

educational theorists and on public opinion. First, the imaginative administrator and, more recently, the teaching machine, have come very much to the fore. It may be time to ask, Where is Britain going in all this? Is she being compulsively attracted towards a system of automation, exploiting to the full the possibilities of self-education based on machines and pre-planning?

In these days, when there are large numbers of students and small numbers of teachers, there are considerable practical difficulties in ensuring that the sparks are able to pass to and fro in this lively relationship and it will undoubtedly be necessary to rely more and more on well-designed systems of instruction, and it will be necessary to invent even more ingenious machines. It will be necessary for teachers to make the fullest possible use of the machine tools of the technology of education, so as to make the human efforts of the individual man or woman more extensive in their impact and more intensively productive. But the key-stone of education lies in an interpersonal relationship. Britain has sometimes been in danger of forgetting this both in the grammar schools and in the universities. She has gone ahead as if good syllabuses and a well-arranged timetable can of themselves alone do the whole job. Certainly they cannot do so; if what is being looked for is true education, though they are quite necessary as conditions, they cannot carry Britain as much as half the way. There is no substitute for the real teacher; and the good teacher has to be able to establish a real relationship, pupil by pupil, with those whom it is his concern to educate. It is certainly going to be difficult enough in our time to ensure that Britain has a sufficient number of teachers. But the most difficult problem of all in the coming years is going to be to see that, in spite of the pressures of numbers, and in spite of the demands of specialism, the good teacher gets a chance to do his true job.

PROVIDING FOOD FOR MAN AND BEAST

BEFORE Section M (Agriculture), Prof. Martin Jones poses the question: Where has the human food come from in the past, and where will it need to come from in the future?

The present increase in population needs a corresponding increase in the production of food, and the popular idea is that the limit of production will soon be reached as nearly all the land suitable for crop production is already in use.

Such a view ignores what the scientist can do to modify the methods of food production. The problem of food is how to collect the energy from light and convert that light energy into food energy either in the form of fruit and vegetables or as meat and milk. Only about a tenth of the light energy per acre is now utilized by our farm crops, even our most popular crops.

Improvements due to manuring and plant-breeding are playing their part, but the limiting factor over a vast area of the world's surface is the supply of moisture. Man needs only to harness the water and irrigate the large areas of desert in the tropics to bring about a ten-fold increase in the quantity of food available, particularly when combined with the use of modern manures. Experiments have shown that this method is practical and, furthermore, irrigation is spreading so fast that soon it will be regarded as a waste of manures if the requisite amount of water is not supplied with them, especially at the critical stage in the life of the crop.

This increase in the production of food in the tropical and semi-tropical deserts is already being done by enthusiasts who have the confidence to look ten years ahead and are prepared to spend the capital necessary for storing and utilizing the vast supplies of water available, even if

it means conducting it through a pipe-line over a thousand miles.

Changes on such a vast scale may alter the distribution of the human race and encourage the people not only to grow their food in these drier areas but also to live there for choice of climate.

Such a development would no doubt guarantee the quantity of food for all; but we have now to guard very carefully that the food is of the right kind for the proper nutrition of the people, particularly young people. Here, with modern crops such as cereals which are easy to mechanize, there is a great danger of the diet lacking sufficient protein and the proper balance of the right kind of proteins, minerals and vitamins.

This balance could be helped very considerably through the use of more meat and milk—animal products based on grass, which requires not only suitable soils and manures but also modern methods of conservation and utilization.

This all adds up to limitless opportunities for an increase in our food production so as to keep pace with the increase in population for at least the next two hundred years, by which time even our proposed methods may again be out of date, if the human being should be able to get his supply of energy through some other means than a green plant. For the time being, however, the green plant is an essential link in collecting the energy of life for us, and it is our duty to study the needs and behaviour of such plants.

PROBLEMS OF PENOLOGY

A SCIENTIFIC penology, the subject of Prof. W. J. H. Sprott's presidential address to Section N (Sociology), is impossible to achieve until the principle of retribution is abandoned. Arguments are given against this principle. If the 'tariff' system of punishment is given up, penology becomes entirely forward-looking. It has three objectives: preventing the offender from offending again, either by deterring him or reforming him, deterring potential offenders, and the protection of the public. Taking the treatment of offenders alone, the first aim is to keep them out of prison, partly on economic grounds but mainly because of the deleterious effects of imprisonment.

To this end research is required into a typology of offenders and also a study of differential treatment. Reference is made to the work at present being carried out in California. Such treatment is particularly directed towards first offenders, but recent research has shown that many habitual criminals are in need of supervisory care on account of their social inadequacy. For them permanent hostels are recommended. The problem of general deterrence demands more research than has been devoted to it. The problem here is: Precisely at what classes of person is the deterrence of potential offenders directed? Some classes of potential offenders are not likely to be deterred at all. Others may be, and here the question is: What threat will deter them? If deterrence of potential offenders is accepted as a justifiable aim, then some offenders will be sent to prison with this end in view, as will also be the case with those for whom non-custodial treatment has proved ineffective. The issue here is: What reformative influences can be brought to bear on them?

Reference is made to three experiments now being tried out in Great Britain. The first is the psychiatric prison recently opened at Grendon Underwood, where prisoners referred by prison medical officers are treated and where the problem of treating the psychopath is being explored. The second is the attempt to bridge the gap between prisoner and custodial staff by means of 'group counselling'. The third is the open prison at Ashwell for recidivists where the régime consists of a minimum of supervision by the prison staff and maximum