

Technology Notes

ELECTRIFICATION

Balloon-borne Power Stations

A balloon 400 feet long and 130 feet in diameter, girdled by a ring-shaped "wind wheel," has been proposed by a team of Soviet engineers as a floating power plant, capable of producing more than 10 million kilowatt-hours of electricity per year.

Anchored by a cable, the balloon would hover between five and six miles above the ground. It would be constructed in three fiberglass layers, with foam plastic between them, thus giving it a rigid or semi-rigid shape, as well as making it "gas-proof, heat-resistant and more reliable than any other film coating."

Primary uses for the floating stations would be in agricultural areas and in "reclaiming new territories in the far north, says the official Soviet press agency, Novosti. They could also be used as radio and television relay stations, with a range of 400-450 miles, compared to Moscow's newly built TV tower, almost a third of a mile high, which has a range of 80 miles.

PROPULSION

Air-breathing Hybrid Rocket

A rocket engine that scoops up air as it flies, thereby reducing the amount of oxygen that it has to carry for combustion, is being developed for the Air Force by Lockheed Propulsion Co., Redlands, Calif.

Air-augmented rockets, Lockheed says, can have nearly twice the range of pure rockets of the same size. At the heart of the system is a gas generator in which an on-board liquid oxidizer is used to incompletely burn a solid fuel propellant. The fuel-rich exhaust gases from the generator pass into a secondary combustion chamber, where air ducted in from the atmosphere completes the burning with a resultant large increase in power.

The system is believed to be intended at first for very high-speed missiles, but later applications could include use in manned hypersonic transport vehicles.

CRYOGENICS

Insulation Sandwich Replaces Vacuum

Almost the only way to pipe supercold liquid nitrogen and liquid oxygen through high-temperature areas has been through vacuum-jacketed piping. This is expensive; the pipes usually have to be specially ordered and ultra-precisely made, and such installations are difficult if not impossible to modify or change in the field.

A partial solution has been developed by Westinghouse for use as propellant feed line for the Nerva nuclear rocket engine, now being tested in Nevada. Though the new pipe is only 1/20 as efficient as a vacuum-jacket system, it only costs 1/10 as much, and the much easier manufacturing and handling could compensate for the difference in many applications.

The insulation, which uses no vacuum at all, is made

in layers: from the inside out, cork, fiberglass, Mylar-aluminum-Mylar, more cork, and an aluminum-foil-faced fiberglass tape. Despite its comparatively low efficiency, the insulation, developed for the National Aeronautics and Space Administration's Space Nuclear Propulsion Office, is used in Nevada under exposure to gamma rays that heat the outer layers to as high as 600 to 700 degrees F.

CHEMISTRY

'Snow Job' Replaces Whitewash

A new white camouflage coating for snowy terrain has been designed to replace whitewash by the U.S. Army Mobility Equipment Command at Ft. Belvoir, Va.

A mixture of resins and pigments, it can be applied in the field by spray or brush at temperatures down to minus 30 degrees F. The material dries in 30 minutes and is highly resistant to abrasion, moisture and moderate heat. It is removed by spraying it with a mild alkali solution.

FIRE PREVENTION

Foam-filled Tanks Cut Fuel Fires

A polyurethane foam soon to be installed in the fuel tanks of U.S. combat aircraft in Vietnam will greatly reduce the hazards of fire and explosion, according to the Air Force Systems Command at Wright-Patterson AFB, Ohio.

The foam, which is composed of open cells to permit free flow, "virtually prevents explosion" in case of a direct hit on the fuel tank by machine gun tracer bullets or other incendiaries. It also keeps the fuel from spurt-ing from a ruptured tank, and prevents flame on the outside from creeping back into the tank.

Originally used in racing cars at Indianapolis, the material can be installed in blocks through the standard fuel tank openings. Although it completely fills the tank, it reduces the fuel volume only slightly.

METEOROLOGY

Radar Spots and Rates Lightning

A new radar device that pinpoints lightning areas within storms and indicates the lightning's intensity has been developed by the University of Miami, Fla., Radar Meteorological Laboratory.

Called a sferics-to-radar converter, the instrument could be used to guide airline pilots or to alert forest rangers of approaching fire danger. Its 100 transistors take radio noises emanating from electrical storms and convert them into arrow-like markings on a radar screen, which point to the zones of strongest activity and also indicate their relative intensity.

Developed under contract from the Office of Naval Research, the prototype unit has been operational for three months.