the first example of the exploitation of fish for biological control.

FOOD PRODUCTION

Starvation round Another Corner

FOR once, the annual report of the Food and Agriculture Organization has some cheerful news to relate. According to preliminary estimates, food production rose by about 3 per cent in the world as a whole in 1967 and by 6 per cent in the developing countries. The losses incurred in the disastrous harvests of 1965 and 1966 have been made good, and *per capita* rates of food production in the developing regions are at least no lower than they were in the early sixties.

Good weather apparently takes most of the credit, though the introduction of high yielding varieties of cereals has proved very successful. The most effective of these proved to be a strain of dwarf rice developed in the Philippines and some dwarf wheats developed by the Rockefeller Foundation in Mexico. But the report is anxious to scotch any premature optimism. In many countries cereals are not a basic food, and in others natural conditions are unsuitable for the high yielding varieties. Further, successful use of the new varieties is contingent on improvements in fertilizer supply and irrigation control.

The most serious nutritional problem facing the world continues to be the shortage of protein. The new cereals will contribute here by releasing land from cereals to the production of protein-rich crops, and lowering cereal prices sufficiently for them to be fed to livestock. There is also promise of a strain of wheat which combines high yields and high protein content.

The report emphasizes the obvious economic truth that any lasting solution of nutritional problems in the developing world depends on home consumer purchasing power and thus on progress in non-agricultural sectors of the economy, though the report has no remedies to offer except gently to beseech the rich nations to abandon their evil ways and pursue less selfish forms of foreign trade.

ENGINEERING

Teaching Tribology

FOR a subject which officially came into existence only two years ago, tribology probably holds a record for the number of committees, panels and centres set up and educational courses initiated to ensure its continued wellbeing. Most of this activity was sparked off by a report published by the Department of Education and Science (HMSO, 6*s* 6*d*, 1966) in which the word tribology was coined for the science and technology of interacting surfaces in relative motion. The report deplored industry's lack of awareness of tribology and stressed the need for education—both general and specialist.

The University of Leeds now offers a twelve month MSc course in tribology which includes the fundamental principles of lubrication, friction and wear; the analysis of lubricated machine elements and the selection and design of bearings. The Universities of Reading and Swansea are cooperating to start a similar MSc course this year. The Universities of Sheffield, Salford, Aston and Swansea offer an assortment of part time courses, evening classes and intensive two or three week postgraduate courses covering most aspects of tribology. A number of colleges of technology and technical colleges hold evening classes, concentrated courses and symposia.

A third series of short courses on lubrication is to be held at Imperial College this year. The courses, each a week long, are designed for practising engineers and designers in industries, and are practical and non-mathematical. There are general courses of about thirty lectures each which provide an introduction to the subject or a background for specialists. The syllabus has been modified and developed with the help of the 400 engineers who have so far attended the courses. One new feature is a discussion on centralized lubrication systems and their development from grease guns to completely automated units. A particularly interesting set of lectures deals with the diagnosis of bearing failures. There are also two more specialized courses—one on the lubrication of large and medium diesel engines and the other on automotive bearings. In both courses special methods of calculation for dynamically loaded bearings are discussed.

MEDICINE

Medicine and Biochemistry

WHAT contribution has the biochemist made to medical knowledge in the past and what might medicine hope to gain from biochemical research in the future? These were the questions which Professor E. B. Chain, Nobel laureate, considered when he spoke to the British Postgraduate Medical Federation in Senate House, University of London, at the inaugural lecture of the series, "The Scientific Basis of Medicine". In tracing the development of biochemical knowledge Professor Chain drew attention to two stages or eras in research. The first, with its relatively crude and inexpensive techniques of analysis and separation, saw the isolation of vitamins A, B_1 and B_2, of hormones such as insulin; and initiated the elucidation of the metabolic pathways, such as glycolysis, oxidation and the urea cycle. The contributions to medicine were enormous; Garrod's work on inborn errors of metabolism, Hopkins' research on vitamin deficiency diseases and the discovery of hormones were the highlights of the era. The understanding which they gave into the cause of disease produced more widespread effects than many of the more recent biochemical discoveries.

The present era of biochemistry with its emphasis on sophisticated techniques and expensive equipment began with the demonstration in 1937 by Tiselius of protein cataphoresis. This led the way for analytical and diagnostic advances—for example, immuno-electrophoresis, which pinpoints diseases of the lymph and nutrition disorders, and demonstrates serum enzyme abnormalities produced by tissue lesion. The uses of radioactive isotopes and spectrometers and ultracentrifuges are a few of the new techniques; combination of two techniques—say, detection and separation methods such as gas chromatography and scintillation counting—provided further automation. Autoanalysers are now widely used both in research and in diagnosis.

These machines and the techniques which they