ANTHRONOTES™

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GOING DIGITAL

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"I find some jewel in each AnthroNotes*," wrote one linguistics professor, and a California teacher assured us: "every issue has something I can use in class." In July, a former teacher, museum professional and amateur archaeologist wrote from Mt. Desert Island, Maine: "It's probably been decades that I've…enjoyed your informative newsletter. The issues not kept for reference [go] to the local library [where] they are widely read…your work is appreciated."*

This special issue marks our thirty-third year of publication – and our *print to digital* rite of passage. While preparing our last print issue, however, we can also announce that *AnthroNotes* soon will be re-purposed by using technology to scan, convert, upload, package, tag, and recombine 33 years of materials that will become even more accessible, usable, relevant, and connected for teachers and the general public. Under the guidance of our new digital editor and anthropologist Colleen Popson, currently with the National Museum of Natural History Office of Education and Outreach, we will be "bundling" *AnthroNotes* articles and teaching activities under topics of wide interest, such as Human Origins, Africa, Arctic cultures, Evolution, Asia, Race, Archaeology, and Languages. We hope that *AnthroNotes* will gain even greater relevance to classrooms around the globe. We will keep you posted at http://anthropology.si.edu/outreach/outrch1.html.

At our 25th anniversary symposium in Denver, Colorado, held at the Society for American Archaeology's annual meeting, former SAA President Jeremy Sabloff spoke about *AnthroNotes*' mission of keeping its readers up-to-date on developments in the field. "This mission," Sabloff said, "has been fulfilled in an exciting and stimulating if not daring manner…not by publishing bland syntheses of consensus on 'safe' topics, but by offering well-edited pieces of cutting-edge thinking by major scholars in the field."

AnthroNotes has always been a labor of love – even at its creation as part of the NSF-funded George Washington University (GWU)-Smithsonian Institution Anthropology for Teachers Program. *AnthroNotes* grew into a 20-page publication with research-based articles and classroom-tested teaching activities. Today the *AnthroNotes* mailing list includes almost 10,000 pre-college, university, and museum anthropologists and educators from all 50 states and 50 countries worldwide. Through its digital version available on the internet, *AnthroNotes* reaches tens of thousands of readers worldwide.

Throughout our history, *AnthroNotes* editors have tried to choose topics central to the discipline but of wide interest. Articles are written by leading scholars specializing in the chosen topic. Many of these articles have been reprinted in other volumes for even wider classroom use.

This will be the last print issue of *AnthroNotes*.

To sign up for the digital publication, go to:

http://anthropology.si.edu/outreach/anthronotesForm/anSignupForm.cfm

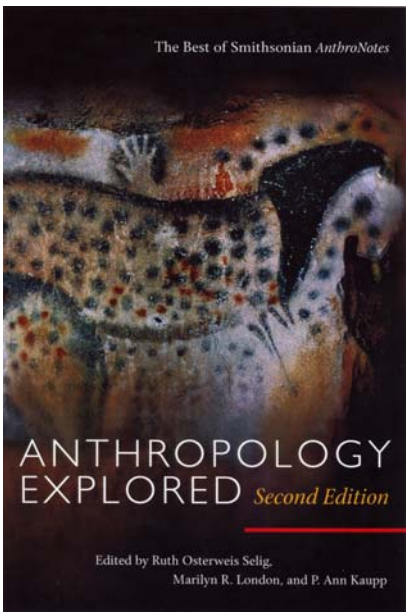
AnthroNotes reflects the many changes that anthropology has gone through over the past three decades. For example, lead articles reflect the discipline's growing concerns with relevance, social issues, collaboration, and close ties to the communities studied, as well as anthropologists' increased involvement in the social and international issues of their day. Today we see an anthropology discipline with new agendas, increased access to data, use of new technologies, and a deeper involvement with communities, including Native colleagues and collaborators.

In 2002, the SAA honored *AnthroNotes* with the Society's Excellence in Public Education Award "for contributions to the public understanding of anthropology and archaeology." The award also recognized the compendium of *AnthroNotes* articles, *Anthropology Explored: The Best of Smithsonian AnthroNotes,* edited by Ruth O. Selig and Marilyn R. London. In 2004 a revised, expanded 2nd edition was published – edited by Selig, London, and P. Ann Kaupp, along with an online Instructor's Guide.

Through time, our mission has remained the same, but our staff has changed. Our cartoon illustrator, GWU anthropology professor Robert L. Humphrey, passed away in 2002. Bob's cartoons offered our readers humor and insight, and fortunately, we have been able to continue using them. In 2008, JoAnne Lanouette retired from both the Sidwell Friends School and from *AnthroNotes*. She was replaced by Carolyn Gecan, long-time anthropology teacher at Fairfax County, Virginia's Thomas Jefferson High School for Science and Technology. The three founding editors – Alison S. Brooks, P. Ann Kaupp and Ruth O. Selig – have continued, although Ruth retired from her Smithsonian staff position in 2010. Ann is retiring December 29, 2012, and Carolyn Gecan retired in 2012 from her teaching position in Virginia.

The Museum of Natural History that has supported the printing of *AnthroNotes* is creating a new Learning Center, opening in 2013 (see pp. 15-17 of this issue). Fortunately, anthropology will be an important part of the Center and its outreach. We encourage our readers to continue accessing not only *AnthroNotes* resources online, but also all the educational offerings of the Museum (http://www.mnh.si.edu/education/).

The AnthroNotes Editors



Anthropology Explored, Revised and Expanded. Edited by Ruth Osterweis Selig, Marilyn R. London, and P. Ann Kaupp (Smithsonian Books). Foreword by David W. McCurdy; illustrations by Robert L. Humphrey. Cover photo © Jean Vertut. [Limited copies still available.]

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THE FUTURE OF THE PAST

by Alison S. Brooks

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When *AnthroNotes* began publishing in 1979, what we knew about human evolution and how we studied it differed significantly from today. Field research among wild populations of great apes by Jane Goodall (chimpanzees), Dian Fossey (mountain gorillas), and Birute Galdikas (orangutans) had provided exciting new data for modeling the likely capabilities of our earliest ancestors. Ecologically focused field studies of living hunter-gatherer populations such as the Ju/'oansi in southern Africa, the Mbuti in the eastern Congo basin, the Hadza in northern Tanzania, and other groups throughout the tropical and sub-tropical world provided new ideas about how ancestral hunter-gatherers might have lived – using a mobile life style without domestic animals. Social systems were fluid. Nourishing toddlers in the absence of domestic animal milk and soft vegetable foods required mothers and infants to stay in close contact throughout the day and night. Vegetable foods were more important than meat in the diet; women brought in more calories than men did through a daily foraging round; and long-distance exchange networks alleviated the ever-present risk of starvation when local resources failed.

By 1980, teams searching for fossils in some regions could employ more precise dating techniques. Especially important were those based on an atomic "clock" in which radioactive isotopes decay at a known rate, beginning with radiocarbon in the 1950s and potassium argon in the 1960s. Deep sea and ice cores provided material and dates for understanding both climate change through time and changes in the earth's magnetic field that could be correlated to land-based sequences.

Further exploration of new regions in the rift valleys of Kenya (Lake Turkana) and Ethiopia (the Awash and Omo valleys) yielded a large number of early fossils relating to the human lineage. But the study of such fossils was largely confined to observations and direct measurements, comparing fossil specimens to one another and to skeletal remains of living apes and humans. In the dawn of the computer age, — the home computer was *Time's* 1982 "person of the year" — statistical analysis was laborious and limited.

Not only was the computer revolution in the future, but so was the genetic revolution. The 1987 publication of the "African Eve" hypothesis, arguing that all humans today are descended from a 'recent' African ancestor and not from the earlier inhabitants of Europe and Asia, strongly challenged existing ideas. Neandertals, "Peking Man," "Java Man," and others were largely (although perhaps not entirely) out of our direct ancestral line.

As in so much else of the modern world, technology revolutionized the study of human evolution. Scientists began to use new imaging techniques for studying and reconstructing fossils; new geochemical techniques for dating sites and reconstructing ancient diets and environments; and new motion sensor equipment to understand how bones and muscles are used in various activities. Today a field team looking for fossils is likely to include more geochemists and geoscientists than "physical anthropologists." Anthropology departments' laboratories now are less likely to hold skeletal remains of modern humans or caged primates and more likely to contain live mice, sheep, snakes, hyraxes and other experimental animals, along with CT scanners, treadmills, 3-D digital scanners and printers, and equipment for chemical or physical analysis.

Scanning the Past

Both fossils and artifacts are routinely "digitized" or scanned by CT (computerized tomography) or 3-D digital scanners to produce digital images that can be statistically analyzed, manipulated, and compared. These differ from digital photographs in that the images are three-dimensional and are created by complex computerized computations. A micro-CT scanner has an extremely small X-ray beam, so that each pixel has a resolution of a micron or less (one thousandth of a millimeter). After the scanner produces vertical X-ray "slices" of an object, a computer then puts the slices together to create a 3-D image that shows the internal structure of the object.

