

## Australian science budget

# Election promises not kept

Canberra

THE first budget of the Labor Government under Prime Minister Bob Hawke, presented on 23 August, was parsimonious in expenditure on science and technology, with most appropriations failing to match inflation. Principal beneficiaries are companies willing to invest in research in high technology. The overall economic strategy seems to be a mildly stimulatory budget constrained by containing the deficit below \$A8,400 million (4.7 per cent of gross domestic product).

Estimated government expenditure in areas relevant to research is shown in the table. As the inflation rate is about 10 per cent, any change in expenditure less than this must be regarded as a fall in real terms. The main points of the budget are:

- **Defence** science and technology establishment funds have fallen. These go to projects such as the Jindalee over-the-horizon radar, defence against anti-ship missiles (Project Winnin) and underwater detection aids.

- **Medical** research grants have risen significantly in real terms. These provide funds for basic research in universities and institutions such as state government departments, the Howard Florey Institute and the Walter and Eliza Hall Institute.

- **Industrial** research and development incentives schemes have been improved to support high technology research and development. Under the scheme, companies can apply for three kinds of grants: commencement grants, intended to encourage companies developing a new capability; project grants, for specific projects; and public interest grants for projects considered to be in the national or public interest. The biggest increase is in the allocation to public interest grants, rising from \$A4.9 million to \$A10 million.

- The Australian Atomic Energy Commission's allocation includes \$A1.6 million for the fourth year of a five-year safety upgrading programme for the Hifar reactor and \$A1.3 million towards the

building of a pilot fabrication plant to produce and test the Synroc radioactive waste disposal technique.

- The Commonwealth Scientific and Industrial Research Organization (CSIRO) has again suffered a cut in funding, particularly in its expenditure on major capital works as work on the Australian National Animal Health Laboratory nears completion. The \$A316.7 million breaks down to \$A268.7 for operations, \$A4.5 million for equipment, \$A5.4 million for repairs and maintenance and \$A26.0 million on capital works. In addition, CSIRO will receive as separate allocations \$A3.5 million for the Australian telescope (commenced last year and expected to cost \$A29.0 over five years), \$A7.0 million for an oceanographic research vessel being constructed as a national facility, increased support for key technology areas and an allocation for the construction of marine science laboratories, which will bring its total allocation to \$A331.6 million.

- The Antarctic Division's budget is increased, but by less than the increase promised during the election earlier this year. The increased support will buy transport facilities including a marine research ice-breaker and Hercules aircraft.

- **Basic research.** There is only a marginal increase, if any, in the Australian Research Grants Scheme despite an election promise of a 10 per cent increase in real terms. Together with the Queen Elizabeth II Fellowships, the scheme will administer \$A21.8 million in 1983-84 for basic research projects in physics, chemistry, biology, earth sciences, engineering, applied sciences and humanities. Marine science research administered by the Marine Research Allocations Advisory Committee, on the other hand, will get an increase. Support available to universities through the National Biotechnology Scheme amounts to \$A1.5 million, but the National Research Fellowship Scheme has at least got off the ground. **Vimala Sarma**

## West German budget

# Science beats inflation

WEST German non-nuclear energy specialists will have to tighten their belts a notch or two next year, to judge by budget proposals now being debated in the federal parliament in Bonn.

The ministry for research and technology (BMFT), which accounts for the lion's share of federal research cash and spends 40 per cent of its funds on energy research and development, has been squeezed on three sides. First it faces rising costs in its fast-breeder and high-temperature reactor research programme: second, it has to respond to "green" pressure to act on acid rain; and last it struggles within tight restraints on the whole federal budget. Responding to the latter, BMFT is meekly proposing a one per cent increase (in current marks) in its total budget — which means a real reduction of 2-3 per cent with present German inflation. Overall, given parliamentary approval, the renewable energy and conservation research budget of BMFT, often held up as an example by proponents of alternative energy in other countries, faces cuts of 10-15 per cent next year. Many items, such as passive solar collectors, will receive reduced support, although some, solar voltaics for example, will enjoy increases.

BMFT officials were quick last week to point out the rationale behind these moves. Many alternative energy technologies need little further research, they said: their adoption is now not a matter of research but of price and market economics.

