tration to ensure that the right sort of training is found for, or adapted to, the right sort of students, and that what is learnt is applied and passed on.

Technical assistance generally is reviewed in a separate chapter. Since 1950 technical assistance has been extended to about 11,000 trainees and about 4,000 experts have been provided, the figures under the Technical Co-operative Scheme in 1955–56 being 50 per cent higher than those for 1954–55. There has been some shift in emphasis towards engineering (particularly applied scientific research), while interest in agriculture, health and education continued and training periods tend to lengthen. Increasing use is being made of training facilities available in the region, and India has provided training facilities for 556 persons. In some fields contributions from teams of experts are becoming more frequent, and generally there is a marked emphasis in technology and industry on experts from outside the region. New ways by which technical assistance could be provided are being studied, and Australia has introduced a Correspondence Scholarship Scheme under the Colombo Plan. Much equipment has been provided for laboratories and training and research institutions and of the offers of equipment and spare parts to the value of £3 million made or under negotiation, £600,000 is for laboratory equipment, £1,300,000 for training purposes and £375,000 for research equipment.

Technical assistance continues to form a large part of United States aid to the countries of south and south-east Asia, for which more than 40 million dollars were made available in the year ending June 30, 1956, a major objective being the development of self-supporting educational and training facilities to the point where more and better training can be provided from the countries' own resources. Up to that date the United States Government technical co-operation programmes financed the training of nearly 4,000 persons and the provision of more than 1,200 United States experts in the countries concerned, as well as making available a wide range of demonstration and training equipment. Many contracts, usually for three years, have been concluded between universities in south and south-east Asian countries and those in the United States, covering assistance in improving curricula, provision of training facilities in United States universities and interchange of teaching staff.

The United States Government and its Specialized Agencies are another major source of technical assistance, and stress is laid on the value of the reports and economic surveys produced by these bodies. The United Kingdom is the principal source of technical assistance to Singapore, the Federation of Malaya, Sarawak and North Borneo, and bilateral technical assistance agreements have been made between certain Colombo Plan countries and countries which are not members of the Plan. To avoid overlapping and ensure that such assistance is, so far as possible, complementary, liaison officers are maintained with the Council for Technical Co-operation in Colombo by both the United States Government and the United Nations Technical Assistance Board.

A chapter of special interest in the report is that which reviews the tasks ahead. While much progress has been made in the economic growth of the region, there is an increasing awareness of the need for maintaining flexibility in furthering development programmes, while consolidating existing gains. The problem of developing sufficient opportunities for productivity employing the growing human resources of the area remains, while the varying stages and forms of development and the wide range of experience within the region provide new opportunities for co-operation among the countries of south and south-east Asia. Future development will tend to require more complex and difficult decisions in such matters as the extent to which the fruits of development can and should be devoted to consumption rather than investment, the pattern of investment, and the impact of a country's development programme upon its external situation and the economic life of other countries. The mobilization of additional departmental energies will be required in both the public and the private sectors, and while the flow of external resources to the countries in the region has so far been largely in the form of grants, increased opportunities may develop for drawing on foreign private investment and on private and public loans as sources of external capital. The record of achievement set forth in this report gives reason to believe that, however great may be the difficulties ahead, they will be overcome.

## THE FUTURE OF REINDEER IN SCOTLAND

WHEN reindeer were introduced into Scotland some ten years ago, a significant factor was that the various ground, rock and tree lichens eaten by reindeer play little part in the diet of red deer, roe deer, sheep, or other indigenous animals. In places the lichens form a carpet several inches deep. It was this discovery of untouched lichens that gave rise to the reindeer experiment now proceeding in Scotland; its course has been described by N. N. P. Utsi (*Oryx*, 4, No. 1; April 1957).

In northern Scandinavia there are more than 600,000 domesticated reindeer and in the northern U.S.S.R. approximately two million, valued for their meat, skins, milk and hair, and for transport. These benefits have led to imports of reindeer in Alaska, Canada and South Georgia. Usually described as an arctic animal, the reindeer is widely found in the sub-arctic and in zones regarded as 'temperate'.

There were many reindeer in Scotland in prehistoric times, and these were probably hunted with red deer. Why the wild reindeer died out while the red deer remained is unknown. Utsi suggests that reindeer meat was probably more popular, and the pre-firearm techniques of the chase were not adequate to eliminate the fleeter red deer.

Why should reindeer now be 'forced' to live in Scotland when they had once died out? There are a number of reasons. Good meat can more easily be obtained at the time it is wanted, and be carefully handled, when it comes from a tame or at least half-tame animal. Reindeer owners, whatever their language or origin, eat mainly or only reindeer meat; their farming neighbours often buy reindeer meat, in spite of owning meat-producing animals themselves. In the cities and towns of Scandinavia it is rated a delicatesse; the tender tongue is a delicacy in Europe. Reindeer hide also tans to a fine chamois-like surface suitable for ladies' gloves and handbags.

