



XXXIV. Memoir upon living and fossil elephants

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poses it to be the first that was invented; but it does not appear how it can be reckoned of that kind.—T. S. E.

THE following is the opinion given of this watch by the French Academy of Sciences at their public sitting the 5th of April 1769:

“ The Academy has adjudged the prize to the memoir which has for its device *Labor improbus omnia vincit*, and to the watch that accompanies this memoir, The author of both of them is M. Le Roy, clock-maker to his majesty. The rate of M. Le Roy’s watch, observed at sea in several voyages (one of which was from the coast of France to Newfoundland, and from Newfoundland to Cadiz) has appeared in general sufficiently regular to merit this reward for the author, the principal intention of which is to encourage him to new researches; for the Academy must not dissemble, that in *one* of the observations which have been made on this watch, it appeared, even while on land, to gain rather suddenly 11 or 12 seconds per day: from which it appears that the desired degree of perfection has not yet been obtained.”

XXXIV. *Memoir upon living and fossil Elephants.* By
M. CUVIER.

[Continued from p. 169.]

THE fossil elephants of Belgium have been long known. In the 16th century Garopius Becanus combated the prejudices which attributed to giants the large fossil bones formerly found in the neighbourhood of Antwerp; and he mentions the bones of two elephants dug up near Vilvorde, in a canal which the inhabitants of Brussels dug from that city to Rupelmonde, to avoid the trouble attending the conveyances by the canals of Malines.

John Lauerentzen, in his edition of the *Museum Regis Daniæ* of Jacobæus, part i. § 1. no. 73, relates the history of a skeleton which Otho Sperling saw dug up at Bruges in 1643, the thigh of which is preserved in the above cabinet. It is four feet long, and weighs 24 pounds.

M. de Burtin, in chap. i. § 2. p. 25. of his Prize Dissertation

dissertation "Upon the Revolutions of the Surface of the Globe," published at Haarlem in 1787, says that he possesses an elephant's tooth found in Brabant. He adds, that a very large fossil head of this kind was dragged out of a river two leagues from Louvain by some fishermen.

The pretended bull's horn, so long suspended from one of the pillars of the cathedral of Strasburg, is merely a fossil tusk which had been formerly dragged out of the same river.

In general, the whole banks of the Rhine swarm with these bones.

In the canton of Basle, in Swisserland, they also abound.

The landgrave of Hesse Darmstadt's cabinet has a lower jaw of great size, found near Worms.

There is a particular dissertation of Charles Gotlob Steding upon the fossil ivory in the environs of Spire. It represents a jaw of thirteen distinct laminæ, weighing three pounds and a half, and was found four feet deep, near a fragment of a tusk of four pounds weight.

Merk mentions a cranium found near Manheim, a plate of which exists; but I cannot procure a sight of it. Its two jaws weighed 200 pounds.

M. Hammer possesses a tooth dug up in an island of the Rhine opposite Manheim, and a fragment brought out of the Rhine near that city. M. Gmelin, an apothecary at Tubingen, has a lower jaw found in the Rhine also near Manheim.

Germany is certainly the country where the largest quantities of fossil bones have been discovered; not, perhaps, because it contains more than any other country, but because there is not in the whole empire any district which does not contain some learned man capable of collecting and publishing whatever is remarkable.

Every body knows the history of the elephant discovered at Tonna, in the country of Gotha, in 1696, and which has been described by Tentzelius and Hoyer*.

* Tentzelii Epistola ad Magliabecchium, de Sceleto Elephantino, Tonna nuper effosso. Phil. Trans. vol. xix. no. 234, p. 757—776. I. G. Hoyer de Libore fossili, seu de Sceleto Elephantis in colle sabuloso reperto, *Ephem. Nat. Cur.* dec. 3. an. 7—8. p. 294, obs. clxxv. See also *Act. Erudit. Lips.* Jan. 1697; and Valentini *Amphitheatr. Zootomicum*, p. 26.

A second skeleton was dug up in 1799 about 50 feet from the place where the former had been found: M. Baron Zach, upon this occasion, gave a circumstantial description of the soil, to which we shall resort in order to give the details of the discovery.

There are two places called Tonna (Græffen Tonna and Burg Tonna), both situated in the valley of Unstrut, below Langensalza, and to the right of Salza and Unstrut. All this valley, like most of the low valleys in Thuringia, is filled by horizontal layers of a tender calcareous sandstone, which contains bones, deers' horns, impressions of various leaves which are thought to proceed from the aquatic plants and trees of the country, and shells which apparently belong to the *helix stagnalis*, and other fresh-water shells. This sandstone in some places resolves into a marly sand, which has been employed for this century past in manuring land. It is partly obtained by subterraneous and irregular trenches; those of the commune of Burg Tonna are 40, 50, and 60 feet below the surface.

