

the head and neck are darker than the back; later on the head and neck become lighter than the back, but by the time the bird has become adolescent the whole body is almost completely white, the head and neck alone being flecked with brown; the beak has increased inordinately in length, with the assumption of a pink tinge. Finally, in the case of the cock, the whole plumage becomes pure white, while the long, sickle-shaped beak, together with a large bare area at its base and in the orbital region, has become brilliant crimson. Although the article is headed "Notes on the ontogeny of the white ibis," no clue to the real meaning of these changes in form and colouring is suggested.

In the June number (vol. viii., p. 2) of *British Birds*, Messrs. Hans Stadler and Cornel Schmidt direct attention to the general neglect of the study and interpretation of the notes of birds in Great Britain, as compared with what is being done in Germany. Apart from the lack of musical appreciation or musical education, three main difficulties—namely, the determination of the pitch, the admixture of non-musical sounds with the notes of birds, and the "colouring" of these notes, which is often widely different from that of the human voice or ordinary musical instruments—have hitherto materially hindered this branch of study. The authors now demonstrate how these difficulties may be overcome.

Prof. R. Ridgway is to be congratulated on the publication (after an interval of three years since the appearance of its predecessor) of the sixth volume (Bull. U.S. Nat. Mus., No. 50) of his invaluable monograph of the birds of North and Middle America. This volume not only completes the Passerines, but also includes the Picarions and related groups, as well as the owls. In the latter group it is a matter for regret to see the barn-owls figuring as *Tyto*, while *Strix*, following the classification of the late Prof. Newton, is transferred to the tawny owl. This is eminently a case for the intervention of the "fiat" of the International Commission on Zoological Nomenclature. In most other respects Prof. Ridgway's latest effort is worthy of high commendation.

In a handbook and guide to the British birds exhibited in the Lord Derby Museum, Liverpool, it is claimed that a coot mounted amid an imitation of its natural surroundings in 1865 was the first exhibit of this kind shown in this country, if not in the world. Groups of all species nesting in the Liverpool district, together with a few others, are now exhibited in the museum, and of a dozen of these groups photographs are reproduced in the guide. The nomenclature is much the same as in Newton's "Yarrell," but it seems illogical to use the name *Lagopus lagopus* for the willow-grouse, and yet to retain *Perdix cinerea* for the partridge.

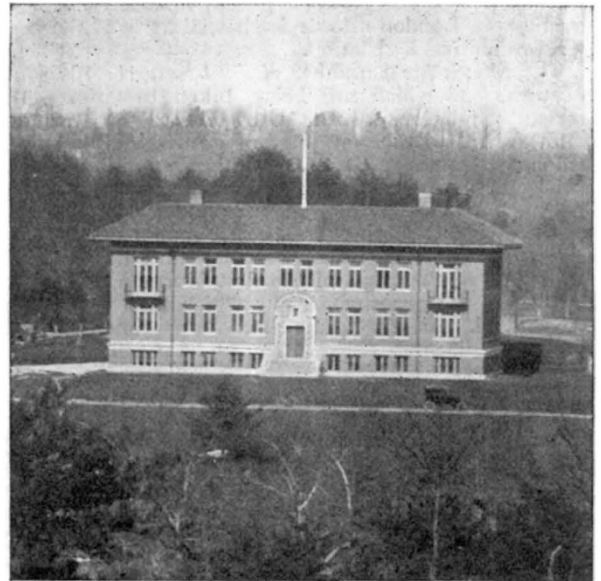
We have to acknowledge the receipt of a copy of a paper from the March number of the *Ottawa Naturalist*, by Dr. C. G. Hewitt, on local bird-protection; also of a catalogue of more than 1400 publications on ornithology offered for sale by Messrs. John Weldon, 38 Great Queen Street, London, W.C. R. L.

TERRESTRIAL MAGNETISM.

