The breeding of potatoes at the Plant Breeding Institute is now well oriented to the needs of the processors. Makers of crisps, frozen chips and instant mashed potato all have similar requirements: a potato with a large content of dry matter but not much reducing sugar. 'Record', the variety now used most for crisps, was found to have as high a dry matter content as most varieties tested last year.

Potatoes for canning, on the other hand, should have as small a content of dry matter as possible, so that they do not break up when cooked. Although the acreage devoted to these potatoes is never likely to exceed 2 per cent of the total acreage of potatoes, it is considered worthwhile to select suitable clones, many of which have been discarded in the past for having tubers that were too small. Some canners have already found the Cambridge variety 'Maris Peer' suitable for their needs, and more and better varieties are expected in the future.

EDUCATION

New Technological Institute?

By stressing the importance of industrial cooperation, Cranfield, the aeronautical and automobile post-graduate engineering college, succeeds in giving its students a training that is immediately applicable in seeing through research projects of potential value to industry. Students come to the college with university degrees or equivalent qualifications and preferably some experience in industry. They then take one-year or two-year diploma courses in the College of Aeronautics, the School of Automotive Engineering or the School of Management. In some fields, the Cranfield diploma has long been internationally recognized as equivalent to a master's degree, and the college is hoping soon to be able to award higher degrees as an Institute of Technology. This was one of the specific recommendations in the Robbins Report and the Privy Council's decision on it is expected within the next few weeks. The college also runs a number of short courses.

One of the attractive features of teaching at Cranfield is the range of experimental equipment available—students in the Flight Department, for instance, spend at least one day a week actually flying. The aircraft owned by the department include Hawker Siddeley Doves, which are used as flying classrooms, a turbojet used to look at the effects on the aircraft structure of turbulence during flight, Canberras for investigating aquaplaning and attempting to measure slush drag, a helicopter and two gliders. The college has a large, 32K-word ICL digital computer which, it is hoped, can be linked to the 100 amplifier analogue computer.

The college with its 500 students is supported by a direct grant of about £1 million from the Department of Education and Science and there seems to be no lack of money for research projects. The Science Research Council is supporting research into the vibration of road vehicles to the tune of £100,000 and also a number of smaller projects including the study of a particular type of welding failure. There is some money from industry—Rolls-Royce, for instance, is supporting work on air spray burners for gas turbines—and the college is hopeful that more will be forthcoming. Pergamon Press is putting £10,000 towards a two-year information retrieval project. The Ministry of Technology is helping with some ambitious feasibility studies including the much publicized use of carbon fibre resins to save weight in the primary structure of airframes. Work done this year on the wings of an airbus suggests that these could be made 50 per cent lighter than conventional wings by using a basic carbon fibre resin structure filled in with lightweight foam, and this sort of design is likely to be equally useful for the tailplane and fins where stiffness is of paramount importance. Next year the Department of Aircraft Design intends to look at the whole airframe design in terms of carbon fibre composites.

The Ministry of Technology has given large grants —£50,000 for aquaplaning trials and a similar amount for runway friction and slush drag trials—to the Department of Flight over the past five years or so and the Materials Handling Research Unit is hoping for a large grant for a study of track-powered air cushion vehicles. A particularly interesting section is the unit for precision engineering—one of five units intended by the Ministry of Technology to bridge the gap between academic and industrial institutions. The unit provides a consultancy service for industry and the director, Professor J. Loxham, hopes that it will be self-supporting by 1970.

CHEMICAL WARFARE

All Peace at Porton

If you grasp a nettle hard, it won't sting. At any rate, that seems to have been the theory of the Chemical Defence Experimental Establishment at Porton when, for the first time in its history, it held open house last week. Previous requests for public access to the laboratories have always been refused on the grounds of national security, but this time the story was very different. "If you find a locked door, just ask and we'll open it," said the director, Dr Neville Gadsby, and this tone was maintained throughout the public exposure which followed.

Colour videotapes flickered in the laboratories, marquees clustered on the lawns outside, and the fairground atmosphere was completed by a jovial mixture of staff and public relations men who tended their martial exhibits like barkers at their stalls. In fact, the grislier the exhibit, the more jovial were its attendants, though this may have been coincidence rather than design.

All the staff were ready with Porton's justifying syllogism: "Even if we don't develop new weapons, *they* will, so we have to explore all the possibilities in order to know what we have to defend ourselves against". This argument is unanswerable in its own terms, and it is true that everything on show at the open day was at least consistent with a defensive function. Nerve gases and the like were clearly being made, but there were no signs of stockpiling, nor of research into delivery systems. The laboratory displays also made much of the civil spin-off from Porton's work. Use of a caeruloplasmin assay system has sparked off what may become another pink spot saga—the detection of specific compounds in the urine of schizophrenics. A marvellous infrared spectrophotometer, with a forty-metre light path, was there

© 1969 Nature Publishing Group

to demonstrate the fact that cigarette smoke contains a foul catalogue of compounds, hydrogen cyanide, carbonyl sulphide, diethyl ketone and styrene among them. Also on show was the germ-free isolator, developed at Porton, in which a human baby was recently born and reared for a few weeks.