The workmen find, from time to time, elephants' bones and teeth, and the bones of the rhinoceros, animals of the stag kind, and that of the tortoise.

These dépôts of sandstone are mixed alternately with others of clay, where these bones are also found, although more rarely.

The two skeletons of 1696 and 1799 were found 50 feet deep.

Of the former there was collected a femur weighing 32 pounds; and the head of the other femur as large as a man's head, and weighing nine pounds; a humerus four feet long, two spans and a half broad; vertebræ, ribs; the head with four grinders weighing twelve pounds each, and two tusks eight feet long: but a great number of these pieces were broken.

We shall not detain our readers by giving an account of the disputes occasioned by this discovery. The medical inhabitants of the country, when consulted by the duke of Gotha, unanimously declared that these bones were *lusus naturæ*, and supported their opinions by several pamphlets:

but

but Tentzel, the librarian to this prince, thought differently; he compared each bone, taken separately, with its analogous bone in the elephant of that period, such as it was in the description of *Allen Moulin*, and by some remarks of Aristotle, Pliny, and Ray; and showed the resemblance. He went further, and proved, by the regularity of the stratum under which this skeleton was found, that it could not be said that it was interred by human hands; but that it must have been brought there by some general cause, such as the deluge has been represented.

The second skeleton, that of 1799, was in a compressed and crooked position: it occupied a length of 20 feet; the hind feet were near the tusks. The latter were 10 feet long. They were tender, but entire; their cavity easily admitted a man's arm. A part only of the lower jaw of the head was preserved, and the two largest grinders. The greater part of the other bones and the ribs were broken as they were detached from the soil; but larger or smaller portions of all the bones were found. The cellulous parts of them were filled with crystals of spar.

The corona of one of the grinders was nine inches long, by three broad; its height was six or eight inches; an entire tibia was two feet four inches, and six or eight inches in diameter: a head of a femur was six inches in diameter.

At a small distance, and in similar strata, stags' horns were found, or what is called the fossil elk; and at Boellstadt, a neighbouring village, some rhinoceros' teeth were found.

The valley of Unstrut has furnished fossil elephants in several other places of it, particularly a tusk, weighing 115 pounds, and 10 feet long, near Vera.

Another place, not less celebrated than Tonna for the number of fossil elephants, and bones of other strange animals which it has furnished, is the little town of Canstadt, in the kingdom of Wirtemberg, upon the Neckar. The principal discovery was made in 1700; and David Splaiss, a physician of Schafhausen, gave an account of it in a particular dissertation, entitled "*Ædipus osteolithologicus; seu*

*Diss. histor. phys. de Cornibus et Ossibus fossilibus Canstadi-
ensibus*, 1701, 4to; in which Spleiss has inserted an ac-
count written by Solomon Reisel, physician to the duke of
Wirtemberg. This discovery is also treated of in the *Me-
dulla mirabilium de Seyfried*, and in the *Descriptio Ossium
fossilium Canstadiensium de Reiselius*, 1715; and John Sa-
muel Earl has given a chemical analysis of it, very correctly
considering the period in which he lived, in his *Lapis Lydius
philosophico-pyrotechnicus*, &c. Francfort 1705.

I am indebted to the friendship of M. Autenrieth, pro-
fessor of anatomy at Tübingen, and of M. Yæger, keeper
of the cabinet of natural history at Stuttgart, for a still more
circumstantial account of the above discovery.

These two gentlemen have still the bones before their
eyes; they know the place where they were found; and they
are in possession of the proces-verbaux which were drawn
up at the time of the discovery.

The spot is on the east of the Neckar, about a thousand
paces beyond the town of Canstadt, on the side of the vil-
lage of Feldbach. Riesel says that there are the remains of
an antient wall there, eight feet thick, and eighty round it,
which seems to have been the inclosure of a fort or temple;
and, in fact, some more remains of the same description are
to be seen. Spleiss concluded that these bones were those
of such animals as were sacrificed; but they were, for the
most part, by far too deep for this supposition: besides, they
have been found much nearer the Neckar in a natural soil,
and quite similar to that where they are usually dug up. All
that can be concluded from their abundance within this in-
closure is, that they have been once before dug up in great
quantities in that neighbourhood, collected together by some
curious people, and again covered over.

The soil is a yellow clay mixed with small grains of
quartz and small shells. M. Autenrieth has sent me draw-
ings of five of the latter, which appear to me to be fresh-
water shells. This clay fills the various cavities of the cal-
careous hillocks in regular rows, and these hillocks are in-
terspersed with larger ones of a reddish marl.

These

These marly hillocks sometimes present us with petrified plants and beds of coal, and their summit is covered with old marine petrifications, such as ammonites, belemnites, &c.

