

licking their lips and gnawing their nails for the hunger that is in them, they look on one side and the other at the mouths of those who pass by, hoping peradventure that one may speak some word to them. O compassionate God, the bed on which they lie is not a thing to rest upon, but to endure torment in; they draw a rag over them at night and so sleep. . . . O our Lord, in whose power it is to give all content, consolation, sweetness, softness, prosperity, and riches, for thou alone art lord of all good, have mercy upon them, for they are thy servants. . . . I supplicate thee that thou wilt lift up their heads with thy favour and aid, that thou wilt see good that they enjoy some days of prosperity and tranquillity, so that they may sleep and know repose, having prosperous and peaceable days of life. . . . Should this nation, for whom I pray and entreat thee to do them good, not understand what thou hast given, thou canst take away the good and pour out cursing, so that all evil may come upon them, and they become poor, in need, maimed, lame, blind, and deaf; then indeed they shall waken and know the good that they had and have not, and they shall call upon thee and lean toward thee, but thou wilt not listen, for in the day of abundance they would not understand thy goodness towards them." These prayers seem essentially genuine; indeed there was no European model from which they could have been imitated; but at the same time it must be remembered that they come down in Spanish writing, and not untouched by Spanish influence, as in one passage where there is a mention of sheep, an animal of course unknown to the native Mexicans. As to sacrifice, maize and other vegetables were offered, and occasionally rabbits, quails, &c.; but, in the absence of cattle, human sacrifice was the chief rite, and cannibalism prevailed at the feasts. Incense was constantly used, especially the *copalli* (copal) well known to us for varnish; little terra-cotta censers are among the commonest of Mexican antiquities. Long and severe religious fasts were customary at special seasons, and drawing blood from the arms, legs, and body, by thrusting in aloe-thorns, and passing sharp sticks through the tongue, was a habitual act of devotion recalling the similar practices of devotees in India. The calendar of religious festivals for the whole course of the Mexican year has been preserved. Each 20-day period had one or more such celebrations. In the month of the "diminishing of waters" the rain-gods or Tlalocs were propitiated by a procession of priests with music of flutes and trumpets carrying on plumed litters infants with painted faces, in gay clothing with coloured paper wings, to be sacrificed on the mountains or in a whirlpool in the lake. It is said that the people wept as they passed by; but if so this may have been a customary formality, for the religion of these nations must have quenched all human sympathy. In the next month the god Xipe-totec, already mentioned, had his festival called the "flaying of men" from the human victims being flayed, after their hearts were torn out, for young men to dress in their skins and perform dances and sham fights. The succeeding festival of Camaxtli was marked by a severe fast of the priests, after which stone knives were prepared with which a hole was cut through the tongue of each, and numbers of sticks passed through. For the great festival of Tezcatlipoca, the handsomest and noblest of the captives of the year had been chosen as the incarnate representative of the god, and paraded the streets for public adoration dressed in an embroidered mantle with feathers and garlands on his head and a retinue like a king; for the last month they married him to four girls representing four goddesses; on the last day wives and pages escorted him to the little temple of Tlacochealco, where he mounted the stairs, breaking an earthenware flute against each step; this was a symbolic farewell to the joys of the world, for as he reached the top he was seized by the priests, his heart torn out and held up to the sun, his head spitted on the tzompantli, and his body eaten as sacred food, the people drawing from his fate the moral lesson that riches and pleasure may turn into poverty and sorrow. The manner of the victim's death in these festivals afforded scope for variety; they dressed them and made them dance in character, threw them into the fire for the fire-god, or crushed them between two balanced stones at the harvest-festival. The ordinary pleasures of festivals were mingled with all this, such as dances in beast-masks, sham fights, and children's games, but the type of a religious function was a sickening butchery followed by a cannibal feast.

