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HISTORY OF THE CONFLICT

BETWEEN

RELIGION AND SCIENCE.

CHAPTER I.

THE ORIGIN OF SCIENCE.

Religious condition of the Greeks in the fourth century before Christ.—Their invasion of the Persian Empire brings them in contact with new aspects of Nature, and familiarizes them with new religious systems.—The military, engineering, and scientific activity, stimulated by the Macedonian campaigns, leads to the establishment in Alexandria of an institute, the Museum, for the cultivation of knowledge by experiment, observation, and mathematical discussion.—It is the origin of Science.

No spectacle can be presented to the thoughtful mind more solemn, more mournful, than that of the dying of an ancient religion, which in its day has given consolation to many generations of men.

Four centuries before the birth of Christ, Greece was fast outgrowing her ancient faith. Her philosophers, in their studies of the world, had been profoundly impressed with the contrast between the majesty of the operations of Nature and the worthlessness of the divinities of Olympus. Her historians, considering the orderly course of political affairs, the manifest

uniformity in the acts of men, and that there was no event occurring before their eyes for which they could not find an obvious cause in some preceding event, began to suspect that the miracles and celestial interventions, with which the old annals were filled, were only fictions. They demanded, when the age of the supernatural had ceased, why oracles had become mute, and why there were now no more prodigies in the world.

Traditions, descending from immemorial antiquity, and formerly accepted by pious men as unquestionable truths, had filled the islands of the Mediterranean and the conterminous countries with supernatural wonders—enchantresses, sorcerers, giants, ogres, harpies, gorgons, centaurs, cyclops. The azure vault was the floor of heaven; there Zeus, surrounded by the gods with their wives and mistresses, held his court, engaged in pursuits like those of men, and not refraining from acts of human passion and crime.

A sea-coast broken by numerous indentations, an archipelago with some of the most lovely islands in the world, inspired the Greeks with a taste for maritime life, for geographical discovery, and colonization. Their ships wandered all over the Black and Mediterranean Seas. The time-honored wonders that had been glorified in the "Odyssey," and sacred in public faith, were found to have no existence. As a better knowledge of Nature was obtained, the sky was shown to be an illusion; it was discovered that there is no Olympus, nothing above but space and stars. With the vanishing of their habitation, the gods disappeared, both those of the Ionian type of Homer and those of the Doric of Hesiod.

But this did not take place without resistance. At first, the public, and particularly its religious portion, de-

nounced the rising doubts as atheism. They despoiled some of the offenders of their goods, exiled others; some they put to death. They asserted that what had been believed by pious men in the old times, and had stood the test of ages, must necessarily be true. Then, as the opposing evidence became irresistible, they were content to admit that these marvels were allegories under which the wisdom of the ancients had concealed many sacred and mysterious things. They tried to reconcile, what now in their misgivings they feared might be myths, with their advancing intellectual state. But their efforts were in vain, for there are predestined phases through which on such an occasion public opinion must pass. What it has received with veneration it begins to doubt, then it offers new interpretations, then subsides into dissent, and ends with a rejection of the whole as a mere fable.

In their secession the philosophers and historians were followed by the poets. Euripides incurred the odium of heresy. Æschylus narrowly escaped being stoned to death for blasphemy. But the frantic efforts of those who are interested in supporting delusions must always end in defeat. The demoralization resistlessly extended through every branch of literature, until at length it reached the common people.

Greek philosophical criticism had lent its aid to Greek philosophical discovery in this destruction of the national faith. It sustained by many arguments the wide-spreading unbelief. It compared the doctrines of the different schools with each other, and showed from their contradictions that man has no criterion of truth; that, since his ideas of what is good and what is evil differ according to the country in which he lives, they can have no foundation in Nature, but must be alto-

gether the result of education; that right and wrong are nothing more than fictions created by society for its own purposes. In Athens, some of the more advanced classes had reached such a pass that they not only denied the unseen, the supernatural, they even affirmed that the world is only a day-dream, a phantasm, and that nothing at all exists.

