

*Temperature of Rivers, Springs, and Torrents observed.*

	1819.		°
Spring between Phagao and Theog,	8th May.	7 A. M.	45.2
Stream on Klashél Range,	24th Sept.	11 A. M.	45.5
Rupen River, below Pass,	29th	9 A. M.	40.5
Satléj River, below Shipké,	15th Oct.	5 P. M.	51.3
Do. at Namghea jhúla,	22nd	9 A. M.	44.0
	1820.		
Beru Naddí or Torrent,	4th Jan.	9 A. M.	33.1
Grassu and Badí Torrents,	5th	8½ A. M.	29.5
Chegaontí River,	9th	8½ A. M.	33.6
Pabar River, near Mandlí,	23rd Mar.	5 P. M.	52.7
Andrí near Chírgaon,	24th	7½ A. M.	43.0
Gop and Chílu Torrents,	30th	9 A. M.	43.0
Sepon River,	30th	10 A. M.	40.1
Pabar River, near Raingarh,	7th Apr.	6½ A. M.	51.8
Shillar Torrent,	20th	6 A. M.	47.0
Tons River at conflux with Pabar,	25th	7 A. M.	57.0
Shalwe River,	2nd May.	6 P. M.	69.9
Couflux of Shalwe and Kholte Rivers,	5th	7 A. M.	56.0
			J. P.

V.—Notes on the Specimens of the Kankar Formation, and on Fossil Bones collected on the Jamna. By Captain E. Smith, Bengal Engineers.

[Read 26th December.]

Captain E. SMITH has been engaged for some years in removing the obstructions to navigation in the river Jamna, between Allahabad and Agra. These obstructions, as is well known, consist of sandstone rocks and *kankar* banks, protruding from the bed of the river at several points, leaving, at low water, dangerous bars but partially concealed, and causing rapids and whirlpools, which have proved in years past highly destructive to boats. In the course of this important duty, of which we hope hereafter to be able to give a full account, the peculiarities of the *kankar* formation, which has been the subject of so much speculation to Indian geologists, have been strongly impressed on his observation, and he has very laudably preserved sketches and remarks of their most remarkable appearances in his note-book, which he has now submitted with the series of specimens to the Society. "They are not numerous"—he writes, "having been taken only where differences in the *kankar* and rock were evident, but they form a regular series from Agra to Allahabad, shewing the nature of the rocks occurring throughout that distance. Having little knowledge of the subject myself, I have not attempted descriptions of the specimens, which will be more correctly recognized by others, but have substituted what may be of use, viz. sketches and notes of the exact situations whence the specimens have been obtained. These even amount to little more than indica-

tions of place, for almost the remarks that have offered themselves have been reserved until I know whether they will be of service."

All geologists will agree that the graphic mode of illustration adopted by Captain SMITH is the very best for communicating at once an acquaintance with the nature of the country he has explored, and though confined to the banks and bed of a river, it must be remembered, that the section thus opened to him by the operations of nature, to a depth in some places of 100 feet or more, is a section of the great alluvium of the Doab and of the Agra plains, and not, as it would be in the lower course of the Ganges, a mere exhibition of the continually shifting channel and sands of the comparatively recent delta.— This remark extends particularly to the fossil bones discovered at Karimkhán and other places, which will be seen, as we proceed, to belong to the genuine class of fossils, underlying the *kankar* stratum of the clayey alluvium, and are not merely casual deposits in the present river, as Captain HERBERT was led to suspect when their existence was first pointed out, in a situation of the same nature, near Calpi, by Doctor DUNCAN, in 1828\*.

Dr. ROYLE also brought away a fragment of bone in 1831, and expressed his opinion that fossils would be found in the banks of the Jamna, (Journal, vol. i. 457.)

Regarding the present collection of fossil bones, Captain E. SMITH's private letter furnishes the following particulars: "With the specimens of rock there is a box of fossils; I have done little more than indicate the localities, with a few remarks on the state of the bones, originating in

\* See GLEANINGS IN SCIENCE, i. 23.—*Account of fossil elephant bones found in the river near Calpi.* As no further notice was taken, at the time, of Dr. DUNCAN's discovery, I take this opportunity of publishing the extract from Mr. J. LESLIE's letter which brought the subject to the notice of the Physical Class of the Asiatic Society.

