

**PATTERNS OF ACTIVITY-INDUCED PATHOLOGY IN A CANADIAN INUIT POPULATION.** By CHARLES F. MERBS. Ottawa: National Museum of Man Mercury Series, Archaeological Survey of Canada Paper No. 119, 1983. 199 p., 80 figs., 15 tables. Softbound. Distributed gratis by Scientific Records Section of the Archaeological Survey of Canada.

This monograph is a substantially revised, enhanced, and updated version of the author's 1969 doctoral dissertation. Merbs's study is based upon a series of 91 adult Sadlermiut skeletons (41 males and 50 females) from Native Point, Southampton Island, N.W.T. The series is diachronic, ranging temporally from the group's tragic extinction (1902-03) to no more than five centuries back in time.

The Sadlermiut (Sallirmiut) of the recent past were restricted to Southampton and Coats islands and were largely isolated both culturally and genetically. Apparently owing to this isolation, the Sadlermiut were culturally quite distinctive from other Central Arctic Inuit regional groups. Aspects of this distinctiveness have led some workers, most notably Therkel Mathiassen and Henry Collins, to suggest a partial Dorset (i.e., dual Thule-Dorset) ancestry for the Sadlermiut. This is in contrast to the consensus view that *other* Inuit are the lineal descendants of exclusively Thule forebears. The dual origin theory, incidentally, has been recently contraindicated by Charles Utermohle. In his 1984 Ph.D. thesis (supervised by Merbs), Utermohle reports that he found no comparative craniometric support for a partial Dorset origin of the Sadlermiut.

The significant accomplishment of Merbs's study is his systematic exploration of the covariation between a selection of known or inferred Sadlermiut activity patterns and a selection of degenerative and traumatic pathological changes to their skeletons. Toward this end, Merbs formulated a listing of 20 human activity patterns with known or seeming potential for inducing "imprints" on the skeleton. Some of these activities are common to all human populations (e.g., erect posture, bipedal locomotion, side dominance), some are primarily or exclusively common to all Inuit males (e.g., throwing a harpoon or dart, using a bow drill, and lifting, carrying, or dragging heavy objects), and some are primarily or exclusively common to all Inuit females (e.g., scraping skins, carrying heavy objects on the back, and riding on a sled or toboggan).

Merbs argues convincingly that the Sadlermiut sample is appropriate for this type of behavioural osteology inquiry, for the following reasons: (1) the skeletal remains are numerically adequate and generally in a good state of preservation; (2) specialized individual behaviours were minimal, with significant motor behavioural differences — linked to economic role differentiation — existing only between adult males and females; and (3) while no primary ethnography exists for the Sadlermiut, historical and "second-hand" ethnographic accounts, together with their archaeological record and interpolation from the ethnographies of proximal Inuit groups, permit the reconstruction of many aspects of their motor behaviour.

The specific activity-induced pathological changes to the skeleton focused upon were osteoarthritis, osteophytosis, vertebral compression, spondylolysis, and anterior tooth loss. Merbs's literature review section (Chapter 3) on these conditions is essentially current up through the 1981 literature and is well executed. The coverage of each pathologic condition is clear and reasonably comprehensive, and it includes discussions on etiology and pathogenesis, clinical consequences, known occupational and anthropometric correlations, and comparative studies done on other archaeologically derived samples. Some omissions, which would have benefitted his review of other monographic studies of archaeologically derived samples, are Swedborg's (1974) study on degenerative changes of the spine among a medieval skeletal sample from Poland and two unpublished Ph.D. theses (Jackes, 1977; Hartney, 1978), which provide comparative data on degenerative skeletal changes among southern Ontario aboriginal populations. What is apparent from Merbs's review section is that his study stands *alone* in terms of its broad anatomical coverage of such pathologic changes, coupled with a biocultural interpretive emphasis!

Osteoarthritic changes to the diarthroidal joints (i.e., those structured to permit substantial movement) were scored by "type" (lipping and/or porosity and/or eburnation) and degree (scored +, ++, or +++) for the temporomandibular, shoulder, elbow, wrist, (selected) hand, vertebral column (articular facets), rib (costovertebral joints on vertebral bodies), hip, knee, ankle, and (selected) foot joints. Tabulated data are clearly presented according to sex and side groupings, and illustrations (both reproduced plates and schematic charts and drawings) are generally well chosen/designed. My only serious complaint here is that a comprehensive set of visual and descriptive "standards" for scoring degree of severity were not illustrated. Photographic reproductions of what constitutes +, ++, and +++ scorings would obviously assist coworkers toward systematically comparing other skeletal groups with the Sadlermiut.

