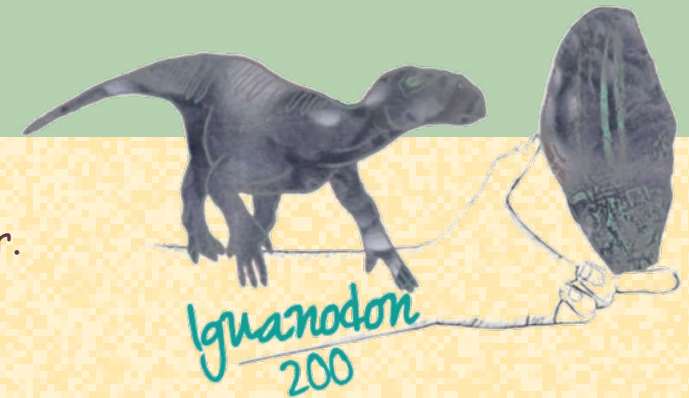


Gideon Mantell names the *Iguanodon* species



An exciting new accessible version of Gideon Mantell's 1825 scientific paper.

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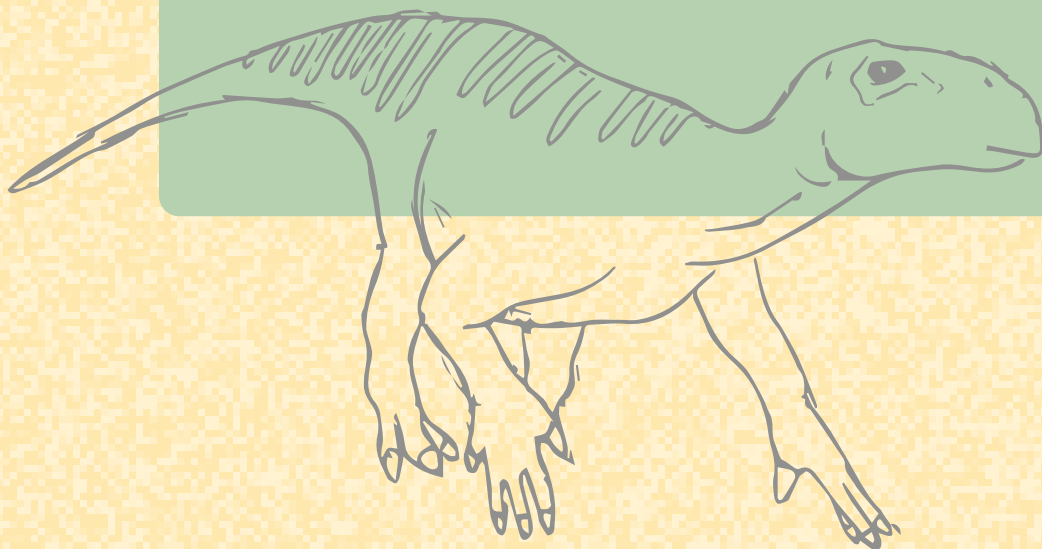
Part of A Town Explores A Book 2025 festival exploration in St Leonards-on-Sea for #Iguanodon200.

You are about to read the scientific paper of 1825 naming the *Iguanodon*!

#Iguanodon200

Gideon Mantell and Mary Ann Mantell discovered fossilised teeth in 1822 in Tilgate Forest, Sussex. They looked different to what had previously been found and inspired Gideon to work with others to name a new species of prehistoric creature before the term 'dinosaur' was in use.

The teeth helped scientists realise that dinosaurs could be plant-eaters.



NAMING THE IGUANODON

Welcome to this scientific paper with a very long title!

VIII. Notice on the *Iguanodon*, a newly discovered fossil, from the sandstone of Tilgate forest, in Sussex.

By Gideon Mantell, F.L.S. and M.G.S., Fellow of the College of Surgeons, &c. In a Letter to Davies Gilbert, Esq., M.P., V.P.R.S., &c., &c., &c. Communicated by D. Gilbert, Esq.

Read February 10, 1825.

