Anthro Notes

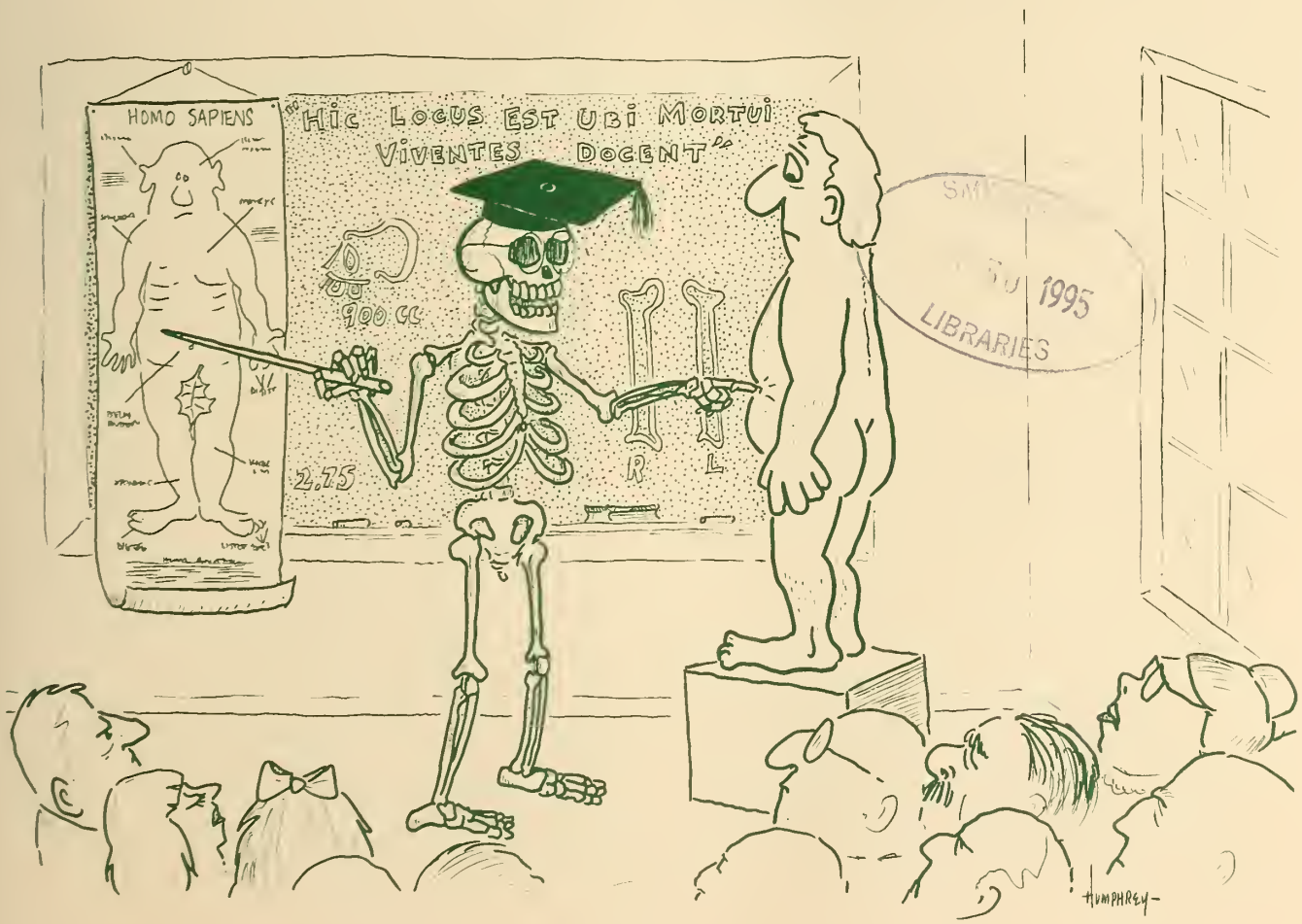
National Museum of Natural History Newsletter for Teachers

Vol. 11 No. 2 Spring 1989

WHAT BONES TEACH US

Collecting and studying human skeletons in museums and scientific laboratories is presently a complex, controversial subject. The purpose of this article is to explore the kinds of information scientists obtain by studying human skeletons, and how that information is used.

A physical anthropologist is trained to determine many facts about an individual from bones alone. For instance, sex identification often can be determined by the differences in the pelvis and skull. Even bone fragments may be sexed; some chemical components of bone differ between men and women. Age at the time of death can be estimated very closely by



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looking at the teeth and at the fusion between different parts of the same bone, especially for children and young adults. For older people, the estimates are less exact and rely more on changes in joint surfaces, fusion between skull bones, and microscopic details of internal bone structure. Height is estimated by the length of the long bones, especially the thigh. Race can often be determined by looking at characteristics of the facial skeleton. Statistical studies of tooth, skull and face shape can even distinguish closely related groups within the same major race.

The skeleton reveals information about lifestyle as well. Well-developed muscles leave their mark on bone and tell of heavy physical activity during life. Habits (such as pipe-smoking) and handedness may leave traces on teeth or in asymmetric bone and muscle development. Health, injuries, and many diseases, such as syphilis, tuberculosis, arthritis, and leprosy, may leave traces on bone. A subfield of physical anthropology, paleopathology, is devoted to the study and diagnosis of diseases in ancient human remains.

From these studies, paleopathologists are often able to provide medical insights on the history and ecology of modern human diseases. For instance, childhood illness or malnutrition can be detected by abnormalities in tooth enamel and bone mineralization. By noting the position of these abnormalities, physical anthropologists, with their knowledge of normal growth patterns of bones and teeth, can often pinpoint at exactly what age the illness or growth disturbances occurred. From this can be determined whether a child's health problems were caused by a sick or poorly nourished mother, by early weaning, or by later periods of food shortage.