THE present activity of the department of terrestrial magnetism of the Carnegie Institution of Washington and the largeness of its future aims are alike illustrated in the annual report for 1913, by the director, Dr. L. A. Bauer, and in a "progress report" which he contributes to the latest (March) number of *Terrestrial Magnetism*. The department, which has lately entered on its eleventh year, has under construc-

tion new buildings at an estimated cost, including site and equipment, of about 25,000. The main structure, which is already completed, is shown in the accompanying figure. It has a length of 102 ft., a width of 52 ft., and from basement to roof a height of 62 ft. Besides ample accommodation for observers and computers, engaged on the reduction and discussion of observations, it includes several laboratories, an instrument-maker's shop, and store places for instruments. A detached building for tests and researches requiring a non-magnetic environment will shortly be completed.

Of late years the energies of the department have been mainly devoted to a magnetic survey of the earth, including the oceans. In the financial year which ended on October 31, 1913, the expenditure of the department, apart from building, reached 22,000. In addition to important work at sea by the surveying vessel *Carnegie*, it had land observations in progress in many quarters of the world. One party observed at seventy-two stations in the Sahara between Algiers and Timbuctoo. Another party in Australia observed in Queensland, Victoria, and New South Wales. A



Main building of the Department of Terrestrial Magnetism, Carnegie Institution of Washington.

third journeyed some 2000 miles by canoe in remote parts of Canada. South America engaged three parties, observing in Peru, Bolivia, Chile, Venezuela, British Guiana, Brazil, Argentina, Paraguay, and Uruguay. It is expected that by 1915 data will have been obtained adequate for the construction of satisfactory magnetic charts for the epoch January 1, 1910, extending from 50° N. to 50° S. latitude.

The work of the department is not confined to terrestrial magnetism. In future more attention is to be given than in the past to atmospheric electricity. Dr. W. F. G. Swann, late of Sheffield University, has been engaged as chief physicist, and is devoting special attention to this subject. One of the objects to which much attention continues to be devoted is the improvement of magnetic instruments. Dr. Bauer's article in *Terrestrial Magnetism* is largely devoted to a discussion of the degree of accuracy reached with existing types of magnetometers, and the prospects of obtaining superior results with electrical methods of measuring the direction and intensity of the earth's field. While

recognising the high accuracy now attained in electrical measurements, he concludes that much experiment will be necessary before we can hope to introduce electrical methods with advantage in place of magnetometers, more especially for field work.

C. CHREE.

TIMBER FOR RAILWAY SLEEPERS.¹

A VALUABLE contribution to the literature on Indian timber trees, containing the preliminary results of experiments and inquiries initiated at the Dehra Dun Institute some three years ago, has lately been issued. Research work on timber from an economic point of view is necessarily a slow business, and years must elapse before final conclusions can be reached, but the information already obtained during this inquiry indicates clearly that the final results are likely to prove of great economic value.

The memoir is divided into five sections, which deal in turn with the physical and mechanical properties of Sál timber, its durability, its uses, as well as those of the minor products of the tree, the quality of the charcoal and fuel, and the yield and prices. One point of special interest will illustrate the nature of the work in progress and its prime importance. Sál is one of the chief timbers employed for railway sleepers, and in these days it is surprising to find that the majority of the sleepers on Indian lines undergo no previous treatment with preservatives—all the more so, when one knows how abundant are the insect and fungus pests, and how rapid their powers of growth and reproduction. This apparent indifference on the part of Indian railways to the great economy effected in other countries by treatment of the sleepers is not easy to explain. It may in part be due to the methods used in temperate climates having proved less satisfactory when the sleepers are exposed to the hot sun of India. But it is also probably due to the natural durability of sál, teak, deodar, pyinkado, and other woods of this class, which last so long in the natural condition, that any extension of their lives by treatment with preservatives would probably result in the resistance to decay becoming greater than the resistance to mechanical wear and tear, and in this event a large proportion of the cost of treatment would be money thrown away.

