

... Biological clock

are the human sleep-wake timekeeper is as yet indirect, based on the experiments in monkeys and observations that some humans with drastic changes in the sleep-wake cycle have damage to that region of the brain, says Moore-Ede. "These findings suggest we're on the right track," he says. "Now we must rely on experiments of nature to continue to validate the findings." □

Baby woolly mammoth blood

Intact red and white blood cells of a woolly mammoth have been found in tissue taken from the mammoth discovered frozen in Siberia in 1977 (SN: 3/18/78, p. 167). The cells are the oldest body cells to be examined in so natural a state — the animal lived approximately 44,000 years ago.

The blood cells were discovered in a gram of tissue given by Soviet scientists to Wayne State University School of Medicine in Detroit. When Marion Barnhart analyzed the dried material by scanning electron microscope, she saw the red and white blood cells in blood vessels and capillaries of the tissue. The cell membranes appear to be intact, and the white cell surfaces still have their characteristic fingerlike projections.

The blood cells resemble those of modern elephants, Barnhart says. For instance, the red blood cells are 5.3 microns in diameter, while frozen elephant cells are 5.1 microns. The mammoth white blood cells are as large as 11.5 microns across.

Barnhart also looked at remnants of skeletal muscle in the abdominal sample. She used scanning electron microscopy to locate an appropriate muscle region and then made thin slices of that tissue to examine under high magnification. The membranes and contractile fibrils are missing, she told *SCIENCE NEWS*. But there is dense material that corresponds to the characteristic A and I bands of muscle, and the Z bands, which define skeletal muscle segments, are intact. "The length of the sarcomeres [segments] is realistic compared to those of modern elephants," Barnhart says.

Others at Wayne State examining the biochemistry of the baby woolly mammoth tissue have identified collagen, the fibrous protein found in connective tissue. The scientists are analyzing abdominal muscle because they believe tissue deep in the mammoth is the best preserved. A slower rate of freezing 44,000 years ago and a slower rate of thaw more recently helped to keep the cells intact. The mammoth is the best preserved specimen that has been found in Siberia; in most cases scavengers and bacteria destroy body cells and repeated thawing and refreezing disrupt the cells. □

MAY 10, 1980

BOOKS

BOOKS is an editorial service for readers' information. To order any book listed or any U.S. book in print please remit retail price, plus 50¢ handling charge for each book to **Book Order Service**, Science News, 1719 N Street, N.W., Washington, D.C. 20036. All books sent postpaid. Domestic orders only.

THE BEGINNER'S HANDBOOK OF ELECTRONICS—George H. Olsen, revised by Forrest M. Mims, III. Written for the layman who wishes to gain an understanding of the principles of electronics. Assumes no more prior knowledge than that of elementary electricity and seeks to avoid mathematics. Discusses such topics as resistors, transistors, semiconductors, integrated circuits, television and digital circuits. P-H, 1980, 305 p., illus., \$17.95, paper, \$6.95.

EARTHQUAKE ENGINEERING AND HAZARDS REDUCTION IN CHINA: A Trip Report of the American Earthquake Engineering and Hazard Reduction Delegation—Paul C. Jennings. The purpose of the delegation was to learn about earthquake engineering research and practice in China, the Chinese earthquake prediction program, their efforts to mitigate earthquake hazards and the effects of the disastrous Tangshan earthquake of July 1976. Natl Acad Sci, 1980, 189 p., illus., paper, \$11.50.

EARTHQUAKES AND VOLCANOES: Readings from Scientific American—Introduction by Bruce A. Bolt. Discusses properties of earthquake sources, seismic waves and the way these are measured by instruments, provides an up-to-date summary of the procedures seismologists use to explore both the structure and deformation of the earth's interior, presents volcanoes as fascinating natural features and their importance as global heat engines. WH Freeman, 1980, 154 p., illus., \$15, paper, \$7.95.

ENERGY AND HUMAN NEEDS—Samuel C. Curran and John S. Curran. Examines most of the resources available to us, the means of their production, questions of conversion and storage and the implications of energy use on the environment and our way of life. Wiley, 1979, 330 p., illus., \$24.95.

FROGS—Gerald Donaldson. A whimsical pageantry of facts and fancy. Selections from literature, art, science and advertising about these amphibious creatures. Van Nos Reinhold, 1980, 128 p., illus., \$14.95.

A GOLDEN THREAD: 2500 Years of Solar Architecture and Technology—Ken Butti and John Perlin. The ancient Greeks designed their homes to capture winter sunlight. This book describes the major advances in solar architecture and technology that have occurred since that time. Van Nos Reinhold, 1980, 289 p., illus., \$15.95.

HYDROPONICS FOR THE HOME GARDENER—Stewart Kenyon. Discusses the use of hydroponics for the small-scale indoor grower—a guide to make hydroponics work in the home. Van Nos Reinhold, 1979, 146 p., illus., paper, \$6.95.

THE LAST CHANCE ENERGY BOOK—Owen Phillips. Explains simply the magnitude of the energy crunch, tells why the problem will become worse before it gets better and presents the options on a personal and national level. Originally published in hardback by Johns Hopkins in 1979. McGraw, 1980, 142 p., illus., paper, \$4.95.

THE STORY OF NIM: The Chimp Who Learned Language—Anna Michel, introduction by Herbert S. Terrace. A simple science book with marvelous photographs explains how Nim, a chimpanzee, was taught to communicate with human beings. Knopf, 1980, 59 p., photographs by Susan Kuklin and Herbert S. Terrace, \$6.95. (See p. 298.)



Edmund Scientific Catalog



Edmund makes science fun!!!

Free! Edmund Scientific Catalog

Explore with us!

Over 4,000 exciting products in our **Free 100 page color catalog** . . . Astronomy • Biofeedback • Binoculars • Fiber Optics • Magnifiers • Diffraction Grating • Lab Equipment • Lasers • Health • Lenses • Magnets • Treasure Hunting • Unique Lighting • Weather . . . and much more . . . in the **Edmund World of Science!**

Edmund has a proud 38 year record of service to the hobbyist, serious amateur and professional!

Rush me your free catalog!

Name _____
Address _____
City _____
State _____ Zip _____

Clip and Mail Coupon Today to:

Edmund Scientific Co. Dept. 2017 QQ10
Edscorp Building, Barrington, N.J. 08007
No. 153 *1979 Edmund Scientific Co.