Victim Identification

Because of their skill at piecing together an individual's life history from skeletal clues, physical anthropologists are constantly in demand to help identify humans who have been the victims of accidents or foul play. The forensic anthropologist can tell authorities if bones are human, and if disarticulated, whether or not they all come from the same individual. Today, physical anthropologists are helping Argentinean authorities locate and identify skeletons of people kidnaped and murdered by political extremists during Argentina's period of upheaval in the past decade. Recently, anthropologists helped confirm the identification of a skeleton attributed to Nazi war criminal Josef Mengele. Other scientists use information learned from studying museum skeletons to help provide facial reconstructions of what missing children might look like several years after their disappearance.

Burial Remains

Why do scientists collect and study more than one skeleton from the same site or cemetery? Isn't one enough? The answer depends on what questions the scientist wants to answer. Although a single skeleton can tell us much about an individual, that person is known only in isolation, and people don't live in isolation. To the anthropologist, much more important information about whole social groups, their history and relationships with neighboring and past cultures, their diet and health, and also their social customs and relationships can be obtained only by studying large numbers of skeletons from the same culture or living site. Such population-wide studies require many specialized analytic techniques that depend on having large numbers of observations in order to be valid.

The Case of the Ainu

Many of these population studies have provided information about past human migrations, declines, and relationships that were unrecorded even in traditional stories and myths. For instance, research by anthropologists on the Ainu of Japan has resolved some long-standing questions about their origins. The Ainu are considered by most Japanese to be a low status ethnic minority whose physical features are somewhat different from the majority population. Although Japanese tradition holds that modern Japanese are descended from the prehistoric Jomon culture found throughout Japan, two studies now show that the Ainu are the true descendants of

the Jomon people. According to studies of minute variations in teeth and skulls of the modern inhabitants of Japan, and of various prehistoric cultures from Japan and other parts of Asia, the modern Japanese are most likely the descendants of invaders from northern China called the Yayoi, who conquered the islands a little over 2,000 years ago. An interesting twist to the story is that many of the medieval Japanese warrior class, the samurai, show physical features that suggest that they were descendants of Jomon mercenary armies recruited by the Yayoi during their military conquest. As the samurai gained power and status, they eventually intermarried with the Yayoi ruling classes and passed on some of their typically "Ainu" facial traits into the modern upper classes of Japan. Today's Ainu are the descendants of unabsorbed Jomon populations who were pushed into increasingly marginal areas by the Yayoi-Japanese and their Jomon-derived samurai.

Similar kinds of studies have been used to provide answers to questions as diverse as how many waves of prehistoric immigrants populated Australia, how much white admixture there is in various Amerindian groups, and how much intermarrying there was between Pueblo groups in the Southwest and Europeans during the contact period. Other researchers using the same techniques have been able to chart the progressive distinctiveness of Amerindian groups from other Asians and Pacific island populations to estimate when Amerindian migrants first entered the Western Hemisphere and when the various tribes became separate.

Mohenjodaro Revisited

Scientists utilizing new techniques have even been helpful in resolving questions about classical civilizations. The city of Mohenjodaro, the center of Harappan civilization in the Indus Valley, was thought to have been sacked by Aryan warriors invading in 1500 BC. After studying the human remains from Mohenjodaro, anthropologists have now concluded that no massacre ever occurred because they found no battle injuries on the bones. They also found no evidence of genetic differences between populations before, during, and after the decline of Mohenjodaro, which makes an invasion of foreigners very unlikely. However, the skeletons did show high levels of disease and parasites, which might have been a more important cause of the Harappan decline than any invasion or conquest.

Disease, Diet, and Demography

Studies of cemeteries show scientists how human groups interact with their environment, and how they in turn are affected by changes in the physical world they occupy. Reconstructions of demography, diet, and growth and disease patterns help physical anthropologists understand the ecology of prehistoric groups and make some surprising discoveries about human adaptations, such as the health costs of agriculture, and the origins of some modern human diseases.

Many diseases can be diagnosed from skeletons, and it is sometimes possible to recover fossilized bacteria, and occasionally, amino acids for blood typing directly from bone. One extensive study of Grecian cemeteries from ancient to modern times traced the increase in malaria-resistant anemia (thalassemia, similar to sickle-cell anemia in Africa) in Grecian populations, and showed the effects of changes in ecology and social and economic patterns on the health and lifespan of ancient and recent Greeks. By looking at groupings of skeletons in cemeteries, the scientist was also able to reconstruct families or clans, and to show that anemic groups were more fertile than others.

Studies of skeletons can also tell what people ate, even without having any cultural information. Some techniques measure certain chemical isotopes and trace elements in ground bone. These amounts will differ, depending on the proportion of meat to vegetables in the diet, and on the type of plant foods eaten. Results have shown that in some prehistoric groups men and women had different diets, with men sometimes consuming more meat and women eating more plant foods. Other studies have shown that different diets leave different microscopic scratch patterns on tooth

surfaces, and several kinds of prehistoric diets can be distinguished in this way.

Changes in diet often cause changes in health, which can be seen in the skeleton. The shift to maize in the prehistoric Southwest coincided with an increase in porous bone in skeletons, a sign of iron deficiency anemia. In maize farmers from Dickson Mounds, Illinois, defects in tooth enamel, which are caused by stress during childhood, are more numerous. Infant mortality was also higher, and adult age at death lower than in pre-agricultural groups. Similar studies of Hopewell mounds concluded that the agricultural Hopewell had more chronic health problems, dietary deficiencies, and tuberculosis than pre-agricultural groups. Agriculture is usually thought to bring an improvement in quality of life, but the surprising conclusion that prehistoric agriculture marked a decline in general health in the New World has been confirmed by many other studies.

