GEOPHYSICS

Dates by Magnetism

The magnetism of cooking hearths of past ages gives the dates of ancient events. Changes in the earth's magnetic field are used as a measuring stick.

➤ THE EARTH'S magnetism in the baked earth of cooking hearths of past ages dates human events of prehistory and gives archaeologists a time index, the Tenth Pacific Science Congress in Honolulu was told by Dr. Naotune Watanabe, anthropologist of the University of Tokyo.

Burned clays are permanently magnetized in the direction of the earth's magnetic field in which they were cooled from a high temperature. This can be measured like the deviation of a compass needle. Because the earth's magnetism changes in direction with the years, this effect can be used in dating. Lava flows from ancient volcanoes are affected similarly and the flows can be used to give a calendar of magnetic variations that can be applied to the ancient camp fires of past peoples.

Dr. Watanabe applied to archaeological sites the magnetic method used by geophysicists on lava flows and other igneous rocks. From baked clay samples of various ages in Japan during the past 6,000 years, he determined that the earth's magnetic field seems to have undergone a secular variation within the range of 40 to 60 degrees in inclination and 20 degrees east and 30 degrees west declination for at least that time in that country.

He built standard scale of secular variations for the past 1,700 years, which is based on dated lava flows, and can be used to date archaeological finds.

Studies are now being made to connect the magnetic dating with radiocarbon and other methods of dating the past.

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Heat in Antarctica

➤ THE AMOUNT of heat flowing into the Antarctic each year by wind is seven to ten times greater than the amount carried in by water vapor.

The heat transport per year amounts to 2,000 times the electrical energy produced in the United States in 1957, Morton J. Rubin, chief of the U. S. Weather Bureau's polar meteorology research project, told the Pacific Science Congress in Honolulu. His calculations are based on meteorological and glaciological data gathered during and after the International Geophysical Year.

Since water vapor and wind are the only means by which any appreciable amounts of heat are carried into the Antarctic, the sum of the latent heat and the measurable heat gives a good estimate of the heat lost by radiation through the top of the atmosphere. Mr. Rubin's calculation of radiation loss is 15% lower than previous estimates. This energy loss will be measured directly by the Nimbus weather satellite to be launched sometime in 1962.

Mr. Rubin said that, as part of the survey, the first map of the average annual precipitation in Antarctica was drawn, showing it to be about six inches per year.

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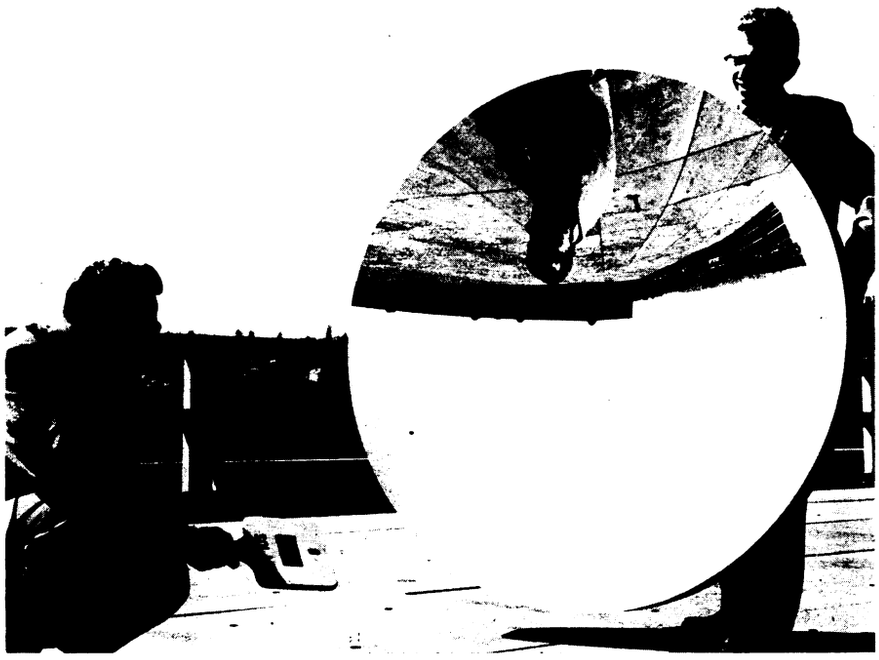

SPACE MIRROR—A prototype solar concentrator, developed by the Boeing Aero-Space Division, Seattle, Wash., may be used to convert the sun's heat to an electric power source for long space flights.

Passage Under Ice Cap

➤ A DEEP PASSAGE buried beneath tons of ice cuts across the Antarctic continent linking the Ross Ice Shelf with the Amundsen Sea.

Lying as much as 7,500 feet below sea level and under 12,000 feet of ice, the passage disappears just short of the Bellingshausen Sea, nearly 1,000 miles away from the Ross Ice Shelf. The passageway was discovered by University of Wisconsin scientists during a traverse across the frozen continent.

Part of the embayment actually veers off and continues toward still unexplored regions of the Antarctic, Dr. Charles R. Bentley, University of Wisconsin geophysicist, told the Pacific Science Congress meeting in Honolulu.

Recent traverses have also pinpointed the exact location of many West Antarctic mountains, the scientist noted.

"New mountains have been discovered and many previously shown on maps have been moved or removed entirely," he said.

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Fish Odor Isolated

➤ CANADIAN SCIENTISTS have isolated a substance that helps give fish their odor.

Dr. Herman Kleerekoper and co-workers at McMaster University separated an amine, an active substance, from the scent of trout. The substance was added to water containing a sea lamprey, causing a sudden burst of activity as the lamprey searched for its prey.

