the sites lie in cavities near the subunit interfaces. The tetramer is made up of two roughly ellipsoidal dimers at right angles, and the sites on different dimers are separated by 25 and 35 Å. Depending on the orientation of the sugar groups, which cannot be discerned at this resolution, two bound saccharides on one tetramer could be up to 47 Å apart—a rather small but feasible distance for the approach of agglutinating cell surfaces.

HUMAN EVOLUTION

# Darwin Centenary

On October 28–30, Rome was the setting for another celebration of the centenary of the publication of the *Descent of Man* by Charles Darwin (see last week's issue: **234**, 251; 1971). The occasion was marked by a distinguished gathering of international scientists at the Palazza Farnesina, home of the Accademia Nazionale dei Lincei. The Lincei is one of the oldest European scientific societies whose membership encompasses the broad sweep of natural philosophy in its true sense; no more suitable venue could be envisaged for a meeting that ranged so widely.

After a welcome by the President of the Lincei, Professor Beniamino Segre, and an introduction by Professor C. Barigozzi, the first session was addressed by Professor T. Dobzhansky (Rockefeller University) and Professor E. Mayr (Harvard University). Professor Dobzhansky, in a wide and deep analysis, emphasized the relative lack of differences between man and apes that are being shown by recent work in comparative biochemistry, but he also drew attention to the overriding distinctiveness of human culture in terms of symbolism, language, self awareness and death awareness. Plasticity of non-genetically determined behaviour was seen as a better adaptive strategy than fixity of behaviour in genes. Man, he insisted, is not a chance animal and natural selection is not a chance process but a feedback servo-mechanism between the gene pool and the environment. If variability is present between forms, natural selection must occur and innovative genotypes will be directional and lead to a closer fit with the environment. Evolution was seen as a synthesis of determinism and chance, a synthesis that is in itself creative.

Professor Mayr drew attention to the fact that much of the *Descent of Man* was concerned with sexual selection, and that this was rejected as an evolutionary process by many of Darwin's critics; he supported sexual selection by showing that it can confer reproductive advantage and lead to sexual dimorphism. On the other hand Professor Mayr could not agree that sexual selection has played an important part in the development of human races but accepted that it may account for the acceleration of the process.

The afternoon of the first day was the turn of the "fossil men". Professor P. V. Tobias (University of Witwatersrand) gave a historical résumé of the evolution of the genus *Homo* in which he supported Darwin's prediction of Africa as the cradle of mankind, and took the opportunity of announcing the find of a new australopithecine skull in the breccia at Sterkfontein. In almost direct contradiction Professor G. H. R. von Koenigswald (Senckenberg Museum, Frankfurt) reviewed the oldest hominid fossils from the Far East and, after denying the hominid status of *Kenyapithecus wickerii*, postulated an Indian centre of dispersal of the early hominids in two directions towards Africa and Java. This viewpoint was succinctly countered by Professor Tobias, in discussion, by the remark that palaeontologists must work with the fossils that they have and not those that are not yet to be found!

In the same session Dr M. H. Day (Middlesex Hospital Medical School, London) reviewed the early evolution of *Homo sapiens* in the light of the recent finds from the Omo Valley in Ethiopia. He emphasized the spectrum of forms that are emerging from the fossil record and contended that the mosaic process is becoming more and more apparent in this phase of human evolution. On the one hand, the *erectus*-like sapients such as Vértesszöllös, Omo II, Solo and Rhodesian form a "pithecanthropoid intermediate" group and on the other hand there is a group which includes Swanscombe, Steinheim, Skhul and Amud that could remain as "neanderthaloid intermediates".

The second day was the turn of the geneticists and behavioural scientists and included Dr G. A. Harrison (University of Oxford), Dr K. K. Kidd (University of California), Dr J. H. Crook (University of Bristol) and Professor L. Balout (Paris). Dr Harrison emphasized the influence of population genetics on evolutionary thinking and Professor Balout outlined the unity and continuity of stone tool cultures by breaking down a number of the artificial barriers that have been placed between cultural stages.

The final day included sessions on art and communication as well as the relationship between evolution and

# More Ribosome Binding Sites Sequenced

The three sites at which ribosomes bind when they initiate the translation of the three cistrons of bacteriophage R17 RNA and the binding site for the phage Q$\beta$ coat protein cistron were sequenced in 1969 by Steitz and by Hindley and Staples. In next week's *Nature New Biology*, Staples and Hindley and Staples, Hindley, Billeter and Weissmann report the base sequences of the two other Q$\beta$ ribosome binding sites, those of the Q$\beta$ replicase and the Q$\beta$ assembly protein. But although the sequence of six initiation sites in two messenger RNAs is now known, it is not possible to formulate a clear picture of how a ribosome recognizes an AUG codon at the beginning of a genetic message and correctly initiates translation.

There are two obvious ways in which, in theory at least, a ribosome might be able to differentiate between an AUG codon acting as an initiator and specifying formyl-methionine and an AUG codon internal in a genetic message which specifies methionine. One is that the initiator AUG codon might be in a region of the messenger with a specific and recognizable secondary structure; the other is that the initiator AUG codon might be preceded by some particular sequence of bases which the ribosome can recognize. The six initiation sites so far analysed do not, however, indicate any common secondary structure, neither do they reveal a common base sequence which might signal initiation. All that can be said for the moment is that the sequence immediately preceding an initiator AUG is rich in purines. In short, there must be some molecular basis for the specificity of chain initiation, but, as Staples and Hindley say, "Knowledge of the six initiation sequences of Q$\beta$ and R17 does not define the reason for this specificity".

Also in next week's *Nature New Biology*, Kozak and Nathans make the intriguing suggestion that the so-called assembly (on maturation) proteins of the RNA phages may act as regulators of translation of the phage cistrons. They report a series of experiments which indicate that on infection the bacteriophage RNA enters an *Escherichia coli* still associated with assembly protein. They postulate that either the assembly protein plays some part in "threading" the phage RNA through an F-pilus or, once in the cell, it may block the translation of all but the replicase cistron, such that at early times replicase rather than coat or assembly proteins are made. There is, of course, a precedent for this suggestion; late in infection phage coat protein blocks the translation of the replicase cistron. This effect of coat protein can be detected *in vitro* and no doubt Kozak and Nathans are currently trying to test with cell free systems their notion that assembly protein blocks the translation of the coat protein cistron.