithsonian Institution. The box had been incorrectly labeled and was not included as part of that burial project. It also was not included in the 1995 NAGPRA inventory because of confusion caused by mislabeling of the box. It was subsequently placed in an area not used for storage of burial projects and was not found again until 2014, at which time it was assigned a new burial project number (UI, OSA 2014). The typed field notes (UI, OSA 1977) indicated glass beads and a copper spiral were found near the head area, and several copper tubular beads were found around the pelvis. A fragment of matting was under the skeletal remains. It was noted that during the laboratory sorting, cleaning, and inventory, there was some confusion about this burial. One trade bead, a piece of chert, and two bone artifacts were found, but their locations within the burial were not recorded.

Individual 25-1

Each element had been stamped in dark ink with the label “25-1.” These subadult skeletal remains included a partial cranium consisting of the right orbital area of the frontal, the basilar portion of the occipital, right temporal, incomplete right maxilla, and two cranial fragments. The mandible was incomplete and missing both ascending rami and the left side posterior to the deciduous second molar socket. The postcranial remains included two unfused sternal body segments; left scapula and incomplete right scapula; left and right clavicles; 24 ribs, 19 vertebrae; the left innominate; the right innominate missing the ischium portion; and an incomplete sacrum. Long bones included the diaphyses of the left and right humeri, right radius and ulna, incomplete left and right femora, and an unsided tibia. Additional remains included four unsided metacarpals and five hand phalanges. Green staining suggestive of contact with copper salts was present on the sacrum, four vertebral arches, five hand phalanges, the four metacarpals, and the left and right innominate portions.

The maxillary dental remains included loose teeth, the deciduous left central incisor and permanent unerupted left first molar. The right maxilla contained the erupted deciduous central incisor and unerupted deciduous first and second molars. The deciduous lateral incisor and canine were lost postmortem. The lateral incisor was probably erupted, but the canine was unerupted. The mandible contained the deciduous left and right canines, right first molar, left and right second molars, and permanent right first molar, all unerupted. All the deciduous incisors were lost postmortem, but appeared to have been erupted, based on development of the tooth sockets. A loose, unerupted permanent left first molar was also present. Coalescence of the permanent first molar cusps was just beginning to occur.

No epiphyses were fused except for the vertebral arches of one cervical, 12 thoracic, and three lumbar vertebrae, indicating an age estimate of 1 to 3 years. Diaphyseal lengths for the humeri, right radius, and nearly complete right ulna, as well as the ilium breadth of both innominates, provided an age estimate of 0.5 to 2.5 years. Dental development provided an age estimate of 0.3 to 0.9 years. Based on a combination of epiphyseal ossification, diaphyseal length, and dental development, age was estimated to be approximately 6 to 12 months.

CATALOG NO. 25-2

A minimum of four individuals were represented by remains that had been stamped with the catalog number 25-2. This may suggest that all these remains came from the same burial feature or an area of disturbed skeletal remains. There is no documentation indicating which burial these remains came from.

Individual 25-2-01

Individual 25-2-01 was represented by an incomplete subadult cranium and a left talus. The remains had been stamped with the catalog number 25-2. Although very fragmented, the cranium had been partially reconstructed. It was missing most of the occipital and right temporal, and the superior portion of both maxillae. The palatine bones were absent. An incomplete sphenoid was represented by seven fragments. An additional 45 cranial fragments could not be identified by element. The left talus had been in with the remains of Individual 25-2-02 but was a duplicate element. The size of the talus was compatible with the age estimate for Individual 25-2-01 and so was included with the remains for this individual.

Although the maxillary dental arcade was complete, many of the teeth were lost postmortem. The left first and second molars and right canine, first premolar and first and second molars were in situ. The third molars were also present, but unerupted. No carious lesions or dental abscesses were present. A slight amount of dental calculus buildup was noted. Dental attrition was slight on the right canine, first premolar, and left and right first molars, with blunting of the cusps. No observable wear was present on the second molars. Four enamel hypoplastic defects were present: two on the right canine and one each on the second molars. They were positive for one episode of enamel growth disruption occurring between 5.5 and 6.0 years of age.

Postmortem damage allowed for evaluation of the right third molar development. The root was almost one-fourth developed, indicating a dental age of around 13.5 to 14.8 years. Age was estimated to be 13.5 to 14.5 years.

Individual 25-2-02

A second individual was represented by remains marked 25-2. The only element that was duplicated by Individual 25-2-01 was the left talus. Those representing Individual 25-2-02 were all adult-sized remains including a mandible missing the left ascending ramus, five hand bones, 16 foot bones, a rib fragment, and 21 vertebrae (all the cervical and thoracic and two lumbar).

Nearly all the mandibular teeth were in situ. The left central incisor was lost postmortem. The left and right second molars had been lost antemortem with the sockets partially resorbed. Three teeth contained carious lesions. The mandibular left first molar contained one small lesion affecting the occlusal and buccal surfaces. The left third molar had two moderate-sized lesions, one on the distal half of the occlusal surface and one at the mesial cemento-enamel junction. The right third molar had a small lesion on the distal surface of the tooth. Most of the teeth contained slight to moderate deposits of dental calculus. Dental attrition was slight to moderate in general, with wear flat in form. Five teeth contained nine enamel hypoplastic defects. They were positive for one episode of enamel growth disruption occurring between 3.0 and 3.5 years of age.

The overall size of the remains was robust. The chin shape was somewhat square and a broadly estimated gonial angle was male in form. Sex was estimated to be possibly male. Dental attrition suggested a young to younger middle-aged adult approximately 25 to 35 years old. Degenerative changes were limited to moderate osteophytic lipping and porosity on the facets of four thoracic vertebrae. No other pathological

conditions were noted.

Individual 25-2-03

A third individual was identified among the remains labeled 25-2. Individual 25-2-03 was a subadult represented by a frontal bone, sphenoid, left and right zygomas, left and right maxillae, and left and right palatine bones.

Nearly all the teeth were lost postmortem, including all four permanent incisors, left and right deciduous canines, first molars and second molars, and the permanent left second molar and left and right third molars. Only the permanent erupted first molars and partially erupted right second molar were in situ. The third molars would have been unerupted. Each permanent first molar contained a small carious lesion: on the mesial aspect of the left molar and the occlusal surface of the right molar. The first molars each contained one enamel hypoplastic defect. The right second molar roots were about one-fourth developed, providing a dental age estimate of 9.0 to 9.4 years. A slight broader age estimate of 8.5 to 9.5 years is posited for this individual.

Moderate cribra orbitalia was noted on the frontal bone. Additionally, most of the ectocranial surface of the frontal bone and both greater wings of the sphenoid contained slight porosity that was pathological in nature, suggesting porotic hyperostosis.

Individual 25-2-04

Individual 25-2-04 was represented by a pair of lumbar vertebral arches. They were fused to each other but not to the centrum. The arches generally fuse to each other between the ages of 1 and 3 years, and then to the centrum between 3 and 7 years. An age estimate of 1 to 3 years is posited for Individual 25-2-04.

CATALOG NO. 25-3 (RUPPÉ'S BURIAL 3)

Information contained in Ruppé's field notes (Ruppé 1958) and the laboratory report with no author listed (Anon 1958-59) indicate that the remains labeled with catalog number 25-3 were from Burial 3. The OSA catalog entry for this number also includes the information that these remains are from Burial 3. Ruppé's field notes from October 19, 1958 indicate that this was a deeply buried skeleton that had been exposed by road construction machinery. The feet and right hand were missing due to disturbance of the burial. A second cranium was located about 11 in east of the Burial 3 cranium, along with scattered bone fragments. The primary skeleton was interred at a "slight angle." The right arm was across the pelvis and the left arm was extended. The body had been placed on a bark mat. The laboratory report (Anon 1958-59) indicates the lower end of the right arm, right hand, and lower end of both legs and both feet were missing. The remains included two large innominate fragments, nine ribs, 29 rib fragments, and three sternum fragments. A second typed report (UI, OSA 1977), also with no author indicated, on Burial 3 describes the bark mat found beneath the pelvic area of the burial. The outer bark was in contact with the floor of the burial. The bark was preserved by copper salts from copper beads embedded in the matting. Many beads associated with the burial had been removed by a local citizen before the burial was excavated. Green staining was noted on the lumbar vertebrae and right forearm. Local avocational archaeologist Gavin Sampson found a similar bark mat in one of the burials he excavated from the same area (13AM43A).

The human skeletal remains labeled with catalog number 25-3 are fairly consistent with the remains described for Burial 3. However, the arm bones were missing.

Individual 25-3

Individual 25-3 was an adult represented by a nearly complete cranium, mandible, hyoid, and left and right scapulae, clavicles, femora, tibiae, and fibulae. An incomplete sternum composed of a partial manubrium and body was also present, as were all the ribs which were mostly incomplete.

The maxillary dental remains included the following teeth in situ: the left and right lateral incisors, right

canine and first premolar; left and right second premolars; and right third molar. Status of the left second and third molars could not be determined due to postmortem damage to the left maxilla. The remaining teeth were lost postmortem. In the mandible, the left and right incisors and canines, right first premolar, and left and right second premolars were in situ. The left first premolar was lost postmortem. All six molars had been lost antemortem with the sockets completely resorbed on all except the left second molar which was partially resorbed. A small carious lesion was present on the distal surface of the maxillary left second premolar. The maxillary right first premolar crown had been completely destroyed by a carious lesion with only a small portion of the root remaining and the pulp chamber exposed. Extreme dental wear had exposed the pulp chamber on the maxillary right canine. The canine socket contained a periapical abscess. Moderate hypercementosis was noted on the roots of the maxillary right second molar. Heavy dental calculus deposits were present on the roots of the mandibular left and right second premolars. Dental attrition was advanced, with almost complete loss of the enamel and marked reduction in crown height on all teeth except the maxillary right third molar. This tooth was only slightly worn, suggesting the opposing mandibular tooth was lost not long after the maxillary right third molar had erupted. The maxillary left lateral incisor and all the mandibular incisors displayed rounded wear. Wear was flat to cupped on the remaining teeth. One linear enamel hypoplastic defect was present on the maxillary right third molar at 3.1 mm inferior to the cemento-enamel junction.

All the epiphyses were fused and at least three third molars had been erupted antemortem. Dental attrition was advanced, and antemortem tooth loss fairly widespread, suggesting an older adult. Evaluation of cranial suture closure was limited due to pathological bone on the cranial vault, described below. It appeared that the sutures were fused endocranially and at least starting to fuse ectocranially. Evaluation of palatal suture closure provided an age estimate of greater than 35 years. Age was estimated to be 40 to 50 years. The sexually dimorphic nonmetric characteristics and metrics were ambiguous for estimation of sex. The supraorbital tori, mastoid processes, and the superior orbital margin were female in form. Robusticity of the external occipital protuberance and the square chin shape suggested the individual was a male. Of eight measurements used to estimate sex, four fell in the range for males, two in the range for females, and two were indeterminate for sex. Lacking the pelvis and with no preponderance of strongly male or female characteristics, sex was indeterminate. Stature, estimated from the left femur using the formula for Asian males, was 168.23 ± 3.8 cm.

The cranial remains displayed multiple healed or partially healed lesions on the frontal, parietals, occipital, and possibly the left maxilla and zygoma. All the cranial lesions appeared to have a somewhat stellate appearance. On the frontal, a lesion just superior to the nasal bones may have slightly involved the left nasal bone. A lesion above and medial to the left orbit appeared to be active or in the early stages of healing. It had perforated the bone, exposing the frontal sinus. Three smaller healed lesions were superior to this lesion. Another larger lesion, also healed, was to the left of the three smaller ones. Healed periostitic bone deposition in the area of bregma created a raised, roughened area. A faint stellate scar was just anterior and to the right of bregma within this larger roughened area. On the right parietal, most of the ectocranial surface was pathological. Healed periostitis had resulted in a roughened appearance with at least five stellate-like scars not completely healed within the pathological bone. Six measurements of lesions were taken, but it is unclear which were measured. They ranged in size from 10 x 11 mm to 16 x 18 mm. Nearly remodeled lesions were also present on the left parietal and occipital. Healed periostitic bone deposits were also present on the occipital and left temporal. A depression was present at the left zygomaxillary suture; another was just anterior to that on left maxilla in the area of the body and process. These also appear to have been healed lesions. In addition to the periostitis and lesions, the cranium was very lightweight. Bone deposition and resorption had resulted in deformation of the cranial shape, especially on the superior surface.

Periostitis was also present on the leg bones. The right femur contained a small area of periostitis on the anterior surface near the distal end. The affected area measured 15 x 32 mm proximodistally. The left femur contained a small area of periostitis in approximately the same location as the right. However, the

full extent could not be assessed because of bone broken and missing distal to the proximal edge of affected area. The entire shaft of the right tibia displayed periostitic bone apposition, mostly healed. The left tibia was missing the proximal end, with the distal end damaged. The entire shaft showed involvement to a lesser degree than the right, with periostitic bone apposition that was mostly healed. The right fibula, missing the proximal end, displayed periosteal bone apposition mainly on the distal third of the shaft that had increased the diameter of the shaft. The periostitis was healed and mostly smooth in appearance. The left fibula, also missing the proximal end, displayed mostly healed periostitic bone apposition primarily on the proximal half of the shaft. Active periostitic bone apposition also affected the left clavicle, covering most of the shaft.

Degenerative changes were noted on the vertebral end of one rib in the form of moderate osteophytic lipping and porosity. Slight osteophytic lipping was present around the margins of both scapulae's glenoid fossae, with slight porosity within both fossae. The distal end of both femora also had slight osteophytic lipping along the articular margins.

The presence of widespread periostitic bone apposition affecting the cranial and postcranial remains, with the addition of stellate-like lesions (*caries sicca*) on the cranium and lightweight cranial remains is strongly suggestive of treponemal infection.

CATALOG NO. 25-4 (RUPPÉ'S BURIAL 7)

According to the OSA catalog records, catalog no. 25-4 is associated with Ruppé's Burial 7. A minimum of five individuals were represented by the remains. It is possible some of the remains representing Individuals 25-4-01 and 25-4-02 were mixed up.

Individual 25-4-01

Individual 24-4-01 was an adult represented by incomplete left and right scapulae, left and right clavicles, 17 ribs (mostly incomplete), numerous rib fragments, an incomplete left innominate, a left humerus, and left and right radii, ulnae, femora, and tibiae. The anterior-superior surface of the right tibia shaft was damaged postmortem. The incomplete or fragmented condition of the scapulae, innominate, and ribs was also due to postmortem damage. At some time after disinterment, the left femur had been cut in half, probably with an electric saw, and a portion was missing at midshaft. It is likely that a bone sample was removed. The missing bone portion was not with the remains when they were returned to the OSA from the Smithsonian Institution, but it is unknown when it was removed.

The overall appearance of the postcranial remains was gracile. The sciatic notch was wide, as was the subpubic angle. These characteristics suggest a female. Of the 11 postcranial metrics taken that express sexual dimorphism, six were in the range for females, two in the range for males, and three were indeterminate for estimation of sex. Sex was estimated to be female. Evaluation of the pubic symphysis morphology yielded an age estimate of 25 ± 4.9 years. An age estimate of 25 to 30 years is posited for this individual. The left radius and ulna were shorter than the right by 8 mm and 6 mm, respectively. The femora displayed asymmetrical femoral torsion, with torsion more pronounced on the right side. Stature, estimated from the left femur, was 163.08 ± 3.5 cm.

Pathologies were present on the ribs and rib fragments. Bone apposition in the form of healed mild periostitis was present on five unisided rib fragments. One incomplete right rib displayed a small exostosis on the internal surface near the vertebral end, which may have been ossified cartilage. Lytic lesions were present on the articular facets of two left and one right ribs. The presence of periostitis and lesions on the ribs may suggest a systemic disease such as pulmonary tuberculosis. No other pathological conditions were noted.

Individual 25-4-02

An incomplete left temporal and nearly complete right maxilla represent a subadult, Individual 25-4-02. The temporal was missing the anterior third, and the superior portion of the right maxilla was broken off

and missing. All damage occurred postmortem. The right maxilla contained sockets for the erupted deciduous central incisor through first molar. The deciduous central incisor and canine were absent postmortem. The lateral incisor and first molar were in situ. The deciduous second molar and permanent first molar were unerupted and in situ. The deciduous lateral incisor was slightly worn. Development of the deciduous first and second molars and permanent first molar yielded a dental age estimate of 0.9 to 1.2 years.

Individual 25-4-03

Adult Individual 25-4-03 was represented by incomplete cranial remains, a mandible, the left and right innominates, a sacrum fragment, and a left femur. The frontal consisted of two fragments: one forming the superior left orbit and the other from the central portion at nasion with part of both nasal bones and a superior fragment of the left maxilla. The left and right temporals were incomplete, and both may not have been from this individual as they were different in size and morphology. The right zygoma was present but incomplete. The right innominate was incomplete, missing the anterior third of the ilium. The left femur was in two portions, with the head separate from the remainder of the element. The distal and distal-lateral surfaces were damaged postmortem. The epiphyses were completely fused on the left innominate and left femur.

The four observable sexually dimorphic characteristics of the cranium and four of the innominate were all female in form. Midshaft circumference of the femur and gonial angle were within the range for females. Sex was estimated to be female. Evaluation of the morphology of the left pubic symphysis yielded an age estimate of 39.2 ± 10.9 years. Morphology of the auricular surface of the innominate provided an age estimate of 35 to 45 years. Age was estimated to have been 35 to 45 years.

All the mandibular teeth were present and in situ except the third molars which were congenitally absent. Antemortem enamel chipping was noted on the mesiobuccal corner of the left second molar crown. One carious lesion of moderate size was present on the mesial surface of the right first molar at the cementoenamel junction. The lesion affected both the crown and root and had exposed the pulp chamber. A periapical abscess was associated with this tooth. Dental calculus deposits were moderate to heavy on all the teeth. Dental attrition was advanced, with marked reduction of crown height on the incisors and almost complete exposure of the dentin on nearly all the teeth. Dental wear was greater on the left side than the right. There was slight resorption of the alveolus associated with the four molars. Of the 14 teeth observable for enamel defects, 12 teeth displayed 12 linear hypoplastic defects. These defects were positive for two episodes of enamel growth disruption occurring between ages 4.0 and 4.5 years and 5.0 and 5.5 years.

Slight cribra orbitalia was present in the left orbit. There was "some arthritic accentuation of the ventral mandibular condyles, especially on the right side". On the left femur, ten small cutmarks were present on the anterior surface just superior to the patellar articular surface. These relatively short nick-like cuts (no measurements provided) were generally horizontal in orientation. The left femur was x-rayed and seven transverse lines were noted in the distal portion of the bone. None were present in the proximal shaft.

Individual 25-4-04

An incomplete subadult cranium, designated Individual 25-4-04, consisted of the frontal, both parietals, the occipital missing the base, the right temporal, and the right maxilla. One sphenoid fragment and several small cranial fragments were also present. The right maxilla contained the sockets for all the deciduous teeth, with only the molars in situ and the others lost postmortem. All the deciduous teeth had been erupted. The deciduous first and second molars were unworn. The permanent dentition, central incisor through second molar, was unerupted, and the second molar had been lost postmortem. The other permanent teeth were visible in their crypts due to slight postmortem damage to the alveolar bone. Based on tooth development, a dental age of 2.2 to 3.0 years was estimated, with two of the teeth having a dental age of 2.8 and 2.9. Age was estimated to be approximately 3 years. No dental pathologies were noted.

Individual 25-4-05

An adult, Individual 25-4-05, was represented by a hyoid, incomplete left innominate, incomplete left femur, and incomplete left and right tibiae. The left innominate consisted of most of the ischium and inferior portion of the ilium. The left femora and both tibiae consisted of the shafts. The left femur was missing the posterior surface of the distal half of the shaft. Part of the neck and two condyle fragments from this element were present. The tibiae shafts were incomplete and fragmented. A portion of the proximal end of the left tibia was present. All damage occurred postmortem. Evaluation of the auricular surface morphology on the left innominate yielded an age estimate of 40 to 50 years. Overall size of the remains was very gracile. The innominate was female in form, with a wide sciatic notch, raised auricular surface, and a pre-auricular sulcus. Sex was estimated to be female.

Pathologies included evidence of degenerative changes. The left innominate displayed mild osteophytic lipping along the margins of the acetabulum and moderate porosity on the articular surface. Some degenerative erosion was present on the superior articular surface fragments from the right tibia. The right tibia contained a bony exostosis on the posterior surface starting just above the nutrient foramen and extending along the popliteal line for 27 mm superoinferiorly. It measured 5 mm mediolaterally and extended at least 6 mm above the normal bone surface. The extent of the bony projection above the normal cortex may have been greater, but the exostosis had been damaged postmortem. This bony growth was likely an enthesopathy that represents ossified muscle tissue. The incomplete proximal end of the left tibia contained moderate osteophytic lipping along the articular margin and moderate porosity on the articular surface. Bone loss was noted on the left innominate in the form of a healed lytic lesion within the acetabulum. An active lytic lesion was present on the proximal third of the left femur shaft. The size of these two lytic lesions was not recorded. The left femur also displayed slight bone increase resulting from periostitic bone apposition that was mild, healed, and widespread. Both tibia shafts also had periostitic bone apposition, more pronounced than on the femur, and on the distal thirds of the shafts. The periostitis on the tibiae was active at the time of death. The remains were lightweight and displayed cortical thinning on three of the long bones, suggestive of osteoporosis.

25-4 Miscellaneous Adult Remains

Small, incomplete, or fragmented remains could not be assigned with confidence to any of the three identified adults labeled with catalog no. 25-4. These remains included an incomplete frontal, incomplete right parietal, incomplete left temporal, 100 cranial fragments, and a cranial ossicle. Postcranial remains included a manubrium fused to the sternal body, 14 scapula fragments, two rib fragments, and eight vertebral fragments. No pathological conditions were noted. Age and sex were indeterminate for these miscellaneous adult remains.

CATALOG NO. 25-5 [RUPPÉ'S BURIAL 10]

According to the OSA catalog records, catalog no. 25-5 is associated with Ruppé's Burial 10. No details of the excavation are documented other than the burial was located below Burial 4a and 4b.

Individual 25-5-01

A nearly complete adult skeleton represented Individual 25-5-01. Several duplicate elements that had been numbered 25-5 were assigned to Individual 25-5-02 (see below). The cranium was missing part of the left and all of the right palatine bones and a small portion of the right maxilla. The mandible, portions of both scapulae, and some of the hand and foot bones were also missing. Most of the ribs were fragmented. Four carpal or tarsal bones from a canid were with the remains and had been recovered from the burial.

All the epiphyses were completely fused and the left maxillary third molar was erupted, indicating an adult. The sexually dimorphic characteristics of the cranium and innominates were female in form. Additionally, among the 14 sexually dimorphic metrics taken, 12 were in the range for females and two were indeterminate for sex. Sex was estimated to be female. Evaluation of the pubic symphyseal morphology

suggested a middle-aged or older adult. In contrast, auricular surface morphology yielded a slightly younger age estimate of 25 to 34 years. All the cranial sutures were open both ectocranially and endocranially. An age estimate of 25 to 35 years is posited for this individual. Stature, estimated from the left femur, was 158.14 ± 3.5 cm.

All the teeth were present except the left central incisor, which was lost postmortem. Status of the right third molar could not be determined due to postmortem damage to the right maxilla posterior to the second molar socket. The right second molar contained one moderate-sized carious lesion affecting the distal surface of the crown and root. Slight to moderate calculus was noted on six teeth, the left second premolar and first molar, and the right first premolar through second molar. Dental attrition was moderate, with some exposure of the dentin on all the teeth. Wear was flat in form on most of the teeth. The left lateral incisor and right central and lateral incisors displayed slightly cupped wear. All 14 of the teeth were evaluated for the presence of enamel defects. Nine teeth displayed 20 linear enamel hypoplastic defects. These were positive for three episodes of enamel growth disruption occurring between 2.5 and 4.0 years of age.

A systemic disease was evidenced by the presence of both lytic lesions and periostitis affecting several elements. In the spine, lytic lesions were noted on all five of the lumbar vertebrae and the sacrum. The lesions affected the bodies and were active at the time of death. Bone loss was slight on the second lumbar vertebra, moderate on the first, fourth, and fifth lumbar vertebrae, and severe on the third lumbar vertebra. A moderate-sized active lytic lesion was also present on the sacral promontory. A healed, moderate-sized lytic lesion was present on the sternal end of the left clavicle. The right fifth metatarsal and the first distal row foot phalanx each contained a small, active lytic lesion on the proximal articular surface. Two healed lytic lesions were present on the distal end of the right fifth metacarpal as well as the active one.

Bone apposition in the form of mild, healed periostitis was present in the acetabulum of the right innominate; over most of the shaft of the left tibia; on the proximal third of the right tibia shaft; on the middle third of the left fibula shaft; and on the distal third of the right fibula shaft.

Degenerative changes included mild osteophytic lipping along the articular body margins of the third through seventh cervical vertebrae; the articular facet margins of the tenth through twelfth thoracic vertebrae; the acetabular margin of the right innominate; the glenoid fossa margin in the left scapula; the margins of the distal articular surfaces of both femora and tibiae; and along the articular margins of the right calcaneus. Other degenerative changes included ossification of the xiphoid process; fusion of the coccygeal vertebrae to the sacrum; and ossified connective tissue in the neural arch of the second lumbar vertebra.

Evidence of trauma was in the form of a possible healed fracture to the distal row first foot phalanx. Both phalanges associated with this digit contained bony exostoses. On the distal phalanx they were located on the lateral surface near the proximal end. On the proximal row first phalanx, the exostoses were on ventral surface just inferior to the proximal end. On the distal first foot phalanx, the exostoses were located on the lateral surface near the proximal end. The right parietal contained evidence of trauma in the form of a healed, depression fracture just inferior to the posterior end of the temporal line. The defect was round, fracture margins were blunt, there were no radiating fractures, and only the outer table was affected. It measured 10.0 by 8.0 mm. Pronounced crests occurred along the shaft margins of five unsided proximal row hand phalanges.

Additional anomalies noted on the vertebrae included spondylolysis on the fifth lumbar vertebra and Schmorl's nodes on four thoracic vertebrae.

The lytic lesions on the lumbar vertebrae and widespread periostitis are suggestive of a systemic disease such as tuberculosis. The mild degenerative changes are consistent with the age range estimate. Radiographs of the femora and tibiae revealed one Harris line in the distal portion of the right tibia.

Individual 25-5-02

Four elements labeled "25-5" duplicated those associated with Individual 25-5. These elements may have been mislabeled and could be associated with one of the adults excavated by Ruppé and crew. The ele-

ments were a right first cuneiform, the first and second cervical vertebrae, and an unspecified thoracic vertebra. All were adult-sized, displayed no degenerative changes, and were much larger than the same elements associated with Individual 25-5-01. With this scant evidence, these four elements may be from a young adult, possibly male based on size of remains. They do not necessarily represent a separate individual.

CATALOG NO. 25-6

No documentation was available to determine the association between remains labeled with catalog number 25-6 and a specific burial excavated by Ruppé.

Individual 25-6

A juvenile, Individual 25-6, is represented by a complete cranium, left and right scapulae, a right clavicle, left and right innominates, a sacrum, 10 vertebrae, 21 ribs, and a right ulna. The vertebrae consisted of two cervical between the third and sixth, three thoracic between the first and ninth, the tenth and eleventh thoracic vertebrae, and the second through fourth lumbar vertebrae. Green staining indicative of contact with copper salts was present on the superior anterior surface of the left and right iliac blades; the anterior surface of the first sacral body; the spinous processes of second through fourth lumbar vertebrae (especially on right side of the third and fourth); and the distal half of the right ulna shaft.

The maxillary teeth in situ included the left central incisor, left and right canines through second molars, and right third molar. The right central incisor, left and right lateral incisors, and left third molar were lost postmortem. The right third molar was partially erupted. A loose mandibular left first premolar was also present with the remains. The loose mandibular premolar had glue on it, possibly from being glued into the wrong socket in the maxilla or because the mandible was present at some time in the past but not present at time of evaluation. Based on similarity in tooth preservation and dental wear, it was included with the Individual 25-6 dental remains. No carious lesions were present. The left central incisor and first premolar, and right second premolar and first molar displayed moderate wear, with some exposure of the dentin. The remaining teeth were only slightly worn, with little to no wear displayed by the mandibular left first premolar. The more worn teeth displayed flat attrition. Of the 12 teeth present, all but one could be evaluated for enamel defects. Eight teeth contained 19 linear enamel hypoplastic defects. The defects were positive for five episodes of enamel growth disruption occurring between 2.5 to 4.0 and 5.0 to 6.0 years of age.

Epiphyseal union was complete on the distal ulna, primary elements of the innominates, and vertebral arches to the centra. The olecranon process of the right ulna was partially fused, as were the ischial tuberosities of the innominates. The iliac crests of the innominates and epiphyseal rings of the vertebrae were unfused, as were the acromion process of the right scapula, and both the sternal and acromial ends of the right clavicle. Based on epiphyseal ossification, age was estimated to be 14.6 to 18 years. The incisive suture of the palatine bones was almost completely fused, indicating an age estimate between 15 and 20 years. Development of the maxillary right third molar could be evaluated and displayed a root between one-half and three-fourths developed. An age estimate of 15.1 to 16.6 years was based on dental development. An age estimate of 15.5 to 16.5 years is posited for this individual.

Although the remains represent a juvenile, the sexually dimorphic characteristics of the cranium and sacrum were female in morphology. Additionally, the subpubic angle was wide, suggesting a female. Morphology of the sciatic notch was indeterminate for estimation of sex. Based on these observations, sex was probably female.

Moderate bone loss was noted on the superior portion of both parietals in the form of moderate localized, active porosity on the ectocranial surface probably from protic hyperostosis. No other pathologies were noted.

One anomalous feature was noted on the occipital. An accessory facet was present just lateral and posterior to the right condyle. This facet sits on a raised bone feature reminiscent of a condyle and may have accommodated an unusual atlas form. The osseous feature measured 12 mm anteroposteriorly by 15 mm

mediolaterally, and extended 6 mm from the normal bone surface. This was likely a paracondylar process.

CATALOG NO. 33-2

The labeling of the remains with number 33-2 is problematic, as “33” does not refer to an OSA accession number associated with 13AM43A, B, or C. Instead, it is associated with site 13WS54, which was not recorded until 1971, and there is no documentation that any human remains are or were associated with this site. A note on the box containing the remains read: “no burial number associated with these remains.” It seems more likely that the number associated with these remains was not related to an OSA accession number at all. It is possible that the remains were collected by someone other than the Ruppé crew and given to Ruppé for analysis, and, therefore, assigned a unique number. It is also possible that the designation “33-2” was assigned during laboratory analysis.

Individual 33-2

Individual 33-2 was represented by poorly preserved and fragmented adult cranial remains. The ectocranial surface was taphonomically eroded and covered with soil. Copper beads and glass trade beads were included with the cranial remains. The incomplete cranial elements included portions of the frontal, left and right parietals, four occipital fragments, left and right temporals, the right maxilla, four sphenoid fragments, and 25 unidentified cranial fragments.

