

the interior of the Earth are far from being understood. But if palaeontologists should now feel sure-footed enough to follow in the tracks of the moufflon without undue danger, it seems that geophysicists at least will be a willing audience to the accounts of their endeavours.

#### UNIVERSITY BIOLOGY

## Monod at Edinburgh

from a Correspondent

FRIDAY, November 15 saw the official opening of the new Department of Molecular Biology of the University of Edinburgh. This occupies the upper three floors of a new eight storey building, on the King's Buildings site, which is shared with the Department of Forestry and Natural Resources. This was the culmination of several years of effort by the university, and will give the joint professors, Dr Martin Pollock and Dr William Hayes, a department with 22 scientific members formed by the fusion of a university staff specializing in protein and nucleic acid biochemistry with the staff of the Microbial Genetics Research Unit. The department is the first in Britain to be so named and to offer courses for second, third and fourth year students leading finally to an honours degree in molecular biology. There are also fourteen full time students for higher degrees.

The main opening ceremony was performed by Professor Jacques Monod of the Institut Pasteur, Paris, who noted that the seal of respectability was finally being given to what was once an indefinable subject—quoting Chargaff “chemistry without a licence”—by the patronage of an old and respected university. Although some, such as Sir Macfarlane Burnet and Gunther Scent, may believe that the “golden age” of molecular biology had passed, Professor Monod felt that there were many opportunities for future research—membrane structure and function, DNA replication and control mechanisms and then, in higher organisms, the molecular mechanisms of hormone action and of the nervous system. He looked forward, however, to the day when biologists would relegate molecular biology to a subject taught in schools, and would progress to a study of the integral descriptions of living organisms for which he coined the word “metabiology”.

The opening was further celebrated the following day by a public lecture given by Professor Monod entitled “Modern Biology and Natural Philosophy”. Professor Monod began by defining living beings as the interim products of emergence and teleonomy. The first of these concepts describes the ability not only to maintain an organized system, but to create from it an even more highly organized one, and the second describes the paradoxical possession of a purposeful structure necessary for survival. He pointed out that at the molecular level, these two properties can be clearly distinguished by their unequivocal assignment to DNA and proteins respectively. DNA is not only self-replicating, ensuring the stability of a species, but also has the unusual property of conserving and multiplying occasional errors, allowing evolution by selection and thus emergence. Proteins, on the other hand, are responsible for the recognition of shape—of their

substrate or of each other, for example, and thus of cells by other cells. These are typical teleonomic properties and proteins are therefore teleonomic agents. The allosteric proteins also have the sophisticated property of modifying their recognition in response to a signal received from an external system, thus allowing the coordination of the many thousands of chemical reactions necessary for the organized structure and function of living cells.

Professor Monod's conclusion was that in the same way that the structure of DNA precedes that of protein, emergence precedes teleonomy. He showed that this conclusion was radically in contradiction with all philosophical and religious thought, which assumes that teleonomy precedes emergence as, for instance, in animism, vitalism, the religious assumptions of a divine plan, the philosophy of Teilhard de Chardin and even dialectic materialism. He suggested that the neurotic traits of modern culture might derive from the fundamental contradiction between intuitive animist thinking and scientifically constructed society, and that the only solution was to banish animism from human behaviour.

#### SPORT

## Playing the Game

from a Correspondent

MEMBERS of the International Society of Sport Psychology from nearly twenty countries attended the second International Congress on Sport Psychology held in Washington, DC, at the end of October, immediately after the Mexico Olympic Games. Dozens of papers were presented in the course of ten scientific sessions, some of which were attended by as many as 250 people. Whereas the first congress held in Rome in 1965 was dominated by philosophical and impressionistic papers, the second congress reflected greater evidence of psychological science being brought to bear on sport and play.

The opening session, conducted by Dr John Paul Scott of Bowling Green State University and considered by many the highlight of the congress, was concerned with the possible role of sport in the peaceful dissipation of aggressive tendencies. This was followed by a reaction statement by Dr Emma McCloy Layman (Iowa Wesleyan College) and a commentary by a distinguished panel in which fighting and aggression were viewed not as innate needs but as behaviour potentials which are subject to conditioning and learning. There was agreement that sport and play can be an effective means of expressing aggressive tendencies harmlessly and even constructively, but it was also agreed that the current emphasis upon excellence of the few and neglect of the many limits drastically the value of play and sport in this respect.

Two subsequent reports by John M. Ringsmore and Dr Edward T. Turner were concerned with assessing the effects of sport “spectating” on the aggressive tendencies of spectators. American professional wrestling—which is not really a sport at all but a carefully contrived, seemingly violent morality play in which the “good guys” win—is apparently the only “sport” which can claim clear-cut experimental evidence of psychotherapeutic value for its fans.

The range of interest of the sport-psychology move-