MEDICINE

# A-Bomb Effects Studied

## People of Nagasaki and Hiroshima need to be studied for many years to determine long-range effects on blood, disease resistance and reproduction.

➤ THE PEOPLE of Hiroshima and Nagasaki must be followed for many years to determine the long-range results of atomic bombing on their blood, resistance to disease and ability to have normal children, Capt. Shields Warren of the Navy Medical Corps, declared at the meeting of the American Association for Cancer Research in Atlantic City.

Capt. Warren, who is president of the association, was chief medical officer of the Naval Technical Mission to Japan and his report is the first official public account of the Navy's medical investigation of the effects of the atom bombings

"The distinctive feature of the atomic bomb is the large amount of radiant energy which it produces," he pointed out.

Its chief effects on the body are: 1. the effects of heat, producing primary injury of the flash burn type and secondary injury due to fires started by the bombing; and 2. the effects of short-wave radiation and neutrons which closely parallel the effects familiar to medical scientists from experimental studies of the effects of X-rays.

"This radiation was produced in an instant," Capt. Warren reported. Security prevented his stating the exact duration of time and the type and quantity of radiation.

The immediate effects from radiation injury as a result of atomic bomb explosions were weakness, malaise, fever and often death. These effects appeared usually within 48 hours. Capt. Warren and his group looked for the delayed effects in the blood, blood-forming tissues and sex glands, tissues known to be particularly sensitive to radiation.

Damage to the blood-forming tissues fell into three chief groups. The first was the one in which the white cells of the blood, important defenders against disease germ invasion, were greatly reduced in numbers. Infection, particularly Ludwig's angina, was the outstanding feature. The great bulk of deaths in this group occurred within the first three weeks after the bombing.

Within three to five weeks after the bombing, a considerable number of persons died of hemorrhage, the result of lack of elements in the blood necessary for clotting. This was due to radiation damage to certain cells of the bone marrow. The hemorrhages varied from extensive black and blue spots to massive bleeding from various openings of the body. Although Capt. Warren did not say so, these hemorrhages might have been what gave rise to rumors of elderly women being rejuvenated by the atomic bomb's effects.

Those with serious bone marrow damage who weathered the first few weeks developed anemia later with red blood cell counts in some dropping to as low as 1,000,000 or less, which is less than one-fourth the normal.

The atomic bombing's effects on the sex glands were much more prominent in the case of men than women, Capt. Warren reported. Changes noted in previously normal high school girls may have been due to psychic shock and malnutrition as well as to direct effect on the ovaries, he suggested. Although women of child-bearing age only occasionally showed damage to the ovaries of a kind to interfere with ability to have children, this type of damage in men was striking.

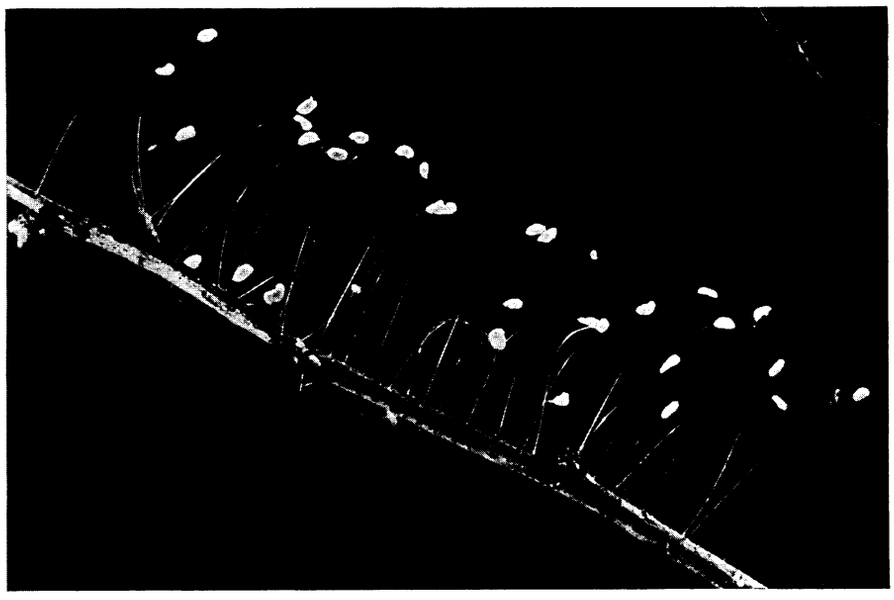
The treatment given A-bomb victims by the Japanese was "utterly inadequate," Capt. Warren found.

The number of deaths should have been materially reduced if victims had been given repeated blood transfusions and penicillin to control the infection during the period of white blood cell anemia.