The partial right maxilla contained the sockets for the first premolar through second molar. The first premolar had been lost antemortem with the socket partially resorbed. The second premolar had been lost postmortem. The first molar was in situ, but poorly preserved, missing much of the enamel due to postmortem damage. However, moderate calculus deposits were present. Dental wear was slight, with blunting of the cusps and slight dentin exposure. Status of the second molar could not be determined with confidence because the socket was incomplete. However, there appeared to be some resorption of the tooth socket, suggesting the second molar may have been lost antemortem or had an associated abscess.

Although incomplete, the remains were of adult or near-adult size. The cranial sutures were open ectocranially and endocranially, suggesting a juvenile or young adult. Cranial vault thickness also suggested a juvenile or gracile female. A broad age estimate of juvenile to young adult is posited for this individual. Sex was possibly female. No pathologies were noted.

CATALOG NO. 55-1 (POSSIBLY RUPPÉ’S BURIALS 1 AND 2)

The labeling of the remains with number 55-1 is problematic, as “55” does not refer to an OSA accession number associated with 13AM43A, B, or C. Instead, it is associated with site 13WB114, which was not recorded until 1961. Human skeletal remains were recovered from the site in 1977, reported on by Fisher (1977), and reburied in 1978. However, a note on the box containing the remains read: “Burials 1 and 2 together in this box, not separated before re-boxed.” It appears that the remains labeled with the number “55” are possibly from Burials 1 and 2. No documentation is available concerning the excavation of these burials.

Individual 55-1-01

Individual 55-1-01 was represented by adult-sized remains: a right zygoma, right maxilla, and incomplete right palatine bone. Although the maxilla was complete, most of the dental remains had been lost postmortem, with only the first premolar and first molar in situ. A fully-erupted third molar had been present antemortem. Moderate calculus deposits were present on the first premolar. Dental attrition was moderate on the first premolar, with some of the occlusal dentin exposed. Attrition was slightly more advanced on the first molar, which displayed partially cupped wear. Both teeth contained linear enamel hypoplastic defects: four on the first premolar and one on the molar. A broad age estimate of 20 to 35 years is posited for this individual, based on dental wear. Sex was indeterminate. No pathologies were noted.

Individual 55-1-02

Individual 55-1-02 was represented by limited adult cranial and postcranial remains. The cranial remains included the right zygoma and nearly complete right maxilla which duplicated remains of Individual 55-1-01. The complete postcranial remains included the manubrium and sternal body, sacrum, right patella, left humerus and ulna, eight thoracic vertebrae, and the five lumbar vertebrae. The incomplete postcranial elements were the left scapula, right clavicle, left innominate, left and right tibiae, right fibula, and seven ribs. Slight rodent gnawing was noted on the shafts of the tibiae and left ulna.

There were no teeth in the right maxilla, but the sockets for the central incisor through third molar were present. It appeared that all the teeth had been lost postmortem. Periodontal abscesses were present in association with the first and second premolars and first molar.

Eruption of the third molar suggested a minimum age of 18 to 21 years. All the epiphyses were fused, indicating an adult. Evaluation of the auricular surface morphology yielded an age estimate of 40 to 49 years. A broad age range of 40 to 55 years was posited for this individual. The remains were generally quite gracile. The innominates were female in morphology, although the sciatic notch was not particularly broad. Six of seven postcranial metrics used for estimating sex were in the range for females; one was indeterminate for sex. Sex was estimated to be female.

Pathological conditions included slight degenerative changes on the eight thoracic vertebrae in the form of slight to moderate osteophytic lipping along the margins of the centra. The lower thoracic vertebrae displayed moderate porosity on the centra. The first through third lumbar vertebrae had slight osteophytic lipping along the articular facet margins and slight porosity on the centra. The fourth and fifth lumbar vertebra displayed more pronounced osteophytic lipping and porosity on both the articular facets and centra. The eleventh thoracic and fifth lumbar vertebral bodies were wedge-shaped, with the fifth lumbar affected on the left half of the body. Four thoracic and two lumbar vertebrae displayed Schmorl's nodes. The sacral promontory contained moderate osteophytic lipping along the margins as well as moderate porosity on the surface of the body. Moderate osteophytic lipping and porosity was present on the proximal articular surfaces of both tibiae. The left patellar articular surface margins also had moderate osteophytic lipping.

Slight, active periostitic bone apposition was present on a left rib, three unsided rib portions, and the left innominate. The pathology on the unspecified rib was localized, but no description of its location was recorded. Periostitis on the left innominate was localized on the external surface of the ilium. Periostitic bone apposition was more advanced on the tibiae, being widespread over most of both shafts. Fibula fragments also contained periostitic bone apposition.

Individual 55-1-03

Individual 55-1-03 was represented by left and right zygomas and maxillae. Only small fragments of the superior portion of the maxillae were present, attached to the zygomas. The left zygoma was incomplete, consisting of only the inferior half. The limited remains were quite gracile but of near-adult size. They could have been from an older juvenile to adult. Age and sex were indeterminate. No pathological conditions were noted.

Individual 55-1-04

An incomplete cranium represented Individual 55-1-04. The frontal was missing the right third including the right orbital area. The left and right parietals consisted of the posterior third to half. The occipital was missing the base portion and part of the lateral-inferior sutures on both sides. The right temporal consisted primarily of the petrous portion and part of the body.

Age was estimated based on size comparison to the more confidently aged remains of Individual 25-4-04 (aged 3 years). The cranium of Individual 55-1-04 was slightly smaller. Age was estimated to be 2 to 3 years. Slight cribra orbitalia was present in the left orbit.

CATALOG NO. 55-2

The information available for catalog number 55-2 was limited to a note in the box containing the remains that read: "No burial number associated with these remains." Nearly all the remains were from a minimum of two adults.

Individual 55-2-01

The adult remains representing Individual 55-2-01 included a partial cranium and most of the postcranial elements, many of which were incomplete or fragmented. No mandible, left patella, left humerus, right fibula, a few ribs, most of the foot bones, a few hand phalanges, and all the thoracic and lumbar vertebrae were absent. The cranium consisted of the frontal, left and right parietals, the occipital, and left and right temporal bones, all complete. No dental remains were present. Slight rodent gnawing was noted on the tibiae and left fibula shafts.

All the epiphyses were fused, indicating an adult. The cranial sutures were open endocranially, except for initial fusion in portions of the coronal suture. Ectocranially, the coronal and sagittal sutures were partially fused, while the lambdoidal suture was open. Morphology of the innominate's auricular surface provided an age estimate of 35 to 44 years. Age was estimated to be 35 to 45 years. The sexually dimorphic characteristics of the cranium were all female in form, although the mastoid processes and superior orbital margins were slightly pronounced. The innominates were incomplete, but the morphology of the subpubic angle and auricular surface were female in form. Thirteen postcranial measurements used for estimating sex were somewhat ambiguous. Three were in the range for males, seven were in the range for females, and three were indeterminate for sex. Sex was estimated to be female. Stature, estimated from the left femur, was 158.14 ± 3.5 cm.

Most of the postcranial remains displayed strongly developed areas of muscle attachment. On the clavicles, this area was on the anterior surface of the shaft near the lateral end.

Slight degenerative changes were present. Slight osteophytic lipping was along the articular facets and body margins of the first and second cervical vertebrae. These vertebrae also had slight porosity and eburnation in the facets. The same degenerative changes were noted on the third through sixth cervical vertebrae, where they were slightly more pronounced. Slight osteophytic lipping was present along the distal articular surface margins of both femora. Moderate enthesophyte development was present on the heel of the right calcaneus. Prominent crests were present along the shaft margins of eight proximal row and two middle row hand phalanges. The cranium displayed mild porosity on the frontal, parietals, and occipital, primarily located near the sagittal suture, suggesting porotic hyperostosis. The bone loss appeared to have been active at the time of death.

Radiographs were taken of the right femur and right tibia for evaluation of the presence of Harris lines. The right femur contained seven transverse lines in the distal portion and one in the proximal portion. The right tibia had one in distal portion and six in the proximal portion.

Individual 55-2-02

Individual 55-2-02 was an adult represented by a cranium, mandible, left and right scapulae and innominates, the sacrum, left and right humeri and femora, the right fibula, six cervical vertebrae, 11 thoracic vertebrae, and five lumbar vertebrae. The right fibula had been included with the 55-2-01 remains during the inventory created in the 1980s but was determined to be incompatible with the left fibula associated with that individual. No ribs, patellae, hand bones, or foot bones were present. The cranium had been damaged postmortem and several elements were incomplete. The frontal consisted of the right half. The left parietal, left maxilla, and both palatine bones were incomplete. Both scapulae and the right fibula were also incomplete.

Most of the maxillary and mandibular teeth were in situ. The maxillary left third molar had been lost postmortem. The maxillary right second molar and the mandibular right first premolar and right first molar

had been lost antemortem with the sockets partially resorbed. The maxillary left second premolar and right third molar had been lost antemortem with the sockets completely resorbed. Periodontal abscessing was associated with ten teeth: the maxillary left first molar; maxillary right lateral incisor and first premolar through first molar; the mandibular left first through third molars; and the mandibular right second premolar and first molar. The alveolar bone associated with the mandibular left third molar also displayed porosity and resorption suggestive of infection in the gum tissue. Twelve teeth contained carious lesions. Small to moderate-sized lesions were present on the maxillary left canine and left second molar. Five teeth each contained two or three small to moderate-sized lesions that had destroyed part of the crown and exposed the pulp chamber: the maxillary left first molar and the mandibular left and right second and third molars. The maxillary right lateral incisor and both right premolar crowns, and the mandibular right second premolar and left second and third molar crowns were completely destroyed by carious lesions, exposing the pulp chamber. Calculus was absent to moderate in buildup on 21 teeth. Only the maxillary left first molar displayed significant, heavy calculus deposits. Dental attrition was marked on the maxillary left central incisor through first premolar and right central incisor and canine, with complete exposure of the occlusal dentin and significant loss of the crown height. Similar dental wear was present on the mandibular incisors. The remaining teeth also had advanced wear except for the maxillary left second molar and mandibular right second and third molars, which were only moderately worn due to not have opposing teeth in the right maxilla for some period of time. All wear was flat in form. Only six teeth could be evaluated for enamel defects; all contained one linear defect. These were positive for one episode of enamel growth disruption occurring at 2.5 to 3.0 years of age.

All the epiphyses were completely fused, indicating an adult. The third molars had erupted, suggesting a minimum age of 18 to 21 years. The more advanced degree of dental attrition suggests the individual was at least middle-aged. Evaluation of the pubic symphysis morphology yielded an age estimate of 30.7 ± 8.1 years. Morphology of the auricular surface of the innominate suggested an age estimate of 35 to 39 years. An age estimate of 35 to 45 years is posited for this individual. The sexually dimorphic characteristics of the cranium and innominate were all female in form. The sexually dimorphic metrics were ambiguous, with five of nine measurements in the range for males, one in the range for females, and three indeterminate for sex. Weight was given to the morphology of the cranium and pelvis. Sex was estimated to be female. Stature was estimate from the left femur and was 164.37 ± 3.5 cm.

Slight degenerative changes were noted in the mandible in the form of slight osteophytic lipping on the right condyle. Additional slight osteophytic lipping was present on the second through seventh cervical vertebrae along the margins of the centra and on the facets of all but the second cervical vertebra. Similar degenerative changes were noted on the lumbar vertebrae and the promontory of the sacrum. Slight osteophytic lipping was present along the articular margins at the proximal and distal ends of the right humerus and proximal right femur. More moderate lipping was present on the distal ends of both femora. The left innominate had a concavity at the superior-posterior margin of the auricular surface with some boney spicules projecting from margins over the concavity. The affected area measured 6 mm deep and was 6 x 8 mm at a maximum diameter. The corresponding area on the sacrum contained bony spicules. The area may have contained a lesion or cyst that had healed.

Two spinal anomalies were noted. The articular facets on the first through third lumbar vertebrae had an extra articular facet on either side of the spinous process' inferior margin. The sacrum contained six segments. The deltoid tuberosities were extremely well developed, and the humeral heads were oriented distally rather than more medially, as they are in normal anatomical position. The humerus heads, when looking at the lateral surface, also were more rhomboidal or square in form rather than their normal shape. The head margins were clearly defined, especially on the right humerus.

Eight postcranial fragments and 22 small cranial fragments came from adult elements. They could not be assigned with confidence to Individual 55-2-01 or 55-2-02.

Individual 55-2-03

Individual 55-2-03 was represented by a rib fragment, the left pubis of the innominate, the arches of a cervical vertebra, and the arches of a thoracic vertebra. The left and right arches of each vertebra were fused but had not yet fused to the centrum, providing an age estimate of greater than 1 to 3 years but less than 3 to 7 years. The remains were slightly larger than those of a confidently-aged 2.5 to 3.5 year old. Age was estimated to have been 3.5 to 4.5 years.

MISCELLANEOUS LOOSE TEETH

Ten loose teeth could not be assigned with confidence to a specific individual. Two of these were worn single-rooted teeth. One was possibly an incisor that was worn past the crown and into the root. The occlusal surface was round. The root displayed slight hypercementosis. The other was a possible maxillary canine also worn past the crown. The worn surface was slightly angled, and the root displayed slight hypercementosis. These two teeth may have come from the same individual, an older adult.

Three of the teeth were identifiable as premolars. A maxillary premolar was missing half of the tooth postmortem. If this was a right premolar, the portion present would have been the distal half. Wear was moderate. A moderate-sized carious lesion was present at the cemento-enamel junction on the assumed distal surface. The degree of wear suggests a middle-aged to older individual. A premolar, probably maxillary, had most of the crown destroyed by a large carious lesion that had exposed the pulp chamber. A third maxillary premolar contained a large carious lesion that had destroyed all but a small fragment of the crown, exposing the pulp chamber. The roots displayed moderate hypercementosis.

The remaining five teeth were molars. One of these could not be identified as to position. The crown had been destroyed by a large carious, exposing the pulp chamber. The roots displayed moderate hypercementosis. A left mandibular molar was missing some of the enamel postmortem. The occlusal surface was worn more on the buccal half, with wear angling sharply downward distal and onto the distal root surface. One small and two moderate-sized carious lesions were present: a pinpoint lesion on the occlusal surface; a moderate-sized lesion at the cemento-enamel junction on the mesial side; and a moderate-sized lesion on the distal surface of the distal root about two-thirds of the way down the root. The roots displayed slight hypercementosis. The remaining three teeth were maxillary third molars. The first could not be sided. The crown was almost completely destroyed by a carious lesion that extended well into the root, exposing the pulp chamber. A maxillary left third molar contained two carious lesions. A fissure was present on the mesial surface at the cemento-enamel junction. A moderate to large lesion was on the buccal and occlusal surfaces, destroying one-fourth of the bucco-occlusal surface and most of the buccal surface. The lesion extended into the root, exposing the pulp chamber. The root surface contained moderate calculus buildup and slight hypercementosis. A maxillary right third molar contained a moderate-sized carious lesion on the mesial surface at the cemento-enamel junction. Wear was slight, with blunting of the cusps. A slight hint of calculus deposits was present. The root displayed slight hypercementosis.

SUMMARY OF HUMAN SKELETAL REMAINS FROM THE 1958 RUPPÉ EXCAVATIONS

The nine catalog numbers associated with the remains excavated in 1958 by Reynolds Ruppé and crew represent a minimum of 22 individuals. Of these, 13 were adults including seven females, one possible female, two possible males, and three of indeterminate sex. Age estimates for the seven females are: one individual 25 to 30 years; one individual 25 to 35 years; three individuals 35 to 45 years; and two individuals between 40 and 55 years. The possible female was an older juvenile to adult. The possible males were 20 to 35 years and 25 to 35 years. The three adults of indeterminate sex were 25 to 35 years old, 40 to 50 years old, and an older juvenile to adult. Age estimates for the nine subadults ranged from 0.5 to 16.5 years and included five infants (newborn to 3 years), one child (3 to 8 years), one older child (8 to 12 years), and two juveniles (12 to 18 years). One of the juveniles, estimated to be 15.5 to 16.5 years old, was probably female.

A range of pathological conditions was noted. Degenerative joint changes were present on seven adults

(25-2-02, 25-3, 25-4-05, 25-5-01, 55-1-02, 55-2-01, and 55-2-02). Cribra orbitalia, both slight and moderate in degree, was noted on two subadults (25-2-03 and 55-1-04) and one adult (25-4-03). Porosity on the cranial remains, possibly porotic hyperostosis, was noted on three subadults (25-2-02, 25-2-03, 25-6) and one adult (55-2-01). Five adults displayed evidence of a systemic disease. Individual 25-3, an adult aged 40 to 50 years and of indeterminate sex, had stellate-like healed lesions and areas of moderate to heavy periostitic bone deposition on the cranial remains. Periostitis was also noted on postcranial elements. A possible etiology is treponemal disease. Three adult females (25-4-01 – 25 to 30 years old; 25-4-05 – 40 to 50 years old; 25-5-01 – 25 to 35 years old) had both lytic lesions and periostitis on the remains suggestive of tuberculosis, possibly pulmonary. On Individual 25-4-01, lesions and periostitic bone deposition were on the ribs. For Individual 25-4-05, the lesions were on the left femur shaft and left acetabulum, with periostitis on the ribs. The remains were lightweight, suggesting osteoporosis. For Individual 25-5-01, lytic lesions affected the five lumbar vertebrae and sacrum, left clavicle, a metacarpal, a metatarsal, and a toe phalanx. Periostitis was present in the acetabulum of the right innominate and on left and right ribs and the fibulae. Individual 55-1-02 displayed periostitis on four ribs, the left innominate, both tibiae, and fibula fragments. A possible healed lytic lesion was present on the left innominate near the auricular surface and on the corresponding area of the sacrum of Individual 55-2-02.

Evidence of trauma was limited. Individual 25-2-01 had a healed possible fracture of the distal row first foot phalanx and a healed depression fracture on the right parietal. Another healed fracture of a foot phalanx was among the remains associated with Individual 25-5-01. The eleventh thoracic vertebra and fifth lumbar vertebra of Individual 55-1-02 displayed wedge-shaped compression fractures on the centra. Individual 25-5-01 had spondylolysis, but it was not noted which vertebra or vertebrae were affected.

Nonpathological conditions were also noted. Individual 25-6, the juvenile female, had an accessory facet near the right occipital condyle which may have been a paracondylar facet. Individual 55-2-02, a 35 to 45 year old female, had unusual orientation and shape to the humeral heads that may have been the result of slight displacement of the heads prior to fusion of the epiphyses, along with biomechanical stresses caused by physical activity. Asymmetrical femoral torsion was noted on the remains of Individual 25-4-01, a 25 to 30 year old female.

The dentition was characterized by dental pathologies. Of 111 observable teeth, 29 (26.1%) contained carious lesions. Fourteen teeth of 151 observable sockets (9.3%) had been lost antemortem. Two periapical and 14 periodontal abscesses were noted. Calculus deposits, ranging from slight to heavy were present on 59 of 112 observable teeth (52.7%). The roots of ten teeth of 46 observable (21.7%) had slight to moderate hypercementosis. Of 58 teeth where enamel defects could be evaluated, 45 of these contained linear enamel hypoplastic defects (77.6%). These were on the dentition of eight individuals, with 13 cases positive for episodes of enamel growth disruption (adults 25-2-02, 25-4-03, 25-5-0, 55-2-02; subadults 25-2-01, 25-6). There was one case of possible antemortem enamel chipping (adult 25-4-03).

1958 Bray Excavation of the Flynn Cemetery and Osteological Analysis

Prior to and following Ruppé's excavations at 13AM43A, Robert Bray, an archaeologist at Effigy Mounds National Monument (EMNM) in Harpers Ferry, Iowa, conducted salvage excavations at the site. Bray was contacted in September 1958 by John Reynolds of *The Gazette* newspaper (Cedar Rapids, Iowa) about the discovery of burials exposed during road construction (Bray 1961:15). Bray, assisted by Robert Kile of EMNM and Gavin Sampson, the local highway commissioner inspector, recovered human skeletal remains and artifacts from reportedly 10 to 13 burials or individuals. A week later, Reynolds' newspaper article on the excavations (Reynolds 1958) included photos of Bray, Sampson, and some of the human remains and artifacts found in the burials. Reynolds reported that 11 interments were found of nine adults and two subadults in burials about 3 feet below the surface, some less than 3 feet apart, and with the heads to the north. Pottery, grave matting, and a large bird skull were found. Many local residents showed up to

observe the excavations.

On November 1, Bray returned to the site. Assisted by Darrell Henning (Luther College student) and locals H.P. Field, Gavin Sampson, Cliff Chase, and Warren Hayes, he supervised the excavation of an additional five burials found near his previous excavation. Four of these were close to the burials excavated by Ruppé and crew just two weeks earlier (*The Gazette* 1958). All the remains were taken to EMNM. When Bray (1961:15) published a report on the burials at 13AM43A, he noted that he “authenticated” 17 burials, but described 10 which included seven adults, an infant, and two children. The information contained in this article is included with the analysis below.

Around 1960, Bray took a position as director of the University of Missouri’s Archeological Research Center in Miami, Missouri. He took the remains and some artifacts from 13AM43A with him to Missouri.

In 1992, two graduate students at the University of Missouri presented a paper at the Midwest Archaeological Conference (Vradenburg and Hollinger 1992) in which they described the burials excavated by Bray. They identified 12 individuals, five subadults, two adolescents, and five adult males. They provided a date for the cemetery site of 1400-1700 A.D., with initial contact with Europeans occurring around 1650-1700 A.D. The presence of European trade goods confirms that at least some of the burials were from the contact period. The conference presentation described the burials as oval-shaped pits. Four burials were oriented east-west, with the remainder north south and up to 1.6 m deep. Most were extended, supine burials.

Once the OSA was aware of the 13AM43A material at the University of Missouri, arrangements were made for their transfer to the OSA in 1994 for NAGPRA compliance (UI, OSA 1994). The remains were reburied in 1997 at a cemetery in Iowa designated solely for the reinterment of Native American remains, and in compliance with the wishes of affiliated tribes.

Other information concerning burials at 13AM43A appears to concern remains that were in the possession of individuals other than Robert Bray. Fetal remains from one burial “may have been taken by H.P. Field” (Hollinger 1995).

Stanley (1993:267-268) describes artifacts from burials in Gavin Sampson’s collection. Sampson (now deceased) reportedly recovered these from two burials he excavated at 13AM43B and collected from the surface of that portion of the burial site. The current location of these materials is not known.

Numerous typed pages included with the notes provided along with the Bray material when it was returned to OSA (UI, OSA 1994). The typed pages appear to be quite old, possibly typed in the 1950s. The author is unknown.

Three pages list material in [Gavin] Sampson’s collection from Burials 1, 2, and 3, with additional notes compiled by Darrell Henning. Henning’s notes report that much of material from Burials 1, 2, and 3 were at EMNM. The details from these notes are given with the corresponding burial described below with the osteological analysis.

Another typed page is merely a list of “surface finds,” but it does not indicate if these were part of a private collection or among Bray’s material. The artifacts included three chert scrapers, four shell-tempered potsherds, 16 bone (?) beads, and 50 small copper beads.

Another typed page lists an inventory of material from 13AM43A donated by H.G. Field. It does not indicate the recipient of the donation. The donation included a partial and fragmented cranium, the pelvic area including the sacrum, coccyx, and incomplete left and right innominates, 15 vertebrae, and two sacra (one complete).

Another page lists artifacts from 13AM43A in the collection of Robert Brower from Garner, Iowa. These include a copper bracelet; two beads (one glass, one stone); two pieces of rolled copper; three pieces of copper spiral; a piece of braded metal wire, possibly copper; 34 rolled copper beads; and an iron tool with wood adhered to one end.

The last of the typed pages were three concerning notes from Charles J. Ryan of Waukon, Iowa. All refer to a burial he excavated at 13AM43A on September 16, 1958. Apparently, he was given permission to perform the excavation from the county engineer, David Hoover. Ryan left the human skeletal remains

in place, undisturbed, but removed numerous artifacts. These he seems to have sent to Robert Bray. They include a copper ring found on the fifth digit of the left hand; 18 blue trade beads and 5 copper beads from around the neck; and a metal knife with a blade about 5 inches long found on the left side of the body. Ryan reported that other glass beads were present but too poorly preserved to collect. Ryan also informed the Iowa Archeological Society of his excavation and the artifacts found (Iowa Archeological Newsletter 1958:5).

The following burial and osteological descriptions include information provided in the notes accompanying the remains when transferred to the OSA (UI, OSA 1994) and other relevant documentation. Based on this information, it was not possible to determine if the burial number designations are correct in some cases, if they were assigned at a later time, and if some of the original skeletal material might be missing from the transferred remains.

BURIAL 1

Burial 1 was excavated in September 1958. According to notes compiled about the Sampson collection and those describing this burial written by Darrell Henning (UI, OSA 1994), Burial 1 had been partially damaged by road construction equipment. A pottery vessel was found next to the right side of the head, with the mouth toward the cranium. A clam shell spoon that had been ground and notched was inside the pottery vessel. Ten copper bracelets were on the right wrist and eight were on the left. Fibrous matting covered portions of the chest and abdomen, partially preserved by 36 copper beads. The beads were in three vertical and one horizontal rows. Twelve pieces of chert debitage and six scrapers were found together above the left shoulder. Nearby were the leg bones of a large bird and the bill of a possible duck. Blue glass beads were also found at the neck, with a copper spiral near the left ear area. Three iron tools, possibly knives were in the torso region.

Bray (1961:15-16) described Burial 1 as an adult in an extended, supine position with the head upslope and to the north. Grave goods correspond somewhat to those described above, with the additional information that the bird skull was that of a “raven” with the bead pointing toward the scapula. A small mammal scapula was recovered to the right of the bird remains. He also described two bone disk beads, one on the right shoulder, with the second found later in the lab. Shell and glass beads (six in all) were found on the right side of the cranium. Some kind of copper ornament was to the right of the ribs, between them and the distal right humerus. Coils of copper were on top of the right forearm, staining the right radius and ulna. No location is given for a polished bone ornament.

When the remains for Burial 1 were transferred to the OSA, it was determined that two individuals were represented by duplicate right femur portions. These were designated Individual 1-1 (the more complete burial) and Individual 1-2 (the duplicate femur). It is likely that Individual 1-2 is represented by a femur that was inadvertently mixed with the Burial 1 remains. It may be associated with one of the other adult burials. The osteological inventory for Burial 1 and the location of green stains indicating contact with copper salts during interment do not appear to match the descriptions for Bray’s Burial 1 provided in Henning’s notes (UI, OSA 1994) or Bray’s (1961) publication. However, the burial was described as partially disturbed. The descriptions above may include the location of artifacts near elements that were no longer present in the burial at the time of excavation.

Individual 1-1

Individual 1-1 was represented by left and right scapulae, clavicles, innominates, humeri, radii, and ulnae, as well as a hyoid, sacrum, 12 hand bones, right femur, 11 ribs, and 16 vertebrae. Some of the elements were incomplete: the left innominate was missing the pubic symphysis; the left radius consisted of the distal third; and three left ribs were incomplete. The vertebrae consisted of five cervical (including the first and second), seven thoracic between the first and ninth, and all the lumbar vertebrae except the first. There were no cranial or dental remains. Green staining, probably resulting from contact with copper or brass during

interment, was present along the anterior lateral margin of right radius. The stained area measured 5 cm superoinferiorly by 1 cm mediolaterally.

All the epiphyses were fused, indicating an adult. Evaluation of the auricular surface of the innominate provided an age range of 25 to 35 years. Morphology of the innominate was male in form with the exception of the presence of a small preauricular sulcus. Of the eight sexually dimorphic postcranial metrics taken, five were in the range for males and three were indeterminate for sex. Sex was estimated to be male. Stature was estimated from the left humerus as the right femur was not complete enough to get an accurate measurement. Stature was 171.63 ± 4.25 cm. Pathological observations were limited to slight marginal lip-ping on the shaft of five hand phalanges and slight compression of the inferior centrum surface on the fifth lumbar vertebra.

Individual 1-2

Individual 1-2 was represented by an incomplete right femur consisting of the proximal third of the bone. No degenerative changes on the portion present, suggesting a possible young adult. The maximum and vertical diameters of the femoral head fell in the range for males. Sex was possibly male. No pathological conditions were noted. It is possible this partial femur came from another burial or was from a burial disturbed by road construction equipment. It does not necessarily represent a unique individual, and may possibly be associated with Individual 4-1.

BURIAL 2

Information provided to the OSA in typed records (UI, OSA 1994) does not match the osteological evidence from the remains labeled Burial 2. According to information about the Gavin Sampson collection and included in Darrell Henning's typed notes, Burial 2 was that of an infant between one and six months old lying face down. The remains were crushed and poorly preserved. Six glass beads were found around the neck. However, Bray (1961:16) reported that Burial 2 was a fully extended, supine adult oriented north-south with the head to the north. It was about 2 m west of Burial 1. This burial included several artifacts, including a piece of material that was identified as worked pumice; a piece of worked red ochre; copper tubes (number not identified) around the left shoulder and cranium; small rolled copper tubes; a piece of flat sheet copper; four small chert flakes near the red ochre; and an area of "shredded juniper bark matting preserved by numerous rolled copper beads from first lumbar vertebra to the middle of the sacrum." Both the matting and beads were also underneath the remains in this same area. The information published by Bray matches the remains of Individual 2-1.

Individual 2-1

Individual 2-1 was represented by a fairly complete skeleton. The cranium was complete except for the superior portion of the right maxilla which was missing postmortem. The sternum consisted of only the manubrium. The left innominate was missing the pubic symphysis. Elements that were not present included the hyoid, left patella, left tibia and fibula, left foot bones and right foot phalanges, several hand bones, and the first through fourth lumbar vertebrae. Numerous areas of staining that were green or brown with greenish tinges, suggestive of contact with copper salts during interment, were noted. A dark brown/greenish stain was on the posterior surfaces of the parietals, temporals, and all of the occipital with one green spot 17 mm superior to opisthion (more on the left than the right side). One hand phalanx was completely stained a dark greenish brown. The anterior surface of the fifth lumbar body and adjacent superior portion of the sacral ala were stained green. A dark brown staining with greenish tinges was present on three left and one right ribs, including the left and right eleventh. On the left scapula's posterior surface, a 5 x 1 cm green stain ran horizontally just below spine; this whole surface was stained dark brown with a small area of greenish tinge. Dark brown staining with a greenish tinge was on the anterior surface of the distal end of the right humerus. Along the iliac crest of the left innominate was a green stain 4.5 cm long by ca. 1 cm running su-

peroinferiorly. The right innominate had at least four distinct green stains on the superior surface of the iliac blade covering most of the surface. Green staining on the lateral surface of the posterior three-fourths of the left femur shaft measured 1.5 to 2.5 cm, with one oval green stain on the anterior surface of neck measuring 1 x 2 cm and a small pale green stain just below the greater trochanter on the anterior lateral surface. The posterior half of the left ulna shaft had green staining on all surfaces, while the proximal four-fifths of the right ulna was stained green especially on the anterior and medial shaft surfaces. On the left radius, the distal three-fifths of the shaft was stained green circumferentially. The right radius had green staining around the circumference from about midshaft superiorly to just below the radial tuberosity.

