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PART 3.

PRICE 1s.

RESEARCHES

ON

FOSSIL BONES,

IN WHICH ARE ESTABLISHED

THE CHARACTERS OF

VARIOUS ANIMALS

WHOSE SPECIES HAVE BEEN DESTROYED

BY THE REVOLUTIONS OF

The Globe;

BY

BARON CUVIER,

Great Officer of the Legion of Honour, Counsellor of State, and Member of the Royal Council of Public Instruction, One of the Forty of the French Academy, Perpetual Secretary to the Academy of Sciences, Member of the Academies and Royal Societies of London, Berlin, Petersburg, Stockholm, Edinburgh, Copenhagen, Gottingen, Turin, Bavaria, Modena, The Netherlands, Calcutta, and of the Linnæan Society of London, &c. &c. &c. &c.

FOURTH EDITION,

Revised and Completed

BY ADDITIONAL NOTES,

AND A

SUPPLEMENT LEFT BY THE AUTHOR.

*Triomphante des eaux, du trépas, et du temps,
La terre a cru revoir ses premiers habitans.*

DELILLE.

IN FOUR VOLUMES.

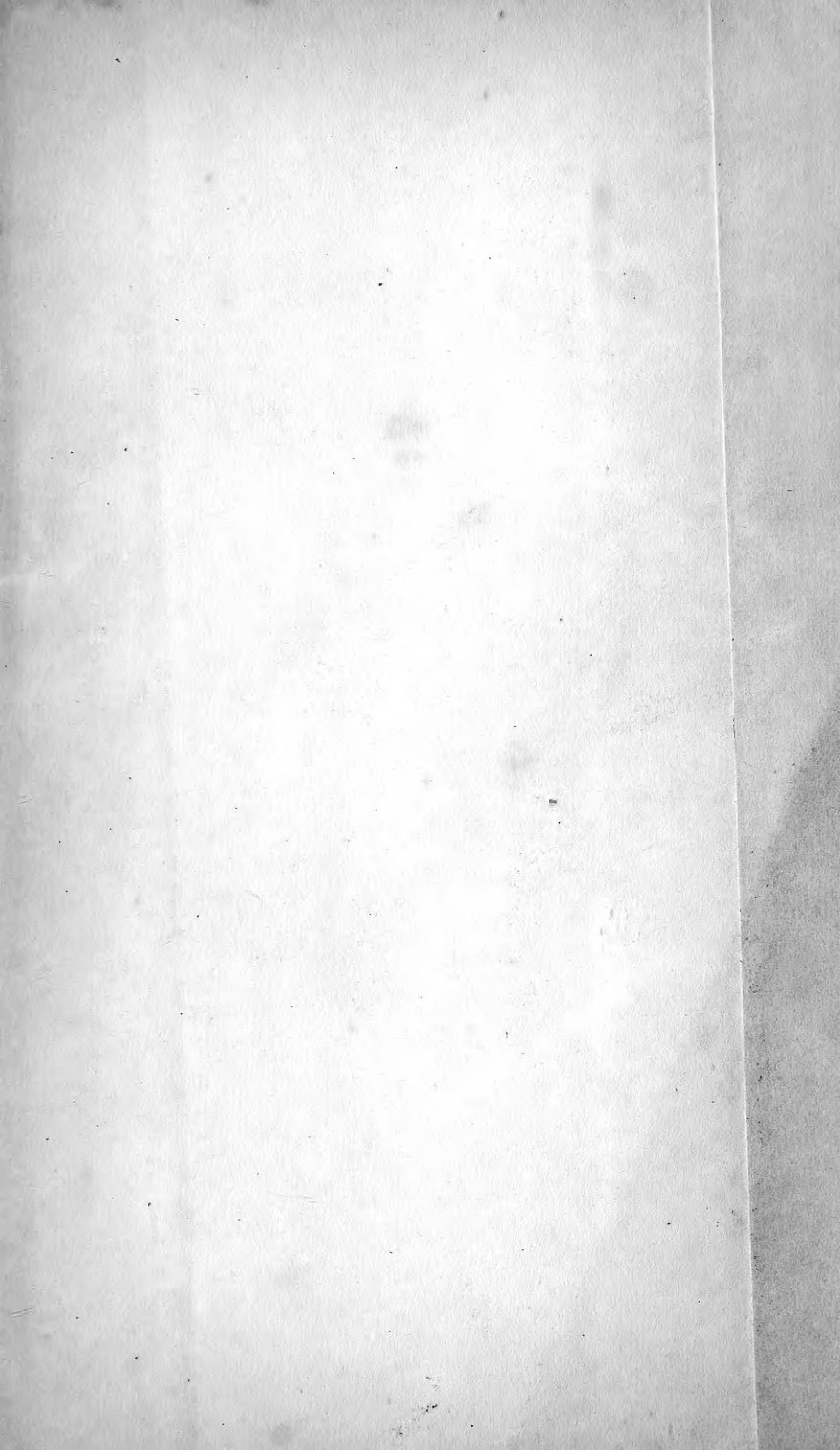
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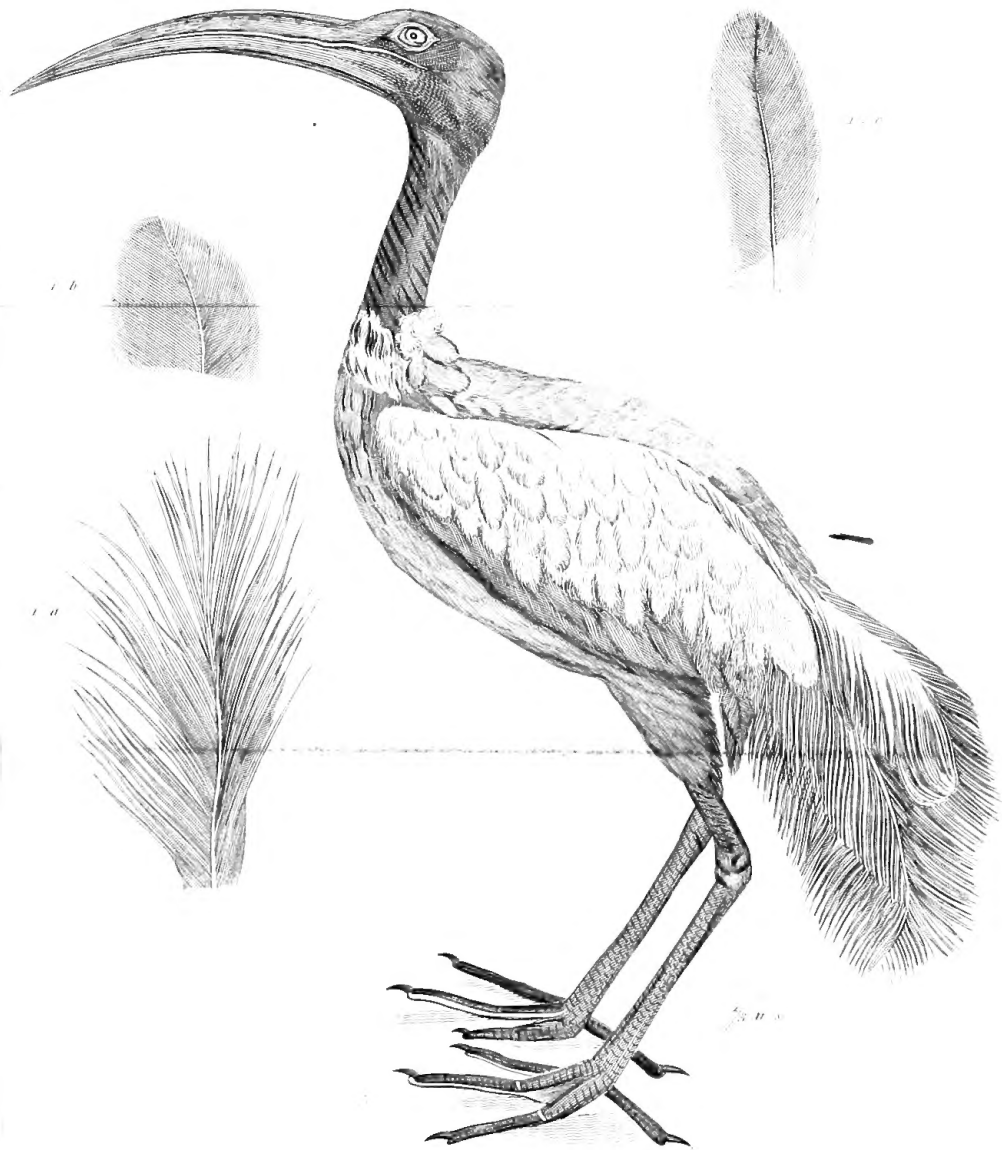
G. HENDERSON, 2, OLD BAILEY, LUDGATE-HILL.

AND SOLD BY ALL BOOKSELLERS.

1834.

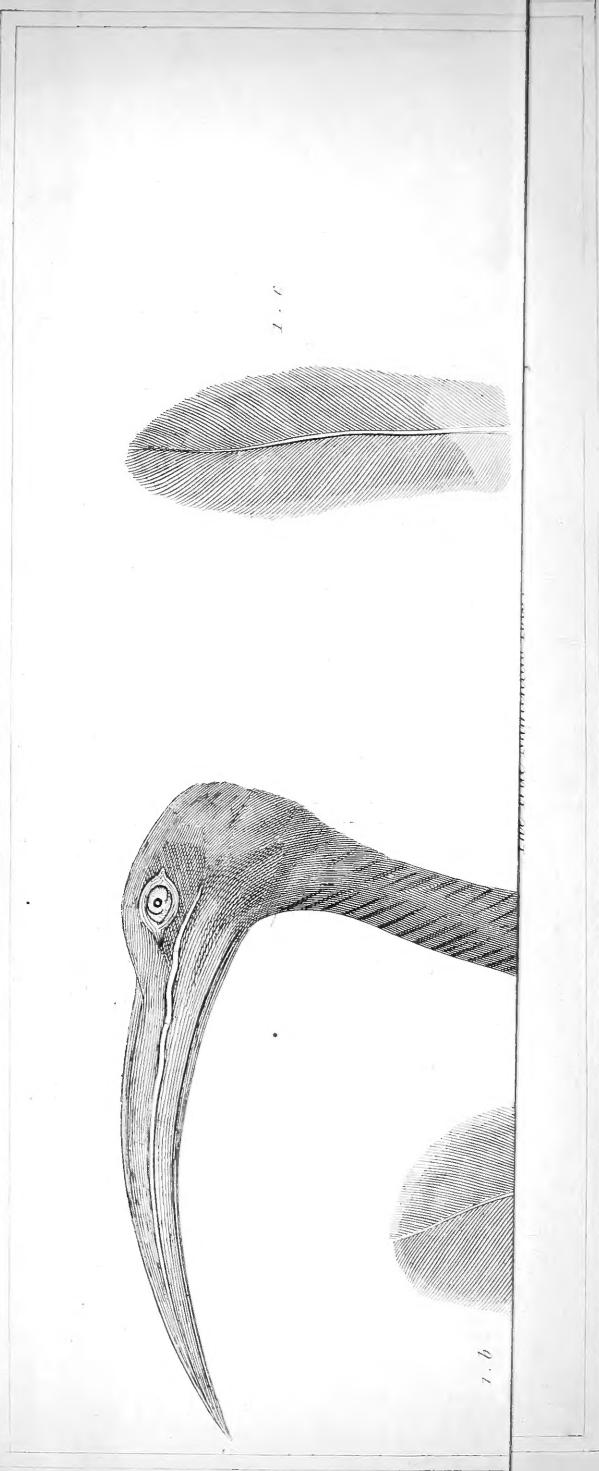


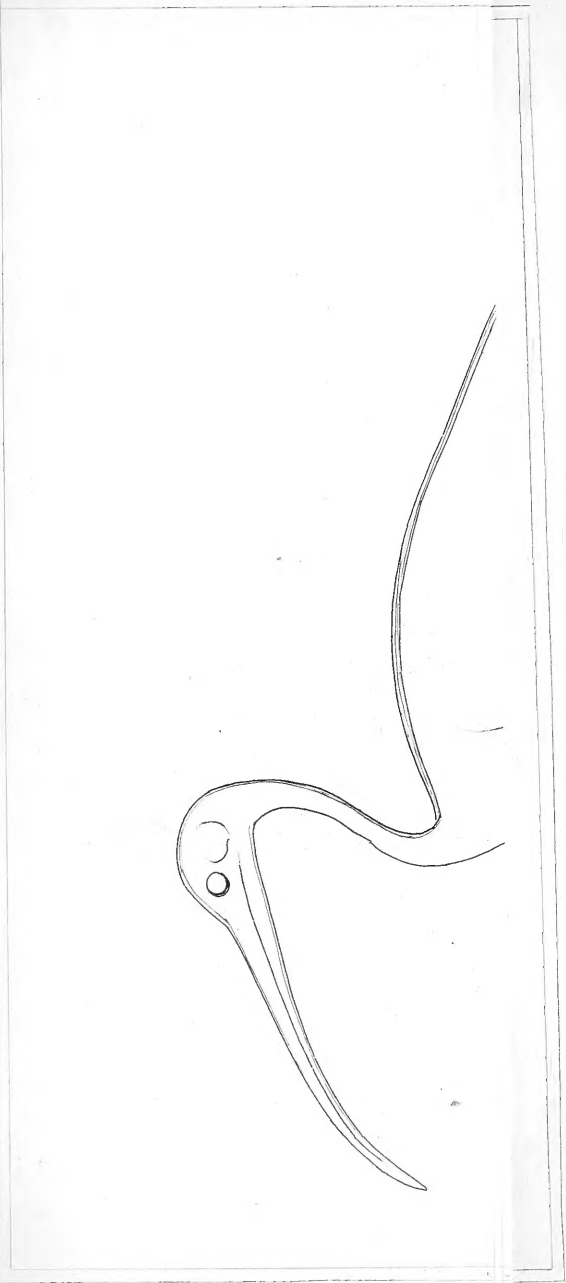




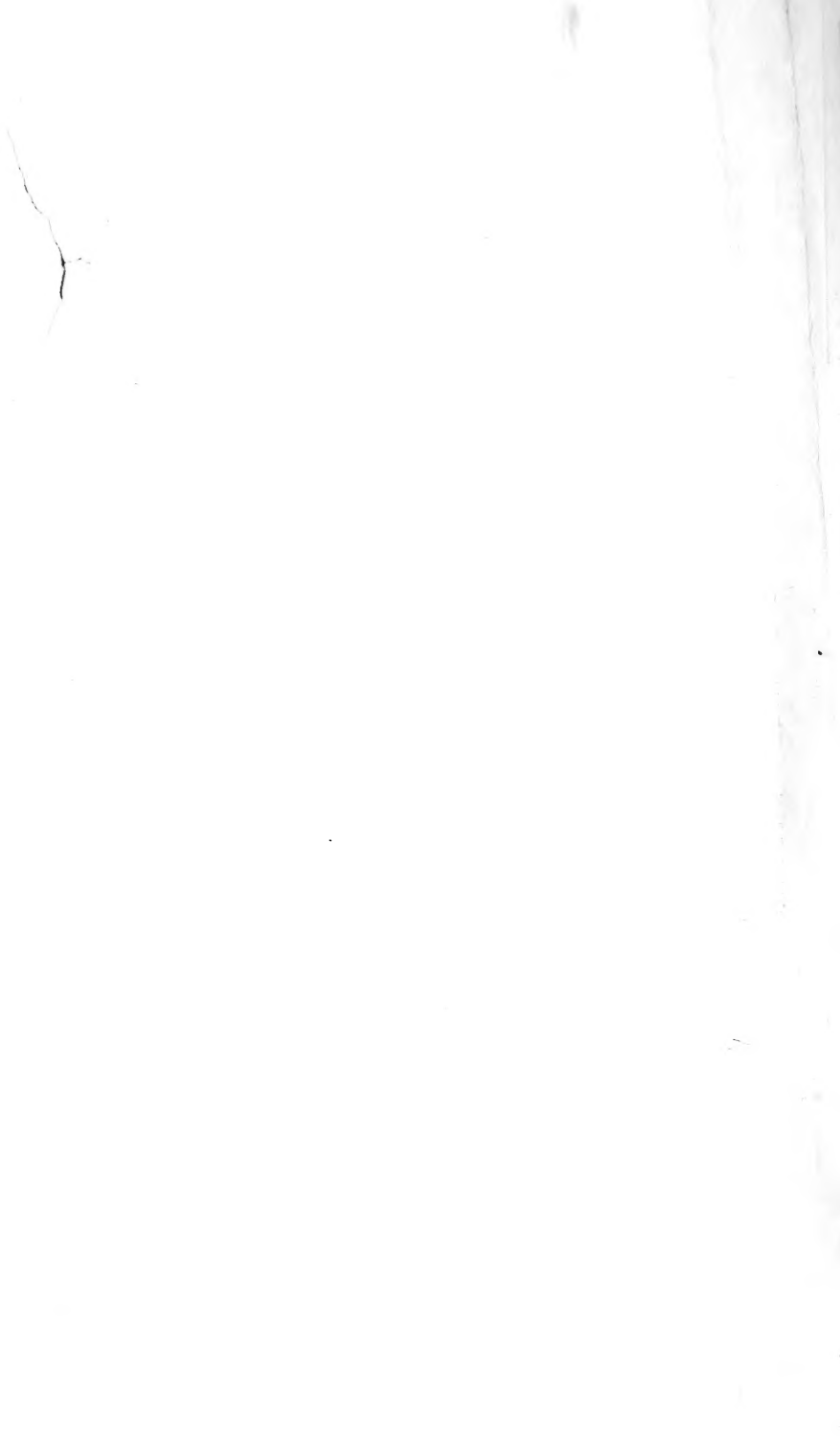
The True Numenius Ibis.