"I had the pleasure of sending you on the 6th, two portions of the fossil bones of an elephant, for which I am indebted to my friend Dr. DUNCAN at Calpi; the following is an extract from his letter which accompanied them: 'The spot on which these remains were found is nearly three miles up the river on the opposite side to Calpi; at the time of visiting them there was not a long bone whole; probably a tooth might have been procured, but certainly not now, the remains being scattered by the natives who accompanied us, in all directions. I however send you what I preserved, part of a long bone (the femur) and a portion of a tusk, the lamellated structure of which is very distinct. The remains lay about 40 yards from the edge of the water, then very low, but which during the rains must evidently overflow the spot to an equal or greater extent. They appeared but superficially imbedded in the slightly coherent earthy stratum, which has been deposited by the waters on a bottom of *kankar*, of which the bed and banks of the river were here composed.' "

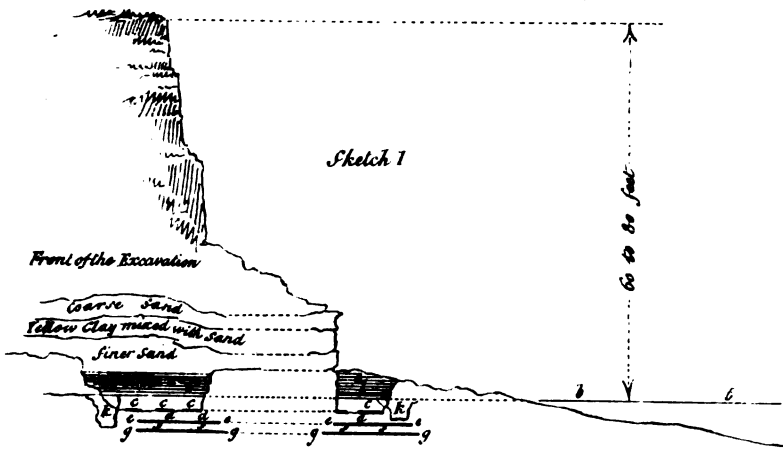
my acquaintance with the situations in which they are found. The portion of the subjoined note in which the fossils are assigned to different parts of the skeletons of various animals, has been derived from better authority than I can pretend to in such questions. From what has been obtained in the last year or two, it seems that fossils in great abundance are lodged in the bed of the river. They have in previous years of the works been procured in smaller quantities, from rocks or shoals differing in nature from those of the last season, having been removed in the first periods. One cause of so many having been of late discovered has been the presence of intelligent European overseers, whose curiosity has been excited by remains which were matter of indifference to the natives. It is to be regretted, however, that the attention of the men was not directed earlier to the preservation of these fossils.

“ I became acquainted with their discovery in such quantities, and of such dimensions, only after an absence from the spot, during which the excavation had been completed, and could then collect merely a few of the fragments, which an interest in the subject on the part of some of the sergeants had induced them to select. Much however has been lost, and as seen in the list, a small piece only was kept of the shoulder blade of an elephant, (No. 3,) described as very perfect, but which unfortunately, with the rest of the mass removed from the shoal, was thrown into the water of a deep channel. I have lately got some more fossils, and in the course of the cold season, I shall have an opportunity of visiting some, of the existence of which in the banks of the river I have just had information, and which (if the account I have received be correct) would seem to prove that the process of petrification is still active.”

Captain SMITH has divided his notices under three heads, which we here insert in the same order, adding the characters of the rocks, and in some places their analysis, from the specimens presented to the Society.

**I.—Notes with Explanatory Sketches on a Description of Kankar found in Slabs in part of the bank of the Jamna. (Plate XXIII.)**

A description of flag, composed of sand coarsely but strongly cemented, in thin slabs, horizontally disposed, is found in considerable quantities at a short distance from Kárfmkhán, near Oreyah, on the Jamna. The situations from which it is usually dug are shown distinctly in the accompanying sketches, with the references and notes; but the flag is not confined to the banks of the river, (Sketches 1st and 5th,) being raised as well from sand-banks far out towards the centre of the bed of the stratum.



