

seismometers left by the Apollo astronauts. The blast would create a crater about one kilometer wide, says Dr. Latham, who maintains that it would be the only way of producing seismic waves capable of penetrating all the way to the lunar core.

Despite possible treaty violations, Dr. Latham says, "I don't think the project is impossible if we include the Russians." He plans to submit the proposal to the National Academy of Sciences for approval, since "It won't work without their cooperation."

APOLLO 12

Manmade lightning

When the launch vehicle carrying the moonbound Apollo 12 astronauts lifted into the thick cloud cover above Cape Kennedy last month, the crew suddenly found itself staring in astonishment at a fully lighted panel of warning lights (SN: 11/22, p. 470).

A surge of electricity had caused the spacecraft fuel cells to disconnect automatically and had given an on-board computer incorrect instructions to realign a gimbal on a device that indicates orientation of the spacecraft. Five minor temperature sensors were burned out, and 100 types of measurement were affected for somewhat less than a second. None were essential to the mission.

The **blowout** was caused, scientists at the fall American Geophysical Union meeting in San Francisco were told this week, by two moderate-sized lightning strikes triggered by the passage of the launch rocket into the clouds. The first came 36.5 seconds after launch, when the vehicle and its three-quarter-mile-long ionized plume served as a conducting rod for the cloud to discharge its electrical energy to the ground. The second came 52

seconds after launch, when a bolt of lesser intensity passed between two cloud layers.

"It was, in effect, man-created lightning," said Donald Arabian, chief of the Apollo test division at the National Aeronautics and Space Administration's Manned Spacecraft Center.

"We didn't realize we could discharge a cloud this easily," Glenn E. Daniels of NASA's Marshall Space Flight Center noted. "We had no evidence before that this would happen."

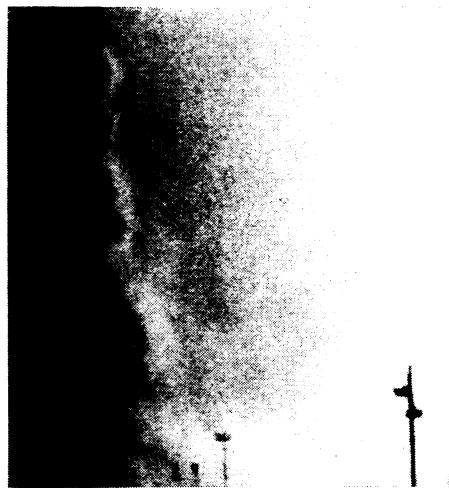
"As a result, NASA officials are planning to revise launch rules on lifting off into electrically charged clouds. No hardware changes are planned on the spacecraft or booster, however.

"If we were to have the same conditions in March for the Apollo 13 flight, my hunch is that we would not launch," said Arabian. He heads the NASA group investigating the incident. Discussions with atmospheric physicists at the AGU meeting this week are part of that effort. The group's report will be completed about the end of January. This will be in time to put modified rules into effect before the Apollo 13 mission.

"We probably will make some restriction on launching," Arabian says, but he expects the increase in restrictions to be very small.

In present launch procedures the vertical differences in the electric field are measured continually at eight sites in the Cape Kennedy area. Radars search out thunderstorms and another set of instruments records and locates lightning strikes.

To provide greater insurance, some instrument modifications may be proposed; some lightning experts, for instance, feel a different kind of potential gradient recorder could give better results. But the major problem is one of scientific interpretation. They are seeking to arrive at some guidelines on how better to predict man-caused lightning—a problem not previously anticipated by NASA personnel.



NASA

Glitch on 12; now preventive action.

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STIMULATING INTERFERON

Human trials with poly I:C

Interferon is the body's first line of defense against viral infection. In response to invading viruses, levels of interferon, a protein, rise in the blood as this natural agent begins combatting the invaders. It appears to act against viruses of all types.

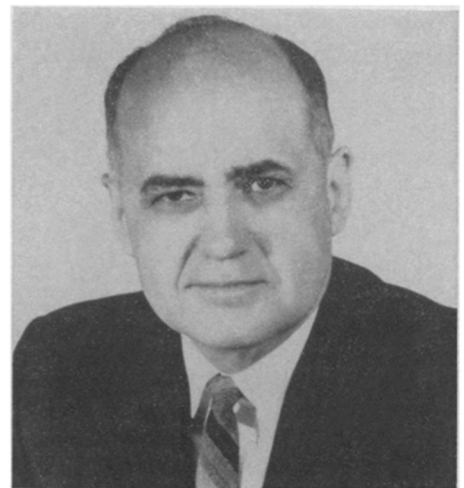
For some time immunologists have been working with a synthetic drug that mimics the infectious core of a virus to stimulate the production of interferon. Increased interferon production could theoretically control virus infections that are otherwise unassailable.

First identified two years ago by Dr. Maurice R. Hilleman (SN: 8/19/67, p. 173), the synthetic polymer called poly I:C (polyriboinosinic-polyribocytidylic acid) has been shown to stimulate interferon production in animals and in cultures of human cells. It also possesses some antitumor properties that have reduced cancers in mice (SN: 1/18, p. 60).

Now Dr. Hilleman, of the Merck Institute for Therapeutic Research in West Point, Pa., and two physicians from the Sloan Kettering Institute for Cancer Research in New York, report evidence that poly I:C actually induces interferon production in man.

Clinical trials of the drug began only a few months ago and data are preliminary, but, Dr. Hilleman says, "We have successfully taken another step in our research for an antiviral agent." With Drs. Charles W. Young and Erwin H. Krakoff, Dr. Hilleman announced experimental results this week at the Third Annual Symposium on Medical and Applied Virology in Ft. Lauderdale, Fla.

