

## MISSILES AND ROCKETS

**H-Bomb Fusion Power May Drive 1983's Rocket**

► THE REACTION of the hydrogen bomb may drive rockets deep into space in 25 years, a space expert reported to the Institute of the Aeronautical Sciences meeting in New York.

Dr. Thomas F. Dixon, chief engineer of the Rocketdyne division of North American Aviation, Inc., said future interplanetary exploration will demand propulsion systems capable of squeezing more power from modest amounts of fuel.

This makes a thermonuclear engine, using the fusion principle of the H-bomb, highly attractive. He said the thermonuclear engine may be in early development stages in about 25 years if controlled fusion is realized in the near future.

Several approaches can be made to thermonuclear propulsion, he said. In the "plasma system," shock waves could be used to excite deuterium or tritium to its ionization potential. Such an engine could be self-operative and would require minimum electromagnetic energy from without. This is because the useful power would reside in the charged particles contained in the magnetic field.

Another possible system could be one in which a pseudo-neutral gas plasma would be created at temperatures between 20,000 and 50,000 degrees Fahrenheit. Here, flow would be caused by momentum possessed by the plasma. A system of this sort would be desirable if a very lightweight powerplant could be produced for generating high electrical currents and/or voltages.

In the "push-pull" system, fission plasma is made critical in a pulsating fashion so that high temperatures and pressures are generated for short durations. While tolerable average temperatures and pressures are maintained, energy is generated for heating a secondary propellant gas.

Too little is known of the problems involved with the development of these systems, said Dr. Dixon, to make their development more than speculative. However, he said, in 25 years all of these things, plus advances undreamed of, will have come to pass.

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## ACOUSTICS

**Increasing Noise Threat To Life, Says Physicist**

► ALTHOUGH noise has distressed the human race throughout history, the increasing decibels of modern civilization may actually threaten life, in the opinion of Dr. Vern O. Knudsen, professor of physics at the University of California at Los Angeles and a leading acoustical expert.

"Even the ancient Romans railed against the donkey-drawn carts rumbling to market over cobbled roads," he said. "But while the Roman urbanite only lost his early morning sleep, today's noise level also frays man's nerves, impairs his hearing, and may even prove fatal in the future."

"During the past 30 years, the loudest noises to which man is exposed have increased from about 120 to 150 decibels, an average increase of one decibel a year," Dr. Knudsen said.

"A level of 160 decibels is lethal for many animals. Furry mice and rats exposed to such intense sounds perish from the resulting rise of body temperature. And with the advent of the jet age, we face another noise nuisance, the sonic booms of airplanes."

Future home design must fight the noise danger through sound-insulation measures, installation of quieter motors, fans, and electromechanical generators, and control of reverberation and room resonance, Dr. Knudsen said.

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## AERO-MEDICINE

**100 Top Scientists Attack Man-In-Space Problems**

► ONE HUNDRED of America's top scientists are about to consider how man can take to space and live.

A new committee will investigate such problems as:

How men can exist on Mars once space vehicles get there.

How a little biological world can be created in a space capsule, maintaining human life safely.

How spacemen will react to long journeys during which they will be subject to great psychological stress and deprived of sight and hearing.

How poison wastes that humans generate can be used or disposed of in space.

How radiation in space will affect spacemen.

The new group is known as the Armed Forces-National Research Council Committee on Bio-Astronautics.

Formed at the request of the Air Force, Army and Navy, and given equal financial support by each of the services, the committee will cooperate with other related governmental space-biology committees to minimize duplication of research, exchange information, establish liaison between investigators with allied interests, analyze the total situation and serve periodically as a scientific forum.

Dr. Sam F. Seeley, acting executive secretary, said that 66 members have already been chosen. An executive council, functioning since last November, consists of one representative from each armed service, six scientists appointed by Dr. Detlev W. Bronk, president of the National Academy of Sciences-National Research Council, and three ex-officio members.

The committee's interests are to be far broader than merely the effects on man of space flight. They will include coordinating development of miniature instruments for recording man's reaction to space flight, measuring stresses of acceleration and weightlessness on man, stating concretely problems that need to be solved but which have received little attention, and collecting a specialized scientific library in the field of bio-astronautics.

