

The fossil iguanodon.

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gallons: to find the shillings and pence, as near as this rule can do it, we must deal with the 820 in such a manner as to reverse the process in (1) and (2); that is, we must ask what number of shillings and pence would have given us 820, if we had done with them what is directed to be done in (1) and (2). The reverse rule is:—

1. Double the first figure, and add 1 if the second figure be 5 or upwards; this is the number of shillings. It is 16 in this instance, since the second figure is not so great as 5.

2. Take away five from the second figure, if that can be done, and with the remainder and the third figure, or with the second and third figures form a number; which number diminish by 1 if it be 25 or upwards. In the present instance this gives simply 20, for the second figure is not so great as 5, nor is 20 so great as 25. If the number had been 887 instead of 820, we should have had 36; the 3 left from the 8 after 5 has been taken away giving 37, which is diminished by 1, because 37 is greater than 25.

3. Turn the last number, considered as farthings, into pence and farthings; which gives, in this case, 5 pence.

Hence the price of ten gallons by our rule is £38. 16s. 5d. The real price is £38. 16s. 5½d.

To find the price of a hundred gallons annex two ciphers to 3882 and cut off three places. This gives 388/200, which, treated in the same way, gives £388. 4s. 0d. The real price is £388. 4s. 7d.

To find the price of a thousand gallons annex three ciphers to 3882 and cut off three places, or, which is the same thing, annex no ciphers. This gives £3882. 0s. 0d.; the real price is £3882. 5s. 10d.

This rule, though it takes some time in the description, may be done after a little practice by the head alone; but with great facility by writing down only as much as is in the following example:—

If 1 gallon costs £42. 6s. 3½d.
42314
10 gallons cost £423. 2s. 9¾d.
100 " £4231. 8s. 0d.
1000 " £42314. 0s. 0d.

which are respectively too small by 1½d., 14d., and 11s. 8d.

We write down the following examples, which the reader may verify by the rule:—

If 1 costs £2. 0s. 11½d.
10 cost £20. 9s. 5d.
100 " £204. 14s. 0d.
1000 " £2047. 0s. 0d.

In this case, and in that where there is only one shilling, a cipher must be placed after the pounds. Thus the number from which these are deduced is 2047.

If 1 costs £31. 9s. 1¾d.
10 cost £314. 11s. 5d.
100 " £3145. 14s. 0d.
1000 " £31457. 0s. 0d.

If 1 costs £0. 19s. 7½d.
10 cost £9. 16s. 0d.
100 " £98. 0s. 0d.
1000 " £980. 0s. 0d.

The rule always gives too little, except in the case where the number of pence is exactly 6d., in which case the answer is accurately true. For example,

If 1 costs £2. 18s. 6d.
10 cost £29. 5s. 0d.
100 " £292. 10s. 0d.
1000 " £2925. 0s. 0d.

As it is very uncommon, when the price is above five shillings, to sell goods, except for an exact number of

shillings and sixpences, this case will be found very convenient.

We may now describe the reverse rule. Knowing how many 10, 100, 1000, &c. cost, convert the sum into one number, by the first rule, strike off three places, and as many more as there are ciphers in the number named. For example, if 100 cost £4936. 18s. 7½d., how much does one cost? The number is 4936932, from which I strike off five places; viz., the three which are struck off in every case, and two for the 2 ciphers in 100. This gives

49/36932

Retain only three figures on the right, or

49/369

which gives, treated according to the second rule, £49. 7s. 4¾d. for the price of one. This is within a farthing of the truth.

We have put the rule in such a way that those who do not understand decimal fractions may avail themselves of it. Those who understand decimals may be told that this process is a short one for converting any number of shillings and pence into the corresponding decimal of a pound. Thus £1. 15s. 6¾d. is £1.778 nearly.