All the dental remains were present and in situ. A possible carious pit was noted on the occlusal surface of the maxillary left first molar. Two small carious lesions were present, one each on the occlusal surface of the mandibular left and right first molars. Although calculus deposits were noted on most of the teeth, it also appeared that the some deposits may have been removed or reduced when the dental remains were cleaned or during handling. Dental attrition was slight on most of the teeth, with moderate dentin exposure on the central incisors. Wear was generally flat or just beginning to flatten. Of 27 teeth observable for the presence of enamel defects, 11 teeth had 24 horizontal enamel hypoplastic defects. These were positive for four episodes of enamel growth disruption occurring between 2.5 to 4.0 years and 4.5 to 5.0 years. The maxillary central and lateral incisors were shovel-shaped. The maxillary right second and third molars had enamel extensions. The maxillary and mandibular right first premolars both displayed crowding and rotation, with the buccal surfaces facing slightly distally. Possible antemortem enamel chipping was noted on five maxillary teeth: the left central incisor, canine, and first premolar; and the right canine and first premolar.

Although most of the epiphyses were closed, several were still in the process of fusing: the head of the humerus; head and distal end of the radius; distal end of the ulna; iliac crest and ischial tuberosity of the innominate; distal end of the femur; proximal and distal ends of the tibiae; basilar suture; and epiphyseal rings of the vertebrae. Based on epiphyseal ossification, age was estimated to be 18 to 20 years. The morphology of the auricular surface of the innominate provided an age estimate of 20 to 24 years. Palatal suture closure indicated an age close to 20 years. X-ray examination of the dental remains showed that the third molar roots were complete, but the apex had not yet developed. Third molar development suggested an age of 19.3 to 20.6 years. Age was estimated to be 19 to 20 years. The sexually dimorphic features of the cranium and mandible were ambiguous. The supraorbital tori and superior margin of the orbit were female in form. The mastoid processes, external occipital protuberance, and chin shape were more male in form. However, the morphology of the innominate was strongly female. Sexually dimorphic postcranial metrics were also somewhat ambiguous. Four were in the male range, seven in the female range, and three were indeterminate for sex. Sex was estimated to be possibly female with weight given to the morphology of the innominates. Stature estimated from the left femur was 157.36 ± 3.5 cm.

The cranial remains were deformed antemortem, with flattening of the left posterior and lateral surface and exaggerated bossing of the right parietal both laterally and posteriorly. The deformation was most easily observable from the superior and anterior views of the cranium. The femora displayed marked asymmetrical femoral torsion, as evidenced by the anterior orientation of the right femoral head. The right femur was more gracile than the left; it was 6 mm shorter and 9 mm smaller at the midshaft circumference. An accessory facet on the superior left surface of the sacrum measured 1.8 cm anteroposteriorly by 2.5 cm mediolaterally. The appearance of ligament ossification on the left transverse process of the fifth lumbar vertebra suggested possible fusion of a portion of the left sacral ala to this process. It is possible that there is some relationship between the abnormality in the fifth lumbar vertebra and sacrum to the marked femoral torsion, such as a genetic malformation, a traumatic event, or a habitual posture. One other area of pathology was noted on the ectocranial surface of the frontal and both parietals. Healed porosity and bone deposition had resulted in an area of raised bone measuring 3.5 cm mediolaterally by 4.0 cm anteroposteriorly situated at bregma. The affected area was raised from 2 to 4 mm above the normal bone surface.

Individual 2-2

The remains representing Individual 2-2 were not labeled with the site number or burial number, as were all the other remains from the Bray excavation. It is unknown if they are related to 13AM43A or not, or if they were from a different burial from this site. The remains are the first cervical vertebra, an unidentified thoracic vertebra, and a left second metatarsal. All are adult sized. Both the vertebrae were darkly stained, and the metatarsal cortex was a very light tan/yellow color. They represent an adult of indeterminate sex. They do not appear to represent an additional individual.

BURIAL 3

Information on a typed page regarding Burial 3 and artifacts from the burial in the Sampson collection indicate the individual was an adolescent buried with 62 flint flakes, two incomplete projectile points, small potsherds, an arrow shaft straightener, a clam shell spoon, a copper spiral, and one glass bead (UI, OSA 1994). The list of artifacts appears to only refer to those in Sampson's collection. Darrell Henning's typed notes on Burial 3 (UI, OSA 1994) describe the individual as face up with the feet to the south and only about 6 inches below the surface. Artifacts included a beaded "headdress," tubular copper bead "belt," a bison rib arrow shaft straightener next to the left forearm; two incomplete projectile points near the left eye orbit; a copper ear spiral about 12 inches north of the cranium; two beaver incisors, one near left elbow and the other with left hand phalanges; and a cluster of flint flakes. Bray's (1961:16) publication states that Burial 3 was an incomplete, extended, supine interment of an adult just west of Burial 2. His list of artifacts includes the two projectile points described as small, unnotched and triangular; an unknown number of animal bones near the right shoulder; an undocumented number of chert flakes; a "small number" of glass beads; and the matting and copper beads in the pelvis area "much like in Burials 1 and 6." However, there is no mention of matting in Burial 1; rather it was found in burials 2, 5, and 6.

A typed but unpublished report by Alton K. Fisher provides a brief analysis of the skeletal remains from Burial 3 (UI, OSA 1994). He describes the remains as those of an adult female at least 40 years of age with two areas of bone resorption on the cranium, one on the frontal and one on the right parietal. He noted carious lesions on the maxillary left first and second molars. The crown of the maxillary right second premolar was destroyed by a carious lesion. The maxillary left third molar was lost antemortem. Periapical abscesses were associated with the left first and second molars. The mandible also displayed antemortem molar loss (not specified) and periodontitis. This description does not match the following analysis of the remains of Individual 3-1. However, it is consistent with the descriptions provided by Bray and others.

Individual 3-1

Individual 3-1 was represented by a cranium, mandible, left and right scapulae, left clavicle, five cervical vertebrae, left and right humeri, left and right radii, left and right ulnae, seven right carpals, four right metacarpals, and three hand phalanges. A sixth cervical vertebra with these remains did not articulate well with the others. The preservation was more similar to the vertebrae associated with miscellaneous remains of Individual 2-2. The alveolar bone of the left maxilla was damaged postmortem from the central incisor socket through the first premolar socket. On the cranium, a large green stain covered the posterior half of the right temporal and extended onto the posterior portion of right parietal.

Most of the epiphyses were fused. The humeral head, basilar suture, and epiphyseal rings of the vertebrae were partially fused. Epiphyseal ossification provided an age range of around 19.5 to 20.5 years. Development of the third molars was determined by x-ray examination. The roots were fully formed, but not the apices. This provided a dental age of 19.3 to 20.6 years. Age was estimated to be between 19 and 21 years. The sexually dimorphic characteristics were somewhat ambiguous: the supraorbital tori and external occipital protuberance were neither clearly male nor female in form. The mastoid processes were moderately pronounced. The square chin shape and blunt orbital margins were male characteristics. Three of five post-cranial measurements were indeterminate for estimation of sex, and two were in the range for males, includ-

ing the gonial angle of 111°. Compared to the more confidently sexed female remains, Individual 3-1 was more male in appearance overall. Sex was estimated to be male. Stature, estimated from the left humerus, was 166.54 ± 4.25 cm.

All the teeth were in situ except the left maxillary central incisor through first premolar. This area was damaged postmortem and the teeth were absent, probably postmortem. No carious lesions were present. Slight to moderate calculus buildup was present on most of the teeth. However, cleaning or handling of the remains appears to have removed some or all calculus. Dental attrition was moderate on all the teeth except the second and third molars which were only slightly worn. Wear was generally flat in form. One exception was the mandibular right first molar which displayed partially cupped wear. All 27 teeth were observable for enamel defects. Eight teeth contained 22 linear enamel hypoplastic defects that were positive for two episodes of enamel growth disruption occurring at 0.5 to 1.0 and 2.0 to 2.5 years. Antemortem enamel chipping was present on the maxillary right canine at the distal-buccal corner and on the right first premolar at the mesial-buccal corner. The mandibular left central incisor was rotated between 30 and 45 degrees with the buccal surface facing mesially.

The cranium was culturally modified deformed in a manner similar to Individual 2-1, but deformation was not as pronounced. The left posterior area was flattened, and the right parietal exhibited bossing both laterally and posteriorly. A small, healed depression fracture was present on the right parietal. It was mid-way along and 15 mm superior to the lambdoidal suture. It measured a maximum of 1.5 cm by a minimum of 0.9 cm.

BURIAL 4

The only documentation on Burial 4 was handwritten (possibly by Bray) on a small piece of grid paper (UI, OSA 1994) and in Bray's published report (1961:16-17). Bray excavated this burial in September 1958. The skull, right arm, clavicles, scapulae, and some ribs were removed by road construction equipment and were absent. The rest of the burial was slightly disturbed. The burial was about 10 m southwest of the other burials and oriented east-west rather than north-south. Although grave goods were included in the burial, none were historic. These artifacts included two bone whistles from a large bird such as a swan. They were lateral and interior to the left hand bones near the proximal end of the left femur. The partial skull of a large bird, later identified as a whooping crane, lay on the proximal end of the left femur. A third bone tube, possibly a whistle, had been incised. Its location within the burial was not noted. The skull (or cranium) of a squirrel or other rodent was just superior to the left knee.

Individual 4-1

Individual 4-1 is represented by postcranial remains including the left humerus, radius, and ulna, seven hand bones, the five lumbar vertebrae, the sacrum, left and right innominates, patellae, femora, tibiae, fibulae, and most of the foot bones. All the remains are complete except the left humerus, which consists of only the distal third. All the epiphyses were fused, indicating an adult. Evaluation of the pubic symphysis provided an age estimate of 51.0 ± 13.6 years. Morphology of the auricular surface of the innominate suggested an age range of 40 to 49 years. Additionally, degenerative changes were noted on the several elements. Age was estimated to be 40 to 50 years. The long bones were relatively robust, and there were strongly developed muscle attachments on the femora, distal ulnae, and along the popliteal lines of both tibiae. Morphology of the innominates was male in form, and all 12 of the sexually dimorphic postcranial measurements fell in the range for males. Sex was estimated to be male. Stature, estimated from the left femur, was 174.69 ± 3.8 cm.

Slight osteophytic lipping was present along the body margins on the first and third through fifth lumbar vertebrae, mainly on the left side. Additional slight degenerative changes in the form of osteophytic development were present on the distal left radius, proximal left ulna, acetabula of the innominates, sacral alae, both distal femora, both proximal and distal ends of the tibiae, both distal fibula, and articular facets of both

tali and both calcanea. Slight to moderate enthesophytes were present on the anterior surface of both patellae. A small lesion was noted on the dorsal end of the inferior surface of the left third cuneiform, where this carpal articulates with the third metatarsal. The lesion was healed and measured about 5 mm in diameter. The left third metatarsal displayed a healed fracture of the shaft. The lesion on the third cuneiform may have developed in association with the traumatic event causing the metatarsal fracture. Slight to moderate compression of the vertebral body was noted on the second through fifth lumbar vertebrae, mainly on the inferior surface.

BURIAL 5

There were no human skeletal remains designated as Burial 5 in the remains transferred to the OSA from the University of Missouri-Columbia (UI, OSA 1994). However, Bray (1961:17) provides a description of this burial, excavated by Gavin Sampson on September 10 and 11, 1958. Bray noted that the remains and artifacts were in Sampson's possession. The burial was of an adult, oriented north-south, and containing numerous grave goods. The artifacts included a shell-tempered pottery vessel with two strap handles; a worked large shell; approximately 100 copper beads; approximately 12 copper bracelets made of rolled sheet metal; two or three pieces of sheet copper approximately 3 cm square or less; 2 "steel" knives that once had wooden handles; a steel awl or file; chert flakes, some possibly scrapers; a small number of glass beads; and a concentration of matted bark fibers and copper beads in the area of the pelvis, both above and below the remains.

BURIAL 6

Bray (1961:17-18) described Burial 6 as that of an adult in an extended supine position, oriented north-south with the head to the north. The burial was about 5 meters from the nearest road equipment disturbance and about 1.2 m below the ground surface. The burial was found by Gavin Sampson and partially excavated by Robert Bray. Eight blue and green glass beads were found in a row behind the occipital. More blue and green glass beads (no number given) were under the mandible and touching the cervical vertebrae. A possible beaver incisor displayed wear and polish and was found on the lower left ribs. Approximately 100 small chert flakes appeared to have been in the left hand. A bi-perforated, polished bison rib lay on top of and parallel with the lower left arm. An incised line, near one end, went around the bone. A copper beaded "girdle," probably similar to those found with Burials 2 and 5, was over the pelvis, but there was no mention of bark matting fragments or other perishables. An adult cranium was at the left knee with the distal end of the femur and proximal end of the tibia in contact with it near the center of the sagittal suture. In a note written on small pieces of grid paper, probably by Bray during the excavation (UI, OSA 1994), he describes the cranium near the left knee as a "trophy skull."

While the 13AM43A remains from the Bray excavations were at the University of Missouri-Columbia, they were housed in what became named the Lyman Archaeological Research Center located in Miami, Missouri. Graduate student R. Eric Hollinger wrote a paper for an osteology course on the remains from Burial 6 (Hollinger 1991). He describes the burial as a long, oval pit about 120 cm below the ground surface and oriented north-south. The primary burial was nearly complete. The "extra" cranium was on its left side. This cranium was not part of Hollinger's analysis. He identified the primary burial as that of a subadult, between 12 and 18 years old and probably male. He found that cervical and the first thoracic vertebrae in with remains labeled as Burial 11 refit with Burial 6. This supports the supposition that the remains had become mixed during the 30+ years between when they were excavated and when they were examined in the early to mid-1990s. The Burial 6 primary burial remains had been covered with a preservative. Some elements were reconstructed, and most were labeled with inked letters of the site and burial numbers. Hollinger (1991) also noted that the subadult cranium displayed deformation, enamel defects, sublaxation of the right temporomandibular joint, and premature suture closure. He proposed a burial date in the late 1600s.

Bray's notes (UI, OSA 1994) and published article (1961:17) claim that the primary burial was an adult.

It appears that there was either a recording error or that the remains were not initially recognized as those of a subadult. The primary burial from Burial 6 was identified as a young juvenile.

Individual 6-1

Individual 6-1 was represented by a nearly complete subadult skeleton. The missing elements included all but one of the foot phalanges; one carpal and nine hand phalanges; one cervical vertebra; one thoracic vertebra; four left and three right ribs; and several epiphyses of the long bones. The left and right scapulae were incomplete, as were most of the ribs. Green staining was noted on the cortex of several elements: anterior and posterior surfaces of the left and right ilia; anterior and posterior surfaces of the first sacral body; posterior surface of the second through fifth lumbar vertebrae and anterior surface of the fifth lumbar vertebra; all surfaces of the left first and second metacarpals; distal epiphysis of second metacarpal and one unidentified metacarpal distal epiphysis; all surfaces of one proximal row hand phalanx and proximal phalanx epiphysis and four middle row hand phalanges; most of the left greater multangular, lesser multangular, and capitate; most of shaft of the right radius; the anterior and medial shaft surfaces of the right ulna; and distal half of the anterior surface of the left ulna and radius diaphyses.

Most of the epiphyses were unfused. The pubis and ischium were fused to each other but not to the ilium. The trochlea of the humeri were partially fused. Epiphyseal union provided an age estimate of 13 to 15 years. Diaphyseal length measurement indicated a broader age range of 9.5 to 15.5 years, with most of the measurements falling in the 10.5 to 12.5 range. Examination of dental x-rays showed that the second molar apices were half developed; the third molar crown was complete and the root appeared to have just started forming. Dental development provided an age range of 11.9 to 12.9 years. Age was estimated to be 12 to 13 years. Sex was not estimated.

All the teeth were in situ, with the third molars unerupted. A pinpoint hole on the occlusal surface of the mandibular right first molar may have been an incipient carious lesion. No other carious lesions were present. Dental calculus buildup was slight to moderate on most of the teeth except the mandibular molars, which had heavy calculus deposits. It appeared that some calculus deposits were removed during cleaning or handling of the dental remains. Dental attrition was slight, with most of the teeth still retaining their cusps. Wear was flat in form only on the four central incisors. Eighteen teeth were observable for enamel defects. Of these, 12 teeth contained 29 linear enamel hypoplastic defects. These were positive for four episodes of enamel growth disruption occurring between 2.0 and 4.0 years of age. Four teeth displayed rotation, with the buccal surfaces slightly facing distally: the maxillary right canine, mandibular right canine, and the mandibular left and right second premolars. The maxillary right canine was also slightly displaced buccally.

The cranium displayed deformation in the form of flattening of the posterior portions of both parietals and superior portion of occipital. The parietals exhibited bilateral bossing with slight sagittal keeling. Just posterior to bregma and the coronal suture, the left and right parietals were slightly indented. The observed deformation suggests a form of cradle boarding where the infant's head was secured by a strap-like device across the top of the head. The cranium also displayed cranial synostosis, with premature fusion and obliteration of the right squamosal suture and the left lateral portion of lambdoidal suture at left temporal.

The left fibula was distinguished by marked curvature of the diaphysis. There was no evidence of a healed fracture, and the right fibula was normal. The curvature may have been caused by postmortem warpage.

Healed periostitic bone apposition was present on the left and right ulnae, radii, and tibiae shafts, and was especially marked on the ulna shafts. From the midshaft and extending distally, bone apposition on the ulna shafts resulted in enlarged shaft diameters. The radius shafts had small areas of bone apposition on the anterior surface near the distal ends. The tibia shafts displayed slight bone apposition on the anteromedial surfaces. No periostitis was discernible on the femora. Subluxation of the right temporomandibular joint noted by Hollinger (1991) was described as a misalignment of the maxilla and mandible, with the mandible

further forward than normal, with resulting changes in the morphology of the right condyle and fossa.

Individual 6-2

Individual 6-2 (the supposed “trophy skull”) was represented by an incomplete cranium consisting of the frontal, left and right parietals, occipital, both temporals, and the left zygoma, maxilla, and incomplete palatine bone. The left facial portion was in a separate piece from the cranial vault. The basilar suture was fused, indicating an adult. The cranial sutures were open or partially fused ectocranially and partially fused endocranially, suggesting the individual was not an older adult. Dental attrition, described below, suggested an older young to middle-aged individual. Age was estimated to be 30 to 45 years. Sexually dimorphic features of the cranium were ambiguous for estimation of sex, with the supraorbital tori and superior orbital margin female in form, while the large mastoid processes and somewhat pronounced occipital protuberance suggested a male. When compared to other adult crania from 13AM43A, this cranium appeared more female than male. Sex was estimated to be possibly female, but this estimation is tenuous.

The left maxilla contained sockets for the central incisor through the third molar, but only the second premolar and first molar were in situ. The other teeth had been lost postmortem. Dental calculus deposits were slight to moderate. Dental attrition was moderate to advanced, with complete dentin exposure on the occlusal surface of the second premolar and slightly less exposure on the first molar. Attrition was flat on the second premolar and slightly cupped on the first molar. Enamel defects could not be evaluated. Both teeth also had antemortem enamel chipping.

The cranium displayed deformation that was similar to that of Individual 6-1. The posterior of both parietals was slightly flattened; there was slight keeling along the superior portion of sagittal suture; and a slight depression was present lateral to bregma and posterior to the coronal suture affecting both parietals.

A large, oval fracture on the posterior portion of the right parietal had penetrated the vault, leaving a hole that measured 2.7 cm mediolaterally by a maximum of 0.8 cm anteroposteriorly. On the endocranial surface, the margins of the area of missing bone beveled inward. On the ectocranial surface, a thin fracture line extended from the medial edge of the perforation to the sagittal suture and measured 1.4 cm long. A second linear fracture line extended laterally and inferiorly from the lateral edge of the perforation for 4.4 cm. The beveled margin of the perforation was stained slightly lighter than the other ectocranial and endocranial surfaces of the cranium. The fracture may have occurred perimortem or could have been postmortem damage that was not recent in origin.

BURIAL 7

No human skeletal remains from Burial 7 were in those from the Bray excavations at 13AM43A transferred to the OSA (UI, OSA 1994). Bray (1961:18) describes the burial as located near the northeast corner of the burial “plot” and covered by two layers of flat stones to a depth of about half a meter. Some of the stones were visible on the ground surface. An oval-shaped stain was under the stones, with the burial 1.6 m below the ground surface. The remains consisted of a child’s cranium. Two small animal mandibles were in the burial. The burial did not appear to have been disturbed.

BURIALS 8 AND 9

No human skeletal remains from Burials 8 and 9 were in those from the Bray excavations at 13AM43A transferred to the OSA (UI, OSA 1994). Both burials were described as badly disturbed, possibly by looters, and contained the incomplete remains of an adult and an infant mandible (Bray 1961:18). The infant was estimated to have been about 30 months old.

BURIAL 10

No human skeletal remains from Burial 10 were in those from the Bray excavations at 13AM43A transferred to the OSA (UI, OSA 1994). Bray (1961:18-19) notes that the burial was excavated by H. P. Field

and contained the complete remains of a fetus or very young infant. No remains matching this age estimate were in the Bray collection. It possible they were taken by Field following the excavation of the burial (Hollinger 1995).

BURIAL 11

Burial 11 does not fit the description of any of the 10 burials described by Bray (1961), and there are no juvenile skeletons that match the elements representing Individual 11 nor the age estimate. It is possible this burial was donated to Bray at some point while he was still at EMNM, but no information was recorded or remains in the documentation.

Individual 11-1

Individual 11-1 is represented by subadult remains including a cranium, incomplete mandible, incomplete hyoid, incomplete right scapula, incomplete left clavicle, a left humerus diaphysis, an incomplete right humerus diaphysis, and seven cervical and one thoracic vertebrae. Green staining was noted around the left external auditory meatus, with a small green stain on the left parietal just above the external auditory meatus.

Most of the dental remains were present. In the maxillae, the permanent central incisors and deciduous canines had been lost postmortem. The deciduous first molars were also absent, but it is possible they had been lost antemortem as the permanent first premolars were partially erupted. The deciduous second molars were present and displayed initial resorption of their roots. The unerupted teeth were the permanent canines, first and second premolars, and second and third molars. Six erupted teeth were present: the deciduous second molars and the permanent left and right lateral incisors and first molars. Three carious lesions were present on the maxillary teeth: a moderate-sized lesion on the buccal surface of the permanent left first molar; a small lesion on the buccal surface of the permanent right first molar; and a moderate-sized lesion on the mesial surface of the deciduous right second molar at the cemento-enamel junction.

The mandible was missing a portion of the right body but the permanent right first premolar through second molar were present as loose dentition. The in situ teeth present and erupted were the permanent left lateral incisor and left first molar, and the deciduous left second molar. The permanent left and right central incisors, right lateral incisor, right canine, and left and right third molars were missing postmortem. Like the maxillary deciduous first molars, the mandibular deciduous first molars were absent, but they may have been lost antemortem. The permanent left canine and left and right first premolars were partially erupted. No carious lesions were present. In general, dental attrition on all the erupted teeth was slight, although the deciduous maxillary second molar displayed slightly cupped wear. Sixteen teeth could be evaluated for the presence of enamel defects. Four teeth contained seven linear enamel hypoplastic defects that were positive for three episodes of enamel growth disruption occurring between 3.0 and 4.5 years of age.

Development of the mandibular canine through second molar provided a dental age estimate of 8.0 to 10.0 years, with most estimates overlapping in the 9 to 10 year age range. No diaphyseal lengths could be taken due to postmortem damage. Age was estimated to be 9 to 10 years. Sex was indeterminate.

BURIAL 12

There was not documentation for Burial 12 other than Hollinger's (1995) suggestion that this burial might be the same as Bray's Burial 10. Burial 10 was that of a fetus to newborn and was described as complete. Neither the age estimate nor the osteological inventory match this description. It is possible these remains were donated to Bray while he was still at EMNM, but no documentation exists.

Individual 12-1

A subadult, Individual 12-1, was represented by a nearly complete cranium, mandible, left and right scapulae, right clavicle, incomplete right ilium, left and right humerus diaphyses, left ulna diaphysis, in-

complete left femur diaphysis, 19 ribs, five cervical vertebrae, and seven thoracic vertebrae. The cranium was not intact, but had separated into individual cranial elements. The left parietal and right palatine bone were incomplete. Green staining was present on the labial/buccal surface of the maxillary and mandibular teeth and most of anterior and posterior surfaces of the mandibular body. Additional green staining was noted on four cervical vertebrae; two thoracic vertebrae; the anterior surface of all the left and six of the right ribs; the distal two-thirds of both humerus diaphyses; and the superior fourth of both scapulae.

All the deciduous dentition was present except the mandibular left central incisor which was lost postmortem. The permanent first and second molars were unerupted, and the maxillary left and mandibular left and right second molars were lost postmortem. Small pits were present on the surface of the maxillary deciduous central and lateral incisors. These may have been enamel defects or incipient carious lesions. Pitting of an unknown etiology also was present on the occlusal surface of the maxillary and mandibular deciduous right first molars. Three deciduous maxillary teeth contained carious lesions: the left lateral incisor had a small lesion on the lingual surface; the right central incisor had a moderate-sized lesion on the lingual surface; and the right lateral incisor had two moderate-sized lesions, one each on the lingual and buccal surfaces. Slight calculus was present on six deciduous molars; moderate calculus deposits were present on one deciduous molar. Dental attrition was slight and present only on the deciduous incisors. The deciduous maxillary left and right incisors and canines were discolored, but no further description was provided. The maxillary deciduous central incisors displayed crowding and slight rotation. Both were slight shifted to the buccal aspect of the alveolus and rotated with the labial surface turned slightly mesially. No bone pathologies were noted.

Diaphyseal length measurements provided age estimates of 1.5 to 3.5 years for the humerus and 2.5 to 3.5 years for the ulna. The dentition was evaluated through dental x-rays. A dental development age estimate was 2.1 to 2.9 years. Age was estimated to be 2 to 3 years.

BURIAL 13

Three individuals, an adult and two subadults, are represented by the remains labeled as Burial 13. It is possible Individual 13-1 is the same as Bray's Burial 8, the disturbed and incomplete remains of an adult. However, the presence of the two subadults with these remains suggests that the elements were probably commingled at some time in the past. It is possible all were donated to Bray while he was at EMNM, but no documentation exists for the burial number nor these individuals.

Individual 13-1

Individual 13-1 was an adult represented by incomplete cranial remains, a sacrum, a foot phalanx, and five metacarpals. The cranium consisted of the frontal, both parietals, the occipital, both temporals, and the left maxilla and palatine bone. The right temporal, left maxilla, and left palatine bone were incomplete. Heavy green staining was present on the sacrum on the anterior surface of the first body, the promontory, the superior surface of both alae, and most of the posterior surface.

The left maxilla contained the lateral incisor, canine, and first through third molars. The other teeth were lost postmortem. The crown of the canine had broken off postmortem. A loose maxillary right second molar was included with the remains and was compatible in condition, wear, and dental calculus deposits. A small carious lesion was present on the occlusal surface of the left first molar. The left third molar contained two carious lesions on the occlusal surface, one small and one of moderate size. Slight calculus was noted on the lateral incisor, while very heavy calculus deposits were present on the left first molar and left and right second molars. The left third molar appeared to have had the calculus removed postmortem. The right second molar displayed antemortem enamel chipping on the buccomesial corner of the occlusal surface and on the distolingual corner. Dental attrition was moderate on the lateral incisor and first molar, and slight on the remaining teeth. Only three teeth could be evaluated for enamel defects; none were present.

Dental attrition suggested this individual was a young adult. The cranial sutures were open endocrani-

ally and ectocranially except for a small area of the left coronal suture which was almost obliterated. Age was estimated to be young adult, approximately 20 to 25 years old. Although the sexually dimorphic characteristics of the cranium were ambiguous for estimation of sex, the remains were quite gracile. Sex was estimated to be possibly female.

The right fifth metacarpal shaft displayed evidence of a healed fracture. The shaft was abnormally narrow and slightly deformed. There was a slight misalignment of the axis of the shaft. No other pathologies were noted. Vradenburg and Hollinger (1992) noted a healed lesion on the left parietal. This pathology was not confirmed by the author of this report.

Individual 13-2

Individual 13-2 was a subadult represented by the anterior third of the left parietal; the mandible missing the ascending ramii; the left ilium and incomplete left ischium; the right talus; the left calcaneus missing the heel epiphysis; the left tibia diaphysis with the ends slightly damaged; and the incomplete left fibula diaphysis.

Although all the tooth sockets were present in the mandible, only six teeth were present: the left and right central incisors, right second premolar, left and right first molars, and the left second molar. The other teeth were lost postmortem, including unerupted third molars. No carious lesions were present. Dental calculus buildup was slight to moderate on all teeth. The greatest degree of dental wear was on the left central incisor, which had a broad area of exposed dentin. The other teeth had slight attrition. Five teeth could be evaluated for enamel defects. Three linear hypoplastic defects were present on the right lateral incisor. The left central incisor was shovel shaped. The right second premolar was rotated about 45 degrees with the buccal surface facing distally. The left second molar contained a parastyle.

The left ilium and ischium were partially fused; the tibial epiphyses and calcaneus epiphysis were unfused. This provided a general age estimate of slightly less than 13 to 15 years. The tibial diaphyseal length, which was estimated, provided a broad age range of 10.5 to 15.5 years. Dental development indicated an age range of 11.9 to 12.9 years. An age estimate of 11.5 to 12.5 years is consistent with epiphyseal union, diaphyseal length of the tibia, dental development, and general size of the remains.

A bony spur was present on the posterior surface of the left calcaneus. Periostitis was noted on the left tibia and fibula diaphyses. On the tibia, bone apposition was moderate, located along the medial and lateral shaft surfaces, and was active at the time of death. On the fibula, slight, active bone deposition was present on the posterior surface at midshaft and on the inferior third of the shaft.

Individual 13-3

Individual 13-3 was a subadult represented by the posterior third of a right parietal and proximal two thirds of a left ulna diaphysis. The ulna diaphysis was larger than that of Individual 12-1, estimated to have been around 2.5 years old. A broad age estimate of 4.5 to 7.5 years is posited for this individual. Vradenburg and Hollinger (1992) noted the presence of a healed lesion on the right parietal, but this was not confirmed by the author of this report.

BURIAL 14

No skeletal remains or documentation from the Bray excavations were associated with this burial number.

BURIAL 15

Two subadults are represented by the remains labeled as Burial 15. The commingling of these remains may have occurred at some time in the past. Additionally, the remains may have been donated to Bray while he was at EMNM, but no documentation exists for the burial number nor these individuals. It is possible some of the remains are associated with Burial 7, but this could not be confirmed.

Individual 15-1

Individual 15-1 was a subadult represented by an incomplete and fragmented cranium, left scapula, and a loose, permanent mandibular right first molar. The cranium was missing the lateral and basilar parts, and part of the right side of the squamous and both zygomas and palatine bones. Most of the sphenoid was present in four large pieces. The scapula consisted of the body with the epiphyses unfused and absent.

