Japanese grants

Once-in-a-lifetime chances

Tokyo

BIOSCIENCE and optoelectronics have pulled in most of the biggest and best research grants in Japan this year, according to figures recently released by Japan's Ministry of Education Science and Culture. But the search for the elusive heavy neutrino also gets a significant boost.

The Ministry of Education, Science and Culture has over ten categories of grants-in-aid for scientific research, ranging from run-of-the-mill general grants of a few thousand pounds to special research grants that can command a cool million. Amongst the latter, the *crème de la crème* are the "special distinguished research" grants awarded to individuals for 3 to 5 years to carry out "internationally recognized research that is likely to produce outstanding results".

Applications for these prestigious grants are made in December each year. After an initial screening, about twenty researchers are summoned to the ministry in April to present their research plan before members of the Science Council. Of these about half are selected and the grants are awarded in July.

This year, bioscience comes out on top, taking five out of ten of this year's awards. For example, Tasuku Honjo of Kyoto University gets Y251 million (about £1.1 million) over five years to continue his pioneering research on immune diversity

and in particular interleukins, while Mutsuo Sekiguchi of Kyushu University School of Medicine receives Y227 million to investigate the regulation of DNA repair and mutagenesis with the aim of unravelling some of the mysteries of cancer and genetic disease.

Optoelectronics also figures prominently with two awards totalling over Y400 million. But the biggest grant of all, at Y268 million (about £1.2 million), goes to Hiroyasu Ejiri of Osaka University for a five-year study of neutrinos. In an attempt to determine the mass of the neutrino and the amount of right-handed current in the weak interaction, Ejiri's group will monitor the neutrino-less double beta decay of a 70 cm² piece of molybdenum foil in a mine-shaft 1,000 m underground in the middle of a mountain at Kamioka in Gifu Prefecture. The mountain will filter out cosmic radiation allowing the observation of perhaps ten events per year.

Research is not all that these awards entail. Grant holders are inundated with requests to write scientific articles, and as these often come via members of the Science Council, they are hard to refuse.

Another drawback of getting an award is that under the "democracy" of Japanese science one can never get another one. In many ways it pays to be a co-researcher rather than the named awardee.

David Swinbanks

Fairer grants system for 1987?

Tokyo

JAPAN'S Ministry of Education, Science and Culture is overhauling its system of "special" research grants in an attempt to make it more open, flexible and responsive to the needs of today. The new system will come into effect from fiscal year 1987.

At present the ministry has three categories of special grant, the special distinguished grants (see above), special long-term grants and special project grants. The special project grants are an unusual feature of Japanese science and allow participation of large numbers of researchers from various institutes under the banner of a single 3-year project. For example, Seturo Ebashi of Okazaki National Institute for Physiological Sciences this year heads a team of 38 from 20 universities investigating vascular function. Funding for the project this year amounts to Y190 million (about £830,000).

The special long-term grants currently cover four major fields: cancer, natural disasters, the environment, and energy and fusion. Each field receives annual funding of between about Y500 million and

Y2,000 million (£2-8 million) dispersed among 100-200 projects.

The special grants, however, came under criticism because the project titles and leaders were designated by the Science Council of Japan, an advisory body of 210 scientists from all disciplines, and only well connected scientists tended to be selected. Further, only those scientists personally acquainted with the project leader could hope to join the project.

Under the new system, the special long-term and special project grants will be partially merged into a new category called "priority areas of research", although cancer and fusion research will remain separate. Grants will run from 3 to 6 years with annual funding of Y50-800 million. But the major change is in the selection of the projects and participants.

Although a few priority areas will be designated by the ministry, most will be selected from proposals made by researchers throughout Japan. And once project titles are selected, any researcher, even high-school teachers, can apply to participate.

David Swinbanks

India's space programme

Rising above forest decline

Bangalore

ALARMING results from the latest Landsat imagery suggest that deforestation in India is occurring at a much greater rate than was previously feared. The Indian Forest Department had believed that forests covered some 22 per cent of the nation's land area, but Landsat reveals only 10 per cent cover. To get some measure of the extent of the problem the Indian Planning Commission's task force on resource management has recommended that satellite images should be used to compile a vegetation map of the country, and a new Indian satellite to be launched next year will be able to contribute to the mapping programme.

The two Bhaskara satellites, launched in 1979 and 1981, have provided Indian space scientists with experience of sensor design and management of the data received by ground stations. Next year the Indian Remote Sensing Satellite (IRS) is to be placed into a polar/Sun-synchronous orbit by a Soviet launcher. IRS, now being built in India, will weigh 850 kg and is a fully-fledged remote sensing satellite stabilized on three axes and featuring deployable solar panels. After IRS, a series of satellites with greater resolution and more channels is planned.

The resources task force also recommends the setting up of remote sensing "cells" in the forest regions of all states so that the information gathered can be distributed to forest workers.

Two steps in India's remote sensing programme. Top, Bhaskara-II, launched in 1981; bottom, an artist's idea of IRS.

Communications should benefit, too. Communications satellites are seen as the logical means of improving telephone and broadcasting services. The Indian Space Research Organization has now been granted the budget to start building its INSAT-II satellite at the Bangalore satellite centre. The first of the INSAT-II series is due to be launched in the early 1990s atop a new liquid oxygen/liquid hydrogen driven geostationary launch vehicle now being designed by Indian space scientists.