The Mexican priesthood, being the educated class, were much concerned with the art of picture-writing, which they had developed to a stage quite above the rude figures of the American hunting-tribes, and used systematically as a means of recording religious festivals and legends, as well as keeping calendars of years and recording the historical events which occurred in them. Facsimiles of several of these interesting documents, with their translations, may be seen in Kingsborough. On inspecting these it will be seen that their main principle is pictorial. Gods are represented with their appropriate attributes,—the fire-god hurling his spear, the moon-goddess with a shell, &c.; the scenes of human life are pictures of warriors fighting with club and spear, men paddling in canoes, women spinning and weaving, &c. An important step towards phonetic writing appears, however, in the picture-names of places and persons. The simplest forms of these depict the objects signified by the name.

as where *Chapultepec* or "grasshopper-hill" is represented by a grasshopper on a hill, or a stone with a cactus on it stands for *Tenoch* or "stone-cactus," the founder of *Tenochtitlan*. The system had, however, risen a stage beyond this when objects were drawn to represent, not themselves, but the syllables forming their names, as where a trap, an eagle, a pricker, and a hand are put together not to represent these objects, but in order that the syllables of their names *mo-quauh-xo-ma* should spell the word *Moquauh-zoma* (see Aubin's introduction to Brasseur, *Hist. du Mexique*, vol. i. p. lxxviii.). The analogy of this to the manner in which the Egyptian hieroglyphs passed into phonetic signs is remarkable, and writing might have been invented anew in Mexico had it not been for the Spanish conquest. The Aztec numerals, which were vigesimal or reckoned by scores, were depicted by dots or circles up to 20, which was represented by a flag, 400 (a score of scores) by a feather, and 8000 (a score of scores of scores) by a purse; but for convenience these symbols might be halved and quartered, so that 534 might be shown by one feather, one quarter of a feather, one flag, one-half of a flag, and four dots. The Mexican calendar depended on the combination of numbers with picture-signs, of which the four principal were the rabbit, reed, flint, house—*tochli, acatl, tepatl, calli*. The cycle of 52 years was reckoned by combining these signs in rotation with numbers up to 13, thus:—1 rabbit, 2 reed, 3 flint, 4 house, 5 rabbit, 6 reed, &c. By accident this calendar may be exactly illustrated with a modern pack of cards laid out in rotation of the four suits, as, ace of hearts, 2 of spades, 3 of diamonds, 4 of clubs, 5 of hearts, 6 of spades, &c. In the Mexican ritual calendar of the days of the year, the same method is carried further, the series of twenty day-signs being combined in rotation with numbers up to 13; as this cycle of days only reaches 260, a series of nine other signs are affixed in addition, to make up the 365-day year. It is plain that this rotation of signs served no useful purpose whatever, being less convenient than ordinary counting such as the Mexicans employed in their other calendar already mentioned, where the 20-day periods had each a name like our months, and their days had signs in regular order. Its historical interest depends on its resemblance to the calendar-system of central and eastern Asia, where among Mongols, Tibetans, Chinese, &c., series of signs are thus combined to reckon years, months, and days; for instance, the Mongol cycle of 60 years is recorded by the zodiac or series of 12 signs—mouse, bull, tiger, &c., combined in rotation with the five male and female elements—fire, earth, iron, water, wood; as "male-fire-bull" year, &c. This comparison is worked out in Humboldt's *Vues des Cordillères*, as evidence of Mexican civilization being borrowed from Asia. Naturally the Mexican calendar-system lent itself to magic in the same way as the similar zodiac-signs of the Old World, each person's fate being affected by the qualities of the signs he was born under, and the astrologer-priests being called in to advise on every event of life. Of all Mexican festivals the most solemn was that of the *ziuhmolpilli*, or "year-binding," when the 52-year cycle or bundle of years came to an end. It was believed that the destruction of the world, which after the Hindu manner the Mexicans held to have already taken place three or four times, would happen again at the end of a cycle. As the time drew near, the anxious population cleansed their houses and put out all fire, and on the last day after sunset the priests, dressed in the garb of gods, set out in procession for the hill of Huixachtli, there to watch for the approach of the Pleiades to the zenith, which gave the auspicious signal for the lighting of the new fire. The finest of the captives was thrown down and fire kindled on his breast by the wooden drill of the priest; then the victim's heart was torn out, and his body flung on the pile kindled with the new flame. The people watching from their flat housetops all the country round saw with joy the flame on the sacred hill, and hailed it with a thank-offering of drops of blood drawn from their ears with sharp stone-flakes. Swift runners carried burning brands to rekindle the fires of the land, the sacred fire on the *teocalli* of the war-god blazed up again, and the people began with feasting and rejoicing the new cycle.

