GOULD CHARLES

MYTHICAL MONSTERS

Charles Gould

Mythical Monsters

Gould C.

Mythical Monsters / C. Gould — «Public Domain»,

Содержание

Charles Gould
Mythical Monsters

THE FUNG WANG.
ACCORDING TO
FANG HENG.

PREFACE

The Author has to express his great obligations to many gentlemen who have assisted him in the preparation of this volume, either by affording access to their libraries, or by furnishing or revising translations from the Chinese, &c.; and he must especially tender them to J. Haas, Esq., the Austro-Hungarian Vice-Consul at Shanghai, to Mr. Thomas Kingsmill and the Rev. W. Holt of Shanghai, to Mr. Falconer of Hong-Kong, and to Dr. N. B. Dennys of Singapore.

For the sake of uniformity, the author has endeavoured to reduce all the romanised representations of Chinese sounds to the system adopted by S. W. Williams, whose invaluable dictionary is the most available one for students. No alteration, however, has been made when quotations from eminent sinologues like Legge have been inserted.

Should the present volume prove sufficiently interesting to attract readers, a second one will be issued at a future date, in continuation of the subject.

June, 1884.

NOTE BY THE PUBLISHERS

The Publishers think it right to state that, owing to the Author's absence in China, the work has not had the advantage of his supervision in its passage through the press. It is also proper to mention that the MS. left the Author's hands eighteen months ago.

13, Waterloo Place. S.W.

January, 1886.

INTRODUCTION

It would have been a bold step indeed for anyone, some thirty years ago, to have thought of treating the public to a collection of stories ordinarily reputed fabulous, and of claiming for them the consideration due to genuine realities, or to have advocated tales, time-honoured as fictions, as actual facts; and those of the nursery as being, in many instances, legends, more or less distorted, descriptive of real beings or events.

Now-a-days it is a less hazardous proceeding. The great era of advanced opinion, initiated by Darwin, which has seen, in the course of a few years, a larger progress in knowledge in all departments of science than decades of centuries preceding it, has, among other changes, worked a complete revolution in the estimation of the value of folk-lore; and speculations on it, which in the days of our boyhood would have been considered as puerile, are now admitted to be not merely interesting but necessary to those who endeavour to gather up the skeins of unwritten history, and to trace the antecedents and early migrations from parent sources of nations long since alienated from each other by customs, speech, and space.

I have, therefore, but little hesitation in gravely proposing to submit that many of the so-called mythical animals, which throughout long ages and in all nations have been the fertile subjects of fiction and fable, come legitimately within the scope of plain matter-of-fact Natural History, and that they may be considered, not as the outcome of exuberant fancy, but as creatures which really once existed, and of which, unfortunately, only imperfect and inaccurate descriptions have filtered down to us, probably very much refracted, through the mists of time.

I propose to follow, for a certain distance only, the path which has been pursued in the treatment of myths by mythologists, so far only, in fact, as may be necessary to trace out the homes and origin of those stories which in their later dress are incredible; deviating from it to dwell upon the possibility of their having preserved to us, through the medium of unwritten Natural History, traditions of creatures once co-existing with man, some of which are so weird and terrible as to appear at first sight to be impossible. I propose stripping them of those supernatural characters with which a mysteriously implanted love of the wonderful has invested them, and to examine them, as at the present day we are fortunately able to do, by the lights of the modern sciences of Geology, Evolution, and Philology.

For me the major part of these creatures are not chimeras but objects of rational study. The dragon, in place of being a creature evolved out of the imagination of Aryan man by the contemplation of lightning flashing through the caverns which he tenanted, as is held by some mythologists, is an animal which once lived and dragged its ponderous coils, and perhaps flew; which devastated herds, and on occasions swallowed their shepherd; which, establishing its lair in some cavern overlooking the fertile plain, spread terror and destruction around, and, protected from assault by dread or superstitious feeling, may even have been subsidised by the terror-stricken peasantry, who, failing the power to destroy it, may have preferred tethering offerings of cattle adjacent to its cavern to having it come down to seek supplies from amongst their midst.[1]

To me the specific existence of the unicorn seems not incredible, and, in fact, more probable than that theory which assigns its origin to a lunar myth.[2]

---

[1] This tributary offering is a common feature in dragon legends. A good example is that given by El Edrisi in his history of the dragon destroyed by Alexander the Great in the island of Mostachin (one of the Canaries?).

[2] The latest writer on this point summarizes his views, in his opening remarks, as follows: – "The science of heraldry has faithfully preserved to modern times various phases of some of those remarkable legends which, based upon a study of natural phenomena, exhibit the process whereby the greater part of mythology has come into existence. Thus we find the solar gryphon, the solar phœnix, a demi-eagle displayed issuing from flames of fire; the solar lion and the lunar unicorn, which two latter noble creatures now harmoniously support the royal arms. I propose in the following pages to examine the myth of the unicorn, the wild, white, fierce, chaste, moon, whose two horns, unlike those of mortal creatures, are indissolubly twisted into one; the creature that endlessly fights with the lion

Again, believing as I do in the existence of some great undescribed inhabitant of the ocean depths, the much-derided sea-serpent, whose home seems especially to be adjacent to Norway, I recognise this monster as originating the myths of the midgard serpent which the Norse Elder Eddas have collected, this being the contrary view to that taken by mythologists, who invert the derivation, and suppose the stories current among the Norwegian fishermen to be modified versions of this important element of Norse mythology.[3]

I must admit that, for my part, I doubt the general derivation of myths from "the contemplation of the visible workings of external nature."[4] It seems to me easier to suppose that the palsy of time has enfeebled the utterance of these oft-told tales until their original appearance is almost unrecognisable, than that uncultured savages should possess powers of imagination and poetical invention far beyond those enjoyed by the most instructed nations of the present day; less hard to believe that these wonderful stories of gods and demigods, of giants and dwarfs, of dragons and monsters of all descriptions, are transformations than to believe them to be inventions.[5]

The author of *Atlantis*,[6] indeed, claims that the gods and goddesses of the ancient Greeks, the Phœnicians, the Hindoos, and the Scandinavians were simply the kings, queens, and heroes of Atlantis, and the acts attributed to them in mythology a confused recollection of real historical events. Without conceding the *locus* of the originals, which requires much greater examination than I am able to make at the present time, I quite agree with him as to the principle. I believe that the mythological deities represent a confused chronology of far-distant times, and that the destruction of the Nemean lion, the Lernean hydra, and the Minotaur are simply the records of acts of unusual bravery in combating ferocious animals.

On the first landing of Pizarro the Mexicans entertained the opinion that man and horse were parts of one strange animal,[7] and we have thus a clue to the explanation of the origin of the belief in centaurs from a distant view of horsemen, a view possibly followed by the immediate flight of the observer, which rendered a solution of the extraordinary phenomenon impossible.

On the Credibility of Remarkable Stories

Ferdinand Mendez Pinto quaintly observes, in one of his earlier chapters, "I will not speak of the Palace Royal, because I saw it but on the outside, howbeit the Chinese tell such wonders of it as would amaze a man; for it is my intent to relate nothing save what we beheld here with our own eyes, and that was so much as that I am afraid to write it; not that it would seem strange to those who

---

to gain the crown or summit of heaven, which neither may retain, and whose brilliant horn drives away the darkness and evil of the night even as we find in the myth, that Venym is defended by the horn of the unicorn." —*The Unicorn; a Mythological Investigation.* Robert Brown, jun., F.S.A. London, 1881.

[3] "The midgard or world-serpent we have already become tolerably well acquainted with, and recognise in him the wild tumultuous sea. Thor contended with him; he got him on his hook, but did not succeed in killing him. We also remember how Thor tried to lift him in the form of a cat. The North abounds in stories about the sea-serpent, which are nothing but variations of the original myths of the Eddas. Odin cast him into the sea, where he shall remain until he is conquered by Thor in Ragnarok." —*Norse Mythology*, p. 387. R. B. Anderson, Chicago, 1879.

[4] *Vide* Anderson.

[5] Just as even the greatest masters of fiction adapt but do not originate. Harold Skimpole and Wilkins Micawber sat unconsciously for their portraits in real life, and the most charming characters and fertile plots produced by that most prolific of all writers, A. Dumas, are mere elaborations of people and incidents with which historical memoirs provided him.

[6] *Atlantis; the Antediluvian World.* J. Donelly, New York, 1882. The author has amassed, with untiring labour, a large amount of evidence to prove that the island of Atlantis, in place of being a myth or fable of Plato, really once existed; was the source of all modern arts and civilization; and was destroyed in a catastrophe which he identifies with the Biblical Deluge.

[7] So also, Father Stanislaus Arlet, of the Society of Jesus, writing to the General of the Society in 1698 respecting a new Mission in Peru, and speaking of a Peruvian tribe calling themselves Canisian, says: "Having never before seen horses, or men resembling us in colour and dress, the astonishment they showed at our first appearance among them was a very pleasing spectacle to us, the sight of us terrifying them to such a degree that the bows and arrows fell from their hand; imagining, as they afterwards owned, that the man, his hat, his clothes, and the horse he rode upon, composed but one animal."

have seen and read the marvels of the kingdom of China, but because I doubt that they which would compare those wondrous things that are in the countries they have not seen, with that little they have seen in their own, will make some question of it, or, it may be, give no credit at all to these truths, because they are not conformable to their understanding and small experience."[8]

Now as some of the creatures whose existence I shall have to contend for in these volumes are objects of derision to a large proportion of mankind, and of reasonable doubt to another, I cannot help fortifying myself with some such outwork of reasoning as the pith of Pinto's remarks affords, and supplementing it by adding that, while the balance between scepticism and credulity is undoubtedly always difficult to hold, yet, as Lord Bacon well remarks, "There is nothing makes a man suspect much more than to know little; and therefore men should remedy suspicion by procuring to know more."

Whately extends Bacon's proposition by adding, "This is equally true of the suspicions that have reference to things as persons"; in other words, ignorance and suspicion go hand-in-hand, and so travellers' tales, even when supported by good evidence, are mostly denied credence or accepted with repugnance, when they offend the experience of those who, remaining at home, are thus only partially educated. Hence it is, not to go too far back for examples, that we have seen Bruce, Mungo Park, Du Chaillu, Gordon Cumming, Schliemann,[9] and Stanley treated with the most ungenerous criticism and contemptuous disbelief by persons who, however well informed in many subjects, lacked the extended and appreciative views which can only be acquired by travel.

Nor is this incredulity limited to travellers' tales about savage life. It is just as often displayed in reference to the surroundings of uneventful life, provided they are different from those with which we are familiar.

Saladin rebuked the Knight of the Leopard for falsehood when the latter assured him that the waters of lakes in his own country became at times solidified, so that armed and mounted knights could cross them as if on dry land. And the wise Indian who was taken down to see the large American cities, with the expectation that, being convinced of the resources and irresistible power of civilization he would influence his tribe to submission on his return, to the surprise of the commissioners who had conveyed him, spoke in directly contrary terms to those expected of him, privately explaining in reply to their remonstrances, that had he told the truth to his tribe he would have been indelibly branded for the remainder of his life as an outrageous and contemptible liar. Chinese students,

---

[8] *The Voyages and Adventures of Ferdinand Mendez Pinto*, done into English by H. C. Gent, London, 1653, p. 109. The vindication of Pinto's reputation for veracity will doubtless one day be, to a great extent, effected, for although his interesting narrative is undoubtedly embroidered with a rich tissue of falsity, due apparently to an exaggerated credulity upon his part, and systematic deception upon that of his Chinese informants, he certainly is undeserving of the wholesale condemnation of which Congreve was the reflex when he made Foresight, addressing Sir Sampson Legend, say: "Thou modern Mandeville, Ferdinand Mendez Pinto was but a type of thee, thou liar of the first magnitude." —*Love for Love*, Act. 2, Scene 1. There are many points in his narrative which are corroborated by history and the accounts of other voyages; and it must be remembered that, although the major part of the names of places and persons which he gives are now unrecognisable, yet this may be due to alterations from the lapse of time, and from the difficulty of recognising the true original Chinese or Japanese word under those produced by the foreign mode of transliteration in vogue in those days. Thus the Port Liampoo of Pinto is now and has been for many years past only known as Ningpo, the first name being a term of convenience, used by the early Portuguese voyagers, and long since abandoned. Just as the wonderful Quinsay of Marco Polo (still known by that name in Pinto's time) has been only successfully identified (with Hangchow-fu) through the antiquarian research of Colonel Yule. So also the titles of Chaems, Tutons, Chumbins, Aytons, Anchacy's, which Pinto refers to (p. 108), are only with difficulty recognisable in those respectively of Tsi'ang (a Manchu governor), Tu-tung (Lieutenant-General), Tsung-ping (Brigadier-General), Tao-tai [??] (Intendant of Circuit) and Ngan-ch'a She-sze (Provincial Judge), as rendered by the modern sinologue Mayers in his Essay on the Chinese Government, Shanghai, 1878. The incidental references to the country, people, habits, and products, contained in the chapter describing his passage in captivity from Nanquin to Pequin are true to nature, and the apparently obviously untruthful statement which he makes of the employment by the King of Tartary of thousands of rhinoceri both as beasts of burthen and articles of food (p. 158) is explicable, I think, on the supposition that some confusion has arisen, either in translation or transcription, between rhinoceros and camel. Anyone who has seen the long strings of camels wending their way to Pekin from the various northern roads through the passes into Mongolia, would readily believe that a large transport corps of them could easily be amassed by a despotic monarch; while the vast numbers of troops to which Pinto makes reference are confirmed by more or less authentic histories.

[9] "I was myself an eye-witness of two such discoveries and helped to gather the articles together. The slanderers have long since been silenced, who were not ashamed to charge the discoverer with an imposture." – Prof. Virchow, in Appendix I. to Schliemann's *Ilios*. Murray, 1880.

despatched for education in American or European capitals, are compelled on their return to make similar reservations, under pain of incurring a like penalty; and officials who, from contact with Europeans at the open ports, get their ideas expanded too quickly, are said to be liable to isolation in distant regions, where their advanced and fantastic opinions may do as little harm to right-thinking people as possible.[10]

Even scientific men are sometimes as crassly incredulous as the uncultured masses. On this point hear Mr. A. R. Wallace.[11] "Many now living remember the time (for it is little more than twenty years ago) when the antiquity of man, as now understood, was universally discredited. Not only theologians, but even geologists taught us that man belonged to the existing state of things; that the extinct animals of the tertiary period had finally disappeared, and that the earth's surface had assumed its present condition before the human race first came into existence. So prepossessed were scientific men with this idea, which yet rested on purely negative evidence, and could not be supported by any argument of scientific value, that numerous facts which had been presented at intervals for half a century, all tending to prove the existence of man at very remote epochs, were silently ignored, and, more than this, the detailed statements of three distinct and careful observers confirming each other were rejected by a great scientific society as too improbable for publication, only because they proved (if they were true) the co-existence of man with extinct animals."[12]

The travels of that faithful historian, Marco Polo, were for a long time considered as fables, and the graphic descriptions of the Abbé Huc even still find detractors continuing the *rôle* of those who maintained that he had never even visited the countries which he described.

Gordon Cumming was disbelieved when he asserted that he had killed an antelope, out of a herd, with a rifle-shot at a distance of eight hundred yards.

Madame Merian[13] was accused of deliberate falsehood in reference to her description of a bird-eating spider nearly two hundred years ago. But now-a-days Mr. Bates and other reliable observers have confirmed it in regard to South America, India, and elsewhere.

Audubon was similarly accused by botanists of having invented the yellow water-lily, which he figured in his *Birds of the South* under the name of Nymphæa lutea, and after having lain under the imputation for years, was confirmed at last by the discovery of the long-lost flower, in Florida, by Mrs. Mary Trent, in the summer of 1876;[14] and this encourages us to hope that some day or other a fortunate sportsman may rediscover the Haliætus Washingtonii, in regard to which Dr. Cover says: "That famous bird of Washington was a myth; either Audubon was mistaken, or else, as some do not hesitate to affirm, he lied about it."

---

[10] "But ask them to credit an electric telegram, to understand a steam-engine, to acknowledge the microscopic revelations spread out before their eyes, to put faith in the Atlantic cable or the East India House, and they will tell you that you are a barbarian with blue eyes, a fan kwai, and a sayer of that which is not. The dragon and the phœnix are true, but the rotifer and the message, the sixty miles an hour, the cable, and the captive kings are false." —*Household Words*, October 30th, 1855.

[11] Address delivered to the Biological Section of the British Association. Glasgow, 1876.

[12] In 1854 a communication from the Torquay Natural History Society, confirming previous accounts by Mr. Goodwin Austen, Mr. Vivian, and the Rev. Mr. McEnery, "that worked flints occurred in Kents Hole with remains of extinct species," was rejected as too improbable for publication.

[13] "She is set down a thorough heretic, not at all to be believed, a manufacturer of unsound natural history, an inventor of false facts in science." – Gosse, *Romance of Nat. Hist.*, 2nd Series, p. 227.

[14] *Pop. Sci. Monthly*, No. 60, April 1877.

Fig. 1. – Fisherman attacked by Octopus.
(*Facsimile from a drawing by Hokusai, a celebrated Japanese artistwho lived about the beginning of the present century.*)

Victor Hugo was ridiculed for having exceeded the bounds of poetic license when he produced his marvellous word-painting of the devil-fish, and described a man as becoming its helpless victim. The thing was derided as a monstrous impossibility; yet within a few years were discovered, on the shores of Newfoundland, cuttle-fishes with arms extending to thirty feet in length, and capable of dragging a good-sized boat beneath the surface; and their action has been reproduced for centuries past, as the representation of a well-known fact, in *net sukes* (ivory carvings) and illustrations by Japanese artists.[15]

Before the days of Darwinism, what courage was requisite in a man who propounded any theory a little bit extravagant! Hark how, even less than twenty years ago, the ghost of the unfortunate Lord Monboddo had bricks of criticism pelted at it, half earnestly, half contemptuously, by one of our greatest thinkers, whose thought happened to run in grooves different from those travelled in by the mind of the unfortunate Scotchman.

"Lord Monboddo[16] had just finished his great work, by which he derives all mankind from a couple of apes, and all the dialects of the world from a language originally framed by some Egyptian gods, when the discovery of Sanskrit came on him like a thunderbolt. It must be said, however, to his

[15] "By the kindness of my friend, Mr. Bartlett, I have been enabled to examine a most beautiful Japanese carving in ivory, said to be one hundred and fifty years old, and called by the Japanese *net suke* or *togle*. These togles are handed down from one generation to the next, and they record any remarkable event that happens to any member of a family. This carving is an inch and a half long, and about as big as a walnut. It represents a lady in a quasi-leaning attitude, and at first sight it is difficult to perceive what she is doing; but after a while the details come out magnificently. The unfortunate lady has been seized by an octopus when bathing – for the lady wears a bathing-dress. One extended arm of the octopus is in the act of coiling round the lady's neck, and she is endeavouring to pull it off with her right hand; another arm of the sea-monster is entwined round the left wrist, while the hand is fiercely tearing at the mouth of the brute. The other arms of the octopus are twined round, grasping the lady's body and waist – in fact, her position reminds one very much of Laocoon in the celebrated statue of the snakes seizing him and his two sons. The sucking discs of the octopus are carved exactly as they are in nature, and the colour of the body of the creature, together with the formidable aspect of the eye, are wonderfully represented. The face of this Japanese lady is most admirably done; it expresses the utmost terror and alarm, and possibly may be a portrait. So carefully is the carving executed that the lady's white teeth can be seen between her lips. The hair is a perfect gem of work; it is jet black, extended down the back, and tied at the end in a knot; in fact, it is so well done that I can hardly bring myself to think that it is not real hair, fastened on in some most ingenious manner; but by examining it under a powerful magnifying glass I find it is not so – it is the result of extraordinary cleverness in carving. The back of the little white comb fixed into the thick of the black hair adds to the effect of this magnificent carving of the hair. I congratulate Mr. Bartlett on the acquisition of this most beautiful curiosity. There is an inscription in Japanese characters on the underneath part of the carving, and Mr. Bartlett and myself would, of course, only be too glad to get this translated." – Frank Buckland, in *Land and Water*.

[16] Max Müller, *Science of Language*, 4th edition, p. 163-165. London, 1864.

credit, that he at once perceived the immense importance of the discovery. He could not be expected to sacrifice his primordial monkeys or his Egyptian idols, &c."

And again: "It may be of interest to give one other extract in order to show how well, apart from his men with, and his monkeys without, tails, Lord Monboddo could sift and handle the evidence that was placed before him."

Max Müller also furnishes us with an amazing example of scepticism on the part of Dugald Stewart. He says[17]: "However, if the facts about Sanskrit were true, Dugald Stewart was too wise not to see that the conclusions drawn from them were inevitable. He therefore denied the reality of such a language as Sanskrit altogether, and wrote his famous essay to prove that Sanskrit had been put together, after the model of Greek and Latin, by those archforgers and liars, the Brahmans, and that the whole of Sanskrit literature was an imposition."

So Ctesias attacked Herodotus. The very existence of Homer has been denied, and even the authorship of Shakespeare's plays questioned.[18]

We are all familiar enough now with the black swan, but Ovid[19] considered it as so utterly impossible that he clinched, as it were, an affirmation by saying, "If I doubted, O Maximus, of thy approval of these words, I could believe that there are swans of the colour of Memnon" [*i. e.* black]; and even so late as the days of Sir Thomas Browne, we find them classed by him with flying horses, hydras, centaurs, harpies, and satyrs, as monstrosities, rarities, or else poetical fancies.[20]

Now that we have all seen the great hippopotamus disport himself in his tank in the gardens of the Zoological Society, we can smile at the grave arguments of the savant who, while admitting the existence of the animal, disputed the possibility of his walking about on the bed of a river, because his great bulk would prevent his rising again.[21] But I daresay it passed muster in his days as a very sound and shrewd observation, just as, possibly, but for the inconvenient waggery of Peter Pindar, might have done the intelligent inquiry, which he records, after the seam in the apple-dumpling.

Poor Fray Gaspar de Jan Bernardine who, in 1611, undertook the journey by land from India to Portugal, was unfortunate enough to describe the mode in which the captain of the caravan communicated intelligence to Bagdad by carrier pigeon. "He had pigeons whose young and nests were at his house in that city, and every two days he let fly a pigeon with a letter tied to its foot containing the news of his journey. This account met with but little belief in Europe, and was treated there as a matter of merriment."[22]

The discredit under which this traveller fell is the more surprising because the same custom had already been noted by Sir John Mandeville, who, in speaking of Syria and adjacent countries,

---

[17] *Science of Language*, p. 168.

[18] "When a naturalist, either by visiting such spots of earth as are still out of the way, or by his good fortune, finds a very queer plant or animal, he is forthwith accused of inventing his game, the word not being used in its old sense of *discovery* but in its modern of *creation*. As soon as the creature is found to sin against preconception, the great (mis?) guiding spirit, *à priori* by name, who furnishes philosophers with their omniscience *pro re natâ*, whispers that no such thing *can* be, and forthwith there is a charge of hoax. The heavens themselves have been charged with hoaxes. When Leverrier and Adams predicted a planet by calculation, it was gravely asserted in some quarters that the planet which had been calculated was not *the* planet but another which had clandestinely and improperly got into the neighbourhood of the true body. The disposition to suspect hoax is stronger than the disposition to hoax. Who was it that first announced that the classical writings of Greece and Rome were one huge hoax perpetrated by the monks in what the announcer would be as little or less inclined than Dr. Maitland to call the dark ages?" —*Macmillan*, 1860.

[19] *Poetic Epistles*, Bk. iii., Ep. 3.

[20] *Rara avis in terris, nigroque simillima cygno.*

[21] "Having showed the foregoing description of the mountain cow, called by the Spaniards *ante* [*manatee*?], to a person of honour, he was pleased to send it to a learned person in Holland." This learned person discusses it and compares it with the hippopotamus, and winds up by saying, in reference to a description of the habits of the hippopotamus, as noticed at Loango by Captain Rogers, to the effect that when they are in the water they will sink to the bottom, and then walk as on dry ground, "but what he says of her sinking to the bottom in deep rivers, and walking there, if he adds, what I think he supposes, that it rises again, and comes on the land, I much question; for that such a huge body should raise itself up again (though I know whales and great fish can do) transcends the faith of J. H." – F. J. Knapton, *Collection of Voyages*, vol. ii., part ii. p. 13. 4 vols., London, 1729.

[22] *Historical Account of Discoveries and Travels in Asia.* Hugh Murray, F.R.S.E., 3 vols. 8vo. Edinburgh, 1820.

says: "In that contree, and other contrees beyond, thei have custom, whan thei schulle usen warre, and when men holden sege abouten Cytee or Castelle, and thei withinen dur not senden messagers with lettres frō Lord to Lord for to ask Sokour, thei maken here Lettres and bynden hem to the Nekke of a Colver and leten the Colver flee, and the Colveren ben so taughte, that thei flun with the Lettres to the very place that men wolde send hem to. For the Colveres ben norrysscht in the Places Where thei been sent to, and thei senden them there, for to beren here Lettres, and the Colveres retournen agen, where as thei ben norrischt, and so thei dou commonly."

While, long before, Pliny had referred to it in his *Natural History*[23] as follows: "In addition to this, pigeons have acted as messengers in affairs of importance. During the siege of Mutina, Decimus Brutus, who was in the town, sent despatches to the camp of the Consuls, fastened to pigeons' feet. Of what use to Antony, then, were his entrenchments? and all the vigilance of the besieging army? his nets, too, which he had spread in the river, while the messenger of the besieged was cleaving the air?"

The pace of railways; steam communication across the Atlantic; the Suez Canal[24]; were not all these considered in former days to be impossible? With these examples of failure of judgment before us, it may be fairly asked whether, in applying our minds to the investigation of the reality of creatures apparently monstrous, we duly reflect upon the extraordinary, almost miraculous, events which incessantly occur in the course of the short existence of all animated nature? Supposing the history of insects were unknown to us, could the wildest imagination conceive such a marvellous transformation as that which takes place continually around us in the passage from the larva through the chrysalis to the butterfly? or human ingenuity invent one so bizarre as that recorded by Steenstrup in his theory of the alternation of generation?

We accept as nothing marvellous, only because we see them daily, the organization and the polity of a community of ants; their collaboration, their wars, and their slaveries have been so often stated that they cease to astonish. The same may be said of the marvellous architecture of birds, their construction of houses to live in, of bowers to play in, and even of gardens to gratify their sense of beauty.[25]

We admire the ingenious imagination of Swift, and essayists dwell upon his happy conceits and upon the ability with which, in his celebrated work, he has ordered all things to harmonise in dimensions with the enlarged and reduced scales on which he has conceived the men and animals of Brobdignag and Lilliput. So much even has this quaint idea been appreciated, that his story has achieved a small immortality, and proved one of the numerous springs from which new words have been imported into our language. Yet the peculiar and essential singularities of the story are quite equalled, or even surpassed, by creatures which are, or have been, found in nature. The imaginary diminutive cows which Gulliver brought back from Lilliput, and placed in the meadows at Dulwich, are not one bit more remarkable, in respect to relative size, than the pigmy elephant (*E. Falconeri*) whose remains have been found in the cave-deposits of Malta, associated with those of pigmy hippopotami, and which was only two feet six inches high; or the still existing *Hippopotamus* (*Chæropsis*) *liberiensis*, which M. Milne Edwardes[26] figures as little more than two feet in height.

The lilliputian forests from which the royal navy was constructed contained even large trees in comparison with the dwarf oaks of Mexico,[27] or with the allied, even smaller species, which

---

[23] Bk. x., chap. 53.

[24] A writer in *Macmillan's Magazine* in 1860 concludes a series of objections to the canal as follows: "And the Emperor must hesitate to identify himself with an operation which might not impossibly come to be designated by posterity as 'Napoleon's Folly.'"

[25] The Bower Bird, *Ptilonorhyncus holosericeus*, and the Garden-building Bird of New Guinea, *Amblyornis inornara*.

[26] *Recherches, &c. des Mammiferes*, plate 1. Paris, 1868 to 1874.

[27] "This obstacle was a forest of oaks, not giant oaks, but the very reverse, a forest of dwarf oaks (*Quercus nana*). Far as the eye could reach extended the singular wood, in which no tree rose above thirty inches in height. Yet was it no thicket, no undergrowth of shrubs, but a true forest of oaks, each tree having its separate stem, its boughs, its lobed leaves, and its bunches of brown acorns." – Capt. Mayne Reid, *The War Trail*, chap. lxiv.

crawls like heather about the hill-slopes of China and Japan, and still more so in comparison with that singular pine, the most diminutive known (*Dacrydium taxifolium*), fruiting specimens of which, according to Kirk, are sometimes only two inches high, while the average height is only six to ten inches; while even among the forests of Brobdignag, a very respectable position could be held by the mammoth trees of California (*Sequoia gigantea*), or by the loftier white gums of Australia (*Eucalyptus amygdalina*), which occasionally reach, according to Von Mueller,[28] the enormous height of 480 feet. Nor could more adequate tenants (in point of size) be found to occupy them than the gigantic reptilian forms lately discovered by Marsh among the deposits of Colorado and Texas.

