

almost inappreciable fraction, to the exact length of the tropical year, as established by the most accurate observations.⁴⁰ Indeed, the intercalation of twenty-five days, in every hundred and four years, shows a nicer adjustment of civil to solar time than is presented by any European calendar; since more than five centuries must elapse, before the loss of an entire day.⁴¹ Such was the astonishing precision displayed by the Aztecs, or, perhaps, by their more polished Toltec predecessors, in these computations, so difficult as to have baffled, till a comparatively recent period, the most enlightened nations of Christendom!⁴²

of one hundred and four years, called "an old age." As this was not used in their reckonings, which were carried on by their "bundles," it seems highly probable that it was designed to express the period which would bring round the commencement of the smaller cycles to the same hour, and in which the intercalary days, amounting to twenty-five, might be comprehended without a fraction.

⁴⁰ This length, as computed by Zach, at 365d. 5h. 48m. 48sec., is only 2m. 9sec. longer than the Mexican; which corresponds with the celebrated calculation of the astronomers of the Caliph Almanon, that fell short about two minutes of the true time. See La Place, *Exposition*, p. 350.

⁴¹ "El corto exceso de 4hor.

38min. 40seg., que hay de mas de los 25 dias en el período de 104 años, no puede componer un día entero, hasta que pasen mas de cinco de estos períodos máximos ó 538 años." (Gama, *Descripcion*, Parte 1, p. 23.) Gama estimates the solar year at 365d. 5h. 48m. 50sec.

⁴² The ancient Etruscans arranged their calendar in cycles of 110 solar years; and reckoned the year at 365d. 5h. 40m.; at least, this seems probable, says Niebuhr. (*History of Rome*, Eng. trans., (Cambridge, 1828,) vol. I. pp. 113, 238.) The early Romans had not wit enough to avail themselves of this accurate measurement, which came within nine minutes of the true time. The Julian reform, which assumed 365d. 5½h. as the length of the

The chronological system of the Mexicans, by which they determined the date of any particular event, was, also, very remarkable. The epoch, from which they reckoned, corresponded with the year 1091, of the Christian era. It was the period of the reform of their calendar, soon after their migration from Aztlan. They threw the years, as already noticed, into great cycles, of fifty-two each, which they called "sheafs," or "bundles," and represented by a quantity of reeds bound together by a string. As often as this hieroglyphic occurs in their maps, it shows the number of half centuries. To enable them to specify any particular year, they divided the

year, erred as much, or rather more, on the other side. And when the Europeans, who adopted this calendar, landed in Mexico, their reckoning was nearly eleven days in advance of the exact time, — or, in other words, of the reckoning of the barbarous Aztecs; a remarkable fact.

Gama's researches lead to the conclusion, that the year of the new cycle began with the Aztecs on the ninth of January; a date considerably earlier than that usually assigned by the Mexican writers. (Description, Parte 1, pp. 49–52.) By postponing the intercalation to the end of fifty-two years, the annual loss of six hours made every fourth year begin a day earlier. Thus, the cycle commencing on the ninth of January, the fifth year of it began on the

eight, the ninth year on the seventh, and so on; so that the last day of the series of fifty-two years fell on the twenty-sixth of December, when the intercalation of thirteen days rectified the chronology, and carried the commencement of the new year to the ninth of January again. Torquemada, puzzled by the irregularity of the new-year's day, asserts that the Mexicans were unacquainted with the annual excess of six hours, and therefore never intercalated! (Monarch. Ind., lib. 10, cap. 36.) The interpreter of the Vatican Codex has fallen into a series of blunders on the same subject, still more ludicrous. (Antiq. of Mexico, vol. VI. Pl. 16.) So soon had Aztec science fallen into oblivion, after the Conquest!

great cycle into four smaller cycles, or indictions, of thirteen years each. They then adopted two periodical series of signs, one consisting of their numerical dots, up to thirteen, the other, of four hieroglyphics of the years.⁴³ These latter they repeated in regular succession, setting against each one a number of the corresponding series of dots, continued also in regular succession up to thirteen. The same system was pursued through the four indictions, which thus, it will be observed, began always with a different hieroglyphic of the year from the preceding; and in this way, each of the hieroglyphics was made to combine successively with each of the numerical signs, but never twice with the same; since four, and thirteen, the factors of fifty-two, — the number of years in the cycle, — must admit of just as many combinations as are equal to their product. Thus every year had its appropriate symbol, by which it was, at once, recognised. And this symbol, preceded by the proper number of "bundles," indicating the half centuries, showed the precise time which had elapsed since the national epoch of 1091.⁴⁴ The ingenious contrivance of a periodical series, in place of the cumbrous system of hiero-

⁴³ These hieroglyphics were a "bit" and "air," which lead the "rabbit," a "reed," a "flint," a respective series.

"house." They were taken as symbolical of the four elements, air, water, fire, earth, according to Veytia. (Hist. Antig., tom. I. cap. 5.) It is not easy to see the connexion between the terms "rab-

⁴⁴ The following table of two of the four indictions of thirteen years each will make the text more clear. The first column shows the actual year of the great cycle, or "bundle." The second, the nu-

glyphical notation, is not peculiar to the Aztecs, and is to be found among various people, on the Asiatic

merical dots used in their arithmetic. The third is composed of their hieroglyphics for rabbit, reed, flint, house, in their regular order.

FIRST INDICATION.			SECOND INDICATION.		
Year of the Cycle.			Year of the Cycle.		
1.	.		14.	.	
2.	..		15.	..	
3.	...		16.	...	
4.	....		17.	....	
5.	.....		18.	.....	
6.	.....		19.	.....	
7.	.....		20.	.....	
8.	.....		21.	.....	
9.	.....		22.	.....	
10.	.....		23.	.....	
11.	.....		24.	.....	
12.	.....		25.	.....	
13.	.....		26.	.....	

By pursuing the combinations through the two remaining indications, it will be found that the same number of dots will never

coincide with the same hieroglyphic.

