

Federation of American Scientists
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For Sunday release
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SCIENTISTS' COMMENT ON BIKINI ATOLL TESTS

It has been stated in the Senate and elsewhere that the atom bomb tests at Bikini are being held to furnish scientific information. It is thus implied that scientists are professionally interested in these tests to learn more about the potentialities of atomic energy.

This is not true. The tests are purely military, not scientific. Appended to this statement is a resolution adopted by the Federation of American Scientists, at a recent council meeting in Philadelphia, in which this fact is stated in unequivocal language. Scientists expect nothing of scientific value, and little of technical value to peacetime uses of atomic energy, as a result of these tests.

Whether or not these tests, involving the expenditure of millions of dollars and tens of thousands of man-hours, are justified, is not a question which scientists are qualified to decide. An atomic bomb is a military weapon, and when, where, and how it should be tested are military questions.

The tests, of course, are based on the frightful idea that we -- mankind -- might have an atomic war in which navies would desperately seek to survive, to defend their countries, or to attack the enemy. Scientists seek by education to teach men that they must abandon atomic weapons to preserve civilization, but we recognize that it may take an atomic war to teach them this lesson.

So long as they have not learned it, the military have a mission, fantastic and short-sighted though it may seem to reasonable men. Scientists are cooperating in these tests at the request of their country's armed forces, although they do so with heavy hearts, and without enthusiasm.

They would like, however, to assist the American people in forming an accurate judgment of the purposes and results of the Navy experiments. We suggest that correspondents and newspaper readers should keep in mind the following considerations. This statement was prepared by the national officers of the Federation of American Scientists. It is based on a special report made to national headquarters by the Executive Committee of the Association of Los Alamos Scientists -- the men who developed the bomb and made the first test at Alamogordo, New Mexico, and who are working on the current tests.

1. THE NUMBER OF SHIPS DESTROYED WILL NOT BE THE BEST STANDARD FOR JUDGING THE EFFECT OF THE BOMB.

Reasonable men should discount in advance headlines which may read Fleet Survives Test; Only One Ship Sunk. Area of damage done by the bomb to brick or steel and concrete structures is about ten square miles. Total destruction extends for a radius of about one mile. There will be one hundred assorted target ships spread over a radius of miles, and the majority will probably not be damaged to any extent. But there is no doubt whatever that a direct hit or near miss by an atom bomb will destroy any ship ever made: One bomb, one battleship.

Flimsy houses three miles from the blasts in Japan were destroyed, but a battleship should be more than fifty times as strong as a Japanese house. It is well known that the variation in pressure is such that at one half the distance it is

not more than four times as great, and the estimated lethal blast distance is less than half a mile. Published reports indicate no serious radiation damage to people beyond one mile. Persons below decks and well shielded by heavy steel construction would probably be safe from radiation at a shorter distance.

Ships closer than one half mile will be damaged, but only those closest to the point of detonation will be sunk. Few ships will be appreciably affected, perhaps ten out of one hundred, and probably only one or two will be sunk.

Dr. Hans Bethe, formerly director of theoretical physics at Los Alamos, who had made some studies of the forthcoming test, has predicted that not even one capital ship will be sunk.

Again, it must not be assumed that any conclusions may be drawn from this as to what damage a bomb would do to an American city. Cities are not built like battleships. (See the May Reader's Digest, or contact Federation Headquarters, for excellent brief, popular studies of what an atomic bomb would do to an American city).

2. ACTUAL STRENGTH OF BIKINI BOMB BLASTS SHOULD BE ANNOUNCED.

It is possible for an atomic bomb to be a dud or a semi-dud, The Navy has announced that the Nagasaki type bomb will be used in these tests, but the actual bomb used may not explode as efficiently as did the bomb at Nagasaki. Instruments for measuring this precisely will be in operation and unless this data is announced at least in part, no valid conclusions may be drawn as to effect of atomic bombs on naval vessels. We can not here, of course, discuss future more powerful bombs.

