

## THE WYPERFELD (MALLEE) NATIONAL PARK, VICTORIA

BY SIR JAMES BARRETT, C.B., C.M.G.

THE Wyperfeld National Park is situated about 300 miles north of Melbourne in the midst of the country known as the Mallee, which occupies about one fifth of the area of the State of Victoria. The soil of the Mallee varies greatly; but much of it, when cleared of the Mallee eucalypts, has proved excellent wheat country. The clearance was due to the invention of the stump jump plough and the roller. It varies greatly in quality, being in some places almost entirely sandy and in others fertile red soil. All of it is very liable to wind erosion, unless special precautions are taken to preserve both belts of eucalypts and some surface vegetation, and so far these precautions have not been taken in general.

At some geological period the whole of the area appears to have been a gulf of the sea into which such rivers as the Murray, the Murrumbidgee, the Goulburn and other Victorian rivers poured their waters, carrying with them silt from the Alps. This gulf has been filled up. The rivers have for the most part fallen to small proportion or are actually dying. I am informed that bores put down go through 200 feet of lake deposit before the marine deposits are reached.

The Wimmera River, once a large stream, running north from the Grampians, enters at Jeparit a large lake called Hindmarsh and then

another—Lake Albacutya—and finally passes north for many miles through the Park itself and loses itself in sandy country. It has flowed in this way usually about once in fifteen to twenty years. I saw it in 1922–23 when the water for a year or two covered the lower 12 feet of the giant eucalypts on the river bed; it gradually evaporated and became saline and then dried altogether. At the present time the only available water is from one well provided with a windmill which, so far, has given a good supply.

The large eucalypts are found only in or near the river bed. The annual rainfall, which is capricious, is something less than 9 inches and the evaporation is enormous. There are quite a number of open spaces with good soil well grassed but flooded when the river resumes control. It is on these areas that the cattle, the emu and the kangaroo feed in the main but not exclusively. The sandhills are enormous, but I have not seen any evidence of any considerable movement.

The biological interest of this arid region of 82,000 acres is the fact that it is well stocked with animals which, since its reservation and with protection, have greatly increased. The black-faced kangaroo, found only in the Mallee, is abundant; emus are plentiful but constantly shift from place to place. It is probably in Victoria the last home of that wonderful bird—the mound builder, called the lowan, which incubates its eggs in the vegetative centre of mounds which it builds and which in one case I measured was 18 ft. in diameter and 4 ft. high (Fig. 2). The parents evidently watch the mounds but, after hatching, the young birds fend for themselves. With protection they have increased in numbers and in their fearlessness of man.

But the major interest which led to the reservation was the fact that it is the home of vast numbers of the parrot and cockatoo family, which apparently nest in the large eucalypts and feed in the desert away from the river. The Regent parrot and the Major Mitchell cockatoo, the disappearance of which



FIG. 1.

WYPERFELD FROM ONE OF THE HIGHER SANDHILLS. *Eucalyptus rostrata* ON A FLAT NEAR THE DRIED-UP WATERCOURSES.

was feared, have become abundant.

The birds drink at the trough provided at the well, but so far no one has seen the kangaroos at this source; yet a tame kangaroo I have in Melbourne drinks greedily. Precisely how they obtain sufficient water in the Park is, so far, unknown to us.

Of reptiles there are only the stumpy tailed lizards, a few tree-climbing lizards, but rarely a snake.

I may add that during the recent heat burst, the temperature to the north of the Park reached 119° F. Many magpies died, a few parrots were lost, but the kangaroos, though exhausted and collapsed, managed to survive.

The Park is leased to a cattle grazier at a low rental, but in return he acts as curator and is well informed of the habits of its inhabitants. A clause in the lease provides that if a fire occurs in the Park his lease may be cancelled. So far no fire has occurred, but during the recent disaster a fire outside the Park was just stopped on the boundary.

The profound interest of the Park lies in the fact that in the arid though very beautiful reserve the animals have adapted themselves to these dry conditions and show no desire to leave it. It should be added that no complete or adequate biological survey has yet been made. There are indications that some of the smaller marsupials may be found. Such a survey can only be made by residence in the Park and a careful search made, especially at night, with a powerful searchlight.

We are indebted to three Ministers of Land for the reservation, which was not easy to secure, namely, the late Mr. Owan, Mr. Bailey and the present Minister, Mr. Lind.

#### BOTANICAL CHARACTERISTICS

By Prof. J. S. Turner, University of Melbourne

The Park, so far as it has been investigated, seems to be composed of two distinct types of vegetation, each with its own soil environment. First, there is the vegetation along the outlet creek from Lake Hindmarsh. Along this creek is a chain of lakes, usually empty, of which Brambruk is one within the Park itself. Along these dried-up water courses there are two eucalyptus communities: (1) the red gum, *E. rostrata*, which is the more moisture-loving of the two; (2) the black box,



Fig. 2.

*Eucalyptus rostratus* WOOD WITH *Acacia* IN BACKGROUND AND LOWAN'S NEST IN FOREGROUND.

*E. bicolor*. The forests formed of these trees are very open and the floor is grassed. Both communities are found elsewhere in Victoria.