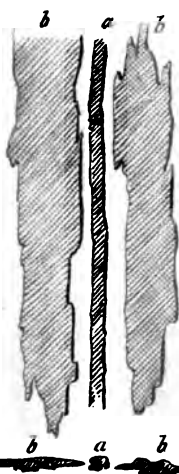
Kankar beds of the Jumna River



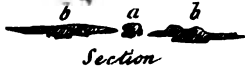
Sketch 2



Sketch 5



Sketch 3



Section



Sketch 4

Method of extracting the Kankar near the centre of the river



It is excavated principally by the boat and ghat men, or the villagers of the *Mallah* class, on the immediate spot; and the search for it, and the mode of raising it, is simple.

In the hot months, when the river is low, these men observe what parts of the bank have been left by the river (Sketch 1st) so bare of sand, or deposits of mud, as to allow of a probability of the flags being reached without much labour in the removal of the superincumbent body. They are, from the excavations in former years, acquainted with the spots in which they may expect to find the flags, and the upper mass being cleared away, if the flags are reached, the excavation is carried on as long as the easy slope of the bank allows of its being profitable. It is generally from about the bottom of the bank, at the level of the lowest fall of the river in the dry months, that the flags are taken, and they are traced at all heights from this level up to 20 or 25 feet above it, but rarely or never higher. Below this lowest level, they are found in depths as great as the water has allowed of the excavation being prosecuted in, but that is not more than 4 or 5 feet. Towards the centre of the river they are raised from similar depths below the surface (Sketch 4th) from a space on which sand settles annually over a greater or less extent. Whenever any part is perceived free of sand, and the flags felt at the bottom of the water clear of that obstruction, they are detached by common iron implements, and raised. As is the case near the shore, the depths from which they are lifted do not exceed 4 or 5 feet. In raising the flags, it is usual to cut them across, (Sketch 2nd,) to reduce them to manageable dimensions, and as they are sometimes connected with each other at the edges, they are there too cut asunder. They are generally taken out in lengths of from 2 to 4 feet, the breadth varying from 1 to 2 feet.

Long round pieces are sometimes found between the flat slabs, (Sketch 3,) that is of course when the latter are not so close as to be connected. These round pieces are always smooth, never knotted, at least as those common on the surface of the kankar banks and shoals usually are. The round are always met within the horizontal line between the flat pieces, never above or below them, not even when there are double or treble strata of slabs. The directions of the lateral divisions of the slabs, as also of the grooves which channel the surfaces of both the flat and round pieces, is stated to correspond nearly with that of the present course of the river. These flags are said to harden on exposure to the air. It is unusual to find, in other parts of the bank, fine sand, similar to that of the sand strata immediately adjoining the

flags, and to that of flags themselves\*. It seems to be of a kind peculiar to this bank of the river, about the lowest level. Cursory observation at least does not discover it elsewhere. It is darker and greyer, but otherwise not unlike the fine sand of the superficial beds. Flags, it is asserted by the people, are never found on the sites of former excavations, that is, they believe them to be old deposits, and have no expectation of discovering fresh formations in the spots from which they have once before raised the layers. Projecting eaves from the roofs and windows of the native pakka houses are in this neighbourhood very generally constructed with these flags. It seems to be the use to which exclusively they are applied, and they are conveyed for it to *Calpi* and other towns in the vicinity, where they are sold at a few rupees a hundred.

Similar flags to these may very possibly exist on other parts of the bank of the river, but they have never been observed or heard of except at this place, and here but in one bank of about half mile in length, and in the bed of the river opposite to it. Although, as shewn in Sketch 5, this is now the main bank of the river, it has not always been so. At some very remote period, the Jamna must have ran along the foot of the higher plain on which *Kentra* stands, and which line, with the relative distances and elevations, is seen on the small sketch.

*References to the Sketches.*

- Sketch 1.*
- a. Sand in strata, alternating in thicknesses of the flags.
  - b. Lowest level of the river.
  - k. Cess-pool for baling out the water.
  - c. First stratum of flags.
  - d. Intervening layer of sand, fine, of the same color and description apparently as that in the composition of the flags, varying in thickness from 6 in. to 1 feet.
  - e. Second stratum of flags.
  - f. Second intervening layer of sand.
  - g. Third stratum of flags.

