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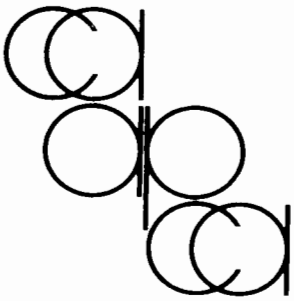

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Anthropology: Wampeters, Foma and Granfalloons

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KEY WORDS Anthropology • Vonnegut • Theory

ABSTRACT An anthropologist who has been overlooked when the roles of the sub-disciplines within anthropology are critically considered is Kurt Vonnegut, Jr. The title of this paper and the "conclusions" presented are based on the philosophy of Vonnegut. Early in his anthropological training he turned from physical anthropology (tedious) and archaeology (unchallenging) to the one area of the discipline that was characterized by Vonnegut's faculty advisor as "poetry which pretends to be scientific", social-cultural anthropology. This paper includes discussions of the implications of foma, the role of a granfalloon and a wampeter for the perceived interrelationships within anthropology of physical anthropology and archaelogy. What may appear, initially, to be a light-hearted philosophical exercise, has implications for the roles of the sub-disciplines within a larger structure. Can be continue to perpetrate foma?

This paper[1] must be prefaced with a quote from the Book of Bokonon, "All of the true things I am about to tell you are shameless lies." (Vonnegut '63). If you are not familiar with the Book of Bokonon you probably have not read the numerous writings of Kurt Vonnegut Jr. Vonnegut is a writer who many people have characterized as a science fiction writer. He rejects this classification and feels that good fiction may or may not be "scientific" but much of science fiction is not literature. His books run the gamut of fiction with titles such as, *God Bless You Mr. Rosewater, The Sirens of Titan, Slaughterhouse Five, Cat's Cradle, Breakfast of Champions* and his latest, *Slapstick*, to name a few. Through many of these volumes runs an underlying ahtropological theme. This comes to Vonnegut because of his training; he received an M.A. in Antrhopology from the University of Chicago. It is obvious from reading Vonnegut's writings that he has a firm grasp of anthropological theory and that his observations on society have an application which is much wider than the fiction in which they are embodied.

His analysis of social organization has explicit applications to anthropology and to the sub-disciplines that are usually included under this general term. Few writers have used the anthropological theory of social organization to subject their own world to self analysis. One example which comes to mind is the paper of several years ago, "The Body Ritual of Nacirema" (Miner '56), which has now become a classic. In the last few years David Schneider has published papers on the kinship patterns of North Americans. Only recently have we begun to look at ourselves rather than exotic groups of exotic lands. We intend to use Vonnegut as a basis for such an introspective analysis, an analysis not of North Americans but of a phenomenon much closer to home — Anthropology.

[1]A version of this paper was presented at the 6th annual meeting of the Canadian Association for Physical Anthropology, Niagara-on-the-Lake, Ontario, 1978.

In a 1971 address to the National Institute of Arts and Letters in the United States, Vonnegut told of his introduction to anthropology. We would like to quote this as it shows his feelings clearly:

> I began with physical anthropology. I was taught how to measure the size of the brain of a human being who had been dead for a long time, who was all dried out. I bored a hole in his skull, and I filled it with grains of polished rice. Then I emptied the rice into a graduated cylinder. I found this tedious.
>
> I switched to archaeology, and I learned something I already knew: that man had been a maker and a smasher of crockery since the dawn of time. And I went to my faculty adviser, and I confessed that science did not charm me, that I longed for poetry instead. I was depressed. I knew my wife and my father would want to kill me if I went into poetry. My adviser smiled.
>
> "How would you like to study poetry which *pretends* to be scientific?" he asked me.
>
> "Is such a thing possible?" I said.
>
> He shook my hand. "Welcome to the field of social or cultural anthropology," he said ('76).

Vonnegut described the happiest day of his life, when he was accepted into the Anthropology Department at Chicago, thusly, "I was happy because I believed that the Department of Anthropology at the University of Chicago was a small, like-minded family which I was being allowed to join. This was not true." Vonnegut had not expected anthropology to be so segmented.

What of the sub-divisions of anthropology? Physical anthropology, linguistics, social-cultural anthropology and archaeology were probably well established by the seventeenth century and these areas coalesced into anthropology departments in North America by the twentieth century. In Vonnegut terminology, anthropology's sub-disciplines would be defined as karasses. A karass is defined as the organization of humanity into teams, "teams that do God's will without ever discovering what they are doing" ('63). In turn, the karasses are organized into a wampeter. A wampeter is "the pivot of a karass" ('63). Vonnegut explains that a karass is "an object around which the lives of many otherwise unrelated people may revolve (it is the souls and not the bodies which revolve)" ('76). He gives as an example the Holy Grail.

We all no doubt acknowledge that the anthropology department of a large university is ideally a co-operative of four sub-disciplines. These share common, basic knowledge so that it is possible for all members of the department to understand all of the other members. You will note the insertion of "ideally" above. We wish to question the assumption that anthropology departments are in fact a single department. Does Vonnegut have anthropology in mind when he gives an example of a false karass — a seeming team that is meaningless in terms of the ways God gets things done? This false karass, he adds, is a "textbook example of what Bokonon calls a granfalloon." Some of his examples of granfalloons are instructive — the Communist Party, the Daughters of the American Revolution, the General Electric Company, the International Order of Odd Fellows and any nation, anytime, anywhere!

How does one study a granfalloon? It's easy, "just remove the skin of a toy balloon."

The concept that an anthropology department, or for that matter anthropology as a discipline, is composed of sub-disciplines, appears to us to be based on foma. Foma "are harmless untruths, intended to comfort simple souls." An example: "Prosperity is just around the corner." In Vonnegut's terminology, an anthropology department is a wampeter made up of karasses but in fact this concept is based on foma.

A few examples of our lack of faith in an anthropology wampeter, as a cohesive group of sub-discipline karasses, can be presented. One may look at the anthropology departments across Canada and see universities where a sub-discipline has achieved discipline status. A ready example is a university with not only a department of anthropology but also a department of archaeology. Here a karass has achieved wampeter status. There are departments where there are extant feelings that a sub-discipline should become a separate department. One has only to read New Perspectives in Canadian Archaeology (McKay, '76) and the journal of the Canadian Archaeological Association to see how strongly some archaeologists feel about being an independent discipline. Archaeologists are not the only discontented group; social anthropologists in some departments would like to go their own way and only deal with "real" anthropology unfettered by archaeologists, linguists and physical anthropologists and their brand of "science".

These examples are pause for thought and

they in no way exhaust the possibilities. At one time the primary national organization for anthropology was the Canadian Sociology and Anthropology Association and under their aegis papers in physical anthropology, etc. were read at meetings; now we have the Canadian Archaeological Association and the Canadian Association for Physical Anthropology, each holding separate meetings. These groups have their own publications as well. While we do not suggest that this secularization is disadvantageous, we are concerned by the increasing lack of interaction between these groups.

If we narrow our focus to the academic relationships between archaeologists and physical anthropologists we find few examples of true cooperation in research. Each sub-discipline appears to regard the other as a service group. "I've excavated these burials, what can you tell me about them?" An extreme example? Perhaps, but situations occur where lack of cooperation has resulted in less than ideal analysis of material from important archaeological sites.

These examples demonstrate that anthropology, as a discipline made up of several interactive disciplines, is an inactive wampeter. The sub-discipline concept is rapidly becoming foma. Instead, sub-disciplines are wampeters rather than karasses.

Two points can be emphasized from this discussion. First, there is a basic philosophical schism in anthropology. Sub-disciplines are becoming less interactive as the discipline of anthropology expands and continues to search for an identity. Second, the sub-disciplines, in order to achieve status within academia, are vying with each other for more importance either within anthropology or, failing this, as a separate entity.

So where are we headed? The alternatives for the professionals of "anthropology" may be divided into two categories: academic and non-academic. Academic alternatives include museums as well as universities. Within these settings we can operate as a "like-minded family" or separate into smaller diverse departments. The non-academic alternatives include government agencies or, in some cases, units within the business milieu. With these alternatives in mind, what is the future of anthropology or the anthropologist? Much of anthropology's future in Canada as a discipline or a sub-discipline is out of our control. It is contingent on the economic resources of the nation and the provinces.

In the academic sphere the future is dependent on monetary constraints. If a sub-discipline decides to go its separate (but equal) way, it will have to surmount tremendous obstacles. Setting up new departments will mean duplications of administration, higher administrative costs, and the splitting of student loyalties. The other possibility is splitting and joining another closely related department or another wampeter. Here it is possible that the new coalition may not be any more satisfactory than the old one. The simple economic solution is forming a more cohesive department. At least in Ontario this seems feasible especially since the hiring of new staff is becoming increasingly difficult because of government financial restraints. A problem which must be faced by department members is the need to be more of a generalist. There will be few opportunities for the super-specialists such as dental anthropologists. This has been pointed out recently by the planning and priorities sub-committee of the University of Toronto in their second interim report when they suggested:

> We have seen examples among departmental submissions where departments, whose total staff complement appears more than adequate to service their overall teaching requirements, have submitted a need for recruitment to fill a particular area within the discipline. We do not see why, in most cases, an existing member of the department does not have a sufficiently common knowledge-base to train himself or herself, upon reasonable notice, to teach other sub-areas of the discipline competently, at least at the undergraduate level (University of Toronto, '78).

In the non-academic sphere the future is directly dependent upon the economy. At a time when governmental programs are being reduced or eliminated, it would appear that few positions for anthropologists will be created, nor will the existing ones be filled if they become vacant. In business, the positions have been and will continue to be few. Anthropologists are not business oriented generally and the only future may be for archaeologists to conduct industrial opportunities or environmental impact surveys. Even these opportunities may be transient and dependent upon being performed by academics on a consulting basis.

We are forced to conclude that the feasibility

of sub-disciplines splitting into separate entities is bleak. The strength of anthropology as a wampeter — a conglomeration of viable sub-discipline karasses — seems to us the best possibility for the future. While undergraduate training in anthropology is generally wide ranging and usually includes basic knowledge in all sub-disciplines, the same is not true for graduate training. It seems appropriate, given our arguments, to suggest a return to a broad graduate training for our future anthropologists. Why not have more truly interdisciplinary courses? While we have no reservations about specialized training at the Ph.D. level, we do feel that these people need a wider background in *all* areas of anthropology to cope with future demands. This trend will require better integration of the present faculty members in graduate departments. To change a vulgar saying of the past we would suggest that physical anthropologists "Help integration, take an archaeologist to lunch."

Vonnegut will have the last word. "And what does an anthropologist do these days? Same thing a supernumerary minister does — becomes a public charge, a bore, or possibly a rum-dum, or a bureaucrat." ('52).

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An Anthropological Project on French Canadian Workers: A Progress Report

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KEY WORDS Differential Aging • Health Factors • Assessment

ABSTRACT Health and safe working conditions are becoming important themes in our industrialized society. A group of workers was studied, in an attempt to establish the diverse factors which affect levels of health. The intent was to attack the problem of differential aging.

Data were obtained via questionnaires which the subjects were required to complete before being given a medical examination. Anthropometric measurements were taken and physiological tests applied. A certain number of socio-demographic and socio-cultural variables were established through the use of the questionnaire.

In continuing to study the problem of differential aging, we shall endeavor to define precisely health levels within our population.

RESUME La santé et la sécurité au travail sont devenus des thèmes importants dans nos sociétés industrialisées. Par l'étude d'une population de travailleurs, nous souhaitons établir les diverses composantes des niveaux de santé la caractérisant et par ce biais, s'attaquer au problème du vieillissement différentiel.

Les données sont obtenues en utilisant un questionnaire pré-examen médical (323 questions) que le répondant doit remplir avant de se présenter à l'examen clinique. Des mensurations anthropométriques sont faites et des tests physiologiques sont appliqués. Un certain nombre de variables socio-démographiques et socio-culturelles sont obtenus par l'utilisation du questionnaire.

Avant d'étudier le problème du vieillissement différentiel, nous devons nous efforcer de préciser les niveaux de santé de notre population.

INTRODUCTION

At this time in the province of Quebec, we are undergoing a reorientation towards workers' health and safety. An emphasis on compensation after injury and disease is still important, but we are becoming more and more engaged in the growth of preventive attitudes. These new attitudes would include, for example, an insistance that workplaces be kept clean and healthful, and that the health, strength and longevity of the workers be one of the conditions for the efficiency of their work.

For the other provinces, we have statistics about serious injuries, accidents, deaths and compensation. Statistics concerning occupational diseases which develop from long-term exposure to noisy, dirty, hot or cold working conditions, and to various toxic chemicals and physical hazards, are not well known.

Why are these statistics for occupational

injury and disease so unfamiliar to the general public, and why do occupational diseases often go unrecognized? The answers to these questions are complex and numerous. A partial answer lies in the nature of the dangers of the workplace where only accidents or extreme exposure to noise, toxic substances, or physical hazards result in acute, easily identified illnesses. However, most workers are exposed to low levels of these assaults, which may be just as deadly in the long run, though less apparent in the short run. Low-level assaults cause chronic illnesses whose onset is not often noticed. The illnesses themselves, such as lung cancer and heart disease, are often attributed to non-occupational causes by industrial management and the medical profession. They therefore go unrecognized, unrecorded and uncompensated.

