

NEW YORK, SUNDAY, FEBRUARY 20, 1921.

THE BATTLESHIP VS. THE AIRPLANE

Tests May Result in Revolution of Armaments

Army Air Service Head Stirs Navy by Asserting Bombs From High Elevation Could Sink Any Capital Ship and by Urging the Building of Huge, Fast Carriers for Bombing Machines, Pursuit Planes, &c.--Wide Divergence in Reports of Two Services as to the Effect of Bombs on the Indiana---Congress Interested in Getting Facts, and Joint War Board Will Investigate

The diagrams in the accompanying layout are self-explanatory. The photograph below was taken after the bomb tests on the Indiana. It shows the second deck looking forward and X shows where a bomb exploded. Below is a broadside view of the Indiana after the tests.

New York Herald Bureau.
Washington, D. C., Feb. 19.

There may be some doubt as to the ability of an aviator to drop bombs on battleships, but there can be no disputing the fact that Brig-Gen. William Mitchell of the Army Air Service dropped a petard of no small dimensions into the most sedate and dignified naval circles when he told the Appropriations Committee of the House that any surface craft the navy has can be "damaged, destroyed or sunk" by aircraft.

Though Gen. Mitchell specifically stated that he had no idea of recommending that battleships be abandoned "at present," many naval officers take the attitude that his premises inevitably commit him to such a course, and they are opposing his contentions on that basis. Others see in the General's onslaught a desire to remove the naval air service from control of the Navy Department and consolidate all aviation in the United States in a single independent department headed by a Cabinet officer, and they are prepared to fight this proposal tooth and nail.

From Secretary Daniels down, the navy men poo-poo the statements of Gen. Mitchell, while the General smilingly answers all quips with the statement that his claims were made before a duly constituted Congressional committee and that he is ready to substantiate them whenever the navy sees fit to furnish ships for the demonstration.

Inasmuch as Secretary Daniels and Secretary Baker of the War Department have mutually agreed that experiments should be conducted jointly to demonstrate the value of aircraft in naval warfare, and the Joint Army and Navy Board has the matter under consideration, it would seem probable that Gen. Mitchell would eventually gain his opportunity.

Congress Asks That Ships Be Given for Experiments

A resolution has been introduced in Congress by Senator New directing the Navy Department to turn over certain old ships for experimental purposes. Secretary Daniels has suggested that the former German ship Ostfriesland, which must be sunk, might be used, and it also has been intimated that the radio controlled Iowa might be provided to permit ship movements which would help to simulate actual battle conditions. It has not been stated, however, whether the air service will be permitted to do the bombing, or whether, as in the past, the navy will confine such work to naval aviators.

"We have bombs," says Gen. Mitchell, "which we think are capable of demolishing or putting out of action at least not only all auxiliary ships but capital ships as well. With these same bombs, as distinguished from projectiles fired out of cannon, we have a greater percentage of hits over 20,000 yards than have cannon projectiles."

To which Secretary Daniels retorts: "We are not taking Admiral Mitchell's advice very seriously in the navy." And when asked if he would be willing to remain aboard a battleship while General Mitchell, who is a pilot, bombed it, the Secretary said:

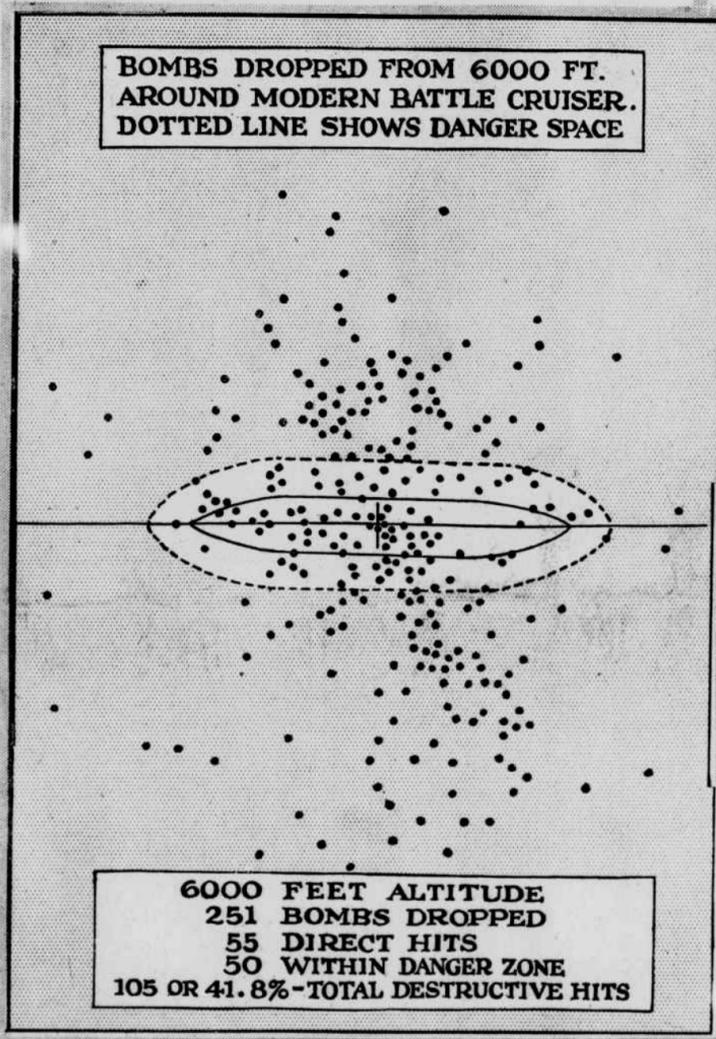
"If Admiral Mitchell doesn't handle bombs any more accurately than he handles facts, I should be perfectly willing to let him bomb me all day long."

The navy contention is, first, that it would be practically impossible for an airplane to drop a bomb on a modern battleship which was maneuvering at full speed and utilizing its anti-aircraft batteries and its own aircraft; and, second, that even if it should happen to be hit, the explosion would probably not be of sufficient force to incapacitate the ship.

Differ Widely About the Tests Made on the Old Indiana

Gen. Mitchell's position is that the speed of the target, far from being a hindrance to the aviator, really makes his task easier; that anti-aircraft guns are practically negligible as a factor in preventing attack by airplane; that the air service has pursuit planes which could easily defeat any planes which the navy now has; and that bombs can and are being constructed which could put the most modern battleship out of commission if not entirely demolish it.

A decided difference of opinion exists between the air service and the Navy De-



**6000 FEET ALTITUDE
251 BOMBS DROPPED
55 DIRECT HITS
50 WITHIN DANGER ZONE
105 OR 41.8% - TOTAL DESTRUCTIVE HITS**

partment as to the conclusions to be drawn from the bombing of the battleship Indiana, which took place under navy auspices in October of last year, though the results were not made public until Gen. Mitchell had drawn attention to the experiments in his testimony before a Congressional committee. Says the navy report:

In order to ascertain the damage resulting from bombs in the water, several bombs of different types were exploded at accurately measured distances from the vessel and at accurately measured depths. Careful records were made of the resulting pressures at different positions on the vessel's hull, and these records of pressure obtained with scientific accuracy will be used in preparing new designs of hull.

During these experiments hull plating on the vessel's quarter sprang a slight leak, and because the watertight doors of the vessel had been removed she started to fill with water and was towed into shoal water in a position that had been previously selected, to be used for some experimental gun practices.

No serious damage resulted from the under water bombing. It was not necessary to the success of the experiment and it was not intended that serious damage should result.

In order to ascertain the amount of damage that would result from a hit by an aerial bomb, bombs of different designs and weights of explosives were placed on different parts of the deck and exploded. Careful examinations were made of the damage resulting from each explosion and a record made for use in the study of future construction. In a general way it was found that the damage to material from aerial bombs was local, that personnel in unprotected positions within the blast area would be destroyed, that personnel in closed and armored turrets would probably not be incapacitated, and considering the probable effect of defensive gunfire against aircraft at the low altitude necessary in order to be accurate with heavy aerial bombs against a rapidly moving target at sea the entire experiment pointed to the improbability of a modern battleship being

either destroyed or completely put out of action by aerial bombs.

Air Service experts sent to watch the experiments and glean information for the War Department drew somewhat different conclusions.

They found that a 1,650 pound British demolition bomb, containing 900 pounds of amatol, or ammonium nitrate and TNT, was exploded between the two smokestacks of the Indiana; that this bomb completely demolished the superstructure and all the upper part of the ship between the two stacks; that it cut off one stack and lifted it up onto the next deck; made two long cracks in the 8-inch barbette and drove in one of the plates of the turret about 8 inches; that the heat was so intense as to fuse the metal in several places on the side of the barbette.