From 1 to 5, strata of flags and intervening sand are found.

*Sketch 2.* The slabs in their natural position, in the sand or the river. ---- Cuts made by the people to detach them.

*Sketch 3.* Plan and section shewing the round pieces of kankar (a) found lying between the flat slabs (b b).

*Sketch 4.* The method of obtaining the kankar from the sand-beds towards the centre of the river.

- A. One of the men separating the pieces by a sharpened crow-bar.
- B. Another lifting up the detached pieces from the bottom.

\* The composition of the flag kankar analysed by me was as follows :

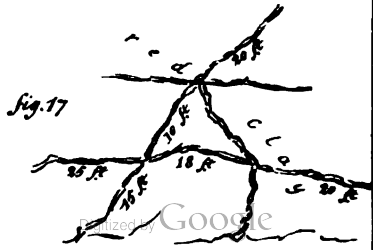
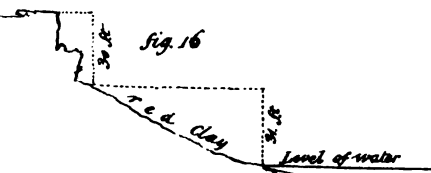
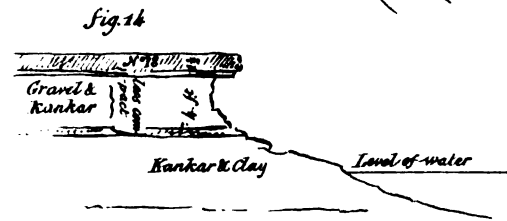
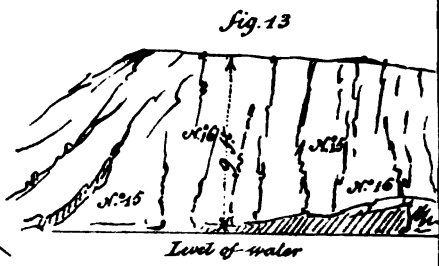
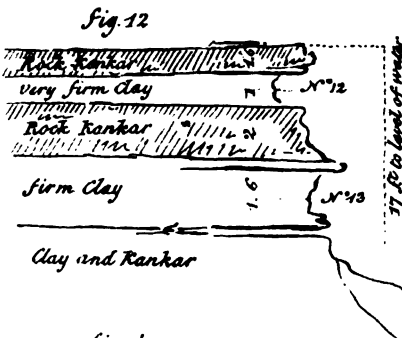
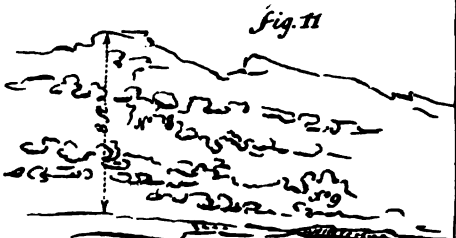
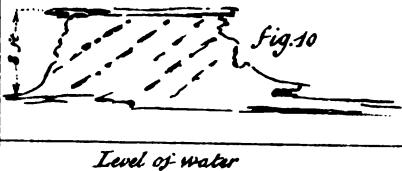
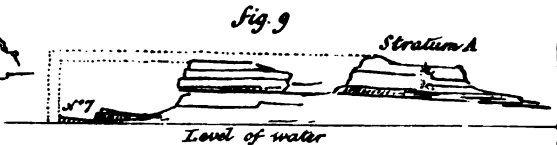
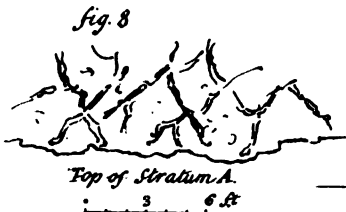
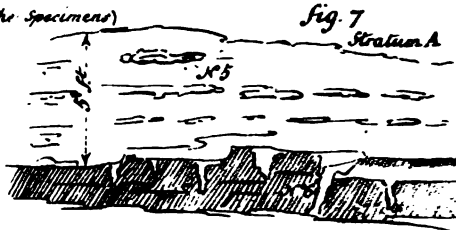
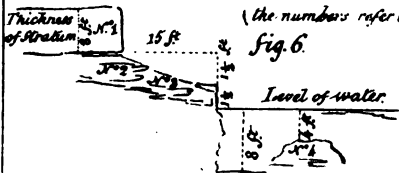
Carbonate of lime, .....	42.2
Fine sand, .....	57.8





Varieties of Kanakar in the Banks of the Jumna

(the numbers refer to the Specimens)



*Sketch 5.* Plan of the locality.

a. Present bank of the river, 40 to 60 feet above the lowest level of the dry season.

b. former bank, 100 to 140 feet above ditto.

c. Bank, in, or near which the slabs are found.