To reconstruct a fragmentary skull of the new 4.4 million-year old Ethiopian fossil hominin ancestor called "Ardi" (*Ardipithecus ramidus*), University of Tokyo anthropologist Gen Suwa used a micro-CT scanner to create digital X-ray images of 65 tiny fragments. He then spent hundreds of hours manipulating the fragments digitally to create one image of the skull. By using a 3-D printer that extrudes a plastic resin copy of each slice of the scanned object and glues the slices together, a physical model could be produced of that image. (You can sometimes see the actual slices if you look closely at the plastic.). Swiss scientist C. Zollikofer and others used this technique to reconstruct the somewhat squashed and distorted skull of "Toumai," the ca. 6-million-year-old hominin ancestor from Chad (*Sahelanthropus tugenensis*).

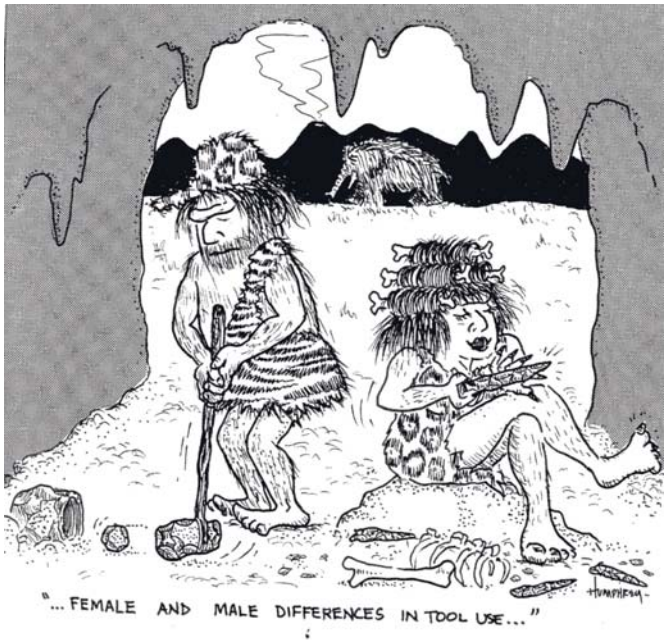
Micro-CT scans also can reveal the thickness of tooth enamel, which relates to diet; the underlying structure of the top of the dentine layer if the enamel is too worn to tell what species of hominin the tooth came from; or the orientation of the bony lines of strength or "trabecular bone" in the spongy interior of long bones. These tell us about the force exerted on the bone by the muscles and hence how the limb was used. Portable micro-CT and digital scanners have enabled researchers to digitize and CT scan fossils while they are working in the museums and labs of the host country.

Archaeologists use 3-D digitization and statistical techniques for the geometric comparison of shapes among stone arrows, art, and spearheads. University of Toronto Ph.D. Jayne Wilkins and others used statistical scans of use wear on the edges of ca. 500,000 year-old stone points from South Africa to demonstrate that they were indeed points and not knives or scrapers, since the use-wear was equivalent on the two sides of the points.

George Washington University's Brian Richmond and Dave Braun have been experimenting with laser-scanning and composite photography to replicate and make physical copies of entire hominin footprint trails and site surfaces dating back thousands and even millions of years in Tanzania and Kenya. The photogrammetry or composite photography technique uses multiple cameras and computer techniques to stitch the images together, and then prints replicas of the footprints on a 3-D printer. The scientists and their team were able to calculate not only the size of the feet (and the attached humans) but also the probable sex (and age, for children) of the foot's owner. This information illuminated the group's social composition, which, at one point, included a group of women and children travelling with one man – a window into a prehistoric moment almost 200,000 years ago.

The Genetic Revolution

The genetic revolution brought us new data and ideas about human evolution at an ever-accelerating pace. When *AnthroNotes* began publishing, many geneticists worked on traits that were expressed in individuals, like blood groups or immune antigens. The first actual DNA sequences of

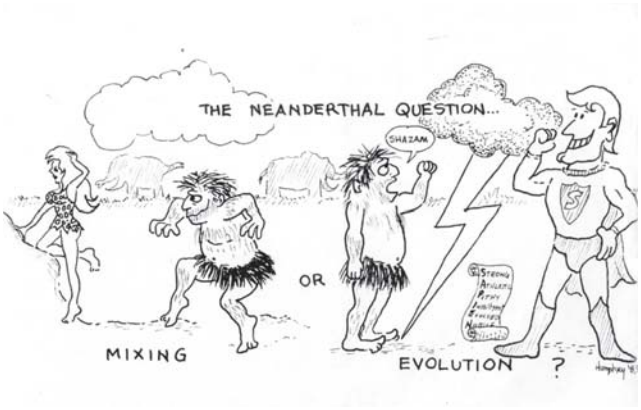


primates in the 1970s and 1980s resulted from labor-intensive methods that applied electric fields to a few DNA samples. Since about 2005, several methods and machines could analyze huge amounts of DNA simultaneously, enabling the relatively rapid sequencing of entire genomes, including our own and that of some of the great apes. Methods for extracting and studying DNA from human remains have become much improved. While applications of ancient DNA techniques to fossils have led to startling discoveries about our prehistory, the greatest need for careful analysis of DNA remains in the forensic science efforts to identify rapists and murderers, as well as the dead, including long-missing remains of fallen soldiers.

Ancient DNA and Human Evolution

DNA exists in the nuclei of cells and also in the mitochondria, small organelles in the cell that help to generate energy. Mitochondria are inherited almost entirely from the mother. DNA recovered from the dead or from fossils has largely broken down into short segments and is a mixture of human DNA, bacterial DNA, and other contaminating DNA. Bacterial sequences can be distinguished fairly easily from human ones – but contaminating sequences can prove more difficult. Unless the excavators wore gloves, fossils may contain fresh contaminants representing the DNA of the excavators, the cataloguers, the lab techs, or others. In one case, a large amount of domestic cat DNA showed up in ancient human remains from the New World, with individuals who died long before domestic cats arrived with the European colonists; the excavator turned out to have multiple cats at home.

Since informative mitochondrial DNA sequences are shorter than ones found in the nucleus, and since there are many mitochondria in each cell, the first studies of fossil DNA looked only at mitochondrial DNA. As of 1997, these studies had indicated that Neandertals and modern humans did not interbreed. Additionally, they confirmed Cann's 1987 initial argument suggesting that the genomes of modern humans were entirely derived from Africans living ca. 200ka or more years ago. The last common ancestor was termed the "African Eve" because we only had the female side of the story. With the advent of nuclear DNA sequencing, geneticists began to develop the genetics of the Y-chromosome, since it was a shorter sequence than the others and passed on only from father to son. Results of the Y-chromosome studies were similar in



arguing that all modern human males descended from an African common ancestor (African 'Adam') but with a younger age for the last common ancestor.

In 2010, the draft sequence of a large part of the Neandertal nuclear genome suggested that Neandertals had, in fact, interbred with the ancestors of modern Eurasians, who are, on average, 1-4% Neandertal — but not with Africans. Furthermore, the separation of modern human and Neandertal lineages was as much as 500,000 years ago or even more. At the end of 2010 came an even more startling discovery – that an entirely new archaic species that lived at the same time as Neandertals and early modern humans had been found in western Siberia, but not "found" in the traditional sense. The entire fossil list of this species, from Denisova Cave, consisted of a molar tooth and a finger bone, — not much evidence on which to define a new species, although the tooth was different from those of Neandertals and modern humans. The DNA of these two pieces matched, but was different from the DNA of both the Neandertals and the modern humans. The degree of difference suggested that the last common ancestor lived close to 500ka, (or 400-800ka) ago.

In 2011 and 2012, other studies showed that southeast Asians and Australians have 3-5% "Denisovan" DNA, reflecting ancient admixture between the two species but also ca. 2.5% Neandertal DNA. One scenario posits that as the modern humans left Africa, they met Neandertals somewhere in the Near East and continued to Asia, where some of them — going southeast — ran into the Denisovans and interbred with them as well. Alternatively, the first SE Asians and Australians only ran into the Denisovans, and a later migration brought people who

went through the Neandertal region. Denisova cave also contained evidence of Neandertals, which extended the Neandertal range about 2,500 km to the east of the previous eastern limit in Uzbekistan.

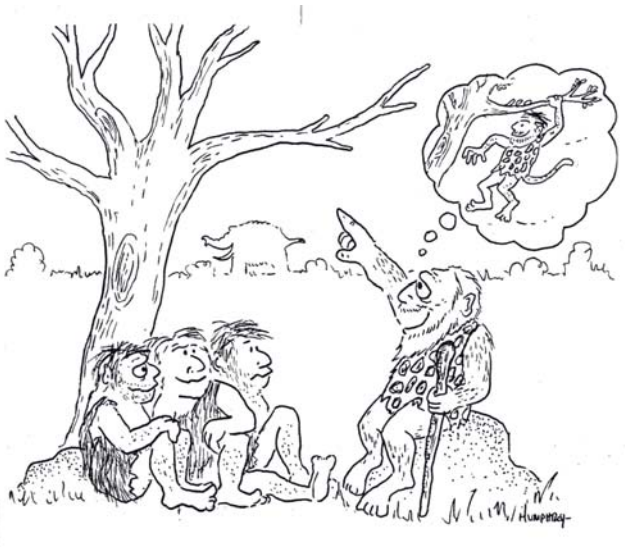
What sorts of genes did Eurasians acquire from Neandertals and Denisovans? Probably they inherited the genes for light skin, as well as for some antigens that protect against disease. Other genes will certainly be discovered as the studies proceed. In 2011, a genetic study of Africans suggested that they also carried genetic material from an admixture with an archaic species, but as yet there is little trace of the bones of the species in question, or any idea of where in Africa this species lived.

