Chemical industry

ICI off course

Britain's largest chemical company — Imperial Chemical Industries Limited (ICI) — is turning to biology to seek a long-term solution to its present financial difficulties. Speaking after the company's announcement of its worst share dividend since 1938, ICI's research director, Charles Reece, said that research priorities would now be in biology-related disciplines — coupled with efforts in composite materials and the by-product chemistry of new transport fuels.

A third of ICI's £200 million annual research and development budget is already linked to biology. Most of this goes into pharmaceuticals, forming the largest single component (18 per cent) of ICI's research. ICI also has the world's largest single-cell protein fermenter and has used genetic engineering to modify the protein-producing organism *Methylophilus methylotrophus* to improve its carbon efficiency (see *Nature* 287, 396; 1980). The modified organism is not in production yet, but only "technicalities" delay its use.

Reece would not say what products ICI would make through genetic engineering except "the obvious ones": proteins for human, animal and plant health. The company is paying special attention to plants — too little is yet known of plant molecular genetics to expect a quick return, but since it is an area of ignorance, it is also likely to be an area of opportunity.

But this is long-term thinking. In the short run, ICI is not about to jump on the bandwagon of small-volume, higher added value products recommended by the pundits of the chemical industry — unlike, say, BP Chemicals, which last week announced a £4 million investment in a new plant at Hythe to produce hydroxyalkyl-acrylates for speciality paints and other uses. Speciality chemicals, the argument goes, are — paradoxically — bought by many small consumers, whereas bulk chemicals are bought only by one or two large buyers. So if the bulk buyers go down, so does the supplier.

Pruteen — no food for the birds

ICI is not impressed by this generalist argument. The company is more concerned to estimate the precise needs of existing customers, who in a recession are being more exacting in the use of their money. This means that research and development in ICI should be related to those needs, but the difficulty is to distinguish long-term structural changes in needs from the effects of the recession, says Reece. One structural change might be the price of steel, with its high energy intensity; this is forcing consideration of substitute materials, particularly composites (rather than new polymers).

Another structural change would be the high cost of oil causing shifts to new fuels — such as syncrude from coal — which will have new chemistries and new spin-off feedstocks for the chemical industry.

So research effort should be concentrated on "C-1 and C-2" chemistry, the chemistry of molecules with low numbers of carbon atoms as potential feedstocks. This would also provide flexibility: whatever the principal transportation fuel source turns out to be, its products could be cracked down to low-carbon molecules to begin higher synthesis.

Back in the factory, production processes could be optimized to the new economics — emphasizing thermodynamic balance for energy or feedstock efficiency, for example, or reducing the capital cost of equipment to allow product flexibility.

Tight environmental regulations are strangling new products, Reece believes. "Try to get water through regulation now — you'd fail." There is an element of double standards for new and existing products. But the regulations, seen in another light, can provide competitive research opportunities: to improve the selectivity of a pesticide, for example, so it might pass regulation more quickly.

But, overall, research in ICI is being seen as just another part of the business, which must tighten its belt and show its economic effectiveness like all other divisions. The days when ICI's corporate laboratory in Runcorn, Cheshire, was called "ICI's university" are over.

Robert Walgate

Indian oil exploration

Partners sought

Lucknow

Faced with the urgent need to find more oil, and the accompanying huge capital risk, the Indian government has decided to invite foreign oil companies to conduct oil exploration. A short list of 34 companies has been drawn up and contracts will be let on a production-sharing basis only to companies agreeing to sell their share of crude to India at a fair market price.

The government is offering exploration rights on 32 blocks — 15 onshore and 17 offshore — a total of about 0.66 million km². The public sector Oil and Natural Gas Commission will represent the government as a "non-operating" party in all exploration contracts and will be given full decision-making rights on any discovery.