Sir,

I avail myself of your obliging offer to lay before the Royal Society a notice of **the discovery of the teeth and bones of a fossil herbivorous reptile** in the sandstone of Tilgate forest; in the hope that, imperfect as are the materials at present collected, they will be found to possess sufficient interest to excite further and more successful investigation, that may supply the deficiencies which exist in our knowledge of the osteology of this extraordinary animal.

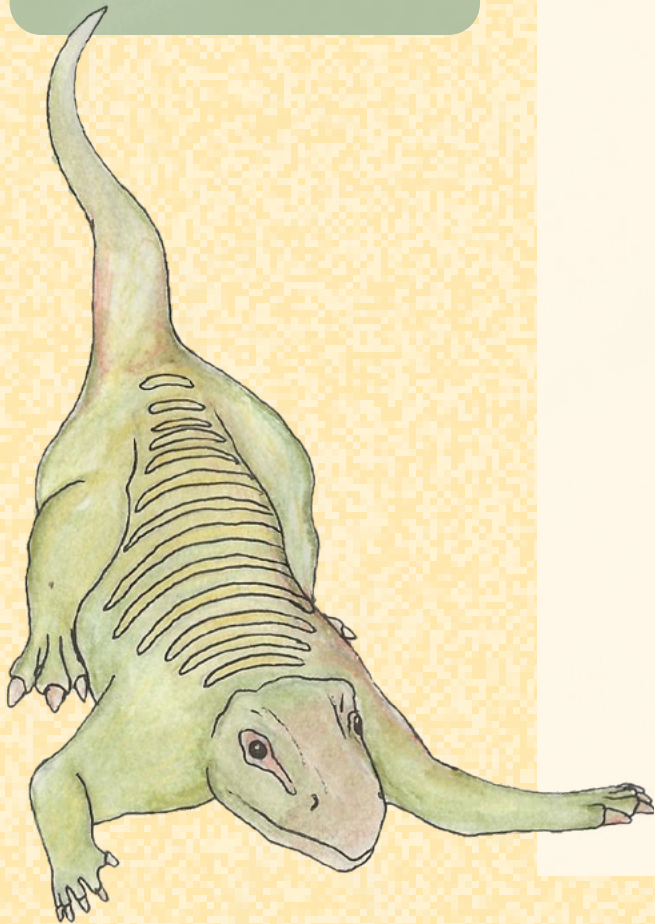
Gideon Mantell has got something exciting to share!

"Discovery of the teeth and bones of a fossil herbivorous reptile".

He wants to explain that fossils of teeth have led him to identify a new species.

Fossil: Part of a being from a past geological age.

Herbivorous: Plant-eating



Where is Gideon?

"Chain of hills ...
extending from
Hastings to Horsham".

These hills are
'Cretaceous' rock in
the county of Sussex.

The sandstone of Tilgate forest is a portion of that extensive series of arenaceous strata, which constitutes the iron-sand formation, and in Sussex forms a **chain of hills** that stretches through the county in a W.N.W. direction, **extending from Hastings to Horsham**. In various parts of its course, but more particularly in the country around Tilgate and St. Leonard's forests, the sandstone contains the remains of saurian animals, turtles, birds, fishes, shells, and vegetables.

Of the former, three if not four species belonging to as many genera are known to occur, viz., the crocodile, megalosaurus, plesiosaurus, and the *iguanodon*—the animal whose teeth form the subject of this communication. **The existence of a gigantic species of crocodile** in the waters which deposited the sandstone is satisfactorily proved by the occurrence of numerous conical striated teeth, and of bones possessing the osteological characters peculiar to the animals of that genus; of the megalosaurus, by the presence of teeth and bones resembling those discovered by Professor Buckland in the Stonesfield slate; and of the plesiosaurus, by vertebrae and teeth analogous to those of that animal.

What did people
already know?

"The existence of a
gigantic species of
crocodile"

Species: A group
of closely related
beings that are
very similar to each
other.

New discovery:
Fossilised teeth.