For a long time, a good portion of the research in the physiology of work has been concerned with factors influencing biological work potential. Behavioral, biological and environmental factors were related to strength, speed, endurance and efficiency. Now, a complementary approach is required and a wide range of challenging topics should be opened up with emphasis on biological factors and the psychosocial aspects of occupational health.

BIOLOGICAL AGING

For us, it seems quite important to stress an ecological approach which emphasizes the importance of multiple and complex environmental influences in disease causation, to establish a health index for individual workers and for the worker population, and to evaluate how those factors might affect biological aging. Figure 1 gives an illustration of this approach.

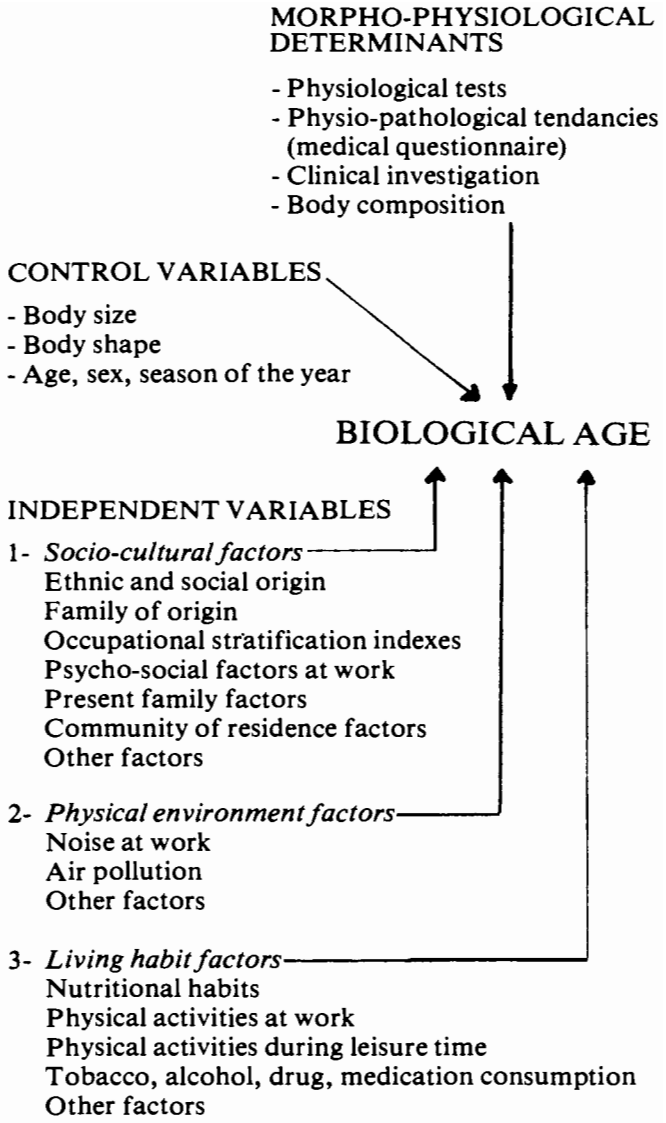

Fig. 1 Factors to be analysed.

METHODS

Data are obtained through a medical questionnaire (323 questions), a clinical investigation, anthropometry, dynamometry and some physiological tests (blood pressure, vision test, audiometer, lung function, etc.). The socio-cultural, physical environment and living habit factors come from another questionnaire (income, education, place of residence, housing, family size, religion, smoking habits, use of alcohol and drugs, etc.). Such data have already been collected for 3,000 individuals (Table 1).

HEALTH STATUS

If we assume that at any given time a person has varying components of illness or pathology as well as varying components of good health, we realize very quickly that if we want to establish a health status we must try to measure each of these components. We know that an attempt to divide health status into several parts or systems is clearly an oversimplification and that there are no natural lines of demarcation. Nevertheless, such a division is almost essential as a device for empirical and preliminary data gathering. For this reason we established, in the

TABLE 1

Occupational Status	Age 20-29	30-39	40-49	50-59	60-65	Total
Manual unskilled	407	178	118	182	72	957
Manual skilled	442	377	287	276	94	1476
Foremen	41	120	58	75	22	316
Clerical workers	61	37	21	25	11	155
Professionals and managers	17	23	8	10	5	63
Total	968	735	492	568	204	2967

Occupational status and age

medical questionnaire, a system of classification (physiological or organ system) to which the physician gives a weight, during his clinical examination. We established the following classification:

(1) State of optimal health;
(2) State of incipient illness;
(3) State of disability; and
(4) State of serious illness.

We know that there is little agreement on the criteria for differentiating various degrees of ill health. However, if we wish to develop a composite index, we must assign a specific level or give a specific value to a health status scale for individuals and for the group. With this in mind we conducted a preliminary analysis to obtain an initial picture of the weights given by the physician to each system during his clinical examination (Table 2).

As we have said, the physician gives a weight to each system during his clinical examination. It is for psychological assessment, vision, O.R.L. and respiratory system that we have a high percentage of weight 4 (3.6%, 3.0%, 2.6%, 2.5%).

If we cumulate weights 2 and 3, the digestive system (92.1%), endocrine system (89.2%), cardiovascular system (65.0%), psychological assessment (60.2%), nervous system (59.7%), vision (52.9%) and O.R.L. (48.2%) are the most important. This initial analysis is preliminary. In the near future, we should be able to carry out a finer analysis.

CONCLUSION

As we experience uncontrolled industrialisation and urbanisation, we all realize the importance of physical, biological and psychosocial stresses in modern life. The impact of these stresses is not always well known. To

TABLE 2

Category of variables	Weight 1 (%)	Weight 2 (%)	Weight 3 (%)	Weight 4 (%)
Hereditary and familial diseases	7.8	51.5	31.5	9.2
Case history	18.3	58.3	21.1	2.3
Surgery	41.4	44.1	13.4	1.1
X-rays, exams during previous year	50.0	37.1	11.1	1.8
Nervous system	38.7	46.6	13.1	1.6
Psychological assessment	36.2	42.6	17.6	3.6
Endocrine system	10.6	78.1	11.1	0.2
Allergies	46.2	43.4	9.9	0.5
Vision	38.3	20.6	38.1	3.0
O.R.L.	49.2	37.1	11.1	2.6
Respiratory system	44.6	37.4	15.5	2.5
Cardiovascular system	33.7	55.1	9.9	1.3
Digestive system	7.3	86.3	5.8	0.6
Genito-urinary system	45.3	49.1	5.1	0.5
Locomotor system	70.1	24.9	4.6	0.4
Hematology	76.0	23.2	0.8	0.0

establish a health status is the first step to a better understanding of biological aging as a response to stress.

ACKNOWLEDGEMENTS

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A Paleodemographic Analysis of the *Os Coxae* from Ossossané Ossuary

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KEY WORDS Paleodemography • Ossuary samples • Ethnohistory

ABSTRACT The innominates from the Ossossané ossuary were analyzed to determine sex, age, and the minimum number of individuals present. Techniques for determining sex and age based on the innominate are discussed. Life tables, mortality profiles, and survivorship curves were constructed and compared with data from two earlier ossuaries excavated in southern Ontario. Comparisons are made between demographic information from Ossossané and model life tables. The ethnohistoric literature is surveyed to determine whether cultural factors might have affected the Ossossané population significantly. Suggestions are made for future work on the recovered skeletal material.

INTRODUCTION

Background to ossuary studies

Studies of prehistoric demography are usually frustrated by the inadequacy of skeletal samples available and the lack of a sufficiently refined chronology to allow the assumption of a contemporary breeding population. The problem of sample size is circumvented when working with ossuary material. For Ubelaker ('74:p.8), the term ossuary refers to:

> . . . those secondary deposits that probably represent the periodic redisposal of individuals, which took place after a culturally prescribed number of years.

Seldom, however, can this "culturally prescribed number of years" be ascertained, given present capabilities in the archaeological determination of chronology. It is only infrequently that a contemporary breeding population can be assumed for a skeletal sample.

Ossuary studies are limited by the general scarcity of such secondary burials. Therefore scientific studies of ossuaries have been infrequent at best. The scarcity of published ossuary studies also stems in part from a traditional concern with grave goods rather than with the skeletal material itself. Moreover, until recently, most authors focused on the individual rather than the population as a whole.

The recent emphasis on demographic analysis in both physical anthropology and archaeology has rendered the study of ossuary materials more appealing. The past three decades have seen several landmark studies. The analysis of the Tabor Hill Ossuary by Churcher and Kenyon ('60) was one of the first to use ossuary materials to attempt demographic reconstruction. Unfortunately, the quality of the sample was problematic since the ossuary had been partially destroyed by power equipment and, by the authors' own admission, normal care in excavation was not taken due to time restrictions. J. E. Anderson's *The People of Fairty* ('64) represented another pioneering attempt at ossuary paleodemography but restricted itself to age distribution and ignored sex as an important aspect of paleodemographic analysis. Studies such as these seem unsatisfactory to present day scholars using elegant statistical techniques. Nevertheless, in

the New World at least, they represent the foundation upon which all subsequent work was based.

Ontario Iroquois ossuaries

It is not coincidental that the studies mentioned above were of Ontario Iroquois ossuaries since these were particularly abundant and were historically documented. According to Anderson ('64), there are 216 known Iroquois ossuaries in Ontario. Few of these remain intact (Kidd, '53). It should be emphasized, however, that there may be a sampling bias in favor of Ontario since Ubelaker ('74) has recently suggested that regular ossuary burial was common practice in the mid-Atlantic region during the late prehistoric and early historic periods.

The Ontario Iroquois ossuaries, especially those of the Huron, are particularly amenable to demographic analysis because, due to historical accident, the problems of sample size and chronological control do not apply. Secondary interment of the dead from a village or group of villages occurred at 10- to 12-year intervals (Trigger, '69:p.107) and involved the reburial of up to 1000 individuals. The accounts of the Jesuit missionaries (Thwaites, 1896-1901) have been invaluable in setting the temporal parameters of the Huron ossuaries and thereby justifying the assumption that the skeletal material recovered archaeologically derives from a single breeding population over a well defined and very short time period.

Ossossané

One of the largest, best excavated, and best historically documented of Iroquoian ossuaries is the 17th-century Huron site of Ossossané, Simcoe County, Ontario. It was discovered by Ridley ('47) and excavated by Kenneth Kidd ('53). Much of this site's significance lies in the fact that it was apparently the scene of the mass secondary burial or "Feast of the Dead" witnessed by the French Jesuit, Jean de Brebeuf on May 13, 1636 (Kidd, '53:p. 373), and described by him in detail.

Although Kidd's excavations took place in 1947/48, analysis of the skeletal material has only recently been initiated under the supervision of Dr. F. J. Melbye of the Department of Anthropology, University of Toronto. Thanks to Dr. Melbye, we have been able to undertake a demographic study of the innominates from Ossossané, a site initially estimated to contain 1000 individuals (Kidd, '53). The results of this analysis as well as a discussion of the problems encountered in working with ossuary material form the basis for this paper.

Unfortunately, Ossossané (as well as most other Iroquoian ossuaries) confronts the researcher with some significant problems. A major limitation of the Ossossané material results from the cultural conditions under which deposition occurred. Brebeuf's description of the interment ceremony at Ossassané (quoted in Kidd, '53:pp. 372-375) tells of bones being thrown into the burial pit from a scaffold erected above it. Five or six men were in the pit redistributing the skeletons with poles. Archaeologically this was manifest in a situation where, apart from a very few extended skeletons:

> The remainder of the bones in the ossuary lay in extreme miscegenation, best exemplified perhaps by crania lying inside pelvic cavities, ribs perforating eye sockets and by one case in which four or five vertebral columns lay side by side in the most inexplicable association. Under such circumstances, hope of recovering entire skeletons was almost nil (Kidd, '53:p. 363).

As Anderson ('64) has emphasized, one is forced to deal with populations of specific anatomical elements rather than with populations of individuals. Sullivan (nd), in his study of the sub-adult mandibles from Ossossané, has pointed out the serious consequences this has for aging and sexing, since ones does not have the whole individual for examination.

A further limitation to be considered when dealing with Huron ossuaries is that there is a definite bias against fetal and infant material due to differential preservation of such remains as well as the fact that they were generally buried elsewhere (Tooker, '64:p. 132; Kapches, '77). Tooker ('64) suggests another possible bias in that those dying violent deaths (mostly warriors) were not re-interred at the "Feast of the Dead". This has implications for specific age and sex categories.

The Ossossané material was plagued to a degree by problems of bone preservation. The human act of bone deposition, compounded by post-depositional soil settling, resulted in the breakage of a high proportion of bones.

Furthermore, Kidd ('53) stated that erosion had occurred and had been especially damaging to the ends of long-bones, the pelvic girdle, mandibles, and crania. Our analysis has confirmed his observations for the pelvic girdle; we encountered breakage and frequent obliteration of diagnostic features (especially those pertaining to age).

