

and England, he was imprisoned in the castle of St. Angelo, and there died. He was brought in his coffin before an ecclesiastical tribunal, adjudged guilty of heresy, and his body, with a heap of heretical books, was cast into the flames. Franklin, by demonstrating the identity of lightning and electricity, deprived Jupiter of his thunder-bolt. The marvels of superstition were displaced by the wonders of truth. The two telescopes, the reflector and the achromatic, inventions of the last century, permitted man to penetrate into the infinite grandeurs of the universe, to recognize, as far as such a thing is possible, its illimitable spaces, its measureless times; and a little later the achromatic microscope placed before his eyes the world of the infinitely small. The air-balloon carried him above the clouds, the diving-bell to the bottom of the sea. The thermometer gave him true measures of the variations of heat; the barometer, of the pressure of the air. The introduction of the balance imparted exactness to chemistry, it proved the indestructibility of matter. The discovery of oxygen, hydrogen, and many other gases, the isolation of aluminum, calcium, and other metals, showed that earth and air and water are not elements. With an enterprise that can never be too much commended, advantage was taken of the transits of Venus, and, by sending expeditions to different regions, the distance of the earth from the sun was determined. The step that European intellect had made between 1456 and 1759 was illustrated by Halley's comet. When it appeared in the former year, it was considered as the harbinger of the vengeance of God, the dispenser of the most dreadful of his retributions, war, pestilence, famine. By order of the pope, all the church-bells in Europe were rung to scare it away, the faithful were commanded to add each day

another prayer; and, as their prayers had often in so marked a manner been answered in eclipses and droughts and rains, so on this occasion it was declared that a victory over the comet had been vouchsafed to the pope. But, in the mean time, Halley, guided by the revelations of Kepler and Newton, had discovered that its motions, so far from being controlled by the supplications of Christendom, were guided in an elliptic orbit by destiny. Knowing that Nature had denied to him an opportunity of witnessing the fulfillment of his daring prophecy, he besought the astronomers of the succeeding generation to watch for its return in 1759, and in that year it came.

Whoever will in a spirit of impartiality examine what had been done by Catholicism for the intellectual and material advancement of Europe, during her long reign, and what has been done by science in its brief period of action, can, I am persuaded, come to no other conclusion than this, that, in instituting a comparison, he has established a contrast. And yet, how imperfect, how inadequate is the catalogue of facts I have furnished in the foregoing pages! I have said nothing of the spread of instruction by the diffusion of the arts of reading and writing, through public schools, and the consequent creation of a reading community; the modes of manufacturing public opinion by newspapers and reviews, the power of journalism, the diffusion of information public and private by the post-office and cheap mails, the individual and social advantages of newspaper advertisements. I have said nothing of the establishment of hospitals, the first exemplar of which was the Invalides of Paris; nothing of the improved prisons, reformatories, penitentiaries, asylums, the treatment of lunatics, paupers, criminals; nothing of the construction

of canals, of sanitary engineering, or of census reports; nothing of the invention of stereotyping, bleaching by chlorine, the cotton-gin, or of the marvelous contrivances with which cotton-mills are filled—contrivances which have given us cheap clothing, and therefore added to cleanliness, comfort, health; nothing of the grand advancement of medicine and surgery, or of the discoveries in physiology; the cultivation of the fine arts, the improvement of agriculture and rural economy, the introduction of chemical manures and farm-machinery. I have not referred to the manufacture of iron and its vast affiliated industries; to those of textile fabrics; to the collection of museums of natural history, antiquities, curiosities. I have passed unnoticed the great subject of the manufacture of machinery by itself—the invention of the slide-rest, the planing-machine, and many other contrivances by which engines can be constructed with almost mathematical correctness. I have said nothing adequate about the railway system, or the electric telegraph, nor about the calculus, or lithography, the air-pump, or the voltaic battery; the discovery of Uranus or Neptune, and more than a hundred asteroids; the relation of meteoric streams to comets; nothing of the expeditions by land and sea that have been sent forth by various governments for the determination of important astronomical or geographical questions; nothing of the costly and accurate experiments they have caused to be made for the ascertainment of fundamental physical data. I have been so unjust to our own century that I have made no allusion to some of its greatest scientific triumphs: its grand conceptions in natural history; its discoveries in magnetism and electricity; its invention of the beautiful art of photography; its applications of spectrum analysis; its attempts to bring

chemistry under the three laws of Avogadro, of Boyle and Mariotte, and of Charles; its artificial production of organic substances from inorganic material, of which the philosophical consequences are of the utmost importance; its reconstruction of physiology by laying the foundation of that science on chemistry; its improvements and advances in topographical surveying, and in the correct representation of the surface of the globe. I have said nothing about rifled-guns and armored ships, nor of the revolution that has been made in the art of war; nothing of that gift to women, the sewing-machine; nothing of the noble contentions and triumphs of the arts of peace—the industrial exhibitions and world's fairs.