"But in the summer
of 1822, others
were discovered in
the same strata"

They are different
from what's been
found before.



The teeth of the crocodile, megalosaurus, and plesiosaurus differ so materially from each other, and from those of the other lacertae, as to be identified without difficulty. **But in the summer of 1822, others were discovered in the same strata** which, although evidently referable to some herbivorous reptile, possessed characters so remarkable that the most superficial observer would have been struck with their appearance as indicating something novel and interesting. As these teeth were distinct from any that had previously come under my notice, I felt anxious to submit them to the examination of persons whose knowledge and means of observation were more extensive than my own. I therefore transmitted specimens to some of the most eminent naturalists in this country and on the continent. But although my communications were acknowledged with that candour and liberality which constantly characterise the intercourse of scientific men, yet no light was thrown upon the subject, except by the illustrious Baron Cuvier, whose opinions will best appear by the following extract from the correspondence with which he honoured me:

The teeth were serrated and adapted for chewing plants. Mantell compared them to the teeth of iguanas with the help of other scientists.

Strata: A layer of rocks.

Serrated: Sawlike teeth, effective for cutting

An expert thinks they're interesting too and he speaks French.

"Ces dents me sont certainement inconnues"
(These teeth are certainly unknown to me.)

"Ces dents me sont certainement inconnues; elles ne sont point d'un animal carnassier, et cependant je crois qu'elles appartiennent, vu leur peu de complication, leur dentelure sur les bords, et le couche mince d'émail qui les revêt, à l'ordre des reptiles. À l'apparence extérieure, on pourrait aussi les prendre pour des dents de poissons analogues aux tétradons ou aux diodons; mais leur structure intérieure est fort différente de celles-là. N'aurions-nous pas ici un animal nouveau, un reptile herbivore? Et de même qu'actuellement chez les mammifères terrestres, c'est parmi les herbivores que l'on trouve les espèces à plus grande taille, de même aussi chez les reptiles d'autrefois, alors qu'ils étaient les seuls animaux terrestres, les plus grands d'entre eux ne se seraient-ils point nourris de végétaux? Une partie des grands os que vous possédez appartiendrait à cet animal, unique, jusqu'à présent, dans son genre. Le temps confirmera ou infirmera cette idée, puisqu'il est impossible qu'on ne trouve pas un jour une partie du squelette réunie à des portions de mâchoires portant des dents. C'est ce dernier objet surtout qu'il s'agit de rechercher avec le plus de persévérance."

Baron Georges Cuvier, known as the "Father of Palaeontology", examined the teeth and suggested they belonged to a plant-eating reptile.

He helped Mantell realise how special the *Iguanodon* was.

Palaeontology: The study of fossils.



Others helped Gideon Mantell define a new species.

"Mr. Clift ... to assist me in comparing the fossil teeth... for in an iguana which Mr. Stutchbury had prepared to present to the College, we discovered teeth possessing the form and structure of the fossil specimens.

These remarks induced me to pursue my investigations with increased assiduity, but hitherto they have not been attended with the desired success, no connected portion of the skeleton having been discovered. Among the specimens lately collected, some, however, were so perfect that I resolved to avail myself of the obliging offer of Mr. Clift (to whose kindness and liberality I hold myself particularly indebted) to assist me in comparing the fossil teeth with those of the recent lacertae in the Museum of the Royal College of Surgeons. The result of this examination proved highly satisfactory, for in an iguana which Mr. Stutchbury had prepared to present to the College, we discovered teeth possessing the form and structure of the fossil specimens.

In the annexed drawing, Plate XIV., examples of the recent and fossil teeth are represented, and the peculiar characters of each accurately shown. A description of it in this place will render the subsequent observations more intelligible.

Mr. Clift offered Mantell access to a museum's extensive collection of specimens.

He helped compare the fossil teeth with the teeth of iguanas.