Our coinage might be altered so as to make this rule exact, without altering the quantity of copper which is now coined into a pound sterling. It would require that the copper which now goes to 960 farthings or 240 pence, should be divided into a thousand farthings or 250 pence, the penny being four farthings, as at present. Of these farthings 50 would go to a shilling, instead of 48 as at present; so that the shilling would be twelve-pence half-penny. This would be inconvenient, but not very much so; and the silver and gold coinage would remain entirely untouched. The difference between the old and new farthing would be only one twenty-fifth part of the old farthing; so that if goods were sold at the same nominal price, the loss to the seller would be about a farthing in sixpence; or if the same real price were to be kept, the old price might be turned into the new, with exceeding accuracy, by adding a farthing for every sixpence. This would be very useful in the period of confusion which would elapse between the establishment of the new coinage and the death of the generation which was brought up under the old. It would become usual to sell goods by tens instead of dozens, which would very much facilitate arithmetical operations.

We are not advocates of any such change, but rather the contrary; but we are convinced that if any alteration ever take place, this should be the one.

We will only add that even at present a simple table, small enough to be engraved on wood or bone, which could be carried in the waistcoat pocket, is all that is necessary to work by this rule with perfect exactness to any extent.

THE FOSSIL IGUANODON.

THE guana, or iguana, of the West Indies, of which a description and wood-cut were given in a recent number of this Magazine, appears to be the living type or representative of one of the largest and most extraordinary reptiles of a former world that has hitherto been found in a fossil state. The discovery of this animal, and of its structure and character, we owe to the scientific researches of Gideon Mantell, Esq., F.R.S., of Lewes in Sussex and a detailed account of its osteology, with plates, was given by that gentleman in the Philosophical Transactions, 1825; and subsequently in an interesting work published in 1827, entitled 'Illustrations of the Geology of Tilgate Forest.' From the close resemblance of the bones and teeth to those of the guana, Mr. Mantell has named the fossil animal the iguanodon; but though there is a resemblance in structure between the living and the fossil animal, they differ enormously

in bulk. The living guana seldom exceeds the length of five feet: that of the iguanodon, estimated by the magnitude of the bones, must have been about seventy feet; the circumference of the body fourteen feet and a half; the length of the thigh and leg eight feet two inches; the foot, from the heel to the point of the claw, six feet; the height, from the ground to the top of the head, nine feet. Let the reader refer to the figure of the guana, No. 41, p. 332, and if he can, let him imagine it to be amplified to the dimensions here given, and he will form a better idea of the iguanodon than a verbal description could convey. The bones of the iguanodon are found imbedded in sandstone, in the quarries near Cuckfield in Sussex; they have also been found in similar strata in other parts of the county. In the same quarries are also found the bones of other large saurian or lizard-shaped animals, together with remains of turtles and fresh-water shells. No entire skeleton of the iguanodon has hitherto been discovered; but Mr. Mantell, from his knowledge of comparative anatomy, has been enabled to trace the connection of the different parts in a satisfactory manner. This was a labour of some years; nor was it until several of the teeth were found that he could determine the true character of the animal, which was an herbivorous masticating reptile. On comparing the teeth with those of various species of crocodiles and lizards, he discovered an identity of form with those of the living guana, as may be seen in the annexed drawings, which are correct representations of both. The reader may be surprised to find the teeth of the iguanodon, which are here given of the natural size, to be so apparently disproportionate to the bulk of the animal, but this is the case with the living guana; its length is five feet, but its teeth are not larger than those of mice.

The living guana bites off the buds of vegetables, and swallows them without mastication; but from the worn-down state of some of the teeth, Mr. Mantell is decidedly of opinion that the iguanodon masticated its food: such was also the opinion of Baron Cuvier, who pronounced this animal to be "the most extraordinary creature that had ever been discovered." From the nature of its food it must have been a terrestrial reptile like the guana. The iguanodon, like one species of guana in St. Domingo, (*Iguana cornuta*), had a bony protuberance or horn placed near the eyes: a fossil horn has been discovered; it is about the size of the lesser horn of the rhinoceros. The principal bones of the iguanodon collected in Mr. Mantell's Museum at Lewes, are immense vertebræ, ribs, thigh-bones of prodigious size, one measuring twenty-three inches in circumference, bones of the feet and toes, and enormous sharp-pointed claws. Mr. Mantell, describing the thigh-bone of such vast circumference, justly observes, "Were it clothed with muscles and integuments of suitable proportions, where is the living animal with a thigh that could rival this extremity of a lizard of the primitive ages of the world?"

