

MEDICINE

Super-Voltage Radiation Essential in Cancer

► EXTRA-POWERFUL X-RAY machines are now "essential" in the arsenal of weapons used to fight cancer, a panel of doctors attending the Fifth Inter-American Congress of Radiology in Washington agreed.

No matter what the voltage of X-rays used to treat deep-seated lesions, the site reacts in the same way, Dr. T. A. Watson of Saskatoon, Canada, pointed out. Advantages of X-rays produced by 20,000,000-volt machines include a low skin dose compared with a very high dose in depth, he said.

Dr. Franz Buschke, associated with the Tumor Institute of the Swedish Hospital in Seattle, noted that biological not technical difficulties, limit the number of cures in cancer treatment.

High-energy beams from the 23,000,000-volt betatron appear to be most suitable for treatment of lesions on the skin or near the skin's surface, Dr. Roger A. Harvey, director of the department of radiology of the University of Illinois Medical School, reported.

Radiologists are physicians who specialize in the use of X-rays, radium and other radioactive substances in the diagnosis and treatment of disease.

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MEDICINE

Treatment Before and After Radiation Works

► SUCCESS WITH a before and after treatment for A-bomb, H-bomb or other irradiation was announced at the meeting of the National Academy of Sciences in Washington.

The success came in studies with mice. "Highly significant survival" was obtained, Dr. Alexander Hollaender of Oak Ridge National Laboratory, Oak Ridge, Tenn., reported.

The treatment consisted in giving the mice before exposure to radiation the chemical, aminoethylisothiuronium. After irradiation, they were given daily injections of bone marrow and streptomycin.

Hybrid mice were used in the experiments. Without protection, these show "significant survival" to doses of radiation somewhat higher than 800 roentgens. With the new before-and-after treatment, there was highly significant survival from doses three times as great, 2400 roentgens.

The results show, Dr. Hollaender declared, that by proper treatment it is possible to extend the survival of mammals, which would include man, to doses higher than that usually considered lethal.

It is too early, he said, to tell what the effect of the new treatment will be in protecting against radiation-induced sterility, genetic changes, leukemia and cataracts.

Bone marrow has previously been shown

effective in giving mice some protection against radiation. Apparently when this is given after radiation and the chemical before, the effects of one add to those of the other.

The blood serum of rats, and presumably of other animals, that have been exposed to radiation all over their bodies develops some substance that will kill others, even if they have not been exposed to radiation. The existence of such a substance has long been suspected, without any direct evidence. Findings showing its existence were reported by Dr. Abraham Edelmann of Brookhaven National Laboratory, Upton, Long Island, N. Y.

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ANTHROPOLOGY

Italy's Greek Speech Traced to Middle Ages

► THOUSANDS OF persons now living in the toe of Italy's "boot" still speak ancient Greek dialects which have survived from the Middle Ages, Prof. Kenneth M. Setton of Columbia University told the American Philosophical Society meeting in Philadelphia.

This fact is evidence that for hundreds of years following the sixth and seventh centuries when the Greeks fled into Sicily and southern Italy to escape the Moslems, Italians and Greeks lived and worked very closely together.

It was this close proximity to Greek culture which was a conspicuous element in the development of the "humanism," or human self-esteem, characteristic of the Italian Renaissance, Prof. Setton explained.

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ORNITHOLOGY

"Best Fertilizer" Source Recovers Under Control

► SEA BIRDS provide Peru and Chile with a tremendous annual "crop" of the "best of all fertilizers," Dr. Robert Cushman Murphy, Lamont Curator of Birds, American Museum of Natural History, New York, told the American Philosophical Society meeting in Philadelphia.

It was generally believed that the world had lost permanently this great source of nitrogen-rich fertilizer when in the 19th century the great guano deposits located along the coast of Chile and Peru were exhausted.

But under proper management the guano beds have staged a remarkable comeback, Dr. Murphy told the meeting. The first year the deposit was under the semi-official Compania Administradora del Guano the yield was 23,790 metric tons. In 1954 the yield had gone up to 300,000 metric tons.

