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Author: Thomas Henry Huxley

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Hasisadra's Adventure

by Thomas Henry Huxley

This is Essay #7 from "Science and Hebrew Tradition"

Some thousands of years ago there was a city in Mesopotamia called Surippak. One night a strange dream came to a dweller therein, whose name, if rightly reported, was Hasisadra. The dream foretold the speedy coming of a great flood; and it warned Hasisadra to lose no time in building a ship, in which, when notice was given, he, his family and friends, with their domestic animals and a collection of wild creatures and seed of plants of the land, might take refuge and be rescued from destruction. Hasisadra awoke, and at once acted upon the warning. A strong decked ship was built, and her sides were paid, inside and out, with the mineral pitch, or bitumen, with which the country abounded; the vessel's seaworthiness was

tested, the cargo was stowed away, and a trusty pilot or steersman appointed.

The promised signal arrived. Wife and friends embarked; Hasisadra, following, prudently "shut the door," or, as we should say, put on the hatches; and Nes-Hea, the pilot, was left alone on deck to do his best for the ship. Thereupon a hurricane began to rage; rain fell in torrents; the subterranean waters burst forth; a deluge swept over the land, and the wind lashed it into waves sky high; heaven and earth became mingled in chaotic gloom. For six days and seven nights the gale raged, but the good ship held out until, on the seventh day, the storm lulled. Hasisadra ventured on deck; and, seeing nothing but a waste of waters strewn with floating corpses and wreck, wept over the destruction of his land and people. Far away, the mountains of Nizir were visible; the ship was steered for them and ran aground upon the higher land. Yet another seven days passed by. On the seventh, Hasisadra sent forth a dove, which found no resting place and returned; then he liberated a swallow, which also came back; finally, a raven was let loose, and that sagacious bird, when it found that the water had abated, came near the ship, but refused to return to it. Upon this, Hasisadra liberated the rest of the wild animals, which immediately dispersed in all directions, while he, with his family and friends, ascending a mountain hard by, offered sacrifice upon its summit to the gods.

The story thus given in summary abstract, told in an ancient Semitic dialect, is inscribed in cuneiform characters upon a tablet of burnt clay. Many thousands of such tablets, collected by Assurbanipal, King of Assyria in the middle of the seventh century B.C., were stored in the library of his palace at Nineveh; and, though in a sadly broken and mutilated condition, they have yielded a marvellous amount of information to the patient and sagacious labour which modern scholars have bestowed upon them. Among the multitude of documents of various kinds, this narrative of Hasisadra's adventure has been found in a tolerably complete state. But Assyriologists agree that it is only a copy of a much more ancient work; and there are weighty reasons for believing that the story of Hasisadra's flood was well known in Mesopotamia before the year 2000 B.C.

No doubt, then, we are in presence of a narrative which has all the authority which antiquity can confer; and it is proper to deal respectfully with it, even though it is quite as proper, and indeed necessary, to act no less respectfully towards ourselves; and, before professing to put implicit faith in it, to inquire what claim it has to be regarded as a serious account of an historical event.

It is of no use to appeal to contemporary history, although the annals of Babylonia, no less than those of Egypt, go much further back than 2000 B.C. All that can be said is, that the

former are hardly consistent with the supposition that any catastrophe, competent to destroy all the population, has befallen the land since civilisation began, and that the latter are notoriously silent about deluges. In such a case as this, however, the silence of history does not leave the inquirer wholly at fault. Natural science has something to say when the phenomena of nature are in question. Natural science may be able to show, from the nature of the country, either that such an event as that described in the story is impossible, or at any rate highly improbable; or, on the other hand, that it is consonant with probability. In the former case, the narrative must be suspected or rejected; in the latter, no such summary verdict can be given: on the contrary, it must be admitted that the story may be true. And then, if certain strangely prevalent canons of criticism are accepted, and if the evidence that an event might have happened is to be accepted as proof that it did happen, Assyriologists will be at liberty to congratulate one another on the "confirmation by modern science" of the authority of their ancient books.

It will be interesting, therefore, to inquire how far the physical structure and the other conditions of the region in which Surippak was situated are compatible with such a flood as is described in the Assyrian record.

The scene of Hasisadra's adventure is laid in the broad valley, six or seven hundred miles long, and hardly anywhere less than a hundred miles in width, which is traversed by the lower courses of the rivers Euphrates and Tigris, and which is commonly known as the "Euphrates valley." Rising, at the one end, into a hill country, which gradually passes into the Alpine heights of Armenia; and, at the other, dipping beneath the shallow waters of the head of the Persian Gulf, which continues in the same direction, from north-west to south-east, for some eight hundred miles farther, the floor of the valley presents a gradual slope, from eight hundred feet above the sea level to the depths of the southern end of the Persian Gulf. The boundary between sea and land, formed by the extremest mudflats of the delta of the two rivers, is but vaguely defined; and, year by year, it advances seaward. On the north-eastern side, the western frontier ranges of Persia rise abruptly to great heights; on the south-western side, a more gradual ascent leads to a table-land of less elevation, which, very broad in the south, where it is occupied by the deserts of Arabia and of Southern Syria, narrows, northwards, into the highlands of Palestine, and is continued by the ranges of the Lebanon, the Antilebanon, and the Taurus, into the highlands of Armenia.

The wide and gently inclined plain, thus inclosed between the gulf and the highlands, on each side and at its upper extremity, is distinguishable into two regions of very different character, one of which lies north, and the other south of the parallel of Hit, on the Euphrates. Except in the immediate vicinity of the

river, the northern division is stony and scantily covered with vegetation, except in spring. Over the southern division, on the contrary, spreads a deep alluvial soil, in which even a pebble is rare; and which, though, under the existing misrule, mainly a waste of marsh and wilderness, needs only intelligent attention to become, as it was of old, the granary of western Asia. Except in the extreme south, the rainfall is small and the air dry. The heat in summer is intense, while bitterly cold northern blasts sweep the plain in winter. Whirlwinds are not uncommon; and, in the intervals of the periodical inundations, the fine, dry, powdery soil is swept, even by moderate breezes, into stifling clouds, or rather fogs, of dust. Low inequalities, elevations here and depressions there, diversify the surface of the alluvial region. The latter are occupied by enormous marshes, while the former support the permanent dwellings of the present scanty and miserable population.

In antiquity, so long as the canalisation of the country was properly carried out, the fertility of the alluvial plain enabled great and prosperous nations to have their home in the Euphrates valley. Its abundant clay furnished the materials for the masses of sun-dried and burnt bricks, the remains of which, in the shape of huge artificial mounds, still testify to both the magnitude and the industry of the population, thousands of years ago. Good cement is plentiful, while the bitumen, which wells from the rocks at Hit and elsewhere, not only answers the same purpose, but is used to this day, as it was in Hasisadra's time, to pay the inside and the outside of boats.