With INSAT-II in operation it should be possible to run as many as eight television channels. Each satellite will be able to carry 6,400 two-way telephone circuits.

Roof-top antennas will then lead to a great improvement in communications — particularly important for the development of business and for better governmental administration.

The immediate future of the Indian space programme, however, lies with the Augmented Satellite Launch Vehicle (ASLV). This solid-fuel rocket is to become the workhorse for the launches of the 150-kg "stretched" Rohini research satellites during the late 1980s. ASLV's maiden flight is due later this year and it is hoped that the second flight, in 1987, will launch a satellite carrying a remote-sensing payload built in West Germany.

Radhakrishna Rao

US drug tests

Hit-and-miss results are likely

Washington

APPROXIMATELY 1.1 million federal employees will have to submit to screening for illegal drug use under the terms of an executive order signed last week by President Reagan. But before the White House implements the new drug testing programme, some members of Congress want one question answered about the tests: do they work?

A first evaluation by the Office of Technology Assessment (OTA), the independent congressional office, has concluded that adequate technology exists to carry out a screening programme. But whether that technology will be used properly, and what will be done with the answers it provides, are still items for debate.

Lawrence Miike, a senior associate in OTA's health programme, last week presented the findings of a preliminary investigation on the accuracy and reliability of currently available urine drug tests to a House of Representatives subcommittee. The most common tests use either thin

layer chromatography, enzyme multiplied immunoassay or radioimmunoassay to screen for drugs. Test kits available to clinical laboratories contain reagents that permit testing for several drugs from one urine sample. The three methods vary in their sensitivity and specificity for different compounds, but all can cross-react with substances in urine that do not result from illegal drug use. Miike considers that all positive tests will need to be confirmed using more sensitive techniques.

But even the most accurate test is useless if it is improperly performed. Regulations governing laboratories vary widely from state to state, says Miike, and monitoring efforts are often ineffectual. A proficiency testing programme run by the Centers for Disease Control focused primarily on clinical testing rather than drug screening, but that comes to an end at the end of this month. Three professional societies offer proficiency testing programmes for urinary drug screening, but these are on a voluntary basis. The best

indication of expected performance from a large-scale screening programme comes from the military, which is now screening about 3 million people a year. Estimates suggest these tests are correct 90 per cent of the time, but as false negatives will typically go undiscovered, this figure is based only on false positive errors.

Miike raises several issues concerning a large-scale screening programme, which must necessarily give only a yes/no answer on drug use. For this reason, heavy users are classified with those with barely detectable levels of a particular drug.

I'm sorry, Mr. President—the machine says you're addicted to cheap publicity...

Determining the cut-off point therefore becomes critical for determining who will be caught in the screening net. As increased use of the tests will promote improvements, more sensitive tests will enable the cut-off point to be lowered; Miike questions whether technology should be the driving force in arriving at public policy on illegal drug use.

There is also the problem of what drugs to test for and what to do with the results. Analgesics, sedatives, tranquilizers and stimulants are sometimes abused, but all also have proper clinical applications. Different government agencies have already reached different answers to this question. A survey earlier this year by the Civil Service revealed wide variations in the drugs to be screened by different agencies. As an example, the Army intended to test only for marijuana and cocaine, while the Department of Treasury's Secret Service planned to test for amphetamines, barbiturates, cocaine, various pain killers, opiates, quinine, phencyclidine, methaqualone and tranquilizers (but not marijuana).

No wide-scale testing programme will be cheap. President Reagan estimates his programme will cost \$56 million. Representative Patricia Schroeder (Democrat, Colorado), puts that figure closer to \$300 million when costs relating to rehabilitation efforts and legal complications are taken into account. Miike says estimates of the direct cost of testing vary from \$15 to \$100 per person. But despite intrinsic limitations, Miike concludes that with appropriate confirmatory tests, a positive result is "highly reliable and difficult to dispute."

Joseph Palca

Example 1 :50 per cent

		DRUG IN URINE		
		Yes	No	
DRUG TEST	Positive	95	10	105
	Negative	5	90	95
		100	100	

Example 2 :10 per cent

		DRUG IN URINE		
		Yes	No	
DRUG TEST	Positive	19	18	37
	Negative	1	126	163
		20	180	

Mass screening programmes using tests that are even marginally inaccurate face a statistical problem depending on the actual frequency of the condition screened for. This figure presents a hypothetical example developed by Lawrence Miike of the Office of Technology Assessment. In this example, the test for drugs in urine has 95 per cent sensitivity, so for 100 positive samples 95 will be correctly identified, and there will be 5 false negatives. The test is also assumed to be 90 per cent specific, meaning that there will be ten false positives from 100 samples that contain no drug. But the test's predictive value varies considerably depending on the expected frequency of positive samples. In example 1, half of 200 urine samples are assumed to show drug contamination. There are 95 correct positive tests and 10 false positives, giving a predictive value for positive test results of 95/105 or 90.5 per cent. But if the expected incidence is only 10 per cent, or 20 out of 200 samples, the picture changes radically. Now there are 19 correct positive tests, but 18 incorrect ones. The predictive value of the positive tests in this situation would be only 51.4 per cent.