2.—*Notes on Specimens of Kankar and Rock taken from the Bed of the Jamna, between Agra and Allahabad. (Plate XXIV.)*

*Fig. 6*—represents a section of the river bank at *Sinjaity*, above *Etáwa*, with the kankar jutting under water.

No. 1. Loose kankar gravel, cemented with clay and lime.

2. Ditto, with kankar cement: micaceous sand.

3. Botryoidal kankar.

4. Resembles 2, but more solid.

*Fig. 7*.—*Kaláysar*, at the junction of the *Sinde*, 20th April.

No. 5. Hard sandy kankar.

6. Stalactitic kankar, rich in lime.

*Fig. 8*—is a plan of the surface of stratum A in the last sketch, which much resembles the filling up of the natural cracks, formed on the drying of a clayey soil, with a carbonaceous and sandy infiltration.

*Fig. 9*—shews the general elevation of the specimens from *Kaláysar*. The main bank immediately above rises to the height of about 70 feet, and at a furlong further back, to a total height of 130 feet; above the kankar the bank is of fine clay.

No. 7. A concretion of rolled fragments of kankar.

*Fig. 10*—is a section taken at *Kanjosa*, at the junction of the *Sinde*. Here the nodular kankar lies in inclined strata in a hard clay, upon the horizontal surface of which rests a flat plate of kankar, (similar to that extracted from the bed of the Jamna?)

*Fig. 11*.—*Himatpúr*, 20th April. A mass of nodules in close contact, but disposed in strata nearly horizontal; some at 12 feet above the level of the water, some at less. The kankar which has acted as a cement to the mass is seen in veins.

No. 8. Hard ramified kankar.

9. Smaller, of various forms.

At *Burlóti*, below the junction of the *Chambal*, 20th April.

No. 10. White kankar in sandy clay; of this there are extensive shoals, which offered obstructions to the navigation.

No. 11. Rock kankar, a granular concrete, with marks of shells? Stratum, two feet thick, sixty feet above the lowest level of the river: total height of the precipitous bank about 100 feet.

*Fig. 12*.—At *Nawí*, between *Calpi* and *Hamatpúr*, the measurement and nature of the strata are shewn in the sketch.

No. 12. Is a firm clay.

13. A sandy marl, effervesces with acids.

14. Rock kankar, a calcareous sandstone, containing angular fragments of silex, felspar, and yellow clay. A few strata, about one foot thick each, with strata of the usual description between, form together masses of 12 feet thick rising to 17 feet above the surface of the water.

*Fig. 13.*—Section of the clay bank above *Hamírpur* and below *Secrorí Ghát*. The kankar (15) here appears in vertical seams in the scarped front of the bank, which is itself of a firm clay.

No. 16. Sandy clay, with perforations—and an imbedded *asio* shell, open.

17. Ramified kankar from the bank at the level of the water, *Hamírpur*.

*Fig. 14.*—Section of part of the bank at *Arroel*, below *Hamírpur*.

No. 18. Kankar conglomerate (large rolled fragments, reunited with kankar cement).

19. Plate kankar, of botryoidal form—micaceous sand adhering: from *Takouri* near *Chiladára Ghát*, it appears combined in large rocks and reefs.

*Note.*—To this part of the *Jamna* the clay and kankar formation prevails. Below, fresh descriptions of rock supersede the kankar, except in the specimens distinguished as such.

20. Red vitrified clay, or *khengar*, of variegated color, from *Marka*. The mass is about 200 feet in dimensions, rising 20 feet above the level of the water.