Chile has recently instituted control similar to that of Peru, the two national agencies working in close cooperation.

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IN SCIEN

GENERAL SCIENCE

Modern Menu Misses Prairie Pups Potential

► MODERN MAN should be killing prairie dogs for his dinner table rather than as pests, a former president of the University of Arizona told scientists attending the International Arid Lands Meetings in Albuquerque, N. M.

"Primitive man used the rodents as an important food supply," Dr. Homer L. Shantz of Santa Barbara, Calif., stated. "Modern man has almost neglected this group as a food source except for squirrels and rabbits."

Pointing out that the prairie dog has made greater adjustments to life in desert areas than any other mammal, the California botanist explained it is not known whether the cow or sheep can produce as much food for man with a ton of grass as can the frolicsome little prairie dog.

"Rodents probably are the greatest consumers of plant material," he reported, "and on these 20,000 species, man and other carnivores could largely depend for food."

The Navajos, for example, consider the prairie dog a delicacy, but in an attempt to improve the Navajos' food supply, modern man poisoned and destroyed the rodents in their area.

"It would seem possible," Dr. Shantz concluded, "to explore this resource as a food source for man, as have the more primitive people on the earth."

The suggestion that prairie dogs are being unjustifiably passed up by man for his Twentieth Century menu was made in an address by Dr. Shantz on the history of arid land development and the problems and potentialities of these regions, which cover almost one-third of the earth's land.

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MEDICINE

Unborn Babies Develop Crippling Bone Condition

► UNBORN BABIES sometimes develop a crippling bone disease, heretofore thought to occur during the first few weeks of life.

X-ray examination of the expectant mother showed overgrowth of the fetal bones, Dr. John Caffey of New York reported to the Fifth Inter-American Congress of Radiology meeting in Washington.

The crippling bone condition, called cortical hyperostosis, is marked by an overgrowth of the outer part of the infant's bones. How the disease develops and its cause are "still obscure," Dr. Caffey said, although many cases have been reported from all parts of the world.

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CE FIELDS

ORNITHOLOGY

Public Asked to Help Last Cranes Fly North

► AS THE world's last flock of whooping cranes, 21 of them, headed northward from Texas, the U.S. Fish and Wildlife Service asked the public not to molest the sole survivors of a once flourishing species.

The birds are making their annual spring migration from the Aransas National Wildlife Refuge on Texas' Gulf Coast. The "whoopers" travel to Canada's northwest territory by way of Oklahoma, Kansas, Nebraska, South Dakota and North Dakota.

In making known the flight schedule of the last surviving cranes, John L. Farley, director of the Service, asked the public to give the birds every possible chance of survival.

"A safe passage through these States," Mr. Farley said, "is essential as the cranes move northward in small groups to reproduce their kind. Only by increasing their numbers can these valiant creatures win a decisive victory in the fight for survival of their species."

Wildlife experts are particularly concerned about the big white bird with black wing-tips and its resounding "whoop," because its numbers dropped from 24 to 21 last year. The Service reported that despite Federal efforts to save the unique bird, natural losses and careless or malicious gunfire have held down the growth of the world's last flock.

They are protected by Federal law.

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BIOCHEMISTRY

Chemical Controls Fatigue of Muscles

► USE OF muscle to do work and its recovery depends upon the chemical action of an enzyme, phosphorylase, which is found in muscle. So long as work is paced slow enough for this chemical action to be complete, fatigue does not occur.

The complicated chemical action was explained to the American Philosophical Society in Philadelphia by Nobelist Prof. Carl F. Cori, biochemist of Washington University, St. Louis, Mo.

Phosphorylase is present in muscle in two forms, Prof. Cori said. A monomeric form, with a molecular weight of 242,000, is inactive. A dimeric form, which has twice the molecular weight, is active. Other enzymes in the muscle interconvert these two forms and keep them in equilibrium.

In rat muscle at rest, the inactive form of the enzyme predominates.