London: G. Henderson, 2. Old Bailey.



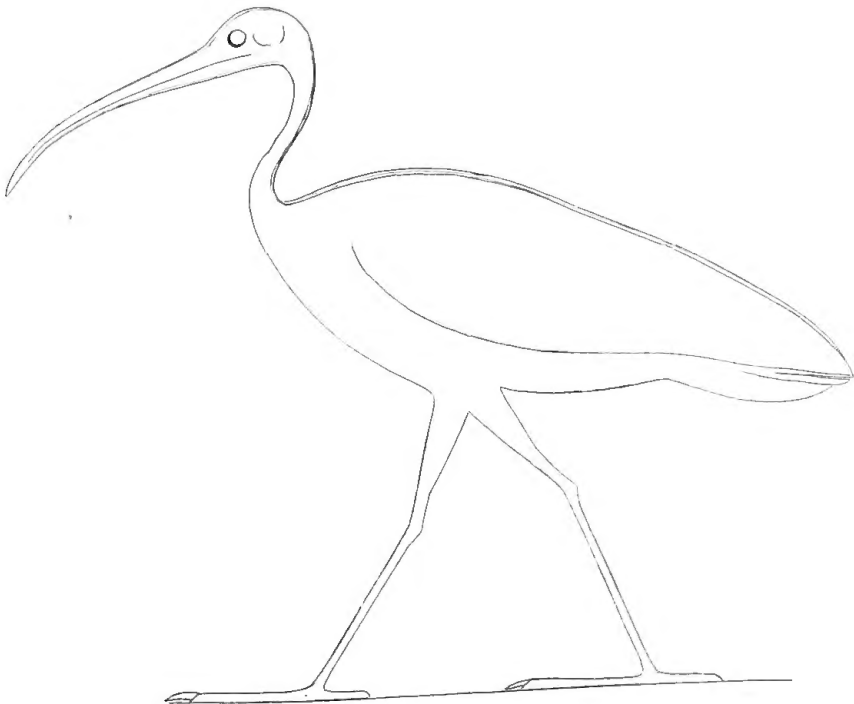
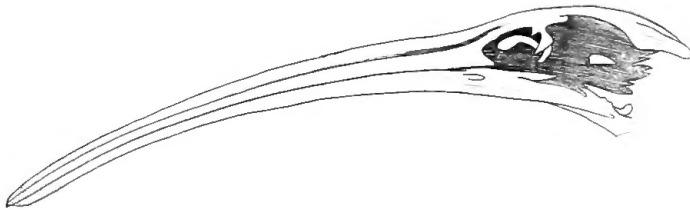
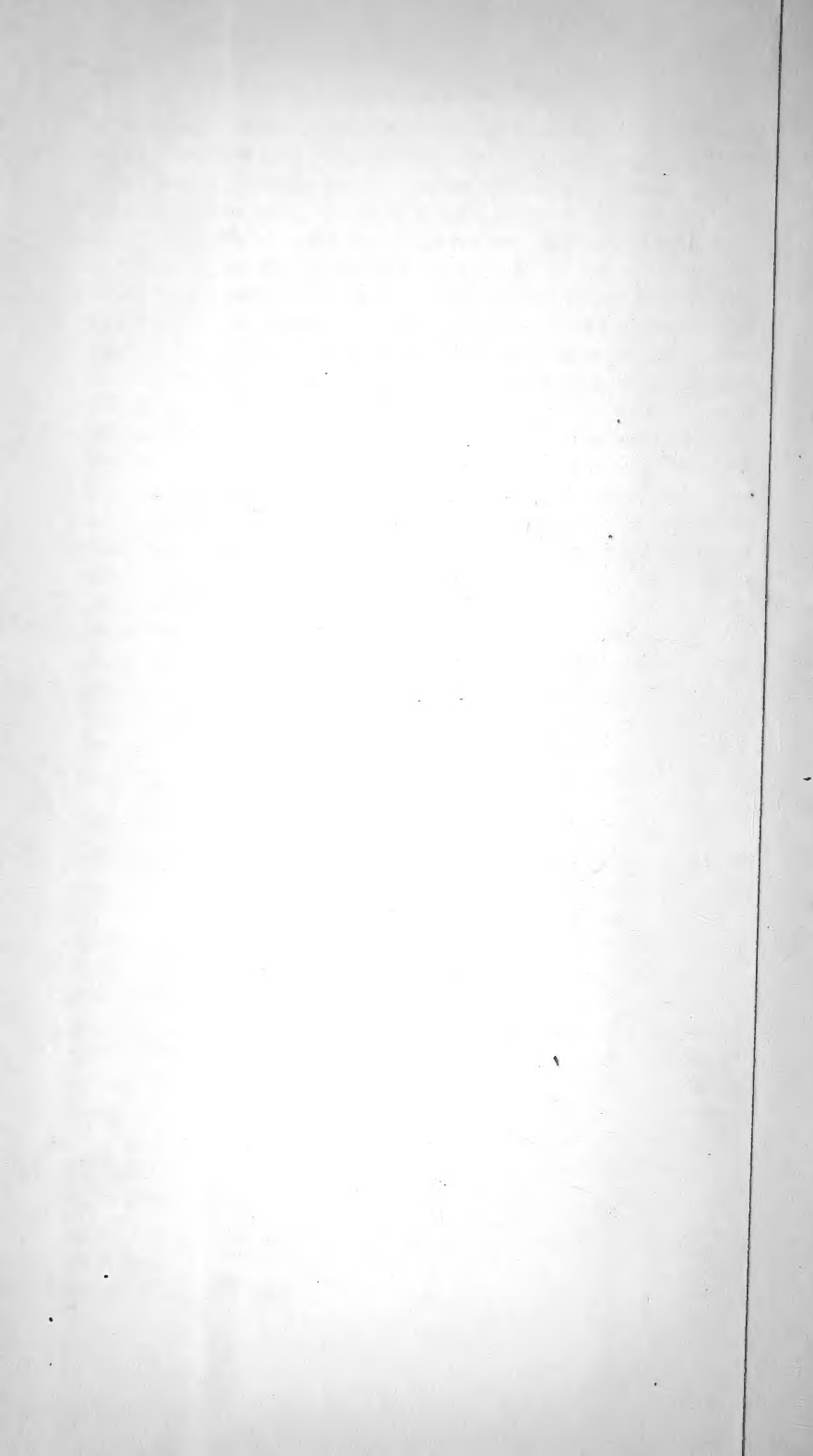


Figure of the Ibis, copied from one of the Temples in upper Egypt



Bill of an Ibis drawn from a Mummy by M^r Olivier (Half the Natural Size)



a succession of events united by a semblance of truth. The north of Europe has no history previous to its conversion to Christianity; the history of Spain, of Gaul, of England, has no earlier date than the conquest by the Romans; that of northern Italy, previously to the foundation of Rome, is now almost unknown. The Greeks confess that they did not know the art of writing until they were taught by the Phœnicians, about thirty-three or thirty-four centuries ago. For a long period subsequently, their history is full of fables; and they are unable to go farther back than three centuries earlier, for the first traces of their union as a body. We have, in the history of Western Asia, but a few contradictory extracts, which only reach, with very slight connexion, to twenty-five centuries back*; and admitting the few historical details which refer to periods more remote, we can scarcely exceed the date of forty centuries †.

Herodotus, the earliest profane writer whose works are left to us, lived two thousand three hundred years ago ‡. The earliest historians before him, whom he consulted, were only a hundred years old §.

We may judge how far they are to be depended on, by their extravagant tales, which are handed down to us in the extracts from Aristæus of Proconnesus, and others.

Before them there were only poets; and the most ancient of those whose works have been preserved, Homer, the master and perpetual model of all the rest, has only preceded our own times by two thousand seven hundred, or two thousand eight hundred years.

When these early historians mention ancient events, either of their own nation or of those near them, they only cite oral traditions, and not public records.

It was long after this, that pretended extracts from Egyptian, Phœnician, and Babylonian annals were given. Berosus only wrote during the reign of Seleucus Nicator, Hieronymus during that of Antiochus Soter, and Manetho under the government of Ptolemy Philadelphus. These three were only three centuries earlier than the coming of Jesus Christ.

Sanchoniatho may be a real or fictitious author; but nothing was known of him until Philo of Byblos published a translation of his work

* To Cyrus, about 650 years before Christ.

† To Ninus, about 2348 years before Christ, according to Ctesias and those who have followed him; but only to 1250, according to Volney, who follows Herodotus.

‡ Herodotus lived B. C. 440.

§ Cadmus, Pherecydes, Aristæus of Proconnesus, Acutilaus, Hecateus of Miletus, Charon of Lampsacus, &c.—Vide Vossius de Hist. Græc. lib. i, and particularly his fourth book.



in the second century after Jesus Christ; and when it was made known, there was only discovered, as in all other authors of his kind, a childish theogony, or metaphysics, so blended with allegories, as not to be distinguishable,

Only one people, the Jews, have preserved prose records of an earlier date than the time of Cyrus.

That part of the Old Testament called the Pentateuch exists, in its original state, at least since the dispersion of the ten tribes under Jeroboam; for the Samaritans had it as well as the Jews; and its antiquity may be confidently reckoned at more than two thousand eight hundred years.

There is no reason to doubt but that the book of Genesis was composed by Moses himself, which would give it a still farther antiquity of five hundred years, namely, thirty-three centuries: and it is sufficient to read it to perceive that it was composed partly of fragments of former works. There is, however, no doubt of its being the most ancient writing which the world is in possession of.

But this work, and all those written subsequently, however unacquainted their authors were with Moses and his people, describe the nations of the banks of the Mediterranean as newly formed; they mention them as half savages some centuries after; moreover, they all allude to an universal catastrophe, of an irruption of the waters, which occasioned an almost entire regeneration of the human race; and they do not go very remotely into antiquity to decide the epoch of this event.

The texts of the Pentateuch, which place this catastrophe the farthest back, do not go more remotely than twenty centuries before Moses, nor consequently more than five thousand four hundred years before our time*.

The poetical traditions of the Greeks, the source of all our profane history which refers to these early periods, have nothing which contradicts the Jewish records; on the contrary, they agree very harmoniously as to the epoch which they assign to the Egyptian and Phœnician colonies, which gave to Greece the first germs of civilization: we see, besides, that about the same period as Israelitish tribes departed from Egypt to carry into Palestine the sublime doctrine of the unity of God, other colonies left the same country, to carry into Greece a more gross religion, at least with respect to exterior form, whatever might be the secrets which it reserved for the initiated; and others, again,

* The Septuagint, 5345 years; the Samaritan text, 4869; the Hebrew text, 4174.

came from Phœnicia, and taught the Greeks the art of writing, and all that relates to navigation and commerce*.

Certainly we have not had a continuous and connected history since that time, as we find, very long after these founders of colonies, a multitude of mythological events and adventures, in which gods and heroes are introduced; and these chieftains are connected with real history by genealogies evidently fictitious †; but what is still more certain is, that all which preceded their arrival could only have been preserved in very confused traditions, and could have been only supplied by unfounded inventions, similar to those of the monks of the middle age concerning the origin of the nations of Europe †.

Thus, not only we should not be astonished that, even in ancient times, there should have existed many doubts and contradictions on the epochs of Cecrops, Deucalion, Cadmus, and Danaüs; not only would it be childish to attach the least importance to any one opinion concerning the precise dates of Inachus ‡ or Ogyges §; but, if anything could surprise us, it is that these personages have not been made from remote antiquity. There must have been some weight in the received traditions which the inventors of fables could not do away with. One of the dates assigned to the deluge of Ogyges agrees so accurately with one that had been mentioned as the period of the deluge of Noah, that it is almost impossible but that it must have been derived from some source by which this latter deluge must have been intended ||.

* We know that chronologists differ many years concerning each of these events; but these migrations do not the less form remarkable events, and give a peculiar character to the fifteenth and sixteenth centuries before Jesus Christ.

In following the calculation of Usserius, Cecrops came from Egypt to Athens about 1556 before Christ; Deucalion settled on Parnassus about 1548; Cadmus arrived from Phœnicia at Thebes about 1493; Danaüs arrived at Argos about 1485; Danaus was established on the Hellespont about 1449. All these founders of nations must have been nearly contemporary with Moses, whose migration occurred in 1491. See, moreover, on the synchronism of Moses, Danaüs, and Cadmus, Diod. lib. xi, and Photius, page 1152.

† Every body knows the genealogies of Apollodorus, and the arguments on which Clavier endeavoured to establish a kind of primitive history of Greece; but when we read of the genealogies of the Arabians and Tartars, and all that the monkish chronologists have invented for the different European monarchs, and some in particular—we easily comprehend that the Greek writers must have done for the early time of their nation what has been done at all other epochs, when criticism had not given its lights to history.

‡ 1856 or 1823 before Christ, and other dates, have been fixed; but always about 350 years before the principal Phœnician or Egyptian colonies.

§ The common date of Ogyges, according to Acusilaus and Eusebius, is 1796 years before Christ; consequently many years after Inachus.

|| Varro placed the deluge of Ogyges, which he calls the first deluge, 400 years before Inachus—(*à priori cataclismo quem Ogygium dicunt, ad Inachii regnum*)—and

As to Deucalion, whether we consider him as a real or feigned personage, however lightly we credit the manner of his deluge, as described in the Greek poems, and the multifarious details with which it became successively enriched, it is plain that it is only a tradition of the great cataclysm, altered and placed by the Hellenians at the epoch in which they also placed Deucalion, because he was considered as the founder of their nation; and his history was confounded with that of all the chieftains of the renewed nations*.

consequently 1600 years before the first Olympiad, which would place it at 2376 years before Christ; and the deluge of Noah, according to the Hebrew text, is 2349, only twenty-seven years difference. This testimony of Varro is substantiated by Censorinus *de Die Natali*, cap. xxi. In fact, Censorinus wrote only 238 years after Christ; and it appears from Julius Africanus, ap. Euseb. præp. cv, that Acusilaüs, the first author who placed the deluge in the time of Ogyges, made this prince contemporary of Phoronæus, which would have brought him very near to the first Olympiad. Julius Africanus only makes an interval of 1020 years between the two epochs; and Censorinus has a passage confirming this opinion. But some read, in the passage of Varro above cited from Censorinus, *Ærogitium* instead of *Ogygium*. But this would only be an Erogitian cataclysm, of which who ever heard!

* Homer and Hesiod knew nothing of the deluge of Deucalion, nor that of Ogyges.

The first author (whose works are extant) who alludes to it, is Pindar (Od. Olymp. ix). He mentions Deucalion as arriving on Parnassus, and establishing himself in the city of Protogenia (*first birth or production*) and re-creating a population with stones; in a word, he recounts, only applying it to a single nation, the fable afterwards generalized by Ovid, and applied to the whole of mankind.

The historians who followed Pindar (Herodotus, Thucydides, and Xenophon) do not mention any deluge, either in the time of Ogyges, or in that of Deucalion, although they speak of this latter as one of the first kings of the Hellenians.

Plato, in his 'Timæus,' says but a few words about the deluge, as well as of Deucalion and Pyrrha, as a commencement of the account of the great catastrophe, which, according to the priests of Sais, destroyed the Atalantis; but in this brief mention, he speaks of the deluge in the singular number, as if it was one only; and even expressly says, a little farther on, that the Greeks knew but of one. He places the name of Deucalion immediately after that of Phoronæus, the first man, without even adverting to Ogyges: thus, to the extent of his knowledge, it was a general event, a completely universal deluge, and the only one that occurred. He looked upon it as identical with that of Ogyges. Aristotle (*Meteor.* i, 14.) seems to have been the first who considered this deluge as only a partial inundation, which he placed near Dodona and the river Acheloüs, but this was the Acheloüs and Dodona of Thessaly.