The scientists have been giving varying but generally low doses of poly I:C to cancer patients who were initially free of detectable levels of inter-



Merck

Hilleman: Another successful step.

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feron. They have completed biochemical tests on four. Within 12 to 24 hours after administration of the drug, interferon was found in the blood of two. "This gives us confirmatory evidence of interferon induction that was missing until now," says Dr. Hilleman.

One patient developed a slight fever from poly I:C. No other side effects were observed at the doses given: between 25 and 200 micrograms per kilogram of body weight. In continuing experiments to be reported in late spring, the scientists will test patient response to gradually increased doses until a maximum safe level is determined.

It is too early to realize the full implication of the recent human tests, Dr. Hilleman points out. From previous fundamental study there is evidence that poly I:C induces antiviral interferon and halts tumor growth by two entirely different mechanisms. Trials in patients so far neither support nor deny either effect.

Says Dr. Hilleman, "It is far too soon to even speculate about poly I:C anticancer activity in man."

Dr. C. Gordon Zubrod of the National Institutes of Health in Bethesda, Md., agrees. He and co-workers, including Dr. Hilton Levy, recently initiated trials of poly I:C in patients with advanced cancer, though it will be a matter of months before they have evaluated the drug's effects. "We have not even reached the maximum dose yet," says Dr. Zubrod, who also speculates that, "Even if poly I:C has no anticancer activity it may prove helpful in some virus diseases."

Fighting virus diseases, particularly the common cold, is what Dr. Hilleman sees as a role for poly I:C. The next research step will be to give the drug to human volunteers who would then be exposed to viruses.

There is some encouraging evidence for this. When poly I:C is given intravenously in very high doses to animals it produces toxic effects. But when administered topically has no ill effects at all. As eye drops, for example, poly I:C has been used to cure rabbits of a potentially blinding eye infection caused by the herpes simplex virus.

As an anticold drug, poly I:C might be administered in the form of a spray or mist that would enter the lungs or nasal passages directly. In this way, by not giving it by injection into the blood, the toxic effects may be minimized.

While interferon workers in the United States lean to the view that the only way to harness interferon is to stimulate its levels in the body artificially, European scientists favor the idea of using interferon itself as a drug (SN: 8/23, p. 149). □

PUBLIC HEALTH

A vote against cigarettes

Last June, just before a law expired that effectively blocked any Government action against cigarette advertising, the House of Representatives adopted a replacement act strikingly similar to the original (SN: 6/14, p. 574). The House bill changed the warning on cigarette packages to read, "The Surgeon General has determined that cigarette smoking is dangerous to your health and may cause lung cancer and other diseases." At the same time, it went a long way toward tying the hands of the Federal Trade Commission, which has been threatening to require advertisements to carry a warning as well. The House bill would bar further regulatory action on advertising and labeling of cigarettes until 1975.

When the House bill passed, Rep. Harley Staggers (D-W. Va.) predicted trouble from antismoking forces in the Senate. His prediction was accurate.

The Senate last week showed itself less concerned with placating the tobacco industry than was the House. By a vote of 70 to 7 the Senate passed a bill that would ban cigarette advertising on television and radio as of January 1, 1971. And if the tobacco industry then channels the bulk of its advertising dollars to newspapers and

magazines, the door is open to an FTC regulation demanding health warnings in newspaper and magazine ads. Whether or not the print media are flooded with cigarette ads after January 1, the FTC can move in any case after July 1, 1971.

The House is not expected to accept the Senate version of the cigarette bill. A compromise, which could be tougher than the House bill, will be worked out in Senate-House conference.

The fighting in conference is expected to be tough. The cigarette industry is experiencing the sharpest drop in sales since the campaign against smoking started in 1964. The National Center for Health Statistics reported this week that 2.5 million smokers kicked the habit in the last three years, and that the number of young people not starting is increasing. And a BUSINESS WEEK study of the industry reported last week that cigarette sales are off by 10 billion, or 2 percent, from the 1968 level.

In light of this, the tobacco industry and its Congressional allies might be willing to accept a compromise law requiring health warnings in advertising as an alternative to the crippling Senate proposal.

TEACH-IN

Ecology on the campus

Student civil rights demonstrations in the early sixties forged the weapons that were adopted later in the decade by the opponents of United States military policies and what came to be called the academic establishment.

Now shifting their targets to concern for the environment, students across the country are planning a massive ecological-environmental teach-in on university campuses for April 22. It promises to become a focus for what appears to be an emerging theme of student protest at the turn of the decade.

There have already been sporadic environment-oriented demonstrations on some campuses, and students at at least 200 colleges and universities have agreed to participate in the April event. The April teach-in's organizers expect the day to dwarf even the massive civil rights and moratorium day demonstrations.

"Even the Vietnam protest is a warm-up for this," comments Bob Waldrop, local coordinator for Sierra Club activities in Washington, D.C. "If the kids see no sense coming out of this, it's going to hit the fan."

The idea for a national teach-in as a campus-oriented response to the growing environmental crisis began with Sen. Gaylord Nelson (D-Wis.) last January. Nelson was joined by California Rep. Paul McClosky, a Republican, and the broad outlines of the teach-in were drawn at an October conference at Airlie House in Virginia, which attracted a national cross-section of student leadership.

Since then, teach-in commitment appears to have snowballed; Nelson, McClosky and Sydney Howe, president of the Washington, D.C.-based Conservation Foundation, formed the non-profit Environmental Teach-In, Inc. to coordinate the effort but not to direct its methods.

"It is our hope that every campus and community in the country will get involved in this," says one ETI staff member.

A pattern for the nationwide demonstration may be set at the University of Michigan at Ann Arbor; students and faculty plan a four-day environmental session from March 11 to March 14.

The Michigan movement began with