

THE PROPOSED GREAT SUSPENSION BRIDGE OVER THE HUDSON RIVER, NEW YORK CITY.

We illustrate in the present issue the general plans for a suspension bridge over the Hudson River at New York City—by far the greatest bridge of the kind ever projected. The plans are issued by the New York and New Jersey Bridge Company, they being authorized by Congress, subject to the direction of the Secretary of War, to construct the bridge in question. The bridge is to extend from a location between 59th and 69th Streets on the New York side to the opposite side of the river in Union Township, N. J.

The plans are largely self-explanatory. The bridge will have a clear span of 3,100 feet—which is almost double the span of the Brooklyn suspension bridge.

The board appointed by the Secretary of War decided that it is probable for \$23,000,000 a six-track railroad suspension bridge of 3,200 feet span could be built, and it considered the amount of traffic that such a bridge would accommodate sufficient to warrant its construction.

The plans and specifications were prepared by Mr. Theodore Cooper, of this city, a member of the commission of expert bridge engineers appointed by President Cleveland, and who has since been retained by the bridge company.

The structure he proposes is a stiffened suspension bridge, the cables carrying only the part between the piers, the approaches to the main span being carried by deck trusses. The main span is stiffened by two through trusses, which may be either continuous for the entire span, or may be hinged in the middle. On the illustration the general dimensions are quoted. There is to be 150 feet head room, and, as will be seen, the river is left intact, no pier being established outside the regular pier line. The towers are to be of steel, commencing about 50 feet above high water, below which level masonry is used. The lateral and sway bracing of the main span and towers is to be of members rigid enough for compression, although some of them may normally be in tension. The general details, such as length of versed sine, the number of and the arrangement of cables, and the depth of trusses, are left to the bidders.

The main piers are to be carried down to rock; the foundations of the viaduct piers are left to the approval of the chief engineer. Quite an exhaustive list of strains allowed and of strengths and of coefficients in general are given. Thus for the wire in the cables a maximum stress of 54,000 pounds per square inch is allowed. In the usual construction of a suspension bridge the saddles which are on top of the towers are movable, being mounted on balls or rollers. The specifications for the proposed bridge provide that the towers and cables must be treated on the supposition that the saddles are or may become immovable. No closed forms are allowed on the bridge, all parts of which must be open for inspection. In other matters the same thoroughness appears. Thus rivet holes, if punched, must be punched too small and must be brought to a proper size by reaming.

Some space is given to the question of the cables. These are to be of straight steel wire, which must be not less than 1/4 of an inch in diameter, and the wire may be twisted into ropes for compacting, or, as in the Brooklyn Bridge, may be formed by compacting the straight untwisted wires. The engineer notes that the unprecedentedly large diameter of the cables will demand that the inner strands of the cable be treated as a separate cable, around which the additional strands can be placed, squeezed, and wrapped. The wire must have a strength of 180,000 pounds per square

inch and elastic limit of 90,000 pounds per square inch, and an elongation of 4 per cent in a length of one foot. Each wire must be 1,800 feet long, without weld, joint, or splice.

Such are the general features of this structure—one which when completed will be at once a triumph of American engineering and an ornament to the city.

THE BIRDS OF THE CONGO.

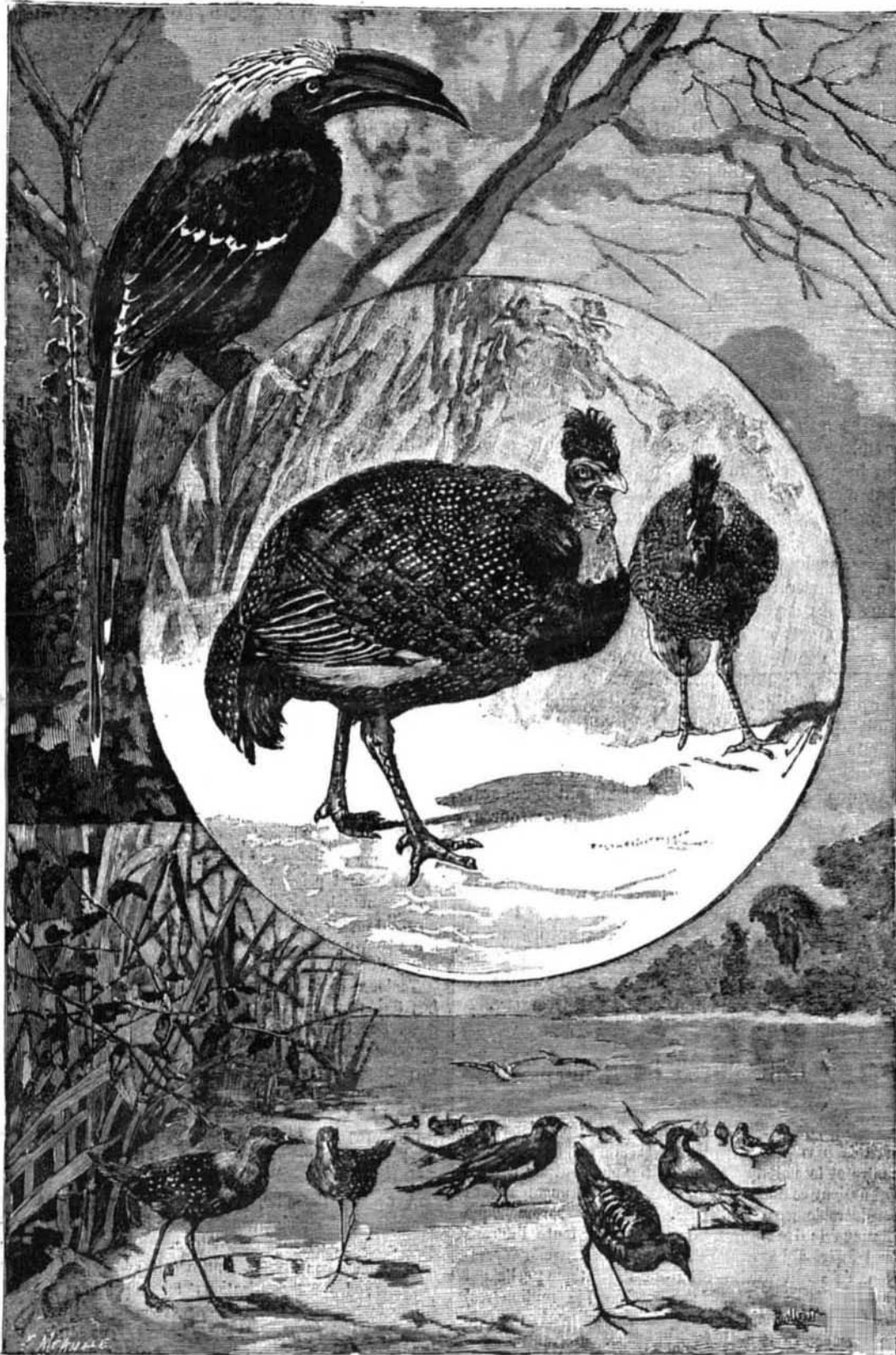
To pass in review here, without the aid of numerous figures, all the types of the birds of the Congo that have been made known to us by the explorations of Messrs. Dybowski, De Brazza, Schwebisch, Thollon, Petit and others, would be an almost impossible task, and an enumeration of the Latin names that ornithologists have given a host of African species that are absolutely different from those of our own country