These tables are generally thrown into the form of wheels,

continent,—the same in principle, though varying materially in arrangement.⁴⁵

The solar calendar, above described, might have answered all the purposes of the nation; but the priests chose to construct another for themselves. This was called a “lunar reckoning,” though nowise accommodated to the revolutions of the moon.⁴⁶ It

as are those, also, of their months and days, having a very pretty effect. Several have been published, at different times, from the collections of Siguenza and Boturini. The wheel of the great cycle of fifty-two years is encompassed by a serpent, which was also the symbol of “an age,” both with the Persians and Egyptians. Father Toribio seems to misapprehend the nature of these chronological wheels; “Tenian rodela y escudos, y en ellas pintadas las figuras y armas de sus Demonios con su blason.” *Hist. de los Indios*, MS., Parte 1, cap. 4.

⁴⁵ Among the Chinese, Japanese, Moghols, Mantchous, and other families of the Tartar race. Their series are composed of symbols of their five elements, and the twelve zodiacal signs, making a cycle of sixty years’ duration. Their several systems are exhibited, in connexion with the Mexican, in the luminous pages of Humboldt, (*Vues des Cordillères*, p. 149,) who draws important consequences from the comparison, to which we shall have occasion to return hereafter.

⁴⁶ In this calendar, the months

of the tropical year were distributed into cycles of thirteen days, which, being repeated twenty times,—the number of days in a solar month,—completed the lunar, or astrological, year of 260 days; when the reckoning began again. “By the contrivance of these *trecenas* (terms of thirteen days) and the cycle of fifty-two years,” says Gama, “they formed a luni-solar period, most exact for astronomical purposes.” (*Description*, Parte 1, p. 27.) He adds, that these *trecenas* were suggested by the periods in which the moon is visible before and after conjunction. (*Loc. cit.*) It seems hardly possible that a people, capable of constructing a calendar so accurately on the true principles of solar time, should so grossly err as to suppose, that, in this reckoning, they really “represented the daily revolutions of the moon.” “The whole Eastern world,” says the learned Niebuhr, “has followed the moon in its calendar; the free scientific division of a vast portion of time is peculiar to the West. Connected with the West is that primeval extinct world which we call the New.” *History of Rome*, vol. I. p. 239.

was formed, also, of two periodical series, one of them consisting of thirteen numerical signs, or dots, the other, of the twenty hieroglyphics of the days. But, as the product of these combinations would only be 260, and, as some confusion might arise from the repetition of the same terms for the remaining 105 days of the year, they invented a third series, consisting of nine additional hieroglyphics, which, alternating with the two preceding series, rendered it impossible that the three should coincide twice in the same year, or indeed in less than 2340 days; since $20 \times 13 \times 9 = 2340$.⁴⁷ Thirteen was a mystic number, of frequent use in their tables.⁴⁸ Why they resorted to that of nine, on this occasion, is not so clear.⁴⁹

⁴⁷ They were named "companions," and "lords of the night," and were supposed to preside over the night, as the other signs did over the day. Boturini, *Idea*, p. 57.

⁴⁸ Thus, their astrological year was divided into months of thirteen days, there were thirteen years in their indictions, which contained each three hundred and sixty-five periods of thirteen days, &c. It is a curious fact, that the number of lunar months of thirteen days, contained in a cycle of fifty-two years, with the intercalation, should correspond precisely with the number of years in the great Sothic period of the Egyptians, namely, 1491; a period, in which the seasons and festivals came round to the same place in the year again. The coincidence may be accidental. But a people

employing periodical series, and astrological calculations, have generally some meaning in the numbers they select and the combinations to which they lead.

⁴⁹ According to Gama, (*Description*, Parte 1, pp. 75, 76,) because 360 can be divided by nine without a fraction; the nine "companions" not being attached to the five complementary days. But 4, a mystic number much used in their arithmetical combinations, would have answered the same purpose, equally well. In regard to this, McCulloh observes, with much shrewdness, "It seems impossible that the Mexicans, so careful in constructing their cycle, should abruptly terminate it with 360 revolutions, whose natural period of termination is 2340." And he supposes the nine "companions"

This second calendar rouses a holy indignation in the early Spanish missionaries, and father Sahagun loudly condemns it, as "most unhallowed, since it is founded neither on natural reason, nor on the influence of the planets, nor on the true course of the year; but is plainly the work of necromancy, and the fruit of a compact with the Devil!"⁵⁰ One may doubt, whether the superstition of those who invented the scheme was greater than that of those who thus impugned it. At all events, we may, without having recourse to supernatural agency, find in the human heart a sufficient explanation of its origin; in that love of power, that has led the priesthood of many a faith to affect a mystery, the key to which was in their own keeping.

By means of this calendar, the Aztec priests kept their own records, regulated the festivals and seasons

were used in connexion with the cycles of 260 days, in order to throw them into the larger ones, of 2340; eight of which, with a ninth of 260 days, he ascertains to be equal to the great solar period of 52 years. (Researches, pp. 207, 208.) This is very plausible. But in fact the combinations of the two first series, forming the cycle of 260 days, were always interrupted at the end of the year, since each new year began with the same hieroglyphic of the days. The third series of the "companions" was intermitted, as above stated, on the five unlucky days which closed the year, in order, if we may believe Boturini, that the first day of the

solar year might have annexed to it the first of the nine "companions," which signified "lord of the year"; (Idea, p. 57;) a result which might have been equally well secured, without any intermission at all, by taking 5, another favorite number, instead of 9, as the divisor. As it was, however, the cycle, as far as the third series was concerned, did terminate with 360 revolutions. The subject is a perplexing one; and I can hardly hope to have presented it in such a manner as to make it perfectly clear to the reader.

⁵⁰ Hist. de Nueva España, lib. 4, Introd.

of sacrifice, and made all their astrological calculations.⁵¹ The false science of astrology is natural to a state of society partially civilized; where the mind, impatient of the slow and cautious examination by which alone it can arrive at truth, launches, at once, into the regions of speculation, and rashly attempts to lift the veil, — the impenetrable veil, which is drawn around the mysteries of nature. It is the characteristic of true science, to discern the impassable, but not very obvious, limits which divide the province of reason from that of speculation. Such knowledge comes tardily. How many ages have rolled away, in which powers, that, rightly directed, might have revealed the great laws of nature, have been wasted in brilliant, but barren, reveries on alchemy and astrology!

