

tute carries quietly on with its profit making research. It boasts of being the only contract research organization owned by a professional scientific body and as such it is remarkably successful, having increased its capital assets from £40,000 when it was founded in 1946 to £250,000 in 1966. It was sold in 1965 by Imperial Chemical Industries to The Institute of Physics and The Physical Society (which is the name of a single organization). Mr E. A. G. Liddiard, the director of the institute since its foundation, is retiring next year.

The institute is run on strictly commercial lines and receives no grants from outside sources or its parent body. Much of its research work is carried out for the Government (about 30 per cent) and for the Atomic Energy Authority (35 per cent). About 15 per cent of the research is for sponsors overseas and the rest for individual British industries. The institute is chiefly engaged in metallurgy, physical, inorganic and analytical chemistry, solid state physics and engineering. Long-term projects include work on the structure of liquid metals using X-ray diffraction techniques and studies of superconducting materials and the problems associated with the production of high magnetic fields. The metallurgy department is at present looking at chromium-base alloys and has studied uranium and aluminium alloys. Precision measurements of heats of formation, and investigations of the physical chemistry of metal producing reactions, heat and mass transfer phenomena and the mechanisms causing stress corrosion and corrosion fatigue, have been sponsored.

#### UNIVERSITY CURRICULUM

### Chemists into Economists

CAN economics be usefully introduced into undergraduate chemistry courses? A group of chemists and economists met at ICI Mond Division, Runcorn, some days ago to discuss the question. The meeting was instigated by Dr Duncan Davies, deputy chairman of ICI Mond Division and a member of the Swann Committee. The discussion was haunted by the now familiar spectre of the unwillingness of bright science graduates to enter industry. The potential contribution of economics to chemistry courses was seen in this light, as a way of informing the students of the urgency and variety of problems that await them in industry. People were less hopeful that such studies might make a direct contribution to the future industrialist's industrial skill.

The group came to two conclusions. First, there is scope for the inclusion of an economic dimension into chemistry courses, even as they are organized at present. The opportunity is clearest where economic factors run counter to chemical expectation in industrial practice. This is exemplified by the manufacture of acrylonitrile, where propylene rather than the chemically more expedient acetylene is the starting material of choice.

To make this teaching effective, the group recommends a one week economics course just before the beginning of the second year of the usual undergraduate course. There would be business games, plant visits, case studies and economic lectures. The Careers Research Advisory Centre, which organized a similar week for postgraduates some time ago, was suggested as a possible manager. A second possibility, more

radical, is to create new courses in which chemistry and economics stand in equal partnership. There is some precedent for this in the Stirling Technological Economics School, and a combined Chemistry and Economics course has been proposed at Oxford. The course at the University of Manchester known as Liberal Studies in Science was held up as an example, although some people feared that this course is more humanistic than industrial. It is unlikely that a satisfactory course of this kind could be formed by the mere grafting together of existing courses—a fairly thorough reworking of current practice would be necessary from both the chemical and economic sides.

Coming so soon after Dainton, Swann and Pippard (see *Nature*, **219**, 1307; 1968), there is little doubt that the group's recommendations will find an audience receptive to the need for change. And the group was confident that some of the academic high flyers, at present set on a career of cloistered research, may be tempted into industry by early exposure to the kind, and the severity, of the problems that would confront them there. The group was less sure that it had an answer to student idealism, a more insidious opponent than academic fastidiousness. A chemistry professor reported with mixed pride and trepidation that the embryo Kropotkins and Proudhons who until very recently gathered themselves exclusively in sociology departments were now making a showing in his freshman classes. Nobody yet knows what, if anything, will persuade these youngsters to mollify their absolutism and yield to the needs of profit-directed industry.

#### ENVIRONMENTAL NOISE

### Non-destructive Testing

As the two-tier postal charges are to the British General Post Office, so are sonic booms to the Ministry of Technology. Taxpayers do not like them. But if anyone expects a report on the series of sonic booms over London and elsewhere in the summer of 1967, the ministry is quick to point out that they were not tests—nothing was measured except the capacity of the ministry's telephone exchange—but simply an exercise to acquaint the public with the sound of a sonic boom. There has not and will not be any report specifically on that exercise. On the other hand, the investigations of the effect of sonic bangs on cathedrals, which were announced on September 20 this year, are real measurements although they will not involve real sonic booms. No one apparently had time to organize seismic measurements in places like Westminster Abbey during the three booms in 1967.

The measurements at cathedrals are being organized by the Royal Aircraft Establishment at Farnborough, which is chiefly responsible for the ministry's sonic boom test programme, but the actual measurements are being made by members of the Institute of Sound and Vibration Research at Southampton University under contract to the RAE. If the church authorities agree—and not all of them have done so yet—the RAE intends to include twelve or thirteen cathedrals in the survey. Winchester, York, Canterbury, Ely, Durham and Manchester are apparently on the list; work at Winchester and Canterbury has been completed and this week Lincoln was tested. The objective is to find out how the cathedrals respond to everyday

environmental sounds, traffic noise and vibration, winds, thunderstorms, ringing the bells and even playing the organ. There are seismographs on the ground and accelerometers on the windows. From the measurements, the structural transform function of the buildings can be calculated, and the RAE hopes to establish a relationship between this and differences in maintenance costs of cathedrals in quiet and noisy sites. The transform functions will also be used to test predictive mathematical models of the effects of sonic bangs on buildings, which have been derived from model experiments at Farnborough and elsewhere.