Recent Population Studies

Studies of human skeletons can be useful even for recent populations, when written records are limited or have been lost. Several studies have reconstructed the living conditions of African-Americans both during and after the end of slavery. Skeletons recovered from an 18th century New Orleans cemetery showed many differences in nutrition and physical stress between urban and rural slaves. Skeletons from a late 19th-early 20th century cemetery in Arkansas open a window on this period, which is not well documented by other historical sources. Researchers concluded that men commonly left the community (there were few male burials), and that some of the community intermarried with the local Indian population. On the whole, the population was poorly nourished and had low resistance to disease. Many infants died at birth of widespread bacterial infections. Childrens' skeletons show dietary deficiencies and chronic infections, with many dying at 18 months, the weaning age. Iron deficiency anemias were common, probably due to corn-based diets; high levels of arthritis indicate heavy physical labor; and many signs of injuries on male skeletons may be evidence of high levels of interpersonal violence. Even without written records, the skeletons in this Post-Reconstruction community tell us of continual malnutrition, poor health, and levels of physical stress, which even exceeded those found in some communities during slavery.

Ancient Diseases in Contemporary Populations

Physical anthropologists find many contemporary diseases in earlier human populations. Some show peculiar distributions in the United States today, which can sometimes be tied to disease prevalence in the past. One of these is osteoporosis, a weakening of bone due to a calcium-poor diet and low bone mass resulting from low exercise levels during life. This condition afflicts primarily elderly white females, leading to spontaneous fractures and spinal deformities. Surprisingly, anthropologists have discovered that osteoporosis is common in living and prehistoric Eskimos of both sexes, and appears at an earlier age when compared to American whites. However, fractures and spinal problems have not been common in Eskimo populations. In spite of the traditional calcium-poor Eskimo diet, vigorous exercise results in heavier bones that protect the individual in old age. Now however, increased lifespan and alterations in lifestyle may contribute to a rise in osteoporotic bone disorders in Arctic populations in the future.

Evidence of a disease in prehistory is sometimes useful in understanding its cause. Osteoarthritis is often found in prehistoric skeletons. Changes in the locations and numbers of joints affected, and in the proportions of men and women afflicted, have suggested that systemic factors affecting only one sex may be involved in the severity of modern arthritis, an insight that may help focus further research efforts. Studies of prehistoric skeletons have shown that high levels of tooth decay are typical only of agricultural populations. This has led to the observation that sticky carbohydrates common to most agricultural diets have something to do with the epidemic of tooth decay modern populations are experiencing. But mineral deficiencies

(continued on p.14)

HAPPY BIRTHDAY!

Our new look signals a rite of passage: *Anthro.Notes* is ten years old this spring! As anthropologists we celebrate an important milestone; as teachers we want to tell our story to those who were not with us at the beginning.

In The Beginning

The cartoon below, drawn in 1978, marks our mythical moment of birth. That spring four anthropologists, two affiliated with the Smithsonian Institution (Ruth Selig and Ann Kaupp) and two with George Washington University (GWU) (Alison S. Brooks and JoAnne Lanouette), created a new kind of museum/university teacher training program under the auspices of the National Science Foundation: **The Smithsonian Institution/George Washington University Anthropology for Teachers Program**. The cartoon, drawn by GWU anthropologist/ artist Robert L. Humphrey, served as program logo. The 1979 reviewers at the National Science Foundation encouraged us to continue the program but suggested we create a continuing link with our graduates. We thought the idea a splendid one and responded with a program newsletter. We called it *Anthro.Notes*!
(See pp. 8-9 for ten years of *Anthro.Notes* cartoons.)

That first issue, vol. 1, no. 1, (spring 1979), was six pages long. It focussed on news for the 50 teachers in our year-long teacher training program as well as for the 25 graduates from the 1978-79 program. It described the program, reviewed basic teaching resources, and announced upcoming events. Three hundred Washington area teachers received the spring 1979 issue.

Early Years

In the fall of 1979 we received a telephone call from the producers of the PBS Odyssey film series: would the *Anthro.Notes* team write an "Educator's Guide to Odyssey"--in one month's time! We spent our Christmas vacation writing furiously, and the extra materials we wrote --too much for the completed *Guide*--we published in *Anthro.Notes*. In April 1980, we received a call from a Council on Anthropology and Education board member asking us to organize a symposium on teacher training programs for the 1980 American Anthropological Association meetings in Washington, D.C. We did, invited our participants to the session, and distributed lots of copies of *Anthro.Notes*.

Meanwhile, the Smithsonian was receiving increasing numbers of letters asking for materials to help teach anthropology in classrooms. Requests for *Anthro.Notes* increased each month (today our mailing list reflects an international readership of 3000, about equally divided among precollege teachers and college and university anthropologists as well as institutional professionals, such as librarians, museum educators, historical society administrators, and state archeologists.) Our newsletter increasingly became a national publication bridging the worlds of education, anthropology, archeology,

museums, and professional societies. To answer the requests for teacher information, we pulled together materials created for our teacher training courses into teachers' packets available from the Smithsonian's Department of Anthropology's Public Information Office. Since *Anthro.Notes* editors and teacher training staff also directed this Public Information Office, the dual efforts dovetailed.

In the summer of 1980, Sol Tax, anthropologist and founding editor of *Current Anthropology*, wrote us a lovely note of congratulations on *Anthro.Notes*, "always good and getting better..." Robert Humphrey "is the best anthropological cartoonist I can recall." We were pleased and encouraged and increasingly serious about our publication and about the importance of anthropology in schools.

