other naturalists of the eighteenth century exhibited ignorance of the nature of paradise birds is no parallel and no excuse. Mr. Buckland's reference was to the Great bird of paradise, which, I believe, is not far off extinction. Mr. Emery Stark's figures of 200,000 birds of paradise skins obviously refer to the many species inhabiting Dutch New Guinea and western Papuasias generally. In all there are some eighty-one or eighty-two distinct species of paradise birds, many of them confined to small areas, the majority living—unhappily—under Dutch rule; and about twenty species are nearly extinct by now on the smaller islands owing to the ruthless proceedings of the Malay, Papuan, and half-caste hunters. The females of some species, it must be remembered, are beautiful enough in plumage to be shot for the feather trade; this is also the case with the young males. It is possible, also, that most of the members of this group are monogamous, or that, like the peacocks and other extravagantly beautiful birds, *only the quite adult males* are fit for breeding. However it may be, all trustworthy authorities are agreed that the numbers of the paradise birds throughout Dutch Papuasia have very greatly diminished during the last thirty years, and that species common in Wallace's day are now extinct in this or that island or forest area.

The Government of the Dutch Indies has set on foot no efficient measures of protection—so far as I know, no measures at all, other than the issuing of licences to kill. I visited Holland two years ago to inquire into this matter, and was truly surprised to find the utter indifference with which it was regarded, even by Dutch zoologists; and Holland has produced some very great zoologists within the last fifty years. I deplore this mental lacuna which is, I fear, to be met with also among British biologists. But I am convinced it will disappear with the general spread of enlightenment. The same Dutchmen and Englishmen are exceedingly keen about the preservation of Dutch and British wild birds; they are simply thoughtless as to the rest of the world, forgetting that the new generation of dwellers in the British and Dutch Empires may daily curse the memories of the rulers of to-day who permitted a marvellous fauna of beautiful, wonderful, and harmless creatures to be extirpated solely for the gratification of the blood-lust among our sportsmen or the furnishing of wares for sale to silly women and magpie men.

A correspondent of *The Times* wrote the other day asking that the rose-ringed parakeets of India might be handed over for destruction to the plumage trade. He must have been a person without a sense of beauty and colour-blind; for if there is, or was, one feature more than another that was lovely in Indian landscapes and old Indian towns it was the flocks of these grass-green, rose-tinted, or blossom-headed parakeets. "But they ravage the natives' crops," he wrote. Well, I know India pretty well, and at one time spoke Hindustani sufficiently to converse with native landowners and peasants. I have never heard one such person complain seriously of the damage or loss done by these fluttering morsels of loveliness; but I have noted—as Rudyard Kipling and his father have noted—the many pet names in the vernacular for the parakeets of India, and the native appreciation of their beauty. This is purely a native and a local affair. If the native of India wishes to thin out the parakeets or other seed- or fruit-eating birds, *let him do so*; but do not permit it to be done for the infamously inadequate purpose of decorating Englishwomen's hats.

I remember in 1895 some British officers in north-west India decided that so many wild peacocks (they were semi-tame) must be "a dam' nuisance" to the

native agriculturists and started out to organise a battue. But the battue was the other way about. The natives of the district, losing all restraint at the idea of their beautiful peacocks being slain to please the Sahib-lög and the Gora-log, turned out with long sticks and thoroughly whacked the shooting-party. This episode was one of the many signs of unrest in India which characterised the year 1895. In this instance, if not in the others (for in most cases it was excellent measures of sanitation which provoked ignorant wrath), I thoroughly sympathised with the natives.