What a catalogue have we here, and yet how imperfect! It gives merely a random glimpse at an ever-increasing intellectual commotion—a mention of things as they casually present themselves to view. How striking the contrast between this literary, this scientific activity, and the stagnation of the middle ages!

The intellectual enlightenment that surrounds this activity has imparted unnumbered blessings to the human race. In Russia it has emancipated a vast serf-population; in America it has given freedom to four million negro slaves. In place of the sparse dole of the monastery-gate, it has organized charity and directed legislation to the poor. It has shown medicine its true function, to prevent rather than to cure disease. In statesmanship it has introduced scientific methods, displacing random and empirical legislation by a laborious ascertainment of social facts previous to the application of legal remedies. So conspicuous, so impressive is the manner in which it is elevating men, that the hoary nations of Asia seek to participate in the boon. Let us not forget that our action on them must be at

tended by their reaction on us. If the destruction of paganism was completed when all the gods were brought to Rome and confronted there, now, when by our wonderful facilities of locomotion strange nations and conflicting religions are brought into common presence—the Mohammedan, the Buddhist, the Brahman—modifications of them all must ensue. In that conflict science alone will stand secure; for it has given us grander views of the universe, more awful views of God.

The spirit that has imparted life to this movement, that has animated these discoveries and inventions, is Individualism; in some minds the hope of gain, in other and nobler ones the expectation of honor. It is, then, not to be wondered at that this principle found a political embodiment, and that, during the last century, on two occasions, it gave rise to social convulsions—the American and the French Revolutions. The former has ended in the dedication of a continent to Individualism—there, under republican forms, before the close of the present century, one hundred million people, with no more restraint than their common security requires, will be pursuing an unfettered career. The latter, though it has modified the political aspect of all Europe, and though illustrated by surprising military successes, has, thus far, not consummated its intentions; again and again it has brought upon France fearful disasters. Her dual form of government—her allegiance to her two sovereigns, the political and the spiritual—has made her at once the leader and the antagonist of modern progress. With one hand she has enthroned Reason, with the other she has reestablished and sustained the pope. Nor will this anomaly in her conduct cease until she bestows a true education on all her children, even on those of the humblest rustic.

The intellectual attack made on existing opinions by the French Revolution was not of a scientific, but of a literary character; it was critical and aggressive. But Science has never been an aggressor. She has always acted on the defensive, and left to her antagonist the making of wanton attacks. Nevertheless, literary dissent is not of such ominous import as scientific; for literature is, in its nature, local—science is cosmopolitan.

If, now, we demand, What has science done for the promotion of modern civilization; what has it done for the happiness, the well-being of society? we shall find our answer in the same manner that we reached a just estimate of what Latin Christianity had done. The reader of the foregoing paragraphs would undoubtedly infer that there must have been an amelioration in the lot of our race; but, when we apply the touchstone of statistics, that inference gathers precision. Systems of philosophy and forms of religion find a measure of their influence on humanity in census-returns. Latin Christianity, in a thousand years, could not double the population of Europe; it did not add perceptibly to the term of individual life. But, as Dr. Jarvis, in his report to the Massachusetts Board of Health, has stated, at the epoch of the Reformation "the average longevity in Geneva was 21.21 years; between 1814 and 1833 it was 40.68; as large a number of persons now live to seventy years as lived to forty, three hundred years ago. In 1693 the British Government borrowed money by selling annuities on lives from infancy upward, on the basis of the average longevity. The contract was profitable. Ninety-seven years later another tontine, or scale of annuities, on the basis of the same expectation of life as in the previous century, was issued. These latter annuitants, however, lived so much longer than their pre-

decessors, that it proved to be a very costly loan for the government. It was found that, while ten thousand of each sex in the first tontine died under the age of twenty-eight, only five thousand seven hundred and seventy-two males and six thousand four hundred and sixteen females in the second tontine died at the same age, one hundred years later."