Although both maxillae were present, no erupted dentition was in situ. All four deciduous incisors were missing postmortem. The left deciduous canine and left and right first molars were present and possibly partially erupted. The unerupted deciduous second molars and permanent first molars also were present. The right permanent first molar was loose but compatible in development and age estimate with this individual. This tooth displayed a protostylid.

An examination of dental x-rays allowed for the determination of tooth development. The deciduous canine root was three-fourths developed. The permanent canine and deciduous second molar crowns were between one-half and three-fourths complete. Roots of the deciduous first molar were one-fourth developed, and the cusps of the permanent first molar had coalesced. Based on dental development, age was estimated to be 0.45 to 0.9 years. The left scapula was smaller than the scapulae of Individual 12-1, aged at 2.5 to 3.5 years. Age was estimated to be 0.5 to 1.0 year. While these remains may have been from the reported fetal to newborn burial, the remains were incomplete and older than the age estimate for that burial.

Individual 15-2

An incomplete left maxilla duplicated the maxilla of Individual 15-1 and was determined to be from a somewhat older subadult. All the deciduous teeth were present except the central incisor. The deciduous second molar and permanent first molar were unerupted. The three erupted deciduous teeth (lateral incisor, canine, and first molar) displayed no dental attrition. Based on examination of a dental x-ray, the deciduous first molar root was three-fourths developed. The deciduous second molar roots were between one-fourth and one-half developed, and the permanent first molar crown was one-half to three-fourths complete. Dental development provided a dental age estimate of 1.0 to 1.6 years.

Miscellaneous Burial 15

A loose, permanent maxillary premolar was slightly damaged postmortem. Side and position of the tooth could not be determined. The tooth was unerupted, with the crown developmental stage between coalescence of the cusps and one-half formed. If the tooth was a first premolar, dental age would be 2.8 to 3.4 years. If a second premolar, age would be 4.1 to 4.8 years. It is possible this tooth was associated with Individual 13-3 with an age estimate of 4.5 to 7.5 years.

SUMMARY OF HUMAN SKELETAL REMAINS FROM THE 1958 BRAY EXCAVATIONS

A minimum of 13 individuals are represented by the remains transferred to the OSA from the University of Missouri-Columbia in 1994 from the Bray excavations. All these remains were reportedly from 13AM43A, the Flynn Cemetery. Six adult and seven subadults were present. Three adults were male, aged 19-20, 25-35, and 40-50 years. Three adults were possibly female, aged 19-20, 20-25, and 30-45 years. The seven subadults' age estimates included three infants (newborn to 3 years); one child (3 to 8 years), two older children (8 to 12 years) and one older juvenile (12 to 18 years). Two individuals identified by miscellaneous adult elements, 1-2 and 2-2, may be associated with one of the other adult burials. Individual 1-2 is possibly associated with the remains representing Individual 4-1. The others appeared to come from two separate individuals based on preservation, but a specific individual was not identified. The burials, when described, appeared to be primary interments with the remains extended and supine. One exception was an extra cranium in Burial 6. Most of the burials for which a description was provided were oriented north-south with the head to the north. Burial 4, which contained no historic artifacts, was oriented east-west with the head to the east. Evidence that many of the burials were interred after contact with Europeans included

glass beads and copper grave goods in many of the burials. The remains in Burials 1, 2, 3, 6, 11, 12, and 13 showed evidence of contact with copper salts during interment by the presence of green staining on some elements, indicating individuals were interred wearing jewelry and other adornments.

Osseous pathologies included slight degenerative joint changes on Individuals 1-1 and 4-1. Periostitic bone deposition, generally healed in form, was present on the lower arm bones and tibia of Individual 6-1 (aged 12–13 years old) and the left tibia and fibula of Individual 13-2 (aged 11.5–12.5 years). A bony spur was present on the posterior surface of the left calcaneus of Individual 13-2. Individual 6-1, who displayed periostitis and cranial deformation, also had premature suture closure of two sutures. Other pathologies noted were a healed lesion on the left third cuneiform of Individual 4-1 and healed bone deposition at bregma on Individual 2-1.

Evidence of trauma included healed fractures. Individual 3-1 had a healed depression fracture on the right parietal. A healed fracture of the left third metatarsal was present on the remains of Individual 4-1. Individual 13-1 had a healed fracture of the right fifth metacarpal. A possible perimortem fracture was present on the right parietal of Individual 6-2, the extra cranium in Burial 6. It was also possible this was postmortem damage.

Unintentional cranial deformation in the form of posterior flattening, parietal bossing, and indentation of the parietals just posterior to the coronal suture was noted in four individuals: 2-1, 3-1, 6-1, and 6-2. Another probably unintentional cultural modification was marked asymmetrical femoral torsion in the femora of Individual 2-1, a 19–20 year old possible female.

The dental remains included 130 erupted teeth. Of these, 12 (9.2%) contained carious lesions. No dental abscesses or antemortem tooth loss were noted. Hypercementosis was also absent, but only eight teeth could be observed for this pathology. Dental calculus was slight to moderate on nearly all the teeth, but heavy on the first and second molars of Individuals 6-1 (a juvenile) and 13-1 (a young adult possible female). Enamel defects were present on 40 of 114 observable teeth (35.1%), affecting five individuals. Four of these individuals had a total of 14 episodes of enamel growth disruption, with 11 occurring between ages 2 and 4 years. Other dental observations included crowding and/or rotation affecting some of the teeth of two older juveniles (2-1 and 3-1), two younger juveniles (6-1 and 13-2), and a 2 to 3 year old (12-1). One form of probably unintentional modification of the dental remains was antemortem enamel chipping noted on teeth from individuals 2-1, 6-2, and 13-1. This was probably the result of masticating hard foods such as nuts.

Miscellaneous Human Skeletal Remains from 13AM43A

LUTHER COLLEGE COLLECTIONS

Two adult-sized elements from 13AM43A had been in the Luther College Archaeology Laboratory, Decorah, Iowa, in a donation from local avocational archaeologist Gavin Sampson. Sampson participated in excavations at 13AM43A along with Robert Bray in 1958, and it is likely that these elements were from that excavation. The remains were transferred to OSA for analysis and repatriation or reburial (UI, OSA 1995). No information was available concerning their association with a particular burial, and it is possible they were found in a disturbed context following road construction damage to the site. The remains were reburied in 1997 at a cemetery set aside for the reinterment of Native American remains following the wishes of the affiliated tribes.

The elements were the proximal two-thirds of a right radius and proximal two-thirds of a right ulna from an adult or near-adult individual. The elements were compatible in preservation and rearticulated well, so are likely from the same individual. The cortex of both elements was almost completely covered by green staining except for the proximal 4 cm of the radius and proximal 2 cm of the ulna. The staining indicates contact with copper salts during interment. The ulna displayed slight lipping along the proximal articular

margins, and both arm bones had well-developed muscle attachments. The presence of slight degenerative changes suggests a broad age estimate of older young adult to middle-aged adult. No sexually dimorphic characteristics were present; sex was indeterminate. Postcranial metrics were estimated for both elements. For the radius, the midshaft anteroposterior diameter was 10 mm and mediolateral diameter 14 mm; for the ulna, the maximum dorsovolar diameter was 17 mm and transverse diameter 13 mm.

ALLAMAKEE COUNTY HISTORICAL SOCIETY DONATION

In September 2015, human skeletal remains were transferred to the OSA from the Allamakee County Historical Society in Iowa (UI, OSA 2015). These remains had been given to the society by a local resident and were accompanied by a portion of *The Waukon Democrat* newspaper dated October 23, 1958 (The Waukon Democrat 1958). The front page of the paper included an article on the 1958 excavations of burials in Allamakee County as well as six photographs of the excavation, crew, and camp used by Reynold Ruppé and his assistants. The association of the skeletal elements with the newspaper article suggests that the remains were possibly from 13AM43A at the time burials were exposed and excavated in 1958.

The human remains consisted of five bones or fragments that were well-preserved and included both adult and subadult remains. Three of the elements were adult-sized. A fragment of an occipital included the left lambdoidal suture and nuchal crest. The crest was not prominent but was moderately rugose. A right rib was missing the head, tubercle, and sternal end but the majority of the body was intact. The third adult-sized element was a complete lumbar vertebra, probably a first. Very slight osteoarthritic lipping was present on the articular processes. The age and sex of the individual represented by these remains could not be determined due to a lack of sexually dimorphic and age-related features. It is possible these remains were associated with one of the previously described adults from the Ruppé excavation who lacked these elements, or they may also have been collected from the surface following disturbance to the site.

The two subadult elements were an incomplete right parietal and a second cervical vertebra. The parietal consisted of the posterior portion including the squamosal suture and inferior third of the lambdoidal suture. It was roughly comparable in size to the parietal of a confidently aged 5.0 to 6.5 year old subadult. The ossiculum terminale of the second cervical vertebra was unfused and absent. The right transverse foramen had not yet completely formed. The body was incompletely fused to the base of the dens epistrophei. Based on size and degree of development, age was estimated to be 4 to 6 years. These remains are compatible with subadults 25-2-03, 25-2-04, and 25-5-04 from the Ruppé excavation. Also, age estimation is compatible with Individual 13-3 from the Bray excavation, but the right parietal is duplicated.

The remains have been reported for NAGPRA compliance and will be repatriated or reburied following the wishes of the affiliated tribes.

Conclusions

Where described, most of the interments at 13AM43A were primary interments with the remains extended and supine. Nearly all contained grave goods, with many having historic era beads and copper items or other trade goods. Most of the described burials were oriented north-south with the head to the north.

The human skeletal remains from 13AM43A (most or all presumed to be from 13AM43A) discussed in this report represent a minimum of 38 individuals, 21 adults and 17 subadults. The adults included seven females, four possible females, three males, two possible males, and five of indeterminate sex. In general, ages estimates for the adults were in the young to middle-aged range, with only three individuals between 40 and 55 years of age. Age estimates for the 17 subadult included eight infants (newborn to 3 years), three children (3 to 8 years), three older children (8 to 12 years), and three older juveniles (12 to 18 years), one probably female.

Although the cause of death could not be determined for any individual, systemic disease may have been a contributing factor for four adults and two subadults whose remains had periostitic bone deposition. One

of these adults, of indeterminate sex, displayed evidence of treponemal infection, and the other three, all female, may have had pulmonary tuberculosis. The cause of periostitis on the two subadults could not be determined.

Nine adults had mild to moderate degenerative joint changes. Two subadults displayed mild to moderate cribra orbitalia, one of which also displayed porotic hyperostosis. Possible porotic hyperostosis was also noted on two other subadults and one adult. One subadult with cranial deformation also displayed cranial synostosis. Evidence of trauma was generally minor and included healed fractures on seven individuals. The affected bones were the parietals and bones of the hands and feet, except for one individual with compression fractures in two vertebrae and another with spondylolysis. The extra cranium from Burial 6 of the Bray excavations had a possible perimortem fracture on the right parietal.

Nonpathological conditions included a paracondylar facet on a juvenile female; possible slight displacement of the humeral heads on a 35 to 45 year old female, and two cases of asymmetrical femoral torsion on two females aged 19 to 20 years and 25 to 30 years. This form of unintentional cultural modification is defined as differential torsion of the femoral head and neck. It has been noted in femora of at least five other Oneota females (Lillie and Schermer 2015b:122) and probably results from “repeated, habitual posture such as sitting cross-legged with the same leg always or almost always on top” (Lillie and Schermer 2015a:123–124). Four individuals displayed unintentional cranial deformation, probably resulting from cradle boarding during infancy.

The dentition from the Ruppé and Bray excavations was characterized by dental pathologies. The 241 erupted teeth included 41 (12%) with carious lesions. Of 307 observable tooth sockets, 14 (3.6%) from the Ruppé excavation only had been lost antemortem. Sixteen abscesses were present on the teeth from the Ruppé excavation. Calculus deposits ranged from slight to heavy, with the latter noted on the first and second molars of one juvenile and one adult. It appeared that some or all of the calculus had been removed by cleaning of the teeth or handling, particularly from the Bray excavation dentition. Hypercementosis was noted on 10 teeth in the remains from the Ruppé excavation. Of the 172 teeth where enamel could be evaluated, 79 teeth (45.9%) contained linear enamel hypoplastic defects. These were on the dentition of 12 individuals, with 27 cases positive for episodes of enamel growth disruption caused by disease or nutritional stress. The majority of these periods of enamel growth disruption occurred between ages 2.0 and 4.0 years and may have been related to weaning stress and the vulnerability of young children to both disease and nutritional stress at that time and immediately following.

Other dental observations included crowding and/or rotation affecting 12 teeth of five subadults and one adult. Five were premolars, two were canines, one was a permanent central incisors, and four were deciduous central incisors. Antemortem enamel chipping was present on some posterior teeth for four individuals. This was probably the result of masticating hard foods such as nuts.

Despite the excavations conducted by Ruppé and Bray, along with indiscriminate looting of 13AM43A, the possibility of intact burials exists (Stanley 1993). The Flynn Cemetery is legally protected by Iowa law. The remains are culturally affiliated with the Oneota tradition based on associated artifacts.

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Table 1. Osteological Inventory, 13AM43A, Allamakee County, Iowa.

Individual 25-1

frontal, incomplete
occipital, incomplete
temporal, right
maxilla, right, incomplete
mandible, incomplete
2 cranial fragments
sternal body, incomplete – two unfused body segments
2 scapulae, left and right – right incomplete
2 clavicles, left and right – right incomplete
22 ribs, 11 left, 11 right – two right incomplete, plus one unsided rib fragment
19 vertebrae – 2 cervical; 12 thoracic; 5 lumbar
2 innominates, left and right – right missing ischium
sacrum, incomplete
2 humeri, left and right diaphyses
radius, right diaphysis
ulna, right diaphysis
4 metacarpals, left
5 hand phalanges
2 femora, left and right, incomplete diaphyses
tibia, incomplete, unsided diaphysis
2 diaphysis fragments
5 miscellaneous bone fragments

Individual 25-2-01

cranium, incomplete
 frontal
 2 parietals, left and right
 occipital, incomplete
 2 temporals, left and right – right incomplete
 2 zygomas, left and right
 2 maxillae, left and right – incomplete
 sphenoid, incomplete
37 cranial fragments
talus, left

Individual 25-2-02

mandible
rib fragment
21 vertebrae – 7 cervical; 12 thoracic; 2 lumbar
possible innominate fragment
2 metacarpals, left
3 hand phalanges
talus, left
calcaneus, left
7 tarsals, 4 left, 3 right
8 metatarsals, 4 left, 4 right
6 foot phalanges
6 miscellaneous bone fragments

Individual 25-2-03

frontal
2 zygomas, left and right
2 maxillae, left and right
2 palatine bones, left and right

Individual 25-2-04

lumbar vertebral arches

Table 1. continued.

Individual 25-3

cranium

frontal

2 parietals, left and right

occipital

2 temporals, left and right

2 zygomas, left and right

2 maxillae, left and right – right incomplete

2 palatine bones, left and right, incomplete

mandible

hyoid

sternum – incomplete manubrium and body

24 ribs, 12 left, 12 right – all incomplete except for 4 right

31 rib fragments

2 scapulae, left and right – somewhat fragmented

2 clavicles, left and right

2 femora, left and right

2 tibiae, left and right

2 fibulae, incomplete – both missing proximal end

30 small miscellaneous bone fragments

Individual 25-4-01

2 scapulae, left and right – left incomplete

2 clavicles, left and right

17 ribs, 11 left, 6 right – all incomplete except 3 left

49 rib fragments

innominate, left, incomplete

humerus, left

2 radii, left and right

2 ulnae, left and right

2 femora, left and right

2 tibiae, left and right

Individual 25-4-02

temporal, left, incomplete

maxilla, right, nearly complete

Individual 25-4-03

frontal, incomplete

2 temporals, left and right, incomplete

zygoma, right, incomplete

2 nasal bones, left and right, incomplete

mandible

2 innominates, left and right – right incomplete

sacrum fragment

femur, left

Individual 25-4-04

cranium, incomplete

frontal

2 parietals, left and right

occipital, incomplete – missing base

temporal, right

maxilla, right

sphenoid fragment

7 cranial fragments

Individual 25-4-05

hyoid

innominate, left, incomplete

femur, left, incomplete

2 tibiae, left and right, incomplete

Table 1. continued.

25-4 Miscellaneous Adult

frontal, incomplete
parietal, right, incomplete
temporal, left, incomplete – arch fragment
100 cranial fragments
cranial ossicle
sternum, incomplete – manubrium and body, fused
14 scapula fragments
2 rib fragments
8 vertebra fragments
6 innominate fragments
2 possible sacrum fragments
coccyx
25 long bone shaft fragments
80 small miscellaneous bone fragments

Individual 25-5-01

cranium, nearly complete – missing right palatine bone
hyoid
sternum
2 scapulae, left and right, incomplete
2 clavicles, left and right
24 ribs, 12 left, 12 right – only 3 complete left and 3 right
42 rib fragments
7 cervical vertebrae
12 thoracic vertebrae
5 lumbar vertebrae
2 innominates, left and right
sacrum and coccyx
2 humeri, left and right
2 radii, left and right
2 ulnae, left and right
13 carpals, 7 left, 6 right
10 metacarpals, 5 left, 5 right
19 hand phalanges
2 femora, left and right
2 tibiae, left and right
2 fibulae, left and right
2 tali, left and right
2 calcanea, left and right
9 tarsals, 5 left, 4 right
8 metatarsals, 5 left, 3 right
14 foot phalanges

Individual 25-5-02

first cuneiform, right
2 cervical vertebrae – C1 and C2
thoracic vertebra

Individual 25-6

cranium
2 scapulae, left and right
clavicle, right
21 ribs, 11 left, 10 right, complete
10 vertebrae – 2 cervical, 5 thoracic, 3 lumbar
ulna, right
2 innominates, left and right
sacrum

Individual 33-2

frontal, incomplete
2 parietals, left and right, incomplete

Table 1. continued.

Individual 33-2 continued

4 occipital fragments – including portion of base
2 temporals, left and right, incomplete
maxilla, right, incomplete
4 sphenoid fragments
25 cranial fragments – 6 vault

Individual 55-1-01

zygoma, right
maxilla, right
palatine, right, incomplete

Individual 55-1-02

zygoma, right
maxilla, right, nearly complete
3 small cranial fragments
sternum, incomplete – manubrium and sternal body with postmortem damage
scapula, left, incomplete
clavicle, right, incomplete
6 ribs, 4 left, 2 right, incomplete
17 rib fragments
humerus, left
ulna, left
8 thoracic vertebrae
5 lumbar vertebrae
innominate, left, incomplete
sacrum
patella, right
2 tibiae, left and right, incomplete
fibula, right, incomplete
14 small miscellaneous bone fragments

Individual 55-1-03

2 zygomas, left and right – left incomplete
2 maxillae, left and right, incomplete – small fragments attached to zygomas

Individual 55-1-04

frontal, incomplete
2 parietals, left and right, incomplete
occipital, incomplete
temporal, right, incomplete
temporal fragment, possibly right

Individual 55-2-01

cranium, incomplete
 frontal
 2 parietals, left and right
 occipital
 2 temporals, left and right
hyoid, incomplete
sternal body, incomplete
2 scapulae, left and right, incomplete
2 clavicles, left and right – right incomplete
20 ribs, 12 left, 8 right, incomplete
53 rib fragments
7 cervical vertebrae
innominate, right, incomplete
humerus, right
2 radii, left and right – right incomplete
2 ulnae, left and right
8 carpals, 5 left, 3 right
10 metacarpals, 5 left, 5 right
16 hand phalanges

Table 1. continued.

Individual 55-2-01 continued

2 femora, left and right
patella, right
2 tibiae, left and right
fibula, left, incomplete
talus, right
2 calcanea, left and right
2 metatarsals, left

Individual 55-2-02

cranium, incomplete
 frontal, incomplete
 2 parietals, left and right – left incomplete
 occipital
 2 temporals, left and right
 zygoma, right
 2 maxillae, left and right – left incomplete
 2 palatine bones, left and right, incomplete

mandible

2 scapulae, left and right, incomplete
6 cervical vertebrae
11 thoracic vertebrae
5 lumbar vertebrae
humeri, left and right
2 innominates, left and right
sacrum

2 femora, left and right
fibula, right, incomplete

Individual 55-2-03

rib fragment
cervical vertebra, incomplete
thoracic vertebra, incomplete
pubis, left

Miscellaneous Loose Teeth

10 loose teeth – 2 single-rooted, three molars, five molars

Individual 1-1

2 scapulae, left and right
2 clavicles, left and right
11 ribs, 3 left, 8 right – left incomplete
rib fragment
5 cervical vertebrae
7 thoracic vertebrae
4 lumbar vertebrae
2 humeri, left and right
2 radii, left and right – left incomplete
2 ulnae, left and right
6 metacarpals, 1 left, 5 right
6 hand phalanges
2 innominates, left and right – left missing portion of pubis
femur, right, incomplete

Individual 1-2

femur, right, incomplete

Individual 2-1

cranium, nearly complete – missing superior portion of right maxilla
mandible
manubrium
2 scapulae, left and right
2 clavicles, left and right
21 ribs, 10 left, 11 right – 2 left and 3 right incomplete

Table 1. continued.

Individual 2-1 continued

7 cervical vertebrae
12 thoracic vertebrae
lumbar vertebra
2 humeri, left and right
2 radii, left and right
2 ulnae, left and right
2 carpals, right
9 metacarpals, 5 left, 4 right
9 hand phalanges
2 innominates, left and right – left incomplete
sacrum
2 femora, left and right
patella, right
tibia, right
fibula, right
talus, right
calcaneus, right
3 tarsals, right
4 metatarsals, right

Individual 2-2

first cervical vertebra
thoracic vertebra – unidentified between T1 and T9
2nd metatarsal, left

Individual 3-1

cranium, nearly complete – incomplete left maxilla
mandible
2 scapulae, left and right – right incomplete
clavicle, left
5 cervical vertebrae
2 humeri, left and right
2 radii, left and right – left incomplete
2 ulnae, left and right – both missing distal end
7 carpals, right
4 metacarpals, right
3 hand phalanges

Individual 4-1

humerus, left, incomplete
radius, left
ulna, left
5 lumbar vertebrae
2 innominates, left and right
sacrum
2 femora, left and right
2 patellae, left and right
2 tibiae, left and right
2 fibulae, left and right
2 tali, left and right
2 calcanea, left and right
7 tarsals, 4 left, 3 right
2 metatarsals, 1 left, 1 right
foot phalanx, right
5 carpals, left
2 metacarpals, left
2 hand phalanges

Individual 6-1

cranium
mandible
sternum, incomplete – manubrium, sternal body

Table 1. continued.

Individual 6-1 continued

2 scapulae, left and right, incomplete
2 clavicles, left and right
17 ribs, 8 left, 9 right – most incomplete
5 cervical vertebrae
11 thoracic vertebrae
5 lumbar vertebrae
2 humeri, left and right – missing distal epiphyses
2 radii, left and right – missing left proximal epiphysis
2 ulnae, left and right – missing both proximal and right distal epiphyses
13 carpals, 7 left, 6 right
10 metacarpals, 5 left, 5 right
19 hand phalanges
2 innominates, left and right
sacrum
2 femoral, left and right
2 patellae, left and right
2 tibiae, left and right – missing right distal epiphysis
2 fibulae, left and right – missing both proximal and left distal epiphyses
2 tali, left and right
2 calcanea, left and right
10 tarsals, 5 left, 5 right
10 metatarsals, 5 left, 5 right
foot phalanges

Individual 6-2

cranium, incomplete
 frontal
 2 parietals, left and right
 occipital
 2 temporals, left and right
 zygoma, left
 maxilla, left
 palatine, left, incomplete

Individual 11-1

cranium
hyoid, incomplete
mandible, incomplete
scapula, right, incomplete
clavicle, left, incomplete
7 cervical vertebrae
thoracic vertebra
2 humerus diaphyses, left and right – right incomplete

Individual 12-1

cranium, nearly complete
mandible
2 scapulae, left and right
clavicle, right
19 ribs, 9 left, 10 right
5 cervical vertebrae
7 thoracic vertebrae
ilium, right, incomplete
2 humerus diaphysis, left and right
ulna diaphysis, left
femur diaphysis, left, incomplete

Table 1. continued.

Individual 13-1

cranium, incomplete
 frontal
 2 temporals, left and right
 occipital
 2 temporals, left and right – right incomplete
 maxilla, left, incomplete
 palatine, left, incomplete
sacrum
5 metacarpals, 3 left, 2 right
foot phalanx

Individual 13-2

parietal, left, incomplete
mandible, incomplete
innominate, left, incomplete
tibia diaphysis, left
fibula diaphysis, left, incomplete
talus, right
calcaneus, left

Individual 13-3

parietal, right, incomplete
ulna diaphysis, left, incomplete

Individual 15-1

cranium, fragmented
 frontal
 2 parietals, left and right
 occipital, incomplete
 2 temporals, left and right
 2 maxillae, left and right
 sphenoid, nearly complete – in four pieces
 10 vault fragments
loose permanent mandibular right first molar, unerupted
scapula, left

Individual 15-2

maxilla, left, incomplete

Miscellaneous Burial 15

maxillary premolar, unerupted

Table 2. Cranial Metrics (mm), 13AM43A, Allamakee County, Iowa.

Measurement	25-2-02	25-3	25-4-03	25-5-01	25-6	55-2-01	55-2-02	2-1	3-1	6-2	13-1
Maximum cranial length		176		159	155	164		165	174	175	174
Maximum cranial breadth		136		141	135	144	135	150	155	138	133
Basion-bregma height		132		124	125	113	140	122	134	131	134
Porion-bregma height								116	117	116	116
Basion-porion height								16	19	19	19
Auricular height								116	117		
Minimum frontal breadth		92		91	90	94		94	92	92	88
Total facial height								111	111		
Upper facial height								67			
Bizygomatic breadth		132		127	126	135	125	(133)	142		
Upper facial breadth								103	103	104	98
Mastoid length		24		29	29	26	23	27	24/26	(26)/24	21/-
Nasal height		50		45	45			48	53		
Nasal breadth		26		24	25				27		
Orbital height		35		31	32			32	36		
Orbital breadth		40		40	38			42	44		
Bimaxillofrontale diameter								17	18		
Maxilloalveolar length		55		55	48		52	54	65		
Maxilloalveolar breadth		58		58	61		58	65	65		
Palatal length								46	44		
Palatal breadth								38	42		
Basion-nasion length		102		94	89	96		94	101	105	99
Basion-prosthion length		91		88	87			93			
Bicondylar breadth								122	(132)		
Length of ramus								96	104		
Maximum breadth of ramus								60	59		
Minimum breadth of ramus								44/44	47/47		
Height of mandibular body								34/34	35/35		
Length of mandibular body								28/26	27/26		
Height of symphysis								78	85		
Breadth of mandibular body								31	29		
Gonial angle								11/11	13/14		
Condyle mesiolateral length		120°					122°	125°	111°		
Condyle anteroposterior length		17						21/20	-/21		
		9						10/9	8/8		

Table 2. continued.

Measurement	25-2-02	25-3	25-4-03	25-5-01	25-6	55-2-01	55-2-02	2-1	3-1	6-2	13-1
Naso-occipital length		176		157	154	163		164	173	173	173
Vertex radius		119		116	117	119	119	116	119	119	120
Lambda radius		101		91	98	102	101	94	97	95	100
Bregma radius		116		114	114	119	116	116	117	116	116
Biauricular breadth		126		122	117	126		129	139	123	
Maximum frontal breadth		109		112	113	120		118	125	113	114
Bijugal breadth		116		117	111			114	114		
Dacryon radius		86		79	72						
Ectoconchion radius		70		67	62						
Zygo-orbitale radius		80		74	70						
Zygomaxillare radius		70		65	60					94	
Nasion radius		96		90	82	92		87	95		
Subspinale radius		95		86	83			88	95		
Prosthion radius		99		90	88			95			
Frontomolare radius		80		75	67						
Nasion-prosthion height		67		59	55			64			
Bimaxillary breadth		100		92	90			100	94		
Zygomaxillary subtense		23		19	22			22	25		
Bifrontal breadth		93		95	96				94		90
Nasiofrontal subtense		18		15	14				17		14
Biorbital breadth		94		95	96				95		
Dacryon subtense		14		10	10				22		
Frontal chord		109		104	97	107		104	115	108	106
Frontal subtense		24		24	23	20		23.5	26	24	22
Frontal fraction		48		50	42	46		41	46	43	39
Parietal chord		111		97	104	100		103	99	108	110
Parietal subtense		24		23	26	21		23	23	26	27
Parietal fraction		54		47	55	54		48	53	51	53

Table 2. continued.

Measurement	25-2-02	25-3	25-4-03	25-5-01	25-6	55-2-01	55-2-02	2-1	3-1	6-2	13-1
Occipital chord		91		89	90	102	92	85	92	85	93
Occipital subtense		28		24	22	22	27	25	24	22	25
Occipital fraction		42		44	40	51	40	45	50	38	48
Foramen magnum length		35		33	32	36	37	37	35	34	35
Foramen magnum breadth							31	31	31	31	
Indices											
Cranial module	148.00			141.33	138.33	140.33	145.67	154.33		148.00	147.00
Cranial index	77.27			88.68	87.10	87.80	90.91	89.08		78.86	76.44
Cranial length-height index	75.00			77.99	80.65	68.90	73.94	77.01		74.86	77.01
Cranial breadth-height index	97.06			87.94	92.59	78.47	103.70	81.33	86.45	94.93	100.75
Cranial mean height index	84.62			82.67	86.21	73.38	77.46	81.46		83.71	84.54
Mean basion-height index	84.62			82.67	86.21	73.38	77.46	81.46		83.71	84.54
Mean porion-height index							73.65	71.12		74.12	73.19
Auricular mean height index								71.12			
Flatness of cranial base							13.11	14.18		14.50	14.18
Frontoparietal index	67.65			64.54	66.67	65.28	62.67	59.35		66.67	66.17
Total facial index							(83.46	78.17			
Upper facial index							(50.38)				
Nasal index	52.00			53.33	55.56			50.94			
Orbital index	87.5			77.5	84.21		76.19	81.81			
Maxilloalveolar index	105.45			105.45	127.08		111.54	120.37			
Palatal index							82.61	95.45			
Gnathic index	89.22			93.62	97.75			98.94			

Note: () indicates approximated measurements

Table 3A. Cranial Nonmetric Characteristics, 13AM43A, Ruppé Excavation, Allamakee County, Iowa.