By the winter of 1982, *Anthro.Notes* had evolved into its present format of sixteen pages offering lead articles based on solid recent research on topics of interest to teachers; "Teachers' Corner" articles with tested, practical teaching activities; articles reviewing resources for teachers such as summer field opportunities, new curriculum packages, films, or books; and feature articles balancing the subdisciplinary coverage of the newsletter. Each issue cannot cover all subdisciplines, but through the year's three issues, we try to balance the articles among the traditional four fields of anthropology: physical anthropology, archeology, linguistics, and cultural anthropology.

Philosophy

Since 1982, the philosophy of *Anthro.Notes* has continued to reflect the philosophy of our teacher training program, first created with George Washington University (1978-1982) and then with the University of Wyoming (1984-1985). The Anthropology for Teachers Program, both in Washington and in Wyoming, had four major objectives: 1) to give teachers a firm foundation in anthropology; 2) to help teachers integrate the subject into their teaching; 3) to aid teachers in better utilizing their community's resources for the teaching of anthropology; and 4) to create a network of teachers, anthropologists, and museum educators interested in encouraging more precollegiate anthropology.

Teacher Training Program

To achieve these objectives, the teacher training program was structured with four separate components: a full year, eight graduate credit university course specifically designed for precollege teachers; a museum-based Anthropology Resource Center for Teachers filled with curriculum materials; the newsletter *Anthro.Notes;* and evening lectures by distinguished anthropologists. In Washington, D.C., the course was presented to 75 junior and senior high school teachers in three sections each year, focussing on eight monthly topics relevant to precollege classes such as Human Evolution; Civilizations of the Past; Native Americans; Socialization in Africa; and Language and Culture. Each monthly topic involved an introductory lecture; experiential, practical teaching activities; a seminar session with museum and university scholars; and a workshop at which teachers shared their own curriculum units. The four *Anthro.Notes* editors served as program staff, including Alison Brooks (director), former secondary school teachers JoAnne Lanouette and Ruth Selig (senior teaching staff), and Ann Kaupp (program administrator/newsletter editor).

Anthro.Notes

Mirroring the philosophy of the teacher training program, the newsletter tries to balance the research and applied side of anthropology. Through lead articles we have highlighted "cutting-edge" research on topics relevant to precollege teaching. These articles also have included controversial topics such as in: "Creationism ≠ Science," "PreColumbian Settlers: Fact or Fancy," "Speaking of Apes: Language Experiments and Communication Among our Closest Relatives," "Vinland Revisited: 986-1986," and most recently,"The Roots of Ancient Egypt."

We have shown an equally strong commitment to helping teachers bring anthropology into their classrooms by offering practical teaching strategies,

reviews of new resources, a yearly "summer opportunities" article, and helpful items in our "Do You Know" columns. Some favorite "Teacher's Corners" showed teachers how to teach family folklore, study community festivals, learn about stratigraphic analysis, teach human origins, and introduce anthropology through literature.

Finally, we have tried to draw from a wide range of resources, bringing as many of those resources in Washington, D.C. to teachers and anthropologists across the country. Whether through an article by a visiting Maasai post-doctoral fellow at the Smithsonian; or a review of a new Smithsonian exhibit that will be travelling throughout the country over the next few years; a teachers' corner drawn from a new commercially available archeology curriculum package; or an invitation to attend a conference or join a new task force on precollege anthropology education, we have tried to create a network of professionals who are interested in anthropology, believe in its relevance to their lives and the world around them, and who find it helpful to share research, teaching ideas, and resources among themselves.

It has been a pleasure to serve our readers for the past ten years, and we look forward to another ten years of *Anthro.Notes*!

Ruth O. Selig

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PRECOLLEGIATE TASK FORCE

The AAA has established a new national AAA task force on The Teaching of Anthropology in Schools co-chaired by Jane J. White (University of Maryland, Baltimore County) and Patricia J. Higgins (SUNY, Plattsburgh). Further information will appear in the fall issue of Anthro.Notes.

MEET THE EDITORS AND THE CARTOONIST

Alison S. Brooks

Alison is Professor of Anthropology at George Washington University and Smithsonian Research Associate. Her research specialties include the palaeo- anthropology of Central and Southern Africa as well as ethno-archaeology based on research with Botswana's San people.

Ann Kaupp

Ann directs the Public Information Office of the Smithsonian's Department of Anthropology, which produces bibliographies and teacher resource packets, in addition to *Anthro. Notes*. Ann is senior editor of *Anthro.Notes* and editor of a Department of Anthropology newsletter, *Anthropolog*.

JoAnne Lanouette

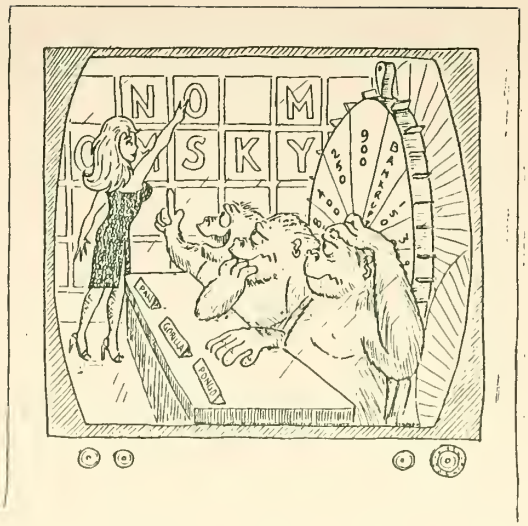
JoAnne teaches English at Sidwell Friends Upper School in Washington, D.C. and integrates anthropology into her senior elective, Individualism and Cultural Pressures. JoAnne has also enjoyed leading students to Japan and China.

Ruth Selig

Ruth serves as Special Assistant to the Smithsonian's Assistant Secretary for Research. She joined the Institution in 1975 to develop a new office of Information and Education for the Department of Anthropology. Ruth helped establish the AAA Task Force on Teaching Anthropology, and co-chairs its Committee Three: Review and Development of Curriculum Materials with Ann Kaupp.

