

THE NATIONAL PARKS COMMISSION REPORT FOR 1957-58

THE ninth annual report* of the National Parks Commission covers the year ended September 30, 1958, and records the establishment of three further areas of outstanding natural beauty, the Minister having confirmed the Commission's orders designating the Northumberland coast, the Surrey hills and Cannock Chase. Decisions are awaited on the Dorset coast and hinterland and the Shropshire hills, and the Commission expects during the next few months to be submitting for confirmation orders for the Cornwall areas, sections of the north and south Devon coasts, the Malvern Hills and the Sussex Downs. As regards the 'Long Distance Routes', the Commission has completed its report on the South Devon Path and its work on the North Devon Path is well advanced. Solutions are being sought for a new line in the Pennine Way, the Blakehope Fell area of Northumberland, and this will leave Edale Bridge as the only major problem of the route outstanding. The Commission again comments on the good work being done by voluntary assistance in clearing disfigurements from disused gun-sites and other sites of wartime activities in the Pembrokeshire Coast National Park, the Lake District, the Peak District and elsewhere, but rightly points out that it is a national disgrace that so many disfiguring marks should still remain. It welcomes the assurance given in the House of Commons on July 2 by the Parliamentary Secretary to the Ministry of Housing and Local Government that purchasers of an airfield are now required to leave it reasonably tidy.

As regards the National Parks themselves, the Commission's report stresses the creative work being undertaken in the Peak District, where the Board's current programme includes many plans for the removal and concealment of scars and blemishes on the landscape; public access is being extended, as well as information work and the development of the

voluntary warden service. In the Lake District, caravan sites have received much attention and anti-litter work has increased, while in Snowdonia an economic survey of the Park is proposed with particular reference to amenity. Substantial agreement was also reached with the Forestry Commission, through the Forestry Consultative Panel, on the definition of zones within the Park where the Forestry Commission would undertake not to carry out planting, and of further zones where planting would only occur after consultation with the Committee. The Park Planning Committee for Dartmoor has now reached agreement with the South Western Electricity Board on detailed procedure for early informal consultation on proposals for overhead electricity supply lines within the Park, and its efforts to remove or mitigate disfigurements and advertising continued to meet with success. Anti-litter work further developed in the North York Moors, and in the Yorkshire Dales the West Riding Park Planning Committee reports further negotiations for public access to Barden Moor and Barden Fell.

The report of the Commission refers to new action to secure publicity for "The Country Code" and for national parks in general as well as to the campaign to abate the litter nuisance. Nearly four hundred development proposals were referred to it during the year, and the Commission does not conceal its disquiet at the granting of Ministerial consent for three major industrial undertakings in National Parks. These decisions must result in grievous damage to the landscape of the Snowdonia and the Pembrokeshire Coast Parks, and the particular and general issues involved are discussed in some detail in the report, while examples of other development issues handled during the year are given in appendixes. These three development proposals and a series of Acts with a direct bearing on the work of the Commission are regarded as the outstanding features of the year under review, but their implications are considered elsewhere.

* Ninth Report of the National Parks Commission for the year ending September 30, 1958. Pp. iv+79+8 plates. (London: H.M. Stationery Office, 1958.) 5s. 6d. net.

MAGNETIC FIELD OF THE EARTH

IN recent years the maintenance of the Earth's magnetic field has generally been ascribed to dynamo interaction between the field and convective motions in the Earth's core. Such an explanation receives support from the relatively rapid fluctuations in the field and its apparent reversals during geological times. However, theoretical investigations of the suggestion have met considerable difficulties. The field is supposed to be expanded in a series of harmonics, and in order to get soluble equations it is necessary arbitrarily to chop off the series at an appropriate point. Questions of convergence arise, and though the work of Bullard and Gellman, using all the resources of an electronic computer, made the convergence appear plausible, it could do no more.

A recent paper by A. Herzenberg* has discussed a dynamo model for which the question of convergence

can be decisively answered. He represents the Earth by a large solid conducting sphere; two eddies in its interior are represented by smaller solid conducting spheres with their centres some distance apart, and which are constrained to rotate uniformly around diameters. The smaller spheres are in electrical contact with the material of the larger one, in which they are imbedded.

The system operates as a self-exciting dynamo if the angular velocities of the inner spheres are sufficiently great, and their axes of rotation are suitably oriented. The mechanism of dynamo maintenance is roughly as follows. The rotation of the first sphere twists the lines of magnetic force which penetrate the sphere, and generates a magnetic field large compared with the exciting field, the lines of force of the induced field being circles around the axis of rotation. This induced field is propagated through the surrounding material to the vicinity of the second sphere, where it provides a seed field

* *Philosophical Transactions of the Royal Society of London*, A, 250 (21 August, 1958): Geomagnetic Dynamos. By A. Herzenberg. Pp. 543-585. (London: Royal Society, 1958.) 13s.

which is similarly twisted by the rotation of that sphere and provides a much larger field with lines of force around the axis of rotation. This induced field in its turn is propagated back to the first sphere, where it provides the primary field which is twisted by the rotation of the latter. With roughly half the possible directions of the axes of rotation, the dynamo interaction amplifies the existing field. Herzenberg finds it necessary to discuss the reflexion of magnetic fields at the boundary of the large sphere, but it is difficult to believe that this can have any decisive importance to maintenance of the dynamo.

