

ARCHAEOLOGY

Microscope Reveals Uses Of Stone Age Knives

► FOCUSING A MICROSCOPE on ancient stone tools reveals the variety of specialized uses to which Stone Age man put them.

Fashioning all his tools from stone and bone, these early hunters had a tool for every use, knives, axes, burins, sickles and even eating equipment.

Dr. Sergei A. Semenov of the Institute of Archaeology, Soviet Academy of Sciences, found that by microscopically studying the wear lines or striations on a tool, he could determine, for example, whether it was used to scrape backward and forward on a hide or just to scrape forward around the edges.

Dr. Semenov had identified two new tools by examining the microscopic lines.

One is a meat knife which was indispensable to hunters for dividing up a carcass and cutting the meat as they ate it. They probably held a piece of meat in their teeth and, with a knife in one hand, cut off a bite-sized piece as some Asiatic nomads do today.

Another knife, designed for whittling wood or bone shows a characteristic flat underside and wear lines caused by the user's hands.

Dr. Semenov's work originally was published in 1957 in "Materials and Researches on the Archaeology of the USSR," by the Institute of the History of Material Culture of the Soviet Academy of Sciences. It recently was translated into English as the book, "Prehistoric Technology" (Barnes and Noble, New York, \$12.50).

In addition to presenting a new technique for study, it draws together a great mass of scattered information and relates ancient tool making with modern methods.

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PHYSIOLOGY

Dream-Producing Sleep Special State of Brain

► SO-CALLED "paradoxical" sleep, which produces dreams, may not be sleep at all but a state of the brain that has not been properly identified.

This is the belief of Dr. Michel Jouvet, a noted French brain authority, who presented a special lecture at the brain research institute of the University of California, Los Angeles. Dr. Jouvet's Laboratory of General and Experimental Pathology is in Lyon, France.

The patterns of electrical activity, brain waves, recorded during paradoxical sleep are more like those of a person awake than asleep, Dr. Jouvet said. That is why it is called paradoxical. It appears that dreaming is largely, if not entirely, limited to this state of the brain.

Dr. Jouvet suggests that this type of brain activity may be a third special state along with sleep and wakefulness. It occurs in all mammals studied, to a lesser extent in birds and not at all in reptiles. Thus it appears

to have been acquired during the avian period of evolutionary development.

Experimental evidence has demonstrated its survival value. Cats deprived of the ability to engage in paradoxical sleep die in one to three months.

"We do not know yet why they die," Dr. Jouvet said.

Dr. Jouvet has found that cats spend about 20% to 25% of their 10-minute catnaps in paradoxical sleep and dreaming. This is about the same percentage that humans spend during their longer six- to eight-hour periods of sleep.

The French brain authority suspects that paradoxical sleep either may perform the function of a "metabolic cleansing agent for our brain cells" or may have some important role in our memory process.

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TECHNOLOGY

Computer Draws Maps For Machine Use

► A NEW COMPUTER can transfer information from punched tapes to graphs, maps, charts and cutter paths for machine use.

Available for a fraction of the cost of earlier systems, this computer, the VP 600, built by the Gerber Scientific Instrument Company, Hartford, Conn., can draw graphs at 200 inches a minute.

It can also reverse the process and read data from maps and charts, translating it into tape usable by other computers.

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METEOROLOGY

Scissors-Like Winds Affect Ionosphere

► WINDS WHIPPING along at 50 miles or more high in the atmosphere form giant scissors in the sky, disturbing the ionosphere that reflects radio waves for long-distance communications.

This energy is transferred from the lower into the upper atmosphere, Dr. Colin O. Hines of the University of Chicago told the International Scientific Radio Union meeting in Washington, D. C.

He said analysis of meteor trails and rocket vapor trails led to the discovery of the great, scissors-like winds. These high-altitude winds are in part responsible for irregularities in the ionosphere.

When shifting or gusty winds strike mountain barriers on the earth's surface, part of their energy shoots straight up in the form of waves. Such waves are similar to sound waves, but of lower frequency. They are technically called "internal atmospheric gravity waves." Gravity's downward pull plays an important part in determining their properties.

The gravity waves increase in amplitude as they move into the rarefied ionosphere. At heights of 50 miles or so, they create irregular shearing winds and whirling eddies, and these winds affect radio communications.

The turbulence in the upper atmosphere may also heat the area nearly 30 degrees Fahrenheit each day.

