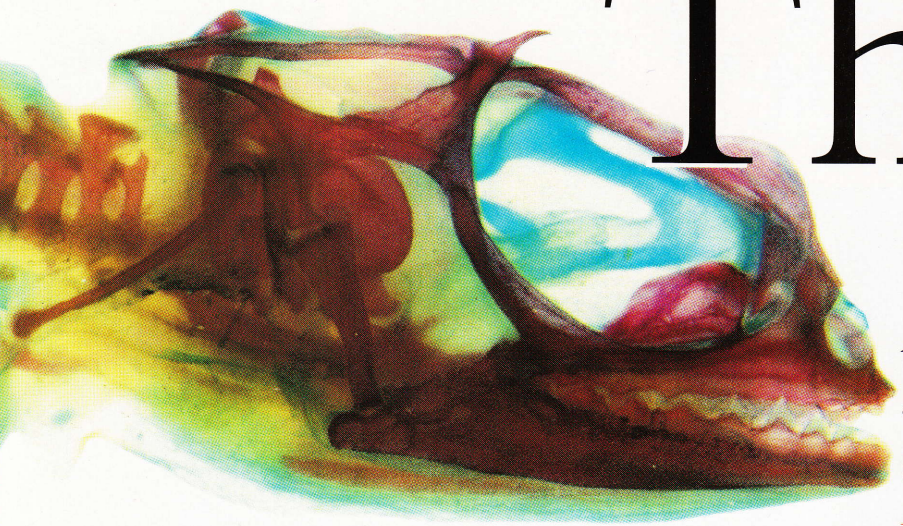
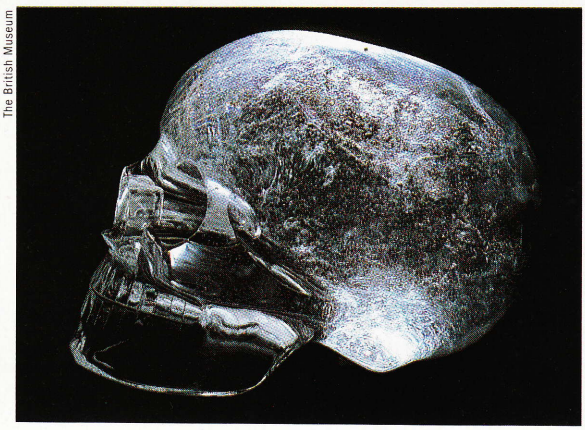
The Art



James Hanken; Charles Crumly

A recurring theme in scientific illustration and fine art, the skull is both an object of beauty and a reminder of our mortality.

BY JAMES HANKEN



The British Museum

Panther chameleon, 1996

The use of natural dyes to reveal details of skeletal anatomy goes back at least to the eighteenth-century comparative anatomist John Hunter. Scientists today also have access to a range of synthetic chemicals with which to stain living tissue. Staining is particularly useful for studying the skeletons of very small animals. The bones and teeth of this newly hatched lizard were stained red; cartilage was dyed blue.

Crystal skull, ca. 14th–15th century

The skull was a revered symbol for many native peoples of the New World, especially the Aztecs, who practiced human sacrifice and maintained an intense belief in the afterlife. This life-size human skull, sculpted out of shimmering rock crystal, is likely of Aztec origin.

Mammals, birds, fish, and other members of the vertebrate clan owe much of their great success to the skull. Unique and versatile, the skull houses the fragile brain and the organs for sight, smell, and hearing. And a number of cranial bones (most prominently the jaws, together with the teeth they hold) largely determine how, how much, and what a vertebrate eats.