On the nuclear side, BMFT is proud of its agreement last April with industry to support about one-quarter of the cost of the SNR-300 fast breeder project at Kalkar and of the high-temperature reactor (HTR) project. SNR-300 is now estimated to cost in total DM 6,500 million (£1,600 million); the HTR, DM 4,000 million (£1,000 million). The latter should be ready for commercial operation in October 1985, and the fast breeder around a year later.

Given the level of industrial support indicated in April, this should leave BMFT picking up a bill for Kalkar in 1984 of around DM 450 million and for the HTR of about DM 300 million including research done at Karlsruhe research centre. In addition, a large part of Karlsruhe's research budget of more than DM 300 million is spent on fast breeder research. All these figures, however, are approximate and subject to parliamentary debate, BMFT emphasizes: it is not inconceivable that the industrial contribution could rise a little, officials say.

Meanwhile, the Max-Planck-Gesellschaft, which supports some of the most important German research institutes, should do a little better than inflation (up 5 per cent in current marks), and

	1981-82 Actual \$AM	1982-83 Actual \$AM	1983-84 Estimate \$AM	Change \$AM/%
Defence science & technology establishments	125.9	138.8	144.0	+5.2/+3.7
Universities	1,006.6	1,090.9	1,126.3	+36.0/+3.3
Medical research grants	25.6	29.6	38.0	+8.4/+28.3
Walter & Eliza Hall Institute	1.6	3.2	8.3	+5.0/+157.1
Industrial research and development	24.2	52.8	71.6	+18.8/+35.6
Australian Industry Development Corporation	—	45.5 (credit)	12.5	+58.0/NA
Australian Atomic Energy	37.8	36.4	38.3	+2.0/+5.4
CSIRO	293.5	238.2	316.9	-11.3/-3.4
Antarctic Division	21.8	32.1	36.2	+4.1/+12.7
Research grants	20.1	22.1	24.9	+2.3/+12.8
Energy research and conservation	15.8	18.0	19.4	+1.4/+7.6
National biotechnology	—	—	1.5	+1.5/NA
National research	—	—	0.6	+0.6/NA

Source: Budget Statement No.3 of 1983-84 Budget Paper No.1, tabled in the House of Representatives on 23 August 1983. NA, not applicable.



“big science” appears to have won a battle with a 15 per cent increased allocation to major projects. Two are singled out for partial funding in 1984: HERA, a large electron-proton collider for the DESY laboratory in Hamburg, and BER II, a research reactor for Berlin. Two others are put on hold: SIS, a heavy ion synchrotron for GSI Darmstadt and a spallation neutron source for Jülich. **Robert Walgate**

## UK biotechnology

### Celltech signs up

CELLTECH Ltd, the British biotechnology company, is further strengthening its commercial links with Japan. Celltech has granted licences to the Sankyo Company of Tokyo which give it world-wide marketing rights for two therapeutic products that will be developed at Celltech's laboratories in Britain. Celltech will receive licensing fees, development costs and royalties.

The two products are human tissue plasminogen activator and calcitonin, a hormone involved in calcium regulation. Celltech has already cloned genes for both molecules in bacteria and hopes to have the products on the market within four years. Sankyo will be responsible for scaling up production on commercial levels. The two companies will also collaborate in research on katalcalcin, a recently-discovered hormone with properties similar to calcitonin.

Tissue plasminogen activator (t-PA) is a thrombolytic agent that has potential to replace urokinase and streptokinase, both of which have the disadvantage that their action is relatively unspecific and that they may stimulate a troublesome immune reaction. The Japanese market for thrombolytics is valued at £100 million a year, although such products are much less widely used in the United States. But a cost effective replacement with the advantages of t-PA might change that. Celltech is not alone in the race: at least two other companies, Biogen in Switzerland (collaborating with Fujisawa in Japan) and Genentech Inc. in the United States are also working on human t-PA.

Calcitonin is at present used in treating Paget's disease and hypercalcaemia. It may also prove to be useful for osteoporosis, which is a disease of considerable economic importance, being the cause of many bone fractures in older women.

In July, the state-backed British Technology Group's stake in Celltech was reduced from 44 to 28 per cent, and Celltech has successfully attracted specialist investors. The latest announcement will be seen as further evidence of Celltech's determination to reap the financial rewards of its expertise. Celltech coyly let slip at the announcement of the agreement that it has turned down several offers for similar deals with “other international pharmaceutical companies”.

