

THE LYRE BIRD.

This bird, if it had been known to the ancients, would have been consecrated to Apollo, its lyre-shaped tail and flexible voice giving it a double claim to such honors. The extraordinary tail of this bird is often upward of ten feet in length, and consists of sixteen feathers, formed and arranged in a very curious and graceful manner. The two outer feathers are broadly webbed, and are curved in a manner that gives to the widely spread tail the appearance of an ancient lyre. When the tail is merely held erect, and not spread, the two lyre-shaped feathers cross each other, and produce an entirely different outline. The two central tail feathers are narrowly webbed, and all of the others are modified with long slender shafts, bearded by alternate feathery filaments, and well representing the strings of the lyre.

The tail is seen at its greatest beauty between the months of June and September, after which time it is shed, to make its first reappearance in the ensuing February or March. The great stronghold of the lyrebird is the colony of New South Wales. It is of a wandering disposition, and although it probably keeps to the same bush, it is constantly engaged in traversing it from one end to the other, from the mountain base to the top of the gullies, whose steep and rugged sides present no obstacle to its long legs and powerful muscular thighs. It is stated that it will spring ten feet perpendicularly from the ground. The food of the lyre bird consists principally of insects, particularly of centipedes and cleoptera.

We take our illustration from Wood's "Natural History."

Photographic Maps.

The advantages of the process of sun engraving upon copper, as practiced by the Austrian Military Geographical Institute, are dwelt upon in *Petermann's Mittheilungen*. The maps of the new Austrian ordnance map are carefully drawn on paper, on a scale of 1 to 60,000. They are then reduced photographically to a scale of 1 to 75,000, transferred upon copper, touched up, and printed. In this manner each sheet of the map can be produced in nine months, while the same amount of work, engraved in the usual manner, requires nearly 46 months for its completion. The whole of the Austrian staff map, consisting of 715 sheets, will thus be completed in 10 or 12 years. No less than 271 have been published since 1874. The advantages of this process, as regards cost and rapidity of publication, are evident, and they fully compensate for any slight inferiority in the appearance of the work.

NEW BRIDGE OVER THE DOURO RIVER, PORTUGAL.

The viaduct projected by the Royal Company of Portuguese Railroads, and designed to traverse the Douro River, near Oporto, Portugal, is nearly 1,129 feet in length between

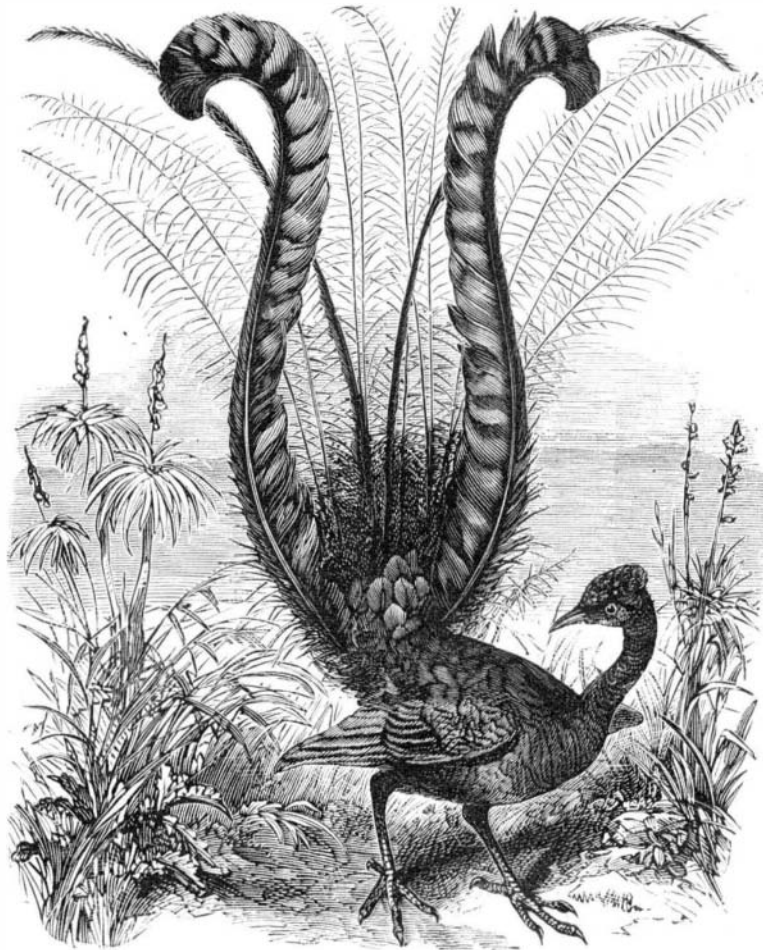
the faces of the abutments. The roadway is 200 feet above the plane of general comparison, said plane being 38 feet below the level at low water. A central arch crosses the stream and is connected at the upper portion to the sides of the ravine by two lateral viaducts. The depth of the river and the thickness of the clay banks, which it was necessary to traverse in order to plant piles securely, rendered the adoption of the single arch, 512 feet in span, and supported on the rocks on each side, advisable. On the summit of this

