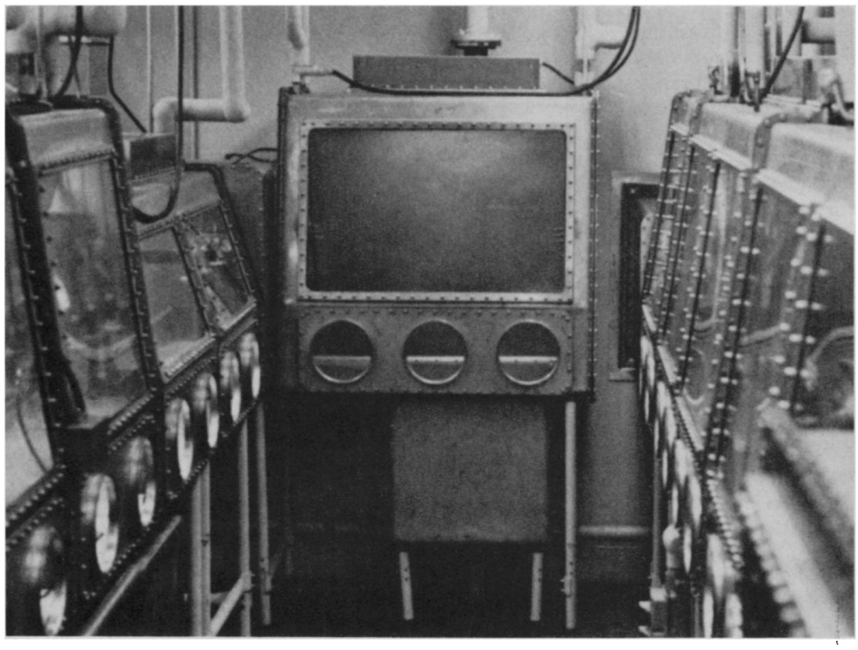

The most sophisticated of Ft. Detrick's containment systems for handling the deadly agents of biological warfare, these "Class III" work cabinets now await isolation of high-risk carcinogens. Workers reach into the completely enclosed system through rubber gloves. Separate modules containing incubators, refrigerators and centrifuges are connected with the work area by conveyor belts. Materials entering or leaving the system are sterilized, and experimental animals may spend their whole lives quarantined here, being exposed to various carcinogenic agents.

A researcher works with anaerobic bacteria suspected of causing cancer of the bowel. The bacteria are grown in an oxygen-free atmosphere consisting of carbon dioxide mixed with a little hydrogen. Epidemiological studies have implicated dietary factors and intestinal bacteria as possible causes of cancer of the colon, and this project seeks to identify the carcinogens or their precursors produced by the action of these bacteria on digested food or bile acids. New rapid-detection methods for identifying the carcinogens are being developed in this laboratory.

Ft. Detrick: From 'Doomsd

by John H. Douglas

All the air to Building 560 laboratories is filtered coming in and incinerated going out—mixed with natural gas and flamed so that nothing living can pass. Air locks with steam autoclaves and intense ultraviolet lamps for sterilization connect the long, featureless corridors. Thin plastic diaphragms cover holes cut into doors of individual laboratories so communication can be carried on in case a room has to be sealed. Every aspect of the E-shaped, three-story brick building was designed with one thing in mind, the security of the most deadly biological agents in the world.

Until 1971, Ft. Detrick in Frederick, Md., 50 miles northwest of Washington, was a biological warfare center, developing sinister new strains of bacteria and viruses and the defenses against them. Presumably these Doomsday Bugs never got closer to the world at large than some well-publicized fiction stories, and after the United States formally abandoned such methods of warfare, Building 560 was sealed and filled with vaporized formaldehyde to decontaminate it for its new role as one of the country's most unusual cancer research centers.

By happy coincidence, the military deactivation of Ft. Detrick came at a time that cancer research was turning increasingly to exploration of viruses and other biological agents as possible causes of cancer, and the facilities and security of the post seemed ideal for this new work. Renamed the Frederick Cancer Research Center, the Ft. Detrick laboratories are now administered by Litton Bionetics, Inc., under contract to the National Cancer Institute of the Department of Health, Education and Welfare. Some Army and Department of Agriculture biological research is also conducted there.

Open less than a year, the new center has already produced important research. Working in a laboratory reserved for visiting scientists, Albert Sabin and Giulio Tarro earlier this year announced strong new evidence that the common herpes virus, which causes "cold sores," can also cause cancer under special circumstances (SN: 5/5/73, p. 287). Large volumes of these viruses and their products are now being produced at Frederick, in continuation of the Sabin-Tarro work,

ay Bug' to cancer research

Photos: John H. Douglas

for use as diagnostic tools in the detection and treatment of human cancer.

Virologist Roman J. Pienta leads a team of researchers seeking quicker, cheaper ways of testing new chemicals for carcinogenic properties. Some 20,000 new chemicals are produced each year at a level of at least a ton. Testing to see whether a particular one of these chemicals can cause cancer may take three years of live-animal experiments and cost $70,000. Pienta and his colleagues hope to validate and standardize a test-tube screening process to select the few chemicals that need the extensive animal experiments. The method, which uses closely reproducible cell cultures to find what Pienta calls "circumstantial evidence" about a carcinogen, should be ready within a year to begin use in screening newly manufactured chemicals.

One of the most frequently occurring cancers is that of the colon, and a team of scientists under Milton Slein is exploring the role certain bacteria and type of diet may play in this disease. Using chambers filled with carbon dioxide to grow the anaerobic bacteria, the team is developing rapid methods for detecting carcinogenic substances given off by the bacteria.

The most sophisticated system of growing chambers and work hoods at Frederick is standing idle at the moment, awaiting the anticipated isolation of high-risk, virulently cancer-causing viruses or bacteria. Called "Class III" cabinets, the units completely isolate materials from the surrounding environment. Conveyor belts carry materials from incubators, refrigerators, animal cages and centrifuges to the work areas—all of which are enclosed in sealed, negative-pressure quarantine. Workers handle materials inside the cabinets through rubber gloves fed through the steel superstructure.

Within a year, the center hopes to add new projects including one to develop anticancer drugs. Animal compounds have been modified to breed and keep 10,000 rats and mice for periods of up to three years for extensive experimentation. As other cancer centers around the country find new strains of cancer-producing viruses or bacteria, Ft. Detrick may become an invaluable support facility in its new kind of biological warfare. □

A technician pours blood serum used in testing for the presence of antibodies to herpes virus in human cancer patients. The effort is a continuation of the work begun in this laboratory by Albert Sabin and Giulio Tarro, who earlier this year linked the virus to human cancer. As antibodies are further isolated and characterized, the technique may become a reliable diagnostic tool for identifying certain types of cancer and increasing knowledge on the role of herpes viruses in causing malignancies. Large volumes of viruses are also produced in the lab.

Roman J. Pienta leads a team of Frederick Cancer Research Center scientists trying to develop quick, inexpensive tests to replace the live-animal experiments now used to find out whether newly manufactured chemicals can cause cancer. Cell cultures are being standardized for use in screening out potentially carcinogenic substances from the 20,000-odd new chemicals mass-produced each year. Emphasis will be placed on determining the properties of cells at various stages after exposure to carcinogenic chemicals or a combination of chemicals and viruses.