In the broad lower course of the Euphrates, the stream rarely acquires a velocity of more than three miles an hour, while the lower Tigris attains double that rate in times of flood. The water of both great rivers is mainly derived from the northern and eastern highlands in Armenia and in Kurdistan, and stands at its lowest level in early autumn and in January. But when the snows accumulated in the upper basins of the great rivers, during the winter, melt under the hot sunshine of spring, they rapidly rise, and at length overflow their banks, covering the alluvial plain with a vast inland sea, interrupted only by the higher ridges and hummocks which form islands in a seemingly boundless expanse of water.

In the occurrence of these annual inundations lies one of several resemblances between the valley of the Euphrates and that of the Nile. But there are important differences. The time of the annual flood is reversed, the Nile being highest in autumn and winter, and lowest in spring and early summer. The periodical overflows of the Nile, regulated by the great lake basins in the south, are usually punctual in arrival, gradual in growth, and beneficial in operation. No lakes are interposed between the mountain torrents of the upper basin of the Tigris and the Euphrates and their lower courses. Hence, heavy rain, or an unusually rapid thaw in the uplands, gives rise to the sudden

irruption of a vast volume of water which not even the rapid Tigris, still less its more sluggish companion, can carry off in time to prevent violent and dangerous overflows. Without an elaborate system of canalisation, providing an escape for such sudden excesses of the supply of water, the annual floods of the Euphrates, and especially of the Tigris, must always be attended with risk, and often prove harmful.

There are other peculiarities of the Euphrates valley which may occasionally tend to exacerbate the evils attendant on the inundations. It is very subject to seismic disturbances; and the ordinary consequences of a sharp earthquake shock might be seriously complicated by its effect on a broad sheet of water. Moreover the Indian Ocean lies within the region of typhoons; and if, at the height of an inundation, a hurricane from the south-east swept up the Persian Gulf, driving its shallow waters upon the delta and damming back the outflow, perhaps for hundreds of miles up-stream, a diluvial catastrophe, fairly up to the mark of Hasisadra's, might easily result.<2>

Thus there seems to be no valid reason for rejecting Hasisadra's story on physical grounds. I do not gather from the narrative that the "mountains of Nizir" were supposed to be submerged, but merely that they came into view above the distant horizon of the waters, as the vessel drove in that direction. Certainly the ship is not supposed to ground on any of their higher summits, for Hasisadra has to ascend a peak in order to offer his sacrifice. The country of Nizir lay on the north-eastern side of the Euphrates valley, about the courses of the two rivers Zab, which enter the Tigris where it traverses the plain of Assyria some eight or nine hundred feet above the sea; and, so far as I can judge from maps<3> and other sources of information, it is possible, under the circumstances supposed, that such a ship as Hasisadra's might drive before a southerly gale, over a continuously flooded country, until it grounded on some of the low hills between which both the lower and the upper Zab enter upon the Assyrian plain.

The tablet which contains the story under consideration is the eleventh of a series of twelve. Each of these answers to a month, and to the corresponding sign of the Zodiac. The Assyrian year began with the spring equinox; consequently, the eleventh month, called "the rainy," answers to our January-February, and to the sign which corresponds with our Aquarius. The aquatic adventure of Hasisadra, therefore, is not inappropriately placed. It is curious, however, that the season thus indirectly assigned to the flood is not that of the present highest level of the rivers. It is too late for the winter rise and too early for the spring floods.

I think it must be admitted that, so far, the physical cross-examination to which Hasisadra has been subjected does not break down his story. On the contrary, he proves to have kept it in

all essential respects⁴ within the bounds of probability or possibility. However, we have not yet done with him. For the conditions which obtained in the Euphrates valley, four or five thousand years ago, may have differed to such an extent from those which now exist that we should be able to convict him of having made up his tale. But here again everything is in favour of his credibility. Indeed, he may claim very powerful support, for it does not lie in the mouths of those who accept the authority of the Pentateuch to deny that the Euphrates valley was what it is, even six thousand years back. According to the book of Genesis, Phrat and Hiddekel--the Euphrates and the Tigris--are coeval with Paradise. An edition of the Scriptures, recently published under high authority, with an elaborate apparatus of "Helps" for the use of students--and therefore, as I am bound to suppose, purged of all statements that could by any possibility mislead the young--assigns the year B.C. 4004 as the date of Adam's too brief residence in that locality.

But I am far from depending on this authority for the age of the Mesopotamian plain. On the contrary, I venture to rely, with much more confidence, on another kind of evidence, which tends to show that the age of the great rivers must be carried back to a date earlier than that at which our ingenuous youth is instructed that the earth came into existence. For, the alluvial deposit having been brought down by the rivers, they must needs be older than the plain it forms, as navvies must needs antecede the embankment painfully built up by the contents of their wheel-barrow. For thousands of years, heat and cold, rain, snow, and frost, the scrubbing of glaciers, and the scouring of torrents laden with sand and gravel, have been wearing down the rocks of the upper basins of the rivers, over an area of many thousand square miles; and these materials, ground to fine powder in the course of their long journey, have slowly subsided, as the water which carried them spread out and lost its velocity in the sea. It is because this process is still going on that the shore of the delta constantly encroaches on the head of the gulf⁵ into which the two rivers are constantly throwing the waste of Armenia and of Kurdistan. Hence, as might be expected, fluviatile and marine shells are common in the alluvial deposit; and Loftus found strata, containing subfossil marine shells of species now living, in the Persian Gulf, at Warka, two hundred miles in a straight line from the shore of the delta.⁶ It follows that, if a trustworthy estimate of the average rate of growth of the alluvial can be formed, the lowest limit (by no means the highest limit) of age of the rivers can be determined. All such estimates are beset with sources of error of very various kinds; and the best of them can only be regarded as approximations to the truth. But I think it will be quite safe to assume a maximum rate of growth of four miles in a century for the lower half of the alluvial plain.

Now, the cycle of narratives of which Hasisadra's adventure forms a part contains allusions not only to Surippak, the exact

position of which is doubtful, but to other cities, such as Erech. The vast ruins at the present village of Warka have been carefully explored and determined to be all that remains of that once great and flourishing city, "Erech the lofty."

Supposing that the two hundred miles of alluvial country, which separates them from the head of the Persian Gulf at present, have been deposited at the very high rate of four miles in a century, it will follow that 4000 years ago, or about the year 2100 B.C., the city of Erech still lay forty miles inland. Indeed, the city might have been built a thousand years earlier. Moreover, there is plenty of independent archaeological and other evidence that in the whole thousand years, 2000 to 3000 B.C, the alluvial plain was inhabited by a numerous people, among whom industry, art, and literature had attained a very considerable development. And it can be shown that the physical conditions and the climate of the Euphrates valley, at that time, must have been extremely similar to what they are now.