The latter is more particularly the study of a primitive age; when the mind, incapable of arriving at the stupendous fact, that the myriads of minute lights, glowing in the firmament, are the centres of systems as glorious as our own, is naturally led to speculate on their probable uses, and to connect them in some way or other with man, for whose convenience every other object in the universe seems to have been created. As the eye of the simple child of nature watches, through the long nights, the

⁵¹ "Dans les pays les plus différents," says Benjamin Constant, concluding some sensible reflections on the sources of the sacerdotal power, "chez les peuples de mœurs les plus opposées, le sacer-

doce a dû au culte des éléments et des astres un pouvoir dont aujourd'hui nous concevons à peine l'idée." *De la Religion*, (Paris, 1825,) lib. 3, ch. 5.

stately march of the heavenly bodies, and sees the bright hosts coming up, one after another, and changing with the changing seasons of the year, he naturally associates them with those seasons, as the periods over which they hold a mysterious influence. In the same manner, he connects their appearance with any interesting event of the time, and explores, in their flaming characters, the destinies of the newborn infant.⁵² Such is the origin of astrology, the false lights of which have continued from the earliest ages to dazzle and bewilder mankind, till they have faded away in the superior illumination of a comparatively recent period.

The astrological scheme of the Aztecs was founded less on the planetary influences, than on those of the arbitrary signs they had adopted for the months and days. The character of the leading sign, in each lunar cycle of thirteen days, gave a complexion to the whole ; though this was qualified, in some degree, by the signs of the succeeding days, as well as by those of the hours. It was in adjusting these conflicting forces that the great art of the diviner was shown. In no country, not even in ancient Egypt, were the dreams of the astrologer more implicitly deferred to. On the birth of a child, he was in-

⁵² "It is a gentle and affectionate thought,
That, in immeasurable heights above us,
At our first birth the wreath of love was
woven

With sparkling stars for flowers."

COLERIDGE, Translation of Wal-
lenstein, Act 2, sc. 4.

Schiller is more true to poetry

than history, when he tells us, in the beautiful passage of which this is part, that the worship of the stars took the place of classic mythology. It existed long before it.

stantly summoned. The time of the event was accurately ascertained; and the family hung in trembling suspense, as the minister of Heaven cast the horoscope of the infant, and unrolled the dark volume of destiny. The influence of the priest was confessed by the Mexican, in the very first breath which he inhaled.⁵³

We know little further of the astronomical attainments of the Aztecs. That they were acquainted with the cause of eclipses is evident from the representation, on their maps, of the disk of the moon projected on that of the sun.⁵⁴ Whether they had arranged a system of constellations is uncertain; though, that they recognised some of the most obvious, as the Pleiades, for example, is evident from the fact that they regulated their festivals by them. We know of no astronomical instruments used by them, except the dial.⁵⁵ An immense circular block

⁵³ Gama has given us a complete almanac of the astrological year, with the appropriate signs and divisions, showing with what scientific skill it was adapted to its various uses. (Description, Parte 1, pp. 25-31; 62-76.) Sahagun has devoted a whole book to explaining the mystic import and value of these signs, with a minuteness that may enable one to cast up a scheme of nativity for himself. (Hist. de Nueva España, lib. 4.) It is evident he fully believed the magic wonders which he told. "It was a deceitful art," he says, "pernicious and idola-

trous; and was never contrived by human reason." The good father was certainly no philosopher.

⁵⁴ See, among others, the Cod. Tel.-Rem., Part 4, Pl. 22, ap. Antiq. of Mexico, vol. I.

⁵⁵ "It can hardly be doubted," says Lord Kingsborough, "that the Mexicans were acquainted with many scientific instruments of strange invention, as compared with our own; whether the *telescope* may not have been of the number is uncertain; but the thirteenth plate of M. Dupaix's *Monuments*, Part Second, which represents a man holding something

of carved stone, disinterred in 1790, in the great square of Mexico, has supplied an acute and learned scholar with the means of establishing some interesting facts in regard to Mexican science.⁵⁶ This colossal fragment, on which the calendar is engraved, shows that they had the means of settling the hours of the day with precision, the periods of the solstices and of the equinoxes, and that of the transit of the sun across the zenith of Mexico.⁵⁷

We cannot contemplate the astronomical science of the Mexicans, so disproportioned to their progress in other walks of civilization, without astonishment. An acquaintance with some of the more obvious principles of astronomy is within the reach of the

of a similar nature to his eye, affords reason to suppose that they knew how to improve the powers of vision." (Antiq. of Mexico, vol. VI. p. 15, note.) The instrument alluded to is rudely carved on a conical rock. It is raised no higher than the neck of the person who holds it, and looks—to my thinking—as much like a musket as a telescope; though I shall not infer the use of firearms among the Aztecs from this circumstance. (See vol. IV. Pl. 15.) Captain Dupaix, however, in his commentary on the drawing, sees quite as much in it as his Lordship. Ibid., vol. V. p. 241.

⁵⁶ Gama, *Descripcion*, Parte 1, sec. 4; Parte 2, Apend.

Besides this colossal fragment, Gama met with some others, designed, probably, for similar scien-

tific uses, at Chapultepec. Before he had leisure to examine them, however, they were broken up for materials to build a furnace! A fate not unlike that which has too often befallen the monuments of ancient art in the Old World.

⁵⁷ In his second treatise on the cylindrical stone, Gama dwells more at large on its scientific construction, as a vertical sun-dial, in order to dispel the doubts of some sturdy skeptics on this point. (*Descripcion*, Parte 2, Apend. 1.) The civil day was distributed by the Mexicans into sixteen parts; and began, like that of most of the Asiatic nations, with sunrise. M. de Humboldt, who probably never saw Gama's second treatise, allows only eight intervals. *Vues des Cordillères*, p. 128.

rudest people. With a little care, they may learn to connect the regular changes of the seasons with those of the place of the sun at his rising and setting. They may follow the march of the great luminary through the heavens, by watching the stars that first brighten on his evening track, or fade in his morning beams. They may measure a revolution of the moon, by marking her phases, and may even form a general idea of the number of such revolutions in a solar year. But that they should be capable of accurately adjusting their festivals by the movements of the heavenly bodies, and should fix the true length of the tropical year, with a precision unknown to the great philosophers of antiquity, could be the result only of a long series of nice and patient observations, evincing no slight progress in civilization.⁵⁸ But whence could the rude inhabitants of these mountain regions have derived this curious erudition? Not from the barbarous hordes who roamed over the higher latitudes of the North; nor from the more polished races on the Southern continent, with whom, it is apparent, they had no intercourse. If we are driven, in our embarrassment, like the greatest astronomer of our age, to