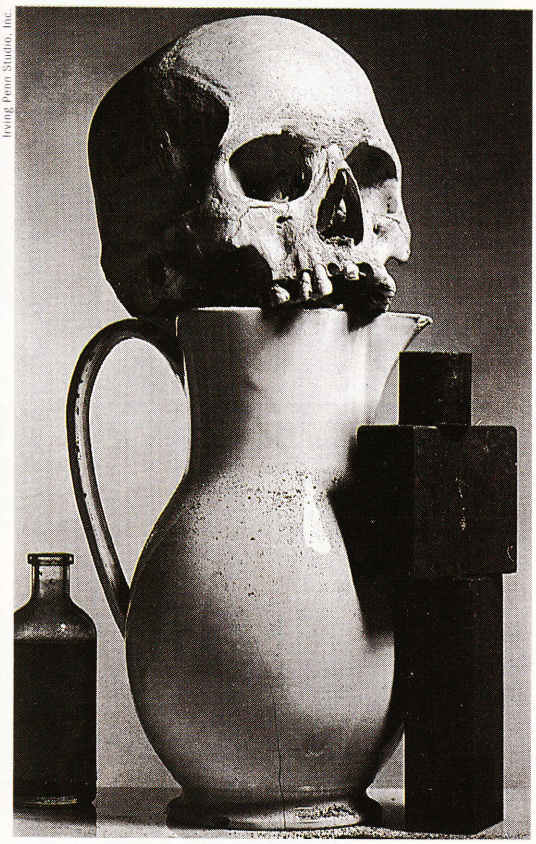
Much of vertebrate evolution has involved modifications of functions centered in the skull. For example, in the evolution of whales, bones surrounding the nostrils moved backward to form the blowhole, allowing these mammals to respire through the top of their heads. In howler monkeys of the New World tropics, the lower jaw and bony tongue skeleton are enlarged to form a resonating chamber, through which the monkeys communicate loudly with friend and foe.

As an evolutionary biologist with a special interest in cranial development, I take pleasure in looking at all kinds of skulls, the "real thing," of course, but also skulls in scientific illustration and fine art. As an object of beauty and contemplation, the skull has an attraction beyond its biological importance.

Most early depictions of the skull focused on humans, often as an adjunct to studies of human anatomy and medicine. The sixteenth-century anatomist Andreas Vesalius pioneered the tradition of drawing skeletons and other anatomical subjects in lifelike poses. Reflecting the Renaissance insistence on faithful representation of natural phenomena, Vesalius sometimes displayed particular features of the body against backgrounds of landscape scenery or buildings.

At that time, the descriptions of human anatomy in

of the Skull

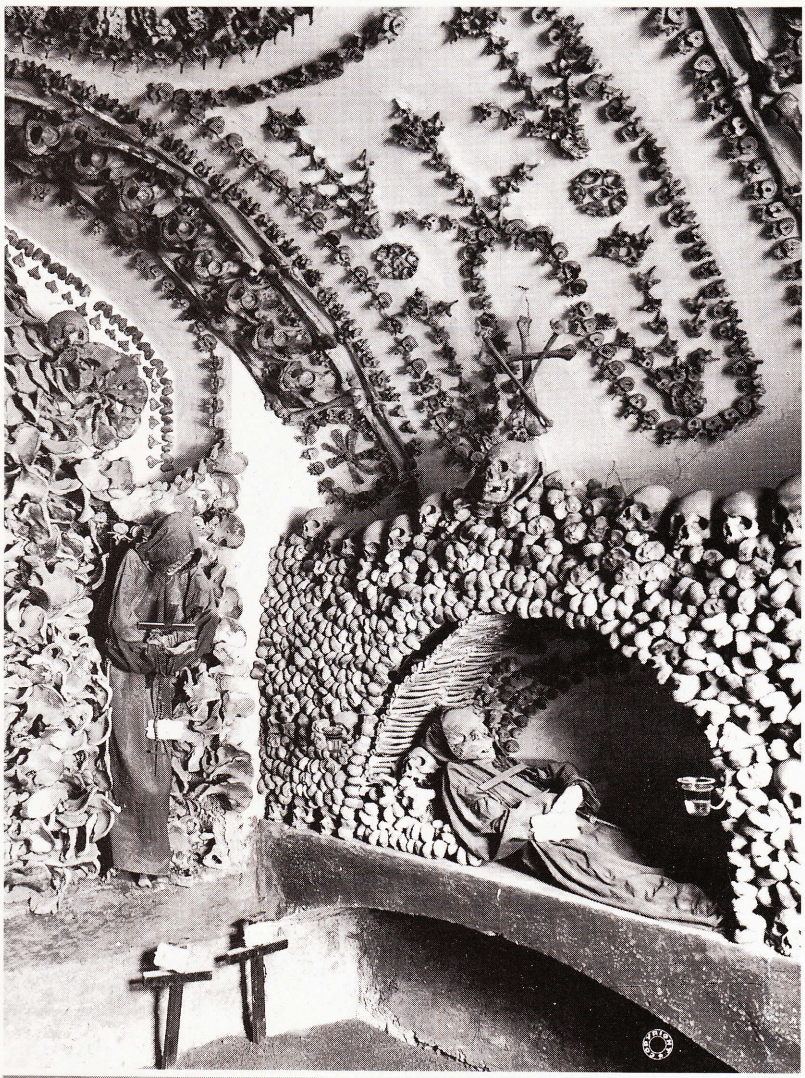


Irving Penn Studio, Inc.

