atographically and electrophoretically identical with the enzyme from Chinese hamster cells and bore no resemblance to that of wild type, mouse L-cells. Of course, it might be argued that revertant A_9 cells could have enzymes which differ from the enzyme of L-cells, but it seems unlikely that such enzymes would be indistinguishable from the hamster hypoxanthine phosphoribosyl transferase. Indeed, a clone of revertant A_9 cells produced an enzyme which was typically mouse and not at all like that from hamster cells.

It is possible, of course, that the cultures could be contaminated with viable Chinese hamster cells. McBride and Ozer noted, however, that Chinese hamster cells have a karyotype with a narrow mode of twenty-three chromosomes, whereas the $HPRT^-$ A_9 cells have rather more than twice that number. Clones of $HPRT^+$ cells derived by treatment of A_9 cells with hamster chromosomes have karyotypes which differ considerably from that of Chinese hamster cells and most closely resemble the mouse karyotype. Moreover, the fact that hamster chromosomes are not present in the karyograms of these $HPRT^+$ cells makes it unlikely that cell fusion is responsible for the enzymatic activity in these clones.

An interesting feature of these $HPRT^+$ A_9 clones is that they were not all stable. Growth in selective medium showed that at each cell division some 10–20 per cent of the cells in one clone were losing the genome responsible for hypoxanthine phosphoribosyl transferase activity. Presumably this can be taken to indicate that the hamster genome is not integrated in any way with the chromosomes of the mouse cells.

On the face of it, it does look as if it may be possible to transfer genetic information from one cell to another by using chromosomes even if the frequency of the event is not very high. What the mechanism is remains unknown, although McBride and Ozer make one or two suggestions. Transformation in the accepted bacterial sense is unlikely because HPRT activity only appears when whole chromosomes are used. On the other hand, some transducing virus in the cells from which the chromosomes are extracted is a possibility. As the authors point out, the technique may be particularly useful as a tool for genetic mapping, especially if it is combined with chromosome fractionation procedures.

SOCIETIES

FEBS in Dublin

from a Correspondent

BECAUSE the international conference of biochemistry is being held in Stockholm this year, the regular meeting of the Federation of European Biochemistry Societies (FEBS) will not be held. Instead, a new experimental approach to hold a restricted FEBS meeting was suggested by the Irish Area Section of the British Biochemical Society, and this led to the section being asked by the Biochemical Society to hold a special FEBS meeting on industrial aspects of biochemistry. The meeting took place at University College, Dublin, from April 15 to 19.

The first scientific session was devoted to the Sir Hans Krebs Lecture which was delivered by Professor A. Pardee (Princeton University, and currently on leave at the Imperial Cancer Research Fund, London), who spoke on the requirements for bacterial division. Professor Pardee partitioned the division cycle of *Escherichia coli* B/r into three sections: (1) initiation of DNA replication; (2) septation; and (3) cell division. In essence, Professor Pardee's hypothesis is that the ability of the bacterial cell to divide depends on the presence of a special protein localized on the cell membrane. He believes that the protein (termed X) acts somewhat like a corset by allowing the architecture of the bacterium to attain the correct configuration for division at the correct time. The synthesis of protein X by the cell seems to be the fundamental biological "clock" which determines the timing of the whole process of cell division.

The remainder of Professor Pardee's talk was concerned with the search for and identification of the putative protein X. His evidence from double labelling with ^{14}C and ^{3}H amino acids, after dissolving of the cell membrane by SDS, seems good. By gel electrophoresis two bands appear; one he calls protein Y, the amounts of which can be readily altered by blocking DNA synthesis, and the other, protein X, can be altered only by techniques that alter the time for cell division.

Paramount to Pardee's hypothesis must be the fact that the synthesis of protein X is continuous and not continual during the growth cycle. Thus, if the synthesis of protein X is blocked, the division cycle should be delayed. After treating the cells with *para*-fluorophenylalanine (known to render cells more heat sensitive), the bacteria are heat shocked by shift from 37 to 45° C. Cell division is delayed, but, more importantly, the cells swell when the same heat shock is used. In high sucrose solution, swelling is precluded and no delay in cell division is seen.

Since its inception in 1968 by Cuatrecasas, Wilchek and Anfinsen (*Proc. US Nat. Acad. Sci.*, **61**, 636) affinity chromatography has been of great use in enzyme purification. It denotes a type of chromatography based on the specific adsorption of enzymes on immobilized derivatives of substrate analogues or of other enzyme ligands. As was pointed out by Dr P. O'Carra (University College, Galway), of the many data published since then, few have been carefully analysed. Many generalizations based on them are incorrect and misleading and numerous complications and difficulties have been overlooked. In Dr O'Carra's laboratory a simple mathematical treatment of idealized, biospecific affinity chromatography has revealed that the degree of interference from non-specific interactions has been grossly underrated and he presented some simple means of rectifying these understimates.

Some other contributions presented at this FEBS meeting will be noted in the next issue of *Nature*.

ANTI-MALARIAL DRUGS

Tests in Owl Monkeys

from a Correspondent

AT a meeting of the Royal Society of Tropical Medicine and Hygiene in London on May 17, Professor L. Schmidt (Southern Research Institute, Birmingham, Alabama) described his work with malaria infections in the owl monkey *Aotus trivirgatus*, which can be infected with *Plasmodium falciparum* and *P. vivax*. For six years Professor Schmidt explored the opportunities which these infections provide for assessing antimalarial drugs. These studies have identified several new compounds with outstanding antimalarial properties. Subsequently, other therapeutic problems such as drug susceptibility and drug resistance were investigated. Strains of human malaria parasites that show varying degrees of resistance to standard antimalarial drugs can also be investigated in the *Aotus* monkey.

In answer to points raised in the discussion, Professor Schmidt said that although there is a continuing need for new antimalarial drugs, interest in clinical malaria research in the United States is waning and competent workers are scarce. Nowadays it takes many months of careful trials before it is deemed safe to give a new drug to volunteer patients in doses large enough to be effective.

Although *Aotus* differs from man in the extent to which some drugs are absorbed from the gut, tests of antimalarial activity in the monkey are likely to increase in importance. The clinical manifestations of human malaria are all seen in infected *Aotus*, although it is not yet possible to reproduce them at will; it is also difficult to obtain reliable transfer of the infection through the mosquito vector.

The removal of large numbers of *Aotus* monkeys from their natural habitat also gives cause for concern. There is a real danger of extermination of the species unless it is in some measure protected.