APPLIED BIOTECHNOLOGY

PROCEEDINGS OF BIOTECH 86 EUROPE HELD IN LONDON MAY 1986

WORLD BIOTECH REPORT 1986

VOLUME 1

online

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Introduction

The past decade has witnessed the emergence of biotechnology as a vital commercial force. It now has a place in the business plans of major corporations and underpins a multitude of new companies, joint ventures, acquisitions and research agreements. The benchmark event, still talked about in the evolution of this new industry, was Biotech '83, held in London in May of that year.

Three years on and both the business and science of biotechnology are stronger. The managers and researchers are more experienced and ambitious, the marketeers have packaged and sold their first products, and the marketplace has high expectations of further progress.

Three years on and **Applied Biotechnology** is the first in Online's 1986 series of Biotech proceedings. Its contents offer more on basic science applied in industry and more in-depth technical coverage. The contributions to this book will keep you informed and updated about the rapid scientific progress and technological innovations in biotechnology today.

Session Chairmen

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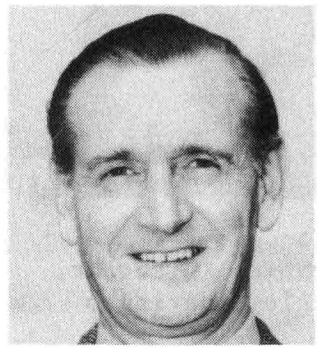

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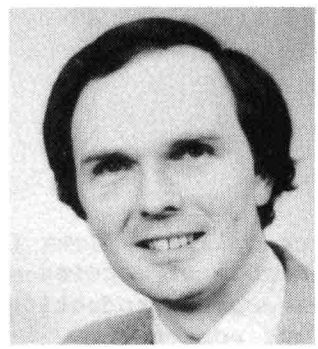

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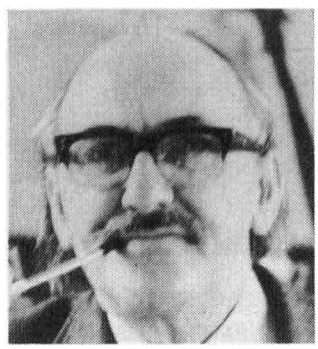

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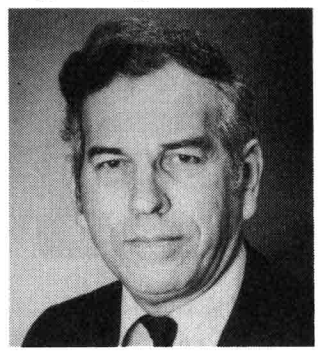

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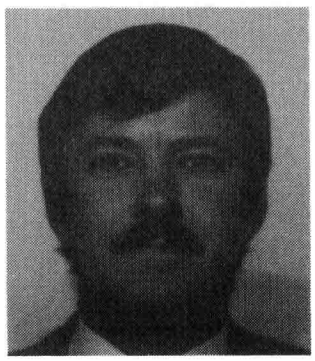

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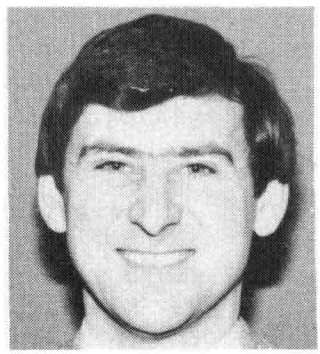

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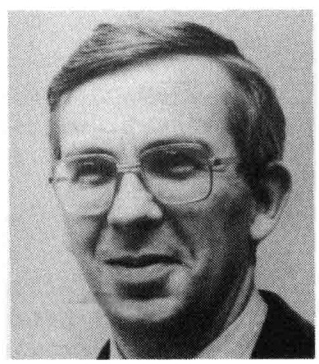

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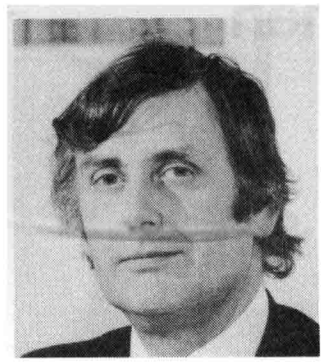