Robert L. Humphrey

Bob is a professor of Anthropology at George Washington University and specializes in Mesoamerican and Paleoindian archaeology and the prehistory of Washington, D.C. An undergraduate major in art history, Bob has cartooned since the 1950's, mostly in the privacy of his own study. He became official *Anthro.Notes* cartoonist in 1979.



...ON TELEVISION (1986)

...ON PERSONALITY (1984)

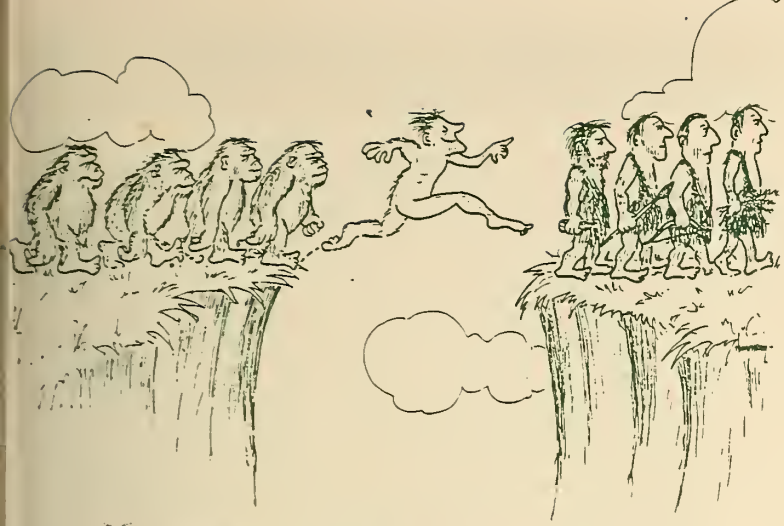
...ON ART (1988)

...ON THE MUSEUM (1986)

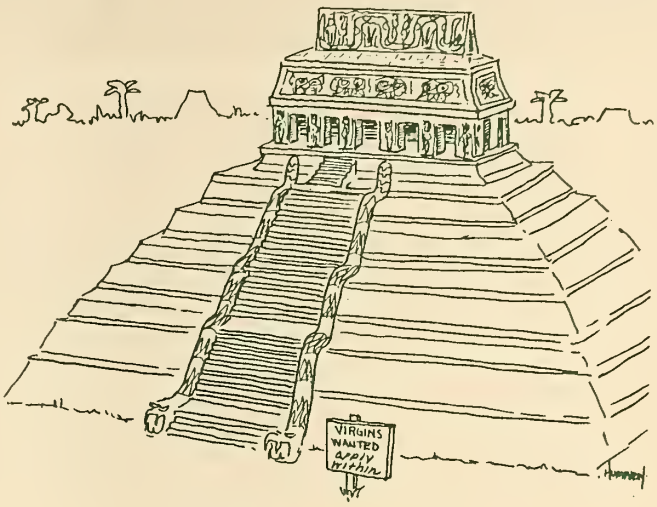
...ON SHELTER (1986)

...ON TECHNOLOGY (1980)

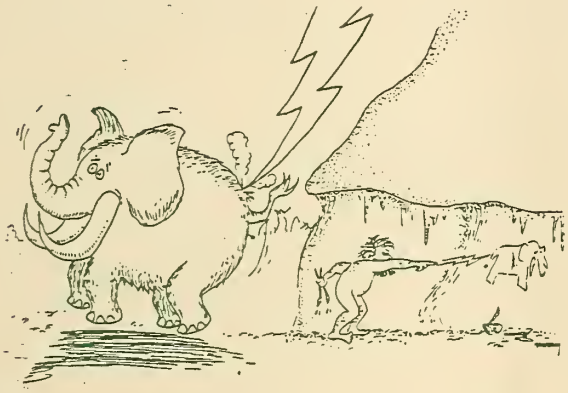
...ON CREATIONISM (1980)



... ON PUNCTUATED EVOLUTION (1987)

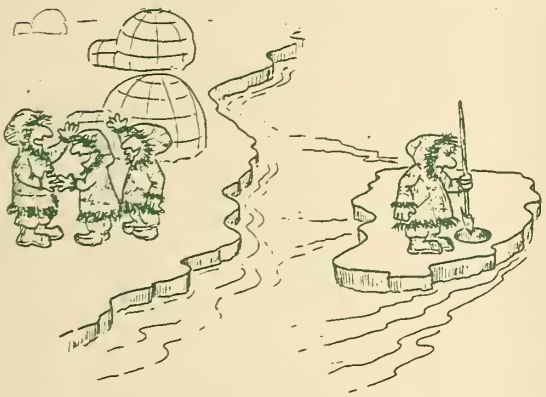


... ON SACRIFICE (1981)



... ON RELIGION (1982)

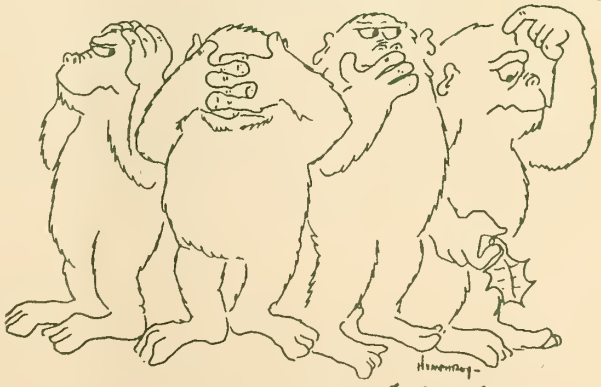
... ON FILM (1985)



... ON TRAVEL (1985)

... ON ETHNOLOGY (1981)

...ON FAMILY LIFE (1983)



... ON SEX (1979)

TEACHER'S CORNER: ARCHEOLOGY FOR THE MIDDLE SCHOOL

Although high school students can take an archeology class; dig in Williamsburg and Alexandria, Virginia, Cahokia Mounds, and Pueblo Indian sites along the Rio Grande; or study paleolithic art and archeology in the Dordogne, the middle school student has often been left out. **Project Archeology: Saving Traditions, (P.A.S.T.)**, an interdisciplinary archeology curriculum for middle school and gifted elementary school students, fills that need. It is a four month curriculum program with three units: The Artifact, The Site, and The Culture.