The topographical configuration of Greece gave an impress to her political condition. It divided her people into distinct communities having conflicting interests, and made them incapable of centralization. Incessant domestic wars between the rival states checked her advancement. She was poor, her leading men had become corrupt. They were ever ready to barter patriotic considerations for foreign gold, to sell themselves for Persian bribes. Possessing a perception of the beautiful as manifested in sculpture and architecture to a degree never attained elsewhere either before or since, Greece had lost a practical appreciation of the Good and the True.

While European Greece, full of ideas of liberty and independence, rejected the sovereignty of Persia, Asiatic Greece acknowledged it without reluctance. At that time the Persian Empire in territorial extent was equal to half of modern Europe. It touched the waters of the Mediterranean, the *Ægean*, the Black, the Caspian, the Indian, the Persian, the Red Seas. Through its territories there flowed six of the grandest rivers in the world—the Euphrates, the Tigris, the Indus, the Jaxartes, the Oxus, the Nile, each more than a thousand miles in length. Its surface reached from thirteen hundred feet below the sea-level to twenty thousand feet above. It yielded, therefore, every agricultural product. Its mineral wealth was boundless. It inherited the

prestige of the Median, the Babylonian, the Assyrian, the Chaldean Empires, whose annals reached back through more than twenty centuries.

Persia had always looked upon European Greece as politically insignificant, for it had scarcely half the territorial extent of one of her satrapies. Her expeditions for compelling its obedience had, however, taught her the military qualities of its people. In her forces were incorporated Greek mercenaries, esteemed the very best of her troops. She did not hesitate sometimes to give the command of her armies to Greek generals, of her fleets to Greek captains. In the political convulsions through which she had passed, Greek soldiers had often been used by her contending chiefs. These military operations were attended by a momentous result. They revealed, to the quick eye of these warlike mercenaries, the political weakness of the empire and the possibility of reaching its centre. After the death of Cyrus on the battle-field of Cunaxa, it was demonstrated, by the immortal retreat of the ten thousand under Xenophon, that a Greek army could force its way to and from the heart of Persia.

That reverence for the military abilities of Asiatic generals, so profoundly impressed on the Greeks by such engineering exploits as the bridging of the Hellespont, and the cutting of the isthmus at Mount Athos by Xerxes, had been obliterated at Salamis, Platea, Mycale. To plunder rich Persian provinces had become an irresistible temptation. Such was the expedition of Agesilaus, the Spartan king, whose brilliant successes were, however, checked by the Persian government resorting to its time-proved policy of bribing the neighbors of Sparta to attack her. "I have been conquered by thirty thousand Persian archers," bitterly exclaimed

Agesilaus, as he reëmbarked, alluding to the Persian coin, the Daric, which was stamped with the image of an archer.

At length Philip, the King of Macedon, projected a renewal of these attempts, under a far more formidable organization, and with a grander object. He managed to have himself appointed captain-general of all Greece, not for the purpose of a mere foray into the Asiatic satrapies, but for the overthrow of the Persian dynasty in the very centre of its power. Assassinated while his preparations were incomplete, he was succeeded by his son Alexander, then a youth. A general assembly of Greeks at Corinth had unanimously elected him in his father's stead. There were some disturbances in Illyria; Alexander had to march his army as far north as the Danube to quell them. During his absence the Thebans with some others conspired against him. On his return he took Thebes by assault. He massacred six thousand of its inhabitants, sold thirty thousand for slaves, and utterly demolished the city. The military wisdom of this severity was apparent in his Asiatic campaign. He was not troubled by any revolt in his rear.

In the spring B. C. 334 Alexander crossed the Hellespont into Asia. His army consisted of thirty-four thousand foot and four thousand horse. He had with him only seventy talents in money. He marched directly on the Persian army, which, vastly exceeding him in strength, was holding the line of the Granicus. He forced the passage of the river, routed the enemy, and the possession of all Asia Minor, with its treasures, was the fruit of the victory. The remainder of that year he spent in the military organization of the conquered provinces. Meantime Darius, the Persian king, had

advanced an army of six hundred thousand men to prevent the passage of the Macedonians into Syria. In a battle that ensued among the mountain-defiles at Issus, the Persians were again overthrown. So great was the slaughter that Alexander, and Ptolemy, one of his generals, crossed over a ravine choked with dead bodies. It was estimated that the Persian loss was not less than ninety thousand foot and ten thousand horse. The royal pavilion fell into the conqueror's hands, and with it the wife and several of the children of Darius. Syria was thus added to the Greek conquests. In Damascus were found many of the concubines of Darius and his chief officers, together with a vast treasure.