Mr. Joseph refers to paradise-bird skins worth in the trade 40*l.* or more, and states that these are eagerly sought after for scientific purposes. What nonsense!—unless he refers to pseudo-science. The true scientific ornithologist has by now in the collections of Britain, Italy, Germany, Holland, and France all the material he can possibly want for the external description of paradise birds. If he desires anything else it is in the way of the bodies of these birds. But even their myology, osteology, intestines—all their anatomy—are by now completely understood. We have, however, to learn much more about their life habits, their eggs, nests, and food. Material in such a quest can only be gathered by a trained scientific observer, such as from time to time is sent out by a learned society or a patron of learning. Scientific men would not go to the plumage-trading firms for such information, for they would not get it, or it would be quite untrustworthy. These firms buy their skins at second-hand, third-hand, fourth-hand, and their ignorance on the subject of ornithology is simply colossal.

I want to narrow the discussion to these unanswerable points. What are the legitimate uses of the skins or plumes of wild birds (excepting such as are carefully protected from diminution by rigid supervision and close times for breeding) in a civilised community—a community civilised enough to appreciate the economic uses of birds and the extreme beauty of birds in a landscape? Do the bodies of the birds I would desire to protect from the plumage-hunter serve as important articles of palatable food? No; except it be in a few instances, so few that they are of no importance in the argument. Do they serve to keep women, especially poor women, warm? No; quite useless for that purpose. Admitting that feathers and plumes do add to the beauty of a woman's costume, are we sufficiently supplied with such by using what we get from birds bred for the purpose or bred or protected for our food supply? Yes. From a hundred species and varieties. In all these circumstances a woman who wants to wear a humming-bird or a parrot's wing or a bird of paradise or egret plume must be depraved, and should not be pandered to and the trade which would live by ministering to such tastes should be closed down without compunction.

H. H. JOHNSTON.

A Palæobotanical Institute at the Royal Botanic Gardens, Kew.

MORE than two years ago there appeared an article in *The Times* (August 24, 1911) the title of which was "A Neglected Science: Fossil Botany and Mining." The chief contents of this article can be summed up as an appeal for the recognition of palæobotany, and was indeed thus named in *NATURE* of August 31, of the same year. The author of the article in *The Times* criticises "the official neglect of palæobotany in this country." It is admitted that the leadership of some branches of palæobotany is found in Britain, but this is stated to be wholly due to the zeal and

interest of some private gentlemen and to some professors of modern botany who "spend their whole leisure from their professional duties in the arduous labour of palæobotanical research."

But "there is no professorship of palæobotany at any of our universities or colleges. There is no lectureship or readership in palæobotany at any of our universities or colleges; and Cambridge alone has a demonstratorship, which is so ill-paid that it might be thought libellous to state the official salary attached. There is no post of palæobotanist to our Survey. . . . There is no post of palæobotanist at our great national Natural History Museum."

After having shown what has been done for palæobotany at Berlin, Stockholm, and Washington (U.S. Geological Survey), and after having developed the reasons—scientific and economic—why palæobotany should receive official support in Britain also, the author asks: "What should be done?" and supplies the following answer:—

"Much in the future. For the present what is urgently needed are professorships and lectureships at one or two of the universities—a professorship, for instance, in London, which would reach the geological students who go out from the School of Mines to all parts of the world. Then two posts at least should be established at the British Museum of Natural History: one for a palæobotanist of standing and repute who has travelled, who with a wide knowledge of the subject could fitly represent the science, and who, keeping abreast of the subject, could direct the work of a junior, and ultimately of several juniors. In our museum at present there are many specialists on animal fossils, and an important department of animal palæontology, while the palæobotanical department does not exist, and though there is a valuable collection of fossil plants the authorities only get in outside specialists from time to time to write monographs on them.

"What is ultimately wanted for the science is a properly equipped institute of palæobotany, which should represent all its sides—with a well-arranged museum, an academic and also economic side to its activities. The immediate need for the foundation of some posts in palæobotany should give trustees and governors food for thought, and might give some millionaire, anxious to be of service to his day and generation, an opportunity to do a unique and serviceable deed in endowing this neglected but important science."