deformation resulting from unequal distribution of the stress. The arch was therefore given considerable vertical thickness, this being 32 feet at the key. At the abutments it was essential that the arch should rest on two supports, as is ordinarily the case on large openings. It thus became necessary that the vertical height should decrease toward the extremities, the extrados and intrados converging on the support. To this end the form adopted is that of an arch of neutral fibers almost parabolic, but the highest of which di-

minishes from key to abutments. This form is that of a demi-lune—the intrados and extrados being besides interconnected by a system of vertical and oblique pieces forming St. Andrew's crosses, so as to insure the complete solidity of the whole.

A new condition also presented itself due to the resistance offered by the structure to the wind. In order that the violence of tempests might be resisted, it was indispensable that the arch should be broad or at least possess a wide base, as it was obviously useless to make the upper portion wider than the 12·8 foot roadway. The width of the base supports was therefore fixed at 48 feet—as it was necessary to form the central arch as a crescent situated in oblique planes with relation to the vertical, distant 12·6 feet at the upper portion and 48 feet at the base. The arches are connected by a system of vertical frames, placed transversely, formed by horizontal traverses and vertical rising timbers fixed on the arches and the St. Andrew's crosses. Besides, in the planes of the intrados and extrados are strengthening pieces which consolidate the connection between the two arches.

The roadway reposes on each side on a metallic pillar fixed on the spandrel of the arch, and is prolonged to the abutments resting on the Lisbon side, on a trestle which has its base on the arch abutment, and then on two similar trestles of less height. On the Oporto side there is but one intermediate pillar. The roadway is so attached to the arch that the latter is free to move without disturbing it. The pillars are entirely of laminated iron—cast iron being rejected as not offering sufficient security. We take our illustration from *Engineering*.