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**IN SCIEN**

## MEDICINE

**Tranquilizers Pacify Patient and Doctor**

► USING tranquilizers can lull doctors, patients and parents into a false sense of security.

The effects of tranquilizers can mask underlying difficulties and create an atmosphere of complacency, Dr. Reginald S. Lourie, director of psychiatric service at Children's Hospital, Washington, said.

If such symptoms as vomiting are controlled by these drugs, the tendency is to assume that the patient is improving, Dr. Lourie told scientists attending a meeting sponsored by the U. S. Public Health Service's National Institute of Mental Health.

The group is formulating research approaches in studying the effects of tranquilizers and other drugs in psychiatric therapy.

Pinpointing some of the problems of using tranquilizers on children, Dr. Lourie said the effects of such drugs on nervous systems not fully developed are still unknown.

"What happens to those functions of life that have elements of frustration in them which lead to formation of defenses on an adequate basis? How can an organism learn how to deal with anxiety if it is spared the anxiety on top of which it can learn?" he asked.

A study based upon the use of tranquilizers on children in one hospital showed they were employed mainly to reduce or control physical symptoms, such as vomiting, and with restless, colicky babies. They have also been employed in sleep problems, bed-wetting and brain damaged children.

Tranquilizers have also been given to children before dental procedures and surgery such as tonsillectomies.

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## VETERINARY MEDICINE

**Cats Get Head Colds, Too But Not Human Variety**

► IF A CAT sneezes, it may have pneumonitis, the feline equivalent of the common head cold in humans, reports Dr. Robert Kirk, veterinary professor at Cornell University, Ithaca, N. Y.

"A cat with pneumonitis will act very much like a human with a head cold," Dr. Kirk told a group of Wisconsin veterinarians in Milwaukee.

"It will sneeze, lose its appetite and drool excessively. And like the head cold, pneumonitis is not in itself dangerous, but if untreated may result in serious secondary infections."

Dr. Kirk said pneumonitis is a virus disease, contagious among cats, but non-transmittable to humans.

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# E FIELDS

## ENGINEERING

### Hydraulic Jet Mining Applicable to Coal Mining

► HYDRAULIC JET mining has a definite application in the coal industry, and coal pipelines may become more popular as rail rates increase.

This was reported to a meeting of the Society of Mining Engineers of the American Institute of Mining, Metallurgical and Petroleum Engineers in San Francisco, by John H. Baker of American Gilsonite Co., Salt Lake City.

Hydraulic mining is not a cure-all, he said, and there are probably many instances where it would not work at all.

Jet cutting methods in the United States, said Mr. Baker, are based on using small quantities of high pressure water to fracture and dislodge the ore, and then low pressure water to fume or convey the ore. The jet nozzle is kept as close to the face as possible because there is a definite loss in efficiency as the distance between the working face and the nozzle increases.

Fracturing, bedding planes and cleavage faces are much more important than hardness of the material in the proper breaking of the ore, he said.

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## PUBLIC HEALTH

### Influenza Hunt Is on At U. S. Ports of Entry

► THE OUTBREAK of influenza in Europe could be spread to this country by persons traveling from that continent to the U. S.

Influenza cannot be turned back at ports of entry as an unwanted alien, but the U. S. Public Health Service is doing the next best thing. Quarantine officers are examining all persons arriving by ship and air, both American and foreign citizens, for symptoms of influenza.

Those cases discovered will either be hospitalized or directed to their own physicians.

Dr. William J. Zukel of the U. S. Surgeon General's office said such port-of-entry detection will be helpful but is not capable of completely stemming the expected sporadic outbreaks here.

Detection of incipient flu, Dr. Zukel explained, is complicated by the two- to seven-day incubation periods of the viruses. Air passengers travel at such speed that they can carry latent viruses across the ocean and not show influenza symptoms until "safe" at home. Three- and four-day ship crossings also cut down the number of detectable cases.

The best preventive measure is vaccination. Two shots between four and six weeks apart should protect between 65% and 75% of the people taking them. The

immunizations are probably good for somewhat less than a year.