Also in 2011, a re-study of an 11,000 year-old skeleton from Nigeria, Iwo Eleru, suggested that it was not entirely a modern human but represented an archaic lineage. Thus genetics has suggested a much more complex picture than was posited earlier, with at least four and perhaps five different human species (*H. sapiens, H. neandertalensis,* 'Denisovans' in Asia, and 'hobbits' on Flores Island in Indonesia) sharing the old world between 200,000 and 50,000 years ago, and with multiple migrations out of (and into?) Africa.

Anthropologists and geneticists are also using genetics to figure out what genes contribute to the development of different body parts, capacities, and other features. Some of this is done with 'knockout' mice, in which normal mice are bred to lack the gene that is the target of interest. Such studies are combined with worldwide studies of variation in the characteristic or body part under study, and efforts to identify what is genetically unique among those who share a deficiency in the functioning of the body part or facility in question.

Capturing and Modeling Motion

When the *Lord of the Rings* film trilogy created the Gollum character using computer graphics, the developers created his movements by having a real actor model the actions by going through the same motions in a motion capture laboratory. Such a lab places markers on the moving parts of a person's anatomy, and then, using as many as 20 cameras, films the person moving in a particular way. A computer attached to the cameras integrates the sensor data, generates a moving stick figure and calculates separately the velocity and direction of each moving body part. The force



exerted by or on the body part can then be calculated using the average weight of the limb in question.

Using motion capture technology, Erin Marie Williams and Brian Richmond at GWU have studied the motions and forces involved in flint knapping, or making stone tools. One surprise, but not to the knappers, was that the distinctive long human thumb did almost nothing during this activity. Dan Lieberman at Harvard studies human running, with and without shoes, and its role in the development of our odd bipedal locomotion. Dan's student, Neil Roach, now at GWU, studies throwing. His research has shown that throwing is the most unique motion made by humans, and that no other animal has the same force and accuracy. Effective human throwing depends on the body rotating toward the throwing arm side just before the throw, as well as on the step forward by the opposite leg, so that the entire side of the body propels the arm forward like a whip.

Modeling Projectile Technology

A major question in human behavioral evolution concerns the development of complex projectile weapons: stone-tipped javelins, spear throwers, and bows and arrows. Such weapons require advanced cognitive capacities for imitation and innovation, as they are composed of three or more parts (stone tip, haft, and glue/adhesive/binding material, each of which requires a complex manufacturing sequence). Many archaeologists are experimenting with calibrated crossbows that provide a standardized amount of force, a dead goat or other animal, and a machine for

capturing the acceleration or force of the projectile – the latter can be as simple as a force plate, or as complex as a ballistics tester with a laser camera stopping the action at microsecond intervals. Stone points get smaller over time in Africa, and the question is: why? Were the users accomplishing the same goal with a smaller point sent with more force? Were they using poison so that they didn't have to deal a mortal blow with the first shot? Two new studies in 2012 argue that projectile technology with small projectile tips is at least 71,000 years old in Africa, and that by ca. 40,000 years ago, there is direct evidence of the use of poison on an applicator stick. And, as mentioned above, the invention of complex hafted points is as old as half a million years, and predates the first appearance of *Homo sapiens*.

Experimental Physiology and Materials Science in Archaeology

When (and why) did humans first control fire and cook their food? Was there ever a "Palaeolithic diet"? A raw foods diet? What foods are we adapted to eat? And how did we get them? For at least half a century, anthropologists have tried to derive the answers from looking at the size, shape, and enamel thickness of teeth, both human and non-human. One prevalent theory was that we had thick enamel because we ate tough objects that were hard to crack open. (A recent paper argued, however, that it was the small silica crystals in tough grasses and sedges that favored the thick enamel). Another theory was that controlled fire and cooked foods were late, since we had little evidence of it before ca. 800,000 years ago.

Medical studies have shown, however, that modern humans lose weight to the point of starvation on a purely raw foods diet, since we lost some of our primate digestive tract that would have allowed us to thrive before cooking. Diets that emphasize only animal protein and no carbohydrates also result in weight loss, as the body needs energy to digest protein foods, and if not enough energy is available, the individual will not metabolize the meat. Humans are also unique in the widespread dependence on cooked starches, (tubers, grains, nuts, etc.) and may have salivary adaptations to eating those particular foods.

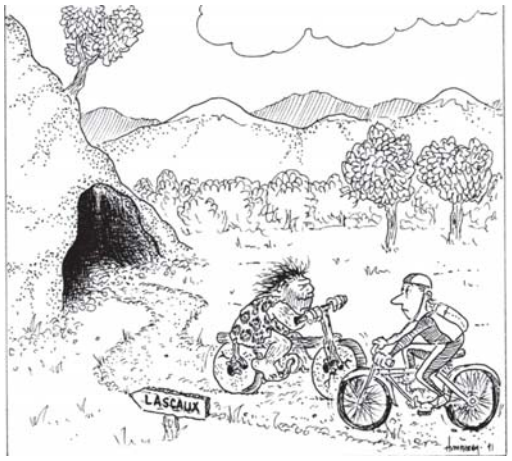
Perhaps the most unusual experiments on this topic were carried out by Richard Wrangham at Harvard and his student Rachel Carmody, who fed cooked and raw mice to snakes and measured their metabolic energy use by placing them in a chamber that measured their oxygen uptake during digestion. The cooked mice required much less energy to digest, suggesting that cooking was another way of freeing up energy to grow a bigger brain, grow taller, expand the population out of Africa, and other advances. While the evidence for early fire before 1 million years ago is very limited and inconclusive, the influence of its discovery on our anatomy and physiology was extreme.

New Dates for the Past

At least two new dating techniques have been developed in the last 10 years. One is cosmogenic nuclide dating, which depends on the decay of isotopes of aluminum and beryllium in sediments. Like many radioactive isotopes, these decay at a regular rate. Since radiation from sunlight forms the two isotopes, the sediments need to have been deeply buried since the period of interest in order to measure the decay since the time of burial. Another new technique involves using uranium-series decay methods to date the thin calcite layers that sometimes form over cave paintings. In the first publication on its use, the authors derived average dates of ca. 40,000 years ago for paintings in 11 caves in Spain, raising the possibility that Neandertals might have made them rather than modern humans.

Environments and Human Evolution

During the 6 to 7 million years for which we have evidence of our lineage's evolution, the climate was growing both cooler and more variable. The longest and most detailed records of climate change come from ice and deep-sea cores, which record fluctuations in the world's tem-



perature in multiple ways. Ice cores record changes in the concentration of heavy isotopes of oxygen, while deep-sea cores also record fluctuating populations of microscopic organisms that are temperature sensitive, as well as dust blowing off the continents during dry intervals, and leaf waxes washing off the continents in wet periods. Only a very few climate records on land, near the sites where remains of humans and their activities are found, come anywhere close to even the last 500,000 years of the deep sea record.

Climate records are built up from multiple studies of sediments, animal remains, lake cores and geochemistry – especially the stable isotopes of carbon. Light isotopes of any element in our bodies go through metabolic processes more easily while the heavy forms get left behind more often. Hence the heavy stable isotope of carbon (carbon-13) is discriminated against as plants take in carbon from the CO2 in the atmosphere and as we then eat the plant (or eat the animals that eat the plants). Plants that are heat or oxygen-stressed, however, like tropical grasses, or sea plants, do not discriminate as much, so their carbon-13 values are higher. In the tropical environments where humans evolved, the percentage of grass cover as opposed to forest or woodland can be estimated from the carbon-13 content of the carbonate nodules that form in the soil. Studies of the carbon-13 in the tooth enamel of the faunal remains will also inform about the environment of that species and its diet. Studies of the heavy oxygen isotopes in the teeth of animals can inform us about the temperature. Strontium isotopes are related to the strontium concentrations of the bedrock in the region where the animal lived when its teeth were forming. The plants take up the bedrock concentration and the animals eat the plants. So by studying several teeth in an animal's mouth, and several animals in a site, it is possible to tell how far an animal migrated during its growth period, and also if one sex moved further than the other.