Scent substances given off by fish occur in such small quantities that thousands of gallons of water have to be processed in order to isolate and identify them. This amine, the most active substance, was prepared in crystalline form, Dr. Kleerekoper told the Pacific Science Congress in Honolulu.

The action of the amine on sea lamprey was studied with an automatic recorder in McMaster University laboratories, Hamilton, Ontario, Canada. The Canadian scientist hopes the identification of scent substances will shed light on the relationship between predator and prey, and the role of smell in fish migration and fish schools.

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Effective Shark Repellent

➤ THE MOST effective repellent for sharks is a nigrosine dye that makes the water around a swimmer black and opaque, Dr. Perry W. Gilbert, Cornell University, Ithaca, N. Y., reported.

This method of preventing shark attacks, he told the Tenth Pacific Science Congress

in Honolulu, is effective except when sharks enter into a "feeding frenzy."

Although sharks can readily distinguish an object against a contrasting background in either bright or dim light, they can neither clearly discern the details of the object nor its color, Dr. Gilbert explained.

In experiments sharks had their vision interrupted by black plastic shields over each eye, and their ability to smell was obliterated temporarily by plugging each olfactory sac with cotton soaked in an anesthetic, pontocaine. At distances greater than 100 feet, smell is more important than vision in guiding sharks to prey.

At distances of 100 feet or less, depending on the clarity of the water and amount of light, vision increases in importance. At very close range of ten feet or less, vision is probably the principal sense involved in directing a shark to its target. When both vision and olfaction are obliterated simultaneously, an adult Negaprion swims helplessly about, injures itself seriously, and dies within three to five days.

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ENTOMOLOGY

Insects Fight Insects

➤ INSECTS are fighting insects at man's instigation in 221 cases throughout the world in about 65 countries.

Dr. Paul DeBach of the University of California, Riverside, told the Tenth Pacific Science Congress in Honolulu that there are 123 more or less successful cases of biological control of insect pests by natural enemies imported into 23 areas in the Pacific. This setting of insect against insect has made it possible to continue to grow major crops over extensive areas that otherwise would have been deprived of important agricultural production.

Entomologists seek out the natural insect enemies of other insects in various parts of the world and then propagate them in areas where it is desired to control the destructive insect. In many cases it has been possible to bring about biological control by means of insects without resorting to costly insecticides.

Dr. DeBach, analyzing the 123 cases of biological control of test insects in the Pacific areas, found that 65 of these were effective on islands and 58 on continents. Some of the natural enemies of insects put to work on control in other than their native areas are parasites, some are predators, others use a combination of both. The parasites outnumber the predators.

More research and importation of insects for biological control was urged by Dr. DeBach since he says that the number of successes obtained is proportional to the effort that is made in this way. He urged the scientists at this Pacific Science Congress to emphasize biological control efforts just as similar congresses did in 1924 and 1939.

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ARCHAEOLOGY

Pacific Peopled Earlier

➤ THE PACIFIC ISLANDS were peopled several hundred years earlier than previously believed. This was revealed by radiocarbon dating determinations reported to the Tenth Pacific Science Congress in Honolulu by Dr. Richard Shutler Jr., archaeologist at the Nevada State Museum, Carson City, Nev.

More than 100 specimens from various parts of the Pacific area were dated by measuring the present radioactivity of carbon isotope-14 in them and thus determining their age.

The inhabitants of the south China Coast had seagoing vessels by 2000 B.C. From this area the ancestors of the future occupants of the Pacific left, following at least two routes: Through the Philippines into Micronesia, and through Indonesia into Melanesia. Long human occupation in the East Indies is indicated by a radiocarbon date of 39,000 years from the Niah Caves, Sarawak. The wanderers arrived in the Marianas Islands by 1500 B.C., and Yap by A.D. 178. Those who took the Melanesian route arrived at New Caledonia by 800 B.C., and Fiji by 46 B.C.

Samoa was occupied by A.D. 9, Easter Island by A.D. 400, Marquesas by 122 B.C., New Zealand by A.D. 1000, and Hawaii by A.D. 124. The dates are fairly consistent with the "line of march," and are not out of line with the distribution of adzes and linguistic evidence.

Dr. Shutler stated "that a major contribution of radiocarbon dating to Pacific archaeology has been to show that the early conceptions of the time of migrations into this area were wrong by several hundred years, being much earlier than anticipated."

Cosmic radiation bombarding nitrogen in the earth's upper atmosphere continually creates radioactive carbon of atomic weight 14 which is washed by rains to earth and accumulates in all living things. The rate of radioactivity, which decreases with time, tells the age of once-living objects.

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Personality and Society

➤ THE WAY children are reared in a certain kind of civilization may affect their personalities and even diseases they will have in later life.

As a part of a world-wide investigation by medical scientists, anthropologists and other experts, the Tenth Pacific Science Congress in Honolulu heard reports of effects of culture in Okinawa on personality.

Okinawa in the Ryukyu Islands near Japan is one of the areas in which a long-continued study is underway. The other regions are New England, India, Mexico, the Philippines and Tegusa in Africa. This research is under the direction of the Harvard Graduate School of Education.

In such inquiries, for example, it is found that under polygamy the mother plays a dominant role and the child may not see his father for years. The experience of breaking away from the family in such a culture is different from that experienced by a child in a culture where monogamy is the custom and the father and his influence are present.

Even the form of government and the educational system have been found to affect the lives of people under various cultures.

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