

# technology notes

## NUCLEAR POWER

### Molten salt reactor to use U-233

The Molten Salt Reactor Experiment at Oak Ridge National Laboratory, shut down two weeks ago for refueling, will resume operation in July powered by uranium 233. It will be the first reactor to use this fuel.

Present-day reactors use U-235, and the next generation will probably use plutonium. The MSRE started with a charge of highly enriched U-235, but included in the fuel was a solution of thorium. That metal, which is more abundant than uranium, doesn't fission easily, but in a reactor it turns into U-233, which does. Under proper conditions, the reactor will change thorium into U-233 faster than it burns up the U-233 already there, making it a breeder of nuclear fuel as well as an energy generator.

The molten salt reactor differs from other types because the fuel itself—melted uranium and thorium salt—circulates through the coils of the reactor, giving off its heat directly to a heat exchanger. Ordinarily, the nuclear fuel is enclosed in metal rods and some non-fuel coolant, such as water, gas, or liquid sodium, carries the fission heat to a heat exchanger. By eliminating the rods, costly processing and reprocessing of the fuel is reduced.

## PROPULSION

### Ford developing steam possibilities

Ford Motor Co. has signed a million-dollar contract with a Massachusetts firm to develop small steam engines for low-power applications. Possibilities mentioned are outboard motors and golf carts.

Thermo Electron Corp. of Waltham, which has been building steam engines for the army, will get \$1 million in development support and research assistance from Ford over a two-year period. In return, Ford will get a royalty license covering car, truck and certain tractor applications, and an option to buy Thermo Electron stock at a fixed price.

Besides hedging its bets with steam, Ford is also developing an electric car for local use.

## DESALINATION

### Cheap low-temperature method

A distillation method that uses waste heat from industrial plants promises to cut the cost of desalting water by a half or more, according to the Aluminum Company of America.

Key to the process is the low operating temperature, well below the 250 degrees F. common in present distillation plants. Alcoa claims the method, invented by Dr. Melvin H. Brown, can produce pure water at temperature differences between hot and cold streams as small as 20 degrees.

The low operating temperature allows the use of the process on streams of water used to cool chemical process, petroleum refining, fertilizer, and steam-powered electric generating plants. It can even function on sun-warmed seawater.

The process has the added plus of removing industrial waste heat from streams and coastal areas, where it can raise havoc with sea life. Another advantage is that high-cost alloys, necessary for high-temperature distillation because of corrosion problems, aren't necessary.

Details of the process have not been revealed; a patent pends.

## ELECTRONICS

### Microwave energy dries print

An English newspaper has found extremely high frequency radio energy dries its printing ink better and—in color—with better fidelity than heat treatments provide.

Douglas L. Moore of Eden Fisher and Hirst, Ltd., reported to the International Microwave Power Institute Symposium in Boston that a 2,450-megahertz print dryer has been drying four-color newsprint at rates of 1,000 feet per minute for the Coventry EVENING TELEGRAPH and EVENING STANDARD. The low heat, rapid drying leaves the print with the maximum permissible moisture content, yielding high quality, low cost color, Moore said.

## RADIOISOTOPES

### Promethium used for heater, battery

Radioactive promethium 147, a product of fission in nuclear reactors, is being used as a heat source for two long-lasting devices, a heater for aircraft guidance system units and a thermionic battery.

The heater unit, developed by the Air Force and the Atomic Energy Commission, keeps gyroscopes and accelerometers constantly at operating temperature, eliminating long warm-up periods during which readings from the instruments are unreliable.

The battery, called Isomite by its developers, McDonnell Douglas Corp., uses radiation heat to boil electrons off an electrode, causing a low-voltage current to flow. The Isomite can also use other isotopes as power sources.

## TRANSPORTATION

### Hover train with silent motor

France's lead in the development of tracked hovercraft vehicles, typified in the Bertin Aerotrains which has been operating successfully over an experimental line at Gometz-le-Chatel, is being further consolidated.

A new type of track is to be laid along the line to enable the vehicles to be operated by a linear electric motor.

This type of motor has one of its components stationary—the track—and the other moving in a straight line along the track because it is constantly repelled when current is applied. It operates as if the rotor and stator of an ordinary motor, instead of being circular, were opened out and laid flat.

The attractive features of such a device are that it provides a forward drive without any need for contact between the vehicle and the conductor rail, at the same time it is completely silent. The turbojet engine now used on the French prototype is particularly noisy.

13 april 1968/vol. 93/science news/357