

AVIATION

# Modern High-Speed Bombers Show Very Bad Marksmanship

## Cause for Encouragement to Peaceful Peoples, Declares Military Student; Mud Still a Great Defensive Weapon

**P**OOR marksmanship by aerial bombers in the Spanish war "has given cause for more encouragement than discouragement to peaceful peoples," declares Capt. Liddell Hart, well-known student of military science. (*Army Ordnance*, Jan.-Feb.)

The very increase in speed that marks modern bombing planes is an important factor in their inability to hit the traditional "flock o' barns."

"Higher speed in the air has offset the improvement of bomb sights and diminished the accuracy of bombing, owing to the fact that the bomb has to be released before the aircraft is over its target," writes Capt. Hart. "As a result, it was found that targets less than 500 yards long and 150 yards broad rarely were hit.

"Attempts to destroy bridges or to put individual batteries out of action failed even when the attacking machines came down to heights of less than a thousand feet, while attacks on fortified positions only have taken effect where these were clearly defined and the bombing formations could operate undisturbed.

"It has been against large targets, such as towns, that the results have been most marked, although even in such cases the actual point hit within the area has been largely a matter of chance. Night bombing has proved more inac-

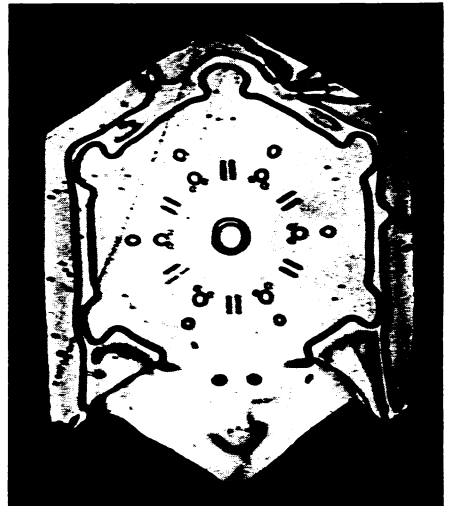
curate."

The real effectiveness of airplane attack, Capt. Hart feels, has been moral rather than material. When troops without adequate anti-aircraft defenses find themselves under consistent and heavy attack from the air, and especially when they see other airplanes going off to attack their home towns in the rear, they are apt to become disheartened and to offer poor resistance against infantry or tank assaults following up the enemy bombing.

The high speed of bombers and other aircraft has been their undoing in another way, under the hurly-burly of field conditions, Capt. Hart points out. The small size and rough surface of the average improvised landing field has proved fatal to planes with high landing speeds, producing many crashes.

And for all the improvements in tanks, and all the advances in other machines of war, one of the greatest enemies of the attack and friends of the defense, is old conservative General Mud. Whether infantrymen are wearily slogging forward on foot, or tanks are rattling ahead on their tractor treads, if they strike boggy going they might as well quit. If they stubbornly push on, presently they find themselves glued like flies on flypaper, immobilized into mere targets.

*Science News Letter, January 29, 1938*



DESIGN FOR A CLOCK FACE

*This pattern, that looks as though it might be an artist's sketch for a new, ultra-modern electric clock, actually is a photograph of a snow crystal, made by the late W. A. Bentley. One side, apparently damaged in some way, rebuilt itself, restoring the hexagonal symmetry but not the original pattern.*

MILITARY SCIENCE

## Nations Pile up Stocks Of Civilian Gas Masks

**E**UROPEAN nations are piling up stocks of gas masks for civilians and spending huge sums in the construction of gasproof shelters, reports Lt.-Col. Augustin M. Prentiss of the U. S. Army chemical warfare service.

England is engaged in manufacturing 30,000,000 gas masks, in an effort to provide protection for every person in the kingdom. France already has accumulated 8,000,000 for its active civilians, Germany has on hand 7,500,000, and Italy 5,000,000 for the same purpose.

