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LES VESTIGES HUMAINS DE L'ABBAYE DE JARROW (GB) D'AGE SAXON - MEDIEVAL

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RESUME

(R. PERROT) **(2 -3)**

1 - METHODES

Cf. texte de Calvin Wells.

2 - MATERIEL

Il est en mauvais état de conservation (entre 60% et 20%) : ce qui peut s'expliquer par une importante lyse post - mortem liée au sol et le fait que de nombreuses tombes ont été réemployées d'où un bouleversement des squelettes.

3 - NOMBRE DE TOMBES

208 « tombes » ont été examinées, parmi lesquelles 43 contenant des restes de deux (voire davantage) individus. On peut admettre, avec vraisemblance, que 261 personnes ont été inhumées dans la nécropole.

4 - AGE ET SEXE

Sur les 261 individus, 109 (41.8%) ne dépassent pas 18 ans. L'âge moyen de décès pour ces morts juvéniles est de 6 ans et demi. Ce % de 41.8 est le plus important rencontré parmi les sites de même époque : les valeurs allant de 18.9 (North Elmham) à 38.3 (Monkwearmouth). Par contre le site de Owslebury (romano - britannique) possède une valeur supérieure (58%). Devant ces valeurs élevées on peut émettre deux hypothèses : infanticide, dysenterie liée à la consommation de lait de vache non stérilisé. Parmi les 152 adultes, 99 ont pu être sexés de manière certaine : on dénombre ainsi 61 hommes pour 38 femmes (respectivement 61.6 et 38.4%). Ce sex ratio n'est pas démographiquement normal, mais cette anomalie est à mettre sur le compte du nombre relativement restreint d'individus dont le sexe est connu. La moyenne d'âge, au moment de la mort est très proche dans les deux sexes : 41.3 ans chez les hommes contre 42.2 ans pour les femmes .Ces valeurs sont inhabituelles : en effet, dans les populations anciennes, les valeurs masculines dépassent de quelques années celles féminines : la raison invoquée est le nombre important d'accidents survenus en couche, à une époque où n'existait aucune surveillance obstétrique. Cependant pour classique que soit cette explication elle n'est pas la seule. C'est ainsi que l'on peut avancer que, chez les anglo-saxons les femmes et les adolescentes étaient moins bien nourries et ceci plus particulièrement lors des famines. On peut donc supposer qu' à Jarrow contrairement à l'habitude, filles et garçons recevaient la même quantité de nourriture. Une autre hypothèse séduisante serait que les moines de l'abbaye aient abrégé leur durée de vie par un abus de pratiques mortificatoires ou pénitentielles.

5 - TYPE PHYSIQUE

On note une très grande diversité, particulièrement visible dans les indices craniens : les trois classes de l'indice cranien horizontal sont, en effet, rencontrées, ce qui laisse supposer que la population autochtone était « rafraîchie » de temps à autre par des migrants d'origine diverse.

1. Décédé en 1978.
2. Pour les lecteurs non anglophiles le texte anglais (Cf. p. 15 et suiv.) a été adapté en français, en en résumant l'essentiel : le plan suivi est celui de l'article original.
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La taille masculine varie de 158 à 185cm (moyenne de 171cm), celle féminine, de 148 à 168 cm (moyenne de 158cm). Ces valeurs sont conformes à celles observées dans les autres sites britanniques.

6 - INDICES MERIQUE (= DE PLATYMERIE) ET CNEMIQUE

La signification de la platymérie et de la platycnémie n'est pas totalement connue. Les deux conditions sont communément rencontrées dans les populations anciennes et chez les primitifs modernes et seraient (?) liées à leur habitude de se tenir accroupis. En fait il n'y a pas de lien entre les deux : platymérie et platycnémie peuvent se rencontrer sans que le tibia ne montre de facettes d'accroupissement et l'inverse ! D'autres hypothèses ont été avancées. La platymérie pourrait être une réponse à des conditions anormales de stress exercées à l'encontre de la diaphyse fémorale, ou bien à des processus pathologiques ou encore à un phénomène physiologique pour économiser les sels minéraux dans l'édification de l'os. La platycnémie, de son côté, est souvent considérée comme dépendante du degré de rétroversion de la tête du tibia. En fait aucune de ces théories n'est totalement satisfaisante. En ce qui concerne Jarrow, 94% des hommes et 95% des femmes possèdent un fémur platymérique à hyperplatymérique. Le tibia, par contre n'est platycnémique que pour 13% des hommes et 7.2% des femmes.

7 - CARACTERES NON METRIQUES (= CARACTERES DISCRETS)

Les variations non - métriques sont des caractères anatomiques, auxquels on attribue une origine génétique et que l'on peut appréhender sur la base de « présent ou absent ». Le métopisme, persdistance de la suture médio - frontale chez l'adulte est le plus classique : à Jarrow 4.2% de la population est métopique contre 8.9% à North Elmham, Monkwearmouth, par contre ne montre pas de métopisme. Une application intéressante de l'étude des caractères discrets est la recherche des liens de parenté entre individus d'une même nécropole. En ce sens Jarrow propose le cas de deux femmes âgées d'environ 50 ans chacune et qui présentent des variations « en miroir » laissant supposer qu'il s'agit non seulement de soeurs, mais très vraisemblablement de jumelles. C'est ainsi que l'une présente un foramen mentonnier double à droite, alors que l'autre l'a à gauche, etc..

8 - FACETTES D'ACCROUPISSEMENT

Situées, quand elles existent, sur la portion antérieure de l'épiphyse distale du tibia, elles signent l'habitude du sujet à adopter, pour travailler ou se reposer, une position accroupie. De grandes variations statistiques sont observées au niveau des populations. A Jarrow, 59.3% des tibias présentent une facette avec une différence marquée en faveur des femmes (77.6% contre seulement 45.5% d'hommes) !Cette différence sexuelle est pareillement retrouvée pour tous les autres sites britanniques. L'explication vraisemblable est la suivante : les femmes devaient s'accroupir fréquemment pour effecteur les travaux domestiques (cuisine, vannerie, filature, etc...), voire même se reposaient ainsi, alors que leur compagnon, du fait d'un statut social plus élevé, bénéficiaient de l'usage de siège.

9 - PATHOLOGIE

9.1 - Congénitale

Cette pathologie concerne essentiellement le rachis. 8 sacrums ont 6 vertèbres. Une sixième lombaire est rencontrée chez trois individus. Six personnes présentent un arc neural lombaire déhiscent : L4 (1 cas), L5 (4 cas) et L6 (1 cas). Un seul cas, par contre de spina bifida est rencontré chez un enfant de 9 ans, au niveau de la S1. Cinq individus montrent une articulation anormale entre L5 et le sacrum. Une autre ano-

malie vertébrale intéressante est la présence d'une côte cervicale chez trois femmes. Une perforation sternale est rencontrée 2 fois. Le condyle mandibulaire gauche d'une femme est déformée en sablier. Pour terminer signalons l'existence d'un processus supratrochléen (= épicondylien) mesurant de 2 à 5 mm, chez 7 femmes (sur 174) soit 4.02%.

9.2 - Fractures

28 fractures ont été relevées, avec une distribution inhabituelle : 16 cas masculins, 10 féminins et 2 non sexables. 5 fractures costales ont été rencontrées, elles concernent deux hommes : trois à droite, bien consolidées, pour l'un ; deux pour l' autre , à gauche. Aucune fracture ne concerne clavicule, humérus, rotule et métatarsiens Pour le restant du post - crâne la répartition décroissante est la suivante : radius (8 cas) ; phalanges (4 cas) ; ulna, fibula et métacarpiens (3 cas chacun) ; fémur et tibia (1 cas chacun). L'avant - bras est fracturé chez 9 individus : 5 hommes et une femme ont le seul radius traumatisé ; 3 autres femmes ont les deux os de l'avant - bras fracturés ; la fracture du seul ulna ne concerne qu'une femme. Pour 5 sujets (3 hommes, 2 femmes) la fracture radiale se situe à 25 mm du poignet : c'est la classique fracture de Colle, liée à une chute sur la main. Souvent, dans ce cas, la styloïde de l' ulna est brisée également : cela s'observe pour une femme. Par contre chez une autre, seule la styloïde ulnarienne est fracturée. Trois individus (2 hommes, 1 femme) présentent une fracture en plein milieu de l'avant - bras que l'on peut expliquer par un coup porté à la tête que le sujet a esquivé en se protégeant avec l'avant - bras. L'unique fracture fémorale est à mettre à part : elle est, en effet, la conséquence d'une maladie osseuse généralisée (osteitis deformans). La seule fracture tibiale observée peut être mise sur le compte d'une chute d'un lieu élevé. Dans de nombreux cimetières anciens, une des lésions la plus fréquente est la fracture de Pott qui concerne la fibula, dans son tiers distal et qui se produit lors d'une chute où le pied porte à faux. Trois fractures seulement, de ce type, ont été rencontrées à Jarrow, ce faible % (3.7 °) laisse supposer que les champs étaient cultivés depuis longtemps, avec un sol relativement meuble et débarrassé de grosses racines ou de tronc d'arbres. Les fractures de métacarpiens, et plus particulièrement celles des phalanges, deviennent extrêmement communes avec la révolution industrielle. Elles sont rares dans les populations anciennes et, quand elles arrivent, elles sont liées à des accidents en transportant des matériaux de construction, à un coup de marteau maladroit, plus rarement à un coup de bâton sur la main. A Jarrow, 3 hommes présentent des phalanges fracturées, vraisemblablement en travaillant, par contre la femme avec deux métacarpiens et une phalange brisés, peut avoir été victime d'une agression. Pour terminer notons qu'aucune fracture cranienne n'a été rencontrée sur le site. Il en est de même pour ces deux marqueurs classiques de la violence que sont les fractures du nez et des mâchoires. Cette remarque vaut également pour les fractures de l'omoplate ou du rachis, absentes à Jarrow. On peut donc, en conclusion, considérer cette population comme étant paisible et ne manifestant que la pathologie traumatique, classiquement liée à la vie quotidienne (mis à part quelques cas rares où une agression délibérée a pu être suspectée).

9.3 - Luxations

Un seul cas évident concerne un homme présentant un remodelage de la glène de l'omoplate droite, avec apparition d'une seconde surface articulaire. Ceci est vraisemblablement lié à une luxation, non réduite, de l'épaule, arrivée de nombreuses années avant la mort et qui avait dû entraîner une importante impotence fonctionnelle (au moins de 60%).

9.4 -Blessures

Aucune blessure par arme blanche n'a été

rencontrée à Jarrow, ce qui oppose singulièrement ce site à celui de Cirencester (romano - britannique) où de nombreux crânes présentent ce type de blessure.

9.5 - Exostoses

Une séquelle occasionnelle, et classique de blessure, est le développement d'une exostose. C'est ce que l'on observe, particulièrement, à la suite d'un mouvement assez violent pour déchirer les ligaments périphériques d'une articulation ou l'insertion tendineuse d'un muscle sur l'os : à l'emplacement de la déchirure, le sang forme alors un caillot qui, envahi par des ostéoblastes, va progressivement s'organiser en os. Peu d' exostose ont été rencontrées à Jarrow : il est intéressant de noter que pour les 5 adultes concernés, 4 sont des hommes ce qui laisse supposer un lien avec des travaux plus violents dévolus au sexe masculin.

9.6 - Ostéoarthrite et ostéophytose

Dans de nombreux cimetières anciens, l' ostéoarthrite est la maladie la plus communément rencontrée et Jarrow n'échappe pas à cette règle. La fréquence, la localisation anatomique et l'intensité de cette maladie, fournissent un indice précieux de l'importance et du type de conditions stressantes auxquelles a été confronté l'individu (humain ou animal) tout au long de sa vie.
Au niveau du squelette, autre que vertébral, ce sont 40 individus (28 hommes, 12 femmes) qui sont concernés(soit 26.3%) dans la population de Jarrow. Les ¾ d'entre - eux ont plus d'une articulation atteinte : on décompte, en effet 85 articulations masculines et 31 féminines, ce qui fait donc que l'homme atteint a, en moyenne, 3 articulations touchées et la femme 2.5, ces valeurs sont relativement proches. Par rapport à l'ensemble de la population, par contre, ce sont 33.7% des hommes et 21.1% des femmes qui sont touchés, soit une différence significative de 12.6 en faveur des hommes. Cette différence entre les deux sexes concernent également le pourcentage pour chaque type d'articulation atteinte, au niveau du membre inférieur : c'est ainsi que pour la hanche et le genou, les % masculins dominent nettement (respectivement 17.6 et 10.6 contre 3.2), pour la cheville on note l'inverse (22.6 pour les femmes contre 15.3 pour les femmes). Pour le membre supérieur, par contre, les % sont très proches : autour de 20% que se soit les épaules ou le poignet. Le coude et les condyles mandibulaires sont très peu atteints. Une dernière différence sexuelle est à noter, elle concerne les atteintes arthritiques de la sacro - iliaque qui ne sont rencontrées que chez l'homme (8 sujets).L' ostéoarthrite de la colonne vertébrale peut se manifester sur la partie postérieure de l'articulation intervertébrale, à n'importe quel niveau. Pour les segments thoraciques elle peut se voir également au niveau de l'articulation costo - vertébrale, aussi bien sur le corps vertébral que sur les apophyses transverses. Très proche de l' ostéoarthrite on peut envisager également l' ostéophytose ou « lipping » des rebords supérieur (et) ou inférieur du corps vertébral.
Lors de l'étude des vertèbres il est important de prendre en compte les deux car elles matérialisent une réponse de l'os à une atteinte physique chronique. Un troisième élément n'est pas à négliger non plus, c'est l'existence des nodules de Schmorl (hernies intraspongieuses), essentiellement situées sur les lombaires et ne remontant pas au delà de T6, en ce qui concerne les thoraciques. Quand on étudie ces trois éléments, conjointement, au niveau des rachis de Jarrow, on constate une importante différence sexuelle, en faveur du sexe masculin qui prédomine : 35.7% contre 25% pour l' ostéoarthrite, 71.4 contre 62.5 pour l'ostéophytose et 46.4 contre 20.8 pour les nodules de Schmorl.
3 mâchoires seulement (1 homme et 2 femmes) présentent des lésions arthritiques (soit 2% des 152 condyles utilisables) ce qui s'ajoutant à l'attrition dentaire très modérée, confirme un régime à bas d'aliments assez mous. En ce sens, Jarrow ressemble beaucoup à Monkwearmouth et, au

contraire, s'éloigne de North Elmham, site du Norfolk, où 17% des mâchoires étaient arthritiques et présentaient une sévère usure dentaire, vraisemblablement liée à des aliments durs.

L' examen osseux ne permet pas de déterminer si les résultats de Jarrow sont liés à la nature des aliments consommés où à la façon de les faire cuire. Une hypothèse intéressante pourrait être que la population de North Elmham mâchait de la viande dure (bovidés) alors que les autres tiraient l'essentiel de leur protéines de la chair de poisson, beaucoup plus tendre.

Il est opportun de revenir sur le cas des pieds de deux femmes montrant, chacune 3 à 4 articulations intertarsiennes arthritiques. Une explication peut être avancée : vraisemblablement ces femmes, veuves ou célibataires, devaient assumer seules , un travail d'agriculteur, ayant pu entraîner la chute d'objets lourds sur les pieds. En dehors de ceci, seulement deux autres femmes présentent une lésion arthritique du membre inférieur : une à la hanche, l'autre au genou. Ce total de 4 femmes seulement présentant des lésions des membres inférieurs, contraste nettement avec les hommes où 21 d'entre - eux totalisent 37 lésions !La hanche est une articulation très résistante et le fait que 15 coxaux masculins (sur un total de 20) soient arthritiques montre parfaitement que ce sont les hommes qui assumaient les tâches difficiles. Ce fait est corroboré par l'examen de la sacro - iliaque, lieu classique de développement des lésions arthritiques : aucune femme de Jarrow ne présente de lésions de cette zone, contre 8 hommes :. ceci illustre parfaitement la division sexuelle du travail dans cette population, les hommes étant chargés, entre - autres tâches, de la manipulation de lourdes charges.

La fréquence totale de l' ostéoarthrite et de l'ostéophytose est plus importante chez l'homme que chez la femme (le double !) et, de plus, ces lésions sont nettement plus sévères : ceci confirme que les femmes de Jarrow menaient une vie plus confortable que les hommes.

En ce qui concerne les nodules de Schmorl, formés habituellement durant l'adolescence, la différence est là également très nette entre les deux sexes : une fois encore c'est le sexe masculin qui est concerné essentiellement. Les jeunes garçons de Jarrow étaient soumis à des tâches rudes alors que leurs soeurs se contentaient des besognes domestiques.

Essayons maintenant d' interpréter les différentes lésions selon leur localisation anatomique et selon le sexe.

- Vingt trois épaules sont arthritiques, ceci étant lié à un étirement sévère de l'articulation, comme on peut le voir, dans le transport de lourdes pièces de charpente ou dans le dressage de chevaux récalcitrants. Ceci peut justifier l'arthrite masculine, mais il est peu probable que ce soit le cas des femmes, présentant également cette pathologie, sauf, peut - être, comme dresseuses de chevaux ? ! On peut envisager également une torsion brutale du membre supérieur derrière le dos, entraînant une déchirure de la capsule ligamentaire, ceci pouvant provoquer, à la longue, une lésion arthritique. Cette position anormale pourrait avoir été le fait de femmes châtiées (voire torturées) par un époux coléreux ou jaloux.
- Le coude étant une articulation composite, il est à prévoir qu'ici les manifestations arthritiques puissent être variables. On prendra l'exemple de la seule femme concernée : elle présente des modifications arthritiques au niveau de l' épiphyse distale de son humérus droit. Le fond des fosses coronoïde et radiale est irrégulier avec une réaction ostéophytique. Les lésions peuvent être consécutives à un traumatisme simple : une chute ou bien une torsion de l'articulation entraînant une déchirure de la capsule et des ligaments voisins. Cependant l'hypothèse d'une chute semble confirmée par l'existence d'une fracture de la styloïde ulnarienne du

même côté.

- Les lésions arthritiques de l'extrémité distale du membre supérieur concernent essentiellement le poignet, avec parfois des atteintes métacarpophalangiennes ou phalangiennes uniquement (celles du pouce, en particulier). Les raisons de telles lésions, doivent être très certainement cherchées dans des activités telles conduire une charrue, bêcher, abattre des arbres, forger du fer ou plus simplement s'asséner involontairement un coup de marteau sur le pouce ou sur un autre doigt !

9-7 - Infections

Il est habituel, et pratique de diviser, les infections en deux groupes, selon qu'elles sont non - spécifiques (dues à plusieurs agents infectieux) c'est le cas des sinusites et des ostéomyélites ou spécifiques (dues à un seul agent), c'est le cas de la lèpre et de la bartonellose. A Jarrow quelques lésions infectieuses ont été rencontrées associées à des caries et à des abcès dentaires. De nombreux cas d'os longs atteints de ostéite - périostite ont été également rencontrés. Cette pathologie est très classique dans les cimetières anciens entraînant l'aspect granuleux et l'amincissement de la diaphyse des os longs (presque toujours tibia et fibula) : en fait, on ne sait pas très bien s'il s'agit d'une infection ou d'une réaction inflammatoire non - infectieuse, par exemple à la suite d'un ulcère variqueux ou après un « grattage » involontaire de la peau par un outil ou en trébuchant sur un pas de porte ou encore une inflammation secondaire à une fracture mal guérie. Des cas d'ostéite - périostite, à Jarrow, concernent également la voûte cranienne et peuvent être attribués à des cheveux non lavés, dont les racines étaient parasitées par des micro - organismes. Mais beaucoup de ces réactions périostées et ostéitiques étaient très probablement dues à des bactéries (comme agent infectieux principal) telles staphylocoques ou streptocoques. A ces dernières peuvent être attribués les 5 cas de sinusite maxillaire rencontrés à Jarrow. La lèpre a été évoquée (mais non confirmée) pour un individu masculin, associant à une périostite tibiale, une ankylose de deux phalanges (une moyenne et une proximale) de la main.

