

as deduced from measurements of the photographs were as follows:—

Time h. m.	Length in miles	Height in miles
11 45 ...	192,000 ...	55,000
3 59 ...	216,000 ...	60,000

When it is mentioned that our earth has a diameter a little less than 8000 miles, an idea of the magnitude of this solar disturbance can be roughly grasped.

An interesting point to notice further in the original is the apparent falling towards the limb of the material forming the highest part of the prominence in the lower picture.

Enough, perhaps, has now been written to give the reader an idea of the instrument at work, and a few deductions from the photographs obtained during the summer months of the past year.

When it is considered that the results described, and others of which no mention has been made, only apply to the photographs secured with the "K" line of calcium, and that other lines in the solar spectrum, such as hydrogen, iron, magnesium, &c., still remain to be examined, some notion of the vast field of work open to investigators becomes apparent.

To avoid too much duplication of work beyond what is absolutely necessary, steps should be taken as soon as possible to subdivide the labour. The past year has seen the formation of a representative body to undertake such a scheme, and it is hoped that more instruments will soon be erected and at work to cope with the large demand of facts relating to our sun rendered now possible by the pioneer work of Prof. Hale and M. Deslandres.

WILLIAM J. S. LOCKYER.

#### THE TEACHING VALUE OF MENAGERIES.<sup>1</sup>

SO far as the general public is concerned, there is always a very considerable danger lest menageries should be regarded merely as places of amusement and curiosity, and that their great value as teachers of zoology should be more or less completely ignored. The main object of the volume before us appears to be to emphasise the teaching value of institutions of this nature, and to show what admirable schools for acquiring the rudiments of practical zoology lie ready to our hand, if only we will take advantage of our oppor-

<sup>1</sup> "Natural History in Zoological Gardens; being some Account of Vertebrated Animals, with Special Reference to those usually seen in the Zoological Society's Gardens in London and Similar Institutions." By F. E. Beddard. Pp. x+310; illustrated. (London: Archibald Constable and Co., Ltd., 1905.) Price 6s. net.

tunities; in other words, we have nature-teaching of a unique description awaiting our attention. Mr. Beddard treats, indeed, his subject almost exclusively from this point of view, so that his volume forms, in great degree, a sketchy kind of text-book of vertebrate zoology, illustrated by a number of first-class photographs and drawings of the animals under discussion. Such a mode of treatment necessarily prevents the inclusion of any great amount of matter that is really new in his work, and from one point of view it is a matter for regret that the author, with his long experience of the establishment in the Regent's Park, has not seen his way to give us more information with regard to the behaviour and life-history of animals in menageries. One point in this connection on which information is sadly lacking is the duration of life of animals in menageries, and the periods during which individuals of long-lived species have survived in captivity. So far as we have seen, information on this