3. THE DEEP UNDER-WATER TEST OF NEXT YEAR WILL BE FAR MORE IMPORTANT THAN THE TWO TESTS PLANNED THIS SPRING.

All scientists who have studied naval atomic bombing are unanimously agreed that there is nothing final to be said about the subject until a deep under-water test has been tried. The first test will not yield spectacular results, the second test will be more damaging, but an under-water test at an appreciable depth, perhaps using something similar to the bathysphere, is potentially far more dangerous to an entire fleet.

Even the surface test will give some tidal wave effect, and since water is non-compressible, a deep sea bombing might have extreme and unpredicted results. The intense shock produced by the chain reaction is dissipated in air, but below the surface would create a sort of monstrous bubble of energy, which might buckle the plates of ships several miles distant. In this connection it should be noted that even ordinary torpedoes do not wound ships by penetrating, but by exploding on contact, alongside the ship under water.

4. ONE BOMB FOR ONE SHIP -- THIS ITSELF IS A REVOLUTIONARY ACCOMPLISHMENT IN NAVAL WARFARE.

A battleship costs approximately one hundred million dollars, even a destroyer twenty million. Dr. J. R. Oppenheimer has stated that an atomic bomb could be produced for about one million dollars. It would be good business to spend not one, but a considerable number of bombs to sink a battleship, and even a few bombs to sink a destroyer. In addition, it takes many times longer to produce a ship than an atomic bomb, an extremely important factor in industrial total war. We already

know, then that it is cheap to sink naval vessels with atomic bombs. Since the bomb creates a 'ball of fire' approximately one third of a mile across, and does total damage for a half mile on either side, it can be seen that it does not have to be a direct hit in the sense that ordinary bombs are described as direct hits.

5. NONETHELESS BOMBING A FLEET MIGHT NEVER BE TACTICALLY VALUABLE.

Despite the economics suggested above, it is still possible that bombing a fleet at sea would not be worth the trouble in an atomic war. Supposing that mankind risks suicide by undertaking such a war, the economics would still be against bombing ships. One square mile of city destroyed atomically would be a loss, in the average American city, representing five hundred million dollars, or five times the cost of one battleship.

Strategically speaking, when the guided missiles now being developed are perfected, V-2s, V-3s, and other robombs with atomic warheads will arch through the stratosphere far above any Navy, even above air forces, and so far as present science is concerned, beyond reach of any kind of radar detection and defense. Scientists assert there is no foreseeable defense whatever against such an attack in a future war.

6. WHAT, THEN, WILL BE THE MISSION OF THE SO-CALLED FIRST LINE OF DEFENSE, IN THE NEXT WAR? WHAT WILL BE THE GOOD OF THE NAVY'S PROTECTING ITSELF BY DISPERSION WHEN IT CAN NO LONGER PROTECT THE HOMELAND THAT IT SERVES?

Scientists can not know any final answer to this question. A proper answer must take into account the full role of the Navy, as well as many relatively minor phases of atomic bombing.

Even where the bomb might not crush and blast whole ships, radiation and incendiary effects would produce incalculable damage, particularly in harbors. Water in the vicinity of the bomb and dust particles in the air will become radioactive and be deadly to human beings until dissipated by the processes of nature. A breeze containing radioactive particles, blown for miles, might conceivably result in the death of many sailors on ships miles away from an atomic bombing. The precautions taken in allowing personnel to enter Bikini harbor after the bombing may be taken as a fair indication when repair and ship crews might re-enter Pearl Harbor, if it were ever atomically bombed.

W. A. Higinbotham, Chairman
Federation of American Scientists

Melba Phillips, Secretary

J. H. Rush, Treasurer

Appended to this statement:

Resolution adopted by Federation, Philadelphia Council Meeting.

Statement by Professor Louis N. Ridenour, reprinted from SCIENCE ILLUSTRATED.

FURTHER STATEMENTS:

We plan at the conclusion of the Navy bombings to issue a statement from scientists who went to Bikini, and further to have available data from individual observers. We would welcome inquiries from newspapermen at that time, as well as copies of published accounts of their observations at the bombings.

