



---

HUMAN SACRIFICE AND WARFARE AS FACTORS IN THE DEMOGRAPHY OF PRE-COLONIAL MEXICO

Author(s): S. F. COOK

Source: *Human Biology*, Vol. 18, No. 2 (MAY, 1946), pp. 81-102

Published by: [Wayne State University Press](#)

Stable URL: <http://www.jstor.org/stable/41447901>

Accessed: 23/06/2014 07:48

---

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.



Wayne State University Press is collaborating with JSTOR to digitize, preserve and extend access to *Human Biology*.

<http://www.jstor.org>

# HUMAN BIOLOGY

a record of research

MAY, 1946

VOL. 18



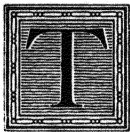
No. 2

---

## HUMAN SACRIFICE AND WARFARE AS FACTORS IN THE DEMOGRAPHY OF PRE-COLONIAL MEXICO

BY S. F. COOK

*Division of Physiology, University of California  
Berkeley, California*



THE population problems of Latin America are of considerable importance to the student of human sociology and biology for numerous reasons, not the least of which is the fact that in this area has proceeded nearly to completion a fusion of two distinct races to form a new type, the so-called mestizo. The process began with a violent collision between an invading, Caucasian group, and a native, mongoloid stock. In many areas, notably in Central Mexico, the former group was numerically small, the latter large. A long series of readjustments followed, characterized in particular by the formation and rise of the intermediate, hybrid form. To follow this evolution throughout four centuries and understand its implications, it is, however, desirable to appreciate the demographic background, insofar as it concerns the native race, and to expound the forces there at work at the time of the conquest by the Spanish.

In 1519 A.D. the empire of the tripartite alliance which, under Moctezuma II, represented the culmination of the steadily developing

civilization of two thousand years, was one of the most remarkable achievements of mankind. Without the knowledge of iron, without the use of any really effective technology, without the support of domestic animals, the Aztecs and their colleagues created a social and material culture that excited the wondering admiration of even their sophisticated conquerors. Two of the most striking external manifestations of this culture were excessive human sacrifice and uninterrupted warfare.

According to the classical concept as set forth by at least the older writers, the focal point of the entire Nahua civilization was a type of religion which in turn centered around human sacrifice. This trend became intensified during the last two hundred years prior to the Spanish conquest to such an extent that the local population could not supply the demand for victims. As a result, wars and forays were undertaken far and wide to satisfy the requirements of the temples. Thus war and religion became inextricably involved with each other on the material level and were simultaneously rationalized into a spiritual unit. Military operations were possible on a scale much greater than elsewhere in primitive America because the Central Mexican plateau and adjacent coasts contained a population of such a remarkably high density as to provide continuous replacement to compensate for losses in battle and by sacrifice.

As an institution, human sacrifice has been known to all primitive peoples at all times in the world's history. In Mexico there is some ground for believing that it was employed by the races inhabiting the country in the Teotihuacan period although the "Toltecs" are generally credited with not embracing the custom. The Aztec and Spanish writers of the sixteenth century generally ascribed its origin to the late Chichimec period, prior to the founding of the Tenochtitlan. The *Codex Boturini* (Radin translation, p. 33) depicts a sacrifice in the time of Aacatl, supposedly somewhere in the eighth or ninth centuries. According to the *Codex Chimalpopocatl*, the great king Quetzalcoatl at Tula did not offer sacrifices although he was strongly tempted by the devil to do so. The *Codex Ramirez* (Radin translation, p. 74) recounts how, when the Aztecs were at Tula, the god Huitzilopochtli became angry because some members of the tribe wished to remain at that locality. One morning these persons were found with their hearts torn out. "In this way it was that they were taught that most cruel of sacrifices . . ." Duran (p. 26) places the first sacrifices just prior to the arrival of the Aztecs at

Chapultepec, that is, sometime between 1150 and 1200. Among modern scholars, Mendizabal (p. 621) is convinced that sacrifice was introduced by the nomadic Chichimecs, particularly the Otomi at the end of the "Toltec" era, since the latter people did not possess the institution. Preuss and Mengin (p. 49) similarly state: "It is thus clear that before the invasion of the Naua-Chichimecs some form of human sacrifice already . . . existed, but that its development and specific character was due largely to the Chichimecs, and particularly to the warrior Naua."

Although there is thus general agreement that human sacrifice was known and probably thoroughly incorporated in religious practice before the final settlement of the Aztecs at Tenochtitlan, the institution at that time retained its purely religious significance as an occasional and very solemn act of propitiation to the gods. It was apparently not until the fifteenth century that the practice of immolating prisoners of war in masses became common. Torquemada (p. 94) says that in 1330 the Mexicans sacrificed a captured Culhua, with the implication that this was the first case of the sort, but subsequently (p. 126) he mentions 1428 A.D. with the remark that "even at that time they made war to capture victims." Some writers even placed the inception of the custom later. For instance, the *Codex Telleriano-Remensis* (Radin translation) claims: "All the old people say that from the year 1465 . . . the custom of sacrificing prisoners taken in war commenced..." Ixtlilxochitl (*Historia Chichimeca*, p. 250) ascribes the origin of the custom to the famine of 1454: "Thus these wars began, and also the abominable sacrifice to the gods, or (better to say) to the demons . . ." On the whole it is safe to ascribe the beginning of the sacrifice of captives to the very early fifteenth or late fourteenth centuries. The development of the custom to include huge numbers occurred not much prior to the middle of the fifteenth.

