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ARTICLE VI.

THE BIBLE AND RECENT SCIENCE.¹

BY PROFESSOR CHARLES HENRY HITCHCOCK, LL.D.

THE readers of the *BIBLIOTHECA SACRA* need not be told who Professor Wright is, nor be reminded of the many volumes he has written upon Science and Revelation. The book before us treats systematically of some of the more important events in the Old Testament history which require scientific explanations, more particularly of those where recent explorations have given us more light.

At first the New Testament is called as a witness. Christianity depends upon facts proved through historical processes, whose knowledge has been transmitted from the earlier generations to their successors. The Gospels, familiar to the church in the first century, give us the knowledge of Christ at first hand, and they indorse the Old Testament. Christ himself appeals to Moses as the author of the Pentateuch. It does not seem correct to deny that the older scriptures had been preserved in this written form, since the art of writing had been known to the world for thousands of years before the time of Moses, and especially because contemporary records of the creation and the deluge have been discovered.

Next to the establishment of the biblical record, opportunity is afforded of comparing it with contemporary documents in the middle and later periods of Jewish history. Thus

¹ *Scientific Confirmations of Old Testament History.* By G. Frederick Wright, D.D., LL.D., F.G.S.A. 12mo. Pp. 450. Oberlin, Ohio: Bibliotheca Sacra Company. 1906. \$2.15, postpaid.

the events recorded in the book of Daniel are confirmed; also the destruction of Sennacherib's army by an epidemic; the history of Ahab and Jehu and the latter's tribute to Shalmaneser; the expedition of Shishak, and a discussion of the erroneous popular interpretation of Joshua's command to the sun to stand still.

The first scientific confirmation cited is the cause of the years of plenty and famine in Egypt, which is ascribed to the abundance or scarcity of the annual overflow of the Nile Valley. The water comes from the great lakes of Central Africa, whose outlet to the river of Egypt has been known to be obstructed by an accumulation of vegetable matter resembling peat, called *sudd*. When the *sudd* is abundant the discharge of water is hindered, thus preventing the proper supply from reaching the agricultural district and producing a famine; but when the flow is unrestricted, the soil will yield plentifully. An Arabian historian records a time of scarcity in lower Egypt, and a consequent famine, between 1064 and 1071 A. D., when the distress of the inhabitants fully equaled that experienced in the days of Joseph. In 1106 A. D. there was another period of low water, and the Sultan of Egypt sent an envoy with magnificent presents to the Emperor of Ethiopia, begging him to have the impediment removed. He was persuaded to open the dam that had turned the course of the river, and the suffering Egyptians immediately experienced relief. In 1899 the water of the Nile again failed to be plentiful. Competent engineers were deputed to remove the obstruction,—the *sudd*,—which was so compressed by the force of the current that men and large animals could cross the river upon it, as on a bridge.

The real mystery of the biblical account lies in the supernatural revelation to Joseph of the coming of the years of

plenty and famine. No claim is made for any supernatural agency in the production of the times of plenty and scarcity; nor is it likely that the imperial authorities were aware of the causes; else they would have been blameworthy for not attempting to change the situation from wretchedness to happiness.

The Israelites were welcomed to Egypt by the Shepherd Kings, or Hyksos, whose capital city, Zoan, lay between Egypt and Canaan. Goshen was a suitable location for the Israelites because it was on the border, as far removed as possible from the homes of the native Egyptians. After the expulsion of the Hyksos, the conquering dynasty caused the Hebrews to build for Pharaoh the treasure cities of Pithom and Rameses, constructed of bricks made partly without straw, as explained in Exodus. In 1883 Edouard Naville unearthed, along the line of the old Freshwater Canal from the delta of the Nile to the Gulf of Suez, numerous store-pits, corresponding to the descriptions given in Exodus. The storehouses occupied the whole extent of Pithom, six hundred and fifty feet square, twenty-two feet thick. The bricks had been made both with and without straw; so that there is an agreement between the biblical and monumental records for this part of the history.

Four startling events recorded in the Pentateuch, particularly open to scientific criticism, are discussed by Professor Wright: (1) the passage of the Red Sea; (2) the parting of the Jordan; (3) the destruction of the cities of the plain; and (4) the Noachian Deluge. These accounts require a knowledge of very recent acquisition for their explanation. Science can show the inherent probability of such occurrences. They do not make extravagant demands upon our beliefs concern-

ing the uniformity of nature, and are in close analogy with the operation of human laws.