Apollodorus (*Bibl.* i, § 7) gives to the deluge of Deucalion all its magnitude and mythological character: it happened at the epoch of the interval between the age of brass and the iron age. Deucalion is made the son of the Titan Prometheus, the fabricator of man; he re-creates the human race with stones; and yet Atlas his uncle, Phoroneus, who lived before him, and many other antecedent personages, leave large posterities.

The nearer we come down to more recent authors, the more facts and details do we meet with coinciding with the Mosaic account of the deluge. Thus Apollodorus gives Deucalion a chest as his means of safety; Plutarch mentions the pigeons by which he endeavoured to ascertain the abatement of the waters; and Lucian alludes to the animals of every species which he had embarked with him, &c.

As to the coincidences of traditions and hypotheses, by which it has recently been sought to prove that the rupture of the Thracian Bosphorus was the cause of the deluge of Deucalion, and even of the opening of the Pillars of Hercules, by causing the Euxine sea to discharge its waters into the Archipelago, which were, prior to this

Every Greek colony which had preserved any isolated traditions, began then with their own particular deluge, because each of them had some recollection of the universal deluge, which had been common to all; and when, in the sequel, they wished to bring their different traditions to one common epoch, different events were supposed to have happened, because dates quite uncertain, and perhaps entirely incorrect, but each in its own colony regarded as authentic, did not coincide with one another. Thus, in the same way that the Hellenians had a deluge of Deucalion, because they regarded him as their first parent, the Autochtones of Attica had a deluge of Ogyges, because it was from him that they derived their origin. The Pelasgi of Arcadia had that which, according to later authors, compelled Dardanus to betake himself towards the Hellespont*. The isle of Samothracia, one in which a succession of priests was the earliest established and also a more regular form of worship and connected traditions, had also its deluge, which was thought the most ancient of all †, and which they attributed to the rupture of the Bosphorus and Hellespont. They preserved the idea of some similar event in Asia Minor ‡, and in Syria §, and eventually the Greeks gave the name of Deucalion to the whole of them ||.

But none of these traditions places this cataclysm very remote; none of them is incapable of explanation, either as to its date or any other circumstances, by the changes which tradition must undergo, to which no precise date has been assigned by any written document.

The very Remote Antiquity attributed to some Nations is not historically true.

Those who are desirous of assigning a very remote antiquity to the

event, much higher and more extended than they have since been, it is needless to occupy ourselves in detailing; since it has been ascertained by the observations of M. Olivier, that if the Black Sea had been as high as is supposed, there would have been many channels for its waters, by hills and plains not so high as the present shores of the Bosphorus; and by those of M. le Comte Andreossy, that had it fallen any day by this new opening, in the manner of a cascade, the small quantity of water which could flow at one time through so confined an opening, would not only be spread over the vast extent of the Mediterranean, without causing a tide of a few fathoms, but that the simple, natural inclination necessary for the flowing of the waters, would have reduced to nothing the excess of height above the banks of Attica.

For other particulars on this subject, see a note that I have published at the head of the third volume of Ovid, in M. Lemaire's collection.

* Dion. Halicar. Antiq. Rom. lib. i. cap. lxi.

† Diodor. Sicul. lib. v. cap. 47.

‡ Stephen of Byzantium Iconium; Zenodotus, Prov. cent. vi, No. 10, and Suidas Nannacus.

§ Lucian de Deâ Syrâ.

|| Arnobus contra Gent. lib. v, from 158, speaks of a rock in Phrygia, whence he pretends that Deucalion and Pyrrha took their stones.

continents and the establishment of nations, are compelled to have recourse to the Indians, to the Chaldeans, and the Egyptians, three people who in fact appear the most anciently civilized of the Caucasian race; but three people singularly resembling each other, not only in temperament, through the climate and the nature of the soil which they inhabit, but still more so in the political and religious constitution which they had framed, but whose testimony this very similarity of constitution must render equally suspicious*.

With all three, an hereditary caste was exclusively charged with the care of religion, law, and science; with all three, this caste had its allegorical language and its secret doctrines; to all three was reserved the privilege of reading and explaining the sacred books in which all the doctrines had been revealed by the gods themselves.

We may easily divine what history would become in such hands; but without any great efforts of reason, we may learn it from the fact itself, in examining what has occurred amongst the only one of the three nations now existing, namely, the Indians.

In truth, they have no history remaining. Amidst the voluminous records of mystic theology, or abstract metaphysics, which the Brahmins are possessed of, and which the indefatigable perseverance of English industry has made known to us, there is nothing which throws any light over the origin of the nation or the changes of their society. They even pretend that their religion forbids them to preserve the remembrance of the present age, the age of misfortune †.

According to the Vedas, the first revealed works, and the foundation of all the Hindoo religion, the literature of this people, like that of the Greeks, began by two epochs, the 'Ramaian' and the 'Mahabarat,' a thousand times more marvellous than the 'Iliad' and 'Odyssey,' although we perceive in them some outlines of a metaphysical nature, of the kind usually termed sublime. The other poems, which, with these two, form the great body of the Pouranas, are only romances or versified legends, written at various periods, by various authors, and not less wild in their fictions than the great works mentioned. It has been thought that in some of these writings, deeds, or the names of men somewhat resembling those mentioned by the Greeks and Latins, may be traced; and it is principally from the similarity of names that

* This similarity of institutions goes to so great an extent, that it is quite natural to suppose that they had a common origin. We must not forget that many ancient authors have thought that the Egyptian institutions came from Ethiopia; and that Lyncellus, p. 151, positively says that the Ethiopians came from the borders of the Indus in the time of King Amenophis.

† See Polier, *Mythology of the Hindoos*, vol. i, pp. 89—91.

M. Wilfort has endeavoured to derive from these Pouranas a sort of concordance with our ancient western chronology,—a concordance which unfolds, at every line, the hypothetical nature of its foundation ; and which, besides, can only be admitted by entirely rejecting the dates given by the Pouranas themselves*.

The lists of kings which the pundits, or Indian doctors, have pretended to compile from these Pouranas, are only plain catalogues without details, or decked with absurd ones, little short of the Chaldeans or Egyptians ; or those which were framed for the nations of the north, by Trithemus and Saxo the grammarian †. These lists are far from coinciding ; none of them supposes either a history, registers, or records ; their very foundation has probably no other source than the fictitious work of the poets, from whose compositions they may have derived their origin. One of the Indian pundits, who supplied M. Wilfort with these, confessed that he filled up at his pleasure, with imaginary names, the spaces that occurred between celebrated kings ‡ ; and he added, that his predecessors had done the same. If this be true of the lists which the English now obtain, why should it not be so with reference to those which Abou-Fazel has given as extracts from the annals of Cashmere §, and which, besides, though filled with fiction, only refer to 4300 years back, of which more than 1200 are filled with the names of princes, the extent of whose reigns are not determined.

The very era whence the Indians now calculate their years, beginning fifty-seven years before Christ, and which bears the name of a prince called Vicramaditjia, or Bickermadjit, bears it only by a kind of convention ; for we find, according to the synchronisms attributed to Vicramaditjia, that there were three, and perhaps eight or nine, princes of this name, who have all had similar legends, and who have all been at war with a prince called Saliwahanna ; and what is more, they do not accurately know if this fifty-seventh year before Christ be

* See the great work of M. Wilfort on the Chronology of the Kings of Magadha and the Indian Emperors, and on the epochs of Vicramaditjia (or Bickermadjit) and Salivahanna. Mem. de Calcutta, tome ix, p. 82. 8vo. edit.

† Sir William Jones on Hindoo Chronology, Mem. de Calcutta, vol. ii, p. 111, 8vo. ed. French translation, p. 164. See also M. Wilfort on the same subject, *ibid.* vol. v, p. 241 ; and the lists which he gives in his work mentioned above, vol. ix, p. 116.

‡ Wilfort, Mem. de Calcutta, in 8vo. vol. ix, p. 133.

§ In the Ayeen-Acbery. vol. ii, p. 138 of the English translation. See also Heeren, Commerce of the Ancients, 1st vol. part ii, page 329.

that of the birth, the reign, or the death of Vicramaditjia, whose name it bears*.

Again, the most of the Indian records contradict, by intrinsic and very obvious characters, the antiquity which these people attribute to them. Their Vedas or sacred books, revealed, as they say, by Brahma himself, at the beginning of the world, and arranged by Viasa (a name which only signifies a collector) at the beginning of the present age, and—if we may judge of them by the calendar which is annexed, and to which they refer, as well as by the position of the colures which this calendar points out—may go as far back as 3200 years, which would closely approach the epoch of Moses †. Perhaps even those who have faith in the assertion of Megasthenes ‡, that in his time the Indians were ignorant of the art of writing; those who will reflect that none of the ancients have made mention of the superb temples, the immense pagodas, those remarkable monuments of the religion of the Brahmins; those who know that the epochs of their astronomical tables have been subsequently calculated, and inaccurately done; and that their treatises on astronomy are modern and antedated, will be inclined to discredit still farther this pretended antiquity of the Vedas.

Yet in the midst of all the Brahminical fables, there occur points of coincidence with the historical monuments in the more western nations, which must astonish us. Thus their mythology determines the successive deluges which the surface of the globe has experienced, and is yet fated to experience; and it is only from a period rather less than 5000 years that they derive that which last occurred §. One of those revolutions, which they in reality place much more remote, is described in terms precisely corresponding with the Mosaic account ||.

M. Wilfort even assures us, that, in another event of this mythology, a person figured very much resembling Deucalion in origin, name, adventures, and even in the name and adventures of his father ¶.

* See Bentley on the Hindoo Astronomical Systems, and their Unison with History, Mem. de Calcutta. vol. viii, page 243 of the 8vo. edition.

† See the Mem. of Mr. Colebrooke on the Vedas, Mem. de Calcutta, vol. viii, of the 8vo. edition, p. 493.

‡ Megasthenes, apud Strabo, lib. xv, p. 709. Almel.

§ That which produced the present age or *cali-yug* (the earth's age) is made 4927 years or 3102 years before Christ (1825). See Legentil, Voyage to India, v. i, p. 535. Bentley, Mem. de Calcutta, v. 8, ed. 8vo. p. 212. According to the Samaritan text, the deluge of Noah was only fifty-nine years more remote.

|| The person named Satyavrata plays the same part as Noah, and saves himself with seven couples of holy persons. See Sir William Jones, Mem. de Calcutta, v. i, p. 230, 8vo. ed. and in the Bagvadam (or Bagvata) translated by de Fouehé d'Obsonville, p. 212.

¶ Cala Javana, or in the common language, Cal-yun, to whom his partisans may have given the epithet of *diva*, deo, or god, having attacked Crishna, the Indian Apollo, at the head of the northern nations (the Scythians, whence sprung Deucalion,

It is equally worthy of remark, that in these lists of kings, barren and doubtful as they are, the Indians place the commencement of their terrestrial sovereigns (those of the race of the sun and moon) at an epoch nearly the same as that which Ctesias, in a list of a precisely similar kind, makes the commencement of his kings of Assyria, about 4000 years before the present time*.

This wretched state of historical knowledge is owing to the subjection of the people to an hereditary priesthood, who enforced a worship monstrous in its external form, and cruel in most of its precepts, and who alone had the privilege of writing, of preserving, and explaining the books. Any absurd tale, invented to give fame to a shrine of pilgrimage, and legends calculated to inspire a deeper homage for their caste, were of more importance to them than all the facts of authentic history. With respect to the sciences, they might have cultivated astronomy, which gave them a reputation as astrologers; mechanics, which assisted them in elevating monuments, signs of their power, and the objects of the most superstitious veneration with the people; geometry, the basis of astronomy as well as of mechanics, and an important auxiliary to agriculture, in those vast alluvial plains which could only be made salutary and fruitful by means of numerous canals; they might encourage the mechanical or chemical arts which nourish their commerce, and contributed to their luxury and the splendour of their temples; but they would look with dread on history, which would inform mankind of their mutual relations.

What we observe in India, we might expect to find in every country in which a priesthood, constituted like that of the Brahmins, established in similar countries, assumed a similar control over the mass of the people. The same causes produce the same results; and in fact, however we reflect on the fragments of Egyptian and Chaldean traditions that are left to us, we perceive that they were not more historical than those of the Indians.

according to Lucian) was driven back with fire and water. His father, Garga, was called also Paramathesa (Prometheus); and, according to another legend, was devoured by the eagle Garuda. These details were extracted by Wilfort (in his Mem. on Mount Caucasus, Calcutta Mem. v. 6, 8vo. edit. p. 507) from the sacred drama, called Hari-Vansa. M. Charles Ritter, in his Vestibule of European History before Herodotus, concludes that the fable of Deucalion was of foreign derivation, and brought into Greece with the other legends of that part of the Greek worship which had come from the north, and which had preceded the Egyptian and Phœnician colonies. But if it be true that the constellations of the Indian sphere have also the names of Grecian personages; that we have Andromeda under the name of Antarmadia, Cepheus under that of Capiia, &c., we may be tempted with M. Wilfort, to draw a different conclusion. Unfortunately the records adduced by this writer have been doubted by the learned.

* Bentley, Mem. de Calcutta, v. 8, p. 226, éd. 8vo.—note.

To judge of the nature of the chronicles which the Egyptian priests pretended to possess, it is sufficient to review the extracts which they have given themselves at different times and to different persons.

Those of Sais, for instance, told Solon about 550 years before Christ, that Egypt, not being subject to deluges, they had preserved not only their own annals, but those of other people; that the city of Athens and that of Sais were both built by Minerva, the former 9000 years before, the other only 8000; and to those dates he added the well-known fable concerning the Atlantes, and respecting the resistance which the ancient Athenians opposed to their conquests, as well as all the romantic accounts of the Atlantis*; in which are to be found facts and genealogies similar to those of all mythological romances.

A century later, about 450 before Christ, the priests of Memphis give a different account to Herodotus†. Menes, the first king of Egypt, as they said, had built Memphis, and confined the Nile with banks, as if such operations could have been done by the first king of any country. Since then they had 330 other kings, down to Mœris, who reigned, as they asserted, 900 years before the epoch in which this statement was made (1350 before Christ).

After these kings came Sesostris, who carried his conquests even to Colchis‡; and in all, there were to Sethos 341 kings and 341 high priests, in 341 generations, during 11,340 years; and in this space, as if to corroborate their genealogy, these priests asserted that the sun had risen twice where he sets, without effecting any change in their climate or the productions of the country; and previously to them no deity had appeared or reigned in Egypt.

To this improbability, (which, in spite of all the explanations which have been given, proves so gross an ignorance of astronomy), they add concerning Sesostris, Phero, Helenus, and Rhampsinitus, the kings who built the pyramids, and an Ethiopian conqueror, named Sabacos, tales equally preposterous.

The Theban priests did better; they pointed out to Herodotus, and had previously shown to Hecateus, 345 wooden colossal figures, representing 345 high priests, who had succeeded father to son, all men, all born one from the other, but who had been preceded by gods§.

* See Plato's *Timæus* and *Critias*.

† *Euterpe*, chap. xcix. et seq.

‡ Herodotus thought that he had detected similarities of figure and colour between the Colchians; but it is infinitely more probable that the black Colchians, of whom he speaks, were an Indian colony attracted by the commerce anciently established between India and Europe by the Oxus, the Caspian, and the Phasis. See Ritter, *Vestibule*, chap. i.

§ *Euterpe*, chap. cxliii.

Other Egyptians told him that they had correct registers, not only of the reign of men, but of that of the gods. They reckoned 17,000 years from Hercules to Amasis, and 15,000 from Bacchus. Pan was even earlier than Hercules*.

These people evidently mistook for history some allegory relative to pantheistic metaphysics, which formed, although they knew it not, the basis of their mythology.

It is only from Sethos that Herodotus begins a history at all credible; and it is important to note that this history begins with a fact agreeing with the Hebrew annals, namely, the destruction of the army of Sennacherib, king of Assyria †; and this agreement continues under Necho ‡ and under Hophra or Apries.

Two centuries after Herodotus (about 260 years before Christ) Ptolemy Philadelphus, a prince of a foreign race, was desirous of knowing the history of a country which circumstances had called him to govern. A priest called Manetho undertook to write it for him. It was not from records or archives that he pretended to have drawn his information, but from the sacred book of Agathodæmon, son of the second Hermes, and father of Tat, who had copied it upon pillars or columns, erected before the deluge by Tat, or the first Hermes in the Seriadic land §; and this second Hermes, this Agathodæmon, this Tat, are personages of whom no one had ever before spoken, nor even of this Seriadic land, nor of these columns. This deluge is itself a fact entirely unknown to the Egyptians of early times, and of which Manetho points out nothing in what remains to us of his dynasties.