Before venturing into the plains of Mesopotamia for the final struggle, Alexander, to secure his rear and preserve his communications with the sea, marched southward down the Mediterranean coast, reducing the cities in his way. In his speech before the council of war after Issus, he told his generals that they must not pursue Darius with Tyre unsubdued, and Persia in possession of Egypt and Cyprus, for, if Persia should regain her seaports, she would transfer the war into Greece, and that it was absolutely necessary for him to be sovereign at sea. With Cyprus and Egypt in his possession he felt no solicitude about Greece. The siege of Tyre cost him more than half a year. In revenge for this delay, he crucified, it is said, two thousand of his prisoners. Jerusalem voluntarily surrendered, and therefore was treated leniently: but the passage of the Macedonian army into Egypt being obstructed at Gaza, the Persian governor of which, Betis, made a most obstinate defense, that place, after a siege of two months, was carried by assault, ten thousand of its men were massacred, and the rest, with their wives and children,

sold into slavery. Betis himself was dragged alive round the city at the chariot-wheels of the conqueror. There was now no further obstacle. The Egyptians, who detested the Persian rule, received their invader with open arms. He organized the country in his own interest, intrusting all its military commands to Macedonian officers, and leaving the civil government in the hands of native Egyptians.

While preparations for the final campaign were being made, he undertook a journey to the temple of Jupiter Ammon, which was situated in an oasis of the Libyan Desert, at a distance of two hundred miles. The oracle declared him to be a son of that god who, under the form of a serpent, had beguiled Olympias, his mother. Immaculate conceptions and celestial descents were so currently received in those days, that whoever had greatly distinguished himself in the affairs of men was thought to be of supernatural lineage. Even in Rome, centuries later, no one could with safety have denied that the city owed its founder, Romulus, to an accidental meeting of the god Mars with the virgin Rhea Sylvia, as she went with her pitcher for water to the spring. The Egyptian disciples of Plato would have looked with anger on those who rejected the legend that Perictione, the mother of that great philosopher, a pure virgin, had suffered an immaculate conception through the influences of Apollo, and that the god had declared to Ariston, to whom she was betrothed, the parentage of the child. When Alexander issued his letters, orders, and decrees, styling himself "King Alexander, the son of Jupiter Ammon," they came to the inhabitants of Egypt and Syria with an authority that now can hardly be realized. The free-thinking Greeks, however, put on such a supernatural

pedigree its proper value. Olympias, who, of course, better than all others knew the facts of the case, used jestingly to say, that "she wished Alexander would cease from incessantly embroiling her with Jupiter's wife." Arrian, the historian of the Macedonian expedition, observes, "I cannot condemn him for endeavoring to draw his subjects into the belief of his divine origin, nor can I be induced to think it any great crime, for it is very reasonable to imagine that he intended no more by it than merely to procure the greater authority among his soldiers."

All things being thus secured in his rear, Alexander, having returned into Syria, directed the march of his army, now consisting of fifty thousand veterans, eastward. After crossing the Euphrates, he kept close to the Masian hills, to avoid the intense heat of the more southerly Mesopotamian plains; more abundant forage could also thus be procured for the cavalry. On the left bank of the Tigris, near Arbela, he encountered the great army of eleven hundred thousand men brought up by Darius from Babylon. The death of the Persian monarch, which soon followed the defeat he suffered, left the Macedonian general master of all the countries from the Danube to the Indus. Eventually he extended his conquest to the Ganges. The treasures he seized are almost beyond belief. At Susa alone he found—so Arrian says—fifty thousand talents in money.

The modern military student cannot look upon these wonderful campaigns without admiration. The passage of the Hellespont; the forcing of the Granicus; the winter spent in a political organization of conquered Asia Minor; the march of the right wing and centre of the army along the Syrian Mediterranean coast; the engineering difficulties overcome at the siege of Tyre; the

storming of Gaza; the isolation of Persia from Greece; the absolute exclusion of her navy from the Mediterranean; the check on all her attempts at intriguing with or bribing Athenians or Spartans, heretofore so often resorted to with success; the submission of Egypt; another winter spent in the political organization of that venerable country; the convergence of the whole army from the Black and Red Seas toward the nitre-covered plains of Mesopotamia in the ensuing spring; the passage of the Euphrates fringed with its weeping-willows at the broken bridge of Thapsacus; the crossing of the Tigris; the nocturnal reconnoissance before the great and memorable battle of Arbela; the oblique movement on the field; the piercing of the enemy's centre—a manœuvre destined to be repeated many centuries subsequently at Austerlitz; the energetic pursuit of the Persian monarch; these are exploits not surpassed by any soldier of later times.