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FOR IMMEDIATE RELEASE

RESOLUTION OF NATIONAL COUNCIL,
FEDERATION OF AMERICAN SCIENTISTS
Washington 6, D. C., NA 5818

STATEMENT ON BIKINI ATOLL TEST

The President's announcement of postponement of the atomic bomb tests at Bikini Atoll we believe will contribute to a more favorable atmosphere for the meeting of the Security Council and the projected meeting of the UN Atomic Energy Commission. We feel it would have been unfortunate at this time to focus the attention of the world so dramatically on our military preparations.

The Navy tests will have a purely military value. Scientists recognize that such bombings will not add anything to fundamental scientific knowledge - they are not significant from the standpoint of development of atomic energy for peaceful purposes.

Scientists believe that in the atomic age no amount of military preparation can give us real security. If there is another war with atomic weapons we and all the world will suffer irreparable losses no matter who may be the "victor". We must put all our best thought on organizing the world for peace.

To this end, we urge full support of the United States program for international controls over atomic armaments, and for the UN program of collective security as opposed to primary reliance on armed might.

The great experiment to which this nation and its leaders should devote their greatest attention and energy is under way in the United Nations Organization. There we are making the fateful test of whether nations can work out their problems without resort to war.

We do not need further bombing tests to tell us that if this larger trial of world order fails the great UN experiment will end in the most destructive explosions our earth has ever seen.

BIKINI: WHAT CAN IT PROVE!

A statement by Prof. Louis N. Ridenour, University of Pennsylvania, Member of Administrative Committee, Federation of American Scientists.

When an atomic bomb is exploded, a good deal of our precious and laboriously produced fissionable material is destroyed. The Bikini tests seem an extraordinary pointless way to destroy it.

It would have been wiser to expend these bombs, if military demonstrations have to be held, in land tests which would be seen by millions of people. All but the most unimaginative witnesses would gain the deep conviction held so strongly by those who were at Alamogordo last July; that war must be ended for all time. Few except active participants will be present at the tests - not primarily as a matter of policy but because of difficulties in providing transportation and grandstand space.

It would have been useful to test the bomb against buildings constructed along occidental lines. Great publicity has been given to assertions that, while the bombs dropped on Japan did widespread damage, an atomic bomb would be no more destructive in lower Manhattan than a 10-ton high-explosive bomb. Although this is contrary to the conclusions drawn by competent specialists on the basis of careful observation and experiment, some wishful thinkers can be convinced only by an actual demonstration.

The value of the proposed tests for their avowed purpose, setting Navy policy, is dubious in the extreme. Only a prodigal enemy would spend his atomic bombs on ships. Even such an enemy would employ against ships an underwater burst, which is not being tried in the Pacific this year "for technical reasons." A bomb bursting over a city will destroy a square mile and kill 100,000 persons; used against sturdy and widely scattered ships it might over destroy one or two and do little harm to others.

No one should be surprised if only one ship is sunk by the first Bikini bomb. An air burst is the least effective way of using a bomb against ships. A blast pressure of about five atmospheres is required to do substantial damage to a ship (half that will knock over a brick wall); and such relatively enormous pressure is not likely to exist beyond a radius of a few hundred yards from the point of explosion. Within the small circle encompassing the blast, there is likely not to be more than one ship.

The gamma rays, which killed so many thousands in Japan, will be expended on a few experimental animals whose fate will probably not make the newspapers, should it be released. The flash of heat, which literally cooked those Japanese who were outdoors and within half a mile of the explosion, will be wasted. Even the thin walls of storage boxes for ready ammunition will provide sufficient heat shielding to prevent explosions; hull and deck plating will keep fuel from catching fire.

The effect of the surface burst in the second Bikini bomb test may be greater, but probably will not be spectacular. The underwater explosion in the third test should prove destructive over a fairly wide radius but there are no plans as yet for this, the only really significant part of the Pacific experiment.

Though extravagant in fissionable material and the public funds, the Bikini tests must not be regarded as establishing any result - not even a scientific result. The tests are being held in such haste and under such difficult geographical conditions that there has been no opportunity for proper instrumentation. Even when the Pacific trials are complete, conclusions on naval policy must be carefully drawn. No sound conclusions can be reached until after an underwater burst.