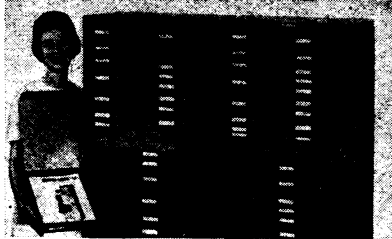


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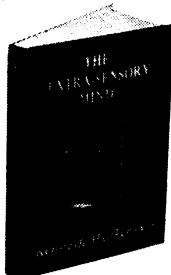
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(from page 146)

Space Development Committee within the Prime Minister's Office, as a step toward unifying the nation's presently scattered space development projects. A little more than a third of the appropriation is funding for a planned ionospheric satellite, to be orbited by 1969.

Three previous attempts by Japan to launch satellites, two in 1966 and one in 1967, all ended in failure.

The agency was also granted a \$12.2 million appropriation to invest in the recently created Power Reactor Nuclear Fuel Development Corp. in Tokyo. Several other government projects, however, including the development of a new jet engine, desalination of seawater, a new method of producing ammonia gas and development of a high-efficiency computer have all been postponed until at least fiscal 1969. These were all to have been undertaken by the Ministry of International Trade and Industry, until its request of \$21,950,000 was chopped to a final appropriation of \$10,950,000.

Stuart Griffin

FROM AUSTRIA

Goiter from iodine-rich diet

Swiss and other mountain peoples have long suffered endemic goiter, presumably because of dietary iodine deficiency.

But certain northern Japanese coastal villagers also suffer enlarged thyroid glands, although they eat mostly generously helpings of iodine-rich kelp seaweed and fish.

Japanese medical researchers, working under a grant from the United Nations International Atomic Energy Agency in Vienna, believe there is strong evidence that the "major cause of goiter in coastal villages of Hokkaido is excessive and prolonged intake of seaweed."

Dr. Keimei Mashimo and colleagues of the Internal Medicine Department of the Hokkaido University Medical School have conducted an epidemiologic survey. They have examined 6,451 grade school children and other inhabitants of Iwanai, Akkeshi and Rishiri villages.

Wherever seaweed consumption has been reduced, they find, the high incidence of goiter is falling.

Furthermore, they report, animal experiments demonstrate that kelp has a goitrogenic effect, at least in some species.

Wistar strain rats and white rock chicks were fed kelp extract, or water containing an equivalent amount of potassium iodide.

A marked increase in the thyroid gland weight was produced in the chicks. But no goiter showed in the rats.

Dr. Herbert Vetter, IAEA medical chief says that further studies using radioactive iodine-131 are now in progress or will start soon.

"We want to obtain a detailed picture of the thyroid function and to determine whether animal goiter is produced by the same mechanism as that in man," he says.

FROM INDIA

World weather watch

India is gearing up to its role as a regional telecommunications hub during the World Weather Watch. New Delhi, Tokyo and Offenbach, Germany, will serve as three of the connecting links in the global program.

Automatic meteorological stations are being put up in many regions, especially deserts from which no observations are now available.

Data will then be passed on by radio teletype link to three world centers in Washington, Moscow and Melbourne.

K. S. Nayar

Windmill design for economical power

Wind as a power source has been known to man for countless generations and windmills have been in existence both in the Orient and in the Occident for centuries past. Primarily used for raising water from wells and grinding corn, wind mills can be utilized for electric power generation, a fact of increasing importance in developing areas of the world.

The kinetic energy of a unit volume of moving air is less than that of falling water or high pressure steam. On the other hand the power of the wind varies as the cube of its velocity. Thus for example the power that can be produced by wind blowing at a speed of 12 kilometers per hour is eight times the power producible when the speed is 6 km per hour. By establishing wind generators at suitable sites where nature offers high winds, it is possible to produce substantial amounts of electrical energy at low cost.

The National Aeronautical Laboratory, located at Bangalore in the South of India, has designed two types of wind electric generators of 12 volt/250 watt capacity. The generators use an automobile dynamo coupled through a gear box to a propeller. The first type is suited for windier regions along the Western coast, like Saurashtra, where the annual mean wind speed is between 12 and 20 km per hour. This type has a 2-bladed propeller with fixed pitch and a diameter of 2.1 meters. The sec-

ond type, which is larger, is suited for regions of wind speeds under 12 km per hour, but above 6 km per hour. It has a 4.88 meter rotor with 12 blades and can resist wind speeds as high as 120 km per hour.

