

PHYSICS

New Theory Found for Future Fusion Reactors

► A NEW THEORY expected to help in efforts to tame the hydrogen bomb reactions for peaceful purposes was reported in New York.

Scientists are trying to build machines in which the thermonuclear reactions such as occur in H-bombs and the sun can be controlled. To do this, they have to heat heavy hydrogen to a high enough temperature for a sufficiently long time to permit the nuclei to fuse.

Because temperatures are so high, they use lines of magnetic force, or a magnetic "bottle" to contain the gas, called a plasma. Dr. Harold P. Furth of the University of California's Lawrence Radiation Laboratory, Livermore, reported development of the new theory in *Physical Review Letters*, 11: 308, 1963.

One way in which the instability of plasmas can be inhibited is by placing them in special "minimum-field magnetic bottles," where the strength of the magnetic field increases away from the plasma.

A striking success with such an experiment was recently reported by the Russian scientist, M. C. Ioffe. He was able to improve the confinement time of a dilute 50-million-degree plasma from 100 millionths of a second to nearly one-tenth of a second by modifying his "magnetic bottle" to give it the minimum-field property.

Dr. Furth's theory describes a family of minimum-field mirror machines that have a much more symmetrical shape than Ioffe's magnetic bottle, but are somewhat more difficult to construct.

The basic idea proposed by Dr. Furth was discovered independently by Dr. J. Andreoletti at Fontenay-aux-Roses, France. Both call for a change in the shape of the magnetic bottle that makes it less likely the plasma will escape its confinement.

• Science News Letter, 84:248 Oct. 19, 1963

MEDICINE

Embolism Rise Requires Anticoagulant Drugs

► DEATHS FROM BLOOD CLOTS in the lungs are increasing to the point of an "epidemic affecting Western society," a team of researchers warned in the *British Medical Journal*, Oct. 5.

Surgeons are therefore urged to give anticoagulant drugs to anyone who may be suspected of harboring blood clots in his veins.

The frequency of pulmonary embolism has increased five times in a ten-year period, a study of 853 cases in two Oxford hospitals showed. An increase in the United States during the past 60 years has also been shown.

Half of the 853 British patients died. The investigators divided them into three main groups: those who were expected to die anyway from the main disease that brought them to the hospital; those who might have survived the illness except for the pulmonary embolism that tipped the

balance and caused their deaths; those who confidently could have been expected to live without the pulmonary embolism.

Patients treated with anticoagulants were found to have a much better chance of living, although patients over 40 and 50 years of age in the group that had had surgery had a poorer chance of survival than younger patients.

Pulmonary embolism usually originates in leg vein thromboses, the researchers said, and any "factor leading to coagulation of blood in the calf veins will be associated with increased risk of pulmonary embolism."

The effective and inexpensive measure of promoting leg-vein drainage by raising the patient's leg should theoretically reduce pulmonary embolism, but drugs are highly beneficial except in cases where the patient dies so quickly that they cannot be given in time to be effective.

Drs. M. Tessa Morrell and S. C. Truelove, with A. Barr, statistician of the Oxford Regional Hospital Board, reported the study, which was done at Oxford, England. The researchers stated that there is "one potentially preventable death every fortnight in the Radcliffe Infirmary and Churchill Hospital."

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CYTOLOGY

Sparkling Particles Found in Cell Body

► TINY "SCINTILLONS" make the bodies of small sea animals sparkle, an investigation indicates.

The "scintillons," crystal-like particles, were discovered within the cell bodies of the *Gonyaulax polyedra* by Richard De Sa, J. W. Hastings and A. E. Vatter of the University of Colorado Medical Center, Denver.

Gonyaulax polyedra is a small marine animal that manufactures its own food by photosynthesis, as plants do, and that sends out short flashes of light.

Evidence that "scintillons" are responsible for the light is indirect: the more particles in the test solutions the greater the glow. Microscopic analysis shows the particles reflect light well. Direct evidence is hard to get, the investigators reported in *Science*, 141:1269, 1963.

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ANIMAL HUSBANDRY

Tasty Pigs Climb Stairs To Reduce Back Fat

► THE WELL-FED PIG now must exercise for his supper.

Pigs are climbing stairs and eating while inclined in order to reduce the amount of back fat and increase the ham meat.

