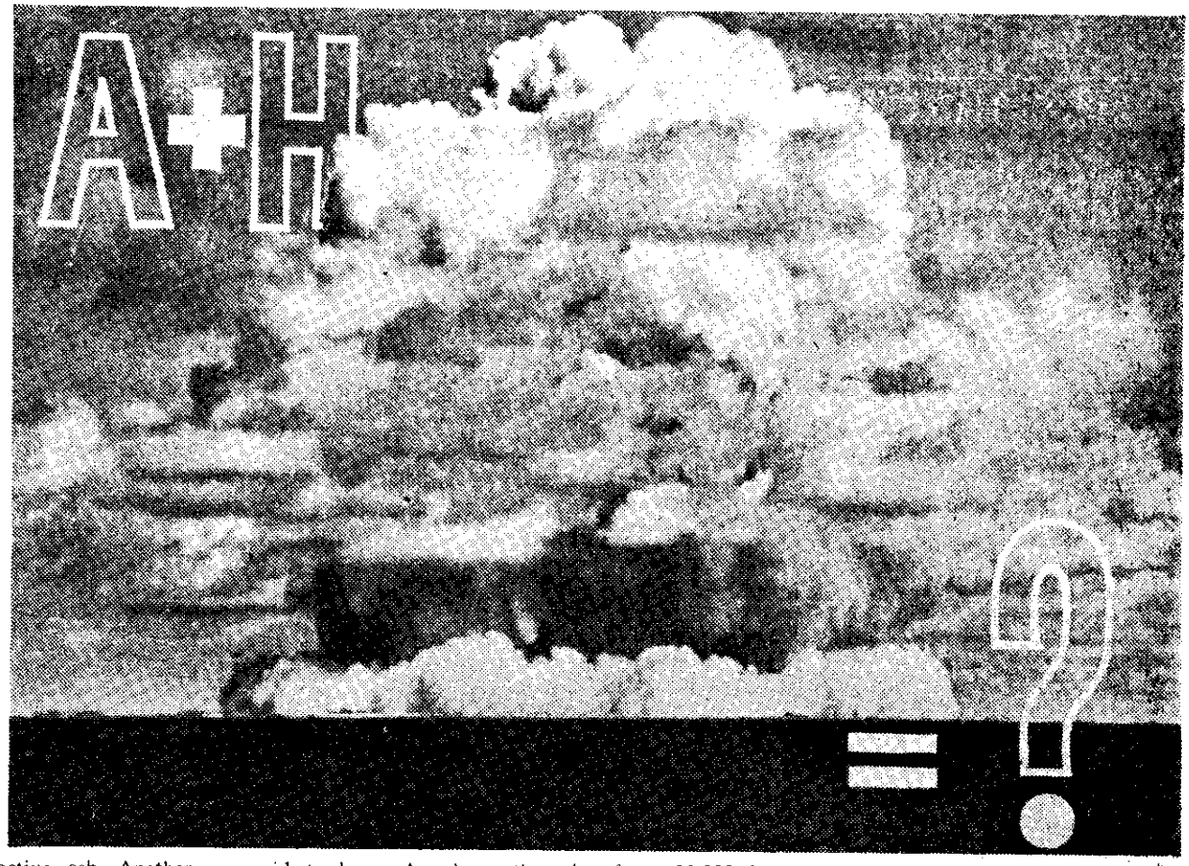
THE Japanese fishermen who were caught within the penumbra of the hydrogen bomb explosion at Bikini last month themselves set up a shock-wave which circled the world, shook the windows of Cabinet rooms and chancelleries, and raised perplexing questions in the minds of everyone. The comments which we print below are the result of an attempt to find answers to these questions. Some can be answered reassuringly, a few (at this stage at least) cannot be answered at all, many only breed more questions.



IN the early morning of March 1 scientists of the U.S. Atomic Energy Commission exploded a thermo-nuclear bomb on an unnamed island in the Bikini-Eniwetok test area. A Marine corporal who saw it, wrote, "The sky lighted up, a bright orange, and remained that way for what seemed like a couple of minutes." Japanese fishermen mistook it for an unusual sunrise—till they noticed the "sun" was in the west.

As the debris settled and the lighter, wind-borne ash moved outward, a number of disquieting facts began to emerge: The Atomic Energy Commission admitted that the explosion had been considerably greater than anticipated. Unofficial sources estimated it as between 500 and 600 times more powerful than the Hiroshima bomb, and between three and five times more powerful than the first hydrogen bomb exploded in November, 1952.