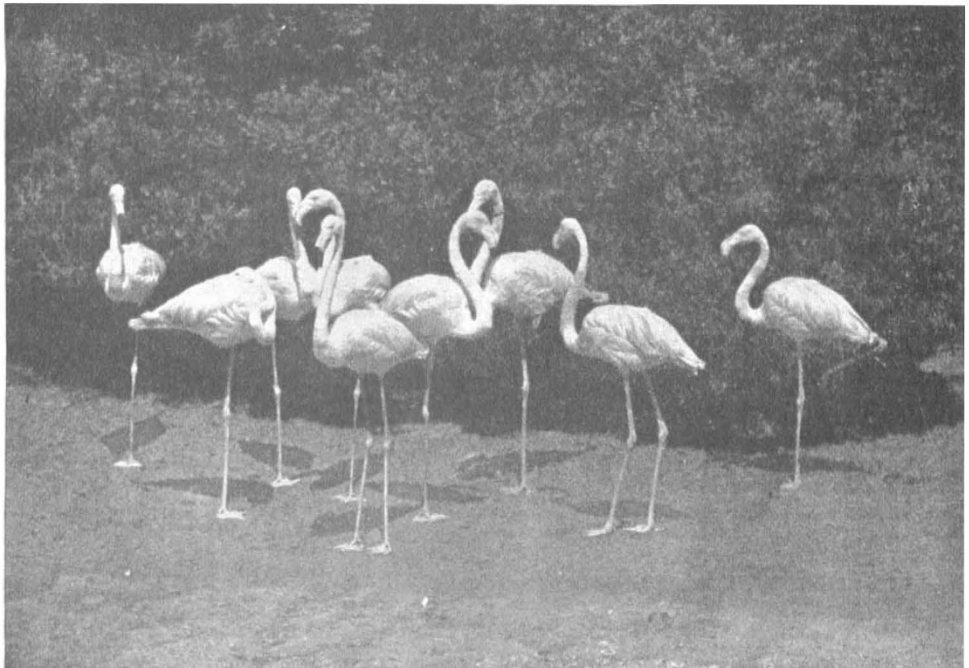


FIG. 1.—Flamingoes in the Regent's Park. From Beddard's "Natural History in Zoological Gardens."

latter point is given only in two cases, namely, in that of the polar bear and that of the pelican. Possibly, however, the author may have in view a companion volume, in which these phases will form the leading theme; and if so, we feel sure that it will supply a marked want.

Restricting, and very wisely so, his volume to the vertebrata, the author commences with a general sketch of the leading features of that group, and then takes in systematic order the various representatives selected for description. Mammals accordingly come first; and it is not out of place to mention that Mr. Beddard directs attention to the fact that a good popular name for this group is still a desideratum. In the case of both mammals and birds, the species taken as examples of different types are in the main well selected, and in nearly every instance the illustrations are almost everything that can be desired. As one of the best, among those reproduced from photographs, we have chosen the group of flamingoes, taken in the gardens, to set before our readers.



Typographical errors appear to be comparatively few. The meaning of the last sentence on p. 22 is, however, obscured by the misplacing of the word "much"; while on p. 125 we have *Suiae* for *Suidae*, and on p. 149 Australia for Australian. As regards other matters for criticism, it may be pointed out that the author admits that the term aurochs properly belongs to the extinct wild ox, and it is therefore not easy to see why he applies it to the bison in the plate of that animal. In the section on the wild ass (p. 60), the non-scientific reader will probably find it difficult to ascertain the proper name and the number of races of the Asiatic representative of that group; while the sportsman will gasp with astonishment when told (p. 63) that this animal may be ridden down by an expert horseman after a run of five-and-twenty miles (or does the author mean minutes?). On p. 139 the Tasmanian devil, under the synonym of the ursine dasyure, is made to do duty for two species. Finally, the palæontologist is likely to be staggered by the suggestion (p. 185) that the horn of the American birds commonly known as screamers is a direct inheritance from a dinosaurian ancestor.

Throughout, Mr. Beddard has made his book readable and mildly interesting; and it is especially satisfactory to find that he is conservative as regards the scientific names of the animals he discusses, and is, moreover, sparing in the use of such of these names as he selects to designate the various species. The book should form a valuable companion during a visit to the gardens in the Regent's Park, and likewise an excellent work of reference to those who really desire to learn something from visits of this nature.

R. L.

#### SCIENCE AT THE ROYAL ACADEMY BANQUET.

AMONG the guests of the Royal Academy of Arts, at the anniversary banquet on Saturday last, were eminent representatives of many branches of science. The president of the Academy, Sir E. J. Poynter, presided; and the Prince of Wales responded to the loyal toast proposed by the chairman. Sir E. Seymour having replied for the Navy and the Duke of Connaught for the Army, the president proposed the toast of "Science," the domain of which, he remarked, appeals to innumerable interests from its utilitarian side, and in its higher aspects deals with matters which, while they transcend the imagination with their speculative possibilities, require for their verification the utmost capacity of the intellect for exactitude and minuteness of research. Sir William Huggins, president of the Royal Society, replied to the toast in the following speech, which we take from the *Times* report of the banquet:—