At present, oil exploration is carried out by the commission and Oil India Limited. The commission has discovered 585 million tonnes of recoverable oil and gas reserves, whereas Oil India has found only 47 million tonnes. According to a report jointly prepared by Soviet and commission experts, however, there are reserves of 12,700 million tonnes of oil, of which 8,700 million tonnes are in offshore and 4,000 million tonnes in onshore areas.

Commercial reserves were first discovered in the early 1920s in the Assam region, and in the mid-1970s crude was commercially produced in Assam and Gujarat states. Offshore exploration began in the early 1960s, and in the mid-1960s reconnaissance surveys by a Soviet seismic ship, Akademik Arkhangel'skiy, delineated certain structures including the Bombay High. Oil was discovered there in 1974 and production began in 1976. By last year, 88 exploratory and assessment wells had been drilled, of which 31 had proved to be dry. Other commercial discoveries include the offshore structures Ratnagiri, North Bassein, South Bassein and Tapti.

The Indian Planning Commission has allocated 30,000 million rupees (£1 = R17.90) for oil exploration during the sixth plan period 1980–85, which includes R18,370 million for offshore activity. So far, offshore exploration has cost R7,250 million with total discoveries of 250 million tonnes of oil and 270,000 million m³ of gas — a potential value of R50,000 million in crude alone.

India spends a sizeable amount of foreign exchange earnings on oil imports. During 1981, indigenous production will be 14–15 million tonnes, less than half domestic demand of 31 million tonnes, so R60,000 million will be needed to fill the gap. By 1985, the demand is expected to reach about 47 million tonnes, with indigenous production reaching only 21 million tonnes.

The Bombay High development is being financed by the World Bank, which recently offered a second instalment of

\$400 million, having provided \$150 million in 1977. During their recent conference in Vienna, OPEC finance ministers also approved an interest-free loan of \$30 million for the project. The present plan is that production capacity will rise to 12 million tonnes per annum.

The collaboration now sought with foreign companies is not new to India. In the 1970s, for example, the government invited two American and one Canadian group of companies to explore. They left, however, after finding their wells dry. India has also been collaborating with other countries in contract surveys and recovery or increased production technologies.

Zaka Imam

UK pharmaceuticals

Bad risks

The problems of getting new drugs onto the market have been brought home to two British pharmaceutical companies in the past few weeks. Fisons, after many years of costly development, have had to abandon the antiasthmatic drug Proxicromil in the face of evidence of ulcerogenic and carcinogenic activity in rats. And Beecham's new antibiotic combination, Augmentin, has received a cool reception from the government's Committee on the Safety of Medicines.

In Proxicromil, Fisons thought they had found a successor to their major money-maker Intal (cromolyn). During the past 10 years, Intal has proved to be one of the most effective inhaled antiasthma drugs. But Fisons' patent on Intal lapses in 1982, and other manufacturers will be able to produce alternative forms of cromolyn.

Since 1973, the company has spent between £12 and £15 million on developing Proxicromil as an orally administered alternative. Clinical trials had been very encouraging, and it looked as if Fisons had succeeded where others had failed and had found a drug which could be taken in the high doses needed by the oral route without having unacceptable effects away from the site of action.

But late in the day, only last October, long-term animal toxicity tests began to show that Proxicromil induced ulcers and renal tumour. Fisons acted quickly and halted further work on the drug despite the massive investment already made. Proxicromil had been expected to bring the company earnings of about £10 million a year, and the immediate reaction on the stock market was to reduce the market value of the company's shares by £10 million.

Trouble in the drugs division comes at an awkward time for Fisons. Four fertilizer plants are to be closed, while the company is also suffering from the general slump in the heavy chemicals industry. Last year, Fisons made a net loss of £16.8 million compared with net profits of £12.1 million the year before. Other cost-cutting moves

include closure of the London office.

Beecham's immediate problems are not so grave. But the Committee on the Safety of Medicines, which is technically advisory to the Department of Health, is quibbling with the company over the indications which should be listed for its new antibiotic Augmentin.

