PHYSICS

Largest "Deep Freeze"

New "cryostat," with capacity of 15 cubic feet, now in operation at Massachusetts Institute of Technology. Works by compressing, cooling and expanding helium.

➤ NEW THEORIES relative to the peculiar behavior of metals at temperatures near absolute zero are expected with the use of the largest "super-deep-freeze" yet constructed. It is now in operation at the Massachusetts Institute of Technology.

It is what scientists call a "cryostat," and was designed and built by Dr. Samuel C. Collins, of the MIT staff. He also developed smaller types of low-temperature apparatus now used by several institutions for studying the behavior of materials at temperatures some 450 degrees below zero on the Fahrenheit scale. Absolute zero is approximately 460 degrees below zero, but this temperature has as yet never been reached.

This new equipment has a capacity of 15 cubic feet and can cool its contents to 452 degrees below zero Fahrenheit. It can hold them at that temperature indefinitely. It is based largely on the principles employed by Dr. Collins in his smaller cryostats. It operates by compressing, regeneratively cooling and then expanding helium gas until a portion of the gas turns into a liquid. This takes place when the helium is just 7.5 degrees above absolute zero.

The new machine, Dr. Collins states, fulfils for the first time the need for a large refrigerated space in which heavy equipment can be cooled and studied at lower temperatures than ever before.

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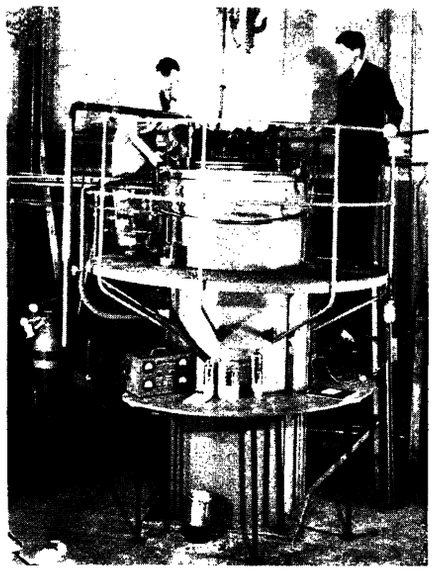

GIANT "DEEP FREEZE"—Drs. Samuel C. Collins and Robert P. Cavileer of MIT are shown here with the newly completed cryostat for very low temperature research.

MEDICINE

Link Virus to Cancer

Evidence reported that Hodgkins' disease is caused by filterable virus. Research continuing to learn more about the agent and how it may be attacked.

➤ SCIENTISTS are coming close to proving that some human cancers are caused by viruses.

For many years it has been possible to induce cancers in experimental animals with certain viruses; and it has long been suspected that some human tumors might also have a virus origin.

Now, Dr. Warren L. Bostick, pathologist in the University of California School of Medicine, San Francisco, has reported (PROCEEDINGS OF THE SOCIETY FOR EXPERIMENTAL BIOLOGY) the first strong evidence that Hodgkins' disease, a consistently fatal form of cancer, is caused by a virus.

Hodgkins' disease long has been suspected to be of virus origin, because it so closely resembles an infectious ailment. It is accompanied by recurring fevers and swelling of gland and lymph tissue. But until now efforts to pin the disease agent down have been inconclusive.

In several ways Dr. Bostick has demonstrated that Hodgkins' disease tissue contains a virus. Extracts of tissue killed a significant number of chicken egg embryos —the anticipated effect of a virus.

The extract also demonstrated the interference phenomena characteristic of viruses. In this case, influenza virus could not get a foothold in fertile chicken eggs already injected with Hodgkins' disease extract.

Finally, the scientist showed that the agent in the extract is filterable. That is, the extract was passed through a filter which is designed to catch all infectious agents but those the size of viruses. Portions of the extract passed through the filters still retained their lethal qualities.

The scientist is continuing work directed at learning more about the agent, its action, and how it may be attacked.

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ENGINEERING

Control of Corrosion Necessary in Pipelines

➤ THE CONTROL of corrosion in petroleum pipelines, both on the inside and the outside, was a leading subject of discussion at the meeting of the American Petroleum Institute in Los Angeles. Unless protective measures are taken pipes carrying crude oil and petroleum products may have a short life.

Internal corrosion is a major problem in producing areas where crude oils with a high content of hydrogen sulfide are prevalent, the Institute was told by J. K. Alfred, Shell Pipe Line Corporation, Colorado City, Texas. One "hot spot" for internal corrosion is the relatively new oil fields in the Permian Basin of West Texas. In this area plastic and cement linings are used to prevent corrosion.

A method of cleaning a pipeline already in use and coating the inside with various vinyl and polyester plastics was described. The method involves the use of two separated rubber plugs which are driven through the pipe by compressed air. They clean the pipe by friction or pressure and coat it by a wiping action.

For outside protection, new developments in coatings and electric cathodic methods were discussed by Carlton L. Goodwin, Portland Pipe Line Corp., Portland, Me. Coating alone has a limited effective life, he said. Cathodic protection with an electric current has been effective on bare pipe, but the cost over a long period of time may be excessive.

Effective coatings must retain good electrical resistance underground and have the lowest solubility in crude oil or crude-oil products. He indicated that hot-applied coal-tar enamels are best.

Direct current supply at low voltages is required for the application of cathodic protection. Various methods used to obtain the current were described. The present principal sources are galvanic anodes and rectifiers which convert power-line currents to direct current. The use of galvanic anodes has limited applications. Dry-type rectifiers have proved most successful and dependable.

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