Trait	25-3	25-4-03	25-5-01	25-6	55-1-01	55-1-03	55-2-01	55-2-02
	L/R							
Epipetric bone	P/P		A/-	P/A				-/A
Asterionic bone	A/A		A/A	A/A			A/-	A/A
Parietal notch bone	A/A		A/A	A/A			A/A	A/-
Os lambdoidal suture	A/A		P/P	P/P			P/P	A/P
Os coronal suture			A/A	A/A			A/A	
Os sagittal suture			A	A			A	A
Os japonicum	-/A		A/A	A/A				
Inca bone	A		A	A			A	A
Bregma bone	A		A	A			A	
Metopic suture	A		A	A			A	
Supraorbital foramen	N/F	F,F/-	F/F	N/N			F,F/F	-/N
Pterion shape	C/C		A/-	C/A				
Parietal foramen	A/A		A/A	P/A			A/A	P/A
Superior sagittal sulcus direction	R		R	R			R	R
Mastoid foramen exsutural	PO/PI		PO/A	PO/A			PO/A	PO/PO
Postcondylar foramen	P/A		P/P	P/A			P/-	P/P
Hypoglossal canal bipartite	A/P-C		A/A	A/A			P-I/P-I	A/A
Foramen ovale incomplete	P-C/P-C		P-C/P-C	P-C/P-C			A/-	
Pterygospinous bridge/spur	A/A		A/A	A/A				
Auditory exostosis	A/A	A/A	A/A	A/A			A/A	A/A
Tympanic delhiscence	A/A	A/A	A/A	A/A			P/P	A/A
Multiple infraorbital foramen	A/-		A/A	A/A				-/A
Infraorbital suture	A/-		A/A	A/A			-/P-C	-/A
Multiple zygomatic foramen	A/-		A/A	A/A			-/A	-/A
Palatine torus				A				A
Mandibular torus	A/A	A/A						A/A
Mylohyoid bridge	A/A	A/A						A/A
Multiple mental foramen	A/A	A/A						A/A

Key:

- A = absent
- F = foramen
- L = left
- N = notch
- P = present
- P-C = present, complete
- P-I = present, incomplete
- PI = present, inside suture
- PO = present, outside suture
- Pterion shape = letter code refers to Fig. 26 (El-Najjar and McWilliams 1978:125)
- R = right

Table 3B. Cranial Nonmetric Characteristics, 13AM43A, Bray Excavation, Allamakee County, Iowa.

Trait	2-1	3-1	6-2	13-1	13-2
	L/R	L/R	L/R	L/R	L/R
Epipteric bone	-/A	P/P	A/A	-/P/A/A	
Asterionic bone	A/A	P/A	P/P	A-/P/A	
Parietal notch bone	A/-	A/A	A/A	A/AA/A	
Os lambdoidal suture	A/P	P/P	A/A	A/AA/P	
Os coronal suture		A/P	A/A	A/AA/A	
Os sagittal suture	A	A	A	A A	
Os japonicum			A/-	A/A	
Inca bone	A	A	A	A A	
Bregma bone		A	A	A A	
Metopic suture		A	A	A A	
Supraorbital foramen		F/-	F/N	F/N/N/N	
Pterion shape	-/N		C/C	A/AA/A	
Parietal foramen	P/A	A/P	A/A	P/PP/P	
Superior sagittal sulcus direction	R	R	R	R ?	
Mastoid foramen exsutural		PO/PO	PO/PI	-/PIPO/PO	
Postcondylar foramen	P/P	A/A	P/P	P/PA/-	
Hypoglossal canal bipartite	A/A	A/A	A/A	A/AA/A	
Foramen ovale incomplete		P-C/P-C	P-C/P-C	P-C/P-CP-C/P-C	
Pterygospinous bridge/spur		A/A	A/A		
Auditory exostosis	A/A	A/A	A/P	A/AA/A	
Tympanic dehiscence	A/A	A/A	A/A	A/A P/A	
Multiple infraorbital foramen	-/A	A/-	A/A	P/-	
Infraorbital suture	-/A	P-C/-	P-C/P-C	A/-	
Multiple zygomatic foramen	-/A	A/A	P/A	A/-	
Palatine torus		A	A	A A	
Mandibular torus		A/A	A/A	A/A	
Mylohyoid bridge		A/A	A/A	A/A	
Multiple mental foramen	A/A	A/P		A/A	

Key:

- A = absent
- F = foramen
- L = left
- N = notch
- P = present
- P-C = present, complete

P-I = present, incomplete

PI = present, inside suture

PO = present, outside suture

Pterion shape = letter code refers to Fig. 26 (El-Najjar and McWilliams 1978:125)

R = right

Table 4. Adult Postcranial Metrics (mm), 13AM43A, Allamakee County, Iowa.

Measurements (Left/Right)	25-3	25-4-01	25-4-03	25-5-01	25-6	55-1-02	55-2-01	55-2-02	1-1	1-2	2-1	3-1	4-1
Scapula													
Scapula length	(157)/158									(140)/(140)			
Glenoid cavity length	36/37	-(36)		35/36			-/36	178/179	41/44		35/36	37/38	
Maximum breadth	99/96	-(101)						104/103		99/101	100/-		
Clavicle													
Maximum length	139/141	151/-		-/134				160/162					
Circumference at midshaft	36/31	28/-		-/33				35/37					
AP diameter at midshaft	11/10	9/-		-/10				12/12					
SI diameter at midshaft	12/9	8/-		-/11				9/10					
Humerus													
Maximum length		307/-		272/278		312/-	-(321)	296/(297)	330/336		311/324	311/311	
Max. diameter at midshaft ^a		18/-		20/20		19/-	-/19	21/2122/22		20/20	20/21		
Max. diameter at midshaft ^b		18/-		21/21		20/-	-/21	23/2325/25		21/21	22/22		
Min. diameter at midshaft ^a		10/-		17/17		17/-	-/16	14/1524/23		18/18	16/17		
Min. diameter at midshaft ^b		8/-		14/14		14/-	-/14	10/1517/17		14/14	13/14		
Max. diameter of head		38/-		41/41		40/-	-/41	43-/47/48		40/-	46/47		
Vertical diameter of head		37/-		40/41		40/-	-/41	41-/47/48		40/41	46/47		
Transverse diameter of head		(35)/-		(38)/(37)		37/-	-(37)	40/4243/44		38/-	43/43		
Least circumference of shaft		50/-		52/54		52/-	-/54	53/5565/65		55/55	57/59		
Epicondylar width		53/-		54/53		55-	-/5860/60	-/5860/60		55/54	57/58	57/-	
Articular width		38/-		36/37		40/-	-/4049/48	-/4049/48		39/39	42/42	41/-	
Radius													
Maximum length		238/246		208/215			223/-	-/225		240/245	-/238	258/-	
Maximum transverse distal width		29/29		(29)/(28)			30/-	-/35		30/30	-/33	35/-	
AP diameter at midshaft		11/11		10/10			14/15	-/13		12/12	-/15	14/-	
ML diameter at midshaft		9/10		-/14			11/10	-/17		10/10	-/11	12/-	
Ulna													
Maximum length		262/268		230/236			249/(250)	275/-				279/-	
Physiological length		231/236		200/206		223/-	216/217	237/-				241/-	
Least circumference of shaft		29/31		33/35		31/-	32/32	40/39		32/32	36/-	37/-	
Dorsovolar diameter		12/15		15/15			16/16	18/17		(12)/15	16/15	17/-	
Transverse diameter		10/11		13/13			10/11	14/15		10/10	12/12	13/-	
Innominate													
Maximum height				191/192			226/-			211/210		225/223	
Maximum breadth				140/139			165/167	171/169		(153)/154		170/171	
Pubis length				80/80			77/-					84/83	
Ischium length				78/80			91/90			79/77		85/84	

Table 4. continued.

Measurements (Left/Right)	25-3	25-4-01	25-4-03	25-5-01	25-6	55-1-02	55-2-01	55-2-02	1-1	1-2	2-1	3-1	4-1
Sacrum													
Maximum anterior height							130		120				108
Maximum anterior breadth				105			123		122		(102)		120
Max. transverse diameter base				49			(53)		59		39		57
Femur													
Maximum length	445/439	448/452		393/394			425/-	454/446			458/452		475/475
Bicondylar length	438/-	-/446		-/388			420/-	-/438			-/448		471/469
AP diameter at midshaft	27/25		24/-	-/36			29/-	31/28			26/24		32/30
ML diameter at midshaft	28/22	-/23	26/-	-/36			27/-	5/23			25/23		26/26
Maximum diameter of head	47/48	43/-		43/43			44/45	-/45			45/46		47/46
Vertical diameter of head	47/48	43/-		42/43			44/45	(44)-/45			45/46		47/46
Circumference at midshaft	94/85	(80)/-	79/-	-/(80)			89/-	86/79			82/73		94/92
Subtrochanteric AP diameter	25/22	23/24	23/-	26/27			23/23	25/25			24/23		32/30
Subtrochanteric ML diameter	35/35	30/30	32/-	33/32			35/36	34/33			33/32		29/37
Bicondylar breadth	(79)/(79)	(72)/73		(71)/(71)			78/78	78/(73)					82/83
Tibia													
Maximum length	-/347	380/388		318/324			-/353				-/366		394/392
Physiological length	-/336	372/375		303/311			338/341				-/351		375/375
AP diameter at nutrient foramen	(37)/-	30/29		(33)/(32)			30/32				-/29		41/40
ML diameter at nutrient foramen	(23)/-	21/23		(23)/(23)			25/24				-/23		24/24
Circ. at nutrient foramen	(96)/-	83/81		(90)/(88)			86/89				-/83		105/103
Proximal breadth	-/(68)	-/(65)		65/67			72/71				-/(69)		77/77
Distal breadth		-/43		46/46			-/46				-/46		58/56
Fibula													
Maximum length				308/311							-/354		378/380
Max. diameter at midshaft				13/12							-/12		15/17
Talus													
Maximum length	(55)/-			45/48			-/54						56/56
Calcaneus													
Maximum length	75/-			67/68			80/79				-/69		79/79
Middle breadth	38/-			38/(38)							-/(41)		45/45

Note: () indicates approximated measurements

^aBass 1995

^bMoore-Jansen et al. 1994

Table 5. Subadult Postcranial Metrics (mm), 13AM43A, Allamakee County, Iowa.

Measurement	25-1 Left/Right	6-1 Left/Right	11-113-2 Left/Right
<i>Humerus</i>			
Diaphyseal length	104/104	234/245	133/132
<i>Radius</i>			
Diaphyseal length	-/89	195/195	
<i>Ulna</i>			
Diaphyseal length	-(93)	214/227	110/-
<i>Femur</i>			
Diaphyseal length		356/351	
<i>Tibia</i>			
Diaphyseal length		291/288	296/-
<i>Fibula</i>			
Diaphyseal length		-/276	
<i>Innominate</i>			
Maximum ilium breadth	63/63	127/127	

Table 6A. Postcranial Nonmetric Characteristics, 13AM43A, Ruppé Excavation, Allamakee County, Iowa.

Trait	25-3		25-4-01		25-4-03		25-5-01		55-1-0255-2-01		55-2-02	
	L/R	L/R	L/R	L/R	L/R	L/R	L/R	L/R	L/RL/R	L/R	L/R	L/R
Allen's fossa	A/A	P/-				A/A		A/A	A/A			
Poirier's facet	A/A	A/A				A/A		A/A	A/A			A/A
Plaque	A/A	A/A				A/A		A/A	A/A			A/A
Hypotrochanteric fossa	A/A	A/A		A/-		A/A		A/A	A/A			A/A
Trochanteric fossa exostosis	P/P	P/-		A/-		P/P		P/P	A/A			-/A
Third trochanter	A/A	P/P		P/-		P/P		P/P	A/A			A/A
Medial tibial squating facet	-/A					A/A		A/A	A/A			
Lateral squatting facet						A/A		A/A	A/A			
Supracondyloid process		A/-				A/A		A/A	A/A			
Septal aperture		P/-				A/A		A/A	P/-/P			P/A
Acetabular crease		A/-				A/A		A/A	A/-			-/A
Accessory sacral facet – innominate						A/P		A/P	P/P			P/P
Accessory sacral facet – sacrum						A/P		A/P	P/P			P/P
Sacralization of L-5						A		A	A			A
Vastus notch						-/P		-/P	-/A-/A			-/A
Vastus fossa						-/A		-/A	-/A-/A			-/A
Emarginate patella						-/A		-/A	-/A-/A			-/A
Os trigonum						A/A		A/A	-/A			-/A
Medial talar facet						A/A		A/A	-/A			-/A
Lateral talar extension						A/A		A/A	-/A			-/A
Inferior talar articular surface						S/S		S/S	-/S			S/S
Anterior calcaneal facet						A/A		A/A	P/A			S/S
Peroneal trochlea						A/-		A/-	-/P			S/S
Atlas facet form						S/S		S/S	S/S			S/S
Transverse foramen bipartite						A/A		A/A	P/P			A/A
Atlas posterior bridge						P/A		P/A	A/A			A/A
Atlas lateral bridge						A/A		A/A	A/A			A/A
Acromial articular facet						A/P		A/P				P/-
Suprascapular foramen						-/A		-/A				A/A
Circumflex sulcus						P/A		P/A				A/A
Sternal foramen						-/A		-/A				A/A
									A/-/P			A/A
									A/-			A/A

Table 6B. Postcranial Nonmetric Characteristics, 13AM43A, Bray Excavation, Allamakee County, Iowa.

Trait	1-1	1-2	2-1	2-2	3-1	4-1	13-1	13-2
	L/R	L/R						
Allen's fossa	A/A		-/A	-/A	A/A			P/A
Poirier's facet	A/A	A/A	-/A	-/A	A/A			P/P
Plaque	A/A	A/A	-/A	-/A	A/A			P/P
Hypotrochanteric fossa	A/A	A/A	-/A	-/A	A/A			A/A
Trochanteric fossa exostosis	A/A	-/A	-/A	-/A	A/A			P/-
Third trochanter	A/A	A/A	-/P	-/P	A/A			P/-
Medial tibial squaring facet	A/A				-/A			A/A
Lateral squaring facet	A/A				-/A			P/)
Supracondyloid process		A/A	A/A		A/A		A/A	A/-
Septal aperture	-/P	P/A	P/P		P/P		A/A	P/-
Acetabular crease		-/A	P/P		A/A			P/P
Accessory sacral facet – innominate		P/P	A/A		A/A			A/A
Accessory sacral facet – sacrum	P/P	A/A		A/A			A/A	A/A
Sacralization of L-5	A	A		A			A	A
Vastus notch					-/A			A/A
Vastus fossa	-/A				-/A			A/A
Emarginate patella	-/A				-/A			A/A
Os trigonum	-/A				-/A			A/A
Medial talar facet					-/A			A/A
Lateral talar extension						A/A		-/P
Inferior talar articular surface						A/A		-/A
Anterior calcaneal facet						D/D		S/-
Peroneal trochlea			-/P			P/P		P/-
Atlas facet form		S/S		S/S	S/S	A/P		A/-
Transverse foramen bipartite		P/P		P/P	P/P	S/S	S/S	S/S
Atlas posterior bridge		A/A	A/A	A/A	A/A	A/A		A/A
Atlas lateral bridge		A/A	A/A	A/A	A/A	A/A	A/A	A/A
Acromial articular facet			P/-	A/-	A/-	A/-	A/A	-/P
Suprascapular foramen				A/A	A/A	A/A		A/-
Circumflex sulcus	A/-	-/P	A/A	P/P		A/A		A/A

Key:

- A = absent
- D = double
- P = present
- S = single

Table 7. Dental Inventory and Pathologies, 13AM43A, Allamakee County, Iowa.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Individual 25-1											
<i>Maxillary</i>											
di1	1/2or6	0/0	0/0	-1	9/9	0/0	1/1	1/1	9	9	
di2	-5			-1							
dc	-7			-1							
dm1	-7			-1							
dm2	-7			-1							
M1	-1+7										
<i>Mandibular</i>											
di1	5/5			1/1							
di2	5/5			1/1							
dc	7/7			1/1							
dm1	7/7			1/1							
dm2	7/7			1/1							
M1	7/1+7			-1							
Individual 25-2-01											
<i>Maxillary</i>											
I1	5/5			1/1							
I2	5/5			1/1							
C	5/2	-0	-0	1/1	-9	-1	2/1-2	2/1	4/2	0	
P1	5/2	-0	-0	1/1	-9	-1					
P2	5/5			1/1							
M1	2/2	0/0	0/0	1/1	9/9	1/1	2/1	2/1-2	0	0	
M2	2/2	0/0	0/0	1/1	9/	1/1	1/1	1/1	4/1	4/1	
M3	7/7										
Individual 25-2-02											
<i>Mandibular</i>											
I1	5/2	-0	-0	-1	-0	-(1)	2/1-2		9	9	
I2	2/2	0/0	0/0	1/1	9/0	1-2/	9	9	9	9	
C	2/2	0/0	0/0	1/1	9/9	9/(1)	9	9	4/4	9	

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Individual 25-2-02 continued											
P1	2/2	0/0	0/0	1/1	9/9	½	2-3/1-2	9	4/1	4/2	
P2	2/2	0/0	0/0	1/1	9/9	2/2	2/2	2-3/2	9	9	
M1	2/2	1 oc bu/0	0/0	1/1	9/9	1/1	(3-4)/2	3/2	9	9	
M2	3/3			4/4							
M3	2/2	2 oc, 2 int/1 int	0/0	1/1	9/9	0/0	2/1-2	2/1-2	4/1	4/1	
Individual 25-2-03											
<i>Maxillary</i>											
I1	5/5			1/1							
I2	5/5			1/1							
dc	5/5			1/1							
dm1	5/5			1/1							
dm2	5/5			1.1							
M1	2/2	1 int/1 oc	0/0	1/1	0/0	0/0	1/1	1/1	4/1	4/1	
M2	5+6/6										
M3	5+7/5+7										
Individual 25-3											
<i>Maxillary</i>											
I1	5/5			1/9							
I2	2/2	0/0	0/0	1/1	9/9	0/0	7+8/5	7+8/3	9	9	
C	5/2	-0	-0	1/3	-1	-0		7+8/2		9	
P1	5/2	-4 oc	-2	1/1	-1	-0		9		9	
P2	2/2	1 int/0	0/0	1/1	9/1	0/0	6+8/3	7+8/3	9	4/1	
M1	5/5			1/9							
M2	9/5			9/9							
M3	9/2	-0	-9	9/1	-2	-0		2/1			
<i>Mandibular</i>											
I1	2/2	0/0	0/0	1/1	9/9	0/0	7+8/5	7+8/5	9	9	
I2	2/2	0/0	0/0	1/1	9/9	0/0	7+8/5	7+8/5	9	9	
C	2/2	0/0	0/0	1/1	9/9	0/0	7+8/2	7+8/2	9	9	
P1	5/2	-0	-0	-1	-9	-0		6+8/2		9	
P2	2/2	0/0	0/0	1/1	0/0	5/5	6/3	7+8/3	9	9	
M1	4/4			5/5							
M2	3/4			4/5							
M3	4/4			5/5							

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Individual 25-4-02											
<i>Maxillary</i>											
di1	-5			-1							
di2	-2	-0	-0	-1	-0	-0		1-2/1			0
dc	-5			-1							
dm1	-2	-0	-0	-1	-0	-0		1/1			0
dm2	-7										
M1	-7										
Individual 25-4-03											
<i>Mandibular</i>											
I1	2/2	0/0	0/0	1/1	9/9	2/2	5+8/2	5+8/2	9	9	
I2	2/2	0/0	0/0	1/1	0/9	2/2	5+8/2	5+8/2	4/1	4/1	
C	2/2	0/0	0/0	1/1	0/-	2/2	5/2		4/2	4/3	
P1	2/2	0/0	0/0	1/1	9/9	2/3-5	6/2	4/2	4/1	4/1	
P2	2/2	0/0	0/0	1/1	9/9	2/3-5	4/2	4/2	0	9	
M1	2/2	0/2 int	0/0	1/2	9/9	2/2	6/2	6/2	4/1	0	1.8/2.4
M2	2/2	0/0	0/0	1/1	9/0	2/3-5	6/2	5/2	4/1	4/1	1.5/2.3
M3	8/8										
Individual 25-4-04											
<i>Maxillary</i>											
di1	-5			-1							
di2	-5			-1							
dc	-5			-1							
dm1	-2	-0	-0	-1	-9	-0		1/1			0
dm2	-2	-0	-0	-1	-9	-0		1/1			0
M1	-7										
M2	-5+7										

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R	
							degree/form Left	degree/form Right	type/no. Left	type/no. Right		
Individual 25-5-01												
<i>Maxillary</i>												
I1	5/2	-0	-0	1/1	-9	0/0		4/3		4/5		
I2	2/2	0/0	0/0	1/1	9/9	0/0	4/3	5/3	0	4/2		
C	2/2	0/-0	0/0	1/1	-9	0/0		4/2	4/5	0		
P1	2/2	0/0	0/0	1/1	0/9	0/1	4/2	4/2	4/2	0		
P2	2/2	0/0	0/0	1/1	0/9	1/1	3/2	3/2	0	0		
M1	2/2	0/0	0/0	1/1	0/9	2/2	3-4/2	3-4/2	4/2	4/1	(1.7)/1.9	
M2	2/2	0/2 int, r	0/0	1/1	0/0	0/1	2-3/1-2	2-3/2	4/1	4/1	1.3/1.1	
M3	2/9	0/-	0/-	1/-	0/-	0/-	2-3/2	2-3/2	4/1	4/1	0.6/-	
Individual 25-6												
<i>Maxillary</i>												
I1	2/5	0/-	0/-	1/1	0/-	0/-	4/2		4/2			
I2	5/5			1/1								
C	2/2	-/-	-/-	1/1	-/-	-/-			4/4	4/5		
P1	2/2	9/0	0/0	1/1	9/9	9/-	9	2/1	4/2	4/1		
P2	2/2	0/0	0/0	1/1	9/9	1/1	2/1	3/2	4/3	0		
M1	2/2	0/0	0/0	1/1	9/0	0/9	4/2	3/2	0	9		
M2	2/2	0/0	0/0	1/1	9/9	0/1	2/1-2	1-2/1	4/1	4/1		
M3	5+6/6											
<i>Mandibular</i>												
P1	1/-	0/-	0/-		0/-	1/-	1/1		0			
Individual 33-2												
<i>Maxillary</i>												
P1	-3			-4?								
P2	-5			-1								
M1	-2	-9	-0	-1	-0	-2		2-3/1-2		9		
M2	-3?			-4?								
Individual 55-1-01												
<i>Maxillary</i>												
I1	-5			-1								
I2	-5			-1								
C	-5			-1								

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Individual 55-1-01 continued											
P1	-2	-0	-0	-1	-0	-0		4/2		4/4	
P2	-5			-1							
M1	-2	-9	-0	-1	-9	-2		5/3		4/1	
M2	-5			-1							
M3	-5			-1							
Individual 55-1-02											
<i>Maxillary</i>											
I1	-5			-1							
I2	-5			-1							
C	-5			-1							
P1	-5			-3							
P2	-5			-3							
M1	-5			-3							
M2	-5			-1							
M3	-5			-1							
Individual 55-2-02											
<i>Maxillary</i>											
I1	2/2	0/0	0/0	1/1	9/9	0/0	6+8/2	6+8/2	9	9	
I2	2/2	0/4	0/2	1/3	9/0	0/9	6+8/2	9	9	9	
C	1/2	1 bu/0	0/0	1/1	0/9	0/0	5+8/2	6+8/2	9	9	
P1	2/2	0/4	0/2	1/3	9/9	1/1	6+8/2	9	9	9	
P2	4/2	-/4	-/2	4/3	-/0	-/9	9	9	9	9	
M1	2/2	2 oc, 3 int/2 oc, int	2/2	3/3	9/0	5/1	6/2	(6-7)/2	4/1	4/1	3.6/3.5
M2	2/3	2 r/-	0/-	1/4	9/-	1/-	3/2		4/1		
M3	5/4			1/4							
<i>Mandibular</i>											
I1	2/2	0/0	0/0	1/1	9/0	1/2	6+8/2	6+8/2			
I2	2/2	0/0	0/0	1/1	9/0	1/2	5+8/2	5+8/2	4/1		
C	2/2	0/0	0/0	1/1	9/0	1/0	5/2	5/2	4/1	4/1	
P1	2/3	0/-	0/	1/1	9/-	0/-	6/2	6/2			
P2	2/2	0/4	0/2	1/3	9/9	0/9	6/2	9			
M1	3/3			3/3							
M2	2/2	4 in/3oc, 2 bu, 1 in	2/0	3/1	0/0	1/2	9	3/2			3.6/4.2
M3	2/2	3-4/1 oc, 3 bu, 2 li	2/0	2&3/1	0/9	2/2	9	2-3/2			

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R	
							degree/form Left	degree/form Right	type/no. Left	type/no. Right		
Miscellaneous Loose Teeth												
<i>Maxillary</i>												
P, possibly right	-/1	-/2 r	-/0		-/0	-/0		4/2			9	
P, unisided	1	4	2		2	0						
P, unisided	1	4	2		0	0						
M3, unisided	1	4	2		0	0						
M3	1/-	1 int, 2 bu, oc/-	2		1	2						
M3	-/1	-/2 int	-/0		-/0	-/1		2/1-2			0	
<i>Mandibular</i>												
M	1/-	1 oc, 2 int, 2 int/-	0/-		2/-	0/-	6+8/3			9		
<i>Unidentified</i>												
possible I, unisided	1	9	0		1	0		8/4				
possible C, unisided	1	9	0		1	0		8/3				
M, unisided	1	4	2		2	0						
Individual 2-1												
<i>Maxillary</i>												
I1	2/2	0/0	0/0	1/1	9/9	0/0	3/2	3/2	4/4	4/4		
I2	2/2	0/0	0/0	1/1	9/9	0/1	2/2	2/2	4/2	4/3		
C	2/2	0/0	0/0	1/1	9/9	1/1	2/2	2/2	4/2	4/2		
P1	2/2	0/0	0/0	1/1	9/9	1/1	3/1-2	2/1-2	0	0		
P2	2/2	0/0	0/0	1/1	9/9	1/1	3/1-2	2/1-2	9	0		
M1	2/2	0/0	0/0	1/1	9/9	2/1	3/1-2	3/2	9	0		1.8/1.8
M2	2/2	0/0	0/0	1/1	9/9	2/1	2/1	2/1-2	9	0		1.9/1.0
M3	2/2	0/0	0/0	1/1	9/9	2/2	1/1	1/1	9	0		1.1/0.7
<i>Mandibular</i>												
I1	2/2	0/0	0/0	1/1	9/9	1/1	3/2	3/2	9	4/1		
I2	2/2	0/0	0/0	1/1	9/9	1/1	2/2	2/2	4/1	4/1		
C	2/2	0/0	0/0	1/1	9/9	1/1	2/2	2/2	4/2	4/2		
P1	2/2	0/0	0/0	1/1	9/9	2/2	3/1-2	2/1-2	0	0		
P2	2/2	0/0	0/0	1/1	9/9	2/2	3/2	2/2	0	0		
M1	2/2	1 oc/1 oc	0/0	1/1	9/9	2/2	3/1-2	3/2	0	0		1.8/1.9
M2	2/2	0/0	0/0	1/1	9/9	2/2	2/1-2	2/1-2	0	0		1.0/1.7
M3	2/2	0/0	0/0	1/1	9/9	1/1	1/1	1/1	0	0		0.7/0.8

Table 7. continued.