Would Break Electric Lights And Disrupt Communications

From the effects observed, they concluded that a 1,650 pound bomb of the type described, if exploded on the deck of a hostile battleship of the most modern type, would put the ship out of action; that the flames and gases generated would instantly kill all personnel on deck or in the fighting tops; all personnel in turrets, provided the openings were directed toward the explosion, and all personnel in the engine and firerooms.

The Air Service experts were unable to

determine from the single experiment whether a bomb of that size would penetrate the "citadel" or central part of the ship, which is covered with armor and contains such vital parts as the engines and boilers.

They decided, however, that direct hits on the deck and superstructure would break every electric light globe on the ship, throwing the vessel into absolute darkness below decks; disrupt telephone, radio, fire-control and other electrical apparatus; fill with deadly gases the firerooms, engine rooms and all other compartments ventilated by forced draft; cause shell shock to persons within a radius of 300 feet; disrupt ammunition hoists, jam turrets, kill all the gun crews and fire control parties; and cause fires to break out which would explode all ammunition on the upper decks.

From their observation of the effects of bombs detonated beneath the water, but within 60 feet of the vessel, they decided that if the blast occurred forward of the "bulge" or part of the ship which is fitted with longitudinal bulkheads, it would cause her to settle by the bow, decrease speed, steer badly and necessitate her falling out of formation.

If the explosion occurred aft of the "bulge," the after compartments would fill, causing the ship to settle by the stern, throwing the main propeller shafts out of line and stopping the engines almost im-

mediately. The rudder also probably would be jammed, they decided, and the ship would likely have to be towed.

If the explosion occurred abreast of the "bulge" it might sink the ship immediately, or falling that would certainly cause her to take a sharp list, making steering difficult and consequently making it next to impossible for her to keep in formation. If she stayed afloat, a marked change in elevation of the main battery guns would result and her accuracy of fire would be greatly decreased.

Armor Is Much Thinner And She Was Anchored

Replying to these contentions, naval officers point out that the Indiana was an obsolete battleship of much thinner armor than that borne by modern warcraft; that she was anchored, and that the bombs exploded on her deck were placed there. They assert that under actual war conditions the story would be vastly different.

A modern battleship has sixteen inches of steel armor on her sides and seven inches on her decks; that she would be maneuvering at a speed up to 23 knots an hour, and that all her anti-aircraft batteries would be blazing away at any airplane with temerity enough to approach her, is to be presupposed under wartime conditions, they say.

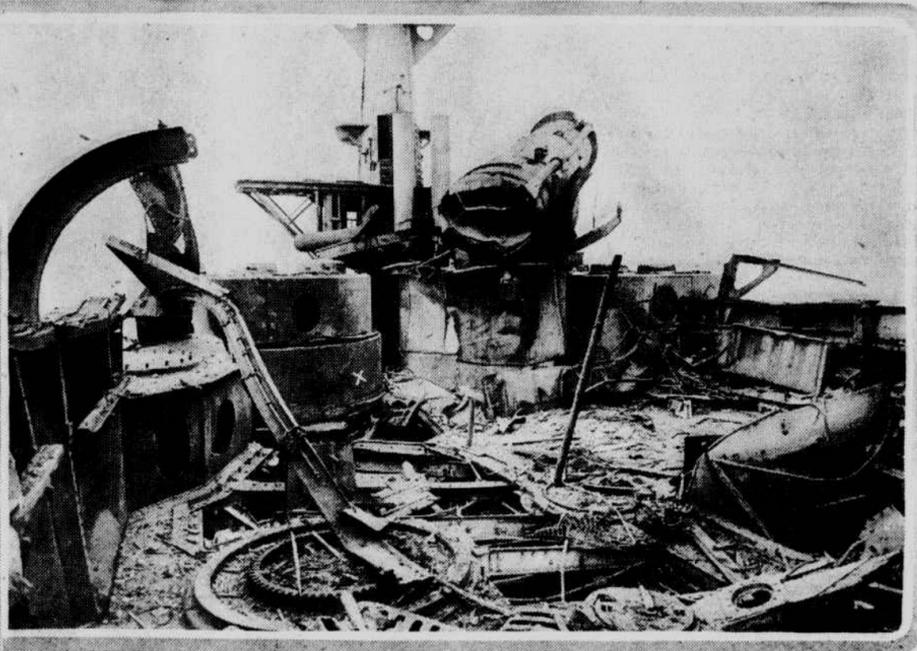
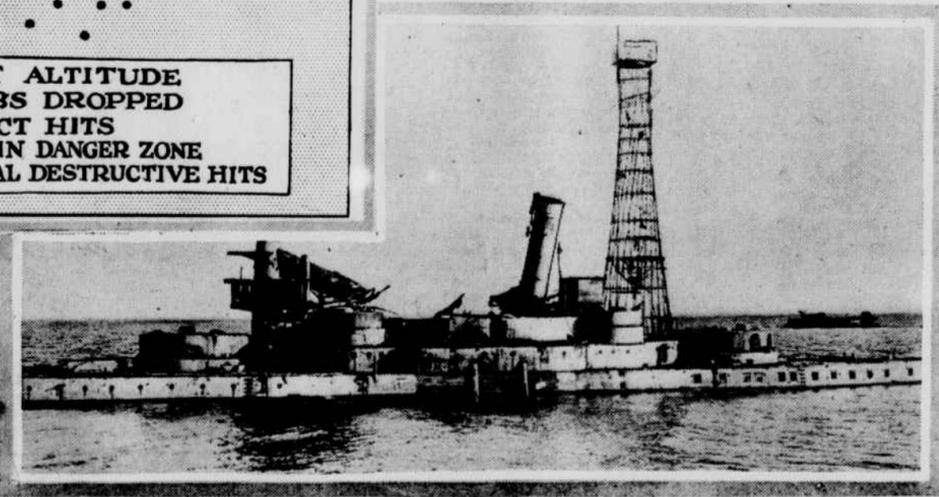