Osteophytosis, or degenerative (inter-vertebral) disk disease, was scored identically to the lipping component of osteoarthritis (again, no scoring standard was provided). This was the only pathologic state on the vertebral bodies that was thoroughly analyzed in the monograph; however, Merbs also produced and briefly summarized data on abnormal porosity (osteochondrosis), herniation of disks into the vertebral bodies (Schmorl's nodes), and the presence of plaques of smooth bone on the superior and inferior body surfaces. Marginal osteophytes were scored on the anterior (including left and right lateral) surfaces of each vertebra, and the data were tabulated according to vertebral unit, superior or inferior surface, and sex. Horizontal bar charts effectively summarize the osteophytic patterning according to sex and joint margin.

Vertebral compression (compression fracturing) is a term that indicates a diminution in the height of a vertebral body, usually in its anterior portion. Merbs used subjective ("simple interpolation") and objective (contrasting observed anterior to posterior vertebral height ratios to normative "expected" ratios) techniques in evaluating degree of compression. Data are presented that summarize the distribution of vertebral compression according to vertebral unit and sex. Merbs notes that, in contrast to the Sadlermiut's relatively high frequency of this type of compression fracturing, there is "infrequent" mentioning of this traumatic consequence in other osteological reports. While this may, as Merbs indicates, tell us something about inter-societal differentials in exposure to activities that produce chronic compressive forces on the spine (Merbs implicates the jarring of the Sadlermiut's sled and toboggan travel), it may also indicate underreporting.

Merbs employs a broad operational definition of spondylolysis, viz., a condition in which the continuity of the vertebral arch (surrounding/protecting the spinal cord) is broken. Similar in general etiology to that of vertebral compression, the current view is that these discontinuities usually result from sustained stress, which leads to fractures that frequently do not heal, owing to the often consequent anterior displacement of the vertebral body. There appears to be a genetic component involved, as well, in that certain individuals appear to be structurally predisposed to such "fatigue" fracturing. Merbs, once again, is fastidious in his descriptive work and presentation of results. For the individuals affected (22.6% of adults: Eskimos appear to have the highest frequencies of this condition worldwide), he notes the unit affected (mostly lower lumbar), side, whether the separation is partial or complete, and whether the break occurs at interarticularis (the most common site: between the upper and lower articular processes) or at the lamina (more posteriorly than the above). Merbs correctly treats discontinuities in the midline (spina bifida) as a different entity, with a distinctively different developmental pathogenesis, unrelated to activity-induced stress.

Anterior tooth loss was scored and tabulated by sex, jaw, and side for the canines and incisors. In addition to presenting the Sadlermiut data, Merbs extracted a vast amount of comparative data from a 1940 study by Hrdlicka on eight Eskaleut and Asiatic groups. Merbs reports strikingly higher tooth loss frequencies for the Sadlermiut than any other group; a "Paleo-Aleut" sample most closely approaches the Sadlermiut for these values. While Hrdlicka concluded that the overall relative high frequency and locational patterning of anterior tooth loss

among "Northern Mongoloids" indicated ritualized ablation (non-curative extraction) of these teeth, Merbs's reanalysis of the same data, complemented by his literature review finding that there is no ethnographic evidence for ritualized tooth ablation among the Eskimo, leads him to conclude that tooth loss in these populations is "accidental" and is related to the multiple "third hand" usages of their teeth and jaws as tools.

Merbs's examination of the patterning of these selected traumatic and degenerative skeletal changes reveals some significant sex differentials. In general, males manifest greater prevalence and severity of osteoarthritis, vertebral osteophytosis and spondylolysis, while females more frequently exhibit anterior tooth loss and vertebral compression. Within these broad categories, Merbs reveals many finer-grained differentials (e.g., male vs. female tendencies for greater osteoarthritic change at the elbow occurring on the capitulum and trochlea respectively), some of which are interpretable in motor behavioural terms, while other patterns elude ready interpretation.