The ministry and the RAE say they have chosen cathedrals for the tests because their complexity provides an exacting test of the theoretical models, because the history of cathedral buildings is well documented and because their longevity is in some sense a guarantee of immunity from damage. The RAE insists that the tests in no way imply that cathedrals are likely to be particularly susceptible to sonic boom damage and, in fact, the RAE is claiming that the cumulative effect of sonic booms would only increase the maintenance costs by a fraction of one per cent. Although some alarm has been caused by the mention of using small explosive charges in some of the tests, this seems to be a red herring. Apparently the charges are no greater than many of the fireworks which will be let off on Guy Fawkes night, and Mr D. R. B. Webb of the RAE says that the noises in Canterbury Cathedral on bonfire night will be greater than that of the charge which was used in the test there. Judging, however, from the reluctance of some of the cathedral authorities to allow tests involving explosions, Mr Webb's confidence is not everywhere shared.

Each cathedral will be tested for between two and

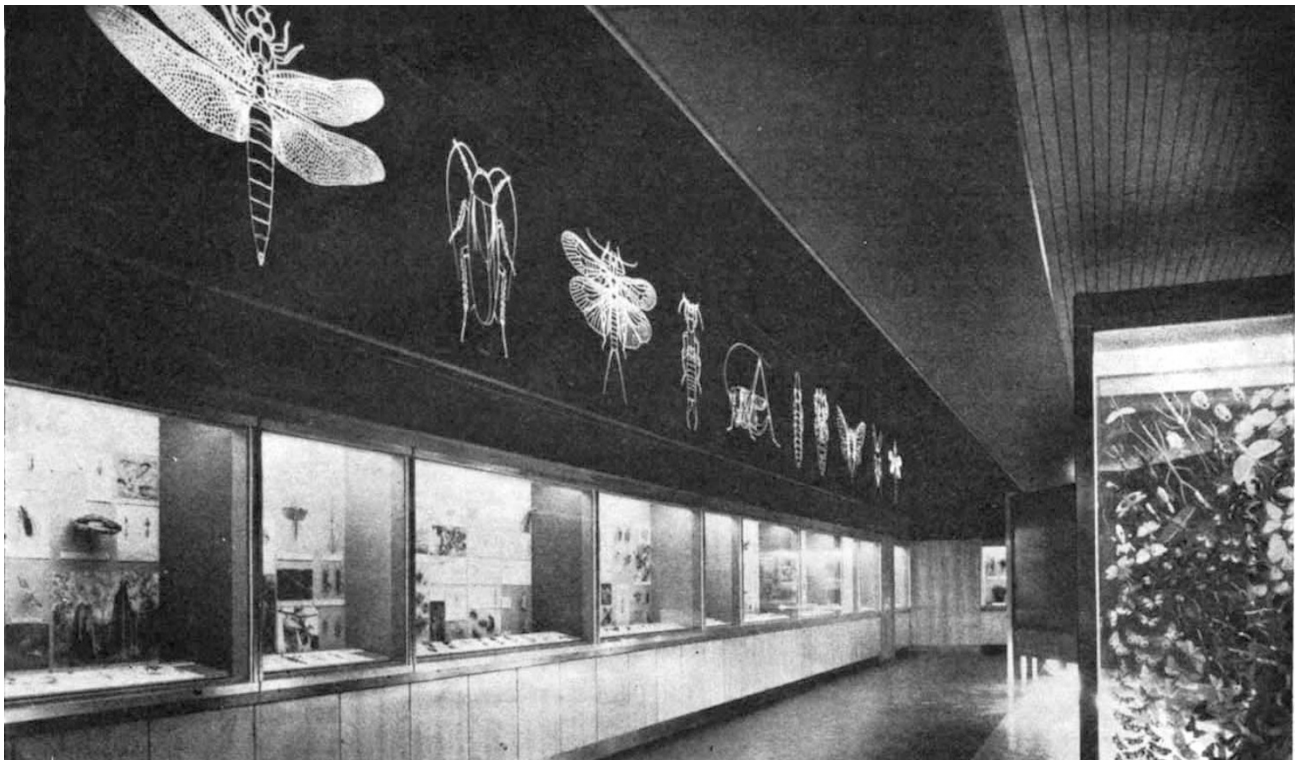
seven days; the whole survey is due to be completed by November 18.

The whole operation is costing several thousand pounds, but Professor Clarkson of Southampton said on the telephone last week that, even if he knew the exact amount, he would probably not be prepared to say what it is.

#### EXHIBITIONS

### Insects on Show

A COMPLETE break from the traditional and rather musty displays of insects in natural history museums has been made by the new insect gallery, opened to the public last Tuesday in the British Museum (Natural History) in South Kensington. The new gallery occupies part of the old Shell Gallery which was damaged during the Second World War. This has since been repaired and completely re-equipped. A riveting vertical panel of butterflies, moths and large colourful beetles stands at the entrance to the gallery. Around the sides are attractive and well chosen displays illustrating the different types of insects, their structure and distribution and the various adaptations which make insects such a diverse and fascinating group. In the middle of the room other cases are temporarily filled with photographs but will eventually contain displays of insects in relation to man—carriers of disease, agricultural pests and so on. Daylight has been completely excluded from the gallery and light in the display cases provides the only illumination. Round the dark upper part of the gallery is a striking frieze of large line engravings on glass illuminated from behind illustrating the diversity of insect form.



The new insect gallery at the British Museum (Natural History).