Ospedale, *1980*
IRVING PENN (1917–)
Simple geometric forms within the human skull (and everyday objects as shown above) have captured the interest of many twentieth-century artists, including photographer Irving Penn.

De Humani Corporis Fabrica
ANDREAS VESALIUS (1514–64)
The Venetian painter Titian and his assistants may have been among the artists responsible for the plates in Vesalius's masterwork. One anthropologist has suggested that this illustration may have inspired the famous graveyard scene in *Hamlet,* in which Hamlet contemplates the skull of "poor Yorick."

James Hanken; Charles Crumly



Art Resource

Board of Trustees, National Gallery of Art, Washington

The British Museum

Church of Santa Maria della Concezione, Rome

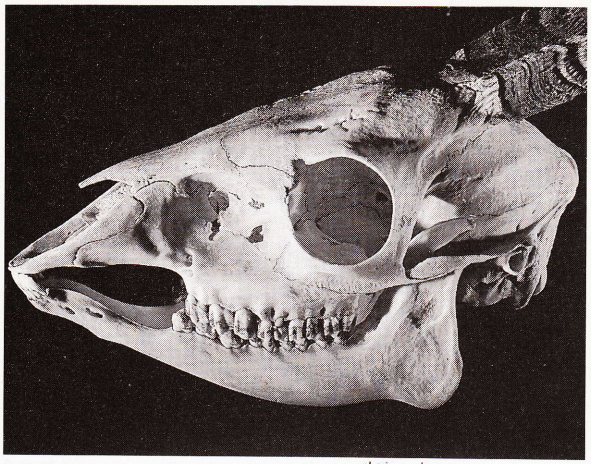
The bony remains of more than 4,000 Capuchin monks are housed in five subterranean vaults of this seventeenth-century church. Many skulls are arranged in piles or, along with various smaller bones, decorate the ceilings and walls. The vaults are illuminated on November 2, All Souls' Day.

O'Keeffe's Hands with Skull, *1930*
ALFRED STIEGLITZ (1864–1946)

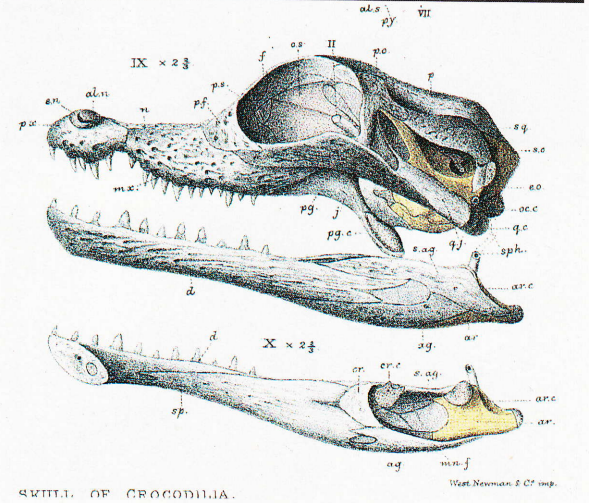
Beginning in the 1930s, artist Georgia O'Keeffe painted a colorful series of skulls and other bones of large desert mammals of the American Southwest. Her passion for skulls was captured in black-and-white by her husband, photographer Alfred Stieglitz.

medical texts were largely based on dissections of animals, many of which had been performed by the Greek anatomist Galen more than a thousand years earlier. Not surprisingly, these accounts contained many errors. Perhaps Vesalius's most fundamental contribution was his insistence that anatomical descriptions of humans be based on the study of human cadavers.

A milestone in the history of scientific illustration, the works of Vesalius and his collaborators were still somewhat stylized. In the seventeenth century, artists such as Pietro da Cortona drew skeletons that were more anatomically accurate. In his atlas of human anatomy (*Tabulae Anatomicae,* 1618), da Cortona continued to depict skeletons in lifelike poses, but true to the elaborate style of the baroque period, his backgrounds included such elements as rustic, waterside settlements with people passing by in boats.



Andreas Feininger; *Life* magazine, Time, Inc.