21. Ditto, partially heated, found in detached lumps near the base of ditto.

*Figs. 15, 16, 17.*—At *Agrye*, 1st May, above *Mhow*. Veins of kankar (No. 22, clayey kankar), here run in veins through red clay, containing nodules of kankar: from the unequal wear of such materials by atmospheric influence, the veins are sometimes seen to protrude like dykes above the clay, as represented in *Fig. 15*, to the height of half a foot or more: the superficial appearance is reticulated, as shewn in *Fig. 17*.

No. 23. Plate kankar from *Kankota*;—of this kind extensive beds and reefs occur, it is much the same as that at *Pachkouri*.

The other specimens forwarded with the kankar series, are as follows:

No. 24. A calcedonic conglomerate of fused lithomarge, forming the substance of a rocky island above the *Taboda* hill, taken from the mass 25 to 40 feet above the water-level.

Specimens from *Mhow*, 40 miles above *Allahabad*.

No. 25. Sandstone from the rock about the centre of the river, at six feet above the level of the water.

26. Lithomarge, in masses, 10 feet above the water.

27. Sandstone flag, from the *Bundelkhand* bank of the river.

28. Red clay and gravel (ferruginous kankar), running in veins 30 to 40 feet in length, 3 or 4 inches thick, taken from the same spot as No. 27.

29. Friable white sandstone, from about the centre of the river, near the lower part of the pass, forming large reefs and masses, 3 or 4 feet above the water-level.

30. Sandstone, fine grained, from a large mass about the centre of the river, in the higher part of the pass, taken from 3 or 4 feet above the level of the water.

Specimens from the great reef at *Bamiári*.

31. Hard sandstone, 6 to 10 feet above the level.

32. Kankar, in very small quantities, found near the above.

Unless specified otherwise, it should be understood, that by the "level of the water," in the preceding notes, is meant every where the lowest annual level of the river.

Small springs, flowing in free through scanty streams, run from under many of the ledges of kankar on the banks of the river. They are rarely met with except in these situations, and in the possibility of their being still impregnated with the calcareous matter which seems to have been the principal agent in the formation of the kankar, some of the water has been brought off in bottles,—a rude attempt made here to discover the presence of lime was not successful in detecting it\*.

3.—*List of Fossil bones found in various situations in the prosecution of the Jumna works at Karimkhán, 1833.*

The numbers refer to the specimens presented to the Society, and to the figures in plate XXV.

1. A tooth supposed to have belonged to an elephant, 14 or 15 years old.

2. The bony or inner part of an elephant's tusk.

3. The extreme point of an elephant's shoulder-blade; the remaining part of the bone weighed about  $1\frac{1}{2}$  maunds.

4. A portion of an elephant's shin-bone.

5. Portions of the back-bone of a camel, (?) or one of the vertebræ of the lower part of the neck.

6. Knuckle bone of the knee-joint of ditto.

7. That part of the shin-bone nearest the fetlock joint of ditto, or end of the shank-bone next the knee.

8. Portion of a rib of ditto.

\* Both of these waters were found to be nearly pure, their specific gravity being sensibly the same as that of distilled water. On applying the proper tests, the only salt discovered in the water from *Nanf* was carbonate of lime; that from *Arroel* contained the same, with a very slight admixture of muriate of soda. The slight solution of carbonate of lime may have been rather derived from the kankar, than have aided in producing it.—ED.

9. Portions of human bones, (?) the two black ones being the head of the thigh-bone and head of the arm-bone.
10. Two pieces supposed to have been parts of alligators.
11. Portions of bones belonging to the skeletons of horses, buffaloes, &c.
12. The upper part of the leg-bone nearest the shoulder of a young elephant, or the lower part of the thigh-bone of the same animal.

1 and 2 were taken out of a mixture of sand and kankar, partially exposed to the atmosphere.

3, 4, 8, 9, 10 and 11, were all procured on sloping the banks of a channel, the sides of which are from 1 to 5 feet above the lowest level of the river (the bank being 50 feet high.) They were dug from depths of from 6 to 18 inches in the firm shoal, which is composed of substances, kankar stone, gravel, rounded bricks (vitrified clay?) more or less rolled and cemented by mud and clay.

5. Were dug out of a cleft in hard yellow clay about 9 inches deep, filled with black mud, about 3 feet from the surface of the water.

6. Were found in the bed of the river about 18 inches deep, and 4 feet from the surface of the water, during the excavation of a bund.

