

# anthro notes

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## ANGEL BRINGS BONES TO LIFE

Earlier this year local newspapers carried a story about a gas tank explosion near Front Royal, Virginia, that left what were thought to be the charred remains of the truck driver. The bones were packaged and sent for identification to Dr. J. Lawrence Angel, physical anthropologist at the Smithsonian Institution. When Angel opened the package, he knew immediately that the bones were not human -- a colleague showed that they belonged, in fact, to a pig.

This request for identification was not unusual for Angel whose success rate helping law enforcement agencies has earned him the nicknames "The Bone Man" and "Sherlock Bones". Every week Angel receives skeletal materials, some fresher than others, of possible missing persons or murder victims. As a physical anthropologist and leading forensic specialist, Angel can identify age, sex, ethnic background and stature by examining certain parts of the skeleton, particularly the skull, pelvis, teeth and long bones. For example, in determining the sex of an individual, the pelvis and skull are the best indicators. In females the pubic portion of the hip bone is larger than in males producing a greater sub-pubic angle. The skull is usually more robust and muscle-marked in males and has more prominent brow ridges. The skeletal materials Angel receives from law enforcement agencies or uncovers in his fieldwork seldom include the whole skeleton of an individual. He usually has only a portion of a skeleton, which may consist of fragmented bones, or bones partially gnawed

away by animals. The bones' condition and specific markings can sometimes reveal the cause of death or physical diseases contracted during the person's lifetime. (An excellent reference and required reading in Angel's physical anthropology classes is Human Osteology: A Laboratory and Field Manual of the Human Skeleton by William M. Bass.)

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## Teaching with Evelyn

Angel often uses skeletal materials from a forensic case in his lectures on osteology, but he refers to the bone or bones using the victim's name if known. As Peggy Angel, his wife of 46 years, explains: "My husband feels compassion for crime victims and believes in treating their skeletons with dignity." Evelyn is an example.

Evelyn Nasca was a high school student in Rockville, Maryland. In January 1973 she was reported missing after she attended a high school talent show. Two years later a human skull, minus a jaw, was found in the vicinity of Evelyn's disappearance and immediately handed over to Angel. The skull gave him significant information. The third molars were not fully in; therefore, the person was not yet an adult. The brow ridge, though somewhat developed, and the delicate facial contours suggested it was probably a female while the shape of the cranium reflected Evelyn's German-Sicilian background. The decisive bit of evidence was the resemblance of the two front teeth on the photograph of Evelyn and on the skull -- both were slightly out of line. (Today Evelyn's bones, donated to the Smithsonian Institution by her family, are under the curatorial care of Angel.)

The challenge of identifying signs of an individual's occupation and avocation from bones particularly interests Angel. Under stress, bone builds extra layers in areas of the most pressure. A skeletal study of 18th/19th century ironworkers of Catocin Furnace, Maryland, carried out by Angel and his research assistant, Jennifer Olsen Kelly, reveals

signs of occupational stress appearing as bony crests in the ironworkers' forearms. In examining knobby bumps next to the jaw joint of a Delaware murder victim, Angel's suspicion was correct: the victim played a wind instrument. Horseback riders do not escape detection: stress marks on their lower femurs provide clues.

Angel's forensic work for law enforcement agencies has made him the subject of numerous articles in Science Digest, Smithsonian magazine, The Washington Post and recently People magazine (May 16th issue) where Angel received a two-page coverage, the envy of any Hollywood star. Mrs. Holland, Angel's secretary for many years, commented: "Dr. Angel sometimes dries bone specimens in a wire cage on the ledge of his window. He gets very excited and looks forward to new material coming in and devotes all his time to it until the work is completed." Besides helping to solve crimes, Angel's forensic work also enables him to study skeletons of middle class Americans.

## Smithsonian Curator

Forensic work and identification of missing persons are just two aspects of Angel's professional interests and responsibilities as a Smithsonian physical anthropologist. He also curates the bone collection in the Department of Anthropology. The skeletal materials consist primarily of prehistoric North and South American Indian populations; African, Asian, Australian, Hawaiian, and Chinese populations; and European and U.S. specimens. This latter group includes the Terry Collection which consists of over 1650 unclaimed bodies, black and white, male and female, from the Washington University School of Medicine in St. Louis with known age, sex, ethnic background and cause of death. Angel and Kelly have been studying the Terry Collection to compare the health of males and females, blacks and whites, over the past 100 years. They have researched indicators of dietary and environmental improvement including the

skull base height, the pelvis inlet depth (what radiologists call the "Park Avenue" pelvis -- a deeper pelvis indicative of better nutrition), stature, enamel growth arrest lines, dental disease and alveolar bone disease.

