Internationalization

Lig big science to the rescue

'INTERNATIONALIZATION' is a watch-word of the Finnish strategy for tackling the ubiquitious problem that small countries have of carrying out research on a shoestring but at the leading edge of a number of disciplines. The word is used to describe both the goal and the means to attain it. Some countries are more 'international' than others, though, and some connections are more coveted.

For Finns, internationalization means the exchange of scientists and the sharing of 'big science' between countries. It also means developing prominence in areas that are manageable on a small budget. Finns are proud of their successes in this last area — 'little big science', as it has been called. As Markku Mannerkoski, director-general of the Technical Research Centre of Finland (VTT), puts it, "we can't make the rockets, but we can make the instruments".

In basic science, collaboration between research groups is often necessary for expensive research, and, according to Jonathen Knowles, research professor at the Biotechnical Laboratory of VTT, "here you know everybody. It can be much more parochial in larger laboratories. Here you are forced to collaborate". Just that situation contributed to Finland being the country where interferon was first purified (see below).

This advantage also applies to horizontal communication between different research administrations, like the Academy of Finland and TEKES, or between university and industry. "Isolation of organizations is a big country problem", says Juhani Kuusi, director-general of TEKES.

When Finnish scientists talk of establishing international contacts, they usually mean contacts with the United States and Europe. "Cooperation between Nordic countries is very important, but it is so natural and common that we tend to forget it. We consider this as domestic", says Markku Mannerkoski. Through the Nordic Consortium, Finland hopes to be able to participate in the European Synchrotron radiation source at Grenoble.

Finland is also contributing, on a small scale, to a number of other European projects, such as the European Space Agency, of which it became an associate member this year, as well as several Eureka projects, organized through TEKES.

Connections with the United States, especially in biomedical areas, are particularly strong. Because Finland repaid its entire Second World War debt to the USA by the early 1950s, American research foundations, such as the National Institutes of Health (NIH) and Fulbright readily gave postdoctoral fellowships to Finns — six each year in medical sciences.

Many of the most successful Finnish research groups were established by scientists who profited from these fellowships in the 1950s and 1960s. Helena Mäkelä, for example, now director of the bacteriology department of the National Public Health Institute in Helsinki and chairperson of the Medical Research Council of the Academy of Finland, introduced bacterial genetics to Finland after postdoctoral training in the United States.

Some senior scientists are able to maintain transatlantic collaboration with grants from the United States and some money from the Academy of Finland. Nearly 60 per cent of the FIM 12 million budget of the Public Health Institute currently comes from abroad, either from the World Health Organization or from NIH, for field trials on vaccines and for a study of vitamin A therapy for cancers.

For many, collaboration with the Soviet Union does not count as 'internationalization'. There is a feeling, justified or not, that Soviet scientists need Finland more than the reverse. It is a question of "*ystävyys ja yhteistyö*" — friendship and cooperation, the basis of Finland's diplomatic relationship with the Soviet Union.

Professor Pekka Halonen, head of the Department of Virology at Turku University, explains that "Finland's expertise in molecular biology is particularly valued in the Soviet Union, where techniques may be unknown and materials unobtainable. We send tens of thousands of reagents to collaborating laboratories in the Soviet Union. We also often have anywhere between 3 and 5 visitors to the laboratory from the USSR".

In radio astronomy and nuclear physics, collaboration between Soviet and Finnish scientists is more balanced. By comparing observations from radio telescopes in Finland and the Soviet Union researchers at Helsinki University of Technology's Radio Laboratory have access to a highly sensitive observation system.

Finland will also contribute to the Soviet Phobos mission to Mars, although Antti Räisänen, of the Radio Laboratory, anticipates difficulties with COCOM regulations, particularly regarding the gallium arsenide 22 GHz receiver he is due to build since the only three suppliers of gallium arsenide are in the United States, France and Japan. □

The first interferon

IT was because of a friendship between Kari Cantell of the National Public Health Institute and the chief professor of the Blood Transfusion Centre there that Cantell was able to get sufficient supplies of buffy coat separated out from blood units to achieve, in 1963, the first purifications of interferon.

"In our best years, we produced six billion units of natural interferon but not a single unit of blood was collected for this purpose. All of the buffy coat we supplied to Dr Cantell was produced by removing unwanted leukocytes from blood units", says G. Nyllylä of the institute's Blood Transfusion Centre. When the value of interferon was appreciated, the US NIH provided Cantell and his co-workers with funds for large scale purification.

Today, 'recombinant' interferon has taken over, but the Finnish natural product may have accidental properties that the recombinant product lacks. "Our product is rather impure", explains Nyllylä, "but it contains all or most of the subtypes of alpha interferon. From *in vitro* experiments we know that these have a synergistic effect. It remains to be seen from clinical trials whether this 'soup' of alpha interferons is more effective than the single type produced from recombinant DNA". □

Small is beautiful

WORKING in a small country does have advantages, as a recent study of AIDS (acquired immune deficiency syndrome) in Finland is proving. A well-established national health service has encouraged public willingness to co-operate with doctors. For epidemiological studies, this is giving Finland the edge over some bigger countries.

In 1983 Sirkka-Liisa Valle and Annamari Ranki of the Helsinki University Central Hospital and Kai Krohn of the Institute of Biomedical Sciences at Tampere University started to build up a cohort of homosexual men and their partners, in order to look at T4 and T8 lymphocyte ratios. The cohort has now grown to almost 300 and in four years there have been almost no drop-outs.

"Our cohort is relatively small, but it is very stable", says Ranki. "In the United States it would be almost impossible to keep track of this kind of sample. The participants are also willing to help, so that it has been possible to perform spinal taps as well as taking samples of blood. This again would be very difficult in the United States." A tendency for the cohort to heed medical advice on precautions against AIDS infection, Ranki speculates, may have contributed to the finding that HIV (human immunodeficiency virus) antigens, or antibodies to recombinant proteins were seen 6 to 14 months before seroconversion in the 9 subjects who seroconverted.

An epidemiological study on AIDS has now started and blood samples are being routinely taken from outpatients at some hospital clinics. Patient participation is voluntary, but few have declined. □