Thus, once more, we reach the conclusion that, as a question of physical probability, there is no ground for objecting to the reality of Hasisadra's adventure. It would be unreasonable to doubt that such a flood might have happened, and that such a person might have escaped in the way described, any time during the last 5000 years. And if the postulate of loose thinkers in search of scientific "confirmations" of questionable narratives --proof that an event may have happened is evidence that it did happen--is to be accepted, surely Hasisadra's story is "confirmed by modern scientific investigation" beyond all cavil. However, it may be well to pause before adopting this conclusion, because the original story, of which I have set forth only the broad outlines, contains a great many statements which rest upon just the same foundation as those cited, and yet are hardly likely to meet with general acceptance. The account of the circumstances which led up to the flood, of those under which Hasisadra's adventure was made known to his descendant, of certain remarkable incidents before and after the flood, are inseparably bound up with the details already given. And I am unable to discover any justification for arbitrarily picking out some of these and dubbing them historical verities, while rejecting the rest as legendary fictions. They stand or fall together.

Before proceeding to the consideration of these less satisfactory details, it is needful to remark that Hasisadra's adventure is a mere episode in a cycle of stories of which a personage, whose name is provisionally read "Izdubar," is the centre. The nature of Izdubar hovers vaguely between the heroic and the divine; sometimes he seems a mere man, sometimes approaches so closely to the divinities of fire and of the sun as to be hardly distinguishable from them. As I have already mentioned, the tablet which sets forth Hasisadra's perils is one of twelve; and, since each of these represents a month and bears a story appropriate to the corresponding sign of the Zodiac,

great weight must be attached to Sir Henry Rawlinson's suggestion that the epos of Izdubar is a poetical embodiment of solar mythology.

In the earlier books of the epos, the hero, not content with rejecting the proffered love of the Chaldaean Aphrodite, Istar, freely expresses his very low estimate of her character; and it is interesting to observe that, even in this early stage of human experience, men had reached a conception of that law of nature which expresses the inevitable consequences of an imperfect appreciation of feminine charms. The injured goddess makes Izdubar's life a burden to him, until at last, sick in body and sorry in mind, he is driven to seek aid and comfort from his forbears in the world of spirits. So this antitype of Odysseus journeys to the shore of the waters of death, and there takes ship with a Chaldaean Charon, who carries him within hail of his ancestor Hasisadra. That venerable personage not only gives Izdubar instructions how to regain his health, but tells him, somewhat *a propos des bottes* (after the manner of venerable personages), the long story of his perilous adventure; and how it befell that he, his wife, and his steersman came to dwell among the blessed gods, without passing through the portals of death like ordinary mortals.

According to the full story, the sins of mankind had become grievous; and, at a council of the gods, it was resolved to extirpate the whole race by a great flood. And, once more, let us note the uniformity of human experience. It would appear that, four thousand years ago, the obligations of confidential intercourse about matters of state were sometimes violated--of course from the best of motives. Ea, one of the three chiefs of the Chaldaean Pantheon, the god of justice and of practical wisdom, was also the god of the sea; and, yielding to the temptation to do a friend a good turn, irresistible to kindly seafaring folks of all ranks, he warned Hasisadra of what was coming. When Bel subsequently reproached him for this breach of confidence, Ea defended himself by declaring that he did not tell Hasisadra anything; he only sent him a dream. This was undoubtedly sailing very near the wind; but the attribution of a little benevolent obliquity of conduct to one of the highest of the gods is a trifle compared with the truly Homeric anthropomorphism which characterises other parts of the epos.

The Chaldaean deities are, in truth, extremely human; and, occasionally, the narrator does not scruple to represent them in a manner which is not only inconsistent with our idea of reverence, but is sometimes distinctly humorous. When the storm is at its height, he exhibits them flying in a state of panic to Anu, the god of heaven, and crouching before his portal like frightened dogs. As the smoke of Hasisadra's sacrifice arises, the gods, attracted by the sweet savour, are compared to swarms of flies. I have already remarked that the lady Istar's reputation is torn to shreds; while she and Ea scold Bel

handsomely for his ferocity and injustice in destroying the innocent along with the guilty. One is reminded of Here hung up with weighted heels; of misleading dreams sent by Zeus; of Ares howling as he flies from the Trojan battlefield; and of the very questionable dealings of Aphrodite with Helen and Paris.

But to return to the story. Bel was, at first, excluded from the sacrifice as the author of all the mischief; which really was somewhat hard upon him, since the other gods agreed to his proposal. But eventually a reconciliation takes place; the great bow of Anu is displayed in the heavens; Bel agrees that he will be satisfied with what war, pestilence, famine, and wild beasts can do in the way of destroying men; and that, henceforward, he will not have recourse to extraordinary measures. Finally, it is Bel himself who, by way of making amends, transports Hasisadra, his wife, and the faithful Nes-Hea to the abode of the gods.

It is as indubitable as it is incomprehensible to most of us, that, for thousands of years, a great people, quite as intelligent as we are, and living in as high a state of civilisation as that which had been attained in the greater part of Europe a few centuries ago, entertained not the slightest doubt that Anu, Bel, Ea, Istar, and the rest, were real personages, possessed of boundless powers for good and evil. The sincerity of the monarchs whose inscriptions gratefully attribute their victories to Merodach, or to Assur, is as little to be questioned as that of the authors of the hymns and penitential psalms which give full expression to the heights and depths of religious devotion. An "infidel" bold enough to deny the existence, or to doubt the influence, of these deities probably did not exist in all Mesopotamia; and even constructive rebellion against their authority was apt to end in the deprivation, not merely of the good name, but of the skin of the offender. The adherents of modern theological systems dismiss these objects of the love and fear of a hundred generations of their equals, offhand, as "gods of the heathen," mere creations of a wicked and idolatrous imagination; and, along with them, they disown, as senseless, the crude theology, with its gross anthropomorphism and its low ethical conception of the divinity, which satisfied the pious souls of Chaldaeae.

I imagine, though I do not presume to be sure, that any endeavour to save the intellectual and moral credit of Chaldaeae religion, by suggesting the application to it of that universal solvent of absurdities, the allegorical method, would be scouted; I will not even suggest that any ingenuity can be equal to the discovery of the antitypes of the personifications effected by the religious imagination of later ages, in the triad Anu, Ea, and Bel, still less in Istar. Therefore, unless some plausible reconciliatory scheme should be propounded by a Neo-Chaldaeae devotee (and, with Neo-Buddhists to the fore, this supposition is not so wild as it looks), I suppose the moderns will continue to smile, in a superior way, at the grievous

absurdity of the polytheistic idolatry of these ancient people.