Stable isotope analyses are now widespread in the study of human evolution, and expeditions often include a stable isotope geochemist who is monitoring the ancient climate. In addition, a new program starting this year will drill deep cores into lake basins that are now dry but rich in fossil and archaeological remains, like the Hadar Basin where 'Lucy' was found. These cores will provide a clearer idea of locally changing climates during human evolution. Analyses of the cores will be carried out by paleobotanists (looking for plant microfossils pollen and phytoliths), stable isotope geochemists, sedimentologists, and, where there are lake deposits, specialists in the microorganisms that live in freshwater lakes. The hope is for a better understanding of the climate in which our species evolved.

Fossils Are Still Important

New fossils and sites are still at the heart of what we do. Like the new australopithecines from Malapa in South Africa; the new jaws published this year from Kenya; the new dates for cave paintings, musical flutes, projectile points, and decorated ostrich eggshells, there are always surprises lying in the ground concerning our ancestry. But the surprises hiding in the laboratory are equally exciting and hold the promise of new questions and directions in the study of the human past.

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(Other references upon request -abrooks@gwu.edu.)

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Alison Brooks at Olorgesalie.

PUTTING ANTHROPOLOGY INTO SCHOOLS**

by Colleen Popson and Ruth O. Selig

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At a Montgomery County, MD high school, seniors in an AP biology class stage an 1890s debate focusing on Darwin's theory of evolution by natural selection, while in a Cheyenne, WY, 9th grade social studies class, students engage in a simulation of two "societies" unable to communicate because their communication styles appear so alien to one another. Back in Washington, D.C., at the National Zoo, 7th graders conduct observations of primate language, locomotion, and mother/infant behavior, while a teacher at the Gallaudet Model Secondary School for the Deaf describes his summer fieldwork experience studying Indian petroglyphs. Meanwhile, in Fairfax County, VA, students plan a dance-a-thon to raise money for a game reserve in Sierra Leone for endangered chimpanzees. The teachers involved do not know one another, but each is a graduate of either the NSF-funded or NEH-funded *Anthropology For Teachers Program.*

Because teachers in schools influence such large numbers of students, they constitute a constituency of great importance to the wider public understanding of anthropology. To anyone who has ever taught anthropology to middle- and high-school students, the discipline's impact on young people's intellectual and social development is undeniable. Because of anthropology's positive influence on student motivation and understanding of the modern world, some educators become committed to bringing anthropology to their classrooms and then further dedicate themselves to promoting the discipline's even wider dissemination. These educators join a long-standing effort to integrate anthropology into the K-12 school curriculum.

Today, junior high and high schools with a separate anthropology course appear to be primarily private or independent schools, charter/magnet schools, or public schools in wealthy school districts. The essential ingredient is almost always an energetic teacher with some anthropology training. Anthropology at Fairfax County, Virginia's Thomas Jefferson High School for Science and Technology (TJ) provides an instructive case study. TJ opened in 1985; two years later the Social Studies department added a one-semester Anthropology elective, due to the strong advocacy of a single teacher, Dolores Steinhauer, a graduate of the 1978-1982 George Washington University/Smithsonian Institution Anthropology for Teachers program.

A year later TJ hired Carolyn Gecan, a history teacher with anthropology training, to teach the anthropology elective to 10-12th graders. Given complete freedom to develop her semester course – with textbooks, readings, films, field trips, guest speakers, lab activities – Gecan taught anthropology every semester for 23 years, often to 32 students in each of two or sometimes even three sections. For many years, a popular field archaeology unit culminated with a mock dig at an old sanitary landfill in Fairfax County. Students read classic ethnographies, studied human evolution, and conducted primatology zoo labs. Visiting forensic anthropologists brought in bones to

Amanda Hurowitz and *AnthroNotes* editor Carolyn Gecan examine artifacts at a Smithsonian Department of Anthropology teacher workshop.

teach Gecan's classes. A few years prior to her retirment in 2012, the school system hired Amanda Hurowitz to continue the course, although budget restrictions, state graduation requirements, and competing social studies electives reduced the number of enrolled students.

The record of anthropology in schools, like this TJ Case Study, illustrates teachers' earnest efforts, low visibility, limited resources, and scant assistance provided by most national anthropology associations. This story unfortunately also reflects the low value that professional anthropologists have placed on putting anthropology into schools.

Why should anthropology exist in pre-college classrooms? For those who believe in putting anthropology into schools, the answer is obvious: anthropology motivates and excites students while broadening their perspective; it helps young people deal with differences at home and understand international differences abroad. Increased awareness of the discipline encourages students to pursue the subject further in college, and such study undoubtedly would increase the public's understanding of anthropology. To put anthropology into schools, effort must be made to make anthropology a part of teacher preparation programs, certification requirements, and in-service training. To bring about such change, there must be continuous and sustained support at the national level on the part of the national anthropological associations.

A Smithsonian Case Study

For almost thirty-five years (1978-2012), several Smithsonian staff members mounted a continuous, concerted effort to promote the teaching of Anthropology in Schools. Initially encouraged by the National Science Foundation's "Pre-College Teacher Development Program," the Smithsonian initially undertook a major initiative in anthropology teacher training in cooperation with the Department of Anthropology at the George Washington University and later, with NEH funding, with the Anthropology Department at the University of Wyoming. Along with the publication, *AnthroNotes*, the two Smithsonian Anthropology for Teachers Programs continued to provide one model demonstrating how museum and university anthropologists can work together with teachers and schools to offer anthropology teacher training (Selig 1997). As a result of this effort, a small cadre of teachers began to take an anthropological approach to the teaching of social studies, science, literature and the arts.

The Anthropology for Teachers Program, both in Washington, D.C. and in Laramie, Wyoming, offered a university course specifically designed for teachers. This course focused on a variety of monthly topics since each class included teachers representing a number of grade levels and subject matter teaching. The course carried university graduate level credits. The Anthropology for Teachers course was offered for four years in Maryland, Virginia, and the District of Columbia. Later it was offered to teachers representing every school in Laramie, Wyoming, and every junior high and high school in Cheyenne, Wyoming. Many of these teachers incorporated anthropology and museum resources into their curriculum for years afterwards.

During the Wyoming program, a linguist at the University of Wyoming wrote about the power of anthropology, to help both teachers and students understand their own cultures, in addition to the cultures of other societies:

> The most important aspect of this teacher training program has been its making all of us aware and proud of the rich resources right here in our own community for understanding some of the most important anthropological and humanities questions ever posed: Where and when did humans first come to the New World? How do cultures change and adapt to varying environments over time and around the world? How has language shaped local cultures? We didn't need to go very far to learn about and to discuss these issues – teachers and scholars together.

Cultural anthropologists have often been seen as "cultural outsiders," both in their own culture and the cultures they study. This "outsider" role helps anthropologists bridge the worlds of anthropology, teachers and schools — enabling them to act as effective cultural brokers, moving from their discipline into the arena of schools, bringing the richness of each to the other.

Although funding eventually ceased for the teacher training programs, *AnthroNotes* continued, designed to carry out the same goals as the teacher training program: to give teachers a firm foundation in anthropology by offering up-to-date, research-based articles on major topics in the field; to provide teaching activities and exposure to community resources such as museums, zoos, and research

laboratories; and to create a network of teachers, and museum and university professionals committed to pre-collegiate anthropology. Today, through the internet, *AnthroNotes* reaches tens of thousands of teachers, anthropologists, and the general public.

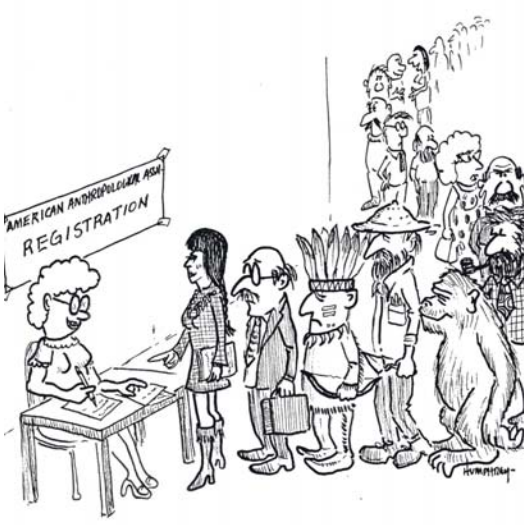
In 1998, The Smithsonian Press published a compendium of the best *AnthroNotes* articles in a single volume – designed for classroom use – titled A*nthropology Explored: The Best of Smithsonian AnthroNotes* (Selig and London, 1998), with a second, expanded edition published six years later (Selig, London and Kaupp 2004). The book, selected as a Natural History Book Club selection when first published, is divided into three sections devoted to Human Origins, Archaeology, and Culture, and, with its free online instructor's guide, serves as an introductory text for high school as well as college students.

In recent years, the Smithsonian Anthropology Outreach Office has organized local teacher workshops on anthropological subjects (American Indians, Archaeology, Forensic Anthropology), and the office has continued to be an important source of teaching material, much of it available online (http://anthropology.si.edu/outreach/outrch1.html). In addition, there are new museum programs reaching high school teachers such as the Human Origins Program (website: http://humanorigins.si.edu/) and that program's new NSF-funded effort to encourage the incorporation of human origins science into high school AP Biology classes.

