

will take the place of the diplomas which were awarded by the College of Aeronautics, and they will be strictly comparable to corresponding university degrees.

Professor A. J. Murphy, principal of the College of Aeronautics, will be the institute's first Vice-Chancellor and, when he retires at the end of the month, he will be succeeded by Professor A. H. Chilver, who has been director of the Centre for Environmental Studies since 1967.

#### HORTICULTURE

## Banishing the Viruses

from our Botany Correspondent

THE technique of growing plants free of viruses by starting with the tiny growing points or meristems of previously infected plants seems to be coming into fashion. The latest annual report of the Glasshouse Crops Research Institute near Littlehampton (15s) describes a crop of experiments in meristem culture involving various ornamental flowers as well as a potato. The essence of the technique is to subject infected plants to a temperature of 35°–38° C, which upsets the balance between replication and breakdown of the viruses in the host cells. If the meristems are then removed and cultured, some of the resulting plants are free of viruses. Some of the popularity of the technique no doubt derives from the discovery that the yield of many familiar crop plants is depressed by viruses even if there are no outward symptoms of disease.

In the virology department at GCRI, there are now clones of *Chrysanthemum* cultivar 'Mistletoe' free from stunt virus, and of carnation cultivar 'Tangerine Sim' free from carnation etched ring virus 50, all derived from meristem cultures. Similar clones of *Narcissus* cultivar 'Grand Soleil d'Or' are also growing well, free of known viruses. Some of them have flowered, producing more and larger blooms than infected plants. Clones of *Freesia*, free of streak virus, have also flowered. Meristem tips of other *Narcissus* cultivars are growing well in culture. Tulip, iris and hyacinth complete the list of ornamental plants that are in the early stages of meristem culture, and no doubt we can expect to see bigger, better and healthier blooms in the gardens of the future.

The same technique has also been used to produce clean Kenyan potatoes from imported strains which were infected with a virus of the potato Y group and an unknown bacterium. Meristem tips from axillary buds have been cultured to produce clones free of both virus and bacterium, and tubers of these clones are to be sent to Kenya to form a foundation stock.

Investigations of factors which affect the so-called vase life of cut flowers have revealed that 'William Sim' and 'Pink Sim' carnations will droop more quickly if the plants from which they were cut grew in soil deficient in boron. It seems that during the second year of cropping, when boron deficiency tends to build up, vase life can be extended by supplying the plants with the element. Calcium, on the other hand, seems to be harmful in this respect.

Plant hormone enthusiasts should be interested in trials of a new defoliant 'Ethrel' (2-chloroethyl-phosphonic acid). When this compound enters a leaf, it is broken down, releasing ethylene, which promotes

abscission. 'Ethrel' has been tried on various varieties of deciduous shrubs, but results so far compare unfavourably with those obtained with the more mundane potassium iodide.

#### PHYSICS

## Europhysics Journals

THE European Physical Society has adopted the *Philosophical Magazine* as one of its general physics journals, in line with its policy of coordinating European physics publications. The editor, Professor Sir Nevill Mott, will meet members of the publications committee early next year to discuss the formation of an advisory European editorial committee. The other journals which have so far been recommended by the society are the British *Journals of Physics* A, B and C (General, Atomic and Molecular, and Solid State), the Italian high energy journal *Nuovo Cimento*, the French *Journal de Physique*, the Dutch *Physica*, the Czechoslovak *Journal of Physics* and the Yugoslavian *Fizika*.

The EPS intends to start its programme of coordination by concentrating on selected European journals which contain primary articles and are not published by societies. The publication committee of the EPS will attempt to draw up criteria for the journals participating in the scheme which will define the languages of publication, the composition of editorial committees, abstracts, refereeing system and the time lag before publication. It is not yet clear how the system will work in practice or to what extent the EPS will be able to influence the editorial policy of the individual journals.

There will also have to be agreement on more technical details such as page charges, subscription rates and the standardization of size and covers. Of the journals that have been recommended so far, only *Nuovo Cimento* has page charges and discussions are in progress on ways of abolishing them. Each of the recommended journals has the right to use *Europhysics Journal* as an additional title, together with the emblem of the EPS.

#### SOVIET RESEARCH

## Diamond Threads

from our Soviet Correspondent

A NEW property of carbon has been discovered by a team of scientists working in the Institute of Physical Chemistry of the Academy of Sciences of the USSR, who have demonstrated that carbon is capable of being isolated from organic compounds in the form of filament crystals of diamond. A special reactor has been developed in which carbon atoms are "precipitated" from a heated gas on to the surface of diamond monocrystals which act as seeds. Crystals have been obtained of up to 2 mm in length and several tens of microns in diameter. A high rate of growth of the monocrystals is claimed; it is stated that this may even be observed directly with a microscope. No details have so far been given as to the temperature or composition of the gases employed. The research team includes Academician B. V. Deryagin, Dr V. M. Luk'yanovich, Candidates of Technical Science D. V. Fedoseev, V. A. Ryabov, B. V. Spitsyn, and Engineer A. V. Lavrent'ev.