Fig. 8

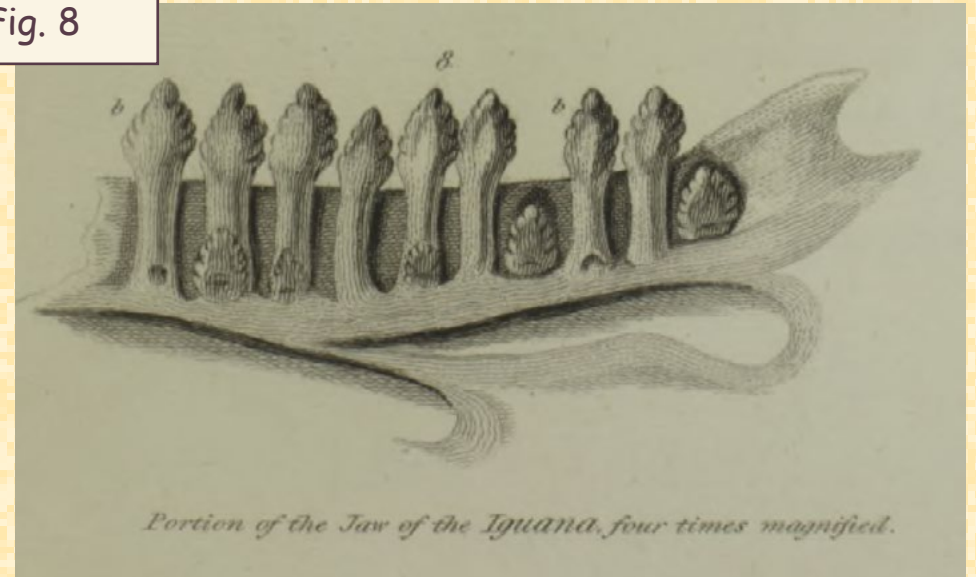


Fig. 8 represents a portion of the upper jaw of the iguana viewed from within; it is magnified four diameters.

Fig. 9a shows the inner, and **Fig. 9b** the outer surface of a tooth of the same, greatly magnified. It may be proper to remark that the teeth differ considerably in the number of points, and that the eminence at **f**, **Fig. 9a**, is sometimes the first or second in the series, instead of being the third, as in the figure. In some teeth, the points vary but little in size; they are more distinct on the edges of the teeth occupying the center of the jaw than in the anterior and posterior ones. The skeleton from which the drawings were made is three feet six inches in length. It is said to be the common edible iguana of the West Indies, but I have not been able to ascertain its species with certainty. The remaining figures represent different examples of the fossil teeth.

Fig. 9b



Fig. 9a



Fig. 1a represents the outer, and **Fig. 1b** the inner surface of one of the largest and most perfect specimens of the teeth of the *iguanodon*. As the letters of reference in each figure indicate the same parts, they are explained here to avoid repetition:

- a. Surface worn by mastication.
- b. The serrated edges.
- c. Fang broken; the cavity filled with sandstone.
- d. Cavity or depression in the base of the fang, the effect of absorption caused by the pressure of a secondary tooth.
- e. Ridge extending down the front of the tooth.

Fig. 2. This tooth evidently belonged to a young animal; yet even in this example, the apex is worn away (a, **Fig. 2c**). The ridge extending down the front (e, **Fig. 2a**) is more or less distinct in every specimen.

Fig. 3. A tooth much worn by mastication. The serrated edges and other characters are obliterated, the tooth being worn down to the point marked by the line at g, **Fig. 1a**. The fang has been removed by absorption, and the cavity formed by the pressure of the new tooth is very deep.

Fig. 1a



Fig. 1b



Fig. 2a



Fig. 2b



Fig. 2c



Fig. 3a



Fig. 3b

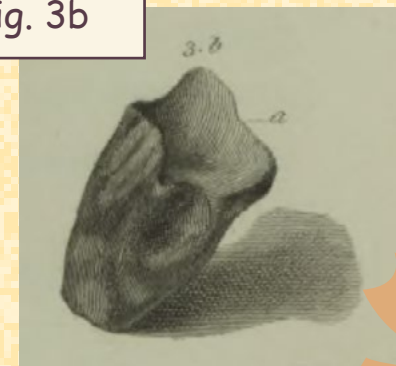


Fig. 4. In this specimen, the point is perfect, and it therefore more closely resembles the recent tooth (**Fig. 9**) than those above described.

