GEOPHYSICS

Diamonds in Meteorites Formed by Impact Shock

➤ THE SHOCK of slamming into the earth at very high speed, carving out the Canyon Diablo meteorite crater in Arizona, caused the diamonds found on the canyon's rim to form.

This theory of how diamonds in meteorites were made is advanced by Drs. Edward Anders and M. E. Lipschutz of the University of Chicago.

Another theory is that diamonds exist in some meteorites before they enter the earth's atmosphere. If meteorites resulted from the breakup of a planet-like body long ago, the pressure and temperature required to form diamonds would have existed in the planet's interior.

These two theories on diamonds in meteorites have been studied by R. N. Wentorf Jr. and H. P. Bovenkerk of General Electric Research Laboratory, Schenectady, N.Y., based on their experience with man-made diamonds.

Formation of diamonds from carbon requires a pressure at least 45,000 times that of the normal atmosphere and temperatures more than 1,200 degrees Fahrenheit. Estimates are that when the meteorite causing Canyon Diablo struck earth, pressures in excess of several hundred thousand atmospheres existed within it for a fraction of a second.

Drs. Anders and Lipschutz point out that the breakup of a large body as a source for the diamonds in meteorites has several drawbacks. Among these are that this theory does not explain why only a small fraction of the Canyon Diablo fragments contain diamonds, and why those that do have been found only at the crater rim.

Besides using high temperatures and pressures, diamonds have also been made artificially by sending a sharp shock wave through graphite.

The report on diamonds in meteorites appears in Sky and Telescope, 23:130, 1962.

• Science News Letter, 81:168 March 17, 1962

PUBLIC SAFETY

Effective Bomb Shelters Could Destroy Mankind

➤ EFFECTIVE BOMB SHELTERS, in the event of a major war, instead of saving humanity may mean the death of mankind, Dr. Freeman J. Dyson, theoretical physicist at the Institute for Advanced Study, Princeton, N. J., warns.

An outbreak of war with effective shelters on both sides of the Iron Curtain would mean that "the military machines on both sides will continue to grind on until there is nothing left for them to grind," if past history is any guide, Dr. Dyson writes in the Bulletin of the Atomic Scientists, 27:14, 1962.

Bomb shelters are even more dangerous if they are effective than if they are ineffective, Dr. Dyson argues. He foresees that a technically advanced country can dig its population and its material resources into the ground to such an extent that it can counteract and keep pace with the constantly increasing destructive force of its adversaries. A vicious circle of building more and more massive bomb shelters, in Dr. Dyson's opinion, risks the whole future of humanity itself.

The U.S. Government's shelter program "is certainly so modest that it seems ridiculous to be afraid that it might be effective," Dr. Dyson notes. However, if a shelter program is seriously started, it could be a self-reinforcing activity ending only when effective shelters are achieved.

"Our present policy of peace through deterrence, so long as we have no bomb shelters, is a policy of finite risk," Dr. Dyson argues. In the absence of effective bomb shelters, "war might reasonably end in a day or a week through the death of the combatant populations." The annihilation of the combatant populations, however, would leave the survivors of the rest of the world to carry on the aspirations of the human race.

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TECHNOLOGY

Olympic Game Scoring Getting Too Difficult

➤ KEEPING PACE with trim athletes in the 1964 winter Olympic games will apparently take more than the usual scorers, judges and officials.

International Business Machines Corporation (IBM) will provide a giant electronic system that will use computers, compilers, communications networks, scoreboards and television. The system was requested by the Organizing Committee of the IX Olympic Winter Games.

Dr. Friedl Wolfgang, secretary-general of the Committee, pointed out that the winter events wlil be spread over a 124-square-mile area around Innsbruck, Austria, with some sites 24 miles apart, making it difficult to learn who is winning and how the scoring is going.

The computers will be linked by lines from each event site so times can be relayed directly for processing.

When an athlete completes his event and the information is sent to the computer center, stored instructions and rules (previously compiled) of the event will be used in the scoring computations. The computer will compare and sort the times of the ten top athletes while the event is still running, and print out the standings and final results in sequence.

For the figure-skating event alone, about 500,000 characters of information will be processed. The computers will execute nearly 25,000 instructions from memory to obtain results on this one event.

