

10 January 1980

# Biotechnology back in the limelight

A FEW years ago — in the mid to late 60s — there grew up a fashion for thinking that the 'new biology' would revolutionise the chemical and pharmaceutical companies. It has made its impact, but not so great as was first promised. Now again the genie rises, to face a number of problems — which we outline on pages 122-131.

The first flowering came with the elucidation of the sequences, structure, and function of a few enzymes, and their immobilisation to act as efficient, recoverable industrial catalysts, so that it became conceivable that all biology could be tamed and put to work. It affected mainly enzymologists and microbiologists. The second follows the discovery by molecular geneticists of techniques for manipulating and transferring DNA between organisms, and it has led to that new group of biologists discovering something quite different: the profit motive and the ways of industry.

Problems and acrimony have arisen between the biologists and industry, and among the biologists, particularly over the question of confidentiality. Scientists with one foot in the academic and one in the business world have felt a conflict between the need to publish fast and first in the former, and to keep secrets and respect patent law in the latter. In some of the smaller business ventures the urge to publish appears to have been effectively quashed; in others, it survives, if not completely intact.

Secrecy means that some academics cannot disclose to their colleagues the details of industry-funded research that is going on in the lab next door — souring relationships between them. For example the silence from most of the laboratories competing fiercely to sequence, clone, and manufacture interferon has, at times, been complete. But that is not surprising when what used to be an innocent amino-terminal acid sequence can be the key to a fortune.

These problems, though, should be temporary. They come about because the firms need to draw on a new community of scientists, one that is used only to the priorities of basic research. But already a new breed of molecular biologist is emerging which concerns itself not so much with understanding basic mechanisms as with manipulating them to reach desired goals. The joys of mission-oriented research are totally different from those

of simple inquiry, and slowly they will sort out a different kind of biologist, and eventually a different career structure, different opportunities and relationships. It was in just this way that the devices engineer became separated from the solid state physicist, and the nuclear power specialist from the physicists who play with quarks. The same will happen in biology.

The middle-term problem rests with governments: how to set up a productive biotechnological community involving both basic biologists and industry, so that interested biologists can 'get their feet wet' and solutions be found to real practical problems. As with any technology, there will always be a need for an academic bioengineering community dealing with long-range issues of only partial interest to industry, between the industry-based biologist and his or her fundamentally inclined colleague; it is for government — and the universities — to set up this community and ensure its proper recruitment, training, and regeneration. In the UK, it is to be hoped that the Royal Society committee currently inquiring into biotechnology will make recommendations on this matter.

But strangely the long-term issue rests again with the biologists. The physicists have learned, rather late, that their technologies have had an immense impact on society. That impact began with a certain selection of priorities, mainly by industry, which led physicists to research in one area rather than another. (Thus, for example, solid state physics was vigorously pursued because of its significance to the electronics industry, whereas oceanography was relatively neglected — until the need to detect nuclear submarines or search for minerals.) The same forces are undoubtedly at work now in biotechnology — and this is precisely the moment when patterns of research will be formed which will ultimately shape lives. Communities and laboratories will be set up in various targeted disciplines, some fields will be encouraged and others neglected; expertise and training will develop along lines which will later be difficult to change. It is an interesting moment for biologists: they have great power in their hands. Do they let the entrepreneur guide them, willy nilly, to the fastest return? Or do they, if ever so slightly, change his priorities? □