

## EVOLUTION

# Study Primate Evolution

► COUNTING HOW MANY chromosomes a monkey has may help place it in the time-scale of evolution.

Improved laboratory techniques for growing cells and studying the tiny chromosome found in the cell nucleus have now made possible accurate determination of the number and "looks" of these microscopic carriers of heredity.

With this information scientists may be able to solve some of the puzzles in classifying primates according to which one evolved first. So far the study of anatomy has left many gaps in understanding the relationships among this important group of animals.

Experiments with some ten different monkeys representing eight genera of primates are reported by Drs. Michael A. Bender and Lawrence E. Mettler of Johns Hopkins University biology department in *Science* (July 25). Their research includes the first reported chromosome count for an early primate, called a slow loris.

From the more than 30 good chromosome studies obtained from each species the scientists were able to make both drawings and photographs of the chromosomes.

A large variation in chromosome number

exists among the primates, the scientists report, as the numbers range from 34 to 66. However, examination of the chromosome shapes points to central fusion as one way the chromosome number has evolved from species to species.

In four species, including the cinnamon ringtail, a red titi, a squirrel monkey, and a hooded spider monkey, the most highly specialized monkey in the family has the fewest chromosomes.

If, in the course of evolution, chromosomes fused together, this would account for the progressively lower number in more specialized species. Particularly interesting, the scientists report, is the observation that the spider monkey, which is better adapted for living in trees, had the greatest number of chromosomes that fused at the mid-point. This indicates fusion would have taken place in the middle of the two chromosomes.

"Although the studies of the chromosomes of the primates which have been made to date have only scratched the surface, so to speak," the scientists concluded, "it is already obvious that such studies can be of great help in the analysis of the problem of the evolution of this group."

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## PUBLIC HEALTH

# A-Stockpile "Unclean"

► AMERICA'S defense forces admittedly are stockpiling nuclear weapons that are "dirty," but not "salted."

The question of whether the weapons we are stockpiling are really "dirty" is still open to debate, and persons who have different definitions of "dirty" bombs will take different sides of the issue.

Defense Secretary Neil H. McElroy's recent letter on the subject to Sen. Richard B. Russell (D.-Ga.) states that our armed forces do not recognize the word "dirty," but admits a growing stockpile of unclean nuclear weapons.

The letter, which confirmed development of a new bomb fuse to trigger the weapons at ground level, admitted that some of our unclean nuclear weapons will be even less clean in actual use.

Although the Secretary of Defense denied we have considered making deliberately "dirty" weapons, the full text of the letter shown to newsmen three days after part of its contents were "leaked" on Capitol Hill suggests we are interested in the science of "dirty" weapons from the standpoint of self-preservation.

Secretary McElroy said he had requested the Atomic Energy Commission to "determine whether it is technically feasible to design" dirty atomic weapons for two reasons:

1. "We should like to know whether an enemy might be able to design and use such weapons against us.

2. "We visualize certain situations under which it might be highly desirable to deny the enemy the use of certain facilities and/or areas for a limited period without causing wholesale destruction."

A high Pentagon official told *SCIENCE SERVICE* he doubts that an enemy would ever use a "dirty," or "salted" bomb against us because "it probably would cause him as much harm as it would us."

The Department of Defense recognizes three types of nuclear weapons, with respect to their cleanliness:

1. Normal weapons which are similar to the first atomic bombs, but larger. These are primarily fission weapons and release large amounts of radioactivity into the atmosphere. We continue to stockpile them, Mr. McElroy said, because they have their specific uses.

2. "Salted" weapons which have been made deliberately "dirty" and are designed to cause death and sickness through radiation as much as they are designed to destroy military objectives.

3. Clean bombs. These are fusion weapons, such as hydrogen bombs, which are five percent "dirty" and 95% clean due to the nature of fusion reactions.

One of the Atomic Energy Commission's most bitter critics on the dirty bomb versus clean bomb issue, Sen. Clinton P. Anderson (D.-N.M.) told *SCIENCE SERVICE* "I am glad to see they now acknowledge they are continuing to stockpile normal 100% fis-

sion, or 'dirty,' weapons along with the cleaner hydrogen bombs."

Sen. Anderson said he saw no objection to unclean fission bombs, but felt the Atomic Energy Commission had misled the public into believing that all our nuclear weapon production recently has been devoted to so-called "clean" bombs.

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## CHEMISTRY

# Tektites Come From Beyond Solar System

► TEKTITES, GLASSY OBJECTS found in widely scattered groups around the world, come from somewhere in the vast regions of space beyond the solar system, according to a new theory.

If so, tektites are the only material available for study on earth showing the composition of matter formed elsewhere than in the solar system. Further study of their chemical make-up could give experimental verification of the theory on the origin of tektites, proposed in *Nature* (July 26) by Dr. Truman P. Kohman, now at the Max-Planck-Institute for Chemistry, Mainz, Germany.

Dr. Kohman bases his theory on the high levels of radioactivity he and Dr. W. D. Ehmann found in certain tektites while working at the Carnegie Institute of Technology, Pittsburgh. The radioactivity, caused by cosmic ray bombardment, of aluminum 26 and beryllium 10 was measured "considerably above any conceivable levels of production by cosmic or terrestrial radiations at or beneath the earth's surface."

This finding virtually eliminates not only the earth but also the moon as the source of tektites. Dr. Kohman suggests tektites arrived at the earth's surface as a loose cluster of glassy objects from outside the solar system.

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## GENETICS

# Chromosomes Affected By "Medium" Radiation

► A "MEDIUM" DOSE of radiation may be more dangerous to a living organism than a high dose.

J. S. Kirby-Smith and G. W. Dolphin of St. Bartholomew's Hospital Medical College in London, England, noted a "definite and significant decrease" in the frequency of chromosome breaks and exchanges when a spiderwort plant was subjected to higher dose rates of radiation.

At present, they report in *Nature* (July 26), there is no satisfactory explanation of the 40% to 50% drop in chromosome aberrations or changes that follows intense irradiation.

They suggest that they may be due to a partial, temporary anoxia resulting from the immediate consumption of oxygen under intense bursts of radiation.

Their studies were made with microspores of the spiderwort plant, *Tradescantia paludosa*.

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