Currently, the *AnthroNotes* editors are planning to re-purpose their publication for the digital age. Using technology to scan, convert, upload, package, tag, and recombine materials, *AnthroNotes* will become even more accessible, usable, relevant, and connected for teachers and the general public. By "bundling" the best and most useful *AnthroNotes* articles, teaching activities, and videos under "topics" of wide public interest (i.e. Human Origins; Africa; Evolution; Asia; Race; Growing Up in Other Cultures; Archaeology; Language, etc.), these materials will have even greater relevance to classroom curriculum and teachers around the globe.

The AAA

The story of the American Anthropological Association (AAA)'s involvement with K-12 education has been one of intermittent involvement with a few exemplary efforts by the Association as well as by a few dozen AAA members. In the 1960s and 1970s, professional anthropologists and



the AAA first became involved in curriculum development and teacher training programs for schools (Rice 1986). The successful launch of the Soviet satellite Sputnik (October 1957), Cold War rivalry, social ferment, and increased concern over science teaching in schools all led to increased federal funding for education through the NSF in the 1960s.

The AAA took advantage of this new opportunity and produced an anthropology-based high-school curriculum, *Patterns in Human History*. Many elementary schools also taught the anthropology-based *Man: A Course of Study* and the University of Georgia's *Anthropology Curriculum Project* (Higgins 1993; Rice 1993; Dow 1991). These early initiatives apparently had some impact, reflected in three surveys of pre-college anthropology courses conducted by Thomas Dynneson in 1971, 1978, and 1985, revealing a small but increasing presence of anthropology in schools (Dynneson and Coleman 1986). During the 1970s and 1980s, NSF funded a major social science teacher training initiative in anthropology focused pre-college teacher training programs. In a 1986 review of 17 such programs, Patricia J. Higgins documented the increased emphasis on anthropology in pre-college classrooms that resulted from this federal funding (Higgins 1986).

AAA Task Force/Commission

In 1988 several AAA members created a Task Force on Teaching Anthropology sponsored by the AAA, with the Board's mandate 'to promote the teaching of anthropology from elementary school through college' (Higgins 1993; Erickson 2000; Selig 2001). The Task Force organized symposia at the annual AAA meeting that helped define

the core concepts of anthropology and identified effective ways of teaching them. This effort resulted in a major publication focusing on teaching anthropology at all levels, including K-12 students (Kottak et al. 1997).

In 1990, the American Anthropological Association's Task Force on Precollege Education, under the leadership of anthropologist Paul Erickson, undertook a survey to assess the presence of anthropology in the pre-college curriculum, in teacher training, and in teacher certification (Erickson 1992; Selig 1997). The survey revealed that 19 of the 50 U.S. schools of education that responded had a required course in anthropology for teachers in training, although seven of these required it only for those training to teach anthropology. In 20 schools of education, anthropology could be taken as an elective. Of the 30 U.S. state certification agencies responding to the survey, 13 said anthropology was required for some types of teacher certification.

Thus, in 1990, there were clear indications of anthropology's growing inclusion in teacher education and in state certification of teachers (Higgins 1993). Almost a decade later, in 1997, Eric Haanstad compiled a state-by-state assessment of high school social studies curriculum on behalf of the AAA (Haanstad 1997; Selig 2000). Haanstad found that 15 states approved the offering of anthropology electives or had stated anthropology goals or requirements. Momentum continued from 1999 to 2002, as the AAA President appointed seven members to a three-year Commission on Anthropology in Schools, which undertook several initiatives to encourage anthropology teaching in schools. Unfortunately, little substantive progress has been reported in the twelve years since, with a short-lived Anthropology Education Committee (AEC) now discontinued.

Archaeology

Professional archaeologists in the U.S. have provided strong institutional support for public education, primarily because of historical mandates related to combating looting and increasing public awareness of issues surrounding the repatriation of human remains. The public education efforts of the Society for Historical Archeology (SHA) and the Public Education Committee (PEC) of the Society for American Archaeology (SAA) have produced the most visible results in teacher programs, conference presentations, and classroom visibility (Smith and McManamon 1991). Over many years, these organizations have conducted numerous teacher workshops, hired paid staff, and coordinated the work of active volunteer subcommittees. They also sustained a presence at some of the professional meetings of K-12 teachers (Smardz and Smith 2000).

Of all anthropology's subfields, archaeology has the most popular recognition. Students relate most easily to archaeology, which fits more comfortably with existing social studies classes such as American history, world history, and geography. A flourishing program of teacher training, begun under the auspices of the U.S. Bureau of Land Management – 'Project Archaeology' – has long brought archaeology to elementary and middle school teachers. Currently based at the University of Montana, Project Archaeology continues to offer innovative teacher workshops throughout the country and online (http://projectarchaeology.org).

Psychology and Sociology

It is instructive to compare anthropology's limited success in putting anthropology into US high schools as an AP elective to the successful story of psychology and sociology. Partly this reflects the difference in the size and available resources of the national organizations. The American Psychological Association (APA) has 137,000 members today compared to the AAA's 11,000. But the American Sociological Association (ASA) includes only 14,000 members and has strongly supported K-12 education for many decades, and, in particular, an Advanced Placement (AP) course in sociology.

In the case of psychology, over 30 years ago the APA focused manpower and funding on making psychology a substantial presence in American high schools. Today, almost a third of high school graduates take psychology. By 2005, approximately 31 percent of graduating high-school students (about 800,000) had taken a psychology course — according to the U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, High School Transcript Study (2005). By 2009, over 133,000 students took the Psychology AP examination, compared to 4,000 in 1992 when the exam was first offered. Today the APA offers a panoply of support to teachers, including affiliated membership, teaching resources, an electronic network of K-12 teachers, publications, and several dedicated staff in the national headquarters.

Archaeology can be used to teach geology, anatomy, paleontology, social studies, STEM, art, and creative writing.

Likewise, the ASA mounted a strong effort to have Sociology formally recognized as a high school elective with an AP exam. Currently, the ASA High School Initiative is building a grassroots network of high school sociology teachers who can join the ASA as individual affiliates. The ASA hopes this new network will help their advocacy with the College Board to establish an AP course and test in sociology. Additionally, the ASA supports an active teachers' listserve, a newsletter for teachers, a Teaching Resources Center, and high school teaching workshops held during the annual ASA meeting.

The Larger Educational Context

National and Local Standards

The National Council for the Social Studies (ncss.org) and each state-by-state counterpart is concerned with four disciplines – history, geography, economics, and civics (citizen participation in government). National and local state standards have been published with some involvement by the corresponding scholarly associations. Social Studies is a required subject for all pre-university students for the first eight or nine years, so there is both motive and opportunity for standards to be implemented. Some of these social studies standards reflect anthropological content (see www.socialstudies.org/standards/strands). However, none of anthropology's five fields is included in any state's social studies requirements. Consequently, there is no impetus on the part of teachers, school districts, parents, students, or relevant professional associations to produce uniformly shared standards for anthropology.

IB/AP Programs

Recent data from the administrative offices of the worldwide International Baccalaureate Organization (IBO) suggest that, at least in some of the IB schools located in the U.S., interest in anthropology has grown in recent years. In 2012, 193 of 777 IB Diploma schools offered Social and Cultural Anthropology. Some 475 capstone essays in the subject were submitted to the IBO in 2012. These data are encouraging. As has been seen for psychology and sociology, the development of IB and Advanced Placement (AP) courses often helps lay a foundation for the creation and spread of elective classes in high-school subjects (Selig 2001). Wherever the IB course is offered, one can assume that teachers are trained in the subject and that curriculum and teaching materials are available.

21st Century Partnership

Global Awareness is a critical theme woven into core subjects. According to the Partnership for 21st Century Skills, an advocacy organization working closely with the U.S. Department of Education, as well as departments of education at the state and local level, achieving Global Awareness implies:

- Using 21st century skills to understand and address global issues;
- Learning from and working collaboratively with individuals representing diverse cultures, religions, and lifestyles in a spirit of mutual respect and open dialogue in personal, work, and community contexts;
- Understanding other nations and cultures, including the use of non-English languages (The Partnership for 21st Century Skills 2009).

To those involved in the push to make anthropology a more visible part of K-12 education in the U.S., this statement represents an exciting opportunity. It provides a convenient shorthand and structure within which to justify teaching anthropological content, methods, and concepts.

Some organizations that are focused on increasing global awareness in K-12 include the *Asia Society* and its Partnership for Global Learning (http://asiasociety.org/education/partnership-global-learning), as well as *Primary Source*, which connects educators to people and cultures around the world through professional development and resources.

Technology/ Informal Education

The education landscape is rapidly changing nationally because of technology-fueled globalization. Educators recognize that students will need different skills from those traditionally taught in the K-12 classroom. Rather than trying to encourage entire school districts or education departments to adopt new courses and standards in anthropology, advocates might, instead, leverage existing opportunities, including new technologies, with a view to introducing as many educators and students as possible to anthropological concepts and methods.