Surely a profound acquaintance with the different branches of natural history should render a man credulous rather than incredulous, for there is hardly conceivable a creature so monstrous that it may not be paralleled by existing ones in every-day life.[29]

Fig. 2. – Pterodactylus. (*After Figuier.*)

[28] Respecting the timber trees of this tract, Dr. Ferdinand von Mueller, the Government botanist, thus writes: – "At the desire of the writer of these pages, Mr. D. Bogle measured a fallen tree of *Eucalyptus amygdalina*, in the deep recesses of Dandenong, and obtained for it a length of 420 feet, with proportions of width, indicated in a design of a monumental structure placed in the exhibition; while Mr. G. Klein took the measurement of a *Eucalyptus* on the Black Spur, ten miles distant from Healesville, 480 feet high! In the State forest of Dandenong, it was found by actual measurement that an acre of ground contained twenty large trees of an apparent average height of about 350 feet." – R. Brough Smyth, *The Gold Fields of Victoria*. Melbourne, 1869.

[29] "In the next place, we must remember how impossible it is for the mind to invent an entirely new fact. There is nothing in the mind of man that has not pre-existed in nature. Can we imagine a person, who never saw or heard of an elephant, drawing a picture of such a two-tailed creature?" – J. Donelly, *Rangarok*, p. 119. New York, 1883.

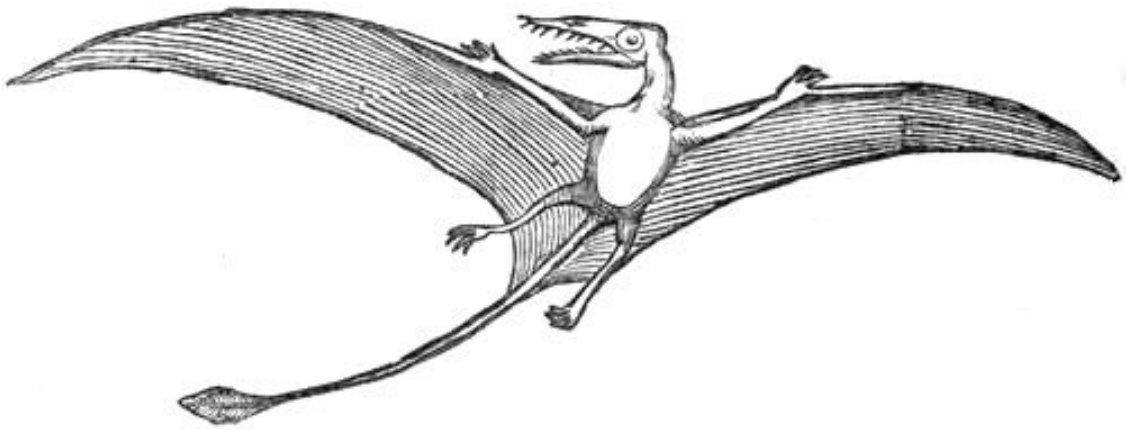

Fig. 3. – Rhamphorynchus. (*From "Nature."*)

Are the composite creatures of Chaldæan mythology so very much more wonderful than the marsupial kangaroo, the duck-billed platypus, and the flying lizard of Malaysia which are, or the pterodactylus, rhamphorynchus, and archæopteryx which have been? Does not geological science, day by day, trace one formation by easy gradation to another, bridge over the gaps which formerly separated them, carry the proofs of the existence of man constantly further and further back into remote time, and disclose the previous existence of intermediate types (satisfying the requirements of the Darwinian theory) connecting the great divisions of the animal kingdom, of reptile-like birds and bird-like reptiles? Can we suppose that we have at all exhausted the great museum of nature? Have we, in fact, penetrated yet beyond its ante-chambers?

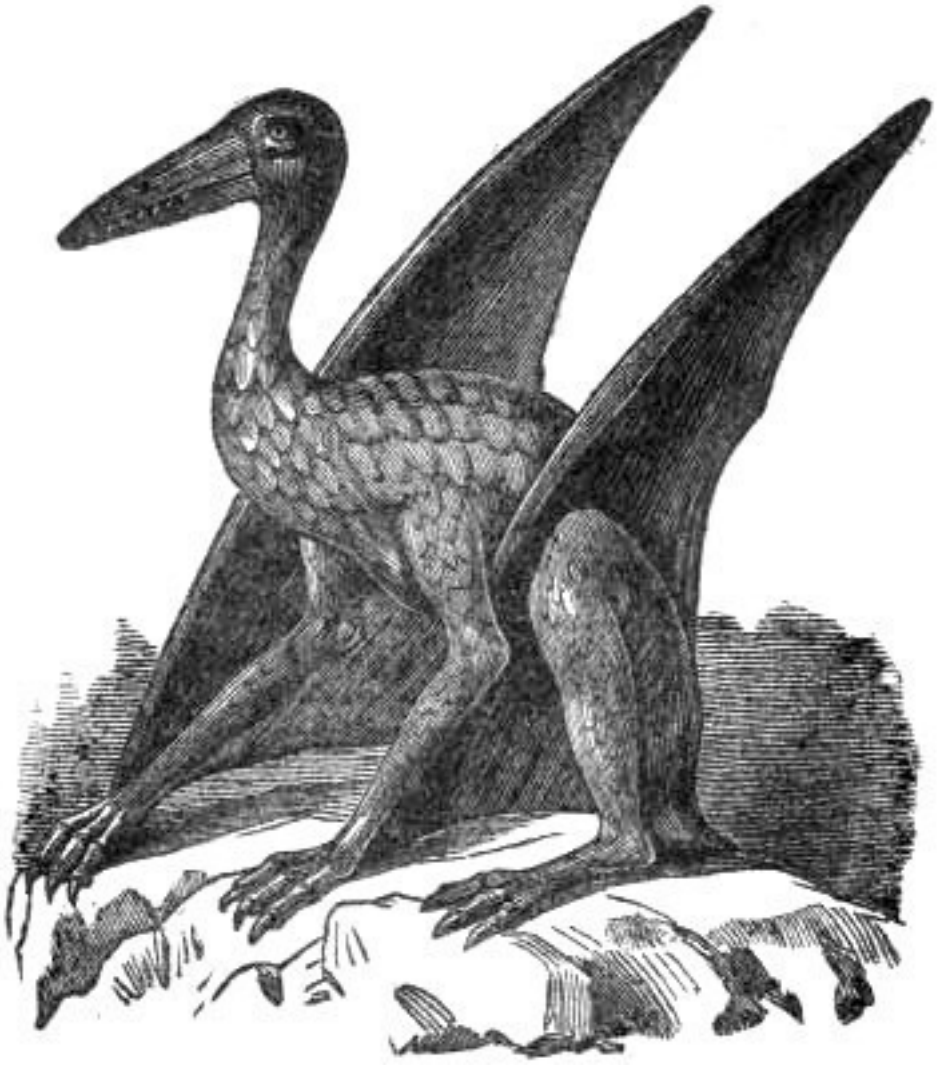

Fig. 4. – Archæopteryx.

Does the written history of man, comprising a few thousand years, embrace the whole course of his intelligent existence? or have we in the long mythical eras, extending over hundreds of thousands of years and recorded in the chronologies of Chaldæa and of China, shadowy mementoes of pre-historic man, handed down by tradition, and perhaps transported by a few survivors to existing lands from others which, like the fabled (?) Atlantis of Plato, may have been submerged, or the scene of some great catastrophe which destroyed them with all their civilization.

The six or eight thousand years which the various interpreters of the Biblical record assign for the creation of the world and the duration of man upon the earth, allow little enough space for the development of his civilization – a civilization which documental evidence carries almost to the verge of the limit – for the expansion and divergence of stocks, or the obliteration of the branches connecting them.

But, fortunately, we are no more compelled to fetter our belief within such limits as regards man than to suppose that his appearance on the globe was coeval with or immediately successive to its own creation at that late date. For while geological science, on the one hand, carries back the creation of the world and the appearance of life upon its surface to a period so remote that it is impossible to estimate it, and difficult even to faintly approximate to it, so, upon the other, the researches of palæontologists have successively traced back the existence of man to periods variously estimated at from thirty thousand to one million years – to periods when he co-existed with animals which have long since become extinct, and which even excelled in magnitude and ferocity most of those

which in savage countries dispute his empire at the present day. Is it not reasonable to suppose that his combats with these would form the most important topic of conversation, of tradition, and of primitive song, and that graphic accounts of such struggles, and of the terrible nature of the foes encountered, would be handed down from father to son, with a fidelity of description and an accuracy of memory unsuspected by us, who, being acquainted with reading and writing, are led to depend upon their artificial assistance, and thus in a measure fail to cultivate a faculty which, in common with those of keenness of vision and hearing, are essential to the existence of man in a savage or semi-savage condition?[30]

The illiterate backwoodsman or trapper (and hence by inference the savage or semi-civilized man), whose mind is occupied merely by his surroundings, and whose range of thought, in place of being diffused over an illimitable horizon, is confined within very moderate limits, develops remarkable powers of observation and an accuracy of memory in regard to localities, and the details of his daily life, surprising to the scholar who has mentally to travel over so much more ground, and, receiving daily so many and so far more complex ideas, can naturally grasp each less firmly, and is apt to lose them entirely in the haze of a period of time which would still leave those of the uneducated man distinguishable or even prominent landmarks.[31] Variations in traditions must, of course, occur in time, and the same histories, radiating in all directions from centres, vary from the original ones by increments dependent on proportionately altered phases of temperament and character, induced by change of climate, associations and conditions of life; so that the early written history of every country reproduces under its own garb, and with a claim to originality, attenuated, enriched, or deformed versions of traditions common in their origin to many or all.[32]

Stories of divine progenitors, demigods, heroes, mighty hunters, slayers of monsters, giants, dwarfs, gigantic serpents, dragons, frightful beasts of prey, supernatural beings, and myths of all kinds, appear to have been carried into all corners of the world with as much fidelity as the sacred Ark of the Israelites, acquiring a moulding – graceful, weird or uncouth – according to the genius of the people or their capacity for superstitious belief; and these would appear to have been materially affected by the varied nature of their respective countries. For example, the long-continuing dwellers in the open plains of a semi-tropical region, relieved to a great extent from the cares of watchfulness, and nurtured in the grateful rays of a genial but not oppressive sun, must have a more buoyant disposition and more open temperament than those inhabiting vast forests, the matted overgrowth of which rarely allows the passage of a single ray, bathes all in gloom, and leaves on every side undiscovered depths, filled with shapeless shadows, objects of vigilant dread, from which some ferocious monster may emerge at any moment. Again, on the one hand, the nomad roaming in isolation over vast solitudes, having much leisure for contemplative reflection, and on the other, the hardy dwellers on storm-beaten coasts, by turns fishermen, mariners, and pirates, must equally develop traits which affect their religion, polity, and customs, and stamp their influences on mythology and tradition.

---

[30] "I conceive that quite a large proportion of the most profound thinkers are satisfied to exert their memory very moderately. It is, in fact, a distraction from close thought to exert the memory overmuch, and a man engaged in the study of an abstruse subject will commonly rather turn to his book-shelves for the information he requires than tax his memory to supply it." – R. A. Proctor, *Pop. Sci. Monthly*, Jan. 1874.

[31] "It was through one of these happy chances (so the Brothers Grimm wrote in 1819) that we came to make the acquaintance of a peasant woman of the village of Nieder-Zwehrn, near Cassel, who told us the greater part of the Märchen of the second volume, and the most beautiful of it too. She held the old tales firmly in her memory, and would sometimes say that this gift was not granted to everyone, and that many a one could not keep anything in its proper connection. Anyone inclined to believe that tradition is easily corrupted or carelessly kept, and that therefore it could not possibly last long, should have heard how steadily she always abided by her record, and how she stuck to its accuracy. She never altered anything in repeating it, and if she made a slip, at once righted herself as soon as she became aware of it, in the very midst of her tale. The attachment to tradition among people living on in the same kind of life with unbroken regularity, is stronger than we, who are fond of change, can understand." —*Odinic Songs in Shetland.* Karl Blind, *Nineteenth Century*, June 1879.

[32] See quotation from Gladstone, *Nineteenth Century*, Oct. 1879.

The Greek, the Celt, and the Viking, descended from the same Aryan ancestors, though all drawing from the same sources their inspirations of religious belief and tradition, quickly diverged, and respectively settled into a generous martial race – martial in support of their independence rather than from any lust of conquest – polite, skilled, and learned; one brave but irritable, suspicious, haughty, impatient of control; and the last, the berserker, with a ruling passion for maritime adventure, piracy, and hand-to-hand heroic struggles, to be terminated in due course by a hero's death and a welcome to the banqueting halls of Odin in Walhalla.

The beautiful mythology of the Greek nation, comprising a pantheon of gods and demigods, benign for the most part, and often interesting themselves directly in the welfare of individual men, was surely due to, or at least greatly induced by, the plastic influences of a delicious climate, a semi-insular position in a sea comparatively free from stormy weather, and an open mountainous country, moderately fertile. Again, the gloomy and sanguinary religion of the Druids was doubtless moulded by the depressing influences of the seclusion, twilight haze, and dangers of the dense forests in which they hid themselves – forests which, as we know from Cæsar, spread over the greater part of Gaul, Britain, and Spain; while the Viking, having from the chance or choice of his ancestors, inherited a rugged seaboard, lashed by tempestuous waves and swept by howling winds, a seaboard with only a rugged country shrouded with unsubdued forests at its back, exposed during the major portion of the year to great severity of climate, and yielding at the best but a niggard and precarious harvest, became perforce a bold and skilful mariner, and, translating his belief into a language symbolic of his new surroundings, believed that he saw and heard Thor in the midst of the howling tempests, revealed majestic and terrible through rents in the storm-cloud. Pursuing our consideration of the effects produced by climatic conditions, may we not assume, for example, that some at least of the Chaldæans, inhabiting a pastoral country, and being descended from ancestors who had pursued, for hundreds or thousands of years, a nomadic existence in the vast open steppes in the highlands of Central Asia, were indebted to those circumstances for the advance which they are credited with having made in astronomy and kindred sciences. Is it not possible that their acquaintance with climatology was as exact or even more so than our own? The habit of solitude would induce reflection, the subject of which would naturally be the causes influencing the vicissitudes of weather. The possibilities of rain or sunshine, wind or storm, would be with them a prominent object of solicitude; and the necessity, in an unfenced country, of extending their watch over their flocks and herds throughout the night, would perforce more or less rivet their attention upon the glorious constellations of the heavens above, and lead to habits of observation which, systematized and long continued by the priesthood, might have produced deductions accurate in the result even if faulty in the process.

The vast treasures of ancient knowledge tombed in the ruins of Babylon and Assyria, of which the recovery and deciphering is as yet only initiated, may, to our surprise, reveal that certain secrets of philosophy were known to the ancients equally with ourselves, but lost through intervening ages by the destruction of the empire, and the fact of their conservancy having been entrusted to a privileged and limited order, with which it perished.[33]

We hail as a new discovery the knowledge of the existence of the so-called spots upon the surface of the sun, and scientists, from long-continued observations, profess to distinguish a connection between the character of these and atmospheric phenomena; they even venture to

[33] Mr. C. P. Daly, President of the American Geographical Society, informs us, in his Annual Address [for 1880], that in one book found in the royal library at Nineveh, of the date 2000 B.C., there is —1. A catalogue of stars.2. Enumeration of twelve constellations forming our present zodiac.3. The intimation of a Sabbath.4. A connection indicated (according to Mr. Perville) between the weather and the changes of the moon.5. A notice of the spots on the sun: a fact they could only have known by the aid of telescopes, which it is supposed they possessed from observations that they have noted down of the rising of Venus, and the fact that Layard found a crystal lens in the ruins of Nineveh. (N.B. – As to the above, I must say that telescopes are not always necessary to see the spots on the sun: these were distinctly visible with the naked eye, in the early mornings, to myself and the officers of the S.S. *Scotia*, in the Red Sea, in the month of August of 1883, after the great volcanic disturbances near Batavia. The resulting atmospheric effects were very marked in the Red Sea, as elsewhere, the sun, when near the horizon, appearing of a pale green colour, and exhibiting the spots distinctly.)

predict floods and droughts, and that for some years in anticipation; while pestilences or some great disturbance are supposed to be likely to follow the period when three or four planets attain their apogee within one year, a supposition based on the observations extended over numerous years, that similar events had accompanied the occurrence of even one only of those positions at previous periods.

May we not speculate on the possibility of similar or parallel knowledge having been possessed by the old Chaldæan and Egyptian priesthood; and may not Joseph have been able, by superior ability in its exercise, to have anticipated the seven years' drought, or Noah, from an acquaintance with meteorological science, to have made an accurate forecast of the great disturbances which resulted in the Deluge and the destruction of a large portion of mankind?[34]

Without further digression in a path which opens the most pleasing speculations, and could be pursued into endless ramifications, I will merely, in conclusion, suggest that the same influences which, as I have shown above, affect so largely the very nature of a people, must similarly affect its traditions and myths, and that due consideration will have to be given to such influences, in the case of some at least of the remarkable animals which I propose to discuss in this and future volumes.

Chronological List of some Authors writing on, and Works relating to Natural History, to which References are made in the present Volume; extracted to a great extent, as to the Western Authors, from Knight's "Cyclopædia of Biography."

The Shan Hai King– According to the commentator Kwoh P'oh (A.D. 276-324), this work was compiled three thousand years before this time, or at seven dynasties' distance. Yang Sun of the Ming dynasty (commencing A.D. 1368), states that it was compiled by Kung Chia (and Chung Ku?) from engravings on nine urns made by the Emperor Yü, B.C. 2255. Chung Ku was an historiographer, and at the time of the last Emperor of the Hia dynasty (B.C. 1818), fearing that the Emperor might destroy the books treating of the ancient and present time, carried them in flight to Yin.

The 'Rh Ya– Initiated according to tradition, by Chow Kung; uncle of Wu Wang, the first Emperor of the Chow dynasty, B.C. 1122. Ascribed also to Tsze Hea, the disciple of Confucius.

The Bamboo Books– Containing the Ancient Annals of China, said to have been found A.D. 279, on opening the grave of King Seang of Wei [died B.C. 295]. Age prior to last date, undetermined. Authenticity disputed, favoured by Legge.

Confucius– Author of Spring and Autumn Classics, &c., B.C. (551-479).

Ctesias– Historian, physician to Artaxerxes, B.C. 401.

Herodotus– B.C. 484.

Aristotle– B.C. 384.

Megasthenes– About B.C. 300. In time of Seleucus Nicator. His work entitled *Indica* is only known by extracts in those of Strabo, Arrian, and Ælian.

[34] Ammianus Marcellinus (bk. xxii., ch. xv., s. 20), in speaking of the Pyramids, says: "There are also subterranean passages and winding retreats, which, it is said, men skilful in the ancient mysteries, by means of which they divined the coming of a flood, constructed in different places lest the memory of all their sacred ceremonies should be lost."As affording a minor example of prophesy, I quote a correspondent's communication, relating to Siam, to the *North China Daily News* of July 28th, 1881: – "Singularly enough the prevalence of cholera in Siam this season has been predicted for some months. The blossoming of the bamboo (which in India is considered the invariable forerunner of an epidemic) was looked upon as ominous, while the enormous quantity and high quality of the fruit produced was cited as pointing out the overcharge of the earth with matter which, though tending to the development of vegetable life, is deleterious to human. From these and other sources of knowledge open to those accustomed to read the book of nature, the prevalence of cholera, which, since 1873, has been almost unknown in Siam, was predicted and looked for; and, unlike most modern predictions, it has been certainly fulfilled. So common was the belief, that when, some months since, a foreign official in Siamese employ applied for leave of absence, it was opposed by some of the native officials on the ground that he ought to stay and take his chance of the cholera with the rest of them."

Eratosthenes– Born B.C. 276. Mathematician, Astronomer, and Geographer.

Posidonius– Born about B.C. 140. Besides philosophical treatises, wrote works on geography, history, and astronomy, fragments of which are preserved in the works of Cicero, Strabo, and others.

Nicander– About B.C. 135. Wrote the *Theriaca*, a poem of 1,000 lines, in hexameter, on the wounds caused by venomous animals, and the treatment. Is followed in many of his errors by Pliny. Plutarch says the *Theriaca* cannot be called a poem, because there is in it nothing of fable or falsehood.

Strabo– Just before the Christian era. Geographer.

Cicero– Born B.C. 106.

Propertius (*Sextus Aurelius*) – Born probably about B.C. 56.

Diodorus Siculus– Wrote the *Bibliotheca Historica* (in Greek), after the death of Julius Cæsar (B.C. 44). Of the 40 books composing it only 15 remain, viz. Books 1 to 5 and 11 to 20.

Juba– Died A.D. 17. Son of Juba I., King of Numidia. Wrote on Natural History.

Pliny– Born A.D. 23.

Lucan– A.D. 38. The only work of his extant is the *Pharsalia*, a poem on the civil war between Cæsar and Pompey.

Ignatius– Either an early Patriarch, A.D. 50, or Patriarch of Constantinople, 799.

Isidorus– Isidorus of Charaux lived probably in the first century of our era. He wrote an account of the Parthian empire.

Arrian– Born about A.D. 100. His work on the Natural History, &c. of India is founded on the authority of Eratosthenes and Megasthenes.

Pausanias– Author of the Description or Itinerary of Greece. In the 2nd century.

Philostratus– Born about A.D. 182.

Solinus, Caius Julius– Did not write in the Augustan age, for his work entitled *Polyhistor* is merely a compilation from Pliny's *Natural History*. According to Salmasius, he lived about two hundred years after Pliny.

Ælian– Probably middle of the 3rd century A.D. *De Naturâ Animalium.* In Greek.

Ammianus Marcellinus– Lived in 4th century.

Cardan, Jerome A.– About the end of 4th century A.D.

Printing invented in China, according to Du Halde, A.D. 924. Block-printing used in A.D. 593.

Marco Polo– Reached the Court of Kublai Khan in A.D. 1275.

Mandeville, Sir John de– Travelled for thirty-three years in Asia dating from A.D. 1327. As he resided for three years in Peking, it is probable that many of his fables are derived from Chinese sources.

Printing invented in Europe by John Koster of Haarlem, A.D. 1438.

Scaliger, Julius Cæsar– Born April 23rd, 1484. Wrote *Aristotelis Hist. Anim. liber decimus cum vers. et comment*. 8vo. Lyon, 1584, &c.

Gesner– Born 1516. *Historiæ Animalium*, &c.

Ambrose Paré– Born 1517. Surgeon.

Belon, Pierre– Born 1518. Zoologist, Geographer, &c.

Aldrovandus– Born 1552. Naturalist.

Tavernier, J. B.– Born 1605.

Păn Ts'ao Kang Muh– By Li Shê-chin of the Ming dynasty (A.D. 1368-1628).
Yuen Kien Léi Han– A.D. 1718.

CHAPTER I.
ON SOME REMARKABLE ANIMAL FORMS

The reasoning upon the question whether dragons, winged snakes, sea-serpents, unicorns, and other so-called fabulous monsters have in reality existed, and at dates coeval with man, diverges in several independent directions.

We have to consider: —

1. – Whether the characters attributed to these creatures are or are not so abnormal in comparison with those of known types, as to render a belief in their existence impossible or the reverse.

2. – Whether it is rational to suppose that creatures so formidable, and apparently so capable of self-protection, should disappear entirely, while much more defenceless species continue to survive them.

3. – The myths, traditions, and historical allusions from which their reality may be inferred require to be classified and annotated, and full weight given to the evidence which has accumulated of the presence of man upon the earth during ages long prior to the historic period, and which may have been ages of slowly progressive civilization, or perhaps cycles of alternate light and darkness, of knowledge and barbarism.

4. – Lastly, some inquiry may be made into the geographical conditions obtaining at the time of their possible existence.

It is immaterial which of these investigations is first entered upon, and it will, in fact, be more convenient to defer a portion of them until we arrive at the sections of this volume treating specifically of the different objects to which it is devoted, and to confine our attention for the present to those subjects which, from their nature, are common and in a sense prefatory to the whole subject.

I shall therefore commence with a short examination of some of the most remarkable reptilian forms which are known to have existed, and for that purpose, and to show their general relations, annex the accompanying tables, compiled from the anatomy of vertebrated animals by Professor Huxley: —

REPTILES CLASSIFIED BY HUXLEY.

Amphibia.

ORDER.	——	SUB-ORDER.	GROUPS.	ILLUSTRATIVE GENERA.	RANGE OF THE ORDER.
Chelonia.	Land tortoises	1. Testudinea		Pyxis, Cinyxis	The Chelonia are first known to occur in the Lias.
"	River and marsh do.	2. Emydea	*a* Terrapenes	Emys, Cistudo	
			b Chelodines	Chelys, Chelodina	
	Mud tortoises	3. Trionychoidea		Gymnopus Cryptopus	
"	Turtles	4. Euereta		Sphargis, Chelone	To recent.
Plesiosauria.		5. . . .	Post Triassic	Plesiosaurus Pliosaurus	Trias to Chalk inclusive.
"		6. . . .	Triassic	Nothosaurus Simosaurus Pistosaurus	
Lacertilia.	Geckos	7. Ascalabota			recent
"		8. Rhynchocephala		Sphenodon or Rhyncocephalus	
"		9. Homœosauria			Solenhofen slates to Trias
"		10. Protosauria			Permian
"	Monitor	11. Platynota			recent
"		12. Eunota			"
"		13. Lacertina			"
"		14. Chalcidea			"
"		15. Scincoidea			Recent
"		16. Dolichosauria		Dolichosaurus	Chalk
"		17. Mosasauria		Mososaurus	Chalk
"		18. Amphisbænoida		Chirotes Amphisbæna	
"		19. Chamæleonida			
Ophidia.	Non-venemous constricting	20. Aglyphodontia		Python, Tortrix	
"		21. Opisthoglyphia			Older Tertiary to recent.
"		22. Proteroglyphia			
"	Vipers and Rattlesnakes	23. Solenoglyphia		Crotalus	
"		24. Typhlopidæ			

Permian to recent.

Icthyosauria.		. . . .	Icthyosaurus	Trias(?) to chalk inclusive.	
Crocodile.	Alligator	26. Alligatoridæ	Alligator Caiman Jacare		
"	Crocodiles	27. Crocodilidæ	Crocodilus Mecistops	Trias to recent.	
"	Gavials	28. Gavialidæ	Rhynchosuchus Gavialis		
"		29. Teleosauidæ	Teleosaurus		
"		30. Belodontidæ	Belodon		
Dicynodontia.		31. . . .	Dicynodon Oudenodon	Trias.	
Ornithoscelida		32. Dinosauria	Thecodontosaurus	Trias	
			Scelidosaurus	Lias	
			Megalosaurus Iguanodon	Middle & Upper Mesozoic	Mesozoic formations.
		33. Compsognatha		Solenhofen slates	
Pterosauria.	Flying reptile	34. Pterodactylidæ	Ornithopterus Pterodactylus Rhamphorynchus Dimorphodon	Lias to Chalk inclusive.	

Aves.

The most bird-like of reptiles, the Pterosauria, appear to have possessed true powers of flight; they were provided with wings formed by an expansion of the integument, and supported by an enormous elongation of the ulnar finger of the anterior limb. The generic differences are based upon the comparative lengths of the tail, and upon the dentition. In *Pterodactylus* (see Fig. 2, p. 18), the tail is very short, and the jaws strong, pointed, and toothed to their anterior extremities. In *Rhamphorynchus* (see Fig. 8, p. 18), the tail is very long and the teeth are not continuous to the extremities of the jaws, which are produced into toothless beaks. The majority of the species are small, and they are generally considered to have been inoffensive creatures, having much the habits and insectivorous mode of living of bats. One British species, however, from the white chalk of Maidstone, measures more than sixteen feet across the outstretched wings; and other forms recently discovered by Professor Marsh in the Upper Cretaceous deposits of Kansas, attain the gigantic proportions of nearly twenty-five feet for the same measurements; and although these were devoid of teeth (thus approaching the class Aves still more closely), they could hardly fail, from their magnitude and powers of flight, to have been formidable, and must, with their weird aspects, and long outstretched necks and pointed heads, have been at least sufficiently alarming.

We need go no farther than these in search of creatures which would realise the popular notion of the winged dragon.

The harmless little flying lizards, belonging to the genus Draco, abounding in the East Indian archipelago, which have many of their posterior ribs prolonged into an expansion of the integument, unconnected with the limbs, and have a limited and parachute-like flight, need only the element of size, to render them also sufficiently to be dreaded, and capable of rivalling the Pterodactyls in suggesting the general idea of the same monster.

It is, however, when we pass to some of the other groups, that we find ourselves in the presence of forms so vast and terrible, as to more than realise the most exaggerated impression of reptilian power and ferocity which the florid imagination of man can conceive.