On March 11, AEC announced that 236 natives and 28 Americans had been unexpectedly exposed to radio-activity during the test. Their exposure was ten times greater than scientists consider safe, but they were reported not to have suffered burns.

The 100-ton fishing craft Daigo Fukuryu Maru returned to its home port on March 14 coated in whitish ash. All 23 of its crew suffered burns and radiation sickness. Two were in a serious condition. At the time of going to press they were reported to be improving. The vessel was said to have been 70 miles from the centre of the explosion.

Three other Japanese fishing craft and the tanker Patapsco were reported to have been exposed to lesser degrees of radio-activity, but their crews were apparently unharmed. One of the vessels, the Shunyo Maru, was believed to have been operating 600 miles from the testing grounds, and to have passed through an ocean current carrying radio-active ash. Another was said to have been no closer than 1200 miles. The cargo of a third, the Sumiyoshi Maru, was found to be contaminated, though not to a dangerous extent. The U.S. Government increased the danger zone in the vicinity of Bikini to about three times its former size, extending it to 450 miles in each direction in which winds normally blow at this time of year. The total area will be up to 315,000 miles. A member of AEC, Mr. C. Holifield, blamed unpredictable upper winds for the distribution of ash in the March 1 test.

According to the American news magazine *Time* the results of the latest nuclear bomb test forced AEC to reclassify its previous test of November, 1952, as a misfire. The fireball of this "misfire" was reported to have been 28 miles in diameter, its force equal to that of 5,000,000 tons of TNT. The mushroom cloud extended to 90,000 feet. An observation aircraft at 30,000 feet, 50 miles distant, had to turn and run to avoid being caught under the lip of the mushroom.

Scientists at Kyoto University, Tokio, reported a jump in their cosmic ray count from a normal of 40 to 50 to a peak of 225, two days after last month's explosion. This was higher than any previous reading obtained after a bomb test, either Russian or American.

ATOMIC CLOUD dispersing after the Monte Bello explosion in 1952

MISCALCULATION NOT LARGE

LOOKING for elucidation of these reports, *The Listener* spoke first to C. N. Watson-Munro, Professor of Physics at Victoria University College. He appeared not unduly concerned at the extent of the error in calculation attributed to the scientists. "Assuming the reports to be true," he said, "a four times stronger bomb would have only a 50 per cent greater effect. The straight radiation would increase by 100 per cent, but the radiation from fission products near the bomb, carried by the air, would not increase so greatly."

If such an error of calculation could be made, the professor was asked, could the scientists also be wrong in their assurance that a chain reaction was impossible? "No," he said. "One is an error of degree, the other would be an error of kind. We could not achieve the intensity necessary to make a miniature sun of the earth. Besides, a miscalculation of factor four is not large. There are some things in nuclear physics in which we would like to achieve an *accuracy* equal to a mistake of four times."

The professor discounted the suggestion that radio-active ash reportedly falling on Japan would be sufficiently active to be harmful. The increased activity recorded by cosmic ray equipment at Tokio was similar to that which would occur if the equipment were moved to the summit of Mt. Everest.

"But there is no doubt that the dust can be nasty, and no doubt that it could be very harmful to eat radio-active fish. The material cannot be assimilated and finds its way into the bone structure. Fortunately, it's easy to monitor suspected fish before eating."

According to Professor Watson-Munro the widespread effects of the March 1 explosion were probably due to unexpected weather coupled with the fact that a greater blast may have carried dust to heights not foreseen by meteorologists. "A normal A-bomb cloud goes to about 35,000 feet. One 600 times that power may well go to over 100,000 feet." From the reports, he said, the dust which reached Japan appeared to have travelled slowly by comparison with that which reached New Zealand after the Australian test. This had arrived over Wellington some 18 hours after the explosion—at an average speed of about 60 miles per hour.

Asked whether statements of the destructive potentialities of the so-called cobalt bomb were true or exaggerated, the professor said he thought them exaggerated. "An enormous amount of cobalt would be required to spread all over the earth. There is probably not as much as that available."

On the moral issues raised by atomic weapons, Professor Watson-Munro drew attention to the following statement of David Lilienthal, one-time chairman of AEC. In his book *This I Do Believe*, Lilienthal wrote: "If the myth that atomic energy is simply a military weapon becomes a fixed thing in our minds, if we accept the error, it can never be anything else but a weapon. . . The myth will cause us to fall into an even deeper pit of error. We will grow forgetful of the true sources of democracy's vitality and the true source of our nation's strength. We will be misled into believing that America is strong because of military strength

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