Mexican education, at any rate that of the upper class, was a systematic discipline much under the control of religion, which here presents itself under a more favourable light. After the birth of a child, the *tonalpouhqui* or "sun-calculator" drew its horoscope from the signs it was born under, and fixed the time for its solemn lustration or baptism, performed by the nurse with appropriate prayers to the gods, when a toy shield and bow were provided if it was a boy, or a toy spindle and distaff if it was a girl, and the child received its name. An interesting picture-writing, to be seen in Kingsborough, shows the details of the boy's and girl's education, from the early time when three small circles over the child show it to be three years old, and a drawing of half a tortilla or corn-cake shows its allowance for each meal; as they grow older the lads are seen beginning to carry burdens, paddle the canoe, and fish, while the girls learn to spin and weave, grind maize, and cook,—good conduct being enforced by punishments of increasing severity, up to pricking their bodies with aloe-thorns and holding

their faces over burning chillis. The schools were extensive buildings attached to the temples, where from an early age boys and girls were taught by the priests to sweep the sanctuaries and keep up the sacred fires, to fast at proper seasons and draw blood for penance, and where they received moral teaching in long and verbose formulas. Those fit for a soldier's life were trained to the use of weapons and sent early to learn the hardships of war; children of craftsmen were usually taught by their fathers to follow their trade; and for the children of nobles there was elaborate instruction in history, picture-writing, astrology, religious doctrines, and laws. Marriages depended much, as they do still in the East, on comparison of the horoscopes of the pair to ascertain if their birth-signs were compatible. Old women were employed as go-betweens, and the marriage ceremony was conducted by a priest who after moral exhortations united the young couple by tying their garments together in a knot, after which they walked seven times round the fire, casting incense into it; after the performance of the marriage ceremony the pair entered together on a four days' fast and penance before the marriage was completed. The funeral rites of the Mexicans are best seen in the ceremonies at the death of a king. The corpse laid out in state was provided by the priest with a jug of water for his journey, and with bunches of cut papers to pass him safely through each danger of the road—the place where the two mountains strike together, the road guarded by the great snake and the great alligator, the eight deserts and the eight hills; they gave him garments to protect him from the cutting wind, and buried a little dog by his side to carry him across the nine waters. Then the royal body was invested in the mantles of his patron-gods, especially that of the war-god, for Mexican kings were warriors; on his face was placed a mask of turquoise mosaic, and a green chalchihuite-stone as a heart between his lips. In older times the dead king was buried on a throne with his property and dead attendants round him. But after cremation came in a mourning procession of servants and chiefs carried the body to the funeral pyre to be burnt by the demon-dressed priests, after which the crowd of wives and slaves were exhorted to serve their lord faithfully in the next world, were sacrificed and their bodies burnt. Common people would not thus be provided with a ghostly retinue, but their simpler funeral ceremonies were as far as they went similar to those of their monarch.

The staple food of the Mexicans before the conquest has continued with comparatively little change among the native race, and has even been adopted by those of European blood. Maize or Indian corn was cultivated on patches of ground where, as in the Hindu *jam*, the trees and bushes were burnt and the seed planted in the soil manured by the ashes. A sharp-pointed planting stick, a wooden shovel, and a bronze-bladed hoe called a *coatl* were the simple implements. The Mexicans understood digging channels for irrigation, especially for the cultivation of the beverage *chocollali*; which they taught the Europeans to prepare the beverage *chocollali*; these native names passed into English as the words cacao, or cocoa, and chocolate. Other vegetables adopted from Mexico are the tomato and the *chilli*, used as flavouring to native dishes. The maize was ground with a stone roller on the grinding stone or *metlatl*, still known over Spanish America as the *metate*, and the meal baked into thin oval cakes called by Aztecs *tawacalli*, and by Spaniards *tortilla*, which resemble the *chapati* of India and the oat-cake of Scotland. The Mexicans were also skillful makers of earthen pots, in which were cooked the native beans called by the Spanish *frijoles*, and the various savoury stews still in vogue. The juice extracted by tapping the great aloe before flowering was fermented into an intoxicating drink about the strength of beer, *octli*, by the Spaniards called *pulque*. Tobacco, smoked in leaves or cane-pipes or taken as snuff, was in use, especially at feasts. It is related that in old times Mexican clothing was of skins or woven aloe and palm fibre, but at the time of the conquest cotton was largely cultivated in the hot lands, spun with a spindle, and woven in a rudimentary loom without a shuttle into the mantles and breech-cloths of the men and the chemises and skirts of the women, garments often of fine texture and embroidered in colours. Ornaments of gold and silver, and jewels of polished quartz and green chalchihuite were worn,—not only the ears and nose but the lips being pierced for ornaments. The artificers in gold and silver melted the metals by means of a reed-blowpipe and cast them solid or hollow, and were also skilled in hammered work and chasing, as some fine specimens remain to show, though the famous animals modelled with gold and silver fur, feathers, and scales have disappeared. Iron was not known, but copper and tin ores were mined, and the metals combined into bronze of much the same alloy as in the Old World, of which hatchet blades and other instruments were made, though their use had not superseded that of obsidian and other sharp stone flakes for cutting, shaving, &c. Metals had passed into a currency for trading purposes, especially quills of gold-dust and T-shaped pieces of copper, while cocoa-beans furnished small change. The vast size of the market-squares with their surrounding porticos, and the importance of the caravans of merchants who traded with other nations, show that mercantile had risen into some proportion to