A prodigious stimulus was thus given to Greek intellectual activity. There were men who had marched with the Macedonian army from the Danube to the Nile, from the Nile to the Ganges. They had felt the hyperborean blasts of the countries beyond the Black Sea, the simooms and sand-tempests of the Egyptian deserts. They had seen the Pyramids which had already stood for twenty centuries, the hieroglyph-covered obelisks of Luxor, avenues of silent and mysterious sphinxes, colossi of monarchs who reigned in the morning of the world. In the halls of Esar-haddon they had stood before the thrones of grim old Assyrian kings, guarded by winged bulls. In Babylon there still remained its walls, once more than sixty miles in compass, and, after the ravages of three centuries and three conquerors, still more than eighty feet in height; there

were still the ruins of the temple of cloud-encompassed Bel, on its top was planted the observatory wherein the weird Chaldean astronomers had held nocturnal communion with the stars; still there were vestiges of the two palaces with their hanging gardens in which were great trees growing in mid-air, and the wreck of the hydraulic machinery that had supplied them with water from the river. Into the artificial lake with its vast apparatus of aqueducts and sluices the melted snows of the Armenian mountains found their way, and were confined in their course through the city by the embankments of the Euphrates. Most wonderful of all, perhaps, was the tunnel under the river-bed.

If Chaldea, Assyria, Babylon, presented stupendous and venerable antiquities reaching far back into the night of time, Persia was not without her wonders of a later date. The pillared halls of Persepolis were filled with miracles of art—carvings, sculptures, enamels, alabaster libraries, obelisks, sphinxes, colossal bulls. Ecbatana, the cool summer retreat of the Persian kings, was defended by seven encircling walls of hewn and polished blocks, the interior ones in succession of increasing height, and of different colors, in astrological accordance with the seven planets. The palace was roofed with silver tiles, its beams were plated with gold. At midnight, in its halls the sunlight was rivaled by many a row of naphtha cressets. A paradise—that luxury of the monarchs of the East—was planted in the midst of the city. The Persian Empire, from the Hellespont to the Indus, was truly the garden of the world.

I have devoted a few pages to the story of these marvelous campaigns, for the military talent they fostered led to the establishment of the mathematical and

practical schools of Alexandria, the true origin of science. We trace back all our exact knowledge to the Macedonian campaigns. Humboldt has well observed, that an introduction to new and grand objects of Nature enlarges the human mind. The soldiers of Alexander and the hosts of his camp-followers encountered at every march unexpected and picturesque scenery. Of all men, the Greeks were the most observant, the most readily and profoundly impressed. Here there were interminable sandy plains, there mountains whose peaks were lost above the clouds. In the deserts were mirages, on the hill-sides shadows of fleeting clouds sweeping over the forests. They were in a land of amber-colored date-palms and cypresses, of tamarisks, green myrtles, and oleanders. At Arbela they had fought against Indian elephants; in the thickets of the Caspian they had roused from his lair the lurking royal tiger. They had seen animals which, compared with those of Europe, were not only strange, but colossal—the rhinoceros, the hippopotamus, the camel, the crocodiles of the Nile and the Ganges. They had encountered men of many complexions and many costumes: the swarthy Syrian, the olive-colored Persian, the black African. Even of Alexander himself it is related that on his death-bed he caused his admiral, Nearchus, to sit by his side, and found consolation in listening to the adventures of that sailor—the story of his voyage from the Indus up the Persian Gulf. The conqueror had seen with astonishment the ebbing and flowing of the tides. He had built ships for the exploration of the Caspian, supposing that it and the Black Sea might be gulfs of a great ocean, such as Nearchus had discovered the Persian and Red Seas to be. He had formed a resolution that his fleet should attempt the

circumnavigation of Africa, and come into the Mediterranean through the Pillars of Hercules—a feat which, it was affirmed, had once been accomplished by the Pharaohs.