We have long been acquainted with numerous gigantic terrestrial Saurians, ranging throughout the whole of the Mesozoic formations, such as *Iguanodon* (characteristic of the Wealden), *Megalosaurus* (Great Saurian), and *Hylæosaurus* (Forest Saurian), huge bulky creatures, the last of which, at least, was protected by dermal armour partially produced into prodigious spines; as well

as with remarkable forms essentially marine, such as *Icthyosaurus* (Fish-like Saurian), *Plesiosaurus*, &c., adapted to an oceanic existence and propelling themselves by means of paddles. The latter, it may be remarked, was furnished with a long slender swan-like neck, which, carried above the surface of the water, would present the appearance of the anterior portion of a serpent.

To the related land forms the collective term Dinosauria (from δεινός "terrible") has been applied, in signification of the power which their structure and magnitude imply that they possessed; and to the others that of Enaliosauria, as expressive of their adaptation to a maritime existence. Yet, wonderful to relate, those creatures which have for so many years commanded our admiration fade into insignificance in comparison with others which are proved, by the discoveries of the last few years, to have existed abundantly upon, or near to, the American continent during the Cretaceous and Jurassic periods, by which they are surpassed, in point of magnitude, as much as they themselves exceed the mass of the larger Vertebrata.

Take, for example, those referred to by Professor Marsh in the course of an address to the American Association for the Advancement of Science, in 1877, in the following terms: – "The reptiles most characteristic of our American cretaceous strata are the Mososauria, a group with very few representatives in other parts of the world. In our cretaceous seas they rule supreme, as their numbers, size, and carnivorous habits enabled them to easily vanquish all rivals. Some were at least sixty feet in length, and the smallest ten or twelve. In the inland cretaceous sea from which the Rocky Mountains were beginning to emerge, these ancient 'sea-serpents' abounded, and many were entombed in its muddy bottom; on one occasion, as I rode through a valley washed out of this old ocean-bed, I saw no less than seven different skeletons of these monsters in sight at once. The Mososauria were essentially swimming lizards with four well-developed paddles, and they had little affinity with modern serpents, to which they have been compared."

Or, again, notice the specimens of the genus Cidastes, which are also described as veritable sea-serpents of those ancient seas, whose huge bones and almost incredible number of vertebræ show them to have attained a length of nearly two hundred feet. The remains of no less than ten of these monsters were seen by Professor Mudge, while riding through the Mauvaise Terres of Colorado, strewn upon the plains, their whitened bones bleached in the suns of centuries, and their gaping jaws armed with ferocious teeth, telling a wonderful tale of their power when alive.

The same deposits have been equally fertile in the remains of terrestrial animals of gigantic size. The *Titanosaurus montanus*, believed to have been herbivorous, is estimated to have reached fifty or sixty feet in length; while other Dinosaurians of still more gigantic proportions, from the Jurassic beds of the Rocky Mountains, have been described by Professor Marsh. Among the discovered remains of *Atlantosaurus immanis* is a femur over six feet in length, and it is estimated from a comparison of this specimen with the same bone in living reptiles that this species, if similar in proportions to the crocodile, would have been over one hundred feet in length.

But even yet the limit has not been reached, and we hear of the discovery of the remains of another form, of such Titanic proportions as to possess a thigh-bone over twelve feet in length.

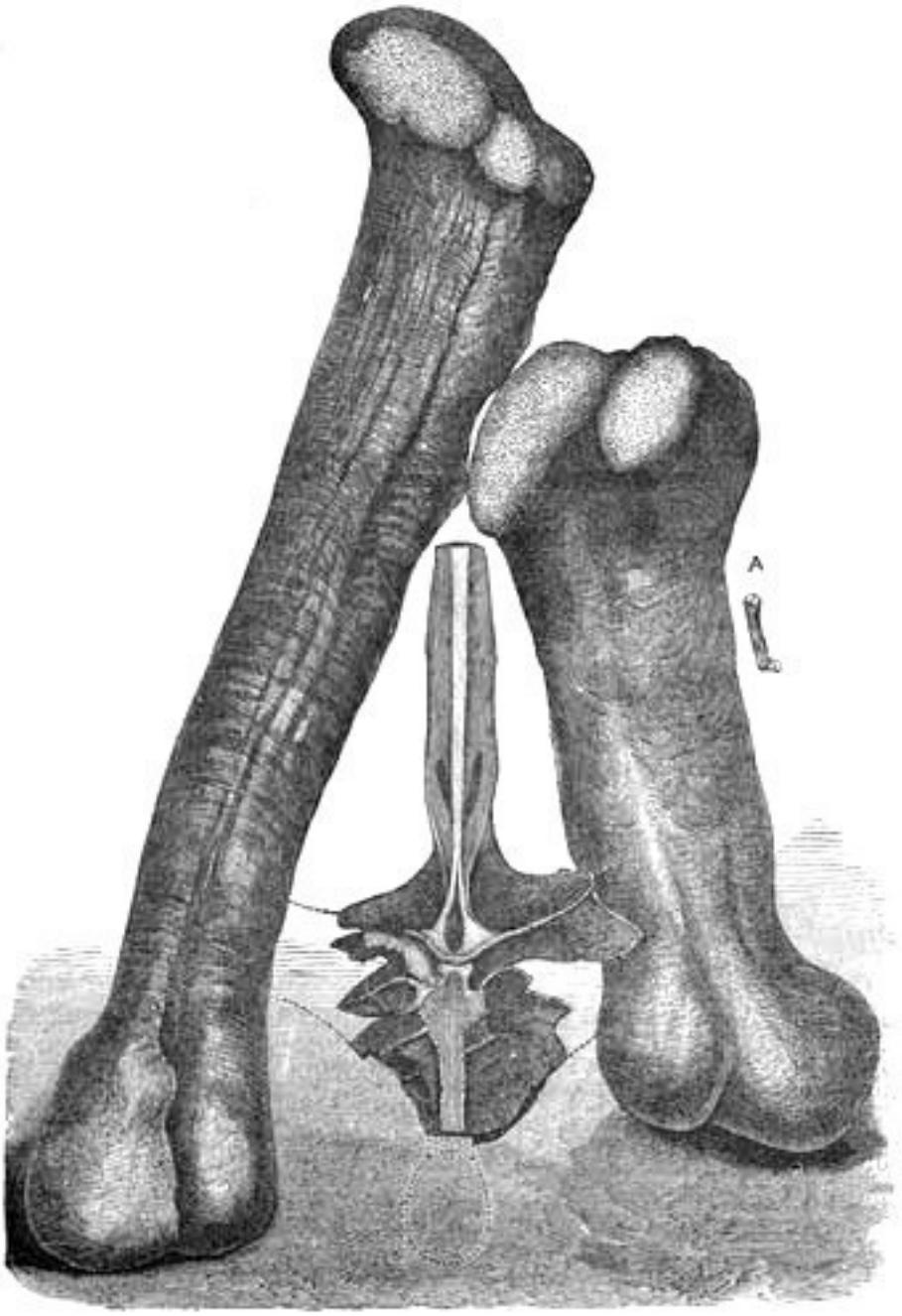

Fig. 5. – Monster bones of extinct gigantic Sauriansfrom Colorado, showing relative proportionsto corresponding bone in the Crocodile (A).

(*From the "Scientific American."*)

From these considerations it is evident that, on account of the dimensions usually assigned to them, no discredit can be attached to the existence of the fabulous monsters of which we shall speak hereafter; for these, in the various myths, rarely or never equal in size creatures which science shows to have existed in a comparatively recent geological age, while the quaintest conception could hardly equal the reality of yet another of the American Dinosaurs, *Stegosaurus*, which appears to have been herbivorous, and more or less aquatic in habit, adapted for sitting upon its hinder extremities, and protected by bony plate and numerous spines. It reached thirty feet in length. Professor Marsh considers that this, when alive, must have presented the strangest appearance of all the Dinosaurs yet discovered.

The affinities of birds and reptiles have been so clearly demonstrated of late years, as to cause Professor Huxley and many other comparative anatomists to bridge over the wide gap which was formerly considered to divide the two classes, and to bracket them together in one class, to which the name Sauropsidæ has been given.[35]

There are, indeed, not a few remarkable forms, as to the class position of which, whether they should be assigned to birds or reptiles, opinion was for a long time, and is in a few instances still, divided. It is, for example, only of late years that the fossil form Archæopteryx[36] (Fig. 4, p. 19) from the Solenhofen slates, has been definitely relegated to the former, but arguments against this disposal of it have been based upon the beak or jaws being furnished with true teeth, and the feather of the tail attached to a series of vertebræ, instead of a single flattened one as in birds. It appears to have been entirely plumed, and to have had a moderate power of flight.

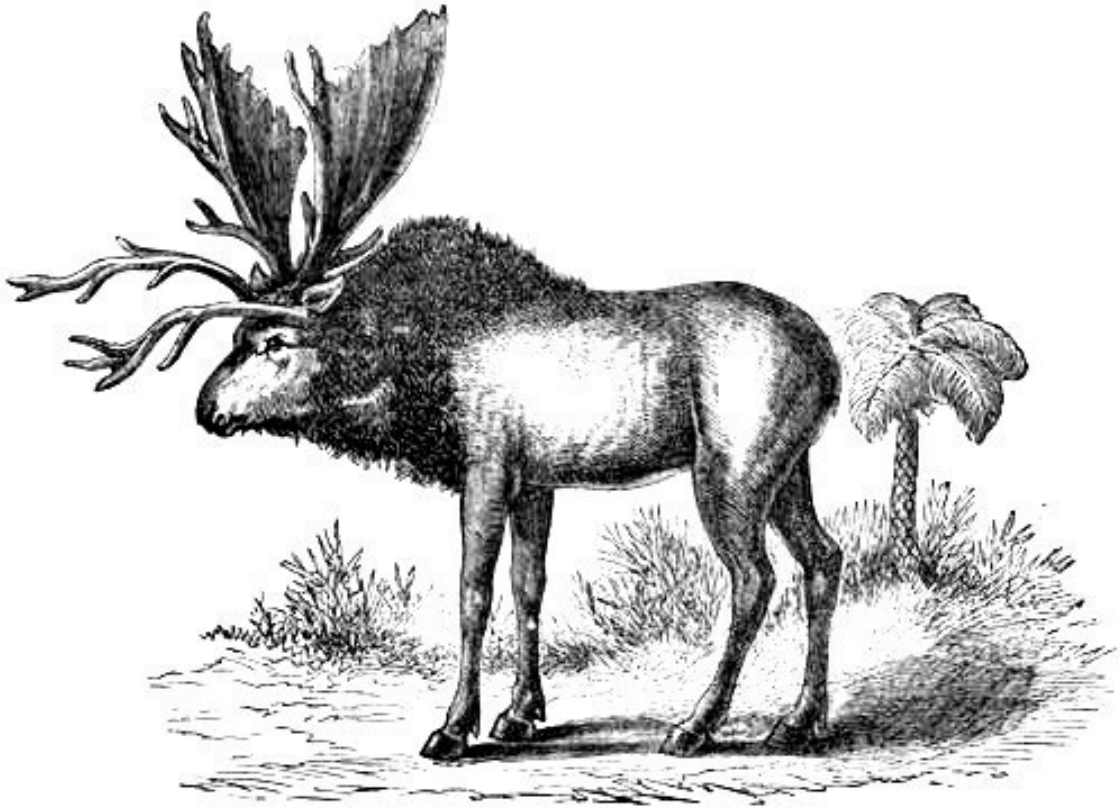

Fig. 6. – Sivatherium (restored), from the Upper Miocenedeposits of the Siwalik Hills. (*After Figuier.*)

[35] "It is now generally admitted by biologists who have made a study of the Vertebrata that birds have come down to us through the Dinosaurs, and the close affinity of the latter with recent struthious birds will hardly be questioned. The case amounts almost to a demonstration if we compare with Dinosaurs their contemporaries, the Mesozoic birds. The classes of birds and reptiles as now living are separated by a gulf so profound that a few years since it was cited by the opponents of evolution as the most important break in the animal series, and one which that doctrine could not bridge over. Since then, as Huxley has clearly shown, this gap has been virtually filled by the discoveries of bird-like reptiles and reptilian birds. Compsognathus and Archæopteryx of the old world, and Icthyornis and Hesperornis of the new, are the stepping-stones by which the evolutionist of to-day leads the doubting brother across the shallow remnant of the gulf, once thought impassable." —*Marsh.*

[36] Professor Carl Vogt regards the Archæopteryx "as neither reptile nor bird, but as constituting an intermediate type. He points out that there is complete homology between the scales or spines of reptiles and the feathers of birds. The feather of the bird is only a reptile's scale further developed, and the reptile's scale is a feather which has remained in the embryonic condition. He considers the reptilian homologies to preponderate."

On the other hand, the Ornithopterus is only provisionally classed with reptiles, while the connection between the two classes is drawn still closer by the copious discovery of the birds from the Cretaceous formations of America, for which we are indebted to Professor Marsh.

The Lepidosiren, also, is placed mid-way between reptiles and fishes. Professor Owen and other eminent physiologists consider it a fish; Professor Bischoff and others, an amphibian reptile. It has a two-fold apparatus for respiration, partly aquatic, consisting of gills, and partly aerial, of true lungs.

So far, then, as abnormality of type is concerned, we have here instances quite as remarkable as those presented by most of the strange monsters with the creation of which mythological fancy has been credited.

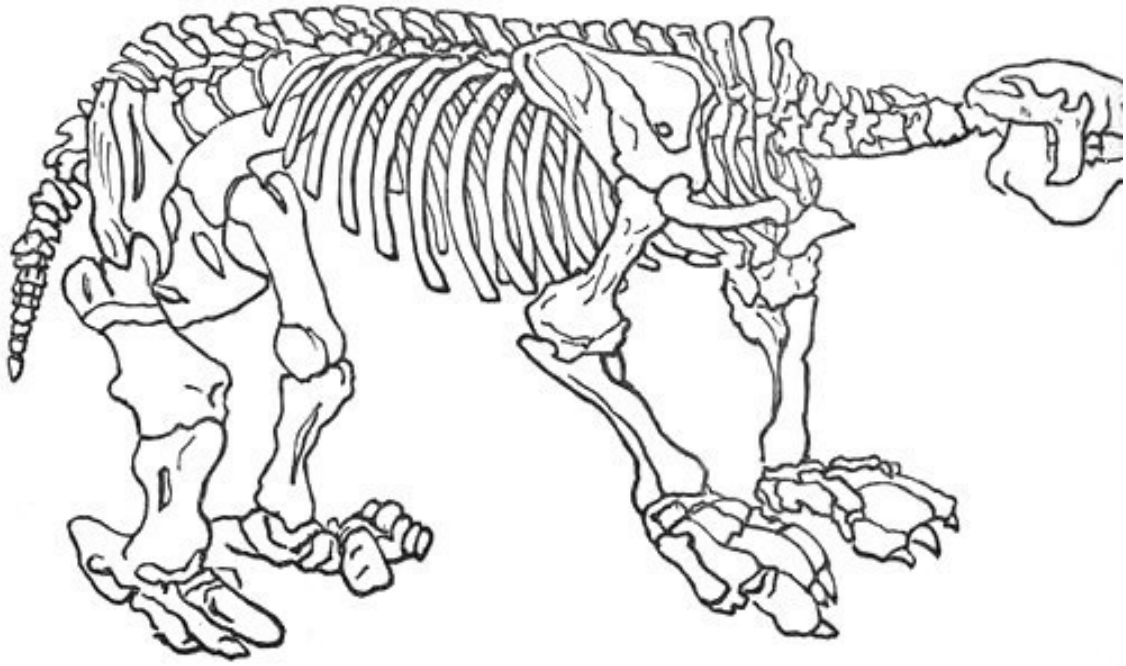

Fig. 7. – Skeleton of Megatherium. (*After Figuier.*)

Among mammals I shall only refer to the Megatherium, which appears to have been created to burrow in the earth and to feed upon the roots of trees and shrubs, for which purpose every organ of its heavy frame was adapted. This Hercules among animals was as large as an elephant or rhinoceros of the largest species, and might well, as it has existed until a late date, have originated the myths, current among the Indians of South America, of a gigantic tunnelling or burrowing creature, incapable of supporting the light of day.[37]

[37] A similar habit is ascribed by the Chinese to the mammoth and to the gigantic Sivatherium (Fig. 6, p. 39), a four-horned stag, which had the bulk of an elephant, and exceeded it in height. It was remarkable for being in some respects between the stags and the pachyderms. The Dinotherium (Fig. 8), which had a trunk like an elephant, and two inverted tusks, presented in its skull a mixture of the characteristics of the elephant, hippopotamus, tapir, and dugong. Its remains occur in the Miocene of Europe.

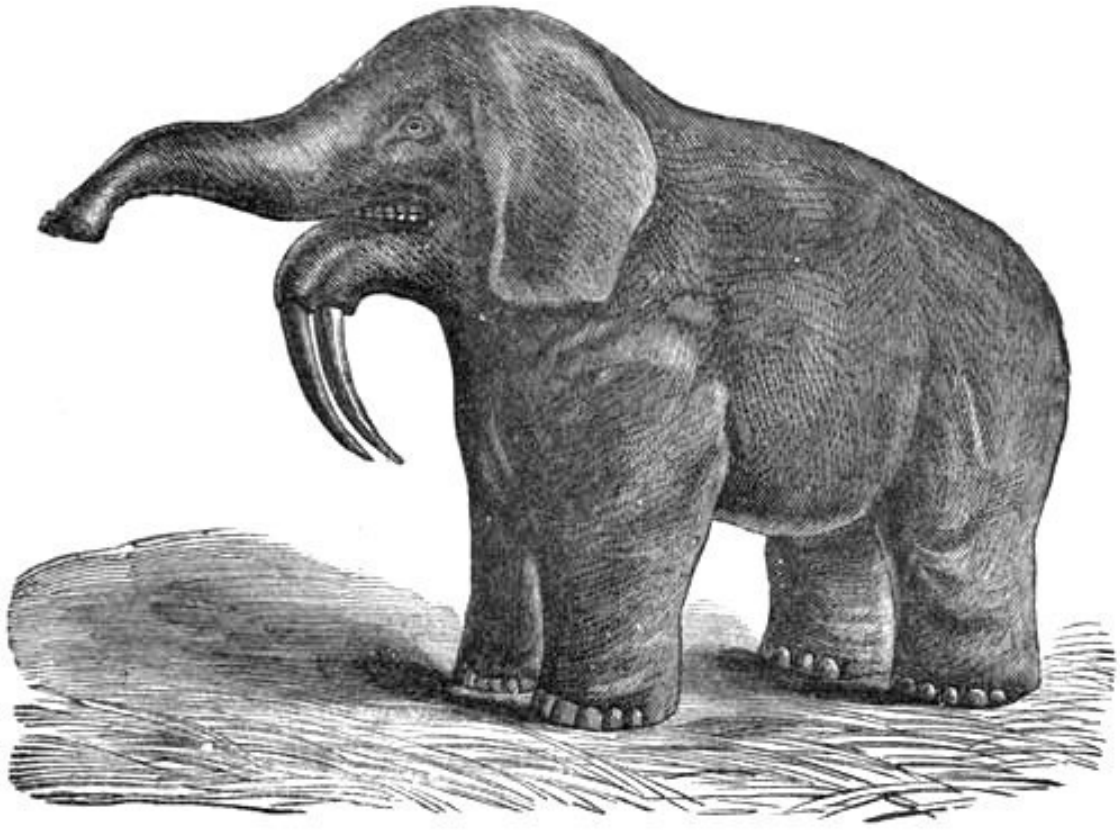

Fig. 8. – Dinotherium. (*After Figuier.*)

CHAPTER II.
EXTINCTION OF SPECIES

In reviewing the past succession of different forms of ancient life upon the globe, we are reminded of a series of dissolving views, in which each species evolves itself by an imperceptible gradation from some pre-existing one, arrives at its maximum of individuality, and then slowly fades away, while another type, either higher or lower, evolved in turn from it, emerges from obscurity, and succeeds it on the field of view.

Specific individuality has in all cases a natural term, dependent on physical causes, but that term is in many cases abruptly anticipated by a combination of unfavourable conditions.

Alteration of climate, isolation by geological changes, such as the submergence of continents and islands, and the competition of other species, are among the causes which have at all times operated towards its destruction; while, since the evolution of man, his agency, so far as we can judge by what we know of his later history, has been especially active in the same direction.

The limited distribution of many species, even when not enforced by insular conditions, is remarkable, and, of course, highly favourable to their destruction. A multiplicity of examples are familiar to naturalists, and possibly not a few may have attracted the attention of the ordinary observer.

For instance, it is probably generally known, that in our own island, the red grouse (which, by the way, is a species peculiar to Great Britain) is confined to certain moorlands, the ruffs and reeves to fen districts, and the nightingale,[38] chough, and other species to a few counties; while Ireland is devoid of almost all the species of reptiles common to Great Britain. In the former cases, the need of or predilection for certain foods probably determines the favourite locality, and there are few countries which would not furnish similar examples. In the latter, the explanation depends on biological conditions dating prior to the separation of Ireland from the main continent. Among birds, it might fairly be presumed that the power of flight would produce unlimited territorial expansion, but in many instances the reverse is found to be the case: a remarkable example being afforded by the island of Tasmania, a portion of which is called the unsettled waste lands, or Western Country. This district, which comprises about one-third of the island upon the western side, and is mainly composed of mountain chains of granites, quartzite, and mica schists, is entirely devoid of the numerous species of garrulous and gay-plumaged birds, such as the Mynah mocking-bird, white cockatoo, wattle bird, and Rosella parrot, though these abundantly enliven the eastern districts, which are fertilized by rich soils due to the presence of ranges of basalt, greenstone, and other trappean rocks.

Another equally striking instance is given by my late father, Mr. J. Gould, in his work on the humming-birds. Of two species, inhabiting respectively the adjacent mountains of Pichincha and Chimborazo at certain elevations, each is strictly confined to its own mountain; and, if my memory serves me correctly, he mentions similar instances of species peculiar to different peaks of the Andes.

Limitation by insular isolation is intelligible, especially in the case of mammals and reptiles, and of birds possessing but small power of flight; and we are, therefore, not surprised to find Mr. Gosse indicating, among other examples, that even the smallest of the Antilles has each a fauna of its own, while the humming-birds, some of the parrots, cuckoos, and pigeons, and many of the smaller birds are peculiar to Jamaica. He states still further, that in the latter instance many of the animals are not distributed over the whole island, but confined to a single small district.

---

[38] "It enters Europe early in April, spreads over France, Britain, Denmark, and the south of Sweden, which it reaches by the beginning of May. It does not enter Brittany, the Channel Islands, or the western part of England, never visiting Wales, except the extreme south of Glamorganshire, and rarely extending farther north than Yorkshire." – A. R. Wallace, *Geographical Distribution of Animals*, vol. i. p. 21. London, 1876.

Continental limitation is effected by mountain barriers. Thus, according to Mr. Wallace, almost all the mammalia, birds, and insects on one side of the Andes and Rocky Mountains are distinct in species from those on the other; while a similar difference, but smaller in degree, exists with reference to regions adjacent to the Alps and Pyrenees.

Climate, broad rivers, seas, oceans, forests, and even large desert wastes, like the Sahara or the great desert of Gobi, also act more or less effectively as girdles which confine species within certain limits.

Dependence on each other or on supplies of appropriate food also form minor yet practical factors in the sum of limitation; and a curious example of the first is given by Dr. Van Lennep with reference to the small migratory birds that are unable to perform the flight of three hundred and fifty miles across the Mediterranean. He states that these are carried across on the backs of cranes.[39]

> In the autumn many flocks of cranes may be seen coming from the North, with the first cold blast from that quarter, flying low, and uttering a peculiar cry, as if of alarm, as they circle over the cultivated plains. Little birds of every species may be seen flying up to them, while the twittering cries of those already comfortably settled upon their backs may be distinctly heard. On their return in the spring they fly high, apparently considering that their little passengers can easily find their way down to the earth.

The question of food-supply is involved in the more extended subject of geological structure, as controlling the flora and the insect life dependent on it. As an example we may cite the disappearance of the capercailzie from Denmark with the decay of the pine forests abundant during late Tertiary periods.

Collision, direct or indirect, with inimical species often has a fatal ending. Thus the dodo was exterminated by the swine which the early visitors introduced to the Mauritius and permitted to run wild there; while the indigenous insects, mollusca, and perhaps some of the birds of St. Helena, disappeared as soon as the introduction of goats caused the destruction of the whole flora of forest trees.

The Tsetse fly extirpates all horses, dogs, and cattle, from certain districts of South Africa, and a representative species in Paraguay is equally fatal to new-born cattle and horses.

Mr. Darwin[40] shows that the struggle is more severe between species of the same genus, when they come into competition with each other, than between species of distinct genera. Thus one species of swallow has recently expelled another from part of the United States; and the missel-thrush has driven the song-thrush from part of Scotland. In Australia the imported hive-bee is rapidly exterminating the small stingless native bee, and similar cases might be found in any number.

Mr. Wallace, in quoting Mr. Darwin as to these facts, points the conclusion that “any slight change, therefore, of physical geography or of climate, which allows allied species hitherto inhabiting distinct areas to come into contact, will often lead to the extermination of one of them.”

It is the province of the palæontologist to enumerate the many remarkable forms which have passed away since man’s first appearance upon the globe, and to trace their fluctuations over both hemispheres as determined by the advance and retreat of glacial conditions, and by the protean forms assumed by past and existing continents under oscillations of elevation and depression. Many interesting points, such as the dates of the successive separation of Ireland and Great Britain from the main continent, can be determined with accuracy from the record furnished by the fossil remains of animals of those times; and many interesting associations of animals with man at various dates, in

[39] *Bible Customs in Bible Lands.* By H. J. Van Lennep, D.D. 1875. Quoted in *Nature*, March 24, 1881.

[40] *Origin of Species*, C. Darwin, 5th edit. 1869.

our present island home and in other countries, have been traced by the discovery of their remains in connection with his, in bone deposits in caverns and elsewhere.

Conversely, most valuable deductions are drawn by the zoologist from the review which he is enabled to take, through the connected labours of his colleagues in all departments, of the distinct life regions now mapped out upon the face of the globe. These, after the application of the necessary corrections for various disturbing or controlling influences referred to above, afford proof reaching far back into past periods, of successive alterations in the disposition of continents and oceans, and of connections long since obliterated between distant lands.

The palæontologist reasons from the past to the present, the zoologist from the present to the past; and their mutual labours explain the evolution of existing forms, and the causes of the disparity or connection between those at present characterizing the different portions of the surface of the globe.

The palæontologist, for example, traces the descent of the horse, which, until its reintroduction by the Spaniards was unknown in the New World, through a variety of intermediate forms, to the genus Orohippus occurring in Eocene deposits in Utah and Wyoming. This animal was no larger than a fox, and possessed four separated toes in front, and three behind. Domestic cattle he refers to the Bos primigenius, and many existing Carnivora to Tertiary forms such as the cave-bear, cave-lion, sabre-tiger, and the like.

The zoologist groups the existing fauna into distinct provinces, and demands, in explanation of the anomalies which these exhibit, the reconstruction of large areas, of which only small outlying districts remain at the present date, in many instances widely separated by oceans, though once forming parts of the same continent; and so, for the simile readily suggests itself, the workers in another branch of science, Philology, argue from words and roots scattered like fossils through the various dialects of very distant countries, a mutual descent from a common Aryan language: the language of a race of which no historical record exists, though in regard to its habits, customs, and distribution much may be affirmed from the large collection of word specimens stored in philological museums.

Thus Mr. Sclater, on zoological grounds, claims the late existence of a continent which he calls Lemuria, extending from Madagascar to Ceylon and Sumatra; and for similar reasons Mr. Wallace extends the Australia of Tertiary periods to New Guinea and the Solomon Islands, and perhaps to Fiji, and from its marsupial types infers a connection with the northern continent during the Secondary period.

Again, the connection of Europe with North Africa during a late geological period is inferred by many zoologists from the number of identical species of mammalia inhabiting the opposite sides of the Mediterranean, and palæontologists confirm this by the discovery of the remains of elephants in cave-deposits in Malta, and of hippopotami in Gibraltar; while hydrographers furnish the supplemental suggestive evidence that an elevation of only fifteen hundred feet would be sufficient to establish two broad connections between the two continents – so as to unite Italy with Tripoli and Spain with Morocco, and to convert the Mediterranean Sea into two great lakes, which appears, in fact, to have been its condition during the Pliocene and Post Pliocene periods.

It was by means of these causeways that the large pachyderms entered Britain, then united to the continent; and it was over them they retreated when driven back by glacial conditions, their migration northward being effectually prevented by the destruction of the connecting arms of land.

Some difference of opinion exists among naturalists as to the extent to which zoological regions should be subdivided, and as to their respective limitations.

But Mr. A. R. Wallace, who has most recently written on the subject, is of opinion that the original division proposed by Mr. Sclater in 1857 is the most tenable, and he therefore adopts it in the very exhaustive work upon the geographical distribution of animals which he has recently issued. Mr. Sclater's Six Regions are as follows: —

1. —*The Palæarctic Region*, including Europe, Temperate Asia, and North Africa to the Atlas mountains.

2. —*The Ethiopian Region*, Africa south of the Atlas, Madagascar, and the Mascarene islands, with Southern Arabia.

3. —*The Indian Region*, including India south of the Himalayas, to South China, and to Borneo and Java.