⁵⁸ Un calendrier," exclaims the enthusiastic Carli, "qui est réglé sur la révolution annuelle du soleil, non seulement par l'addition de cinq jours tous les ans, mais encore par la correction du bissextile, doit sans doute être regardé comme une opération déduite d'une étude réfléchie, et d'une grande combinaison. Il faut donc supposer chez ces peuples une suite d'observations astronomiques, une idée distincte de la sphère, de la déclinaison de l'écliptique, et l'usage d'un calcul concernant les jours et les heures des apparitions solaires." *Lettres Américaines*, tom. I. let. 23.

seek the solution among the civilized communities of Asia, we shall still be perplexed by finding, amidst general resemblance of outline, sufficient discrepancy in the details, to vindicate, in the judgments of many, the Aztec claim to originality.⁵⁹

I shall conclude the account of Mexican science, with that of a remarkable festival, celebrated by the natives at the termination of the great cycle of fifty-two years. We have seen, in the preceding chapter, their tradition of the destruction of the world at four successive epochs. They looked forward confidently to another such catastrophe, to take place, like the preceding, at the close of a cycle, when the sun was to be effaced from the heavens, the human race, from the earth, and when the darkness of chaos was to settle on the habitable globe. The cycle would end in the latter part of December, and, as the dreary season of the winter solstice approached, and the diminished light of day gave melancholy presage of its speedy extinction, their apprehensions increased; and, on the arrival of the five "unlucky" days which closed the year, they abandoned themselves to despair.⁶⁰ They broke in pieces the little images of their household gods, in whom they no

⁵⁹ La Place, who suggests the analogy, frankly admits the difficulty. *Système du Monde*, lib. 5, ch. 3.

⁶⁰ M. Jomard errs in placing the *new fire*, with which ceremony the old cycle properly concluded, at the winter solstice. It was not

till the 26th of December, if Gama is right. The cause of M. Jomard's error is his fixing it before, instead of after, the complementary days. See his sensible letter on the Aztec calendar, in the *Vues des Cordillères*, p. 309.

longer trusted. The holy fires were suffered to go out in the temples, and none were lighted in their own dwellings. Their furniture and domestic utensils were destroyed ; their garments torn in pieces ; and every thing was thrown into disorder, for the coming of the evil genii who were to descend on the desolate earth.

On the evening of the last day, a procession of priests, assuming the dress and ornaments of their gods, moved from the capital towards a lofty mountain, about two leagues distant. They carried with them a noble victim, the flower of their captives, and an apparatus for kindling the *new fire*, the success of which was an augury of the renewal of the cycle. On reaching the summit of the mountain, the procession paused till midnight ; when, as the constellation of the Pleiades approached the zenith,⁶¹ the *new fire* was kindled by the friction of the sticks placed on the wounded breast of the victim.⁶² The flame was soon communicated to a funeral pile, on which the body of the slaughtered captive was thrown. As the light streamed up to-

⁶¹ At the actual moment of their culmination, according to both Sahagun (Hist. de Nueva España, lib. 4, Apend.) and Torquemada (Monarch. Ind., lib. 10, cap. 33, 36). But this could not be, as that took place at midnight, in November ; so late as the last secular festival, which was early in Montezuma's reign, in 1507. (Gama, Descripcion, Parte 1, p. 50, nota.—

Humboldt, Vues des Cordillères, pp. 181, 182.) The longer we postpone the beginning of the new cycle, the greater still must be the discrepancy.

⁶² "On his bare breast the cedar boughs are laid ;

On his bare breast, dry sedge and odorous gums

Laid ready to receive the sacred spark,
And blaze, to herald the ascending Sun,
Upon his living altar."

SOUTHEY'S Madoc, part 2, canto 26.

wards heaven, shouts of joy and triumph burst forth from the countless multitudes who covered the hills, the terraces of the temples, and the house-tops, with eyes anxiously bent on the mount of sacrifice. Couriers, with torches lighted at the blazing beacon, rapidly bore them over every part of the country; and the cheering element was seen brightening on altar and hearth-stone, for the circuit of many a league, long before the sun, rising on his accustomed track, gave assurance that a new cycle had commenced its march, and that the laws of nature were not to be reversed for the Aztecs.

The following thirteen days were given up to festivity. The houses were cleansed and whitened. The broken vessels were replaced by new ones. The people, dressed in their gayest apparel, and crowned with garlands and chaplets of flowers, thronged in joyous procession, to offer up their oblations and thanksgivings in the temples. Dances and games were instituted, emblematical of the regeneration of the world. It was the carnival of the Aztecs; or rather the national jubilee, the great secular festival, like that of the Romans, or ancient Etruscans, which few alive had witnessed before, — or could expect to see again.⁶³

⁶³ I borrow the words of the summons by which the people were called to the *ludi seculares*, the secular games of ancient Rome, "*quos nec spectasset quisquam, nec spectaturus esset.*" (Suetonius, *Vita Tib. Claudii*, lib. 5.) The old Mexican chroniclers warm into something like eloquence in their descriptions of the Aztec festival. (Torquemada, *Monarch. Ind.*, lib. 10, cap. 33. — Toribio, *Hist. de los Indios*, MS., Parte 1, cap. 5. — Sahagun, *Hist. de Nueva España*,

lib. 7, cap. 9-12. See, also, Gama, *Descripcion, Parte 1*, pp. 52-54,—Clavigero, *Stor. del Mexico*, tom. II. pp. 84-86.) The English reader will find a more brilliant coloring of the same scene in the canto of Madoc, above cited, —“On the Close of the Century.”