The second main type of vegetation is of greater interest and constitutes what is locally known as 'desert'. It is made up of wind-blown sandhills of comparatively recent origin but not, at present, mobile. These sandhills are entirely distinct from the sand ridges found in the settled regions of the Mallee. In these more settled parts, the original vegetation was largely the Mallee eucalypts, but in the 'desert' these trees are much less frequent.

In spite of the inhospitable character of the sandhills and the very low rainfall, the 'desert' area carries a large number of typical Australian plants. The family Myrtaceæ is represented by *Eucalyptus*, *Leprospermum* and *Melaleuca*; Leguminosæ by *Acacia*; Proteaceæ by *Hakea* and *Banksia*; Epacridaceæ by *Leucopogon* and *Astroloma*; Casuarineæ by *Casuarina*; and Coniferæ by *Callitris*.

The sandhills are frequently capped by species of *Callitris*, *C. verrucosa* being probably the commonest. These pines are, however, dwarfed, and the sandhills cannot be compared to the pine ridges in other parts of the Mallee. Below the pines occur a large number of tall shrubs and small trees; for example, *Leptospermum coriaceum*, *Banksia ornata*, *Casuarina Muelleriana*, which last species has a restricted range but is abundant in the Park.

*Acacia spinescens* is a very spinous shrub. *Astroloma conostephioides* has conspicuous brilliant red flowers. The two genera *Pimelea* and *Hibbertia*, which are very widespread in Victoria, are both

represented here by very handsome species, *P. stricta* and *H. virgata*. These two species differ from most of those in the Park, in that their leaves are not sclerophyllous. The vegetation does not nearly form a complete cover on the sandhills, but it is sufficient to prevent wind erosion.

As in deserts in other parts of the world, this area bears a large number of minute annuals with a very short life-cycle. The number of these species in Wyperfeld will probably be found to be very large. The family Compositæ is particularly well represented. *Toranthus Muelleri*, *Brachycome pachyptera* and *Gnaphalodes uliginosum* are all extremely minute annuals found in the Park. Most of these species spend a dry season as seeds and pass through their short life-cycles soon after periods of heavy rain, and they are consequently easily missed by investigators of the flora.

#### GEOLOGICAL CHARACTERISTICS

By Dr. E. S. Hills, University of Melbourne

The rocks of the Mallee are marine, estuarine, fluvial and lacustrine sediments laid down in and near the margins of a former marine gulf during Cainozoic times. This marine bight, which has been named the Murray Gulf, came into existence in Oligocene times, and from then on to the end of the Pleistocene it was gradually filled with clays, limestones, marls and sands. The thickness of these ranges up to a total of more than 2,000 ft. and they rest upon a depressed basement of older rocks, chiefly Palæozoic granites, schists, sandstones and conglomerates, which have been

penetrated in bores. The limestones, which are of Miocene age, are overlain by impervious clays in the Mallee, and are important aquifers for artesian and subartesian water.

The superficial deposits are sands, gypsum and local freshwater ostracodal limestones, of fluvial and lacustrine origin. The sandy soils derived from these deposits have been heaped by the wind into long regular sand ridges, trending east-west, with areas of irregularly arranged 'Jumbled' sandhills in places. In their virgin state, these sand ridges are fixed by a cover of vegetation, but where this has been cleared, extensive sand drift has since taken place. There is evidence that the regular sand ridges, which have been formed under the action of the dominant westerly and north-westerly winds, have grown in stages. Buried soil horizons of 'travertine' limestone indicate that periods of relatively high rainfall have alternated with drier periods. The present (or immediate past) time appears to be a relatively wet period.

Apart from the minor undulations due to the sand ridges, the surface of the Mallee exhibits broad ridges and troughs, some miles in width, the trend of which varies from north to north-west. These are of tectonic origin, reflecting buried faults or warps in the underlying basement complex. Uplift across the lower course of the Murray resulted in the formation of lakes, which have now been drained, and in these and other old lake basins extensive deposits of gypsum, locally known as copi, were laid down. These now constitute an important source of this mineral.

## OBITUARIES

Dr. W. J. Mayo

TO the surgeon, and especially to the surgeon in the United States of America, the death of Dr. W. J. Mayo on July 28 at the age of seventy-eight years is a major historical event. Born in 1861, in the State of Minnesota, he spent his life and did his work in the small country town of Rochester; and there with his brother Charles, who died two months ago (see NATURE of July 15, p. 103), he built up the Mayo Clinic the expansion of which has been very great. In early life he conceived the idea that patients could best be treated by groups of medical men among whom could be found specialists in every disorder. This idea was revolutionary at the time; and although in operation it may best be suited to American conditions, not only did it underly the practical success of the Mayo Clinic, but it has also influenced wider opinion because medical men from all over the world were attracted to the experiment. In Rochester was to be found an

organization almost fanatically devoted to the interest of the patient, to the exclusion both of financial considerations and of personal professional renown. For from the beginning of the clinic part of its profits were set aside to be devoted to research not only in clinical subjects and the fundamental clinical sciences, but also in such related sciences as chemistry and physics. The two brothers and their early collaborators deliberately sacrificed wealth; and chose to regard as their reward the knowledge that their Institution was making substantial contributions to medical progress. As funds accumulated they were to expand their efforts, always governed by the same general principles, to postgraduate education; and their system of training young men broadly and encouraging specialization only after a sound basic experience has been watched with interest by the medical academic world, and has frequently been utilized by medical schools both in America and in Europe; for one of the many