4. —*The Australian Region*, including Celebes and Lombok, Eastward to Australia and the Pacific islands.

5. —*The Nearctic Region*, including Greenland, and North America, to Northern Mexico.

6. —*The Neotropical Region*, including South America, the Antilles, and Southern Mexico.

This arrangement is based upon a detailed examination of the chief genera and families of birds, and also very nearly represents the distribution of mammals and of reptiles. Its regions are not, as in other subsequently proposed and more artificial systems, controlled by climate; for they range, in some instances, from the pole to the tropics. It probably approaches more nearly than any other yet proposed to that desideratum, a division of the earth into regions, founded on a collation of the groups of forms indigenous to or typical of them, and upon a selection of those peculiar to them; with a disregard of, or only admitting with caution, any which, though common to and apparently establishing connection between two or more regions, may have in fact but little value for the purpose of such comparison; from the fact of its being possible to account for their extended range by their capability of easy transport from one region to another by common natural agencies.[41]

Such an arrangement should be consistent with the retrospective information afforded by palæontology; and, taking an extended view of the subject, be not merely a catalogue of the present, but also an index of the past. It should afford an illustration of an existing phase of the distribution of animal life, considered as the last of a long series of similar phases which have successively resulted from changes in the disposition of land and water, and from other controlling agencies, throughout all time. A reconstruction of the areas respectively occupied by the sea and the land at different geological periods will be possible, or at least greatly facilitated, when a complete system of similar groupings, illustrative of each successive period, has been compiled.

It is obvious that any great cosmical change, affecting to a wide extent any of the regions, might determine a destruction of specific existence; and this on a large scale, in comparison with the change which is always progressing in a smaller degree in the different and isolated divisions.

The brief remarks which I have made on this subject are intended to suggest, rather than to demonstrate – which could only be done by a lengthy series of examples – the causes influencing specific existence and its in many cases extreme frailty of tenure. And I shall now conclude by citing from the works of Lyell and Wallace a short list of notable species, now extinct, whose remains have been collected from late Tertiary, and Post Tertiary deposits – that is to say, at a time subsequent to the appearance of man. From other authors I have extracted an enumeration of species which have become locally or entirely extinct within the historic period.

---

[41] Thus Mr. Wallace considers that the identity of the small fish, *Galaxias attenuatus*, which occurs in the mountain streams of Tasmania, with one found in those of New Zealand, the Falkland Islands, and the temperate regions of South America, cannot be considered as demonstrating a land connection between these places within the period of its specific existence. For there is a possibility that its ova have been transported from one point to another on floating ice; and for similar reasons fresh-water fish generally are unsafe guides to a classification of zoological regions. Mr. Darwin has shown (*Origin of Species*, and *Nature*, vol. xviii. p. 120 and vol. xxv. p. 529) that mollusca can be conveyed attached to or entangled in the claws of migratory birds. Birds themselves are liable to be blown great distances by gales of wind. Beetles and other flying insects may be similarly transferred. Reptiles are occasionally conveyed on floating logs and uprooted trees. Mammals alone appear to be really trustworthy guides towards such a classification, from their being less liable than the other classes to accidental dispersion.

These instances will, I think, be sufficient to show that, as similar destructive causes must have been in action during pre-historic times, it is probable that, besides those remarkable animals of which remains have been discovered, many others which then existed may have perished without leaving any trace of their existence. There is, consequently, a possibility that some at least of the so-called *myths* respecting extraordinary creatures, hitherto considered fabulous, may merely be distorted accounts —*traditions*– of species as yet unrecognised by Science, which have actually existed, and that not remotely, as man's congener.

Extinct Post Tertiary Mammalia

The Mammoth. – Among other remarkable forms whose remains have been discovered in those later deposits, in which geologists are generally agreed that remains of man or traces of his handicraft have also been recognised, there is one which stands out prominently both for its magnitude and extensive range in time and space. Although the animal itself is now entirely extinct, delineations by the hand of Palæolithic man have been preserved, and even frozen carcases, with the flesh uncorrupted and fit for food, have been occasionally discovered.

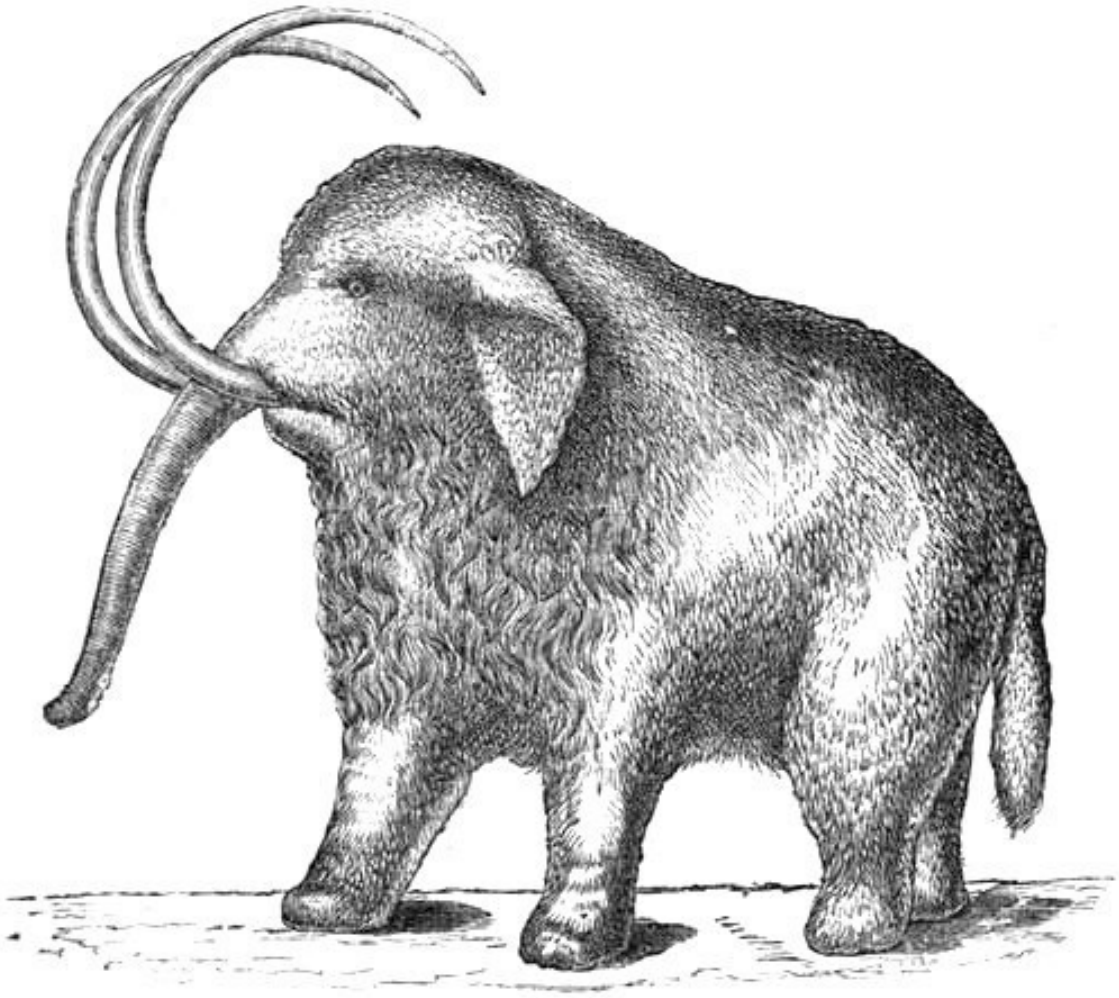

Fig. 9. – The Mammoth. (*After Jukes.*)

This is the mammoth, the *Elephas primigenius* of Blumenbach, a gigantic elephant nearly a third taller than the largest modern species, and twice its weight. Its body was protected from the severity of the semi-arctic conditions under which it flourished by a dense covering of reddish wool,

and long black hair, and its head was armed or ornamented with tusks exceeding twelve feet in length, and curiously curved into three parts of a circle. Its ivory has long been, and still is, a valuable article of commerce, more especially in North-eastern Asia, and in Eschscholtz Bay in North America, near Behring's straits, where entire skeletons are occasionally discovered, and where even the nature of its food has been ascertained from the undigested contents of its stomach.

There is a well-known case recorded of a specimen found (1799), frozen and encased in ice, at the mouth of the Lena. It was sixteen feet long, and the flesh was so well preserved that the Yakuts used it as food for their dogs. But similar instances occurred previously, for we find the illustrious savant and Emperor Kang Hi [A.D. 1662 to 1723] penning the following note[42] upon what could only have been this species: —

"The cold is extreme, and nearly continuous on the coasts of the northern sea beyond Tai-Tong-Kiang. It is on this coast that the animal called Fen Chou is found, the form of which resembles that of a rat, but which equals an elephant in size. It lives in obscure caverns, and flies from the light. There is obtained from it an ivory as white as that of the elephant, but easier to work, and which will not split. Its flesh is very cold and excellent for refreshing the blood. The ancient work Chin-y-king speaks of this animal in these terms: 'There is in the depths of the north a rat which weighs as much as a thousand pounds; its flesh is very good for those who are heated.' The Tsée-Chou calls it Tai-Chou and speaks of another species which is not so large. It says that this is as big as a buffalo, buries itself like a mole, flies the light, and remains nearly always under ground; it is said that it would die if it saw the light of the sun or even that of the moon."

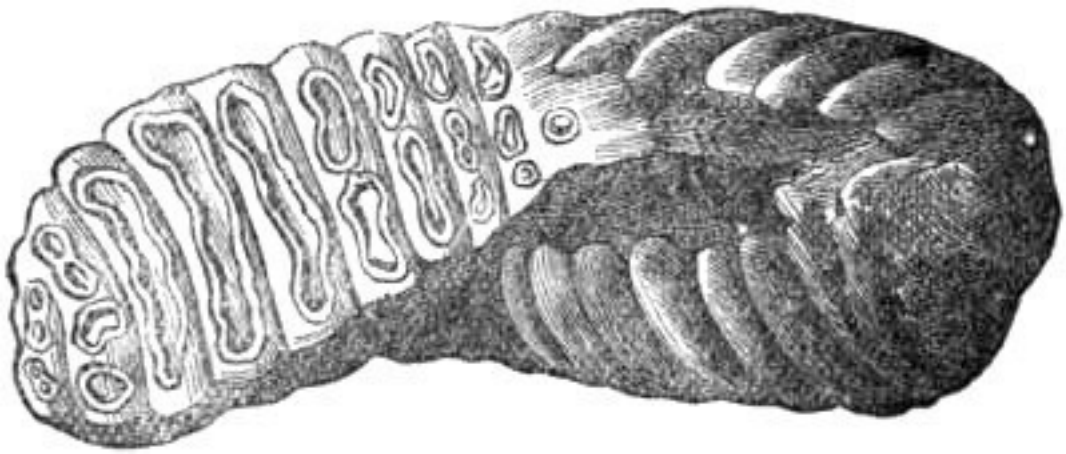

Fig. 10. – Tooth of the Mammoth. (*After Figuier.*)

It seems probable that discoveries of mammoth tusks formed in part the basis for the story which Pliny tells in reference to fossil ivory. He says[43]: – "These animals [elephants] are well aware that the only spoil that we are anxious to procure of them is the part which forms their weapon of defence, by Juba called their horns, but by Herodotus, a much older writer, as well as by general usage, and more appropriately, their teeth. Hence it is that, when these tusks have fallen off, either from accident or old age, they bury them in the earth."

Nordenskjöld[44] states that the savages with whom he came in contact frequently offered to him very fine mammoth tusks, and tools made of mammoth ivory. He computes that since the conquest of Siberia, useful tusks from more than twenty thousand animals have been collected.

---

[42] *Mémoires concernant l'histoire, &c. des Chinois, par les Missionaires de Pekin*, vol. iv. p. 481.

[43] *The Natural History of Pliny*, J. Bostock and H. T. Riley, book viii. chap iv.

[44] *The Voyage of the Vega*, A. E. Nordenskjöld. London, 1881.

Mr. Boyd Dawkins,[45] in a very exhaustive memoir on this animal, quotes an interesting notice of its fossil ivory having been brought for sale to Khiva. He derives[46] this account from an Arabian traveller, Abou-el-Cassim, who lived in the middle of the tenth century.

Figuier[47] says: "New Siberia and the Isle of Lachon are for the most part only an agglomeration of sand, of ice, and of elephants' teeth. At every tempest the sea casts ashore new quantities of mammoth's tusks, and the inhabitants of New Siberia carry on a profitable commerce in this fossil ivory. Every year during the summer innumerable fishermen's barks direct their course to this isle of bones, and during winter immense caravans take the same route, all the convoys drawn by dogs, returning charged with the tusks of the mammoth, weighing each from one hundred and fifty to two hundred pounds. The fossil ivory thus withdrawn from the frozen north is imported into China and Europe."

In addition to its elimination by the thawing of the frozen grounds of the north, remains of the mammoth are procured from bogs, alluvial deposits, and from the destruction of submarine beds.[48] They are also found in cave deposits, associated with the remains of other mammals, and with flint implements. This creature appears to have been an object of the chase with Palæolithic man.

Mr. Dawkins, reviewing all the discoveries, considers that its range, at various periods, extended over the whole of Northern Europe, and as far south as Spain; over Northern Asia, and North America down to the Isthmus of Darien. Dr. Falconer believes it to have had an elastic constitution, which enabled it to adapt itself to great change of climate.

Murchison, De Verneuil, and Keyserling believed that this species, as well as the woolly rhinoceros, belonged to the Tertiary fauna of Northern Asia, though not appearing until the Quaternary period in Europe.

Mr. Dawkins shows it to have been pre-glacial, glacial, and post-glacial in Britain and in Europe, and, from its relation to the intermediate species *Elephas armeniacus*, accepts it as the ancestor of the existing Indian elephant. Its disappearance was rapid, but not in the opinion of most geologists cataclysmic, as suggested by Mr. Howorth.

Another widely distributed species was the *Rhinoceros tichorhinus*– the smooth-skinned rhinoceros – also called the woolly rhinoceros and the Siberian rhinoceros, which had two horns, and, like the mammoth, was covered with woolly hair. It attained a great size; a specimen, the carcase of which was found by Pallas imbedded in frozen soil near Wilui, in Siberia (1772), was eleven and a half feet in length. Its horns are considered by some of the native tribes of northern Asia to have been the talons of gigantic birds; and Ermann and Middendorf suppose that their discovery may have originated the accounts by Herodotus of the gold-bearing griffons and the arimaspi.

Its food, ascertained by Von Brandt, and others, from portions remaining in the hollows of its teeth, consisted of leaves and needles of trees still existing in Siberia. The range of this species northwards was as extensive as that of the mammoth, but its remains have not yet been discovered south of the Alps and Pyrenees.

The investigation,[49] made by M. E. Lartet in 1860, of the contents of the Grotto of Aurignac, in the department of the Haute Garonne, from which numerous human skeletons had been previously

---

[45] *On the Range of the Mammoth in Space and Time*, by W. B. Dawkins, *Quart. Journ. Geol. Soc.*, 1879, p. 138.

[46] The notice is taken from *Les Peuples du Caucause, ou Voyage d'Abou-el-Cassim*, par M. C. D'Ohsson, p. 80, as follows: – "On trouve souvent dans la Boulgarie des os (fossils) d'une grandeur prodigieuse. J'ai vu une dent qui avait deux palmes de large sur quatre de long, et un crâne qui ressemblait à une hutte (Arabe). On y déterre des dents semblables aux défenses d'éléphants, blanche comme la neige et pesant jusqu' à deux cents menns. On ne sait pas à quel animal elles out appartenu, mais on les transporte dans le Khoragur (Kiva), où elles se vendent à grand prix. On en fait des peignes, des vases, et d'autres objets, comme on façonne l'ivoire; toute fois cette substance est plus dure que l'ivoire; jamais elle ne se brise."

[47] *The World before the Deluge*, L. Figuier. London, 1865.

[48] According to Woodward, over two thousand grinders were dredged up by the fishermen of Happisburgh in the space of thirteen years; and other localities in and about England are also noted. – Dana's *Manual of Geology*, p. 564.

[49] Lyell, *Antiquity of Man*, p. 185, 2nd edit., 1863.

removed in 1852, shows that this animal was included among the species used as ordinary articles of food, or as exceptional items at the funeral feasts of the Palæolithic troglodytes. In the layers of charcoal and ashes immediately outside the entrance to the grotto, and surrounding what is supposed to have been the hearth, the bones of a young *Rhinoceros tichorhinus* were found, which had been split open for the extraction of the marrow. Numerous other species had been dealt with in the same manner; and all these having received this treatment, and showing marks of the action of fire, had evidently been carried to the cave for banqueting purposes. The remains of Herbivora associated with those of this rhinoceros, consisted of bones of the mammoth, the horse (*Equus caballus*), stag (*Cervus elaphus*), elk (*Megaceros hibernicus*), roebuck (*C. capreolus*), reindeer (*C. tarandus*), auroch (*Bison europæus*). Among carnivora were found remains of *Ursus spelæus* (cave-bear), *Ursus arctos*? (brown bear), *Meles taxus* (badger), *Putorius vulgaris* (polecat), *Hyæna spelæa* (cave-hyæna), *Felis spelæa* (cave-lion), *Felis catus ferus* (wild cat), *Canis lupus* (wolf), *Canis vulpis* (fox). Within the grotto were also found remains of *Felis spelæa* (cave-lion) and *Sus scrofa* (pig). The cave-bear, the fox, and indeed most of these, probably also formed articles of diet, but the hyæna seems to have been a post attendant at the feast, and to have rooted out and gnawed off the spongy parts of the thrown-away bones after the departure of the company.

In the Pleistocene deposits at Würzburg, in Franconia, a human finger-bone occurs with bones of this species, and also of other large mammalia, such as the mammoth, cave-bear, and the like.

And flint implements, and pointed javelin-heads made of reindeer horn, are found associated with it in the vicinity of the old hearths established by Palæolithic man in the cave called the Trou du Sureau, on the river Malignée in Belgium.

In the cavern of Goyet, also in Belgium, there are five bone layers, alternating with six beds of alluvial deposits, showing that the cave had been inhabited by different species at various periods. The lion was succeeded by the cave-bear, and this by hyænas; then Palæolithic man became a tenant and has left his bones there, together with flint implements and remains of numerous species, including those already enumerated as his contemporaries.

The Sabre-toothed Tiger or Lion. – This species, *Machairodus*[50] *latifrons* of Owen, was remarkable for having long sabre-shaped canines. It belongs to an extinct genus, of which four other species are known, characterised by the possession of serrated teeth. The genus is known to be represented in the Auvergne beds between the Eocene and Miocene, in the Miocene of Greece and India, in the Pliocene of South America and Europe, and in the Pleistocene. Mr. Dawkins believes that this species survived to post-glacial times. It is one of the numerous animals whose remains have been found with traces of man and flint implements in cave deposits at Kent's Hole, near Torquay, and elsewhere.

The Cave-Bear, *Ursus spelæus*, of Rosenmüller. – The appearance of this species has been preserved to us in the drawing by Palæolithic man found in the cave of Massat (Arieze).

It occurs in the Cromer Forest Bed, a deposit referred by Mr. Boyd Dawkins to the early part of the Glacial period, and generally regarded as transitional between the Pliocene and Quaternary. It is also found in the caves of Perigaud, which are considered to belong to the reindeer era of M. Lartet or the opening part of the Recent period, and numerous discoveries of its remains at dates intermediate to these have been made in Britain and in Europe. Carl Vogt, indeed, is of opinion that this species is the progenitor of our living brown bear, *Ursus arctos*, and Mr. Boyd Dawkins also says that those "who have compared the French, German, and British specimens, gradually realize the fact that the fossil remains of the bears form a graduated series, in which all the variations that at first sight appear specific vanish away."

It has been identified by Mr. Busk among the associated mammalian bones of the Brixham cave. Its remains are very abundant in the bone deposit of the Trou de Sureau in Belgium, and in the

[50] Fr. μάχαιρα "a sword," and ὀδούς "a tooth."

cavern of Goyet, which it tenanted alternately with the lion and hyæna, and, like them, appears to have preyed on man and the larger mammalia.

Mr. Prestwich has obtained it in low-level deposits of river gravels in the valleys of the north of France and south of England, and it has been obtained from the Löss, a loamy, usually unstratified deposit, which is extensively distributed over central Europe, in the valleys of the Rhine, Rhone, Danube, and other great rivers. This deposit is considered by Mr. Prestwich to be equivalent to other high-level gravels of the Pleistocene period.

The Mastodon. – The generic title Mastodon has been applied to a number of species allied to the elephants, but distinguished from them by a peculiar structure of the molar teeth; these are rectangular, and in their upper surfaces exhibit a number of great conical tuberosities with rounded points disposed in pairs, to the number of four or five, according to the species; whereas in the elephants they are broad and uniform, and regularly marked with furrows of large curvature. The mastodons, in addition to large tusks in the premaxillæ, like those of the elephant, had also in most instances, a pair of shorter ones in the mandible.

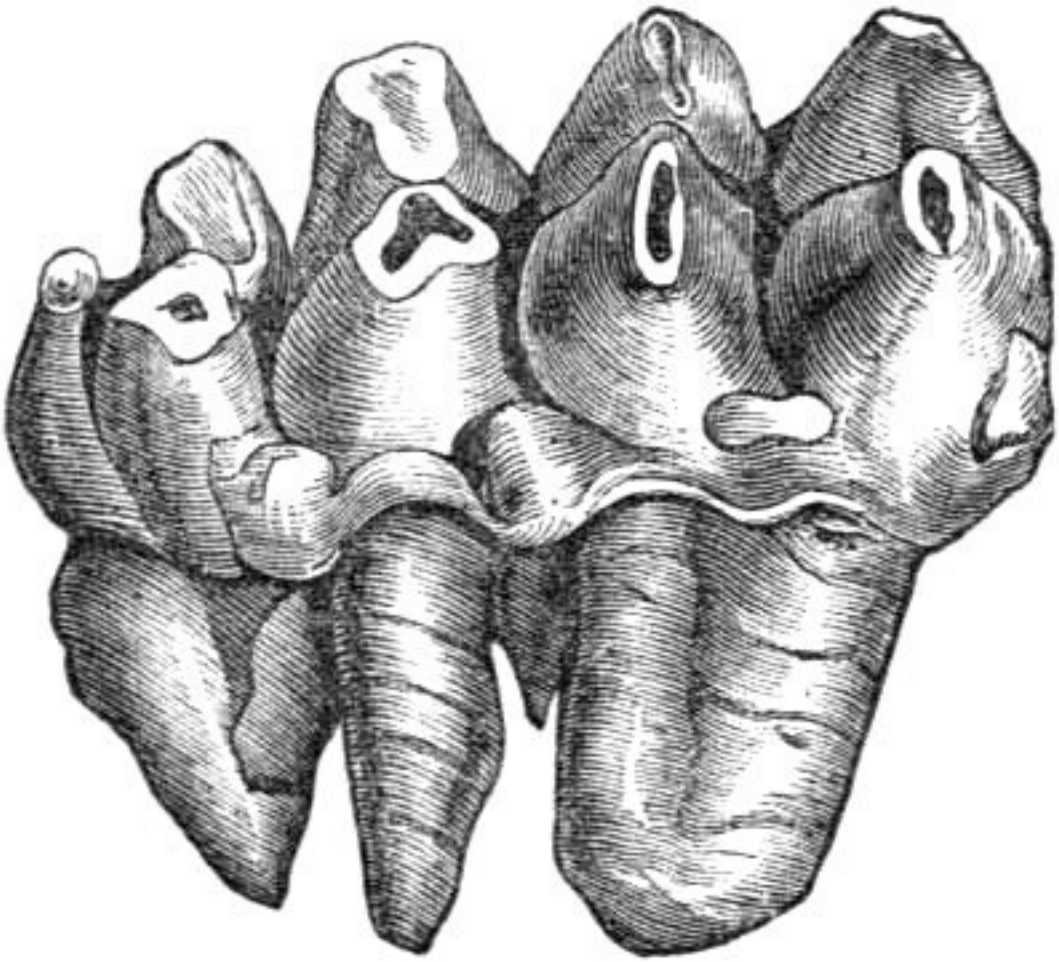

Fig. 11. – Mastodon's Tooth (worn). (*After Figuier.*)

Cuvier established the name Mastodon,[51] or teat-like toothed animals, for the gigantic species from America which Buffon had already described under the name of the animal or elephant of the Ohio.

[51] From μαστός "a teat," and ὀδούς "a tooth."

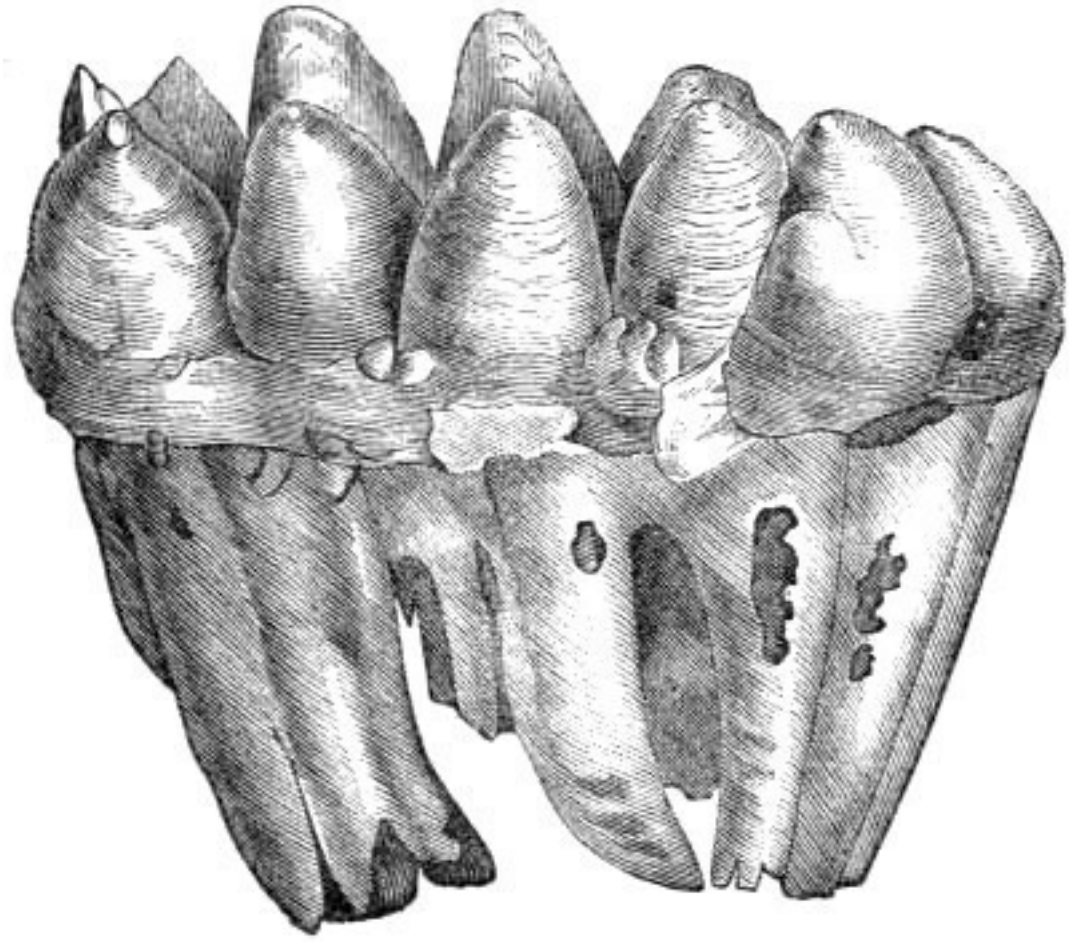

Fig. 12. – Mastodon's Tooth. (*After Figuier.*)

The form first appears in the Upper Miocene of Europe, five species being known, two of them from Pikermi, near Athens, and one, *M. angustidens*, from the Miocene beds of Malta. Mastodon remains have also been found in the beds of the Sivalik hills, and four species of mastodon in all are known to have ranged over India during those periods.

In Pliocene deposits we have abundant remains of *M. arvernensis*, and *M. longirostris* from the Val d'Arno in Italy, and the *M. Borsoni* from central France.

The *M. arvernensis* may be considered as a characteristic Pliocene species in Italy, France, and Europe generally. In Britain it occurs in the Norwich Crag and the Red Crag of Suffolk.

Species of mastodon occur in the Pliocene of La Plata, and of the temperate regions of South America; on the Pampas, and in the Andes of Chili.

The *Mastodon mirificus* of Leidy is the earliest known species in America; this occurs in Pliocene deposits on the Niobrara and the Loup fork, west of the Mississippi.

The remains of the *Mastodon americanus* of Cuvier occur abundantly in the Post Pliocene deposits throughout the United States, but more especially in the northern half; they are also found in Canada and Nova Scotia.

