



**WITH THE SPEED OF SOUND**—This swordfish-like plane with its narrow sleek body and long lance-like pointed nose is the Navy Skyrocket. This winged V-2 has rocket power supplementing jet engine propulsion. It is a sister ship to the Skystreak which holds the world's official speed record.

AERONAUTICS

## To Keep Pace with Sound

Rocket and jet powered, the Navy's Skyrocket is expected to fly at approximately 760 miles an hour, 100 miles faster than its sister ship the Skystreak.

► **ROCKET** power, supplementing jet engine propulsion, features the new Navy transonic Skyrocket plane revealed in El Segundo, Calif. It is a sister ship of the turbo-engined Douglas Skystreak, which now holds the world's official speed record of 650.8 miles an hour.

The new plane, dubbed a winged V-2, is designed to better this record by perhaps 100 miles, approaching the speed of sound, which is approximately 760 miles an hour at sealevel. It is a research craft, to gather information relative to problems encountered at those speeds.

The Skyrocket in appearance resembles a swordfish, with its narrow sleek body and long lance-like pointed nose. It is powered with a Westinghouse turbo-jet engine and with a rocket engine built by Reaction Motors, Inc. It can take off and cruise at high speeds with its ordinary jet propulsion, then sweep to higher speeds when the rocket engine is turned on. It is the first man-carrying flight machine to utilize a combination of jet

and rocket energy.

To be known as the D-558-2 by the Navy, the new plane is radically different in appearance from the D-558 Skystreak, because of its needle-like nose, its slimly tapered fuselage resembling a winged V-2 rocket, and its stubby swept-back wings which give a total wingspan of only 25 feet. The body of the plane is about 45 feet long. The pilot's enclosure is entirely within the fuselage, with no "bubble" to increase air drag.

Built to withstand the extreme strains at the speed of sound, the body of the new plane is made chiefly of magnesium alloy. Wing and tail faces are largely the tough aluminum alloy known as 75s.

The Skyrocket is a joint undertaking of the Navy, National Advisory Committee for Aeronautics, and Douglas Aircraft. It will undergo a test-flight program at the Air Force Test Center, Muroc Dry Lake, Calif., and then be turned over by the Navy to the NACA.

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ASTRONOMY

## Galaxies Are Scattering Away from Each Other

► **THE** hundred-billion-odd galaxies, systems of stars like the Milky Way system of which the earth is a part, are flying away from each other so rapidly that eventually they may become lost in space. Cosmic repulsion or "negative gravitation" has set in so that clusters of billions of stars are scattering away from each other.

But the average density of matter throughout our planetary system and even throughout our galaxy, where stars are separated from each other by millions of light years, is so high that the tendency to scatter is overcome by the great gravitational forces involved. This view is stated by Dr. Harlow Shapley, director of Harvard Observatory, in the annual report of the Smithsonian Institution.

Even in a cluster of galaxies like the one in our vicinity—a cluster which includes our Milky Way galaxy, the Andromeda nebula and its companions, the Magellanic Clouds and half-a-dozen others—gravitation still controls the situation, Dr. Shapley states. Our cluster of galaxies is not dissolving under cosmic repulsion—at least not with marked rapidity. The cohesion that maintain our cluster apparently operates in a number of other close associations of galaxies. Their mean density is high enough for gravitational control.

But throughout the universe in general the mean density is perhaps only one-hundredth of that within the cluster of galaxies. It is too low for gravitation any longer to maintain the situation. The expansion that has set in under the repulsive force will still further lower the mean density. It therefore appears that we—the metagalaxy—are doomed to infinite dissipation.

At the same time that the earth is expanding, the heat of the stars is going out into cold space. The universe is steadily approaching a heat-death—a cold near absolute zero in an empty world.

We cannot be sure that the reverse building-up processes are not going on in some parts of the universe, Dr. Shapley points out. We see less than one percent of it. There is, however, no substantial evidence or argument for the cyclic restoration of heat and density. And some cosmogonists are bold enough to abstain from wishful thinking.

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