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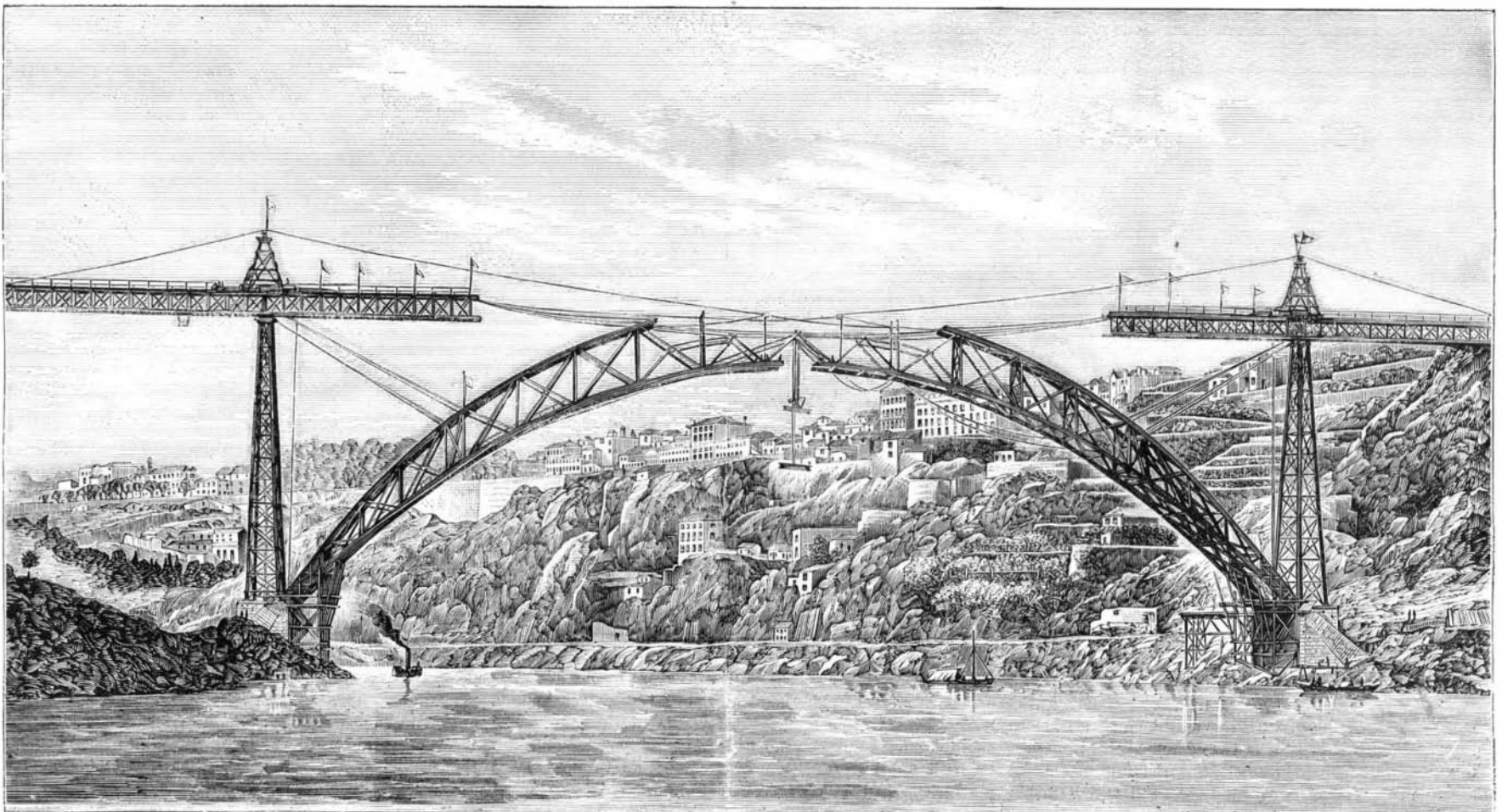
arch the roadway rests, while it is also supported by metal trestles which conform in height to the irregularities of the soil.

Owing to the dimensions of the arch its construction involves some peculiar features. It was, in the first place, necessary to avoid the use of rigid tympanums, in which case the calculations, already very uncertain, became still more complicated owing to the dilatation, the effects of which would profoundly disarrange the equilibrium of the various parts. It would also be necessary to use an immense quantity of metal in order to insure the safety of the structure. Tympanums were therefore completely suppressed, the arch being given sufficient rigidity to resist the strains tending to

American Institute Exhibition.

Our manufacturers are now fully awake in the matter of exhibitions, and so far as their limited space is concerned we are assured the coming exhibition of the American Institute of this city will be of more than usual value and novelty. For information address the General Superintendent, New York city.

CONSUMPTIVE PERCH.—Seth Green has lately been examining the perch and sunfish that have died in great numbers in Lake George. He finds that the disease is a fungous growth on the gills, resembling pulmonary consumption; and warns the people against eating the fish.



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