

RADIOLOGY

Heart Radiation Damage Blamed for Fatal Surgery

► A NEW ZEALANDER who underwent surgery for lung cancer died because his heart was damaged by previous radiation at very high voltages.

Dr. Raymond Windsor of Green Lane Hospital, Auckland, New Zealand, reported in the *British Medical Journal*, Feb. 9, 1963, that the 62-year-old patient had been given an estimated tumor dosage of 4,800 roentgens by daily fractions during a four-week period. When death occurred during the lung cancer operation, his heart was found to be flabby and grossly abnormal.

Autopsy showed injuries to the heart muscle believed to have been from irradiation. The heart condition was thought to have caused the surgical complication leading to the man's death.

Dr. Windsor said that no change in radiotherapy technique was suggested as a result of this fatality, but that it is obviously important to be aware of radiation damage to a heart muscle receiving so large a dose.

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TECHNOLOGY

Meter Measures Distance Between Two Cars

► "QUIT BREATHING down my neck!" This may become a motorist's obsolete growl with a new meter that reports the distance between a car and the vehicle ahead.

Such a meter would improve driver skills and speed traffic flow because the driver following a car is able to maintain safe distance, reports Robert L. Bierley of the General Motors Research Laboratories at Warren, Mich. The device, which has been tested in laboratories, combines the distance with the relative speeds of the two vehicles.

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CRIMINOLOGY

Only Five Out of 100 Murder Cases Unsolved

► A MURDERER'S chances of being caught are 95 out of 100.

About 8,000 murders a year, slightly less than one an hour, every hour, are committed in the United States. Less than 5% remain unsolved, J. Cafferty, of the administration office of U. S. Courts, told SCIENCE SERVICE.

Modern police investigating methods for murder cases often include color motion picture photography, complete diagramming and written observations of the scene of a crime, and careful collection of tiny bits of evidence.

In the laboratory the most advanced scientific analytical instruments are used to examine evidence too small to be seen with the naked eye, such as dust, material on a piece of clothing or automobile paint samples. Police also have access to vast type-writer standards, handwriting, fingerprint and fraudulent check files.

A murderer's footprints can be cast in plastic. The position and distance from which a gun was fired, even within inches, can be determined.

Scientists may not only detect a murderer with a hairbreadth of evidence, they may keep his victim from dying. Modern medical techniques make it possible to save a much greater percentage of victims of a murderer's gun or knife.

Recent crime statistics from the Federal Bureau of Investigation show that among age groups the greatest number of male murder victims were 25 to 28, while among females the group was 30 to 34. Guns were responsible for 52.5% of deaths, more than any other single weapon. The largest percentage of murder victims were Negroes, 54.8%, while 44.8% were white.

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PSYCHOLOGY

Two-Week Isolation Affects Brain Activity

► BIRDS CHIRPING and waves splashing were among the hearing illusions reported during a two-week isolation test at the University of Manitoba, Winnipeg, Canada.

Brain-wave records were still abnormal one week later, Drs. John P. Zubek, G. Welch and M. G. Saunders reported in the *Journal of Science*, 139:490, 1963.

A 36-year-old professor, who underwent the test "for scientific curiosity" without pay, recovered normal brain activity sooner than two senior students, who were paid \$300 for participating in the experiment.

Except for an occasional 30-minute intrusion to attach a set of needle electrodes to the subject's skull by the person in charge of the machine recording the brain waves, called an electroencephalograph, each man was shut off from ordinary perception.

Toilet facilities, a food chamber and an air-conditioning unit were provided in a dome-shaped chamber, making it unnecessary for the person to leave. The only piece of furniture in the room was an air mattress, on which the subject lay in polo pajamas. Translucent goggles reduced the light, special gloves minimized the stimulation of touch and ear muffs reduced the noise to slightly over the threshold of hearing.

The men were not allowed to sing, hum or engage in any other type of vocal activity, nor to exercise, although they could move about. Their behavior was monitored at all times by means of an intercommunication and closed-circuit television system. Conversation occurred on the rare occasion when rules were disobeyed.

Upon emerging from isolation, the men reported a "don't-give-a-darn" attitude to ward everything. This lasted eight days in one, six in another, and only three in the professor.