In the analysis which follows, we have attempted to exploit the advantages of Huron ossuary burials as well as to minimize some of the analytical problems peculiar to this material. The results, although not without limitations, are informative and relatively satisfying.

MATERIALS AND METHODS

Establishing minimum number of Individuals

Due to the fragmented condition of the innominates, it was necessary to establish criteria for determining the minimum number of individuals present. Recovered remains include over 3000 identifiable innominate fragments varying from small pieces to complete bones. The fragments were first separated into adult and juvenile categories, based on whether or not fusion of the ilium, ischium, and pubis had occurred at the acetabulum. The adult fragments were then sorted according to the component or components represented. We defined three components based on the following criteria:

(1) Ilium — Minimally a fragment including greater than one half of the auricular area;

(2) Ischium — Minimally a fragment including part of both the acetabulum and the ischial tuberosity;

(3) Pubis — Minimally a fragment including greater than one half of the symphyseal surface of the os pubis.

These criteria ensured that one individual could not be counted more than once. The criteria for defining the ilia and ischia were chosen because the densest areas of bone are included; thus the best representation of the actual number of individuals should be based on a count of either ischia or ilia. The criterion for the pubic bone was chosen because the symphyseal surface is useful in age determination (Todd, '20; McKern and Stewart, '57; Gilbert and McKern, '73), while the symphyseal rim and the ischio-pubic ramus are useful in sex determination (Phenice, '69).

Larger fragments were also classified using the above definitions so that, for example, a complete innominate must include the features in all three definitions but may lack the iliac blade or part of the ischio-pubic ramus.

The fragments were then sorted into right and left sides and counted. The same procedure was used to sort the juvenile bones. Table 1 shows the results of sorting. The sample size is based on the number of right ilia, giving a minimum number of 681 individuals. The largest discrepancy between counts for right and left sides occurred for the ilia, with 10% more rights than lefts. Rather than attribute this to differential preservation or some cultural phenomenon, it should be noted that thirty years have elapsed since Ossossané was excavated and it is possible that some of the remains have simply been lost. The number of individuals buried in the ossuary will probably best be determined from a count of mandibular or long-bone fragments, but presently the only count which has been completed is that of innominate fragments.

TABLE 1

Representation of innominate components from the Ossossané ossuary sample

Adults and subadults: Innominate component	Right	Left	TOTAL
Ilia	334	338	672
Ischia	254	311	565
Pubes	161	179	340
Ilium & ischium	179	163	342
Ilium & pubis	5	0	5
Ilium, ischium & pubis	41	23	64
Ischium & pubis	9	14	23
TOTAL	983	1028	2011
Representation of separate components for adults and subadults			
Ilia	559	524	1083
Ischia	483	511	994
Pubes	216	216	432
TOTAL	1258	1251	2509
Juveniles: Innominate component			
Ilia	122	89	211
Ischia	88	77	165
Pubes	49	66	115
TOTAL	259	232	491
Total juvenile, adult and subadult components:			
Ilia	681	613	1294
Ischia	571	588	1159
Pubes	265	282	547
TOTAL	1517	1483	3000

Ubelaker ('74), in his study of two Maryland ossuaries, found the innominate to be only slightly under-representative of total population number. For adults, innominate counts represented 90% and 87% of the total populations in ossuaries I and II respectively. For sub-adults, 77% and 81% of ilia were present (Ubelaker, '74:pp. 35-36). The population size for these ossuaries is based on the most frequently occurring element, which varied for adults and sub-adults in both instances.

Because the innominate is the best single element for both sex and age determination of adult skeletal remains, it was felt that a demographic profile of the population could be constructed using information obtained from the material available. The results show this to have been a somewhat optimistic assumption although several interesting problems pertaining to currently acceptable sexing and aging techniques were revealed.

Sex determination

Sex determination was based on five grossly observable morphological features of the in-

nominate. Three of these, presence or absence of a ventral arc, configuration of the sub-pubic region, and shape of the medial aspect of the ischio-pubic ramus, were presented by Phenice ('69) as highly reliable indicators of sex. Phenice achieved greater than 95% accuracy using his technique on the Terry collection. Kelley ('78) tested the method for ambiguity on well preserved archaeological material. He found that, in most cases, at least one trait was definitely characteristic of one sex while the other traits were either in agreement or were not diagnostic of either sex.

A fourth feature found to be somewhat useful is visual evaluation of the width and depth of the greater sciatic notch. Measurements were not attempted since most of the material lacked one or more of the landmarks (as defined by Davivongs, '63; Olivier, '69; and Singh and Potturi, '78). Singh and Potturi ('78) demonstrated that the posterior angle of the notch is the best discriminator of the sexes. With this in mind, it was observed that, even in the absence of the ischium, very narrow and very wide notches could be distinguished.

The fifth feature used in sex determination is the presence or absence of the pre-auricular sulcus. Its presence was recognized as a female trait as early as 1866 when Zaaijer found it in 23 of 26 female Javanese pelves (Derry, '09:p. 270). Houghton ('74 and '75) further defined the pre-auricular sulcus as appearing in two characteristic forms: (1) the groove formed by the attachment of the anterior sacroiliac ligament (GL), which is found in both males and females; and (2) the groove caused by relaxation of this ligament and simultaneous bone resorption during pregnancy and parturition (GP). GL is characteristically even in depth and smooth, while GP is pitted and irregular. According to Houghton ('75) the presence of GP is the only conclusive evidence of sex.

The dorsal margin of the pubic symphysis often shows similar pitting resulting from the relaxation of the pubic ligaments and resorption of bone at their attachments during pregnancy and parturition (Derry, '09; Stewart, '57; and Houghton, '75). Presence of these scars was noted in the Ossossané material although, in most cases, a pubic bone complete enough to show definite parturition scarring could also be sexed using Phenice's method. In all cases where parturition scars were obvious, the bone had previously been sexed as female, hence scarring was used as further confirmation rather than as a separate sexing criterion.

Due to poor preservation all five criteria could seldom be used on any one specimen. This necessitated weighting the criteria since the reliability of each feature is different. The presence of GP is highly diagnostic but the presence of GL and the absence of a pre-auricular sulcus give no indication of sex. The sciatic notch is only reliable when it is either extremely wide or narrow so that generally it is not a good indicator. Phenice's method offers a high degree of reliability but in many cases the sub-pubic portion of the ischio-pubic ramus was broken and could therefore not be scored. Phenice ('69) found that of the three features he observed, the presence or absence of the ventral arc was the single most reliable trait.

Keeping the above limitations in mind, sex was determined for individuals where minimally two of the five criteria were in agreement. In cases where four or five features were scored, but were not in agreement, preference was given to the ventral arc first, then to the sub-pubic concavity and medial aspect of the pubic bone. In no case was an individual determined to be male based on the pubic bone while possessing the GP form of the pre-auricular sulcus.

No attempt was made to determine the sex of individuals under the age of 13-15 (i.e., prior to fusion of the three components of the innominate). Although certain skeletal features of the pelvis are sexually dimorphic prior to the onset of puberty (the sciatic notch for example; Coleman, '69), the nature of the sample does not permit reconstruction of the pelvic complex, so these features are difficult to evaluate properly. Only twelve individuals in the 16-20 age range were sexed using the right side, while eight were sexed using left bones. This low number, in contrast to the total of twenty-nine individuals aged 16-20 using the right side, is a result of the fact that Phenice's method cannot be used for individuals under about twenty years of age ('69:p. 300) because the ventral arc and sub-pubic concavity are not well developed.

Age determination

Five techniques were used to determine age at death. Three of these involved evaluation of age

changes on the symphyseal face of the os pubis in adults. Todd's ('20) method was used if sex could not be determined, although it is less accurate for aging females (Stewart, '57). The McKern and Stewart models ('57) were used to age males, and the Gilbert and McKern models ('73) were used for females. Problems encountered using the latter method will be discussed in another section.

The fourth technique was developed by Merchant ('73) for aging subadults (under 15-17 years of age). Merchant correlated measurements indicative of growth for long-bones, the ilium, and mandible, with the Moorrees, Fanning, and Hunt dental age standards ('63a,b) in a protohistoric Arikara population. Maximum breadths of ilia without the iliac crest were correlated with dental age in 127 individuals under 18 years of age. From Ossossané, 86 right and 59 left ilia were aged using this standard. In cases where landmarks were worn or broken, maximum breadth was estimated based on comparisons with complete, measurable bones of similar size.

In Merchant's ('73) conclusions, she states:

> . . . longitudinal long bone growth data derived from one Indian population sample may be used reliably for age estimation with samples from other Indian populations of similar adult stature. . . . While not as conclusive, the findings of the study indicate that the Arikara iliac breadth data from birth to at least 6.5 years, also may be utilized for age estimation with Indian samples. However, the growth of the ilium is less intense than that of the long bones, and its use would be desirable only in the absence of the latter. ('73:p.81).

For lack of another technique for aging subadult innominates, Merchant's standard was used, although the limitations mentioned in the above quotation should be kept in mind. Assuming that adult stature is also related to growth of the ilium, stature was compared between Merchant's Arikara sample and material from the Fairty ossuary using the Trotter and Gleser ('52 and '58) regression formulae for Mongoloid populations. Fairty data were used because appropriate data for determining stature have not yet been compiled for Ossossané. A difference of 10 cm was found between means for the Arikara and the larger Iroquois population, indicating that Ossossané subadults are probably overaged. Some of this error is countered by the use of five-year age intervals.

The fifth technique is based on epiphyseal union of the iliac crest and ischial tuberosity. Following the ages for fusion given in Krogman ('62), it was possible to estimate the age of individuals falling between the ranges encompassed by the pubic symphysis standards and Merchant's standard.

In order to avoid aging the same individual twice, two qualifications were placed on using epiphyseal ages. First, if the pubic symphysis was present as part of the bone, but age was best determined using epiphyses, the latter was recorded. A large number of ilia and ischia are present in the sample both as separate components and as fused components where the entire pubic bone is broken off. Epiphyseal ages were recorded where possible, but there was the potential of overlap with isolated pubic bones aged in the lower ranges (e.g., 17-20, 18-23, after McKern and Stewart, '57). To avoid this overlap, the difference was found between the number of pubic bones and the number of ilia and ischia aged within the same range. Unfortunately, the aged pubic symphyses cancelled out the other components so that the second qualification, although possibly too conservative, limited the number of individuals we were able to include in the life table.

RESULTS

Sexing and aging[1]

Sex was determined for 134 individuals — 69 females and 65 males. Phenice's method ('69), alone or in combination with evaluation of the sciatic notch and preauricular sulcus, was used to determine the sex of 63 females and 60 males, while the latter two criteria alone were used for only 6 females and 5 males. The sex ratio is 94.2 for these 134 individuals.

Age was determined for 249 individuals. Included were: 53 females, 57 males, and 31 unsexed individuals aged using standards for the pubic symphysis; 10 females, 5 males, and 7 unsexed individuals aged from epiphyseal union; and 86 subadults aged using Merchant's ('73) standard.

Figure 1 shows the sex and age distribution of 111 right and 100 left innominates on which both sex and age were estimated. It is both

[1]Material from the right side consistently provided more data, and all future discussion refers to data collected from that side unless otherwise stated.