12—was found on the left shore of the *Jamna*, at *Chowra*, above *Calpé*, partially imbedded in a clay and kanker bank: all the rest were dug up at *Karimkhán*.

Of the fossil bones those found in the shoals of kankar were the least perfect, the petrification being less complete, or the fossil in inferior preservation. In the stiff clay, which composes a considerable portion of the bed of the river here, the fossils were in better order. This difference may be accounted for on various suppositions. The fossils, after being washed from the spots where they became such, might have been better preserved in the stiff clay than in the loose shoals; or the change into the fossil state may have taken place in the immediate neighbourhood of the clay, and those found in the loose shoals have been carried by the water from the original place of formation, having suffered injury in their progress from their first to the new situation in which they are found.

It is difficult to assign to these remains the dates of their passing into the fossil state. The greater number have been found in an extensive shoal, of partially rolled kankar, cemented by mud, and which from known changes in the river might be of very recent accumulation. A large proportion of the fossils seem to have had a former situation in the hard clay of the bed of the river, however carried thence to the

kankar shoal. But whether they become fossils in the clay, or whether, after becoming so in other spots, they were swept on, till lodged in the clefts of the clay, still remains a point to be ascertained.

There is a probability in the former supposition, from the fossils found in clay being coloured throughout with its yellow tinge, whilst those dug up from gravel or kankar are of the greyish hue of these latter substances. If then the fossils are of the dates of the masses in which they were discovered, their age must be considerable, for the clay spoken of lies at great depth in the plain of the *Doab*, and must be a very early deposit.

In regard to fossils—will substances, after having completed their change to that state in some other spot, acquire throughout their internal structure the color of clays, in the clefts of which, after traveling from a distance, they may have found a fresh resting place? If they will, the difference of color in the fossils leads to no evident conclusion on the preceding surmises. One curious particular seems established after repeated inquiries. The fossils marked 5 were taken out of clefts in clay which lay below a thick stratum of rock kankar. Still it is far from certain that the rock kankar was so entire, so free from fissures, as to permit of no other explanation than that of the fossils having been deposited or changed in the clay, before the formation of the kankar which rested in it. That clay is itself of great age, it is at the bottom of the river, 40 feet from the extreme height of the rise of the river in the rains, and from 100 to 150 below the plain of the *Doab* and *Bundelkhand*."

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To these guarded remarks of Captain E. SMITH, every attention is due, and he deserves our best thanks for so impartially laying the circumstances of the *Jamna* fossils before us. It would seem to be pretty well established from his local observations, that many if not all of the fossils were first deposited in the clay stratum from 100 to 150 feet below the plain of the *Doab*, and under the general line of the kankar formation; that upon the excavation of the present bed of the *Jamna*, many have been washed out of their original seats and removed to clefts in the ledges of rock in the bed of the river, and have been there mixed up with a fresher muddy deposit, and in some cases impregnated with a tint therefrom. That they belong to the former period, and that the kankar attached to them is also much more ancient than the present sands of the river, is rendered sufficiently evident in some of the specimens by the large angular quartz and felspar gravel, cemented on to many of the bones. Some angular pebbles of

quartz are here and there perceived also in the concretions of rolled kankar; and it is a curious fact, that the size and description of the granitic gravel adhering to the bones, exactly resemble the characters of those attached to the *Jabalpur* fossils.

With regard to the human bones (No. 9), much doubt may fairly be entertained, on account both of the imperfect preservation of the fragments and the rarity of their occurrence in a fossil state: indeed, it is well known to be a much contested point whether the bones of man, or those of the monkey tribe, have ever been so discovered; although the careful examination of the human remains lately found in the caves of the south of France seem to have set the point at rest with most of the French geologists.

As the *Annales de Chimie*\*, in which M. TOURNAL sets forth his opinions, is rarely to be met with in India, and as the animal remains imbedded in the mud and gravel of caves may prove hereafter to be contemporaneous, geologically speaking, with our newly-discovered deposits under the clays of the *Doub*, we shall make no apology for concluding our present notice with a brief sketch of M. TOURNAL'S view on this interesting subject.