The Public Health Service urges pregnant women, the aged and persons with heart diseases and diabetes to be vaccinated at once. Such groups are especially susceptible to influenza and its potentially severe complications.

Since last year's Asian flu epidemic, PHS scientists have been investigating the long-term effects on the children of mothers who were stricken during pregnancy. Dr. Zukel said the studies must run for years before any significant results can be determined.

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## PUBLIC HEALTH

### More Evidence Mosquito Carries Sleeping Sickness

► MORE EVIDENCE that some mosquitoes may be responsible for keeping various forms of encephalitis, dread sleeping sickness, "going" in the eastern United States is found by four U. S. Public Health Service researchers from the Communicable Disease Center, Montgomery, Ala. The disease afflicts animals and sometimes humans.

Both eastern and western encephalitis viruses were obtained from mosquitoes captured in North Carolina and New Jersey, Drs. R. W. Chamberlain, W. D. Sudia, P. P. Burbutis and M. D. Bogue report in *Mosquito News*.

Recovery of the eastern form from the mosquito *Culiseta melanura* "further substantiates its role as an important vector" or carrier of the disease, they pointed out. Blood-engorged and non-engorged insects were studied.

*Culiseta melanura* may also be important in maintaining western encephalitis as an endemic disease, one that is native to a locality, in the East.

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## AERO-MEDICINE

### Artificial Skin Aids Study of Solar Radiation

► AN ARTIFICIAL human skin may help overcome radiation hazards confronting high-altitude pilots.

In a device to measure the effects of radiation a pilot might face from direct sunlight at high altitudes, a material simulating human skin is laid over a metal cylinder. Temperature is controlled above and below the skin surface and instruments measure the temperature through it.

This technique was reported by Alice M. Stoll, physiologist, and Leon C. Greene, pharmacologist, both of the U. S. Naval Air Development Center of the Aviation Medical Acceleration Laboratory in Johnsville, Pa.

Successful operation of the device would provide information to enable designers to produce proper clothing and atmosphere for persons exposed to extreme sun heat.

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## SEISMOLOGY

### Statistics Released On Alaska Earthquake

► THE EARTHQUAKE that shook a 115-mile strip in southeastern Alaska last July 10 was caused by a 21½-foot horizontal slip and a 3½-foot upward slip along the Fairweather fault, two experts have reported. The quake was accompanied by an "enormous wave" in Lituya Bay that destroyed a hillside forest to a height of more than 1,700 feet.

Believed triggered by a rock slide, the wave destroyed a forest area of nearly four square miles and stripped to bedrock a triangular area about one mile wide at the base.

Dr. D. J. Miller, U. S. Geological Survey, Menlo Park, Calif., and Don Tocher, University of California's seismic station at Berkeley, report in *Science* (Feb. 13), that the zone of "shattered soil and rock" along the fault measured generally wider than 6½ feet.

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## PUBLIC HEALTH

### U. S. Experiencing Start Of Hepatitis Wave

► A SUBSTANTIAL INCREASE in the number of cases of infectious and serum hepatitis indicates that the U. S. is in for another bout with this liver-damaging disease.

This present upswing in this country is probably the beginning of another cycle that will last through the next two years, Dr. C. C. Dauer, medical adviser for the National Office of Vital Statistics, said.

A total of 608 cases, the largest number for one week since early 1956, has been reported by the U. S. Public Health Service. This is more than 75% above the number of cases reported for the comparable week one year ago.

Until the last six months, the number of cases reported weekly was slipping down. Since then the number has slowly risen. The disease usually reaches its peak in March, after which it is expected to dip for the summer months, he explained.

But next winter will no doubt see another increase, perhaps more so than this season. The last wave of hepatitis reached a peak in 1954. Since records of the incidence of the disease have been recorded only since 1950, the exact cycle of hepatitis has not been determined, Dr. Dauer said.

The recent cases of hepatitis reported from U. S. Navy ships in the Mediterranean have not been included in these latest statistics.

There is no vaccine for this virus that travels in the blood stream of humans. Doctors can use an immune serum globulin that protects persons for between six and eight weeks. But widespread administration of such a serum would be impractical. The serum is expensive, difficult to obtain, and, generally, not available in large quantities.

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