The production resembles the source; not only is the whole filled with absurdities, but they are peculiar absurdities, and such as it is impossible to reconcile with those which the more ancient priests had related to Solon and Herodotus.

Vulcan is the first of the divine kings. He reigns 9000 years; the gods and demi-gods reign 1985 years. Neither the names, nor the successions, nor the dates of Manetho, coincide with what was published before or after him; and his accounts must have been as obscure and confused in themselves as they were with the statements of other authors, if we may credit the extracts of Josephus, Julius Africanus, and Eusebius. They do not even agree about the total of years of his

* Ibid. cxliv.

† Euterpe, cxli.

‡ Ibid. clix, and in the 4th book of Kings, chap. xix., or in the 2nd of Paral. chap. xxxii.

§ Syncell, p. 40.

human knigs. According to Julius Africanus, they reached 5110, and, according to Eusebius, to 4723; according to Syncellus, to 3555. We may believe that the difference of names and figures was made by copyists; but Josephus cites at length a passage, the details of which are manifestly contradictory to the extracts of his successors.

A record, called the Antique*, and which some call anterior and others posterior to Manetho, gives other calculations: the whole duration of the kings is 36,525 years, of which the sun reigned 30,000, the other gods 3,984, the demi-gods 217, only leaving for the human race 2,339 years; which gives only 113 generations, instead of the 340 of Herodotus. The astronomer Eratosthenes, a learned man of an order different from that of Manetho, discovered and published under Ptolomæus Evergetes, about 240 years before Christ, a particular list of thirty-eight kings of Thebes, beginning with Menes, and continuing for 1024 years. Of this we have an extract copied by Syncellus in Apollodorus †. Scarcely any of the names which are there correspond with the other list.

Diodorus went to Egypt under Ptolomæus Auletes, about sixty years before Christ, and consequently two centuries after Manetho, and four after Herodotus. He also gleaned from the priests themselves the history of the country, and he obtained it again in an entirely new form ‡.

It was not now Menes who built Memphis, but Uchoreus; and long before his time Busiris II. had built Thebes. The eighth ancestor of Uchoreus, Osymandyas, obtained possession of Bactria, and subdued revolts there. Long afterwards, Sesostris made still more extended conquests; he reached to the Ganges, and returned thence through Scythia and the Tanais. Unfortunately these names of kings are unknown to all previous historians, and no people that they had conquered preserved the least remembrance of them. As to the gods and heroes, according to Diodorus, they reigned 18,000 years, and the human sovereigns 15,000; four hundred and seventy were Egyptians, four Ethiopians, without counting Persians or Macedonians. The tales with which the whole are intermingled do not otherwise yield in childishness to those of Herodotus.

In the eighteenth year of Christ, Germanicus, nephew of Tiberius, attracted by a desire of knowing the antiquities of this celebrated

* Syncell, p. 51.

† Ibid. p. 91, et seq.

‡ Diodorus Sic. lib. i. sect. 2.

country, went to Egypt, at the risk of displeasing a prince as suspicious as his uncle. He ascended the Nile as far as Thebes. It was not of Sesostris or Osmandyas of whom the priests told him as of a conqueror, but of Rhameses, who with an army of 700,000 men had invaded Libya, Ethiopia, Medea, Persia, Bactria, Scythia, Asia Minor, and Syria*.

Finally, in the famous article of Pliny on the Obelisks †, we find names of kings, mentioned nowhere else; Sothies, Mnevis, Zmarreus, Eraphius, Mestires, or Semenpserteus, cotemporary of Pythagoras, &c. A Ramises, who may be the same as Rhameses, is there made cotemporary with the siege of Troy.

I am aware that it is attempted to reconcile these lists, by supposing that the kings have had other names. To me, considering not only the contradiction of these different accounts, but particularly the mixture of facts attested by vast monuments and childish extravagancies, it seems much more natural to conclude that the Egyptian priests had no history; that inferior even to the Indians, they had not congruous and connected fables; that they only kept lists, more or less defective, of their kings, and some recollection of the chief amongst them, of those in particular who had taken care to inscribe their names on their temples and other large monuments which adorned the country; but these recollections were confused, and were only founded on the traditional explanations which they gave to the representations painted or engraved on their monuments; explanations founded only on the hieroglyphics, conceived like those which have been transmitted to us in any general terms ‡, and which, passing from mouth to mouth, were altered as to details according to the fancy of those who communicated them to strangers; and consequently it is impossible to rest any proposition relative to the antiquity of the present continents on the fragments of these traditions, so incomplete even in their own times, and rendered utterly unintelligible by the pens of those who have handed them down to us.

If this assertion needed farther proof, it might be found in the list of the sacred work of Hermes, which the Egyptian priests carried in

* Tacit. *Annal.* lib. 2, chap. lx.

N. B. According to the interpretation of Ammianus, lib. xvii. chap. vi. by the hieroglyphics of the obelisk of Thebes now at Rome in the place of St. John Lateran, it appears that a Rhamestes was styled in the eastern manner, "lord of the habitable world," and that the inscription given to Germanicus was only a commentary on this.

† Pliny, lib, xxxvi. c. 8, 9, 10, 11.

‡ That of Rhamestes in Ammian. loc. cit.

their solemn procession. Clemens Alexandrinus * enumerates them in number forty-two; and there is not amongst them, as with the Brahmins, one epic, or one book which has the pretension of being a narrative, or of fixing in any way any great action or any event.

The learned researches of M. Champollion, junior, and his astonishing discoveries concerning the language of hieroglyphics †, confirm rather than destroy these surmises. This ingenious antiquary has read in a series of hieroglyphical pictures of the temple of Abydos ‡ the prænomena of a certain number of kings placed in order, one after the other; and a portion of these prænomena (the ten last) being found on many other monuments, accompanied with proper names, he concludes that they are those of kings, who bore those proper names, which has given him nearly the same kings, and in the same order, as those of which Manetho composed his eighteenth dynasty, that which drove out the pastoral kings or shepherds. The concordance, however, is not complete: in the painting of Abydos, six of the names found in Manetho's list are wanting; there are others which do not resemble them; and, unfortunately, there is a break before the most remarkable of all—the Rhameses, who appears the same as the king represented on so many of the finest monuments, with the attributes of a great conqueror. It should be, according to M. Champollion in Manetho's list, the Sethos, chief of the nineteenth dynasty, who, in fact, is pointed out as potent in ships and horsemen, and as having carried his arms into Cyprus, Media and Persia. M. Champollion thinks, with Marsham and many others, that it is Rhameses or this Sethos, who is the Sesostris or Sesoosis of the Greeks; and this supposition is probable, in the sense that the representations of the victories of Rhameses, obtained probably over the wandering tribes near Egypt, or, at farthest, over Scythia, have given rise to the fabulous tales of the vast conquests, attributed by some confusion to a Sesostris; but in Manetho it is in the twelfth dynasty, and not in the eighteenth, which has a prince named Sesostris, marked as the conqueror of Asia and Thrace §. Marsham pretends that this twelfth || dynasty and the eighteenth form only one. Manetho could not then have comprehended the lists which he copied. In fact, if we entirely receive both the historical truth of this bas-relief of Abydos and its

* Stromat. lib. vi. p. 633.

† See the 'Précis du Système Hieroglyphique des anciens Egyptiens,' par M. Champollion le jeune, page 245; and his 'Lettre à M. le Duc de Blacas,' p. 15, et seq.

‡ This important bas-relief is engraved in the 'Voyage à Meroé,' by M. Caillaud, v. 2, plate xxxii.

§ Syncell. p. 59.

|| Canon. p. 353.

accordance, either with the portion of the lists of Manetho which appears to correspond with it, or with the other hieroglyphical inscription, this consequence would arise, that the pretended eighteenth dynasty, the first with which the ancient chronologists can make any agreement, is also the first which has left out on the monuments any trace of its existence. Manetho may have consulted this and similar documents; but it is not the less apparent that a list, a series of names or of portraits, which everywhere occur, is very far from being history.

May we not then assume of the inhabitants of the valleys of the Euphrates and the Tigris, what we have proved and known with regard to the Indians, and is made so probable respecting the people of the valley of the Nile? Established as the Indians * and Egyptians are, on a fine commercial situation—in extensive plains in which they have been compelled to intersect with various canals—instructed like them by an hereditary priesthood, the pretended depositaries of sacred books, the privileged possessors of the sciences, astrologers, constructors of pyramids and other vast monuments †—should they not also have a mutual resemblance in other essential points? May not their history be similarly reduced to mere legends? I venture to say, that it is not only probable, but that it is demonstrated by fact.

Neither Moses nor Homer make any mention of a great kingdom in Upper Asia. Herodotus ‡ only assigns to the supremacy of the Assyrians five hundred and twenty years of duration, and makes its origin about eight centuries before his own time. After visiting Babylon, and having consulted the priests, he did not even learn the name of Ninus, as king of the Assyrians, and only mentions him as the father of Ason §, first Lydian king of the race of the Heraclidæ. Nevertheless he makes him son of Belus, so much confusion had then occurred in the oral traditions. If he speaks of Semiramis as one of the queens who has left great monuments in Babylon, he only places her seven generations before Cyrus.

Hellanicus, cotemporary with Herodotus, far from allowing that Semiramis built anything at Babylon, attributes the founding of that city to || Chaldæus, fourteenth in order from Ninus.

* All the ancient mythology of the Brahmins relates to the plains through which the Ganges flows, and it is evidently there that their first establishments were formed.

† The descriptions of the ancient Chaldean monuments are very similar to those of the Indians and Egyptians; but these monuments are not similarly preserved, because they were only made of sun-dried bricks.

‡ Clio, cap. xcv.

§ Clio, cap. vii.

|| Stephen of Byzantium, at the word Chaldæi.

Berosus, a Babylonian and a priest, who wrote scarcely one hundred and twenty years after Herodotus, gives an alarming antiquity to Babylon; but it is to Nebuchadnezzar, a prince of comparatively recent date, that he attributes the principal monuments*.

As far as regards Cyrus, that remarkable prince, and whose history should be so well-known, so common, Herodotus, who only lived a century after him, confesses that there were three different opinions; and, in fact, sixty years later, Xenophon gives us a biography of this prince entirely different from that of Herodotus.

Ctesias, nearly cotemporary with Xenophon, pretends to have drawn from the archives of the Medes, a chronology which renders the origin of the Assyrian monarchy more remote by eight hundred years, placing at the head of its kings the same Ninus, the son of Belus, whom Herodotus had made one of the Heraclidæ; and at the same time he attributes to Ninus and Semiramis, conquests towards the west, of an extent absolutely incompatible with the Jewish and Egyptian history of this period †.

According to Megasthenes, it was Nebuchadnezzar who made these incredible conquests. He carried them through Libya to Spain ‡. We see that, from the time of Alexander, Nebuchadnezzar had entirely usurped the reputation which Semiramis had had from the time of Artaxerxes. But, we must certainly suppose, that Semiramis and Nebuchadnezzar had conquered Ethiopia and Libya, nearly in the same manner as the Egyptians attributed the conquest of India and Bactria to Sesostris or Osymandias.

It would avail us nothing, if we now entered into an examination of the different traditions of Sardanapulus, in which a celebrated learned man has imagined that he has discerned proof of the existence of three princes of that name, all victims of similar misfortunes §; and in the same way, another learned man finds in the Indies, at least three Vicramaditjia, equally the heroes of precisely similar adventures.

It was doubtlessly from the disagreement of all these narratives, that Strabo was induced to say that the authority of Herodotus and Ctesias was not equal to that of Hesiod or Homer ||. Ctesias has not been more fortunate in copyists than Manetho; and it is now very

* Josephus (contra App.) lib. i, cap. xix.

† Diod. Sicul. lib. 2.

‡ Josephus (contra App.) lib. i, chap. vi, and Strabo, lib. x; p. 687.

§ See the Memoir of Freret, on the History of the Assyrians, in the Memoirs of the Academy of Belles Lettres, vol. v.

|| Strabo, lib. xi, p. 507.

difficult to reconcile the extracts given us from his works by Diodorus, Eusebius and the Syncellus.

If so great a state of uncertainty existed in the fifth century before Christ, how can we imagine that Berosus could clear them up in the third? And can we give more credence to 430,000 years which he puts before the deluge—to 35,000 years which he places between the deluge and Semiramis—than in records of 150,000 years which he boasts of having consulted*?

Mention has been made of works raised in distant provinces, and which bore the name of Semiramis; they pretend also to have seen in Asia Minor and in Thrace columns erected by Sesostris †. But, as in Persia at the present day, the ancient monuments, perhaps even some of these, bear the name of Roustan; and in Egypt or Arabia they have those of Joseph or Solomon; a custom appertaining to the Orientalists of all ages, and, most probably, to all ignorant nations. The peasantry of our country call all ancient Roman entrenchments the camp of Cæsar.

In a word, the more I reflect on the subject, the more I am persuaded that there was no more an ancient history of Babylon or Ecbatana than of Egypt or the Indies; and instead of explaining mythology historically, as Evhemere or Bannier, it is my opinion that a great portion of history should be considered as mythology.

It is only from the epoch commonly called that of the second kingdom of Assyria, that the history of the Assyrians and Chaldeans begins to be at all clear; at the same time in which that of the Egyptians also becomes intelligible; when the kings of Ninevah, Babylon and Egypt, began to meet and fight on the theatre of Syria and Palestine.

It appears, however, that the writers of these countries, or those who had consulted its traditions, Berosus, Hieronymus, and Nicholas de Damas, agree in mentioning a deluge. Berosus even describes it with circumstances so similar to that of Genesis, which it is scarcely possible but that he must have derived his information from the same sources, although he makes its epoch many centuries earlier; that is, if we may judge from the confused extracts which Josephus, Eusebius and Syncellus, have preserved of his writings. But we must remark—and with this observation we shall terminate our mention of the

* Syncellus, p. 38 and 39.

† N. B. It is remarkable, that Herodotus says nothing of having seen any monuments of Sesostris, but in Palestine, and only mentions those in Ionia from hearsay, adding, that Sesostris is not named in the inscriptions, and that those who have seen these monuments attribute them to Memnon.—Euterpe, chap. cvi.

Babylonians—that these numerous ages, and this long list of kings, placed between the deluge and Semiramis, is a new thing, entirely originating from Berosus, and of which Ctesias, and those who followed him, had not the least idea, and which has not even been adopted by any profane author after Berosus. Justin and Velleius considered Ninus as the first of the conquerors, and those who, against all probability, place him highest, only make him forty centuries anterior to the present time*.

The Armenian writers of the middle age agree very nearly with one of the texts of Genesis, when they date the deluge as 4916 years anterior to their own time; and it might be imagined, that having collected the old traditions, and perhaps extracted the old chronicles of their country, they form an additional authority in favour of the newness of nations. But when we reflect, that their historical literature is only dated from the fifth century, and that they were acquainted with Eusebius, we may understand that they accommodated themselves to his chronology and that of the Bible. Moses of Chorene expressly professes to have followed the Greeks, and we may perceive that his ancient history is formed on that of Ctesias †.

It is, however, certain, that the tradition of the deluge existed in Armenia, even before the conversion of the inhabitants to Christianity; and the city, which according to Josephus, was called the Place of the Descent, still exists, at the foot of mount Ararat, and bears the name of Nachidchevan, which has the same meaning ‡.

By Armenians, we mean the Arabs, Persians, Turks, Mongolians and Abyssians, of the present day. Their ancient books, if they ever had any, exist no longer. They have no other ancient history than that which they have recently made, and which they modelled on the Bible. Thus what they say of the deluge is borrowed from Genesis, and adds no testimony to that book.

It is curious to learn the opinion of the ancient Persians on this subject, before it was modified by Christian and Mahometan creeds. We find it deposited in their Boundehesh or Cosmogony, a work of the prince of the Sassinides, but evidently extracted or translated from more ancient works, and which Anguetil du Perron found among the Parsees of India. The whole duration of the world it states to be only 12,000 years, therefore it cannot yet be very old. The appear-

* Justin, lib. 1, c. 1; Velleius Paterculus, lib. 1, c. vii. ^

† See Moses Chorenensis. Hist. Armen. lib. 1, c. 1.

‡ See the Preface of the two Whistons on Moses of Chorene, p. 4.

ance of the Cayoumortz (the bull-man, the first man,) is preceded by the creation of a great water*.

For the rest, it would be useless to ask from the Parsees a serious history, as from the other oriental nations. The Magi have left no more than the Brahmins or Chaldeans, I ask no other proof than the uncertainties concerning the epoch of Zoroaster. It is even pretended, that the little history that they might have had which related to the Achemenides, the successors of Cyrus to the time of Alexander, has been expressly altered, and by the official command of one of the kings Sossanides †.