It is probably a congenital absence of some faculty which I ought to possess which withholds me from adopting this summary procedure. But I am not ashamed to share David Hume's want of ability to discover that polytheism is, in itself, altogether absurd. If we are bound, or permitted, to judge the government of the world by human standards, it appears to me that directorates are proved, by familiar experience, to conduct the largest and the most complicated concerns quite as well as solitary despots. I have never been able to see why the hypothesis of a divine syndicate should be found guilty of innate absurdity. Those Assyrians, in particular, who held Assur to be the one supreme and creative deity, to whom all the other supernal powers were subordinate, might fairly ask that the essential difference between their system and that which obtains among the great majority of their modern theological critics should be demonstrated. In my apprehension, it is not the quantity, but the quality, of the persons, among whom the attributes of divinity are distributed, which is the serious matter. If the divine might is associated with no higher ethical attributes than those which obtain among ordinary men; if the divine intelligence is supposed to be so imperfect that it cannot foresee the consequences of its own contrivances; if the supernal powers can become furiously angry with the creatures of their omnipotence and, in their senseless wrath, destroy the innocent along with the guilty; or if they can show themselves to be as easily placated by presents and gross flattery as any oriental or occidental despot; if, in short, they are only stronger than mortal men and no better, as it must be admitted Hasisadra's deities proved themselves to be--then, surely, it is time for us to look somewhat closely into their credentials, and to accept none but conclusive evidence of their existence.

To the majority of my respected contemporaries this reasoning will doubtless appear feeble, if not worse. However, to my mind, such are the only arguments by which the Chaldaean theology can be satisfactorily upset. So far from there being any ground for the belief that Ea, Anu, and Bel are, or ever were, real entities, it seems to me quite infinitely more probable that they are products of the religious imagination, such as are to be found everywhere and in all ages, so long as that imagination riots uncontrolled by scientific criticism.

It is on these grounds that I venture, at the risk of being called an atheist by the ghosts of all the principals of all the colleges of Babylonia, or by their living successors among the Neo-Chaldaeans, if that sect should arise, to express my utter disbelief in the gods of Hasisadra. Hence, it follows, that I find Hasisadra's account of their share in his adventure incredible; and, as the physical details of the flood are inseparable from its theophanic accompaniments, and are guaranteed by the same authority, I must let them go with the

rest. The consistency of such details with probability counts for nothing. The inhabitants of Chaldaea must always have been familiar with inundations; probably no generation failed to witness an inundation which rose unusually high, or was rendered serious by coincident atmospheric or other disturbances. And the memory of the general features of any exceptionally severe and devastating flood, would be preserved by popular tradition for long ages. What, then, could be more natural than that a Chaldaean poet should seek for the incidents of a great catastrophe among such phenomena? In what other way than by such an appeal to their experience could he so surely awaken in his audience the tragic pity and terror? What possible ground is there for insisting that he must have had some individual good in view, and that his history is historical, in the sense that the account of the effects of a hurricane in the Bay of Bengal, in the year 1875, is historical?

More than three centuries after the time of Assurbanipal, Berosus of Babylon, born in the reign of Alexander the Great, wrote an account of the history of his country in Greek. The work of Berosus has vanished; but extracts from it--how far faithful is uncertain--have been preserved by later writers. Among these occurs the well-known story of the Deluge of Xisuthros, which is evidently built upon the same foundation as that of Hasisadra. The incidents of the divine warning, the building of the ship, the sending out of birds, the ascension of the hero, betray their common origin. But stories, like Madeira, acquire a heightened flavour with time and travel; and the version of Berosus is characterised by those circumstantial improbabilities which habitually gather round the legend of a legend. The later narrator knows the exact day of the month on which the flood began. The dimensions of the ship are stated with Munchausenian precision at five stadia by two--say, half by one-fifth of an English mile. The ship runs aground among the "Gordaeon mountains" to the south of Lake Van, in Armenia, beyond the limits of any imaginable real inundation of the Euphrates valley; and, by way of climax, we have the assertion, worthy of the sailor who said that he had brought up one of Pharaoh's chariot wheels on the fluke of his anchor in the Red Sea, that pilgrims visited the locality and made amulets of the bitumen which they scraped off from the still extant remains of the mighty ship of Xisuthros.

Suppose that some later polyhistor, as devoid of critical faculty as most of his tribe, had found the version of Berosus, as well as another much nearer the original story; that, having too much respect for his authorities to make up a *tertium quid* of his own, out of the materials offered, he followed a practice, common enough among ancient and, particularly, among Semitic historians, of dividing, both into fragments and piecing these together, without troubling himself very much about those resulting repetitions and inconsistencies; the product of such a

primitive editorial operation would be a narrative analogous to that which treats of the Noachian deluge in the book of Genesis. For the Pentateuchal story is indubitably a patchwork, composed of fragments of at least two, different and partly discrepant, narratives, quilted together in such an inartistic fashion that the seams remain conspicuous. And, in the matter of circumstantial exaggeration, it in some respects excels even the second-hand legend of Berosus.

There is a certain practicality about the notion of taking refuge from floods and storms in a ship provided with a steersman; but, surely, no one who had ever seen more water than he could wade through would dream of facing even a moderate breeze, in a huge three-storied coffer, or box, three hundred cubits long, fifty wide and thirty high, left to drift without rudder or pilot. Not content with giving the exact year of Noah's age in which the flood began, the Pentateuchal story adds the month and the day of the month. It is the Deity himself who "shuts in" Noah. The modest week assigned to the full deluge in Hasisadra's story becomes forty days, in one of the Pentateuchal accounts, and a hundred and fifty in the other. The flood, which, in the version of Berosus, has grown so high as to cast the ship among the mountains of Armenia, is improved upon in the Hebrew account until it covers "all the high hills that were under the whole heaven"; and, when it begins to subside, the ark is left stranded on the summit of the highest peak, commonly identified with Ararat itself.

While the details of Hasisadra's adventure are, at least, compatible with the physical conditions of the Euphrates valley, and, as we have seen, involve no catastrophe greater than such as might be brought under those conditions, many of the very precisely stated details of Noah's flood contradict some of the best established results of scientific inquiry.

If it is certain that the alluvium of the Mesopotamian plain has been brought down by the Tigris and the Euphrates, then it is no less certain that the physical structure of the whole valley has persisted, without material modification, for many thousand years before the date assigned to the flood. If the summits, even of the moderately elevated ridges which immediately bound the valley, still more those of the Kurdish and Armenian mountains, were ever covered by water, for even forty days, that water must have extended over the whole earth. If the earth was thus covered, anywhere between 4000 and 5000 years ago, or, at any other time, since the higher terrestrial animals came into existence, they must have been destroyed from the whole face of it, as the Pentateuchal account declares they were three several times (Genesis vii. 21, 22, 23), in language which cannot be made more emphatic, or more solemn, than it is; and the present population must consist of the descendants of emigrants from the ark. And, if that is the case, then, as has often been pointed out, the sloths of the Brazilian forests, the kangaroos of

Australia, the great tortoises of the Galapagos islands, must have respectively hobbled, hopped, and crawled over many thousand miles of land and sea from "Ararat" to their present habitations. Thus, the unquestionable facts of the geographical distribution of recent land animals, alone, form an insuperable obstacle to the acceptance of the assertion that the kinds of animals composing the present terrestrial fauna have been, at any time, universally destroyed in the way described in the Pentateuch.