M. de Humboldt remarked, many years ago, “It were to be wished that some government would publish at its own expense the remains of the ancient American civilization; for it is only by the comparison of several monuments, that we can succeed in discovering the meaning of these allegories, which are partly astronomical, and partly mystic.” This enlightened wish has now been realized, not by any government, but by a private individual, Lord Kingsborough. The great work, published under his auspices, and so often cited in this Introduction, appeared in London in 1830. When completed, it will reach to nine volumes, seven of which are now before the public. Some idea of its magnificence may be formed by those who have not seen it, from the fact, that copies of it, with colored plates, sold originally at £175, and, with uncolored, at £120. The price has been since much reduced. It is designed to exhibit a complete view of the ancient Aztec MSS., with such few interpretations as exist; the beautiful drawings of Castañeda relating to Central America, with the commentary of Dupaix; the unpublished history of father Sahagun; and, last, not least, the copious annotations of his Lordship.

Too much cannot be said of the mechanical execution of the book,—its splendid typography, the apparent accuracy and the delicacy of the drawings, and the sumptuous quality of the materials. Yet the purchaser would have been saved some superfluous expense, and the reader much inconvenience, if the letter-press had been in volumes of an ordinary size. But it is not uncommon, in works on this magnificent plan, to find utility in some measure sacrificed to show.

The collection of Aztec MSS., if not perfectly complete, is very extensive, and reflects great credit on the diligence and research of the compiler. It strikes one as strange, however, that not a single document should have been drawn from Spain. Peter Martyr speaks of a number having been brought thither in his time. (*De Insulis nuper Inventis*, p. 368.) The Marquis Spineto examined one in the Escorial, being the same with the Mendoza Codex, and perhaps the original, since that at Oxford is but a copy. (*Lectures*, lec. 7.) Mr. Waddilove, chaplain of the British embassy to Spain, gave a particular account of one to Dr. Robertson, which he saw in the same library, and considered an Aztec calendar. Indeed, it is scarcely possible, that the frequent voya-

gers to the New World should not have furnished the mother-country with abundant specimens of this most interesting feature of Aztec civilization. Nor should we fear that the present liberal government would seclude these treasures from the inspection of the scholar.

Much cannot be said in favor of the arrangement of these codices. In some of them, as the Mendoza Codex, for example, the plates are not even numbered; and one, who would study them by the corresponding interpretation, must often bewilder himself in the maze of hieroglyphics, without a clue to guide him. Neither is there any attempt to enlighten us as to the positive value and authenticity of the respective documents, or even their previous history, beyond a barren reference to the particular library from which they have been borrowed. Little light, indeed, can be expected on these matters; but we have not that little. — The defect of arrangement is chargeable on other parts of the work. Thus, for instance, the sixth book of Sahagun is transferred from the body of the history to which it belongs, to a preceding volume; while the grand hypothesis of his lordship, for which the work was concocted, is huddled into notes, hitched on random passages of the text, with a good deal less connexion than the stories of queen Scheherezade, in the "Arabian Nights," and not quite so entertaining.

The drift of Lord Kingsborough's speculations is, to establish the colonization of Mexico by the Israelites. To this the whole battery of his logic and learning is directed. For this, hieroglyphics are unriddled, manuscripts compared, monuments delineated. His theory, however, whatever be its merits, will scarcely become popular; since, instead of being exhibited in a clear and comprehensive form, readily embraced by the mind, it is spread over an infinite number of notes, thickly sprinkled with quotations, from languages ancient and modern, till the weary reader, floundering about in the ocean of fragments, with no light to guide him, feels like Milton's Devil, working his way through chaos, —

"neither sea,
Nor good dry land; nigh foundered, on he fares."

It would be unjust, however, not to admit that the noble author, if his logic is not always convincing, shows much acuteness in detecting analogies; that he displays familiarity with his subject, and a fund of erudition, though it often runs to waste; that, whatever be the defects of arrangement, he has brought together a most rich collection of unpublished materials to illustrate the Aztec, and, in a wider sense, American antiquities; and that, by this munificent undertaking, which no government, probably, would have, and few individuals could have, executed, he has entitled himself to the lasting gratitude of every friend of science.

Another writer, whose works must be diligently consulted by every student of Mexican antiquities, is Antonio Gama. His life contains as few incidents as those of most scholars. He was born at Mexico, in 1735, of a respectable family, and was bred to the law. He early showed a preference for mathematical studies, conscious that in this career lay his strength. In 1771, he communicated his observations on the eclipse of that year to the French astronomer M. de Lalande, who published them in Paris, with high commendations of the author. Gama's increasing reputation attracted the attention of government; and he was employed by it, in various scientific labors of importance. His great passion, however, was the study of Indian antiquities. He made himself acquainted with the history of the native races, their traditions, their languages, and, as far as possible, their hieroglyphics. He had an opportunity of showing the fruits of this preparatory training, and his skill as an antiquary, on the discovery of the great calendar-stone, in 1790. He produced a masterly treatise on this, and another Aztec monument, explaining the objects to which they were devoted, and pouring a flood of light on the astronomical science of the Aborigines, their mythology, and their astrological system. He afterwards continued his investigations in the same path, and wrote treatises on the dial, hieroglyphics, and arithmetic of the Indians. These, however, were not given to the world till a few years since, when they were published, together with a reprint of the former work, under the auspices of the industrious Bustamante. Gama died in 1802; leaving behind him a reputation for great worth in private life; one, in which the bigotry, that seems to enter too frequently into the character of the Spanish-Mexican, was tempered by the liberal feelings of a man of science. His reputation as a writer stands high for patient acquisition, accuracy, and acuteness. His conclusions are neither warped by the love of theory so common in the philosopher, nor by the easy credulity so natural to the antiquary. He feels his way with the caution of a mathematician, whose steps are demonstrations. M. de Humboldt was largely indebted to his first work, as he has emphatically acknowledged. But, notwithstanding the eulogiums of this popular writer, and his own merits, Gama's treatises are rarely met with out of New Spain, and his name can hardly be said to have a transatlantic reputation.

CHAPTER V.

AZTEC AGRICULTURE. — MECHANICAL ARTS. — MERCHANTS. —
DOMESTIC MANNERS.

