Nuclear power technology

Liberal policy plea for free trade

INTERNATIONAL trade in nuclear power technology could make a major contribution to international security, Mr Ian Smart, an international energy consultant, told the Royal Institute of International Affairs in London recently. Since the detonation by India in 1974 of a nuclear explosion using plutonium from a heavy water reactor supplied by Canada, international trade in nuclear power technology and materials has become increasingly a matter of unilateral and sectional regulations by supplier countries and at the same time, said Mr Smart, a cause of "general alarm and growing despondency". Had a liberal policy of nuclear trade continued, he argued, the situation now would be less gloomy.

Mr Smart argued that nuclear power is dangerous "only insofar as all human activity is dangerous". It cannot be ignored, at least for the next 20 years (by which time, at the "most pessimistic" estimate, nuclear plant will account for at least 20 per cent of the world's total generation capacity). Although it is "ludicrous" he said, to "equate nuclear power with nuclear weapons", the Indian explosion showed that nuclear power inevitably spreads nuclear skills and materials, including such sensitive technologies as enrichment. By the year 2000, it is estimated, some 38 countries will possess reactors, and enrichment technology will inevitably have proliferated.

Since 1974, the supplier governments have imposed their own unilateral constraints on the sale of nuclear technology, producing a situation in which a would-be purchaser can shop around to find the least

demanding supplier, and, failing that, will try to go it alone, producing reactors which are at once less efficient and less safe.

Smart argued that for economic reasons as well as safety, it would be more satisfactory to have relatively few fuel-cycle plants (which would therefore be under international control). The post-1974 atmosphere of distrust, Mr Smart argued, is a result of the lack of a liberal policy of trade plus safeguards and the failure to develop a sound basis for non-proliferation of weapons before 1974, for which the "nuclear weapons states are primarily responsible". For the original concept of the Non-Proliferation Treaty of 1968 was that preferential trading terms should be given to customer states that acceded to the treaty, accepting agreed "full-scale" safeguards against the diversion of the transferred technology to weapons. Such a system would make the treaty attractive to all states except those which deliberately wanted a nuclear weapons programme, making it possible, at the very least, to pinpoint potential offenders. At present, however, says Mr Smart, there is a good argument for non-nuclear-weapons states to stay outside the Non-Proliferation Treaty, which entails international control with full-scale safeguards and no great incentives. But countries outside the treaty can still purchase nuclear technology without the fuss of full-scale safeguards, and such bilateral agreements are not conducive to safety. The Indian explosion of 1974 contravened neither safeguards arrangements nor treaty obligations but exploited a loophole in the purchase agreement of 1955.

Vera Rich

Chelsea physic garden blooms

ONE of Britain's oldest botanic gardens, the Chelsea Physic Garden, which was founded in 1673 by the Society of Apothecaries for the study of plants for "medicinal and general scientific use", is to be opened to the public this year for the first time in over 300 years. It was this four-acre garden in London that supplied the cotton growers of Georgia in the American South with their original seed stocks. Other exports include Chinese bananas to Fiji and rubber to Malaysia.

US national laboratories

Leaner Argonne looks ahead

Argonne, Illinois

NOT very long ago, things did not look good for Argonne National Laboratory. The boom of Carter-era solar and conservation research had collapsed with the coming of the Reagan Administration; 800 jobs were being eliminated; grumbling was heard in high places that Argonne had strayed from its original mission into a maze of unrelated and undirected projects. And with the more glamorous high-energy physics research and new accelerator projects passing Argonne by, a hint of woe-begoneness was beginning to settle over this laboratory founded in the glory days of nuclear physics that followed the Manhattan Project.

Now, after two years of cutbacks and no small amount of rethinking by its director, Dr Walter Massey, Argonne seems poised for a comeback. "There were things that, when I got here" — in 1979 — "I wondered why they were being done", Massey says. He stopped some of them, reemphasized Argonne's traditional strengths, and did not shy away from initiatives that fit nicely with the administration's philosophy on government cooperation with industry.

The most obvious of these efforts came to fruition last October, with the repackaging of Argonne's historically strong materials science expertise into a more coherent and more visible programme. Work that had been scattered throughout the laboratory was brought together into a new Materials Science and Technology division that will concentrate on defects studies, surface science and corrosion, and advanced materials research.

Dr Brian Frost, director of the division, says the reorganization has already reaped scientific benefits by breaking down disciplinary barriers. A research project on organic conductors, for example, has gained new life, he says, now that physicists as well as chemists are involved.

The political benefits are sure to be great, too. Materials science has become the prototype of research that this administration believes government belongs in: too applied for universities, too risky for industry. Worries about Japan, where industry and government are investing heavily in ceramics research and worries about supplies of strategic materials have added to the appeal of materials science in the American political realm.

Lawrence Berkeley Laboratory (LBL) recently unveiled plan to establish a National Center for Advanced Materials received the enthusiastic backing of the President's science adviser, Dr George Keyworth; Argonne can no doubt count on similar support.

While LBL's centre will be built around a new synchrotron light source, Argonne