It is upon this and other unimpeachable grounds that, as I ventured to say some time ago, persons who are duly conversant with even the elements of natural science decline to take the Noachian deluge seriously; and that, as I also pointed out, candid theologians, who, without special scientific knowledge, have appreciated the weight of scientific arguments, have long since given it up. But, as Goethe has remarked, there is nothing more terrible than energetic ignorance; and there are, even yet, very energetic people, who are neither candid, nor clear-headed, nor theologians, still less properly instructed in the elements of natural science, who make prodigious efforts to obscure the effect of these plain truths, and to conceal their real surrender of the historical character of Noah's deluge under cover of the smoke of a great discharge of pseudoscientific artillery. They seem to imagine that the proofs which abound in all parts of the world, of large oscillations of the relative level of land and sea, combined with the probability that, when the sea-level was rising, sudden incursions of the sea like that which broke in over Holland and formed the Zuyder Zee, may have often occurred, can be made to look like evidence that something that, by courtesy, might be called a general Deluge has really taken place. Their discursive energy drags misunderstood truth into their service; and "the glacial epoch" is as sure to crop up among them as King Charles's head in a famous memorial--with about as much appropriateness. The old story of the raised beach on Moel Tryfaen is trotted out; though, even if the facts are as yet rightly interpreted, there is not a shadow of evidence that the change of sea-level in that locality was sudden, or that glacial Welshmen would have known it was taking place. Surely it is difficult to perceive the relevancy of bringing in something that happened in the glacial epoch (if it did happen) to account for the tradition of a flood in the Euphrates valley between 2000 and 3000 B.C. But the date of the Noachian flood is solidly fixed by the sole authority for it; no shuffling of the chronological data will carry it so far back as 3000 B.C.; and the Hebrew epos agrees with the Chaldaean in placing it after the development of a somewhat advanced civilisation. The only authority for the Noachian deluge assures us that, before it visited the earth, Cain had built cities; Jubal had invented harps and organs; while mankind had advanced so far beyond the neolithic, nay even the bronze, stage that Tubal-cain was a worker in iron. Therefore, if the Noachian legend is to be

taken for the history of an event which happened in the glacial epoch, we must revise our notions of pleistocene civilisation. On the other hand, if the Pentateuchal story only means something quite different, that happened somewhere else, thousands of years earlier, dressed up, what becomes of its credit as history? I wonder what would be said to a modern historian who asserted that Pekin was burnt down in 1886, and then tried to justify the assertion by adducing evidence of the Great Fire of London in 1666. Yet the attempt to save the credit of the Noachian story by reference to something which is supposed to have happened in the far north, in the glacial epoch, is far more preposterous.

Moreover, these dust-raising dialecticians ignore some of the most important and well-known facts which bear upon the question. Anything more than a parochial acquaintance with physical geography and geology would suffice to remind its possessor that the Holy Land itself offers a standing protest against bringing such a deluge as that of Noah anywhere near it, either in historical times or in the course of that pleistocene period, of which the "great ice age" formed a part.

Judaea and Galilee, Moab and Gilead, occupy part of that extensive tableland at the summit of the western boundary of the Euphrates valley, to which I have already referred. If that valley had ever been filled with water to a height sufficient, not indeed to cover a third of Ararat, in the north, or half of some of the mountains of the Persian frontier in the east, but to reach even four or five thousand feet, it must have stood over the Palestinian hog's back, and have filled, up to the brim, every depression on its surface. Therefore it could not have failed to fill that remarkable trench in which the Dead Sea, the Jordan, and the Sea of Galilee lie, and which is known as the "Jordan-Arabah" valley.

This long and deep hollow extends more than 200 miles, from near the site of ancient Dan in the north, to the water-parting at the head of the Wady Arabah in the south; and its deepest part, at the bottom of the basin of the Dead Sea, lies 2500 feet below the surface of the adjacent Mediterranean. The lowest portion of the rim of the Jordan-Arabah valley is situated at the village of El Fuleh, 257 feet above the Mediterranean. Everywhere else the circumjacent heights rise to a very much greater altitude. Hence, of the water which stood over the Syrian tableland, when as much drained off as could run away, enough would remain to form a "Mere" without an outlet, 2757 feet deep, over the present site of the Dead Sea. From this time forth, the level of the Palestinian mere could be lowered only by evaporation. It is an extremely interesting fact, which has happily escaped capture for the purposes of the energetic misunderstanding, that the valley, at one time, was filled, certainly within 150 feet of this height--probably higher. And it is almost equally certain, that the time at which this great Jordan-Arabah mere reached its

highest level coincides with the glacial epoch. But then the evidence which goes to prove this, also leads to the conclusion that this state of things obtained at a period considerably older than even 4000 B.C., when the world, according to the "Helps" (or shall we say "Hindrances") provided for the simple student of the Bible, was created; that it was not brought about by any diluvial catastrophe, but was the result of a change in the relative activities of certain natural operations which are quietly going on now; and that, since the level of the mere began to sink, many thousand years ago, no serious catastrophe of any description has affected the valley.

The evidence that the Jordan-Arabah valley really was once filled with water, the surface of which reached within 160 feet of the level of the pass of Jezrael, and possibly stood higher, is this: Remains of alluvial strata, containing shells of the freshwater mollusks which still inhabit the valley, worn down into terraces by waves which long rippled at the same level, and furrowed by the channels excavated by modern rainfalls, have been found at the former height; and they are repeated, at intervals, lower down, until the Ghor, or plain of the Jordan, itself an alluvial deposit, is reached. These strata attain a considerable thickness; and they indicate that the epoch at which the freshwater mere of Palestine reached its highest level is extremely remote; that its diminution has taken place very slowly, and with periods of rest, during which the first formed deposits were cut down into terraces. This conclusion is strikingly borne out by other facts. A volcanic region stretches from Galilee to Gilead and the Hauran, on each side of the northern end of the valley. Some of the streams of basaltic lava which have been thrown out from its craters and clefts in times of which history has no record, have run athwart the course of the Jordan itself, or of that of some of its tributary streams. The lava streams, therefore, must be of later date than the depressions they fill. And yet, where they have thus temporarily dammed the Jordan and the Jermuk, these streams have had time to cut through the hard basalts and lay bare the beds, over which, before the lava streams invaded them, they flowed.