Herzenberg's mechanism possesses definite advantages from the mathematical point of view. If the distance between the centres of the smaller spheres is sufficiently great, the higher-order harmonics of the field which is induced by the rotation of one sphere are strongly attenuated before they reach the other sphere. This ensures the convergence of the expansions used by Herzenberg; a large part of his paper is, in fact, concerned with the convergence. The

mechanism also has the advantage that the method of feedback is clearly evident; in Bullard and Gellman's work the same mass of fluid partook of two different sorts of motion at the same time, and it was virtually impossible to separate the effects of the two motions.

Like other earlier workers, Herzenberg made no attempt to consider the reaction of the induction process on the motion which causes it, and indeed his mechanism does not lend itself to considering such a reaction. The reaction must clearly be important, and be responsible for the tendency for the Earth's magnetic axis to approximate to its axis of rotation. Thus the importance of Herzenberg's work is primarily not physical, but mathematical. It decisively clears up any lurking doubts about the dynamo theory due to defects of convergence in earlier discussions. In considering the physical picture it is now no longer necessary to worry lest deeper research may show that failures of convergence invalidate the whole dynamo hypothesis.

T. G. COWLING

RAILWAY ECONOMICS

ALTHOUGH it appeared after the House of Commons debate on December 11, when the Transport (Borrowing Powers) Bill received its second reading, the broadsheet, "Paying for the Railways" (No. 429, December 19, 1958), issued by Political and Economic Planning, throws much further light on the problem of the future of railways, reviewing briefly the origin of the financial difficulties of British Railways since the War, the policies recently proposed, including the problem of wages, and finally setting forth four possible alternative solutions. In moving the second reading of the Bill, Clause 1 of which extends the borrowing powers of the British Transport Commission by a further £600 million, the Minister of Transport and Civil Aviation, Mr. H. Watkinson, said that the crux of the problem was how the railway system of the Victorian age could streamline itself to fit the age of the motor-car and nuclear power. For the first forty-four weeks of 1958 merchandise traffic was 14 per cent below 1957 and 10 per cent on 1956. Nevertheless, the Commission was pressing on with modernization of heavy traffic, but it was inevitably slow and took long to come to fruition. By the end of 1958, fitted freight trains would represent 35 per cent of the whole and wagons fitted with continuous brakes number 270,000; 44,000 containers suitable for door-to-door carriage would be in use, 150 older marshalling yards would be closed and 27 new yards constructed. Each working day 4 million passengers and 1 million tons of freight were moved.

Mr. Watkinson said a severe fall in heavy freight traffic in the last two months of the year was the main cause of the deficit for the year, which is expected to be about £85 million. Transport of coal was at present down by about 500,000 tons a week; production of crude steel in 1958 was probably about 10 per cent lower than in 1957, and the Commission's report indicates a fall in receipts from coal and mineral transport of more than £600,000 a week on 1957, but assumes that this is a temporary decline, calling for temporary measures only.

Mr. Watkinson said that at his request the Commission had already initiated a full, detailed and urgent review of the whole modernization plan, taking account of both present and probable changes in traffic in the light of the probable level of activity in the coal industry, in view of competition from oil and future developments in nuclear energy. He hoped to lay the findings of this review before Parliament by the early spring. Meanwhile, with the Government's full support, the Commission was proceeding with more modernization on a narrower front. It proposed to concentrate resources for main-line electrification on the London Midland and Scottish line to Manchester and Liverpool and to accelerate its completion by several years. The introduction of diesel locomotives to eliminate the use of steam would be accelerated as quickly as possible on an area basis, particularly on routes north of Newcastle upon Tyne: by 1961 nearly 1,100 main line diesel locomotives would be in use. Multi-unit diesel trains would be doubled, from 2,300 to 4,600, by the end of 1961. As a result of these and other measures the Commission expected to achieve additional savings of at least £30 million in a full year. Although there had been a reduction in the labour force of 20,000 during the past year, this had been effected with proper agreements between the Commission and the trade unions. In replying on the debate, Mr. C. R. H. Nugent, Joint Parliamentary Secretary to the Ministry, referred to the encouraging position of passenger services, revenue for which in November 1958 showed an increase of £0.3 million on 1957. The Minister himself also referred to the success of some of the luxury trains and to the Commission's intention to pursue a more flexible policy in fares.

Dealing with the modernization programme, first published in 1955, the Planning broadsheet agrees that the most important feature, the gradual substitution of electric or diesel traction for steam locomotives, as well as the plans for extending automatic train control and colour light signalling, fitting