

## ROCKETS AND MISSILES

# Outdo Reds in 18 Months

► THE UNITED STATES can outmatch the Russians in heavy weight-lifting in space in 18 months, Harold Richey, president of the American Rocket Society, reported in Washington, D. C.

A contract study by the National Aeronautics and Space Administration shows this country could have a 21,000,000-pound thrust in a cluster of seven solid-fuel rockets ready to shoot in three years, he claimed. And, if in a hurry, the time could be cut in half, declared Mr. Richey, who also is director of the Ogden Rocket Operations Center of the Thiokol Chemical Corporation of Ogden, Utah. The cost would be about \$5,000,000 to \$10,000,000.

The rocket that shot the 7.1 ton Sputnik into orbit Feb. 3 and the one that sent the Russians' Venus vehicle on its way is estimated to have had 800,000 pounds of thrust.

The earliest estimate for the development of Saturn, a three-stage rocket engine powered by liquid fuel capable of 1,550,000 pounds of thrust, is 1965, Dr. Hugh Dryden, deputy director of NASA, told the House

Committee on Science and Astronautics. More than \$200,000,000 has been spent on Project Saturn to date, he said.

Dr. Dryden told the Committee that he believed solid fuel propulsion had a "great future," but that it was not yet as reliable as required for space launch. Solid fuel burns too fast to allow the time needed for maximum thrust. He did not favor replacing Saturn with a solid fuel rocket engine.

The space official foresaw a space gap of four to five years, but insisted this was limited solely to booster capacity. For scientific achievements in meteorology, communications and other areas, the U. S. holds the lead, he said. This scientific knowledge has been made available to the rest of the world.

Knowledge from Soviet probes has been "sketchy," he said. But whether this was due to a refusal to tell what has been discovered or whether there was nothing much to tell, Dr. Dryden could not say.

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## SOCIOLOGY

# Incompetence Favored

► A TOTALITARIAN system of government, such as the USSR, tends to promote to high positions a large number of persons of little competence and loyalty to the currently ruling party.

Drs. Karl W. Deutsch and William G. Madow of Yale University and Stanford Research Institute said these are the persons who change sides in each of the crucial political purges and survive them in accordance with the laws of probability.

In a totalitarian society, the sides a bureaucrat takes in a purge, either the winning or the losing, may be of much greater importance to his life and reputation than any decisions he may make on technical matters in his field.

If a government or a large private organization should come to be characterized by a succession of spectacular emergencies and if their bureaucrats should come to be judged mainly in terms of their

performance in meeting them, the effects might be somewhat similar to those of a succession of major political purges.

In both cases a small sequence of important decisions will become decisive for personnel selection and promotion.

A related consideration would hold true for the reputation of large bureaucratic organizations dealing with the general public. The larger the number of decision-making bureaucrats in such an organization and the fewer the number of decisions to which the public pays attention, the easier it would be for the organization to impress the public with the wisdom of its high-level personnel.

The researchers report in a forthcoming issue of Behavioral Science that probability showed the selection and promotion of high-level personnel in large organizations may be seriously affected by supposed "wise men," if the number of men seeking to be decision makers is large while the number of important decisions is small.

Every major country has several hundred generals in its armed forces, yet each might have to make only half a dozen really important decisions in the course of his career. This way several so-called "military geniuses" may be produced by chance and be put into important positions without really being more able than other men to whom they are preferred.

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## TECHNOLOGY

# Electrical Explosions Used to Shape Metals

► UNDERWATER ELECTRICAL explosions are used in a new process to mold hard-to-form metals such as titanium, stainless steel and tungsten.

The new process, described as "capacitor discharge electro-spark forming," is under development at General Electric Company's General Engineering Laboratory, Schenectady, N. Y. It makes possible the saving of millions of dollars a year in the working of these difficult metals.

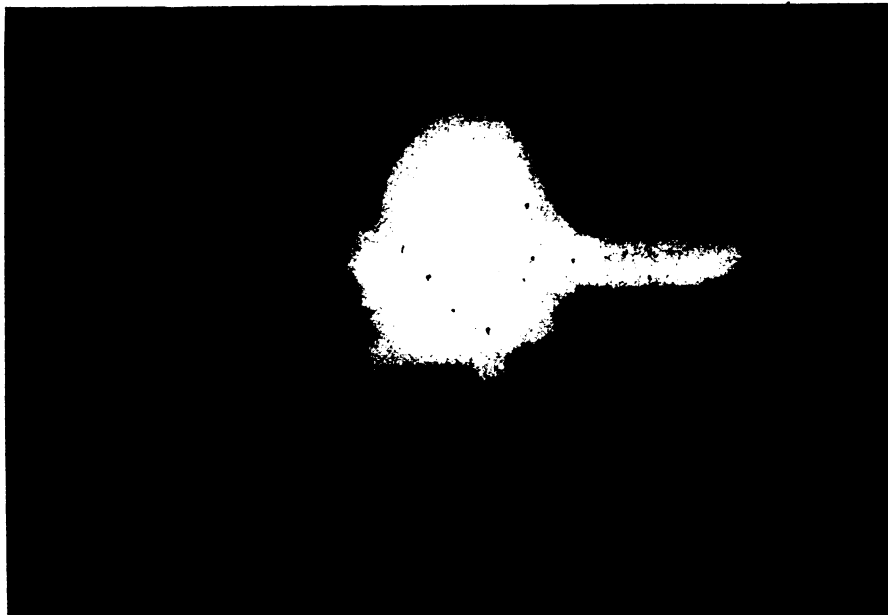
In the process the metal to be shaped is placed in a die underwater. A build-up of electrical energy produces an explosion that directs high-intensity shock waves against the metal to be formed. The impact of the shock wave causes the metal to take the shape of the die immediately. Removal of air from the die is necessary to prevent irregularities on the metal's surface.

The need for TNT, dynamite or other chemical explosives in forming the metals is eliminated by the process. Electrical potentials up to 35,000 volts are used now, but eventually 100,000 volts or more will be used.

Manufacturing aircraft and missile parts will be greatly simplified by this process. Metals thus far successfully shaped include niobium (or columbium), molybdenum and certain beryllium alloys in addition to titanium, tungsten and stainless steel.

The fact that the forming is done at room temperature without preheating is a considerable advantage.

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**METAL PIECES FORMED BY ELECTRO-SPARK METHOD**