In fact, the antiquity of the present Jordan-Arabah valley, as a hollow in a tableland, out of reach of the sea, and troubled by no diluvial or other disturbances, beyond the volcanic eruptions of Gilead and of Galilee, is vast, even as estimated by a geological standard. No marine deposits of later than miocene age occur in or about it; and there is every reason to believe that the Syro-Arabian plateau has been dry land, throughout the pliocene and later epochs, down to the present time. Raised beaches, containing recent shells, on the Levantine shores of the Mediterranean and on those of the Red Sea, testify to a geologically recent change of the sea level to the extent of 250 or 300 feet, probably produced by the slow elevation of the land; and, as I have already remarked, the alluvial plain of the Euphrates and Tigris appears to have been affected in the

same way, though seemingly to a less extent. But of violent, or catastrophic, change there is no trace. Even the volcanic outbursts have flowed in even sheets over the old land surface; and the long lines of the horizontal terraces which remain, testify to the geological insignificance of such earthquakes as have taken place. It is, indeed, possible that the original formation of the valley may have been determined by the well-known fault, along which the western rocks are relatively depressed and the eastern elevated. But, whether that fault was effected slowly or quickly, and whenever it came into existence, the excavation of the valley to its present width, no less than the sculpturing of its steep walls and of the innumerable deep ravines which score them down to the very bottom, are indubitably due to the operation of rain and streams, during an enormous length of time, without interruption or disturbance of any magnitude. The alluvial deposits which have been mentioned are continued into the lateral ravines, and have more or less filled them. But, since the waters have been lowered, these deposits have been cut down to great depths, and are still being excavated by the present temporary, or permanent, streams. Hence, it follows, that all these ravines must have existed before the time at which the valley was occupied by the great mere. This fact acquires a peculiar importance when we proceed to consider the grounds for the conclusion that the old Palestinian mere attained its highest level in the cold period of the pleistocene epoch. It is well known that glaciers formerly came low down on the flanks of Lebanon and Antilebanon; indeed, the old moraines are the haunts of the few survivors of the famous cedars. This implies a perennial snowcap of great extent on Hermon; therefore, a vastly greater supply of water to the sources of the Jordan which rise on its flanks; and, in addition, such a total change in the general climate, that the innumerable Wadys, now traversed only by occasional storm torrents, must have been occupied by perennial streams. All this involves a lower annual temperature and a moist and rainy atmosphere. If such a change of meteorological conditions could be effected now, when the loss by evaporation from the surface of the Dead Sea salt-pan balances all the gain from the Jordan and other streams, the scale would be turned in the other direction. The waters of the Dead Sea would become diluted; its level would rise; it would cover, first the plain of the Jordan, then the lake of Galilee, then the middle Jordan between this lake and that of Huleh (the ancient Merom); and, finally, it would encroach, northwards, along the course of the upper Jordan, and, southwards, up the Wady Arabah, until it reached some 260 feet above the level of the Mediterranean, when it would attain a permanent level, by sending any superfluity through the pass of Jezrael to swell the waters of the Kishon, and flow thence into the Mediterranean.

Reverse the process, in consequence of the excess of loss by evaporation over gain by inflow, which must have set in as the climate of Syria changed after the end of the pleistocene epoch,

and (without taking into consideration any other circumstances) the present state of things must eventually be reached--a concentrated saline solution in the deepest part of the valley--water, rather more charged with saline matter than ordinary fresh water, in the lower Jordan and the lake of Galilee--fresh waters, still largely derived from the snows of Hermon, in the upper Jordan and in Lake Huleh. But, if the full state of the Jordan valley marks the glacial epoch, then it follows that the excavation of that valley by atmospheric agencies must have occupied an immense antecedent time--a large part, perhaps the whole, of the pliocene epoch; and we are thus forced to the conclusion that, since the miocene epoch, the physical conformation of the Holy Land has been substantially what it is now. It has been more or less rained upon, searched by earthquakes here and there, partially overflowed by lava streams, slowly raised (relatively to the sea-level) a few hundred feet. But there is not a shadow of ground for supposing that, throughout all this time, terrestrial animals have ceased to inhabit a large part of its surface; or that, in many parts, they have been, in any respect, incommoded by the changes which have taken place.

The evidence of the general stability of the physical conditions of Western Asia, which is furnished by Palestine and by the Euphrates Valley, is only fortified if we extend our view northwards to the Black Sea and the Caspian. The Caspian is a sort of magnified replica of the Dead Sea. The bottom of the deepest part of this vast inland mere is about 3000 feet below the level of the Mediterranean, while its surface is lower by 85 feet. At present, it is separated, on the west, by wide spaces of dry land from the Black Sea, which has the same height as the Mediterranean; and, on the east, from the Aral, 138 feet above that level. The waters of the Black Sea, now in communication with the Mediterranean by the Dardanelles and the Bosphorus, are salt, but become brackish northwards, where the rivers of the steppes pour in a great volume of fresh water. Those of the shallower northern half of the Caspian are similarly affected by the Volga and the Ural, while, in the shallow bays of the southern division, they become extremely saline in consequence of the intense evaporation. The Aral Sea, though supplied by the Jaxartes and the Oxus, has brackish water. There is evidence that, in the pliocene and pleistocene periods, to go no farther back, the strait of the Dardanelles did not exist, and that the vast area, from the valley of the Danube to that of the Jaxartes, was covered by brackish or, in some parts, fresh water to a height of at least 200 feet above the level of the Mediterranean. At the present time, the water-parting which separates the northern part of the basin of the Caspian from the vast plains traversed by the Tobol and the Obi, in their course to the Arctic Ocean, appears to be less than 200 feet above the latter. It would seem, therefore, to be very probable that, under the climatal conditions of part of the pleistocene period, the valley of the Obi played the same part in relation to the

Ponto-Aralian sea, as that of the Kishon may have done to the great mere of the Jordan valley; and that the outflow formed the channel by which the well-known Arctic elements of the fauna of the Caspian entered it. For the fossil remains imbedded in the strata continuously deposited in the Aralo-Caspian area, since the latter end of the miocene epoch, show no sign that, from that time onward, it has ever been covered by sea water. Therefore, the supposition of a free inflow of the Arctic Ocean, which at one time was generally received, as well as that of various hypothetical deluges from that quarter, must be seriously questioned.

The Caspian and the Aral stand in somewhat the same relation to the vast basin of dry land in which they lie, as the Dead Sea and the lake of Galilee to the Jordan valley. They are the remains of a vast, mostly brackish, mere, which has dried up in consequence of the excess of evaporation over supply, since the cold and damp climate of the pleistocene epoch gave place to the increasing dryness and great summer heats of Central Asia in more modern times. The desiccation of the Aralo-Caspian basin, which communicated with the Black Sea only by a comparatively narrow and shallow strait along the present valley of Manytsch, the bottom of which was less than 100 feet above the Mediterranean, must have been vastly aided by the erosion of the strait of the Dardanelles towards the end of the pleistocene epoch, or perhaps later. For the result of thus opening a passage for the waters of the Black Sea into the Mediterranean must have been the gradual lowering of its level to that of the latter sea. When this process had gone so far as to bring down the Black Sea water to within less than a hundred feet of its present level, the strait of Manytsch ceased to exist; and the vast body of fresh water brought down by the Danube, the Dnieper, the Don, and other South Russian rivers was cut off from the Caspian, and eventually delivered into the Mediterranean. Thus, there is as conclusive evidence as one can well hope to obtain in these matters, that, north of the Euphrates valley, the physical geography of an area as large as all Central Europe has remained essentially unchanged, from the miocene period down to our time; just as, to the west of the Euphrates valley, Palestine has exhibited a similar persistence of geographical type. To the south, the valley of the Nile tells exactly the same story. The holes bored by miocene mollusks in the cliffs east and west of Cairo bear witness that, in the miocene epoch, it contained an arm of the sea, the bottom of which has since been gradually filled up by the alluvium of the Nile, and elevated to its present position. But the higher parts of the Mokattam and of the desert about Ghizeh, have been dry land from that time to this. Too little is known of the geology of Persia, at present, to allow any positive conclusion to be enunciated. But, taking the name to indicate the whole continental mass of Iran, between the valleys of the Indus and the Euphrates, the supposition that its physical geography has remained unchanged for an immensely long period is hardly rash.