AMNH

Turquoise mosaic mask

A real human skull forms the "canvas" for an Aztec ceremonial mask. The face is inlaid with fragments of turquoise and obsidian; pyrite forms the eyes.

Skull of an antelope, 1966

ANDREAS FEININGER (1906–)

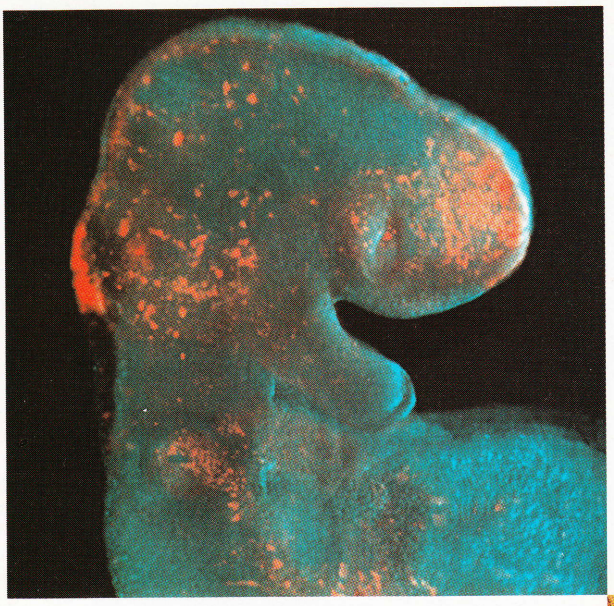
A staff photographer for the original *Life* magazine for twenty years, Feininger remarked about skulls that "the movement of the finest watch . . . seems rough and crude when compared to these tiny bits of bone and the utter precision with which they are finished and fitted together."

Crocodile skull, 1883

WILLIAM KITCHEN PARKER (1823–90)

English anatomist and embryologist Parker produced an illustrated account of skull development in crocodiles and alligators, based on embryos sent by friends and colleagues in the Americas and the Far East. Here, the skull of an embryonic mugger crocodile, native to India and Sri Lanka, is depicted from the side. The lower jaw is drawn twice to show its inner and outer surfaces.

Scott Fraser



Neural crest, 1992

Much of the skull develops from the neural crest, a group of cells found in vertebrate embryos. Here, neural crest cells in the head of a living mouse embryo have been stained with a fluorescent dye. The brightly colored cells migrate inward and down, contributing to bone and cartilage of the face and jaw. The lower jaw is the limblike structure at center-right. The developing eye lies above it in a small depression. This photograph was taken with a laser confocal microscope and enhanced by advanced computer imaging.

Joseph Kurstin, M.D.

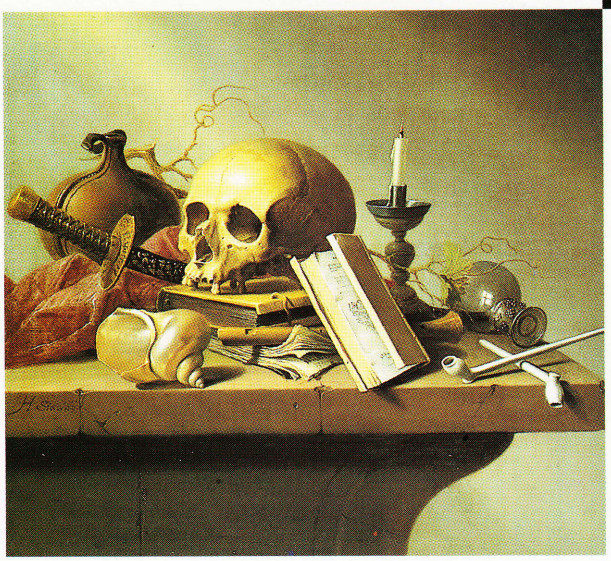
Secretary of the Treasury, *1986*

ARTHUR TRESS (1940–)

The photograph below is part of a series, all featuring human skulls, entitled "The Presidential Cabinet."

Arthur Tress

Stedelijk Museum De Lakenhal



Frogs ringing gong in a skull, 19th century

SHUZAN

In the eye sockets of a four-centimeter-high, boxwood netsuke skull, ivory frogs ring a lacquer gong sounded during religious ceremonies, while a venomous snake crawls atop the head.