In view of these results, the investigators said "one can only wonder about the possible physiological and psychological state of prisoners of war and others who, in the past, have been isolated for months or even years."

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IN SCIENCE

BIOTECHNOLOGY

All-Season House Permits Close Biological Studies

► IT MAY NOT be a tempest in a teapot, but it is a storm in a room.

Within a three-story building to be built at the University of Wisconsin, equipment will simulate rain and snow, the dry heat of the desert, the hot humidity of the jungles, the pressures of high altitudes and the turmoil of storms. Under these man-made weather conditions, healthy and diseased plants and animals will eat, sleep, reproduce and carry on other life processes—all under the watchful eyes of scientists.

This will be the first house with scientific facilities to permit the thorough study of the effects of different environments upon plants and animals together, Carl W. Borgmann, director of the Ford Foundation's program in science and engineering at New York, said.

The so-called "biotron" will be built with the aid of a \$1.7 million grant from the Ford Foundation. Support is also coming from the National Science Foundation and the National Institutes of Health.

Biotron means a scientific facility with controlled climate conditions for studying the growth, development, reproduction and behavioral responses of flora and fauna. The Wisconsin building will be used not only by the University's science departments but also by scientists from other institutions as a national research center in environmental biology.

Among the many experiments slated for the biotron are studies of insect and animal hibernation, responses of animals to noises and odors and reactions of plants, animals and man to closed environments for space travel.

Scientists will also be able to study the effect of environment on genetic factors that influence size, form, and reproduction in plants and animals.

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HORTICULTURE

Emergency Pruning Needed for Iced Shrubs

► EMERGENCY or "rough" pruning is needed to help ornamental shrubs and trees recover from the heavy ice and snow storms this winter.

Broken or low hanging limbs that do not spring back into position should be cut off within a few days after ice storms, reports R. Ralph Clarke, Oregon State University extension horticulturist. Waiting until late February or early March to trim the less damaged branches is all right, he said.

If an evergreen shrub is bent badly out of shape by the ice, tie it loosely with a heavy cord to support it in its normal shape.

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CE FIELDS

VETERINARY MEDICINE

Domestic Animal Cancer Rate Highest in Cows

► THE COW appears to have a higher cancer rate than any other large domestic animal, but dogs and cats are also susceptible.

Serious economic loss results from a wide variety of tumors in the large domestic animals, Dr. J. E. Moulton of the School of Veterinary Medicine, University of California, Davis, told the Conference on Epizootiology of Cancer in Animals held at the New York Academy of Sciences in New York.

Eye tumors and cancer of the lymph nodes occur before slaughter age in cows. Among cats, cancer of the blood-forming tissues far outnumbers all its other malignant tumors, and among dogs, various types of leukemia are prevalent.

Boxers had more leukemic tumors than any other dogs among 300 cases reviewed by Dr. Hilton A. Smith of the Armed Forces Institute of Pathology, Washington, D. C. Cocker spaniels ranked next, with fox terriers third, Boston terriers fourth and German shepherds fifth in the incidence of malignant tumors. Tumors in dogs occur in late middle age, from five to nine years.

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ASTRONOMY

Drawings of Sunspots Aid Solar Understanding

► ASTRONOMERS have become free-hand artists to sketch the spots of the sun that cannot be easily photographed.

The shape and structure, growth and decline of the always active sunspots can be accurately drawn in detail as fine as a penumbral filament measuring one second of an arc or less, about 1/2000 of the diameter of the moon.

This method is particularly valuable when poor atmospheric conditions prevent clear photography, reported Patrick S. McIntosh of the Sacramento Peak Observatory in Sunspot, N. Mex., part of the Air Force Cambridge Laboratories in Hanscom Field, Mass.

Superior quality photography of sunspots are certain only when the telescope is lifted above the atmosphere, or on those rare occasions when weather conditions permit use of the full resolving power of telescopes on the ground.

With the 3.5-inch telescope of the Sacramento Peak Observatory, observations were made through eyepieces that magnify 80 and 160 times, using a full aperture neutral chromium filter. The drawings were corrected for distortion and then enlarged to a uniform scale of one second of arc per millimeter by comparing them with the Sacramento Peak Observatory projection drawings made with a 6-inch telescope.