9-8 - Cribra orbitalia

Ce terme qualifie l'aspect porotique du plafond orbitaire, très souvent rencontré (entre 50 et 100 %, en particulier pour les enfants) dans les populations anciennes. Les causes n'en sont pas encore clairement admises aujourd'hui : anémie (comme par exemple dans le cas de la thalassémie) ; déficience vitaminique, liée à l'usage unique du lait de chèvre, etc. A Jarrow les lésions sont uni- ou bilatérales : 5.3% des adultes sont atteints contre 17.6% des enfants.

9-9 - Osteochondrite disséquante

L'O.D. est une maladie classique mais d'étiologie incertaine. Néanmoins la cause la plus fréquemment retenue paraît être traumatique. La lésion consiste essentiellement dans une nécrose avasculaire de l'os sous - chondral d'une articulation suivie par la dégénérescence du cartilage articulaire. Cela peut entraîner la formation d'un corps intra - articulaire et d'un cavité dans l'os. A Jarrow 11.8% des adultes (18 sur 152) montrent ces lésions. 3 jeunes également sont concernés. Trois cas seulement sont guéris, c'est à dire que la cavité osseuse crée par le départ du corps intra - articulaire, est comblée par de l'os néo - formé. Près de 40% des adultes avec O.D. possèdent des lésions multiples pouvant concerner jusqu'à 5 os différents ! Ce fait milite en faveur d'une étiologie génétique, dans certains cas. Cependant le fort % de cas masculins (13 hommes pour 6 femmes) apporte un élément complémentaire à l'hypothèse d'une origine traumatique de la maladie. Il est intéressant pour terminer le chapitre des O.D. de donner une répartition

des différentes localisations rencontrées à Jarrow, dans l'ordre décroissant, en signalant quelle est très proche de celle trouvée dans les autres cimetières anciens. La phalange proximale du gros orteil vient largement en tête avec 21%, suivie par l'épiphyse distale du tibia (12%), les condyles fémoraux, le naviculaire et le premier métatarsien (à égalité 9%). Puis avec 6% on trouve les deux épiphyses de l'humérus et la partie supérieure du talus. En dernière position on trouve regroupés (avec 3%) les vertèbres, l'épiphyse proximale de l' ulna, celle distale du radius, l' acétabulum, l' épiphyse proximale du tibia, le talus et le calcaneum. A titre comparatif on retiendra qu'actuellement, les lésions du condyle fémoral, de l' épiphyse distale de l'humérus et de la surface supérieure du talus, représentent autour de 99% des cas d' O.D. traités en orthopédie.

9-10 - Anomalies variées

Nous regrouperons dans cette rubrique un certain nombre d' anomalies et pathologies aux étiologies diverses.

- Crâne plagiocéphale : un cas à signaler avec aplatissement oblique du côté gauche de l'occipital et du pariétal homolatéral. Cette déformation peut être liée à la prime enfance où le bébé appuyait préférentiellement sa tête, toujours du même côté, dans le berceau. A Red Castle (Thetford) de nombreux cas similaires ont été relevés.
- Erosion de la marge supérieure d'une vertèbre lombaire, sorte d'O.D. souvent qualifiée de dysplasie épiphysaire antérieure (4 cas dont 3 masculins)
- Erosion étendue des plateaux supérieur et inférieur du corps vertébral de C6 et C7 (un homme), associée à la destruction du disque intervertébral :blessure liée probablement à une flexion excessive du cou
- Sujet féminin (50-55 ans) montrant une sévère atteinte de tout le rachis, particulièrement remarquable par la dépression en miroir des surfaces supérieure et inférieure de toutes les vertèbres lombaires et de celles thoraciques inférieures. Ceci est du à la forte expansion du disque inter - vertébral à travers l' os du corps vertébral, associé à une forte ostéoporose. Cette condition est réalisée dans le syndrome de Cushing , du à un fonctionnement anormal des glandes surrénales, et caractérisé par : obésité, faiblesse musculaire marquée, augmentation de la tension artérielle et autres anomalies, en particulier de l'hirsutisme (sans autre manifestation de virilisme) et absence de menstruation. Le diagnostic de cette maladie, ici est difficile à faire et il semble plus raisonnable de parler d'un cas d'ostéoporose post - ménauposique.
- Sujet masculin possédant deux côtes droites articulées entre - elles par deux exostose de leur portion médiane.
- Sujet féminin, os coxal avec une cavité de 12x14mm et de 6mm de profondeur, au dessus de l'acétabulum droit. Ceci probablement du à un kyste para - articulaire associé avec de l' ostéoarthrite.
- Un autre sujet féminin présentant le même type de lésion mais bilatérale
- Un sujet masculin montre l'ossification du ligament acétabulaire transverse gauche. Il possède également des tubérosités ischiatiques irrégulières et tourmentées. Cet aspect est typique d'un forme de bursite chronique, avec ostéite, communément appelée le « cul du tisserand » et que l'on rencontre chez toutes les personnes dont l'activité entraîne frottements et meurtrissures de l'ischion, c'est par exemple les cas des cochers, des rameurs et des galériens.
- Un sujet féminin avec une absence du palais dans sa partie gauche, au niveau de la ligne médiane. Le dia-

gnostic hésite entre une absence congénitale et une destruction par un processus infectieux ou tumoral, cependant l'absence de réaction ostéitique et de toute autre manifestation cancéreuse, milite en faveur de la première hypothèse.

Quelques anomalies ou lésions apparaissent également chez les enfants.

- Foramen magnum anormalement long et étroit chez un enfant de 6-7 ans
- Sujet de 9 -11ans : lésion de la branche montante droite correspondant à une perforation de 13.8 x 12.5mm dans la partie antéro - supérieure. On note par ailleurs une incompétence occlusale, pour ce même côté, ayant pour conséquence que les droites étaient nettement moins usées que les gauches. La cause la plus vraisemblable de ces anomalies paraît être liée à une pression externe, par exemple d'une glande parotide hyperdéveloppée (tumeur) qui aurait partiellement détruit la branche montante droite et, secondairement, affecté le développement des dents et de l'os.
- Enfant de 6-7ans : humerus asymétriques avec d'important changements ostéitiques dans le 1/3 proximal (ostéomyélite ?). On note aussi une déformation en champignon de la tête du fémur droit pouvant être la résultat d'une luxation congénitale de la hanche
- Un jeune individu présente une importante disparité entre l'âge dentaire (12-13ans) et celui déterminé par les longueurs humérale et radiale (8-9 ans). Tout le squelette, par ailleurs est frêle et gracile, évoquant une malnutrition chronique. Il est intéressant de noter que cette dernière, si l'hypothèse est la bonne, n'a pas perturbé l'évolution dentaire
- Un enfant de 2.5-3 ans : fémurs arqués, avec forte convexité antérieure. Dans un cimetière du 18ème ou du 19ème siècle cela évoquerait immédiatement un cas de rachitisme. Pour l'époque anglo - saxonne un tel diagnostic est nettement moins connu mais l'individu est datable du 12ème-13ème siècle (Moyen - Age) où l'urbanisation commençante, associée à une détérioration climatique et une insolation moindre, crée les conditions d'apparition de la maladie.
- Un autre individu (4 ans) présente des lésions similaires, attribuables également à la même étiologie
- Un sujet féminin est intéressant. Bien qu'âgé de seulement 24-27 ans, il présente cependant une importante ostéophytose vertébrale, marquée par un lipping des rebords des plateaux, en particulier thoraciques et lombaires. Il y a un effondrement ancien des corps vertébraux de T7 et T9 et toutes les lombaires présentent des perforations de leur plateau supérieur. Mais cet aspect ne rappelle pas les classiques nodules de Schmorl. La C7 n'a pas de foramen transverse et présente une facette articulaire costale sur le corps vertébral et sur l' apophyse transverse droite. Une côte cervicale droite s'articule avec ces facettes et sa portion antérieure s'articule à son tour avec le rebord médial de la première côte (thoracique). Le restant du grill costal est très abimé mais on peut quand - même constaté que 4 côtes médianes présentent une concavité anormale de la surface externe du corps. En complément des ces anomalies, les deux sinus maxillaires montrent une importante ostéite à mettre en rapport avec une sinusite chronique, entraînant la formation d'un pus abondant, ayant pu, de façon indirecte, entraîner une infection chronique de l'arbre bronchique. Pour terminer relevons la très petite taille du sujet : 130cm ! Ce nanisme pourrait être du à une maladie chronique nutritionnelle pendant l'enfance. Cependant les muscles étaient correctement développés comme le montre

leurs insertions osseuses (par exemple la tubérosité deltoïdienne) il semble donc que l'on se trouve en présence d'une véritable naine. Les nains les plus classiques sont hypopituitaires, mais présentent des proportions corporelles normales, ce qui n'est pas le cas ici. En effet la portion distale des membres est relativement courte par rapport à celle proximale. Ceci est particulièrement visible au niveau des indices brachial et crural (respectivement 62 et 75.2 contre 73.2 et 83.5 pour des femmes normales). Plusieurs hypothèses prenant en compte l'ensemble des anomalies décrites, peuvent être avancées mais aucune n'est pleinement satisfaisante : dysplasie chondro - ectodermique (syndrome de Elles Van Creveld), le syndrome de Brailsford - Morquio, le syndrome de Turner (monosomie X).

- Pour terminer parlons d'un vieillard atteint d'une maladie très largement répartie sur l'ensemble de son squelette. Le fait le plus marquant étant un épaississement de la voûte cranienne au - delà de 22mm en même temps que les vaisseaux méningés ont laissé des traces profondes dans l' endocrâne. Par ailleurs on note également : un épaississement des os longs avec une importante oblitération de leur cavité médullaire ; une importante torsion des os longs, des côtes et du bassin ; des anomalies vertébrales ainsi que l'aspect radiologique très caractéristique « floconneux » du crâne, du bassin, des os longs et des métacarpiens. Cet ensemble d'éléments est très pathognomonique de l'ostéite déformante de la maladie de Paget.

10 - DENTURE

Hormis quelques petits fragments non sexables, 120 mâchoires adultes ont pu être utilisées, réparties équitablement dans les deux sexes : 28 maxillaires et 30 mandibules chez les hommes, 30 maxillaires et 32 mandibules chez les femmes,.1920 dents sont identifiables, auxquelles il faut enlever 218 chutes post - mortem (CPM) : pour les 1702 emplacements restants on compte 59 dents (57 troisièmes molaires et deux canines) agénésiques (soit 3.5%).Pour les 1643 dents sorties, 131 (7.9%) ont été perdues ante - mortem (CAM) réparties en 78 molaires (59.5%), 34 prémolaires (26%), 17 incisives (13%) et 2 canines (1.5%). Le % des CAM de Jarrow est très proche de celui de Monkwearmouth (7.7%), par contre il est différent de celui de North Elmham (11.1 %) et de Red Castle of Thetford (15.9%). Ces différences suggèrent un niveau plus élevé de soins dentaires pour les sites nordiques. Les causes des CAM ne sont pas encore totalement élucidées, en dehors du lien évident avec les caries . Le % des caries à Jarrow est faible : pour 1174 dents adultes, seulement 33 (2.8%) sont cariées, moins chez les hommes (1.9% : 11 dents sur 592) que chez les femmes (3.8% : 22 dents sur 582). Ce % de 2.8 se situe dans la moyenne des sites britanniques : Monkwearmouth (0.4%), Thetford (1.5%) et North Elmham (6.4%).Les causes des caries sont complexes, spécialement à l'époque « pré - glucides » et avant celle de la consommation générale de farine raffinée. Le régime joue un rôle important incluant autant la nature de l'aliment que sa préparation culinaire. Des traces d' éléments comme fluor et sélénium sont également importantes. Le fluor qui protège contre les caries était probablement peu important dans les eaux de Jarrow, mais a pu être compensé par une forte consommation de poissons. Comme il est communément admis, la dent la plus cariée est la première molaire (« royauté pathologique » selon Brabant). Il est possible de localiser l'origine de 31 des caries de Jarrow : pour 3 d'entre - elles (9.7%) elle a été cervicale, pour 6 (19.4%) occlusale et pour 27 (70.9%) interstitielle. Les cavités liées à des abcès périodontiques sont rares à Jarrow (18 chez 10 personnes seule-

ment) et de petite taille : 2 seulement étaient associés avec des dents cariées. Il est probable que dans la plupart des cas, l'origine est à chercher dans une enveloppe de graine ou une esquille d'os, malencontreusement coincée entre la dent et la gencive alvéolaire. Ces 18 abcès concernent donc seulement 1.1% des dents sorties (2.1 à North Elmham et 2.5 à Monkwearmouth), le site de Jarrow est donc légèrement en retrait.

L'attrition dentaire est fréquente dans ces mâchoires, excepté chez quelques très jeunes enfants. L'importance de l'usure peut - être indiquée par 4 degrés allant du premier, dans lequel l'émail et les cuspides sont usés avec apparition de une à deux (maximum) surfaces de dentine non coalescente au quatrième montrant une destruction importante de la couronne, une ouverture de la cavité pulpaire et souvent les racines séparées et en passant par deux degrés intermédiaires. En prenant en compte les adultes sexés (72), on compte au total 187 degrés d'usure soit une moyenne de 2.6 par mâchoire (contre 3.1 à North Elmham).

Le dépôt de tartre est connu sur les dentures de Jarrow. L'estimation de ces dépôts est nettement plus subjectif que pour l'usure dentaire mais une codification pratique permet de retenir 5 degrés allant de l'absence totale de tartre (degré 0) à un dépôt important pouvant constituer une carapace complète entourant la dent (degré 4). A Jarrow, le tartre est présent chez 39.4% des dentures masculines et 53.1% de celles féminines : la moyenne tournant autour du degré 2 (dépôt recouvrant la moitié de la dent). Bien que la tartre puisse être réduit quand les dents sont utilisées lors de mâchages énergiques ou bien augmenté dans les régimes à base de bouillies, il est possible que les femmes de Jarrow aient été davantage affectées que les hommes, car elles avaient l'habitude de mordiller gateaux et brioches, en allant et venant dans la maison, plutôt que des morceaux de viandes dures ! La distribution du tartre à Jarrow est classique : la plupart des dépôts sont supra - gingivaux et habituellement avec une incidence mixte labiale, buccale et liguale. En ce sens cela ressemble beaucoup à Monkwearmouth et à de nombreux sites anciens, à la différence de la tendance moderne où le tartre est concentré sur les surfaces occlusales à l'opposé des canaux salivaires.

15 dentures (au maximum) montrent ponts, creux et autres anomalies de l'émail : tout ceci correspond à l'hypoplasie, due à des conditions perturbatrices (maladie ou malnutrition) du développement de la dent, pendant la petite enfance : 3 hommes et 6 femmes sont concernés. Pour les enfants modernes, les dents les plus communément atteintes sont les incisives centrales et latérales ainsi que les premières molaires, ce qui indique que les maladies responsables : dysenterie, bronchopneumonie, rougeole interviennent dans les premiers 18 mois de la vie. A Jarrow (comme à Monkwearmouth), ce sont les canines et les 2èmes molaires les plus concernées, ce qui correspond à la période allant de 2 à 4 ans : ceci peut vouloir indiquer que de nombreux enfants mourraient au cours des deux premières années, avant même d'avoir développé des hypoplasies sur leurs incisives et premières molaires.

Dans la plupart des mâchoires de Jarrow, la disposition et l'occlusion des dents étaient bonnes. Quelques anomalies seulement ont été rencontrées : par exemple, une 27 à 4 racines bien développées ; une 23 disposée horizontalement à côté du plancher de la fosse nasale dans la partie antérieure du sinus maxillaire. Une 12 présente la classique forme en pelle. Un cas de diastème (de 3.5mm) entre les canines et les premières molaires, concerne un maxillaire.

Quelques rares cas d'anomalies d'éruption sont à signaler : un adulte masculin (30-35 ans) a condervé une 75 déciduale à la place d'une 35 non sortie ; chez une adolescente de 15 ans, la 38 était complètement sortie alors que les autres 3èmes molaires étaient incluses.

11 - MALADIES ABSENTES

A Jarrow aucune trace n'a été rencontrée de syphilis et de tuberculose. Pour cette dernière, elle a pu, cependant exister, sous sa forme pulmonaire, sans les atteintes vertébrales caractéristiques du mal de Pott.
La lèpre concernerait (?) un cas seulement. L'ostéomyélite du type « flamboyant », si commune habituellement dans les cimetières post - médiévaux n'existe pas ici.
En dehors de cas sévères de sinusite maxillaire on n'a pas de preuve de mastoïdite ou d'infection de l'oreille moyenne.
Les tumeurs osseuses malignes sont absentes : qu'elles soient primaires, de type sarcome ou secondaires à des métastases de carcinome et autres cancers.
On ne remarque pas non plus de blessure par arme blanche.
La luxation congénitale de la hanche, affection classique dans les cimetières anciens, semble avoir été absente à Jarrow, hormis un cas litigieux.
Dans certains cimetières post - médiévaux, l'hallux valgus est commun et indique le port de chaussures fortement serrées : ceci est rarement rencontré dans les cimetières anglo -saxons et ne concerne qu'un sujet à Jarrow.
En dehors des extraction dentaires, aucune preuve n' a été trouvée d'interventrion chirurgicale. Trépanations et amputations sont également absentes.
Un cas de plagiocéphalie est connu, par contre aucune preuve n'existe de déformation intentionnelle du crâne.

12 - CAUSE DU DÉCES

Sur l'ensemble du cimetière de Jarrow, il n'existe aucun individu (en dehors d'un adulte atteint d'un Paget et un enfant d'une ostéomyélite)pour lequel la cause de la mort soit connue avec certitude. De même que pour North Elmham et de nombreux autres sites, à Jarrow aucune blessure mortelle n' a été trouvée.

13 - NOMBRE DE NAISSANCES

La parité, c'est à dire le nombre d'enfants qu'une femme a mis au monde, peut être estimé à partir du bassin.
Conséquence de la grossesse, les ligaments et les muscles entourant le pubis sont étirés, voire déchirés, ce qui entraîne de petites hémorragies : la surface de l'os devient rugueuse, perforée de petites cavités kystiques remplies de caillots sanguins, de petites exostoses croissent à la surface du pubis. L'importance et l'aspect de ces changements donnent une idée approximative de la parité : il faut, en effet, bien comprendre que si l'examen osseux permet d'avancer, par exemple le nombre de 2 naissances pour une femme, la réalité, en fait, doit être comprise entre 1 et 3 enfants !
A Jarrow, le pubis n'était bien conservé que dans 7 cas : ces femmes dont les âges s'échelonnaient de 35-40 ans (2 individus) à 50-65 ans (4) en passant par 45-50 ans (1), auraient eu, au total 35 enfants soit en moyenne 5 chacune (de 3 à 8 si l'on prend en compte les cas individuels). Il faut, cependant insister sur le fait que 5 de ces femmes avaient dépassé l'âge de la ménopause et ne risquaient donc plus de tomber enceintes ! Par ailleurs les 2 autres (les plus jeunes par conséquent) auraient eu 4 enfants chacune, mais il n'est absolument pas certain que, si elles avaient vécu, elles auraient donné naissance à d'autres enfants. On peut donc retenir ce nombre de 35 enfants, sans tenir compte, bien entendu, des fausses couches (non répérables sur le squelette). Cependant il est possible que certaines de ces fausses couches aient pu se produire peu de temps avant l'accouchement et dans ce cas elles ont pu être prises en compte comme naissance d'enfants viables. Il est, bien connu qu'une grossesse sur cinq, avorte spontanément, le plus souvent autour de 12 à 14 semaines.
Dans de nombreuses sociétés actuelles (primitives ou non), les filles, même en ayant des rapports sexuels non protégés, ne tombent enceintes que lorsque leur menstruation s'est bien régularisée sur plusieurs

années. Ceci paraît applicable, également à l'époque anglo - saxonne où les femmes ne commençaient leur vie reproductrice qu'à partir d'une vingtaine d'années. Après 30 ans, et encore plus rapidement après 35 ans, la fréquence de l'ovulation déclinait, de telle manière que même si les menstruations continuaient jusqu'à 50 ans , la possibilité de grossesses devenait rare.
Les observation effectuées à Jarrow permettent de supposer valablement que les femmes n'utilisaient pas de méthodes contraceptives. Un autre conclusion intéressante peut être apportée : pour les 5 femmes qui ont dépassé l'âge de la ménopause, l'accouchement, peut être éliminé comme cause directe du décès. A Jarrow 5 femmes ont probablement eu 27 enfants et 5 à 6 fausses couches sans succomber à des fièvres puerpérales et autres aléas obstétriques. Ce résultat peut être rapproché de celui de North Elmham où 9 femmes semblent avoir eu 37 naissances pour une dizaine d'avortements. En regroupant ces deux sites ce sont donc une soixantaine de naissances qui, semble t-il, n'ont pas provoqué de décès obstétrique.