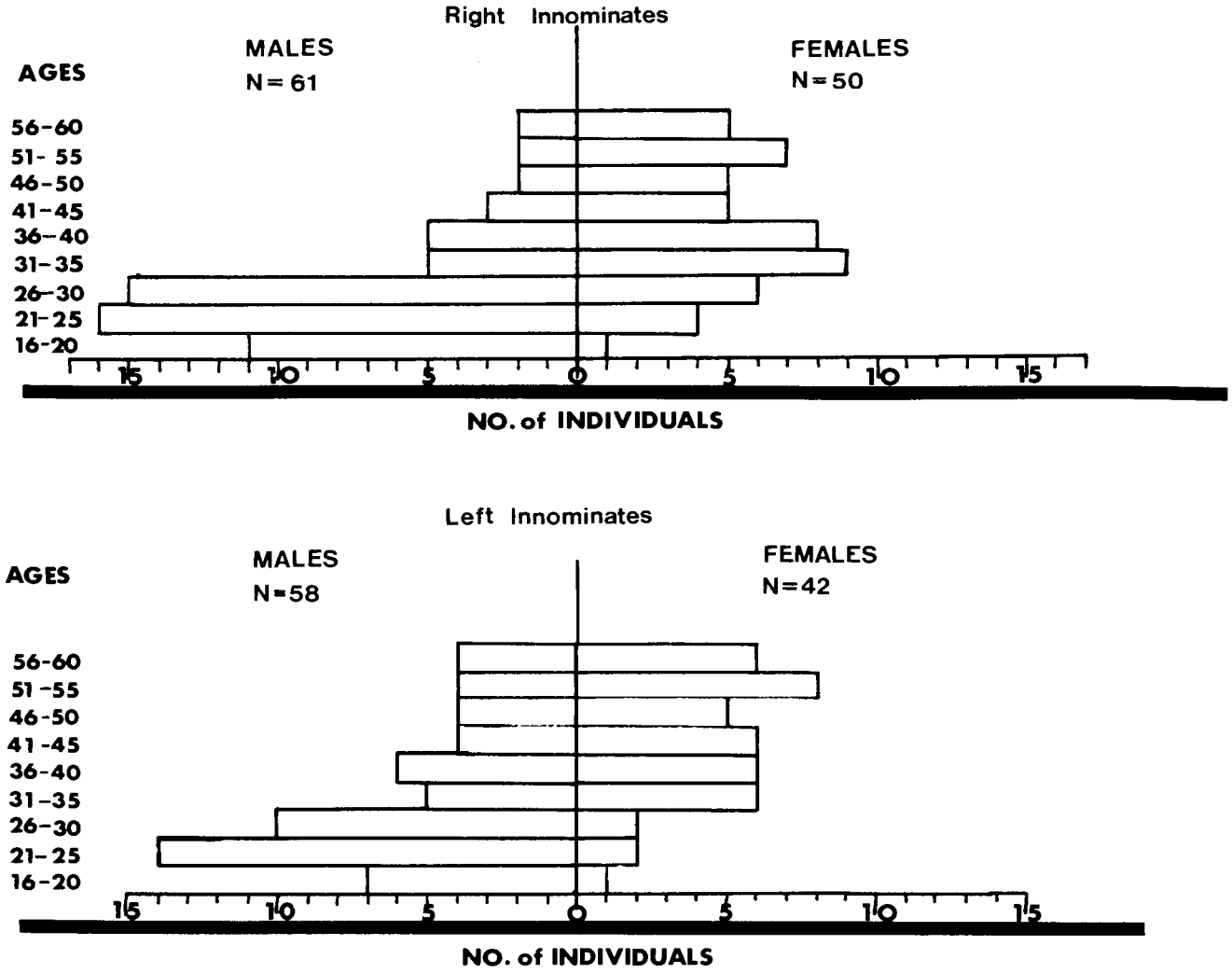

Fig. 1 Comparison of age at death for Ossossané males and females using data from right and left innominates.

interesting and encouraging to note the great similarity in the two pyramids. This indicates precision, if not accuracy, in the application of sexing and aging techniques. The high ratio of males to females dying in the 16 through 30 year age classes is somewhat disturbing, considering the characteristically high mortality usually observed in women of pre-industrial societies during their child-bearing years. The chi-square value for this ratio (42 males to 11 females) indicates significance at the 0.01 level. This irregularity may be offset by at least three factors:

(1) Ten of the 12 adults for whom sex was estimated while age was not were female.

(2) The sex ratio of the 38 aged adults of undetermined sex may be skewed in favor of females.

(3) Of those females who were aged, 53 estimates are based on comparisons with Gilbert and McKern ('73) pubic symphysis casts. We had difficulty using this method as most of the resulting age estimates fell in the broad upper ranges (e.g. 23-39, 32-52) which necessitated smoothing to fit the data to five-year intervals. In many cases it was obvious that the individual was not too young to be aged by this method, although none of the casts resembled the bone. Parturition scarring could be the cause of this. It is of interest to note that in a study by Suchey ('77), only 51% of age assessments by competent forensic anthropologists on pubic bones of known age, fell in the correct age range using the Gilbert and McKern method. In short, we believe that the irregular appearance of the age/sex pyramid is

better explained by the problems associated with aging adult female skeletons than by some cultural phenomenon acting to lower female mortality during the child-bearing years, although that possibility must remain.

Some further potential sources of error should be mentioned. Ubelaker ('74) presents a number of examples of the variability in age data obtained using different techniques on the same sample. Due to the nature of our sample, it was necessary to use the combined results of several techniques in order to obtain the maximum amount of data. This potential source of error can only be minimized with further study of the Ossossané population. Most importantly, age estimates based on osteon counts would greatly increase the number of individuals aged and the accuracy of age estimates (Kerley and Ubelaker, '78). Sex estimates based on other parts of the skeleton, more likely to be well preserved than the innominates, would also increase the data base, although some accuracy might be sacrificed.

On a more positive note, the combined age data (Fig. 2) present a fairly standard age pyramid for an anthropological population. Characteristically, there is a greater proportion of individuals in the lower age classes (Weiss, '73). The appearance of the 50-60 age class, an artifact of the aging technique, can be smoothed following a procedure presented by Melbye ('77) so that the pyramid tapers off in the upper ranges rather than ending so abruptly. Although the sex-age pyramid does not seem to represent a random sample of the population, the aged individuals, including those whose sex could not be determined, more closely resemble what one would expect in a population such as Ossossané.

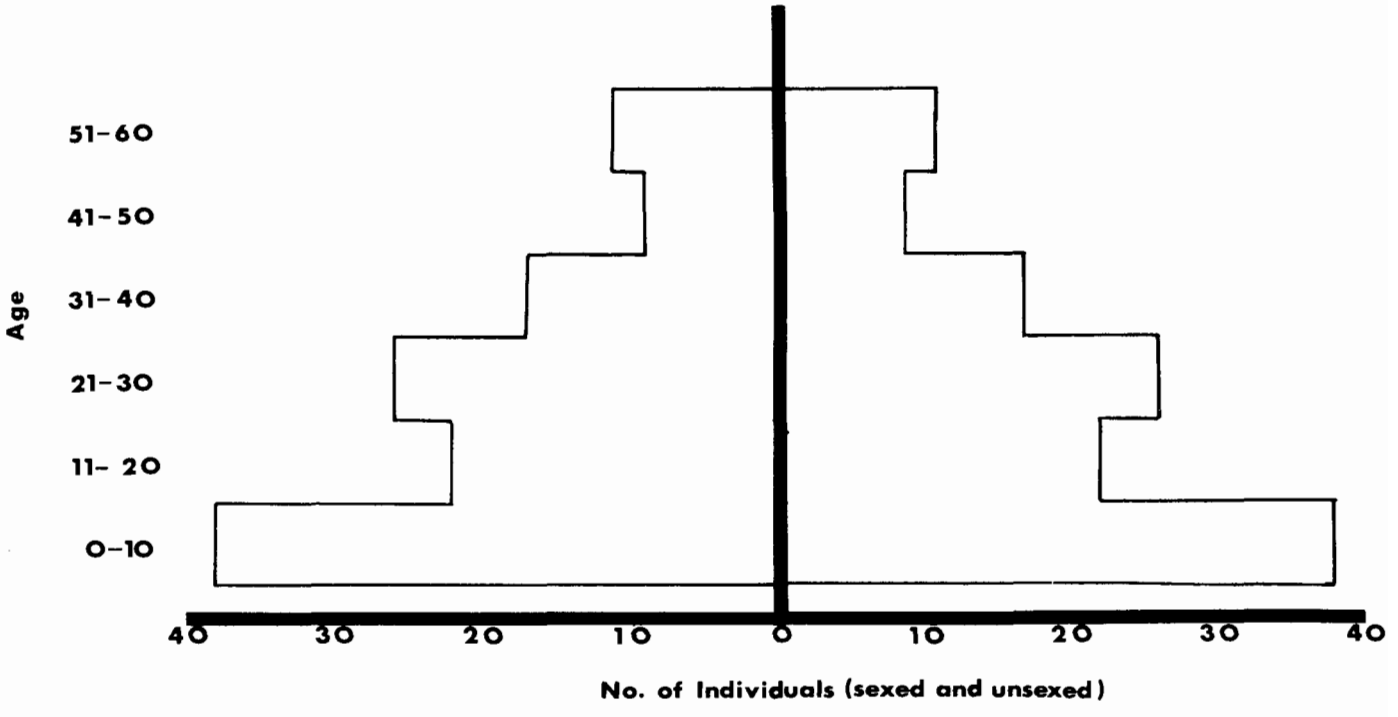

Fig. 2 Ossossané age pyramid (sexes combined plus unsexed material).

Construction of life tables for Ossossané

Two life tables were constructed based on the 249 aged right innominates. Table 2 is unadjusted except for smoothing of the age intervals originally obtained from the aging techniques employed. The procedure for smoothing intervals described by Acsádi and Nemeskéri ('70) was used. Five-year intervals were chosen to facilitate comparisons with other paleodemographic studies. The 0 to 5 year interval was broken up to better evaluate infant and early childhood mortality. This is possible because Merchant's standard ('73) is broken up into well-defined intervals in the first 2 years, with little overlap in range.

population strongly suggests that infants are missing from the sample. The right ilia of 122 subadults (under 15 years of age) were recovered while 559 right ilia of adults were present. For subadults, 94, or 77%, of these ilia were aged, while only 155, or 28%, of the adults were aged. This is a result of the different aging techniques employed. Subadults were aged using the ilium, while most adults were aged using the pubic symphysis, of which only 216 were recovered. If the data are normalized to account for this discrepancy, more error may be introduced since younger adults are more likely to be preserved than older adults due to the greater density of their bones. Because we were unable to distinguish the total number of aged and unaged young adults versus old adults, any

TABLE 2

Age*	Y_x	d_x	l_x	Q_x	L_x	M_x	T_x	e_x
0	24	96.4	1000	.0964	951.8	.1013	22747.0	22.75
1	17	68.3	903.6	.0756	869.5	.0785	21795.2	24.12
2-5	17	68.3	835.3	.0817	3204.8	.0213	20925.7	25.05
6-10	21	84.3	767.0	.1099	3624.5	.0233	17720.9	23.10
11-15	15	60.2	682.7	.0882	3263.1	.0185	14096.4	20.65
16-20	29	116.5	622.5	.1871	2821.3	.0413	10833.3	17.40
21-25	26	104.4	506.0	.2063	2269.1	.0460	8012.1	15.83
26-30	26	104.4	401.6	.2600	1747.0	.0598	5743.0	14.30
31-35	17	68.3	297.2	.2297	1315.3	.0519	3996.0	13.45
36-40	16	64.3	228.9	.2807	983.9	.0653	2680.7	11.71
41-45	10	40.1	164.6	.2439	722.9	.0556	1696.8	10.31
46-50	8	32.1	124.5	.2581	542.2	.0593	973.9	7.82
51-55	13	52.2	92.4	.5652	331.3	.1576	431.7	4.67
56-60	10	40.2	40.2	1.0000	100.4	.4000	100.4	2.50

N = 249

*Cohorts include individuals through the upper age limit (e.g. 11-15.9, 16-19.9, etc.).

Unadjusted Ossossané life table

Twenty-four infants (newborn to 0.9 years) are present in the sample. This number does not immediately give the impression that infants are under-represented, although a comparison of the percentages of infants and children versus adults who were aged out of the total

attempt to more accurately represent the subadults would distort the distribution of adults. It was decided for the present to correct only for missing infants since further research on other skeletal elements from Ossossané may clear up the above problem.

TABLE 3

Age*	Y_x	d_x	l_x	Q_x	L_x	M_x	T_x	e_x
0	99	305.5	1000	.3056	847.2	.3607	17597.2	17.60
1	17	52.5	694.5	.0756	668.2	.0785	16750.0	24.12
2-5	17	52.5	642.0	.0817	2463.0	.0213	16081.8	25.05
6-10	21	64.8	589.5	.1099	2785.5	.0233	13618.8	23.10
11-15	15	46.3	524.7	.0882	2507.7	.0185	10833.3	20.65
16-20	29	89.5	478.4	.1871	2168.2	.0413	8325.6	17.40
21-25	26	80.2	388.9	.2063	1743.8	.0460	6157.4	15.83
26-30	26	80.2	308.7	.2600	1342.6	.0598	4413.6	14.30
31-35	17	52.5	228.5	.2297	1010.8	.0519	3071.0	13.45
36-40	16	49.4	176.0	.2807	756.2	.0653	2060.2	11.71
41-45	10	30.9	126.6	.2439	555.6	.0555	1304.0	10.31
46-50	8	24.7	95.7	.2581	416.7	.0593	748.5	7.82
51-55	13	40.1	71.0	.5652	254.6	.1576	331.8	4.67
56-60	10	30.9	30.9	1.0000	77.2	.3999	77.2	2.50

N = 324

*Cohorts include individuals through the upper age limit (e.g. 11-15.9, 16-19.9, etc.).

Ossossané life table (adjusted for infant under-representation)

Melbye's ('77) infant correction was applied (Table 3) using Patterson's ('78) program for constructing adjusted and unadjusted life tables. A more recent method, which corrects for missing infants using model life tables (Sullivan and Melbye, '78), should prove useful to the data from Ossossané. It was not used in this report as revisions in the method are still in progress. In addition to the evidence suggested by the data, infants were believed to be under-represented for three other reasons: (1) due to their size and density, infant bones do not preserve well; (2) ethnographic evidence (Tooker, '64) indicates that often, infants under several months of age were not buried in the ossuary; and (3) in support of the ethnographic data, there is archaeological evidence (Kapches, '77) that infants were sometimes interred inside longhouses.

