to buy animals from the centre, which charges £15 for a cat. In the long run, however, Mr Bleby maintains that carefully bred, often vaccinated and genetically defined animals obtained from the centre are more economical as fewer need to be used.

About 90 per cent of all animals used in experiments in Britain come from commercial breeders who are under the direct control of the Medical Research Council. This accredited breeders scheme was started by the Laboratory Animals Centre in 1950 to boost large-scale production of the animals, and is voluntary. But the demand for specialized strains of animals has become so great that the breeders alone cannot cope and the centre now maintains a number of strains from which breeding nuclei are supplied. Together with the specific pathogen free (SPF) and germ-free animals, these breeding nuclei have become a major feature of the centre.

SPF animals are, as the name suggests, without disease, but they still have a normal gut flora. Germ-free animals, on the other hand, are completely without bacteria and the technical difficulties in rearing these animals are considerable. For this reason, the rearing of small germ-free animals at Carshalton is still at the pilot stage under the direction of Dr D. K. Blackmore. These animals will be used to restock the SPF unit should any mishap occur there, such as infection of the animals. They can also be used, however, in specific studies such as determining the synergistic effect of certain bacteria or, as Dr H. B. Stoner at the centre suggested, to find out why some food additives become toxic in the human body; this could either be a result of the action of the gut flora, or part of the normal human metabolism.

Germ-free swine and cattle are also being reared at the Royal Veterinary College, London, with considerable success. Here they are being used by Dr P. C. Trexler and his colleagues to study respiratory diseases; for the production of monospecific antisera against viruses; and for investigating the role of the normal bacteria in the economy of the animal. Even more striking is the news that a human child was born in December under germ-free conditions. The reason for this strange delivery was given by Mrs M. Tuffrey at the Institute of Child Health and is that the child had a one in four chance of being born with a specific defect of the immunological mechanism; the mother had already lost one child as a result of this defect. The child was therefore delivered prematurely by caesarean section in a specially designed isolator at University College Hospital, and was then transported in an isolator to the Institute of Child Health where she was kept in a maintenance isolator for seven days during which time she was fed on sterile canned milk. As it turned out, the results of a number of tests carried out during this time showed that the child was in fact normal, but Mrs Tuffrey said that it could have been kept in isolation for up to one month had the need arisen. She added that as babies usually die as a result of this deficiency at four months, there would have been time for the clinicians to diagnose and try to treat the disease, perhaps by grafting immunocompetent tissue such as the thymus. Mrs Tuffrey suggested that the treatment of patients who are unduly susceptible to infection in a protective environment such as a germ-free isolator would be useful in a number of diseases such as leukaemia, burns and, of course, in helping those transplant patients receiving immunosuppressive treatment. Whether or not gnotobiotics has advanced sufficiently to justify the delivery of a human child under germ-free conditions seems, however, debatable.

Hot Soak for Seeds

ONE of the best ways to spread plant diseases is through the sale and shipment of seed. In some cases, such as celery leaf rust, only one infected plant in 10,000 is needed to cause an epidemic in the crop. Particularly critical are fungal diseases lodged within the seed where seed dressings cannot reach them. The problem in dealing with these diseases has been to kill the fungus but not the seed.

This type of disease can now be completely eliminated by a process developed at the National Vegetable Research Station (near Warwick) which was on view at last week's Chelsea Flower Show. The treatment is first to soak seed for twenty-four hours in a solution containing 0·2 per cent of the fungicide 'Thiram' at 30° C. The seed is then dried by driving air through it for several hours. So far this treatment has been found to give complete control in eleven commercially important plant species with infections involving eighteen different seed-borne diseases. The plants, with the number of specific diseases which can be controlled given in parentheses, are: pea (2), celery (1), carrot (2), brassicas (2), beet (3), trefoil (1), flax (1), oats (1), wheat (2), barley (2), lobelia (1); tick-beans have shown 70–80 per cent control. For the many flower seeds which are sensitive to the treatment the concentration of the soak is cut by half.

For the first time this year the principal celery seed company in the United Kingdom is selling 'Thiram' soaked seed. Dr Keyworth, the head of the plant pathology department at the National Vegetable Research Station, points out: "We've now got a method where we can give 100 per cent guarantee that seeds are free from fungal disease and this is the very first time that anyone anywhere can say this". This should have sales appeal abroad. The treatment also substantially increases germination rates and this makes it popular with growers. The economic advantage of seed-soaking over controlling a disease in the field is great. A few pence for seed treatment as against £100 to spray for celery blight in a ten acre field is a comparison which has been quoted.

Disease as a Social Problem

THE Arthritis and Rheumatism Council for Research and the British Rheumatism and Arthritis Association have together compiled a report on the social consequences of arthritis and rheumatism. The most interesting parts of this report are drawn from a more analytical statistical study on arthritis in Britain by the World Health Organization.