The leader of the experimental herd has now been in Scotland four and a half years. After setbacks on unsuitable land, the herd has been increasing since May 1955, through calves bred and born in the Cairngorms, and now numbers sixteen. When considering the future of reindeer in Scotland, it is recognized that there is some overlap between the pasture of reindeer, red deer and sheep. But, as there are areas in Scotland which are scarcely grazed by red deer or sheep and yet offer good reindeer pasture, this slight overlap would not justify the exclusion of reindeer.

## RARER BIRDS OF PREY

BIRDS of prey always attract attention and arouse an unusual degree of admiration or persecution according to outlook. Largely for that reason, their distribution and their breeding-populations are often shrouded in secrecy. Indiscriminate disclosure which could lead to persecution or disturbance of hard-pressed species would be indefensible. Secrecy can be carried too far, however, and it is essential to both science and bird-protection that adequate records should be kept, and that information which cannot harm the birds should be shared. The editors of *British Birds* have, therefore, prepared an up-to-date account of British birds of prey, indicating those factors which have been working for and against the birds (**50**, No. 4; April 1957).

Over the past few years there has been an increase in the numbers of buzzards, kites, hen harriers, marsh harriers and, perhaps, golden eagles. The osprey may now be re-establishing itself, and the goshawk has returned after an absence of a century or two. In almost every case, however, the position to-day looks worse than it was a year or two ago. The buzzard received a severe setback during 1954–55 through the impact of myxomatosis, coupled with increased human persecution. The kite population has also been unsettled and reduced. The 1956 reports from Scotland indicate that the hen harrier fared badly on the mainland and in the Hebrides. The golden eagle also suffered from shooting, poisoning, eyrie-stoning and burning, and in 1956 a number of pairs were missing from regular haunts. The disturbance caused by human intervention during the osprey's attempted nesting last season is widely known. Marsh harriers failed almost entirely in 1956 in one of their three strongholds. No breeding record of the goshawk has been made in recent seasons. Of other birds of prey, the numbers of Montagu's harrier are perhaps about the same as before the War, or a little higher, although probably less than they were ten years ago; there is no evidence of change in the status of hobby or honey buzzard; the peregrine has made some recovery from war-time organized shootings.

It is hoped that the publication of the survey will lead to the filling in of a number of gaps in the available information by contributions from other ornithologists. It is also hoped that efforts will be made to review the food and economic status of birds of prey and to bring about a more scientific and modern attitude towards them. A special article on the buzzard is being prepared for a later issue of the journal.

## A NEW ELECTRONIC DIGITAL COMPUTER

THE Metropolitan-Vickers Electrical Co., Ltd., which has for some years been engaged on basic developments for a variety of electronic computers, has recently announced the completed development of the first model of a new range, the 'Metrovick 950', which is a general-purpose electronic digital computer capable of application to a wide variety of mathematical problems in research and engineering design. The computer incorporates interesting features of modern technique including the use of printed wiring on the plug-in boards and the extensive use of transistors in place of thermionic valves.

The machine is basically a device which will do arithmetic at high speed under the control of instructions given to it by the operator. The problem to be solved must first be stated in mathematical terms, and then the process of solution must be reduced to a series of simple arithmetical operations which the machine will perform. The list of instructions, called the 'programme', causes the machine to perform the necessary operations and combines them in appropriate sequence. The five basic units of the computer consist of the input equipment, for feeding information into the machine; the store, for holding instructions and data; arithmetical circuits, for performing the calculations; output equipment, for giving the results; and a control unit, to co-ordinate the whole machine so that instructions are obeyed correctly and in the right order. The input of numerical data and the programme of instructions are coded into holes punched on a paper tape, which is fed into the computer and from there read off photo-electrically at a high speed of up to 200 characters per second. The numbers are punched in the tape as decimals, each digit being represented by a five-hole combination, and each instruction is coded as a combination of decimal digits which is punched into the tape in that form. The computer automatically converts the decimal form into a binary representation in which one number or instruction is normally represented by thirty-two binary digits, called a 'word'. The main store is a cylindrical drum coated with magnetic oxide, on which a total of 4,096 'words' are 'written' as magnetized spots on 128 separate circumferential tracks, and the mean access time to the location of any word on the drum is one-half of a revolution period, that is, ten milliseconds. In the circuits the numbers and instructions are represented by electrical impulses which occur in a regular series with a pulse or digit frequency of 75 kc./s. In addition to the main store there are several stores with capacities of one or two words, the 'registers', for use in the arithmetical unit. The registers take the form of regenerative tracks on the drum, and a further store holding eight words on a regenerative track is provided to enable instructions to be modified after they are taken from the main store and before they are obeyed. The arithmetical circuits, which use transistors, include an adder–subtractor unit and a multiplier. The output is by means of five-hole punched tape or a printed page, and the control unit, using transistor circuits, controls the sequence of operations and the flow of instructions and numbers in the computer. The basic timing of the computer is controlled by signals obtained from the tracks on the magnetic drum, thus synchronizing the computer with the drum.