The most obvious differences between the adjusted and unadjusted tables is in the survivorship (l_x) column where survivorship drops off more rapidly in the adjusted table. Life expectancy (e_x) at birth is lower in Table 3, but is unchanged for the other age groups. Mortality (d_x) for the adjusted table is flattened in the adult age classes as a result of the heightened infant mortality. Data from the unadjusted table were used to construct a mortality profile so that adult mortality is accentuated. Figure 3

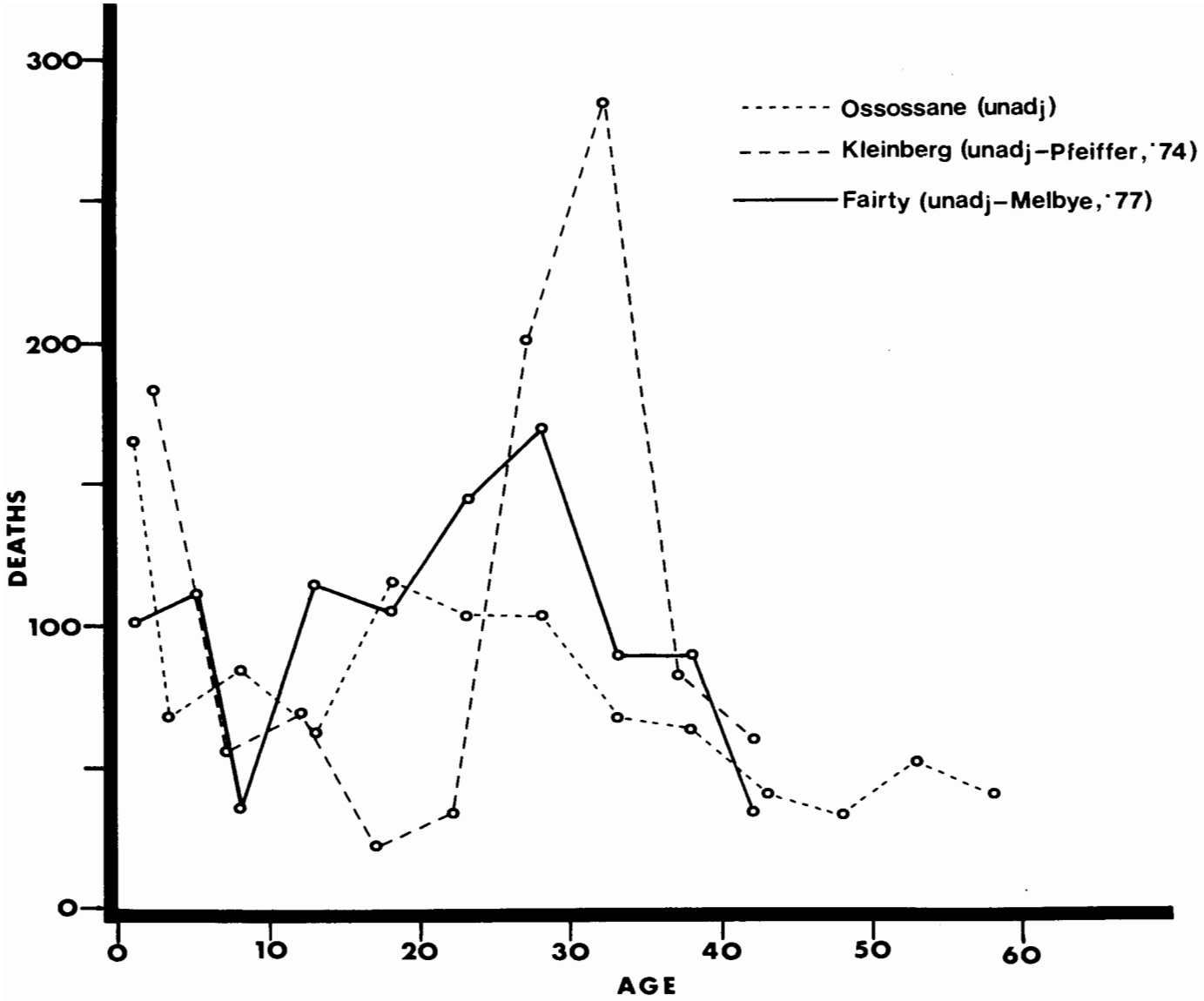

Fig. 3 Mortality profiles for Ossossané, Kleinberg, and Fairty.

shows profiles for Ossossané and two other ossuary populations from southern Ontario: Fairty, dated 1400 A.D. (Anderson, '64) and Kleinberg, dated 1600 (Melbye, personal communication). The most obvious difference between Ossossané's profile and those of the other two ossuaries is the lack of an accentuated peak between the ages of 20 to 30 for Ossossané. Clark ('77) points out two general trends in mortality among prehistoric populations: (1) a rise in mortality between 2 and 6 years of age; and (2) another rise from 20 to 30 years. Ossossané shows peaks during both intervals although they are not as accentuated as those of the other populations shown in Fig. 3. Clarke's data ('77) from Dickson Mound, Point of Pines, and Meinarti also show more exaggerated peaks in morality during these intervals. The 2 to 6 year increase is usually attributed to post-weaning stress while the 20 to 30 year increase has been attributed to death associated with child bearing (Clark, '77). In

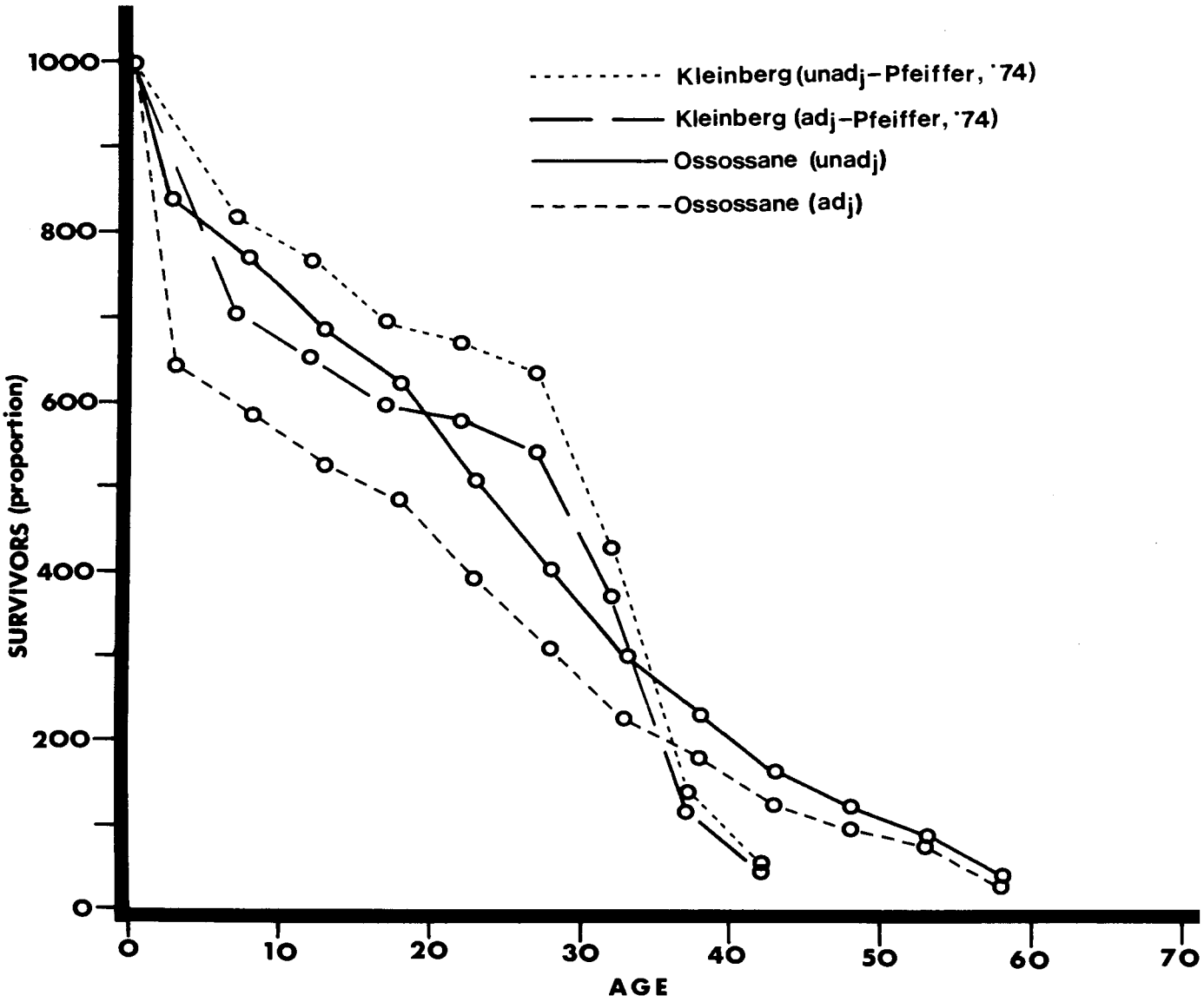

Fig. 4 Survivorship curves for Ossossané and Kleinberg.

societies where warfare is a factor, males also contribute significantly to the 20 to 30 year peak.

Survivorship curves were plotted for both the adjusted and unadjusted data from Ossossané. Figure 4 is a comparison of adjusted and unadjusted data from Kleinberg and Ossossané. The curves for Ossossané show noticeable decreases in survivorship at the ages of 3 and 18 years, while the Kleinberg curves show a

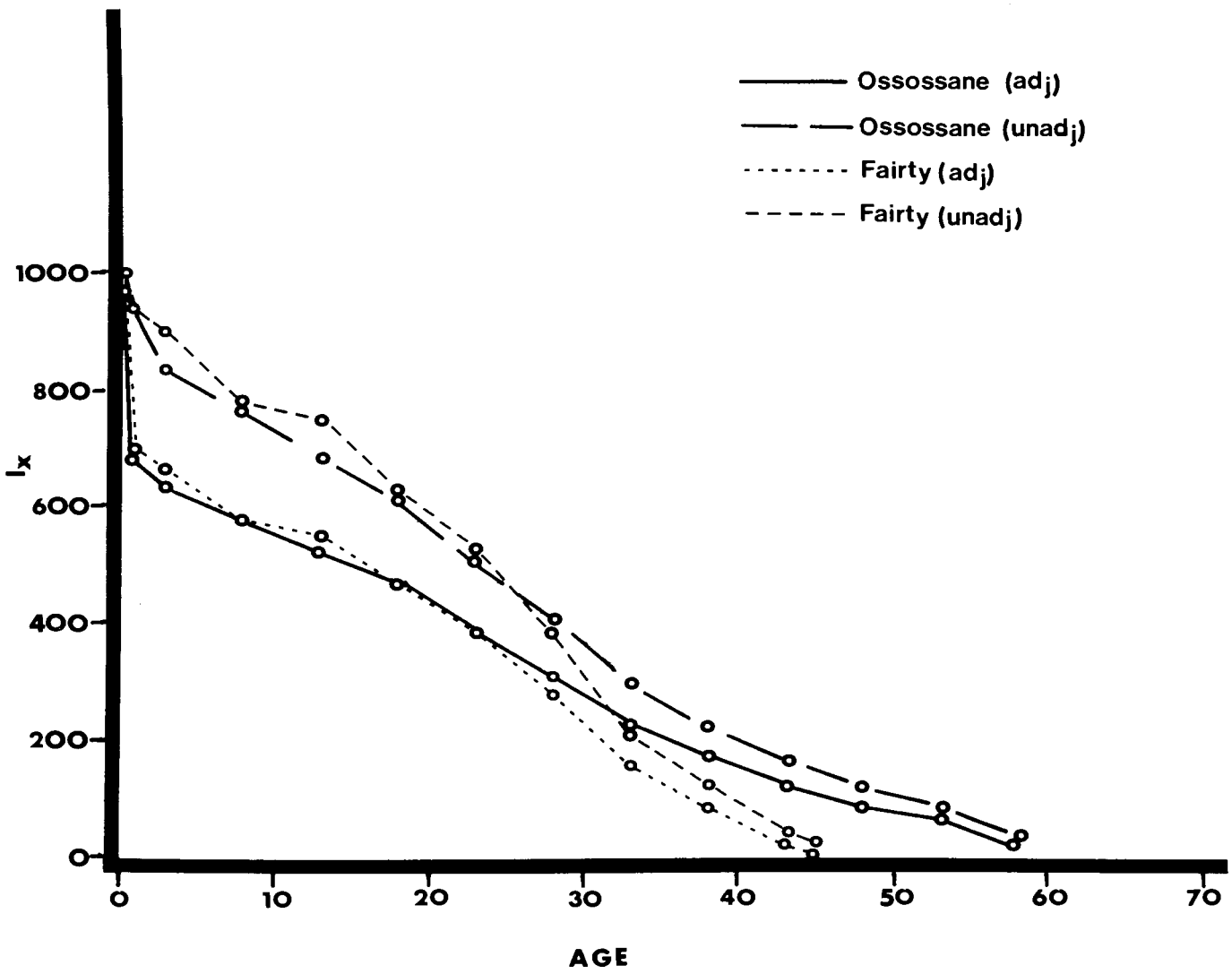

Fig. 5 Survivorship curves for Ossossané and Fairty.

marked decrease at age 27. Figure 5 is a comparison of adjusted and unadjusted survivorship curves from Ossossané and Fairty. Both Fig. 4 and 5 show the marked change in the appearance of survivorship with the use of the infant correction. Unlike mortality profiles, survivorship curves can be wholly misinterpreted when infant numbers are unknown.