THE HUMAN REMAINS OF JARROW ABBEY (C.WELLS)

Summary

The remains of 261 individuals excavated at Jarrow Abbey are described. Despite the poor condition of this material an attempt has been made to established the sex and age of these persons, together with a few details of their physical type. Some comparisons with other sites are noted. Attention has been given to non - metrical anatomical variants and it is hoped that this will become even more informative as future excavations are analysed and contrasted with what is found here. Extensive details of the pathology are recorded and, within the limits of its ambiguity, attempts have been made to elucidate the significance of these findings. Much about these people remains obscure but much has been revealed. It can at least be said that by a cautious interpretation of their physical remains, they now emerge as a group with a recognizable life style and as persons with individual peculiarities.

INTRODUCTION

This is an account of the human skeletons excavated at Jarrow Abbey. Although more than two hundred and fifty burials are dealt with here, the poor state of the majority precludes anything other than the most superficial statistical handling of these remains, especially in the direction of establishing their physical type and genetic affinities.
To compensate for this a substantial amount of pathology is identifiable. This has the advantage that it reflects each individual's response to the pressures of his environnement - using that term in its broadest application. It can show how persons, and the group as whole, worked, fed ; dressed, sat, behaved to each other and reacted to the ordinary and extraordinary events of their daily lives. But pathology does not yield this information as if it were a written text to be easily read. It must be interpreted with painstaking and meticulous care. Archaeologists have their own problems, which are numerous and complex enough to demand all their attention : very few have the ability to interpret the full significance of obscure diseases and ambiguous pathological processes. Because of this an attempt has been made in this report to indicate the meaning of any disease, injury or anomaly that was found at Jarrow, rather than remaining content with a brief description or bare statement of its occurrence. Pathologists and some biologists may find this tediously redundant but it is hoped that the busy archaeologist, and most general readers, will be grateful for these attempts at elucidation, not condemn them as patronizing prolixities.

1 - METHOD

The measurements, method of measurement, and coding of skulls (including mandibles) follow those of Mourant (1922), except for the omission of his categories of doubt « ? » and presumed inaccuracy « ». Long bones are measured according to the technique of Trevor (1950). Dental coding is expressed according to FDI (cf. appendix A).

Stature is estimated according to the formulae of Trotter and Gleser (1958 for men ; 1952 for women). Other details of methods used (assessment of dental attrition, size of squatting facets, etc.) will be found in the relevant sections.

Appendix A Dental coding according to the International Dental Federation (IDF)

A : Adult teeth diagram :

A	(+)	(-)	(-)	-	+	C +	+	+	+	+	+	+	(-)	(-)	?
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
A	(-)	(-)	-	-	C +	+	P +	-	-	+	(-)	(-)	+	(+)	?

B : deciduous teeth diagram :

55	54	53	52	51	61	62	63	64	65
85	84	83	82	81	71	72	73	74	75

In the two diagrams the two upper lines represent the maxilla, the two lower lines, the mandible . Note that the left and right sides of the jaws are reversed in the diagram which record them .

Legends :
tooth present in the the jaw = +
tooth lost ante-mortem = (-)
tooth lost post-mortem = -
tooth not (or not fully) erupted = (+)
agenesy = A
carious = C
parodontal abscess = P
unknown : damaged yaw = ?

2 - CONDITION OF MATERIAL

The overall condition of the skeletons from Jarrow Abbey is poor. Virtually none are anywhere near complete ; most comprise less than 60% of their potential osseous material ; many have barely 20% ; some consist of no more than a few tattered scraps of bone. No skulls survive undamaged and few are well enough preserved to offer more than a small selection of the commonly used cranial measurements. Whithout elaborate reconstruction of many severely fragmented skulls statistical analysis of these remains would be valueless. Even were it attempted the results would carry a degree of uncertainty too high to justify the work involved.

The chief reason for the poor condition of these remains is post - inhumation soil erosion due to the combined action of various chemical, physical and biological factors. The position is also much aggravated by the fact that many of the inhumations had been anciently disturbed. Burials overlapped each other and were intermingled in a way that inevatably resulted in a translation of skeletal elements from one body to another - or several others. These combined effects of this anatomical disarray and the extensive erosion of what survive greatly limit the amount and reliability of the information which can be extracted from this material. In reading what follows this must be constantly borne in mind lest a measured of dogmatism and certainty, which it is not intended to bear, is imputed to the text. The average state of desintegration of the Jarrow material was, in fact, even worse than may appear from this account because, from several hundred excavated graves, some deliberate selection was made in order to ensure that a number of above - average skeletons were included in the specimens to be examined.

3 - NUMBER OF BURIALS

Two hundred and eight « burials » have

been examined, of which 43 contained parts of two or more individuals. In all, it seems probable that 261 persons are represented amongst these remains and this figure has been adopted as the basis of any inferences which are made here. Some difficulty was experienced in arriving at the number 261. Many burials contained, in addition to the remain inhumation, a single stray bone from another individual or even several such duplicated elements. With the certainty of early disturbance of the graves these additional elements were presumably displaced fragments from an adjacent skeleton and could not justifiably be counted as separate burials. If, however, one inhumation contained a substantial proportion of two skeletons it was assesses as a « double » burial and two individuals were scored. This assessment was not taken to imply that the two corpses has necessarily, or even probably, been interred together.

4 - AGE AND SEX (see appendix B 1-2 , pp. 18 - 19)

Of the 261 individuals, 109 (41.8%) were juveniles less than 18 years of age. The average of these deaths in childhood was about 6 ½ years. Some perspective is given to this by Table 1 which shows the percentage of juveniles found at a few other sites. Although Table 1 shows interesting differences between the sites it is more revealing to plot the distribution of these juvenile deaths according to the age which they occured. This is done in Table 2 . This shows some very striking differences between the sites, differences which are not always easy to explain. At Owslebury the very high incidence of juvenile deaths derives from the exceptional incidence of 86.2% in the first two years and of these 25 deaths no fewer than 17 (68%) were those of newborn or premature infants. This, and some other evidence, suggests the possibility of infanticide, especially female infanticide. They are, however, difficulties in accepting this and the problem cannot be confidently resolved. The overall juveniles

(Suite page 20)

Table 1 Percentage of juveniles (0 to 18 years)

Site	Date	n inhumations	n juveniles	%
Jarrow	Late Saxon/Med.	261	109	41,8
Monkwearmouth	Late Saxon	206	79	38,3
North Elmham	Late Saxon	206	39	18,9
Thetford (Red Castle)	Late Saxon	85	24	28,2
Caervent	Late Saxon/Med.	121	27	22,3
Owslebury	Romano-British	50	29	58

Table 2 Distribution of juveniles deaths

Age(years)	Jarrow		Monkwearmouth		North Elham		Thetford		Caervent		Owslebury	
	n	%	n	%	n	%	n	%	n	%	n	%
0 to 2	21	19,3	37	46,8	3	7,7	14	58,3	7	25,9	25	86,2
2 to 4	26	23,9	14	17,7	10	25,6	4	16,7	7	25,9	1	3,4
4 to 6	8	7,3	2	2,6	6	15,4	3	12,5	1	3,7	0	0
6 to 8	14	12,8	8	10,1	7	17,9	2	8,3	3	11,1	0	0
8 to 10	8	7,3	5	6,3	1	2,6	0	0	0	0	0	0
10 to 12	11	10,1	3	3,8	1	2,6	1	4,2	4	14,8	0	0
12 to 14	9	8,3	6	7,6	6	15,4	0	0	1	3,7	0	0
14 to 16	4	3,7	3	3,8	1	2,6	0	0	2	7,4	2	6,9
16 to 18	8	7,3	1	1,3	3	7,7	0	0	2	7,4	1	3,4
?	0	0	0	0	1	2,6	0	0	0	0	0	0
Juveniles %	41,8		38,3		18,9		28,2		22,3		58	

Appendix B - 1 Age and sex of each burial (cf note)								
Inhumation	Sex	Age	Inhumation	Sex	Age	Inhumation	Sex	Age
69PO 3	?	3-4	70OE 39(b)	M	A	70SO 92 (a)	M	25-30
69QI 6	M	A	70PJ 44	F	A	70SO 92(b)	?	5-6
69QC 7	?	A	70PF 46	?	3-4	70AHG 93	?	10-11
69RS 8	?	9 m	70QE 47	?	10-12	70TM 94	M	A
69RR 9	?	4-6 m	70RT 48	?	2-2 1/2	70TH 95(a)	F	15
69QJ 10(a)	M ?	A	70PX 51	F ?	A	70TH 95(b)	F ?	A
69QJ 10(b)	?	N.B.	70PE 52	?	7-8	70TH 95(c)	?	4--5
69VZ 11	M	A	70PW 53(a)	?	6-7	70UL 96	M	20-22
69TD 12	?	7-9	70PW 53(b)	?	5-6	70XP 98	M	A
69WR 14(a)	M	45-50	70AHC 55(a)	?	11-12	70TA 99	?	12-14
69WR 14(b)	?	8-9	70AHC 55(b)	?	15-16	70AHA 100	M	50-70
69UW 15	M ?	A	70AHC 55(c)	?	2	70AGV 102	F	50-60
69WC 16(a)	M	55-75	70RR 56	M ?	12-14	70UM 105	?	A
69WC 16(b)	?	2-3	70AB 157	F ?	A	70UW 106(a)	?	7
69WC 16(c)	F	35-45	70QY 58	F	A	70UW 106(b)	?	2-2 1/2
69WU 18	?	N.B.	70WK 61(a)	M	50-70	70VO 107(a)	M	55-70
69XJ 20	M	40-55	70WK 61(b)	?	6-8	70VO 107(b)	?	3-5
69YS 23	?	10-11	70SP 62	F	22-26	70VD 108	M	26-29
70HI 3	?	8-10	70QS 64	?	1 1/2-2	70WN 109	F	40-60
70PY 8	?	11-12	70SM 66	F ?	A	70UC 110	?	1-1 1/2
70AHJ 9	M	A	70TP 68	M	A	70UO 111	M ?	A
70JN 10	?	4 m	70VE 70	F ?	30-40	70UN 112(a)	F	A
70QR 12	?	4	70RM 38	M	43-50	70UN 112(b)	F ?	18-19
70IW 14	M ?	40-50	70UA 40	?	2-3	70TW 115	M	17-18
70QF 14	M	40-50	70SH 71	F	40-60	70VU 116	M ?	45-60
70JX 15	M ?	A	70RQ 72	?	6	70VF 118	M ?	A
70PQ 17	?	10-12	70WX 73	M ?	19-20	70WT 120	F ?	A
70MP 23(a)	?	4-6	70SJ 74	F	40-45	70WO 121	?	2
70MP 23(b)	?	N.B.	70SN 75	F ?	A	70VZ 128	F	55-65
70OY 24(a)	M ?	45-50	70TT 76	M	A	70WU 128(a)	?	A
70OY 24(b)	?	2-2 1/2	70TL 77	M	A	70WU 128(b)	?	1-2 m
70OY 24(c)	?	2-3	70TK 78	F	50-60	70US 130	F	48-55
70PP 26(a)	F	50-65	70TO 79	M	A	70XS 131	?	N.B.
70PP 26(b)	?	1 1/2-2	70VR 81	?	6-8 m	70YX 133	M	40-55
70PV 27	M	A	70ZV 82(a)	?	5	70XU 134(a)	F	39-44
70PB 28(a)	M ?	45-55	70ZV 82(b)	F	25-35	70XU 134(b)	?	9-12 m
70PB 28(b)	?	9-12	70ZV 82(c)	?	A	70WL 136	?	6-7
70PB 28(c)	?	1 1/2-2	70ABK 83(a)	F	55-75	70WW137(a)	F	50-65
70PL 31	F	40-60	70ABK 83(b)	M ?	A	70WW137(b)	M	A
70PO 32	?	2	70ABK 83(c)	?	11-12	70YA 139(a)	M	25-35
70PR 33	?	7-8	70ABK 83(d)	?	2-3	70YA 139(b)	F ?	A
70PT 34(a)	?	3	70VY 84	M ?	45-53	70XJ 140	M	42-48
70PT 34(b)	?	2	70AEV 86	?	11-12	70XR 141	F ?	A
70PK 35	F	40-60	70SA 87	?	1-2 m	70XR 142	M	21-24
70QG 36	?	6-7	70VN 88(a)	?	6	70XW 143(a)	M	50-60
70PA 38	?	A	70VN 88(b)	?	12	70XW 143(b)	?	2
70PI 39(a)	M	50-60	70AHB 90	M	A	70XQ 144	M ?	A
70PI 39(b)	?	8-10	70YN 90	M ?	17-18 ?	70YB 145	M?	A
70OE 39(a)	F	A	70UD 91	?	2-2 1/2	70YB 146	F ?	40-45

Appendix B-2 Age and sex of each burial (cf note)

Inhumation	Sex	Age	Inhumation	Sex	Age	Inhumation	Sex	Age
70XML 147	M	24-26	70SP 62	F	22-26	71OE 35	F	30-45
70XO 149	F	22-24	70QS 64	?	1 1/2-2	71OY 36	M	16-17
70ACI 150(a)	F	24-26	70SM 66	F ?	A	71OD 37	F ?	16
70ACI 150(b)	M	A	70TP 68	M	A	71OA 38	M ?	A
70ABS 151	F	42-47	70VE 70	F ?	30-40	71OE 39(a)	?	5-6 m
70AFE 151(a)	M	A	70RM 38	M	43-50	71OE 39(b)	?	A
70AFE 151(b)	?	2-3	70UA 40	?	2-3	71PJ 40	M	16-17
70YW 152	?	12-13	71NY 32	F ?	14-15	71OM 41	?	2-2 1/2
70ZS 153	M	A	71UC 34	?	7-8	71OX 42	?	3-4
70YU 154	M	18-19	71SG 35	M	27-30	71PF 43(a)	F ?	25-30
70ACQ155(a)	M	A	71UD 36	M	43-48	71PF 43(b)	?	5-6 ?
70ACQ155(b)	F ?	40-60	71RJ 37	F	40-60	71PF 43(c)	M	A
70ACH 157	?	6-7	71GX 1(a)	M	45-55	71PE 44	F	26-28
70ZR 159(a)	F ?	A	71GX 1(b)	?	9-11	71PM 45	F	20-22
70ZR 159(b)	?	1-1 1/2	71HG 2	?	13-14	71PH 46	M ?	A
70ZA 160	F ?	12	71HY 3	F	45-55	71PO 49	M	A
70AAK 161	M ?	21-23	71JK 4	M	19	71PN 50	F	42-47
70AAP162(a)	M	A	71KC 5(a)	F	25-27	71PG 51	F	A
70AAP162(b)	?	2-3	71KC 5(b)	?	A	71ABP	F	40-60
70AAD 163	M	A	71JQ 6	M	A	71MT	F ?	A
70AAM 164	M ?	13	71KD 7	M	24-28	73PD 1	M	25-28
70ABF 165	?	A	71KS 9	F	39-44			
70PO 32	?	2	71KX 9(a)	F ?	A			
70PR 33	?	7-8	71KX 9(b)	M ?	18-19			
70PT 34(a)	?	3	71KO 10	M	A			
70PT 34(b)	?	2	71LW 11	F	50-65			
70PK 35	F	40-60	71KY 12(a)	F	35-45			
70QG 36	?	6-7	71KY 12(b)	M	A			
70PA 38	?	A	71LN 14	?	7			
70PI 39(a)	M	50-60	71LM 16	?	9-11			
70PI 39(b)	?	8-10	71MG 17	?	12			
70OE 39(a)	F	A	71MD 19	M	50-60			
70OE 39(b)	M	A	71MC 20(a)	F	45-50			
70PJ 44	F	A	71MC 20(b)	?	9-10			
70PF 46	?	3-4	71MB 21(a)	?	8-9			
70QE 47	?	10-12	71MB 21(b)	?	9-10			
70RT 48	?	2-2 1/2	71LX 22	?	8-10			
70PX 51	F ?	A	71ME 23	?	7			
70PE 52	?	7-8	71NE 24	M	55-70			
70PW 53(a)	?	6-7	71ND 26	F ?	A			
70PW 53(b)	?	5-6	71MJ 27	M ?	12			
70AHC 55(a)	?	11-12	71NF 28	?	2 1/2-3			
70AHC 55(b)	?	15-16	71NG 29	F	24-27			
70AHC 55(c)	?	2	71NJ 30	F ?	30-50			
70RR 56	M ?	12-14	71NN 32(a)	M	50-60			
70AB 157	F ?	A	71NN 32(b)	?	A			
70QY 58	F	A	71NN 32(c)	?	N.B.			
70WK 61(a)	M	50-70	71NL 33	M	48-55			
70WK 61(b)	?	6-8	71NK 34	F	23-27 ?			

Note : all ages are in years unless specified as " months" or "N.B."new born.

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death rate at Jarrow is closely similar to that of Monkwearmouth. Both these are about 30% more than the incidence at Thetford and roughly double that of North Elmham and Caervent. But the distribution of the Jarrow deaths is very different from that at Monkwearmouth. The latter site has two and half times as many deaths in the first couple of years but fewer throughout the rest of childhood. Thetford has even more in the early years : 45% under the age of four and nearly 60% under two. This figure is surprising in wiew of the situation at North Elmham where only 7.7% of juvenile deaths occured in the first two years. Yet these were contemporary populations only 40 kilometers apart. In contrast, to Owsleburry, to Thetford and to Monkwearmouth, Caervent, and to a lesser extent North Elmham and Jarrow, have a more even distribution of deaths troughout chilhood. Because infantile deaths must often have been due to dysentery and enteritis it is possible that the high mortality at Thetford and Monkwearmouth was due to a lewer level of hygiene than prevailed at North Elmham. Jarrow and Caervent fail between the extremes of the other sites and are more ambiguous.

But in early communities, which lacked the notion of bacterial contamination or the microbic spread of disease, it is difficult to envisage differences in their level of hygiene large enough to explain the wide divergence found in their infantile death rates. Other possibilities may be sought. Until the 20th century, with the universal availability of pasteurized, dried or canned milk, dysenteric infections were especially common when, by accident or design, babies were not breast fed. Cow's milk, which was almost the only available substitute, was invariably more or less contaminated by enteric organisms and often carried the additional hazard of having been drawn from tuberculous udders. So it is at least possible that the low mortality in the first two years of life at North Elmham, and to a lesser extent at Jarrow, was due to the mothers being better breast feeders than those at the other sites. Various reasons can plausibly be found which might account for such differences. On the other hand, the very low death rate in the first two years at North Elmham may be partly illusory. There is some evidence to suggest that this village served as a burial « catchment area » for surrounding parishes. If so, it may be that very young children were not thought to be important enough to « graduate » to this prestigious plot and so the few infants found there would be an inadequate sample, not representing the true rate of young deaths in the communities from which they came. A similar explanation might apply, less forcefully, to the 19.3% rate at Jarrow. Further information can be obtained from the Jarrow figures by noting in greater detail the distribution of death under the age of two years, as shown in Table 3 .

Table 3 Distribution of juvenile deaths (new born to 24 months)

Age in months	n	%
newborn to 1	6	28,6
1 to 3	3	14,3
3 to 6	3	14,3
6 to 12	4	19
12 to 18	2	9,5
18 to 24	3	14,3

From Table 3 it can be seen that, of the 21 deaths under 2 years, 28.6% were newborn, 42.9% were less than 3 months and 57.2% were less than 6 months.