Vanitas

HARMEN VAN STEENWIJCK (1612–56)

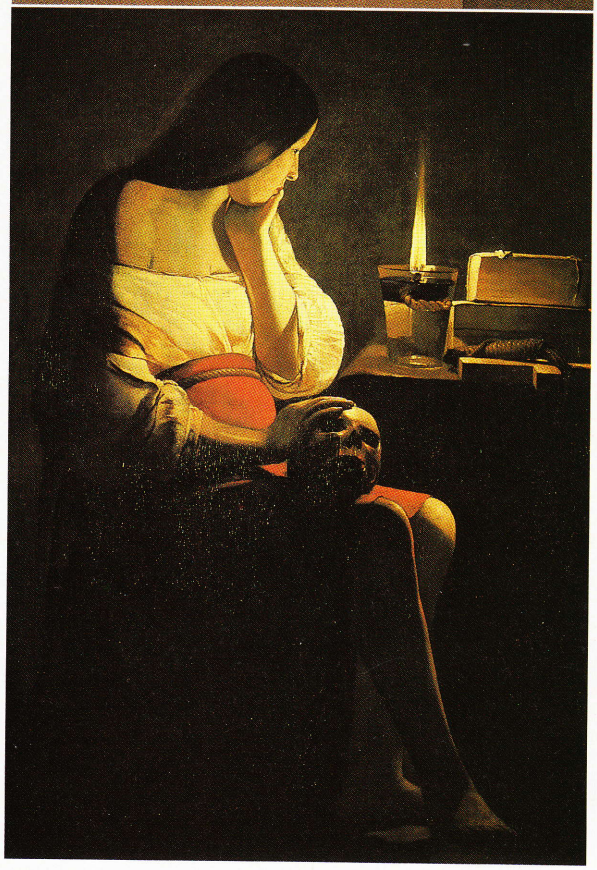
A popular motif of still-life painting in seventeenth-century Europe combined everyday objects with reminders of eventual and certain death.

In the eighteenth and nineteenth centuries, interest in natural history and comparative anatomy grew. Scientific expeditions probed the four corners of the globe and returned with reports, and frequently specimens, of all manner of odd beasts. The popular and professional fascination with these discoveries led to a marked increase in the number of scientific illustrations of the skulls of nonhuman vertebrates. Although many of the nineteenth-century anatomical drawings are technically superb, they seem somewhat lifeless next to the ornamental style of previous centuries.

The publication in 1937 of eminent zoologist Sir Gavin de Beer's *The Development of the Vertebrate Skull* culminated nearly one hundred years of intense scientific examination of cranial structure, development, and evolution. In the decades immediately following de Beer's monumental tome, the study of skulls, and vertebrate morphology in general, entered a period of relative inactivity, in part because of a shift to other topics, such as population genetics and developmental mechanisms. The last ten years or so, however, have witnessed a resurgence of interest. Technological advances—widespread use of the scanning electron microscope, sophisticated genetic and cell markers, and a variety of molecular analyses—enable investigators to resolve details of the skull, and its development, at a level scarcely imaginable less than a generation ago. Together with photomicrography and computer imaging, such studies often yield pictures as spectacular to look at as they are useful to science.

Over the centuries, while scientific illustrators have become increasingly accurate and technically sophisticated, most fine artists have remained less concerned with realism than with artistic vision. While many works depicting skulls can be somber or even moralistic, others are reflective or even playful. Most artists, like the early scientists, have been primarily interested in the human skull, although some have been attracted to skulls of all kinds of creatures. The painter Georgia O'Keeffe, who found tremendous inspiration in the spectacle of the New Mexican desert, amassed in her studio "a large pile of bones–a horse's head–a cow's head–a calf's head–long bones–short bones–all sorts of funny little bones and big ones too." In a statement for a 1944 exhibition, she wrote, "When I found the beautiful white bones . . . I picked them up and took them home. . . . I have used these things to say what is to me the wideness and wonder of the world as I live in it." Like O'Keeffe, I am inspired by the beauty of bones and have found that aesthetic and scientific appreciation of the natural world come together in the study of the vertebrate skull. □

Marisa del Re Gallery



Photograph by Erich Lessing; Art Resource
Louvre, Paris, France

Mirror I, *1962*
GEORGE TOOKER (1920–)
Tooker named de La Tour as the inspiration for this meditation on the transience of youth and beauty, a painting in the tradition of *vanitas*.

The Penitent Magdalene
GEORGES DE LA TOUR (1593–1652)
In one of several "night" paintings by de La Tour, the Magdalene gazes at one symbol of mortality (the candle) while resting her hand on another.