The porkers may eat whenever they wish, said scientists at the Agricultural Experiment Station of the Oklahoma State University in Stillwater.

But they have to mount a specially built ramp to do so. In an effort to slim instead of fatten the hog, the scientists said, this method may limit the time porkers spend in eating, and thus cut down on the amount of food they eat each day.

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IN SCIENCE

PUBLIC HEALTH

New Orleans Tops In Strontium Count

► NEW ORLEANS, La., was the "hottest" spot in the land during the 12-month period ending last July, Government radioactivity checks show.

Radioactivity in the city, however, still was far below acceptable levels set by the Federal Radiation Council.

Public Health Service tallies, from the National Pasteurized Milk Network, show New Orleans topped the country in the number of picocuries of strontium-89 per liter of milk, 54,565, and was second in strontium-90, with 12,558.

A picocurie, previously called a microcurie, is one-millionth of one-millionth of the equivalent of the radioactivity produced by one gram of radium. The yearly acceptable level for strontium-89 is 730,000 picocuries; for strontium-90, 73,000, and for iodine-131, 36,500 for infants and 365,000 for adults.

Little Rock, Ark., had the highest strontium-90 count, 13,307, and was third in strontium-90, with 48,965.

Palmer, Alaska, actually exceeded the acceptable infants' level for iodine-131, with 36,940 picocuries. Most of the iodine-131 was recorded there last fall.

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PHYSICS

Electric Current Flows In Supercold Gold

► COLD GOLD seems to conduct electricity after all, physicists at the University of California at San Diego have found.

Until now little electrical current could be passed through copper, silver or gold when they were cooled to less than 423 degrees below zero Fahrenheit.

Half of all other metals do conduct electricity at those temperatures, even though some of them do not at higher temperatures.

The University of California team, however, got a current to pass through an alloy containing one part barium to five parts gold at a temperature of 457.7 degrees below zero Fahrenheit, two degrees above absolute zero.

The team had to use gold alloys because temperatures at which gold might conduct electricity are too low to be reached with conventional low temperature equipment.

To find out whether or not almost all metals will show this phenomenon, called superconductivity, physicists have been making systematic investigations of the elements. This part of the investigation was reported in *Physical Review Letters*, 11:313, 1963, by Dr. Gustav Arrhenius, Dr. Christopher J. Raub, David C. Hamilton and Dr. Bernd T. Matthias.

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CE FIELDS

PUBLIC HEALTH

Health of Ethiopia Stressed by Emperor

► THE EMBATTLED King Haile Selassie of Ethiopia is taking on his country's oldest and most dreaded enemy—disease and poverty.

"Our second five-year plan," he explained in answer to a question from SCIENCE SERVICE at a news conference, "includes a goal of eliminating hunger and diet deficiency, as well as other provisions for public health."

With scientific understanding, this diminutive but wiry monarch has said that ignorance, hunger and disease can only be eradicated by the pooling of the world's resources in peace.

The second five-year plan of the Ethiopian Government, which will extend through 1967, is giving more priority than previously to public health. Preventive medicine is being emphasized to forestall diseases as well as control them.

Malaria is one of the country's scourges. It is being combatted with DDT spraying. Leprosy control is being managed through health centers, and regional tuberculosis centers in the various provinces are planned.

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SPACE

Requests Keep Coming For Moon Flight Seats

► SPACE ENTHUSIASTS writing the President asking for a ride to the moon will not get a seat on a lunar flight, but they will get replies to their letters.

Requests for flights to the moon which are addressed to the President are referred to public information officials of the National Aeronautics and Space Administration (NASA).

That office answers an average of 20 letters a week from persons wanting to go to the moon.

Most of the letters are addressed to the President, but a fair number are to NASA, the Smithsonian Institution and various Government agencies. The volume of letters handled by NASA's Washington office has increased considerably after each manned space shot.

A form letter is used as a guide to answer requests for moon flights, but each reply is tailored to correspond with the contents of the letter being answered.

Youths are encouraged to continue their education so they may someday qualify to take part in the space program. If appropriate, they are sent Circular No. 569B of the Department of Health, Education and Welfare, which lists publications concerning aerospace education.

Adults wanting to go to the moon are furnished a list of the qualifications for

astronaut training along with a reply to their letters.

