MISS SURPASSES HIT IN SUPERSONIC TEST: RESULTS OF EXPLOSIONS AT ANGLE ...

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Results of Explosions at Angle Rather Than on Target Are Told to Physicists

By WILLIAM L. LAURENCE

Special to THE NEW YORK TIMES.

WASHINGTON, May 3—Studies of the behavior of objects traveling at supersonic speeds are bringing to light a strange Alice-in-Wonderland world in which, among other things, a miss is much better than a hit, it was disclosed here today at the closing sessions of the meeting of the American Physical Society.

Such facts, so far derived largely by pure mathematics, and aided enormously by the recently devised high-speed calculating machines, promise to have highly significant applications in the development of jet planes and rockets. A great increase is also expected in the efficiency of torpedoes and other projectiles, including that of the atomic bomb, without actually increasing their size or changing their design.

The recent findings in this strange new world of super-sound, many of which became known just before the end of the war and were made available to our armed forces, were presented in a number of reports by investigators in this field before a new committee of the Physical Society. This group is concerned with the study of fluid dynamics, namely, the motion of air and liquids. It is headed by Dr. R. J. Seeger, director of the mechanics division of the Naval Ordnance Laboratory.

The explorers of this new continent, hitherto but vaguely understood, include physicists, chemists, mathematicians, experts on explosives, aeronautical engineers and other scientific disciplines. They include such men as Dr. Theodore von Karman, aeronautical engineer of the California Institute of Technology; Prof. John von Neumann, one of the world's leading mathematicians, of the Institute for Advanced Studies at Princeton, N. J.; Dr. John G. Kirkwood, Cornell chemist, and Prof. C. B. Millikan, also of California Tech.

The discovery that at supersonic speeds a miss is better than a hit was made by Professor von Neumann. For this he received the Legion of Merit, in recognition of its significance to the war effort. It came as the result of his successful interpretation of a mysterious phenomenon known as the "Mach effect," originally observed by Prof. Ernest Mach, Austrian mathematical physicist and philosopher, more than fifty years ago.

By the employment of pure mathematics, Dr. von Neumann discovered that the pressure exerted by a projectile on its target is fully one-third greater when the projectile explodes at an oblique angle from the target rather than directly on it. Not only that, he worked out the mathematical formula for determining the size of the oblique angle for any given mass and velocity. The maximum angle for efficiency varies with different conditions.

Possibilities at Bikini

This means that the present type of atomic bomb, the Nagasaki, could be made to exert one-third more pressure if dropped from the proper oblique angle rather than straight down. At Bikini, for example, it would have done considerably more damage if it had been aimed to miss the target ship. However, the failure of the bomb to hit the Nevada was not by design and it missed the mark by too wide a margin .

While one group of scientists is devoting attention to the study of objects traveling at supersonic speeds, another is studying methods and devising instruments for detecting very faint sounds from a distance and for distinguishing their characteristics in order to determine their origin. One of these studies was reported by Dr. Edward F. Cox, also of the Naval Ordnance Laboratory.

Army-Navy Tests Reported

Pressure waves produced by charges detonated for Army-Navy Explosive Safety Board tests at Aroo, Idaho, in October were picked up at varying distances up to 282 miles by means of a new highly sensitive barometer, Dr. Cox reported.

One of the significant factors in these studies is the ability to distinguish abnormal from normal signals by the characteristic pattern of their microwaves. With further development, such instruments promise to make it possible to detect any experimentation with high explosives anywhere in the world.

For example, should any nation develop an atomic bomb and carry on test explosions, the microwave-detecting instruments would make such tests known to us no matter how much secrecy surrounded such tests.

Such a development promises to be of enormous value to us. No nation could then possess an atomic bomb without our knowing it, since it would have to test the bomb to make sure that it works, just as we had to do in New Mexico. Such knowledge would put us on our guard against any possible surprise attack.