Of the 152 adults, 12 were unsexable, 41 were sexed with varying degrees of uncertainty (which is expressed by one or more query marks « ? ») and 99 were firmly sexed. Of the 140 skeletons which were firmly or tentatively sexed 83 (59.3%) were males, 57 (40.7%) were females. This sex ratio is not a demographically normal one but, having regard to the relatively small numbers and the uncertainty of sexing in early material of poor quality, it is not extravagantly unusual. In most ancient cemeteries the sex ratio does not deviate far from 50 : 50. When discrepancies from this

are found explanation must be sought. Thus the 80 males : 140 females ratio in an Iroquoian cemetery was probably due to many of the men having been killing in tribal warfare and buried far from their home. The 220 males: 46 females at Trentholme Drive, York, may have been chiefly due to an excess of ex - legionary soldiers. The 136 males : 12 females at Gallen Priory in Ireland was almost certainty due to this being a monastic site. At Iona the situation was reversed, this being a conventual establishment yielding only 12 males to about 45 females. The 61 males : 38 females at Jarrow may have been partly due to a similar cause. But here, with only a 3 : 2 ratio, it is possible that a substantial part of the cemetery served a demographically normal community (the number of children's burials suggests this) whilst a small preponderance of men was added as a result of inhumations of the Abbey religious. Other explanations might be found but none can be proved beyond all doubt and the above suggestion seems more probable than most.

The estimation of adult ages at death can be very uncertain in defective skeletons. Cranial suture fusion is now a much less valued criterion than formerly. Dental evidence is difficult to use in the absence of an adequate series of well preserved jaws to serve as a basis for estimating the average molar attrition gradient of the group.

The extremely useful criteria given by the pubic symphysis are especially likely to be eroded or absent when skleletons are much damaged by soil action and other disturbances. Hence, the estimated age of these Jarrow persons is usually given with a fairly wide margin of probability except in the young adultes where epiphyseal evidence is still available or in the occasional case where a well preserved andseemingly unequivocal pubis has survived. In about two fifths of all skeletons the evidence was insufficient to justify even an approximate estimate of their age and they have simply been recorded as « Adult ».The average age of 43 males (M + ?M) was 41.3 years and of 40 females (F + ?F) was 42.2 years. The difference between the sexes is not significant but the fact that they are so similar is interesting. In almost all early material the men are found to outlive the women by several years. Table 4 shows a few typical examples, including several assessed by me on the same criteria as those used for Jarrow.

Table 4 Mean age at death

Site	male	female
Jarrow	41,3	42,2
Monkwearmouth	40,8	37,6
North Elmham	38,2	35,8
Thetford (Red Castle)	38,1	30,4
Caister by Yarmouth	36,8	31,7
Caervent	31,6	31,7

It has customarily been said that the younger mean age at death of the women is due to the hazards of childbirth in societies where obstetric skills were almost non - existent. But there are very strong reasons for believing that deaths from parturition accounted for an extremely small part of the adult female mortality in most early population. This is not the place for an extended discusion of the reasons for different mortality rates in these peoples but it may be said that, among the Anglo - Saxons, there is substantial evidence to suggest that the boys and men were better fed than the girls and women, at least in times of relative food shortage. In a male dominated society where food supplies were often marginal to needs, girls probably grew up suffering from a slight degree of malnutrition which their brothers just managed to escape. This could well leave the women with lower reserves of vital energy and reduced powers of resistance with which to meet the demands of what must have been a vigorous and physically demanding life for many, even most, of them. Why the Jarrow community should differ from others in its relative sex mortality can only be conjectured. Perhaps it was more amply fed than most and a juvenile differential of nutririon was seldom or never needed. Perhaps the custom of the group was to give

equal shares to the boys and girls even if food did become short. Perhaps the « demographically normal » part of this community did have a lower mean age at death for its women, which is masked in the total population by the presence of a small group of men with an exceptionnaly low survival rate. If so, can we look to an unusually ascetic fraternity of monks who, by fasting, vigil, flagellation, blood - letting and other mortifications or penitential disciplines, reduced themselves well below the average level of health enjoyed by the laity around them ? Other explanations might be proposed but no certainty is possible.

Apart from the fact that the Jarrow men and women appear to have had almost the same average longevity they also outlived many similar communities. Table 4 shows this and a possible inference here is that their relativity long life was indeed due to an above average standard of diet. Perhaps the example of an industrious and beneficent abbey served to inspire a high level of husbandry in the surrounding villages. Perhaps the proximity of the sea offered unusual opportunities to augment their basic (and most essential) protein ration with fish, molluscs and various kelps. Survival in early and technogically simple communities always depends on a delicate balance between tight - knit independant variables. Where food is in short supply every available calorie must be munched from each sparse mouthful. To do this demands vigorous jaw muscles and an efficient set of teeth. Thus in primitive populations the loss of a few molars can make all the difference between bare survival and gradual disintegration. This is easily forgotten in an age of Welfare State dentures and canned, predigested paps but it is worth remenbering that, even as late as Tudor times, the edentulous Dr. John Caius was kept alive in his old age by being put to wet nurses. The teeth of the Jarrow people were good with a low rate of ante - mortem loss and little caries. This must have helped them to extract calories from their diet but the fact that their dentition was good may itself have been a result of a relatively high fluorine intake. There is nothing to make us suppose that they derived a lot of fluorides from their water, much of wich was probably from surface supplies of low mineral content. If these people were part - time fishermen or had easy access to coastal fishmongers, they probably obtained a much higher fluoride intake than would otherwise have been available to them. A beneficial circle would then have operated : their teeth, protected by fluorine, would have better able to chew the maximum available calories from their diet to give them greater energy to expend on obtaining fish to provide them with fluorine to... If this sounds fanciful there are parallels and analogies to be found in other early societies. Much of the Meso - American culture (Maya, Aztec, etc.) was based on the combined staples of maize and gourds but it is likely that the vigorous dynamism of these peoples was derived from their cultivation of beans - a plant which gave them essential supplies of protein which were less easily obtainable from other sources.

5 - PHYSICAL TYPE

The defective nature of this material, especially the poor state of the skulls, excludes any extensive metrical analysis. Tables 5 and 6 (p. 23) record a few of the available measurements on some of the better preserved calvaria.

Tables 7 and 8 (p. 24) give mandibular measurements and Tables 9 and 10 (p. 25) give the mean and range of long bone measurements.

No comments will be made on these metrical details beyond noting that these people emerge a being a group with a wide range of characters. Despite the small number available dolichocranial, mesocranial and brachycranial persons are found and a similar diversity is present in other cranial indices. This would be expected when it is recalled that the burial ground continued in use for several centuries and was no doubt refreshed, from time to time, by immigrants of diverse origin.

Tables 9 and 10, together with some additional evidence not recorded there, show that they were a fairly sturdy and well built people of medium stature.

Table 5 : Cranial measurements (males)

Inhumation	L	B	H	NH	NB	O1	O2	100 B/L	100 H/L	100 H/B	100 O2/O1	100 NB/NH
GX1	193.8	148.2	133.5	53.5	24.6	44	34.8	76.5	68.9	90.1	79.1	45.9
JK4	179.3	139.2	?	56.1	20.5	44	38.1	77.6	?	?	86.6	36.5
MD19	136.2	?	139.4	?	?	?	?	?	74.9	?	?	?
NE34	191.6	155.3	?	?	?	?	?	81.1	?	?	?	?
XJ20	189.1	140.7	123	49.1	22.4	41.2	34	71.4	65	87.4	82.5	45.6
PV27	178.5	142.3	128	?	?	?	?	79.7	71.7	89.9	?	?
WK61	181.8	149.8	134.1	?	?	?	?	82.4	73.3	89.5	?	?
HA100	178	143.3	129.2	?	?	?	?	80.5	72.6	90.2	?	?
AGZ195	198	139.4	?	?	?	?	?	70.4	?	?	?	?
RM33	179.4	143.2	138.5	?	?	?	?	79.8	77.2	96.7	?	?
X	185.6	144.6	132.2	52.9	22.5	43.1	35.6	78	72	90.6	82.7	42.7

Table 6 : Cranial measurements (females)

Inhumation	L	B	H	NH	NB	O1	O2	100 B/L	100 H/L	100 H/B	100 O2/O1	100 NB/NH
KS9	181.7	141.6	123.1	49.7	24.2	?	?	77.9	67.7	86.9	?	48.7
LW11	176.3	132.4	125.8	43.3	21.4	36.3	30.8	75.1	71.4	95	84.8	47.2
WC16(a)	176.8	136.2	124.6	48.2	24.4	40.3	31.1	77	70.5	91.5	84.6	50.6
SH71	195.7	138.2	?	?	?	?	?	70.6	?	?	?	?
X	182.6	137.1	124.5	47.7	23.3	38.3	32.4	75.1	69.9	91.1	84.7	48.8

Table 11 (p. 24) shows the mean stature and its range for men and women, at Jarrow and a few others sites

The Jarrow figures are not greatly different from those of other Anglo - Saxon groups. The difference of 135mm between male and female is a common one, whilst the male range of 274mm and the female range of 180mm are both unexceptional for communities of this size.

6 - MERIC AND CNEMIC INDICES

The Meric Index is a measure of the antero - posterior flattening of the femoral shaft, the Cnemic Index measures the side - to - side flattening of the tibia.

The significance of platymeria and platycnemia is not fully understood. Both conditions are more common in early and modern « primitive » peoples than in those of advanced civilizations and this has led to their being ascribed to the habit of squatting. This theory is difficult to sustain. In many populations femoral and tibial flattening vary independently of each other, and in known squatters both may be absent, or in non - squatters either or both may be found. Some workers believe that platymeria is a response to unusual stresses on the femoral shaft ; or that it is due to various pathological processes ; or that it is simply a physiological device to economize in the use of minerals for bone formation. Platycnemia is sometimes said to be dependant on the degree of retroversion of the tibal head. None of these theories carry conviction. Sometimes large difference are found between the two legs, as with the Jarrow Inh. (= Inhumation.) 70 SO 92 (a) (male) whose L. (= left) femur is platymeric with an Index of 83.4 compared to an eurymeric R. (= Right) femur at 89.7 or Inh. 70 US 130 (female) with a 9 point difference between the tibiae : L.tibia, Index 63.2 (mesocnemic) ; R.tibia , Index 72.2 (eurycnemic). Both conditions are probably multifactorial in origin and it is not clear how the Jarrow results should be interpreted. Table 12 (p. 24) shows the means and the ranges of the Meric and Cnemic Indices at this site and Table 13 (p. 24) shows their distribution.

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Tables 7, 8, 11, 12 and 13 (*)

Table 7	Mandibular measurements (males) means and ranges		
Index	n	mean	range
100 ml/cr cr	14	106.06	86.3 - 132.7
100 gogo/crcr	12	94.51	80 - 100.1
100 rb'/cpl	14	49.72	44.1 - 55.9
M angle	15	117.39	114.8 - 135.1
R angle	11	68.14	54.8 -78.3

Table 8	Mandibular measurements (females) means and ranges		
Index	n	mean	range
100 ml/cr cr	11	115.5	106.5 - 124.8
100 gogo/crcr	13	95.36	88.3 - 102.4
100 rb'/cpl	11	47.59	46.3 - 52.9
M angle	12	130.1	115.3 - 139.5
R angle	10	70.56	66.5 - 76.7

Table 11 Stature

Site	Sex	Mean(cm)	Range
Jarrow	M	171,7	158,2-185,6
	F	158,2	148,8-168,8
Monkwearmouth	M	172,5	161,2-185
	F	158,8	153,9-164,4
North Elmham	M	172,1	162,3-180,7
	F	157,4	142,4-169,7
Thetford(Red Castle)	M	169,7	161,3-175,4
	F	158,1	151,9-167
Trentholm Drive, York	M	170,2	160,1-198,4
	F	154,9	142,4-170

Table 12 Means and ranges of Meric and Cnemic indices

Meric index			
Sex	n	Mean	Range
M	50	76,5	66,2-89,7
F	44	74,5	61,4-90,3
Cnemic index			
Sex	n	Mean	Range
M	54	72,2	54,7-99,4
F	42	72,9	56,6-82,1

Table 13 Distribution of Meric and Cnemic indices

Meric index								
	Hyperplatymeric		Platymeric		Eurymeric		Stenomeric	
Sex	n	%	n	%	n	%	n	%
M	19	38	28	56	3	6	0	0
F	20	45,5	22	50	2	4,5	0	0
Cnemic index								
	Hyperplatycnemic		Platycnemic		Mesocnemic		Eurycnemic	
Sex	n	%	n	%	n	%	n	%
M	1	1,9	6	11,1	18	33,3	29	53,7
F	0	0	3	7,2	8	19	31	73,8

(*) For tables 9 and 10, please to see page.25.

Table 9 Male long bones measurements: means(mm) and range

Measurements		n	mean	range
Clavicle max.lenght	Left	14	141,9	135,4-164,5
	Right	11	136,1	131,3-165
Humerus max.lenght	Left	14	337,3	321,8-371,2
	Right	13	344,1	320,8-365,1
Humeral head max.diam.	Left	15	46	42,5-55,1
	Right	15	47,6	41,3-54,3
Humerus bicondylar	Left	19	36,2	50,2-74,4
	Right	24	67,9	58,5-75,9
Ulna max.lenght	Left	17	271,8	253,1-301,2
	Right	14	271,4	205,2-250,2
Radius max.lenght	Left	15	254,2	237,1-279,3
	Right	13	251,7	234,7-278,2
Femur max.lenght	Left	18	459,7	420,7-507,1
	Right	15	449,3	393,4-487,3
Femoral head max.diam.	Left	19	50,4	44,3-57
	Right	22	51,1	43,3-58,1
Femoral shaft minimum antero-posterior diam.	Left	21	26,1	19,8-28,9
	Right	25	26,6	20,5-32
Femoral shaft breadth at same level	Left	21	35,5	28,8-40,6
	Right	25	34,7	28,4-39,1
Femur bicondylar	Left	21	82,9	69,4-92,4
	Right	16	83,3	71,3-93,1
Tibia max.lenght	Left	15	366,5	315,2-400,7
	Right	12	370,5	338,6-403,2
Tibia antero-posterior diam.	Left	18	36,1	32,7-42,7
	Right	18	35,5	28,4-33,6
Tibia transversal diam.	Left	18	25,7	22,1-29,8
	Right	18	25,4	21,5-29,6

Table 10 Female long bones measurements: means(mm) and range

Measurements		n	mean	range
Clavicle max.lenght	Left	15	136,4	129,2-148
	Right	17	133,7	126,3-144,3
Humerus max.lenght	Left	17	300,8	284-323
	Right	15	304,7	279-332
Humeral head max.diam.	Left	17	42,1	37-45,6
	Right	15	44,4	35,8-45,7
Humerus bicondylar	Left	17	58,4	52,1-63,1
	Right	20	58,7	52,8-64,3
Ulna max.lenght	Left	11	244,8	228,1-259,2
	Right	12	245,2	231,2-264,6
Radius max.lenght	Left	12	221,9	205,8-236
	Right	9	225,1	215-237
Femur max.lenght	Left	20	417,6	387,2-452,8
	Right	18	417,6	379,4-450,3
Femoral head max.diam.	Left	23	43,2	40,2-46,2
	Right	24	43,2	38,2-50
Femoral shaft minimum antero-posterior diam.	Left	23	23,7	20,5-27,3
	Right	21	23,3	21,3-25,6
Femoral shaft breadth at same level	Left	23	31,7	27,7-35,6
	Right	21	31,4	26,2-36,1
Femur bicondylar	Left	21	73,5	69,2-77,8
	Right	20	74	70,8-78,1
Tibia max.lenght	Left	13	334,8	322,8-363,2
	Right	13	336,9	317,6-363,6
Tibia antero-posterior diam.	Left	17	30,3	27,2-34
	Right	19	30,6	26,8-34,6
Tibia transversal diam.	Left	17	21,9	18,3-24
	Right	19	22,6	17,9-24,2

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Table 14 Frequency of non - metrical variants

CRANIAL VARIANTS

	Jarrow									Monkwearmouth			North Elmham		
	n males	n variants	%	n females	n variants	%	population	n variants	%	population	n variants	%	population	n variants	%
Metopic	48	2	4.2	33	2	6.1	96	4	4.2	32	0	0	67	6	8.9
Bregma bone	22	0	0	22	0	0	45	0	0	27	0	0	53	0	0
Epipteric bone	25	0	0	16	0	0	41	0	0	36	0	0	48	4	8.3
Lambdoïd wormians	39	8	20.5	23	3	10.7	73	15	20.5	23	8	34.8	82	6	7.3
Sagittal wormians	23	0	0	19	0	0	45	0	0	23	1	4.3	56	1	1.8
Coronal wormians	34	0	0	30	2	6.7	66	2	3	37	0	0	73	0	0
Asterionic ossicle	24	4	16.7	14	0	0	33	4	10.5	23	1	4.3	43	5	11.6
Inca bone	32	1	3.1	20	0	0	56	2	3.6	35	1	2.9	62	1	1.6
Mastoïd notch bone	15	0	0	10	0	0	25	0	0	?	?	?	?	?	?
Paramastoïd process	16	8	50	12	2	16.7	28	10	35.7	21	2	10	33	3	9.9
Parietal foramina	49	31	63.3	41	28	68.3	97	64	65.9	51	23	43.7	?	?	?
Supra orbital notch	57	32	56.1	47	27	57.4	111	60	54.1	?	?	?	127	66	51.9
Multiple supra orbital foramen	54	14	25.9	40	7	17.5	96	21	21.9	56	11	19.6	113	21	17.8
Supra orbital grooves	45	25	55.6	41	27	65.9	90	56	90	52	25	48.1	103	59	57.3
Multiple infra orbital foramen	28	4	14.3	24	2	8.3	63	8	12.7	?	?	?	70	7	10
Foramen of Hushke	67	5	7.5	62	2	3.2	154	15	9.7	?	?	?	173	18	10.4
Double occipital condyle	39	0	0	37	1	2.7	76	1	1.3	?	?	?	33	0	0
Post condylar canal	27	13	48.1	17	8	47.1	55	30	54.5	25	4	16	63	24	38.1
Double hypoglossal canal	50	3	6	44	9	20.5	110	15	13.6	23	3	13	115	18	15.7
Precondylar tubercules	51	0	0	36	0	0	100	4	4	24	0	30	86	3	3.5
Sagittal sinus turns left	33	3	7.9	30	2	6.7	80	6	7.5	30	9	50	77	4	5.2
Pterygoïd spurs	5	5	100	7	3	42.9	14	10	71.4	10	5	11.7	23	14	60.9
Blurred sub-nasal margin	53	10	17.2	46	4	8.7	109	14	12.8	34	4	0	118	8	6.8
Sub- nasal fossiculae	56	0	0	44	3	6.8	104	3	2.9	34	0	4	113	2	1.8
Malar tuberosity	40	12	30	43	4	9.3	83	16	19.3	25	1	?	95	6	6.3
Marginal tuberosity(zygoma)	9	8	88.9	43	4	9.3	52	12	23.1	?	?	?	?	?	?
Zygo - maxillary tubercle	38	4	10.5	42	0	0	80	4	5	21	2	9,5	?	?	?
Multiple mental foramen	63	0	0	67	4	5.9	161	4	2.5	52	1	1,9	175	3	1.7
Gonial eversion	61	28	45.9	58	13	22.4	119	41	34.5	45	14	31,1	126	47	37.3
Infero - lateral mental tubercles	53	12	22.6	65	8	12.3	120	22	18.3	32	3	9.4	128	13	10.2

POST CRANIAL VARIANTS

	Jarrow									Monkwearmouth			North Elmham		
	n.males	n variants	%	n females	n variants	%	population	n variants	%	population	n variants	%	population	n variants	%
Atlas bridge	35	4	11.4	51	5	9.3	92	10	9.7	29	4	10.2	109	13	11.9
Ossified apical ligament	24	3	12.5	25	3	12	50	6	12	25	0	0	?	?	?
Septal aperture	75	9	12	66	6	9.1	174	15	8.6	55	5	9.1	184	20	10.9
Acetabular crease	57	16	28.1	38	4	10.5	95	20	21.1	41	12	29.3	107	25	23.4
Third trochanter	85	27	31.8	60	16	26.6	150	43	28.7	42	10	23.8	153	21	7.2
Vastus notch	59	5	8.5	25	5	20	85	10	11.8	22	0	0	92	8	8.7

(Suite de la page 23)

7 - NON - METRICAL VARIANTS (see Table 14, p. 26).