Fig. 5. Another example where the point is but little worn.

Fig. 6. A large, strong tooth less curved than **Figs. 1 and 2**. It probably occupied a place in the posterior part of the jaw.

Fig. 7. In this figure, the cavity of the base of the fang for the reception of the new tooth is remarkably distinct.

The teeth above described, although varying from each other in some particulars, do not present greater dissimilarity than the differences arising from age, and the situation they respectively occupied in the jaw, would be liable to produce. Like the teeth of the recent iguana: The crown of the tooth is acuminate. The edges are strongly serrated or dentated. The outer surface is ridged, and the inner smooth and convex.

Fig. 4a



Fig. 4b



Fig. 5



Fig. 7



Fig. 6



This is how Mary Ann Mantell illustrated the teeth in the scientific paper.



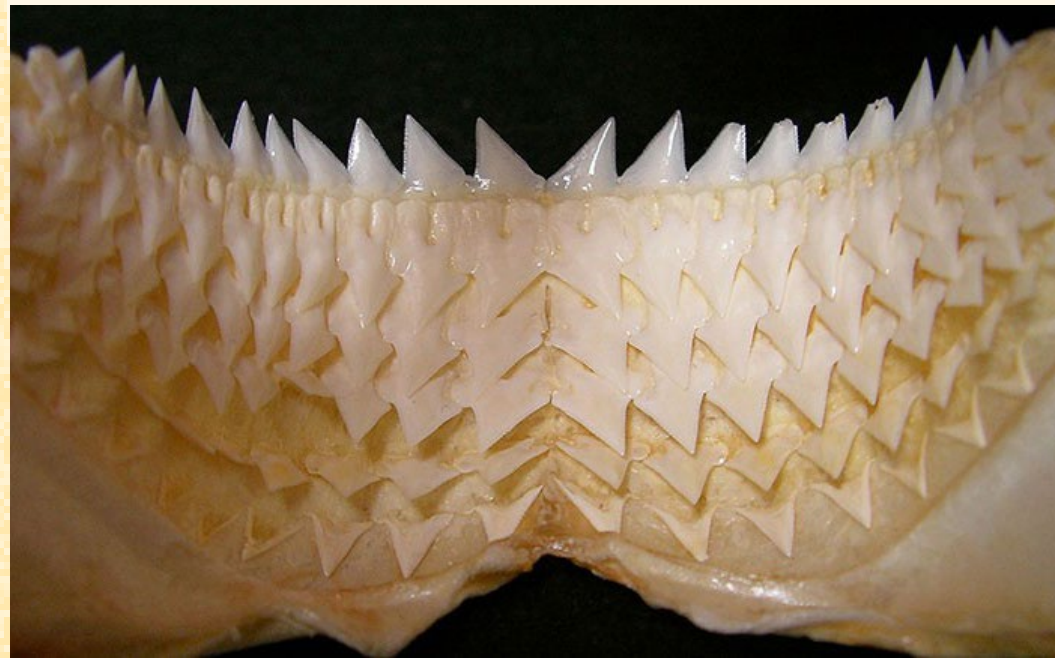
Hollow teeth!

Fossil teeth showed that *Iguanodons* had new teeth growing in as old ones wore out, similar to how sharks grow teeth today. Humans have only two sets.

The hollow spaces at the base of the teeth were for new teeth to grow and push out the old ones. It's like having a tooth factory in your mouth!

As in that animal, the secondary teeth appear to have been formed in a hollow in the base of the primary ones, which they expelled as they increased in size. From the appearance of the fangs in such fossil teeth as are in a good state of preservation, it seems probable that they adhered to the inner side of the maxillae, as in the iguana, and were not placed in separate alveoli, as in the crocodile. **The teeth appear to have been hollow in young animals and to have become solid in the adult.**

The curved teeth (**Figs. 1, 2**) probably occupied the front of the jaw, and those which are nearly straight (**Fig. 3**) the posterior part.



