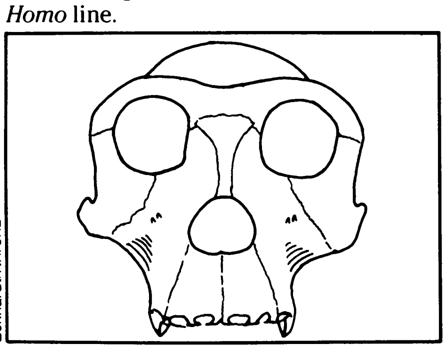
balance." They say the fact that similar enzymes help control blood pressure adds "further credence" to their proposed regulatory role for adipsin. It also may solve the difficult task of determining whether obesity is caused by a metabolic or genetic problem, or by gluttony. If what occurs in rodents holds true in humans, "circulating adipsin levels could serve as a highly useful marker for characterizing obese patients," conclude the authors. *– D.D. Edwards*

Hominoid lineages and keystone clues

When attempting to distinguish between early members of the human line and their now-extinct relatives known as the robust australopithecines, does the nose know?

In 1985, Todd R. Olson of the City University of New York Medical School answered in the affirmative. Connecting the nasal bones, he reported, was a keystone-shaped pattern of sutures that characterizes only robust australopithecines, also known as *Paranthropus*, as well two other distinct suture patterns marking modern apes and humans. He used these patterns to label the more than 3-million-year-old skull of a child found at Hadar, Ethiopia, as a member of the *Paranthropus* line, and another infant skull from about 2 million years ago – the Taung child – as a member of the *Homo* line.



Eckhardt/NATURE

The nasal bone keystone pattern on the skull of a modern chimp.

But Olson's analysis is now being challenged. According to Robert B. Eckhardt of Pennsylvania State University in University Park, the paranthropine keystone pattern occurs on about 8 percent of modern ape skulls. This configuration of sutures appears to be a normal variation in facial structure and part of the common heritage of hominoids, or apes and humans, and is not confined to robust australopithecines, concludes Eckhardt in the July 23 NATURE.

He examined the crania of 66 chimpanzees, 99 gorillas and 108 orangutans obtained from the U.S. National Museum of Natural History in Washington, D.C., and the Field Museum of Natural History in Chicago. The three groups contained both sexes and ranged in age from infancy to adulthood. Most of the crania had been collected in the wild.

Nasal bone outlines sometimes display confusing similarities across different hominoid groups, adds Eckhardt. For example, one chimp had nasal bones resembling those of a recently discovered robust australopithecine even though the two specimens share no other cranial features. The lesson of the survey, he says, is that "the anatomical region including the nasal bones is so highly variable that to abstract a few patterns is seriously to misrepresent reality."

Olson, however, says his 1985 analysis has not been disproved. "There is certainly variation in hominoid nasal bone anatomy," responds Olson, "but there is a consistent pattern. More than 90 percent of Eckhardt's specimens fit my previous description [of nasal bone outlines] in hominoid groups."

On the basis of Eckhardt's finding, says Olson, the probability is that in 9 out of 10 cases a fossil skull with the keystone pattern will be of the paranthropine lineage.

Olson also holds that Eckhardt misinterpreted nasal bone anatomy by concentrating on the skull surface and not the pattern of sutures on the inside of the skull. Olson estimates that only one specimen in the three groups of apes actually displayed a paranthropine pattern.

– B. Bower

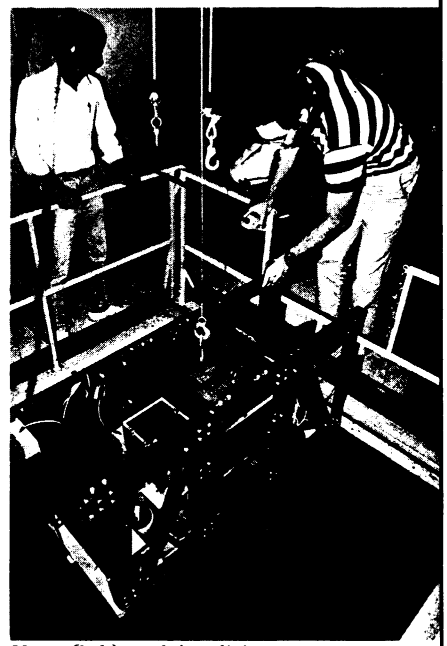
Dropping smoothly to a fiery end

How do you make a falling droplet stand still? With considerable difficulty, it turns out. Mechanical engineer Thomas Avedisian and graduate student Jiann Yang of Cornell University in Ithaca, N.Y., spent three years perfecting an apparatus to enable them to study how a droplet of fuel burns under near-weightless or "microgravity" conditions. Now they can track, on film, a burning droplet's complete life history – from ignition to extinction.

Their results, says Avedisian, will help test fundamental theories about how fuels burn and validate computer models of combustion. The information may also lead to a better understanding of how liquid fuels behave in spacecraft propulsion systems.

The basic idea sounds simple. It's a matter of releasing at the same time a fuel droplet and a camera focused on the droplet, allowing them to plummet 25 feet into a cushion of foam rubber chunks. Such drop-tower experiments have been done in the past, but researchers usually managed to observe less than half of a droplet's burning history. Furthermore, the sudden tug needed to release a droplet hanging from a fiber tended to give it an unpredictable initial velocity.

Avedisian and Yang overcame these problems by designing a special droplet generator and a precise timing circuit to control the whole experiment. Sitting in a clear plastic chamber, a tiny nozzle squirts a stream of droplets, each less than 0.5 millimeter in diameter, in a nearly vertical trajectory. The timing circuit shuts off the stream, and when the final droplet reaches the peak of its trajectory, the droplet is ignited and the whole platform on which the apparatus sits is released. At that instant, the droplet is stationary. "If the timing is correct," says Avedisian, "the droplet looks motionless with respect to the camera." The plunge takes about 1.2 seconds.



Claude Levet/Cornell

Yang (left) and Avedisian prepare to drop their 350-pound instrument package.

To make the experiment work, the researchers had to ensure that the droplet generator yielded repeatable trajectories, even after numerous falls. In addition, they had to account for the slight delay between the time when the electromagnet holding the platform is shut off and when the platform is actually released.

These drop-tower experiments allow Avedisian and Yang to study combustion without the complicating effects of flows within droplets due to buoyancy. So far, they have done about half a dozen experiments on droplets of fuels such as heptane and hexadecane and various mixtures of the two components. Eventually, they hope to look at the effects of additives and changes in pressure.

– I. Peterson