

Non-coherent light pipes are already being used in dentistry, built into dental mirrors and drills.

In common with the laser, fibre optics may yet find its most important application in telecommunications. Fibre optics engineers are already talking of constructing light guides with lengths measured in miles, carrying information in the form of pulses of light. The problem is that present glasses can only be used to make guides up to about 100 ft in length, because of absorption in the glass. So far, the lengths of the longest guides have been tens of feet rather than miles. Research is therefore likely to concentrate on finding new materials with transmission properties which will make long fibres feasible.

## Economical Desalination

DESALINATION as a source of fresh water is well established technically. Now, like nuclear power, it faces a period in which its economic advantages are likely to be argued out *ad nauseam*. A new report, produced by M. J. Burley and P. A. Mawer of the Water Research Association (WRA, £5), sets the ball rolling. It examines the various ways of removing salt from water and of bringing brackish water up to a drinkable standard, and describes the situations in which each method would be economically justified.

The first, and most important, conclusion is that flash distillation, so far the market leader in desalination equipment, is unlikely to be economic for base load production of fresh water in Britain for "a considerable number of years". Conventional water supply schemes can almost always supply fresh water at costs of less than 3s. a thousand gallons—of twenty-four schemes considered in the report, only two were more expensive than this. In contrast, flash distillation costs are well in excess of 3s. per thousand gallons, and without favourable financing and low cost steam would be unlikely to fall below 4s. 8d. per thousand gallons. Where a supply of brackish water is available, electro-dialysis offers a better alternative, although it can only be used with mildly brackish water. The costs of this process, the report says, would at least in some cases fall below the 3s. per thousand gallons reference line. The additional costs of boreholes, effluent discharge and the like would add only another 3d. to 4d. a thousand gallons. Reverse osmosis, the report says, is unlikely to be competitive with electro-dialysis for the treatment of low salinity, but it may well become cheaper for the slightly more brackish sources.

But the most interesting conclusion in the report concerns the joint use of conventional supplies and desalination plant. The idea here is to take more water from a reservoir than would otherwise be justified, and use the desalination plant as a hedge against prolonged dry spells. In this case, the load factor of the desalination plant would be low, perhaps no more than 10 to 15 per cent, but its advantage would be to maintain the overall reliability of the system. The main use of the desalination plant would be during the summer months, when demand for electricity is lowest; it might therefore be possible to negotiate cheap rates for the supply of steam during these periods. If this were done, the overall cost of the water would work out at about 2s. 11d. per thousand gallons. This type of system, it is suggested, might be particularly useful

as a means of deferring major capital investments in new reservoirs until the demand really justifies them. The report also suggests that it might be worthwhile considering the possibility of using desalination to augment all the linked surface water resources in the south-east of England. While this might not show an immediate advantage, it might be a useful scheme later in this century.

## Defence Research

DESPITE the successes of the past few months, the Society of British Aerospace Companies is disturbed about British Government policy towards aviation. The society, represented by Dr D. H. Gardner, Mr L. Boddington, Mr L. S. Greenland, Mr S. Bragg, Mr R. H. Francis and Mr Green, made plaintive noises about it when it gave evidence to the Select Committee on Science and Technology. The chief difficulty, according to the society, is "the absence of a coherent and firm national aerospace programme". The Government should make "a firm declaration of projects which Britain intends to support". Without this, it will be impossible to arrange partnership with foreign countries on an advantageous basis. "The UK has no bargaining lever in securing design leadership if it is known that it will not embark on a project except in partnership with a foreign country".

Dr Edmund Davies was unimpressed by these arguments. What the society was really complaining about, he suggested, was not the lack of government policy but its direction. The policy was quite clearly defined in the White Papers, and the society was alarmed because it involved no major aircraft projects. Why did the society itself not produce a plan? Dr Gardner revealed that "steps were being taken to see if this can be done". Dr Davies suggested that the society's case was equivalent to saying that it wanted a guaranteed home market for its products, while at the same time arguing that the export market was vast.

The society gave a jaundiced view of the virtues of international collaboration. Mr Green said that the loss of technical information across the Channel had become far more serious than the loss of manpower to the United States. But within Britain, at least, things seem to be getting better. A new committee had been set up, with members from the Ministry of Technology, the industry, the nationalized airlines and the Air Registration Board, to discuss research policy. This was a splendid innovation, and gave the industry a chance of influencing research policy at an early stage. But the society claimed that not enough research was being done. There was a particular need for a wind tunnel suitable for work on low-speed aerodynamics, very important for problems of take-off and landing. The industry had been asking for this tunnel for seven years, but it was not yet built.