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IN SCIEN

SPACE

Manned Environmental Space Labs Built

► OUTER SPACE is being brought down to earth and into two large chambers, built for astronaut training near Houston, Texas.

Two chambers, part of the National Aeronautics and Space Administration's Manned Spacecraft Center, will undergo temperatures ranging from 240 degrees above zero to 400 degrees below zero. A turntable which produces the effect of tumbling in space, has a capability of rotating a full half circle. Atmospheric pressure will be reduced to equal that 75 miles above the earth's surface.

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BIOCHEMISTRY

Cure Pregnancy-Related Cancer by Safer Drug

► A SAFER DRUG treatment for the pregnancy-related cancer called choriocarcinoma is believed to cure the malignancy with less danger to the patient than two presently used drugs.

The new treatment is with DON, a name coined from the initials of the chemical ingredients, 6-diazo-5-oxo-L-norleucine.

The word "cure" applied to cancer is rarely used, but successful choriocarcinoma treatment is believed to warrant the term in many cases.

Choriocarcinoma occurs during and after pregnancy, getting its name from the chorion, the outer membrane that surrounds the fetus early in development. The chorion also forms the embryonic part of the placenta, through which the fetus is attached to the womb.

DON, like Methotrexate and Actinomycin D, was originally, and still is, used as a treatment for leukemia.

The drug is an antibiotic produced by an unidentified species of *Streptomyces* from Peruvian soil. All three of these drugs are dangerous to the unborn baby in varying degrees.

Six of ten women treated with DON have responded to treatment from one to seven years, researchers reported at the 55th annual meeting of the American Association for Cancer Research in Chicago. Drs. David A. Karnofsky and Robert B. Golbey of the Sloan-Kettering Memorial Cancer Center and Dr. Min Chiu Li of Nassau Hospital, New York, reported the cases.

Three of the successfully treated women had widespread deposits of cancer throughout their lungs.

Choriocarcinoma spreads rapidly and extensively throughout the body, and, until 1956 when Methotrexate was first used in its treatment, was considered a rapidly fatal disease.

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CE FIELDS

MILITARY SCIENCE

Cobalt Dusting Would Defeat Own Purpose

➤ **DUSTING** a strip of land as long as the Korean-Chinese border with radioactive cobalt to hold back an army would have presented the same problem that was noted with another diabolical weapon, poison gas.

Once let loose, the material might come back and kill those who unleashed it.

The cobalt proposal, cited by Gen. Douglas A. MacArthur in interviews published after his death, would have required sowing radioactivity over more than 2,000 square miles of land.

It would have achieved the purpose of making the territory uninhabitable for a period of weeks, months or years, depending on the quantity used. But radioactivity would have wafted upon every breeze and lasted possibly for a generation.

Further, the border still could have been crossed by troops in fast-moving, heavily-shielded vehicles. A cobalt-covered strip of land probably would have no effect on airplanes passing over it.

Ordinary cobalt is cobalt isotope 59. Under bombardment, a neutron sticks to the heart of the atom and converts it into cobalt-60. This is radioactive and in an intense emitter of gamma rays or X-rays.

The radioactivity persists for a long time. After 5.3 years, half of the amount of cobalt changes into an isotope of ordinary nickel, with the deadly gamma rays produced in the transformation.

Gamma rays are highly penetrating. They have the ability to ionize as they traverse matter, that is, they cause the ejection of energetic electrons. These electrons interact with surrounding atoms to produce additional ion pairs. If the material attacked is living tissue, the result can be disastrous.

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MEDICINE

Overfreezing a Danger In New Ulcer Treatment

➤ **OVERFREEZING** the stomach in the new refrigeration treatment of gastric ulcers should be avoided, one of the pioneers in the method told a meeting of the American College of Physicians in Atlantic City.

Forty patients were treated in the past two months with a new technique in which the lining of the stomach was kept at 25 degrees Fahrenheit for only ten minutes out of a total 30-minute freezing time. During 20 minutes of the half hour, 32 degrees Fahrenheit was allowed.

The 40 patients so far have shown better results than the 600 patients previously treated at lower temperatures, Dr. Owen H. Wangenstein of the University of Minnesota Medical School said.

"We are now using the drug Pitressin to reduce arterial blood flow to the stomach that could cause warming of the temperature," Dr. Wangenstein told *SCIENCE SERVICE*.