But such work is clearly the icing on the cake. The main business of the Chemical Defence Experimental Establishment continues to be the assessment of new weapons, the design of detection and decontamination systems, and the development of chemical therapies. One obvious difficulty is that if Porton is working on new chemical weapons, it would be expected to keep quiet about them. The only weapons revealed were the familiar triumvirate of nerve gas (cholinesterase inhibitors), tear gas (for example, chloracetophenone) and psychedelic (for example, BZ, and perhaps LSD).

Two nerve gas detectors were on display. One, electrolytic in nature, depends on the reaction between cyanophosphonate nerve gas and an oxime, while another, more specific but rather temperature-sensitive, depends on the reaction between purified cholinesterase and the gas. Therapies for nerve gas poisoning seem to have made little progress for some time. A combination of oxime, to dislodge the nerve gas residue by nucleophilic substitution, and atropine, to block acetylcholine, is still the mainstay of treatment. But some nerve gas residues readily dealkylate into a form which is immune to oximes, while administering the highly poisonous atropine poses a few problems of its own. At the open days, Porton took some credit for showing that Russian accounts of antidotes to nerve gas are misleading. The clear implication, for Porton's chemical Kremlinologists at any rate, is that the Russian publications may be covers for more successful unpublished work.

More straightforward progress has been made in designing protective clothing, masks and the like, and the displays here were clear, and in the case of gas masks, striking. The open days made an unexpected contribution to social history by showing for the first time a film of a military exercise by a platoon of Commandos who had eaten 160 micrograms of LSD (200 micrograms of LSD tartrate). Discipline collapsed as the drug took its effect, and one hour after ingestion the soldiers were giggling, climbing trees and feeding the birds. The troop commander tried to maintain his authority but eventually he too abandoned himself to the effects of the drug. The metamorphosis of these highly trained men into a species of flower child was remarkable—and all the more so because it happened in 1963, years before there were any civilian experiments with the drug.

All in all, Porton's exercise in self-exposure can be counted a success. Three thousand people attended the open days, of every shade of opinion, and there were signs of suspicions being allayed on all sides. A booklet issued for the occasion caught the tone of the proceedings: its cover featured a painting of allied soldiers routed by a German chlorine attack in the First World War, and the painting was captioned: "Past sorrows, let us moderately lament them. For those to come, seek wisely to prevent them." Inside was another quotation, scarcely apt but still effective: "In full, fair tide, let information flow. That evil is half-cured whose cause we know."

ARCHAEOLOGY

Archaeology at Royal Society

THE announcement that the Royal Society and the British Academy are to hold a joint symposium on the "Impact of Natural Sciences on Archaeology" next December marks a further step in the changing attitudes at Carlton House Terrace. Traditionally the Royal Society seemed to have decided that archaeology was not a science and was therefore outside its purview. Whether or not archaeology is a science is still an open question, but in the past twenty years archaeologists have come to rely increasingly on techniques based on new developments in the natural sciences. Indeed, the December symposium is a celebration of the most important of these, the coming of age of the radiocarbon-14 dating method.

It is hoped that Professor W. F. Libby of the University of California, who discovered the carbon-14 technique, will open the symposium by reviewing radiocarbon datings of specimens from Egypt and Arizona and the discrepancies between these dates and those derived from astronomical evidence and analyses of tree-rings. The discrepancies may be the result of changes in the Earth's magnetic field, which will also be discussed by Professor Libby. Forty years ago nobody dreamed that changes in terrestrial magnetism were relevant to archaeology.

As well as Professor Libby, the symposium promises an impressive list of speakers from Europe and the United States; the British Museum and the Universities of Oxford and Cambridge are well represented with such people as Drs A. E. A. Werner, I. E. S. Edwards and M. J. Aitken and Professor H. Godwin; Dr I. Scolla from Bonn and R. E. Linington from Rome have been invited as well as Professor A. Sachs from Brown University, Professor B. Bannister from Arizona and Professor R. Berger and Dr V. Bucha from California. Their topics range from critical assessments of carbon 14 datings and absolute datings from Mesopotamian records to magnetic methods of prospecting, analysis of metals and magnetic field studies.

The symposium clearly promises to be of great interest to both scientists and archaeologists; it should also prove a great fillip to those who argue that archaeology needs to be classed as a science if only to put it under the wing of a research council—NERC is the obvious choice—and so guarantee respectable financial support. And perhaps once the archaeologists have proved their scientific mettle the Royal Society will open its doors to them more often.

NORTH SEA GAS

Shore Terminal

THE processing plant at Bacton, Norfolk, for purifying up to 4,000 million cubic feet a day of North Sea gas was officially opened on Tuesday, June 3. By 1972, the Gas Council estimates that the plant will be handling about 2,000 million cubic feet a day of natural gas, about twice the present average consumption of the whole of Britain, and by 1974 the rate of flow is expected to reach the maximum capacity of the plant of 4,000 million cubic feet a day.

The Bacton site has two functions. The gas piped to shore from the North Sea rigs has to be purified to

© 1969 Nature Publishing Group