The electronic system, Dr. Wolfgang pointed out, "will enable us to literally shrink the distances between the event sites and provide the fastest computing and reporting of Olympic results in history."

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IN SCIEN

MEDICINE

Heralded Diet Margarine Shows Little Difference

➤ THE WIDELY advertised special diet margarines are not much different from regular margarines in the average food intake of an individual, physicians read in the Journal of the American Medical Association, 179:719, 1962.

Little difference was found in the saturated fatty acid content between the various types of margarines. The saturated fatty acid has been implicated as a possible cause of hardening of the arteries.

Six special margarines were compared with regular margarines in a special test made by the AMA's Council on Foods and Nutrition.

A new type of drug is reported to have effectively reduced high blood pressure in 31 of 33 severe cases (p. 673).

Alpha-methyl DOPA (dihydroxyphenylalanine) was found to be "a palatable oral medication useful in treating patients with severe hypertensive disease," Drs. Paul J. Cannon, Robert T. Whitlock, Marielena Angers and John H. Laragh, New York City, and R. Curtis Morris, San Francisco, report.

The mode of action of the drug has not as yet been fully defined. However, it is believed to affect one of the hormones secreted by the adrenal glands, norepinephrine, which has been linked to the development of high blood pressure.

The drug is a derivative of DOPA, one of the body's naturally occurring amino acids involved in the chemical formation of norepinephrine.

Unlike some drugs used to lower blood pressure, they state, alpha-methyl DOPA produced few side effects.

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PUBLIC HEALTH

Wildlife Poison Project Prevents Rabies Epidemic

➤ POISON WARFARE conducted jointly by Mexican and United States authorities on both sides of the California border has prevented the spread of rabies from wild animals, specifically coyotes, to domestic dogs and people.

As reported by the Public Health Service in Public Health Reports, 77:147, 1962, sodium fluoroacetate poison was used in horse meat bait on several occasions during the past two years to kill the infected wild animals.

In cities, rabies is controlled by elimination of stray unowned dogs and the vaccination of the rest. In rural areas, poisoning of the infected wildlife is the method used.

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CE FIELDS

MEDICINE

Russian Nuclear Tests Affect Irish Cattle

➤ THE RECENT Russian atmospheric nuclear tests caused an increase of radioactive content in cattle thyroids in northern Ireland that may carry dangers for humans.

Thyroid extract for humans lacking the vital hormone, thyroxin, is prepared from the glands of slaughtered cattle.

The thyroid gland of the cow is believed to act as a filter for removing most of the radioactive iodine-131 that is one of the major, early fallout constituents. Dr. P. J. Gillespie of the Northern Ireland Radiotherapy Centre, Purdysburn, Belfast, reports in Nature, 193:892, 1962, that samples of cattle's thyroid glands showed a "very appreciable increase of radioactive content" three days after the date of maximum fallout.

Another hazard is the fact that all the thyroid glands from cattle slaughtered in northern Ireland are collected commercially, and thus could be dangerous to persons handling them.

Japanese mothers' diets of leafy vegetables contaminated by the Russian fallout can endanger the thyroids of breast-fed babies, another article on the same page of Nature reports.

Drs. Noboru Yamagata and Kiyoshi Iwashima of the Institute of Public Health, Tokyo, states that unwashed spinach samples collected on the market in Tokyo showed "remarkable contamination with fission products."

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MEDICINE

Many Methods Used to Identify Crash Bodies

➤ MANY METHODS are used to identify the dead from airline crashes such as the jetliner that plunged into Jamaica Bay after taking off from Idlewild Airport.

The most successful methods are often the most obvious, such as fingerprints, dental records and laundry marks. However, when charring makes these means difficult or impossible to apply, fragments from bone marrow can be used.

The identification results from determining the victim's blood group and subgroup. Bits of tissue other than bone can also be used for this purpose. This method has been very successful, but it can be used only when a record of the victim's blood group is available.

Two of the reasons for its success are:

1. Large numbers of persons have had their blood typed while in the Armed Forces, when giving blood to the Red Cross, or as a routine when a patient in a hospital. Records of blood types are usually easily available and often known to the families.