Tooth	Status		Caries		Pulp Exposure		Alveolar Abscess		Hyper-cementosis		Calculus		Attrition		Enamel Defects		Alveolar Resorption (mm)		
	L/R	L/R	L/R	L/R	L/R	L/R	L/R	L/R	L/R	L/R	L/R	L/R	Left	Right	Left	Right	L/R	L/R	
Individual 3-1																			
<i>Maxillary</i>																			
I1	-5	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0
I2	-2	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	3/2	4/3	3-4/2	4/2	3.0/2.9	2.3/2.1	3.3/2.7
C	-2	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	4-5/2	0	0	0	0	0	0
P1	-2	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	-0	4/2	0	0	0	0	0	0
P2	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	4/2	0	0	0	0	0	0
M1	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	4/2	0	0	0	0	0	0
M2	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	2/1-2	0	0	0	0	0	0
M3	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	1/1	0	0	0	0	0	0
<i>Mandibular</i>																			
I1	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	3/2	4/2	4/2	4/2	2.3/2.0	1.8/1.7	1.4/1.4
I2	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	3/2	4/2	4/3	4/4	0	0	0
C	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	3/2	4/4	0	0	0	0	0
P1	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	3/2	0	0	0	0	0	0
P2	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	3/2	0	0	0	0	0	0
M1	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	3/2	0	0	0	0	0	0
M2	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	5/2	0	0	0	0	0	0
M3	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	2/1-2	0	0	0	0	0	0
Individual 6-1																			
<i>Maxillary</i>																			
I1	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	1/1	4/5	4/4	4/4	0.8/1.0	0	0
I2	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	2/2	4/2	4/2	4/2	0	0	0
C	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	1-2/1-2	4/3	4/2	4/2	0	0	0
P1	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	1/1	4/2	0	0	0	0	0
P2	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	1/1	0	0	0	0	0	0
M1	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	1/1	9	9	9	0.8/1.0	0	0
M2	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	2-3/1-2	9	9	9	0	0	0
M3	7/7	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	1/1	9	9	9	0	0	0

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Individual 6-1 continued											
<i>Mandibular</i>											
I1	2/2	0/0	0/0	1/1	9/9	1/1	2/2	2/2	4/1	4/2	
I2	2/2	0/0	0/0	1/1	9/9	1/1	2/1-2	2/1-2	9	4/3	
C	2/2	0/0	0/0	1/1	9/9	1/1	2/1-2	1/1	4/2	4/1	
P1	2/2	0/0	0/0	1/1	9/9	2/2	1/1	1/1	0	0	
P2	2/2	0/0	0/0	1/1	9/9	2/2	2/1	2/1	0	0	
M1	2/2	0/0	0/0	1/1	9/9	3-5/3-5	2-3/1-2	2-3/1-2	9	9	1.6/1.1
M2	2/2	0/0	0/0	1/1	9/9	3-5/3-5	1-2/1	1-2/1	9	9	
M3	7/7										
Individual 6-2											
<i>Maxillary</i>											
I1	5/-			1/-							
I2	5/-			1/-							
C	5/-			1/-							
P1	5/-			1/-							
P2	2/-	0/-	0/-	1/-	9/-	1-2/-	6/2		9		
M1	2/-	0/-	0/-	1/-	9/-	1-2/-	6/2-3		9		2.8/-
M2	5/-			1/-							
M3	5/-			1/-							
Individual 11-1											
<i>Maxillary</i>											
I1	5/5			1/1							
I2	2/2	0/0	0/0	1/1	0/0	(1-2)/(1-2)	1/1	1/1	4/2	4/1	
C	7/6			-/1						4/2	
P1	6/6			1/1							
P2	7/7										
dm2	2/2	0/2 int	0/0	1/1	0/9	2/2-3	3/1-2	2-3/1	0	9	
M1	2/2	2 bu/1 bu	0/0	1/1	9/9	2/2	1/1	1/1	0	0	
M2	7/7										
M3	7/5+7										

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R	
							degree/form Left	degree/form Right	type/no. Left	type/no. Right		
Individual 11-1 continued												
<i>Mandibular</i>												
I1	5/9			1/9								
I2	2/9	0/-	0/-	1/9	0/-	2/-	1/1			0		
C	6/-			1/-						4/1		
P1	6/1+6			1/-								
P2	7/1+7			1/-								
dm2	2/-	0/-	0/-	1/-		0/-	2	3/1-2		0		
M1	2/1	0/0	0/0	1/-	9/0	1-2	1/1	1/1		0	0	
M2	7/1+7			1/-								
M3	5+7/-			1/-								
Individual 12-1												
<i>Maxillary</i>												
di1	2/2	0/2 li	0/0	1/1	9/9	0/0	2/1	2/1		7/1	7/1	
di2	2/2	1 li/2 bu, li	0/0	1/1	9/9	0/0	1/1	2/1		7/1	7/1	
dc	2/2	0/0	0/0	1/1	9/9	0/0	1/1	1/1		7/1	7/1	
dm1	2/2	0/1 oc	0/0	1/1	9/9	0/(1)	1/1	1/1		0	0	
dm2	2/2	0/0	0/0	1/1	9/9	(1)/(1)	1/1	1/1		0	0	
M1	7/7											
M2	7/5+7											
<i>Mandibular</i>												
di1	2/5	0/-	0/-	1/1	9/-	0/-	2/1			0		
di2	2/2	0/0	0/0	1/1	9/9	0/0	2/1	1/1		0	0	
dc	2/2	0/0	0/0	1/1	9/9	0/0	1/1	1/1		0	0	
dm1	2/2	0/1 oc	0/0	1/1	9/9	1/1	1/1	1/1		0	0	
dm2	2/2	0/0	0/0	1/1	9/9	1/2	1/1	1/1		0	0	
M1	7/7											
M2	5+7/5+7											

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Individual 13-1											
<i>Maxillary</i>											
I1	5/-			9/-							
I2	2/-	0/-	0/-	1/-	9/-	1/-	3/2		0		
C	2*/-			1/-							
P1	5/-			1/-							
P2	5/-			1/-							
M1	2/-	1 oc/-	0/-	1/-	9/-	5/-	3/1-2		9		
M2	2/1	0/0	0/0	1/-	9/0	5/5	2/1-2	2/2	9	0	
M3	2/-	1, 2 oc/-	0/-	1/-	9/-	0/-	1/1		0		
Individual 13-2											
<i>Mandibular</i>											
I1	5/2	-0	-0	1/1	-9	-1		1/1		4/3	
I2	2/5	0/-	0/-	1/1	9/-	1-2/-	3/2		9		
C	5/5			1/1							
P1	5/5			1/1							
P2	5/2	-0	-0	1/1	-9	-2		1-2/1		0	
M1	2/2	0/0	0/0	1/1	9/9	1-2/2	2/1-2	3/1-2	0	0	
M2	2/5	0/-	0/-	1/1	0/-	1/-	1/1		0		
M3	5+7/5+7			1/1							
Individual 15-1											
<i>Maxillary</i>											
di1	5/5			1/1							
di2	5/5			1/1							
dc	6/5			1/9							
dm1	6/6			1/1							
dm2	7/7			1/1							
M1	7/7			1/1							
Individual 15-2											
<i>Maxillary</i>											
di1	5/-			1/-							
di2	2/-	0/-	0/-	1/-	9/-	0/-	1/1		0		
dc	2/-	0/-	0/-	1/-	9/-	0/-	1/1		0		
dm1	2/-	0/-	0/-	1/-	0/-	0/-	1/1		0		
dm2	7/-										
M1	7/-										

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Miscellaneous possibly Burial 15											
P1, probably 1+7											
Key											
<i>Status</i>											
1 = present, tooth only											
2 = present, tooth in socket											
3 = antemortem loss (socket resorbing)											
4 = antemortem loss (socket resorbed)											
5 = postmortem loss											
6 = partial eruption											
7 = unerupted											
8 = congenital absence											
9 = unknown											
<i>Caries</i>											
0 = absent											
1 = pit or slight fissural beginning											
2 = pit to 1/2 of surface destroyed											
3 = destruction of 1/2 or more of surface											
4 = complete destruction of crown											
oc = occlusal											
bu = buccal											
li = lingual											
int = interproximal											
<i>Pulp exposure</i>											
0 = absent											
1 = due to attrition											
2 = due to carious lesion											
<i>Alveolar abscess</i>											
1 = absent											
2 = periodontal abscess with destruction of alveolar crest											
3 = periapical abscess with perforation of cortex or bone destruction											
4 = tooth abscessed out											
5 = antemortem tooth loss with bone resorbed											
<i>Hypercementosis</i>											
0 = absent											
1 = present, slight											
2 = present, moderate to severe											
9 = unknown											
<i>Calculus</i>											
0 = absent											
1 = slight or flex											
2 = moderate, up to 1/2 crown covered											
3 = heavy, over 1/2 crown covered											
5 = 3-dimensional											
<i>Attrition degree</i> (Hinton 1981)											
Incisors and canines											
1 = unworn to polish or small facets (no dentin exposure)											
2 = hairline of dentin exposure											
3 = dentin line of distinct thickness											
4 = moderate dentin exposure											
5 = large dentin area with enamel rim complete											
6 = large dentin area with enamel rim lost on one side											
7 = enamel rim lost completely											
8 = severe loss of crown height											
9 = degree cannot be coded											
Premolars											
1 = unworn to polish or small facets (no dentin exposure)											
2 = moderate cusp removal											
3 = full cusp removal and/or moderate dentin patches											
4 = at least one large dentin exposure on one cusp											
5 = two large dentin exposures, may be slight coalescence											
6 = dental exposures coalesced, enamel rim still complete											
7 = full dentin exposure with loss of enamel rim on at least one side											
8 = severe loss of crown height											
9 = degree cannot be coded											
Key continued on following page											

Table 7. continued.

Key continued

Molars

- 1 = unworn to polish or small facets (no dentin exposure)
- 2 = moderate cusp removal
- 3 = full cusp removal and/or some dentin exposure, pinpoint to moderate
- 4 = several large dentin exposures, still discrete
- 5 = two dentinal areas coalesced
- 6 = three dentinal areas coalesced or four coalesced with enamel island
- 7 = dentin exposed on entire surface
- 8 = severe loss of crown height
- 9 = degree cannot be coded

Attrition form (Hinton 1981)

- 1 = natural face or slightly blunt
- 2 = flat
- 3 = cupped on half to 3/4 of surface
- 4 = entire surface cupped
- 5 = rounded
- 9 = form cannot be coded

Enamel defect type

- 0 = normal
- 1 = opacity (white/cream)
- 2 = opacity (yellow/brown)
- 3 = hypoplasia (pits)
- 4 = hypoplasia (horizontal grooves)
- 5 = hypoplasia (vertical grooves)
- 6 = hypoplasia (missing enamel)
- 7 = discolored enamel (not opacity)
- 8 = other defects
- 9 = unknown

*crown broken off postmortem, only root present in socket

Table 8. Dental Metrics (mm), 13AM43A, Allamakee County, Iowa.

Tooth	Maxillary			Mandibular		
	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R
Individual 25-1						
di1	(6.7)/6.9	(4.4)/-				
dc		-(5.7)	-(7.3)			
dm1	-/6.9			-(7.9)		
Individual 25-2-01						
C	-/7.8	-/8.4				
P1	-/7.0	-/9.8				
M1	12.2/12.2	12.6/12.5				
M2	12.6/12.4	11.0/10.9				
Individual 25-2-02						
P1				7.0/6.9	8.6/8.6	
P2				7.1/7.6	9.5/9.3	
M3				11.6/11.7	11.17.2015 11.8	
Individual 25-2-03						
M1	11.9/11.4	11.9/12.1				
M2	-/9.5	-/10.6				
Individual 25-3						
M3	-/9.3	-/10.6				
Individual 25-4-02						
di2	-/4.8	-/5.6				
dm1	-/7.3	-/8.9				
Individual 25-4-03						
I2					5.8/(6.0)	
C				(6.6)/(6.5)	7.1/7.3	
P1				6.8/6.7	7.8/7.8	
P2				6.7/6.7	8.2/8.2	
M1				10.5/10.1	10.9/11.0	
M2				10.5/10.8	10.2/10.4	
Individual 25-4-04						
dm1	-/6.5	-/8.5				
dm2	-/9.2	-/10.2				
Individual 25-5-01						
I1	-/7.0	-/6.2				
I2	5.9/5.9	5.6/5.6				
C	7.4/-	7.9/-				
P1	5/75.7	8.6/8.8				
P2	5/6/5.8	9.2/9.1				
M1	8.9/9.0	(11.3)/11/0				
M2	9.2/9.1	11.0/(11.0)				
M3	7.1/-	9.5/-				
Individual 25-6						
I1	8.2/-	6.7/-				
C	7.5/7.5	7.7/7.8				
P1	6.5/6.4	8.2/8.4				
P2	5.7/5.9	7.9/8.1				
M1	9.8/(9.8)	11.6/(11.5)				
M2	8.9/8.7	10.5/10.3				
Individual 55-1-01						
P1	-/6.6	-/9.0				
Individual 55-2-02						
M2	10.8/-	11.4/11.2				
M3				-/10.5	-/10.4	

Table 8. continued.

Tooth	Maxillary			Mandibular		
	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R
Miscellaneous Dental Remains, Ruppé Excavation						
M3	(9.6)/-	(8.2)/-				
M3	-/8.9	-/6.9				
Individual 2-1						
I1	7.9/8.3	7.2/7.0		4.7/4.4	5.4/5.6	
I2	7.4/7.3	6.7/6.4		5.5/5.5	6.1/6.2	
C	7.7/7.7	8.0/7.8		6.3/6.1	7.7/7.2	
P1	6.5/7.1	9.2/9.5		6.6/(6.3)	7.6/7.5	
P2	6.2/6.8	9.4/9.2		6.6/7.2	8.0/8.2	
M1	10.6/10.4	12.0/11.9		11.2/11.3	10.6/10.7	
M2	9.9/10.4	11.2/11.5		11.0/10.6	10.6/10.3	
M3	9.0/9.3	10.4/10.3	(6.2)/(6.2)	10.4/10.7	10.5/10.3	(6.3)/(5.9)
Individual 3-1						
I1				5.2/4.9	5.7/5.8	
I2	-/6.7	-/5.9		5.8/6.0	6.2/6.2	
C	-(7.5)	-/8.1		6.8/7.0	8.0/7.8	
P1	-/6.2	-/8.7		6.5/6.4	7.4/7.2	
P2	6.2/6.4	9.5/9.0		6.9/6.6	7.9/7.9	
M1	11.1/11.1	11.9/11.9		11.5/11.3	11.3/10.7	
M2	10.4/10.6	11.8/11.7		11.3/10.8	10.7/10.9	
M3	9.7/9.1	10.3/10.8	(5.8)/(6.0)	19.8.11,2	19.3.19,4	(6.8)/(6.8)
Individual 6-1						
I1	8.5/8.3	6.8/6.9	(9.6)/(9.7)	5.1/5.2	5.6/5.75	(7.2)/(7.3)
I2	7.1/7.0	6.3/6.3	(9.2)/(8.5)	5.7/5.6	6.0/5.9	(8.0)/(7.9)
C	8.0/8.1	8.8/8.9	(10.1)/(10.5)	6.8/6.8	7.7/7.7	(11.6)/(10.2)
P1	6.7/6.6	9.7/9.3	(8.1)/(6.8)	7.3/7.4	7.85/8.1	(8.3)/(8.2)
P2	6.6/6.9	9.4/9.65	(7.1)/7.6	6.9/7.2	8.3/8.2	(6.8)/(6.75)
M1	10.5/10.3	11.8/12.0	(6.8)/(7.1)	11.8/11.8	11.6/11.6	(5.6)/(6.1)
M2	10.9/9.8	11.75/11.7	(8.6)/(8.0)	11.2/11.6	10.7/10.5	(7.3)/(7.2)
Individual 6-2						
P2	6.2/-	8.8/-				
M1	9.5/-	11.1/-				
Individual 11-1						
I1	6.6/7.1	6.4/6.9	(10.0)/(10.0)			
I2				6.2/-	6.3/-	(9.1)/-
C	8.1/7.9	-/9.1	-/11.3	6.9/-	8.0/-	11.7/-
P1	7.2/7.3	9.4/9.7	8.1/8.4	7.3/7.3	7.8/8.1	9.3/9.1
P2				8.0/7.7	8.5/8.8	8.0/8.4
dm2	9.4/11.1	10.5/11.1		10.7/-	9.6/-	
M1	11.8/(11.1)	12.5/12.5	(7.1)/7.5	11.8/11.7	11.8/11.5	(7.9)/(7.4)
M2	(9.6)/(9.8)	(11.2)/11.4		(10.8)/11.5	9.8/10.2	-/8.2
Individual 12-1						
di1	(6.5)/(6.7)	5.0/5.0	(6.1)/(6.0)	3.9/-	3.4/-	(4.9)/-
di2	5.5/5.8	4.8/4.7	(5.8)/(5.6)	4.5/4.7	3.9/3.9	(5.5)/(5.5)
dc	6.8/6.8	5.9/5.7	(6.4)/(6.7)	(5.6)/5.7	5.5/5.5	(7.6)/(7.2)
dm1	8.1/8.0	8.5/8.5	(5.3)/(5.2)	8.3/8.5	6.6/6.7	(6.5)/(6.5)
dm2	10.1/10.2	10.9/10.7	6.4/6.2	10.3/10.4	9.3/9.5	6.5/(6.2)
Individual 13-1						
I2		6.9/-				
M1	10.6/-	12.1				
M2	10.9/10.5	12.5/12.9				
M3	8.5/-	10.8/-	6.3/-			

Table 8. continued.

Tooth	Maxillary			Mandibular			
	Mesial-Distal L/R	L/R	Buccal-Lingual L/R	Crown Height L/R	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height
Individual 13-2							
I1				-/6.0	-/6.1	-(/7.5)	
I2				5.3/-	5.8/-	8.6/-	
P2				-/7.8	-/7.6	-(/7.0)	
M1				12.3/12.5	11.5/11.6	(7.1)/(6.2)	
M2				12.2/-	11.3/-	(7.2)/-	
Individual 15-1							
dc	6.7/-	5.9/-	6.5/-				
dm1	7.8/7.7	9.3/9.2					
Individual 15-2							
di2	5.4/-	4.9/-	5.8/-				
dc	7.1/-	6.2/-	6.1/-				
dm1	7.1/-	8.7/-	5.7/-				
dm2	9.5/-	10.4/-					

Note: () indicates approximated measurements

Table 9. Enamel Hypoplastic Defects Measurements (mm), 13AM43A, Allamakee County, Iowa.

	<u>Maxilla</u>				<u>Mandible</u>			
	Quad 1	Quad 2	Quad 3	Quad 4	Quad 1	Quad 2	Quad 3	Quad 4
Individual 25-2-01								
C, right		2.8	4.8					
M2, left		2.5						
M2, right		2.9						
Individual 25-2-02								
C, left					1.4, 2.5	3.5, 4.3		
P1, left						3.7		
P1, right						3.5	5.9	
Individual 25-2-03								
M1, left			3.2					
M1, right		2.9						
Individual 25-3								
M3, right			3.1					
Individual 25-4-03								
I2, left						2.3		
I2, right						2.1		
C, left					1.4	3.2		
C, right					1.8	3.1, 4.6		
P1, left					1.1			
P1, right					1.6			
M1, left					1.3			
M2, left					1.3			
M2, right						1.9		
Individual 25-5-01								
I1, right	1.8	2.8, 3.6, 4.2	5.2					
I2, left	2.0	2.6, 3.6	4.0					
I2, right		3.6, 4.1						
C, left	0.7, 2.2	2.8, 3.7	4.7					
P1, left	1.4	2.7						
M1, left	1.3	2.2						
M1, left		2.5						
M2, left		3.7						
M2, right		3.2						
M3, left		2.6						
Individual 25-6								
I1, left	2.0	3.6						
C, left		3.1, 3.6	4.7, 6.2					
C, right	0.9, 2.4	3.2, 4.6	6.2					
P1, left		2.7	4.2					
P1, right			3.8					
P2, left	0.8	1.8, 3.2						
M2, left		2.5						
M2, right		2.4						
Individual 55-1-01								
P1, right	0.8	1.5, 2.0	3.6					
M1, right			3.6					
Individual 55-2-02								
I2, left						2.2		
C, left						3.2		
C, right						2.8		
M1, left		2.8						
M1, right		2.8						
M2, left	1.9							

Table 9. continued.

	Maxilla				Mandible			
	Quad 1	Quad 2	Quad 3	Quad 4	Quad 1	Quad 2	Quad 3	Quad 4
Individual 2-2								
I1, left	1.8	3.3, 3.8	4.8					
I1, right	2.0	2.7, 3.8	4.8				3.8	
I2, left	2.5	4.0			1.6			
I2, right	2.0	3.5			1.8			
C, left	1.8	3.2			1.7	3.8		
C, right	2.3	3.6				2.9, 4.1		
Individual 3-1								
I2, left							9.0	10.6
I2, right			9.5	10.9, 11.8		3.4, 4.8	5.7	
C, left						3.1-10.3		11.6
C, right			8.6, 11.0		1.1	3.0, 4.3	6.3	
Individual 6-1								
I1, left	2.2	3.0, 4.2	5.2, 6.4		2.4			
I1, right		4.6	5.9, 6.6, 7.0		2.4			6.0
I2, left		3.5-6.6*						
I2, left		4.3, 4.7						
I2, right		3.7, 4.3				2.8	5.3	6.3
C, left		3.4, 5.2	6.4		2.4		6.4	
C, right		3.9	5.5				6.1	
P1, left		3.3, 3.6						
Individual 11-1								
I2, left	2.0	2.9						
I2, right		2.2						
C, left						3.1, 4.5		
C, right	2.7	4.1						
Individual 13-2								
I1, right						2.5, 3.4	4.2	

Quads:

- 1 = crown $\frac{3}{4}$ to crown complete
- 2 = crown $\frac{1}{2}$ to crown $\frac{3}{4}$
- 3 = crown $\frac{1}{4}$ to crown $\frac{1}{2}$
- 4 = crown initial to crown $\frac{1}{4}$ (no defects recorded in this quadrant)

*vertical groove in center of buccal surface

Analysis of Oneota Burials from Hartley Fort, 13AM103, Allamakee County, Iowa

Robin M. Lillie

A minimum of 12 individuals are represented by human skeletal remains recovered during the 1964 excavations at Hartley Fort, 13AM103. Nine individuals are from probable Oneota burials. The remaining three individuals, all adult, were identified by scattered and limited remains with no burial association. They may have been affiliated with either the Late Woodland or Oneota culture. Positioning of the Oneota burials includes five that were extended and supine with the head to the east; one probably extended and supine with the head to the northwest; and one in a sitting position, with the head to the northwest. The remains from two burials were incomplete and secondary or disturbed. The six adults from Oneota burials include three females (young adult, 30 to 35 years, older adult), one male (25 to 35 years), and two of indeterminate sex (35 to 45 years and possibly 25 to 40 years). The three Oneota subadults were estimated to have been 5.5 to 7.5, ca. 7, and 7.0 to 8.5 years old. The dental remains were characterized by carious lesions, antemortem tooth loss, and numerous linear enamel hypoplasias indicating nutrition and/or disease stressors during infancy and early childhood. One adult exhibited antemortem enamel chipping, and two each had one slightly rotated tooth. Osseous pathologies include degenerative joint disease, osteoporosis, possible tuberculosis, lytic lesions on vertebrae, and spondylolysis.

The Hartley Fort site, 13AM103, is located in the NW¼ of Section 1, T99N, R5W, Allamakee County, Iowa (Figure 1). Hartley Fort also has been known as the Hartley Site, Hartley Enclosure, and Old Fort (Stanley 1993:50). It was first mapped by Norris (1882), and published by Thomas (1894). In 1934, Ellison Orr also mapped 13AM103 within the larger area of Lane Farm Terrace (Orr 1936). Situated on a rise overlooking the confluence of French Creek and the Upper Iowa River, the site is a stockaded Late Woodland village dating to approximately A.D. 900. Portions of the site were excavated by Marshall McKusick, then State Archaeologist of Iowa, in the summer of 1964 (McKusick 1964a, 1964b, 1965, 1973). In addition to the Woodland village material, nine burials considered by McKusick to be Oneota were excavated. Radiocarbon dates for the Oneota burials were A.D. 1460 ± 85 and A.D. 1475 ± 95 (McKusick 1973:10). Five burials were located in the south rampart of the stockade. Two of these obliterated parts of the stockade post line. The other four burials were within the Late Woodland village area. One was in a small mound (Mound 2) superimposed on Woodland village features. McKusick believed this mound and others within the village area had been constructed by the Oneota. In 1992, the site was the subject of an archaeological field school headed by Fred A. Finney, then of the Iowa Office of the State Archaeologist (OSA) (Finney 1992, Finney et al. 1993, Younie 1993). No human skeletal remains were found during the 1992 excavations. The site was dedicated as an Iowa State Preserve in 1970 and is privately owned (Tiffany 1978).

The human skeletal remains from McKusick's excavation were in the OSA Burials Program repository by the mid-1980s, probably transferred from the University of Iowa's Department of Anthropology at some time prior to that time. A burial project number was not assigned until much later (University of Iowa, Office of the State Archaeologist 1995).

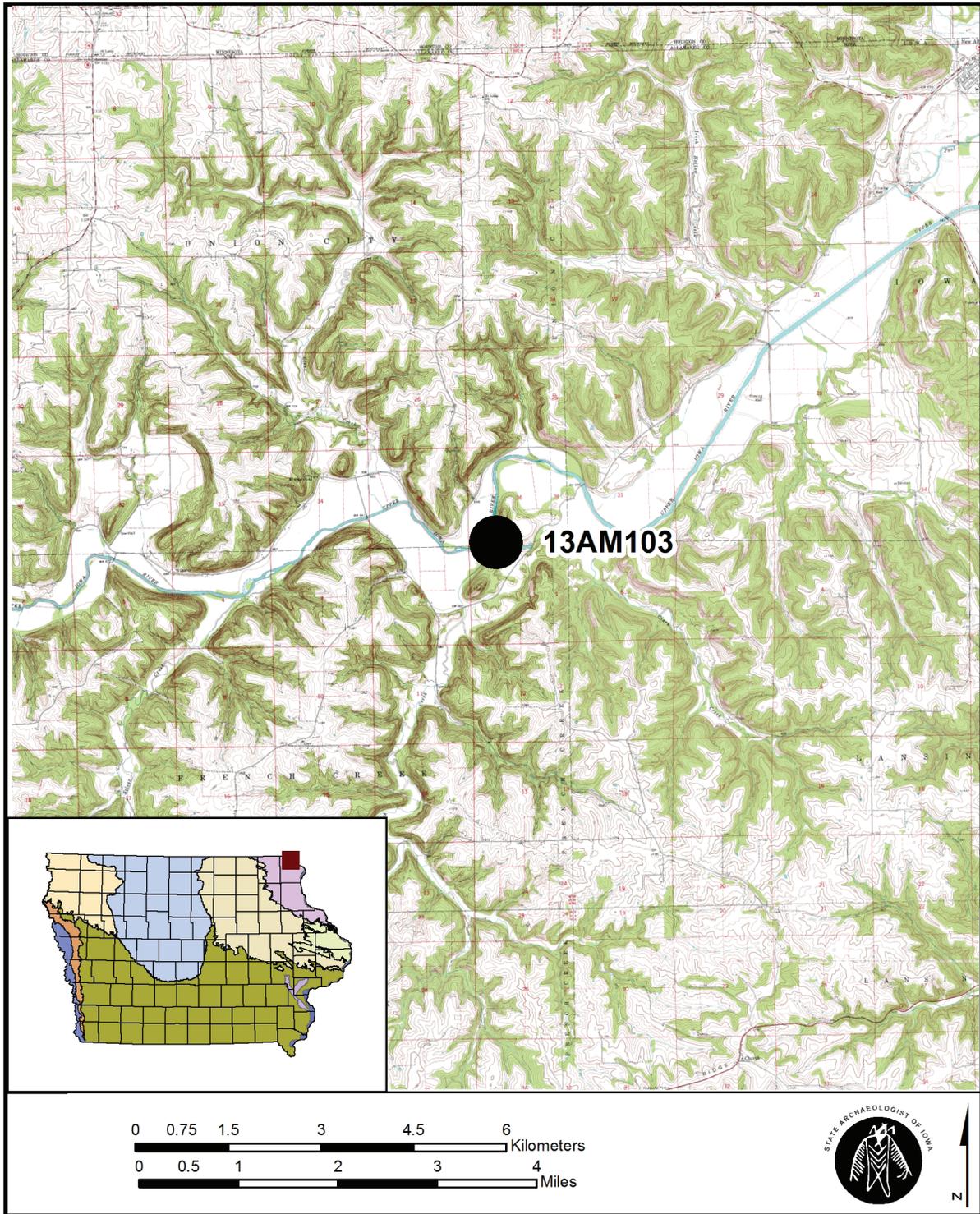


Figure 1. Location of 13AM103 in the NW¼, Section 1, T99N, R5W, Allamakee County, Iowa. Map based on USGS Waukon NW, Iowa, (1968) 7.5' series quadrangle map, scale 1:24,000. Figure map at scale 1:100,000 due to confidentiality of burial site locations.

Osteological Analysis

In 1985, osteological data was collected on the 13AM103 remains by Shirley J. Schermer (then of the OSA) and Douglas Owsley (then at Louisiana State University). The remains were loaned to Owsley and subsequently moved by him to the Smithsonian Institution in Washington, D.C. While at the Smithsonian Institution, postcranial metrics were taken by Richard Jantz. The 13AM103 remains were returned to the OSA for NAGPRA compliance and repatriation in September 1997. Additional data was collected by the author just prior to their reburial in 1997. It should be noted that a few of the teeth that were recorded as present in 1985 were missing when the remains were returned to the OSA.

This report incorporates data collected in 1985 and data collected by the author in 1997 just prior to the reburial of the remains at a cemetery in Iowa designated for the reinterment of Native American remains as requested by the affiliated tribes. In 1985, the individuals represented had been assigned designations based on their OSA catalog numbers. This system is continued in the following report for consistency. The burials are described in numeric order based on the burial numbers assigned by McKusick. An osteological inventory is presented in Table 1. Tables 2 and 3 contain cranial metrics and nonmetrics, respectively. Postcranial metrics and nonmetrics are presented in Tables 4 and 5, respectively. Table 6 contains the dental inventories and pathologies. Dental metrics are given in Table 7. Table 8 presents enamel defect measurements.

Very little written documentation was available concerning specifics of the burials. However, photographs taken by McKusick are in the OSA Archives. Descriptions of burial orientation, condition of remains, position of remains in the burial, etc. are based on examination of these photographs and notes on McKusick's 13AM103 maps, also on file at the OSA.

BURIAL 1, MOUND 2, TRENCH 2, UNIT 5

Burial 1 was located in McKusick's excavation Trench 2, Unit 5 and within Mound 2 (Figure 2). This mound was in the Woodland village area of the site. The burial was located within an oval-shaped pit, 37 in. below the ground surface. The body was extended, supine, and with the head to the east. Two artifacts were recovered with the burial. A shell-tempered ceramic pot (OSA catalog no. 2-375) incised with Oneota motifs was fragmented into several pieces. A small bone tool (OSA catalog no. 2-71) weighing 1.6 g, was examined in 1997 by Professor Mary Whelan, then of the Anthropology Department at the University of Iowa. The artifact was a thin, curved, and polished bone fragment. One of four margins, the thin polished edge, was damaged from use-wear. Whelan identified the bone element as most likely a rib fragment from a large mammal, c.f. bison or elk. Whelan believed the artifact was possibly a spoon, cup or bowl fragment, but also was similar to Late Woodland decorative artifacts from northern Minnesota that were used on breast plates or bracelets. If the bone artifact was from the Late Woodland culture, it may have been an inadvertent inclusion in the mound/burial fill or was picked up and reused by the Oneota.

Individual 2-803

The majority of the skeletal remains were catalogued under OSA catalog # 2-803. Additional remains that did not duplicate these and were consistent with the age estimate for Burial 1 were found in the OSA Repository under catalog # 2-719. These were transferred to the OSA Burials Program. The remains included most of the cranium, the mandible, and most postcranial elements. Some of smaller bones such as epiphyses and hand/foot elements were missing postmortem. Many of the elements were incomplete, and the nearly complete calva had been damaged in transit from the Smithsonian Institution. The cranium had been partially reconstructed at some time in the past. The ribs and vertebrae were in fair to poor condition; the long bones were in fair to good condition. Nearly all the elements were taphonomically eroded postmortem. Only the dental data had been collected in 1985.

The teeth were in excellent condition. However, the maxillary and mandibular right canines were not with the remains when they were returned to the OSA in September 1997. Their status was recorded based on the 1985 dental data.

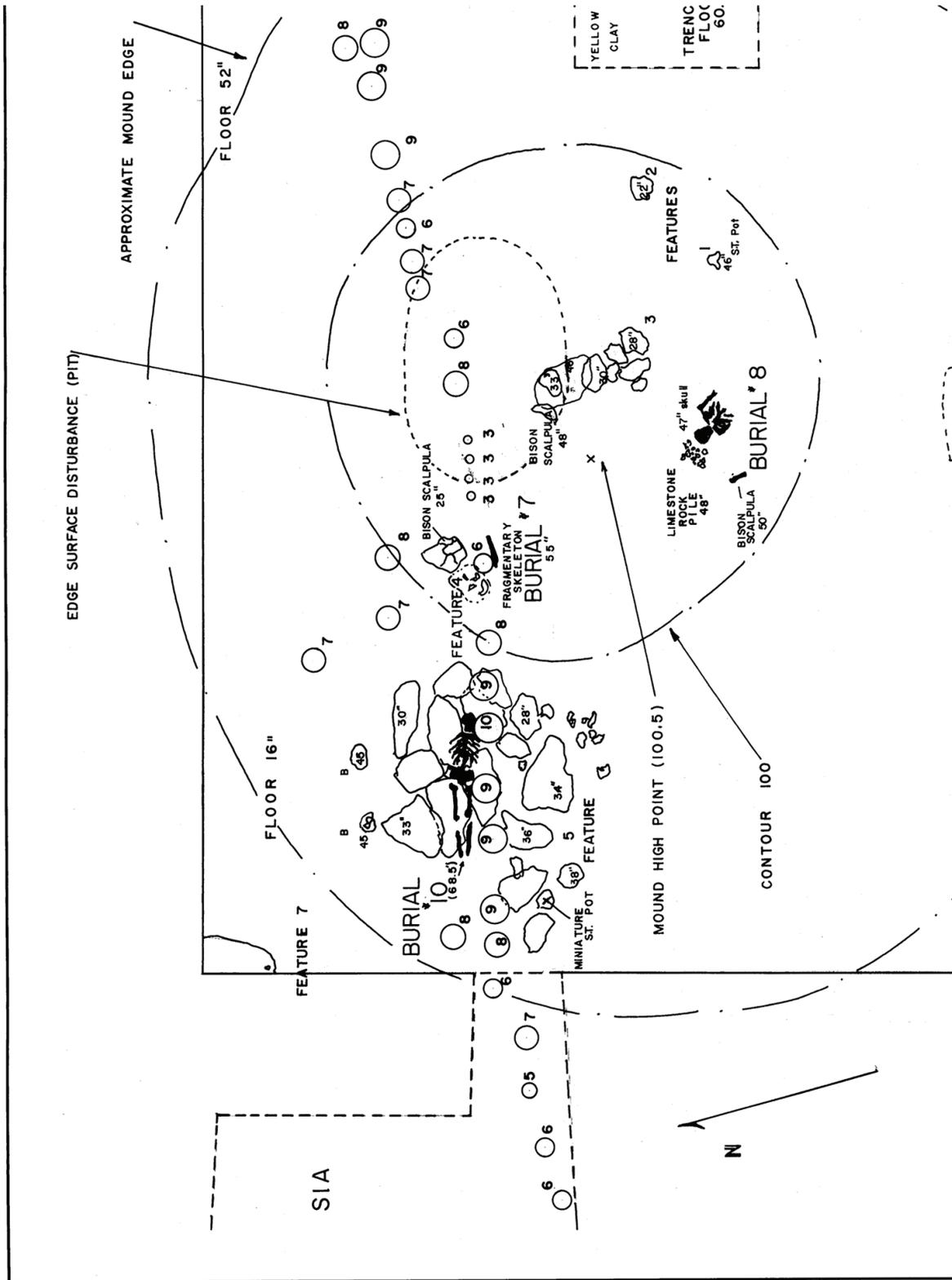


Figure 2. Map depicting 1964 excavation units and trenches at 13AM103. (McKusick 1967a).