To discover the authentic dates of the commencement of empires, and traces of the universal deluge (grand cataclisme) we must go beyond the vast deserts of Tartary. Towards the east and north is another race, whose institutions and modes of life differ from ours as much as their formation and temperament. Their language is monosyllable,—their writing is arbitrary hieroglyphics,—they have only a political morality, without religion, for the superstitions of Fo were brought to them from the Indians. Their yellow complexion, projecting cheek-bones, their narrow and oblique eyes, and scanty beard, render them so different from us, that we are tempted to believe that their ancestors and ours escaped at the great catastrophe by different sides; but, however that may be, they date their deluge from nearly the same epoch as our own.

The most ancient book of the Chinese, is called the Chou-king ‡, which is said to have been compiled by Confucius, from the fragments of former works, about 2255 years ago. Two centuries later, they say, was the persecution of letters, and the destruction of the books, under the emperor Chi-Hoangti, who wanted to destroy the traces of the feudal government, established under a dynasty previous to his own. Forty years afterwards, under the dynasty which had overthrown that to which Chi-Hoangti belonged, a part of the Chou-king was restored from memory by an old sage, and another was found in a tomb; but nearly half of it was utterly lost. But this book, the most authentic of China, begins the history of this country with Yao, an emperor so named, who it represents to us as occupied in making the waters pass away, *which being raised as high as heaven, were still laving the feet of the loftiest mountains, covering the hills that were less elevated,* and ren-

* Zendavesta d'Anquetil, v. 2, p. 354.

† Mazoudi ap. Sacy. Manuscripts of the king's library, vol. viii, p. 161.

‡ See the preface of the edition of Chou-king, by M: de Guignes.

dered the plains impassable.* The date of Yao is, by some, fixed 4163 years before the present time; according to others, at 3943 years. The variety of opinions on this epoch extends even to 284 years.

Some pages further on we find Yu, a minister and engineer, re-establishing the course of the waters, forming dykes, digging canals, and regulating the taxes of every province in China, that is to say, in an empire of six hundred leagues in every direction. The impossibility of such operations, after such events, shows that the whole is but a moral or political romance.†

More modern historians have added a series of emperors before Yao, but with a great many fabulous circumstances, without venturing to assign fixed dates to them, varying incessantly one with the other, even in number and names, and not being approved of by many of their countrymen. Fouhi, with his serpent's body, his bull's head, and tortoise's teeth, and his successors not less monstrous, are as absurd, and have had no more reality than Enceladus and Briareus.

Is it possible that mere chance gave a result so striking as to make the traditional origin of the Assyrian, Indian, and Chinese monarchies agree in being as remote as 4000 years back? Would the ideas of nations, who have had so little communication with each other, whose language, religion, and laws, have nothing in common, agree on this point, if they were not founded on truth?

We will not ask for precise dates from the Americans, who had no real writing, and whose most ancient traditions go no further back than to some few centuries before the arrival of the Spaniards; and yet we still imagine that we can detect traces of the deluge in their rough hieroglyphics. They have their Noah, or their Deucalion, like the Indians, the Babylonians, and the Greeks.‡

The negroes, the most degraded of human beings, whose forms are the nearest to those of brutes, and whose intellect has nowhere expanded so greatly as to attain a regular government, nor to the least semblance of connected information, have preserved no records, no traditions. They cannot then afford us any information concerning our inquiry, although all their characters clearly show that they escaped from the great catastrophe by some other point than the Caucasian and Altaic races, from whom they were probably separated long before this catastrophe happened.

* Chou-King. French translation, p. 9.

† It is the Yu-King, or chap. 1, of the second part of the Chou-King, pp. 43—60.

‡ See the admirable and splendid work of M. de Humboldt, on the Mountains of Mexico.

But, it is said, if the ancient races have not left us any history, their long existence as nations is not the less attested by the progress which they made in astronomy ; by observations which are easily dated, and even long by the monuments still existing and which themselves bear their dates.

Thus the length of the year, such as the Egyptians are supposed to have determined it, according to the heliacal rising of Sirius, is correct for a period comprised between the year 3000 and the year 1000 before Christ, a period to which the traditions of their conquests, and the great prosperity of their empire, also have reference. This accuracy proves to what an exact pitch they had carried their observations, and makes it evident that they had devoted themselves for a long time to such studies.

To appreciate this reasoning, it is necessary that we enter into some explanation.

The solstice is that moment of the year, at which the rising of the Nile begins, and which the Egyptians must have observed with very great attention. Having in the beginning formed a civil or sacred year, of exactly three hundred and sixty-five days, from imperfect observations, they would preserve it from superstitious motives, even after they had discovered that it did not coincide with the natural or tropical year, and that the seasons did not revert on the same days.* However, it was the tropical year which it most behoved them to mark for directions in their agricultural operations. They would then seek in the heavens for some apparent sign of its return, and they imagined that they had found it when the sun returned to the same position, with relation to a certain remarkable star. Thus they applied themselves, like nearly all nations, who begin a similar enquiry, to the examination of the heliacal rising and setting of the stars. We know that they particularly fixed on the heliacal rising of Sirius ; at first, doubtless, because of the splendour of this star ; and above all because in ancient times this rising of Sirius nearly coinciding with the solstice, announcing the inundation, was to them a phenomenon of the most important nature. Hence it was that Sirius, under the name of Sothis, played a prominent part in all their mythology, and their religious rites. Supposing then that the recurrence of the heliacal rising of Sirius and the tropical year were of the same duration, and believing that they had at length discovered that this duration was three

* Geminus, a contemporary with Cicero, explains these notions at length. See M. Halma's edition, at the end of Ptolomæus, p. 43.

hundred and sixty-five days and a quarter, they imagined a period, after which the tropical year, the ancient year, the year of the three hundred and sixty-five days only, would revert to the same day; a period which, according to these incorrect data, was necessarily 1461 sacred years, and 1460 of those perfected years, to which they gave the name of the years of Sirius.

They took as the point of departure of this period, which they called the sothaic or great year, a civil year; the first day of which was or had been also that of the soliacal rising of Sirius; and we learn from the positive testimony of Censorinus, that one of these great years terminated in the year 138 before Christ.* Consequently it began 1322 years before Christ, and that which preceded it, 2782 years previously. In fact, from calculations of M. Ideler, we learn that Sirius rose heliacally on the 20th July, in the Julian year 139, a day which corresponds to the first of Thot, or the first day of the sacred Egyptian year.†

But not only the sun's position, with relation to the stars of the ecliptic or the sidereal year, is not the same as the tropical year, because of the precision of the equinoxes. The heliacal year of a star, or the period of its heliacal rising, especially when it is distant from the elliptic, differs also from the sidereal year, and differs variously, according to their latitudes in the places of observation. Yet what is singular enough, and what Bainbridge,‡ and father Petau§ have remarked,|| is, that it happens by a remarkable concurrence in the positions, that in the latitude of Upper Egypt, at a certain epoch, and during a certain number of centuries, the year of Sirius, was really within very little of three hundred and sixty-five days and a quarter; so that the heliacal of this star returned, in fact, to the same day of the Julian year, on the 20th of July, in 1322 years before, and 138 after Christ.¶

* All this system is developed by Censorinus, de Die Natali, cap, xviii. and xxi.

† Ideler. Hist. Researches on the Astronomical Observations of the Ancients. Halma's translation at the end of his Canon of Ptolamæus, p. 32, et. seq.

‡ Bainbridge, Canicul.

§ Petau, Var. Diss. lib. v, c. vi, p. 108.

|| See La Nauze, on the Egyptian year. Acad. de Bell. Let. v. xiv. p. 346, and the Memoir of Fourier, in the great work on Egypt, Mem. v. i, p. 803.

¶ Petau, loc. cit. M. Ideler affirms that this coincidence of the heliacal rising of Sirius, took place also 2782 years before Christ, (Rech. Hist. in the Ptolamæus of M. Halma, v. iv, p. 37.) But with respect to the Julian year, 1498 after Christ, which is also the last of a great year, father Petau and M. Ideler differ. The latter places the heliacal rising of Sirius, on the 22nd of July, the former on the 19th of August.

From this positive coincidence, at a period so remote, M. Fourier, who has determined all these coincidences by great labour and new calculations, concludes, that since the length of the year of Sirius was so perfectly known to the Egyptians, they must have determined it by observations made during a long series of years, and with much exactness; observations as remote as 2500 years before our era, and could not have been made either much before or much after this interval of time.*

Certainly, this result would be very striking if the length of the year of Sirius had been directly decided by observations made on Sirius itself. But experimental astronomers affirm, that it is impossible that the heliacal rising of a star could serve as the basis of these exact observations on such a subject, particularly in a climate where *the circumference of the horizon is always so much loaded with vapours, that, on fine nights, stars of the second and third magnitude are never seen within a few degrees of the edge of the horizon, and that the sun itself, at its rising and setting is entirely obscured.*† They maintain, that if the length of the year had not been discovered by some other means, they would have been mistaken in one or two days.‡ They do not doubt then that this duration of three hundred and sixty-five days and a quarter is that of the tropical year, inaccurately determined by the observation of the shadow, or by that of the point where the sun rose daily, and ignorantly identified with the heliacal year of Sirius; so that it would be mere chance which determined with so much accuracy the duration of the latter for the epoch in question.§

We shall also, perhaps, conclude, that men capable of such accurate observations, and who made them for so long a period, would not have assigned so much importance as to worship him; for they would have seen that the coincidence of his rising with the tropical year and the inundation of the Nile are only temporary, and only took place in a determinate latitude. In fact, according to the calculations of M. Ideler, 2782 years before Christ, Sirius appeared in Upper Egypt, the second day after the solstice; in 1322, the thirteenth; and in one hundred and thirty-nine after Christ, the twenty-sixth.||

* See the great work on Egypt. Antiq. Mem. v. 1, p. 803; the ingenious Memoir of M. Fourier, entitled 'Recherches sur les Sciences et le Gouvernement de l'Egypte.'

† These are the words of the late M. Nouet, astronomer to the expedition to Egypt. See Volney's 'Recherches Nouvelles sur l'Histoire Ancienne,' v. iii.

‡ Delambre Abrégé d'Astronomie, p. 217, and in his note on the Paranatellons. Hist. de l'Astr. du Moyen Age, p. 52.

§ Delambre's Report on M. de Paravey's Memoir concerning the Sphere, in the 8th vol. of the New Annals of Voyages.

|| Ideler loc. cit. p. 38.

At the present day it does not rise heliacally till more than a month after the solstice. The Egyptians would have had a decided preference in finding an epoch which would afford a coincidence between the commencement of the sacred year, with that of the actual tropical year; and then they would discover that their great period should be 1508 sacred years, and not 1461.* We certainly do not find any trace of this period of 1508 years in antiquity.

Can we, generally speaking, defend ourselves with the idea that if the Egyptians had such long series of observations, and exact observations, their disciple Eudoxus, who studied amongst them for thirteen years, would have carried a more perfect system of astronomy, maps of the heavens less inaccurate, and even congruous in their different parts?†

How was it that the precession of the equinoxes was not known to the Greeks but from the works of Hipparchus, if it had been inserted in the registers of the Egyptians, and written in such manifest characters on the ceilings of their temples?

How is it that Ptolemæus, who wrote in Egypt, did not deign to make use of any of the observations of the Egyptians?‡

Besides, Herodotus, who dwelt with them so long, says nothing of these six hours which they added to the sacred year, nor of that great sothaic period which resulted from it. He, on the contrary, positively says, that the Egyptians making their years three hundred and sixty-five days, the seasons return at the same periods; so that at his time there was no appearance that they had as yet suspected the necessity of this quarter of a day§. Thales, who had visited the priests of Egypt less than a century before Herodotus, in like manner did not make known to his fellow-countrymen any other than the year of three hundred and sixty-five days only;|| and, if we reflect that the colonies that went from Egypt, fourteen or fifteen centuries before Christ, the Jews and the Athenians carried with them the lunar year; we may perhaps judge that the year of three hundred and sixty-five days itself did not exist in Egypt at a period so remote.

I know that Macrobius¶ attributes a solar year of three hundred and sixty-five days and a quarter to the Egyptians. But this author, comparatively modern, and who lived long after the fixed year of Alex-

* See Laplace, *Système du Monde*, 3d. edit. p. 17, and *Annuaire* of 1818.

† See M. Delambre, on the inaccuracy of the determination of the Sphere, by Eudoxus, in the 1st vol. of his *History of Ancient Astronomy*, p. 120, et. seq.

‡ See M. Delambre's *Preliminary Discourse on the History of the Astronomy of the Middle Age*, p. 8, et seq.

§ Euterpe, ch. iv.

|| Diog. Laert. lib 1, in Thalet

¶ Saturnal, lib. 1, ch. xv.

andria, may have confounded the epochs. Diodorus* and Strabo† only give a similar year to the Thebans; they do not say that it was generally adopted, and they lived long after Herodotus.

Thus the sothaic year, the great year, may have been but a modern invention, since it results from a comparison of the civil year with this pretended heliac year of Sirius; and that accounts for its not being spoken of before the writings of the second and third century after Christ ‡, and that Syncellus alone, in the ninth century, seems to quote Manetho, as having mentioned it.

Whatever may be said on the subject, we have the same ideas of the astronomical science of the Chaldeans. That a people inhabiting vast plains, under a sky always serene, may have been led to observe the course of the stars even from the times when they were wandering tribes, and when the stars alone could guide them at night, is natural. But since what period did they become astronomers, and how far have they carried the science of astronomy? That is the question. It is agreed that Callisthenes sent Aristotle observations made by them, which went as far back as 2200 years before Christ. But this is stated only by Simplicius §, according to the authority of Porphyry, and six hundred years after Aristotle. Aristotle himself makes no mention of it; no accredited astronomer speaks of it. Ptolemæus relates and makes use of ten observations on eclipses really made by the Chaldeans; but it only goes back to Nebuchadnezzar (721 years before Christ); they are incorrect; the time is only expressed in hours and half hours, and the obscuration only in half or quarter diameters. However, as they had certain dates, the Chaldeans must have had some knowledge of the accurate length of the year, and some method of measuring time. They appear to have known the period of eighteen years, which brings back the eclipses of the moon in the same order, and which the mere inspection of their registers would have informed them quickly; but it is certain that they neither knew how to explain nor foretel the eclipses of the sun.

Cassini and Bailey, having misunderstood a passage in Josephus, have asserted that they had discovered in it a luni-solar period of six hundred years, which must have been known to the early patriarchs ||.

* Bibl. lib. 1, p. 46.

† Geogr. p. 102.

‡ See the admirable dissertation of M. Biot, on the probable newness of this period, in his researches on many points of Egyptian Astronomy, p. 148, et seq.

§ See M. Delambre's *Hist. d'Astro.* v. 1, p. 212. See also his *Analysis of Geminus*, ib. p. 211. Compare with them the *Memoirs of M. Ideler*, on the Astronomy of the Chaldeans, 4th vol. of Halma's *Ptolemy*, p. 166.

|| See Bailey's *Hist. of Ancient Astronomy*, and M. Delambre's work on the same subject, v. 1, p. 3.

Thus all confirms the idea that the great reputation of the Chaldeans was given to them, in more modern times, by their unworthy successors, who, under the same name, sold, throughout the Roman empire, horoscopes and predictions; and who, to gain more credit, attributed to their rude ancestors the honour of the discoveries of the Greeks.

As to the Indians, it is well known that Bailly, thinking that the epoch which is used as a period of departure in some of their astronomical tables had been really observed, has attempted thence to deduce a proof of the remote antiquity of this science amongst this people, or at least in the nation which had bequeathed its knowledge to them. But the whole of this system, so laboriously conceived, falls to the ground of itself, now that it is proved that this epoch was subsequently adopted on calculations made backwards, and the result of which was incorrect*.

M. Bentley has discovered that the tables of Tirvalour, on which particularly the assertion of Bailly was founded, must have been calculated about 1281 after Christ (540 years since); and that the *Surya-Siddhanta*, which the Brahmins regard as the most ancient and scientific treatise on astronomy, and which they pretend was revealed more than twenty millions of years ago, could not have been composed until about 760 years since †.

The solstices and equinoxes marked in the *Pouranas*, and calculated according to the positions which were assigned to them in the signs of the Indian zodiac, have had a very remote antiquity assigned to them. A more exact study of these signs, or *nacchatrons*, has lately shown M. de Paravey that reference is only made to solstices of twelve centuries before Christ. This writer, at the same time, states that the place of these solstices is so indefinitely fixed, that we cannot decide on it nearer than two or three hundred years. Those of Eudoxus and Tcheou-Kong are the same ‡. It is confidently asserted that the Indians do not make observations, and have no instruments necessary for that purpose. M. Delambre agrees with Bailly and Legentil, that they have processes of calculations which, without proving the antiquity of their astronomy, at least show its originality §; and this conclusion cannot be extended to their sphere, for in-

* See Laplace's *Exposé du Systeme du Monde*, p. 330; and the *Memoir of M. Davis on the Astronomical Calculations of the Indians*. *Mem. de Calcutta*, v. 2, p. 225, 8vo. edit.

