

# Development of Nuclear Rocket Seen Necessary for Race To Solar System

Editor's note: It has been charged that the United States is moving too slowly toward development of a nuclear rocket - that it may lose the race to the planets in its pre-occupation with reaching the moon. The following dispatch by a UPI space expert explores the situation.

By JOSEPH L. MYLER

Washington - (UPI) - Space experts agree that only the atom's fantastic energy can put men on Mars or fly them around the more distant planets of the solar system.

But after eight years of research and development, and an expenditure of \$400 million, a reliable nuclear rocket is not yet a certainty.

A few years ago optimists were predicting that a nuclear rocket would be tested in flight as early as 1965. A far more realistic guess now is 1968.

If that first flight turns out to be an unqualified success, it still will take at least two years more of intensive testing before anyone can say the rocket is dependable enough and safe enough to transport human beings on missions deep in hostile space.

At the present rate of progress, by the time nuclear rockets are proven and available the first men should long since have landed on the moon.

By that time, however, the United States may have decided to explore Mars. Boosters of atomic energy profess certainty that it will be broken to space harness and ready for the mission.

Under Review

At the moment, the nuclear rocket development schedule is being reviewed while experts study what happened in the most recent firing of a flightless prototype engine at the atomic proving ground in Nevada.

Six experimental rocket reactors have been ground-tested so far, and project managers expect to "consume" 30 to 40 more before a flight test is attempted. When the seventh firing will take place, however, has not been decided.

There are those who believe atom-powered rocket stages might have become available - if only more money and effort had been committed - for the Apollo program to land men on the moon before 1970.

But when the space race began, the only rockets available either to Russia or the United States were chemical-fueled. So both countries based their programs so far on the chemical rocket technology, which was a legacy of World War II.

Cannot Wait

When the United States decided to make a lunar landing the main space business of the 1960s, officials concluded they could meet the schedule only with chemical rockets. They couldn't wait, they figured, until a brand new atomic rocket technology was perfected.

Why should they have to wait? Atomic energy obviously is far greater, pound for pound, than that extractable from the best chemical fuels.

One pound of fissionable uranium, for example, contains 10 million times the energy in a pound of gasoline. And the concept of a nuclear reactor is fairly simple. You merely heat a propellant, hydrogen, in a reactor core and expel it through a nozzle.

But the atom is by nature intractable, and dangerous.

It would take a 10-million-pound all-chemical rocket system to send an exploring party to Mars. Substitution of a nuclear stage would cut the weight to one million pounds.

Such a saving in just one Mars mission, the experts say, would more than repay all

## Poor Cooking Can Lead To Overweight

New York - (UPI) - The man who sizes up his girth and says "my wife feeds me too well" is in for a surprise.

Obesity clinics operated by New York City's health department have found that poor cooking can lead to overweight, and good cooking maintains the proper weight level.

When the basic meals do not satisfy the natural desire for eating pleasure, the tendency is to consume highly caloric sweet treats, the department said.

The clinics consider good food preparation so important to proper weight control that they train mothers of obese children to become better cooks.

The trick, it is one to weight control, is to cook delicate food that gives complete flavor satisfaction with every meal and still keep away from every unnecessary calorie.

Employment in the Los Angeles metropolitan area increased 45 per cent in the last decade, according to the Los Angeles Chamber of Commerce.

the cost of developing and producing the nuclear rocket. Problems Formidable

So why not barge ahead with an all-out crash program to make a nuclear rocket? The engineering difficulties are, as the project managers say, formidable. What's wanted at the outset is a compact reactor generating temperatures at least twice those asked of any ground-based or ocean-going atomic plant.

What's wanted are fuel core and other materials that can stand temperature extremes ranging from about

430 degrees below zero Fahrenheit, the temperature of the liquid hydrogen propellant, to 4,000 to 6,000 degrees above zero, the temperature of the reactor core.

What's wanted are rocket parts - valves, bearings, nozzles, control instruments, guidance equipment - that can operate not merely in such temperatures but in the presence of radiation levels comparable to those created by an atomic bomb.

All these things - the right materials, the right components, the necessary structural

strength - must add up to a rocket that can go from zero to full power in a matter of seconds, shut down and coast a while, and then restart in the near vacuum of space.

As one authority said, practically everything ever undertaken in the space program starts out looking impossible. The nuclear rocket looked even more impossible than some other projects. But the scientists and engineers are not dismayed. They have encountered no difficulties yet which convinced them the job cannot be done.

### Books Donated for Overseas Shipment

Kansas City, Mo. - (UPI) - Over 7,000 unused books have been donated to People-to-People by Maxwell Greffen of Books Abridged, Inc., New York City. The publications will be distributed overseas by the international friendship organization.

The hardback books, which include autobiographies, biographies, contemporary novels, classics and documentaries, constitute the largest single gift presented People-

to-People since its reorganization in November, 1961.

The gift resulted from former President Dwight D. Eisenhower's article "How You Can Make A Better World" which appeared in a national magazine last summer.

Persons working at home constituted 7.2 per cent (4.7 million) of the total work force (64.7 million) of the United States at the time of the 1960 census.

## More Americans Attend Concerts Than Ball Games

Menlo Park, Calif. - (UPI) - The American is not as backward culturally as he's painted by some critics.

Arnold Mitchell, Stanford Research Institute economist, cites statistics to prove the point.

In a recent study, Mitchell reported that twice as many Americans attend concerts and recitals as see major league ball games and that there are more theatergoers than boaters, skiers, golfers and skindivers combined.

Mitchell reported to the Institute's associate companies that 120 million Americans attend cultural events annually and as many as 30 million are active amateur artists of one

sort of another.

"I find it somehow quaint," he said, "that more servicemen visiting New York go to the Museum of Modern Art than to any other attraction, except the Empire State building."

Mitchell found the market for "the arts" currently runs around \$2.5 billion a year and predicted the trend will create a total arts market of about \$7 billion by 1970.

Mitchell believes the urge to express personal creativity is a major factor in the trend toward the "arts" and thinks this urge will increase as a means of attaining both social and personal satisfaction.

reflects the U.S. consumer's growing disenchantment with mass-produced goods as status symbols.

Individually, Mitchell found the outlay for culture rose by well over 100 per cent between 1953 and 1960 - twice as fast as spending on all recreation.

Mitchell estimated that among those 50 million Americans who participate in amateur art activities the ones who play musical instruments are the most numerous, about 32 million. He also found there were about 15 million Sunday painters, sketchers or sculptors, a million "art" photographers and a half million amateur actors.

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