I rise, as representing the Royal Society, to acknowledge the toast of science, so cordially honoured by her younger sister, the Royal Academy. I say sister, because art and science have in common the same object of worship and study—nature, in her varying moods and aspects; art "to exalt the forms of nature," science "to enlarge her powers." More than this, for to be accepted of nature, to be true artists or true men of science, both must possess an intuitive and profound insight into nature. The fine paintings which surround us are not mere transcripts of nature, but created visions of nature, revealing to the common eye the cryptic poetry and prose visible only to the second sight of the true artist—

"... a painter gazing at a face  
Divinely through all hindrance finds the man behind it."

As truly, the man of science must be a seer, endowed with the open eye and power of imagination. At this point the sisters part company. The muse of art fixes on the canvas a momentary aspect of nature, or of the human

face divine. The muse of science strains her eyes to see what is behind the outward show, her quest is for the why and wherefore of nature's changes. But science is more than a presiding muse; she is in very deed a great beneficent power imminent in the lives of her votaries, a power such as was feebly foreshadowed in the tales of folk-lore by the Queen of the Good Fairies, richly rewarding by enchantment with all good things those who made her their friend. The seven-league boots and the magic steeds were but poor anticipations of the gifts of science—the railway, the motor, and the turbine-driven vessel. The enchantment of gold, jewels, feasts, and palaces are more than realised by the boundless resources which science places at man's disposal. Science, indeed, brings back the age of Methuselah. Even literally life is prolonged by increased power over disease. True life is not measured by the passing of the suns, but by the sum of our activities; not by the falling sands of the hour-glass, but by the living pulses of the mind. The flying train, the flashing of intelligence, night turned into day, and the thousand and one appliances of machinery crowd into one year a fulness of life which was possible to our fathers only, if at all, in many years. How great, then, would be the gifts of science to the nation in return for full national recognition—by placing science on an equality with the humanities in our universities and public schools, and by the endowment of laboratories worthy of the nation! With science nationally honoured, our armies and our ships could know no defeat, our machinery and our manufactures no rivalry in the world's markets, our every undertaking must prosper. Shall we then remain in deadly apathy and take no steps to have it so?

#### NOTES.

ON Sunday, the President of the French Republic entertained the King at the Elysée at a dinner party, at which 120 guests were present. The guests included distinguished authors, artists, musicians, and other representatives of intellectual activity, almost exclusively members of the Institute of France. By inviting leaders of literature, art, and science to meet the King, graceful recognition was given of the high place occupied by the muses in the polity of the Republic. In the days when sheer muscular force was the mainstay of a nation, bodily strength and prowess were rightly regarded as recommendations for Court favours; but now that brain-power instead of muscle determines the rate of national progress, the State that desires to advance must foster all the intellectual forces it possesses. This principle is well understood in France, and is also clearly recognised in Germany, where every man who makes notable contributions to knowledge of any kind, assists industrial progress, or creates works of distinguished merit, whatever they may be, is sure to receive personal encouragement from the Emperor. The presence of these leaders of thought is a striking characteristic of the German Court; while, on the other hand, their absence, and the overpowering influence of military interests, are distinguishing features of Russian, and, let us add, of British Court functions.

ON many occasions reference has been made in these columns to the excellent object lesson of the intimate connection between a scientifically organised system of education and national prosperity afforded by the success which has in recent years attended Japanese enterprise. It is gratifying to find that this insistence on our part is, in view of affairs in the Far East, now being echoed by our contemporaries. Commenting upon the account of its Tokio correspondent of the battle of Mukden, the *Times*, in a leader in the issue of April 25, remarked:—"We have before us evidence of national education in its highest and most complete manifestation—education such as we in this country have hardly begun to conceive. We have co-