



Federal Aviation Agency

**SUPERSONIC AIRLINER**—Preliminary drawings for a supersonic airliner have been submitted to the Federal Aviation Agency. From top to bottom, above, are the designs of North American Aviation, Boeing and Lockheed. By May 1 the FAA will pick one or two of the companies to draw up more detailed designs. A supersonic plane traveling 1,980 miles per hour, which is about three times the speed of sound at 35,000 feet, would take only two hours 15 minutes to fly from Los Angeles to New York.

## MILITARY SCIENCE

## Latest Nuclear Weapons

➤ **THE LATEST WORD** in nuclear weapons is more bang with less weight.

This achievement resulted from 34 test blasts exploded during 1962, the Atomic Energy Commission reported to Congress in its annual accounting of activities for 1963. The test series, called Operation Dominic, lasted from April 25 to Nov. 4 1962.

However, the AEC report for 1963 contains the first overall evaluation of results to be made public. The tests were of four kinds:

1. **WEAPONS DEVELOPMENT.** Although the tests did not include any nuclear devices of very high yields, they did show the designs would combine "relatively low weights and high yields."

Furthermore, the fission reaction contributed only a small percentage to the total bang, thus greatly reducing radioactive fallout.

2. **VERIFICATION TESTS.** Another valuable result of the Dominic series was in checking on the reliability of nuclear bombs and warheads manufactured during the three

years between 1958 and 1961 when the U.S. did not conduct tests. Each nuclear weapon so tested "functioned satisfactorily."

3. **EFFECTS TESTS.** These were aimed at studying what nuclear explosions will do to military equipment and to communications. The ability of intercontinental missile systems, early warning systems, and command and control systems to operate after a nuclear blast was investigated.

Both the AEC and the Defense Department said no further information concerning specific results of these tests could be made public now.

However, the AEC report stated that the tests "provided a great amount of information that is expected to result in substantial improvements to the military defense of the U.S."

4. **SYSTEMS TESTS.** The performance of two complete nuclear weapons systems was investigated. A Polaris missile was fired from a nuclear submarine under the Pacific Ocean and exploded over the intended target with the predicted yield. An anti-

submarine rocket, or ASROC, was fired from a combat vessel and the nuclear warhead detonated underwater at the target with expected yield.

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## GEOPHYSICS

## Earth's Early Heat Found Higher Than Now

➤ **HEAT** from radioactive elements during earth's early history was four to eight times higher than it is now.

The heating resulted from the radioactive breakup of uranium, thorium and potassium.

However, half of all the potassium present released its heat in about one-fourth of the earth's lifetime of five billion years. Because of this, potassium contributed to earth's heating at a much greater rate four and a half billion years ago than it does now.

Uranium and thorium, on the other hand, have released their heat more evenly during earth's history.

The comparison of how much heat these three elements contribute to earth's warmth was reported in *Science*, 143:465, 1964.

The calculations were made by Drs. G. J. Wasserburg and William A. Fowler of California Institute of Technology, Pasadena, Gordon J. F. MacDonald of the University of California's Institute of Geophysics and Planetary Physics, Los Angeles, and Dr. Fred Hoyle of Cambridge University, Cambridge, England.

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## Nature Note

### Barracudas

➤ A **VICIOUS**, malicious fish that will attack almost any living thing including human beings is the barracuda, sometimes called the "tiger of the sea."

This predatory killer will cold-bloodedly stalk his prey in the shadow of a reef, before striking with lightning speed. Barracudas, some as long as eight feet, will "herd" a school of smaller fish through the water until hungry again.

Because the barracuda viciously strikes at anything that moves, he is particularly vulnerable to the sport fishermen's hook.

His fearless and inquisitive nature makes him unafraid of swimmers, and with one swipe of his strong jaws, he can amputate a man's arm.

His teeth are pointed and razor-sharp with fangs at the front tips of his jaws. The lower jaw projects out a little beyond the upper one.

In the United States, the Great Barracuda, *Sphyræna barracuda*, ranges in the tropical Atlantic, sometimes traveling as far north as Cape Cod. This is considered to be the most dangerous of the barracudas, as far as men are concerned. The Pacific barracuda, *Sphyræna argentea*, and the northern barracuda, *Sphyræna borealis*, are smaller and harmless to man.

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