It is hardly possible that a nation, so far advanced as the Aztecs in mathematical science, should not have made considerable progress in the mechanical arts, which are so nearly connected with it. Indeed, intellectual progress of any kind implies a degree of refinement, that requires a certain cultivation of both useful and elegant art. The savage, wandering through the wide forest, without shelter for his head, or raiment for his back, knows no other wants than those of animal appetites; and, when they are satisfied, seems to himself to have answered the only ends of existence. But man, in society, feels numerous desires, and artificial tastes spring up, accommodated to the various relations in which he is placed, and perpetually stimulating his invention to devise new expedients to gratify them.

There is a wide difference in the mechanical skill of different nations; but the difference is still greater in the inventive power which directs this skill, and makes it available. Some nations seem to have no power beyond that of imitation; or, if they possess invention, have it in so low a degree, that they are

constantly repeating the same idea, without a shadow of alteration or improvement; as the bird builds precisely the same kind of nest which those of its own species built at the beginning of the world. Such, for example, are the Chinese, who have, probably, been familiar for ages with the germs of some discoveries, of little practical benefit to themselves, but which, under the influence of European genius, have reached a degree of excellence, that has wrought an important change in the constitution of society.

Far from looking back, and forming itself slavishly on the past, it is characteristic of the European intellect to be ever on the advance. Old discoveries become the basis of new ones. It passes onward from truth to truth, connecting the whole by a succession of links, as it were, into the great chain of science which is to encircle and bind together the universe. The light of learning is shed over the labors of art. New avenues are opened for the communication both of person and of thought. New facilities are devised for subsistence. Personal comforts, of every kind, are inconceivably multiplied, and brought within the reach of the poorest. Secure of these, the thoughts travel into a nobler region than that of the senses; and the appliances of art are made to minister to the demands of an elegant taste, and a higher moral culture.

The same enlightened spirit, applied to agriculture, raises it from a mere mechanical drudgery, or the barren formula of traditional precepts, to the

dignity of a science. As the composition of the earth is analyzed, man learns the capacity of the soil that he cultivates; and, as his empire is gradually extended over the elements of nature, he gains the power to stimulate her to her most bountiful and various production. It is with satisfaction that we can turn to the land of our fathers, as the one in which the experiment has been conducted on the broadest scale, and attended with results that the world has never before witnessed. With equal truth, we may point to the Anglo-Saxon race in both hemispheres, as that whose enterprising genius has contributed most essentially to the great interests of humanity, by the application of science to the useful arts.

Husbandry, to a very limited extent, indeed, was practised by most of the rude tribes of North America. Wherever a natural opening in the forest, or a rich strip of *interval*, met their eyes, or a green slope was found along the rivers, they planted it with beans and Indian corn.¹ The cultivation was slovenly in the extreme, and could not secure the improvident natives from the frequent recurrence of desolating famines. Still, that they tilled the soil at all was a peculiarity which honorably distinguished

¹ This latter grain, according to Humboldt, was found by the Europeans in the New World, from the South of Chili to Pennsylvania; (*Essai Politique*, tom. II. p. 408;) he might have added, to the St. Lawrence. Our Puritan fathers found it in abundance on the New England coast, wherever they landed. See Morton, *New England's Memorial*, (Boston, 1826,) p. 68. — Gookin, *Massachusetts Historical Collections*, chap. 3.

them from other tribes of hunters, and raised them one degree higher in the scale of civilization.

Agriculture in Mexico was in the same advanced state as the other arts of social life. In few countries, indeed, has it been more respected. It was closely interwoven with the civil and religious institutions of the nation. There were peculiar deities to preside over it; the names of the months and of the religious festivals had more or less reference to it. The public taxes, as we have seen, were often paid in agricultural produce. All, except the soldiers and great nobles, even the inhabitants of the cities, cultivated the soil. The work was chiefly done by the men; the women scattering the seed, husking the corn, and taking part only in the lighter labors of the field.² In this they presented an honorable contrast to the other tribes of the continent, who imposed the burden of agriculture, severe as it is in the North, on their women.³ Indeed, the sex was as tenderly regarded by the Aztecs in this matter, as it is, in most parts of Europe, at the present day.

² Torquemada, Monarch. Ind., lib. 13, cap. 31.

“Admirable example for our times,” exclaims the good father, “when women are not only unfit for the labors of the field, but have too much levity to attend to their own household!”

³ A striking contrast also to the Egyptians, with whom some antiquaries are disposed to identify the ancient Mexicans. Sophocles

notices the effeminacy of the men in Egypt, who stayed at home tending the loom, while their wives were employed in severe labors out of doors.

“Ὡς πάντ' ἐκείνῳ τοῖς ἐν Αἰγύπτῳ νόμοις

Φύσιν κατεκασθύνει καὶ βίου τροφάς.

Ἐκὶ γὰρ οἱ μὲν ἄρσινι κατὰ στέγας

Θακοῦσιν ἰστοσυργαῖντες· αἱ δὲ σύννομοι

Τάξῳ βίου τροφίῃα προσέουσ' ἀντί.”

SOPHOCLES, Œdip. Col., v. 337-341.

There was no want of judgment in the management of their ground. When somewhat exhausted, it was permitted to recover by lying fallow. Its extreme dryness was relieved by canals, with which the land was partially irrigated; and the same end was promoted by severe penalties against the destruction of the woods, with which the country, as already noticed, was well covered before the Conquest. Lastly, they provided for their harvests ample granaries, which were admitted by the Conquerors to be of admirable construction. In this provision we see the forecast of civilized man.⁴

Among the most important articles of husbandry, we may notice the banana, whose facility of cultivation and exuberant returns are so fatal to habits of systematic and hardy industry.⁵ Another celebrated plant was the cacao, the fruit of which furnished the chocolate, — from the Mexican *chocolatl*, — now so common a beverage throughout Europe.⁶ The

⁴ Torquemada, Monarch. Ind., lib. 13, cap. 32. — Clavigero, Stor. del Messico, tom. II. pp. 153–155.

“Jamás padecieron hambre,” says the former writer, “sino en pocas ocasiones.” If these famines were rare, they were very distressing, however, and lasted very long. Comp. Ixtlilxochitl, Hist. Chich., MS., cap. 41, 71, et alibi.

⁵ Oviedo considers the *musa* an imported plant; and Hernandez, in his copious catalogue, makes no mention of it at all. But Hum-

boldt, who has given much attention to it, concludes, that, if some species were brought into the country, others were indigenous. (Essai Politique, tom. II. pp. 382–388.) If we may credit Clavigero, the banana was the forbidden fruit, that tempted our poor mother Eve! Stor, del Messico, tom. I. p. 49, nota.