military interests. Nor was the wealth and luxury of Mexico and surrounding regions without a corresponding development of art. The stone sculptures such as that remaining of Xoelicalco, which is figured by Humboldt, as well as the ornamented woodwork, feather-mats, and vases, are not without artistic merit. The often-cited poems attributed to Nezahualcoyotl may not be quite genuine, but at any rate poetry had risen above the barbaric level, while the mention of ballads among the people, court odes, and the chants of temple choirs would indicate a vocal cultivation above that of the instrumental music of drums and horns, pipes and whistles, the latter often of pottery. Solemn and gay dances were frequent, and a sport called the bird-dance excited the admiration of foreigners for the skill and daring with which groups of performers dressed as birds let themselves down by ropes wound round the top of a high mast, so as to fly whirled in circles far above the ground. The ball-game of the Mexicans, called *tlachtli*, was, like tennis, the pastime of princes and nobles; special courts were built for it, and the ball of india-rubber (perhaps the first object in which Europeans became acquainted with this valuable material) might not be touched by the hands, but was driven against the walls by blows of the knee or elbow, shoulder or buttock. The favourite game of *patalli* has been already mentioned for its similarity to the *pachisi* of modern India.

The accounts given by Spanish writers of the Central Americans in their state after the Spanish conquest are very scanty in comparison with the voluminous descriptions of Aztec life. They bring out perfectly, however, the fact of close connexion between the two civilizations. Some Central-American peoples were actually Mexican in their language and culture, especially the Pipils of Guatemala and a large part of the population of Nicaragua, but these were descendants of Aztecs or allied peoples who in the comparatively modern times of Aztec power invaded and colonized these distant countries (see Buschmann, *Aztek. Ortsnamen*, viii., ix.). With regard to the Central-American nations proper, especially the Mayas of Yucatan and the Quichés of Guatemala, who dwelt in the cities and worshipped in the temples of Chichen-Itza and Uxmal, Palenque and Copan, the problem of Aztec connexion is deeper and obscurer. How closely related these nations were in institutions to the Mexicans appears, not only in their using the same peculiar weapons, such as the spear-thrower and the toothed club or maquahuitl, but in the similarity of their religious rites, such as drawing blood from their bodies as an act of penance, and sacrificing human victims by cutting open the breast and tearing out the heart; the connexion is evident in such special points as the ceremony of marriage by tying together the garments of the couple, or in holding an offender's face over burning chillis as a punishment; the native legends of Central America make mention of the royal ball-play, which was the same as the Mexican game of *tlachtli* already mentioned. At the same time many of the Central-American customs differed from the Mexican; thus in Yucatan we find the custom of the youths sleeping in a great bachelor's house, an arrangement common in various parts of the world, but not in Mexico; the same remark applies to the Maya exogamous law of a man not taking a wife of his own family name (see Diego de Landa, *Relacion de Yucatan*, ed. Brasseur de Bourbourg, p. 140), which does not correspond with Mexican custom. We have the means of comparing the personal appearance of the Mexicans and Central Americans by their portraits on early sculptures, vases, &c.; and, though there does not appear any clear distinction of race-type, the extraordinary back-sloping foreheads of such figures as those of the bas-reliefs of Palenque prove that the custom of flattening the skull in infancy prevailed in Central America to an extent quite beyond any such habit in Mexico. It is from the ruined cities now buried in the Central-American forests that we gain the best information as to the nations who built them. The notion sometimes propounded that these famous cities were of great antiquity and the work of extinct nations has no solid evidence; some of them may have been already abandoned before the conquest, but others were inhabited, and by the ancestors of the Indians who now build their mean huts and till their patches of maize round the relics of the grander life of their ancestors. In comparing these ruins through the districts of Yucatan, Chiapas, Guatemala, and Honduras, it is evident that, though they are not the work of a single nation, but of two or more highly distinct in language, yet these nations had the great bond of a common system of pictorial or written characters. One specimen of a Central-American inscription may give a general idea of them all, whether it be from the sculptured façade of a temple sketched by Catherwood, or from the painted deer-skin called the Dresden Codex (reproduced in Kingsborough), or from the chapter of Diego de Landa where he professes to explain and translate the characters themselves. These consist of combinations of faces, circles, lines, &c., arranged in compartments in so complex a manner that hardly two are found alike. How they conveyed their meaning, how far they pictorially represented ideas or spelt words in the different languages of the country, is a question not yet answered in a complete way; Landa's description (p. 320) gives a table of a number of their elements as phonetically representing letters or syllables, but, though there may be a partial truth in his rules, they