« Non - metrical » variants are anatomical features which can be assessed on a « present or absent » basis. Metopism, the persistance of a mid - frontal suture into adult life, is a well known example. It is, of course, true that most of these anomalies vary in size, e.g. zygomatic tuberosity, ad could therefore be recorded metrically but owing to their smallness or imprecision this is not thought to be rewarding and a present or absent record seems to be the most appropriate treatment of them. Theoretical justification for this is found in the fact that almost all these non - metrical variants are though to be genetically determined. Hence, their frequency in different populations may throw some light on the relationship of the groups under scrutiny. Unfortunately, very few studies have been done so far with this in mind. A few of these traits (e.g. metopism, inca bone, septal aperture) are well known and have a large literature which includes records of their frequency in many populations but studies which cover several dozen such features in a single community are extremely few. So the details recorded here are likely to be of less immediate use than they will ultimately become when there are more and larger British or European series with which to compare them. For genetic purposes the comparison of the Jarrow Abbey series with such exotic populations as Anderson's (1968) Iroquoian Serpent Mound groups is unlikely to be greatly rewarding. A comparison with the Late Saxon people of North Elmham is of more immediate interest and has the additional advantage that both populations were assessed by me on the basis of the same criteria. This last point is of some importance because although most of these features such as the occurrence of a suture or a foramen can be determined on a present or absent basis, a few, such as sub - nasal guttering or gonial eversion, are less cut - and - dried in their manifestation.

Few of these variants appear to be sex - linked and it is reasonable, therefore, to lump sexed and unsexable specimens together. However, in the accompanying table they are shown separately as well as combined. In a few instances significant differences between the male and female incidence is found. This is the case with gonial eversion but this character may be functionally determined, wholly or in part, rather than genetically sex - linked. Table 14 shows these results, with some from Monkwearmouth and North Elmham for comparison.

In wiew of the small numbers in these series the differences are not especially remarkable. Where they are so it is usually due to the oddity of the Monkwearmouth figures. Thus the absence of metopism in 32 frontal bones is unusual whilst the presence of a left - turning sagittal sinus in 30% of cases seems to be well above the average for an Anglo - Saxon population. North Elmham had the distinction of a marked sexual difference in the frequency of septal aperture : 2 out of 96 (2.1%) in male humeri, 18 (20%) of 88 females. The reason for this ten fold difference is uncertain : it was slight at Jarrow, negligible at Monkwearmouth.

Finally, one suggestive finding at Jarrow is worth noting. Inhumations 70 PL 31 and 70 PK 35 were both women aged about 50. They were of closely similar physical appearance, as far as can be seen from their incomplete skeletons. They had somewhat similar patterns of mandibular tooth loss and one had two carious molars whilst the other had three. This hints at a possible physiological, chemical, functional and behavioural similarity between the mouths of these two women. When their non - metrical variants are considered it is found that 70 PL 31 has a double left hypoglossal canal, 70 PK 35 a double right one ; 70 PL 31 has a double left supra- orbital and infra - orbital foramen, 70 PK 35 has both these foramina double on the right ; 70 PL 31 is one of the few Jarrow skeletons with a double mental foramen, on the left, whilst 70

PK 35 it doubled on the right ; and, post - cranially, 70 PL 31 has a right atlas bridge, 70 PK 35 has a left one. In wiew of the remarquable « mirrow image » distibution of these variants and the other features in which these two skeletons resemble each other there is strong presumptive evidence that these women were not only sisters but also identical twins. It is regrettable that their remains are not in better condition to yield further evidence.

8 - SQUATTING FACETS

A the distal end of the tibia a small upward extension of the antero - lateral aspect of the articular surface is sometimes found. These are known as « squatting facets » because they are thought, with good reason, to be most commonly produced by the habitual adoption of a crouched posture.
How much squatting, for what purpose and in precisely what position is needed to produce this feature are still questions which remain unresolved and the problem is too complex to discuss here. It suffices to say that great differences are found in the frequency with which squatting facets occur in different populations and races. They are rare in Western Europe today but among peoples with whom squatting is common or preferred position of work or rest they may occur with frequencies up to 100%. This has been found in some early European groups, e.g. a 7th - 9th century community from Iona where every tibia had a large, well defined facet (Wells, 1980).
At Jarrow the relevant part of the tibia survived in 135 of the sexable bones and, of these, 80 (59.3%) had squatting facets. But when the sexes are separated significant differences are found between them. Of 77 male tibiae 35 (4505%) have facets, of 58 females 45 (77.6%) have them. These facets vary in size from tiny flanges rising no more than a few tenths of a millimetre to large articular surfaces extending proximally along the bone for 10 mm or more. A simple way of classifying them is to measure the maximum vertical extent of the facet from the inferior margin where it turns back to ascend as the normal articular surface of the joint. Three degrees are adopted here :

- the height of the facet is 2 mm or less,
- it is from 2 to 4.9 mm high,
- it is 5 mm or more.

Table 15 shows the occurrence of these degrees in males and females.
Not only are these facets more common in the Jarrow women but, when present, they are on average much bigger than those of the men. How this should be interpreted is uncertain. It may indicate that the women used a crouched position for many everyday tasks such as cookink, dressmaking, basketry, weawing or potmaking whilst the men mostly upright at tasks of agriculture, husbandry or building. It might also imply that, at the end of the day, squatting was the normal position of rest for women either from preference or because to sit on chairs and benches was a privilege and status symbol mostly reserved for the men.It may be noted here that a similar sexual difference in the frequencies and size of these facets was found at Monkwearmouth, North Elmham and Caervent.

Table 15 Size and frequency of squatting facets

Sex		Degree		
		1	2	3
M	n	17	12	6
	%	49	34	17
F	n	6	22	17
	%	13	49	38

9 - PATHOLOGY

9 - 1 Congenital

In addition to the anatomical variants listed (Table 14) there are a number of anomalies, probably of genetic or developmental origin, some of which are of uncertain sta-

tus.

The human vertebral column reflects its evolutionary novelty and instability in many ways and some of its various deviations from « normality » occur at Jarrow. Eight sacra (5 M, 3 F) have six segments instead of the usual five. Six persons (1 M, 4 F, 1 ?) have a detached neural arch, once of the L4, four times of the L5 and once, in the 9 year old child 67LX22, of a supernumerary or sixth lumber vertebra. An L6 is also preserved in inhumations 70ANB190 (M) and 70ACL150 (a) (F). Only one example of spina bifida was found, also in the child 67LX22, where it affected the S1 segment. Anomalous articulations between the L5 and the sacrum are very common in early burials (as they still are today). Five persons have deviations of this kind. Most of these anomalies consist of one or more extra articular facets between the transverse processes of L5 and the sacral ala. Opinions differ to whether they are genetic in origin or due to developmental hazards of various kinds. The extra facet is often large : one in Inh. 71UD36 (M) measures 30.5 x 16 mm, another in Inh. 70XU134 (F) is 24 x 18 mm. Fused neural arches, probably developmental rather than originating from post - natal pathology, occur between T3/T4 in Inh. 67 LM 16, a ten year old child, and between C2/C3 in Inh. 67PJ40 (M). Incomplete foramina transversaria of the atlas occur on the left in 67LM16 and bilaterally in 67LX22. In Inh. 70ANB190, which was noted above, the L5 and L6 vertebrae have markedely wedge - shaped bodies : L5 narrow to the right, L6 to the left . The reason for this difformity is not clear but it is found again, affecting only the L5, in 70XX142 (M). Another vertebral variant is the presence of a cervical rib which is found three times, all in the females. In 67HY3 it is 28.5 mm long ; in 67KC5 it measures 47 mm to its free tip ; in 67NG29 it is a substantial bone springing from the right side of C7 and articulating anteriorly with the first rib. In life this anomaly may have given rise to neurological symptons such as pain, « pins - and needles » or even muscular wasting and paralysis in the right arm as a result of this accessory rib pressing down on some of the nerve roots of the brachial plexus. A sternal perforation was found in 70TP68 (M) and 70VZ128 (F). Inh. 70WN109 (F) has an « hour - glass » deformity of the left mandibular condyle.

There is nothing very exceptional about the type or frequency of these anomalies, although the occurrence of only one spina bifida is, perhaps, low for an Anglo - Saxon series of thid size. In 174 humeri, 7 (40%) examples of epicondylar process occur and this may seem hight but they are all small, ranging from 2 to 5 mm in their projection from the humeral shaft. Terry found a 0.7% incidence of processes 4 to 7.2 mm in height in a living population of 1000 persons from St. Louis, Missouri. He suggests 1% as a likely general average. This is a character of the kind which is sometimes called « atavistic » because it is a normal anatomical feature in the Felidae and some other genera.

9-2 Fractures

At least 28 fractures were identifiable in these people but the distribution of these was somewhat unusual : 16 occured in men, 10 in women and 2 were unsexable. In the males, Inh. 67GX1 had 2 fractured left ribs. These were the only rib fractures in the series, a decidely low rate although the precise frequency is difficult to estimate owing to the fragmentary state of most ribs. Table 16 (p. 30) shows the distribution and frequency in the remaining 22 fractures for adult males, females, and both sexes combined with the unsexables included.

It will be seen that no fractures were present in the clavicles, humeri, patellae or metatarsals. In a series of 91 Saxon clavicles a broken one might have been expected but, unfortunately, this is uncertain. Although many fractures have been recorded from ancient burial grounds, a precise calculation of their frequency has seldom been

made and the overall picture of the Anglo - Saxons in this respect is still unknown. Fractured clavicles are usually the result of falling on the point of the shoulder but they are sometimes due to direct violence, as when a cudgel blow aimed at the head is incompletely dodged and the weapon smashes the collar bone isntead of the skull. Their absence at Jarrow is thus a small point to note when assessing the amount of aggression shown by these people. Fractured humeri are almost always due to accidental falls : they tend to occur as « working » fractures when people fall from buildings or other heights or sometimes when tripping over rough ground and other obstacles. Metatarsal fractures may be due to jumping from too great a height or, commonly, to a heavy weight crushing the bone, as when the foot is trampled by a restless horse or is trapped beneath the wheel of an ox wagon. The absence of all these fractures gives some hint about patterns of occupation and behaviour at Jarrow.

The forearm is fractured in 9 persons : 5 males have a fractured radius, one woman has a fractured radius, another an ulna and two have both bones broken. In 3 of the men and 2 of the women the break of the radius occurs about 25 mm proximal to the wrist joint. This is the classic Colles' fracture which is usually due to falling forward on to an outstreched hand. Often, in this accident, the syloid process of the ulna also snaps as happened in the case of Inh. 67LW11 (F). In 70AGV102 (F) the ulnar styloide process has also been broken. In 67GX1 (M), 67NL33 (M) and 70XU134 (F) the fracture occurs near the middle of the forearm bones. This is much more likely, than a Colles' fracture, to be due to direct violence from a club or other weapon, especially when the ulna is broken alone or in conjunction with the radius, as happened to the woman here. But these fractures may also be due to accident as well as malice, so woman beating must remain no more than a fair probability in this case. The single broken femur of 67WC16 (M) stands apart form all other lesions as being secondary to generalized bone disease, osteitis deformans. The unusual tibial fracture of 70XW143 (a) (M) was probably due to falling or jumping from too great a height. If this was the cause, its severity suggests the possibility that it may have been an industrial accident of the building trade, such as was postulated for a grossly fractured pelvis and femur in Inh. 66UK31 (M) at Monkwearmouth.

In many early burial grounds one of the commonest lesions is a Pott's fracture, a break of the fibula, usually in its distal quarter. It is typically caused by tripping over rough so that the foot is violently inverted on the leg. At Red Castle, Thetford, 14% of surviving fibulae showed this le-

Table 16 Frequency of fractures

Bones	M			F			M + F + unsexables		
	bones(n)	fractures(n)	%	bones(n)	fractures(n)	%	bones(n)	fractures(n)	%
Clavicule	46	0	0	45	0	0	91	0	0
Humerus	55	0	0	48	0	0	103	0	0
Ulna	59	0	0	42	3	7,1	101	3	3
Radius	62	5	8	39	3	7,6	100	8	8
Femur	70	1	1,4	49	0	0	122	1	1
Patella	52	0	0	23	0	0	75	0	0
Tibia	59	1	1,7	44	0	0	107	1	1
Fibula	46	1	2,2	33	1	3	80	3	4
Metacarpal	265	0	0	177	2	1,1	463	3	1
Metatarsal	191	0	0	139	0	0	348	0	0
Phalanges	377	3	0,8	328	1	0,3	741	4	1

sion. At Jarrow only 3 Pott's fractures occured (1 M, 1 F, 1 ?) giving an overall rate of 3.7% in the 80 bones which could be examined for this condition. The high rate at Thetford was thought to be, perhaps, the result of deforestation, clearing virgin ground and the preparation of heavy, rutted soils. The low frequency at Jarrow may reflect the fact that the seed beds had been long under cultivation and were relatively smooth, unclutered by roots and fallen timber.

Fractured metacarpals and especially phalanges became extremely common after the industrial revolution and the introduction of power driven machinery. They are relatively rare in early societies. When found, fractured phalanges probably result from accidents such as a crushed finger when handling building materials, an ill directed hammer blow or, occasionally, deliberate aggression as when a person is struck on the hand by a club. There is no way to decide, here what caused these breaks though it is probable that the 3 men with fractured phalanges met with simple occupational accidents. The woman, Inh. 70ABS151, who had 2 broken metacarpals and one phalange of her left hand might have been the victim of aggression. The bones healed in bad position, with transverse union between the two metacarpals.

Finally, it should be noted, that no fractured skull was found here. And neither of those two tell - tale indicators of intra - group belligerence, broken noses and jaws, was present. Nor were fractured scapulae found : these typically result from heavily clubbing a person on the back. Fractured vertebrae, often due to severe falls or crushing injuries were likewise absent.

The sum of this evidence suggests that the overall incidence of fractures at Jarrow was fairly low by Anglo - Saxon standards (although, as noted above, precise frequencies are still uncertain). A few broken bones from deliberate aggression may be present but none can be asserted with great conviction and the evidence, as a whole, points strongly to this being a peaceful community whose broken bones arose from normally going about their ordinary occupations.

9-3 Dislocations

The only indubitable dislocation here was in Inh. 70XJ140 (M) where there was an extensive re - modelling of the right scapular glenoid fossa, with a secondary articular surface, 42 x 29mm, on the anterior surface of the neck of the bone. This must have been due to a chronic unreduced dislocation of the shoulder joint. The affected scapula and the head of the right humerus are both arhritic as well as deformed by this lesion, which had probably been present for several years before death and must have reduced the functional efficiency of the arm by at least 60%.

9-4 - Wounds

No wounds caused by sharp weapons were present in any of the Jarrow skeletons. As opposed to fractures, wounds from cudgel clouts, are always difficult to identify and are usually quite ambiguous. An infected lesion of the skull of Inh. 67NN32 (M) might possibly have been due to a blow on the head but, even so, there is nothing which could indicate whether this was the result of deliberate aggression or an accidental mishap. No other case suggests itself as being the result of a calculated assault. In this, The Jarrow series contrasts strikingly whith a Romano - British one from Cirencester where numerous skull wounds from sharp and blunt weapons were found (Wells,1977).

9-5 - Exostosis

An ocasional sequel of injury is the development of an exostosis. One common way for this to happen is for a violent strain or movement to tear the ligaments around a joint or the tendinous attachment of muscles to bone. Bleeding occurs at the site of the tear, the blood subsequently clots, and eventually the clot becomes « organized »,

that is, it is invaded by osteoblasts which convert it into bone. Very few exostoses were found at Jarrow and such as there were could not all be explained in this way. Inh. 67KC5 (F) had a small protrusion or osseous ridge attached to the infero - medial border of the left patella. This was probably due to a tear of a few fibres of the Musculus rectus femoris or its tendon of insertion. In Inh. 67PH46 (M) there was an exostosis, about 17mm wide and 62mm long, on the left femur at the site of the insertion of the Adductor longus muscle. It rises 11mm above the level of the linea aspera and very closely resembles the type of lesion which is often called a « rider's bone » (Wells, 1963). It was presumably caused by violent contraction and tearing of the Musculus adductor longus, perhaps in an effort to remain in the saddle of a bucking horse or when trying to grip the branch of a tree between the thighs in an attempt to save himself from falling. Inh. 67NN32 (M) had a well developed exostosis on the antero - lateral corner of his right navicular bone in the foot. It was probably due to tearing the middle and lateral fibres of the dorsal cuneonavicular ligament. This accident would commonly be due to wrenching the foot when walking over rough plow furrows, etc. In Inh. UO111 (M) there is a prominent exostosis of the left ulna at the site of insertion of the Tendo triceps brachii. This is a muscle which extends the elbow joint to straighten the arm and a tear of the tendon could be produced by some violent action which involved this movement. Inh. 71RM38 (M) has an extensive exostosis of the right fibula just proximal to the malleolus. This was almost certainly due to a tear of the interosseous membrane from twisting the ankle or from « springing » the joint when jumping from too great a height. In Inh. 70ABT175 (M) there was a small exostosis on the anterior border of each fibula which may have been caused in a similar way. A child aged about 4 years, Inh. 70ZV82 has a jagged tag projecting from the medial border of its left tibia, 20mm distal to the head of the bone. The cause of this exostosis is uncertain. It is notable that 4 of the 5 adult exostoses occured in males, this affords one more proof of the vigour of their daily lives.

9-6 - Osteoarthritis and osteophytosis

In most early burial grounds some form of osteoarthritis is the commonest disease (Wells, 1972). Jarrow is not exception. For the archaelogist, this is fortunate because the condition is predominatly due to physical stress and strain, often of minor intensity but usually long continued. If fractures usually result from sudden violent injury, osteoarthritis may be seen as reflecting the slow « wear and tear » of joints. The frequency, anatomical location and severity of this disease are, therefore, a sensitive indicator of the amount and kind of stresses which affected a person (or animal) throughout his (its) life. In Jarrow skeletons at least 40 (26.3%) of the 83 males and 57 female adults were affected, three quarters of whom had more than one joint involved. Of the 40 persons with the disease (excluding intervertebral and costovertebral lesions) 28 were men with a minimum of 85 joints affected, 12 were women with at least 31 affected joints. This means that 33.7% of the males and 21.1% of the females had non - vertebral arthritis. But in addition to this significant difference in the incidence of the disease between the sexes, other differences were found. Of the affected male joints 43.5% were in the lower limbs : hips (17.6%), knees (10.6%), ankles and feet (15.3%) ; whereas less than a third of the females had their lesions there : hips (3.2%), knees (3.2%), ankles and feet (22.6%). In these figures it is interesting that the frequency is higher in women's feet than in the men's. By modern standards the shoulder joints are much affected in these people : 13 shoulders in 9 men and 10 shoulders in 6 women. That is, of the 116 non - vertebral arthritic joints 23 (19.8%) were shoulders. The wrist or hand is affected with a similar frquency : 8

men have 15 and 5 women have 9 affected joints, making 20.7% of all these arthritic lesions located in wrist or hand. Five men and 2 women had each one elbow joint affected. In 2 women and one man the mandibular condyles showed moderate arthritic changes.

An obtrusive difference between the sexes is that 8 males had 15 arthritic sacroiliac joints between them, whereas no female had the disease in this location.

Osteoarthritis of the spinal colum may occur at the posterior intervertebral articulations at any level. In the thoracic segments it also occurs at the costovertebral joints, either on the body of the vertebra where the head of the rib is attached or on the articular facet of its transverse process at the costotransverse articulation.

A closely similar condition to osteoarthritis is osteophytosis or « lipping » of the upper or lower borders of the vertebral bodies, adjacent to the intervertebral discs.

When recording spinal changes it is convenient as well as sensible to consider arthritic and osteophytotic changes together, since both largely represent responses to chronic physical strains. But there is yet another condition which may be included at the same time. In young people the intervertebral discs are tough fibrous capsules containing a gelatinous or semi - fluid core, the whole structure being surrounded by a thin elastic membrane. If, usually in adolescence, violent work is undertaken which produces compressional strains on an inervertebral disc, its fibrous capsule may rupture and its gelatinous core (still contained whitin the outer elastic membrane) extrudes, presses on the body of one or both neighbouring vertebrae and eventually produces a small depression or cavity in the superior or inferior surface of the vertebra, perhaps at a place where vestigial remnants of the notochord have left a focus of weakness. The depressions are known as Schmorl's nodes.