While most conventional windmills have a horizontal rotor on which the blades rotate in a vertical plane, a strikingly new and economical design

has been recently evolved at the Indian Institute of Technology, Kharagpur, and full scale units are being developed at the Punjab Agricultural University. In this design the rotating shaft is placed in a vertical direction as an upright post, instead of being horizontal. This shaft carries cross arms to which are fixed sails which catch the wind.

S. K. Ghaswala

FROM LONDON

Anglo-French technological rapport

Diplomatically, Anglo-French relations look dismal, but on the technology scene there is fast-growing respect for the talents and achievements of each other. The Concorde supersonic airliner, whether or not the collaboration runs the full course, has shown convincingly that a joint program in very advanced technology can be pursued. Meanwhile Britain manages to sell other advanced technology—from computers to cryogenics—to the French. This has the full approval of the French government, provided the imports have a clear technological advantage over those available domestically.

In this context the French are showing flattering interest in Britain's nuclear technology. In statements recently, France's Minister of Scientific Research, Maurice Schuman, made it plain that his government is keen on closer ties between the two countries in advanced nuclear schemes.

In fact, for a year or so there have been strong if informal ties between the state nuclear research authorities and between the state generating utilities of the two countries, begun on the initiative of the French. Both countries have pursued the gas-cooled, graphite-moderated approach to nuclear power, leading toward the plutonium-burning breeder. But Britain is far ahead, both in gas-cooling developments and in her pursuit of the breeder.

French interest now focuses on a highly developed version of Britain's advanced gas-cooled (AGR) concept, for which Britain is already installing 3,700 megawatts of generating capacity and is likely to order the same amount again.

Stretched versions to come later will run at temperatures far beyond the gas outlet temperature of 565 degrees C., the limit of the AGR and also of present-day steam turbines. They would contain key ideas culled from Dragon, the helium-cooled high-temperature reactor experiment run by the European Nuclear Energy Agency in England.

Two stretched AGRs are emerging, one to be cooled by carbon dioxide and the other by helium. The carbon-diox-

ide-cooled core would probably use an unclad uranium fuel of low enrichment, but the helium-cooled core could well take advantage of a ceramic fuel developed by the British Atomic Energy Authority. This fuel, of uranium carbide dispersed in silicon carbide, has run at a surface temperature well beyond 1,000 degrees C., with burnups around 40,000 megawatt-day/ton.

As Dr. Hans Kronberger, scientist-in-chief on the AEA's Reactor Group pointed out recently, Britain's reactor research has now reached the stage the AEA always predicted: that designs of high-temperature reactors would converge towards a common concept.

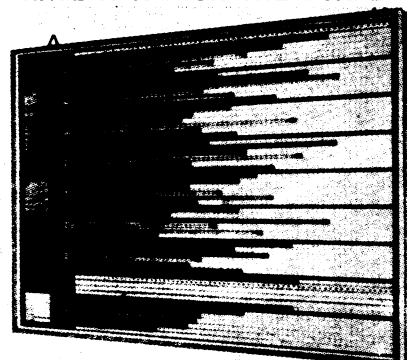
The next question is how best to use the very hot gas from these advanced AGR's, for manifestly there now emerges the prospect of driving a gas turbine directly from the outlet gas. Either gas could be used in this way. At first sight helium appears to have the edge. The gas will be hotter, perhaps 850 degrees C., and helium turbines can be run at very high speeds. A very compact turbine is envisaged by Rolls-Royce, whose studies appear to favor the direct-cycle helium machine.

But temperatures in prospect for carbon dioxide have risen rapidly in the past year or two, and the French CEA has proposed a new thermodynamic cycle for this gas that promises "almost within known technology," according to Kronberger, to push the thermal efficiency beyond the 42 percent of the AGR. The gas when compressed is not unlike steam but the turbine should still be a great deal smaller.

For a year past the CEA has collaborated with the AEA's reactor group to bring this carbon dioxide concept to an advanced stage of development. There are hopes for a more formal agreement very soon between the two countries, covering exchanges of know-how and patents from research right through to utility operations. It could lead to a British design for a high-temperature gas-cooled nuclear station for the French grid.

George Saxby

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