#### Occurrence of the Bones of Man in the Fossil State.

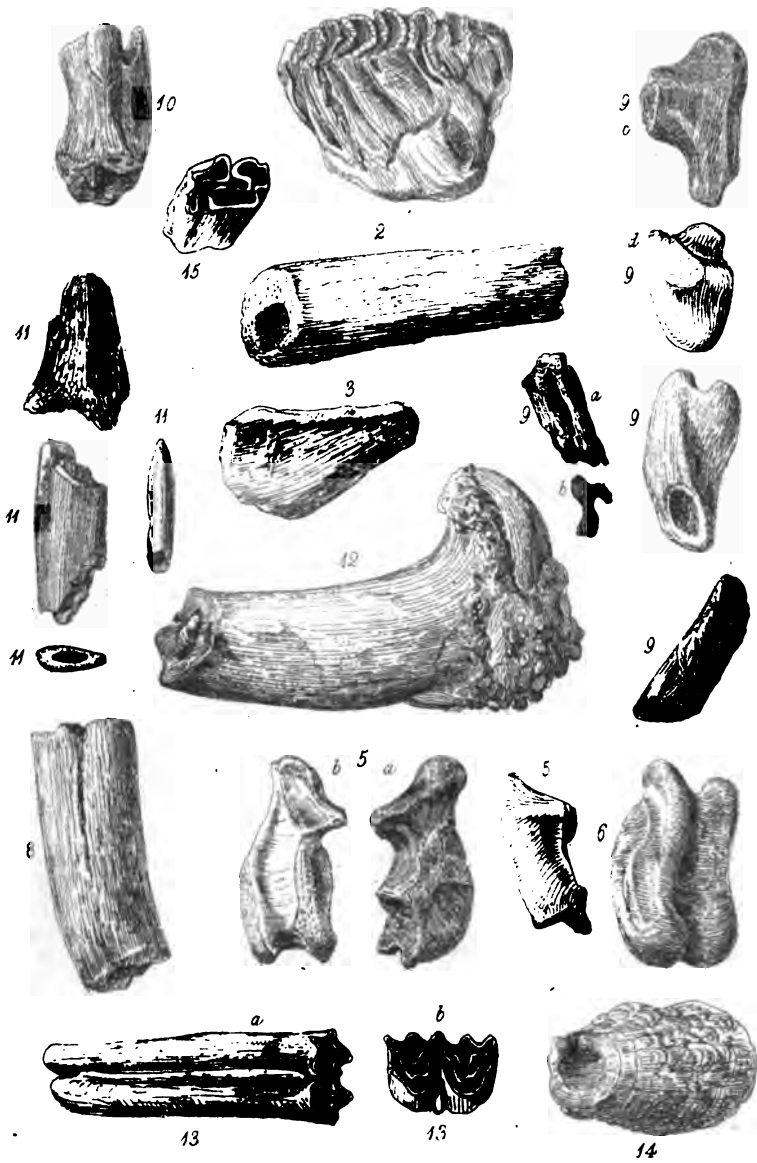
The phenomena of caves is much more complicated than was at first supposed, when the simple theory of a diluvial wave washing into them the debris of animals on the instant of their sudden destruction was proposed as sufficient to account for the quantity of bones found imbedded in the mud, gravel, and stalagmite of these truly valuable geological depositories.

Of the vast number of caves lately brought to light on the continent of Europe, some have been found to contain no fossils; others merely gravel and mud;—some, ancient bones and coprolite; and others only a prodigious quantity of the recent dung of bats and birds of prey. No general law pertains to them. They occur at all heights;—in calcareous rocks of every different age, and at various elevations above the present contiguous valleys. Such as are found in inaccessible situations, and at a distance from running water, are generally empty; those of which the apertures have been but recently disclosed by gradual wear of the rock in front, contain only modern deposits; the nature of the organic remains varying according to the locality and the antiquity of the aperture. In some cases we meet exclusively with the bones of a species of large bear (*ursus spelæus*), the skeletons of which are still in connection, and appear to have been gradually imbed-

\* *Annales de Chimie*, Fevrier, 1833.

*Fossil bones from the bed of the Jumna River,  
collected by Capt. E. Smith, Eng*

N<sup>o</sup>. 1.



*Nos 13, 14, & 15 from Treut Purts Collection*