PHOTO BY U.S. ARMY AIR SERVICE

COMPARATIVE COST AND EFFICIENCY OF BOMBING PLANES OVER BATTLESHIPS

AIRPLANE CARRIER		BATTLESHIP		BOMBING PLANE	
1-HOUR FLIGHT = 120 MILES		INITIAL COST \$45,000,000.		INITIAL COST \$45,000	
1-HOUR FLIGHT = 120 MILES		SPEED 21 KNOTS (24 1/2 M)		SPEED 120 MILES	
1-HOUR FLIGHT = 120 MILES		PERCENTAGE OF HITS 15000 - YDS -- 11.2		PERCENTAGE OF HITS IN DANGER ZONE FROM 6000 FT. -- 41.8	
1-HOUR FLIGHT = 120 MILES		MAXIMUM RANGE 20 MILES		RADIUS OF OPERATION 300 MILES	
COST OF AIRPLANE CARRIER COMPLETE WITH SOBRN. or BOMBING PLANES, SHARES and SUPPLIES to MAINTAIN SQD. 100 HOURS FLYING \$8,000,000					



In answer to this, the adherents of General Mitchell say that a bomb dropped from a great height is much more effective than one placed on deck and exploded, because it would pierce the armor and explode inside; that only a beginning has been made in the construction of bombs and that there is practically no limit to their size and power. The use of the aircraft as a weapon of war is scarcely more than five years old, they argue.

No Limit to Size of Bombs-- Some Now Weigh 3,200 Pounds

Practically all its employment has been on the land and its bombs were designed for use against unarmored, even unfortified places. Nevertheless, the American Air Service now has bombs of 1,100 pounds, the French 2,350 and the British have recently developed bombs of 3,200 pounds. Such weapons, they assert, can be developed to cope with practically any armor that may be devised.

As for the speed of the warship, the speediest craft afloat would have no chance with an airplane, in their opinion. To illustrate their contention that a rapidly moving target is easier for an airplane to hit than one that is stationary, they use the example of a person endeavoring to pass from one automobile to another. If one machine is standing still and the other is moving at forty miles an hour it would be impossible for a person to make the transfer in safety. If both cars were running at practically the same speed and were abreast of each other, the feat would be much less difficult.

The idea that a ship might outmaneuver an airplane causes most of the Air Service men to laugh. They say any maneuver a warship might make would be cow-like compared with the quick turns of an airplane making 175 miles an hour.

Though Secretary Daniels admits the importance of aviation as a subsidiary factor in naval warfare, he is opposed to any attempt to deprecate the importance of the capital ship.

"The capital ship," he says, "is the lineal descendant of and development from the 'ship of the line' of a century ago. New types have arisen, as when the armorclad came into existence, but the battleship or its equivalent has always survived. There have always been those searching for something simpler, and more especially cheaper, and with the development of every new weapon enthusiasts have claimed that the

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