Not only her greatest soldiers, but also her greatest philosophers, found in the conquered empire much that might excite the admiration of Greece. Callisthenes obtained in Babylon a series of Chaldean astronomical observations ranging back through 1,903 years; these he sent to Aristotle. Perhaps, since they were on burnt bricks, duplicates of them may be recovered by modern research in the clay libraries of the Assyrian kings. Ptolemy, the Egyptian astronomer, possessed a Babylonian record of eclipses, going back 747 years before our era. Long-continued and close observations were necessary, before some of these astronomical results that have reached our times could have been ascertained. Thus the Babylonians had fixed the length of a tropical year within twenty-five seconds of the truth; their estimate of the sidereal year was barely two minutes in excess. They had detected the precession of the equinoxes. They knew the causes of eclipses, and, by the aid of their cycle called Saros, could predict them. Their estimate of the value of that cycle, which is more than 6,585 days, was within nineteen and a half minutes of the truth.

Such facts furnish incontrovertible proof of the patience and skill with which astronomy had been cultivated in Mesopotamia, and that, with very inadequate instrumental means, it had reached no inconsiderable perfection. These old observers had made a catalogue of the stars, had divided the zodiac into twelve signs; they had parted the day into twelve hours, the night into twelve. They had, as Aristotle says, for a long time devoted themselves to observations of star-occulta-

tions by the moon. They had correct views of the structure of the solar system, and knew the order of emplacement of the planets. They constructed sundials, clepsydras, astrolabes, gnomons.

Not without interest do we still look on specimens of their method of printing. Upon a revolving roller they engraved, in cuneiform letters, their records, and, running this over plastic clay formed into blocks, produced ineffaceable proofs. From their tile-libraries we are still to reap a literary and historical harvest. They were not without some knowledge of optics. The convex lens found at Nimroud shows that they were not unacquainted with magnifying instruments. In arithmetic they had detected the value of position in the digits, though they missed the grand Indian invention of the cipher.

What a spectacle for the conquering Greeks, who, up to this time, had neither experimented nor observed! They had contented themselves with mere meditation and useless speculation.

But Greek intellectual development, due thus in part to a more extended view of Nature, was powerfully aided by the knowledge then acquired of the religion of the conquered country. The idolatry of Greece had always been a horror to Persia, who, in her invasions, had never failed to destroy the temples and insult the fanes of the bestial gods. The impunity with which these sacrileges had been perpetrated had made a profound impression, and did no little to undermine Hellenic faith. But now the worshiper of the vile Olympian divinities, whose obscene lives must have been shocking to every pious man, was brought in contact with a grand, a solemn, a consistent religious system, having its foundation on a philosophical basis. Persia,

as is the case with all empires of long duration, had passed through many changes of religion. She had followed the Monotheism of Zoroaster; had then accepted Dualism, and exchanged that for Magianism. At the time of the Macedonian expedition, she recognized one universal Intelligence, the Creator, Preserver, and Governor of all things, the most holy essence of truth, the giver of all good. He was not to be represented by any image, or any graven form. And, since, in every thing here below, we see the resultant of two opposing forces, under him were two coequal and coeternal principles, represented by the imagery of Light and Darkness. These principles are in never-ending conflict. The world is their battle-ground, man is their prize.

In the old legends of Dualism, the Evil Spirit was said to have sent a serpent to ruin the paradise which the Good Spirit had made. These legends became known to the Jews during their Babylonian captivity.

The existence of a principle of evil is the necessary incident of the existence of a principle of good, as a shadow is the necessary incident of the presence of light. In this manner could be explained the occurrence of evil in a world, the maker and ruler of which is supremely good. Each of the personified principles of light and darkness, Ormuzd and Ahriman, had his subordinate angels, his counselors, his armies. It is the duty of a good man to cultivate truth, purity, and industry. He may look forward, when this life is over, to a life in another world, and trust to a resurrection of the body, the immortality of the soul, and a conscious future existence.

In the later years of the empire, the principles of Magianism had gradually prevailed more and more over those of Zoroaster. Magianism was essentially a wor-