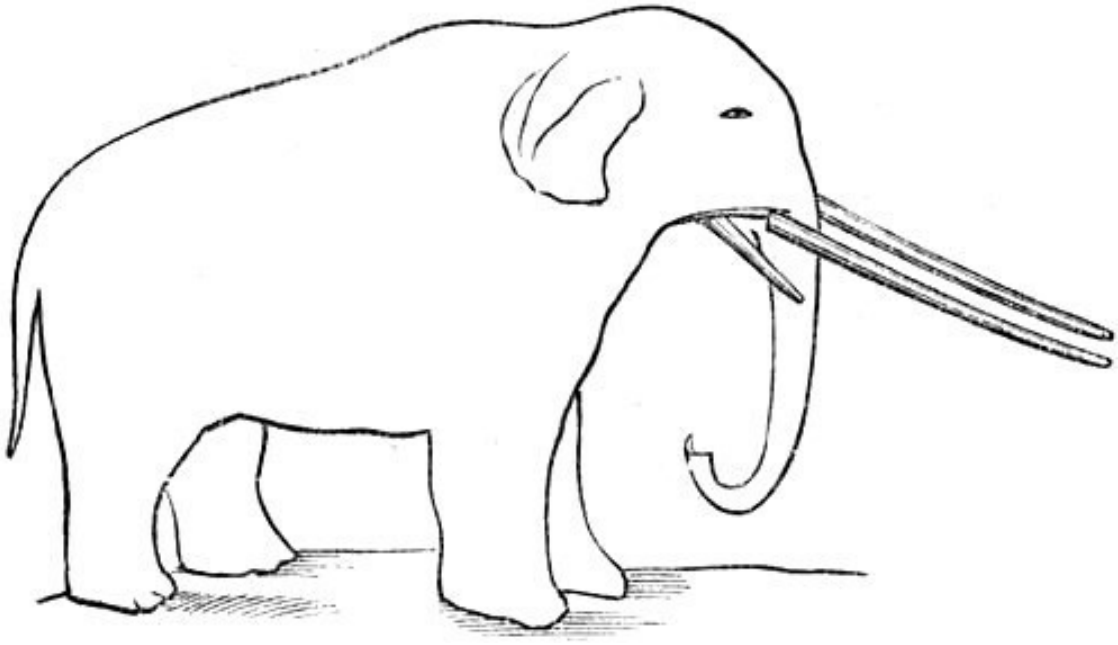

Fig. 13. – The Mastodon.

Perfect skeletons are occasionally procured from marshes, where the animals had become mired. In life this species appears to have measured from twelve to thirteen feet in height and twenty-four to twenty-five feet in length, including seven feet for the tusks. Undigested food found with its remains show that it lived partly on spruce and fir-trees. A distinct species characterised the Quaternary deposits of South America.

The Irish Elk. – The species (*Megaceros hibernicus*), commonly but erroneously called the Irish Elk, was, as professor Owen[52] has pointed out, a true deer, whose place is between the fallow and reindeer.

Though now extinct, it survived the Palæolithic period, and may possibly have existed down to historic times. Mr. Gosse adduces some very strong testimony on this point, and is of opinion that its extinction cannot have taken place more than a thousand years ago.

It had a flattened and expanded form of antler, with peculiarities unknown among existing deer, and was, in comparison with these, of gigantic size; the height to the summit of the antlers being from ten to eleven feet in the largest individuals, and the span of the antlers, in one case, over twelve feet.

Although its remains have been found most abundantly in Ireland, it was widely distributed over Britain and middle Europe. It has been found in peat swamps, lacustrine marls, bone caverns, fen deposits, and the Cornish gravels. It has been obtained from the cavern of Goyet in Belgium, and from the burial-place at Aurignac, in the department of the Haute Garonne. Its known range in time is from the early part of the Glacial period down to, possibly, historic periods.

The Cave-Hyæna. —*Hyæna spelæa* of Goldfuss – is, like the cave-bear, characteristic of Europe during the Palæolithic age. It has been found in numerous caves in Britain, such as Kent's Hole, the Brixham cave, and one near Wells in Somersetshire, explored by Dawkins in 1859; in all of these the remains are associated with those of man, or with his implements. This species is closely related to the *H. crocuta* of Zimm, at present existing in South Africa, and is by some geologists considered identical with it. It is, however, larger.

[52] *Palæontology*, R. Owen. Edinburgh, 1860.

It appears to have to some extent replaced the cave-bear in Britain; we are also, doubtless, greatly indebted to it for some of the extensive collections of bones in caverns, resulting from the carcases which it had dragged thither, and imperfectly destroyed.

In a cave at Kirkdale, in the vale of Pickering, the bones of about three hundred individuals – hyænas – were found mingled with the remains of the mammoth, bear, rhinoceros, deer, cave-lion, brown bear, horse, hare, and other species. Mr. Dawkins,[53] in describing it, says: "The pack of hyænas fell upon reindeer in the winter, and at other times on horses and bisons, and were able to master the hippopotamus, the lion, the slender-nosed rhinoceros, or the straight-tusked elephant, and to carry their bones to their den, where they were found by Dr. Buckland. The hyænas also inhabiting the 'Dukeries,' dragged back to their dens fragments of lion."

Notable Quaternary forms (now extinct) on the American continent are the gigantic sloth-like animals *Megatherium*, which reached eighteen feet in length, and *Mylodon*, one species of which (*M. robustus*) was eleven feet in length; Armadillos, such as *Glyptodon*, with a total length of nine feet; *Chlamydotherium*, as big as a rhinoceros; and *Pachytherium*, equalling an ox.

In Australia we find marsupial forms as at the present day; but they were gigantic in comparison with the latter. As for example, the *Diprotodon*, which equalled in size a hippopotamus, and the *Nototherium*, as large as a bullock.

I may mention a few other species, the remains of which are associated with some of those commented on in the last few pages; but which, as they have undoubtedly continued in existence down to the present period, are external to the present portion of my argument, and are either treated of elsewhere, or need only to be referred to in a few words.

[53] *The British Lion*, W. Boyd Dawkins, *Contemporary Review*, 1882.

Fig. 14. – Mylodon robustus. (*After Figuier.*)

It must also be borne in mind that the linking together of species by the discovery of intermediate graduated forms, is daily proceeding; so that some even of those spoken of in greater detail may shortly be generally recognised, as at present they are held by a few, to be identical with existing forms.

The Hippopotamus. – The *Hippopotamus major*, now considered identical with the larger of the two African species —*H. amphibia*, has been found associated with *E. antiquus* and *R. hemitæchus* of Falc in Durdham Down and Kirkdale caves, and in those at Kent's Hole and Ravenscliff. It has also been found in river gravels at Grays, Ilford, and elsewhere, in the lower part of the river-border deposits of Amiens with flint implements, and in Quaternary deposits on the continent of Europe.

The Cave-Lion —*Felis spelæa*– is now considered to be merely a variety of the African lion (*Felis leo*), although of larger size; it had a very wide range over Britain and Europe during the Post Pliocene period, as also did the leopard (*F. pardus*) and probably the lynx (*Lyncus*).

The Reindeer or Cariboo —*Cervus tarandus*– which still exists, both domesticated and wild, in northern Europe and America, is adapted for northern latitudes. It formerly extended over Europe, and in the British Isles probably survived in the north of Scotland until the twelfth century.

Its remains have been found in Pleistocene deposits in numerous localities, but most abundantly in those which M. Lartet has assigned to the period which he calls the Reindeer age.

Other Pleistocene mammals still existing, but whose range is much restricted, are the musk ox (*Ovibos moschatus*), familiar to us, from the accounts of arctic expeditions, as occurring in the

circumpolar regions of North America; the glutton (*Gulo luscus*), the auroch (*Bison europæus*), the wild horse (*E. fossilis*), the arctic fox (*Canis lagopus*), the bison (*Bison priscus*), the elk or moose (*Alces malchis*), found in Norway and North America, the lemming, the lagomys or tail-less hare, &c.

As examples of total extinction in late years, we may mention the dodo, the solitaire, and species allied to them, in the islands of Mauritius, Bourbon, and Reunion; the moa in New Zealand; the *Æpiornis* in Madagascar; the great auk, *Alca impennis*, in northern seas, and the *Rhytina Stelleri*, common once in the latitude of Behring's Straits, and described by Steller in 1742.

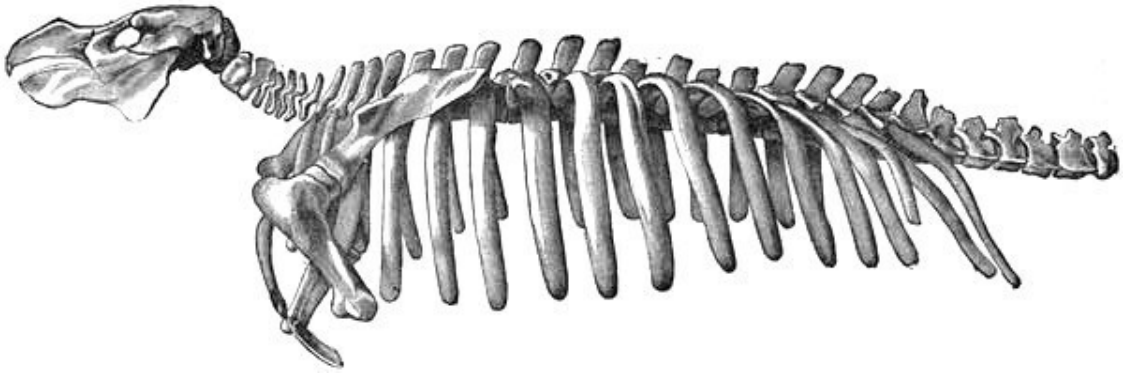

Fig. 15. – Skeleton of Rhytina Stelleri. (*From "The Voyage of the 'Vega.'"*)

The Dodo, a native of the island of Mauritius, was about 50 lbs. in weight, and covered with loose downy plumage, it was unable to rise from the ground in consequence of the imperfect development of its wings; it was minutely described by Sir Thomas Herbert in 1634, and specimens of the living bird and of its skin were brought to Europe. Its unwieldiness led to its speedy destruction by the early voyagers.

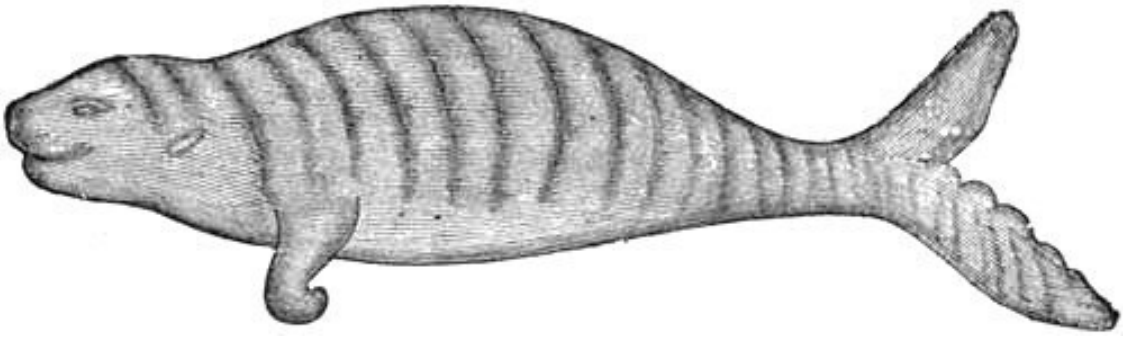

Fig. 16. – Rhytina Stelleri. (*From "The Voyage of the 'Vega.'"*)

The Solitaire was confined to the island of Mascaregue or Bourbon. It is fully described by Francis Leguat, who, having fled from France into Holland in 1689, to escape religious persecution consequent on the revocation of the Edict of Nantes, engaged under the Marquis de Quesne in an expedition for the purpose of settlement on that island. This bird also speedily became extinct.

The Moa (*Dinornis giganteus*, Owen) reached from twelve to fourteen feet in height, and survived for a long period after the migration of the Maories to New Zealand. Bones of it have been found along with charred wood, showing that it had been killed and eaten by the natives; and its memory is preserved in many of their traditions, which also record the existence of a much larger bird, a species of eagle or hawk, which used to prey upon it.[54]

[54] The Moa was associated with other species also nearly or totally extinct: some belonging to the same genus, others to those of

Rapidly approaching total extinction are the several species of *Apteryx* in the same country – remarkable birds with merely rudimentary wings: as also the *Notornis*, a large Rail – at first, and for a long time, only known in the fossil state, but of which a living specimen was secured by Mr. Walter Mantell in 1849: and the *Kapapo* (*Strigops habroptilus*) of G. R. Gray – a strange owl-faced nocturnal ground-parrot.

The *Æpyornis maximus* was almost as large as the Moa; of this numerous fossil bones and a few eggs have been discovered, but there are not, I believe, any traditions extant among the natives of Madagascar of its having survived to a late period.

The Great Auk (*Alca impennis*) is now believed to be extinct. It formerly occurred in the British Isles, but more abundantly in high latitudes; and its remains occur in great numbers on the shores of Iceland, Greenland, and Denmark, as also of Labrador and Newfoundland.

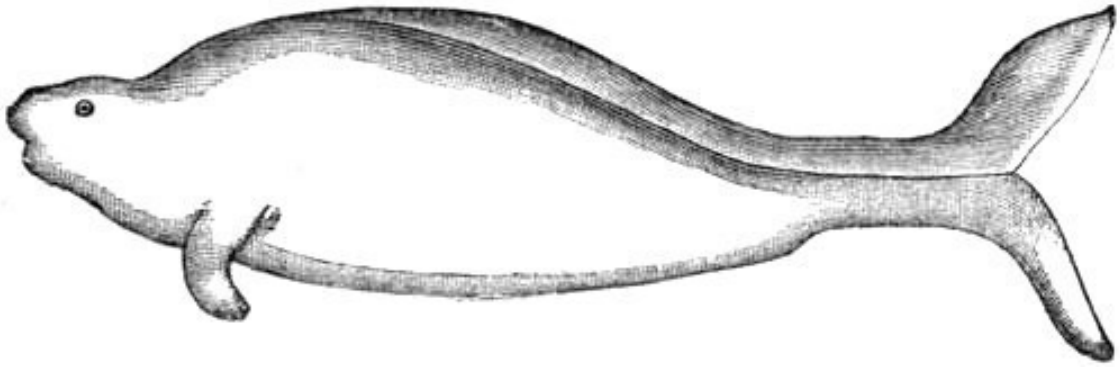

Fig. 17. – Rhytina Stelleri. (*After J. Fr. Brandt.*)

Steller's Sea-cow (*Rhytina Stelleri* of Cuvier) was a mammal allied to the Manatees and Dugongs; it was discovered by Behring in 1768 on a small island lying off the Kamtchatkan coast. It measured as much as from twenty-eight to thirty-five feet in length, and was soon nearly exterminated by Behring's party and other voyagers who visited the island. The last one of which there is any record was killed in 1854.[55]

To the above may be added the *Didunculus*, a species of ground-pigeon peculiar to the Samoa Islands, and the *Nestor productus*, a parrot of Norfolk Island. An extended list might be prepared, from fossil evidences, of other species which were at one time associated with those I have enumerated.

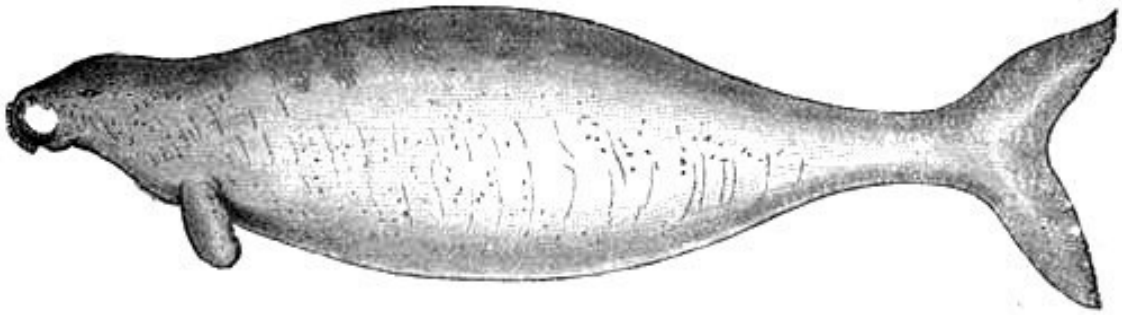

Fig. 18. – Rhytina Stelleri. (*From "The Voyage of the 'Vega.'"*)

Papteryx, of *Nestor*, and of *Notornis*. One survivor of the latter was obtained by Mr. Gideon Mantell, and described by my father, Mr. John Gould, in 1850. I believe the Nestor is still, rarely, met with. Mr. Mantell is of opinion that the Moa and his congeners continued in existence long after the advent of the aboriginal Maori. Mr. Mantell discovered a gigantic fossil egg, presumably that of the Moa.

[55] A. E. Nordenskjöld, *The Voyage of the 'Vega,'* vol. i. p. 272, *et seq.* London, 1881.

In conclusion, I may point out that that excellent naturalist Pliny[56] records the disappearance, in his days, of certain species formerly known. He mentions the Incendiary, the Clivia, and the Subis (species of birds), and states that there were many other birds mentioned in the Etruscan ritual, which were no longer to be found in his time. He also says that there had been a bird in Sardinia resembling the crane, and called the Gromphæna, which was no longer known even by the people of the country.

Local Extinction

Of local extinction we may note in our own island the cases of the beaver, the bear, the wolf, the wild cattle, the elk, the wild boar, the bustard, and the capercailzie; of these the beaver survived in Wales and Scotland until the time of Giraldus Cambrensis in 1188, and Pennant notes indications of its former existence in the names of several streams and lakes in Wales. It was not uncommon throughout the greater part of Europe down to the Middle Ages.

The bear, still common in Norway and the Pyrenees, is alluded to, as Mr. Gosse points out, in the Welsh Triads,[57] which are supposed to have been compiled in the seventh century. They say that "the Kymri, a Celtic tribe, first inhabited Britain; before them were no men here, but only bears, wolves, beavers, and oxen with high prominences." Mr. Gosse adds, "The Roman poets knew of its existence here. Martial speaks of the robber Laureolis being exposed on the cross to the fangs of the Caledonian bear; and Claudian alludes to British bears. The Emperor Claudius, on his return to Rome after the conquest of this island, exhibited, as trophies, combats of British bears in the Arena. In the Penitential of Archbishop Egbert, said to have been compiled about A.D. 750, bears are mentioned as inhabiting the English forests, and the city of Norwich is said to have been required to furnish a bear annually to Edward the Confessor, together with six dogs, no doubt for baiting him."

The wolf, though greatly reduced in numbers during the Heptarchy, when Edgar laid an annual tribute of three hundred wolf-skins upon the Welsh, still occurred in formidable numbers in England in 1281, and not unfrequently until the reign of Henry VII. The last wolf was killed in Scotland in the year 1743, and in Ireland in 1770.[58]

The wild cattle are now only represented by the small herds in Chartley Castle, Chillingham, and Cadgow parks; the spare survivors probably of the species referred to by Herodotus when he speaks of "large ferocious and fleet white bulls" which abounded in the country south of Thrace, and continued in Poland, Lithuania, and Muscovy until the fifteenth century, or perhaps of the Urus described by Cæsar as little inferior to the elephant in size, and inhabiting the Hercynian forest, and believed to be identical with the *Bos primigenius* found in a fossil state in Britain.

The wild boar was once abundant in Scotland and England. The family of Baird derives its heraldic crest from a grant of David I. of Scotland, in recognition of his being saved from an infuriated boar which had turned on him. In England only nobles and gentry were allowed to hunt it, and the slaughter of one by an unauthorized person within the demesnes of William the Conqueror was punished by the loss of both eyes.[59]

The bustard, once abundant, is now extinct in Britain, so far as the indigenous race is concerned. Occasionally a chance visitant from the continent is seen; but there, also, its numbers have been greatly diminished. It was common in Buffon's time in the plains of Poitou and Champagne, though now extremely rare, and is still common in Eastern Asia.

The capercailzie, or cock of the woods, after complete extinction, has been reintroduced from Norway, and, under protection, is moderately abundant in parts of Scotland.

---

[56] Pliny, *Nat. Hist.*, Bk. x., chap. xvii., and Bk. xxx., chap. liii.

[57] *The Romance of Natural History*, by P. H. Gosse, 2nd Series, London 1875.

[58] *Pop. Sci. Monthly*, October 1878.

[59] *Excelsior*, vol. iii. London, 1855.

In America, the process of extermination marches with the settlement of the various states. W. J. J. Allen records the absolute disappearance of the walrus from the Gulf of St. Lawrence, and of the moose, the elk, and the Virginian deer, from many of the states in which they formerly abounded. This also is true, to some extent, of the bear, the beaver, the grey wolf, the panther, and the lynx.

The buffalo (*Bos americanus*) is being destroyed at the rate of two hundred and fifty thousand annually, and it is estimated that the number slain by hunters for their hides during the last forty years amounts to four millions. It has disappeared in the eastern part of the continent from many extensive tracts which it formerly inhabited.

Among the ocean whales, both the right and the sperm have only been preserved from extinction by the fortunate discovery of petroleum, which has reduced the value of their oil, and thus lessened considerably the number of vessels equipped for the whale fishery.

In South Africa, elephants and all other large game are being steadily exterminated within the several colonies.

In Australia, we find that the seals which thronged the islands of Bass's Straits in countless thousands, at the period when Bass made his explorations there, have utterly disappeared. The bulk of them were destroyed by seal-hunters from Sydney within a few years after his discovery. The lamentable records of the *Sydney Gazette* of that period show this, for they detail the return to port, after a short cruise, of schooners laden with from twelve to sixteen thousand skins each. The result of this has been that for many years past the number of seals has been limited to a few individuals, to be found on one or two isolated rocks off Clarke's Island, and on Hogan's group.

The great sea-elephant, which, in Peron's time, still migrated for breeding purposes from antarctic regions to the shores of King's Island, where it is described by him as lining the long sandy beaches by hundreds, has been almost unseen there since the date of his visit, and its memory is only preserved in the names of Sea-Elephant Bay, Elephant Rock, &c. which are still inscribed on our charts.

The introduction of the Dingo, by the Australian blacks in their southward migration, is supposed to have caused the extinction of the Thylacinus (*T. cynocephalus*), or striped Australian wolf, on the main land of Australia, where it was once abundant; it is now only to be found in the remote portions of the island of Tasmania. This destruction of one species by another is paralleled in our own country by the approaching extinction of the indigenous and now very rare black rat, which has been almost entirely displaced by the fierce grey rat from Norway.

We learn from incidental passages in the *Bamboo Books*[60] that the rhinoceros, which is now unknown in China, formerly extended throughout that country. We read of King Ch'aou, named Hĕa (B.C. 980), that "in his sixteenth year [of reign] the king attacked Ts'oo, and in crossing the river Han met with a large rhinoceros." And, again, of King E, named Sëĕ (B.C. 860), that "in his sixth year, when hunting in the forest of Shay, he captured a rhinoceros and carried it home." There is also mention made – though this is less conclusive – that in the time of King Yiu, named Yeu (B.C. 313), the King of Yueh sent Kung-sze Yu with a present of three hundred boats, five million arrows, together with rhinoceros' horns and elephants' teeth.

Elephants are now unknown in China except in a domesticated state, but they probably disputed its thick forest and jungly plains with the Miaotsz, Lolos, and other tribes which held the country before its present occupants. This may be inferred from the incidental references to them in the *Shan Hai King*, a work reputed to be of great antiquity, of which more mention will be made hereafter, and from evidence contained in other ancient Chinese works which has been summarized by Mr. Kingsmill[61] as follows: —

[60] *The Chinese Classics*, vol. iii. p. 1, by James Legge, B.D.

[61] Inaugural Address by President, T. W. Kingsmill, North China Branch of the Royal Asiatic Society, 1877.

"The rhinoceros and elephant certainly lived in Honan B.C. 600. The *Tso-chuen*, commenting on the C'hun T'siu of the second year of the Duke Siuen (B.C. 605), describes the former as being in sufficient abundance to supply skins for armour. The want, according to the popular saying, was not of rhinoceroses to supply skins, but of courage to animate the wearers. From the same authority (Duke Hi XIII., B.C. 636) we learn that while T'soo (Hukwang) produced ivory and rhinoceros' skins in abundance, Tsin, lying north of the Yellow River, on the most elevated part of the Loess, was dependent on the other for its supplies of those commodities. The *Tribute of Yu* tells the same tale. Yang-chow and King (Kiangpeh and Hukwang), we are told, sent tribute of ivory and rhinoceros' hide, while Liang (Shensi) sent the skins of foxes and bears. Going back to mythical times, we find Mencius (III. ii. 9) telling how Chow Kung expelled from Lu (Shantung) the elephants and rhinoceroses, the tigers and leopards."

Mr. Kingsmill even suggests that the species referred to were the mammoth and the Siberian rhinoceros (*R. tichorhinus*).

M. Chabas[62] publishes an Egyptian inscription showing that the elephant existed in a feral state in the Euphrates Valley in the time of Thothmes III. (16th century B.C.). The inscription records a great hunting of elephants in the neighbourhood of Nineveh.

Tigers still abound in Manchuria and Corea, their skins forming a regular article of commerce in Vladivostock, Newchwang, and Seoul. They are said to attain larger dimensions in these northern latitudes than their southern congener, the better-known Bengal tiger. They are generally extinct in China Proper; but Père David states that he has seen them in the neighbourhood of Pekin, in Mongolia, and at Moupin, and they are reported to have been seen near Amoy. Within the last few years[63] a large specimen was killed by Chinese soldiery within a few miles of the city of Ningpo; and it is probable that at no distant date they ranged over the whole country from Hindostan to Eastern Siberia, as they are incidentally referred to in various Chinese works – the *Urh Yah* specially recording the capture of a white tiger in the time of the Emperor Süen of the Han dynasty, and of a black one, in the fourth year of the reign of Yung Kia, in a netted surround in Kien Ping Fu in the district of Tsz Kwei.

The tailed deer or Mi-lu (*Cervus Davidianus* of Milne Edwardes), which Chinese literature[64] indicates as having once been of common occurrence throughout China, is now only to be found in the Imperial hunting grounds south of Peking, where it is restricted to an enclosure of fifty miles in circumference. It is believed to exist no longer in a wild state, as no trace of it has been found in any of the recent explorations of Asia. The *Ch'un ts'iu* (B.C. 676) states that this species appeared in the winter of that year, in such numbers that it was chronicled in the records of Lu (Shantung), and that in the following autumn it was followed by an inroad of "Yih," which Mr. Kingsmill believes to be the wolf.

There also appears reason to suppose that the ostrich had a much more extended range than at present; for we find references in the *Shi-Ki*,[65] or book of history of Szema Tsien, to "large birds with eggs as big as water-jars" as inhabiting T'iaou-chi, identified by Mr. Kingsmill as Sarangia or Drangia; and, in speaking of Parthia, it says, "On the return of the mission he sent envoys with it that they might see the extent and power of China. He sent with them, as presents to the Emperor, eggs of the great bird of the country, and a curiously deformed man from Samarkand."

The gigantic Chelonians which once abounded in India and the Indian seas are now entirely extinct; but we have had little difficulty in believing the accounts of their actual and late existence

---

[62] Chabas, *Études sur l'Antiquité Historique, d'après les sources Égyptiennes*.

[63] Subsequently to 1874.

[64] O. F. von Mollendorf, *Journal* of North China Branch of the Royal Asiatic Society, New Series, No. 2, and T. W. Kingsmill, "The Border Lands of Geology and History," *Journal* of North China Branch of the Royal Asiatic Society, 1877.

[65] "Intercourse of China with Eastern Turkestan and the adjacent country in the second century B.C.," T. W. Kingsmill, *Journal* of North China Branch of the Royal Asiatic Society, New Series, No. 14.

contained in the works of Pliny and Ælian since the discovery of the Colossochelys, described by Dr. Falconer, in the Upper Miocene deposits of the Siwalik Hills in North-Western India. The shell of *Colossochelys Atlas* (Falconer and Cautley) measured twelve feet, and the whole animal nearly twenty.

Pliny,[66] who published his work on Natural History about A.D. 77, states that the turtles of the Indian Sea are of such vast size that a single shell is sufficient to roof a habitable cottage, and that among the islands of the Red Sea the navigation is mostly carried on in boats formed from this shell.

Ælian,[67] about the middle of the third century of our era, is more specific in his statement, and says that the Indian river-tortoise is very large, and in size not less than a boat of fair magnitude; also, in speaking of the Great Sea, in which is Taprobana (Ceylon), he says: "There are very large tortoises generated in this sea, the shell of which is large enough to make an entire roof; for a single one reaches the length of fifteen cubits, so that not a few people are able to live beneath it, and certainly secure themselves from the vehement rays of the sun; they make a broad shade, and so resist rain that they are preferable for this purpose to tiles, nor does the rain beating against them sound otherwise than if it were falling on tiles. Nor, indeed, do those who inhabit them have any necessity for repairing them, as in the case of broken tiles, for the whole roof is made out of a solid shell so that it has the appearance of a cavernous or undermined rock, and of a natural roof."

