

### THE ATTITUDE OF DIPLODOCUS.

Readers of the *SCIENTIFIC AMERICAN* are familiar with the prehistoric animal known as "Diplodocus," the largest of dinosaurs. To the American Museum of Natural History, and particularly to Prof. Henry Fairfield Osborn, president of the Museum, is due much credit not only for the arduous work of excavating the bones of this and other extinct creatures in the far West, but also for painstaking care in correctly mounting the skeletons.

The donation of a Diplodocus skeleton through the kindness of Mr. Carnegie to the Berliner Museum fuer Naturkunde has brought this extinct animal much into the public eye in Europe. Dr. Tornier is largely responsible for this increased popular interest in palæontology, because of the paper which he recently read before the Gesellschaft naturforschender Freunde on the structure of the Diplodocus skeleton in the Berliner Museum, a paper based largely upon the studies of Hay and therefore hardly the result of original investigation. The Berlin diplodocus is mounted in the attitude of a mammal, with extended legs. Tornier holds that its posture should have been more reptilian. We abstract from *Umschau* an account of Tornier's views. Dr. Tornier argues that four-footed lizard-like reptiles rise but little from the ground even when in active motion; that the humerus and the femur move in approximately horizontal planes, so that the animal crawls rather than walks. The Diplodocus was a reptile, a giant lizard in other words. Tornier holds that the skeleton has been incorrectly mounted and that its posture should have been that indicated in Fig. 1, rather than that indicated in Fig. 2. If the animal had been mounted as in Fig. 1, it would have walked somewhat like a crocodile, which, in Dr. Tornier's opinion, it did.

In the reconstruction of Diplodocus the hind feet rest flatly upon the ground, whereas the fore feet touch the ground with the toes only. Hatcher, who was one of the first to study the animal closely, thought that perhaps the fore feet were placed flatly upon the ground. Holland disputed this view. Dr. Tornier believes that Holland was right, because reptiles do not tip-toe with their fore feet, and because, so far as we know, there is no land animal which employs only the toes of its front feet and the soles of its hind feet in locomotion.

Dr. Tornier holds that the tail of Diplodocus was a far more important member than the mounters of the skeleton suspected. In the Berlin model only the end of the tail rests upon the ground, the remaining portion rising at a fairly sharp angle to join the lumbar vertebrae. He stated that in order to mount the tail in this manner and to produce the pronounced curve of the reconstruction, it was necessary to spread the vertebrae of the tail. He states that the caudal vertebrae of lizards are never separated in this fashion, but that they are more or less locked together. Inasmuch as the Diplodocus vertebrae are reptilian in form, he believes that here again an error was made, and that the tail did not curve up sharply from the ground, but that it projected rearwardly in a slightly curved line as in all reptiles. In the restoration only one-half of the tail rests upon the ground, the other half rising free into the air. If this were correct, the rear extremities of the animal would have been compelled to support an enormous load of bone which served no

useful purpose. In typical four-footed lizards it is the function of the tail to guide the animal. As soon as the animal begins to move, the tail stiffens the spinal column, thereby enabling the animal to proceed rapidly along in a straight line. If the tails of such animals be cut away, they seem to be no longer able to move properly. It was the purpose of the tail of the Diplodocus to stiffen the lumbar vertebrae, as in the case of all lizards, when the animal was in motion. Moreover, it served to counterbalance the head of the creature and to prevent it from tipping over forward, particularly when it was traveling down an incline.

Dr. Tornier is of the opinion that Diplodocus did not hold its head horizontally, but that the neck was habitually curved in the form of an S. Holland also made this assumption and likened the head and neck of Diplodocus to the head and neck of an ostrich. The evidence for this attitude of the head is to be found in



Fig. 1.—Tornier's conception of the true position of Diplodocus.