⁶ Rel. d' un gent., ap. Ramusio, tom. III. fol. 306. — Hernandez, De Historiâ Plantarum Novæ Hispaniæ, (Matriti, 1790,) lib. 6, cap. 87.

vanilla, confined to a small district of the seacoast, was used for the same purposes, of flavoring their food and drink, as with us.⁷ The great staple of the country, as, indeed, of the American continent, was maize, or Indian corn, which grew freely along the valleys, and up the steep sides of the Cordilleras to the high level of the table-land. The Aztecs were as curious in its preparation, and as well instructed in its manifold uses, as the most expert New England housewife. Its gigantic stalks, in these equinoctial regions, afford a saccharine matter, not found to the same extent in northern latitudes, and supplied the natives with sugar little inferior to that of the cane itself, which was not introduced among them till after the Conquest.⁸ But the miracle of nature was the great Mexican aloe, or *maguey*, whose clustering pyramids of flowers, towering above their dark coronals of leaves, were seen sprinkled over many a broad acre of the table-land. As we have already noticed, its bruised leaves afforded a paste from which paper was manufactured;⁹ its juice was fermented into an

⁷ Sahagun, Hist. de Nueva España, lib. 8, cap. 13, et alibi.

⁸ Carta del. Lic. Zuazo, MS.

He extols the honey of the maize, as equal to that of bees. (Also Oviedo, Hist. Natural de las Indias, cap. 4, ap. Barcia, tom. I.) Hernandez, who celebrates the manifold ways in which the maize was prepared, derives it from the Haytian word, *mahiz*. Hist. Plantarum, lib. 6, cap. 44, 45.

⁹ And is still, in one spot at least, San Ángel, — three leagues from the capital. Another mill was to have been established, a few years since, in Puebla. Whether this has actually been done I am ignorant. See the Report of the Committee on Agriculture to the Senate of the United States, March 12, 1838.

intoxicating beverage, *pulque*, of which the natives, to this day, are excessively fond; ¹⁰ its leaves further supplied an impenetrable thatch for the more humble dwellings; thread, of which coarse stuffs were made, and strong cords, were drawn from its tough and twisted fibres; pins and needles were made of the thorns at the extremity of its leaves; and the root, when properly cooked, was converted into a palatable and nutritious food. The *agave*, in short, was meat, drink, clothing, and writing materials, for the Aztec! Surely, never did Nature enclose in so compact a form so many of the elements of human comfort and civilization! ¹¹

¹⁰ Before the Revolution, the duties on the *pulque* formed so important a branch of revenue, that the cities of Mexico, Puebla, and Toluca alone, paid \$817,739 to government. (Humboldt, *Essai Politique*, tom. II. p. 47.) It requires time to reconcile Europeans to the peculiar flavor of this liquor, on the merits of which they are consequently much divided. There is but one opinion among the natives. The English reader will find a good account of its manufacture in Ward's *Mexico*, vol. II. pp. 55-60.

¹¹ Hernandez enumerates the several species of the *maguay*, which are turned to these manifold uses, in his learned work, *De Hist. Plantarum*. (Lib. 7, cap. 71 et seq.) M. de Humboldt considers them all varieties of the *agave Americana*, familiar in the south-

ern parts, both of the United States and Europe. (*Essai Politique*, tom. II. p. 487 et seq.) This opinion has brought on him a rather sour rebuke from our countryman, the late Dr. Perrine, who pronounces them a distinct species from the American *agave*; and regards one of the kinds, the *pita*, from which the fine thread is obtained, as a totally distinct genus. (See the Report of the Committee on Agriculture.) Yet the Baron may find authority for all the properties ascribed by him to the *maguay*, in the most accredited writers, who have resided more or less time in Mexico. See, among others, Hernandez, *ubi supra*. — Sahagun, *Hist. de Nueva España*, lib. 9, cap. 2; lib. 11, cap. 7. — Toribio, *Hist. de los Indios*, MS., Parte 3, cap. 19. — Carta del Lic. Zuazo, MS. The

It would be obviously out of place to enumerate in these pages all the varieties of plants, many of them of medicinal virtue, which have been introduced from Mexico into Europe. Still less can I attempt a catalogue of its flowers, which, with their variegated and gaudy colors, form the greatest attraction of our greenhouses. The opposite climates embraced within the narrow latitudes of New Spain have given to it, probably, the richest and most diversified Flora to be found in any country on the globe. These different products were systematically arranged by the Aztecs, who understood their properties, and collected them into nurseries, more extensive than any then existing in the Old World. It is not improbable that they suggested the idea of those "gardens of plants" which were introduced into Europe not many years after the Conquest.¹²

The Mexicans were as well acquainted with the mineral, as with the vegetable treasures of their kingdom. Silver, lead, and tin they drew from the mines of Tasco; copper from the mountains of Zacotollan. These were taken, not only from the crude masses on the surface, but from veins wrought in the solid rock, into which they opened extensive

last, speaking of the maguey; which produces the fermented drink, says expressly, "De lo que queda de las dichas hojas se aprovechan, como de lino mui delgado, ó de Olanda, de que hacen lienzos mui primos para vestir, é bien delgados." It cannot be denied, however, that Dr. Perrine

shows himself intimately acquainted with the structure and habits of the tropical plants, which, with such patriotic spirit, he proposed to introduce into Florida.

¹² The first regular establishment of this kind, according to Carli, was at Padua, in 1545. Lettres Améric., tom. I. chap. 21.

galleries. In fact, the traces of their labors furnished the best indications for the early Spanish miners. Gold, found on the surface, or gleaned from the beds of rivers, was cast into bars, or, in the form of dust, made part of the regular tribute of the southern provinces of the empire. The use of iron, with which the soil was impregnated, was unknown to them. Notwithstanding its abundance, it demands so many processes to prepare it for use, that it has commonly been one of the last metals pressed into the service of man. The age of iron has followed that of brass, in fact as well as in fiction.¹³

They found a substitute in an alloy of tin and copper; and, with tools made of this bronze, could cut not only metals, but, with the aid of a silicious dust, the hardest substances, as basalt, porphyry, amethysts, and emeralds.¹⁴ They fashioned these last, which were found very large, into many curious and fantastic forms. They cast, also, vessels of gold

¹³ P. Martyr, *De Orbe Novo*, Decades, (Compluti, 1530,) dec. 5, p. 191. — Acosta, lib. 4, cap. 3. — Humboldt, *Essai Politique*, tom. III. pp. 114–125. — Torquemada, *Monarch. Ind.*, lib. 13, cap. 34.