Each unit contains an introduction, advance preparations, safety guidelines, and at least seven sound and stimulating experiential group activities. For example, in the Artifact unit the student activities show how to make a stone tool; to describe, locate, and name an artifact; to sort projectile points; and to come face-to-face with the question of who owns the artifact. Many activities even take students outside the classroom.

The curriculum emphasizes problem solving approaches and combines science, mathematics, and language arts. It contains tests, student field notebooks, lists of State Historic Preservation Offices, a filmstrip and tape about "The Cutting Edge," and the game "Archeology: Can You Dig It?"

The game simulates a fictional archeological site located on the confluence of a river flowing into Puget Sound. The game board illustrates the topography of the area including a steep hill, a mud slide, and beaches, all important to the development of the site. The game cards represent three different cultural levels laid down over a period of 10,000 years, and fate cards determine how many excavation units an archeological crew can dig. As the creator of P.A.S.T., Nan McNutt explains: "Unlike many simulations, the importance of this game is not just in the decision and actions taken by each team but the actual analysis that must take place in order for a conclusion to be presented."

This curriculum has benefited from the close assistance of archeologists and from testing by teachers and students. The project was funded by the U.S. Department of Education. The drawbacks of P.A.S.T. are minimal: a few misspellings such as potatoe and ware; a few items difficult for students to bring from home; and a few overly complicated activities such as the mapping game. But, in the main, it is a sound, stimulating, and welcome curriculum. To purchase, write or call: Sopris West, Inc., 1120 Delaware Avenue, Longmont, CO 80501; (303) 651-2829. $40.

The following activity comes from **Project Archeology: Saving Traditions.**

DESCRIBE AN ARTIFACT

What's the Point?

The basis of any science is the researcher's ability to describe his/her observations. In archeology, describing and recording is not only necessary for artifacts but also for soil, features, fauna, flora and even the hunches an archeologist has while working with these materials. Quite often, an artifact is given a name based on its

description, because its use is unknown. In this activity, students will learn description skills and will develop an understanding for the need to precisely describe artifacts.

Time Required: Two to three class periods.

Materials Required:

An "unknown" artifact--some old object that the students may have never seen, e.g. apple peeler

Objects from a junk store or basement (approximately 30)

6 cardboard boxes
Paper and Pencil
Masking tape
40 index cards (3x5 inches)
metric rulers
string that is pre-measured into 3 meter lengths.

Preparation:

Place 5 dissimilar objects and 5 index cards (numbers 1-30) into each box.

ACTIVITY I: THE METRIC ME

Divide the class into groups of four to six. Assign each group a table with a box of five artifacts and ask the group to describe each artifact on individual index cards. The descriptions should include size, shape, color, etc. Measurements of the artifacts should be part of the description. The description should not include a drawing and the actual name or use (e.g. pencil, used for writing) should not be given. Each group should record their artifacts on a page of a notebook.

After each artifact has been "named" and recorded on index cards, have students put the artifacts and cards into the boxes but keep their notebook page. The groups should then exchange boxes and cards with each other.

After the exchange, each group of students should tape the index card to the specimen they think it describes, name each artifact using a "description" (e.g. bifacially flaked tool) and then return the box of artifacts to the original group. The original group should then check their match with the original list, and compare "description names" to choose the best name for the artifact. The "description names" can be shared orally or displayed with the artifact. Perhaps the students will invent even better names for the objects.

Discussion

Why is it so important for archeologists to use descriptions? What would happen if archeologists did not use descriptive names?

ACTIVITY II: THE UNKNOWN ARTIFACT

Present your "unknown" artifact. Ask students who know the name not to tell anyone. Using the chalkboard, have the class create an "index card" for this object. The index card should include the descriptors, a descriptive name and the possible uses of the object. When suggestions are exhausted, discuss with the class the reasons that archeologists describe artifacts in detail.

Have any students that know the name of the artifact tell its name. If no one knows the artifact, tell the students its name and what it was (is) used for. Have the students explore the ways in which they may have learned about the artifact.

JoAnne Lanouette

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SUMMER WORKSHOPS FOR HIGH SCHOOL TEACHERS

The American Anthropological Association (AAA) is sponsoring teacher workshops (for ex. Native American Medicines and Cures, Teaching Anthropology and Archeology, Northwest Coast Art and Prehistory, Flintknapping, Early Man in the New World) at the 1989 Circum-Pacific Prehistory Conference in Seattle, Washing-ton, August 2-6. For information contact: Conference Coordinator, Circum-Pacific Prehistory Conference, 1001 4th Avenue Plaza, Seattle, WA 98154-1001; (206) 464-6580. CEU credits offered.

ANTHROPOLOGY IN PUBLIC SCHOOLS: WHY SHOULD WE CARE?

Imagine the year 2010. On the campus of one large state university, the president is addressing the student body. She explains that in a recent university poll almost half the students identify themselves as belonging to a minority; less than 20% say they are not, to some degree, "ethnic." The president reveals that similar demographics are quietly transforming public schools across the nation, making it imperative that teachers be trained to deal with multi-ethnic student populations.