Nature is properly the system of causally connected sequences of the universe which can be broken by the will of personal beings, whether the Creator or man. Man can bring about new combinations of natural forces. Nature would never erect a house, build a railroad, or develop domestic animals or plants. Man's control of nature is limited, but God can bring about results which are superhuman as well as supernatural. The class of events discussed in Professor Wright's book have been termed "mediate miracles," where we can see the forces that have been used, and judge of them by analogy.

The story of the crossing of the Red Sea is remarkable in the way secondary causes have been put forth for the deliverance of the people. The Lord "caused the sea to go back" through the agency of "a strong east wind," which blew all night, and "made the sea dry land." The cessation of the wind enabled the waters to return to their original level, and thus overwhelm the Egyptians.

That the wind may change the levels of water in lakes was very recently (January, 1907) shown upon Lake Erie, when southwest winds piled up the water seven or eight feet at Buffalo above the ordinary level, and urged an immense additional volume over Niagara Falls, doubling the size of the stream in the Whirlpool Rapids, seriously damaging the trolley line. At Suez there is a difference of more than ten feet in the water-level as recorded upon the map of the Canal Company, which must be due to the wind, as there is no tide in the Red Sea.

Professor Wright thinks the Israelites crossed the valley at Chalof between the Red Sea and the Bitter Lakes, where the

highest part of the divide has been excavated twenty-seven feet for the canal, about six miles from the Red Sea. The highest point along the canal is above Ismailia (Etham), forty miles from the Red Sea, seventy to eighty feet above the ocean, along which runs the passageway between Africa and Asia for caravans and armies used for thousands of years. A submergence of thirty feet in this region would overflow the entire region between the Red and Mediterranean Seas, except the continental bridge. The Israelites could not utilize this passageway because it was held by the Egyptians. Professor Wright thinks this water must have been thirty feet higher than it is now, at the time of the Exodus, so that the lowering of it by seven or eight feet would leave ample space for the passage of the Hebrew host.

Other authors have located the crossing between the Bitter Lakes and Ismailia, but the locality of Chalooft better brings out the contrasts. Israel was shut in by the wilderness behind and by the Red Sea before; so that escape would have been impossible, except for the providential interposition. It is noted that the language employed is rhetorical, so that the representation of the water "as a wall on their right and on their left" does not necessitate the maintenance of the mobile element in an impossible situation, but that the Bitter Lakes and the Red Sea were the walls which prevented a flank movement by the forces of Pharaoh, who could only press upon their rear. Thus the topography of the country is in perfect agreement with the conditions described by Moses.

The physical character of Palestine fits the special mission of Israel. Except for their isolation, the people would have amalgamated with the more powerful nations adjacent, and their exclusive religious development would have been impossible. First of these features is the great fault, one thousand

and miles long, from Antioch in Syria to the south end of the Gulf of Akabah, following the valley of the Jordan and the Dead Sea. On the eastern side the rocks were depressed, but on the west they were elevated. Lateral pressure assisted in this development, causing the strata to bend downwards instead of upwards, producing a saddle rather than an arch, and differing from related foldings only in happening to lie below the sea-level. Lake Galilee is more than six hundred, the surface of the Dead Sea twelve hundred and ninety-two, and the bottom of the same twenty-six hundred feet below the sea-level, or six thousand feet lower than the heights of Moab and Hebron. The western arch has been affected by a cross-fault from the Jordan a little north of Galilee to the Mediterranean by Mount Carmel. This produced the valley of Esdraelon, only two hundred feet above the sea, which thus becomes a natural line of communication between the valley of the Euphrates and the Mediterranean at Acre, that is, between Assyria and Egypt, the two rival nations of antiquity. Jerusalem is on one side, and therefore not an essential possession for either party. Hence it was protected by its situation, and its population left free for religious development. The Judæan heights are also easily defensible, and there was little temptation for armed forces to interfere with the peaceable inhabitants on either side of the valley of Esdraelon.

Three great events are illustrated by the physical structure of the country,—the falling of the walls of Jericho, the parting of the waters of the Jordan, and the destruction of the cities of the plain.