But it is open to question whether such valuable woods should be employed for sleepers at all. During the past forty years it has been pointed out again and again that India possesses several species of lower-grade timbers which appear to possess all the necessary qualifications for sleepers. Their natural durability is low, but this defect can be overcome by artificial methods. The fact brought out at the end of this memoir, that India is now beginning to import Jarrah sleepers from Australia, shows the urgent need for testing these lower-grade timbers to see whether by treatment they can be rendered equally as serviceable as sál, teak, deodar, etc. This question is being investigated at Dehra Dun on a practical scale, and if any of these timbers can be brought into general use the economic value of the work will be enormous. India will not only be enabled to continue the production of her own sleeper requirements, and to employ timbers for the purpose which have no special outlet in other directions, but she will also economise her more valuable forests of sál alone to the extent of some two and a half million cubic feet per annum, to say nothing of teak, deodar, pyinkado, and the jarrah from Australia.

¹ "On the Economic Value of *Shorea robusta*, Sál." By R. S. Pearson. Indian Forest Memoirs, Economy Series, vol. II, part 2. Pp. 70. (Calcutta: Superintendent Government Printing, 1913.) Price 3s.

Although there is at present little market for sál outside India, the steady diminution of the world's timber supply renders it certain that there will be a market in the future, when the sál forests recover from past maltreatment, and come into full bearing. These facts indicate the importance of the work at Dehra Dun, which is being organised on lines that must appeal to everyone who has the country's interest at heart.

E. R. B.

OFFICIAL GUIDES FOR GEOLOGICAL TRAVELLERS.

THE International Geological Congress of 1913 was indeed fortunate in the reception and support accorded to it by the official geological surveys of Canada. The guide-books issued for the excursions were in reality memoirs on the districts traversed, and formed, with their coloured maps and illustrations, works of reference for scientific libraries. They have now been re-issued for the general public, and seven of these handy volumes have reached us from the Department of Mines in Ottawa.

No. 1, in two parts, covers Eastern Quebec and the Maritime Provinces, and is largely of stratigraphical interest. No. 2 deals with the eastern townships of Quebec and eastern Ontario, including the amphibolites and limestones of the Bancroft area. The metamorphic origin of amphibolites from both igneous rocks and limestone, as recognised by Lacroix and others in Europe, is here concisely described. No. 3 is concerned with the neighbourhood of Montreal and Ottawa, including areas of interesting igneous alkali-rocks, and the original locality of the serpentinous marble known as Eozoön. No. 4 describes excursions in south-western Ontario (where the interest for most geological visitors centres in Niagara Falls) and the history of the great lake system. No. 5 deals with Ordovician and Gotlandian beds in the western peninsula of Ontario, and contains a fine illustration of a mass of bedded limestone overthrust by ice-pressure on the flank of a Glacial drumlin. We are informed that Nos. 6 and 7, on the Toronto region and the rich mining districts of Ontario respectively, are issued by the Bureau of Mines, Toronto. The Dominion Department of Mines in Ottawa, however, is also responsible for No. 8, in three parts, and No. 9, which describe the whole transcontinental routes from Toronto to Victoria, and for No. 10 on Northern British Columbia, the Yukon Territory, and the North Pacific Coast. Nos. 8 and 9, on the Canadian Pacific, Grand Trunk, Canadian Northern, and National Transcontinental lines, should meet with especial appreciation.

Such guidance as is here provided for those who may be styled "post-graduate" visitors shows how official surveys may aid in opening up a country. Seeing that conference with workers from other fields is highly stimulating to those who must devote themselves to special areas of their homelands, the encouragement given to strangers is sure to bring a full reward. Even in our well-explored islands, descriptions of districts which have become classical in the history of geology might with advantage be issued for those visitors who can devote only a few days to the ground. We are apt to leave some clever teacher or some local enthusiast to extract such matter from our detailed official memoirs, and thus to produce a compact and reasonable guide. The union of our geological surveys, both in Great Britain and in Ireland, with departments concerned with public education suggests that the encouragement of geological travel may well lie within their scope.