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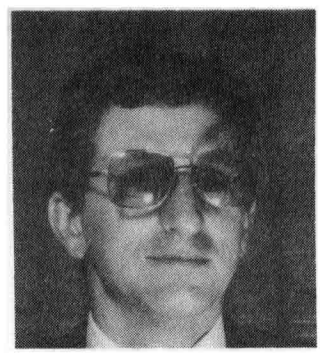

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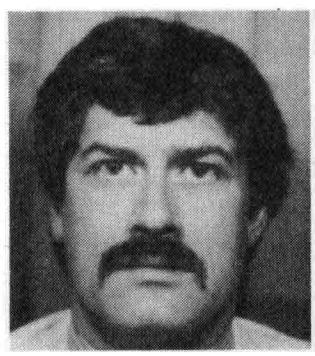

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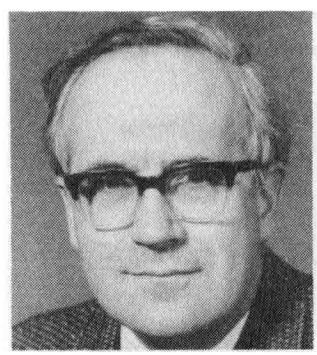

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Authors

Biotechnology: potential impact on the chemical industry

Sol J Barer
Director
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The chemical industry has undergone significant change during the past decade. A major aspect of this is the industry's trend to more high value-added materials from the previous commodity orientation. This change is still proceeding, with biotechnology potentially representing a discontinuity within this industry in both process technology and products. This talk will review the major potential advantages of microbial processing to fine chemicals and discuss the economics of specific potential processes including hydroxylated aromatics and amino acids.

Dr Sol J Barer is currently Director of Process Evaluation and Research Planning for Chem Systems, an international consulting firm for the chemical and biotechnology industries. He is involved with evaluation of the impact of biotechnology and other technologies on the chemical industry including techno-economic, strategic and commercial analyses. His clients include both major chemical companies and biotechnology companies.

Previously he was responsible for Celanese's Corporate research in the biotechnology, catalysis and new chemical process technology areas. His experience included the areas of agricultural chemicals, commodity chemicals and fine and specialty materials.

He is the holder of over twenty-five patents, is on the editorial board of Biocatalysis, is editing a book on industrial biotechnology, is on the Board of Directors of Alpha Probe a diagnostic company, is involved with new start-up biotechnology companies, is on the Industrial Overseeing Committee of the Engineering Research Center of Purdue University, and has been recently named a Distinguished Industrial Fellow at North Carolina State University.

Presented at BIOTECH '86: Online Publications, Pinner, UK. 1986.

The chemical industry has undergone significant change during the past decade. A major aspect of this is the industry's trend to more high value-added materials from the previous commodity orientation. This change is still proceeding, with biotechnology potentially representing a discontinuity within this industry in both process technology and products. This "new" technology arose as a result of a number of contributing factors building on the base of traditional fermentation technology. These factors include the increased knowledge of microbial pathways, the advent of recombinant DNA technology, advances in analytical capabilities, advances in biochemical engineering and the advent of monoclonal antibody technology.

Biotechnology processes are well known to have the potential advantages of selectivity, specificity, use of alternative raw materials, milder operating conditions, non-toxic nature and the ability of catalyst tailoring. The traditional disadvantages have been the requirement of dilute aqueous solutions as well as low rates and sterility. Although some of these disadvantages, e.g. dilute aqueous solutions, are solvable via biological and/or engineering means, they still represent a barrier to successful exploration of this technology.

Although much of the recent exploitation of this technology has been by the pharmaceutical industry, there has also been considerable activity in the chemical industry. Today a number of products are being produced biologically by this industry. These include the amino acids, citric acid, ethanol, polysaccharides, and pharmaceuticals. Newer research is in these areas as well as the specialty areas comprising flavors and fragrances, insecticides, fats and oils and, of course, pharmaceuticals.

Significant resources are being expanded towards the development of bioprocesses both within corporations and in university supported research.

Acrylamide is conventionally produced by the hydrolysis of acrylonitrile, which uses a heterogeneous catalyst. Conversion rates of 90 percent are typical, although a new Dow process is said to have a conversion rate of about 96 percent. Nitto's process involves a microbiological method for carrying out the hydrolysis of acrylonitrile to acrylamide using a variety of organisms.