For classroom teachers, a simple Google search for K-12 anthropology resources will return pages of sites, some outdated or of questionable value, some with broken links, but others useful, providing ideas for lesson plans in anthropology, and more commonly, archaeology. Still, although teachers looking for inspiration can find among these resources ways to actively incorporate such lessons into their other courses, there is no single place for teachers with an interest in anthropology to get vetted examples of anthropology curricula clearly aligned to the standards they have been asked to teach. The quality of online resources is mixed, and without a process of verification, outdated and even misleading information can be used from resources found online, particularly in physical anthropology and archaeology where theories, interpretations, and approaches frequently change.

Nonetheless, the rise of online education, as well as homeschooling, provides new avenues and new demands for producing precollege education materials in less traditional subjects. For example, K12 (www.k12.com), a company that produces online curriculum that can be used at home or in the classroom, has a unit on anthropology. In addition, some online schools and curriculum offerings include anthropology as an elective course, and we can expect to see more of these as more teaching moves online.

New emphases have also emerged with regard to Informal Education. The recent National Academy of Sciences study, "Learning Science in Informal Environments: People, Places and Pursuits," as well as the National Science Foundation Informal Science Education grant program, highlight the potential of informal education, emphasizing after-school programs, exhibits, and online learning experiences that teach anthropology to a general audience.

One informal education example comes from the American Museum of Natural History in New York City where every year, the After School Program (ASP) offers courses to New York City high school students interested in the sciences. The courses include anthropology, along with astrophysics, earth science, genetics, biodiversity, and more. As the museum's website explains, the courses include hall visits, lab and collections tours, talks and lectures by scientists and hands-on activities. Each course is six weeks long and meets once or twice a week after school. The Museum has also initiated internships for high school students, an approach embraced by many museums nationwide, including Smithsonian museums. In fact, museum programs offer one of the best opportunities for bringing anthropology to a broad audience of students.

With the explosion of the digital age and the increasing role of technology, the Internet, games, and free and available resources also may be changing the playing field. The future may well see much less emphasis on textbooks and more experimentation within the curriculum, particularly in charter and magnet schools, and in after-school programs.

Conclusion

The story of anthropology in U.S. schools begins in the early days of anthropology as a profession, with a few anthropologists such as Edgar Lee Hewett advocating the teaching of anthropology in schools. Hewett in 1904 wrote in the *American Anthropologist* that anthropology "should enrich the course of study of every public school in the land" (Hewett 1904). Later leaders such as Margaret Mead continued this tradition, but most anthropologists disparaged the value of "popular anthropology." Whereas other social sciences – sociology, psychology, and economics—had an "applied" aspect and emphasized the public understanding of their subject, anthropologists remained skeptical of those like Mead who popularized the field.

Although national funding led the AAA to support curriculum development and teacher training in the 1960s, this interest was short-lived. Efforts by anthropology national organizations were relatively limited compared to continuing, committed efforts by other social science organizations. For the most part, anthropologists value research above all else; there is little incentive to support efforts to integrate anthropology into school curriculum. However, increasingly graduate anthropology and archaeology programs include applied courses and even requirements encouraging public engagement, including involvement in school programs.

Looking back through time, it is clear that individual advocates rather than institutional efforts helped put anthropology into some schools. Individuals — with their good intentions, strong commitments, and well-developed curriculum materials — advanced the infusion of anthropological questions, perspectives, and knowledge in school classrooms and, indeed, around dinner tables in homes worldwide. We hope these individual efforts will continue, while at the same time we recognize that only larger-scale institutional efforts, including at museums, can bring anthropology to a wider audience, here and abroad.

**This paper is partly based on several earlier papers by Selig (1997, 2000, 2001) that were used to help prepare the 2010 article "Grassroots Dedication and Opportunism: The Pre-University Anthropology Education Movement in the United States" by Colleen Popson and Guven Witteveen, *Anthropology in Action*, 17, 2&3:34-43. Berghahn Books and the Association for Anthropology in Action.

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Q?RIUS — Inspiring the Next Generation of Science Leaders and Innovators

by Amy Bolton and Shari Werb

Imagine the next generation of museum space—a place that is equal parts laboratory, field site, museum collection, and window onto the natural world. Welcome to *Q?RIUS,* or *Q?,* the National Museum of Natural History's new education center. The name Q?RIUS (pronounced 'curious') was chosen for its power to inspire visitors and excite interest in natural history and science.

Newly constructed inside the Museum, right in the heart of the nation's capital, the new 10,000-square-foot center will be a place that inspires learning, sparks curiosity, and ignites the minds of the next generation of responsible citizens, naturalists, and STEM (Science, Technology, Engineering, and Mathematics) professionals. Q?RIUS offers an approach to engaging with the museum, extending not only into the exhibit halls, but also into visitors' homes and classrooms through digital outreach tools that are customized, immersive, and participatory. In spirit and practice, Q?RIUS removes real and perceived barriers to

High school students from the Washington Metropolitan Area explore specimens from the bird collection with Marcy Heacker, Research Assistant, Birds Division.

science as visitors see and experience science in new ways: interactive, self-directed, and relevant to their own lives.

The Spaces Within

Upon entering Q?RIUS, visitors will encounter small, discrete learning environments, each with a distinct character. At **Base Camp**, staff and volunteers will greet visitors, orient them to the day's program offerings, and help them plan their visit. The **Field** will be a large, dynamic, and welcoming space with hands-on activities where visitors can experience how scientific methods, tools, and collections enable them to explore important issues presented by the natural world. The **Collection Zone** will house the world's largest hands-on natural history education collection available to the public: 20,000 objects representing the Museum's core research areas, including minerals, insects, plants, mammals, fossils, and cultural artifacts. The digitized collection includes data on species as well as videos, images, and stories from the scientists who study them. Through activities in the Collection Zone and online, visitors will learn the importance of collections to scientific research by following the methods practiced by scientists: asking questions that arise from curiosity, making observations, formulating hypotheses, and using data to develop conclusions.

The **Lab,** an enclosed space, will accommodate approximately 40 people, or one school group at a time. Modeled on the Museum's successful Forensic Anthropology Lab, this new lab invites visitors to delve into scientific challenges using more sophisticated scientific instruments. The 100-seat **Theater** will be a multi-purpose space with retractable seats and a flexible layout. There staff will screen films, present lectures, and webcast programs that will be available to online visitors. The **Loft** and the **Studio** will be located on the Mezzanine overlooking the first floor. The Loft will offer visitors an informal gathering space encouraging small-group conversations and accommodating programs that integrate art and science. In addition, the Loft will serve as a hub for teen programming. The Studio's focus will be distance learning—this time in the intimate format of video conferencing.

Programming

The Q?'s programming schedule will accommodate the shifting flow and varied concentrations of the target audiences: students of all ages, families, and teens. School day mornings will be reserved for school groups; summer, weekends and holidays for families; and after-school hours and weekends for teen groups. All the spaces within Q?RIUS will have a flexible design so that programming and activity set-ups can be changed seasonally and respond to the needs and interests of a varied audience. Throughout the space, moveable furniture will foster flexible set-ups for greater or smaller numbers of visitors, encourage longer or shorter time interactions, and offer different activity presentation styles. The programming should appeal to a variety of learning styles and will be accessible to people with physical and sensory disabilities. Visitors will have opportunities to take part in hands-on activities, talk to scientists, create art, watch videos, listen to lectures, and read about nature and culture.

Visitors, whether online or in person at the Museum, will learn about the science behind the headlines through conversations with and presentations by Smithsonian scientists, as well as through activities with related collections. The activities are being designed to encourage group interaction, but can also be accomplished alone. Whether the visitor is a novice or an expert, there will be an activity at their individual level and appropriate for their learning style and interests.

NatureBadges offers yet another exciting new program for the Museum. This program encourages both onsite and online visitors to pursue their interests in science by earning badges in anthropology, biology, and geology. Participants earn points and badges – similar to virtual versions of Scout badges — and share their accomplishments through social media or on their resumés. By motivating learning and rewarding engagement, the badge program will encourage participants to go deeper into understanding and responding to important issues in the worlds of nature and culture.

In addition to serving a national audience, Q?RIUS is designed to engage local students, grades 6-12, from the Washington metropolitan area. These students will be able to participate in hands-on programs, aligned with their region's curricula, using the methods and tools Museum scientists employ to explore the natural and cultural world. Young people who participate in the Q?'s Youth Volunteer Corps will be trained in communication methods as well as science content, and through this training will gain scientific knowledge and experience while developing greater confidence in public speaking. As participants in YES! (Youth Engagement through Science), high school

students will have the opportunity to work alongside scientists on research, explore science careers, and investigate the college courses needed to reach their goals. As part of the program they also will serve as ambassadors to their community, sharing their experiences and enthusiasm with peers and community members.