We have been comparing the spiritual with the practical, the imaginary with the real. The maxims that have been followed in the earlier and the later period produced their inevitable result. In the former that maxim was, "Ignorance is the mother of Devotion;" in the latter, "Knowledge is Power."

CHAPTER XII.

THE IMPENDING CRISIS.

Indications of the approach of a religious crisis.—The predominating Christian Church, the Roman, perceives this, and makes preparation for it.—Pius IX. convokes an Ecumenical Council.—Relations of the different European governments to the papacy.—Relations of the Church to Science, as indicated by the Encyclical Letter and the Syllabus.

Acts of the Vatican Council in relation to the infallibility of the pope, and to Science.—Abstract of decisions arrived at.

Controversy between the Prussian Government and the papacy.—It is a contest between the State and the Church for supremacy.—Effect of dual government in Europe.—Declaration by the Vatican Council of its position as to Science.—The dogmatic constitution of the Catholic faith.—Its definitions respecting God, Revelation, Faith, Reason.—The anathemas it pronounces.—Its denunciation of modern civilization.

The Protestant Evangelical Alliance and its acts.

General review of the foregoing definitions and acts.—Present condition of the controversy, and its future prospects.

No one who is acquainted with the present tone of thought in Christendom can hide from himself the fact that an intellectual, a religious crisis is impending.

In all directions we see the lowering skies, we hear the mutterings of the coming storm. In Germany, the national party is arraying itself against the ultramontane; in France, the men of progress are struggling against the unprogressive, and in their contest the political supremacy of that great country is wellnigh neu-

tralized or lost. In Italy, Rome has passed into the hands of an excommunicated king. The sovereign pontiff, feigning that he is a prisoner, is fulminating from the Vatican his anathemas, and, in the midst of the most convincing proofs of his manifold errors, asserting his own infallibility. A Catholic archbishop with truth declares that the whole civil society of Europe seems to be withdrawing itself in its public life from Christianity. In England and America, religious persons perceive with dismay that the intellectual basis of faith has been undermined by the spirit of the age. They prepare for the approaching disaster in the best manner they can.

The most serious trial through which society can pass is encountered in the exuviation of its religious restraints. The history of Greece and the history of Rome exhibit to us in an impressive manner how great are the perils. But it is not given to religions to endure forever. They necessarily undergo transformation with the intellectual development of man. How many countries are there professing the same religion now that they did at the birth of Christ?

It is estimated that the entire population of Europe is about three hundred and one million. Of these, one hundred and eighty-five million are Roman Catholics, thirty-three million are Greek Catholics. Of Protestants there are seventy-one million, separated into many sects. Of Jews, five million; of Mohammedans, seven million.

Of the religious subdivisions of America an accurate numerical statement cannot be given. The whole of Christian South America is Roman Catholic, the same may be said of Central America and of Mexico, as also of the Spanish and French West India possessions. In the United States and Canada the Protestant population

predominates. To Australia the same remark applies. In India the sparse Christian population sinks into insignificance in presence of two hundred million Mohammedans and other Oriental denominations. The Roman Catholic Church is the most widely diffused and the most powerfully organized of all modern societies. It is far more a political than a religious combination. Its principle is that all power is in the clergy, and that for laymen there is only the privilege of obedience. The republican forms under which the Churches existed in primitive Christianity have gradually merged into an absolute centralization, with a man as vice-God at its head. This Church asserts that the divine commission under which it acts comprises civil government; that it has a right to use the state for its own purposes, but that the state has no right to intermeddle with it; that even in Protestant countries it is not merely a coördinate government, but the sovereign power. It insists that the state has no rights over any thing which it declares to be in its domain, and that Protestantism, being a mere rebellion, has no rights at all; that even in Protestant communities the Catholic bishop is the only lawful spiritual pastor.

It is plain, therefore, that of professing Christians the vast majority are Catholic; and such is the authoritative demand of the papacy for supremacy, that, in any survey of the present religious condition of Christendom, regard must be mainly had to its acts. Its movements are guided by the highest intelligence and skill. Catholicism obeys the orders of one man, and has therefore a unity, a compactness, a power, which Protestant denominations do not possess. Moreover, it derives inestimable strength from the souvenirs of the great name of Rome.

Unembarrassed by any hesitating sentiment, the