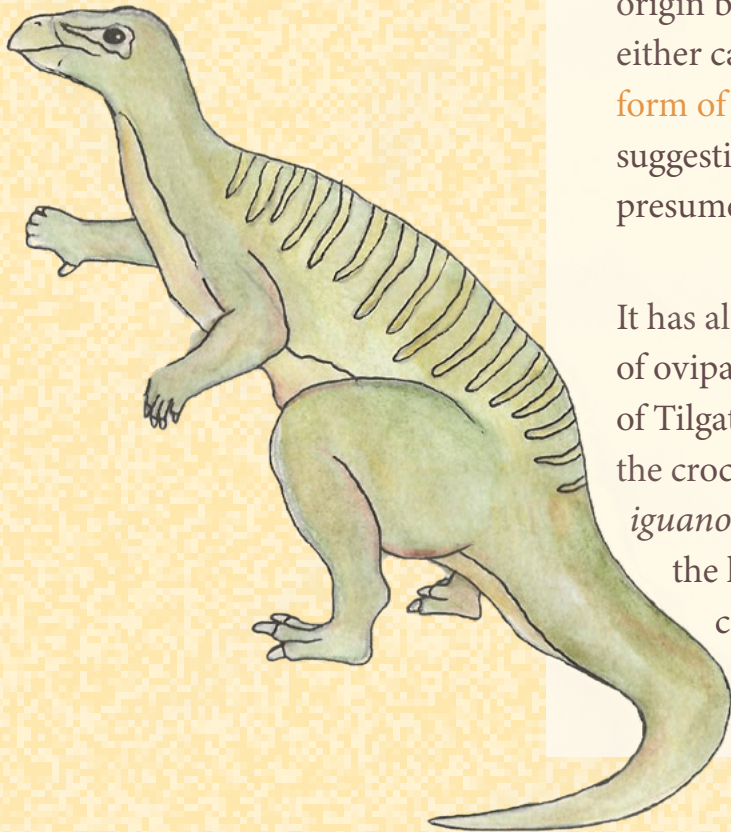
Jaw of a kitefin shark

Credits: Alessandro De Maddalena

Source: Natural History Museum

"*Iguanodon*", what does it mean?

"the term *Iguanodon*, derived from the form of the teeth".



It appears unnecessary to dwell longer on the resemblance existing between the recent and fossil teeth. Whether the animal to which the latter belonged should be considered as referable to existing genera, differing in its specific characters only, or should be placed in the division of Enalio-sauri of Mr. Conybeare (which includes marine genera only), cannot at present be determined. If, however, any inference may be drawn from the nature of the fossils with which its remains are associated, we may conclude that if amphibious, it was not of marine origin but inhabited rivers or freshwater lakes. In either case, **the term *Iguanodon*, derived from the form of the teeth** (and which I have adopted at the suggestion of the Rev. W. Conybeare), will not, it is presumed, be deemed objectionable.

It has already been mentioned that, of the bones of oviparous quadrupeds found in the sandstone of Tilgate forest, some are decidedly referable to the crocodile, and others to the megalosaurus and *iguanodon*. But our knowledge of the osteology of the latter is at present so limited that, until some connected portion of the skeleton shall be

Mantell named the dinosaur after its teeth, which were similar to iguanas.

"*Iguanodon*" combines the words "iguana" and "odon" (Greek for tooth). Scientists love using Greek and Latin words for names.

A huge dinosaur.

"The tooth... must have belonged to an individual upwards of sixty feet long".

discovered, it is impossible to distinguish the bones of the one from those of the other. Since, however, the teeth of the *iguanodon* are not known to occur in the Stonesfield slate, perhaps such of the bones from Tilgate forest as resemble those figured and described by Professor Buckland (in Vol. I, Second Series of the Geological Transactions) may be attributed to the megalosaurus, while others not less gigantic may be assigned to the *iguanodon*.

