ment in this area was the report of the synthesis of a photo-affinity labelled radioactive derivative of tetrodotoxin (M. Lazdunski, Université de Nice). The derivative binds specifically and irreversibly to sodium channels after pulse irradiation. This work might open the way to a biochemical characterisation of the sodium channels involved in propagation of action potentials (see also *Proc. natn. Acad. Sci. U.S.A.* 75, 2606; 1978). □

Genetics of industrial microorganisms

from Vedpal S. Malik

At a recent international conference on the genetics of industrial microorganisms*, both the novel techniques of introducing recombinant DNA into industrially important microorganisms as well as more conventional ways of manipulating their physiology were discussed.

Bacterial, fungal and yeast protoplasts are potentially valuable in several ways. One of their uses is to overcome mating barriers between microbes by protoplast fusion and regeneration of a hybrid organism. This technique can be used to breed industrial strains with improved fermentation products, yields or with entirely new metabolites. In fact, P. Hamlyn and C. Ball (Glaxo Laboratories Ltd., Ulverston; UK) have bred a strain of *Cephalosporium acremonium* with a 40% improvement in cephalosporin C titre from the fusion of protoplasts from divergent strains of *Cephalosporium acremonium*. This strain also grows and sporulates better than its highest titre ancestor.

The ability to transform yeast (A. Hinnen, Cornell University Ithaca, New York) and *Streptomyces coelicolor* (D. Hopwood, John Innes Institute, Norwich) protoplasts with plasmid DNA paves the way for the introduction of foreign genes and transposons into industrially important organisms. In this manner industrial strains can be tailor-made by introducing genes of interest and new ways of mutagenesis with insertion elements can be explored.

C. Stuttard (Dalhousie University, observed that reversible loss of chloramphenicol resistance is frequently accompanied by deletions of the nearby arginine locus in *Streptomyces coelicolor*. This suggests

Climatic collaboration

from John Imbrie

UNLIKE physics, chemistry, and mathematics, the science of climatology depends on the availability of a world-wide observation grid capable of recording variations of the global climate system in time and space. Over time scales of months, years, and even decades, climatologists can make use of international data-exchange systems such as the World Weather Watch. But to date, the exchange of information on the lower frequencies of climatic variance — of the sort studied by palaeoclimatologists — has occurred almost exclusively through the normal, spontaneous process of scientific research and publication.

One exception to this rule is the system of International Commissions set up by the INQUA Congress, especially the Commission on Palaeogeographic Atlas of the Quaternary, now chaired by A. A. Velichko of the Institute of Geography of the Soviet Academy of Sciences. Another exception is Working Group VIII of the US-USSR Bilateral Agreement on the Environment. Set up in 1972 as one of the fruits of the Nixon-Kissinger diplomacy, the members of Working Group VIII try by various means to promote the exchange of scientists and data bearing on the problem of climate and climatic change.

Under the auspices of Working Group VIII, six US palaeoclimatologists visited Moscow and Baku during November, 1976, and participated in the First US-USSR Conference on Palaeoclimatology. From 18-27, June this year the same US delegation (John Imbrie, Herbert Wright, Ted C. Moore, James D. Hays, Thompson Webb and Stephen Porter) served as hosts to a Soviet delegation (Academician I. P. Gerasimov, Ye. Gurtovaya, A. A. Velichko, V. Khodakov, and F. V. Mamedov).

One outcome of the visit, which included a scientific conference and field trips to classic Quaternary exposures in the US was the signing of a communiqué in which specific plans were laid out for publishing a National Monographs series, with volumes appearing in both English and Russian. The Soviet monograph would describe the last glaciation of the USSR, including its degradation and the development of the modern landscape. The US monograph would appear in two volumes, the first dealing with the interval 25,000–10,000 BP, and the second with the past 10,000 years.

John Imbrie is in the Department of Geological Sciences, Brown University, Rhode Island.

that chloramphenicol resistance in *Streptomyces* could be located on an insertion-type element.

C. Stuttard (Dalhousie University, Halifax) reported the isolation of virulent transducing phage in a chloramphenicol-producing streptomycete. There were many other reports on plasmids and phages of streptomycetes but their role in antibiotic formation has not been conclusively established. Genetic studies suggest that methylenomycin in *S. coelicolor* and chloramphenicol biosynthesis in *S. venezuelae* is plasmid-controlled but plasmid DNA that would lend support to this view has not been isolated (H. Schrempf, Institute for Genetics and Microbiology, Wurzburg; L. C. Vining, Dalhousie University, Halifax). There is at present no known streptomycete plasmid that has a well characterised biochemical marker and can be physically isolated. Such a plasmid could help in developing a cloning system in streptomycetes.

New derivatives of anthracycline glycosides have been obtained by cosynthesis with blocked mutants of

Streptomyces griseus and *S. violaceus*. A new anthracycline antibiotic iremycin (a derivative of violamycin) has been produced by an interspecific recombinant. This recombinant, called *S. violaceus* ss iremyciums was obtained after hybridisation between blocked mutants of turimycin (a macrolide antibiotic)-producing *S. hygroscopicus* and violamycin (an anthracycline)-producing *S. violaceus* (W. Fleck, Central Institute for Microbiology and Experimental Therapy, Jena).

E. Cerda-Olmedo (University of Seville) reported that unstable heterokaryons of phycomycetes make increased amounts of β -carotene. Such heterokaryons were stabilised by introducing a system of balanced lethal mutations and may therefore have industrial applications.

Mutants of *Nocardia mediterranei*, one blocked in the transketolase and another in shikimate kinase, accumulate D-ribulose and shikimate respectively in amounts equivalent to

Vedpal S. Malik is a research scientist at The Upjohn Company, Kalamazoo, Michigan.

*The Third International Symposium on Genetics of Industrial Microorganisms was held on 4-9 June, 1978, at The University of Wisconsin in Madison. The proceedings will be published by the American Society of Microbiology.