

persed harmlessly over a wide area.

Extensive investigation will be made at Bikini of both radiation effects and radioactivity.

The details of the manufacture of the atomic bomb are secret, but the Smyth report gives a general idea of how it is put together. The bomb must be larger than a certain "critical size" in order to blow up. The number of neutrons produced by the first fissions of the atoms must be sufficient to get into other atoms and produce further fission. It must do this before the bomb flies apart. The time that elapses between the beginning and the end of this nuclear chain reaction is extraordinarily brief. This very, very short time—less than a millionth of a second—is the reason for most of the technical difficulties of making an atomic bomb.

### Neutrons Reflected Back

The bomb is evidently surrounded by an envelope of pure graphite or a similar substance that reflects many neutrons back into the bomb instead of letting them escape outward where they would not hit the hearts of atoms in the bomb. This layer is called a tamper. In addition to being a neutron reflector, it also helps to delay the expansion of the reacting material.

Because there are enough neutrons from cosmic rays or sources inside the bomb to set up a chain reaction, it is necessary to keep the bomb in separate pieces, each below the critical size, until

it is desired to produce the detonation. When the bomb is to be set off, these separate pieces must be brought together just as fast as possible. Evidently the method of assembling the bomb at the instant when an explosion is desired is to shoot one part as a projectile in a gun against a second part as a target. Doing this successfully is not as simple as it sounds, of course, and much of the "know-how" of the atomic bomb itself is concerned with this problem.

### History of Atomic Bomb

When atomic bombs are exploded at Bikini, more historic dates will be added to the chronology of science's achievement of atomic power.

The story of the release of atomic energy really begins with many discoveries, experiments and theories in nuclear physics in the 1930's, but the immediate start of the researches which resulted so spectacularly was in January, 1939, when two Germans, O. Hahn (awarded the Nobel prize in 1945) and F. Strassmann proved that an isotope of barium was produced by neutron bombardment of uranium. The neutron is a fundamental particle of matter without electrical charge and with a mass about equal to that of the proton or nucleus of the hydrogen atom.

Two refugees from Germany, O. R. Frisch and Lise Meitner, suggested that the absorption of a neutron by a uranium nucleus sometimes caused that nucleus to split into approximately equal parts with the conversion of some of the mass, by Einstein's 1905 formulation, into enormous quantities of energy, a process called fission.

These reports were brought to the January 26, 1939, conference on theoretical physics at Washington, D. C., jointly sponsored by The George Washington University and the Carnegie Institution of Washington, with Niels Bohr of Denmark, Enrico Fermi and others discussing the problem. Experimental confirmation of uranium fission in several laboratories followed and the suggested likelihood of emission of neutrons in the process was demonstrated. This indicated the possibility of a chain reaction releasing energy explosively.

On December 2, 1942, the first self-maintaining nuclear chain reaction was initiated at an uranium-graphite pile at Stagg Field Stadium, Chicago. On July 16, 1945, 5:30 a.m., the first atomic explosion created by man blasted the New Mexico desert. On August 6, 1945,

the first atomic bomb used in warfare was dropped on Hiroshima, Japan.

*Science News Letter, June 22, 1946*

### GENERAL SCIENCE

## Seeds and Insects To Be Tested in Atomic Blast

► IN ADDITION to testing warships, the atomic bomb blast at Bikini will be turned upon seeds, molds, insects, and diseases of plants and animals.

A collection of these test materials, carefully nursed by U. S. Department of Agriculture scientists, are now en route.

Plants with new hereditary strains may result from the atomic bomb explosions. X-rays are known to change the hereditary mechanisms of seeds and resulting plants, and scientists expect some such hereditary changes from the alpha and gamma radiation from the bomb.

Among the materials to be exposed at 25 locations in the bombed area are: cereals, forage crop seeds, vegetable seeds, flower seeds, cotton seed, smut spores, snap beans, micro-organisms, various cultures for treatment of animal diseases, beetles, weevils, moths, mosquito eggs, termites, bedbugs, several kinds of ticks and mites.

*Science News Letter, June 22, 1946*

A survey and reports covering the major research work done during the last decade

## VIRUS DISEASES in MAN, ANIMAL & PLANT

By GUSTAV SEIFFERT

*Published upon recommendation of  
The National Research Council*

A GUIDE to those who want to become more closely acquainted with the virus problem. Subjects include: *Manifestations and Nature of Virus; Epidemiology of Virus Diseases; Diseases of the Eye; Exanthematous Diseases; Japanese Encephalitis; Australian Disease; Viruses and Neoplasms; Virus Diseases of Insects; Jaundice of Silk-worms; Summit Sickness, etc.*

"The most comprehensive coverage in the field of viruses available today."

—*Southern Medical Journal*

LIMITED EDITION. ORDER NOW. \$5.00

PHILOSOPHICAL LIBRARY, Publishers  
15 E. 40th St., Dept. 35 New York 16, N. Y.



## LANGUAGE IS POWER

... Forge ahead, win special assignments, promotion, better job in global peace time opportunities through ability to speak a foreign language.

**MASTER A NEW LANGUAGE quickly, easily, correctly by LINGUAPHONE**

The world-famous Linguaphone Conversational Method brings voices of native teachers INTO YOUR OWN HOME. You learn the new language by LISTENING. It's amazingly simple; thousands have succeeded.

**HOME-STUDY COURSES IN 29 LANGUAGES**  
Send for FREE book—

**LINGUAPHONE INSTITUTE**  
31 RCA Bldg., New York 20 • Circle 7-0830

LINGUAPHONE INSTITUTE,  
31 RCA Bldg., New York 20, N. Y.  
Send me the FREE Linguaphone Book.

Name.....

Address..... City.....

Language Interested.....