“Men wrought in brass,” says Hesiod, “when iron did not exist.”

Χαλκῶ δ' ἐργάζοντο· μέλας δ' οὐκ ἔσκε σιδηρεὺς.

HESIOD, *Ἔργα καὶ Ἡμέραι*.

The Abbé Raynal contends that the ignorance of iron must necessarily have kept the Mexicans in a low state of civilization, since without it “they could have produced

no work in metal, worth looking at, no masonry nor architecture, engraving, nor sculpture.” (*History of the Indies*, Eng. trans., vol. III. b. 6.) Iron, however, if known, was little used by the Ancient Egyptians, whose mighty monuments were hewn with bronze tools, while their weapons and domestic utensils were of the same material, as appears from the green color given to them in their paintings.

¹⁴ Gama, *Descripcion*, Parte 2, pp. 25–29. — Torquemada, *Monarch. Ind.*, ubi supra.

and silver, carving them with their metallic chisels in a very delicate manner. Some of the silver vases were so large that a man could not encircle them with his arms. They imitated very nicely the figures of animals, and, what was extraordinary, could mix the metals in such a manner, that the feathers of a bird, or the scales of a fish, should be alternately of gold and silver. The Spanish goldsmiths admitted their superiority over themselves in these ingenious works.¹⁵

They employed another tool, made of *itztli*, or obsidian, a dark transparent mineral, exceedingly hard, found in abundance in their hills. They made it into knives, razors, and their serrated swords. It took a keen edge, though soon blunted. With this they wrought the various stones and alabasters employed in the construction of their public works and principal dwellings. I shall defer a more particular account of these to the body of the narrative, and will only add here, that the entrances and angles of the buildings were profusely ornamented with images, sometimes of their fantastic deities, and frequently of animals.¹⁶ The latter were executed

¹⁵ Sahagun, Hist. de Nueva España, lib. 9, cap. 15-17. — Boturini, Idea, p. 77. — Torquemada, Monarch. Ind., loc. cit.

Herrera, who says they could also enamel, commends the skill of the Mexican goldsmiths in making birds and animals with movable wings and limbs, in a most curious fashion. (Hist. General, dec. 2,

lib. 7, cap. 15.) Sir John Maundeville, as usual,

"with his hair on end

At his own wonders,"

notices the "gret marvayle" of similar pieces of mechanism, at the court of the grand Chané of Cathay. See his Voiage and Travaile, chap. 20.

¹⁶ Herrera, Hist. General, dec. 2,

with great accuracy. "The former," according to Torquemada, "were the hideous reflection of their own souls. And it was not till after they had been converted to Christianity, that they could model the true figure of a man."¹⁷ The old chronicler's facts are well founded, whatever we may think of his reasons. The allegorical phantasms of his religion, no doubt, gave a direction to the Aztec artist, in his delineation of the human figure; supplying him with an imaginary beauty in the personification of divinity itself. As these superstitions lost their hold on his mind, it opened to the influences of a purer taste; and, after the Conquest, the Mexicans furnished many examples of correct, and some of beautiful portraiture.

Sculptured images were so numerous, that the foundations of the cathedral in the *plaza mayor*, the great square of Mexico, are said to be entirely composed of them.¹⁸ This spot may, indeed, be regarded as the Aztec forum, — the great depository of the treasures of ancient sculpture, which now lie hid in its bosom. Such monuments are spread all over the capital, however, and a new cellar can hardly be dug, or foundation laid, without turning up some of the mouldering relics of barbaric art. But they are little heeded, and, if not wantonly

lib. 7, cap. 11. — Torquemada, Monarch. Ind., lib. 13, cap. 34. — Gama, Descripcion, Parte 2, pp. 27, 28.

¹⁷ "Parece, que permitia Dios, que la figura de sus cuerpos se asi-

milase á la que tenian sus almas, por el pecado, en que siempre permanecian." Monarch. Ind., lib. 13, cap. 34.

¹⁸ Clavigero, Stor. del Messico, tom. II. p. 195.

broken in pieces at once, are usually worked into the rising wall, or supports of the new edifice.¹⁹ Two celebrated bas-reliefs, of the last Montezuma and his father, cut in the solid rock, in the beautiful groves of Chapoltepec, were deliberately destroyed, as late as the last century, by order of the government!²⁰ The monuments of the barbarian meet with as little respect from civilized man, as those of the civilized man from the barbarian.²¹

The most remarkable piece of sculpture yet disinterred is the great calendar-stone, noticed in the preceding chapter. It consists of dark porphyry, and, in its original dimensions, as taken from the quarry, is computed to have weighed nearly fifty tons. It was transported from the mountains beyond Lake Chalco, a distance of many leagues, over a broken country intersected by water-courses and canals. In crossing a bridge which traversed one of these latter, in the capital, the supports gave way, and the huge mass was precipitated into the water, whence it was with difficulty recovered. The fact,

¹⁹ Gama, Descripción, Parte 1, p. 1. Besides the *plaza mayor*, Gama points out the Square of Tlatelolco, as a great cemetery of ancient relics. It was the quarter to which the Mexicans retreated, on the siege of the capital.

²⁰ Torquemada, Monarch. Ind., lib. 13, cap. 34. — Gama, Descripción, Parte 2, pp. 81–83.

These statues are repeatedly noticed by the old writers. The last was destroyed in 1754, when it was

seen by Gama, who highly commends the execution of it. Ibid.

²¹ This wantonness of destruction provokes the bitter animadversion of Martyr, whose enlightened mind respected the vestiges of civilization wherever found. "The conquerors," he says, "seldom repaired the buildings that were defaced. They would rather sack twenty stately cities, than erect one good edifice." De Orbe Novo, dec. 5, cap. 10.