Technology transfer

High-tech for Britain

A NEW company specializing in technology transfer was launched in Britain last week. The company, Business Application of Science and Technology — BASE — aims to take an active managerial role in seeking new applications for research results and also to become a source of investment capital.

The chairman of BASE International is Sir Henry Chilver, vice-chancellor of Cranfield Institute of Technology and chairman of the government's Advisory Council on Applied Research and Development (ACARD). BASE is developing a network of contacts in universities and government and corporate laboratories and will assess technical and commercial opportunities for innovation. Where opportunities are identified, BASE will buy or obtain under licence technologies to place with its client companies. Financial returns will be from royalties and, in some cases, capital growth.

By seeking to introduce new technologies to existing companies, BASE hopes to avoid some of the problems that beset would-be innovators. It aims to bridge the "development gap" that has been identified in a number of studies of innovation in Britain, not least those of ACARD. BASE says it will acquire technologies from a wide range of sources and will where necessary sponsor further research and development to match them to market requirements.

BASE starts life with a modest £450,000 of capital, subscribed mainly by the Royal Life Insurance Group, TR Technology Investment Trust and the BP Pension Fund. The Cranfield Institute of Technology is also an investor, through its own research and development company. BASE's managing director, Mr John Castle, has a personal stake of £20,000. There are plans to double the capital base as the company grows and BASE will seek additional capital from its shareholders as it is required, on a project-by-project basis.

BASE will certainly benefit from the government's decision to rescind the first option on much publicly-funded research that is now enjoyed by the British Technology Group. BASE will have no preferential access to publicly-funded research. The company has already identified a number of projects in which it might wish to invest, and Sir Henry said last week that the civil application of defence technologies was a area of interest. One project BASE is examining was originally developed at the Royal Signals and Radar Establishment.

BASE looks on the face of things like a textbook model for innovation, and the connection with ACARD is very apparent in BASE's approach. The low uptake of defence technology has been criticized widely in recent years and defence

establishments are thought to be fertile fields for entrepreneurs. Last September, Mr Michael Heseltine, Secretary of State for Defence, announced that he was inviting technology brokers into defence establishments to examine technologies with possible commercial applications, and through Sir Henry's connection with Cranfield, BASE will have a direct route to a substantial pool of university engineering research. Industry sources were impressed last week by the account BASE gave of itself.

Tim Beardsley

Galactic centre seen

THE first results from the Infrared Astronomical Satellite (IRAS) were announced last week at simultaneous press conferences in the United States, the Netherlands and the United Kingdom — the three countries running the mission.

The photograph below shows IRAS's view of 45 degrees of the galactic plane, including the galactic centre, completely obscured at optical wavelengths by interstellar dust. The bulge is the galactic centre, while the knots and blobs are giant clouds of gas and dust heated by nearby

stars. The data confirm that star formation is taking place — the gravitational contraction that precedes the onset of energy generation by nuclear reactions releases heat, so that proto-stars are strong infrared sources.

Other newly discovered objects include three continuous dust rings within the Solar System, a broad central band and two rings 9° above and below it, lying between Mars and Jupiter at a distance of 2.3 to 3.3 astronomical units. One theory for their origin is that a comet, with an orbital inclination of 9° to the plane of the Solar System, collided with an asteroid. IRAS has also observed many new regions of star formation, a ring of large dust particles around the star Vega — thought to be a proto-solar system — and galaxies in which intense bursts of star-formation are taking place. The latter also appear to be the most likely explanation for unidentified objects — objects for which no previously observed counterpart has been recorded. Such galaxies would produce a great amount of energy in the infrared but could be so far away that the optical radiation is too dim to have been observed.

Philip Campbell

Life in outer space

Infrared data debugged

THE conflict between Professors Sir Fred Hoyle and Chandra Wickramasinghe and their critics, astronomers and spectroscopists sceptical of the claim that life is to be found in interstellar space, was left unresolved last week. A meeting arranged by the Royal Astronomical Society was marred by a lack of time for free discussion. But at the end, none of the protagonists had conceded ground.