The freezing technique for ulcers is still experimental and one that should be used with the greatest care, he said.

Pain is stopped along with the secretion of the digestive juice containing hydrochloric acid, thus allowing the ulcer to heal. But of the 600 patients treated some two years ago, only 35% are entirely without ulcer symptoms. Refreezing has been done in 25%.

Dr. Wangenstein began his cooling technique back in 1958 as a method of stopping gastric and esophageal bleeding. This can be done with a latex alcohol-filled balloon at only 50-60 degrees Fahrenheit in perfect safety.

If temperatures are too cold, however, cells and nerve terminals can be injured. Devices called thermocouples must be used to monitor the temperature of the stomach lining outside the balloon.

Dr. Wangenstein's research with humans has been mainly with ulcers of the duodenum, a part of the small intestine that connects with the stomach.

Experiments with dogs have been tried using frozen liquid Teflon outside the balloon, but Dr. Wangenstein says he is afraid to use it on the stomach of man. A safe liquid would help the treatment of humans. If the balloon should rupture, it would have to be removed and the stomach washed out to prevent harm from the alcohol.

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MEDICINE

Bronchitis Death Less Likely If Stop Smoking

➤ **THE PERCENTAGE** of deaths from bronchitis and emphysema, a condition in which the air spaces of the lungs are enlarged, was less among persons who had stopped smoking than among those who continued to smoke, three Denver physicians believe.

Emphysema is a disease clearly described in the medical literature of the 19th century before cigarettes were generally available, the physicians said. But even if emphysema is not caused by cigarettes, the lungs of patients are irritated by cigarette smoking.

Drs. Robert S. Mitchell, Thomas N. Vincent and Giles F. Filley reported the study, which included 150 patients, in the *Journal of the American Medical Association*, 188:132, 1964.

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BIOTECHNOLOGY

New Device for Neutron Treatment of Cancer

➤ **A STEEL DEVICE** to make neutrons travel in a parallel beam so they can be used for treating cancer patients has been built at the Christie Hospital and Holt Radium Institute, Manchester, England. The experimental device was designed for fast neutrons by D. Greene, who reports details in *Nature*, 202:204, 1964.

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BIOCHEMISTRY

New Cancer Drug Helps Lymph Disease Patients

➤ **PATIENTS WITH** advanced Hodgkin's disease were reported improved after treatment by a new compound active against cancer of the lymphatic tissues.

Hodgkin's disease, a malignancy of the lymph nodes and glands, is considered fatal.

The new drug belongs to the group known as methyl hydrazines, which are believed to have a type of activity against cancer different from that of other drugs now used.

Seventeen of 25 patients have responded to treatment, a team of physicians reported at the 55th annual meeting of the American Association for Cancer Research, Chicago. The compound was first used in Switzerland, where it was developed by Hoffman-LaRoche Laboratories.

Drs. K. Brunner, A. Martz, I. Krakoff, W. Geller and G. Escher of Sloan-Kettering Memorial Cancer Center, New York, reported the research.

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SPACE

First Gemini Mission Successfully Concluded

➤ **THE MISSION** of the unmanned Gemini spacecraft launched April 8 has been successfully concluded. The spacecraft along with the second stage of its Titan II rocket fell out of orbit over the South Atlantic about midway between South America and Africa, the National Aeronautics and Space Administration reported. No attempt was made for recovery.

This was the first launch test of the Gemini-Titan II combination. The first manned test of the Gemini is set for before Christmas with Astronauts Virgil I. Grissom and John W. Young aboard.

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PSYCHOLOGY

Heavy Drinkers Worry About Their Sex Potency

➤ **INTEMPERATE MEN DRINKERS** are more concerned about sex, especially their abilities as sex partners, than those who drink moderately, a Veterans Administration hospital study reported.

Shyness, anxiety, excitability, pessimism and job instability are other characteristics of the heavy drinker, Drs. David B. Wine and Allan E. Edwards of the Veterans Administration Center, Los Angeles, reported in the *Quarterly Journal of Studies on Alcohol*, 22:77, 1964.

The 78 men questioned were not considered alcoholics, although they were asked if there had been periods of their lives in which they had done "quite a bit of drinking." Thirty-four were placed in an "intemperate" group; the other 44 in a "temperate" group for comparison of personality traits.

All were patients hospitalized in the Los Angeles VA Wadsworth General Medical and Surgical Hospital.

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