Letters addressed to the President are returned to the White House with a copy of NASA's reply.

U.S. citizens have been asking for seats aboard rockets since just after World War II when the United States began testing captured German V-2 rockets to get information on how to build its own.

It will be awhile yet before the Government picks the men to go on its first moon trip, scheduled for late in this decade.

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RADIOLOGY

Alaskan Eskimos Have 'Hot' Radioactive Bodies

► COLD though it is above the Arctic Circle in Alaska, Eskimos there have "hot" bodies, radioactively speaking.

Levels of cesium-137 are from at least three to as much as 80 times higher in Eskimos than for persons in the State of Washington. This is because Eskimos eat caribou and reindeer that have high levels of radioactivity. The animals acquire their radioactivity by eating lichens that have picked up heavy fallout from A-bomb tests, particularly those in Russia.

Non-Eskimos who did not eat any significant amounts of native food have bodies with radioactivity levels similar to those of people in the rest of the United States, four General Electric Company scientists from Richland, Wash., reported in Washington, D. C.

Five tons of lead bricks were used to shield the radioactivity-measuring counter, Drs. Harvey E. Palmer, Wayne C. Hanson, Bobby I. Griffin and William C. Roesch stated in Science, 142:64, 1963. Drs. Palmer and Richard E. Perkins, also of GE's Hanford Laboratories, report in the same journal that radioactive cesium-134 also has been found in Alaskan Eskimos.

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PUBLIC SAFETY

Emergency Facilities Tested by 'Hams'

► AN INVISIBLE network of communication lines covered the entire country on Oct. 6 when some 5,000 amateur radio operators engaged in a test of their emergency facilities.

The American Radio Relay League blended two separate groups, the Amateur Radio Emergency Corps and the National Traffic System, into a single streamlined organization for the test.

The new group, called the Amateur Radio Emergency Corps, consists entirely of persons who volunteer their time and radio equipment so that no part of the United States will ever find itself without communications as a result of a failure of telephone and telegraph lines.

This test placed special emphasis on the mobility and versatility of the members and equipment.

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METEOROLOGY

Year's 'Weather Watch' Record Set by Tiros VI

► TIROS VI has set an all-time record for durability and reliability of meteorological satellites, after a full year of continuous "weather watching" and taking 63,000 pictures.

The satellite will continue to transmit pictures, but its tracking beacon has been turned off on schedule and its location will be hard to predict.

The seven Tiros satellites with a record of seven successes in seven launches have sent back a total of 270,200 TV pictures of cloud covers, storms, snow and ice conditions, and other weather phenomena. During the 1961-62 hurricane season, the satellites spotted and tracked every major storm in the Northern and Southern Hemispheres.

An eighth Tiros weather satellite with a newly developed Automatic Picture Taking (APT) system will be launched later this year. The system will provide weather pictures of a surrounding area 1,000 miles square.

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PUBLIC HEALTH

Air Conditioning Helps Healthwise in Winter

► OVERHEATED apartments, school-rooms and homes need air conditioning in winter as well as summer. But not so much for comfort as for health.

The term "air conditioning" is used too loosely, Dr. Edward C. Riley of the Laboratory of Industrial Medicine, Eastman Kodak Co., Rochester, N. Y., told SCIENCE SERVICE.

"In winter," Dr. Riley said, "air conditioning usually means humidity control and in the summer cool enough temperature for comfort."

The dried, floating droplets in a room that cause germs to be carried from one person to another could be controlled by a hitherto impractical, but not impossible, method of air conditioning, he explained. Unfortunately, in schools where this has been tried, children caught infections on the school bus so the achievement was nullified.

Dr. Riley and his brother, Dr. Richard L. Riley of Johns Hopkins University, Baltimore, reported a study on the health aspects of air conditioning in the Archives of Environmental Health, 7:359, 1963.

• Science News Letter, 84:249 Oct. 19, 1963

CHEMISTRY

Pure Nitrogen 'on Tap' For Immediate Use

► "HOT," "cold" and "nitrogen" are the new signs on the taps at the B. F. Goodrich Company research center at Brecksville, Ohio. The company converted 4,000 feet of piping to have pure liquid nitrogen at their fingertips when the inert gas is needed as a coolant and as a replacement for air in chemical experiments.

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