Comparison with model life tables

Because Ossossané represents a rather small population, random fluctuations in demographic patterns may potentially distort such factors as mortality, life expectancy, and survivorship. Model life tables are constructed from the composite data of many similar populations so that random fluctuations are smoothed over. The survivorship curves from Ossossané adjusted and unadjusted data were compared to those in the Weiss ('73) model life tables. The unadjusted data give a higher life expectancy at birth and 90% survivorship in the second year of life, which is higher than most modern populations (Coale and Demeny, '66). For this reason, the infant adjusted data were

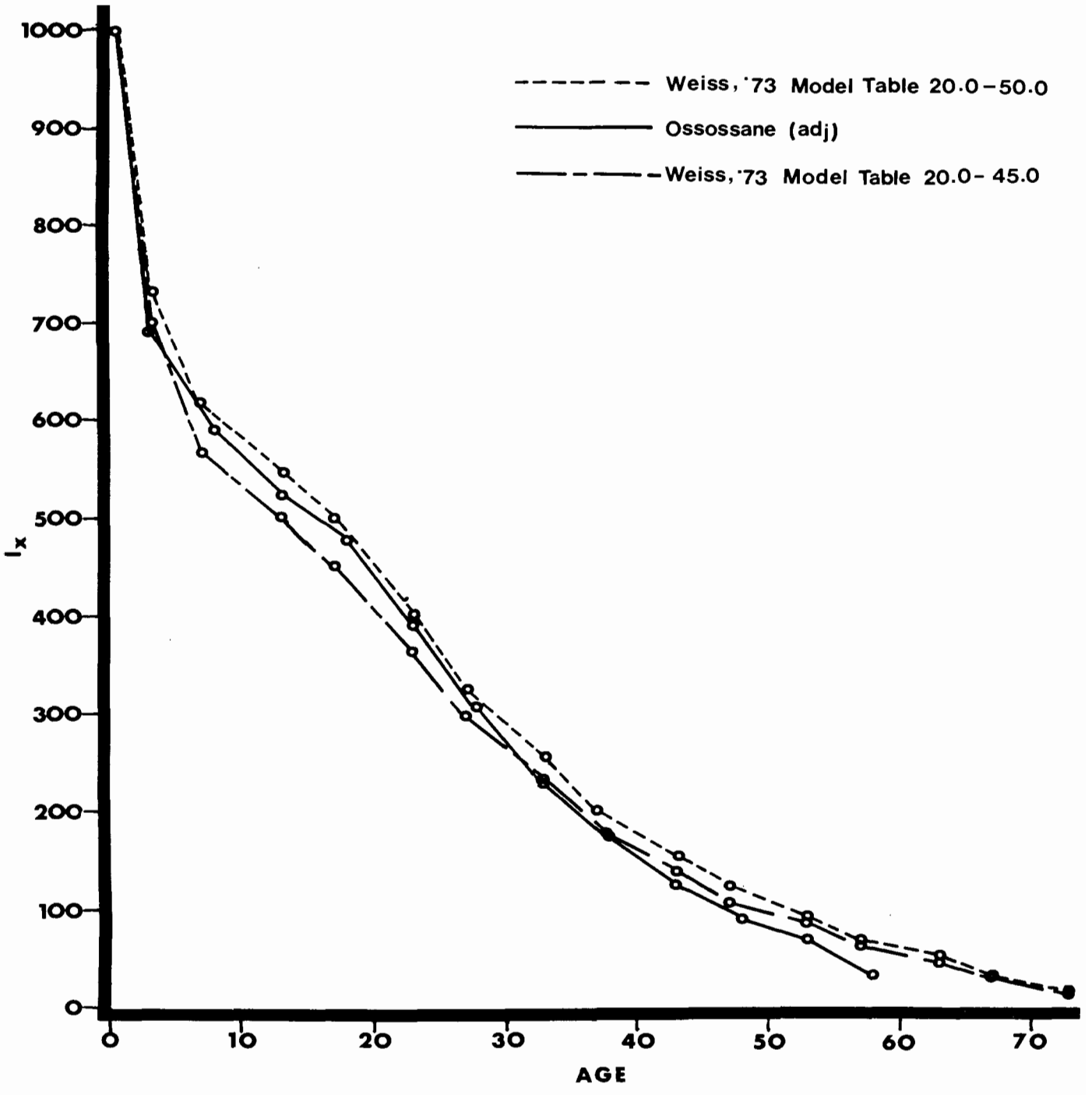

Fig. 6 Comparison of Ossossané survivorship to that derived from Weiss's model tables.

used to fit to Weiss's tables. Figure 6 shows a fit between survivorship from two of the model tables, both with a life expectancy of 20 years at birth. Survivorship is 45% and 50% at age 15 in the model tables chosen (Weiss tables 20.0-45.0 and 20.0-50.0, '73). Ossossané fits slightly more closely to the 20.0-50.0 table. The close fit to the model curve suggests minimal distortion in the data from Ossossané. The life expectancy of 20 at age 15 [e(15)] for Ossossané compares well with the mean e(15) of 19.8 from the 22 proto-agricultural groups used in the construction of

TABLE 4

Demographic parameters: a comparison of Ossossané and model life table values

Demographic parameters	Weiss model (20.0-50.0)	Ossossané (adjusted)
Proportion under 15 yrs	47.4	52.2
Proportion between 15-50 yrs	46.6	40.7
Proportion over 50 yrs	6.0	7.1
Average age	19.9	17.3
Average age of adults (≥ 15 yrs)	31.6	33.8
* Crude death rates:		
12 yr time interval (t)		[a]31.5 [b]56.8
10 yr time interval		37.8 56.8
8 yr time interval		47.3 56.8
Completed family size	3.51	—
Mean family size (including mother and father)	4.00	**6.0
Crude birth rate	52.7	—

*Crude death rates were calculated using the following formula (Bogue, '69:p. 39):

$$CDR = \frac{\text{total deaths/year}}{\text{total living population}} \times 1000$$

Where: total deaths = 756 or 681 (minimum number of individuals) plus 75 missing infants added in the infant adjusted table.

Calculations were done for 8, 10 and 12 year intervals to determine total deaths per year giving 94.5, 75.6 and 63.0 respectively.

** Heidenreich, '72

[a,b] Total living population was estimated from two different sources giving the CDR results in columns a and b:

[a] Brebeuf (quoted in Kidd, '53) estimated that 2000 individuals attended the Feast of the Dead he witnessed in 1636. This figure is used in the calculations in this column.

[b] Acsádi and Nemeskéri ('70:p.65) present the following formula for estimating the total number in the living population:

$$P = k + \frac{D\,(\mathring{e}_x)}{t}$$

Where: P = average size of the population
D = total number dead
e_x = life expectancy at birth
t = the period during which the cemetery was in use
k = correction factor, approximately 10 percent of D

Again, 8, 10 and 12 year intervals for "t" were used resulting in population estimates of 1664, 1332 and 1110 individuals, respectively.

Weiss's models. Table 4 presents further comparisons between the demographic information provided in the models and that calculated from the Ossossané life table.

DISCUSSION

Ethnohistoric accounts

Assuming Kidd ('53) is correct in identifying

this ossuary as the one reported by Brebeuf in 1636, it should be useful to review the social environment of the Huron at this period in history to determine what, if any, unusual factors may have operated to affect the demographic profile of this particular population. Epidemics reportedly occurred among New England Indian groups as early as 1616 when the so-called plague of 1616-1619 struck. According to Cook ('73), who has surveyed the early literature, this plague was fairly localized and decreased in virulence as it moved inland, dying out not far from the coast. Smallpox first appeared in November of 1633 in Boston and by the end of 1634 had spread west of the Hudson River (Cook, '73). "Within three or four years not only the Iroquois, but the Huron, Ottawa and other tribes were involved (Cook, '73:p. 492)." With a twelve-year period from the previous ossuary burial, the individuals buried at Ossossané represent people dying between 1624 and 1636; therefore smallpox was not likely to have caused any of the deaths. In addition, Brebeuf makes no mention of any epidemics among the Huron during that period (quoted in Kidd, '53).

The Iroquois Wars should also be considered with regard to Ossossané. Tooker ('64:p. 17), citing the Jesuit Relations, states that in "the spring of 1634 before the Jesuits arrived, the Huron suffered great losses and defeat at the hands of the Seneca". Yet, according to Hunt ('60, p. 72) until 1637, "there was a definite peace of some years' standing between the Huron and Seneca". Brebeuf's account in the Jesuit Relations makes reference to only two alarms in the year 1636, both of which amounted to only fear. Hunt ('60:p. 73) states that "what engagements there were during this decade favored the Hurons, who, confident, were invading Iroquois rather than themselves being invaded". By 1640 the Iroquois fur supply was exhausted and attacks on the Huron began on a large scale. "Before the very definitive years of 1640 and 1641 the conflict was not comparatively serious . . . (Hunt, '60:p. 69)."

It is unlikely that the dead from the earlier small conflicts would show up in the ossuary because individuals who died by violence were not reburied at the "Feast of the Dead" (Tooker, '64). Had warfare been a significant cause of death between 1624 and 1636, young males would be expected to be underrepresented in the population profile. Paleopathological analysis of the Ossossané remains will either confirm or refute the claim that deaths by violence are not represented in the ossuary.

CONCLUSIONS

Several conditions must be met in order to construct meaningful life tables. Of primary importance is the factor that the population must approximate stable conditions. As defined by Weiss ('73:p. 6), the "theory of stable population requires that a population is infinite in size, has no set immigration or out migration, and has fixed rates of fertility and mortality at each age". For skeletal data, in addition to assuming population stability, "one must assume that the sample is representative of the population, and that it is free from systematic aging error (Weiss, '73:p. 14)".

The fact that the data from Ossossané fit well with Weiss's proto-agriculturalist models suggests that Ossossané meets stable conditions at least as closely as do the source data used to construct the models. The ethnohistoric records indicate that the Huron were sedentary and had a mixed subsistence derived from corn agriculture, hunting, and fishing and gathering (Tooker, '64). With the exception of some visiting Algonquins, there was no significant immigration, and no out migration is mentioned prior to the beginnings of warfare. Large scale warfare and epidemics greatly reduced and altered Huron populations beginning about 1639-41, but these factors should not influence the individuals excavated from Ossossané. The earlier small skirmishes reported in Tooker ('64) and Hunt ('60) probably did little to reduce the number of warriors. Because women were sometimes abducted while working in the fields, the stress associated with the threat of raids may have affected fertility. This cannot be determined from the available evidence. Given what is known, then, there is little reason to suspect that Ossossané did not approach stable conditions.

The sample recovered from the ossuary should represent the living population very closely. Exceptions, known from early accounts (Tooker, '64), include very young infants who

were buried on the edge of the village, and individuals who died by violence, drowning or freezing. Differential preservation further decreases the number of infants and young children recovered.

In comparison to other skeletal samples, ossuaries are probably the single best source of demographic information as, not only are most members of the society interred together, but the time depth is known within a narrow range. The major problem is not whether the sample represents the population, but how to reconstruct a population of individuals from a mass of disarticulated bones. Pertinent to this study is the question — are the individuals who are included in the life table representative of the population? This question brings up the problems associated with aging techniques. It was previously mentioned that a greater percentage of recovered juveniles were aged as compared to adults, and that age estimates for females are suspected of being too high. Differences in the age distribution could significantly affect values in the life table. Because this analysis of innominates is the first study on one skeletal element to be completed, there is great potential for refinement of the age data. Sullivan (nd) has completed an analysis of subadult mandibles and was able to age 121 individuals using the crown and root calcification standard developed by Moorrees, Fanning and Hunt ('63 a,b). This technique for aging subadults has a much higher reliability than Merchant's ('73) standard for the ilium (Ubelaker, '78). Osteon counts on cortical bone sections (Kerley, '65, and Kerley and Ubelaker, '78) will greatly increase both the number of individuals aged and the reliability of the estimates. Once these further studies are completed, it will be interesting to compare data from the various techniques as Ubelaker ('74) did in his study of two Maryland ossuaries.

Despite the limitations of this preliminary study, it should serve to set the groundwork for future analyses of other skeletal elements from Ossossané. It is hoped that eventually a comprehensive analysis comparable to Ubelaker's will result. Ossossané provides the added advantage of being accompanied by a rich body of ethnohistoric literature which will make possible a more complete anthropological reconstruction of early contact Huron lifeways.

SUMMARY

While the Ossossané material offers certain advantages to the paleodemographer, it also presents problems characteristic of ossuary populations in general. Primary among these are poor bone preservation and the impossibility of assembling complete or even partially represented skeletons. We have attempted to minimize these problems by:
(1) establishing component criteria to include the greatest number of individuals; and
(2) using a number of sexing and aging techniques to make the most efficient use of the fragmentary material.