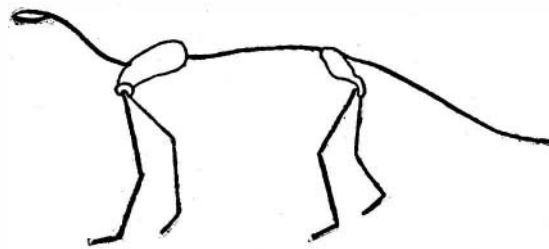


Fig. 2.—Present mounting of Diplodocus.

the peculiar ball-and-socket connection of the neck vertebrae. It was the object of this form of articulation to enable the neck to be extended to all sides as well as up and down.

It must not be assumed that Dr. Tornier's criticism of the mounting of Diplodocus meets with general European approval. Dr. Fritz Drevermann, curator of Senckenbergisches Museum, Frankfort-on-the-Main, believes that there is room for two opinions. He points out that Dr. Tornier's conception of the position of the legs of Diplodocus is based on Hay's view. If American students and particularly Prof. Osborn (under whose direction the Frankfort Diplodocus was mounted), Hatcher, Holland, and the Viennese Abel regard the present position as correct, it is not likely that Tornier is right. It is inconceivable that the palæontologists of the American Museum of Natural History, who have mounted Dinosaurs by the dozen, are ignorant of reptilian skeletons.

Marcellin Boule, professor of palæontology at the Museum d'Histoire Naturelle, Paris, agrees with Drevermann. He too argues that American authorities are fairly in accord on Dinosaur reconstruction and that the few disagreements affect only minor details. Inasmuch as Americans alone have had an opportunity of finding Dinosaurs in any number, and therefore have had the best opportunity of studying them, their opinion must be accepted as authoritative. He quotes B. P. Hay, who does not agree with most Amer-

ican students and who seems to have inspired Tornier. Prof. Boule contends that Tornier is wrong in holding that mammals have one form of locomotion and reptiles another. The conclusion that because Diplodocus is a reptile it must crawl is not necessarily valid. Locomotion is dependent upon external conditions. As a matter of fact there was once a time in the history of the earth when reptiles were lords of widely different elements. They dominated the water as Ichthyosaurs, Plesiosaurs and Mosasaurs; they roamed the earth as Dinosaurs and navigated the air as Pterosaurs. If present reptiles are limited to a crawling movement that is by no means conclusive proof that they always crawled.

