1967) shows that zinc can accelerate wound healing in human beings when given by mouth. Two groups of healthy young airmen were operated on to drain the pilonal sinus. This operation gives a uniform wound which can be used as a measure of healing capacity. Ten of the subjects were given zinc sulphate by mouth in capsule form three times daily, while ten were not given zinc. The treated airmen showed a marked acceleration of wound healing: their wounds became covered with epithelium and formed no further scab after only 45 days, while the wounds of the control subjects took an average of 80 days to heal. The effect was more marked in the second half of the healing process—the phase of epithelialization. The wounds in the patients given zinc were also cleaner, pinker and healthier than those of the controls.

The obvious question is how zinc acts to make healing quicker. Zinc is known to be concentrated in the skin and epithelia. It takes part in a number of enzyme systems, some of which are likely to play a part in wound healing. Zinc may be incorporated into these systems. One interesting finding in connexion with this piece of research is that the amount of zinc in the urine increases markedly after wounding.

Preclinical Institute

A NEW preclinical institute, which will eventually accommodate about 360 students as well as research workers and other staff, was opened on October 31, 1966, at the University of Bergen, Norway. The departments of biochemistry, physiology and anatomy are housed in one block and this is connected to a second block containing the teaching laboratories, auditoria, a museum and a reading room.

In the research block a special feature—unusual in a research institute—is the arrangement of laboratories around a central area which contains special facilities such as service and instrument rooms, and X-ray and tissue culture units, which are thus easily accessible from all laboratories. The biochemistry department has four principal laboratories, each with about eight research workers engaged particularly in projects in molecular biology. Of the five general laboratories in the physiology department one is specially equipped for electrophysiology. Each of the fifteen scientists here has his own office. In the department of anatomy there are laboratories for cytology, histology, embryology, comparative anatomy and dental anatomy. The illustration unit, staffed by an artist and two photographers, is available to all three departments.

Bacterial Interactions

from a Correspondent in Microbiology

PRACTICAL means of prolonging the steady state of exponential growth of bacteria followed rapidly on the fundamental studies of Monod. Today, continuous flow culture techniques are becoming increasingly important in the study of microbial and cell culture physiology. The use of this technique for investigating population changes within a single bacterial species under the influence of a constant environment has complemented earlier observations from batch cultures, where growth is influenced by a changing set of conditions. Such studies have clearly demonstrated the interplay of mutation rates and selective processes in the changing character of populations; in particular, the maintenance of exponential growth conditions has revealed the phenomenon of periodic selection. But pure cultures, by definition, are free from the selective pressures of biological competition which operate naturally.

The application of continuous cultures to the study of mixed bacterial populations has posed considerable technological problems, but recent work at the University of Oregon Dental School augurs well for their use in determining interactions between different bacterial species. R. B. Parker (*Biotech. Bioeng.*, **8**, 473; 1966), in an article which contains full details of the mechanical system, describes a two-stage continuous culture unit in which steady state pure populations are fed into a common mixed culture vessel. This equipment has made possible the investigation of interactions between at least six species, and the results of a tri-culture mixture composed of *Staphylococcus aureus*, *Streptococcus salivarius* and *Veillonella alcalescens* are used to illustrate the potentialities of the system. The established conditions of the mixed culture vessel (the "ecostat" condition) are such that the dilution rate, D, exceeds u_{max}, the specific growth rate constant.

The generation times of each species are altered markedly from those characteristic of pure cultures. Thus, *V. alcalescens* and *S. salivarius* show reciprocal stimulation while inhibitory interaction seems to be directed against *S. aureus*. Moreover, under the ecostat conditions, the generation time of *S. salivarius* falls to the remarkably low value of 8·1 ($s=0{\cdot}5$). Although the residence time of bacteria in the ecostat is short when $D > u_{max}$, this regime assures a steady state and there is no oscillation of population density as a result of interaction. These conditions, however, are far from being natural for mixed populations, and the results of experiments with increased residence times will be of great interest, for under those conditions the experimental system will most closely approach the natural ecosystem. Apart from providing necessary fundamental analyses of microbial interactions, studies of this sort could eventually have important repercussions in experimental pathology and industrial fermentation.

Ribosomes—Structure and Function

by a Correspondent in Molecular Biology

REMARKABLY little concrete information is available so far about the structure of the ribosome and the part it plays, in physical terms, in the synthesis of polypeptide chains. A systematic attempt to identify which features of the ribosome are essential to its integrity and function has now been made by Moore (*J. Mol. Biol.*, **22**, 145; 1966). He shows that mild treatment with formaldehyde modifies amino groups in the RNA or in the protein—or both—at the messenger binding site, and that ribosomes so treated are inactive. Some cross-linking occurs, for after exposure to formaldehyde, the 70*S* ribosomes will no longer dissociate into their sub-units at low magnesium concentrations. The involvement of amino groups in messenger binding is borne out by a similar effect