By Professor Wickramasinghe's account, he and Hoyle were persuaded of the existence of interstellar microorganisms by the failure (as he described it) of more conventional models of interstellar grains to match features in astronomical spectra. Specifically, the astronomical evidence consists of (1) an infrared absorption feature at 3.4 micrometres wavelength observed in the spectrum of a star (IRS-7) known to be obscured by interstellar dust; (2) features at about 10 micrometres in the thermal radiation spectra from the Trapezium nebula; (3) the variation of the interstellar extinction of ultraviolet radiation with wavelength and, in particular, a claimed feature in this variation at a wavelength of 2,800 Å.

Hoyle and Wickramasinghe have measured the absorption properties of *Escherichia coli* and "microorganisms from a nearby river" and, as reported in several publications, have managed to obtain good fits to the astronomical observations with, they claim, a success far exceeding that of modellers using more conventional materials.

Various aspects of this work were attacked by speakers at the meeting. Thus Professor J. M. Greenberg (University of Leiden) noted that in fitting an amino acid with an excess in ultraviolet extinction at 2,800 Å, Hoyle and Wickramasinghe had overlooked that the spectrum observed from the International Ultraviolet Explorer (IUE) was "over-exposed" and flagged as such. Thus, Greenberg said, the feature is spurious. Hoyle's reply that the level of noise seemed to be consistent across the wavelength band was dismissed by other speakers.

A similar difficulty arose with the infrared feature at 3.4 micrometres. Dr H. Kroton (University of Sussex) emphasized that there is virtually an infinity of ways of producing this feature, since any compounds containing C-H bonds will exhibit absorption in this range. Thus, nobody should consider such a spectral match as unique — and in any case the data used by Hoyle and Wickramasinghe in their match with laboratory absorption measurements of *E. coli* were shifted in wavelength from the original publication. Hoyle and Wickramasinghe responded by saying they had used the data as supplied by the

original investigators, but the discrepancy remained unresolved.

A successful fit to the infrared data based on more conventional materials was provided by Dr D. A. Williams (University of Manchester Institute of Science and Technology), who offered hydrogenated amorphous carbons (HAC) as candidates. They contain carbon both in benzene-ring and in tetrahedral bonds, with hydrogen atoms also present; Williams used them to deny claims for the uniqueness of biological material without claiming that HAC is actually "up there".

To Greenberg's calculation that, given

photochemical processes in grains, bacteria would be destroyed within a few thousand years at the most, Hoyle replied that he and Wickramasinghe did not claim that all the bacteria in space are alive, but that colonies of bacteria might enjoy a degree of protection in the nuclei of comets.

Briefly, the meeting allowed participants the opportunity to state their positions for and against the idea that life exists in the interstellar medium. Many direct questions were left in the air for lack of time. An hour of unplanned debate might have done everybody involved a great deal of good.

Philip Campbell

Paranormal weapons

Congress flirts with psychic war

Washington

THE Soviet Union is making "significant progress" on military uses of psychic phenomena, according to a US Army study which recommends that the United States should begin work on defensive measures. The report, disclosed in a new book on "psychic warfare"*, seems certain to find at least a few receptive ears on Capitol Hill. Earlier this year, several legislators commissioned a study by the Congressional Research Service (CRS), an arm of the Library of Congress, on the status and potential of "psi" research, and the resulting document, no doubt reflecting the congressmen's hopes, is remarkably optimistic.

After summarizing the "relatively consistent informal replication" of psi phenomena, which include extrasensory perception, psychokinesis, miscellaneous apparitions, out-of-body experiences, and reincarnations, the CRS report offers some "conservative" speculation on possible applications. Besides the rather mundane possibilities in animal training and finding lost wallets, the report notes that "remote perception, precognition, and retrocognition are of potential interest to intelligence agencies, law enforcement units, and activities involving surveillance". The report also warns that "low-level of micro-PK" effects might cause malfunctions in microelectronic circuits, and that before sensitive equipment becomes even more dependent on microchips, the phenomenon should be better understood.