In the maxillae, the only deciduous teeth present were the left and right second molars. It is possible the deciduous first molars had been present antemortem, or they may have been lost naturally. The permanent maxillary teeth present were the left central incisor, both lateral incisors, the right canine, both first premolars, the right second premolar, and both first and second molars. The left canine, second premolar, and both third molars were missing postmortem. The canines and first premolars were partially erupted and the second and third molars unerupted. Moderate-sized carious lesions were present on the occlusal surfaces of both deciduous second molars. Dental wear was slight on the permanent right central incisor and both deciduous second molars. In the mandible, all the permanent teeth were present except the left canine and left and right third molars, which were lost postmortem. The deciduous first and second molars were also present. The permanent right canine was partially erupted. The four premolars and both second molars were unerupted. No carious lesions were present on the mandibular teeth. Both permanent central incisors displayed slight wear, as did the left deciduous second molar. Both deciduous first molars and the deciduous right second molar were worn, with slight dentin exposure. Fourteen teeth could be evaluated for enamel defects. All of them contained at least two linear enamel hypoplasias, for a total of 48 defects. These were positive for six episodes of enamel growth disruption occurring between 1.5 and 3.5 years, and 4.0 and 5.5 years.

Estimated age for this individual was based on dental development and long bone diaphyseal lengths. The first premolar roots were between one-fourth to one-half developed, suggesting 6.4 to 8.6 years. The second premolar roots were one-fourth developed, suggesting 7.6 to 7.8 years. The permanent central incisors had roots that were one-half developed, while the lateral incisor roots were one-fourth developed. Development of the incisors provided an age estimate of 8.2 to 8.8 years. Dental age was ultimately estimated to be 7.5 to 8.5 years, and long bone diaphyseal lengths suggested 5 to 7.5 years. Therefore, age was determined to be approximately 7.5 years.

BURIAL 2, UNIT E-3

Individual 2-804

The remains representing Individual 2-804 were recovered in excavation unit E-3, located just southeast of Trench 2 (Figure 2). Photographs of the burial show the cranial vault and the lower portion of the body from the lower vertebrae through ankle area. This was probably a poorly preserved or disturbed extended and supine burial. The head was to the east. The skeleton was missing numerous elements, with the postcrania very fragmented and incomplete. The cranium was missing the face and generally was in poor to fair condition. No mandible was present. The frontal appeared to have been damaged by an excavation tool, such as a shovel, and the ectocranial surface was exfoliating due to taphonomic processes. Some of the elements displayed rodent gnaw marks. The postcrania included incomplete left and right humeri, the right ulna, four vertebrae and 19 vertebral fragments, both innominates, the sacrum, both femora and tibiae, and two foot bone fragments.

The primary elements and iliac crest were fused on the innominates, as were the epiphyses of the femora and proximal tibiae, indicating an adult. Evaluation of the auricular surface of the innominates provided an age range of 35 to 45 years. The morphology of the innominate was somewhat ambiguous. The sciatic notch was more male than female in form. The auricular surface was neither male nor female in form, but a preauricular sulcus was present. The sexually dimorphic characteristics of the cranium were also ambiguous, with the surporbital tori and external occipital protuberance neither strongly male nor female. The mastoid processes were small, a female characteristic; but the superior orbital margin was rounded, a male characteristic. The circumference of the femur was estimated, but taken at the smallest midshaft area. The measurement of 88 mm was well within the range for males. The diameter of the femur head fell between the range for males and females. Sex was indeterminate.

Mild to moderate degenerative changes were noted in the lumbar vertebrae and left innominate. The first

through third lumbar vertebrae contained moderate osteophytic lipping on the superior and inferior articular margin of body. The fourth and fifth lumbar vertebrae had mild osteophytic lipping on the articular margin of the superior and inferior facets and mild porosity on the facet surfaces. Additionally, moderate osteophytic lipping was present on the articular margin of the bodies. The right innominate had mild osteophytic lipping along the outer articular margin of the acetabulum.

BURIAL 3, TRENCH 2, UNIT 8B

Individual 2-805

Burial 3 was found in Trench 2, Unit 8 when the unit was enlarged to the north (Figure 2). The burial was of a subadult, less complete than Burial 1, but about the same age. This was either a highly disturbed or secondary burial. The cranium was upside down over the vertebrae, with the femora and other long bones next to or under the cranium. The floor of the burial was 30 in. below the ground surface. Only data on the dental remains was collected in 1985. The cranial remains included the frontal, both parietals, incomplete occipital, incomplete temporal, the right zygoma, both maxillae (left incomplete), the palatine bones, incomplete sphenoid, and 18 facial and vault fragments. Several of the cranial elements were in fragments, and all were exfoliating both ectocranially and endocranially. The mandible, six vertebrae, both innominates, the femora and tibiae, and the left talus were present.

Most of the permanent teeth were in situ. The maxillary left central incisor and first premolar, and the right lateral incisor and second molar were missing postmortem, as was the mandibular left second molar. The left maxilla was damaged in the area of the left third molar, so status of this tooth could not be determined. The canines, first premolars, and second molars were partially erupted. The second premolars and third molars were unerupted. The deciduous second molars were still present. The maxillary deciduous second molars each contained a moderate-sized carious lesion on the mesial surface, with the pulp chamber exposed on the right molar. Wear was slight on all teeth except the first molars which displayed moderate exposure of the dentin. The maxillary right lateral incisor had an unusual cusp pattern that was more similar to that of a premolar without a lingual cusp than that of an incisor. The maxillary right lateral incisor had a tuberculum dentale. Viewed occlusally, an extra cusp is present on the lingual aspect, with two grooves oriented buccolingually, one mesial and one distal to the cusp, near the tooth's center line and adjacent to the cemento-enamel junction. Eighteen teeth were codeable for enamel defects. All were positive, with 58 linear enamel hypoplasias recorded. These were positive for 10 episodes of enamel growth disruption occurring between 0.5 and 5.5 years of age.

Assessment of tooth development was used to estimate dental age. The central incisor, canine, both premolars, and all three molars were examined and provided an age estimate of 7.1 to 8.6 years. The left femur diaphyseal length yielded an age estimate of 6.5 to 7.5 years. Age was estimated to be 7.0 to 8.5 years.

No pathological conditions were noted on the osseous remains.

BURIAL 4, TRENCH 2 SECTION 8

The remains recovered from Burial 4 were found in Trench 2, Section 8, in the south portion of the unit (Figure 2). The burial was extended and supine, with the head to the east. The right arm was tightly flexed, with the hand near the throat/chin area. Disturbance to the burial, probably from burrowing animals, had displaced the mandible, which was located just proximal to the left innominate. No left ribs appeared to have survived, and the left arm was slightly lateral to its correct anatomical position. In 1985, the remains from Burial 4 were sorted into two individuals, then labeled Individual 2-806A and 2-806B. When reexamined and compared to excavation photos, only one individual was present in Burial 4. The left and right arm bones showed differences in preservation. The cortex was exfoliating, weathered, mottled, and more darkly stained on the left arm bones but not on the right. It is possible these differences were the result of differential taphonomic factors within the burial environment, such as an area of poorly drained soil. A

bison scapula (OSA catalog no. 2-732) recovered in the burial had been placed parallel and lateral to the left lower leg.

Individual 2-806

Individual 2-806 was represented by an incomplete cranium; mandible; an incomplete right scapula; left clavicle; left and right arm long bones and right capitate; three right metacarpals and two unisided hand phalanges; five right ribs and 14 rib fragments; nine thoracic and five lumbar vertebrae; incomplete left and right innominates; the sacrum; left and right femora and tibiae; and the left fibula and patella.

The cranium consisted of a nearly complete frontal, left and right parietals, an incomplete occipital, left and right temporals (right incomplete), the right zygoma, and incomplete maxillae and palatine bones. The mandible was missing the right ascending ramus.

The alveolus of the maxillae was damaged postmortem. As a result, status of the central incisors and right canine could not be determined. The portion posterior to the left first molar and right first premolar was absent postmortem. The right lateral incisor was present as a loose tooth in 1985, but was absent when the remains were returned in 1997. The left lateral incisor and first molar were lost antemortem with the sockets resorbed. The right first premolar and left second premolar were lost postmortem. Only the left canine and first premolar were in situ. Both were severely worn, with extreme loss of crown height. Wear on the first premolar was partially cupped in form. The mandible was better preserved than the maxillae, although the right lateral incisor through first premolar were lost postmortem. Both central incisors, the left lateral incisor, right second premolar, both first molars, and the left second molar were all lost antemortem, with partial resorption of the socket on all except the right first molar and left second molar which had completely resorbed sockets. The left canine and right second molar had been present in 1985 but not with the mandible when it was returned to the OSA in 1997. Status of the third molars could not be determined, although x-rays of the mandible did not show any evidence of unerupted teeth or abscessing, suggesting these teeth may have been congenitally absent. The only tooth present in 1997 was the left first premolar. Both it and the second premolar displayed severe loss of crown height.

The supraorbital tori, mastoid processes, and external occipital protuberance were neither strongly male nor female in form. The chin shape was female. The gonial angle of the mandible could not be measured, but appeared to be in the range for females. However, antemortem tooth loss may have affected the angle. The three sexually dimorphic characteristics present on the incomplete innominates were female in form. Five of seven of the postcranial metrics fell in the range for females; the other two were indeterminate for sex. Sex was estimated to be female. Evaluation of the auricular surface of the innominate provided an age estimate of 50 to 60 years. An age estimate of older adult is consistent with the extreme tooth wear and widespread antemortem tooth loss. Stature, estimated from the left femur, was 150.82 ± 3.5 cm (59.38 ± 1.38 in.).

Numerous pathological conditions were noted on the remains. Overall, thinning of the bone cortex and light weight elements were noted, indicative of osteoporosis. The clavicle, which consisted of the sternal end and several fragments, displayed severe porosity. Evidence of possible tuberculosis was also present. Lytic lesions were present on the bodies of all the lumbar vertebrae except the third. On the first lumbar vertebra, the lesion was severe, active, and widespread. On the second lumbar vertebra, the lesion was active, but localized and mild. The fourth lumbar vertebra had a moderate, active, but localized lesion. The lesion on the fifth lumbar vertebra was moderate, active, and widespread. The promontory of the sacrum also contained a moderate, active, and widespread lesion. All nine of the thoracic vertebrae (T1 through T9) contained moderate osteophytic lipping along the superior articular margins of the bodies. The first through third lumbar vertebrae had mild osteophytic lipping on the superior and inferior articular facets, with severe lipping on the superior and inferior body margins. The fourth and fifth lumbar vertebrae displayed moderate osteophytic lipping on the superior and inferior articular margins and surface of the facets, with mild porosity, and moderate osteophytic lipping along the body margins. The sacrum had moderate osteophytic

lipping on the margins of the superior articular processes and moderate porosity with mild eburnation within the facets. Other elements also displayed degenerative changes in the joints. The glenoid fossa of the scapula contained mild porosity. The distal articular surface of the humerus had mild osteophytic lipping along the margins. The proximal end of the ulna contained moderate osteophytic lipping along the articular margins and surface, with moderate osteophytic development along the distal articular margins. The distal articular margins of both femora and the proximal end of the left tibia contained slight osteophytic lipping. An x-ray taken of the left femur revealed nine Harris lines in the distal shaft, but none in the proximal shaft.

BURIAL 5, POSSIBLY MOUND 5, TRENCH S-1B

Burial 5 was found along the southern portion of the 1964 excavation in Trench S-1B (Figure 3). This area was within the south rampart but did not overlap the post hole line. It appears to be within the mound labeled Mound 5. The burial was beneath a layer of limestone rock, described as a cairn. The remains were in a sitting position, with the legs extended and the upper body upright. The head was to the northwest. The most superior portion of the cranium, the superior occipital and posterior right parietal, appeared to have been damaged by an excavation tool, such as a shovel. Although no artifacts were associated with the burial, McKusick felt it was probably Oneota, based on its position above the post holes.

Individual 2-807

Burial 5 contained a fairly complete adult skeleton, labeled Individual 2-807. Only some of the smaller elements were missing postmortem. A few elements were incomplete, including the sternal body, both scapulae, the left innominate, and most of the ribs. The left mandibular condyle was slightly damaged postmortem. The cranium was fragmented in transit from the Smithsonian Institution. Overall preservation was good, although some cortex was exfoliating on the long bones. Rodent gnaw marks were present on the tibia shafts. A left first cuneiform, which did not duplicate any of the 2-807 remains, was found in the OSA Repository under catalog no. 2-531. This element was transferred to the OSA Burials Program. Its provenience is unknown, but it was compatible with the Burial 5 remains and did not duplicate the Burial 5 foot bones. Preservation was also similar. It was possibly associated with Burial 5.

In 1985, all the teeth were present except the mandibular right lateral incisor. However, this tooth was present when the remains were returned to OSA in 1997. Unfortunately, the maxillary left canine, and mandibular left lateral incisor and canine were absent. It is likely that the mandibular lateral incisor was misidentified as a left in 1985 and was the same tooth identified as a mandibular right lateral incisor in 1997.

Small carious lesions were present on the distal surface of the maxillary left second premolar and mesial surface of the left first molar. Two more small lesions were present on the occlusal surface of the mandibular left and right second molars. Calculus deposits were slight to moderate. Dental attrition was moderate on most of the dentition, with the most advanced wear on the maxillary incisors and right canine, the mandibular right incisors, and all the first molars. Wear on the third molars had exposed a moderate amount of dentin. Antemortem enamel chipping was noted on the maxillary left lateral incisor, left canine, left first premolar, right second and third molars, and the mandibular right first and third molars. Thirty teeth could be evaluated for the presence of enamel defects. Of these, 13 contained 15 linear enamel hypoplasias. These were positive for four episodes of enamel growth disruption occurring at 2.5 to 4.0 and 5.0 to 5.5 years. A vertical area of enamel pitting was present on the buccal surface of the mandibular left canine. It was on the distal half of the surface and extended from the occlusal edge to close to the cemento-enamel junction. No measurement of its length was taken. The mandibular right canine was slightly rotated, with the buccal surface facing distally, and slightly displaced buccally.

Although the remains were not particularly large, all the sexually dimorphic features of the cranium and innominates were male in form. The gonial angle was in the range for males, and the ratio of the width of the sacral promontory to the ala was also male. Of the twelve postcranial metrics used for estimating sex, five were in the range for males, two were in the range for females, and five were indeterminate for sex. Sex

was estimated to be male. Evaluation of the auricular surface of the innominate provided an age range of 25 to 35 years. Stature, estimated from the right femur, was 175.82 ± 3.8 cm (69.22 ± 1.5 in).

Degenerative changes were noted on several elements. Mild osteophytic development was present on the facets and bodies of all 12 thoracic and five lumbar vertebrae. Two moderate-sized lytic lesions were present on the posterior portion of the inferior surface of the fifth lumbar body. The lesions were active and localized. They measured 7 x 10 mm and 10 x 10 mm and were 3 to 5 mm deep. This vertebra also displayed spondylolysis. Although only one vertebra was affected by lytic lesions, Schermer initially thought this might suggest tuberculosis. Since the other vertebrae and ribs were not affected, the author feels that the etiology of the lesions on the fifth lumbar vertebra is indeterminate. The left femur had ossified connective tissue, but the location on the bone was not recorded. The shaft of the right second metacarpal was very curved as a result of a well-healed and remodeled fracture. No reactive bone was present. X-rays were taken on several of the long bones. Two Harris lines were present in the distal end of the left femur and one in the distal end and three in the proximal end of the left tibia.

BURIAL 7, MOUND 4

Burial 7 was located slightly northwest of the Mound 4 high point, obscuring or obliterating post holes from the stockade (Figure 3). Photos of the burial show only incomplete femora and one tibia. It appears to have been labeled Feature 4. Although a bison scapula hoe was found near the burial, it was not catalogued as associated with Burial 7.

Individual 2-808

Burial 7 contained the incomplete and fragmentary remains of Individual 2-808. Only the shafts of the left and right femora and the proximal two-thirds of the right tibia were labeled with the catalog number 2-808. All were taphonomically eroded and had extensive animal gnaw marks.

Additional human remains were found in the OSA Repository under catalog numbers 2-532 and 2-724/725. Catalog information for 2-532 indicated this one human element had been recovered from Feature 4 in Mound 4. It consisted of a right temporal fragment that included the fossa. It was of adult size and possibly human. The remains from catalog no. 2-724/725 were recovered from Feature 3 in Mound 4, an area of rocks to the southeast of Burial 7. Although it was not in the immediate vicinity of Burial 7, the remains could have been scattered at the time of Burial 7's interment or redeposited some time afterwards. The remains are considered possibly associated with Individual 2-808. They included four cranial fragments, an incomplete mandible, unisided humerus shaft portion, and a possible patella fragment.

The individual represented by the femora and tibia was probably an adult, based on the size of the remains and complete fusion of the proximal tibia epiphysis. Because these elements were heavily damaged by taphonomic processes and animal gnawing, no measurements could be taken. There were no features diagnostic of sex or age. The determination that the individual was an adult was based on complete long bone development and epiphyseal fusion. The additional remains from catalog number 2-724/725 included a mandible body that was in three pieces and badly eroded. However, six teeth were in situ. These were also in poor condition, missing most or all of the enamel. The enamel that was present was stained. The left first and second molars and right second premolar through third molar were in situ. All the other teeth had been lost postmortem. A small portion of the tooth root was present in the sockets of the left and right first premolars. Due to the absence of much of the enamel, carious lesions, calculus deposits, and enamel defects could not be evaluated. Dental attrition on the molars was moderate, with small areas of dentin exposed on the third molar. All wear was flat in form. Based solely on dental wear, a general age estimate of older young to middle-aged adult, approximately 25 to 40 years, is posited for the individual represented by this mandible. If this element is associated with Burial 7, then this age estimate would apply to all those remains as well.

BURIAL 8, MOUND 4

Burial 8 was slightly south and west of the high point of the mound (Figure 3). Drawings and photographs of the burial show the skull and upper torso of an adult burial. The head was to the northwest. The original burial was probably extended and supine.

Individual 2-809

The remains representing Individual 2-809 from Burial 8 were in poor condition. The cortex was badly taphonomically eroded and most of the elements fragmented. Animal gnaw marks were present on the left humerus. The remains consisted of an incomplete cranium, a mandible, an incomplete hyoid and sternum, the right clavicle, incomplete left and right humeri, three ribs and 17 rib fragments, the third through seventh cervical vertebrae, and all of the thoracic vertebrae. The occipital, both temporals, both zygomas, and both palatine bones were incomplete. Most of the enamel was missing from the teeth postmortem.

In the maxillae, the left central incisor had been lost antemortem, with the socket partially resorbed. All the left molars were missing postmortem. The right second molar had been lost antemortem with the socket completely resorbed. The right second premolar was congenitally absent. All the other maxillary teeth were in situ. In the mandible, the left central incisor and the right molars were missing postmortem. The broken root of the right first molar was still in the socket. The other mandibular teeth were in situ. Four teeth contained carious lesions. The maxillary left second premolar had a moderate-sized lesion affecting the distal surface of the crown and root at the cemento-enamel junction. The maxillary right canine had a similar lesion in the same location. The maxillary right third molar had a moderate-sized lesion on the mesial surface of the root at the cemento-enamel junction. The mandibular left first molar had a moderate-sized lesion on the distal surface, affecting the crown and root at the cemento-enamel junction. A periapical abscess was associated with the mandibular right first molar socket. Only two teeth could be evaluated for dental calculus; none was present. Twelve teeth could be assessed for dental attrition. It was marked on the maxillary right incisors, with almost complete dentin exposure on the occlusal surface and significant loss of crown height. Most of the remaining teeth had moderate to advanced wear except the maxillary third molar, which was slightly worn. Of the 22 teeth present, only four were observable for enamel defects. They each contained one or two defects for a total of five linear enamel hypoplasias. One was not measureable. They were not positive for any episodes of enamel growth disruption. The maxillary right first premolar was slightly rotated, with the buccal surface facing distally.

The third molars were erupted and the sternal end of the clavicle was fused, indicating an individual at least in their early 20s. Slight wear on the third molar suggests it had not been in occlusion for an extended period of time. A general age estimate of 30 to 35 years is posited for this individual. The supraorbital tori and chin shape were female in form. The gonial angle fell in the range for females. The postcranial remains were quite gracile, but no postcranial metrics could be taken. Sex was estimated to be female.

Mild osteophytic development was present along the superior and inferior facets and body margins of the tenth through twelfth thoracic vertebrae. These same vertebrae also had moderate porosity and mild eburnation on the facet surfaces and mild porosity on the bodies. No other pathological conditions were noted.

BURIAL 9, MOUND 4

Burial 9 was located near the presumed southern edge of Mound 4 (Figure 3) and consisted of an incomplete skeleton. The skull was in the northeast corner, with the leg bones extended in the southwest portion. It appears to have been disturbed in the past or was very poorly preserved, but probably was an extended, supine interment.

Individual 2-810

The skeletal remains representing Individual 2-810, Burial 9 from Mound 4, were an incomplete cranium and mandible; fragments of a clavicle; both innomines, calcanei and tali; three cervical vertebrae includ-

ing the first and second; and incomplete left and right femora and tibiae. The remains were poorly preserved and most were fragmented. The cranial vault was thin, as was the mandible. All the postcranial elements appeared to be quite small.

The dental remains were in poor condition, with enamel missing postmortem. A strong smell of acetone was present on the dental remains. Both maxillae were incomplete, missing the sockets for the third molars and left incisors. The left canine through second molar and right canine were in situ. The right incisors and first premolar through second molar were missing postmortem. In the mandible, the left canine through first molar and third molar were in situ. The left second molar had been lost antemortem with the socket partially resorbed. The right mandibular teeth present were the first premolar and first and third molars. The other right mandibular teeth had been lost postmortem. Two carious lesions were noted. A small lesion was present on the occlusal surface of the maxillary left second molar. A moderate-sized lesion was on the mesial half of the occlusal surface of the mandibular right third molar. Due to postmortem damage, most of the sockets could not be assessed for abscesses and calculus. Dental attrition was coded for nine of the 14 teeth. It was generally moderate, with some dentin exposure, but slight on the third molars. Three linear enamel hypoplastic defects were noted on the maxillary right third molar. The other teeth could not be assessed.

The third molars were erupted, indicating an adult. The cranial sutures were open endocranially, and displayed slight fusion ectocranially. No degenerative changes were noted. The individual was probably a young adult. Based on the gracility of the remains, sex was estimated to be female. No pathological conditions were noted.

BURIAL 10, MOUND 4

Burial 10 was recovered from the western portion of Mound 4 (Figure 3). The burial was rock-covered and contained the extended, supine skeletal remains of a subadult. The head was to the east. A shell-tempered ceramic pot (OSA catalog no. 2-373) was included in the burial.

Individual 2-811

The remains of Individual 2-811, from Burial 10 in Mound 4, had not been inventoried or analyzed in 1985. The skeletal elements included an incomplete cranium consisting of an incomplete frontal, right parietal, incomplete occipital and left temporal, and complete right temporal. No dental remains were present. The postcranial remains included one body segment of the sternum; right scapula; 14 ribs (seven complete) and 14 rib fragments; both right and left humerus, femur, and tibia diaphyses; one unisided proximal humerus epiphysis and both tibia proximal epiphyses; the incomplete right ulna diaphysis; all the vertebrae; both incomplete innominates and sacrum; and an incomplete talus.

None of the epiphyses were fused on the long bones or innominates. The vertebral arches were fused to each other and almost completely fused to the centra, indicating an age estimate of 3 to 7 years. Diaphyseal lengths provided an age range of 5.5 to 7.5 years. Age was estimated to be 5.5 to 7.5 years. No pathological conditions were noted.

INDIVIDUALS 11 THROUGH 13

Based on distance from recorded burials or duplication of elements with the burials closest to where the following remains were recovered, an additional three individuals are represented.

Individual 2-711

An incomplete left parietal was recovered in Unit N-1 at 30 in. below the ground surface. It was labeled with OSA catalog no. 2-711. The element was of adult size, with the sutures open, suggesting a young adult. Sex was indeterminate. No pathological conditions were noted.

Individual 2-529/533

The remains representing Individual 2-529/533 were recovered from units S-1 and S-1C. Although Buri-

al 5 was in close proximity to these remains, these remains duplicated elements of Burial 5. Three loose teeth (OSA catalog no. 2-529) were found at Level 3 of Unit S-1, and incomplete left and right temporals (OSA catalog 2-533) came from Unit S-1C. It is possible these remains were from the same individual.

The three loose teeth were an unisided maxillary premolar, an unisided mandibular premolar, and a maxillary right molar, probably second. Enamel was missing from all three teeth, so dental observations were limited. No hypercementosis was present. Dental attrition was estimated, with moderate to more advanced exposure of the dentin. Wear was flat on the premolars but cupped on the molar, with significant loss of crown height on the distal side. Based on dental attrition, age was estimated to be middle-aged, probably at the older end of a range of 35 to 50 years. The left and right temporal consisted primarily of the petrous portions. Both were taphonomically eroded and stained. Sex was indeterminate.

Individual 2-555

An incomplete left femur (OSA catalog no. 2-555) was recovered from Unit E-4 at 30 in. below the ground surface. Burial 2 was recovered in adjacent Unit E-3, but the femur from Unit E-4 duplicated a left femur associated with Burial 2. The left femur representing Individual 13 consisted of two shaft portions. The cortex was very taphonomically eroded and extensive animal gnaw marks were present. The element appears to have been quite gracile. The femur is estimated to represent an adult of indeterminate age, possibly female.

MISCELLANEOUS HUMAN REMAINS

Only one element, an incomplete right fibula, could not be directly associated with one of the identified adult individuals. It had been included with the Individual 2-807 remains but duplicated the right fibula from that burial and had no catalog number written on it. It consisted of the distal end only, which was completely fused to the shaft and was of adult size. Age and sex were indeterminate, and no pathological conditions were noted.

Summary

A minimum of 12 individuals are represented by human skeletal remains recovered during the 1964 excavations at 13AM103. Nine of these are from probable Oneota burials. The three individuals represented by scattered remains are either of Late Woodland or Oneota affiliation.

The following summarizes the Oneota burials. Five burials (Burials 1, 2, 4, 9, and 10) were extended and supine, with the head to the east. Burial 8 was probably an extended, supine burial, but the head was oriented to the northwest. Burial 5 was interred in a sitting position, with the legs extended and the head to the northwest. Burial 3 was either highly disturbed or a secondary burial. Burial 7 was incomplete and disturbed. The adults included three females (Burials 4, 8, and 9), one male (Burial 5), and two of indeterminate sex (Burials 2 and 7). The females were one older adult (Burial 4), one aged 30 to 35 years (Burial 8), and one young adult (Burial 9). The male was estimated to have been 25 to 35 years old. The two adults of indeterminate sex were 35 to 45 years old (Burial 2) and possibly 25 to 40 years old (Burial 7). Three subadults from Oneota burials (Burials 1, 3, and 10) were estimated to have been ca. 7.5, 7.0 to 8.5, and 5.5 to 7.5 years old, respectively. The dental remains were characterized by 14 small to moderate-sized carious lesions in 108 fully-erupted teeth. Of 118 intact tooth sockets, one periapical lesion was present. Ten teeth had been lost antemortem (8.5%). Sixty-seven teeth were observable for enamel defects. Of these, 48 contained linear enamel hypoplasias (71.6%). The enamel defects were positive for episodes of enamel growth disruption for Burials 1, 3, and 5. The six episodes for Burial 1 occurred at 1.5 to 3.5 years and 4.0 to 5.5 years. The dentition of Burial 3 contained 58 linear hypoplasias positive for 10 episodes occurring between 0.5 and 5.5 years. Burial 5 experienced four episodes of enamel growth disruption occurring at 2.5 to 4.0 years and 5.0 to 5.5 years. Burials 1 and 3 were subadults, and each had two carious lesions in their dental

remains. The stress load experienced as infants and young children may reflect both weaning/nutritional stress as well as recurring diseases. Burial 5 exhibited antemortem enamel chipping. Burials 5 and 9 each had one tooth that was slightly rotated.

The most prevalent osseous pathology noted in the adult remains was degenerative joint changes in Burials 2, 4, and 8 remains. Burial 4, the older adult female, also displayed evidence of osteoporosis as well as numerous lytic lesions suggestive of tuberculosis. The 25 to 35 year old male (Burial 5) had a fifth lumbar vertebra with two lytic lesions on the body as well as spondylolysis.

The remaining three individuals were identified by scattered and limited remains with no burial association. They were estimated to have been a young adult, an older middle-aged adult of indeterminate sex, and an adult female.

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Table 1. Inventory of Human Skeletal Remains, 13AM103, Allamakee County, Iowa.

Burial 1 Individual 2-803 (including OSA catalog no. 2-719)

cranium, incomplete – reconstructed
 frontal, incomplete
 2 parietals, left and right
 occipital
 2 temporals, left and right – left incomplete
 zygoma, right, incomplete
 2 zygomatic arch fragments
 2 maxillae, left and right – right incomplete
 2 palatine bones, left and right
 5 sphenoid fragments – includes sella tursica
 30 small vault fragments
 44 cranial fragments – mostly facial
mandible
2 scapulae, left and right – incomplete
2 clavicle, right and unsided, incomplete
2 humerus diaphyses, left and right
radius diaphysis, right, incomplete
possible radius diaphysis, incomplete
2 radius distal epiphyses, left and right
ulna diaphysis, right, nearly complete
7 ribs, nearly complete, unsided
19 rib fragments
6 cervical vertebrae, incomplete
6 thoracic vertebrae, incomplete
lumbar vertebra, incomplete
vertebral portions - 2 centra; 6 spinous process – 3 probably thoracic and 3 probably lumbar; vertebral process fragment
2 innominates, left and right, incomplete
sacrum, incomplete
2 femur diaphyses and distal epiphyses, left and right
proximal epiphysis, femur or humerus, incomplete
2 tibia, left and right – includes diaphyses and proximal and distal epiphyses
2 fibula diaphyses, left and right – and right distal epiphysis
2 long bone shaft fragments
2 tali, left and right
2 calcanea, left and right
6 tarsals, 2 left, 4 right
10 metatarsals, 5 left, 5 right
foot phalanx – distal
3 hand or foot phalanges
2 possible carpal or tarsal bones, incomplete

Burial 2, Individual 2-804

cranium, incomplete
 frontal
 2 parietals, left and right
 occipital, incomplete – missing base
 2 temporals, left and right
 sphenoid fragment
 13 small cranial fragments – mostly facial
2 humeri, left and right – left incomplete, right shaft fragment
ulna, right, incomplete
thoracic vertebra, incomplete
3 lumbar vertebrae – L4 and 2 incomplete
19 vertebral fragments – 9 body, 10 process or arch
2 innominates, left and right – incomplete, plus 3 fragments
sacrum, incomplete – plus 1 fragment
2 femora, left and right, incomplete
2 tibiae, left and right, incomplete

Table 1 continued.