It is estimated that some 30 million working days are lost in a year as a result of arthritis, at a cost to the country of £130 million. Miners, because of the often cramped conditions of their work, have the highest number of lost days—134 days lost/100 men/year. Then come electrical linesmen, lorry driver mates and other jobs connected with lifting heavy loads. At any

one time, nearly half the British population has some sign of osteo-arthritis and thousands of children get a form of arthritis called Still's disease. Another way of expressing all this is that only two people in a hundred in Britain can hope to escape some form of rheumatism or arthritis by the time they are seventy.

The sociological report suggests that in contrast to the "ingrown" public attitude that arthritis is an inevitable accompaniment of old age, an education programme is needed to inform the public that this is not so; that early treatment can do a great deal for the sufferer, and that welfare can do much to relieve the suffering already present. But is this not an over-optimistic view? The causes of arthritis are innumerable and often unknown. As Dr A. M. Denman of the Rheumatism Research Unit in Maidenhead points out, some cases of arthritis where the cause is known can be cured and others can be controlled but not cured. At the other extreme, diseases of unknown origin such as rheumatoid arthritis can sometimes be controlled by large doses of aspirin, and cytotoxic drugs will kill cells infiltrating the synovial membrane of infected joints. Unfortunately, however, undesired effects often accompany the use of these drugs.

Dr Lucille Bitensky and Dr Joseph Chayen of the Kennedy Institute of Rheumatology are hopeful that they are on a path which may lead to an effective treatment for rheumatoid arthritis. They have been using microchemical techniques to investigate the activity of enzymes within the lysosomes of the synovial membranes of joints. According to the two workers, by using very thin slices of intact tissue and examining it through a scanning and integrating microdensitometer, they have shown that the apparent activity of cathepsins within the lysosomes increases near the junction between the synovial membrane and the articular cartilage, and is very much higher than normal in rheumatoid patients.

As has been shown by much detailed work undertaken at Strangeways Research Laboratory, the permeability of lysosome membranes can be altered under certain physiological conditions, and it seems that in the rheumatoid patient the permeability is greatly increased; the cathepsins leak out and attack the cartilage. Drugs such as hydrocortisone, the two doctors say, stabilize the membrane by acting on the lipid portion. Their own work, however, suggests that stabilization can also be achieved by aiming at the protein component of the membrane. Dr Bitensky and Dr Chayen have shown that the lysosome membrane of rheumatoid tissue grown in culture can indeed be stabilized by changing the redox potential of the cells. Why the lysosome membrane in rheumatoid patients becomes permeable to the enzymes in the first place, however, is still not known.

It is obvious that there are serious sociological consequences of rheumatism and arthritis. The report indicates that these range from light restriction of movement to severe isolation and economic hardship; in addition, psychological factors may produce stress in a family where there are severely afflicted parents. It suggests that more should be spent on research into rheumatism than the present £400,000 a year. But because research, for example, into the inflammatory response underlying rheumatoid arthritis is of interest in several fields including transplantation, it is difficult to define lines of research which are associated with arthritis and rheumatism only. Perhaps the best solution is to have better organization of large teams representing many disciplines who can work in well-equipped centres on the many underlying mechanisms concerned with the disease, and then apply the results clinically.

Prizes for Teachers

THE fifth series of Guinness awards to science and mathematics teachers were presented last week, in London, to teachers in service, in training or working overseas. The subjects described in the award-winning entries covered topics such as scientific models, clubs, approaches to teaching of various subjects and, from the winner, a record of experiences and suggestions for starting work with the Nuffield approach to junior science teaching. Prizes were also presented to the winners of the third national mathematical Olympiad; the top five schoolboys from the seventy finalists in the national mathematical contest which is also sponsored by Guinness. Speaking after the presentation, Lord Snow condemned the Government for not allowing a team of young British mathematicians to go to Moscow to compete in the international Olympiad. In the equivalent competition in Yugoslavia last year the British team came fourth, a creditable performance. In refusing to allow a team to compete this year, Lord Snow believed that the Government, through an administrative decision, must have stirred up unnecessary ill-will in Russia, and all for £1,500 which is the sum required to finance the team. Before presenting the awards Mrs Shirley Williams, Minister of State at the Department of Education and Science, upheld the honour of the Government from beneath an elegant felt hat with the comment that although this year's contest had been missed the DES was prepared to consider suggestions for the organization of a team for next year.

Planning the North-West

THE problems of the increasing holiday traffic in the north-west of England are the subject of a new report by the National Parks Commission. The report, *The Coasts of North-West England* (HMSO, £1 5*s*), is the sixth in a series on coastal preservation and development. There are to be nine reports altogether, based on nine regional conferences arranged by the commission with local planning authorities. When all the reports have been published there will follow a final report on "The Planning of the Coastline" which will be a digest of the work of the conferences and other special studies together with recommendations to the ministers.

About a tenth of the whole coastline of England and Wales is involved in the area covered by the North-West England regional conference. As ten different local planning authorities are responsible for this varied coastal region, it was natural that the subject of co-operation in surveying and analysing problems was discussed. Fairly informal co-operation between some of them already takes place at regional level, but it was agreed at the conference that coastal preservation and development is an obvious field for closer integration. Much of the discussion revolved around the belief that you cannot plan the north-west coast with-