have lived at the Zoological Garden of London, has a proud bearing and feeds almost exclusively upon fresh meat. It is met with not only in the country of Angola, but in Congo, Gaboon, on the Gold Coast, in Portuguese Guinea and in Senegambia, where it is already becoming very rare. To the south it does not extend beyond the country of Mossamedes, and upon the east coast of Africa it has been observed but once, and that at a single point, the island of Pemba, to the north of Zanzibar. It is a bird, then, that is essentially characteristic of West Africa. We shall say as much of the Scotopelies among the nocturnal birds of prey. The Scotopelies belong to the same family as our great horned owls and may be compared thereto as regards dimensions, but they differ from them markedly by the absence of egrets on the head and by the aspect of their feet, the tarsi of which are bare, and the toes of which are provided beneath with spiny papillæ, a feature that we observe only in the ospreys and the Asiatic horned owls of the genus *Ketupa*. Three species at least are known, which are distributed from Senegambia to the Quanza, and a single one of which, the same that inhabits Congo, has been met with on the east or rather the southeast coast, in the region of the Zambezi. They are accompanied in the west by the true horned owls, the scops-eared owls, the screech owls, common brown owls and barn owls.

In Congo the parrots are but slightly varied. Besides the gray parrot or jacko, which is observed with its squat varieties, there is hardly any but the green parrot with red forehead and shoulders (*Pæocephalus ubryanus*), which is everywhere rare, another species with yellow forehead (*P. Gulielmi*) and the small inseparable parrot (*Psittacula pullaria*), which is distributed throughout the whole of equatorial Africa. As for the banded parrot (*Ps. docilis*), so common in Senegambia, that does not descend so far as the basin of the Congo.

The other birds that Cuvier arranged in the order Scansores appear to be still more common in this region than the parrots, judging from the number of specimens belonging to the group of barbels, woodpeckers and cuckoos that figured in the collections received from the Gaboon and Congo by the Museum of Natural History. The barbels, which owe their vulgar name to the coarse hairs that clothe the base of the bill, which is laterally compressed and usually denticulate upon the edges of the upper mandible, belong to a dozen species of small size, and of dark brown, deep black or yellowish green plumage.

The woodpeckers make themselves remarked neither by their large size nor by the brilliancy of their colors. They are generally small and of green plumage, ornamented with red spots, with stripes or with numerous white dots upon the lower parts of the body, but in the eyes of naturalists they offer great interest, because they belong either to species that have been recently described or are still rare in collections, or to species whose area of habitat was believed to be much less extensive. The same is the case with the wrynecks, those odd birds that have the curious habit of turning their heads in all directions and bristling their feathers when they are frightened. It was already known that the common wryneck (*Jynx torquilla*) remains in our country only during the summer, and emigrates toward the south before the end of this season. It had been found in Morocco, Algeria, Abyssinia, Kordofan, and even in Senegal, but it was not known that it descended as far as to the Congo. Mr. Dybowski discovered it in this region, where it is met with in company with one of its near relatives, the *Jynx pectoralis*, of Southern Africa, which advances in



BIRDS OF THE CONGO—HORNBILL, GUINEA FOWLS, BAILES, AND SEA PARTRIDGES.

would prove exceedingly tiresome to our readers. We shall therefore confine ourselves to making known those species that are most remarkable by their form or color, the most interesting from the standpoint of geographical distribution, or the most important as regards the profit that man can derive from them. Leaving aside from among the diurnal birds of prey the vultures, fish-hawks, buzzards, falcons, etc., we shall have a few words to say of the *Gypohierox Angolensis*. This bird of prey, notably smaller than an eagle, slightly recalls the latter and especially the *Perenopters* of Egypt by certain features of its physiognomy. In fact, a circle around its eyes and the sides of its bill and at its feet are bare and of a pale rose color, and its plumage, after having been brown, passes to pure white varied with black upon the wings and tail; but its strong bill denotes affinities with the eagles that are belied neither by the attitude nor the food of the bird. The *Gypohierox*, several specimens of which

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