Technology

Technology will play an exciting and innovative role in Q?RIUS. Digital tools, which can replicate many of the physical tools scientists use in their research, will be embedded within the hands-on activities and the distance learning programs. Using these tools, such as creating digital field books, a visitor will be able to take on the role of scientist by measuring, comparing, analyzing, sorting, and annotating digital assets such as specimens, artifacts, photos, and maps. These digital field books, based on those that Museum scientists use to document their thoughts and observations over the course of their research, will allow visitors to save their work for later access and sharing, well beyond their Museum visit. By scanning a unique barcode to access a personalized digital field book at stations throughout Q?RIUS, they can write notes, draw diagrams, observe, measure, compare, plot, visualize, diagram, and record data points in the course of their activities. Visitors can use the field books onsite in the center and later return online to continue their investigations on the Q?RIUS website. They will also be able to share elements of their experiences with their peers through social media such as Facebook, Twitter and Flickr.

Using webcasting technology and Museum curriculum materials, students in wired classrooms will watch and ask questions of Smithsonian researchers who address them live from their labs and field research sites. Scientific demonstrations and lectures will also be digitally recorded and made available via online learning platforms such as iTunes U. Partnerships with other informal education institutions will expand the reach of these programs.

Conclusion

Scheduled to open in the fall of 2013, the new education space will be an evolving *learning laboratory* serving as a hub for education in the Museum and beyond. It will change the way natural history museums engage visitors in learning about the natural and cultural world. Q?RIUS will seamlessly connect distance learners and Museum visitors to Smithsonian field sites, collections, research labs, and scientists. Through personal interactions, audiences near and far will come away with a better understanding of how relevant science is to them and how relevant *they* are to science.

By Amy Bolton, Education Specialist, and Shari Werb, Director of Education and Outreach, National Museum of Natural History, Smithsonian Institution.

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STAY INFORMED

Sign up for the National Museum of Natural History's newsletter to learn about new exhibits, scientific discoveries, museum activities, web resources, and to meet museum staff.
Visit http://tinyurl.com/nmnh-news

December issue of the Natural History Museum Newsletter.

TEACHER'S CORNER: CAREERS IN ANTHROPOLOGY

by P. Ann Kaupp

What do anthropologists do?

Anthropologists study past and present cultures, language, human evolution, and biological variation. They are engaged in issues relating to contemporary society, such as health care, human rights, law, industry, language revitalization, urban development, environmental management, and global population. Of all the sciences — such as biology, psychology, and sociology — only anthropology attempts to study the entire human condition over all time and space. Anthropologists work in many settings: teaching at all levels, but primarily college and university students; engaging in applied work in government, business, and social services; and conducting archaeological fieldwork, such as for governmental agencies and companies engaged in contract archaeology.

Where can I study Anthropology?

The American Anthropological Association (AAA) publishes *The Guide* that describes faculty and their specialties and research programs in college and university anthropology departments in the U.S. and Canada. It is available for purchase from the AAA: http://www.aaanet.org/publications/guide.cfm

How can I learn about careers in Anthropology?

Career Videos

The video "Anthropology: Real People, Real Careers," by Francis E. Smiley (Northern Arizona University) addresses the question of "What exactly does an applied anthropologist do?" http://www.aaanet.org/resources/students/CareersDVD.cfm

The DVD "*Beyond Ethnography: Corporate and Design Anthropology"* by Emily L Altimare offers information on the use of anthropology in corporate settings. http://www.aaanet.org/resources/students/CareersDVD.cfm

The video "*Doing Anthropology*," by MIT Video Productions, strives to promote a greater public understanding about cultural anthropology and the process of fieldwork. The video is housed on MIT TechTV (http://techtv.mit.edu/videos/315-doing-anthropology).

Staff Video Interviews on Careers in the Department of Anthropology, Smithsonian Institution are available at http://anthropology.si.edu/video_interviews.html

Career Publications

Careers in Anthropology (2nd ed.), by John T. Omohundro (Mayfield Publishing Company, 2002), is a practical and informative workbook that explains what anthropology is, what anthropologists do, the available career opportunities (beginning at the B.A. level), how to begin job hunting, and how to get hired. The book contains exercises to help you determine if a career in anthropology is for you.

The Anthropology Graduate's Guide from Student to a Career by Carol J. Ellick and Joe E. Watkins (Left Coast Press, 2011) describes a wide range of professions in which an anthropology degree can be used and offers a step-by-step approach to reaching your career goal.

Museum Careers

The Smithsonian Center for Education and Museum Studies http://museumstudies.si.edu/

The Smithsonian Institution http://www.sihr.si.edu/tour.html

Smithsonian Internships and Volunteer Opportunities http://www.si.edu/Encyclopedia_SI/volunteer/

The American Association of Museums http://www.aam-us.org/aboutmuseums/abc.cfm#careers

Publication: *Museum Careers: A Practical Guide for Students and Novices* by N. Elizabeth Schlatter. 2008. Left Coast Press.

Professional Anthropology Organizations

American Anthropological Association
http://www.aaanet.org

The AAA is the central professional organization and is organized into small sections of topical interest. The AAA holds annual meetings and produces the quarterly *American Anthropologist*, the monthly *Anthropology News*, career publications and The AAA *Guide*. The website contains a new interactive feature on race and human variation (http://www.understandingRACE.org).

Society for American Archaeology
http://www.saa.org

SAA is an international organization dedicated to the research, interpretation, and protection of the archaeologi-

cal heritage of the Americas. It produces several publications, and its website offers a wealth of educational resources, including an Archaeology Teacher's Guide.

Society for Anthropology in Community Colleges
http://www.aaanet.org/sections/sacc/

SACC, a section of the American Anthropological Association, sponsors its own annual conference and a symposium at the AAA annual meetings. SACC produces the biannual publication *Teaching Anthropology: SACC Notes* and maintains a listserve and blog. Teaching activities and resources can be found on the SACC website as well as member profiles.

Society for Historical Archaeology
http://www.sha.org/

SHA is concerned with the archaeology of the modern world (A.D. 1400 - present), with an emphasis on the New World. The Society is specifically concerned with the identification, excavation, interpretation, and conservation of sites and materials on land and underwater. The website contains career information and listings of field schools. Members receive the quarterly journal *Historical Archaeology* and the *SHA Newsletter.*

The Society for Applied Anthropology
http://www.sfaa.net/

The SFAA is a professional association that promotes "the integration of the anthropological perspectives and methods in solving human problems throughout the world." The Society publishes two journals – *Practicing Anthropology*, a career-oriented publication, and *Human Organization* – and a quarterly newsletter.

Archaeological Institute of America

http://www.archaeological.org

The AIA publishes the bimonthly *Archeology* magazine and the *American Journal of Archeology*. There are over 104 local societies across the U.S. and Canada that sponsor lectures, symposia, field trips to local sites and museums, and foreign study tours. The *AFOB (Archaeological Fieldwork Opportunities Bulletin)* http://www.archaeological.org/fieldwork/afob lists U.S. and foreign excavations seeking volunteer workers, paid staff members, and students for formal training programs.

Summer Fieldwork Opportunities

Teachers, students, and the general public can become personally involved in the field of anthropology through field schools and research organizations. Anthropology departments at local universities and colleges, state historic preservation offices, and state archaeological societies often organize local archaeological excavations and frequently accept volunteers with no previous fieldwork experience.

The Archaeological Institute of America offers a listing of its state societies at http://www.archaeological.org/webinfo.php?page=10016 and fieldwork opportunities around the world in its online AFOB (*Archaeological Fieldwork Opportunities Bulletin)* http://www.archaeological.org/fieldwork/afob

Earthwatch Institute
http://www.earthwatch.org

Earthwatch offers international opportunities to assist scientists in the field. Grants and special volunteer service are available.

(continued)

Passport in Time (PIT)
http://www.passportintime.com/

PIT is a volunteer program of the U.S.D.A. Forest Service. Volunteers work with professional archaeologists and historians on national forests throughout the country.

Old Pueblo Archaeology Center
http://www.oldpueblo.org

Old Pueblo offers workshops, lectures, and archaeological opportunities to promote appreciation and preservation of Southwest cultures. The website soon will offer a virtual dig of a Hohokam site (A.D. 750-1450) that the Center has been excavating for several years.

Crow Canyon Archaeological Center
http://www.crowcanyon.org

The Center offers programs for all ages to learn about archaeological field methods, laboratory techniques, and excavation. It also offers domestic and international travel opportunities.

Center for American Archeology, Kampsville Archeological Center
http://www.caa-archeology.org

The Center provides programs in archeological investigation, educational outreach and cultural stewardship, and summer field schools, as well as hands-on activities in basketry and flintknapping.

The U.S. Experiment in International Living - Summer Abroad
http://www.worldlearning.org

This organization offers high school, undergraduate, and graduate students three to five weeks of immersion in a another culture in Asia, Europe, Africa, the Americas, Oceania, or Asia, through homestay, language-study, and ecologically-focused programs.