The Soviet Union, CRS says, has already shown interest in dowsing for water, oil and minerals (dowsing is taught to professional mineralogists at Tomsk Polytechnic Institute). The Soviets are also widely suspected of investing tens of millions of roubles in psi research directed at military applications such as "remote hypnotic manipulation".

The US Government, by contrast, supported only four psi research projects, totalling \$179,500 between 1971 and 1978. The largest source of funding for such research in the United States is a private group, the McDonnell Foundation,

which donated \$500,000 to Washington University to establish a psychic research laboratory. That laboratory last year became one of the many victims of James "the amazing" Randi, a professional magician who specializes in exposing psychic research. Randi sent two of his protégés to amaze the researchers with their "psychic" abilities at spoon bending and other tricks, and then revealed at a press conference their true identities — after the researchers had published several papers on the subjects.

The CRS report dismisses such sceptics in a few paragraphs, noting that "the quality of criticism of psi research is often poor" and that polls of both the general public and the scientific community show a "generally positive attitude" towards psi research.

A CRS staff member refused to identify the congressmen who commissioned the study; the report itself, however, notes that a workshop on the subject conducted by the "Congressional Clearinghouse on the Future" elicited considerable interest on the part of "certain members and their staffs".

Senator Claiborne Pell (Democrat, Rhode Island) who is known to support psychic research (although a staff member, perhaps trying to play down the issue, attributed the senator's interest to the eclectic mind of a "renaissance man"), was quoted last week by the Associated Press as saying, "I personally have never experienced or seen a psychic event, but it seems to me that there have been adequate scientific articles written that would indicate that they do occur".

Stephen Budiansky

**Psychic Warfare: Threat or Illusion?*, Martin Ebon.

UK higher education

Oxbridge scraps the old rules

THE universities of Oxford and Cambridge have now introduced changes in their admissions procedures intended to increase the proportion of their undergraduates coming from British state schools.

Traditionally, applicants for Oxford and Cambridge have taken a special entrance examination peculiar to those universities, but in recent years more places have been awarded on the basis of performance in school-leaving A-level examinations. In both universities, about half the applicants for places have attended independent fee-paying schools, as have about half of those who are successful, although only five per cent of sixth-formers attend such schools.

The more radical of the changes agreed are at Oxford, where the undergraduate colleges have decided after a long and difficult review that candidates applying to the university after their school-leaving examinations should not in future sit the entrance examination. Candidates applying before finishing school study will retain the option of taking the examination. The practice of allowing post-A-level candidates to compete against others with less experience has been widely criticized, not least because few state schools are able to provide post-A-level coaching. This may be one reason why many state schools do not at present encourage applications to Oxford or Cambridge.

But the Oxford colleges failed to agree on a recommendation from Sir Kenneth Dover, chairman of the committee set up to review the admissions procedure, that pre-A-level candidates should be free to choose whether or not to sit the entrance examination. Some admissions tutors are reluctant to admit undergraduates without having seen their performance in the examination, and they have insisted on the right to advertise their preferred method of entry in particular subjects.

In another move which will increase the incentive for state school applicants, both Oxford and Cambridge have decided to stop giving awards to candidates who excel in the entrance examination. This feature of the admissions system has been criticized for encouraging premature specialization and, again, for seeming to favour candidates from independent schools, which are better able to provide the sort of special tuition likely to result in awards.

For the time being, Cambridge intends to keep the post-A-level entrance examination. If the two universities go their separate ways, with only Cambridge allowing post-A-level examination candidates, some independent school candidates may see Cambridge as the better bet: only there will they have the opportunity to make amends for disappointing school results.

Tim Beardsley