The country is, in fact, an enormous basin, surrounded on all sides by a mountainous rim, and subdivided within by ridges into plateaus and hollows, the bottom of the deepest of which, in the province of Seistan, probably descends to the level of the Indian Ocean. These depressions are occupied by salt marshes and deserts, in which the waters of the streams which flow down the sides of the basin are now dissipated by evaporation. I am acquainted with no evidence that the present Iranian basin was ever occupied by the sea; but the accumulations of gravel over a great extent of its surface indicate long-continued water action. It is, therefore, a fair presumption that large lakes have covered much of its present deserts, and that they have dried up by the operation of the same changed climatal conditions as those which have reduced the Caspian and the Dead Sea to their present dimensions.<11>

Thus it would seem that the Euphrates valley, the centre of the fabled Noachian deluge, is also the centre of a region covering some millions of square miles of the present continents of Europe, Asia, and Africa, in which all the facts, relevant to the argument, at present known, converge to the conclusion that, since the miocene epoch, the essential features of its physical geography have remained unchanged; that it has neither been depressed below the sea, nor swept by diluvial waters since that time; and that the Chaldaean version of the legend of a flood in the Euphrates valley is, of all those which are extant, the only one which is even consistent with probability, since it depicts a local inundation, not more severe than one which might be brought about by a concurrence of favourable conditions at the present day; and which might probably have been more easily effected when the Persian Gulf extended farther north. Hence, the recourse to the "glacial epoch" for some event which might colourably represent a flood, distinctly asserted by the only authority for it to have occurred in historical times, is peculiarly unfortunate. Even a Welsh antiquary might hesitate over the supposition that a tradition of the fate of Moel Tryfaen, in the glacial epoch, had furnished the basis of fact for a legend which arose among people whose own experience abundantly supplied them with the needful precedents. Moreover, if evidence of interchanges of land and sea are to be accepted as "confirmations" of Noah's deluge, there are plenty of sources for the tradition to be had much nearer than Wales.

The depression now filled by the Red Sea, for example, appears to be, geologically, of very recent origin. The later deposits found on its shores, two or three hundred feet above the sea level, contain no remains older than those of the present fauna; while, as I have already mentioned, the valley of the adjacent delta of the Nile was a gulf of the sea in miocene times. But there is not a particle of evidence that the change of relative level which admitted the waters of the Indian Ocean between Arabia and Africa, took place any faster than that which is now going on in Greenland and Scandinavia, and which has left

their inhabitants undisturbed. Even more remarkable changes were effected, towards the end of, or since, the glacial epoch, over the region now occupied by the Levantine Mediterranean and the AEgean Sea. The eastern coast region of Asia Minor, the western of Greece, and many of the intermediate islands, exhibit thick masses of stratified deposits of later tertiary age and of purely lacustrine characters; and it is remarkable that, on the south side of the island of Crete, such masses present steep cliffs facing the sea, so that the southern boundary of the lake in which they were formed must have been situated where the sea now flows. Indeed, there are valid reasons for the supposition that the dry land once extended far to the west of the present Levantine coast, and not improbably forced the Nile to seek an outlet to the north-east of its present delta--a possibility of no small importance in relation to certain puzzling facts in the geographical distribution of animals in this region. At any rate, continuous land joined Asia Minor with the Balkan peninsula; and its surface bore deep fresh-water lakes, apparently disconnected with the Ponto-Aralian sea. This state of things lasted long enough to allow of the formation of the thick lacustrine strata to which I have referred. I am not aware that there is the smallest ground for the assumption that the AEgean land was broken up in consequence of any of the "catastrophes" which are so commonly invoked.<12> For anything that appears to the contrary, the narrow, steep-sided, straits between the islands of the AEgean archipelago may have been originally brought about by ordinary atmospheric and stream action; and may then have been filled from the Mediterranean, during a slow submergence proceeding from the south northwards. The strait of the Dardanelles is bounded by undisturbed pleistocene strata forty feet thick, through which, to all appearance, the present passage has been quietly cut.

That Olympus and Ossa were torn asunder and the waters of the Thessalian basin poured forth, is a very ancient notion, and an often cited "confirmation" of Deucalion's flood. It has not yet ceased to be in vogue, apparently because those who entertain it are not aware that modern geological investigation has conclusively proved that the gorge of the Penens is as typical an example of a valley of erosion as any to be seen in Auvergne or in Colorado.<13>

Thus, in the immediate vicinity of the vast expanse of country which can be proved to have been untouched by any catastrophe before, during, and since the "glacial epoch," lie the great areas of the AEgean and the Red Sea, in which, during or since the glacial epoch, changes of the relative positions of land and sea have taken place, in comparison with which the submergence of Moel Tryfaen, with all Wales and Scotland to boot, does not come to much.

What, then, is the relevancy of talk about the "glacial epoch" to the question of the historical veracity of the narrator of

the story of the Noachian deluge? So far as my knowledge goes, there is not a particle of evidence that destructive inundations were more common, over the general surface of the earth, in the glacial epoch than they have been before or since. No doubt the fringe of an ice-covered region must be always liable to them; but, if we examine the records of such catastrophes in historical times, those produced in the deltas of great rivers, or in lowlands like Holland, by sudden floods, combined with gales of wind or with unusual tides, far excel all others.

With respect to such inundations as are the consequences of earthquakes, and other slight movements of the crust of the earth, I have never heard of anything to show that they were more frequent and severer in the quaternary or tertiary epochs than they are now. In the discussion of these, as of all other geological problems, the appeal to needless catastrophes is born of that impatience of the slow and painful search after sufficient causes, in the ordinary course of nature, which is a temptation to all, though only energetic ignorance nowadays completely succumbs to it.

POSTSCRIPT.

My best thanks are due to Mr. Gladstone for his courteous withdrawal of one of the statements to which I have thought it needful to take exception. The familiarity with controversy, to which Mr. Gladstone alludes, will have accustomed him to the misadventures which arise when, as sometimes will happen in the heat of fence, the buttons come off the foils. I trust that any scratch which he may have received will heal as quickly as my own flesh wounds have done.

A contribution to the last number of this Review (*The Nineteenth Century*) of a different order would be left unnoticed, were it not that my silence would convert me into an accessory to misrepresentations of a very grave character. However, I shall restrict myself to the barest possible statement of facts, leaving my readers to draw their own conclusions.

In an article entitled "A Great Lesson," published in this Review for September, 1887:

(1) The Duke of Argyll says the "overthrow of Darwin's speculations" (p. 301) concerning the origin of coral reefs, which he fancied had taken place, had been received by men of science "with a grudging silence as far as public discussion is concerned" (p. 301).