This is a combination of the semi-synthetic penicillin amoxicillin with clavulanic acid. The clavulanic acid is there to block the action of β -lactamase enzymes produced by penicillin-resistant organisms and so protect the active amoxicillin.

The committee is broadly suspicious of any combination of drugs, considering that general use might cause problems of multiple drug resistance in the long term. It seeks to restrict the use of Augmentin to only the severest of infections in adults and has suggested it be used only for infections with Gram-negative bacteria, mostly urinary tract infections and bacterial gastroenteritis. Beechams had in mind a wider range of applications. What happens now is that the company will resubmit its views to the committee, pointing out the benefits to be had by a wide use of Augmentin. And sooner or later a final list of indications will emerge.

Charles Wenz

Telecommunications

Bell's bother

Washington

The future of one of the world's largest private research institutions, the Bell Laboratories, once again hangs in the balance following the failure of its parent body, the American Telephone and Telegraph Company (AT&T), to reach a settlement with the US Justice Department on anti-trust charges.

The trial of the Justice Department's suit against AT&T opened on Wednesday, 4 March in New York. The lawyers are settling in for what may be a two-year spell. Last month, a day after the suit had come to court, the case was adjourned when both sides informed Judge Harold H. Greene that the "framework" for a consent decree settlement had been reached. The trial was deferred to allow the details of the settlement to be worked out providing the ground rules under which the company will be allowed to operate in new areas of telecommunications, such as information processing. A fortnight ago, however, negotiations over the terms of the settlement broke down.

The suit filed by the government alleges that AT&T had abused its monopolistic power over the US telephone system in the 1960s and 1970s, and required the company to divest itself of various parts. This would have included not only 23 operating telephone companies and an equipment manufacturer, but also part of the Bell Labs, where much of the world's basic research into telecommunications is

carried out. Although no formal announcement was made by either side about the rumoured settlement, it was generally believed that the laboratories would not have been affected.

With the breakdown of the negotiations, however, there is no longer any assurance that the laboratories will remain untouched, and it seems likely that the final settlement could be less favourable to the company.

A major uncertainty at present is the likely attitude of the new Administration, whose refusal to approve the framework negotiated under the Carter Administration has been cited as one of the reasons for the delay in reaching an agreement.

Last week, President Reagan announced the nomination of Stanford law professor William F. Baxter as Assistant Attorney General in the Department of Justice responsible for anti-trust affairs. Mr Baxter has previously spoken out against large divestiture cases, and the Office of Management and Budget has recently proposed terminating the anti-trust activities of the Federal Trade Commission, both factors which were thought to be in AT&T's favour.

However, lobbyists for AT&T's competitors cite a paper in the American Bar Association's *Antitrust Journal* written by Mr Baxter in 1977 in which he argues that divestiture may be the appropriate remedy in cases involving regulated monopolies.

The resumption of the trial has also provided an excuse for renewed attempts on Capitol Hill to develop legislation aimed at breaking up AT&T, on the grounds that the future control of telecommunications technology is too important to be left to regulatory commissions or to the courts.

Last week, Timothy Wirth, the new chairman of the House subcommittee on telecommunications, consumer protection and finance, said that the House was prepared to step in with legislation to increase competition in the telecommunications industry. Members of the Senate Commerce Committee are also considering draft legislation.

Last year, the House committee passed legislation which would have required the company merely to undergo an internal restructuring, setting up a subsidiary to carry out the research and development of competitive services. Such legislation had long been sought by AT&T, but was opposed by its competitors on the grounds that it would be pre-empting the Justice Department suit.

The latest challenge to AT&T comes from a group of shareholders, who are proposing at the company's annual meeting next month that it change its name to either American Telephone and Technology Inc. or American Telephone and Telecommunications Inc. to reflect the new areas of operation that the company is keen to enter. Both changes are opposed by the company itself.

David Dickson