It was a common soldier who first remarked some large bones above the ground in April 1700. The reigning duke continued digging for them for six months, and such bones as were most entire were carefully preserved. The remains, being a prodigious quantity, (for, according to Reisel, there were more than sixty tusks,) were sent to the laboratory to be employed as fossil ivory.

The bones themselves were without any order, for the most part all broken; some few of them were as if they had been rolled about. There were whole cart loads of horse teeth, and there were not bones in proportion to the tenth part of these teeth. The elephants' bones seem to have been uppermost, and the others buried lower. In general, they were never found deeper than twenty feet. A part of them were entangled in a kind of rock formed of clay, sand, flint, and ochre, agglutinated together; and the workmen were obliged to have recourse to gunpowder in order to separate them.

The elephant bones still in the royal cabinet at Stutgard consist of the following pieces; viz. part of an upper jaw with two parallel grinders; two upper fore teeth almost entire, and fragments of two others: the enamel on the used part of the teeth was, as in almost all fossil teeth, slender and thin; four upper back teeth; two lower teeth; a very crooked tusk of five feet and a half long, and another four feet and a half, measured on the convex side; fragments of several other tusks; pieces of vertebræ and ribs; four shoulder blades, and pieces of some others; a piece of a *humerus*; three cubitus; six nameless bones of the right side, and seven of the left, for the most part incomplete; four heads of femurs; three femurs without the heads; a rotula; two tibias. There is also, at an apothecary's in the same city, a lower jaw and a portion of a tibia.

These bones are accompanied in the cabinet with plenty of bones of the rhinoceros, the hyæna, and animals of

the horse kind, the stag, the ox, the hare, and small carnivorous animals. Some very large epiphyses of vertebræ might incline us to think they were of the cetaceous class of animals. There are also some fragments of human bones, to which I shall recur. Unfortunately, the different depths at which each bone was found were not accurately enough ascertained; neither were the bones which were found in the entrenchment mentioned by Reisel, sufficiently distinguished from those found out of their limits.

Canstadt is not the only place in the vale of the Neckar where similar discoveries have been made.

Near the village of Berg, above Canstadt, there is a singular mass of calcareous earth which consists of nothing else than incrustations of aquatic plants: I have often visited this place myself, and I learn from M. Autenrieth that he found a fossil skeleton of a horse there. In 1745 a tusk of fifty pounds weight was dug up in the same place; and M. Jøger found a lower jaw four years ago.

About eighteen months ago there was found, very near the walls of Stutgard, upon digging a cave, a considerable part of a large elephant's skeleton, two large tusks and a smaller one, in reddish and blueish clay.

The narrow valley of the Kocher, near Halle, in Suabia, furnished some tusks in 1494 and 1605; the latter discovery, which is still suspended in the church of Halle, weighs 500 pounds. An inscription below it informs us that there were a great many very large bones found near it. A fire having destroyed one third of this city in 1728, upon digging the new foundations plenty of fossil ivory was found, and in particular a tusk seven feet and a half long. A grinder, from the same place, is represented in the *Museum Closterianum*, fig. 8.

All the valleys of the great rivers in Germany have furnished fossil bones, as well as the places we have mentioned. In the valleys of the Danube, and through all Hungary, they particularly abound.

To return to Germany. We find a skeleton was dug up in 1722 at Tide, in the valley of the Ocker, between Wolfen-
bittel

büttel and Stetlerburg: Leibnitz had previously given a drawing of a jaw-bone found at the same place.

In 1742 there was an entire skeleton discovered by Dr. Kœnig, at Osterode, at the foot of the Hartz, and at the same place where a shoulder-blade and a radius of a rhinoceros had been dug up in 1773.

In the valleys of the Elbe, besides the entire skeletons of the vale of Unstruth, mentioned above, we find the numerous collections of bones at Esperstædt, in the county of Mansfeld, between Halle in Saxony, and Querfurt, and in the vales of the Sala. It is very remarkable that some part of them was found in a quarry of hard stone, as if the animal had fallen into some crevice.

Some fossil bones have been also lately found at Dessau, upon the Elbe, and at Potzdam, at the confluence of the Havel and the Spree.

As far as concerns the valleys of the Oder, we may consult the *Silesia subterranea* of Volkmann, who speaks of a humerus suspended in the church of Trebnitz, a femur in the cathedral of Breslau, and of a pretended giant dug up at Liegnitz on digging the foundations of the church, the bones of which were distributed through the different churches of the country.

The banks of the Vistula in Prussia and Poland, although much less examined than those of the rivers of Germany, also furnish us with fossil bones, which have given rise, as in other countries, to stories of giants. The banks of the Dniester also supply great quantities of these phænomena; and in 1729 great quantities were found near Kaminiek.

[To be continued.]