When the muscle contracts at a rate of ten times per second for five to ten seconds,

the active form of the enzyme increases at the expense of the inactive form. The conversion must be very rapid because after the contraction, the active form is converted back to the inactive one. The speed with which they get back into their original balance depends on the amount and rate of the work that put them out of equilibrium.

If the muscle works for ten seconds at a rate which causes fatigue, the active form of the enzyme falls to low levels and then it may require ten to 20 minutes of rest before the equilibrium is reestablished.

But if the work is performed slowly and steadily at a rate of two contractions a second, the balance is maintained because the increase in active form during each contraction is balanced by decrease during rest periods between contractions.

The chemical reaction initiated by phosphorylase, which accompanies work of a single muscle, involves a total of 12 enzymes acting in series, Prof. Cori told the meeting.

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TECHNOLOGY

Invisible Holes Made By Micromachining

► MINUTE HOLES so tiny they are invisible can be made in metals with a new technique for machining by etching in an electrically conducting solution.

Dr. A. Uhlir Jr. of Bell Telephone Laboratories told the American Physical Society meeting in Washington that flow of current in the solution was confined to a particular spot by a nonconducting partition, which can be a glass tube with a tip no larger than one micron in diameter.

A micron is the thousandth part of one millimeter (about 25 millimeters make one inch).

A variety of shapes can be produced by moving the tip with respect to the work. Plating with metals at a particular tiny point has also been accomplished with the technique.

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TECHNOLOGY

Silicon Pours From New Electric Furnace

See Front Cover

► SILICON THE element of common sand and rock used in the solar battery and the transistor, is being produced 98% pure in a new smelting furnace in Midland, Mich.

Using heats as high as 3,100 degrees Fahrenheit, quartzite rock is reduced with coke and charcoal. Dow Corning Corporation's electric furnace provides the high heat to produce silicon, second most common element on earth.

The cover of this week's SCIENCE NEWS LETTER shows molten silicon being poured amid sparks and streaks of blinding light into a cart lined with firebrick and sand.

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AGRICULTURE

North Africans Find Roman Ruins and Water

► WHEN IN Tunisia, do as the Romans did. This is what today's North Africans do to find fresh water and plant new crops, a French engineer disclosed.

Many wells and hydraulic works are located each year by finding Roman ruins along the Mediterranean, Jean Tixeront, chief engineer of Public Works in Tunis, told the International Arid Lands Meetings in Albuquerque, N. M. Ancient artifacts offer another clue to the location of underground water. Mr. Tixeront reported that olive trees were planted in the coastal Sfax area only after very old oil-presses were found there.

The French engineer also stated that automatic weather stations might be both necessary and a solution to the upkeep of lonely scientific desert outposts.

To illustrate the problems confronting humans operating desert climate stations, he said that wandering nomads, "intending no harm," sometimes take away scientific instruments for use as housekeeping objects.

It is difficult, too, to keep a water-flow observer on the job, Mr. Tixeront noted, for "when he has observed a river during a few months without having seen any flow, his attention (wanders) and he will possibly be absent at the very moment there is something to be noticed."

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BIOLOGY

High Pressures Cause Molecules to Roll Up

► UNDER HIGH pressures, large molecules of the living organisms such as enzymes and proteins tend to roll up into a globular form that occupies less space.

As pressure is reduced or temperature increased, the molecule unfolds and takes up a greatly increased volume.

This effect of pressure was described to the American Philosophical Society in Philadelphia by Prof. Frank H. Johnson, Princeton University biologist.

Such narcotics as alcohol, ether or urethan act as does high temperature to favor the unfolded state of larger volume in the large molecule, Prof. Johnson said.

Thus the effect of high pressures on biological molecules can be modified by temperature, drugs or other chemicals.

The high pressures discussed by Prof. Johnson occur in nature only in the cold depths of the sea and in the hot brines of deep oil wells. They have recently been reproduced in the laboratory, however. A great variety of life processes, including growth, cell division, respiration, muscle contraction, nerve function, and photosynthesis, have been modified, sometimes reversibly, by pressures of a few hundred atmospheres, Prof. Johnson reported.

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