

international lines and the Australian national network. The system is of a type already installed at Tumba, near Stockholm, and should go into trial operation in Sydney in 1970. Trials will last until 1972, after which the exchange may be expanded for regular commercial use.

The Australian Post Office is currently considering tenders for a large capacity trunk exchange in Sydney, possibly operating on a basis of stored program control. It may be next year before a contract is awarded, but a number of companies from Britain, Europe and Japan have submitted designs, and in view of the particular requirements of the Australian network it seems that stored program control may eventually be used. How this technique works can most easily be described by a comparison with critical path analysis. Because a trunk call is typically routed in a complex way through a number of exchanges, the most economical path available may be difficult to find quickly, as is well known to all who have been frustrated in their attempts to make long-distance calls through the operator. With the coming of trunk dialling, it is clearly helpful to accelerate the process, and the value of stored program control is that it can bring this about by making it a matter of going through computer routines. An Ericsson system for this is now in operation at the Tumba exchange in Sweden. In Britain, the Post Office is conducting trials with a model of a large exchange system which uses a measure of stored program control for switching operations. According to the Post Office, decisions on suitability for general use on the public telephone network must await assessment of these London trials, but industrial opinion is that it may be ten or fifteen years before the system will come into widespread operation.

Whether stored program control is suitable for a particular telephone system is very much a function of the nature of the network and the size of the exchanges involved. Smaller exchanges may continue to function quite happily with mechanical switching, and the GPO is developing improved electromechanical devices for operating switches. If stored program control is going to be used, however, it is better that the exchange should be entirely electronic, because the time saved might be reduced considerably by the slower action of mechanical switches. It seems to be the development of a complete electronic exchange that needs most work.

One pointer to the future may be provided by information released from the Plessey Co., Ltd, last April, which forecasts that the market for stored program control systems will be expanding greatly by the mid-1970s. The company expects to have 4,000 people engaged by then in working on a version which, it claims, has clear advantages through using several smaller processors instead of one centralized processor. If one computer fails, it can be substituted automatically from another part of the system, so that total breakdown is avoided.

#### HIGH ENERGY PHYSICS

### Labour Troubles at Frascati

It is tragic that ever since the successful operation of the Italian electron-positron storage ring ADONE

(*Nature*, **222**, 927; 1969), the laboratory at Frascati has been on a go-slow strike which has involved a complete cessation of research. The Centro Nazionale di Energia Nucleare runs three laboratories in Italy, including a large part of the National Laboratory in Frascati (including ADONE). It is in an unusual position; the president of CNEN is not a civil servant but one of the ministers of the government (Tassari). This led to problems some years ago when the secretary-general of CNEN—Ippolito—was jailed for exceeding his authority (the only personal gain there seems to have been the personal use of a CNEN car while at Cortina d'Ampezzo).

For the past year, the Government of Italy has had more important preoccupations than CNEN; the socialist party has split, and there is the unusual experience of a political crisis during the summer holiday. The effect on CNEN has been disastrous. There have been no proper salary increases for some time; and there is no proper organization with which the union (SANN) can negotiate. Among other details, which it is hard to discuss from a distance, the union wants an immediate salary increase; the lowest scale now is L.75,000 (£80) a month (paid for 14 months) which is inadequate with Italy's high cost of living. An immediate increase of L.30,000 is requested.

It is to be hoped that these issues can soon be resolved even in the absence of the president of CNEN and that ADONE can commence the exciting experiments that are prepared.

#### PHYSICS

### Anglo-Italian Microscope

THE agreement reached in 1968 between the Royal Society and the Accademia Nazionale dei Lincei for promoting Anglo-Italian collaboration in science has now led to a joint programme of research to be carried out at the Cavendish Laboratory, Cambridge, and the University of Bologna to study the development of new electron microscope instruments and techniques. The Science Research Council is making a grant of £23,000 towards the cost of the project and the Consiglio Nazionale della Ricerca of Italy is providing £6,000.

The research will be carried out by Dr H. Valdre at the University of Bologna and Drs V. E. Cosslett, A. Howie and L. M. Brown at Cambridge. The grants will cover a period of three years, and will provide a welcome extension of the collaboration between the two university groups established some years ago.

The project will be in two parts. The first will be to examine the production of an electron optical analogue of the familiar light optical phase contrast microscope. The experiments to be carried out include the interpretation of electron diffraction data by determining the relative phases in a diffraction pattern and the structure determination of viruses and macromolecules. There may also be a study to determine unambiguously the nature of imperfections in crystalline materials and to investigate the possibility of resolving individual atoms in the electron microscope.

The second part of the project will involve the design and development of a straining stage, with specimen tilting, to work reliably under conditions of constant load. Among the proposed experiments is the observa-