† See *Mem. of Bentley, on the Antiquity of Surrya-Siddhanta*. *Mem. de Calcutta*, v. vi, p. 540; and on the *Astronomical Systems of the Indians*, ib. v. viii, p. 165 of the 8vo. edit.

‡ *Manuscript Memoirs of M. de Paravey, on the Sphere of Upper Asia*.

§ See the profound treatise on the *Astronomy of the Indians*, in the *History of Ancient Astronomy*, by M. Delambre, v. I, p. 400—556.

dependently of their twenty-seven nacchatrons, or lunar houses, which are very similar to those of the Arabs, they have in their zodiac the same twelve constellations as the Egyptians, Chaldeans, and Greeks *; and if we refer to M. Wilfort, their extra-zodiacal constellations were the same as those of the Greeks, and had names which differ very slightly from the Greek names †.

The introduction of astronomy in China is attributed to Yao, who sent, says the Chou-King, astronomers towards the four cardinal points of his empire to examine what stars presided at the four seasons, and to regulate what was to be done at each season of the year ‡, as if it was necessary to send them to different parts to effect this. About two centuries later, the Chou-King mentions a solar eclipse, but with absurd circumstances, as in all the fables of this kind; for a general, and the whole Chinese army, is made to march against the astronomers, because they had not properly predicted it §; and it is known that for more than two thousand years afterwards the Chinese astronomers had no means of predicting the eclipses of the sun with precision. In 1629, of our era, at the time of their dispute with the Jesuits, they did not even know how to calculate the obscurations.

The real eclipses, recorded by Confucius in his chronicle of the kingdom of Lou, do not begin until 1400 years after this, in 776 before Christ, and scarcely fifty years earlier than those of the Chaldeans recorded by Ptolemæus. So true it is, those nations which escaped at the same period from the universal catastrophe, have, under similar circumstances, reached a similar degree of civilization about the same period. But we should believe, by the identity of the name of the Chinese astronomers under different reigns (they appear, according the Chou-King, to be all called *Hi* and *Ho*), that at this remote epoch their profession was hereditary, as in India, Egypt, and Babylon.

* See Sir W. Jones's Memoir on the Antiquity of the Indian Zodiac. Mem. of Calcutta, v. ii, p. 289, 8vo. edit. and in the French translation, v. ii, p. 332.

† We subjoin M. Wilfort's own words from his Memoir on the Testimonies of the Ancient Hindoo books, concerning Egypt and the Nile. Mem. de Calcutta, v. iii, p. 433, of the 8vo. edit.

“ Having requested my pundit, who is a learned astronomer, to point out to me in the heavens the constellation of Antarmada, he immediately directed me to Andromeda, which I had taken care not to show him as a constellation that I knew. He then produced a very scarce and curious book, in Sanscrit, in which was a particular chapter on the Upanacshatras, or extra-zodiacal constellations, with figures of Capeya, and of Casyape sitting, holding a lotus flower in her hand, of Antarmada, chained with the fish near her, and of Parasica, holding the head of a slain monster dripping with blood, and with snakes for hair.”

Who does not here recognize Perseus, Cepheus, and Cassiopea? But let us not forget that this pundit of M. Wilfort has been much doubted.

‡ Chou-King, pp. 6, 7.

§ Chou-King, pp. 66, et seq.

The only more ancient Chinese observation, which does not bear in itself the proof of its own falsity, is that of the observation calculated by Tcheou-Kong, about 1100 before Christ, and even that is incorrect*.

Our readers may thus judge that the inferences drawn from the high perfection of the astronomy of ancient people are not more conclusive in favour of the excessive antiquity of these people than the testimonies which they have adduced in their own favour.

But what would this astronomy prove if it were even more perfect? Have we calculated the progress which a science could make in the bosom of nations which, in some sort, had no other; when the serenity of the sky, the wants of a pastoral or agricultural life, and superstition, made the stars an object of universal contemplation; when colleges of the most respected men were charged with keeping a register of interesting phenomena, and of transmitting their memory of them; where the inheritance of the profession caused children to be brought up from the cradle in the knowledge acquired by their fathers? If, amongst the multitude of persons solely occupied with astronomy, there were one or two expert geometricians, even then all that these people knew might have been discovered in a few centuries.

We may learn that, since the Chaldeans, real astronomy has had only two epochs, that of the Alexandrian school, which lasted 400 years, and our own, which has not lasted so long. The age of the Arabs scarcely added any thing to it. The other ages have been mere nullities with respect to it. Only three hundred years have intervened between Copernicus and the author of *La Mécanique Celeste* (Laplace), and yet did the Indians require thousands of years to arrive at their crude theories †.

The Astronomical Monuments left by the Ancients have not the excessively remote Dates generally attributed to them.

Recourse has been had to another species of argument. It is pretended that, independently of the knowledge which these nations might have attained, they have left monuments which bear, by the state of the heavens which they represent, a certain and remote date; and the zodiacs engraved in two temples of Upper Egypt have appeared for some years to afford, on this point, most perfectly conclusive proofs. They present the same zodiacal figures that we now use, but arranged in a peculiar manner. It has been thought that this

* See in "La Connaissance des Temps," of 1809, p. 382, and in M. Delambre's 'History of Ancient Astronomy,' v. i, p. 391, extracted from a Memoir of P. Gaubil, on the observations of the Chinese.

† The English translator (Jameson) of this Discourse quotes, on this point, the example of the celebrated James Ferguson, who was a shepherd in his youth, and who, whilst watching his flocks at night, had conceived the idea of a chart of the heavens, and drew it perhaps more correctly than any Chaldean astronomer. A similar account is given of Jamerey Duval.

distribution represents the state of the heavens at the moment when these monuments were delineated, and that it would be possible thence to decide on the date of the building of the edifices which contain them*.

But to reach the remote antiquity which is pretended to be deduced from them, we must first suppose that their division had a decided relation to a certain state of the sky, dependent on the precession of the equinoxes, which causes the colures to make the tour of the zodiac in twenty-six thousand years; that it pointed out, for example, the position of the solstitial point; and secondly, that the state of the heavens represented was precisely that which took place at the epoch when this monument was constructed; two suppositions, which of themselves evidently suppose many others.

In fact, are the figures of these zodiacs constellations, the real groups

* Thus, at Dendera (the ancient Tentyris), a city above Thebes, in the portico of the great temple which faces the north*, there are on the ceiling the signs of the zodiac marching in two bands, one of which is along the east side, and the other on the opposite side; they are each held in the embrace of a female figure of similar length, whose feet are towards the entrance, the head and arms towards the bottom of the portico, and consequently the feet are towards the north, and the head towards the south.

The Lion heads the band which is in the western side; he is directing his course towards the north, or the feet of the female figure, and his feet are towards the eastern wall. The Virgin, the Balance, the Scorpion, the Archer, and the Capricorn, follow in the same line. This latter is towards the bottom of the portico, and near the hands and head of the large female figure. The signs of the eastern band begin at that extremity when those of the other band finish, and are consequently directed towards the bottom of the portico, or towards the arms of the tall figure. They have their feet towards the lateral wall of their own side, and the heads in the contrary direction to the opposite band. The Aquarius (Verseau) is advancing foremost, followed by the Fishes, the Ram, the Bull, and the Twins. The last of the series, which is the Cancer, or rather Scarabæus (or beetle), for this insect is substituted for the Cancer of the Greeks in the zodiacs of Egypt, is thrown on one side on the legs of the great figure. The place it should occupy is filled by a globe placed on the apex of a pyramid composed of small triangles, which represent a kind of rays, and in front of its base is a large female head, with two small horns. A second Scarabæus is placed sideways and across on the first band in the angle which the feet of the large figure form with the body, and in front of the space where the Lion is advancing, which is rather behind. At the other end of the same band, the Capricorn is very near the bottom, or the arms of the great figure, and on the band at the left the Aquarius is at some distance from it, but the Capricorn is not repeated like the Cancer. The division of this zodiac, from the entrance, is then between the Lion and the Cancer, where, if it be thought that the repetition of these Scarabæus marks the division of a sign, it takes place in the Cancer itself; but that at the bottom is between the Capricorn and Aquarius.

In one of the inner halls of the same temple there was a circular planisphere inscribed in a square, which has been brought to Paris, by M. Lelorrain, and is now in the king's library. There are also the signs of the zodiac, amongst many other figures which appear to represent constellations*.

The Lion there corresponds with one of the diagonals of the square; the Virgin, who follows him, corresponds with a perpendicular line directed eastward; the outer

* See the great work on Egypt. Antiq. v. iv., pl. xx.

† See the great work on Egypt. Antiq. v. iv. p. 21.

of stars which now bear the same name, or simply what astronomers call signs, that is to say, divisions of the zodiacs proceeding from one of the colures, whatever place this colure occupies ?

Is the point at which these zodiacs have been divided into two bands necessarily that of a solstice ?

Is the division of the side next the entrance necessarily that of the summer solstice ?

signs advance in their known order to Cancer, which, instead of completing the chain by corresponding to the level of the Lion, is placed above him nearer the centre of the circle ; so that the signs are in a line rather spiral.

The Cancer, or rather Scarabæus, advances in a contrary direction to the other signs. The Twins correspond with the north ; the Sagittary with the south ; and the Fishes with the east, but not exactly. On the eastern side of this planisphere is a large female figure, with her head in a southerly direction, and her feet towards the north, like the rest in the portico. A doubt might then be raised as to what point of this second zodiac should be taken as the commencement of the signs. If we take one of the perpendiculars, or one of the diagonals, or the point where one part of the series passes over the other part, we should divide it at the Lion, or between the Lion and the Cancer, or lastly at the Twins.

At Esne (the ancient Latopolis), a city below Thebes, there are zodiacs on the ceilings of two different temples.

That of the great temple, whose entrance is eastward, is on two bands contiguous to, and parallel with, the length of the south side of the ceiling*.

The female figures who embrace them are not placed lengthwise, but in the breadth of the bands, so that one is across near the eastern entrance, the head and arms towards the north, and the feet towards the lateral wall, or southward, and the other is at the bottom of the portico, also across and facing the first.

The nearest band to the axis of the portico, or north, first presents, on the side of the entrance, or eastward, and towards the head of the female figure, the Lion placed a little backwards and going towards the bottom, the feet towards the lateral wall ; behind the Lion, at the commencement of the band are two smaller Lions ; before it is the Scarabæus, and then the Twins advancing in the same direction ; then the Bull, the Ram, and the Fishes, close to each other, placed across the middle of the band. The Bull with his head towards the lateral wall, the Ram towards the axis. The Aquarius is farther off, and takes the same direction towards the bottom as the three first signs.

On the band nearest to the lateral wall and the north, we see at first, but at some distance from the bottom or west, the Capricorn, which is going in an opposite direction to the Aquarius, and directs his course eastward, or towards the entrance of the portico with the feet turned towards the lateral wall. Close to it is the Sagittary corresponding with the Fishes and the Ram. He advances towards the entrance, but his feet are turned towards the axis in an opposite direction to those of the Capricorn.

At a certain distance in front, and near each other, are the Scorpion and a female holding a balance ; finally, a little more in front, but still sufficiently distant from the anterior, or eastern extremity, is the Virgin, who is preceded by a Sphynx. The Virgin and the female who holds the balance have their feet towards the wall, so that the Sagittary is the only sign which is placed with its head differently to those of the other signs.

Northward of Esne is a small isolated temple, equally directed towards the east, and whose portico has also a zodiac † ; it is on two lateral and separated bands. That which is along the south side begins with a Lion, who is advancing towards the bottom, or westward ; the feet turned towards the wall, or southward ; the Sca-

* See the great work on Egypt. Antiq. v. i, pl. lxxix.

† See the great work on Egypt. Antiq. v. i, pl. lxxxvii.

Does this division indicate, even in a general sense, a phenomenon dependent on the precession of the equinoxes ?

Does it not rather relate to some epoch whose rotation would be less ; for example, to the moment of the tropical year when such or such of the sacred years of the Egyptians began, which being shorter than the real tropical year, by nearly six hours, made the circuit of the zodiac in 1508 years ? Finally, whatever meaning it may have had, has it been intended thereby to mark the time when the zodiac was engraved, or that when the temple was built ? Was there no contemplation of recalling a previous state of the heavens at some interesting epoch for religion, whether by observation at the time, or concluded on by posterior calculations ?

From the mere statement of such questions we may perceive how complicated they were, and how any solution that might be adopted must be subject to dispute, and how little susceptible of positive proof in solving any other problem, such as the antiquity of the Egyptian nation. Thus we may say that, amongst those who endeavoured to draw a date from these data, there are as many opinions as there have been writers on the subject.

M. Burkard, the learned astronomer, according to a first examination, judged that at Dendera the solstice is in the Lion, and conse-

rabæus precedes it, and this latter is headed by the Twins marching in the same direction. The Bull, on the contrary, meets them, going in an easterly direction ; but the Ram and the Fishes take the direction towards the bottom, or towards the west.

At the band on the northern side, the Aquarius is near the bottom, or the west, advancing towards the entrance, or the east, their feet turned towards the wall, preceded by the Capricorn and the Sagittary, which are going in opposite directions. The other signs are lost ; but it is evident that the Virgin should go at the head of this band on the side of the entrance.

Amongst the accessory figures of this small zodiac, we must remark two winged Rams, placed crosswise, the one between the Bull and the Twins ; the other between the Scorpion and the Sagittary ; and each nearly in the middle of its band, the second, however, rather more advanced towards the entrance.

It was thought at first that, in the great zodiac of Esne, the division at the entrance was made between the Virgin and the Lion, and that of the bottom between the Fish and the Aquarius.

But Mr. Hamilton, and MM. de Jallois and Villiers, have imagined that they discovered in the Sphinx, which preceded the Virgin, a repetition of the Lion, analagous to that of the Cancer in the great zodiac of Dendera ; so that, according to them, the division should be made in the Lion. In fact, without this explanation, there would be only five signs on one side, and seven on the other.

As to the small zodiac at the north of Esne, we cannot tell if there be any emblem analagous to the Sphinx, because this part is destroyed *.

* British Review, February 1827, p. 136 ; and the end of the *Critical Letter* on *Zodiacomania*, p. 33.

quently two signs earlier than at the present day, and that the temple had stood at least 4000 years*.

He, at the same time, assigned an antiquity of 7000 years to that of Esne, although it is not known how he meant to make these numbers agree with what was known of the precession of the equinoxes.

The late Lalande, seeing that the Crab was repeated on the two bands, imagined that the solstice passed through this constellation; but as it was so in the sphere of Eudoxus, he concluded that some Greek might have represented this sphere on the ceiling of an Egyptian temple, without knowing that he was depicting a state of the heavens which had for a long time ceased to exist †. It was, as we may perceive, a very different inference from that of M. Burkard.

Dupuis was the first who deemed it necessary to seek for confirmation of this idea, and he in some sort confidently adopted, that it was the solstice that was denoted; he found then, for the great zodiac of Dendera, in the globe at the apex of the pyramid, and in many emblems placed near different signs, and which sometimes, according to the ancient authors, such as Plutarch, Horus Apollo, or Clemens Alexandrinus; sometimes, according to his own conjectures, he imagined to represent phenomena which could have really been those of the seasons affected at each sign.

Besides, he maintained that this state of the heavens gives the date of the monument, and that they had, at Dendera, the original, and not a copy of the sphere of Eudoxus, which would relate to 1468 years before Christ, in the reign of Sesostris.

But the number of nineteen boats placed under each band gave him the idea that the solstice might have been in the nineteenth degree of the sign, which would make an addition of 288 years ‡.

Mr. Hamilton §, having remarked that, at Dendera, the Scarabæus on the side of the ascending signs is smaller than that on the other side, an English author || has thence concluded that the solstice may have been nearer the actual point that the middle of Cancer, which would take us back to a period of 1000 or 1200 years before Christ.

The late Nouet, judging that this globe, the rays, and the horned head or Isis, represent the heliacal rising of Sirius, pretended that they intended to denote an epoch of the sothaic period, but that they

* M. Grobert's Description of the Pyramids of Geza, p. 117.

† *Connaissance des Temps*, for the year XIV.

‡ *Observations on the Zodiac of Dendera*, in the *Philosophical and Literary Review*, in 1806, 2d division, p. 257, et seq.