At the same time, the world's increasingly global society necessitates more teaching of cultural studies in the schools. To meet these changing needs, the state legislature has passed legislation designed to strengthen elementary and secondary education.

The imagined new law (1) establishes a five-year integrated education program whereby all education undergraduate majors must simultaneously earn a bachelor's degree in the liberal arts before obtaining teaching certification; (2) establishes new teaching certification requirements for all teachers that include at least six hours of coursework in subjects relating to cultural diversity, including a mandated course in anthropology; and (3) states that anyone applying for certification to teach high school social studies must have a minimum of six hours of anthropology.

Finally, imagine the president announcing that the anthropology department will be given three new faculty positions in anticipation of the increased need for anthropology teaching.

Is the above fantasy pure wish fulfillment? Perhaps so, but in 1988 the state of Illinois passed a law mandating coursework focused on cultural diversity for all newly certified teachers. Anthropo-logy is cited as one possible course to fulfill this requirement. Furthermore, 25 states now require teachers to obtain bachelor's degrees outside of education before they get their teaching certificates.

Several years ago AAA President Roy Rappaport called for ways to increase public awareness of anthropology and its influence on public affairs. If anthropology were an important part of teacher training and the high school curriculum--as psychology has been for decades--students would automatically go to college knowing about the subject. As a matter of course, public understanding of anthropology would increase, as well as awareness of anthropology's potential role in the world today and, more important, in the world of tomorrow.

The 1990s presents some unique opportunities for disseminating anthropology into the American educational system. These opportunities grow from new directions within education and within society, as well as from changes within anthropology itself. Within education, national studies, increased anthropology-related subject matter in the curriculum, and the growing ethnic diversity in American classrooms provide a strong context for precollege anthropology. Within anthropology, a growing acceptance of applied anthropology and a willingness to work within mainstream cultures afford opportunities for anthropologists to become involved with precollege anthropology. Most important is the growing awareness of the potential impact such efforts might have on the overall health and future of the discipline.

Changes within Education

National Studies, such as the 1983 Nation at Risk and the 1985 Holmes Report on Teacher Education that called for abolishing the undergraduate education major, propose more science and social science teaching as well as the strengthening of teachers' academic credentials. Some data indicate that the anthropology background of teachers has increased slowly but steadily over the past two decades. It is possible, though difficult to document, that the increased teaching of anthropology in our nation's colleges and universities in the 1960s and early 1970s has resulted in more teachers with anthropology backgrounds.

What is documented clearly is that at least 1500 teachers have participated in in-service anthropology teacher-training institutes over the past decade, the majority in National Science Foundation (NSF)- and National Endowment for the Humanities (NEH)-funded university-based teacher development programs.

Not only have new pressures for change emerged within the education establishment and not only are more teachers aware of anthropology, but additional pressures within school curricula also argue for more formal anthropology in teacher training. The social and intellectual ferment of the 1960s and 1970s left a legacy that had great impact on the schools of the 1980s, particularly in the curriculum and some of the textbooks. In social studies and history classes, the traditional text, once a chronology of political and economic events and elites, now includes at least a minimum treatment of the everyday lives of ordinary people, women's experiences, contributions of ethnic and minority groups, and descriptions of cultures previously ignored, such as Pre-Columbian Native American cultures or West African cultures ravaged by the slave trade. Much of the data and the concepts behind these new materials and approaches arise, of course, from anthropology. Teachers with anthropology degrees would certainly be better prepared to teach today's and tomorrow's curricula.

Changes within Society

Not only are more teachers today asked to teach anthropology-related materials in their classes, but more teachers are living daily with cultural diversity in their classrooms. The demographic shift is all around us: from California, where children from non-European ethnic backgrounds currently constitute 42% of the school-age population, to the Virginia suburbs of Washington, DC, where Asian-Americans comprise a majority in more than a few elementary public school classrooms. This growing diversity in the student population offers anthropologists an important opportunity to form partnerships with those responsible for teacher education and the formation of school curricula. One model exists in California, where anthropologist Carol Mukhopadhyay worked with education faculty at the state university to develop anthropology-based multicultural teacher education programs for education majors.

Changes within Anthropology

In addition to changes within the educational establishment, the school curricula, and society at large can be added the shifts marking anthropology as a discipline today. As anthropologist Sidney Mintz (Johns Hopkins University) has pointed out, "many of anthropology's most distinguished contemporary practitioners have turned their attention to so-called modern or Western societies," despite the fact that "anthropology has built its reputation as a discipline upon the study of non-Western peoples" (Mintz, *Sweetness and Power*, 1986). Moreover, anthropologists now are working in applied settings, both in the U.S. and abroad. As more anthropologists work in American society, perhaps more will turn their attention to school settings. Directing a teacher-training program, after all, is a type of applied anthropology, with the goal of infusing an anthropological component into precollege teachers' thinking and teaching.

For many reasons, anthropologists are particularly well suited to working in American schools. Because they have been trained to build bridges and to work as sensitive outsiders participating in other cultures, anthropologists possess essential skills for working in and promoting innovations within the subculture of schools. As anthropologists, they share with teachers the role of interpreter, for just as anthropologists try to understand and then interpret their subject matter to the outside world, so teachers interpret their subject matter to their students. In addition, anthropology often entails a strong personal commitment with which teachers can identify.

Though some anthropologists may argue otherwise, many would probably agree that anthropology belongs in our nation's schools, integrated into both the curriculum

(continued on p.15)

("Bones," continued from p. 4)

may also be involved, as some high levels of cavities and periodontal disease have been found in non-agricultural prehistoric Illinois Indians. Since the mineral content of ground water would affect the disease resistance of tooth enamel, such studies pointed to mineral supplementation of drinking water as a means of combating tooth decay. Tuberculosis has been found in skeletons as early as 5000 yrs B.P. in the Old World and by at least A.D. 1000 in the New World. It is associated with keeping livestock and living in sedentary or urban centers. Cemetery studies in Europe have shown a curious relationship between tuberculosis and leprosy, also a very ancient disease. Skeletons rarely show signs of both diseases, and as tuberculosis became more common in Europe in the late Middle Ages, signs of leprosy in European skeletons declined. Medical researchers now speculate that exposure to tuberculosis provides individuals with some immunity to leprosy.