The same appeal for the recognition of palæobotany as in the article referred to has recently been taken up again by Dr. Marie C. Stopes, in a lecture delivered at University College (University of London), on October 17, and published in an abridged form in *NATURE* of November 20, 1913. To the question what the palæobotanist in the future will demand the following answer is given:—"That in at least *one* institution in each civilised country there shall be a recognition of his science and adequate accommodation for it," after which the plan and details for such an institution, according to the opinion of Dr. Stopes, are fully developed for which the number of this journal cited should be consulted.

It is earnestly to be hoped that this proposition will be realised, and at the same time realised in the right way. As keeper of the palæobotanical department of the State Museum of Natural History (Naturhistoriska Riksmuseet) at Stockholm, which was specially mentioned in the article referred to, I may be permitted to express my opinion regarding the proposed palæobotanical institution. I have, it is true, no idea of the present position of the question here discussed, nor if there is any possibility of the realisation of the plan proposed below. But I

hope that my British fellow-workers will not consider my suggestion as an intrusion, since they are probably aware of my deep interest in British palæobotany, by which I have profited so much myself during repeated visits to Britain.

I quite agree with Dr. Stopes that the establishment of a properly equipped British institute of palæobotany is a most urgent need, which ought not to be postponed. But in order to give such an institute an opportunity for working under the best conditions possible, I consider it almost necessary that it should be established in connection with the Royal Botanic Gardens, Kew. The reason for such a connection is simply this: that the scientific study of palæobotany signifies a constant and repeated comparison of the fossil plants with the recent ones. For the botanical determination of Palæozoic and Mesozoic plants the palæobotanist must compare the recent Pteridophytes and Gymnosperms, especially the tropical ones; and there exists no better opportunity than in the Kew Gardens, where the hothouses, temperate houses, museums, and herbaria offer the most excellent and complete materials possible for such work. The same holds true for the determination of dicotyledonous leaves of the Cretaceous and Tertiary. The determination of those leaves is a most difficult task, for which an extensive and repeated comparison with the leaves of trees and shrubs of the arboretums and gardens, of the temperate houses and hothouses, and, ultimately, of the herbaria is necessary. There is no other place in the United Kingdom which offers such excellent opportunities for this work as the Kew Gardens; and the same holds true for the determination of leaves, fruits, and seeds from the Quaternary also. It therefore seems evident that the Kew Gardens are the right place for the establishment of a palæobotanical institute, the headquarters for the British palæobotany of the future. A. G. NATHORST.

Stockholm, December 12, 1913.

Electrodeless Spectra of Hydrogen.

WHILE making experiments on the apparent production of neon and helium during electric discharges, I have noticed an effect which may be of interest to spectroscopists. A powerful oscillatory discharge is produced in eight or nine coils of wire from two Leyden jars, with a spark-gap of about 2 in. in parallel, connected to a large coil which is run from the main supply. Set in the coils of wire is a glass bulb of about 300 c.c. capacity provided below with a small bulb containing coconut charcoal, and connected by a side-tube and tap with a mercury pump. After evacuating, heating, and "washing out," the bulb with hydrogen, when pure hydrogen is admitted at a fairly low pressure and the discharge is passed, the glow is bluish in colour, and shows both hydrogen and mercury spectra; but if the charcoal bulb be cooled in liquid air so that mercury vapour and any other impurities are completely removed, the glow is of a brilliant rose colour, and shows only hydrogen lines. If the pressure is reduced, however, to a value somewhere below 1 mm., there appears in the middle of the rose ring a fairly bright blue zone; and whereas the former shows both the simple and complex spectra of hydrogen, the blue zone shows nothing but the elementary line spectrum; and, moreover, the blue line $\lambda 4861$ is more intense than the red line. Further reduction of pressure causes the obliteration of the blue zone by the spreading inwards of the rose ring.

As I have not found any mention of this isolation of the primary spectrum, with weakening of the α line, in pure dry hydrogen, the fact is possibly worth recording.

IRVINE MASSON.

University College, London, December 11.