Burial 2, Individual 2-804 continued

calcaneus fragment, right

talus fragment, unsided

42 small miscellaneous bone fragments

Burial 3, Individual 2-805

cranium, incomplete

frontal, nearly complete

2 parietals, left and right, nearly complete

occipital, incomplete – missing 2/3 of base

2 temporals, left and right, incomplete – plus 1 unsided fragment

zygoma, right, incomplete

2 maxillae, left and right – left incomplete

2 palatine bones, left and right

sphenoid, incomplete

18 cranial fragments – 11 vault, 17 facial bone

mandible – in two pieces; missing portion of left ramus

hyoid

4 cervical vertebrae, 2 incomplete

2 lumbar vertebrae

2 innominates, left and right, incomplete – ilia plus 1 unsided fragment

2 femur diaphyses, left and right, nearly complete

2 tibia diaphyses, left and right, incomplete

4 diaphyseal fragments

talus, left

2 possible carpal or tarsal fragments

Burial 4 Individual 2-806

cranium, incomplete

frontal, nearly complete

2 parietals, left and right

occipital, incomplete

2 temporals, left and right – right incomplete

zygomas, right, incomplete

2 maxillae, left and right, incomplete

2 palatine bones, left and right, incomplete

mandible, nearly complete – missing right ascending ramus

scapula, right, incomplete

clavicle, left, incomplete

2 humeri, left and right

2 radii, left and right

2 ulnae, left and right

carpal, right – capitate

3 metacarpals, right 1st and 2nd, 1 unsided

2 hand phalanges – proximal row

5 ribs, right

14 rib fragments

9 thoracic vertebrae – 1st through 9th

5 lumbar vertebrae

2 innominates, left and right, incomplete

sacrum

2 femora, left and right

patella, left

2 tibiae, left and right, incomplete

fibula, left, incomplete

Table 1 continued.

Burial 5, Individual 2-807

cranium
mandible
sternum, incomplete – missing part of body and xiphoid process
2 scapulae, left and right, incomplete
2 clavicles, left and right
21 ribs, 10 left, 11 right – 9 complete (4 left, 5 right)
19 rib fragments
2 humeri, left and right
2 radii, left and right
2 ulnae, left and right
3 carpals, right
4 metacarpals, right – 2nd through 5th
14 hand phalanges
7 cervical vertebrae
12 thoracic vertebrae
5 lumbar vertebrae
2 innominates, left and right – right incomplete
sacrum
2 femora, left and right
patella, right
2 tibiae, left and right
2 fibulae, left and right
4 foot phalanges

Possibly Burial 5, OSA catalog no. 2-531

first cuneiform, left, incomplete

Burial 7, Individual 2-808

2 femora, left and right, incomplete – shafts only
tibia, right, incomplete – proximal 2/3s

Possibly Burial 7

OSA Catalog No. 2-724/725, Mound 4, Feature 3

possible occipital fragment
temporal, right, incomplete – petrous portion
possible temporal fragment – petrous portion
cranial vault fragment
mandible, incomplete
possible patella fragments
humerus, unsided, incomplete – shaft portion
OSA Catalog No. 2-532, Mound 4, Feature 4
temporal fragment, right, possibly human

Burial 8 Individual 2-809

cranium, incomplete
 frontal
 2 parietals, left and right
 occipital, incomplete
 2 temporals, left and right, incomplete
 2 zygomas, left and right, incomplete
 2 maxillae, left and right
 2 palatine bones, left and right, incomplete
 2 sphenoid fragments
 3 cranial fragments
mandible
hyoid, incomplete
sternum, incomplete – partial manubrium and body
clavicle, right
3 ribs, right, 1 incomplete plus 17 unsided fragments
5 cervical vertebrae – C3-C7
12 thoracic vertebrae
2 humeri, left and right, incomplete

Table 1 continued.

Burial 9, Individual 2-810

cranium, incomplete – fragmented
 frontal, incomplete
 2 parietals, left and right, incomplete
 occipital, incomplete
 2 temporals, left and right, incomplete
 2 maxillae, left and right, incomplete
 2 palatine bones, left and right, incomplete
 4 possible sphenoid fragments
 17 cranial vault fragments
mandible, incomplete
clavicle fragment
3 cervical vertebrae, incomplete – 1st, 2nd, 1 from C3-C6
2 innominate fragments
2 femora, left and right, incomplete
2 tibiae, left and right, incomplete
talus fragment
calcaneus fragment
small miscellaneous bone fragment

Burial 10

Individual 2-811

cranium, incomplete
 frontal, incomplete
 parietal, right
 occipital, incomplete
 2 temporals, left and right – left incomplete
 5 cranial vault fragments
sternum, incomplete – 1 body segment
scapula, right
14 ribs, 6 left, 8 right (3 left complete, 4 right complete)
14 rib fragments
2 humeri diaphyses, nearly complete
humerus proximal epiphysis, unsided, incomplete
ulna diaphysis, right, incomplete
7 cervical vertebrae – C1 incomplete
12 thoracic vertebrae
5 lumbar vertebrae – 3 incomplete
2 innominates, left and right, incomplete
sacrum, incomplete
2 femora, left and right – both diaphyses and proximal epiphyses, right diaphysis nearly complete
2 tibiae, left and right, incomplete – left diaphysis and both proximal epiphyses
talus, possibly left, incomplete
4 small miscellaneous bone fragments

Individual 2-711

parietal, left, incomplete

Individual 2-529/533

3 loose teeth

2 temporals, left and right, incomplete

Individual 2-555

femur, left, incomplete

No Provenience

fibula, right, incomplete

Table 2. Cranial Metrics (mm), 13AM103, Allamakee County, Iowa.

Measurement	Burial 2 2-804	Burial 4 2-806	Burial 5 2-807	Burial 8 2-809
Maximum cranial length	(177)	183	(187)	
Maximum cranial breadth	(145)			
Minimum frontal breadth	(93)		92	88
Upper facial breadth	(102)		107	
Mastoid length	(24)/-	-(26)	24/(26)	
Maxilloalveolar breadth			66	
Palatal breadth			34	
Bicondylar breadth			127	
Bigonial breadth			(104)	
Length of ramus			75	(55)
Maximum breadth of ramus		46/-	52/52	-(33)
Minimum breadth of ramus		34/-	42/41	
Height of mandibular body			36/-	
Length of mandibular body		(73)	93	(71)
Height of symphysis			42	(27)
Breadth of mandibular body		13/13	15/15	12/12
Gonial angle		(128°)	112°	(124°)
Condyle mesiolateral length			-/22	
Condyle anteroposterior length			-/10	6/-
Naso-occipital length		179		
Biauricular breadth	(131)			
Maximum frontal breadth	114			
Frontal chord		108	114	101
Frontal subtense		24	19	(22)
Frontal fraction		41	52	(46)
Parietal chord	106	(110)	114	95
Parietal subtense	24	(25)	24	
Parietal fraction	54	(58)	56	
Foramen magnum breadth			27	
Indices				
Cranial index	81.92			
Frontoparietal index	64.14			

Note: () indicates approximated measurements

Table 3. Cranial Nonmetric Characteristics, 13AM103, Allamakee County, Iowa.

Trait	Burial 2	Burial 4	Burial 5	Burial 8	Burial 9	Burial 10
	2-804 L/R	2-806 L/R	2-807 L/R	2-809 L/R	2-810 L/R	2-811 L/R
Epipteric bone	A/A					
Asterionic bone	A/A					
Parietal notch bone	A/A					
Os lambdoidal suture	A/A	A/A	P/-			
Os coronal suture	A/A	A/A	A/A			
Os sagittal suture		A	A	A		
Os japonicum			A/-			
Inca bone	A	A	A			
Bregma bone	A	A	A	A		
Metopic suture	A	A	A	A		
Supraorbital foramen	F/-		N/N	F/F		
Pterion shape	-/A					
Parietal foramen	A/P	P/P	A/P			
Superior sagittal sulcus direction		R	R			
Mastoid foramen exsutural			PI/PO			
Postcondylar foramen			A/P			-/P
Hypoglossal canal bipartite			A/PI			-/A
Auditory exostosis	A/A	A/A	A/A	A/-	A/A	A/A
Tympanic dehiscence	A/A	A/A	A/A	P/-	A/A	P/P
Multiple infraorbital foramen			-/A			
Infraorbital suture			-/A			
Multiple zygomatic foramen			A/A			
Palatine torus		A	P			
Mandibular torus		A/A	A/A	A/A		
Mylohyoid bridge		A/-	A/A	A/-		
Multiple mental foramen		A/A	A/A	A/A		

Key:

A = absent

F = foramen

N = notch

P = present

PI = present, inside suture

PO = present, outside suture

Pterion shape = letter code refers to Fig. 26 (El-Najjar and McWilliams 1978:125)

R = right

Table 4. Postcranial Metrics (mm), 13AM103, Allamakee County, Iowa.

Measurement	Burial 1	Burial 2	Burial 3	Burial 4	Burial 5	Burial 10
	2-803 L/R	2-804 L/R	2-805 L/R	2-806 L/R	2-807 L/R	2-811 L/R
Scapula						
Glenoid cavity length				-(35)	(36)/(37)	
Clavicle						
Maximum length					-/156	
Circumference at midshaft					-/33	
AP diameter at midshaft					-/12	
SI diameter at midshaft					-/9	
Humerus						
Diaphyseal length	-(/199)					-(/175)
Maximum length					(295)/298	
Maximum diameter at midshaft ^a					21/25	
Maximum diameter at midshaft ^b					22/26	
Minimum diameter at midshaft ^a					16/17	
Minimum diameter at midshaft ^b					15/13	
Vertical diameter of head				-(/41)	-/45	
Transverse diameter of head					-(/40)	
Least circumference of shaft				53/55	61/61	
Epicondylar width				-/55	(59)/(57)	
Articular width				-/38	40/(/41)	
Radius						239/240 (30)/(31)
Maximum length						
Maximum transverse distal width				-(/31)		
Midshaft subperiosteal diameter				(12)/-	13/13	
AP diameter at midshaft				(9)/-	10/11	
ML diameter at midshaft				(12)/-	14/14	
Ulna						
Maximum length					(260)/264	
Physiological length					228/228	
Least circumference of shaft				27/(31)	30/32	
Dorsovolar diameter				14/15	15/14	
Transverse diameter				11/11	12/13	
Innominate						
Maximum breadth					(156)/-	
Ischium length				-/77	(78)/81	

Table 4 continued.

Measurement	Burial 1	Burial 2	Burial 3	Burial 4	Burial 5	Burial 10
	2-803 L/R	2-804 L/R	2-805 L/R	2-806 L/R	2-807 L/R	2-811 L/R
Sacrum						
Maximum anterior breadth		115				
Maximum transverse diameter of base		60				
Sacral index						
Femur						
Diaphyseal length	280/281		274/-	411/413	414/413	257/-
Maximum length				-/409	-/407	
Bicondylar length				-/25	-/(30)	
AP diameter at midshaft		(27)/-		-/22	-/(25)	
ML diameter at midshaft		(28)/-			-/44	
Maximum diameter of head		-/(45)		(40)/(41)	(43)/(43)	
Vertical diameter of head		(88)/-		-/78	-/(86)	
Circumference at midshaft		26/26		24/24	25/24	
Subtrochanteric AP diameter		34/33		31/31	33/34	
Subtrochanteric ML diameter				72/72	80/78	
Bicondylar breadth						
Tibia						
Diaphyseal length	225/223					(205)/-
Maximum length					351/351	
Physiological length					338/341	
AP diameter at nutrient foramen				32/31	38/40	
ML diameter at nutrient foramen				21/22	28/25	
Circumference at nutrient foramen				84/85	98/102	
Proximal breadth				70/(68)	75/(73)	
Distal breadth					49/50	
Fibula						
Diaphyseal length	222/221					
Maximum length					334/-	
Maximum diameter at midshaft					15/-	

Note: () indicates approximated measurements

^a Bass 1995

^b Moore-Jansen et al. 1994

Table 5. Postcranial Nonmetric Characteristics, 13AM103, Allamakee County, Iowa.

Trait	Burial 2	Burial 4	Burial 5	Burial 8
	2-804	2-806	2-807	2-809
	L/R	L/R	L/R	L/R
Allen's fossa			A/-	
Poirier's facet			A/A	
Plaque			A/A	
Hypotrochanteric fossa		A/A	A/A	
Trochanteric fossa exostosis	P/-	P/P	P/A	
Third trochanter	A/A	P/A	P/P	
Medial tibial squatting facet			A/A	
Lateral squatting facet			-/A	
Supracondyloid process		A/A	A/A	
Septal aperture		P?/A	P/P	P/-
Acetabular crease		A/A	A/A	
Accessory sacral facet – innominate			A/A	
Accessory sacral facet – sacrum		A/A		
Sacralization of L-5		A		
Vastus notch		A/-	-/P	
Vastus fossa		A/-	-/A	
Emarginate patella		A/-	-/A	
Anterior calcaneal facet	-/P			
Atlas facet form			S/S	
Atlas posterior bridge			A/A	
Atlas lateral bridge			A/A	
Circumflex sulcus			A/A	

Key:

A = absent

P = present

S = single

Table 6. Dental Inventory and Pathologies, 13AM103, Allamakee County, Iowa.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R	
							degree/ form	Left	Right	Left		Right
Burial 1, Individual 2-803												
<i>Maxillary</i>												
I1	5/2	-0	-0	1/9	-0	-0						
I2	2/2	0/0	0/0	9/9	0/0	0/0	1/1	2/1	4/4	4/4	4/4	4/4
C	5+6/6 ¹			9/1				1/1	4/4	4/4	4/4	4/4
P1	6/6			9/1								4/5
dm2	2/2	2oc, int/2 oc, int	0/0	9/1	9/9	0/0	1-2/1	1-2/1				
P2	5+7/7			9/1								
M1	2/2	0/0	0/0	1/1	9/9	0/0	1/1	1/1	4/2			4/2
M2	7/7			1/1								
M3	5+7/5+7			1/1								
<i>Mandibular</i>												
I1	2/2	0/0	0/0	1/1	9/9	0/0	2/1	2/1	4/3	4/5		4/5
I2	2/2	0/0	0/0	1/1	9/9	0/0	1/1	1/1	4/3	4/4		4/4
C	5/6 ¹			9/9								4/5
dm1	2/2	0/0	0/0	9/9	0/9	0/0	2-3/1-2	2-3/1-2				
P1	7/7			1/1	9/9	0/0	2/1	2-3/1-2				
dm2	2/2	0/0	0/0	1/1	9/9	0/0	2/1	2-3/1-2				
P2	7/7			1/1	9/9	0/0	1/1	2/1	4/1			4/2
M1	2/2	0/0	0/0	1/1	9/9	0/0	1/1	2/1				
M2	7/7			1/1								
M3	5+7/5+7			1/1								
Burial 3, Individual 2-805												
<i>Maxillary</i>												
I1	5/2	-0	-/	1/1	-0	-0						
I2	2/5	0/-	0/-	1/1	0/-	0/-	1/1	1-2/1	4/2	4/8		4/8
C	6/6			1/1					4/3	4/6		4/6
P1	5+6/6											
dm2	2/2	2 int/2 int	0/2	1/1	0/0	0/0	3/2	2-3/1-2	4/2			4/3
P2	7/7			1/1								
M1	2/2	0/0	0/0	1/1	0/0	0/0	1-2/1	1-2/1	4/2			4/3
M2	6/5+6			1/1					4/2			
M3	9/7			-/1								

Table 6 continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Burial 3, Individual 2-805 continued											
<i>Mandibular</i>											
I1	2/2	0/0	0/0	1/1	0/9	0/0	2/1	2/1	4/3	4/3	
I2	2/2	0/0	0/0	1/1	0/9	0/0	1/1	1/1	4/2	4/3	
C	6/6			1/1					4/6	4/6	
P1	6/6			1/1					4/3	4/4	
dm2	2/2	0/0	0/0	1/1	0/0	0/0	2-3/1-2	2-3/1-2			
P2	7/7										
M1	2/2	0/0	0/0	1/1	0/9	0/0	2/1	2/1-2	4/1	4/2	
M2	5+6/6			1/1							
M3	1+7/7			1/9							
Burial 4, Individual 2-806											
<i>Maxillary</i>											
I1	9/9			9/9							
I2	3 or 4/1 ¹			4 or 5/9							
C	2/9	0/-	0/-	9/9	1/-	9/-	8/2		9		
P1	2/5	9/-	9/-	9/1	0/-	9/-	8/(3)		9		
P2	5/-			1/-							
M1	4/-			5/-							
<i>Mandibular</i>											
I1	3/3			4/4							
I2	3/5			4/1							
C	2 ¹ /5			1/1							
P1	2/5	0/-	0/-	1/1	9/-	9/-	8/2		9		
P2	2/3			1/4	9/-	9/-	8/2		9		
M1	3/4			4/5							
M2	4/2			5/1							
M3	8 [?] /8 [?]										
Burial 5, Individual 2-807											
<i>Maxillary</i>											
I1	2/2	0/0	0/0	1/1	9/9	1/1	5/2	5/2	0	0	
I2	2/2	0/0	0/0	1/1	9/9	1/2	5/2	5/2	4/1	0	
C	2 ¹ /2	-0	-0	1/1	-9	2/2	5/2	5/2	4/1	4/1	
P1	2/2	0/0	0/0	1/1	9/9	2/2	4-5/2	4/2	0	4/1	
P2	2/2	1 in/	0/0	1/1	9/9	2/2	4/2	4/2	4/1	4/1	

Table 6 continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Burial 5, Individual 2-807 continued											
<i>Maxillary continued</i>											
M1	2/2	1 int/	0/0	1/1	9/9	2/2	5/2	6/2	4/1	4/1	2.6/-
M2	2/2	0/0	0/0	1/1	9/9	2/2	3/2	3/2	0	4/1	1.4/-
M3	2/2	0/0	0/0	1/1	9/9	2/1	3/2	3/2	0	4/2	1.0/-
<i>Mandibular</i>											
I1	2/2	0/0	0/0	1/1	9/0	1/1	5/2	5/2	0	0	
I2	2 ¹ /2	-0	-0	1/1	-9	-1	5/2	5/2	0	0	
C	2 ¹ /2	-0	-0	1/1	-9	-1	5/2	5/2	4/1	0	
P1	2/2	0/0	0/0	1/1	9/9	2/2	4/2	3-4/2	0	0	
P2	2/2	0/0	0/0	1/1	9/9	2/2	3-4/2	3/5	0	0	
M1	2/2	0/0	0/0	1/1	9/9	2/2	5/2	5/2	0	0	2.0/-
M2	2/2	1 oc/1 oc	0/0	1/1	9/9	2/2	3-4/2	3-4/2	0	4/1	1.5/-
M3	2/2	0/0	0/0	1/1	9/9	2/2	3/2	3/2	0	4/1	1.7/-
Possibly Burial 7											
<i>Mandibular</i>											
I1	5/5			9/9							
I2	5/5			9/9							
C	5/5			9/9							
P1	5/5			9/9							
P2	5/2	-9	-0	9/9	-0	-9		9		9	
M1	2/2	9/9	0/0	1/1	9/9	9/9	(3-4)/2	9	9	9	
M2	2/2	9/9	0/0	1/1	9/9	9/9	2-3/2	(3-4)/2	9	9	
M3	8 ¹ /2	-9	-0	-1	-9	-9		3/2		9	
Burial 8, Individual 2-809											
<i>Maxillary</i>											
I1	3/2	-9	-0	1/9	-9	-9		5+8/3		4/1	
I2	2/2	9/9	0/0	1/9	9/9	9/9	9	(5)+6/3	9	4/1	
C	2/2	9/2 int, r	0/0	1/1	9/9	9/9	5/3	5/3	9	9	
P1	2/2	1 int/9	0/0	1/1	9/9	9/9	9	9	9	9	
P2	2/8	2 int, r/-	0/-	1/-	9/-	9/-	9	6/2	9	9	-3.6
M1	5/2	-9	-0	1/1	-9	-9					
M2	5/4			1/5							
M3	5/2	-2 r	-0	9/1	-9	-0		2/1		9	-1.5

Table 6 continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R	
							degree/form Left	degree/form Right	type/no. Left	type/no. Right		
Burial 8, Individual 2-809 continued												
<i>Mandibular</i>												
I1	5/2	-9	-9	1/1	-9	-9	9	9		9		
I2	2/2	9/9	9/9	1/1	9/9	9/9	9	9	9	9		
C	2/2	9/0	9/0	1/1	9/9	9/0	9	5/2	9	4/2		
P1	2/2	9/9	9/0	1/1	9/9	9/9	9	4/2	9	9		
P2	2/2	9/9	0/0	1/1	9/9	9/9	9	9	9	9		
M1	2/2 ²	2 int, r/-	0/-	1/2	9/-	9/-	(3-4)/2		9			
M2	2/5	9/-	0/-	1/1	9/-	9/-	(6)/2		9			
M3	2/5	9/-	0/-	1/1	9/-	9/-	(2-3)/1-2		4/1		2.3/-	
Burial 9, Individual 2-810												
<i>Maxillary</i>												
I1	-/5			-/9								
I2	-/5			-/9								
C	2/2	9/9	9/9	9/9	0/0	9/9	9	9	9	9		
P1	2/5	9/-	0/-	9/9	0/-	9/-	9	9	9	9		
P2	2/5	9/-	0/-	9/9	0/-	9/-	9	9	9	9		
M1	2/5	9/-	0/-	9/9	0/-	9/-	(4-5)/9		9	9		
M2	2/5	1 oc/-	0/-	1/9	9/-	9/-	2/1		9	9		
<i>Mandibular</i>												
I1	5/5			9/9								
I2	5/5			9/9								
C	2/5	9/-	0/-	9/9	9/-	9/-	(4)/2		9	9		
P1	2/2	9/9	0/0	9/9	9/9	9/9	(4)/2	9	9	9		
P2	2/5	9/-	0/-	1/9	9/-	9/-	(3)/2		9	9		
M1	2/2	9/9	0/0	1/9	9/9	9/9	(3-4)/2	(3)/2	9	9		
M2	3/5			1/1								
M3	2/2	9/2 oc	0/0	1/1	9/0	9/0	(1-2)/1	1/1	9	4/3		
Individual 2-529												
<i>Maxillary</i>												
P, unisided	1	9	9		0	9	(3-6)/(2)			9		
M2, left	1/-	9/-	0/-		0/-	9/-	(5-7)/3		9			
<i>Mandibular</i>												
P, unisided	1	9	9		0	9	(4-5)/2		9			

Key on following page

Table 6 continued.

Key:

Status

- 1 = present, tooth only
- 2 = present, tooth in socket
- 3 = antemortem loss (socket resorbing)
- 4 = antemortem loss (socket resorbed)
- 5 = postmortem loss
- 6 = partial eruption
- 7 = unerupted
- 8 = congenital absence
- 9 = unknown

Caries

- 0 = absent
- 1 = pit or slight fissural beginning
- 2 = pit to 1/2 of surface destroyed
- 9 = cannot be coded

oc = occlusal

int = interproximal

r = root

Pulp exposure

- 0 = absent
- 2 = due to carious lesion
- 9 = cannot be coded

Alveolar abscess

- 1 = absent
- 2 = periodontal abscess with destruction of alveolar crest
- 4 = tooth abscessed out
- 5 = antemortem tooth loss with bone resorbed
- 9 = cannot be coded

Hypercementosis

- 0 = absent
- 1 = present, slight
- 9 = cannot be coded

Calculus

- 0 = absent
- 1 = slight or flex
- 2 = moderate, up to 1/2 crown covered
- 9 = cannot be coded

Attrition degree (Hinton 1981)

Incisors and canines

- 1 = unworn to polish or small facets (no dentin exposure)
- 2 = hairline of dentin exposure
- 5 = large dentin area with enamel rim complete
- 6 = large dentin area with enamel rim lost on one side
- 8 = severe loss of crown height

Premolars

- 3 = full cusp removal and/or moderate dentin patches
- 4 = at least one large dentin exposure on one cusp
- 5 = two large dentin exposures, may be slight coalescence
- 6 = dentinal exposures coalesced, enamel rim still complete
- 8 = severe loss of crown height
- 9 = degree cannot be coded

Molars

- 1 = unworn to polish or small facets (no dentin exposure)
- 2 = moderate cusp removal
- 3 = full cusp removal and/or some dentin exposure, pinpoint to moderate
- 4 = several large dentin exposures, still discrete
- 5 = two dentinal areas coalesced
- 6 = three dentinal areas coalesced or four coalesced with enamel island
- 7 = dentin exposed on entire surface
- 9 = degree cannot be coded

Attrition form (Hinton 1981)

- 1 = natural face or slightly blunt
- 2 = flat
- 3 = cupped on half to 3/4 of surface
- 9 = form cannot be coded

Enamel defect type

- 0 = normal
- 1 = opacity (white/cream)
- 9 = cannot be coded
- 4 = hypoplasia (horizontal grooves)

¹Tooth not present in 1997 during reanalysis

²Tooth broken postmortem, only root present

Table 7. Dental Metrics (mm), 13AM103, Allamakee County, Iowa.

Tooth	Maxillary			Mandibular		
	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R
Burial 1, Individual 2-803						
I1	-/6.7	-/9.1	-/11.7	5.0/5.3	5.2/5.3	(9.0)/(9.3)
I2	6.1/5.7	7.3/7.1	10.1/(9.8)	6.3/5.9	5.9/6.1	10.0/10.0
C	-/7.6	-/8.2		-/7.0	-/7.4	
P1	7.1/6.9	8.6/8.9		-/7.1		
dm1				7.0/7.0	6.8/8.0	
dm2	10.0/9.9	8.7/8.9		9.3/9.1	10.6/10.8	
M1	11.7/11.4	11.2/11.2	(7.3)/(7.8)	11.0/10.6	12.3/12.0	(7.8)/(7.3)
Burial 3, Individual 2-805						
I1	-/8.8	0/6.5	-/(11.8)	5.0/5.1	5.0/5.0	(8.7)/(8.6)
I2	6.0/-	5.0/-	(9.1)/-	6.1/6.3	5.6/5.5	9.5/9.5
C	8.1/7.9	7.5/7.5	11.5/11.4	7.2/7.1	6.7/6.3	11.2/11.4
P1	-/6.5	-/3	-/8.1	6.2/6.4	6.8/7.1	7.6/8.2
dm2	-/8.3	-/9.7		-/10.2	(8.9)/9.0	
P2	7.0/-	8.5/-	6.8/-	7.3/-	7.8/-	8.2/-
M1	11.4/11.3	11.4/11.5		12.0/11.9	10.9/10.7	
M2	10.4/-	11.2/-	7.5/-	-/11.5	-/10.1	-/7.8
Burial 5, Individual 2-807						
I1	(8.0)/(7.7)	(7.8)/7.8			(6.2)/6.1	
I2	6.5/6.8	6.9/7.2		-/5.5	-/6.8	
C	8.4/8.4	9.3/9.2		7.1/7.4	8.8/8.6	
P1	6.6/6.8	9.6/9.5		7.0/6.7	8.6/8.5	
P2	6.6/6.9	9.7/9.9		7.1/7.4	8.7/8.6	
M1	10.2/10.1	12.3/12.2		11.2/11.5	11.3/11.3	
M2	10.0/10.3	12.1/12.1		11.3/11.6	11.4/11.2	
M3	9.3/8.7	10.5/10.5		11.7/10.9	11.8/11.3	
Burial 8, Individual 2-809						
M3		-/10.1		9.4/-		
Burial 9, Individual 2-810						
M3						-/9.6

Note: () indicates approximated measurements

Table 8. Enamel Hypoplastic Defects Measurements (mm), 13AM103, Allamakee County, Iowa.

	Maxilla				Mandible			
	Quad 1	Quad 2	Quad 3	Quad 4	Quad 1	Quad 2	Quad 3	Quad 4
Burial 1, Individual 2-803								
I1, left					1.4	2.3, 3.6		
I1, right	3.0	4.4, 5.0	6.9		1.0, 1.6	2.4, 3.2	5.9	
I2, left	1.0	3.2	5.0, 6.0	1.0	1.9	2.6, 3.4		
I2, right	0.5	3.2, 4.3	5.3		1.5, 2.6	4.5	6.7	
C, right	1.0	3.0, 4.8	5.7		1.0, 2.6	3.9, 5.6	8.1	
P1, right	0.5, 1.5	2.4, 3.1	3.8					
M1, left		3.0	4.4		1.2			
M1, right		2.6	4.3		1.3	4.2		
Burial 3, Individual 2-805								
I1, left					0.5, 1.8	3.5		
I1, right	1.6, 3.0	4.3, 5.2	5.8, 6.4, 7.4	8.9	0.6, 1.5	3.4		
I2, left		2.7	5.2		1.5	3.3		
I2, right					1.9	3.6	5.9	
C, left	2.0	3.5	5.4		1.3, 2.9	4.0, 5.7	7.6	8.6
C, right	1.5, 2.6	3.4, 4.1	5.2, 6.2		1.4	2.9, 3.9	7.5	8.5, 9.9
P1, left						3.0	4.7, 5.7	
P1, right					1.5	2.6, 4.0	5.8	
P2, left	2.0	3.3						
M1left		2.8, 3.5				4.1		
M1, right	1.2	2.9	4.0		2.2	3.6		
Burial 5, Individual 2-807								
I2, left		3.7						
C, left		4.5	5.8			5.1		
C, right		4.9						
P1, right		6.0						
P2, left		5.0						
P2, right		4.8						
M1, left		3.0						
M1, right		3.5						
M2, right		3.9				2.8		
M3, right	1.2	2.5					2.8	
Burial 8, Individual 2-809								
I2, right	1.1							
C, right						3.2, 3.9		
M3, left					1.7			
Burial 9, Individual 2-810								
M3, right						2.4	3.2	4.6

Quads:

- 1 = crown $\frac{3}{4}$ to crown complete
- 2 = crown $\frac{1}{2}$ to crown $\frac{3}{4}$
- 3 = crown $\frac{1}{4}$ to crown $\frac{1}{2}$
- 4 = crown initial to crown $\frac{1}{4}$ (no defects recorded in this quadrant)