Cost of gas shelters ranges from \$150 for a single room to \$100,000 for large communal shelters capable of accommodating several thousand persons. In France, plans have been drawn for the construction of fifty large gas shelters in the subways, at an estimated cost of \$5,000,000. Germany believes in a decentralized gas defense system, and it is claimed that more than half a million such small shelters have already been built. Similar construction is also under way in Japan.

According to Lt.-Col. Prentiss, civilians are classified into "active" and "passive" groups. The former, about ten per cent. of the total population, comprise policemen, firemen, decontamination squads, and others who must stay out even in

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the thickest of the gas attack to preserve order and clear out the gas after the raiders have flown away. The great "passive" bulk of the people can best meet a gas raid by taking shelter until it is over.

For the active civilians, elaborate gas-proof suits have been designed, together with military-type masks giving full protection. For the passive group, less elaborate and costly equipment, effective during short exposures only while they make for the gasproof shelters, is considered sufficient.

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## SEISMOLOGY

## Tenth of Earthquakes Occur at Great Depths

**D**EEP-FOCUS earthquakes, disturbances whose actual centers are scores or hundreds of miles underground, account for about ten per cent. of all recorded shocks. They release tremendous amounts of energy, yet seldom cause the death and destruction for which the more numerous surface earthquakes are responsible.

A summary study of deep-focus earthquakes has recently been made by Drs. Andrew Leith, of the University of Wisconsin, and J. A. Sharpe, of the Los Angeles laboratory of the Western Geophysical Company. They are convinced that except for factors introduced by the great depths themselves, there is no essential difference between the deep and the shallow earthquakes.

Both types occur in the same general regions of the earth—one a great horse-shoe-shaped zone roughly arching about the Pacific, the other stretching in a long line from Portugal to Formosa. Both types vary greatly in amount of energy released. Due largely to their great depths, the deep class of earthquakes have surface results more widespread and diffuse, hence less destructive, than the shallow-focus disturbances.

Deep-focus earthquakes may occur at all depths from 100 kilometers beneath the surface to 700 kilometers—the greatest depth for any earthquake thus far on record.

Where the vast stresses needed to power such earthquakes come from is still pretty much of a riddle. Cycles of deep earthquakes have been correlated with the forces resulting from the moon's movements and other outside factors, but the stresses involved in these are so small that their action is undoubtedly that of triggers rather than of main cause.

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## ARCHAEOLOGY

# Unearth Six Centuries of Painting in Antioch Floors

**A** COMPLETE history of painting from the first to the sixth centuries after Christ has been discovered through excavation of a unique series of mosaic floors in houses in Antioch, Syria, it was announced at the annual meeting of the Archaeological Institute of America at Philadelphia, by Dr. F. O. Waage of the Department of Classics of Cornell University.

Dr. Waage exhibited for the first time photographs of the remarkable mosaics which were copies of long since destroyed paintings of early masters. Executed with remarkable craftsmanship, the mosaics retain the original color effects of the variegated bits of limestone, terra cotta and glass which were used in their design.

Found by natives during the fall and winter and cleared and lifted by the expedition, several mosaic floors in the suburb of Antioch called Daphne are unusually important. One is a well-preserved panel of Narcissus, probably third century, and a striking panel of a striding lion set in an immense field of patterned flowerets, of the fifth century.

Another mosaic realistically shows the courses of a Roman banquet. One panel contains artichokes, pigs feet, eggs in egg cups and bottles of wine.

Supported by the Worcester, Fogg, Baltimore, and Louvre, Paris, Museums and Princeton University, excavations have been carried on at Antioch during the past spring and summer and will be continued next year.

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## ISSUED

December, 1937

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per, muleteer, speculator, and lawyer before he was thirty, such was his versatility.

He killed Indians relentlessly when menaced; yet he considered creation of an Indian empire to halt encroachment of white settlers on the "rightful owners" of the land. He never hesitated to pistol, club, or butt anyone who crossed him; yet the Governor of California singled him out to suppress the Vigilante rioters of 1856. He stood armed to fight Abolitionists and believed ardently in State rights; yet his privately-raised regiment is credited with saving the Union at Gettysburg and in the Seven Days Battles.

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