Any young astronomer considering investigating this method should remember this warning: Do not look directly at the sun with your naked eye or through a telescope unless it is heavily shaded with a dense filter. Your eyes can be irreparably damaged or blinded by careless observation. Sunglasses are NOT sufficient protection.

Visual drawings are sometimes influenced by the subjectivity of the designer, and must be corrected by comparison with projection drawings. Sometimes the details of the sunspots are too complex to be copied, or their rate of evolution is too fast to be accurately recorded, the report states.

Yet enough valuable qualitative data can be obtained from the pencil or pen and ink drawings to insure continuous study of the solar phenomena.

The drawings can become more effective if they are obtained with simultaneous photometric, metric and spectroscopic observations.

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TECHNOLOGY

Forest Fire Simulator "Creates" Fires

► A NEW, REALISTIC device that "creates" fires will be used by the U. S. Forest Service to train fire fighters.

The first forest-fire simulator was put on display in Washington, D. C., by Secretary of Agriculture Orville Freeman.

Three projectors and two tape recorders are used by a three-man staff to present changing problems in the actual atmosphere of a fire-fighting command post.

In a demonstration of the simulator 12 trainees were grouped into four teams, each headed by a Forest Ranger. The fire-fighting teams solved problems involving all the erratic behavior of a giant forest fire—shifting winds, changing weather, different fuel types and varying terrain.

The trainees had available communications equipment to simulate contact with other locations by ground-to-air radio, ground-to-ground radio and telephone.

The simulator is housed in a circular enclosure of wood panelling with a canvas top. It can be assembled or disassembled rapidly and fits onto an especially designed automobile trailer.

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TECHNOLOGY

GI Jeep Radio's Voice Made Much Stronger

► GI JEEPS now have 100-pound, double-distance radios to report information and receive commands. The two-way transistorized set is called the "Angry-106." It uses single sideband circuitry that reaches miles over rough country, with ten times the signal power, and twice the range of earlier jeep radios.

The Angry-106 was completed in two years by the U. S. Army Electronics Research and Development Laboratory, Fort Monmouth, N. J. Its contractor was General Dynamics Electronics of Rochester, N. Y.

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BIOTECHNOLOGY

Platinum Electrodes Help Diagnose Heart Defects

► A QUICKER and more accurate diagnosis of the surgically correctable defects in the valves that control the flow of blood through the heart and lungs may be achieved by inserting tiny platinum electrodes into the heart chambers.

Drs. Eliot Corday and Robert B. T. Skelton of the University of California, Los Angeles, Medical School and Cedars of Lebanon Institute for Medical Research have developed such a technique in experimental animals.

The electrodes, which are specifically sensitive to a vitamin C solution, are placed one on either side of a valve through a catheter technique. This involves inserting them via long, flexible tubes which are pushed in through blood vessels going to the heart.

A test solution of vitamin C is then injected into the heart via the catheter on the downstream side of the valve.

If the valve is normal, only the electrode on the downstream side of the valve will sense the test solution. If the valve is defective, some of the solution with regurgitate back through the valve and be detected by the electrode on the upstream side.

The UCLA investigators believe that with refinement in the instrumentation and catheter system they will be able to detect the amount of regurgitation through the valve. This would enable a physician to evaluate the degree of valvular insufficiency and whether the patient might benefit from surgery or medical treatment.

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MEDICINE

New Cancer Treatment From Detection Method

► DOING what surgery cannot do, a new method of treating cancer with radioactive iodine has been developed by a team of Walter Reed General Hospital physicians.

It uses a method formerly confined to diagnosis—the viewing of lymph vessels by X-rays following the injection of contrast material.

This procedure is now being used to treat tumors of the genitourinary tract through administration of radioactive iodine. The treatment may precede or follow surgery.

By injecting a mixture of radioactive iodine and ethiodol, the contrast material, the researchers can eliminate lymph nodes not reached by surgery.

Dr. Fouad A. Halaby of the hospital's radiological service said results with 15 persons have been encouraging, with no complications or adverse side effects. The new method also can relieve the pain of patients who cannot tolerate further external irradiation or drugs. A much larger dose of radiation can be administered by this procedure than by conventional external means, he said. Maj. David M. Seitzman, Maj. Robert Wright and Capt. James H. Freeman, reported their findings in the American Journal of Roentgenology, Radium Therapy and Nuclear Medicine, Jan. 1963.

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