The truth is that, as every one acquainted with the literature of the subject was well aware, the views supposed to have

effected this overthrow had been fully and publicly discussed by Dana in the United States; by Geikie, Green, and Prestwich in this country; by Lapparent in France; and by Credner in Germany.

(2) The Duke of Argyll says "that no serious reply has ever been attempted" (p. 305).

The truth is that the highest living authority on the subject, Professor Dana, published a most weighty reply, two years before the Duke of Argyll committed himself to this statement.

(3) The Duke of Argyll uses the preceding products of defective knowledge, multiplied by excessive imagination, to illustrate the manner in which "certain accepted opinions" established "a sort of Reign of Terror in their own behalf" (p. 307).

The truth is that no plea, except that of total ignorance of the literature of the subject, can excuse the errors cited, and that the "Reign of Terror" is a purely subjective phenomenon.

(4) The letter in "Nature" for the 17th of November, 1887, to which I am referred, contains neither substantiation, nor retraction, of statements 1 and 2. Nevertheless, it repeats number 3. The Duke of Argyll says of his article that it "has done what I intended it to do. It has called wide attention to the influence of mere authority in establishing erroneous theories and in retarding the progress of scientific truth."

(5) The Duke of Argyll illustrates the influence of his fictitious "Reign of Terror" by the statement that Mr. John Murray "was strongly advised against the publication of his views in derogation of Darwin's long-accepted theory of the coral islands, and was actually induced to delay it for two years" (p.307). And in "Nature" for the 17th November, 1887, the Duke of Argyll states that he has seen a letter from Sir Wyville Thomson in which he "urged and almost insisted that Mr. Murray should withdraw the reading of his papers on the subject from the Royal Society of Edinburgh. This was in February, 1877." The next paragraph, however, contains the confession: "No special reason was assigned." The Duke of Argyll proceeds to give a speculative opinion that "Sir Wyville dreaded some injury to the scientific reputation of the body of which he was the chief." Truly, a very probable supposition; but as Sir Wyville Thomson's tendencies were notoriously anti-Darwinian, it does not appear to me to lend the slightest justification to the Duke of Argyll's insinuation that the Darwinian "terror" influenced him. However, the question was finally set at rest by a letter which appeared in "Nature" (29th of December, 1887), in which the writer says that:

"talking with Sir Wyville about 'Murray's new theory,' I asked what objection he had to its being brought before the public? The answer simply was: he considered that the grounds of the

theory had not, as yet, been sufficiently investigated or sufficiently corroborated, and that therefore any immature dogmatic publication of it would do less than little service either to science or to the author of the paper."

Sir Wyville Thomson was an intimate friend of mine, and I am glad to have been afforded one more opportunity of clearing his character from the aspersions which have been so recklessly cast upon his good sense and his scientific honour.

(6) As to the "overthrow" of Darwin's theory, which, according to the Duke of Argyll, was patent to every unprejudiced person four years ago, I have recently become acquainted with a work, in which a really competent authority, <14> thoroughly acquainted with all the new lights which have been thrown upon the subject during the last ten years, pronounces the judgment; firstly, that some of the facts brought forward by Messrs. Murray and Guppy against Darwin's theory are not facts; secondly, that the others are reconcilable with Darwin's theory; and, thirdly, that the theories of Messrs. Murray and Guppy "are contradicted by a series of important facts" (p. 13).

Perhaps I had better draw attention to the circumstance that Dr. Langenbeck writes under shelter of the guns of the fortress of Strasburg; and may therefore be presumed to be unaffected by those dreams of a "Reign of Terror" which seem to disturb the peace of some of us in these islands (April, 1891).

[See, on the subject of this note, the essay entitled "An Episcopal Trilogy" in the following volume.]

FOOTNOTES

(1) In May 1849 the Tigris at Bagdad rose 22-1/2 feet--5 feet above its usual rise--and nearly swept away the town. In 1831 a similarly exceptional flood did immense damage, destroying 7000 houses. See Loftus, <i>Chaldea and Susiana,</i> p. 7.

(2) See the instructive chapter on Hasisadra's flood in Suess, <i>Das Antlitz der Erde,</i> Abth. I. Only fifteen years ago a cyclone in the Bay of Bengal gave rise to a flood which covered 3000 square miles of the delta of the Ganges, 3 to 45 feet deep, destroying 100,000 people, innumerable cattle, houses, and trees. It broke inland on the rising ground of Tipperah, and may have swept a vessel from the sea that far, though I do not know that it did.

(3) See Cernik's maps in <i>Petermanns Mittheilungen,</i> *Erganzungshefte* 44 and 45, 1875-76.

(4) I have not cited the dimensions given to the ships in most translations of the story, because there appears to be a doubt

about them. Haupt (*Keilinschriftliche Sündfluth-Bericht*, p. 13) says that the figures are illegible.

(5) It is probable that a slow movement of elevation of the land at one time contributed to the result--perhaps does so still.

(6) At a comparatively recent period, the littoral margin of the Persian Gulf extended certainly 250 miles farther to the northwest than the present embouchure of the Shatt-el Arab. (Loftus, *Quarterly Journal of the Geological Society*, 1853, p. 251.) The actual extent of the marine deposit inland cannot be defined, as it is covered by later fluvial deposits.

(7) Tiele (*Babylonisch-Assyrische Geschichte*, pp. 572-3) has some very just remarks on this aspect of the epos.

(8) In the second volume of the *History of the Euphrates*, p. 637 Col. Chesney gives a very interesting account of the simple and rapid manner in which the people about Tekrit and in the marshes of Lemlum construct large barges, and make them water-tight with bitumen. Doubtless the practice is extremely ancient and as Colonel Chesney suggests, may possibly have furnished the conception of Noah's ark. But it is one thing to build a barge 44ft. long by 11ft. wide and 4ft. deep in the way described; and another to get a vessel of ten times the dimensions, so constructed, to hold together.

(9) "Es ist nichts schrecklicher als eine thatige Unwissenheit," *Maximen und Reflexionen*, iii.

(10) The well-known difficulties connected with this case have recently been carefully discussed by Mr. Bell in the *Transactions* of the Geological Society of Glasgow.

(11) An instructive parallel is exhibited by the "Great Basin" of North America. See the remarkable memoir on *Lake Bonneville* by Mr. G. K. Gilbert, of the United States Geological Survey, just published.

(12) It is true that earthquakes are common enough, but they are incompetent to produce such changes as those which have taken place.

(13) See Teller, *Geologische Beschreibung des sud-ostlichen Thessalien*; *Denkschriften d. Akademie der Wissenschaften*, Wien, Bd. xl. p. 199.

(14) Dr. Langenbeck, *Die Theorien über die Entstehung der Korallen-Inseln und Korallen-Riffe* (p. 13), 1890.

End of The Project Gutenberg Etext of Hasisadra's Adventure, by Huxley

This is Essay #7 from "Science and Hebrew Tradition"

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