**Tim Beardsley**

## Artificial sweeteners

### Sour welcome for aspartame

THE atmosphere was far from sweet at last week's British launch of G. D. Searle and Company's new artificial sweetener, aspartame. Professor Richard J. Wurtman of the Massachusetts Institute of Technology has raised questions about the effects on brain chemistry of high doses of aspartame, and the Searle representatives at the launch were prepared for a fight.

Aspartame (a dipeptide of aspartic acid and the methyl ester of phenylalanine) is one of three new high intensity sweeteners approved for unrestricted use in Britain on 6 September, and Searle expects to capture a large part of the UK market for low-calorie sweeteners. Aspartame is already on the market in several countries (including the United States, Canada and France) and Searle is plainly delighted with its reception. The product is claimed to taste like sugar, which should give it a substantial advantage over saccharin. Searle's patent on the use of aspartame expires in 1987. Small wonder, then, that Searle disputes the significance of Wurtman's results.

Wurtman's data (*New England Journal of Medicine* 18 August) show that high doses of aspartame given to rats produce a rise in brain levels of aromatic amino acids (including phenylalanine) and that the effect is potentiated by glucose. Aspartame blocks the rise in serotonin levels that normally follows glucose ingestion. Wurtman suggests that aspartame, while not toxic in the usual sense, may affect mechanisms controlling carbohydrate and protein intake and raise phenylalanine levels dangerously in susceptible individuals. Although other foods may contribute much larger amounts of phenylalanine (Phe) to the diet, they contain other amino acids that compete for access to the brain and so limit brain levels of Phe.

Because of impaired Phe metabolism, people suffering from phenylketonuria will certainly have to be wary of aspartame. In order to avoid brain damage caused by an increase of Phe to toxic levels, severe cases must limit their intake to around 200 mg per day. A circular produced by Sir Henry Yellowlees, Chief Medical Officer at the Department of Health, points out that soft drinks sweetened with aspartame may contain up to 400 mg of Phe per litre.

Searle has voluntarily announced that it will include a warning to phenylketonurics on its own aspartame product and will encourage other manufacturers to do likewise. As phenylketonurics all know that they have the disease and have anyway to follow an extremely restricted diet, it will be possible for them to avoid aspartame.

The real controversy is whether other groups could be affected. Wurtman is not concerned about low levels of aspartame — he uses the product himself — but says that the behavioural tests necessary to deter-

mine the effects of high doses have not been carried out. A child drinking soft drinks in large quantities will, he says, approach levels of phenylalanine equivalent to those in his experimental subjects. Wurtman says these levels are well within the range that might produce behavioural effects. Other authorities are more sceptical, saying that the changes Wurtman has observed are within the range of normal variation. But if he is right, individuals heterozygous for the phenylketonuria gene, who have a slightly impaired Phe metabolism, might be more at risk than others.

Wurtman's conclusions have been rejected by the US Food and Drug Administration, but Wurtman maintains that his points have not been answered. The data have not yet been formally considered by the UK Department of Health's Committee on Toxicity, but Labour Member of Parliament Jack Ashley has asked for an emergency meeting to discuss aspartame. The committee will otherwise next meet in October. Searle says it is fully confident that the authorities will have no reason to reconsider their decision. It is also pointed out that no ill-effects have been encountered with the product in the many countries where it is in use. **Tim Beardsley**

## Mediterranean treaty

**SOME 85 per cent of all sources of pollution in the Mediterranean are now under control, at least on paper. Last month the 1980 Athens treaty on land-based sources of pollution, inspired by the United Nations Environment Programme (UNEP), came into force with its ratification by six of the original sixteen signatories.**

The six ratifiers are Algeria, Tunisia, Egypt, Turkey, Monaco and France, which, through the Rhône river, is one of the major industrial and agricultural polluters of the Mediterranean. The remaining ten signatories are near ratification, says UNEP. Full implementation of the treaty would cost some £7,000–10,000 million, UNEP estimates, and it expects that money to be spent in the next 10–15 years.

According to Dr Mustafa Tolba, executive director of UNEP, pollution monitoring shows that because of untreated sewage, 20–25 per cent of Mediterranean bathing beaches are now unsafe for bathing, and that only 4 per cent of shellfish-growing areas produce shellfish “safe for direct consumption”. Some coastal waters are also showing signs of eutrophication, Tolba says. The resulting loss of revenues from tourism and fishing are difficult to estimate, but it seems that the threat of such losses is now the chief incentive to ratify the Athens treaty.

**Robert Walgate**