El Edrisi, in his great geographical work,[68] completed A.D. 1154, speaks of them as existing down to his day, but as his book is admitted to be a compilation from all preceding geographical works, he may have been simply quoting, without special acknowledgment, the statements given above. He says, speaking of the Sea of Herkend (the Indian Ocean west of Ceylon), "It contains turtles twenty cubits long, containing within them as many as one thousand eggs." Large tortoises formerly inhabited the Mascarene islands, but have been destroyed on all of them, with the exception of the small uninhabited Aldabra islands, north of the Seychelle group; and those formerly abundant on the Galapagos islands are now represented by only a few survivors, and the species rapidly approaches extinction.

I shall close this chapter with a reference to a creature which, if it may not be entitled to be called "the dragon," may at least be considered as first cousin to it. This is a lacertilian of large size, at least twenty feet in length, panoplied with the most horrifying armour, which roamed over the Australian continent during Pleistocene times, and probably until the introduction of the aborigines.

Its remains have been described by Professor Owen in several communications to the Royal Society,[69] under the name of *Megalania prisca*. They were procured by Mr. G. F. Bennett from the drift-beds of King's Creek, a tributary of the Condamine River in Australia. It was associated with correspondingly large marsupial mammals, now also extinct.

From the portions transmitted to him Professor Owen determined that it presented in some respects a magnified resemblance of the miniature existing lizard, *Moloch horridus*, found in Western Australia,[70] of which Dr. Gray remarks, "The external appearance of this lizard is the most ferocious of any that I know." In Megalania the head was rendered horrible and menacing by horns projecting from its sides, and from the tip of the nose, which would be "as available against the attacks of Thylacoleo as the buffalo's horns are against those of the South African lion." The tail consisted of a series of annular segments armed with horny spikes, represented by the less perfectly developed ones in the existing species *Uromastix princeps* from Zanzibar, or in the above-mentioned moloch. In regard to these the Professor says, "That the horny sheaths of the above-described supports or cores arming the end of the tail may have been applied to deliver blows upon an assailant, seems not

---

[66] *The Natural History of Pliny.* Translated by J. Bostock and H. T. Biley, 6 vols. Bohn, London, 1857.

[67] *Æliani de Natura Animalium*, F. Jacobs. Jenæ, 1832.

[68] *Géographie d'Edrisi, traduite de l'Arabe en Français*, P. Amédée Jaubert, 2 vols. Paris, 1836.

[69] *Phil. Trans.*, vol. cxlix. p. 43, 1859; vol. clxxi. p. 1,037, 1880; vol. clxxii. p. 547, 1881.

[70] Description of some New Species and Genera of Reptiles from Western Australia, discovered by John Gould, Esq., *Annals and Magazine of Natural History*, vol. vii. p. 88, 1841.

improbable, and this part of the organization of the great extinct Australian dragon may be regarded, with the cranial horn, as parts of both an offensive and defensive apparatus."

The gavial of the Ganges is reported to be a fish-eater only, and is considered harmless to man. The Indian museums, however, have large specimens, which are said to have been captured after they had destroyed several human beings; and so we may imagine that this structurally herbivorous lizard (the Megalania having a horny edentate upper jaw) may have occasionally varied his diet, and have proved an importunate neighbour to aboriginal encampments in which toothsome children abounded, and that it may, in fact, have been one of the sources from which the myth of the Bunyip, of which I shall speak hereafter, has been derived.

CHAPTER III.
ANTIQUITY OF MAN

I do not propose to bestow any large amount of space upon the enumeration of the palæontological evidence of the antiquity of man. The works of the various eminent authors who have devoted themselves to the special consideration of this subject exhaust all that can be said upon it with our present data, and to these I must refer the reader who is desirous of acquainting himself critically with its details, confining myself to a few general statements based on these labours.

In the early days of geological science when observers were few, great groups of strata were arranged under an artificial classification, which, while it has lost to a certain extent the specific value which it then assumed to possess, is still retained for purposes of convenient reference. Masters of the science acquired, so to say, a possessive interest in certain regions of it, and the names of Sedgwick, Murchison, Jukes, Phillips, Lyell, and others became, and will remain, inseparably associated with the history of those great divisions of the materials of the earth's crust, which, under the names of the Cambrian, Silurian, Devonian, Carboniferous, and Tertiary formations, have become familiar to us.

In those days, when observations were limited to a comparatively small area, the lines separating most of these formations were supposed to be hard and definite; forms of life which characterized one, were presumed to have become entirely extinct before the inauguration of those which succeeded them, and breaks in the stratigraphical succession appeared to justify the opinion, held by a large and influential section, that great cataclysms or catastrophes had marked the time when one age or formation terminated and another commenced to succeed it.

By degrees, and with the increase of observers, both in England and in every portion of the world, modifications of these views obtained; passage beds were discovered, connecting by insensible gradations formations which had hitherto been supposed to present the most abrupt separations; transitional forms of life connecting them were unearthed; and an opinion was advanced, and steadily confirmed, which at the present day it is probable no one would be found to dispute, that not all in one place or country, but discoverable in some part or other of the world, a perfect sequence exists, from the very earliest formations of which we have any cognizance, up to the alluvial and marine deposits in process of formation at the present day.[71]

Correlatively it was deduced that the same phenomena of nature have been in action since the earliest period when organic existence can be affirmed. The gradual degradation of pre-existing continents by normal destructive agencies, the upheaval and subsidence of large areas, the effusion from volcanic vents, into the air or sea, of ashes and lavas, the action of frost and ice, of heat, rain, and sunshine – all these have acted in the past as they are still acting before our eyes.

In earlier days, arguing from limited data, a progressive creation was claimed which confined the appearance of the higher form of vertebrate life to a successive and widely-stepped gradation.

[71] "We shall, I think, eventually more fully recognise that, as is the case with the periods of the day, each of the larger geological divisions follows the other, without any actual break or boundary; and that the minor subdivisions are like the hours on the clock, useful and conventional rather than absolutely fixed by any general cause in Nature." – Annual Address, President of Geological Society, 1875."With regard to stratigraphical geology, the main foundations are already laid, and a great part of the details filled in. The tendency of modern discoveries has already been, and will probably still be, to fill up those breaks, which, according to the view of many, though by no means all geologists, are so frequently assumed to exist between different geological periods and to bring about a more full recognition of the continuity of geological time. As knowledge increases, it will, I think, become more and more apparent that all existing divisions of time are to a considerable extent local and arbitrary. But, even when this is fully recognised, it will still be found desirable to retain them, if only for the sake of convenience and approximate precision." – Annual Address, President of Geological Society, 1876.

Hugh Miller, and other able thinkers, noted with satisfaction the appearance, first of fish, then of reptiles, next of birds and mammals, and finally, as the crowning work of all, both geologically and actually, quite recently of man.

This wonderful confirmation of the Biblical history of creation appealed so gratefully to many, that it caused for a time a disposition to cramp discovery, and even to warp the facts of science, in order to make them harmonize with the statements of Revelation. The alleged proofs of the existence of pre-historic man were for a long time jealously disputed, and it was only by slow degrees that they were admitted, that the tenets of the Darwinian school gained ground, and that the full meaning was appreciated of such anomalies as the existence at the present day of Ganoid fishes both in America and Europe, of true Palæozoic type, or of Oolitic forms on the Australian continent and in the adjacent seas.

But step by step marvellous palæontological discoveries were made, and the pillars which mark the advent of each great form of life have had to be set back, until now no one would, I think, be entirely safe in affirming that even in the Cambrian, the oldest of all fossiliferous formations, vestiges of mammals, that is to say, of the highest forms of life, may not at a future day be found, or that the records contained between the Cambrian and the present day, may not in fact be but a few pages as compared with the whole volume of the world's history.[72]

It is with the later of these records that we have to deal, in which discoveries have been made sufficiently progressive to justify the expectation that they have by no means reached their limit, and sufficiently ample in themselves to open the widest fields for philosophic speculation and deduction.

Before stating these, it may be premised that estimates have been attempted by various geologists of the collective age of the different groups of formations.[73] These are based on reasonings which for the most part it is unnecessary to give in detail, in so much as these can scarcely yet be considered to have passed the bounds of speculation, and very different results can be arrived at by theorists according to the relative importance which they attach to the data employed in the calculation.

Thus Mr. T. Mellard Reade, in a paper communicated to the Royal Society in 1878, concludes that the formation of the sedimentary strata must have occupied at least six hundred million years: which he divides in round numbers as follows: —

---

[72] "It was not until January 1832, that the second volume of the *Principles* was published, when it was received with as much favour as the first had been. It related more especially to the changes in the organic world, while the former volume had treated mainly of the inorganic forces of nature. Singularly enough, some of the points which were seized on by his great fellow-labourer Murchison for his presidential address to this Society in 1832, as subjects for felicitation, are precisely those which the candid mind of Lyell, ever ready to attach the full value to discoveries or arguments from time to time brought forward, even when in opposition to his own views, ultimately found reason to modify. We can never, I think, more highly appreciate Sir Charles Lyell's freshness of mind, his candour and love of truth, than when we compare certain portions of the first edition of the *Principles* with those which occupy the same place in the last, and trace the manner in which his judicial intellect was eventually led to conclusions diametrically opposed to those which he originally held. To those acquainted only with the latest editions of the *Principles*, and with his *Antiquity of Man*, it may sound almost ironical in Murchison to have written, 'I cannot avoid noticing the clear and impartial manner in which the untenable parts of the dogmas concerning the alteration and transmutation of species and genera are refuted, and how satisfactorily the author confirms the great truth of the recent appearance of man upon our planet.'"By the work (*Principles of Geology*, vol. iii.), as a whole, was dealt the most telling blow that had ever fallen upon those to whom it appears 'more philosophical to speculate on the possibilities of the past than patiently to explore the realities of the present,' while the earnest and careful endeavour to reconcile the former indications of change with the evidence of gradual mutation now in progress, or *which may be* in progress, received its greatest encouragement. The doctrines which Hutton and Playfair had held and taught assumed new and more vigorous life as better principles were explained by their eminent successor, and were supported by arguments which, as a whole, were incontrovertible." – Annual Address, President of Geological Society, 1876."But, as Sir Roderick Murchison has long ago proved, there are parts of the record which are singularly complete, and in those parts we have the proof of creation without any indication of development. The Silurian rocks, as regards oceanic life, are perfect and abundant in the forms they have preserved. *Yet there are no fish.* The Devonian age followed tranquilly and without a break, and in the Devonian sea, suddenly, fish appear, appear in shoals, and in form of the highest and most perfect type." – The Duke of Argyll, *Primeval Man*, p. 45, London, 1869.

[73] T. Mellard Reade, "Limestone as an Index of Geological Time," *Proceedings*, Royal Society, London, vol. xxviii., p. 281.

	Millions of Years.
Laurentian, Cambrian, and Silurian	200
Old Red, Carboniferous, Permian, and New Red	200
Jurassic, Wealden, Cretaceous, Eocene, Miocene, Pliocene, and Post Pliocene	200
	600

He estimates the average thickness of the sedimentary crust of the earth to be at least one mile, and from a computation of the proportion of carbonate and sulphate of lime to materials held in suspension in various river-waters from a variety of formations, infers that one-tenth of this crust is calcareous.

He estimates the annual flow of water in all the great river-basins, the proportion of rain-water running off the granitic and trappean rocks, the percentage of lime in solution which they carry down, and arrives at the conclusion that the minimum time requisite for the elimination of the calcareous matter contained in the sedimentary crust of the earth, is at least six hundred millions of years.

A writer in the *Gentleman's Magazine*[74] (Professor Huxley?), whose article I am only able to quote at second-hand, makes an estimate which, though much lower than the above, is still of enormous magnitude, as follows: —

	Feet.	Years.
Laurentian	30,000	30,000,000
Cambrian	25,000	25,000,000
Silurian	6,000	6,000,000
Old Red and Devonian	10,000	10,000,000
Carboniferous	12,000	12,000,000
Secondary	10,000	10,000,000
Tertiary and Post Tertiary	1,000	1,000,000
Gaps and unrepresented strata	6,000	6,000,000
	Total	00,000,000

Mr. Darwin, arguing upon Sir W. Thompson's estimate of a minimum of ninety-eight and maximum of two hundred millions of years since the consolidation of the crust, and on Mr. Croll's estimate of sixty millions, as the time elapsed since the Cambrian period, considers that the latter is quite insufficient to permit of the many and great mutations of life which have certainly occurred since then. He judges from the small amount of organic change since the commencement of the glacial epoch, and adds that the previous one hundred and forty million years can hardly be considered

[74] *Scientific American*, Supplement, February 1881.

as sufficient for the development of the varied forms of life which certainly existed towards the close of the Cambrian period.

On the other hand, Mr. Croll considers that it is utterly impossible that the existing order of things, as regards our globe, can date so far back as anything like five hundred millions of years, and, starting with referring the commencement of the Glacial epoch to two hundred and fifty thousand years ago, allows fifteen millions since the beginning of the Eocene period, and sixty millions of years in all since the beginning of the Cambrian period. He bases his arguments on the limit to the age of the sun's heat as detailed by Sir William Thompson.

Sir Charles Lyell and Professor Haughton respectively estimated the expiration of time from the commencement of the Cambrian at two hundred and forty and two hundred millions of years, basing their calculations on the rate of modification of the species of mollusca, in the one case, and on the rate of formation of rocks and their maximum thickness, in the other.

This, moreover, is irrespective of the vast periods during which life must have existed, which on the development theory necessarily preceded the Cambrian, and, according to Mr. Darwin, should not be less than in the proportion of five to two.

In fine, one school of geologists and zoologists demand the maximum periods quoted above, to account for the amount of sedimentary deposit, and the specific developments which have occurred; the other considers the periods claimed as requisite for these actions to be unnecessary, and to be in excess of the limits which, according to their views, the physical elements of the case permit.

Mr. Wallace, in reviewing the question, dwells on the probability of the rate of geological changes having been greater in very remote times than it is at present, and thus opens a way to the reconciliation of the opposing views so far as one half the question is concerned.

Having thus adverted to the principles upon which various theorists have in part based their attacks on the problem of the estimation of the duration of geological ages, I may now make a few more detailed observations upon those later periods during which man is, now, generally admitted to have existed, and refer lightly to the earlier times which some, but not all, geologists consider to have furnished evidences of his presence.

I omit discussing the doubtful assertions of the extreme antiquity of man, which come to us from American observers, such as are based on supposed footprints in rocks of secondary age, figured in a semi-scientific and exceedingly valuable popular journal. There are other theories which I omit, both because they need further confirmation by scientific investigators, and because they deal with periods so remote as to be totally devoid of significance for the argument of this work.

Nor, up to the present time, are the evidences of the existence of man during Miocene and Pliocene times admitted as conclusive. Professor Capellini has discovered, in deposits recognised by Italian geologists as of Pliocene age, cetacean bones, which are marked with incisions such as only a sharp instrument could have produced, and which, in his opinion, must be ascribed to human agency. To this view it is objected that the incisions might have been made by the teeth of fishes, and further evidence is waited for.

Not a few discoveries have been made, apparently extending the existence of man to a much more remote antiquity, that of Miocene times. M. l'Abbé Bourgeois has collected, from undoubted Miocene strata at Thenay, supposed flint implements which he conceives to exhibit evidences of having been fashioned by man, as well as stones showing in some cases traces of the action of fire, and which he supposes to have been used as pot-boilers. M. Carlos Ribeiro has made similar discoveries of worked flints and quartzites in the Pliocene and Miocene of the Tagus; worked flint has been found in the Miocene of Aurillac (Auvergne) by M. Tardy, and a cut rib of *Halitherium fossile*, a Miocene species, by M. Delaunay at Pouancé.

Very divided opinions are entertained as to the interpretation of the supposed implements discovered by M. l'Abbé Bourgeois. M. Quatrefages, after a period of doubt, has espoused the view of their being of human origin, and of Miocene age. "Since then," he says, "fresh specimens discovered

have removed my last doubts. A small knife or scraper, among others, which shows a fine regular finish, can, in my opinion, only have been shaped by man. Nevertheless, I do not blame those of my colleagues who deny or still doubt. In such a matter there is no very great urgency, and, doubtless, the existence of Miocene man will be proved, as that of Glacial and Pliocene has been, by facts." Mr. Geikie, from whose work —*Prehistoric Europe*– I have summarized the above statements, says, in reference to this question: "There is unquestionably much force in what M. Quatrefages says; nevertheless, most geologists will agree with him that the question of man's Miocene age still remains to be demonstrated by unequivocal evidence. At present, all that we can safely say is, that man was probably living in Europe near the close of the Pliocene period, and that he was certainly an occupant of our continent during glacial and interglacial times."

Professor Marsh considers that the evidence, as it stands to-day, although not conclusive, "seems to place the first appearance of man [in America] in the Pliocene, and that the best proofs of this are to be found on the Pacific coast." He adds: "During several visits to that region many facts were brought to my knowledge which render this more than probable. Man, at this time, was a savage, and was doubtless forced by the great volcanic outbreaks to continue his migration. This was at first to the south, since mountain chains were barriers on the east," and "he doubtless first came across Behring's Straits."

I have hitherto assumed a certain acquaintance, upon the part of the general reader, with the terms Eocene, Miocene, and Pliocene, happily invented by Sir Charles Lyell to designate three of the four great divisions of the Tertiary age. These, from their universal acceptation and constant use, have "become familiar in our mouths as household words." But it will be well, before further elaborating points in the history of these groups, bearing upon our argument, to take into consideration their subdivisions, and the equivalent or contemporary deposits composing them in various countries. This can be most conveniently done by displaying these, in descending order, in a tabular form, which I accordingly annex below. This is the more desirable as there are few departments in geological science which have received more attention than this; or in which greater returns, in the shape of important and interesting discoveries relative to man's existence, have been made.

Comparatively recent – comparatively, that is to say, with regard to the vast æons that preceded them, but extending back over enormous spaces of time when contrasted with the limited duration of written history, – they embrace the period during which the mainly existing distribution of land and ocean has obtained, and the present forms of life have appeared by evolution from preceding species, or, as some few still maintain, by separate and special creation.

THE TERTIARY OR CAINOZOIC AGE.

Man's range, according to l'Abbé Bourgeois, Quatrefages, and others.	Man's range according to Capellini, Marsh, and others.	Man's range, generally admitted.	1. Recent 2. Post Glacial 3. Pleistocene or Quaternary (including Glacial formation)	Post Tertiary	
			4. Newer Pliocene 5. Older Pliocene	Pliocene	Tertiary or Cainozoic.
			6. Upper Miocene 7. Lower Miocene	Miocene	
			8. Upper Eocene 9. Middle do. 10. Lower do.	Eocene	

PLIOCENE.

		BRITAIN.
Newer Pliocene.	Many shells abundant, such as	Norwich *Sand loam and gravel* Marine, land, and fresh-water shells Fusus striatus " antiquus Tunitella communis Cardium edule, still existing in adjacent sea. Norwich Crag.
Older Pliocene.	Crag	Red, White, or Coralline

MIOCENE.

	BRITAIN.	FRANCE.	OTHER COUNTRIES OF EUROPE.		INDIA.	AMERICA.
UPPER MIOCENE.	Ferruginous sands of the North downs.	Faluns of Touraine and Bordeaux.	Edgehem beds Diest sands Boldeberg beds	Belgium	Fresh-water deposits of	Fresh-water deposits in Oregon
	Terebratula grandis.	*Dinotherium.* *Mastodon.* *Lamartine.*	Superga beds	Italy	Siwalik hills	
	Astarte pyrula with other shells common to the Crag.	Marine shells such as *Cypræa, Oliva, Mitra, Conus,* indicative of an elevated temperature.	Deposits of Pikermé with *Mastodon* *Dinotherium* *Hipparion* *Antelope* *Camelopardalis*	Greece	with *Mastodon* *Sivatherium* *Colossochelys*	White river group in the Upper Missouri Regions *Oreodont* *Brontetherium.*
		Fresh-water deposits of Gers near the base of the Pyrenees. *Dinotherium giganteum.*	Beds above the brown coal with Marine shells	Croatia	*Rhinoceros*	Wind river group (Fresh-water deposit).
		Mastodon angustidens.	Fresh-water Molasse at Oeningen *Abundant flora* Marine Molasse	Switzerland	*Felis* *Machairodus* *Equus*	Miocene deposits over a large part of the Atlantic Tertiary border.
	Hempstead beds, Isle of Wight.	Calcaire de la Beauce, fresh-water deposits of Auvergne, Sandstone, indusial limestone of Cantal.	Kleyn Spawn beds and Limburg beds	Belgium	*Hippotherium*	
	Marine and fresh water *Voluta* *Cyrena* *Cerithium*	Fluvio-marine strata of Merignac and Bazas?	Marine and Fluvialite shells		*Camelopardalis*	In California Miocene marine deposits reach from 4,000 to 5,000 feet in thickness.
LOWER MIOCENE.	&c. &c.	*Cerithium, Pyrula,* &c.	Most of the Lignites are Lower Miocene	Germany		
	Lignite deposits of Bovey Tracey.	*Asterias limestone.*				
		Nummulites.	Lower (fresh-water) Molasse			
	Numerous plants, such as *Sequoia Nysa Annona,* indicating a sub-tropical climate.	Fresh-water strata of Fontainebleau. Grès de Fontainebleau (Marine).				

EOCENE

The subdivisions of the Eocene have been worked out in great detail in Britain, France, and America. Those of most other countries have either not yet been fully studied or their exact equivalence remains undetermined.

	BRITAIN.		FRANCE.		CONTINENT OF EUROPE AND ASIA.	INDIA.		N. AMERICA.		S. AMERICA.
								East of the Rocky Mts.	West of the Rocky Mts.	
	A1 Bembridge Series	*Palæotherium Anoplotherium Chæropotamus &c.*	Gypseous Series of Montmatre	*Land and fresh-water shells Many quadrupeds (⅔hs of them Perrissodactyls), Trionyx, Emys*						
	A2 Osborne Series	Fresh-water & brackish genera *Do. Emys*	Calcaire Siliceux						Uinta group *Uintatherium*	
UPPER MIOCENE.	A3 Headon Series	*Trionyx Alligator Crocodilus Lepidosteus*						Vicksburg beds	Bridger group	
	A4 Barton Clay	*Voluta Mitra*	Grès de Beauchamp	*Nummulites*				The Claiborne beds are considered by Lyell as the equivalent of the Middle Eocene of Britain; the parallelism of the other American deposits has not yet been completed.	*Orohippus Dinoceras Uintatherium Tinoceras Tillotherium*	Deposits believed to be of Tertiary age, in the Pampas, contain Palæotherium and Anoplotherium, and other forms presenting a resemblance to the fauna of that period in Europe.
	B1 Bagshot and Bracklesham Sands and Clays	*Cerithium Voluta Cowries Marine Serpents Nummulites*	Calcaire Grossier	*Miliolite limestone of minute Foraminifera. Nummulites Cerithium, &c. &c.*	Nummulitic Limestone of the Alps, Carpathians N. Africa Asia Minor Western Thibet.	Nummulitic formation of Cutch, portions of the Himalaya, and frontiers of China.	[*The* Alabama Period] *Marine deposits*	Claiborne beds		
MIDDLE MIOCENE.	indicating a warm climate with a vegetation reminding the botanist of the types of tropical India and Australia							*Zeuglodon cetoides*	Green River group	
	B2 Wanting		Soissonnais Sands	*Nummulites Nerita, &c. &c.*						
	C1 London Clay and Bognor beds	*Palms Turtles Sea Snakes Crocodiles Conus, Voluta,*	Argile de Londres						Wahsatch	
LOWER MIOCENE.	*Cyprina, Nautilus,* and other shells indicating a semi-tropical climate								*Coryphodon Eohippus*	
	C2 Plastic and Mottled Clays and Sands		Argile plastique and lignite	*Fluviatile shells Large bird Gastornis Parisiensis*						
	C3 Thanet Sands	*Pholadomya Cyprina, &c.*	Sables de Bracheux					Laramic or Lignitic Period.		

We learn, both from the nature of these deposits and from their organic contents, that climatic oscillations have been passing during the whole period of their deposition over the surface of the globe, and inducing corresponding fluctuations in the character of the vegetable and animal life abounding on it. A complete collation of these varying conditions at synchronous periods remains to be achieved, but the study of our own country, and those adjacent to it, shows that alternations of tropical, boreal, and temperate climate have occurred in it; a remarkable series of conditions which has only lately been thoroughly and satisfactorily accounted for.

Thus, during a portion of the Eocene period a tropical climate prevailed, as is evidenced by deposits containing remains of palms of an equatorial type, crocodiles, turtles, tropical shells, and other remains attesting the existence of a high temperature. The converse is proved of the Pleistocene by the existence of a boreal fauna, and the widespread evidences of glacial action. The gradations of climate during the Miocene and Pliocene, and the amelioration subsequent to the glacial period, have resulted in the gradual development or appearance of specific life as it exists at present.

Corresponding indications of secular variability of climate are derived from all quarters: during the Miocene age, Greenland (in N. Lat. 70°) developed an abundance of trees, such as the yew, the Redwood, a Sequoia allied to the Californian species, beeches, planes, willows, oaks, poplars, and walnuts, as well as a Magnolia and a Zamia. In Spitzbergen (N. Lat. 78° 56′) flourished yews, hazels, poplars, alders, beeches, and limes. At the present day, a dwarf willow and a few herbaceous plants form the only vegetation, and the ground is covered with almost perpetual ice and snow.

Many similar fluctuations of climate have been traced right back through the geological record; but this fact, though interesting in relation to the general solution of the causes, has little bearing on the present purpose.

Sir Charles Lyell conceived that all cosmical changes of climate in the past might be accounted for by the varying preponderance of land in the vicinity of the equator or near the poles, supplemented, of course, in a subordinate degree by alteration of level and the influence of ocean currents. When, for example, at any geological period the excess of land was equatorial, the ascent and passage northwards of currents of heated air would, according to his view, render the poles habitable; while, *per contrâ*, the excessive massing of land around the pole, and absence of it from the equator, would cause an arctic climate to spread far over the now temperate latitudes.

The correctness of these inferences has been objected to by Mr. James Geikie and Dr. Croll, who doubt whether the northward currents of air would act as successful carriers of heat to the polar regions, or whether they would not rather dissipate it into space upon the road. On the other hand, Mr. Geikie, though admitting that the temperature of a large *unbroken* arctic continent would be low, suggests that, as the winds would be stripped of all moisture on its fringes, the interior would therefore be without accumulations of snow and ice; and in the more probable event of its being deeply indented by fjords and bays, warm sea-currents (the representatives of our present Gulf and Japan streams, but possessing a higher temperature than either, from the greater extent of equatorial sea-surface originating them, and exposed to the sun's influence) would flow northward, and, ramifying, carry with them warm and heated atmospheres far into its interior, though even these, he thinks, would be insufficient in their effects under any circumstances to produce the sub-tropical climates which are known to have existed in high latitudes.

Mr. John Evans[75] has thrown out the idea that possibly a complete translation of geographical position with respect to polar axes may have been produced by a sliding of the whole surface crust of the globe about a fluid nucleus. This, he considers, would be induced by disturbances of equilibrium of the whole mass from geological causes. He further points out that the difference between the polar and equatorial diameters of the globe, which constitutes an important objection to his theory, is materially reduced when we take into consideration the enormous depth of the ocean over a large portion of the equator, and the great tracts of land elevated considerably above the sea-level in higher latitudes. He also speculates on the general average of the surface having in bygone geological epochs approached much more nearly to that of a sphere than it does at the present time.

Sir John Lubbock favoured the idea of a change in the position of the axis of rotation, and this view has been supported by Sir H. James[76] and many later geologists.[77] If I apprehend their arguments correctly, this change could only have been produced by what may be termed geological revolutions. These are great outbursts of volcanic matter, elevations, subsidences, and the like. These having probably been almost continuous throughout geological time, incessant changes, small or great, would be demanded in the position of the axis, and the world must be considered as a globe rolling over in space with every alteration of its centre of gravity. The possibility of this view must be left for mathematicians and astronomers to determine.

Sounder arguments sustain the theory propounded by Dr. Croll (though this, again, is not universally accepted), that all these alterations of climate can be accounted for by the effects of nutation, and the precession of the equinoxes. From these changes, combined with the eccentricity of the ecliptic from the first, it results that at intervals of ten thousand five hundred years, the northern and southern hemispheres are alternately in aphelion during the winter, and in perihelion during the summer months, and *vice versâ*; or, in other words, that if at any given period the inclination of the

[75] *Proceedings*, Royal Society, vol. xv. No. 82, 1866.

[76] *Athenæum*, August 25, 1860, &c.

[77] The mass of astronomers, however, deny that this is possible to any very great extent.

earth's axis produces winter in the northern hemisphere, while the earth is at a maximum distance from that focus of its orbit in which the sun is situated, then, after an interval of ten thousand five hundred years, and as a result of the sum of the backward motion of the equinoxes along the ecliptic, at the rate of 50′ annually, the converse will obtain, and it will be winter in the northern hemisphere while the earth is at a minimum distance from the sun.