On the much discussed question of danger from left-over radioactivity in the area after atomic bombing, Capt. Warren stated:

"We were fortunate in locating a number of persons who had entered the bombed areas soon after the explosion and had remained there. None showed any deleterious effects."

In other words, the area was safe for



*INSECT EGGS—This photograph shows the odd way in which the lacewing fly places her eggs as a means of preventing her carnivorous offspring from eating each other. The young, called aphis lions, are so hungry when they hatch that the first one out would eat up all the eggs containing the others. So she secretes a series of stiff, silk-like stalks with her eggs attached to their ends. Then as each larva hatches out it crawls down the stem and goes away from the rest of the eggs in its search for something to eat. Aphis lions feed on plant lice, and are very valuable in keeping down these pests. Photograph by George A. Smith, of Quarryville, Pa.*

humans soon after the bombing was over.

Besides the heat and radiation effects, atomic bombs also produced the blast effects of the conventional types of bombs. Survivors might suffer from flash burns, blast injury and radiation injury simultaneously. In the cities and villages around Nagasaki and Hiroshima it was easy to pick out the irradiated refugees by the characteristic flash burns and frequent baldness. Of the 80,000 who died at Hiroshima and the 45,000 who died at Nagasaki it would be very difficult to say what proportion were killed by one or another type of energy.

A very striking feature of the heat injury of the A-bomb was the speed with which it acted and passed. Clothes, wisps of hair, or even the shadow of an arm across the body were enough to protect against this kind of burn, Capt. Warren reported. He showed a picture on which the profile of blades of grass stood out in relief against the burned background of a board bunker where the intense but instantaneous radiant heat burned the wood before the grass had time to wave or wither.

"The destructive effect of the blast was centrifugal except at the hypocenter (the project of the true center on the ground) where it was essentially vertical," Capt. Warren added in a brief description of the nonmedical aspects of the A-bombing effects.

"Consequently some poles and trees stood at the hypocenter, although extensively levelled elsewhere. The importance of streamlining in resisting blast was well shown by factory smoke stacks, the great majority of which stood."

*Science News Letter, March 23, 1946*

ELECTRONICS

# Wind-Finding Equipment

**Developed during the war, it provides data on conditions in the upper atmosphere. Gives speed and direction of wind. Is known as a transponder.**

➤ "Wind-finding" equipment, which provided data on conditions in the upper air vitally needed by the armed services, was developed during the war by the National Bureau of Standards, it is now revealed. Initially the project involved means for increasing the usefulness of radiosonde, which automatically transmits, by radio, data on barometric pressure, humidity and temperature from different altitudes as the balloon carrying it ascends. The Navy also wanted data on the speed and direction of the wind.

The new device is known as a transponder, the Department of Commerce says, and is also called a re-emitter because it picks up signals and re-emits them back to a receiving station on the ground. In plain English, it is a two-way radio set which operates on the principle of amplitude modulation, widely used in broadcasting. Because this device requires a rather complicated antenna which swings from one position to another, it was found impracticable for installation on fighting ships because of their constant roll.

The answer to the problem was found in the "corner cube reflector" and the "pulse repeater" which operated on ships without interfering with other equipment. The corner cube reflector operates on the same principle as the reflectors commonly found in road signs throughout the country. When a radio or radar signal strikes the corner cube reflector as it revolves under the small balloon by which it is borne aloft, it is reflected back to the ground or ship station.

Fire-control radar follows the balloon, just as it follows a plane in order to provide data for aiming anti-aircraft guns. From these data the naval meteorologist is able to trace the position of the corner cube reflector as it moves through the air and to determine the direction and speed of the wind.

The pulse repeater is a small two-way unit which receives signals or pulses and repeats them in stronger volume. In addition to providing data on wind direction and speed for weather analysis, the device has a very definite application to ballistics, supplying information on wind conditions for correction of fire-control data.

The work of the National Bureau of Standards on wind-finding equipment was sponsored and financed by the Navy, which also made available to Bureau experts the Navy's modern radar laboratory on Chesapeake Bay.

*Science News Letter, March 23, 1946*

ENGINEERING

## Internally Cooled Piston For Explosion Engines

➤ AN INGENIOUS idea for an internally cooled piston for heavy-duty explosion engines is embodied in patent 2,396,500, obtained by Walter Gasser of El Cerrito, Calif. The upper end of the hollow connecting rod is expanded into a large sphere, around which a collar-like piston fits, ball-and-socket fashion. The top of the sphere thus constitutes the piston head. Oil is forced up through the hollow connecting rod in a cooling jet against this hot surface. Rights in the patent are assigned to the Shell Development Company.

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