Even so, certain analytical problems are important to note. In sexing, techniques employing metrics and indices were impractical due to missing landmarks. Furthermore, all five of the sex indicators could seldom be assessed on the same specimen due to breakage. Perhaps most importantly, due to the limitations of currently available sexing techniques practical for use in this collection, only twenty specimens (rights and lefts combined) under the age of twenty could be sexed.

As regards aging, it is important to emphasize the limitations in the use of the Gilbert and McKern ('73) models for females. Also, the population-specific nature of Merchant's standard limits its cross-cultural application, although with growth data on other populations, a correction factor could be introduced to extend the application of the standard. Finally, after Ubelaker ('74), it should be noted that some error is introduced by using a combination of aging techniques.

The above limitations must be kept in mind in evaluating the information given in life tables constructed for Ossossané, and also in evaluating comparisons with the other ossuary populations cited in this work.

The methodological problems outlined above notwithstanding, both the ethnohistoric record, and the close fit with two model tables (indicating minimal random fluctuation), strongly suggest that Ossossané meets the stable population conditions prerequisite to constructing "meaningful" life tables.

This study of the innominates from Ossossané represents the first completed analysis of a single skeletal element from the ossuary. Further analysis of additional elements

will enhance and refine the paleodemographic data obtainable from this collection and allow more meaningful statements to be made about the early contact Huron.

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On the Estimation of Prehistoric Population Size

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KEY WORDS Paleodemography • Population Size Estimation

ABSTRACT The equation for estimating population size advanced by Acsádi and Nemeskéri (1970) is compared with that proposed by Ubelaker (1974), concluding that they are identical and that, consequently, the latter formula is superfluous.

Ubelaker's ('74) monograph on the reconstruction of demographic profiles from ossuary materials has been very well received (e.g., Buikstra, '77; Larsen, '78) and deservedly so, as it is an innovative and imaginative approach to the perennial problem of guessing better how many people might have lived in the New World before the arrival of Europeans.

However, I have found a curious lapse in Ubelaker's otherwise well considered treatise. Since this particular anomaly has misled several of my colleagues and students and, indeed, has quite evidently escaped even Ubelaker's notice, I believe it will provide some benefit to subject it to critical scrutiny. Ubelaker ('74:p.66) estimates the size of the Nanjemoy populations with the equation $P = \frac{1000N}{MT}$ and acknowledges on the following page that Acsádi and Nemeskéri ('70) would use the equation $P = \frac{k + D\mathring{e}_0}{T}$, without realizing that, aside from the correction factor k (which is simply 10% of T), the two equations are identical. Since M (crude mortality rate) is an expression of the death rate per thousand population and is the reciprocal of $\mathring{e}_0$, as Ubelaker ('74:p.65) himself points out, and since N obviously equals D, and T occurs in both equations, the two formulae are computationally equivalent. If Ubelaker had in fact expressed M as the reciprocal of $\mathring{e}_0$ in his equation (e.g., 0.0478 rather than 47.8 in his denominator), he would have found that the '1000' in his numerator is superfluous. Consequently, it is not surprising, as Ubelaker ('74:p.67) notes, "that population estimates calculated from the two formulae are nearly the same". I suggest that in the interest of parsimony and with due regard to prior authorship, it would be better to adhere to Acsádi and Nemeskéri's formulation and, if necessary, to regard the use of their k as optional (as Ubelaker has in effect done).

There are some additional points about the behavior of the variables in these formulae that are worth making. Within archaeological contexts, D (Ubelaker's N) is obtained in relatively straightforward fashion. If a site is totally excavated, then D attains, of course, a fixed value; if only a sample can be taken then D must be estimated using procedures that cannot be discussed in this brief note. The value of $\mathring{e}_0$ tends to lie within a narrow range for pre-industrial populations; it is consistently low, largely because of the high rates of infant mortality such populations experience. The chances for significant biasing of $\mathring{e}_0$ due to observor error are, or should be, relatively low also. In most instances it should be possible to achieve fair accuracy (i.e., within a year or two) in the age assessment of preadults. Even fairly substantial errors in the estimation of older adult ages will not substantially affect $\mathring{e}_0$ because of the relatively low numbers of adults in these populations. In the most extreme example of which I am aware, Johnston and Snow's ('61) striking reassessment of age in the Indian Knoll remains raised the value of $\mathring{e}_0$ from 15.78 to 19.30 yrs.; a significant part of this three and one-half year difference can likely be

attributed to the fact that their re-evaluation included only about 78% of the original series.

The remaining term in the equation is T, the time interval in years since the remains were placed in the ground. By contrast with the other 'known' values of the equation, T is very much more difficult to control, and heavily influences the resulting estimate of population size, P. Of course, P is what we would find interesting if we could reliably determine it. Given that D and $\mathring{e}_0$ can be estimated consistently, we can think of P and T as standing in an inverse log-log relationship to each other. Under these circumstances, if we gain control of either P or T, we can proceed to solve the equation of Acsádi and Nemeskéri with some confidence. Failing, as we almost always do, to arrive at a close estimate of either P or T, the best we can do is to establish that our population falls somewhere on a curve whose parameters are $\mathring{e}_0$ and D. Figure 1 illustrates three curves of this kind, as determined by the Acsádi-Nemeskéri equation $P = \frac{D\mathring{e}_0}{T}$ (omitting the correction factor, k). The value of D is arbitrarily set at 500. The same curves can be expressed with Ubelaker's redundant equation by expressing M as the reciprocal of $\mathring{e}_0$ and setting N at 500. For example, a sample of 500 with $\mathring{e}_0 = 20$ (or $M = 0.05$) represents a population of 100 using a burial ground for 100 yrs., or a population of 1000 burying their dead over the span of one decade, or any projection of that particular curve.

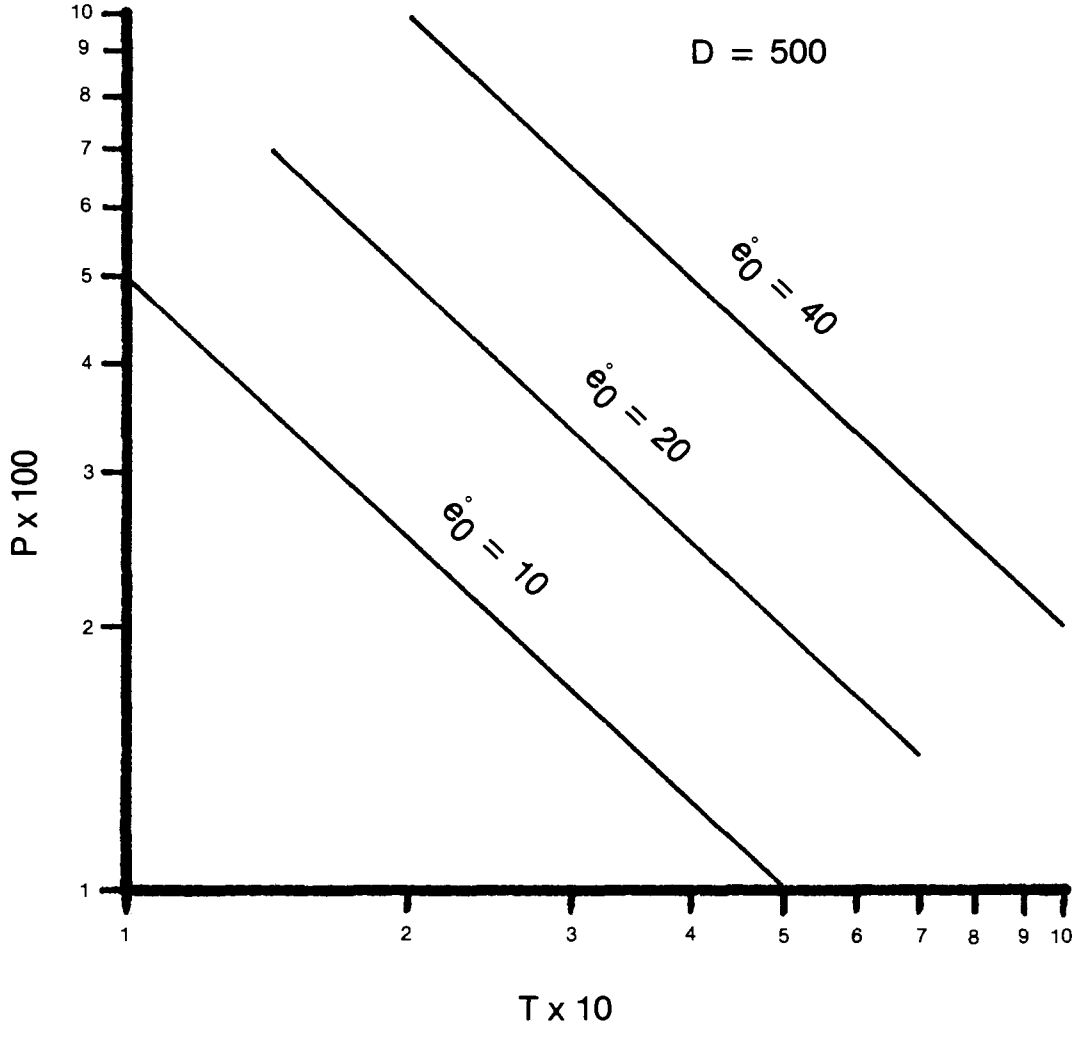

Fig. 1 A series of curves demonstrating the relationship between P and T for three values of e_0.

In conclusion, I would like to reconsider with emphasis an important point to which I gave passing mention above. Ubelaker's Nanjemoy ossuaries are a definite exception to the state of affairs usually faced by the palaeodemographer; not only is there excellent preservation, there is excellent time-control as well. Most archaeological work succeeds only in giving brackets of several hundred years within which a skeletal sample, usually not exceeding a few hundred, probably lived. Further to this point, we must realize that the Acsàdi-Nemeskéri equation gives us an estimate of the *average* population size within the period considered. We can conclude nothing from such an estimate about fluctuation in population size, growth or decline. It is essential that we gain better temporal control of burial sites, in particular. If we can recognize reasonably narrow and, ideally, successive intervals in our larger skeletal series, we could provide very much more precise and better documented estimates of aboriginal population size. In many instances, we could also infer much more about population dynamics than has so far been the case.

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COMMITTEE REPORT:

Statement on the excavation, treatment, analysis and disposition of human skeletal remains from archaeological sites in Canada

This brief has been prepared in response to public concern over the nature and purposes of scientific study of human skeletal remains from archaeological sites in Canada. Such remains are generally found in "unmarked graves" which commonly, though not exclusively, pertain to the prehistoric period, that period of time prior to the written historical record of a particular region or locale. Prehistoric peoples have occupied portions of this country for as long as 27,000 years. By 4,000 years ago all of Canada was inhabited, including the High Arctic. Archaeologists generally are responsible for the excavation of human skeletal remains when encountered in archaeological sites. Physical anthropologists are responsible for the analysis of the remains.

The purpose of this brief is to clarify what is meant by human skeletal remains, the types of archaeological sites in which they are found, and the information that is acquired from their analysis. It also proposes guidelines to be followed in the excavation, treatment, analysis and disposition of human skeletal remains from archaeological sites, as well as guidelines to be followed in the event of the accidental discovery of human skeletal remains. The subject is further considered with respect to the concerns of living native peoples in that certain archaeological sites, particularly those of the late prehistoric period and those of the protohistoric period, have direct bearing on their cultural and biological heritage.

HUMAN SKELETAL REMAINS

The human skeletal remains found in an archaeological site may consist of whole or partial skeletons, or individual skeletal parts such as skulls, jaws, teeth, limb bones, vertebrae, ribs, and fragments thereof. Remains usually consist solely of bones, and their arrangement in the ground indicates the body was buried in the flesh or as a bone bundle. Prehistoric peoples practiced different forms of burial such as the separate placement of individuals in cemeteries, houses or above-ground scaffolds, the placement of bone bundles in communal pits, and cremation.

ARCHAEOLOGICAL SITES WITH SKELETAL REMAINS

Many archaeological sites do not contain human remains. Those that do are of three types:

(1) A specific burial ground, or "cemetery", where the skeletal remains of two or more persons have been deliberately placed.

(2) A village, town, or temporary campsite where the skeletal remains of one or more persons have been deliberately placed or have been deposited as part of the refuse of the site. These primarily are habitation sites. The excavation of the site results in the *unexpected* discovery of human skeletal remains, except in rare instances where the known cultural practice was to place the deceased within the villages.

(3) A location in which human skeletal remains have been secondarily deposited by the action of natural forces such as earth movements or the outwash of rivers and streams.

There generally is no *a priori* knowledge that a site will contain skeletal remains. The identification is made after survey and test excavations or, as in a vast number of cases, when prehistoric skeletal remains are exposed by non-archaeological activities such as construction, farming, and soil erosion.

INFORMATION ACQUIRED FROM THE ANALYSIS OF HUMAN SKELETAL REMAINS

Human skeletal remains from archaeological sites aid the understanding of population and culture history. Indeed, they provide the only means of establishing the genetic identity of an archaeological population and, therefore, skeletal remains are *essential* to reconstructing its history. Moreover, archaeological skeletal remains aid modern medicine in the study of diseases and injuries that affect bones, and in establishing methods for the identification of unknown deceased as required by modern forensic practice.