When the Jarrow spines are considered for these three conditions, extensive sexual differences are found. Of 28 males 10 (35.7%) have arthritis, 20 (71.4%) have osteophytosis and 13 (46.4%) have at least one Schmorl's node. Of 24 female spines 6 (25%) have arthritis, 15 (62.5%) have osteophytosis and 5 (20.8%) have Schmorl's nodes. When any of these changes were present they were almost always more advanced and affected more vertebrae in the men than the women. Table 17 shows the number and percentage of affected vertebrae.

Table 17 Vertebral pathology (Total incidence)

Sex	Lesion								
	Osteoarthritis			Osteophytosis			Schmorl's nodes		
	n	present	%	n	present	%	n	present	%
M	873	64	7,3	952	262	28	1001	65	6,5
F	1031	45	4,4	973	191	20	1032	16	1,6

Table 18 Vertebral pathology (Level of incidence)

Lesion	Sex	Vertebral level					
		Cervical		Thoracic		Lumbar	
		n	%	n	%	n	%
Osteoarthritis	M	22	34,4	22	34,4	20	31,2
	F	10	22,2	22	48,9	13	28,9
Osteophytosis	M	34	13	140	53,4	88	33,6
	F	32	16,7	88	46,1	71	37,2

In each spinal segment the superior intervertebral articular facets, surfaces and margins of the body were counted separately from the inferior, i.e. a potential 48, not 24, segments were assessed.

In neither sex was a Schmorl's node found higher than the T6 vertebra. Of the 81 nodes present 19 (29.2%) of 65 in males were on lumber vertebrae ; 6 (37.5%), of 16 in females were at that level.

Table 18 shows the frequency of arthritic and osteophytotic lesions at the cervical, thoracic and lumbar levels.

Finally, Tables 19 - 1 (p. 34) and 19 - 2 (p. 35) splits these figures to show the numbers and frequency of arthritis, osteophytosis and Schmorl's nodes on the superior and inferior halves of each vertebra. Reverting to arthritis alone, it was found that 4 men had a minimum of 16, and 4 women had at least 10, affected ribs. In almost all these the arthritic change was present on the head of the rib and on its costotransverse articulation and also on both the

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Table 19 -1 Male vertebral pathology by half segment

Vertebral segment		Osteoarthritis			Osteophytosis			Schmorl's nodes		
		n	present	%	n	present	%	n	present	%
C1	s	16	0	0	?	?	?	?	?	?
	i	16	0	0	?	?	?	?	?	?
C2	s	20	0	0	?	?	?	?	?	?
	i	20	2	10	20	1	5	21	0	0
C3	s	20	3	15	18	1	5,6	20	0	0
	i	20	2	10	20	2	10	19	0	0
C4	s	18	3	16,7	19	2	10,5	18	0	0
	i	18	2	11,1	19	3	15,8	19	0	0
C5	s	16	1	6,2	18	3	16,7	18	0	0
	i	15	2	13,3	18	6	33,3	17	0	0
C6	s	17	3	17,6	20	5	25	19	0	0
	i	17	1	5,8	20	5	25	20	0	0
C7	s	17	1	5,8	21	5	23,3	21	0	0
	i	17	2	11,8	20	1	5	21	0	0
T1	s	18	2	11,1	15	1	6,7	16	0	0
	i	18	2	11,1	16	0	0	17	0	0
T2	s	19	2	10,5	19	0	0	20	0	0
	i	18	2	11,1	19	2	10,5	20	0	0
T3	s	18	1	5,6	17	3	17,4	19	0	0
	i	18	1	5,6	17	2	11,8	19	0	0
T4	s	19	2	10,5	21	5	23,8	22	0	0
	i	20	2	10	19	6	31,6	22	0	0
T5	s	20	2	10	22	3	13,6	23	0	0
	i	20	1	5	23	7	30,4	23	0	0
T6	s	20	1	5	21	6	28,6	23	0	0
	i	19	0	0	22	9	40,9	23	2	8,7
T7	s	19	0	0	20	4	20	20	3	15
	i	19	0	0	20	7	35	21	3	14,3
T8	s	19	0	0	22	6	27,3	23	3	13,4
	i	18	0	0	23	8	34,8	25	3	12
T9	s	18	0	0	22	8	36,4	23	5	21,7
	i	18	1	5,6	22	8	36,4	26	4	15,4
T10	s	22	1	4,5	22	9	40,9	24	3	12,5
	i	21	0	0	21	8	38,1	25	5	20
T11	s	23	0	0	24	11	45,2	25	3	12
	i	23	0	0	25	10	40	25	4	16
T12	s	23	1	4,3	25	9	36	25	4	16
	i	22	1	4,5	24	8	33,3	25	4	16
L1	s	23	0	0	23	6	26,1	23	3	13
	i	22	1	4,5	23	8	34,8	22	2	9,1
L2	s	24	1	4,2	24	8	33,3	24	4	16,7
	i	24	1	4,2	23	9	39,1	25	1	4
L3	s	23	2	8,7	23	10	43,5	24	2	8,3
	i	22	1	4,5	22	8	36,4	24	2	8,3
L4	s	23	3	13	21	11	52,3	23	3	8,7
	i	22	2	9,1	21	7	33,3	22	1	4,5
L5	s	21	4	19	20	8	40	22	1	4,5
	i	20	3	15	21	7	33,3	22	0	0
C1	s	20	3	15	19	6	31,6	21	0	0

Table 19 - 2 Female vertebral pathology by half segment

Vertebral segment		Osteoarthritis			Osteophytosis			Schmorl's nodes		
		n	present	%	n	present	%	n	present	%
C1	s	22	0	0	?	?	?	?	?	?
	i	22	0	0	?	?	?	?	?	?
C2	s	20	0	0	?	?	?	?	?	?
	i	20	1	5	20	1	5	20	0	0
C3	s	20	1	5	20	1	5	20	0	0
	i	20	1	5	21	3	14,3	21	0	0
C4	s	20	0	0	19	3	15,8	21	0	0
	i	20	1	5	19	3	15,8	21	0	0
C5	s	22	1	4,5	19	4	21,1	21	0	0
	i	22	1	4,5	19	4	21,1	20	0	0
C6	s	21	1	4,8	20	4	20	21	0	0
	i	21	2	9,5	20	3	15	22	0	0
C7	s	19	0	0	17	4	23,5	19	0	0
	i	19	1	5,3	17	2	11,8	19	0	0
T1	s	21	2	9,5	22	1	4,5	23	0	0
	i	21	0	0	22	1	4,5	23	0	0
T2	s	21	0	0	24	1	4,2	24	0	0
	i	20	1	5	23	1	4,3	24	0	0
T3	s	20	1	5	23	3	13	24	0	0
	i	20	2	10	24	3	12,5	24	0	0
T4	s	20	2	10	24	3	12,5	24	0	0
	i	20	1	5	24	4	16,7	23	0	0
T5	s	22	1	4,5	24	3	12,5	23	0	0
	i	22	0	0	24	4	16,7	24	0	0
T6	s	22	0	0	23	3	13	24	1	4,2
	i	22	0	0	23	4	17,4	24	0	0
T7	s	22	0	0	23	5	21,7	24	1	4,2
	i	22	0	0	24	4	16,7	24	1	4,2
T8	s	21	0	0	22	5	22,7	24	1	4,2
	i	20	0	0	24	8	33,3	24	0	0
T9	s	21	1	4,8	23	6	26,1	23	0	0
	i	21	3	14,3	23	6	26,1	22	0	0
T10	s	22	2	9,1	24	5	20,8	23	0	0
	i	21	2	9,5	24	4	16,7	24	1	4,2
T11	s	23	2	8,7	23	5	21,7	24	1	4,2
	i	23	1	4,3	21	1	4,8	24	1	4,2
T12	s	23	1	4,3	22	5	22,7	22	2	9,1
	i	23	0	0	21	3	14,3	22	1	4,5
L1	s	23	1	4,3	21	6	28,6	24	0	0
	i	22	0	0	22	5	22,7	23	1	4,3
L2	s	22	1	4,5	23	9	39,1	22	1	4,5
	i	22	0	0	22	7	31,8	22	0	0
L3	s	22	1	4,5	23	10	43,5	22	2	9,1
	i	22	1	4,5	20	6	30	22	0	0
L4	s	21	2	9,5	21	9	42,9	21	0	0
	i	21	2	9,5	18	4	22,2	22	2	9,1
L5	s	20	3	15	18	6	33,3	21	0	0
	i	16	1	6,2	20	5	25	22	0	0
C1	s	19	1	5,3	20	4	20,5	22	0	0

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corresponding facets of the vertebrae.

Some attempt must now be made to assess the significance of the osteoarthritic and allied lesions at Jarrow. Although, as noted above, these changes reflect fairly closely the general « wear and tear » of the affected joints, it would be improper to pretend to a greater precision than in fact they offer.

Much is still not fully understood about these important diseases which are no doubt multifactorial in origin and correspondingly ambiguous in significance. It cannot be too strongly emphasized that the following inferences are certain to carry varying degrees of error and must be taken as a general guide to what was the likely state of affairs at Jarrow, rather than a minutely accurate assertion of what happened.

Only 3 jaws (1 M, 2 F) were arthritic and this low incidence (1.9% of 152 surviving condyles) reinforces the evidence of the moderate dental attrition that diets at Jarrow were fairly soft by early standards. In this, Jarrow resembles Monkwearmouth, where mandibular arthritis was not found and where the dental attrition was similarly not very severe. By contrast, the dental erosion at North Elmham was heavier and the implication that this was due to a more generally tough diet is supported by the finding that, at the Norfolk site, about 17% of jaws were arthritic. Whether the presumed relatively tender diet at Jarrow was due to the kinds of food eaten or to its method of preparation is not clear from the osteological evidence alone. One obvious possibility is that while the North Elmham people were chewing tough meat, the northerners were getting much of their protein from the softer flesh of fish. Cooking habits may have differend between the sites : hard baked loaves, biscuits and bannocks may have been the favoured method of consuming grain at North Elmham whilst porridges, dumplings and boiled puds may have been more to the taste of the Jarrow and Monkwearmouth people. Perhaps even in Saxon times palates made a firm choice between the roast beef of Old England and the haggis of Auld Acquaintance ! Osteology can only leave the answer open to conjecture but it is a problem that, at some lucky site, may not be beyond an archaelogical solution.

Table 20 shows the percentage distribution of non - vertebral or costo - vertebral osteoarthritic lesions in both sexes.

Table 20 Distribution of osteoarthritis

Joint	Men (85 lesions)			Women (31 lesions)		
	Number	%	Persons	Number	%	Persons
Jaw	1	1,2	1	2	6,5	2
Shoulder	13	15,3	9	10	32,3	6
Elbow	6	7,1	5	1	3,2	1
Wrist/Hand	15	17,6	8	9	29	5
Sacroiliac	13	15,3	8	0	0	0
Hip	15	17,6	10	1	3,2	1
Knee	9	10,6	6	1	3,2	1
Ankle/Foot	13	15,3	5	7	22,6	2

The interestingly high percentage of lesions, more than a fifth of their total, in women's feet must be seen in its context : only 2 women were affected but these two had, respectively, 3 and 4 arthritic intertarsal joints. Perhaps these women had been accustomed to much walking over rough ground, working as drovers or, more probably, engaged in agricultural work which put heavy strains on their feet. They may have been long widowed and have had to tend their fields with little help from the men of the community. One, Inh. 70US130 also had vertebral arthritis but not other affected joints.

The other, Inh.67LW11, had the disease in her jaw, shoulders and right wrist in addition to her foot lesions which involved cuboids, metatarsals and phalanges. Possibly they were unmarried and, for this reason, were usually obliged to till their own plots. If so, they may have been the whores of the village, since both had borne several children. These suggestions, unprovable as they are, are included here to show the kinds of interpretation which could occur to an alert an sensitive imagination when faced with equivocal evidence of the sort found at Jarrow. If we cannot prove how exactly people came by their lesions, it is

better to show how they might have done so than to maintain a sullen and unhelpful silence.

Apart from these, only two other women had an arthritic lesion of the lower limb : one in a hip and one in a knee. This total of only 4 women with lower limb lesions contrasts with what is found among the men, whose 37 lesions were apread among 21 persons. The hip is an exceedingly strong an resilient joint and the fact that 10 males had 15 arthritic hips between them is a clear indication that it was overwhelmingly the men who did most of the heavy work which would have produced these lesions. This must have included plowuing, digging and other strenuous agricultural jobs, heavy lifting, building and timber jacking. This evidence from the hip lesions is confirmed and supplemented by that from the knees and feet, which were no doubt injured by more or less similar tasks. As engineering devices, joints vary greatly in design, ranging from the mechanical efficiency of the acetabulum to the precarious and often dislocated shoulder or knee. Few , if any, articulations in the human body are more unstable than the sacroiliacs. « Slipped » sacroiliac joints are a commonplace event at the orthopaedic clinics and anciently, as now, it was a frequent site for the development of arthritis. None of the Jarrow women had this lesion but it was present in 15 sides among 8 of men : 17.6% of their total arthritic lesions. Nothing could more clearly show the basic difference between male and female allocation of work among these people. The men must have damaged their sacroiliac articulations by several physical strains and, of these, humping heavy loads was probably the paramount cause. Functionally the sacroiliac joints are closely related to the rest of the vertebral column and the two structures should be considered together. When Table 17 is studied, perhaps the most striking fact to emerge is that men had four times as many Schmorl's nodes as were found among the women. As noted above, this lesion is usually produced in adolescence, when it is often the result of violenty straining the spinal column by heavy compression loads before the para - vertebral muscles are strong enough to perform such tasks. A first inference, therefore, is that the boys and youths were made to start strenuous labour in adolescence or even in late childhood whilst their sisters were still occupied with domestic duties or with such relatively light tasks as dairy - maiding goose herding and the gathering of herbs or berries. Although Tables 18 and 19 show that the distribution of spinal lesions by segment level was nowhere extremely different in males and females, Table 17 shows that the total frequency of arthritis and osteophytosis was fifty per cent higher in the men. What these tables do not show, however, is that in the men the lesions were far more severe than in the women. This is of the greatest importance and is not limited merely to the spinal disease. In all other locations, except the jaw, the male arthritis was much more advanced than that of the women. Of the 31 non - vertebral lesions among the women not more than 2 or 3 could be called severe ; of the 85 male lesions at least 25 were severe or even gross. Independendtly of the frequence and distribution of the arthritic joints at Jarrow, this excess severity in the men leaves no doubt that, relatively speaking, the women led much easier lives than the men. This point needs emphasizing. It must not be taken for granted, because at Red Castle, Thetford, where the incidence of osteoarhritis was very high, the women were often almost as badly affected as the men.

Table 19, which shows the distribution of pathology per half vertebra, does however reveal that slight sexual differences are in fact found in the levels of maximum focus. For osteoarthritis, the male peaks are between C6/C7, L4/L5 and L5/S1. The female peaks are between T3/T4, T9/T10 and L4/L5, with a more even scatter of lesions over their columns and, compared with themselves, relatively more of their arthritis in the thoracic segments. For osteophytosis, the male peaks are on T9 to T11 and L2 to L4 ;

the female peak is also from L2 to L5 with a secondary one at T8/T9. In both sexes all levels of the column are affected. Scmorl's nodes are more common on T9 in males, with T10 and T12 closely runners - up. In females, T12 is most often affected.

The significance of any of these differences is open to various interpretations but in no case should undue weight be given to them because, as already been said, they are not extreme and, moreover, the number of vertebrae available is small. They must be taken as indicating likely tendencies in the location of these lesions rather than inexorably patterns of distribution.

When the distribution of osteoarthritis in the upper limb is considered the high incidence in the women is striking (Table 20), altough, of course, it must necessarily be high in their arms if it is low in their legs and sacroiliacs. But an overall 23 arthritic shoulders is an impressive number in such a small community and it must indicate that both sexes had extensive strains at this joint. Severe wrenching of the joint as from struggling with clod - clotted plows, jerking heavy building timbers or perhaps from breaking recalcitrant horses could explain the men's arthritis. It seems improbable that the women would have done similar work...or were Anglo - Saxon women horse - breakers ? !

The shoulder, unlike the hip, knee or ankle, is a dependent, not a weight - bearing, joint and such tasks as carrying buckets from the well or humping their children around do not normally lead to arthritic changes. Violent twisting of the arm behind the back, straining or tearing the ligamentous capsule of the joint may produce arthritis, especially if often repeated. Can it be that some of these women suffered these lesions because irate husbands were in the habit of attacking their wife in precisely this way ? Pattern of chastisement and assault are often as stylized and custom - bound as habits of eating, gesturing or dress. No final interpretation of all these lesions is possible and the field remains wide open for ingenious, plausible but always cautious and tentative suggestions. The elbow is a composite joint composed of three articulations so it might be expected that arthritic changes would show some diversity here. This does, in fact, happen and to an extent where no clear pattern emerges at Jarrow. The only woman with this condition had slight arthritic changes at the distal end of her right humerus. The floor of the coronoid and radial fossae is irregular and a very low roughening or osteophytotic reaction is present on both. These lesions may have been due to a single episode of trauma, perhaps a fall or from twisting the joint with tearing of its capsule and surrounding ligaments. Additional support is given to the possibility that this was due to a fall by the presence of a fractured styloid process on the right ulna. Of the men, three had arthritic changes on the proximal end of the ulna (2 left, 1 right), one distally on the right humerus with eburnation of the bone, and one on the right humerus and ulna. The man with the arthritic right ulna, which was quite mild, was also the person with the chronic dislocation of the right shoulder (Inh. 70XJ140) and it is probable that the two conditions where causelly related. Inh. 67NE24 had arthritis of his left ulna and also in his right shoulder and right thumb. This, together with osteochondritic lesions of both humeral heads points to vigorous use of both his arms. Inh. 67NL33 (M) had mild arthritis at the proximal end of his left ulna but it was more advanced, with eburnation, distally. In this man these changes were probably causally related to a mid - shaft fracture of his left radius. Inh. 67GX1 (M) had a fractured right radius of a possible « Parry type » with extensive arthritis in both shoulders, wrists and hands, as well as his sacroiliacs, hips, knees and vertebrae. He was the most severely arthritic person to be found at Jarrow and this, together with the fractures of his radius and ribs, which could have been due to punches, makes him a candidate for the role of most traumatized, down - trodden or hardest worked member of the community. These few examples show clearly the di-

versity of arthritis and their associated lesions. They emphasize, once again, the need for extreme caution in interpreting their origin and significance.

The arthritic wrist and hands are, perhaps, even more complicated. All the five women with these lesions were affected at the wrist joint ; one also had involvement of her right first metacarpo - phalangeal joint, i.e. her right thumb ; and in one (Inh. 70ABK83) carpals and metacarpals were also affected. Of the 8 men, 3 had the disease only in the wrist joint : one in the carpus only ; one in the carpus and phalanges ; one in metacarpal and phalange ; and one severely in the base of a left phalange of the thumb. The causes of these lesions would almost cetainly include such events as wrenching of the wrists when steering awkward plows, jarring the wrist and carpus when digging, timber felling or forging iron and, in the cause of the phalangeal lesions at least, perhaps from direct hits by a misdirected hammer.

One final point must be stressed about these arthritic lesions (and this applies), indeed, to all the pathology at Jarrow. Because of the poor preservation of many of the burials the true frequency of disease must have been much higher than is recorded here. How much higher is extremely difficult to conjecture but it is unlikely that we can now identify more than two - thirds of the osseous lesions which these persons took with them to their graves. It is more probable that we can see only half or even less of the full picture.

9-7 - Infections

It is customary and convenient to divide infections into two groups : (i) non - specific, in which the lesions could be due to various different kinds of organisms and (ii) specific, in which the disease is always caused by one well defined organism (Wells, 1964). Sinusitis and osteomyelitis fall in the first group, leprosy and bartonellosis in the second. At Jarrow a few infective lesions were found in addition to the carious teeth and dental abscesses described elsewhere in this report.