flow through the profound rocky gorges or *barrancas*, as they are here called, which form a characteristic feature of the Mexican table-lands.¹ On the east side some of these barrancas, here running mostly west and east, attain depths of 800 to 1000 feet in the unfossiliferous limestones of that region: and even on the west coast the De Beltran cañon is flanked by sheer rocky walls over 500 feet high. Hence the rivers are almost useless for irrigation purposes, and available as means of communication only for short distances in their lower reaches, where they flow through the narrow alluvial strips of level coast-lands to the sea. Even the Rio Grande del Norte, which is by far the largest, and which forms the frontier line between Mexico and Texas, is navigable by large vessels only for a few miles above its port of Matamoras. The Rio Grande de Santiago, the largest on the Pacific side, is almost everywhere obstructed by falls and rapids. On this coast the next in importance is the Mercala, or Rio de las Balsas, which, like the Panuco, Alvaredo, Coatzacoalcos, Grijalva, and Usumacinta flowing to the Gulf of Mexico, is subject to sudden freshets during the rains.

At this season the waters which find no seaward outlet are collected in the depressions of the plateaus, where extensive tracts remain flooded for several months at a time. But these lacustrine basins of the Anahuac and Chihuahua table-lands, standing at elevations of from 4000 to 7000 feet, are, by evaporation under semi-tropical suns, rapidly reduced to their normal level. The diminished size of the Anahuac lakes shows that since the conquest a steady process of desiccation has been going on, due probably to the reckless destruction of the upland forests by the European settlers. None of these lakes are of great size except Lake Chapala, which is traversed by the Rio Grande de Santiago, and has a reputed area of about 1300 square miles. Amongst those of the plateau especially noteworthy for their magnificent scenery are Tezcucoc and Chalco, in whose sparkling waters are reflected the surrounding volcanic peaks and extinct craters of the Anahuac table-land, with a background formed by the Cordilleras, whose snowy summits rise here and there high above the dark pine forests of the lower slopes.

In the higher ranges the prevailing formations are granites, which seem also to form the foundation of the plateaus, above which rise the traps, basalts, mineral-bearing porphyries, and more recent lavas. Hence Lyell's theory that Mexico consisted originally of granitic ranges with intervening valleys subsequently filled up to the level of the plateaus by subterranean eruptions. Igneous rocks of every geologic epoch certainly to a large extent form the superstructure of the central plateau. But the Mexican table-land seems to consist mainly of metamorphic formations, which have been partly upheaved, partly interpenetrated and overlaid by igneous masses of all epochs, and which are chiefly represented by shales, greywacke, greenstones, silicious schists, and especially unfossiliferous limestone. All these formations are alike remarkable for the abundance and variety of their metalliferous ores, such as silver, silver-glance, copper, and gold. Gneiss and micaceous schists prevail in Oajaca and on all the southern slopes facing both oceans. But the highest ranges are formed mainly of plutonic and volcanic rocks, such as granites, syenites, diorites, mineral-bearing trachytes, basalts, porphyries, obsidian, pearlstone, sulphur, pumice, lavas, tufa, and other recent volcanic discharges. Obsidian (*itxli*) was the chief material formerly used by the natives