P. Ann Kaupp is Managing Editor of AnthroNotes and head, Smithsonian Anthropology Outreach Office.

ARCTIC YOUTH PARTICIPATE IN INUIT STUDIES CONFERENCE

Six youth from the Arctic north (including Cambridge Bay, Nunavut; Point Lay and Barrow, Alaska; and Uummannaq, Greenland) attended the 18th biannual Inuit Studies Conference (ISC), held at the Smithsonian from October 24-28, 2012. The youth attended sessions and interviewed conference speakers and each other about climate change, their languages, and other important issues affecting their lives. Their experiences were captured using videos, photos, tweets and online summaries to be posted on the ISC website**, www.mnh.si.edu/arctic/ISC18** Their involvement concluded with a youth panel where participants shared their experiences with conference attendees. This interactive youth project will be available online and may be used as a model for long - distance learning in Q?RIUS, the new NMNH Education Center.

The Smithsonian's Arctic Studies Center hosted this well attended and innovative conference that was the largest ISC meeting ever, with an attendance of over 600 and an online audience of over 1000 from 17 countries and 42 states. The conference brought together Arctic scientists, anthropologists, linguists, archaeologists, historians, educators, health and government specialists, as well as Inuit artists, filmmakers, and cultural activists from Canada, Greenland, Alaska, and Russia. The conference theme *Arctic| Inuit | Connections: Learning from the Top of the World* fostered discussion on changes and challenges to the Inuit people, including rapid climate change, issues of Arctic governance, globalization in the North, Inuit art, cultural studies, education, heritage, and the role of museums. Among the conference's many partnerships was the collaboration between the Anthropology Department and the museum's Education and Outreach Office that received a Youth Access Grant to support this first ever youth- focused program at an Inuit Studies Conference.

Youth panel at recent Inuit Studies Conference.

LOOKING BACK THROUGH TIME: THE ANTHROPOLOGY OUTREACH OFFICE (1975-2012)

by P. Ann Kaupp and Ruth O. Selig

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For the past 33 years, *AnthroNotes* has been produced in the Smithsonian's Anthropology Outreach Office at the National Museum of Natural History. Promoting the public understanding of anthropology has been a major goal of the Anthropology Outreach Office, and of *AnthroNotes*. The office and its flagship publication particularly supported the teaching of anthropology in schools. *AnthroNotes* reaches thousands of teachers by informing them about anthropological research around the world and offering excellent teaching activities and other educational resources for the classroom, many now available online.

Currently, *AnthroNotes* is undergoing a digital *rite of passage*. The Anthropology Outreach office is closing after 37 years, and *AnthroNotes* editors are taking their publication into the digital universe. As part of this transition, we (Ruth O. Selig and P. Ann Kaupp) wanted to offer a brief history of the Outreach Office, which was for so many an important Clearinghouse of anthropological materials and information about the teaching of anthropology.

From 1975 - 2012, we ran the Outreach Office and edited *AnthroNotes*. Working with curatorial staff, we produced publications and information materials to handle public inquiries, organized workshops and teacher training programs, and worked with outside professional anthropology organizations.

The thousands of inquiries that the Smithsonian's Anthropology Department received over past decades, as well as the many media requests for access to the department's researchers and collections, speaks to the public's strong interest in anthropology. The Smithsonian has had a long history of public service; accordingly, the museum's responsibilities always have included the answering of public inquiry mail. In the late 1950s, curatorial staff produced prepared materials to respond to the ever-increasing public inquiry mail. For a time, the department hired a contractor, but then relied on volunteers to assist the curators in answering public inquiries.

In 1975, the department's information materials (bibliographies and leaflets) were out-of-date and individual inquiries numbered on average over 4,000 annually. Chairman Bill Fitzhugh hired one of us, anthropology educator Ruth Selig, then teaching anthropology at George Washington University, to develop a Public Information Office for the Department. A new departmental information system was developed, modeled on that used by the U.S. Geological Survey, consisting of a large number of specific information sheets and leaflets, teacher packets, and bibliographies. GWU anthropology graduate students helped develop these materials, working with curatorial staff. In 1978, the other half of the team, Ann Kaupp, joined the office as a part-time unpaid assistant and soon became a contractor.

Between 1978 and 1986, with guiding support from Chairman Bill Fitzhugh, the Office grew through NSF, NEH, and Smithsonian grants, along with the assistance of volunteers and interns. The Office created about 50 new prepared materials; developed, in conjunction with Bill Fitzhugh's *Inua* exhibit, the first Smithsonian secondary school curriculum packet *Of Kyaks and Ulus* (co-authored by Selig); and initiated with Alison S. Brooks the George Washington University/Smithsonian Institution Anthropology for Teachers Program - AFTP), funded by the National Science Foundation (1978-1982).

The AFTP, staffed by four individuals (Alison S. Brooks and Ruth O. Selig; JoAnne Lanouette and Ann Kaupp) trained over 350 Washington, DC area teachers from 152 local schools in year-long graduate courses. In 1983, Ruth took a year's leave of absence to move with her husband to Laramie, Wyoming. The following year she returned to the Smithsonian payroll to conduct the Anthropology for Wyoming Teachers Program with funding from the Wyoming Council for the Humanities/National Endowment for the Humanities. When Ruth returned to NMNH in 1985, she became Director Dick Fiske's special assistant and Ann took over the Anthropology Outreach Office. Over the following decades, Ruth worked in

various Smithsonian administrative positions but continued as a co-editor of *AnthroNotes*, while Ann became managing editor of the publication.

By the mid-1980s, Ann had become a full-time employee and initiated and edited a departmental newsletter called *Anthropolog* (1985-2012) with staff contributions to keep members of the Department and other administrators within the Smithsonian abreast of departmental research and activities. Ann also organized teacher workshops on American Indians, archaeology, and forensic anthropology.

The earlier Anthropology for Teachers Program, in addition to generating new information materials for handling the Outreach Office's public inquiries, also produced a tri-annual newsletter, *AnthroNotes, National Museum of Natural History Bulletin for Teachers*, first published in 1979. Robert Humphrey, GWU anthropologist and artist, provided pen and ink cartoon illustrations for the publication until his death in 2002. *AnthroNotes* has a readership of well over 10,000 school, university, and museum educators, students, and anthropologists, and has grown from a six-page local newsletter to a 20-page international publication with scholarly articles written for a general audience.

Throughout its history, the Anthropology Outreach Office worked closely with the anthropological professional organizations, particularly the American Anthropological Association and the Society for American Archaeology. Both of us held various positions with and contributed to education initiatives in both national organizations. For example, both were invited members of the AAA Task Force on Teaching Anthropology and the AAA's Anthropology Education Commission (1999-2002), whose members were appointed by the AAA President.

Both of us served for several years on the SAA Public Education Committee. Ann was also active in the Society for Anthropology in Community Colleges, helping support their outreach to teachers, and then serving as President of the Society. The office also worked closely with Project Archaeology, a national education program, when the Anthropology Department became the Chesapeake Regional Office and supported archaeology education by hosting teacher workshops.

In 1998, *Anthropology Explored: The Best of Smithsonian AnthroNotes* was published by the Smithsonian Press, edited by Ruth and Marilyn London, who became an editor of *AnthroNotes* when Ann took a year off to travel in 1995. In 2003, Ruth, Marilyn, and Ann worked on a 2nd expanded and revised edition of *Anthropology Explored*, published in 2004. In 2002, after 23 years of publication, *AnthroNotes* received the Society for American Archaeology Award for Excellence in Public Education, "for presenting archaeological and anthropological research to the public in an engaging and accessible style, and for encouraging the study of these disciplines in the classrooms across the nation."

Increasingly the department website has become an essential vehicle for informing the public about our educational materials, including the "American Indian Annotated Bibliography for K-12," as well as many teaching activities, past issues of *AnthroNotes*, and staff videos. Currently we are focusing on re-purposing *AnthroNotes* for the digital age and have added digital specialist and archaeology journalist Colleen Popson to the editorial team (Alison Brooks, Carolyn Gecan, Ann Kaupp, and Ruth Selig).

The *AnthroNotes* editors look forward to continuing to inform the public, in general, and teachers, in particular, about the rich knowledge that anthropology offers in helping us to understand our world, both past and present.

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Ruth Selig (left) and Ann Kaupp at an exhibition in the 1980s.

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AnthroNotes® offers in-depth articles on current anthropological research, teaching activities, and reviews of new resources. *AnthroNotes* was originally part of the George Washington University/Smithsonian Institution Anthropology for Teachers Program funded by the National Science Foundation. A compendium of *AnthroNotes* articles is available as *Anthropology Explored: The Best of Smithsonian AnthroNotes* http://anthropology.si.edu/outreach/anthropology_explored.htm

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***ANTHRONOTES* has a three part mission:**

1. To more widely disseminate original, recent research in anthropology in order to help readers stay current in the field;
2. To help those teaching anthropology utilize new materials, approaches, and community resources, as well as integrate anthropology into a wide variety of subjects; and
3. To create a national network of anthropologists, archaeologists, teachers, museum and other professionals interested in the wider dissemination of anthropology, particularly in schools.

ANTHRONOTES® STAFF**:** P. Ann Kaupp, managing editor; Ruth O. Selig, Alison S. Brooks, Carolyn Gecan, editors; Colleen Popson, digital editor; Robert Humphrey, illustrations©.

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Please don't forget to inform ***AnthroNotes*** editors of your email address. Send an email to: Anthronotes@si.edu

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