Some health problems are more common in Native Americans than in the general population. One of these is rheumatoid arthritis, which had been thought to be a recent disease possibly caused by an infection. The discovery of rheumatoid-like lesions in prehistoric American Indians has changed the focus of medical research on this disease. Another condition more common than expected in some Native American tribes is the cleft palate/cleft lip complex of congenital bone defects. Clefting of the face has been found in prehistoric skeletons from the same region, though it is not as common as in the modern population. It is not known whether this shows a real increase in the problem, or if burials of prehistoric babies who died from their condition are simply not recovered as often as adults. Some researchers speculate that the increase, if real, might be the result of more inbreeding in tribal populations than would have occurred in the past, after groups were confined on reservations, and traditional migration and marriage patterns were disrupted.

Patterns of Social Organization

It might seem surprising that we can learn much about the patterns of political and social organization of past cultures from a study of bones, but in fact physical anthropologists and archaeologists can discover a great deal about social customs in prehistory through studies of cemeteries. This is only possible, however, with data about age and sex of each burial.

Evidence of status and marriage patterns are often visible in cemetery populations. Anthropologists studying skeletons from the prehistoric North American site of Moundville, Alabama, reconstructed three different status groups in Moundville society. These included individuals whose remains were either used as trophies, or were possibly sacrifices sanctifying the mound-building process, an intermediate group containing both men and women, and a high-status group composed entirely of adult men. By analyzing genetic differences among men and women in the same cemetery, it is often possible to reconstruct marriage and residence patterns. For instance in one study of prehistoric and historic Pueblo cemeteries, women in each cemetery had very similar genetic markers, while the men in each group were quite variable for those same traits. This indicates that women lived and were buried with their kin groups, while men lived and were buried with unrelated groups. The ancient Pueblo people were matrilocal, just as the modern tribes are today. Some studies have revealed a relationship between an individual's status during life, and his or her physical characteristics, such as height. Taller people tend to have higher status markers in their graves in several prehistoric cultures. This is more often true for men, but in some groups taller women also had higher status. By studying skeletons for indications of growth disturbances and disease, scientists can sometimes tell whether the greater height of high status people was due to better diet and more resources, or whether they were just genetically predisposed to be taller.

Conclusion

The above examples show how anthropologists can learn about many facets of the lives of individuals and communities of past cultures by studying the skeletal materials. The study of modern, historic, and prehistoric skeletons has made it possible for anthropologists to contribute an enormous and diverse array of information about human behavior and morphology past and present. None of these studies could have been accomplished without thorough study of human skeletons. To obtain this information, scientists commonly use techniques that were unheard of and unanticipated even a generation ago. It is certain that many more new approaches to reconstructing past lives from bones will be discovered in the future. Many collections may be studied and restudied, in the quest for new answers to old questions, or for answers to new questions altogether.

Prehistoric populations left us little of their history and experience from which to learn. By careful study of their skeletons, we gain an understanding of ancient humans that would not otherwise be possible. The late J. Lawrence Angel, a noted Smithsonian physical anthropologist and forensic expert, always kept a sign in his laboratory: "Hic locus est ubi mortui viventes docent." In this place, the dead teach the living. They teach us about the past, and if we listen carefully, about the future as well.

Recommended Reading:

Brothwell, D. R. Digging Up Bones. 3rd ed. Ithaca, NY: Cornell University Press, 1981.

Ubelaker, D. H. Human Skeletal Remains. 2nd ed. Washington, DC.: Taraxacum, 1989.

Wells, Calvin Bones, Bodies, and Disease. New York: Praeger, 1964.

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("Public Schools," continued from p.13)

and teacher education. Because anthropology provides a broad cross-cultural perspective, and a framework within which to teach many other precollege science and social science subjects, some would even argue that it should be the basic building block for elementary education and a required subject for secondary school natural and social science teachers. By teaching anthropology to teachers, a perspective and framework are offered within which teachers may better understand the many seemingly diverse fragments of their curricula, enabling them to approach their subjects--geography, social studies, world cultures, history, biology, earth science, language, literature and the arts--in a more coherent and less ethnocentric fashion. As anthropologist Larry Breitborde (Beloit College) has argued, if more anthropologists were to conceive of precollege education as one special form of applied anthropology, perhaps more would be willing to become involved in this important arena critical to the public understanding of the discipline.

If anthropologists are serious about wanting greater public understanding of anthropology, then we would do well to become involved with precollegiate anthropology, through working with teachers, schools and students. If anthropology belongs in our nation's schools, if teachers function better when trained in our discipline, then anthropologists must bear a major responsibility for encouraging anthropology in schools, by working with school administrators, teacher-training establishments and textbook publishers. Fortunately, such work is not only important, but has been demonstrated to be personally satisfying, intellectually stimulating, and professionally productive.

Ruth O. Selig

(Originally published as the "Commentary" in the Anthropology Newsletter, February 1989.)

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ANTHRO.NOTES, a National Museum of Natural History Newsletter for Teachers, is published free-of-charge three times a year (fall, winter, and spring). Anthro.Notes was originally part of the George Washington University/Smithsonian Institution Anthropology for Teachers Program funded by the National Science Foundation. To be added to the mailing list, write: P. Ann Kaupp, Public Information Office, Department of Anthropology, Stop 112, Smithsonian Institution, Washington, DC 20560.

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