### Early Interests

One might begin to wonder how Angel became interested in bones in the first place and what led him to a career in physical anthropology. He was born in England in 1915, the son of an English sculptor and an American classics scholar, whose father had helped to found the American School of Classical Studies in Athens. As a small child Angel, like most children, was frightened of skeletons, even the one housed in his father's studio. But, by the age of eight his fear had turned to fascination during his frequent visits to the Natural History Museum in London. A collector of butterflies and moths, Angel enjoyed the museum's exhibit on the moth's adaptation to London's industrial environment. The exhibits on human anatomy led him to think that the "Piltdown man didn't make much sense" and the displays on evolution raised fascinating questions: How did it take place? Why did the dinosaurs become extinct?

Angel did not recognize his interest in anthropology until he was a student at Harvard University studying classics. Angel explains, "Classics was almost a boring field. Literature was not enough; archeology was necessary in order to appreciate and understand classical studies." The turning point in Angel's career was his decision to turn down his parents' offer of a European vacation and instead attend a series of courses led by Clyde Kluckhohn at the American School of Prehistoric Research in New Mexico. "Clyde Kluckhohn, a Rhodes scholar, was excessively dynamic, more or less a universal man who made a big impact on students. He presented the field of anthropology as a unified whole as I never before, or after, heard it. We started with geology and archeology of the Southwest, then on to climate, botany, ecology, and the

attitude of man toward his environment by contrasting the Navajo (pastoralists) with the Pueblo (maize growers). We had the unique opportunity of observing the Indians' ceremonies honoring nature."

### On to Greece

In 1936 Harvard professors Clyde Kluckhohn and Earnest Hooton strongly encouraged Angel to pursue his interest in anthropology. From Hooton, his physical anthropology teacher, Angel became interested in the jaw joint which differs among ethnic groups, between humans and other primates, and among fossil humans (i.e. Neanderthal and Homo sapiens sapiens). "Hooton wanted me to do fieldwork in Greece where very little had been done since the 1890's and where few samples had been retrieved because of the acid soil which eats away skeletal material. Having received permission from both Greece's Director of Antiquities and a Greek archeologist, I worked for over a year taking a complete sample of all the skeletal material that had been excavated from the Neolithic onward. The material was enough for my Ph.D. thesis. I was also concerned about the Nazi interpretations of race espousing the ancient Greeks as the ideal Nordic." Angel's research revealed that the Greeks varied considerably physically as a result of several waves of migrations into the area. "The Middle Bronze Age demonstrated the greatest heterogeneity. Just before 2000 B.C. the Indo-Europeans moved in and after the Late Bronze Age the heterogeneity narrowed." After several expeditions to Greece over the years, often accompanied by his wife who mended bones and recorded bone measurements, Angel published his findings in The People of Lerna (1971), a book he dedicated to his wife Peggy whom Angel describes as "a constant source of help, advice and love."

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### Joining the Smithsonian

In an effort to do something useful for the war effort, and at the same time avoid the draft and a probable desk job, Angel became an Associate Professor of Anatomy and Physical Anthropology at The Jefferson Medical College in Philadelphia. When questioned what brought him to the Smithsonian, Angel replied, "By 1960 I was getting bored having taught anatomy for 19 years. In 1961 Dr. T. Dale Stewart, then Department head, offered me a position as Curator of Physical Anthropology which I readily accepted. Carmichael was then Secretary and he was interested in international education and neurology. There was an atmosphere of creativity at the Smithsonian which Dillon Ripley has continued."

Angel continued his research on ancient Greeks and at the same time began to explore opportunities for studying other populations. He has compared the nutrition of the Colonial Williamsburg population with their English ancestors' (selection favored higher skulls in the Americans) and American Blacks with Africans. Just as his research shows a significant improvement in health in modern U.S. populations over the last 100 years (a relatively short period of time), the health of the Classic Greeks was much better than their ancestors, though it was a much slower process. At present, Angel is working on a book Health & the Growth of Civilization, an expression of his career-long interests in demography, health and disease studies, and the processes of human evolution at the population level. "I've done pretty much what I've wanted to do. However, it would be nice to do a very detailed and extensive twin study to separate genetic and environmental factors which influence disease and different aspects of nutrition such as stature. Maturation and growth is faster today and my concern is how it affects stature and body proportions. Modern teenagers' rate of psychological maturity falls

behind their physical rate, getting them involved in adult behavior before they are psychologically ready to accept its consequences."

When asked what people think of Dr. Angel's work, Peggy Angel replied, "People think physical anthropologists are strange. There is a certain fear of their work since it is connected with death. Actually my husband doesn't like to kill anything. We have a stable of crickets in our cellar and if one of them should find its way upstairs, he returns it to the cellar."

A Latin verse hangs in Dr. Angel's office -- "Hic Locus Est Ubi Mortui Viventes Docent" (This is the place where the dead teach the living.) We might add that this is the place where Dr. Angel teaches the living about the dead.

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