The amount of eccentricity of the ecliptic varies greatly during long periods, and has been calculated for several million years back. Mr. Croll[78] has demonstrated a theory explaining all great secular variations of climate as indirectly the result of this, through the action of sundry physical agencies, such as the accumulation of snow and ice, and especially the deflection of ocean currents. From a consideration of the tables which he has computed of the eccentricity and longitude of the earth's orbit, he refers the glacial epoch to a period commencing about two hundred and forty thousand years back, and extending down to about eighty thousand years ago, and he describes it as "consisting of a long succession of cold and warm periods; the warm periods of the one hemisphere corresponding in time with the cold periods of the other, and *vice versâ*."

Having thus spoken of the processes adopted for estimating the duration of geological ages, and the results which have been arrived at, with great probability of accuracy, in regard to some of the more recent, it now only remains to briefly state the facts from which the existence of man, during these latter periods, has been demonstrated. The literature of this subject already extends to volumes, and it is therefore obviously impossible, in the course of the few pages which the limits of this work admit, to give anything but the shortest abstract, or to assign the credit relatively due to the numerous progressive workers in this rich field of research. I therefore content myself with taking as my text-book Mr. James Geikie's *Prehistoric Europe*, the latest and most exhaustive work upon the subject, and summarizing from it the statements essential to my purpose.

From it we learn that, long prior to the ages when men were acquainted with the uses of bronze and iron, there existed nations or tribes, ignorant of the means by which these metals are utilized, whose weapons and implements were formed of stone, horn, bone, and wood.

These, again, may be divided into an earlier and a later race, strongly characterized by the marked differences in the nature of the stone implements which they respectively manufactured, both in respect to the material employed and the amount of finish bestowed upon it. To the two periods in which these people lived the terms Palæolithic and Neolithic have been respectively applied, and a vast era is supposed to have intervened between the retiring from Europe of the one and the appearance there of the other.

Palæolithic man was contemporaneous with the mammoth (*Elephas primigenius*), the woolly rhinoceros (*Rhinoceros primigenius*), the *Hippopotamus major*, and a variety of other species, now quite extinct, as well as with many which, though still existing in other regions, are no longer found in Europe; whereas the animals contemporaneous with Neolithic man were essentially the same as those still occupying it.

[78] James Croll, F.R.S., &c., *Climate and Time in their Geological Relations*.

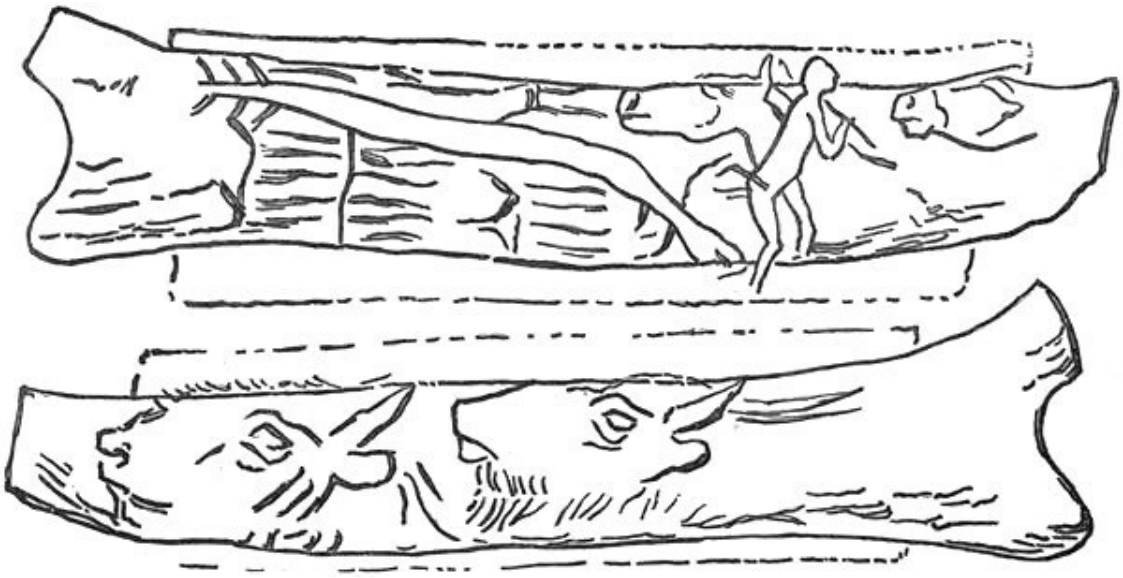

Fig. 19. – Engraving by Palæolithic Man on Reindeer Antler.[79]
(The two sides of the same piece of antler are here represented.)

The stone implements of Palæolithic man had but little variety of form, were very rudely fashioned, being merely chipped into shape, and never ground or polished; they were worked nearly entirely out of flint and chert. Those of Neolithic man were made of many varieties of hard stone, often beautifully finished, frequently ground to a sharp point or edge, and polished all over.

Palæolithic men were unacquainted with pottery and the art of weaving, and apparently had no domesticated animals or system of cultivation; but the Neolithic lake dwellers of Switzerland had looms, pottery, cereals, and domesticated animals, such as swine, sheep, horses, dogs, &c.

Implements of horn, bone, and wood were in common use among both races, but those of the older are frequently distinguished by their being sculptured with great ability or ornamented with life-like engravings of the various animals living at the period; whereas there appears to have been a marked absence of any similar artistic ability on the part of Neolithic man.

[79] Figs. 19 and 21 are taken, by permission of Edmund Christy, Esq., from *Reliquiæ Aquitanicæ*, &c., London, 1875.

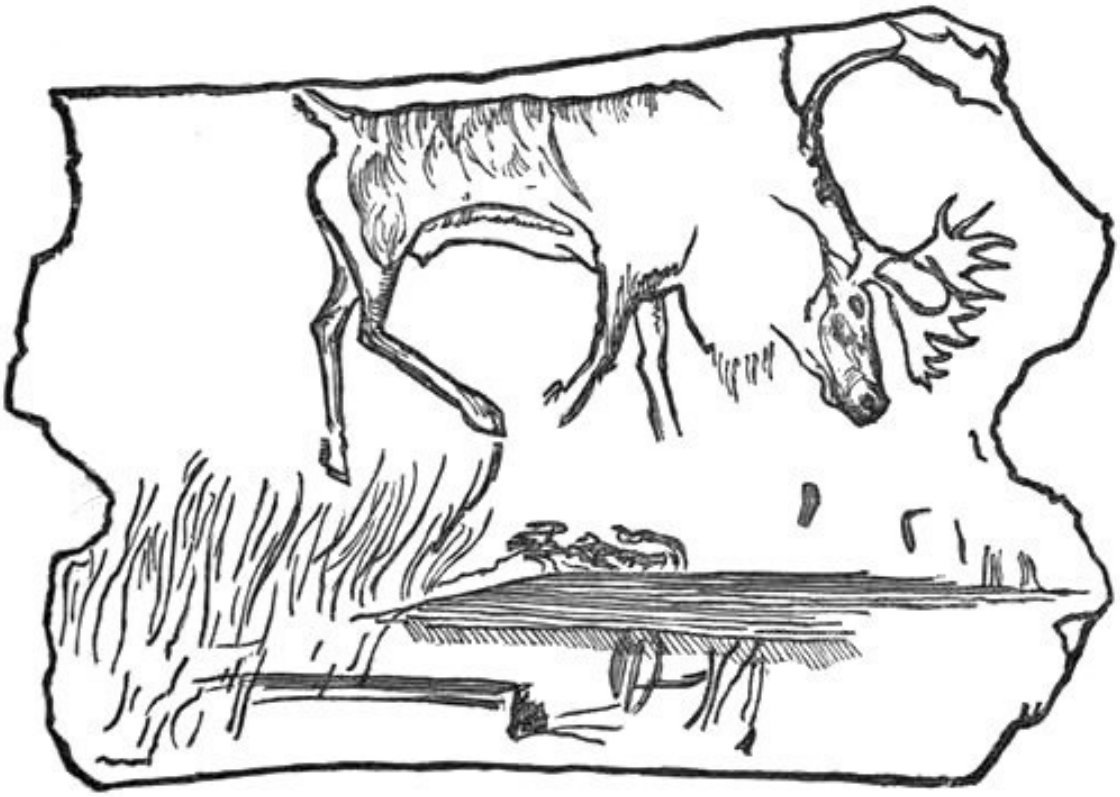

Fig. 20. – Reindeer engraved on Antler by Palæolithic Man. (*After Geikie.*)

Again, it is noticeable that, while the passage from the Neolithic age into the succeeding bronze age was gradual, and, indeed, that the use of stone implements and, in some parts, weapons, was contemporaneous with that of bronze in other places, no evidence exists of a transition from Palæolithic into Neolithic times. On the contrary, the examination of bone deposits, such as those of Kent's Cave and Victoria Cave in England, and numerous others in Belgium and France, attest "beyond doubt that a considerable period must have supervened after the departure of Palæolithic man and before the arrival of his Neolithic successor." The discovery of remains of Palæolithic man and animals in river deposits in England and on the Continent, often at considerable elevations[80] above the existing valley bottoms, and in Löss, and the identification of the Pleistocene or Quaternary period with Preglacial and Glacial times, offer a means of estimating what that lapse of time must have been.[81]

[80] In some cases as much as 150 feet.

[81] "Starting from the opinion generally accepted among geologists, that man was on the earth at the close of the Glacial epoch, Professor B. F. Mudge adduces evidence to prove that the antiquity of man cannot be less than 200,000 years."His argument, as given in the Kansas City Review of Science, is about as follows: —"After the Glacial epoch, geologists fix three distinct epochs, the Champlain, the Terrace, and the Delta, all supposed to be of nearly equal lengths."Now we have in the delta of the Mississippi a means of measuring the duration of the third of these epochs."For a distance of about two hundred miles of this delta are seen forest growths of large trees, one after the other, with interspaces of sand. There are ten of these distinct forest growths, which have begun and ended one after the other. The trees are the bald cypress (*Taxodium*) of the Southern States, and some of them were over twenty-five feet in diameter. One contained over five thousand seven hundred annual rings. In some instances these huge trees have grown over the stumps of others equally large, and such instances occur in all, or nearly all, of the ten forest beds. This gives to each forest a period of 10,000 years."Ten such periods give 100,000 years, to say nothing of the time covered by the interval between the ending of one forest and the beginning of another, an interval which in most cases was considerable."'Such evidence,' writes Professor Mudge, 'would be received in any court of law as sound and satisfactory. We do not see how such proof is to be discarded when applied to the antiquity of our race.'"There is satisfactory evidence that man lived in the Champlain epoch. But the Terrace epoch, or the greater part of it, intervenes between the Champlain and the Delta epochs, thus adding to my 100,000 years."'If only as much time is given to both those epochs as to the Delta period, 200,000 years is the total result.'" —*Popular Science Monthly*, No. 91, vol. xvi. No. 1, p. 140, November 1878.

Skeletons or portions of the skeletons of human beings, of admitted Palæolithic age, have been found in caverns in the vicinity of Liege in Belgium, by Schmerling, and probably the same date may be assigned those from the Neanderthal Cave near Düsseldorf. A complete skeleton, of tall stature, of probable but not unquestioned Palæolithic age, has also been discovered in the Cave of Mentone on the Riviera.

These positive remains yield us further inferences than can be drawn from the mere discovery of implements or fragmentary bones associated with remains of extinct animals.

The Mentone man, according to M. Rivière, had a rather long but large head, a high and well-made forehead, and the very large facial angle of 85°. In the Liege man the cranium was high and short, and of good Caucasian type; “a fair average human skull,” according to Huxley.

Other remains, such as the jaw-bone from the cave of the Naulette in Belgium, and the Neanderthal skeleton, show marks of inferiority; but even in the latter, which was the lowest in grade, the cranial capacity is seventy-five cubic inches or “nearly on a level with the mean between the two human extremes.”

We may, therefore, sum up by saying that evidences have been accumulated of the existence of man, and intelligent man, from a period which even the most conservative among geologists are unable to place at less than thirty thousand years; while most of them are convinced both of his existence from at least later Pliocene times, and of the long duration of ages which has necessarily elapsed since his appearance – a duration to be numbered, not by tens, but by hundreds of thousands of years.

Fig. 21. – Engraving by Palæolithic Man on Reindeer Antler.

CHAPTER IV.
THE DELUGE NOT A MYTH

If we assume that the antiquity of man is as great, or even approximately as great, as Sir Charles Lyell and his followers affirm, the question naturally arises, what has he been doing during those countless ages, prior to historic times? what evidences has he afforded of the possession of an intelligence superior to that of the brute creation by which he has been surrounded? what great monuments of his fancy and skill remain? or has the sea of time engulphed any that he erected, in abysses so deep that not even the bleached masts project from the surface, to testify to the existence of the good craft buried below?

These questions have been only partially asked, and but slightly answered. They will, however, assume greater proportions as the science of archæology extends itself, and perhaps receive more definite replies when fresh fields for investigation are thrown open in those portions of the old world which Asiatic reserve has hitherto maintained inviolable against scientific prospectors.

If man has existed for fifty thousand years, as some demand, or for two hundred thousand, as others imagine, has his intelligence gone on increasing thoughout the period? and if so, in what ratio? Are the terms of the series which involve the unknown quantity stated with sufficient precision to enable us to determine whether his development has been slow, gradual, and more or less uniform, as in arithmetical, or gaining at a rapidly increasing rate, as in geometric progression. Or, to pursue the simile, could it be more accurately expressed by the equation to a curve which traces an ascending and descending path, and, though controlled in reality by an absolute law, appears to exhibit an unaccountable and capricious variety of positive and negative phases, of *points d'arrêt*, nodes, and cusps.

These questions cannot yet be definitely answered; they may be proposed and argued on, but for a time the result will doubtless be a variety of opinions, without the possibility of solution by a competent arbiter.

For example, it is a matter of opinion whether the intelligence of the present day is or is not of a higher order than that which animated the *savans* of ancient Greece. It is probable that most would answer in the affirmative, so far as the question pertains to the culture of the masses only, but how will scholars decide, who are competent to compare the works of our present poets, sculptors, dramatists, logicians, philosophers, historians, and statesmen, with those of Homer, Pindar, Œschylus, Euripides, Herodotus, Aristotle, Euclid, Phidias, Plato, Solon, and the like? Will they, in a word, consider the champions of intellect of the present day so much more robust than their competitors of three thousand years ago as to render them easy victors? This would demonstrate a decided advance in human intelligence during that period; but, if this is the case, how is it that all the great schools and universities still cling to the reverential study of the old masters, and have, until quite recently, almost ignored modern arts, sciences, and languages.

We must remember that the ravages of time have put out of court many of the witnesses for the one party to the suit, and that natural decay, calamity, and wanton destruction[82] have obliterated the bulk of the philosophy of past ages. With the exceptions of the application of steam, the employment of moveable type in printing,[83] and the utilization of electricity, there are few arts and inventions

[82] Such as the destruction of the Alexandrine Library on three distinct occasions, (1) upon the conquest of Alexandria by Julius Cæsar, B.C. 48; (2) in A.D. 390; and, (3) by Amrou, the general of the Caliph Omar, in 640, who ordered it to be burnt, and so supplied the baths with fuel for six months. Again, the destruction of all Chinese books by order of Tsin Shi Hwang-ti, the founder of the Imperial branch of the Tsin dynasty, and the first Emperor of United China; the only exceptions allowed being those relating to medicine, divination, and husbandry. This took place in the year 213 B.C.

[83] The Chinese have used composite blocks (wood engraved blocks with many characters, analogous to our stereotype plates) from

which have not descended to us from remote antiquity, lost, many of them, for a time, some of them for ages, and then re-discovered and paraded as being, really and truly, something new under the sun.

Neither must we forget the oratory and poetry, the masterpieces of logical argument, the unequalled sculptures, and the exquisitely proportioned architecture of Greece, or the thorough acquaintance with mechanical principles and engineering skill evinced by the Egyptians, in the construction of the pyramids, vast temples, canals[84] and hydraulic works.[85]

Notice, also, the high condition of civilization possessed by the Chinese four thousand years ago, their enlightened and humane polity, their engineering works,[86] their provision for the proper administration of different departments of the State, and their clear and intelligent documents.[87]

---

an early period. May not the brick-clay tablets preserved in the Imperial Library at Babylon have been used for striking off impressions on some plastic material, just as rubbings may be taken from the stone drums in China: may not the cylinders with inscribed characters have been used in some way or other as printing-rollers for propagating knowledge or proclamations?

[84] As, for example, the old canal from the Nile to the Red Sea, in reference to which Herodotus says (*Euterpe*, 158), "Neco was the son of Psammitichus, and became King of Egypt: he first set about the canal that leads to the Red Sea, which Darius the Persian afterwards completed. Its length is a voyage of four days, and in width it was dug so that two triremes might sail rowed abreast. The water is drawn into it from the Nile, and it enters it a little above the city Bubastis, passes near the Arabian city Patumos, and reaches to the Red Sea." In the digging of which one hundred and twenty thousand Egyptians perished in the reign of Neco.

[85] The co-called tanks at Aden, reservoirs constructed one below the other, in a gorge near the cantonments, are as perfect now as they were when they left the hand of the contractor or royal engineer in the time of Moses.

[86] In the 29th year of the Emperor Kwei [B.C. 1559] they chiselled through mountains and tunnelled hills, according to the Bamboo Books.

[87] An interesting line of investigation might be opened up as to the origin of inventions and the date of their migrations. The Chinese claim the priority of many discoveries, such as chess, printing, issue of bank-notes, sinking of artesian wells, gunpowder, suspension bridges, the mariner's compass, &c. &c. I extract two remarkable wood-cuts from the *San Li T'u*, one appended here showing the origin of our college cap; the other, in the chapter on the Unicorn, appearing to illustrate the fable of the Sphynx.

Fig. 22. – Royal Diademof the Chen Dynasty.(*From the San Li T'u.*)I also give a series of engravings, reduced facsimiles of those contained in a celebrated Chinese work on antiquities, showing the gradual evolution of the so-called Grecian pattern or scroll ornamentation, and origination of some of the Greek forms of tripods.

Fig. 23. – Vase. Han Dynasty,
B.C. 206 *to* A.D. 23.
(*From the Poh Ku T'u.*)

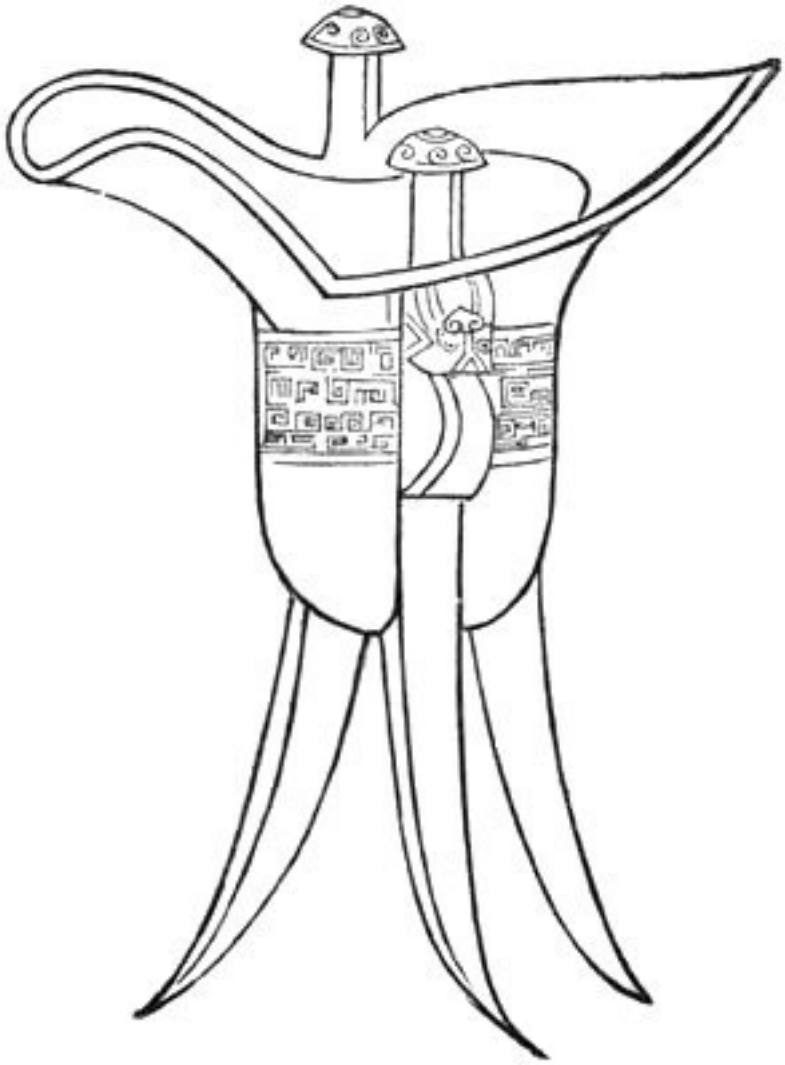

Fig. 24. – Cyathus or Cup for Libations.Shang Dynasty, B.C. 1766 *to* B.C. 1122.
(*From the Poh Ku T'u.*)

In looking back upon these, I think we can hardly distinguish any such deficiency of intellect, in comparison with ours, on the part of these our historical predecessors as to indicate so rapid a change of intelligence as would, if we were able to carry our comparison back for another similar period, inevitably land us among a lot of savages similar to those who fringe the civilization of the present period. Intellectually measured, the civilized men of eight or ten thousand years ago must, I think, have been but little inferior to ourselves, and we should have to peer very far back indeed before we reached a status or condition in which the highest type of humanity was the congener of the cave lion, disputing with him a miserable existence, shielded only from the elements by an overhanging rock, or the fortuitous discovery of some convenient cavern.

If this be so, we are forced back again to the consideration of the questions with which this section opened; where are the evidences of man's early intellectual superiority? are they limited to those deduced from the discovery of certain stone implements of the early rude, and later polished ages? and, if so, can we offer any feasible explanation either of their non-existence or disappearance?

In the first place, it may be considered as admitted by archæologists that no exact line can be drawn between the later of the two stone-weapon epochs, the polished Neolithic stone epoch, and the succeeding age of bronze. They are agreed that these overlap each other, and that the rude hunters, who contented themselves with stone implements of war and the chase, were coeval with

people existing in other places, acquainted with the metallurgical art, and therefore of a high order of intelligence. The former are, in fact, brought within the limit of historic times.

Fig. 25. – Incense Burner(?).Chen Dynasty, B.C. 1122 *to* B.C. 255.
(*From the Poh Ku T'u.*)

Fig. 26. – Tripod of the Shang Dynasty.
Probable date, B.C. 1649.
(*From the Poh Ku T'u.*)

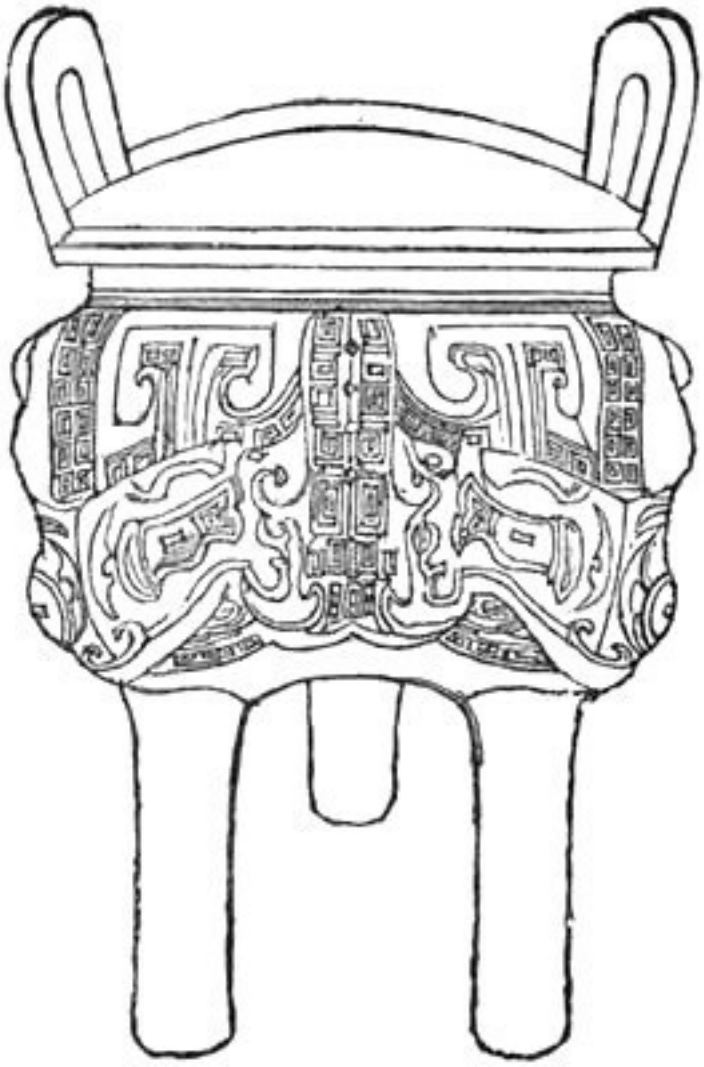

Fig. 27. – Tripod of Fu Yih,Shang Dynasty.
(*From the Poh Ku T'u.*)

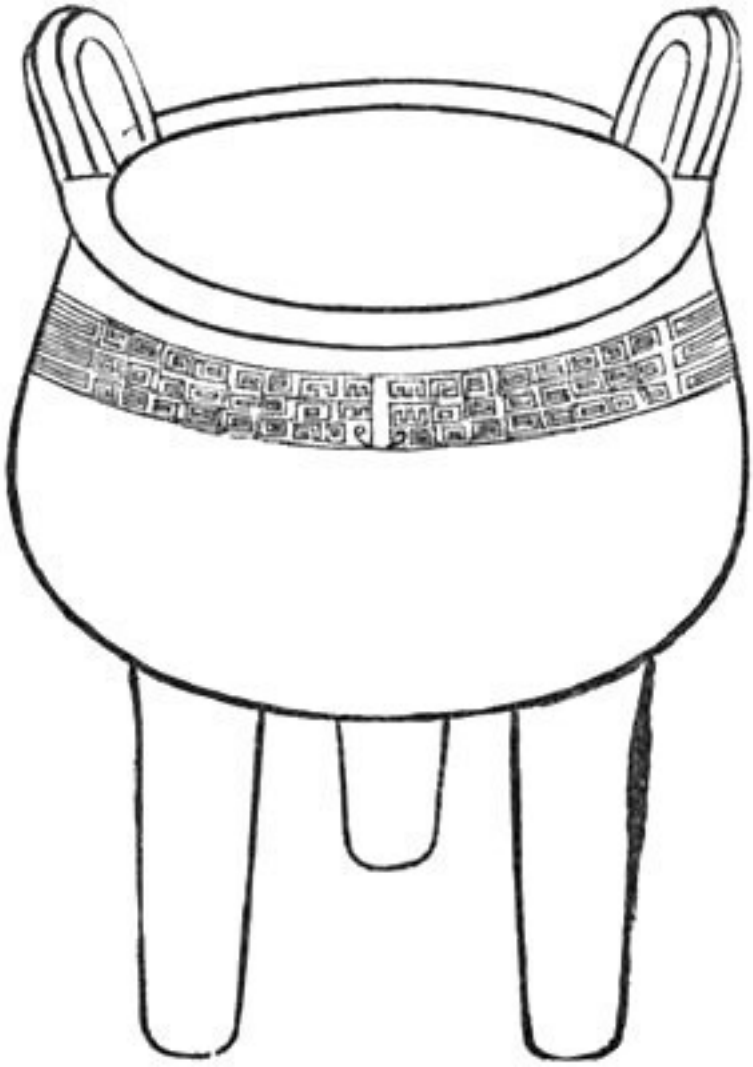

Fig. 28. – Tripod of Kwai Wan,Chen Dynasty, B.C. 1122 *to* B.C. 255
(*From the Poh Ku T'u.*)

A similar inference might not unfairly be drawn with regard to those numerous discoveries of proofs of the existence of ruder man, at still earlier periods. The flint-headed arrow of the North American Indian, and the stone hatchet of the Australian black-fellow exist to the present day; and but a century or two back, would have been the sole representatives of the constructive intelligence of humanity over nearly one half the inhabited surface of the world. No philosopher, with these alone to reason on, could have imagined the settled existence, busy industry, and superior intelligence which animated the other half; and a parallel suggestive argument may be supported by the discovery of human relics, implements, and artistic delineations such as those of the hairy mammoth or the cave-bear. These may possibly be the traces of an outlying savage who co-existed with a far more highly-organized people elsewhere,[88] just as at the present day the Esquimaux, who are by some geologists considered as the descendants of Palæolithic man, co-exist with ourselves. They, like their reputed ancestors, have great ability in carving on bone, &c.; and as an example of their capacity not only to conceive in their own minds a correct notion of the relative bearings of localities, but also to impart the idea lucidly to others, I annex a wood-cut of a chart drawn by them, impromptu, at the request of Sir J. Ross, who, inferentially, vouches for its accuracy.

[88] "The old Troglodytes, pile villagers, and bog people, prove to be quite a respectable society. They have heads so large that many a living person would be only too happy to possess such." – A. Mitchell, *The Past in the Present*, Edinburgh, 1880.