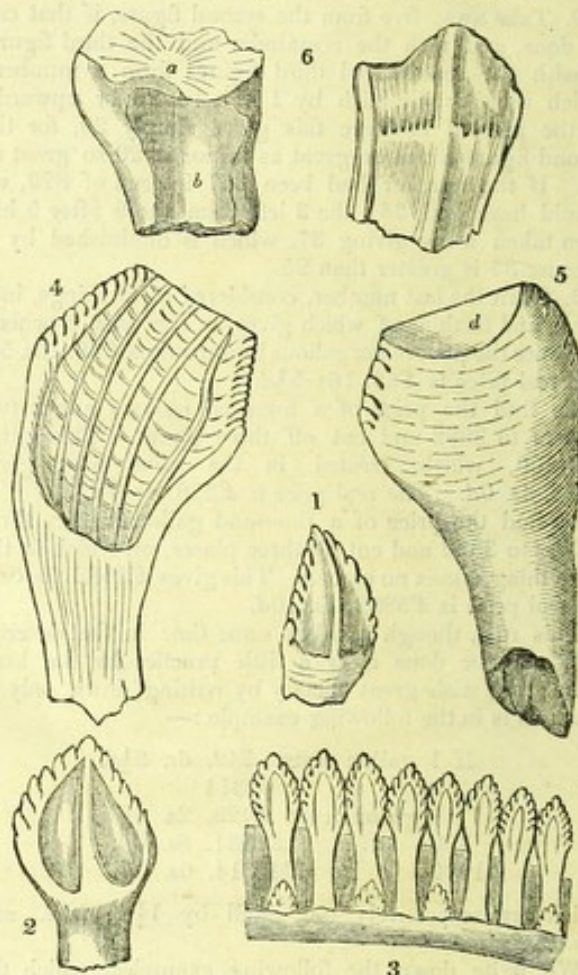
It was for some time believed that the remains of the iguanodon were not to be found beyond the wealds of Sussex and Kent; but recently, teeth nearly resembling those of this animal have been discovered by Dr. Jager in Germany.

During the last summer Mr. Mantell discovered the remains of another species of fossil reptile, less than the iguanodon, but resembling it in part of its structure, though differing from it and from all other known reptiles in other parts. It appears to have had a range of enormous scales or spines upon its back, resembling in form those of the guana, as represented in the drawing of that animal before referred to. Mr. Mantell read a description of the parts of this reptile, and exhibited its remains, at a meeting of the Geological Society in December last. He is now of opinion, that from the dislocated and broken bones being still placed in a certain relation to each other, they must have been

injured and subsequently disjoined while covered by muscles and integuments.

From the extreme hardness of the stone in which the bones are imbedded, great skill and care were required in removing the stone. The strata of Tilgate Forest, in which these organic remains are found, contain exclusively the shells of fresh-water animals and terrestrial plants. The chalk, which nearly surrounds the strata of the weald, contains the remains of marine animals only.

[Teeth of the Fossil Iguanodon and of the Guana.]



1. Crown of a tooth of the Iguanodon not worn by use, and in this state closely resembling fig. 2.
2. A magnified view of a tooth of the recent Guana.
3. Portion of the upper jaw of the recent Guana, with eight teeth highly magnified.
4. Front view of a tooth of the Iguanodon, natural size, the point worn off by grinding its food.
5. Back view of a similar tooth; the worn surface marked d.
6. Front and back view of a tooth of the Iguanodon worn down by use. a the worn surface. b the cavity formed by the pressure of a new tooth, as in the recent jaw, fig. 3, c.

A PARTY OF EMIGRANTS TRAVELLING IN AFRICA—(Concluded from No. 51).

IN the mode described in a former number we travelled for ten days; the features of the country changing from dark jungle to the open champaign, and from that again to the desolate sterility of savage mountain scenery, or of parched and desert plains, scattered over with huge ant hillocks and flocks of springboks. Here and there a solitary farm-house appeared near some permanent fountain, or willow-margined river; and then again the wilderness, though clothed perhaps with verdant pasturage and bedecked with magnificent shrubbery, extended from twenty or thirty miles, without a drop of water. It was consequently uninhabitable except after heavy rains.

At length we reached Roodewal, a military post on the Great Fish River, 200 miles from Algoa Bay, and about 50 miles distant from the spot allotted for our location. Here we were most hospitably entertained for a couple