A common and exceedingly puzzling condition which is often found in early burial grounds is a « grained », pitted and slighty thickened appearance of the shafts of long bones, almost always the tibia and fibulae. This change very strongly suggests a periostitis/osteitis but it is not clear whether it is due to some sort of infection or whether it is a non - infection inflammatory reaction. A difficulty in interpreting these lesions is that comparable conditions are not convincingly recognizable in modern medical pratice. Periosteitic bones such as this are found in several of the Jarrow skeletons. In Inh. 67NJ30 (F ?) the proximal half of the left fibula was affected ; in 67PF43 (c) (M)the proximal third of the right fibula ; in 70WN109 (F) most of the left fibula ; and in 67PO49 (M) most of the shafts of both fibulae were involved.

In 70ABT175 (M) periosteitic graining was present on the medial surfaces of both tibiae, as it was in 70TR68 (M). In none of these skeletons was there any other pathology which might have indicated the origin of their lesions. It is possible that they were a reaction to an infected process in the overlying tissues : varicose ulcers, perhaps, or abrasions due to scraping the skins with tools or in stumbles over doorsteps.

Inh. 70XW143 (a) (M) had extensive periostitis, osteitis and swelling of the distal third of his right tibia. This was the man in whom gross osteoarthritic deformities of his left tibia were due to a bad oblique fracture trough the head of the bone. It is possible that the inflammatory condition of his right leg was consequently related to this severe and unusual fracture. The thichened right tibia suggests an infection which stops only just short of a true osteomyelitis invading the medullary cavity.

Inh. 67NN32 (M) had mild periosteitic roughening and thickening of the right tibia. This may have been related to a lesion on his skull but it would be most incautious to assert this. The skull lesion consists of an area of osteitic thickening about 55x40

mm, slightly to the left of the frontal bone and a similar area, 35x60 mm, on the antero - medial quadrant of the left parietal. Both these lesions are irregularly raised above the surrounding bone and are somewhat granular and pitted. They were almost certainty associated with an infection of the pericranium and scalp but it is not clear whether this was originally due to trauma or to a primarily septic condition such as a carbuncle or an infected sebaceous cyst. On balance, it is unlikely that this man's cranial and tibial lesions were causally related.

Inh. 70PP26 (F) also had a low - grade periostitis and osteitis with pitting, roughness and slightly raised striate lesions of both parietal bones. These could have been similarly caused by an extensive infection of the overlying scalp. Apart from the suggestions offered for the previous case, a strong possibility would be that this woman had extensive ulceration as a result of scratching and picking among the roots of louse infected hair. The average archaeologist of today is apt to lose sight of the fact that long tangled tresses, unwashed and uncombed, may harbour a population of several thousand vermin big enough to be seen with an unaided eye. Within the past decade a young women who sought to preserve (for several weeks) an elaborate hair - do to enhance her elegance, was found to be giving refuge to several dozen cockroaches.

Inh. 70WL136 (a 6 year old child) has asymmetrical humeri with osteitic reaction in the proximal third of each. This was probably due to an osteomyelitis of staphylococcal origin which killed the child before the lesions could become more typically and flamboyantly established with fistulae leading from a pus - filled medullary cavity. Another child, 70ZV82 (c.4 years) also had a rough osteitic area, 40x15mm, of his right humeral shaft and light periostitis of the distal extremity of the left femur and the proximal third of both tibiae. This is a child who seems also to have suffered from rickets. It was presumably a sickly little creature who succumbed early to a mixture of infectious and deficiency diseases.

Most of thes periosteitic and osteitic reactions were probably largely due to mixed strains of staphylococci as the predominant causal organism. A group of lesions exists at Jarrow, however, which may be chiefly streptococcal in origin, with numerous secondary invaders aggravating the disease. These lesions are the five cases of maxillary sinusitis. In Inh. 70UL90 (M) it was present mildly in the left antrum. In 67NG29 (F), 67PL31 (F), 70QG36 (child 6/7 years) and 70PW53 (a) (child 5/6 years) it was bilateral and severe or gross, with rough and craggy antral cavities, sometimes with small fistulae penetrating the bone. The incidence of 2 females and 2 young children may hint that the condition was initiated or much aggravated by spending a lot of time in smoke filled huts, huddled around an acrid hearth. But no doubt droplet infections would often have spread coryzal and para - nasal diseases among these people who have the misfortune (I write from Provence !) to live among the horrors of damp and drear Northumbria.

In 69QJ10 (M) the proximal half of the right femoral shaft is very rough and thickened, apparently from a periostitic reaction, though the reason for this is not clear. The right acetabulum and femoral head of this specimen are craggy with osteoarthritic lipping but the relationship between this and the osteitis of the shaft is uncertain. The linea aspera of this bone deviates medially to a most unusual extent. Mild periostis is also present on the distal quarter of the left tibia. The possibility of leprosy must be considered here because this man also had an ankylosed proximal and middle phalange in his left hand, a lesion very characteristic of leprosy : as is tibial periostitis. However, no other evidence of the disease is present and no final decision is possible.

9-8 Cribra orbitalia

Cribra orbitalia is an extremely interesting

condition which is often found in early burials but which seems no to be clearly identified in modern clinical practice. It consists of a finely porotic, pitted or trabeculated area in the roof of an eye socket, usually bilateral unless very mild. The lesion is more often found in the chidren than in adults but whether this implies that the disease usually progresses to a spontaneous cure or, alternatively, is a manifestation of some more generalized and lethal condition is not known. The cause is hotly debated and has been attributed to deficiency syndromes, infections, blood dyscrasias, metabolic disorders and other factors. Any theory of its origin must take note of its occasional occurrence in other primates ; also its world - wide distribution in early burials and its high incidence in some populations : 50% or more in adults, up to 100% in children. A common range in Western European material is 5 to 15% but it may be entirely absent in quite long series.

At Jarrow 3 (5.3%) of 57 adults had cribra orbitalia. It was unilateral in one man, bilateral in another. The solitary female frontal bone with it had only the right orbital roof intact. Part of the orbits of 34 children survived and of these 6 (17.6%) were affected. It was mild (porotic or pitted) in four, moderate (trabeculated) in two. One of these, Inh. 67LN14 (age 7 years) had it unilaterally in the left orbit ; in the other, 70UD91 (c. 21/2 years) it was bilateral.

9-9 Osteochondritis dissecans

Osteochondritis dissecans is a very common disease but one of uncertain cause. It is probably multifactorial in origin but there are strong reasons for thinking that it is at least partly due to some kind of trauma. The lesion consists essentially of an avascular necrosis in the sub - chondral bone of a joint followed by degeneration of the overlying cartilage. This may separate, producing a loose body in the joint and leaving a cavity in the bone. Occasionally the condition heals spontaneously, usually with residual irregularity of the articular surface.

The lesions described and discussed here are to be distinguished from that form of anterior epiphyseal dysplasia of the vertebral bodies which is often referred to as osteochondritis (Wells, 1961). Osteochondritis dissecans almost always begins in adolescence and, in modern clinical material, has a strong tendency to produce osteoarthritic changes if it remains untreated. Despite the fact that it is extremely common in ancient bones, this disease has been virtually ignored by palaeopathologists. The only existing review of its general features (there are striking differences between its archaic and its modern manifestation) is by ourself (Wells, 1974). At Jarrow 18 (11.8%) of the 152 adults have these lesions. They are also present in 3 juveniles though, in clinical pratice today, the disease is seldom found in children under 12 years old. In 7 (38.9%) of the 18 adults the lesions were multiple, occasionally on the same bone but more commonly on different ones, as in Inh. 67PF43 © (M) which had 5 bones affected. The presence of several distinct osteochondritic pits in one person gives some support to the suggestion that an inborn constitutional susceptibility may be involved : a suggestion which in modern material is reinforced by its occasional appearance as a familiar trait. In all, the 21 affected persons at Jarrow had a total of 33 lesions. Of these, only 3 were healed, i.e. the hole had been plugged by regenerated bone. In the present series, its incidence (13 M, 6 F) may add weight to the theory that strains and trauma are partly the cause of this disease. In view of the uncertainty about the cause and significance of osteochondritis dissecans elaborate, but unfounded, attempts to explain the meaning of each of the Jarrow lesions would be ill advised. The disease needs much further study by paleopathologists and archaeologists and référence should be made to the article by ourself (Wells, 1974). No more will be said about this group of cases but Table 21 (p.42) gives details of the 33 recorded lesions.Table 22 (p.43) summari-

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Table 21 Details of the osteochondritis dissecans location

Inhumation	Sex	Age	Site of lesion (comments)	Size(mm)
67 KK 9	F	Adult	Base of left proximal hallucial phalange	3x3
67 KY 12	F	35-45	Base of left proximal hallucial phalange	3x2,5
67 MC 20	F	45-50	(a) Left navicular - proximal surface	6x3
			(b) Left navicular - proximal surface (a second pit along side first, forming a single complex)	5x2,5
67 NE 24	M	55-70	(a) Left humeral head	19x13
			(b) Right humeral head (healed)	6x5
67 OY 36	M	16-17	Left navicular - proximal surface	4x2,5
67 PF 43 ©	M	Adult	(a) Right ulna : floor of semilunar notch(healed)	11x7
			(b) Right radius : distal articular surface	3x3
			© Left femur : antero - superior part of medial condyle	12x11
			(d) Right femur : antero - superior part of medial condyle	12x10
			(e) Right talus : near lateral border of trochlear surface	3x3
67 PO 49	M	Adult	Base of right proximal hallucial phalange	7x4,5
69 QC 7	?	Adult	Right calcaneus - superior surface of sustentaculum tali	6,5x4
70 PY 8	?	Juvenile	Right tibia : on unfused distal epiphysis	9x6
70 IW 14	M	40-50	Right acetabulum : postero - superior quadrant	7x5
70 ZV 82	F	25-35	Left tibia : medial condyle	9,5x6,5
70 ADK 83	F	55-75	(a) Base left 1st metatarsal	5x4
			(b) Base right 1st metatarsal	5x5
70 ZS 153	M	Adult	(a) Left talus : posterior talocalcaneal surface	6x4
			(b) Base of right proximal hallucial phalange	4x3
70 ACQ 155 (b)	F	40-60	(a) Left humerus : trochlea	9x7
			(b) Right tibia : distal articular surface	2,5x3
			© Right tibia : distal articular surface (a second pit 14mm away from the first)	2,5x2,5
			(d) Right talus : lateral border of trochlear surface	3x3
70 AAK 161	M	21-23	Base of left proximal hallucial phalange	4x4
70 AAD 163	M	Adult	Mid - thoracic vertebra - right inferior articular process	3,5x2,5
70 AAM 164	M	Juvenile	Left femur - medial condyle(about 4mm deep)	23x16
70 AGK 177	M	45-60	Base of left 1st metatarsal	4,5x3
70 AGW 179	M	50-60	Base of right proximal hallucial phalange	6x4
70 XD	M	Adult	(a) Right tibia - distal articular surface	11x8
			(b) Base of right proximal hallucial phalange	3x3
71 RM 38	M	43-50	Right humerus : capitulum (healed)	10x9

(Suite de la page 41)
zes the anatomical location of the Jarrow lesions.

Table 22 Summarized anatomical location of osteochondritic lesions

Location of lesions		n	%
Vertebra		1	3
Humerus	head	2	6,1
	distal	2	6,1
Ulna	proximal	1	3
Radius	distal	1	3
Acetabulum		1	3
Femur	condyle	3	9,1
Tibia	head	1	3
	distal	4	12,2
Talus	superior	2	6,1
	inferior	1	3
Calcaneus		1	3
Navicular		3	9,1
1st metatarsal		3	9,1
Hallucial phalange		7	21,2

In modern material, at least 80% of lesions occur on the femoral condyles and these, with the distal humerus and superior surface of the talus, account for about 99% of all cases attending the orthopaedic clinics. At Jarrow these 3 locations for only a fifth of all cases whilst the proximal phalange of the big toe outranks all other locations. Far more evidence needs to be collected but it is beginning to appear that the Jarrow distribution is fairly similar to that in other early burial grounds.

9-10 Miscellaneous anomalies

It remains to note a few miscellaneous lesions and anomalies.
Inh. 70WK61 (a) (M) has a plagiocranial skull, i.e. it is flattened obliquely across the left side of the occiput and the left parietal. This appearance is often produced by strapping babies to cradle boards, whereon they tend to turn their heads habitually to one or other preferred side. It may sometimes result from normal cradle decubitus under similiar circumstances. If it came about in this way it is interesting to find almost no other skulls in which this condition is well developed here. At Red Castle, Thetford, many skulls were thus deformed and the difference between that site and Jarrow strongly suggests a difference in the way mothers put their babies to bed.
Four persons had slight bevelling or erosion of the superior margin of a lumbar vertebra. This is the kind of osteochondritis that is sometimes referred to as anterior epiphyseal dysplasis. In Inh. 67MC20 (F) and 70YX133 (M) it affected the L4 segment, in 70ABR171 (M) and 71M3 (M) the L5 was involved. These cases were similar to a Bronze Age one in an adolescent girl described by ourself (Wells, 1961).
Extensive erosion of the superior and inferior surfaces of the bodies of the C6 and C7 vertebrae was found in Inh. 67PO49 (M). This was probably associated with collapse and desintegration of the adjacent intervertebral discs and may have been traumatic in origin, due to a severe compression injury from excessive flexion of the neck.
Inh. 70US130, a woman aged about 50/55, had extensive spinal disease but is especially remarkable for the extreme « cupping » of the superior and inferior surfaces of all the lumbar vertebrae and, less severely, the lower thoracics. This condition of cupped vertebrae is found in Cushing's syndrome, which is due to abnormalities affecting the suprarenal glands. It is associated with a peculiar type of obesity, hirsutism without other manifestations of virilism, marked muscle weakness, commonly with suppressed menstruation, raised blood pressure and other abnormalities. Severe osteoporosis may be present and the cupping of the lumbar and thoracic bodies is due to biconvex intervertebral disc expansion into the softened bone. Wedge compression of the vertebral bodies may also occur and is, indeed, present in this specimen : T5, T12, L1 and L2 are all much narrowed to the left. Additionally, there is bilateral synostosis of the posterior intervertebral joints between T4/ T5. Cushing's syndrome would always be extremely difficult to diagnose in ancient,

rily affected the development and architecture of the teeth and other parts of the jaw.
Inh. 70WL136 (6/7 years) has asymmetrical humeri with extensive opsteitic changes in their proximal thirds. This suggests a low - grade osteomyelitis. There is also a slight mushroom deformaty of the head of the right femur which may have been the result of a mild congenital dislocation of the hip.
Inh. 70YW152 is distinguished by the disparity between its age as estimated from the rest of the skeleton and that from the dental evidence : are present : 11 to 16, 21 to 25, 41 to 47 (48 was unerupted) ; maxilla is damaged in the level of 17-18, 46 to 48 and all the left mandible is unknown.With this dental formula and a well established attrition, an age of 12-13 years might be expected. But the diaphyseal lengths of the left humerus and right radius are only 214.5 and 166.4 mm : lengths more compatible with a child in the 8-9 years range. All surviving fragments are, moreover, very small and frail so it may be that, from chronic illness or malnutrition, this child remained stunted and weakly until its early death.
Inh. 67NF28 (2 ½ - 3 years) has femora which are bowed to an unusual extent. In both, this bowing is mostly convex anteriorly, with slight lateral deviation. The left femur is more severely affected than the right. In an 18th or 19th century burial this would immediately be diagnosed as mild rickets. In an Anglo - Saxon context such a diagnosis would only be offered after scraping the bottom of the barrell for all remotely possible alternatives because rachitic deformities are exceedingly rare at that period. However, this is one of the latest burials at Jarow and has been firmly dated to the Medieval period, most probably to the 12th - 13th centuries. At that time rickets was still uncommon but under conditions of increasing urbanization and, even more importanty, with climatic deterioration and less solar radiation it was beginning to established itself and this child was probably an early suffered from it. Inh. 70ZV82 (c.4 years) presents similar but much more severe lesions. The left femur has extensive lateral bowing in its distal two - thirds with wide splaying of its distal end. The right femur is deformed in the same way, but less so. The left tibia and fibula are also much deformed, being bowed laterraly from just below the head. The right tibia and fibula are somewhat less affected although also deformed. It is difficult to suggest any plausible diagnosis here other than rickets and, again, ther need be no hesitation about accepting it because this burial, too, has been dated as Medieval, perhaps A.D. 1200-1300. A feature of this skeleton which is more difficult to explain is the presence of extensive periostitis/ osteitis of the right humerus. There is a rough of bone, 15x40 mm, over and around the insertion of the deltoid muscle. Mild periosteitic changes are also present in the distal quarter of the left femur and the proximal thirds of both tibiae, especially medially, whilst a jagged exostosis or tag of bone projects from the medial border of the left tibia about 20 mm distal to its head.
Inh. 67NG29 (F) is very interesting. It is that of woman whose age, as determined from her pubes and skull, was about 24/27 years. In spite of this she had extensive osteophytosis of her vertebrae, as well as other abnormalities. The osteophytosis, which consists of lipping of the margins of the body of these bone affects all vertebrae to some extent and is well marked in much of the thoracic and lumbar regions. There is early collapse of the bodies of T7 and T9 and all the lumbar vertebrae have some cavitation or hollowing of the superior surfaces of their bodies. This saucer - like scooping of the bone does not resemble the common form of Schmorl's nodes. The C7 has no foramina transversaria. It has, however, a costal facet on its body and on its right transverse process (the left side is damaged). A right cervical rib articulates with these facets and its anterior end articulates with the medial border of a normal first thoracic rib. The rest of the ribs in this skeleton are much damaged but at least

four (2 left, 2 right) middle ribs are of an unusual shape : the external surface of the body of the rib is concave from above down. In addition to these vertebral and costal abnormalities both antra of Highmore (the maxillary sinuses) have gross irregularity of their cavities, the left more than the right. This is doubtless due to long - standing infection i.e. chronic sinusitis, with the antra probably being full of stinking pus. Toxic absorption from this would greatly reduce this woman's resistance to other infections and might, itself, have been the source of a more generalized condition such as chronic infective bronchitis or bronchopneumonia. Especially interesting is the problem set by her smallness. Stature reconstruction indicates that she was only about 132 cm tall. Dwarfism of this degree might possibly be due to chronic illness, with malnutrition from anorexia or poor appetite, throughout her childhood. In that case she would probably have been physically feeble as well as constitutionally weak. But, in fact, the muscle markings on her bones (e.g. the deltoïd tuberosity) are well developped and show that she must have been fairly strong until she approached her terminal illness. This might be nothing more than a case of « primordial » dwarfism or pygmism. That is a « normal » dwarf : an extremely small person, usually the child of very small parents. Alternatively, the most usual dwarf, apart from the primordial one, is of the hypopituitary type due to various lesions which interfere with the normal functions of the pituitary gland. But both these kinds of dwarf are usually of normal proportions, whereas this woman was not. Owing to post - inhumation damage a precise assessment of all her skeletal proportions is impossible but it seems certain that her distal limb segments were relatively short compared with the proximal ones. Her brachial Index is very close to 62, whilst her crural Index must have been about 75.2. These are extremely low values, the normal white female averages being respectively around 73.2 and 83.5. But abnormal brachial and crural Indices are characteristic of certain diseases. Chondro - ectodermal dysplasia (or Ellis - van Creveld syndrome) is associated with dwarfism, cardiac disorders, polydactyly, hypoplastic nails and teeth and its limb shortening, unlike achondroplasia, affects the distal segments more than the proximal. A condition such as this would need to be considered here. The spinal changes in this woman might suggets the possibility of Brailsford - Morquio syndrome but in that disease vertebral deformities are usually much more extensive than here, with the trunk shortened grossly in comparison with the limbs. Turner's syndrome is a possibility. This is a form of dwarfism associated with lack of breast development, deficient axillary and pubic hair, congenital webbed neck, cubitus valgus and other features. It is unfortunate that this skeleton is not better preserved so that a diagnosis could be more certainly achieved.