The first may be easily understood by a comparison with the recent seismic disturbances in California. There is along the Coast Range a long fault in connection with which the strata were dislocated, rising, falling, and twisted; and in the city of

San Francisco the most violent destruction of buildings was on the made ground. Jericho was situated like San Francisco, adjacent to the fault, and resting upon recent unconsolidated sediments. The falling of the walls and the attack by the Israelites were brought together by divine foresight. The miraculous character of the transaction lay in this foreknowledge, not in the physical movements.

It is to Professor Wright's special investigations that we now have a clear understanding of the passage of the Jordan by the Israelites after the destruction of Jericho. The waters up stream rose and extended several miles, as far as to the city of Adam, while the supply below was cut off. This is exactly what would happen if a dam were thrown across the Jordan, such as would be produced by a land-slide. A very similar action once took place on the Columbia River in Oregon at the Cascades. A lake was formed above the dam, and for a long time it was possible for the aborigines to pass dry-shod over a bridge of the fallen earth and stones. This phenomenon has been described by Newberry, Le Conte, Emmons, and Dutton, and visited by Professor Wright, who was thus enabled to interpret the event on the Jordan. A photograph of bluffs of sediment fifty feet high, worn down by the river, indicates how naturally there might be a slide, which would have provided a highway over which the host and the whole congregation could have passed. They took advantage of a natural though unusual occurrence; and their enemies must have been disheartened when they heard of the feat, which to them appeared to be the interposition of Jehovah in behalf of his people.

The destruction of Sodom and Gomorrah finds its parallel in the calamitous conflagrations occasionally reported from the petroleum districts, both in the United States and along the

Caspian Sea. It is not merely the liquid oil but the associated inflammable gases that produce the most disastrous results. Men could escape from a burning fluid, but would be instantly overwhelmed by explosions of gas.

The Dead Sea is known as the Lake Asphaltites upon our maps. Asphalt is an inspissated petroleum, and hydrocarbonaceous gases are commonly associated with it. Hence the region of the Dead Sea is a place where emissions of the explosive gases may be looked for. There seem to be times when uncommonly large volumes of the gas are liberated; perhaps a shaking of the ground, when reservoirs or tanks of the volatile substance may be set free, and it may be exploded by artificial flames, or easily by the lightning, a "fire from heaven." Thus the use of natural forces to accomplish moral purposes involves the direct action of the Creator as much as the firing of a gun at a mark.

THE NOACHIAN DELUGE.

The chief interest of the book consists in a full discussion of the Noachian Deluge. People have been inclined to regard this early story as mythical. Now that other accounts have been unearthed, and the geological history of the Quaternary age has been more fully studied, it is still possible to speak of a universal deluge, when multitudes of the earth's inhabitants, both men and animals, were destroyed, and a new era of stability was vouchsafed to mankind. The early identification of the Deluge with the "Drift Period" was not so far astray, after all.

Far from undermining the veracity of the biblical record, the discovery of the Babylonian stone tablets has brought out into sharper contrast the truthful and the improbable. First of all, the writer in Genesis pruned the story of polytheism.

Only Jehovah or Elohim directed affairs. Both accounts agree that the Deluge was intended to be a Divine punishment for the wickedness of men. No one seems as yet to have discovered any similarity in the names of the chief actors. The dimensions of the ark as given in Genesis are reasonable. The vessel was comparable with one of the larger Atlantic liners, 562 feet long, 94 feet wide, and 56 feet deep; while the tablets describe a cubic solid, 262 feet high. Though provided with a mast and a pilot, such a structure would be unseaworthy. The later accounts of Berosus and Origen are still farther away from probability. In the biblical account there is nothing conflicting with the sublime conception of holiness, justice, and mercy usually ascribed to God, and illustrated in the general providential scheme of government; but in the cuneiform tablets the Deluge is said to have been occasioned by a quarrel among the gods, and the salvation of the occupants of the ark to have been due to the interposition of Bel.

In all the accounts the ark is represented as starting from lower Mesopotamia (Shurippak or Sippara) and floating up the valley, being stranded about the headwaters of the Euphrates. In Genesis the spread of waters was occasioned partly by the rainfall, and more particularly by the breaking up of the fountains of the great deep; in other words, the sinking of the land followed by a rush of waters over the depressed district. And the reëlevation of the earth is represented at the close of the Deluge as leading to the return of the waters to their original place. The tablets speak only of the storm of rain. Provision is made in both accounts for the preservation of animals, with more detail in Genesis. The accounts differ as to the duration of the Deluge. Genesis says a year and seventy days, when the items are added together; the tablets indicate only a fortnight.