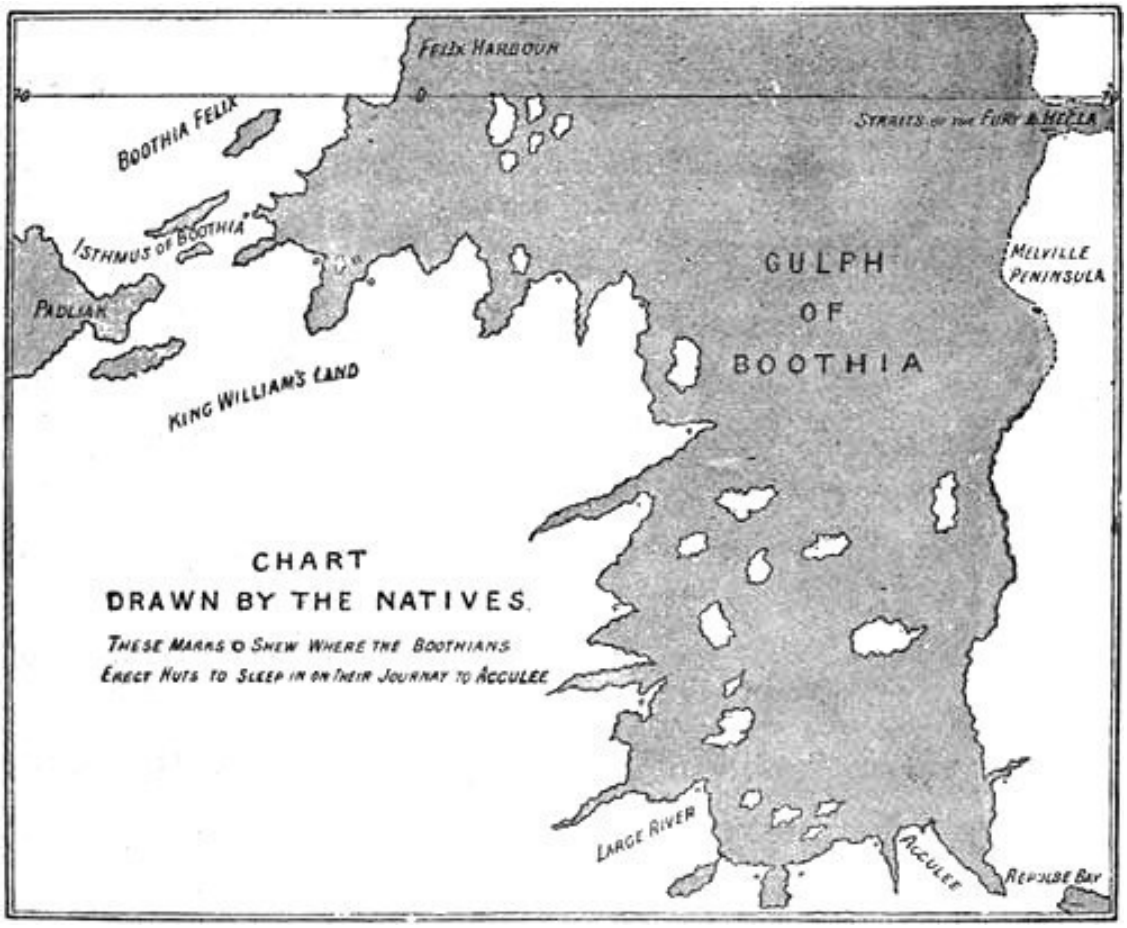

Fig. 29. (*From Sir John Ross' Second Voyage to the Arctic Regions.*)

There is but a little step between carving the figure of a mammoth or horse, and using them as symbols. Multiply them, and you have the early hieroglyphic written language of the Chinese and Egyptians. It is not an unfair presumption that at no great distance, in time or space, either some generations later among his own descendants, or so many nations' distance among his coevals, the initiative faculty of the Palæolithic savage was usefully applied to the communication of ideas, just as at a much later date the Kououen symbolic language was developed or made use of among the early Chinese.[89]

Such is, necessarily, the first stage of any written language, and it may, as I think, perhaps have occurred, been developed into higher stages, culminated, and perished at many successive epochs during man's existence, presuming it to have been so extended as the progress of geology tends to affirm.

May not the meandering of the tide of civilization westward during the last three thousand years, bearing on its crest fortune and empire, and leaving in its hollow decay and oblivion, possibly be the sequel of many successive waves which have preceded it in the past, rising, some higher, some lower, as waves will.

[89] I have given in the annexed plates a few examples of the early hieroglyphics on which the modern Chinese system of writing is based, selected from a limited number collected by the early Jesuit fathers in China, and contained in the *Mémoirs concernant l'Histoire, &c. des Chinois, par les Missionaires de Pekin*, vol. i., Paris, 1776. The modern Chinese characters conveying the same idea are attached, and their derivation from the pictorial hieroglyphics, by modification or contraction, is in nearly all cases obvious.

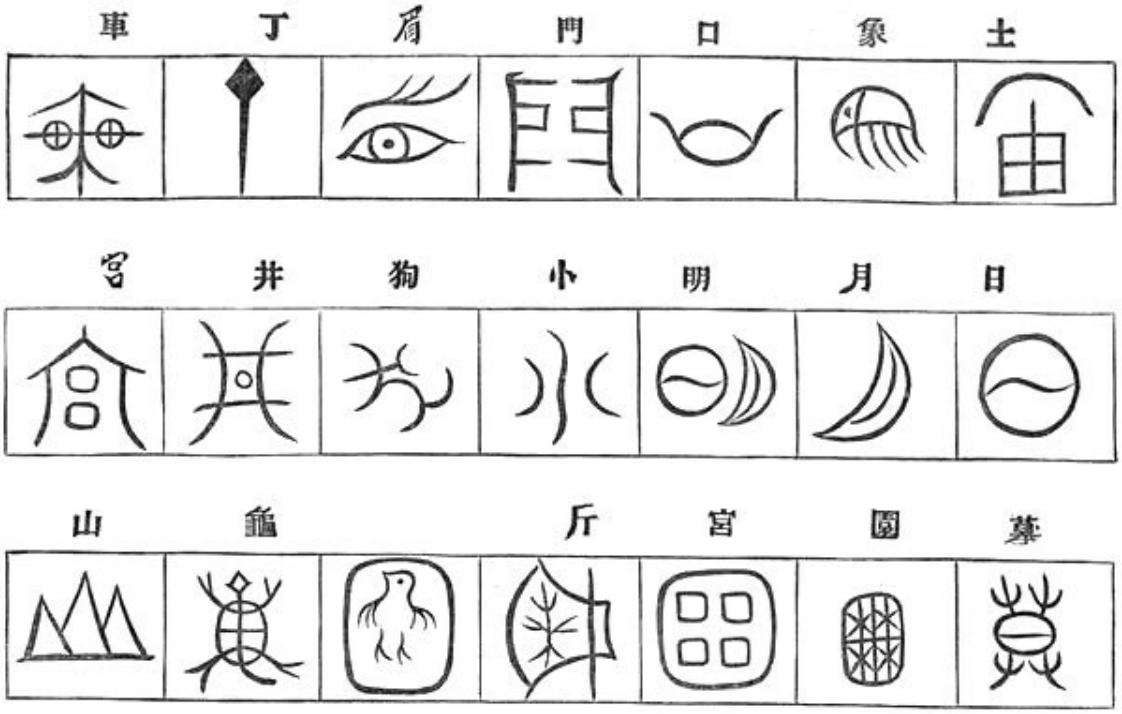

Fig. 30. – Early Chinese Hieroglyphics.

Fig. 31. – Early Chinese Hieroglyphics.

In comparison with the vast epochs of which we treat how near to us are Nineveh, Babylon, and Carthage! Yet the very sites of the former two have become uncertain, and of the last we only know by the presence of the few scattered ruins on the shores of the Mediterranean Sea. Tyre, the vast entrepôt of commerce in the days of Solomon, was stated, rightly or wrongly, by Benjamin of Tudela, to be but barely discernible (in 1173) in ruins beneath the waves; and the glory of the world, the temple of King Solomon, was represented at the same date by two copper columns which had been carried off and preserved in Rome. It is needless to quote the cases of Persia, Greece, and Rome, and of many once famous cities, which have dissolved in ruin; except as assisting to point the moral that conquest, which is always recurring, means to a great extent obliteration, the victor having no sympathy with the preservation of the time-honoured relics of the vanquished.

When decay and neglect are once initiated, the hand of man largely assists the ravages of time. The peasant carts the marbles of an emperor's palace to his lime-kiln,[90] or an Egyptian monarch strips the casing of a pyramid[91] to furnish the material for a royal residence.

Nor is it beyond the limits of possibility that the arrogant caprice of some, perhaps Mongol, invader in the future, may level the imperishable pyramids themselves for the purpose of constructing some defensive work, or the gratification of an inordinate vanity.

In later dates how many comfortable modern residences have been erected from the pillage of mediæval abbey, keep, or castle? and how many fair cities[92] must have fallen to decay, in Central and Eastern Asia, and how many numerous populations dwindled to insignificance since the days when Ghenghis and Timour led forth their conquering hordes, and Nadun could raise four hundred thousand horsemen[93] to contest the victory with Kublai Khan.

The unconscious ploughman in Britain has for centuries guided his share above the remains of Roman villas, and the inhabitants of the later city of Hissarlik were probably as ignorant that a series of lost and buried cities lay below them, as they would have been incredulous that within a thousand years their own existence would have passed from the memory of man, and their re-discovery been due only to the tentative researches of an enthusiastic admirer of Homer. Men live by books and bards longer than by the works of their hands, and impalpable tradition often survives the material vehicle which was destined to perpetuate it. The name of Priam was still a household word when the site of his palace had been long forgotten.

The vaster a city is, the more likely is it to be constructed upon the site of its own grave, or, in other words, to occupy the broad valley of some important river beneath whose gravels it is destined to be buried.

Perched on an eminence, and based on solid rock, it may escape entombment, but more swiftly and more certainly will it be destroyed by the elements,[94] and by the decomposition of its own material furnish the shroud for its envelopment.[95] It is not altogether surprising then that no older discoveries than those already quoted have yet been made, for these would probably never have resulted if tradition had not both stimulated and guided the fortunate explorer.

It is, therefore, no unfair inference that the remains of equally important, but very much more ancient cities and memorials of civilization may have hitherto entirely escaped our observation, presuming that we can show some reasonable grounds for belief that, subsequent to their completion, a catastrophe has occurred of sufficiently universal a character to have obliterated entirely the annals of the past, and to have left in the possession of its few survivors but meagre and fragmentary recollections of all that had preceded them.

Now this is precisely what the history and traditions of all nations affirm to have occurred. However, as a variance of opinion exists as to the credence which should be attached to these

---

[90] "The Porcelain Tower of Nankin, once one of the seven wonders of the world, can now only be found piecemeal in walls of peasants' huts." – Gutzlaff, *Hist. China*, vol. i. p. 372.

[91] The outer casing of the pyramid of Cheops, which Herodotus (*Euterpe*, 125) states to have still exhibited in his time an inscription, telling how much was expended (one thousand six hundred talents of silver) in radishes, onions, and garlic for the workmen, has entirely disappeared; as also, almost completely, the marble casing of the adjacent pyramid of Sen-Saophis. According to tradition the missing marbles in each instance were taken to build palaces with in Cairo.

[92] "The work of destruction was carried on methodically. From the Caspian Sea to the Indus, the Mongols ruined, within four years, more than four centuries of continuous labour have since restored. The most flourishing cities became a mass of ruins: Samarkand, Bokhara, Nizabour, Balkh, and Kandahar shared in the same destruction." – Gutzlaff, *Hist. China*, vol. i. p. 358.

[93] "An army of 700,000 Mongols met half the number of Mahommedans." —*Ibid.* p. 357.

[94] Those interested in the subject may read with great advantage the section on dynamical geology in Dana's valuable manual. He points out the large amount of wear accomplished by wind carrying sand in arid regions, by seeds falling in some crevice, and bursting rocks open through the action of the roots developed from their sprouting, to say nothing of the more ordinarily recognized destructive agencies of frost and rain, carbonic acid resulting from vegetable decomposition, &c.

[95] Darwin, in *Vegetable Mould and Earth-worms*, has shown that earthworms play a considerable part in burying old buildings, even to a depth of several feet.

traditions, I shall, before expressing my own views upon the subject, briefly epitomize those entertained by two authors of sufficient eminence to warrant their being selected as representatives of two widely opposite schools.

These gentlemen, to whom we are indebted for exhaustive papers,[96] embracing the pith of all the information extant upon the subject, have tapped the same sources of information, consulted the same authorities, ranged their information in almost identical order, argued from the same data, and arrived at diametrically opposite conclusions.

Mr. Cheyne, following the lead of Continental mythologists, deduces that the Deluge stories were on the whole propagated from several independent centres, and adopts the theory of Schirrer and Gerland that they are ether myths, without any historical foundation, which have been transferred from the sky to the earth.

M. Lenormant, upon the other hand, eliminating from the inquiry the great inundation of China in the reign of Yao, and some others, as purely local events, concludes as the result of his researches that the story of the Deluge "is a universal tradition among all branches of the human race," with the one exception of the black. He further argues: "Now a recollection thus precise and concordant cannot be a myth voluntarily invented. No religious or cosmogenic myth presents this character of universality. It must arise from the reminiscences of a real and terrible event, so powerfully impressing the imagination of the first ancestors of our race, as never to have been forgotten by their descendants. This cataclysm must have occurred near the first cradle of mankind and before the dispersion of families from which the different races of men were to spring."

Lord Arundel of Wardour adopts a similar view in many respects to that of M. Lenormant, but argues for the existence of a Deluge tradition in Egypt, and the identity of the Deluge of Yu (in China) with the general catastrophe of which the tradition is current in other countries.

The subject is in itself so inviting, and has so direct a bearing upon the argument of this work that I propose to re-examine the same materials and endeavour to show from them that the possible solutions of the question have not yet been exhausted.

We have as data: —

1. *The Biblical account.*
2. *That of Josephus.*
3. *The Babylonian.*
4. *The Hindu.*
5. *The Chinese.*
6. *The traditions of all nations in the northern hemisphere, and of certain in the southern.*

It is unnecessary to travel in detail over the well-worn ground of the myths and traditions prevalent among European nations, the presumed identity of Noah with Saturn, Janus, and the like, or the Grecian stories of Ogyges and Deucalion. Nor is anyone, I think, disposed to dispute the identity of the cause originating the Deluge legends in Persia and in India. How far these may have descended from independent sources it is now difficult to determine, though it is more than probable that their vitality is due to the written Semitic records. Nor is it necessary to discuss any unimportant differences which may exist between the text of Josephus and that of the Bible, which agree sufficiently closely, but are mere abstracts (with the omission of many important details) in comparison with the Chaldæan account. This may be accounted for by their having been only derived from oral tradition through the hands of Abraham. The Biblical narrative shows us that Abraham left Chaldæa on a nomadic enterprise, just as a squatter leaves the settled districts of Australia or America at the present day, and strikes out with a small following and scanty herd to search for, discover,

[96] Rev. T. K. Cheyne, Article "Deluge," *Encyclopædia Britannica*, 1877. François Lenormant, "The Deluge, its Traditions in Ancient Histories," *Contemporary Review*, Nov., 1879.

and occupy new country; his destiny leading him, may be for a few hundred, may be for a thousand miles. In such a train there is no room for heavy baggage, and the stone tablets containing the detailed history of the Deluge would equally with all the rest of such heavy literature be left behind.

The tradition, however reverenced and faithfully preserved at first, would, under such circumstances, soon get mutilated and dwarfed. We may, therefore, pass at once to the much more detailed accounts presented in the text of Berosus, and in the more ancient Chaldæan tablets deciphered by the late Mr. G. Smith from the collation of three separate copies.

The account by Berosus (see Appendix) was taken from the sacred books of Babylon, and is, therefore, of less value than the last-mentioned as being second-hand. The leading incidents in his narrative are similar to those contained in that of Genesis, but it terminates with the vanishing of Xisuthros (Noah) with his wife, daughter, and the pilot, after they had descended from the vessel and sacrificed to the gods, and with the return of his followers to Babylon. They restored it, and disinterred the writings left (by the pious obedience of Xisuthros) in Shurippak, the city of the Sun.

The great majority of mythologists appear to agree in assigning a much earlier date to the Deluge, than that which has hitherto been generally accepted as the soundest interpretation of the chronological evidence afforded by the Bible.

I have never had the advantage of finding the arguments on which this opinion is based, formulated in association, although, as incidentally referred to by various authors, they appear to be mainly deduced from the references made, both by sacred and profane writers, to large populations and important cities existing subsequently to the Deluge, but at so early a date, as to imply the necessity of a very long interval indeed between the general annihilation caused by the catastrophe, and the attainment of so high a pitch of civilization and so numerous a population as their existence implies.

Philologists at the same time declare that a similar inference may be drawn from the vast periods requisite for the divergence of different languages from the parent stock,[97] while the testimony of the monuments and sculptures of ancient Egypt assures us that race distinction of as marked a type as occurs at the present day existed at so early a date[98] as to preclude the possibility of the derivation of present nations from the descendants of Noah within the limited period usually allowed.

These difficulties vanish, if we consider the Biblical and Chaldean narratives as records of a local catastrophe, of vast extent perhaps, and resulting in general but not total destruction, whose sphere may have embraced the greater portion of Western Asia, and perhaps Europe; but which, while wrecking the great centres of northern civilization, did not extend southwards to Africa and Egypt.[99] The Deluge legends indigenous in Mexico at the date of the Spanish conquest, combining the Biblical incidents of the despatch of birds from a vessel with the conception of four consecutive ages terminating in general destruction, and corresponding with the four ages or Yugas of India, supply in themselves the testimony of their probable origin from Asia. The cataclysm which caused what is called the Deluge may or may not have extended to America, probably not. In a future page I shall enumerate a few of the resemblances between the inhabitants of the New World and of the Old indicative of their community of origin.

I refer the reader to M. Lenormant's valuable essay[100] for his critical notice on the dual composition of the account in Genesis, derived as it appears to be from two documents, one of which

---

[97] Bunsen estimates that 20,000 years were requisite for the formation of the Chinese language. This, however, is not conceded by other philologists.

[98] Rawlinson quotes the African type on the Egyptian sculptures as being identical with that of the negro of the present day.

[99] "While the tradition of the Deluge holds so considerable a place in the legendary memories of all branches of the Aryan race, the monuments and original texts of Egypt, with their many cosmogenic speculations, have not afforded one, even distant, allusion to this cataclysm. When the Greeks told the Egyptian priests of the Deluge of Deucalion, their reply was that they had been preserved from it as well as from the conflagration produced by Phaeton; they even added that the Hellenes were childish in attaching so much importance to that event, as there had been several local catastrophes resembling it." – Lenormant, *Contemporary Review*, November 1879.

[100] François Lenormant, "The Deluge; its Traditions in Ancient Histories," *Contemporary Review*, vol. xxxvi. p. 465.

has been called the Elohistic and the other the Jehovistic account, and for his comparison of it with the Chaldean narrative exhumed by the late Mr. George Smith from the Royal Library of Nineveh, the original of which is probably of anterior date to Moses, and nearly contemporaneous with Abraham.

I transcribe from M. Lenormant the text of the Chaldean narrative, because there are points in it which have not yet been commented on, and which, as it appears to me, assist in the solution of the Deluge story: —

> I will reveal to thee, O Izdhubar, the history of my preservation – and tell to thee the decision of the gods.
>
> The town of Shurippak, a town which thou knowest, is situated on the Euphrates. It was ancient, and in it [men did not honour] the gods. [I alone, I was] their servant, to the great gods – [The gods took counsel on the appeal of] Anu – [a deluge was proposed by] Bel – [and approved by Nabon, Nergal and] Adar.
>
> And the god [Êa,] the immutable lord, – repeated this command in a dream. – I listened to the decree of fate that he announced, and he said to me: – "Man of Shurippak, son of Ubaratutu – thou, build a vessel and finish it [quickly]. – By a [deluge] I will destroy substance and life. – Cause thou to go up into the vessel the substance of all that has life. – The vessel thou shalt build – 600 cubits shall be the measure of its length – and 60 cubits the amount of its breadth and of its height. – [Launch it] thus on the ocean and cover it with a roof." – I understood, and I said to Êa, my lord: – "[The vessel] that thou commandest me to build thus, – [when] I shall do it – young and old [shall laugh at me]." – [Êa opened his mouth and] spoke. – He said to me, his servant: – "[If they laugh at thee] thou shalt say to them: [Shall be punished] he who has insulted me, [for the protection of the gods] is over me. – … like to caverns … – … I will exercise my judgment on that which is on high and that which is below … – … Close the vessel … – … At a given moment that I shall cause thee to know, – enter into it, and draw the door of the ship towards thee. – Within it, thy grains, thy furniture, thy provisions, – thy riches, thy men-servants, and thy maid-servants, and thy young people – the cattle of the field and the wild beasts of the plain that I will assemble – and that I will send thee, shall be kept behind thy door." – Khasisatra opened his mouth and spoke; – he said to Êa, his lord: – "No one has made [such a] ship. – On the prow I will fix … – I shall see … and the vessel … – the vessel thou commandest me to build [thus] – which in …[101]
>
> On the fifth day [the two sides of the bark] were raised. – In its covering fourteen in all were its rafters – fourteen in all did it count above. – I placed its roof and I covered it. – I embarked in it on the sixth day; I divided its floors on the seventh; – I divided the interior compartments on the eighth. I stopped up the chinks through which the water entered in; – I visited the chinks and added what was wanting. – I poured on the exterior three times 3,600 measures of asphalte, – and three times 3,600 measures of asphalte within. – Three times 3,600 men, porters, brought on their heads the chests of provisions. – I kept 3,600 chests for the nourishment of my family, – and the mariners divided amongst themselves twice 3,600 chests. – For [provisioning] I had oxen slain; – I instituted [rations] for each day. – In [anticipation of the need of] drinks, of barrels and of wine – [I collected in quantity] like to the waters of a river, [of provisions] in quantity like to the dust of the earth. – [To arrange them in] the chests I set my hand to. – … of the sun … the vessel was completed. – … strong and – I had carried above and below the furniture of the ship. – [This lading filled the two-thirds.]

[101] Here several verses are wanting.

All that I possessed I gathered together; all I possessed of silver I gathered together; all that I possessed of gold I gathered – all that I possessed of the substance of life of every kind I gathered together. – I made all ascend into the vessel; my servants male and female, – the cattle of the fields, the wild beasts of the plains, and the sons of the people, I made them all ascend.

Shamash (the sun) made the moment determined, and – he announced it in these terms: – "In the evening I will cause it to rain abundantly from heaven; enter into the vessel and close the door." – The fixed moment had arrived, which he announced in these terms: "In the evening I will cause it to rain abundantly from heaven." – When the evening of that day arrived, I was afraid, – I entered into the vessel and shut my door. – In shutting the vessel, to Buzurshadirabi, the pilot, – I confided this dwelling with all that it contained.

Mu-sheri-ina-namari[102]– rose from the foundations of heaven in a black cloud; – Ramman[103] thundered in the midst of the cloud – and Nabon and Sharru marched before; – they marched, devastating the mountain and the plain; – Nergal[104] the powerful, dragged chastisements after him; – Adar[105] advanced, overthrowing before him; – the archangels of the abyss brought destruction, – in their terrors they agitated the earth. – The inundation of Ramman swelled up to the sky, – and [the earth] became without lustre, was changed into a desert.

They broke … of the surface of the [earth] like …; – [they destroyed] the living beings of the surface of the earth. – The terrible [Deluge] on men swelled up to [heaven]. – The brother no longer saw his brother; men no longer knew each other. In heaven – the gods became afraid of the waterspout, and – sought a refuge; they mounted up to the heaven of Anu.[106]– The gods were stretched out motionless, pressing one against another like dogs. – Ishtar wailed like a child, – the great goddess pronounced her discourse: – "Here is humanity returned into mud, and – this is the misfortune that I have announced in the presence of the gods. So I announced the misfortune in the presence of the gods, – for the evil I announced the terrible [chastisement] of men who are mine. – I am the mother who gave birth to men, and – like to the race of fishes, there they are filling the sea; – and the gods by reason of that – which the archangels of the abyss are doing, weep with me." – The gods on their seats were seated in tears, – and they held their lips closed, [revolving] future things.

Six days and as many nights passed; the wind, the waterspout, and the diluvian rain were in all their strength. At the approach of the seventh day the diluvian rain grew weaker, the terrible waterspout – which had assailed after the fashion of an earthquake – grew calm, the sea inclined to dry up, and the wind and the waterspout came to an end. I looked at the sea, attentively observing – and the whole of humanity had returned to mud; like unto sea-weeds the corpses floated. I opened the window, and the light smote on my face. I was seized with sadness; I sat down and I wept; – and my tears came over my face.

I looked at the regions bounding the sea; towards the twelve points of the horizon; not any continent. – The vessel was borne above the land of Nizir, – the

[102] "The water of the twilight at break of day," one of the personifications of rain.

[103] The god of thunder.

[104] The god of war and death.

[105] The Chaldæo-Assyrian Hercules.

[106] The superior heaven of the fixed stars.

mountain of Nizir arrested the vessel, and did not permit it to pass over. – A day and a second day the mountain of Nizir arrested the vessel, and did not permit it to pass over; – the third and fourth day the mountain of Nizir arrested the vessel, and did not permit it to pass over; – the fifth and sixth day the mountain of Nizir arrested the vessel, and did not permit it to pass over. – At the approach of the seventh day, I sent out and loosed a dove. The dove went, turned, and – found no place to light on, and it came back. I sent out and loosed a swallow; the swallow went, turned, and – found no place to light on, and it came back. I sent out and loosed a raven; the raven went, and saw the corpses on the waters; it ate, rested, turned, and came not back.

I then sent out (what was in the vessel) towards the four winds, and I offered a sacrifice. I raised the pile of my burnt-offering on the peak of the mountain; seven by seven I disposed the measured vases,[107]– and beneath I spread rushes, cedar, and juniper wood. The gods were seized with the desire of it, – the gods were seized with a benevolent desire of it; – and the gods assembled like flies above the master of the sacrifice. From afar, in approaching, the great goddess raised the great zones that Anu has made for their glory (the gods').[108] These gods, luminous crystal before me, I will never leave them; in that day I prayed that I might never leave them. "Let the gods come to my sacrificial pile! – but never may Bel come to my sacrificial pile! for he did not master himself, and he has made the waterspout for the Deluge, and he has numbered my men for the pit."

From far, in drawing near, Bel – saw the vessel, and Bel stopped; – he was filled with anger against the gods and the celestial archangels: – "No one shall come out alive! No man shall be preserved from the abyss!" – Adar opened his mouth and said; he said to the warrior Bel: – "What other than Ea should have formed this resolution? – for Ea possesses knowledge and [he foresees] all." – Ea opened his mouth and spake; he said to the warrior Bel: – "O thou, herald of the gods, warrior, – as thou didst not master thyself, thou hast made the waterspout of the deluge. – Let the sinner carry the weight of his sins, the blasphemer the weight of his blasphemy. – Please thyself with this good pleasure, and it shall never be infringed; faith in it never [shall be violated]. – Instead of thy making a new deluge, let hyænas appear and reduce the number of men; instead of thy making a new deluge, let there be famine, and let the earth be [devastated]; – instead of thy making a new deluge, let Dibbara[109] appear, and let men be [mown down]. – I have not revealed the decision of the great gods; – it is Khasisatra who interpreted a dream and comprehended what the gods had decided."

Then, when his resolve was arrested, Bel entered into the vessel. – He took my hand and made me rise. – He made my wife rise, and made her place herself at my side. – He turned around us and stopped short; he approached our group. – "Until now Khasisatra has made part of perishable humanity; – but lo, now, Khasisatra and his wife are going to be carried away to live like the gods, – and Khasisatra will reside afar at the mouth of the rivers." – They carried me away and established me in a remote place at the mouth of the streams.

This narrative agrees with the Biblical one in ascribing the inundation to a deluge of rain; but adds further details which connect it with intense atmospheric disturbance, similar to that which would be produced by a series of cyclones, or typhoons, of unusual severity and duration.

---

[107] Vases of the measure called in Hebrew *Seäh*. This relates to a detail of the ritualistic prescriptions for sacrifice.

[108] These metaphorical expressions appear to designate the rainbow.

[109] The god of epidemics.

The intense gloom, the deluge of rain, terrific violence of wind, and the havoc both on sea and land, which accompany the normal cyclones occurring annually on the eastern coast of China, and elsewhere, and lasting but a few hours in any one locality, can hardly be credited, except by those who have experienced them. They are, however, sufficient to render explicable the general devastation and loss of life which would result from the duration of typhoons, or analogous tempests, of abnormal intensity, for even the limited period of six days and nights allotted in the text above, and much more so for that of one hundred and fifty days assigned to it in the Biblical account.

As illustrating this I may refer to a few calamities of recent date, which, though of trivial importance in comparison with the stupendous event under our consideration, bring home to us the terribly devastating power latent in the elements.

Конец ознакомительного фрагмента.