

Israeli science**Optimism from new minister***Rehovot*

ISRAEL'S new science minister, Mr Gideon Patt, has a great many plans but very little money with which to carry them out. Nevertheless, he remains optimistic.

"As minister of commerce and industry", he declares, "I helped promote applied research. Now, as minister of science, I hope to boost basic research. And just as I initiated a five-year plan for industrial development in my old post, I now intend to initiate such a plan for the development of science and technology".

Patt points out that Israeli investment in science and technology now stands at 2.2 per cent of the country's gross national product (GNP), which is, as he puts it, "a respectable figure", and more than is invested, for example, by the Netherlands. But he hastens to add that the percentage figure is misleading on two counts. First of all, Israel's whole GNP is not large and so the total annual investment in research and development is around US\$700 million, less, that is, than is spent on research and development by some individual US companies. Moreover, more than half of the available funds go to military research and development, from which the economy benefits to only a limited extent.

In spite of the problems in regard to applied research, Patt is far more concerned with the decline in funds available for basic research. He notes that the universities, where almost all basic research takes place, once allocated some 50 per cent of the funds for education and the other 50 per cent for research. In the past five years, however, because of massive cuts in government support, they have greatly reduced the money they allocate for research.

"Thanks to superhuman efforts by our scientists", Patt says, "we have not so far fallen behind. However, sheer devotion and ingenuity cannot make up for the lack of funds indefinitely and if something isn't done soon to remedy the situation, Israel will become a scientific backwater, just another little country with enormous problems and few resources with which to solve them."

Patt's solution, one already on the stocks, is to create a special \$250 million fund from overseas sources for scientific research in Israel. This will yield up to \$30 million a year to support research, a sum that will be supplemented by another \$10 million from Israeli government and binational sources.

Why is Patt, a non-scientist, interested in basic research? "I'm not", he says, "I simply realize that without basic research, there will be no innovative applied research, no original products. And if we just base our industry on secondhand research, we will never be able to keep up with our competitors."

The science minister is certain that proper support for research will pay off, generating enough income, through new products, to repay investors in his special fund and to strengthen the economy.

Ultimately Patt would like to see his ministry of science turned into a ministry of science and technology. This would, he believes, facilitate the kind of overall planning that does not exist at present. More specifically, the chief scientists now found in most ministries, where they are charged with helping to find science-based solutions to ministerial problems, would be linked directly to the ministry of science and technology and would be guided by the overall goals that it sets.

In the meantime, Patt has already taken a first step towards greater coordination by creating a regular forum where all the chief scientists meet under his chairmanship at regular intervals. He is now planning to expand the scope of this forum by inviting

university vice-presidents for research and development to participate.

Patt has also turned his attention to the shortage of trained engineers for Israeli industry, which already needs 2,000 more than it can find. He supports attempts to bring back some of those now in the United States, though he sees this, at best, as a partial solution. He has therefore joined hands with the army and with the manufacturers' association to establish a special school where practical engineers with two years of post-secondary training could be turned into qualified engineers in two years. But this school may never be created because the universities have tentatively reversed their long-standing opposition to such a scheme and will probably inaugurate a similar programme themselves.

But the new science minister sees real significance in his present position. "Ten years ago", Patt declares, "the ministry of science wasn't very important. Today it is already important. Ten years from now — if the country develops as it should — this ministry will be among the most important in the government." **Nechemia Meyers**

US telescopes**Caltech takes Texan wind***Washington*

PLANNERS of new ground-based optical telescopes in the United States have been given pause for thought since the announcement in January from the California Institute of Technology of plans to build a 10-metre segmented-mirror instrument on Mauna Kea in Hawaii. The Caltech telescope, for which \$70 million has been pledged by the William M. Keck Foundation, will be the largest optical telescope in the world. Fund-raising for other telescopes is likely to be harder as a result, and some plans may have to be rethought.

The Association of Universities for Research in Astronomy Inc. is doing preliminary design work for the National New Technology Telescope (NNTT), an instrument with four 7.5-metre mirrors that would be built by the National Science Foundation (NSF). But it will be difficult to persuade NSF and the Congress to vote \$150-\$200 million of federal funds for NNTT unless it offers US astronomers facilities that are clearly superior to those available elsewhere.

As things stand, NNTT would have twice the light-collecting power and 1.5-2 times the angular resolution of the Keck telescope. The question of whether that factor of two is sufficient to justify spending money on NNTT has yet to be decided, according to Laura Bautz, director of the division of astronomical sciences at NSF, who is forming a committee to examine the questions raised. Caltech is preparing a site for a second 10-metre telescope alongside the Keck telescope which, if it were built, might be combined with the Keck telescope

for optical interferometry; such a combined facility would have characteristics roughly similar to those of NNTT.

Other telescopes have also been put into the shade by the Keck bequest. The University of Texas has, since 1979, been planning a 7-metre single-mirror telescope at its McDonald Observatory in west Texas, but has so far failed to raise the \$50 million needed. The Texas state legislature, which is in the throes of a spending crisis, recently turned down a second request for \$5 million of state funds to purchase the primary mirror for the telescope.

The publicity surrounding the Keck bequest will "undoubtedly make it harder" to find a private foundation willing to support construction of the Texas telescope, according to Harlan Smith, director of the McDonald Observatory. The telescope can no longer tempt potential sponsors with the glory of supporting the biggest telescope in the world (although Dr Smith points out it would still be the largest monolithic mirror telescope). Dr Smith argues that the supply of optical telescopes is not comparable with the supply of accelerators for high-energy physics, where there is continual pressure for ever-higher energies; rather, the pressure on optical telescopes is for observing time.

Even the Texans' claim to be building the world's biggest monolithic mirror telescope may shortly be disproved, however. The University of Arizona is expected shortly to announce a partnership with other institutions to build a 7-8 metre monolithic mirror telescope, and the Mount Wilson Observatory in California hopes for a similar instrument. **Tim Beardsley**