PHYSICS

Bomb Blasts Go 50 Miles

Temperature inversion and normally found layers of atmosphere bounce blast waves from an atomic bomb burst back to earth as far as 600 miles away.

➤ BLAST WAVES from an atomic bomb sometimes rise as high as 50 miles into the sky and then bounce back to the ground, research by weathermen in connection with the A-bomb explosions in Nevada has shown. The bounce sometimes throws the blast back onto the ground as far as 600 miles away.

Various temperature inversion and normally-found layers of the atmosphere can act as reflecting surfaces for blast waves from an atomic bomb or from any explosion. That is why some of the force of the Nevada test explosions has been felt as far away as California, Arizona and Utah. That is why some windows were broken in Las Vegas and other places.

Claims for blast damage from the 20 test explosions which have been settled amount to $42,929, the Atomic Energy Commission says. Weather forecasts in all probability have kept this sum as small as it is. Some tests were postponed on the advice of meteorologists.

The general theory that temperature inversions, the troposphere, the ozonosphere and the ionosphere, are the cause for the seemingly erratic action of blast waves from explosions has been known for some time. However, meteorologists say that never before has there been the opportunity for controlled experiments in blast wave propagation of this number or size.

The AEC says that a fair degree of accuracy was achieved in predicting the pattern of blast waves from any one particular test explosion. However, when the weather forecasts were off, the prediction of blast wave patterns would be off too.

Most of the direct effects of the blast from an atomic bomb of "nominal" or Hiroshima-type strength occurs within a radius of 12,000 feet of ground zero and within 10 seconds after the explosion. However, some waves travel upwards. If the temperature of the air decreased with height at a uniform rate, these waves would just continue upward until they were dissipated.

However, especially over deserts, temperature inversions are sometimes found within 1,000 to 2,000 feet above the ground. This means the air above is warmer than the air below. Some of the blast waves hitting this go on through. Others bounce back. These are concentrated and hit a focal point on the ground. Anything at the focal point might be damaged, depending on how much energy was reflected back to the ground.

The same sort of action can happen when the blast wave gets to the troposphere, six miles above the ground, the ozonosphere, 25 to 40 miles up, and the ionosphere, some 50 miles up.

Wind direction also has something to do with where the focal points will be. Wind can help or deter the atmospheric temperature pattern in determining where the focal points will be.

Science News Letter, March 14, 1953

FORESTRY

Graft Hybrid Pines

➤ ECONOMICAL PRODUCTION of hybrid pine trees passed from probability to practicality this year, due to a newly developed grafting technique, the U. S. Forest Service has reported.

One seed farm alone produced 55,000 sound hybrid pine seeds this year, enough to reforest 165 acres to hybrid pine, the Forest Service said.

Researchers at the Institute of Forest Genetics in California learned to speed up production of seeds by grafting hybrid seedlings to mature trees. This allows the hybrids to reproduce themselves up to 20 years sooner than would be possible without grafting, the Forest Service said.

Another means of speeding up hybrid pine production being perfected is a new technique for quick germination of seeds after maturation. From seed collected in September it is now possible to produce seedlings in December equal to planted stock one year old.

Forestry scientists are looking for the same kinds of beneficial results from hybrid trees that agriculturalists have found in hybrid vegetables and fruits. They hope to produce trees that are resistant to insect pests and plant diseases, increase the rate of growth and quality of timber produced, and extend the range over which trees can be grown practically.

But the problems of making tree hybrids are much more complicated than those for vegetable hybrids, the Forest Service said. Artificial pollination of the trees often involves risky climbing high into treetops, or the construction of expensive scaffolding. And where most vegetable hybrids yield seeds after a single season, it may take from 20 to 50 years to obtain hybrid tree seeds.

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RADIO

Saturday, March 21, 1953, 3:15-3:30 p.m. EST

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

E. V. Richards, president of the Louisiana Purchase 150th Anniversary Association, and Streuby L. Drumm, vice-president of the New Orleans Public Service Company, discuss "The Louisiana Purchase."

PROJECTS EXHIBITED — Left to right, beginning at top: Joanna Russ demonstrates the growth of certain fungi under colored light and in darkness; Martin Tangora, map-coloring problem with geometrical figures; Karen Spangehl, electrophoresis of protein; Eleanor Wright, methods and applications of chromatography; Merle Mitchell, mass analysis of crude oil; Edward Menhinick, control of house flies; David Isles, various features of oceanography; Daniel Larson, safety through photocells; Robert Shore, chondrification and ossification of the mouse embryo; Etsuyo Itokawa, search for compound effective against leukemia; Alan Moffet, determination of antenna radiation patterns; and David Mumford, a miniature relay calculator.

ENTOMOLOGY

Automatic Greenhouse Used in Insect Research

➤ A GREENHOUSE which automatically controls its own temperature and humidity, and partially regulates solar radiation has been placed in operation at the University of California's Citrus Experiment Station, Riverside, to aid orchard insect studies.

First of its kind to be constructed, it is named the "biotrone," meaning "balance of life." It is an insect-proof glass house equipped with automatically controlled heating and cooling units.

A set of aluminum louvers completely surrounds the house. These are operated by three solar thermostats, installed on top of the east, south and west sides of the structure. When the solar radiation reaches a given intensity, the thermostats automatically close the louvers to maintain their degree of warmth.

Temperatures can also be controlled in the greenhouse by a time clock. Days of varying length can be simulated at any time of the year by use of tungsten filament and fluorescent lamps and the louvers.

Dr. Charles A. Fleschner, entomologist, will direct experiments in the biotrone. He has found that variation in the physiological conditions of plants has a striking effect on the reproduction rate of mites feeding on plants and on their natural enemies.

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