This discovery is considered to be of considerable theoretical and practical importance, and has been registered by the Committee of Inventions and Discoveries of the Council of Ministers of the USSR as a major scientific discovery.

#### HEALTH ECONOMICS

### Cost of Disease

THE treatment of mental, psychoneurotic and personality disorders accounts for more expenditure by the National Health Service than any other group of diseases. An analysis of the costs of medical care published by the Office of Health Economics shows that 18.5 per cent of what the NHS spends on the treatment of specific conditions is spent on caring for mental patients. Most of this cost is attributable to hospital in-patient treatment. More than half of all hospital beds are for mentally ill or subnormal patients, although the relatively low cost of their treatment means that this accounts for a quarter of the total in-patient cost. The Medical Research Council spends only 7 per cent of its total grant-for-aid from the government on mental health.

Diseases of the respiratory system and of the circulatory system account for 9 and 8 per cent of the NHS expenditure respectively. Most of the money spent on respiratory disease is spent outside the hospitals, the largest single cost being the diagnosis of bronchitis and its treatment with antibiotics. On the other hand, more is spent on in-patient treatment for circulatory disease, particularly for coronary heart disease. Next in order of expense are diseases of the teeth (7.5 per cent), deliveries and disorders of pregnancy (7 per cent), diseases of the digestive system (6 per cent), and injuries (5 per cent). The expenditure on cancer is 4 per cent of the total.

#### IMAGE TUBES

### Bigger Market Sought

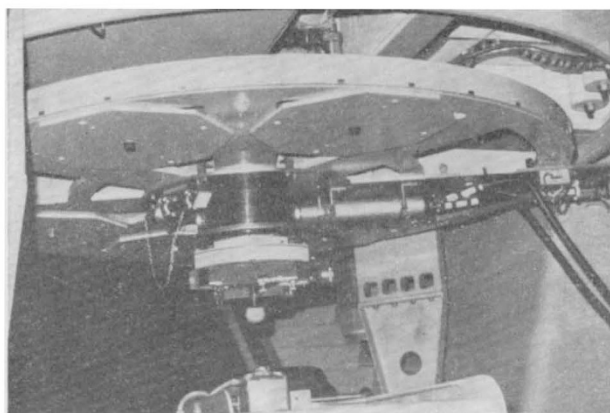
from our Astronomy Correspondent

BRITISH optical astronomers are wondering how to increase the market for Spectracon image tubes from the annual dozen at present to about fifty per year. The tubes, which were developed by Professor J. D. McGee at Imperial College (London), operate by accelerating photoelectrons to such an energy that each exposes a small clump of grains in an emulsion. So far, the tubes are being used almost entirely for spectroscopy, although they have applications whenever faint optical images have to be recorded. Dr M. F. Walker, at the Lick Observatory, for example, has used a Spectrocon at the AURA Observatory at Tololo in Chile on a 60-inch telescope for the direct photography of star clusters. The tube makes possible stellar photometry down to magnitude 23, which is comparable with what can be done with the 200-inch on Palomar Mountain.

The immediate problem is that not enough astronomers need the tubes to make manufacture viable. Apart from providing built-in obsolescence, the answer seems to be to find uses outside astronomy. Things will be worse in two years when Professor McGee will have retired, and the Image Tube Management Committee under Dr V. C. Reddish, the Royal Observatory,

Edinburgh, is aware of the urgency. The committee was set up by the Science Research Council several months ago and administers a grant of £21,000 over three years to cover the production of Spectracons and cascade tubes—about half of each—for astronomy. But part of the problem seems to be that the overseas market is being discouraged. Professor McGee has apparently received many enquiries from abroad, but most of them have had to be turned down because of the limited facilities available at Imperial College.

Some tubes are being used outside astronomy—Professor D. J. Bradley of Queen's University, Belfast, has one for his work on photon physics—but apparently not enough to interest a commercial company. Clearly other people are being as slow to exploit the potentialities of the tube as astronomers were in the first place. A design for a spectrograph for the Isaac Newton Telescope based on a Spectracon image tube has been on the stocks at the Royal Greenwich Observatory, Herstmonceux, for four years now, and is still some way off completion.



Spectracon image tube mounted in focusing solenoid for direct stellar photography at the Cassegrain focus of the Isaac Newton Telescope (photograph by Dr B. L. Morgan).

Professor McGee and his team are turning out two or three dozen of the tubes each year, about half of which are experimental. How much each would cost in commercial production is almost impossible to estimate, but one guess is of the order of £1,000. Even so, this seems to be much less than comparable pieces of apparatus. A similar type of tube, but said to be more complicated to use, has been developed in the United States and taken up by a manufacturer who charges \$35,000. In Britain, the two possible manufacturers who have been approached have apparently not been enthusiastic. What people are worried about is that if a British company cannot be persuaded to take up manufacture, an American firm will come along with a tube more nearly like the Spectracon, and that astronomers in Britain will settle for that rather than the British product.

#### LENIN DAYS

### Science in Estonia

THE latest in the series of Lenin Days of Science, which are held from time to time in Moscow and are devoted to the scientific achievements of the various republics of the USSR, focuses attention on the smallest of them—Estonia. It might seem that Estonia is not