2. Blood types can be determined not only from blood but from bone marrow and other tissue, even if only fragments are available.

Identification from fingerprints, old scars, healed bone fractures and dental records may not be possible.

Blood group substances are quite thoroughly distributed throughout the body. They remain long after the blood itself has disappeared. These substances exist in different forms, so that if one method of extracting them fails, another can be tried.

Extracting the blood group antigens from the remaining tissue and purifying them make up the big job in this use of blood typing. Once this has been done, the material is tested against the standard blood typing sera in the usual way. It may take as long as 12 hours to run one test.

Besides typing for the A, B, and O blood groups, specialists identify subgroups of this system. With many victims of a single crash belonging to Group A, for instance, subgroup typing would be necessary and effective. Subgroup types include the M or N system and the various Rh factors.

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ASTRONOMY

Sun Carves Out Cavity In Space With Solar Wind

➤ THE SUN carves out a cavity in space by creating a solar wind of stripped atoms that reaches out to distances twice as far as from the earth to the sun.

When the solar wind of charged, or ionized, particles is rushing past earth, it has a velocity of 200 miles a second. It slows down to a breeze at about the same distance past earth as earth is from the sun.

The space cavity measures 200,000,000 miles in all directions from the sun. It is dominated by the sun and particles ejected from the sun. After this distance, the sun ceases to dominate and interstellar space takes over.

This steady solar wind, however, is of very low density compared to that thrown out by the sun when it erupts in giant flares. Then the solar wind has speeds of 1,000 miles a second.

Close to the sun, out to a distance of about half that from sun to earth, the solar wind is just beginning to get up steam—its speed is much less than at the earth's distance and deeper into space.

However, since the solar wind disappears at about 200,000,000 miles, instruments on such far-distant planets as Jupiter and Saturn would detect only the properties of interplanetary space.

This picture of the space in the solar system is reported by Drs. John C. Brandt and Richard W. Michie, astronomers at the University of Cailfornia, Berkeley, in Physical Review Letters, 8:195, 1962.

The solar wind is not like a wind at earth's surface, but a vast mass of charged particles, called a plasma.

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PSYCHOLOGY

Minimum of Dreaming Found to Be Required

➤ DREAMING is either a necessity like sleep itself or else may be a habit like smoking or eating candy. In either case, you need to dream a certain amount each night.

If you are deprived of your dreams one night, you will dream more frequently and longer when sleeping again until you catch up on your dreaming.

This conclusion was subscribed to by the world-renowned British physiologist and Nobel Prize winner, Lord Adrian of Cambridge University, England. In an address at the Royal Institution of Great Britain in London, Lord Adrian referred to the work of Nathaniel Kleitman and his associates at the University of Chicago.

It was found that brain wave patterns could be used to determine when the individual was actually asleep and could distinguish between periods of heavy sleep and intervals of light sleep. Dreaming always occurred during light sleep and was betrayed by back-and-forth movements of the eyeballs which could also be recorded electrically without disturbing the sleeper.

If the sleeper was awakened during or immediately following a dream, he could tell what the dream was about. But, if he was not disturbed until he was again sleeping soundly, the dream was likely to be completely forgotten.

Contrary to what you might suppose, waking a sleeper during deep sleep does not harm him, but rousing him in the midst of a dream during light sleep makes the sleeper irritable the following day. It also causes an increase in the number of dreams and in the total time spent in dreaming, as though the sleeper were making up for lost time in dreaming.

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AGRICULTURE

New Chemical Effective Against Seed Diseases

➤ A NEW CHEMICAL originally developed for medical purposes now appears more effective against seed disease organisms than presently used chemicals.

Found unsuitable for medical use because of intense yellow stain, PAC (phenacridane chloride) was applied to agriculture with good results. This medical disadvantage was also useful because the stain shows that the seeds have been treated.

The chemical killed fungal and bacterial disease organisms on seeds during three months of storage, but it did not slow germination, scientists at the Agricultural Research Service, Beltsville, Md., found.

Research is still needed to learn whether PAC is dangerous to human or animal health, ARS pathologist B. C. Smale, research technician M. D. Montgillion and E. H. Toole report in Agricultural Research, 10:14, 1962.

• Science News Letter, 81:169 March 17, 1962