§ *Ægyptiaca*, p. 212.

|| See *British Review*, Feb. 1817, p. 136, et seq. Article vi, on the Origin and Antiquity of the Zodiac. It is translated at the end of Swartz's *Critical Letters on Zodiacomania*.

intended to mark it by the place of the solstice; but, in the last but one of these periods, that which elapsed from 2782 years to 1322 before Christ, the solstice has passed from thirty degrees forty-eight minutes of the constellation of the Lion, to thirty degrees thirty-four minutes of the Cancer; at the middle of this period then it was at twenty-three degrees thirty-four minutes of the Cancer; the heliacal rising of Sirius then occurred some days after the solstice. This, according to Nouet, was indicated by the repetition of the Scarabæus, and by the image of Sirius in the rays of the sun placed at the commencement of the band on the right. According to this calculation, he concludes that this temple is 2052 years before Christ, and that of Esne 4600*.

All these calculations, even admitting that the division marks the solstice, must still be susceptible of many modifications; and it appears at first that their authors have supposed the constellations to be all like the signs, of thirty degrees, and have not reflected that they must be more, at least as they are now drawn, and as the Greeks have transmitted them to us, that they may thus be equal amongst themselves. In reality, the solstice which is now on this side of the first stars of the constellation of the Twins could only have left the first stars of the constellation of Cancer, 45 years after Christ. It only quitted the constellation of the Lion 1260 years before the same era.

My colleague, the celebrated and learned M. Delambre, has kindly supplied me with the subjoined tables, which, with the remarks that follow, elucidate what has been just remarked.

Construction and Use of the Table,

“ The longitude of the stars for 1800 has been taken from the Berlin Tables, as calculated by Lacaille, Bradley, or Flamstead.

“ The first and last of each constellation, and some of the most brilliant intermediate stars, have been taken. The third column indicates the year when the longitude of the star was 0; that is the year when the star was in the equinoctial colure of spring. The last column marks the year when the star was in the solstitial colure, either of winter or summer.

“ For the Ram, the Bull, and the Twins, the winter solstice has been chosen; for the other constellations the summer solstice has been chosen, that the extreme might be avoided of going too remotely into antiquity, or approaching too closely to modern times. Besides, it will be easy to find the opposite solstice, by adding the semi-period of 12,960 years. The same rule applies for finding the time when a star has been or will be at the autumnal equinox.

“ The sign — indicates the years before our era; the sign X the year of our era; and the last line at the end of each sign under the name of ‘ Duration,’ gives the extent of the constellation in degrees, and the

* See the Memoir of Nouet, in the *New Researches on the Ancient History of Volney*, v. iii, p. 328—336.

time that the equinox or the solstice employs in traversing the constellation from one end to the other.

“ Fifty seconds per annum have been taken as the precession, as it is given by a comparison of the catalogue of Hipparchus with modern catalogues. This gave the convenience of round numbers, and an exactness that may be depended on. Thus the entire period is 25,920 years; the half period 12,960 years; the quarter 6,480 years; the twelfth, or a sign, 2,160 years.

“ We must observe that the constellations leave spaces between, and that sometimes they infringe on each other. Thus, between the last star of Scorpio and the first of Sagittarius there is an interval of six degrees and two-thirds; on the contrary, the last of Capricornus is more advanced by fourteen degrees of longitude than the first of Aquarius.

“ Independently of the inequality of the motion of the sun, the constellations would give a very unequal and faulty measurement of the year and months. The signs of thirty degrees afford a more convenient and less defective method. But the signs are only a geometric supposition; we can neither distinguish nor observe them; they are continually changing their places by the retrogradation of the equinoctial point.

“ We have always been able to calculate roughly the equinoxes and solstices; and we have remarked, that the spectacle of the heavens during the night was not any longer exactly the same as it had been anciently at the times of the equinoxes and solstices. We have never been able to observe accurately the heliacal rising of a star; we must be a few days out of the calculation, and thus we often speak without having a positive period from which we could reckon. Before Hipparchus we do not find, either from books or traditions, any thing whence we may calculate, and this has caused a multiplicity of systems. We have disputed without having a knowledge of the subject. Those who are not astronomers may form their own ideas of the science of the Chaldeans, the Egyptians, &c. &c.; no real inconvenience will result. We may assign to these people the intelligence and wisdom of the moderns, but we can borrow nothing from them, for either they had nothing to leave, or have left nothing. Astronomers will never draw from the ancients anything of the smallest utility. Let us then leave to the learned vain conjectures, and confess our positive ignorance of things useless in themselves, and of which there is not a single existing record.

“ The limits of the constellations vary according to the authors that we consult. We see these limits expand or contract where they impress, from Hipparchus to Tycho, from Tycho to Hevelius, from Hevelius to Flamstead, Lacaille, Bradley, or Piazzi.

“ I have said elsewhere, that the constellations were of no use, only that at best they enable us more easily to find out the stars, whilst the stars themselves point out particularly the fixed points whence we may refer the motions of the colures or the planets. Astronomy only began at the period when Hipparchus made the first catalogue of stars, mea-

sured the revolution of the sun, the moon, and their principal inequalities. All the rest is involved in darkness, uncertainty, and gross errors. It would be lost time to endeavour to explain or search into the chaos.

“ Excepting a few particulars, I have said all that I think on the subject. I do not pretend to make converts : it is of little consequence who may or may not adopt my opinions ; but if my arguments be compared with the speculations of Newton, Herschel, Bailly, and many others, it is not impossible that in time these chimeras, more or less brilliant, may not be relished.

“ I have endeavoured to determine the extent of the constellations after the catasterisms of the false Eratosthenes. The thing is really impossible. It would be still worse if Hyginus, and particularly Firmicus, are consulted. I subjoin what I have extracted from Eratosthenes.

Constellations.	Duration.	
Aries	1747 Years	
Taurus	1826	
Gemini	1636	
Cancer	1204	
Leo	2617	
Virgo	3307	
The Talons	1089*
Scorpio	1823	
Sagittarius	2138	
Capricornus ..	1416	
Aquarius	1196	
Pis es	2936	

“ As to the Chaldeans, Egyptians, Chinese, and Indians, we must not think of them. We can, in fact, get nothing from them. My opinion is expressed in the preliminary discourse of my History of the Astronomy of the Middle Age, pp. 17 and 18.

“ See also the note added to the report on the Memoirs of M. de Paravey, vol. viii. of the New Annals of Voyages, and re-published by M. de Paravey in his Summary of his Memoirs on the Origin of the Sphere, pp. 24, and from 31 to 36. See also the Analysis of the Mathematical Labours of the Academy in 1820, pp. 78 and 79.

“ DELAMBRE.”

* Eratosthenes makes only one constellation of Scorpio and the Talons. He makes the commencement of the latter without fixing the end: and, as he gives 1823 years to Scorpio, properly so called, there would remain 1089 years for the Talons, supposing that there was no space between the two constellations.

We should still have to ascertain when they ceased to place the constellation in which the sun entered after the solstice, at the head of the descending signs, and whether that took place immediately that the solstice had retrograded, so as to touch the preceding constellation.

Thus MM. Jollois and Devilliers, to whose unremitting ardour we are indebted for our knowledge of these famous monuments, always taking the division towards the entrance of the vestibule as the solstice, and judging that Virgo must have been the first of the descending constellations, considering that the solstice had not receded at least as far as to the middle of the constellation of Leo; and thinking, moreover, as we have observed, that Leo is divided in the great zodiac of Esne, only make the zodiac as remote as 2610 years before Christ*.

Mr. Hamilton, the first who observed the division of the sign of Leo in the zodiac of Esne, reduced the distance of the period of the solstice there to 1400 years before Christ.

Many other systems on this subject have appeared. Mr. Rhode, for instance, proposed two. The first made the date of the zodiac of the portico at Dendera 591 years before Christ, the second fixes it at 1290 †. M. Latreille assumed the epoch of this zodiac at 670 years before Christ; that of the planisphere at 550; that of the zodiac of the great temple of Esne at 2550; and that of the smaller at 1760.

But there was a vital difficulty in all these dates, which set out on the twofold supposition that the division marks the solstice, and that the position of the solstice marks the epoch of the monument. The unavoidable result is, that the zodiac of Esne must be at least 2000, and perhaps 3000 ‡ years more ancient than that of Dendera, a consequence which evidently destroys the supposition; for no man, with the slightest knowledge of the history of the arts, can believe that two edifices so strikingly similar in their architecture have been built at periods so widely remote from each other.

The feeling of this impossibility, united with the belief that this division of the zodiacs marks a date, give rise to the conjecture, that it was intended to mark the period of the sacred years of the Egyptians, when the monument was constructed. These years only lasting

* See the great work on Egypt. Ant. Mem. vol. i, p. 486.

† Rhode's Essay on the Age of the Zodiac and Origin of Constellations, in German, 1809, p. 78.

‡ According to the tables given above, the solstice remained 3474, or at least 3307 years in the constellation Virgo, which occupies the greatest space in the zodiac; and 2617 in that of Leo.

three hundred and sixty-five days, if the sun, at the commencement of one, was at the commencement of a constellation, he would be six hours backward at the same time in the commencement of the following year, and after one hundred and twenty-one years he would have retrograded to the commencement of the preceding sign.

It seems probable enough that the builders of a temple would have wished to indicate as nearly as possible in what period of the great year, or sothaic year, it was erected, and the indication of the sign which then commenced the sacred year was the best possible means of effecting this. We should thus find that one hundred and twenty or one hundred and fifty years had elapsed between the building of the temple at Esne, and that at Dendera.

But, by this view of the case, it still remained to be determined in which of the great years these erections took place; in that which finished one hundred and thirty-eight years after; or in that which terminated 1322 years before Christ, or in some other.

Visconti, the author of this hypothesis, taking the sacred year, whose commencement corresponded with the sign of Leo, and judging, from the similarity of these signs, that they had been represented at an epoch when the opinions of the Greeks were not unknown in Egypt, could only choose the end of the last great year, or the space that elapsed between the year twelve, and the year one hundred and thirty-eight after Christ *, which seemed to him to agree with the Greek inscription, of which, however, he knew but little, but had heard that it made some mention of one of the Cæsars.

M. Testa, seeking the dates of the monument by another train of reasoning, supposed, that as Virgo is at Esne at the head of the zodiac, it was intended to depict the era of the battle of Actium, as it was established in Egypt, by a decree of the senate, cited by Dion Cassius, and which began in the month of September, or the day on which Augustus took Alexandria †.

M. de Paravey considered these zodiacs in a novel point of view, which embraces at once both the revolution of the equinoxes, and those of the great year. Supposing that the circular planisphere of Dendera must have been placed towards the east, and that the axis from north to south is the line of the solstices, he found the summer solstice at the second of Gemini; that of the winter solstice at the tail of Sagittarius; and the line of the equinoxes would have passed

* Translation of Herodotus, by Larcher, v. ii, p. 570.

† See the dissertation of the Abbé Dominique Testa. "Sopra due Zodiaci novellamente scoperte nell' Egitto." Rome, 1802, p. 34.

through Pisces and Virgo, which would give him the first century of our era for a date.

By this method, the division of the zodiac of the portico could no longer have any relation to the colures, and it would be necessary to seek elsewhere for the mark of the solstice. M. de Paravey, having remarked that between all the signs there were female figures bearing a star on their heads, and going in the same direction; and noticing that the female only who follows Gemini is turned in a contrary direction to the others, judged that she marks the tropic, or *conversion* of the sun, and that this zodiac thus agrees with the planisphere.

By applying the idea of the easting (*orientement*) to the small zodiac of Esne, we should find the solstices between Gemini and Taurus, and between Scorpio and Sagittarius. They would be even marked by the change of direction of Taurus, and by the winged Rams placed across in these two places. In the great zodiac of the same city, the marks would be the position across of the Bull and the reverse situation of Sagittarius. There would then only be one portion of the constellation elapsed between the dates of Esne and those of Dendera; a space, however, still too long for edifices so similar in construction.

The late M. Delambre appeared to confirm these conjectures concerning their more modern construction by an experiment on the circular planisphere, for on placing the stars upon Hipparchus's projection, according to the theory of this astronomer, and the positions which he had assigned them in his catalogue, increasing all the longitudes that thus the solstice would pass through the second of Gemini, he nearly reproduced this planisphere, and he says, "this similarity would have been still more close if he had adopted the longitudes which are laid down in the catalogue of Ptolemæus, for the year of our era one hundred and twenty-three. On the contrary, on referring back twenty-five or twenty-six centuries, the right ascensions and declinations will be greatly changed, and the projections will have taken an entirely different figure *." "All these calculations," adds the great astronomer, "lead us to the conclusion, that the sculptures are subsequent to the epoch of Alexander."

In fact, the circular planisphere having been brought to Paris by MM. Saunier and Lelorrain, M. Biot, in a work † founded on accurate measures, and calculations replete with sagacity, has determined that

* Delambre. Note at the end of the report of the Memoir of M. de Paravey. This report is printed in the new Annals of Voyages, v. viii.

† See M. Biot's work, Researches on many Points of Egyptian Astronomy applied to the astronomical monuments found in Egypt. Paris, 1823, in 8vo.

it represents, according to an exact geometrical projection, the state of the heavens as it was 700 years before Christ; but he is extremely cautious in not coming to any conclusion that it was sculptured at this period.

In fact, all these efforts of genius and knowledge, in so much as they affect the epoch of the monuments, have been rendered superfluous, since terminating where they should naturally have begun (if the first observer had not been blinded by prejudice), pains have been taken to copy and restore the Greek inscriptions engraved on these monuments; and particularly since M. Champollion has attained the art of deciphering those expressed in hieroglyphics.

It is now certain, and the Greek inscriptions agree with the hieroglyphics in proving, that the temple in which the zodiacs have been ensculptured were built whilst the country was under the dominion of Rome. The portico of the temple of Dendera, according to the Greek inscription on its entablature, was dedicated to the health of Tiberius*.

On the planisphere of the same temple we read the title of *Autocrator* in hieroglyphic characters †; and it is probable that it refers to Nero. The small temple of Esne, the origin of which is placed at latest between 2700 or 3000 years before Christ, has a column engraven and painted in the tenth year of Antoninus, one hundred and forty-seven years after Christ, and sculptured and painted in the same style as the zodiac which is near it ‡.

Besides, we have a proof that this division of the zodiac in such or such a sign has no reference to the precession of the equinoxes, nor to the displacing of the solstice. A mummy case lately brought from Thebes by M. Caillaud (and containing, according to a very legible Greek inscription, the body of a young man who died in the nineteenth year of Trajan, one hundred and sixteen years after Christ) §, has on it a zodiac divided at the same point as those of Dendera ||; and, according to all appearances, this division marks some astrological scheme relative to this individual; a conclusion which may probably be applied to the division of the zodiacs of the temples. It either denotes the astrological theme of the moment of their erection; that of the prince for whose safety they were devoted; or some similar

* Letronne. *Researches into the History of Egypt, during the dominion of the Greeks and Romans*, p. 180.

† Letronne. *Researches*, p. 38.

‡ Letronne. *Researches*, pp. 456, 457.

§ Letronne. *Observations, critical and archæological, on the Zodiacal Remains of Antiquity, occasioned by an Ægyptian Zodiac, painted in a mummy case, bearing a Greek inscription of the time of Trajan*. Paris, 1824, in 8vo. p. 30.

|| Letronne, pp. 48, 49.

epoch relative to which the position of the sun would have appeared of some particular importance to be noted.

Thus have for ever dissipated the conclusions that have been drawn from some incorrectly explained monuments against the newness of the continents and nations, and we might have dispensed with so much detail on this point, if they were not so recently broached, and had they not made sufficient impression to preserve their influence on the opinions of many persons.

The Zodiac is far from bearing in itself an assured and very remote Date.

But there are writers who have asserted that the zodiac bears in itself the date of its invention, inasmuch as the names and the figures given to its constellations are an index to the position of the colures at the time of its invention; and this date, according to many, is so evident, and so remote, that it becomes a matter of indifference whether the representations which we possess of this circle are more or less ancient.

They pay no attention to the fact of this sort of argument involving in itself three suppositions equally uncertain:—the country in which they admit that the zodiac was invented; the meaning which is supposed to have been given to the constellations which occupy it; and the position in which the colures were, relatively to each constellation, when this meaning was given to it.

By the explanation given to other allegories, or as these allegories are allowed to have relation to the constellation of which the sun occupied the first degrees, or to that of which it occupied the middle, or to that which it was on the point of entering; that is to say, of which it occupied the last degrees, or finally to that which was opposite to it, and which rose in the evening; or, according as the invention of these allegories was assigned to another climate, so must we change the date of the zodiac. The possible variations in this respect may include as much as half of the revolution of the fixed stars, that is, 13,000 years, and even more.