That the latter equaled, if not exceeded, the former in magnitude, seems highly probable. For if the recent and fossil animal bore the same relative proportions, the tooth (Fig. 1) must have belonged to an individual upwards of sixty feet long—a conclusion in perfect accordance with that deduced by Professor Buckland from a femur and other bones in my possession.

The vertebrae, as in the greater part of the fossil saurians, differ very materially from those of the recent iguana, crocodile, etc. They are not concave anteriorly and convex posteriorly, but have both faces slightly depressed, resembling in this respect the vertical column of one of the fossil crocodiles of Havre and Honfleur. Among the recent lacertae,

Based on the teeth, Mantell estimated the *Iguanodon* might have been over 60 feet long - huge for a plant-eater!

Sixty feet is as long as four cars parked end to end. Imagine a dinosaur that big.

however, there are some (such as the Proteus of Germany, the Syren of Carolina, and the Axolotl of Mexico) in which the vertebrae are deeply cupped at both extremities. Since the fossils in question are clearly of the saurian type, having the annular part united to the body of the vertebra by suture, the discrepancy alluded to does not appear to be sufficiently important to invalidate the accuracy of the opinions I have attempted to establish.

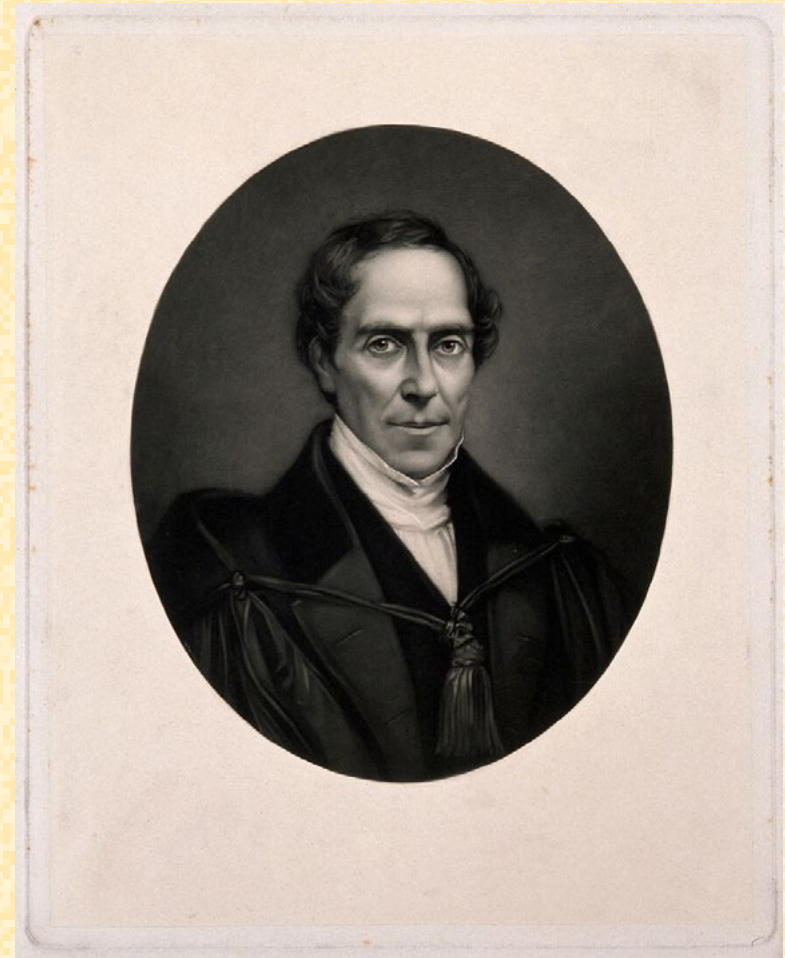
I have the honor to be,

Sir, your most obedient servant,

Gideon Mantell

Castle Place, Lewes,

January 1, 1825



"Portrait of Gideon Algernon Mantell"

1850, William Turner Davey after P. Senties
after J. Mayall.

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