The witnesses could give no clear explanation of the industry's failure to estimate costs more accurately, except to say that the initial estimates, usually the least accurate, were produced by government departments. Unless the specifications were firm, it was impossible to produce reasonable estimates. If specifications changed, as they often did, then so quite naturally did costs. But in part it seemed that escalation in costs was caused by always trying to do more than had ever been done before. Producing less ambitious

aircraft, which cost less and could be costed more accurately, might well result in producing out of date aircraft. These days, Mr Green said, it was no good expecting to sell obsolete equipment. Even the emerging countries were looking for the most modern weapons, and if Britain didn't supply them, somebody else would. It was a sobering thought.

## Recreation in the North-East

THE regional planning problems presented by the diverse development of the North-East coastal area—including as it does both the heavily industrial and coal-mining area of Durham and the primarily scenic coast of Northumberland—are discussed in a report published this week by the National Parks Commission (*The Coasts of North-East England*, HMSO, £1 12s. 6d.). The report, the seventh in a series of reports on the state of coastal development and preservation, stems from a conference held last year by the Commission with the regional planning authorities at the request of the Minister of Housing and Local Government.

A major problem facing the region is the more than 3 million tons of muck dumped from the six active collieries on to Durham's beaches each year. With half of the county's 25 miles of coast already built up for industrial and urban purposes, the additional 8 miles destroyed by tipping seriously limits the land available for recreational use. The Durham county planning officer stressed the pressing need for the Government to carry out a feasibility study of the various methods of clearing the coast and a cost-benefit analysis of the extent to which such expenditure would be justified.

The various authorities agreed that, because of the great variety of the 138 miles of coastline, the regions concerned must co-ordinate, and share in the expense of developing, the recreational facilities needed to serve the population of the area as a whole. While most of the undeveloped coast south of Northumberland is only suitable for local day-trippers, with figures averaging 50,000 on a fine Sunday in summer, the planning officer from Northumberland estimated that more than 172,000 visitors used the Northumberland coast on a comparable day and that some 130,000 came for annual holidays, spending about £1.6 million in the county. Since all but the most intensively used facilities would not appeal to private enterprise, the local authorities agreed that they would have to be prepared to take the initiative in providing for public recreation, and only through combined research efforts could the various authorities determine the future needs of the entire North-East. The chairman of the West Hartlepool Town Planning Committee noted that the cost must be spread over a wide area to include those urban centres from which the visitors came as well as the authority meeting the demand.

For a start a working party of the North Regional Planning Committee was reported to be assessing the present and likely future pattern of recreational demand on the region's coast and countryside, and the Northumberland and Durham Travel Association was attempting to determine how the potential for tourism in the area could best be exploited. In any case, it was stressed that the coast cannot be treated as a situation apart, but must be considered in relation to the other problems and priorities of the region.

## Parliament in Britain

by our Parliamentary Correspondent

### Power Stations

MR REGINALD FREESON, for the Ministry of Power, gave information about dual-fired power stations, which are able to run either on gas or coal. The Central Electricity Generating Board had converted one boiler at Hams Hall power station for experimental purposes. This had established that there were no technical limitations, and the board had applied to the minister for permission to convert the remaining five boilers at the station. The board had also applied for permission to convert the oil-fired South Denes power station to dual firing with gas. While not envisaging general conversion to dual firing, he thought there might be scope for the summer use of natural gas. (Written answers, May 30 and 28.)

### Multi-racial Studies

MR EDWARD SHORT, Secretary of State for Education and Science, said that the Centre for Multi-racial Studies at the University of Sussex was being supported by the UGC and the Ministry of Overseas Development. The UGC had supplied the accommodation, and the MOD had given a grant of £80,000 for the establishment of a centre in Barbados. The Social Science Research Council had given £12,469 for research into "inter-ethnic relationships in Barbados and St Lucia". In the future, it was hoped that the centre might be able to contribute towards an understanding of racial prejudice in schools in Britain. (Written answer, May 30.)

### Overseas Development

MR ALBERT ORAM, Parliamentary Secretary to the Minister of Overseas Development, said that the ministry was in close touch with the Intermediate Technology Development Group, which supports the development of relatively simple tools and techniques as the best way of helping the underdeveloped countries. The Tropical Products Institute and the overseas liaison unit of the National Institute of Agricultural Engineering were working along similar lines. The ministry also provided a comprehensive scheme of postgraduate studentships, covering agricultural, veterinary and other natural resource subjects. (Oral answers, May 30.)

### Post Office

MR ROY MASON, Postmaster General, defended the proposal made by the General Post Office to replace the four London telephone directories by thirty-six directories, each covering one borough. If the present system were maintained, the directories would be twice their present size by 1975; already their size was discouraging people from using them, he said. Each of the borough directories would include 5,000 of the most frequently wanted numbers from all over London. Subscribers who wanted directories other than those for their own neighbourhood could have them; they could have the lot if they wanted them. The plan had been discussed with the Post Office Users Council, the Greater London Council, the London Boroughs' Association and the London Chamber of Commerce. It had, he said, received general support. The scheme had not been kept secret, he said; it had in fact been mentioned in the annual accounts of the GPO for last year. (Oral answer, May 30.)