Thus Pluche, generalizing some indications of the ancients, has thought that Aries announces the beginning of the sun's elevation and the vernal equinox; that Cancer announces his retrogradation to the summer solstice; that Libra, the emblem of the equality, marks the autumnal equinox*; and that Capricornus, a climbing animal, denotes

* Varro de Ling. Lat. lib. vi. Signa quod aliquid significant, at Libra æquinoctium, Mabroc. Sat. lib. I, c. cxxi. Capricornus ab infernis partibus ad superas solem reducens Capræ naturam videtur imitari.

the winter solstice; after which, the sun returns to us. In this manner, by placing the inventors of the zodiac in a temperate climate, we should have rains under Aquarius; the birth of lambs and kids under Gemini; violent heats under Leo; harvests under the Virgin; hunting under Sagittarius, &c.; and these emblems are perfectly appropriate. By placing the colures at the commencement of the constellations, or, at least, the equinox at the first stars of Aries, we should only arrive in the first instance at 389 years before Christ, an epoch evidently too modern, and which would render it necessary to refer to an entire equinoctial period, or 26,000 years. But if it be supposed that the equinox passed through the middle of the constellation, we should reach nearly 1000 or 1200 years more remote, to 1600 or 1700 years before Christ; and this is the epoch which many celebrated men thought have really to be that of the invention of the zodiac, the honour of which, on very slight grounds, they have assigned to Chiron.

But Dupuis, who needed, for the origin which he pretended to attribute to all religions, that astronomy, and particularly the figures of the zodiac, should in some sort have preceded all other human institutions, has sought another climate, to find other explanations for the emblems, and to deduce for them another epoch. If, taking Libra always as the equinoctial sign, but suppressing it at the vernal equinox, it be asserted that the zodiac was invented in Egypt, we shall find other proofs equally plausible for the climate of this country*. Capricornus, or the animal with a fish's tail, will mark the commencement of the elevation of the Nile at the summer solstice; Aquarius and Pisces the increase and decrease of the inundation; Taurus the period of labour; Virgo, the gathering in of the harvest; and they will mark them at the precise seasons when these operations actually did take place. According to this hypothesis, the zodiac would have 15,000 † years for a sun supposed at the first degree of each sign; more than 16,000 for the middle; and only 4,000, in supposing that the emblem was given to the sign, opposite to which the sun was ‡. Dupuis has attached himself to 15,000 years, and on this date has founded the whole system of his celebrated work.

There were not wanting, however, persons who, admitting that the zodiac was invented in Egypt, have imagined allegories applicable to

* See the Memoir on the Origin of the Constellations, in Dupuis' *Origin of Worship*, vol. iii, pp. 324, et seq.

† See the Memoir referred to in the note above, vol. iii, p. 267.

‡ Dupuis himself suggested this second hypothesis, *ibid.* page 340.

subsequent periods. Thus, according to Mr. Hamilton, Virgo would represent the land of Egypt when it is not fertilized by the inundation; the Leo, the season when this land is most infested by wild beasts, &c.*

The remote antiquity of 15,000 years would besides involve this absurd consequence, that the Egyptians, men who represented every thing by emblems, and who attached a vast importance to the conformity of these emblems with the ideas which they intended to portray, must have preserved the signs of the zodiac for thousands of years after they had ceased in any manner to correspond with the original signification.

The late Remi Raige endeavoured to support Dupuis' opinion by an entirely novel argument †. Having observed that we may find, in explaining the Egyptian days of the month by the oriental languages, meanings more or less analogous to the figures of the zodiacal signs, and finding from Ptolemæus that *epifi*, which signifies Capricornus, begins on the twentieth of June, and consequently immediately follows the summer solstice; he draws the conclusion, that at the beginning Capricornus himself was at the summer solstice, and thus of the other signs, as Dupuis had done before him.

But, independently of all conjecture of these etymologies, Raige did not observe that it was merely chance, that five years after the battle of Actium, in the year 25 before Christ, at the establishing of the fixed Alexandrian year, the first day of Thoth was found to correspond with the twenty-ninth of August of the Julian year, and continued ever since to correspond. It is only from this epoch that the Egyptian months began from fixed days of the Julian year, at Alexandria only; and Ptolemæus himself did not discontinue to employ in his *Almagest* the ancient Egyptian year, with its indefinite months ‡.

Why may not, at some epoch, the names of the signs have been given to the months, or the names of the months to the signs, in as arbitrary a manner as the Indians have given to their twenty-seven

* *Ægyptiaca*, page 215.

† See the great work on Egypt. Ant. Mem. v. 1, the Memoir of M. Remi Raige, on the 'Nominal and Primitive Zodiac of the Ancient Egyptians.' See also the table of the Greek, Roman, and Alexandrian months, in the Ptolemæus of Halma, vol. iii.

‡ See 'Ideler's Researches on the Astronomical Observations of the Ancients,' a translation of which has been inserted by M. Halma, in the third volume of his Ptolemæus; and particularly the Memoir of Freret on the opinion of Lanauze, relative to the establishing of the Alexandrian year, in the Memoir of the Academy of Belles Lettres, vol. xvi. p. 308.

months twelve names, chosen from amongst those of their lunar houses, for reasons now impossible to ascertain or account for* †

The absurdity of preserving for fifteen thousand years, in the constellations, the figures and symbolic names which no longer bore any relation to their respective situations, would have been much more evident if it had been carried so far as to preserve to the months those same names which were incessantly in the mouths of the people, and the irrelevancy of which would be perceptible at every instant.

What then would become of all those other systems, if the figures and names of the zodiacal constellations had been given to them, without at all relating to the course of the sun, as their inequality, the extent of many of them beyond the zodiac, and their manifest connexion with neighbouring constellations, seem to demonstrate ‡?

What would be the consequence, if, as Macrobius distinctly says †, “each sign should be considered as an emblem of the sun, considered in some one of his effects or general phenomena, and without any reference to the months through which he passes, either into the sign or into its opposite?”

Finally, how would it be if names had been given in an abstract manner to the divisions of space or time, as they are now assigned by astronomers to what they call the signs, and had not been applied to the constellations or groups of stars but at an epoch determined by chance, so that we could conclude nothing farther from their signification §?

Here are, doubtless, sufficient arguments to deter an ingenuous mind from seeking into astronomy for proofs of the antiquity of nations; but, even if these pretended proofs were as certain as they are vague and destitute of convincing results, what conclusion could we thence draw against the great catastrophe of which we have so many other indisputable demonstrations? We can only allow that, as some modern writers have said, astronomy was amongst the sciences preserved by those persons whom this catastrophe spared.

* See Sir William Jones's Memoir on the Antiquity of the Indian Zodiac, Mem. de Calcutta, vol. ii.

† See the Zodiac explained, or Researches on the Origin and Signification of the Constellations of the Greek Sphere, translated from the Swedish by M. Swartz, Paris, 1809.

‡ Saturnal. l. 1, c. 21, sub fin. *Nec solus Leo, sed signa quoque universa Zodiaci ad naturam solis jure referuntur, &c.* It is only in this explanation of Leo and Capricornus that he has recourse to any phenomena relative to the seasons; Cancer even is explained under a general point of view, and with relation to the obliquity of the progress of the sun.

§ See M. de Guignes' Memoir on the Zodiacs of the Eastern Nations, Academie des Belles Lettres, vol. xlvii.

Exaggerations with respect to certain Operations in Mines.

The antiquity of certain mining operations has been greatly exaggerated. A modern author asserts, that the mines of the island of Elba, judging from the heaps of rubbish excavated from them, must have been worked for more than forty thousand years; but another author, who has also examined these rubbish heaps with care, reduces this period to rather more than five thousand years *, and then, in supposing that the ancients only excavated annually but a quarter of the quantity now extracted. But why should we believe that the Romans, who consumed so much iron in their military arrangements, should draw so little from these mines? Besides, if these mines had been worked for four thousand years only, how should iron have been known in days of such remote antiquity?

General Conclusion concerning the Epoch of the last Revolution.

I concur, then, with the opinion of MM. Deluc and Dolomieu, that if there be anything determined in geology, it is, that the surface of our globe has been subjected to a vast and sudden revolution, not further back than from five to six thousand years: that this revolution has buried and caused to disappear the countries formerly inhabited by man, and the species of animals now most known; that contrariwise it has left the bottom of the former sea dry, and has formed on it the countries now inhabited: that since the revolution, those few individuals whom it spared have been spread and propagated over the lands newly left dry, and consequently it is only since this epoch that our societies have assumed a progressive march, have formed establishments, raised monuments, collected natural facts, and combined scientific systems.

But the countries now inhabited, and which the last revolution left dry, had been before inhabited, if not by mankind, at least by land animals; consequently one preceding revolution, at least, had overwhelmed them with water; and, if we may judge by the different orders of animals whose remains we find therein, they had, perhaps, undergone two or three irruptions of the sea.

Ideas of Researches to be still further made in Geology.

These are the alternatives which now appear to me to form the most important geologic problem which requires solving, or rather, properly defining, or accurately limiting; for, to solve it entirely, it would be

* See M. de Fortia d'Urban's History of China before the Deluge of Ogyges, p. 33,

requisite to discover the cause of these events, an undertaking of a very different nature.

I repeat, we see very clearly what is passing on the surface of the continents in their present state; we have very fairly ascertained the uniform march and regular succession of the primitive formations, but the study of secondary formations has scarcely yet commenced; that wonderful series of unknown zoophytes, and marine mollusca, followed by reptiles and fresh-water fish equally unknown, and these in their turn replaced by zoophytes and mollusca more akin to those of the present day; those land animals and mollusca, and other fresh-water animals, also unknown, which next occupy the places, to be again displaced, but by mollusca and other animals similar to those of our own seas; the relations of these various beings with the plants, whose remains accompany theirs; the relations of these two kingdoms with the mineral layers which contain them; the more or less their uniformity with one another in different basins; all these are a series of phenomena which appears to me to call imperiously for the profound attention of philosophers.

Made interesting by the variety of the productions of the partial or universal revolutions of this epoch, and by the abundance of the various species which alternately figure on the stage, this study is divested of the dryness of that of the primordial formations, and does not, like it, plunge itself into hypotheses. The facts are so close, so curious, and so evident, that they suffice, in a measure, for the most ardent imagination; and the conclusions which they arrive at from time to time, however scrupulous the observer may be, not having anything indefinite, at the same time have nothing arbitrary. Finally, it is in the events which are nearer to our own times that we can hope to find any traces of the more ancient events and their causes, if it be indeed allowed, after so many trials, to flatter ourselves with such a hope.

These ideas have beset, I may say, have tormented me, whilst I have been engaged in making researches amongst fossil bones, the results of which I have lately made public; researches which only comprise so small a portion of these phenomena of the last age but one of the earth, and which, notwithstanding, are united to all the others, in an intimate manner. It was nearly impossible that the desire of studying the generality of these phenomena should not arise, at least, in a limited space around us. My excellent friend, M. Brongniart, in whom other studies had excited similar desires, desired me to associate with him, and thus we have laid the first foundations of our researches in the vicinity of Paris; but this work, although it bears my name, is nearly

all that of my friend, from the infinite pains he has bestowed from the commencement of our plan, and, since our journies, on the profound investigation of the objects, and in classifying the whole. I have, by consent of M. Brongniart, placed it in the second part of my *Researches*, in that in which I have treated of the fossil remains of our neighbourhood. Although relating, apparently, to a limited country, it affords numerous results applicable to geology generally, and in this light may be considered as an integral part of the present Discourse, at the same time that it is most assuredly one of the finest ornaments of my work*.

We have there the history of the most recent changes that have taken place in a particular basin, and it leads us to the chalk formation, whose extent over the globe is infinitely greater than that of the materials of the basin of Paris. The chalk, which has been considered as modern, is thus found to have a remote origin in the ages which preceded the last catastrophe. It forms a kind of boundary between the most recent formations, those to which the name of *Tertiary* may be applied; and the formations which are called *Secondary*, those which were deposited before the chalk, but after the primitive formations, and those termed Transition.

The recent observations of many geologists who have followed up our views, such as MM. Buckland, Webster, Constant-Prevost, and those of M. Brongniart himself, have proved that these formations, posterior to the chalk, have been reproduced in many other basins besides that of Paris, although with some variations; so that it has been possible to constitute an order of succession, many of the stages of which extend to nearly all countries that have been examined.

Recapitulation of the Observations on the Succession of Formations.

The most superficial strata, those deposits of mud and clayey sand mixed with round flints transported from distant countries, and filled with fossil remains of land animals for the most part unknown, or at least foreign to the country, seem principally to have covered all the plains, filled the bottoms of all caverns, choked up all the clefts of rocks which have been in their way. Described with great care by M. Buckland, under the name of *diluvium*, and very different from other beds consisting of matter deposited incessantly by torrents and rivers, which contain only relics of the animals of the country, and which M. Buckland distinguishes by the name of *alluvium*; they form

* Separate copies have been printed, entitled "Description Geologique des Environs de Paris," par MM. G. Cuvier and Al. Brongniart, second edition, Paris, 1822, in 4to.

at present, in the eyes of all geologists, the most evident proof of the immense inundation which was the last catastrophe of this globe*.

Between this diluvium and the chalk are formations alternately filled with the productions of fresh water and salt water, which mark the irruptions and retreats of the sea, to which, since the deposition of the chalk layer, this portion of the globe has been subjected; first, marls and mill-stones and hollow silex, filled with fresh-water shells, like those of our marshes and pools; under them are marls, sand-stones, and limestone, all the shells of which are marine; oysters, &c.

Still deeper are fresh-water formations of a much more remote period, and particularly those famous gypsum deposites in the vicinity of Paris, which have afforded the means of adorning the edifices of this fine city with so much facility, and where we have discovered entire genera of land animals, of which no traces have been elsewhere detected.

They rest on those equally remarkable beds of limestone, of which our capital is built, and in the more or less close composition of which the patience and sagacity of the savans of France have already detected more than eight hundred species of shells, all marine, but the great part unknown in the seas now existing. They also contain bones of fishes, of cetaceous and other marine mammiferous animals.

Under the marine limestone is another fresh-water deposite, formed of clay, in which are interposed great layers of lignite (brown coal), or that fossil coal of more recent origin than the common coal. Amongst the shells, always of fresh water, there are also some bones; but it is remarkable that they are bones of reptiles, and not of mammifera. It is filled with crocodiles and tortoises, but the genera of extinct mammifera, which are deposited in the gypsum, are not there to be found. They did not as yet exist in that country when these clays and lignites were formed.

This fresh-water formation, the most ancient that has been with certainty detected in our neighbourhood, and which supports all the formations which we have just enumerated, is itself supported and environed entirely by chalk; a formation, vast from its thickness and by its extent, which shows itself in very distant countries, such as Pomerania, and Poland; but which, in our environs, pervades with a sort of continuity Berri, Champagne, Picardy, Upper Normandy, and a part of England, and also forms a great circle, or rather basin, in which

* See Professor Buckland's great work, called 'Reliquiæ Diluvianæ,' London, 1823, in 4to. pp. 185, et seq.; and the article 'EAU' by M. Brongniart, in the 14th volume of the Dictionary of Natural Sciences.

the formations of which we have been speaking are contained, but the borders of which they also cover in those places where they were less elevated.

In fact, it is not in our basin alone that these kinds of formations are deposited. In other countries, where the surface of the chalk offered similar cavities; in those even where there was no chalk, and where the most ancient formations alone offered themselves as supporters, circumstances often brought deposits more or less like our own, and containing similar organic bodies.

Our fresh-water shell formations of the second stage have been found in England, Spain, and even to the confines of Poland.

The marine shells placed between them have been discovered along the whole chain of the Appenines.

Some of the quadrupeds of our gypsum deposits, the palæotheria, for instance, have also left some of the remains in the gypseous formations of Velai, and in the molasse quarries of the south of France.

Thus the partial revolutions which took place in our environs, between the epoch of the chalk and that of the general deluge, and during which the sea was thrown upon our districts or retired from them, occurred also in a multitude of other countries. The globe underwent a long series of variations and changes, probably very rapid, since the deposits they have left nowhere show much thickness or solidity. The chalk was produced by a sea more tranquil and uninterrupted; it contains only marine productions, amongst which there are, however, *some* vertebrated animals of most peculiar kinds; but the *whole* class of reptiles and fishes, great tortoises, enormous lizards, and similar animals.

The formations previous to the chalk, and in the hollow of which it is deposited, as the layers of our neighbourhood are, form a great part of Germany and England; and the efforts recently made by the learned of these two countries, similar to ours, and by employing the same principles, united to those which had been previously tried by the school of Werner, will soon leave nothing to be desired in addition to our knowledge of them. MM. Humboldt and de Bonnard in France and Germany, Messrs. Buckland and Conybeare in England, have given us the most perfect and complete tables of them.

The table annexed, which was kindly drawn out for me by M. de Humboldt, to adorn my work, not only has the secondary formations, but the whole series of strata arranged from the most ancient that are known, to the most recent and superficial. It is in a manner the summary of the labours of all geologists.

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