¹ "Near the mountain ranges, from which the water after heavy rains rushes down in innumerable forest streams, these ravines are filled with incredible rapidity as high as 80 feet,—the torrent importing (sic) trees and bearing away rocks with a thundering noise and irresistible power" (Egloffstein, p. 22)

in the manufacture of their cutting implements, as shown by the quarries of the Cerro de las Navajas ("Knife Cliff") near Zimapan. Vast deposits of pumice and the purest sulphur are found at Huichapa and in many of the craters. But immeasurably the most valuable rocks are the argentiferous porphyries and schists of the central plateau and in Sinaloa, unless they are destined to be rivalled by the auriferous deposits of Sonora.² Horizontal and stratified rocks, of extremely limited extent in the south, are largely developed in the northern states, and chalk becomes very prevalent towards the Rio Grande and Rio Gila valleys. To this chalk and to the sandstones are probably to be referred the sandy plains which cover vast tracts in North Mexico, stretching thence far into New Mexico and Texas. Here the Bolson de Mapimi, a vast rocky wilderness inhabited only by wild tribes, occupies a space of perhaps 50,000 square miles in Coahuila and parts of the surrounding states.

None of the horizontal layers seem to be very rich in ores, which are found mainly in the metamorphic, palæozoic, and hypogene rocks of Durango, Chihuahua, and the south. Apart from Sinaloa and Sonora, which are now known to contain vast stores of the precious metals, nearly all the historical mines lie on the south central plateau at elevations of from 5500 to 9500 feet. A line drawn from the capital to Guanajuato, and thence northwards to the mining town of Guadalupe y Calvo in Chihuahua, and southwards to Oajaca, thus cutting the main axis of upheaval at an angle of 45°, will intersect probably the richest known argentiferous region in the whole world. The central group of mines in the three mineral districts of Guanajuato, Zacatecas, and Catorze (San Luis Potosi), which have yielded more than half of all the silver hitherto found in Mexico, lie between 21° and 24° 30' N., within an area of about 13,000 square miles. Here the Veta Madre lode of Guanajuato alone produced £504,000 between 1556 and 1803, besides £10,000 of gold. This metal, however, occurs chiefly, not on the plateau in association with silver, but on the slopes facing the Pacific, and apparently in greatest abundance in Sonora, near the auriferous region of New California. In recent times over half of the silver produced in the whole world has been supplied by Mexico, and the total yield of the precious metals between 1537 and 1880 was as under:—

	Gold.	Silver.	Total.
1537 to 1821.....	£14,000,000	£418,000,000	£432,000,000
1821 to 1880.....	10,000,000	180,000,000	190,000,000
Total.....	£24,000,000	£598,000,000	£622,000,000

Of other minerals the most important are copper, found in a pure state near the city of Guanajuato, and associated with gold in Chihuahua, Sonora, Guerrero, Jalisco,

² On the general character and distribution of the igneous formations Von Egloffstein remarks: "Intimate relations exist between the metalliferous and non-metalliferous porphyries. The metalliferous porphyry is less frequent, but constitutes the most important formation, bearing the precious metals, . . . embracing the rich lodes of Real-del-Monte, Pachuca, Chico, Capula, and Santa Rosa, all of great richness and magnitude. They further form the mineral districts of Angangueo, Oro, Huautla, &c., and part of the mountains of Zimapan and Istapa-del-Oro. The lodes found in this porphyry are characterized by their magnitude and the consistency of the ores they contain. . . . The richest ores of native silver and sulphuret, chloride, and oxide of silver are found in the lodes of Real-del-Monte, Pachuca, and Santa Rosa. . . . The gold seems to exist in small particles in the metamorphic porphyry mountains, whence it is carried by the rains to the valleys as the rocks become disintegrated." (pp. 6-8).

³ *Times* correspondent, December 7, 1882. Guanajuato seems to be still the greatest producer, yielding from £1,500,000 to £1,750,000 yearly, although the great Valenciana mine is flooded, and of the hundred opened only fifty-two are now worked (Geiger).