All accounts agree in sending out birds, but differ in the details. They all mention the offering of sacrifices to the gods or Deity, and in the cuneiform tablets the allusion is hardly complimentary,—“The gods like flies swarmed about the sacrifices.” According to Genesis, Noah survived the Deluge many years; while Nûh-napishtim and his wife were at once deified, and transferred to heaven. Both accounts agree in predicting that the human race will never again be destroyed by a flood.

The similarity of the biblical account of the Deluge to a mariner's logbook is very striking, and makes it clear that the descriptions of the phenomena are such as would be given by the occupants of the vessel, and not necessarily correct as to the universality of the flood, and the submergence of the higher mountains.

A few additional matters are brought out by Edouard Suess, an Austrian geologist of great repute, in his “*Das Antlitz der Erde.*” He concludes: 1. The event known as the *Deluge* took place in the lower Euphrates Valley, and consisted principally in an inundation from the sea, very broad and destructive. 2. The essential cause of the catastrophe was a violent earthquake, which originated in the Persian Gulf, and had been preceded by several minor shocks. 3. A cyclone accompanied the earthquake, attended of course with a heavy precipitation of rain. 4. The traditions of other nations do not authorize in any manner the extension of the flood beyond the limits of the Euphrates-Tigris basin, and still less to affirm that it extended over the whole earth. It was this catastrophe that explains the origin of the term Diluvium in geological writings, as the older geologists correlated the Deluge with the drift, or ice, age.

In the abandonment of the iceberg theory for the explanation of glacial phenomena, geologists had almost forgotten the existence of the enormous inundations necessitated by the melting of the ice-sheet. The area occupied by this sheet in the northern hemisphere was about six million square miles,—two-thirds in North America, and one-third in Europe. Assuming the average thickness to be one mile, there would be an immense weight resting upon the land, sufficient to disturb the balance of the forces preserving the normal relations between the continents and the ocean. This weight may be estimated to be about one-third of that of the land itself above the sea-level, which would be heavy enough to lower the level of the continent, in accordance with the modern doctrine of isostasy. Another source of inequality would be the abstraction of water from the ocean to furnish the snow for the ice-cap, which has been estimated to be sufficient to lower the level of the sea two hundred and fifty feet. Allowance should also be made for the attraction of the water by the ice of the northern regions. Now when the Ice age had culminated, all this glacial material would be converted into water, and enormous floods would result. This was so wide-spread that geologists have a name for the period—Champlain—and much labor has been exerted in the description of the numerous lakes and flooded rivers that must have abounded. Hardly any part of the glaciated regions has been exempt from very remarkable floods produced by the melting of this ice.

Mention might be made of the glacial lakes of this period, in North America; as of Lake Agassiz, a body of water held in place by the unmelted ice to the north, occupying an area of one hundred thousand square miles, in Minnesota, Dakota, and Manitoba, and larger than the combined area of the Great Lakes. In the west there were Lake Bonneville, the glacial

enlargement of the Great Salt Lake, twenty thousand square miles, and Lake Lahontan, nearly as large, reaching to the foothills of the Sierra Nevada. In the east there were Lake Ohio, Lake Warren, Lake Algonquin, and others. The Merimac and Connecticut rivers were so flooded, and at the time so depressed at the north as to become actual estuaries of the sea, leaving behind flood-plain deposits two hundred feet thick. The Mississippi furnished a similar spectacle; and produced a correspondingly large deposit of gravel, sand, and loess from the Gulf of Mexico to Minnesota, and into the Dakotas in the Missouri Valley.

In Asia the areas thus flooded were as much larger than those of North America as is the continent itself. Professor Wright has in his investigations brought to notice the formation of the loess of China and Mongolia, Central Asia and Southern Russia; the presence of the sea in Siberia and the Aral-Caspian depression; the filling of the Jordan and Dead Sea valley from which there was enough evaporation to provide glaciers upon Mount Lebanon in Syria.