Finally, a word must be said about Inh. 69WC16. This was an elderly man with widespread disease throughout his skeleton. The oustanding features of this are enlargement, up to 22 mm thick, of his skull, within which the meningeal blood vessels have left deep channels in the bone ; granular roughness and thickening of the long bones, with extensive obliteration of their cavities ; gross distorsion of the long bones ; distorted ribs and pelvis ; vertebral anomalies, including specific radiological changes and the radiological appearance of so - called « bizarre » bone in the skull, pelvis, long bones and metacarpals. Further details need not be given here ; it suffices to say that this skeleton is a classic or « textbook » example of Paget's disease : osteitis deformans. It is perhaps the finest example ever to have been found in an ancient burial ground and has been fully described elsewhere (Wells and Woodhouse, 1975).

10 - TEETH

Disregarding a few small or unsexable

fragments 120 adult jaws survive (28 maxillae and 30 mandibles of males, 30 maxillae and 32 mandibles of females).

Table 23 Ante - mortem tooth loss

		Site								
		Jarrow			Monkwearmouth			North Elmham		
Sex	Jaw	Places	Lost	%	Places	Lost	%	Places	Lost	%
M	Max.	378	35	9,3	280	20	7,5	474	38	8
	Mand.	432	34	7,9	321	25	7,8	681	76	11
F	Max.	385	23	5,9	132	16	12	573	66	12
	Mand.	448	39	8,7	192	10	5,2	729	92	13
M + F	Max.	763	58	7,6	455	38	8,4	1047	104	9,9
	Mand.	880	73	8,3	342	35	6,5	1410	168	12
M	Max.+ Mand.	810	69	8,5	601	45	7,5	1155	114	9,8
F	Max.+ Mand.	833	62	7,4	324	26	8	1302	158	12
M + F	Max.+ Mand.	1643	131	7,9	925	71	7,7	2457	272	11

From these jaws 1920 identifiable tooth positions ought to be present but owing to post - inhumation damage 218 of these are missing. Of the 1702 identifiable positions 59 (3.5%) were unerupted, all of which (except two canines) were third molars. Of the 1643 erupted teeth 131 (7.9%) had been lost ante - mortem. A further 338 have been lost post - mortem which leaves 1174 teeth surviving in situ. The frequency of ante - mortem loss is shown in Table 23.

Of the 131 Jarrow teeth which were lost ante - mortem 78 (59.5%) were molars, 34 (26%) premolars, 2 (1.5%) canines and 17 (13%) incisors. All these figures are fairly close to those of Monkwearmouth where 7.7% of teeth were lost ante - mortem. The only difference of any note is the 5.9% female maxillary loss at Jarrow compared with a 12.1% loss at Monkwearmouth but the numbers are small, especially at the latter site where only 132 female maxillary teeth survived.

The overall ante - mortem tooth loss of 7.9% at Jarrow may also be compared with a loss of 11.5% at North Elmham and 15.9% at Red Castle, Thetford. It suggests a better level of oral health at the northern site. The causes of ante - mortem tooth loss are complex and not fully understood even now. No doubt many were shed as the result of avanced caries but an unknown proportion were probably lost when alveolar recession from severe gingivitis or periodontal abscess was present.

The caries rate at Jarrow was low. In 1174 sexed adult teeth 33 (2.8%) were carious, of which the males had 11 (1.9%) out of 592, the females 22 (3.8%) of 582. This compares with a total rate at Monkwearmouth of only 3 (0.4%) in 688 teeth. Other caries rates for comparison are : 6.4 at North Elmham, 1.5 at Thetford (Wells, 1968) ; 11.4 for Romano - British (Emery, 1963) ; 4.4 for Romano - British (Cooke and Rowbotham, 1968) ; 8.1 for English Early Saxons (Hardwick, 1960) ; 12.5 for Belgian Frankish (Brabant, 1963) ; 19.7 (M) and 31.3 (F) for 18th century English (Krogman, 1938). It will be seen that the Jarrow decay rate compares favourably with that of all the other series except Monkwearmouth and Thetford.

The causes of caries are complex, especially in the pre - sugar era and before the general consumption of over - refined flour. Diet plays a large part, and this includes the preparation of food no less than its composition. Trace elements such as fluorine and selenium are also important. Fluorine, which protects againts dental decay, was probably not abundant in the Jarrow water which is likely to have been taken almost entirely from shallow surface supplies. But a low level of fluorides in the water may be

compensated by a high intake from fish and it is possible that the Jarrow and Monkwearmouth people were copious fish eaters and thus had a good resistance to cariogenic factors. This probably also applied to the small group of about 100 persons, roughly contemporary with the Jarrow population, on the island of Iona ; they had the very low rate caries of only 0.4%. However, the Jarrow decay rate was not quite as expressed by the Table 23 because they refer only to adult jaws. A further 185 teeth of the second dentition were present in the jaws of chidren or adolescents and of these 4 (2.2%) were carious. This gives a total decay rate of 2.7% for the permanent teeth.

As is commonly found, the most vulnerable tooth was the first molar, with a total caries rate of 5.5% but in this series the rates for second (5.4%) and third (5.3%) molars were not significantly different. In the 197 teeth surviving from the deciduous dentition 2 caries only (1%) was found : 64 In Inh. 70PE52 and 75 in the extremely abnormal Inh. 67LM16.

It seems possible to locate the origin of 31 of the caries cavities. Of these 3 (9.7%) began cervically, 6 (19.4%) occlusally and 22 (70.9%) were interstitial. This contrasts sharply with the modern predominance of occlusal cavities but is typical of what is found in many early populations.

Periodontal abscess cavities were not common at Jarrow : 18 were found distributed among only 10 persons. They were all small and from the fact that only 2 were associated with carious teeth it is probable that most of them were due to husks of grain or spicules of bone lodging between a tooth and the gum or alveolous. These 18 abscesses represent a frequency of 1.1% in the 1643 erupted teeth, compared with 2.1% at North Elmham and 2.5% at Monkwearmouth. At Red Castle, Thetford at least a third of the population had periodontal abscess cavities which were often large and associated with extensive alveolar destruction.

Unerupted teeth were limited to 57 third molars (31.4% of these identifiable places) and 2 maxillary canines in Inh. 67KS9 (F). This is double the North Elmham frequency of 16.4% and fifteen times the 2% rate found at Monkwearmouth. The reasons for the high incidence at Jarrow are uncertain but genetic factors presumably played a major part of this.

Dental attrition was universal in these jaws except for a few very young infants. Elaborate classifications of tooth wear have been made but here, for simplicity of description, the extent of attrition has been codified into four degrees :

the enamel and cups are worn down with no more than one or two uncoalesced exposures of dentine ;

separate areas of dentine have coalesced, most of the occlusal enamel has worn awy but with no more than an occasional slight concavity of the occlusal surface ;

extensive concavity of the occlusal surface is present, with considerable reduction of crown height, but with these changes often somewhat compensated by proliferation of secondary dentine ;

extensive destruction of the crowns of the teeth, opening the pulp cavity and often with the roots left separately exposed.

Basically the four degrees may be referred to as slight, moderate, severe and gross. No attempt is made to deal separately with each tooth ; the general pattern of the jaw is used instead.

Taking all the sexed adults a total of 187 degrees of attrition are scored by 72 persons, an average of 2.6 per jaw. The sexual difference is negligible : 2.5 (M) and 2.6 (F). Thes figures are heavy by modern standards but virtually identical to those of Monkwearmouth, though decidedly less than at North Elmham (3.1). In juveniles 48 psersons scorded 64 degrees of attrition, for an average of 1.3, but the range was wide with 10 having less than 1 degree and 6 having at least 3 degrees on unshed deciduous teeth.

Deposits of calculus or tartar were common on the Jarrow dentitions, including some of the juvenile jaws. The estimation of these deposits is even more subjective than in the

case of attrition but a simple and serviceable codification can be made into five grades :

0. absence of tartar ;
1. light deposits usually limited to only a few teeth ;
2. moderate deposits, commonly involving about half the teeth ;
3. heavy concretions, often involving most of the teeth ;
4. gross deposits, often on all the teeth, several or many of which are largely obliterated under a surrounding carapace of tartar.

Here, it was estimated that 39.4% of male dentitions and 53.1% of females had calculus. Not only was it more frequent in the women, but when present, it was rather more severe : an average of 2.3 degrees (F) to 2 degrees (M) based on only the affected jaws or 1.2 (F) to 0.8 (M) when the 0 (i.e. absent) degrees are included.

Since tartar tends to be reduced when the teeth are vigorously used for powerful chewing and increased by diets of paps, light snacks and functionally less demanding foods, it is possible that the Jarrow women were affected more than the men because they used to nibble cakes and buns about the house, cull dainty morsels from the cook pot and, by assuaging their appetites on tit - bits, feel less inclined to champ the tougher cuts of meat which their ravenous menfolk gnawed with relish, at the end of a hungry day, to the benefit of their jaws if not of their digestive systems.

At Jarrow there was nothing unusual about the distribution of calculus. Most deposits were supra - gingival and usually of mixed labial, buccal and lingual incidence. In this they resemble the patterns found at Monkwearmouth and many early sites in contrast to the modern tendency for tartar to be mostly concentrated on tooth surfaces opposite the salivary ducts.

At least 15 dentitions show ridges, pits or other defects of the enamel. This is the condition of enamel hypoplasia, which is due to some adverse influence (disease or malnutrition) affecting the development of the tooth in early childhood. It was well marked here in 3 men, 6 women and 6 juveniles. Had the Jarrow jaws been more complete there is little doubt that further examples of this condition would have been found but the overall frequency seems to be not greatly different here from what it was at Monkwearmouth where 11 (20.7%) of 53 dentitions had hypoplastic defects. At North Elmham about half the jaws where affected. In modern children the most commonly affected teeth are the central incisors, lateral incisors and first molars which indicates that the causative disease : dysentery, bronchopneumonia, measles, etc., attached the child during its first 18 months of life. At Jarrow, as at Monkwearmouth, the incidence of hypoplasia falls more heavily on the canines and second molars, indicating that the causative morbidity more often attacked the child in its 2-4 year period. This need not to be taken to imply that the firts two years were reltively healthy : it may mean that diseases which could have led eventually to hypoplastic lesions did not do so because they were severe enough to kill the chidren.

In most of the Jarrow jaws the spacing and occlusion of the teeth were good. A few anomalies were found e.g. a severely undershot bite in Inh. 67GX1 (M), overcrowding in 70JX15 (M) and anterior mandibular overcrowding in 69WC 16 (a) (M) and 70SH71 (F).

Several teeth are slightly unusual in form or position :

1. in Inh. 70AHJ9 (M) 27 had four well developed roots ;
2. in 70YX133 (M) the missing 18 was a simple peg shape ;
3. in 70YN90 (M ?) the 23 lies almost horizontally beside the floor of the nasal fossa in the anterior part of the maxillary antrum ;
4. in 70ACL150 (b)(M) 12 is slightly shovel shaped ;
5. Inh. 71SG35 (M) has deformed roots of 12 and 28.
6. In Inh 67NN32 (M) there are diastemata, each about 3.5mm across, bet-

ween the maxillary canines and first premolars.

A few anomalies of eruption are present :

1. Inh. 70ACG176 (M), aged 30/35, has a retained deciduous 75 replacing an unerupted 35 ;
2. Inh. 70TH95 (F) is an adolescent whose age, on epiphyseal evidence, was 15 years. Her 38 was fully erupted altough her other third molars still remain deep in the alveoli ;
3. Inh. 70WX73 (M ?) is interesting : 18 and 28 are much reduced in size ; so, also, is 12 and this seems to be an adjustment to the fact that there was a supernumerary 12, now missing as 11 and the normal 12 from post - mortem loss ; 13 to 18 are present.
4. In 67ND26 (F) a loose canine and premolar have extensive radiculitis ;
5. The mandible of 70AAD163 (M) has small bilateral tori in the region of the canine to second premolar teeth.

11 - ABSENT DISEASES

A few pathologic conditions are worth noting because they were either absent at Jarrow or so weakly attested that it would be imprudent to diagnose them with any dogmatism.

Among infections, no trace of syphilis was detectable and it is probable that the disease did not exist in these people. If it did exist, it was presumably of the non - virulent kind which some pathologists regard as the pre - fifteenth century form of the disease. Tuberculosis cannot be identified either, and this is not surprising because it remains a rare condition in burial grounds until recent centuries. It may have been endemic at Jarrow in the form of « consumption », i.e. in its pulmonary form but this is not usually associated with oseous lesions. Tuberculosis of bones is best known as affecting the vertebrae : the form which is often eponymously called Pott's disease. Leprosy seems to be a thin possibility in Inh. 69QJ10. It is interesting that one post - cranial skeleton from Monkwearmouth strongly suggested this disease but, without the skull, its diagnosis is hazardous. Osteomyelitis of the flamboyant type so common in post - medieval cemeteries does not exist here tough there are a couple of doubtful cases of the disease. In spite of several severe examples of maxillary sinusitis, evidence of mastoiditis or middle ear infection was not found.

Malignant disease appears to be non - existent here. No primary bone tumours of the sarcomatous type were found, nor evidence of secondary invasion from carcinoma or other cancers.

The absence of clearly defined weapon wounds has already been noted.

Congenital dislocation of the hip is a regular, if uncommon, lesion in early burial grounds. No definite case was recognised here although Inh. 70WL136 was a fair possibility. The lack of certain fractures which are common enough in early burial grounds (i.e. nasal bones, jaws, etc.) has also been noted above. In some cemeteries, e.g. post - medieval ones, hallux valgus is common and indicates the use of tightly constricting footwear. This condition is rarely found in Anglo - Saxons and has been recognized in only one person from Jarrow (Inh. 65SE16) described in an earlier report dealing with a previous excavation at this site

Apart from dental extractions, no evidence of surgical operations was found here. Trephinations and amputations were absent. Plagiocrany was noted in at least one skull (see above) but no trace was found of deliberate deformation of skulls.

12 - CAUSE OF DEATH

There is not one person in all the Jarrow burials with uneqivocal evidence of the cause of death. Unlike North Elmham and many other sites no lethal wound was found. Inh. 69WC16, the man with advanced Paget's disease, could have died from some unrelated condition such as bronchopneumonia or a stroke. Of the few iden-

tifiable infections, some may have ended fatally but there is no indubitable proof of this. The likeliest lethal episods was probably in 70WL136, the 6 year old child who possibly had osteomyelitis. It is difficult to find anay other lesion in this cemetery about which one could be almost certain that it ended fatally.

13 - PARITY

Parity, that is the number of children a woman has borne, may be estimated from the pelvis. As a result of pregnancy the ligaments and muscles around the pubic symphysis become strechted and torn, small haemorrhages occur, the bone becomes rough, pitted and invaded by cystic clots of blood, tiny exostoses grow from the surface of the pubes. The extent and pattern of these changes give an approximate idea of the woman's parity. This is a fairly recent technique and, unfortunately, its scope and limitations are inadequately explored and it must be conceded that it is still a tool which lacks precision, even with perfectly preserved pelves. This must be remembered when reading what follows. An estimate badly stating that a woman had had 2 children should be taken to mean « probably 1 to 3 », that she had had 10 chidren to mean « in the range 8-12 ». The quoted figure is an approximation which, with luck, may be correct or not more than one child wrong.

Table 24 Estimated parity

Inhumation	Age(years)	Parity+/- 1
67LW11	50 - 65	5
67KY12 (a)	35 - 45	4
70PP26 (a)	50 - 65	5
70VZ128	55 - 65	6
70US130	48 - 55	3
70WW137	50 - 60	8
70ABS151	42 - 47	4

The pelvis was well enough preserved at Jarrow to enable an estimate of parity to be made in only 7 instances. Table 24 shows the probable number of chidren born to each of these women.

It will be seen that the 7 women had an estimated 35 children between them : an average of 5 each. The range is from 3 to 8. It is especially notable that at least five of the mothers were likely to have passed the menopause and would have had no further pregnancies. Only 67KY12 (a) and, with less likelihood, 70ABS151 might have given birth to further children if they had lived but it is more probable that even these two had finished their reproductive life before they died.

This enables us to accept 35 children as the total reproductive achievement of these women, apart from a (skeletally) unrecognizable number of miscarriages. It is, however, a useful rule of thumb to assume that (without deliberate interference) one pregnancy in five spontaneously aborts : most often at about 12 to 14 weeks. If these women had become pregnant 45 times in all (an average of 6.4 conceptions per woman) we could except 9 miscarriages, leaving 36 children to be born which, effectively, is the number estimated.

In many primitive, and not so primitive, societies girls tend not to become pregnant, despite having sexual intercourse, until menstruation has been established for several years. There is some slight evidence that this also applied specifically to the Anglo - Saxons and it is likeley that their reproductive lives, on average, did not begin untill they were about 20 years old. After the age of 30, and much more rapidly after 35, the frequency of ovulation wanes so that, even when menstruation continues until 50 years, the chance of further pregnancies falls to a low level. In Anglo - Saxon women the fertile phase of their lives probably lasted little more than 20 years.. If, then, these 7 persons had a total of 140 actively reproductive years during which they became pregnant 45 times, they would have averaged just over 3 years between each conception. This is biologically acceptable figure which can be found in ma-

ny of the world's populations especially when after a successful delivery, prolonged lactation delays the onset of subsequent ovulation. It is a figure which disregards the possibilities of deliberately contrived abortions or the extensive use of contraception. Another inference to be drawn from Table 24 is that in those five (or even seven) women who had passed the menopause, childbirth can be eliminated as a dirtect cause of maternal death. They had produced their children and had survived successfully. The figures are far too small to carry statistical weight but they can serve as a tiny beginning on which to add the results from the other series. At Jarrow 5 women probably had 27 children and 5 or 6 miscarriages without succumbing to puerperal infection, obstructed labour, utering haemorrhage or other obstetric hazard. It is likely that these figures can be increased to 7 women having 35 children and 9 miscarriages. To these can be added the results from North Elmham, where 9 women appear to have had 37 deleveries and presumably about 10 abortions. At that site the number of births per woman was estimated to be 4.1 but it was significant that 3 of the 9 almost certainly died before their reproductive period was over and there is a fair likelihood that 3 others did so, too. The ultimate fertility rates for Jarrow and North Elham were probably almost identical. Taken together they give a series of more than 90 conceptions with no evidence of an obstetric death.

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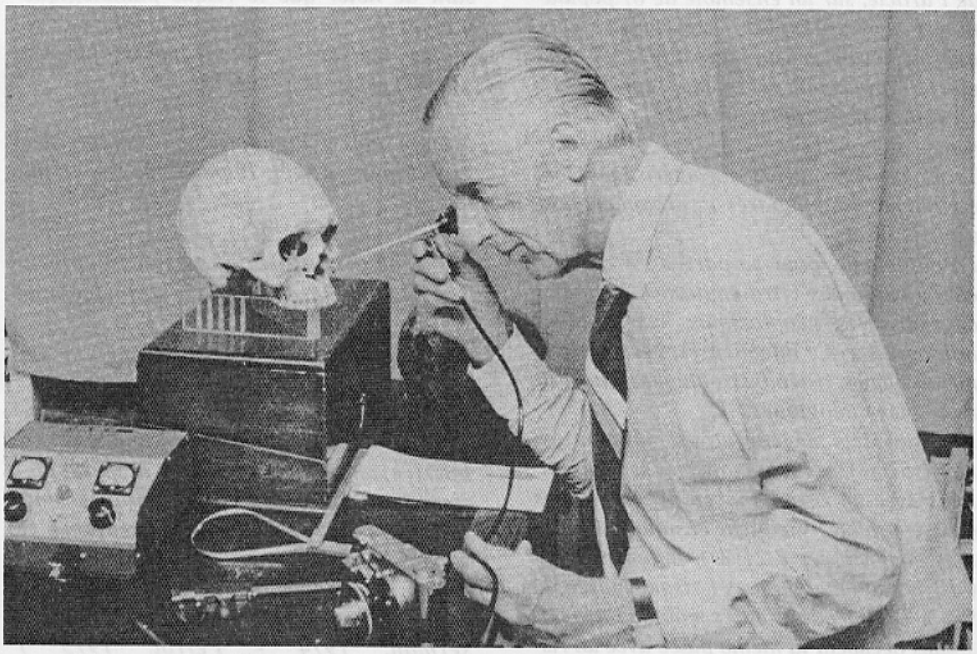

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