### Chartreuse Liqueur Decision.

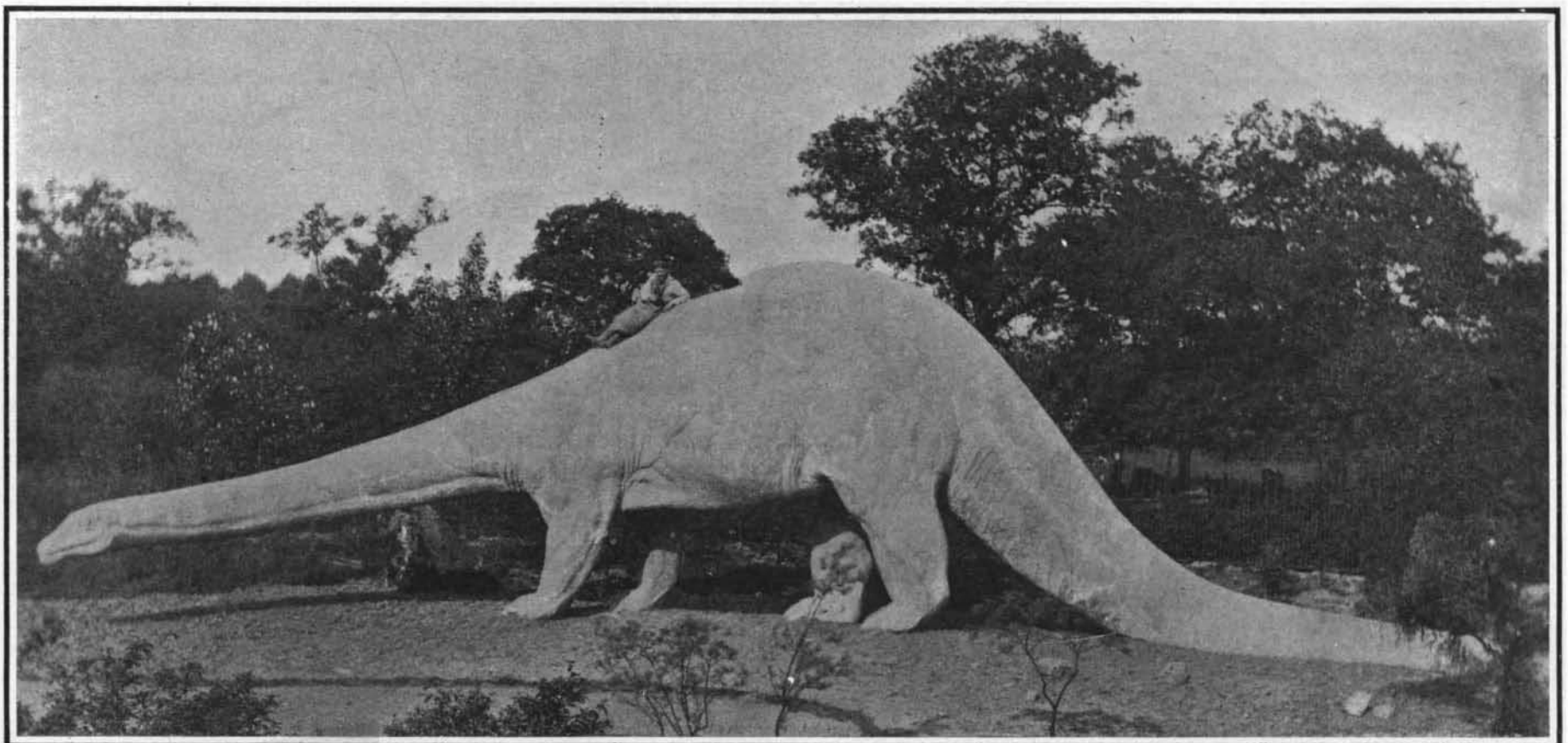
Consul C. P. H. Nason, of Grenoble, submits the following report on the French legal decision concerning the name "Chartreuse" as applied to liqueurs:

The court of appeals at Grenoble on June 22nd rendered a decision in the long-discussed case turning upon the rights involved in the public sale and use in France of the trade-mark "Chartreuse." After the expulsion in 1903 of the Carthusian monks from their convent, La Grande Chartreuse, the making of the well-known liqueur (the distilling of which and the aromatic plants entering into its composition were claimed to be known) was intrusted on the part of the state receiver to a prominent French distiller. The latter, as against the sale by auction of the very valuable trade-mark under which the liqueur was universally known, made a written advance offer, on the basis of which the bids were to begin at 1,500,000 francs (\$289,500). Thereafter came forward a second party and guaranteed the receiver an auction offer of 5,000,000 francs (\$965,000), but this was finally reduced to 3,000,000 francs (\$579,000).

This agreement the second party failed to keep; he withdrew the offer, and, as a consequence, at a forced sale to the highest bidder, the right to the trade-mark was sold to a company formed by the first party for the sacrifice sum of 502,000 francs (\$96,886). Whereupon the receiver brought suit against the second party for breach of contract, and the latter, after a strongly contested trial, was condemned by the civil court of Grenoble to pay the former for non-execution of contract 1,094,000 francs (\$211,142). An appeal was taken from this judgment, and after another prolonged hearing and arguments by eminent advocates, the court has not only affirmed the fault and responsibility of the second party, but increased the damage interests to be paid the receiver to 2,438,000 francs (\$470,534).

The use in this country of the trade-mark Chartreuse was decided by the two lower United States courts against the Chartreux monks and in favor of the new French company. An appeal is, however, pending.

According to the latest statistics, the total peat bogs of Sweden would be capable of producing 10,000 millions of tons of air-dried peat, suitable for fuel. This quantity, as compared with the present import of coal, would be sufficient for a period of 1,500 years. More exact examinations of the geological character of the peat bogs will soon be started by the Swedish Geological Society.



THE HAGENBECK RESTORATION OF DIPLODOCUS, IN WHICH THE AMERICAN MUSEUM OF NATURAL HISTORY'S MOUNTING IS FOLLOWED.