In Europe there are additional phenomena of interest; and the facts were brought out by Professor Joseph Prestwich, "one of the most eminent, cautious, and unerring of recent geological observers." To him the English public was indebted for the discernment of the reality of the existence of man with the extinct mammoth in the north of France. He has published several monographs proving the existence of disastrous floods in several parts of Europe in the decline of the Ice age. The first phenomenon is the "rubble drift," a deposit of angular gravel bearing no relation to the present drainage systems of Southern England and France. It was accumulated by marine waves rushing tumultuously over the depressed land. Secondly, the ossiferous caverns, connected

with these same inundations, abound in the remains of mammalia, that had evidently perished in the floods, and whose remains were carried into fissures. These phenomena occurred also at Gibraltar and Sicily. Third, the loess and elevated beaches are deposits formed in connection with this same submergence.

A still more important generalization may be derived from the coincidence of this cataclysmic submergence¹ with the epoch of the extinction of the large mammalia and early races of men. The mammalia culminated in the early Quaternary, when such animals as the mammoth, mastodon, gigantic carnivora, the early camels and horses, and many others roamed over the northern latitudes. More exactly, they lived in the paleolithic period of the antiquarians. Man's presence at this time was indicated partly by the association of his bones and implements with remains of the extinct quadrupeds, and by the fact that certain artists carved upon ivory and stone pictures of the extinct mammoth, bear, horse, and other animals. These carvings must have been chiseled out when the creatures represented were living, and of course contemporaries of the artists.

The date of the Deluge must be placed considerably earlier than that given by the ordinary chronology as worked out by Archbishop Usher. The cuneiform tablets have been supposed to date at least from 3000 B. C., and no one can say how much later this is than the time of the catastrophe. Several bodies of

¹ Not much is said about this coincidence in the book, as it will be more fully treated of in another volume advertised in the preface as in preparation. The writer advocated the identity of this cataclysm with the Noachian Deluge in an unsigned review of Lyell's "Antiquity of Man" in the *North American Review* for October, 1863, and in the *Bibliotheca Sacra* for July, 1867, in an article on the "Relations of Geology to Theology."

the mammoth supposed to have died at this time have been so perfectly preserved in the ice that the flesh was used for food. The Niagara gorge began to be excavated at the end of the Ice age, and its beginning has been estimated by some to be as little as 10,000 years ago. The general tendency of the geologists has been to increase rather than to diminish that figure.

The book closes with a chapter upon Genesis and Science. There is a wonderful coincidence between the history as recorded in the first chapter of Genesis and as given us by geology. It does not require parallel columns of type to show the close agreement.

1. There was matter, whether expressly created out of nothing or an aggregation of plantessimals.

2. There was light, including also heat and electricity.

3. As the solids, liquids, and gases were commingled, there succeeds the division by the firmament of the clouds above and the waters below.

4. Land is segregated from the water, or continents and oceans.

5. Life is next introduced in the form of plants, the vegetable kingdom.

6. Days and seasons are established through the relation of the earth to the sun and moon. Some have thought the correspondence between the records is not exact between the plants and the heavenly bodies. But as much may be claimed from scientific grounds in favor of the biblical as for the reversed order.

7. The water animals, both invertebrate and reptilian, followed by birds.

8. Cattle, creeping things, and beasts—the mammalia.

9. Last of all, man.

The time has come when science may have something to say about the correctness of the biblical record. Half a century ago many divines claimed that geology must be discredited, because they could not reconcile the scriptural day with the long periods of science. To-day the more liberal element of the church disapproves of geology, because her principles sustain the Scriptures. Science is in better accord with the incidental allusions of Genesis to the origin and development of the earth and its inhabitants than many theologians. The weakest part of the scientific fabric hitherto has been the establishment of the existence and universality of a deluge. Professor Wright has proved that from both biblical and scientific considerations, it is proper to speak of a universal deluge, coupled with the destruction of races of men. A doctrine which has been neglected because of its apparent weakness now becomes a pillar of strength. Too much praise cannot be accorded to Professor Wright for his skill in bringing together the facts that fortify this conclusion.

A century ago vital Christianity was well nigh smothered in New England by liberalism. It was regained, in the providence of God, through the faithful preaching of revivalists. Just now there seems to be an influx of liberalism, illustrating the truth of the adage that "history repeats itself." When this wave has been spent, there will be another revival of evangelic Christianity, more firmly established than before.