Among the males, two habitual activities that appear to have left their "imprints" most clearly on the skeleton are harpoon throwing and kayak paddling. For example, the arthritic patterning of greater (and right side) involvement at the shoulder and elbow, with especially elevated involvement at the acromioclavicular joint and at the olecranon fossa, correlates with sites of mechanical stress when the arm is at full extension at the end of a harpoon throw. While such a demonstration of the correlation between empirically known motor behaviour and observed degenerative change is innovative (i.e., for analysis of a skeletal population), another set of findings seems to truly reveal something about their specific technique in kayak paddling heretofore unknown: in males, the high frequency and site and side of patterning differentials of osteoarthritic change at the wrist joint — together with the side patterning of "battered" and fractured ulnar styloid processes — strongly suggests that the Sadlermiut used the left hand and wrist as a pivot in kayak paddling.

Among the females, the activities with the most unambiguous osseous change responses appear to be the making of clothing (e.g., heavy right-side arthritic change on the trochlear surface of the elbow joint correlate well with known flexion-extension movements used in scraping skins), the softening ("biting") of skins (females have a 2:1 edge over males in arthritic change at the temporomandibular joint), the carrying of heavy objects on the back (females have a distinctive patterning of lower thoracic osteoarthritis, osteophytosis, and compression fracturing), and the carrying of unborn children (their distinctive patterning of costovertebral arthritis appears related to their rib elevation response to fetal growth).

Merbs's study is an important contribution to the fields of arctic anthropology and human osteology. It demonstrates that bones have more to "say" about past lives than what is usually coaxed from them. Whether such rare "osteobiographical" approaches (Saul, 1976) to behavioural reconstruction become commonplace depends on whether other workers will see fit to conduct parallel studies on skeletal series from other geographic realms. Synchronic studies using other ethnographically "known" groups should be conducted first. Only after such a baseline of known behavioural-osteological change patterning is laid down can we confidently proceed with attempts at such behavioural reconstruction for groups from the more distant past.

This monograph could be used to good advantage in a graduate seminar course on human osteology. Sadly, it will reveal to advanced students an avenue of approach to human osteological analysis that is just as "new" today as it was nearly twenty years ago, when Merbs penned the initial version! I will qualify that by mentioning that were Merbs to now redo the data-producing phase of the study, he would likely design it differently to take advantage of current techniques and methods. For example, if microscopic intra-cortical remodeling and bone mineral content determinations were made on the Sadlermiut skeletons, control could be exercised over the important influencing factors of adult age cohort membership and both inter-sex and inter-individual bone mineral variation.

Typographical errors are minimal, the illustrations are mostly excel-

lent (one exception is Figure 79, a line drawing that does not clearly show how a bow drill was used, in spite of its stated intention), and tabularized data are effectively presented. This book deserves a prominent place on the bookshelves of many Eskimologists and all students of the anthropological and functional aspects of the human skeleton. Staff at the Archaeological Survey of Canada deserve thanks for encouraging Merbs to bring to light this previously buried gem.

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SCULPTURE OF THE ESKIMO. By GEORGE SWINTON. Toronto: McClelland and Stewart Ltd., 1972. Paperback edition 1987. 255 p., 825 photos, index, bib. Softbound. Cdn\$24.95.

The quiet authority of George Swinton's text in *Sculpture of the Eskimo* is perfectly complemented by 825 extraordinary photographs, 37 of which are colour plates. As an art historian and an artist, Swinton understands the complexities of the revelation of art. Here, he allows the photographs to give the reader the non-verbal, sensory experience intrinsic to this revelation — it is only our sense of touch that is not satisfied — and he also uses the photographs to illustrate and support his discussion of Eskimo sculpture.

Initially, Swinton's concern is to dispel the notion that art is a collective activity of Eskimos. The idea that all Eskimos carve or, worse, that all those who carve are artists is, he assures us, "simply absurd." What began as a small cottage industry in 1948/49 and was designed to provide economic solutions for the Canadian Eskimo has allowed the development of individual artists who create their own personal styles, who give their carvings content and, from the point of view of Western aesthetics, form. Unlike the Eskimo sculpture of Alaska and Greenland, which has become sterile and commercialized, partly because traditions there have been perpetuated, Canadian Eskimo, or Inuit, sculpture, which is not part of a continuing tradition, is new. And, according to Swinton, one of the most important characteristics of this contemporary Inuit art "is the compelling individuality of the artists."

Swinton's knowledgeable and sensitive comparisons of Eskimo and Western concepts of art are fascinating. For example, he explains how the Eskimo artist's responses to his materials are much more sophisticated and complex than those of Western artists. First of all, overcoming the limitations of their materials has required from the Eskimo extraordinary ingenuity. Swinton believes that:

... the Inuit, like all peoples close to nature and her mysteries, have deeper insights into and more highly developed intuitions about materi-