nature

10 June 1999 Volume 399 Issue no 6736

Help! The data are coming

Some branches of science have learnt how to cope with huge amounts of information. Biologists haven't. There is a dearth of essential skills which is only now starting to be taken seriously.

Terabytes, exabytes, yottabytes: bytes by the zillion are heading this way, thanks to the appetites of particle physicists, Earth scientists and organismal and molecular biologists (see Briefing on pages 517–520). So how will researchers cope?

The particle physicists are well versed in handling such data. They seem to be crossing their fingers and hoping that the off-the-shelf hardware and software will be available in time to allow them to analyse the copious output of their next-generation colliders. Given the history of the technology, their expectations are well founded.

Molecular biologists, on the other hand, appear to have eyes for data that are bigger than their stomachs. As genomes near completion, as DNA arrays on chips begin to reveal patterns of gene sequences and expression, as researchers embark on characterizing all known proteins, the anticipated flood of data vastly exceeds in scale anything biologists have been used to.

Biologists are waking up to the challenge, albeit belatedly. Last week, for example, an expert panel told Harold Varmus, director of the US National Institutes of Health (NIH), that his agency needs to do much more in this direction. As panel co-chair David Botstein rightly emphasized, the big issue is training. Nevertheless, sheer supercomputer power (and, for that matter, medium-sized computer power, too) will be essential. To that end, the panel recommended support for the development of existing supercomputing facilities established for other disciplines, as opposed to new facilities for biology. The strain on existing facilities is enormous, so serious investment will be required, but, the panel argues, not in a way that re-invents wheels. This approach also has the advantage of leveraging NIH dollars at centres that already house needed expertise and infrastructure.

But, equally urgently, the NIH needs to help develop a new generation of computer-wise researchers. The panel recommended that five to twenty "National Programs of Excellence in Biomedical Computing" be established. It's a measure of the speed of the revolution, and of the dearth of expertise in the community, that it's not obvious where in the United States such programmes would be launched. Just as urgent is the need for computer specialists in laboratories, and a change in attitude that sees them as invaluable rather than second-class citizens. In short, computer experts at $85,000 a year are, like it or not, an increasingly necessary component of grant applications.

It would be wrong to leave the US agenda in this area solely in the hands of the NIH. The National Science Foundation has traditionally been the focus of support for supercomputing in the research community, while the Department of Energy has supported most of the country's particle physicists. Both agencies have made their own investment in informatics, and sharing what they learn with biologists is as urgent a necessity as increasing NIH spending.

Other countries and regions face similar shortages of skills. Meanwhile, private companies are busily sequencing and computing and licensing. There is, therefore, an urgent underlying message that all scientifically ambitious countries should heed: strong government funding for the quantitative analysis of data is essential if the results of fundamental biological research are to remain a public good. □

A cause worth funding

A German synchrotron would be good for the Middle East.

It's too easy for *Nature* to urge the world to spend more money on science. On the whole, that temptation is resisted. But there are honourable exceptions. A proposal — as yet unfunded — to establish a joint synchrotron radiation facility in the Middle East is one such, and deserves immediate attention.

The government of Germany is understood to be receptive to the idea of giving away a fully functioning synchrotron radiation source for use by scientists in the Middle East (see pages 507–508). The synchrotron is to be the focus of a broader centre for research excellence for scientists from throughout the region, as well as other parts of the world. The project's founders envisage a facility similar in aim to the European Laboratory for Particle Physics (CERN), which brought together scientists from countries that had fought each other during the Second World War.

Scientists nominated by many of the region's governments will discuss the project at a meeting organized by the United Nations Educational, Scientific and Cultural Organization in Paris next week. Israel is expected generously to agree not to bid to host the synchrotron — as its scientific competence would well qualify it to — allowing the facility to be housed in one of its neighbouring countries. There appears to be no shortage of potential hosts, with Cyprus, Egypt and the Palestinian Authority among the contenders.

But the proposal needs funds in no small measure. There are several potential sources. These include the European Union and the US government, as well as states within the Middle East itself. The issue of funds for the project will also be raised at the World Conference on Science in Budapest later this month. *Nature*'s advice to any potential funder is not to hold back, for this will be a worthwhile investment. Initiatives such as this do not come around often. When they do, they should be supported unhesitatingly.

After a troubled half-century, the peoples of the Middle East are making the slow transition to peace. It is sometimes hard to imagine, but there was a time not so long ago when the Christians, Jews and Muslims of the Middle East lived in relative harmony, when philosophers and scientists were recruited to the region's leading institutions of learning because of their expertise, and not on the basis of their faith or geographic identity.

Is it too optimistic to suggest that next week's meeting in Paris may mark the return of such happier times? Probably. But the meeting will be a valuable and long-awaited beginning. And if the project succeeds, it could be a step closer to the day scientists from Israel and its neighbours are free to travel to — and work in — one another's laboratories, exchange information and cooperate in research. That alone would be a major step forward. □