PHYSICS

Superposed Sound Waves

Two "bangs" in succession are sometimes heard by spectators along the approach path of an aircraft that breaks through the sonic barrier.

➤ THE TWO distinct "bangs" heard by ground spectators at the recent Farnborough airshow when an approaching airplane broke the so-called sonic barrier have awakened much interest relative to the cause, and several possible explanations have been offered by aviation authorities.

The bangs, explosive sounds like that of gunfire, were heard when a de Havilland 110 achieved a speed faster than that of sound. In one test it achieved supersonic speed by diving from a height of over two miles. The following day the same plane attempted to exceed the speed of sound in a low-altitude flight but disintegrated in the air, bringing death to its two crew members and to over a score of spectators struck by flying debris.

The phenomenon of two explosive sounds in succession sometimes heard on the ground by persons along the approach path when an aircraft in the vicinity breaks the sonic barrier is not new to scientists. It is, however, new to the public because few public exhibitions of such speedy flights have been held. The two bangs heard at Farnborough were less than a second apart, but each was distinct. Spectators said that they were as powerful as the backlash of a light artillery piece.

In a recent issue of *Nature* (Nov. 8), T. Gold of Trinity College, Cambridge, offers one explanation. In *Flight* (Oct. 3), a British aeronautical weekly, A. H. Yates of the College of Aeronautics, Cranfield, outlines two possible explanations. Both are technical discussions but the two aeronautic experts seem to agree that the explosive effect comes when two separate sets of sound waves reach the ear of the observer at the same time, one superimposed on the other.

When an airplane is traveling at ordinary speeds, the noise made by it and its engines travels in sound waves away from it in all directions. When it travels at the speed of sound, the noise emitted travels for a few moments along with it. But when it travels faster than sound, the noise, that is, the sound waves, is left behind.

The first bang received from the diving aircraft, according to Mr. Yates, is from around the height at which the dive slows to subsonic speeds. The rate at which the sound is received is very large, and produces the bang.

Immediately afterwards the sound emitted during the supersonic period follows, arriving at the same time as that emitted at lower altitudes. Then follows a bang produced when the aircraft first became supersonic. This energy, emitted at great altitude and left behind by the diving plane, arrives a fraction of a second behind the first bang.

The bangs originate when the plane passes from a subsonic to a supersonic speed, and again when decreasing from the supersonic to the subsonic. The second bang is heard first by ground observers ahead of the plane because it has less distance to travel.

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SURGERY

Removing Brain Cells May Cure Epilepsy

➤ HOPE THAT cerebral palsy, epilepsy and other brain ills may some day be cured by surgical removal of the abnormal brain cells so that their functions may be taken over by nearby healthy cells was seen in experiments reported in New York.

The research, conducted by Dr. Robert W. Doty of the University of Utah, was reported to the Fourth Symposium on Cerebral Palsy at the New York Academy of Medicine.

Sections of the visual centers of the brains of cats were removed and then by use of visual exercises, Dr. Doty determined how fast the brain reorganized and new cells learned the duties of those that were lost.

Youth was an aid to recovery, Dr. Doty found. Adult cats required the most time to get back their normal vision. And they needed the most help in retraining. Best results were obtained with kittens operated on within 24 hours after birth.

Dr. Doty hopes that some day it may be possible to operate early in life in the cases of brain disease or brain injury. This may prevent the spread of the abnormality to healthy cells and may make it possible for nearby cells to take over the functions of the missing brain tissue at a time when this most readily takes place.

Science News Letter, November 29, 1952

OPERATIONS RESEARCH

People Talk Louder Phoning Long Distance

➤ THE LONGER the distance over which you are making a long distance telephone call, the louder you talk.

Dr. V. Subrizi of the Bell Telephone Laboratories, New York, told the first national meeting of the Operations Research Society of America in Washington that he had found that "speech volumes increase about one and a half decibels for every 1,000 air miles" added to the length of the telephone connection.

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