Physical anthropology, like all other sciences, is principally a method, and much of the research on human skeletal remains in these three areas is designed to provide and test methods of study that will solve specific problems. The development of effective methods and informative results requires that scholars investigate similar research problems using many varied and geographically diverse archaeological assemblages of human skeletal remains, and that different scholars research the same collections of human skeletal remains with new ideas and new approaches. The methods of physical anthropology are gradually developed and enhanced with new investigations and the application of new techniques. These projects often take years to be completed. For these reasons it is important that existing collections of archaeological skeletal remains are preserved for study and that future controlled excavations are conducted.

Archaeological Reconstruction

The type of information that is acquired from the study of human skeletal remains depends on the type of site from which the remains are derived, the amount and kinds of skeletal parts, and the number of represented individuals. The larger the collection of skeletal remains, the greater is the amount of information and the broader is its scope. There are six categories of information:

(1) *Physical characteristics* such as stature, body build, robustness and facial features, and the analysis of how much or how little these differ among contemporaries, ancestors and descendants.

(2) *Biological features,* or genetic elements, which enable the study of the degree of relatedness among earlier populations and their relationships with historical and modern groups of people.

(3) *Demographic factors* which define the structure of the population in terms of its age groups and sex ratio, and provide information on birth rates, death rates, and the longevity of past peoples.

(4) *Pathological signs* which permit inferences about diseases and accidents that afflicted past populations and how such maladies were treated, the extent and intensity of conflict with neighbors, and the occurrences of plagues and famine.

(5) *Evolutionary processes* that have shaped the development of modern man through hundreds of thousands of years.

(6) *Treatment of the dead* which reflects the social organization, societal mores and religious life of past populations.

. . . The above information is an essential part of archaeological reconstruction and can *only* be derived from the study of human skeletal remains. For a particular site, each category of information can be fully realized only with thorough comparative analysis of existing collections of human skeletal remains.

Medical Information

Archaeological skeletal remains form important sources for research in the study and identification of disease processes. They enable study of the sequential changes of certain diseases of the skeleton, information that is not as readily obtainable from clinical study of living people and from medical autopsies. The initial signs of certain diseases, previously unknown in modern medical practice, have been identified from archaeological skeletal remains. For example, the initial signs of leprosy were identified from study of the sequential changes of the disease in archaeological skeletal remains from the Medieval Period in Europe. That knowledge has benefitted modern living victims of the disease by permitting its prompt recognition and treatment. Present research on 1,000 year old skeletons from the American Midwest is providing information on the progress and effects of arthritic spinal diseases. Other research in Canada and the United States is concentrating on the associations between

different diets and lifestyles in prehistoric societies and certain diseases manifested in the skeleton. The intent of this research is to help clarify the effects of nutrition and environment on diseases and deficiencies in modern populations.

Forensic Identification

Modern forensic practice requires the identification of unknown deceased in legal situations concerning missing persons, possible homicide or suicide victims, and victims of mass disasters and warfare. Often only the skeleton or skeletal parts are available for identification, and the requirement is to determine age, sex and race of the person or persons, as well as any individualizing features such as signs of bone disease, fracture or other physical deformities. These assessments are a critical first step toward the ultimate identification of the deceased and may be used in legal court proceedings. Although methods for the identification of age, sex and race have been developed from the study of the skeletons of modern medical-school dissecting-room subjects, physical anthropologists must heavily rely on the experience they acquire from careful study of archaeological skeletal remains to expertly apply forensic identification methods. The techniques for identification continue to be developed and refined on that basis.

GUIDELINES

A major area of public concern is how the human skeletal remains from archaeological sites are treated and how they are preserved and stored for future research. It is standard practice among physical anthropologists that human remains, regardless of their antiquity and geographic origin, be treated with respect and that the remains be carefully placed and stored in appropriately designed facilities. Stored collections are accessible only to qualified researchers who have demonstrated the ability and proper training for research on human skeletal remains. In order to clarify procedures to be followed by researchers, the CANADIAN ASSOCIATION FOR PHYSICAL ANTHROPOLOGY recommends certain guidelines with respect to the excavation, treatment, analysis and disposition of human skeletal remains from archaeological sites. A second set of guidelines is proposed with reference to the accidental discovery of human skeletal remains.

Guidelines for Archaeological Research

It is recommended that:

(1) The survey, inventory and excavation of archaeological sites be stringently controlled in each province or territory by one agency legally charged with that purpose and that such agencies be staffed with professional archaeologists;

(2) A close working liaison be established between the provincial and territorial agencies and the Naitonal Museum of Man which is charged with responsibility for the survey, inventory and excavation of archaeological sites in Canada;

(3) The survey, inventory and excavation of archaeological sites be restricted to qualified researchers and legally regulated by provincial or federal permit systems;

(4) When human skeletal remains are involved in the excavation of a site, their excavation and analysis conform with legal provincial or federal procedures governing such remains;

(5) Legal procedures governing known *archaeological* skeletal remains be relegated to *one* provincial or territorial statute, such as an "Archaeological Sites Act", and that the governing procedures of the act be uniform in all provinces and territories. Archaeological human skeletal remains should be clearly excluded from other statutes, such as Coroners Acts and Cemeteries Acts, unless such remains have kin relationships with living persons[1];

(6) When human skeletal remains are involved in the excavation of a site, every effort be made to contact and consult with a qualified physical anthropologist and that prior arrangements be made for the scholarly analysis of the remains;

(7) The excavation of human skeletal remains be carried out within the controlled methods of archaeology;

[1] A survey of existing provincial and federal legislation indicates a lack of uniformity in Canada among statutes governing human skeletal remains from archaeological sites. In some provinces, human skeletal remains may be under the jurisdiction of three or more statutes, including Coroners Acts, Anatomy Acts, Cemeteries Acts, Fatality Inquiries Acts, Heritage Conservation Acts, Archaeological Sites Acts, Antiquities Acts, etc. Imprecise wording in these statutes makes it difficult for one to know exactly whether *archaeological* human remains come under one or all of their jurisdictions, and in the latter case, whether one statute takes precedence over another. In some cases, the legal regulations appear to be in conflict when more than one statute is involved.

(8) Human skeletal remains be treated with respect both during and after excavation;
(9) The excavated remains be catalogued and deposited in a recognized institution that is properly equipped for their inventory, care and storage, such that the remains can be made accessible to future qualified researchers;
(10) Any analysis of the human skeletal remains be summarized in writing, and that this statement and any others resulting from analysis be deposited with the provincial or federal agency responsible for the excavation.

Guidelines for the Accidental Discovery of Human Skeletal Remains

Human skeletal remains may accidentally be discovered by members of the public during urban or rural development projects, hiking, camping or other activities. Such remains may be archaeological in nature or they may be those of recently deceased persons. Recommendations with respect to such discoveries are that:
(1) The remains be treated as a forensic matter and, therefore, not be handled or removed by the discoverer;
(2) The discoverer immediately contact the local law enforcement agency;
(3) The law enforcement agency contact the coroner and nearest qualified physical anthropologist for consultation on the identification of the remains;
(4) The remains continue under the jurisdiction of the coroner unless it can explicitly be shown that they are of an archaeological nature;
(5) Contact be made with a qualified archaeologist for controlled removal of the remains and survey of the immediate location in which they have been discovered. This is to be accomplished in cooperation with the coroner and local law enforcement agency if the remains represent a forensic matter[1], and in cooperation with the provincial or federal agency responsible for archaeological sites if the remains are an archaeological matter;
(6) A detailed report on the discovery and identification of the remains be completed by the physical anthropologist and archaeologist whether the case is a forensic or an archaeological matter, and that the report be filed with the coroner's office and with the provincial or federal agency responsible for archaeological sites;
(7) If the discovery is determined to be an archaeological matter, the provincial or federal agency assume immediate responsibility regarding the excavation, treatment, analysis and disposition of the remains.

NATIVE PEOPLES' CONCERNS

Certain archaeological sites in Canada, particularly those of the late prehistoric and protohistoric periods, have direct bearing on the cultural and biological heritage of living native peoples. Some native peoples' organizations object to the excavation, treatment, analysis and disposition of human skeletal remains from these sites. The objections range from strong demands that human skeletal remains not be excavated at all on the grounds of religious desecration, to expressions of concern that the knowledge gained from excavation — not only of the human remains but also of cultural objects — is not being adequately returned to native peoples and, hence, is of little benefit to them.

It is significant, however, that in some areas of the country, archaeologists and physical anthropologists *have* established close working relations with local native communities to the satisfaction of all concerned. These productive relations in large measure developed from determined efforts to increase communication among archaeologists, physical anthropologists, and the local communities. It is recommended, therefore, that communication and consultation with local communities, on the part of both individual researchers and the provincial or federal agencies responsible for archaeological sites, becoming a working rule uniformily applied throughout the country. The CANADIAN ASSOCIATION FOR PHYSICAL ANTHROPOLOGY urges individual researchers — archaeologists and physical anthropologists — to consult with local native band councils about their projects and to keep local communities informed of the progress of those projects. The ASSOCIATION also encourages individual researchers to return information to the communities in the form of unpublished and published reports, and by means of formal lectures and informal

[1]The experience of archaeologists in the exacting techniques of field documentation can be of considerable aid to law enforcement agencies in forensic matters.

presentations before, during and after field work. Every effort should be made to fully explain the nature of the research before it is conducted and to encourage the participation of the community.

The above recommendations apply to those archaeological sites that can be shown to have direct bearing on the cultural and biological heritage of a particular local native community. It should be recognized that no single public interest group can lay claim to all of Canada's prehistory or history. Canada's prehistory and history is the heritage of all Canadians and that of the global community in general. To function effectively and objectively, archaeology and physical anthropology cannot be publicly restricted to the excavation of certain types of sites and to the analysis of certain types of archaeological materials whether they are cultural objects or human skeletal remains. By this token, the accidental or intentional excavation of pioneer cemeteries and human skeletal remains must also be given consideration in and for scholarly research. The archaeological excavation of human skeletal remains may constitute religious desecration in the eyes of some individuals. However, to impede or to curtail archaeological, medical and forensic research on human skeletal remains because of the religious views of some individuals requires that the vast majority of humanity, including Canada's native peoples, be deprived of the benefits that scholarly research on the dead can offer the living.

(Drafted by the Committee on the disposition of archaeological human remains — J. S. Cybulski, N. S. Ossenberg, and W. D. Wade.)

ANNOUNCEMENTS:

The XI International Congress of Anthropological and Ethnological Sciences

The XIth ICAES will be held in Canada in 1983 (Aug. 16 - 27) with Vancouver as the primary venue. Various matters concerning the XIth Congress were discussed at meetings of the Canadian National Committee to the Permanent Council of IUAES during December, 1978, in New Delhi. Dr. C. Meiklejohn (Winnipeg), CAPA/AAPC member of the Canadian Committee, reports that further organizational meetings will be held in October, 1979, in order to establish necessary committees, conference theme(s), budget, and subsidiary conference locations.

Dr. C. S. Belshaw (President, XIth ICAES) requests that individuals or groups contact him if they can help with or provide information relevant to any of the following concerns: (1) ideas for symposia or topics for the program, (2) names of suitable persons for major central committees (Finance, Program, Local Arrangements), (3) hosting of pre-Congress symposia to be held in the second week of August, (4) ideas for congress themes, and (5) nomination and appointment of an executive secretary responsible for administrative aspects of the XIth Congress. Correspondence should be addressed to the Department of Anthropology and Sociology, University of British Columbia, Vancouver, B.C., V6T 1W5.

Articles Requested

The new journal *Etudes Inuit Studies* is devoted to the study of Inuit societies, primarily from an anthropological perspective. Articles on the physical anthropology of the Inuit are welcome, and may be in either French or English. The editorial office is Département d'Anthropologie, Université Laval, Québec, G1K 7P4 (*communicated by Dr. F. Auger*).

Tobias and Evolution in Africa

Dr. P. V. Tobias (Witwatersrand) presented a series of special lectures at the University of Alberta Feb. 8 - 9, 1979. His topics were "New Fossils from Sterkfontein: Their Bearing on Human Evolution", "The Helicoidal Occlusal Plane of the Dentition — Natural History and Evolution", and "The Newest African Evidence of Human Evolution from South and East Africa" (*communicated by Dr. G. Sperber*).

VIIth Annual Meeting

The Association's VIIth annual meeting will be held November 7-10, 1979, at the Chantecler Hotel in Ste-Adèle, P.Q. Because Ste-Adèle is in the Laurentian resort area, rooms must be booked well in advance of the meeting date. Those wishing to reserve a room ($41 per person/single-bedded room, $35 per person/double-bedded room) should immediately contact Dr. F. Auger or Dr. F. Forest, Departement d'Anthropologie, Université de Montréal, C.P. 6128 Succursale 'A', Montréal, P.Q. H3C 3S7. There is a $25 pre-registration charge, payable upon a request for a room reservation.

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