It was precisely at this period that the population density of Central Mexico was reaching its maximum and that the margin of subsistence was becoming somewhat precarious. With respect to the demography of the times, there are two issues: first, was the mortality due to sacrifice sufficient to act as a serious check on population increase; second, was this custom a manifestation of a social urge toward such a check.

The second issue is one of extreme difficulty and one which cannot be settled by numerical analysis. Nevertheless the suggestion is worth consideration. It is quite clear at the outset that the religious element

cannot be disregarded for it carries great weight. The argument advanced by the sacerdotal class was simply that since human blood was pleasing to the gods, the more blood the greater their pleasure and the greater the benefits to be derived therefrom. But it seems inescapable that this was merely the rationalization of a far deeper tendency or drive. Certainly had it been socially undesirable to perform these acts of sacrifice, very cogent reasons would have been found for not doing so.

The predominant use of war captives is puzzling if the custom is to be regarded as directed toward limiting the population of the tribe itself. However, it should be borne in mind that the entire economic structure and the whole biological complex included all of Central Mexico together with its many linguistic and tribal units. Therefore, whenever the local state, Tenochtitlan or Hueyozingo or Tezcoco or Tlaxcala, immolated its neighbors, it was, in effect, limiting its own population, or at least, balancing the food supply and economic resources upon which it, together with its neighbors, depended. Even the destruction of remoter peoples, such as in Guerrero, or Oaxaca or the Huasteca, achieved the same end by permitting the expansion of the conquering population into new territory and thus restricting not its own total number but its density per unit area. The close association with warfare is obvious. Military operations were inevitable for other purposes, to repel assault, to protect commercial interests, to open new regions for economic exploitation. As a by-product, the population problem could be attacked indirectly by massacre on the spot, or with greater moral justification and religious satisfaction and profit by formal sacrifice.

The sacrifice of slaves was roughly equivalent to that of war prisoners, since both were derived from outside the immediate body politic, and any captive taken in battle automatically assumed the status of slave. On certain occasions, however, it appears to have become necessary to fall back on the method of purchase rather than capture. After one of the wars in Oaxaca, for example, as described by the *Codex Ramirez* (p. 132), victims became so scarce that parties were sent out daily to the public markets at Tlaxcala, Hueyozingo, Cholula, Atlixco and elsewhere so that instead of jewels, sacrificial victims might be purchased. In *Ritos Antiquos* (p. 26) occurs the significant statement in reference to the slave slaughter at the annual festival of the *mercaderes*

at Atzacapotzalco, ". . . for the feast they got slaves to be sacrificed, and they were found cheaply, *as the land was well populated.*" Obviously slaves would not be purchased merely to kill them if the supply were not far in excess of the demand in the labor market. However powerful, no purely religious urge can maintain itself successfully for any material period of time counter to fundamental economic resistance.

In the century preceding the conquest, not only war prisoners and slaves but also children were sacrificed. This destruction of infants is especially significant since they were the offspring of the tribe itself. Indeed, child sacrifice seems to have been regarded as so important that no social class was immune for "these were not slaves but sons of the nobles" (*Ritos Antiguos*, p. 25). The numerical as opposed to the ceremonial importance, however, is difficult to assess, for there are few details available. Sahagun's account is the most circumstantial. At the feast of Atlacahualco, he says (vol. 1, p. 72) ". . . they searched for a great many infants, buying them from their mothers," and killed them at seven places on hilltops and in the Laguna de Mexico. He elsewhere states (p. 54), "According to the reports of some people, they collected the children they sacrificed in the first month, buying them from their mothers, and then killed them at all subsequent festivals until the rainy season came in full force." The payment to the families might be regarded not only as direct compensation for property loss (this alone in the case of slaves) but also as some recognition of an obligation incurred by the state to the individual family through the sacrifice of the child for the public welfare. Sahagun (p. 52.) also mentions that at the feast of Tozotontli "they killed many children."

The *Codex Magliabecchi* mentions several occasions on which children were the victims. At the feast of Xilomaniztli (lamina 17) "they sacrificed children . . . which were drowned in canoes." Drowning seems to have been the standard method for disposing of children. At the feast of Tocoztli (lamina 19) "they sacrificed young children and young girls, and also newborn babies." At the feast of Zazitocoztli (lamina 20) they sacrificed "the children at dawn." At that of Ecalozitli (lamina 22) "they offered . . . newborn babies." At that of Michayehuitl (lamina 25) "they sacrificed children" and "on that occasion the feast of the dead children was celebrated . . ."

Both these sources agree substantially that during at least five out of the eighteen annual religious festivals numerous infants and small

children were sacrificed to various gods. Just how numerous is uncertain. How many is "many"? If Sahagun is correct in stating that at one feast the ceremonies were held on seven hilltops and at the lake then we might suppose that perhaps one hundred were involved in all. Certainly at each hilltop ceremony the number would be several and judging by other accounts the sacrifice at the lake was on a considerable scale. Then if the three or four other sacrifices were of comparable magnitude, the total annual loss was, say, five hundred.

Similar customs prevailed elsewhere on the plateau. At Tlaxcala (Camargo, p. 199), "The victims who were sacrificed were . . . on several occasions . . . newborn infants." Pomar, in his account of Texcoco, says that at the celebration of Tlaloc ". . . ten or fifteen innocent children up to seven or eight years of age were killed." Some of the Spanish writers are more extravagant in their statements. Torquemada (vol. 1, p. 287) says, referring to Cholula, "Many of our people affirmed when entering the town that they considered as true the report that six thousand creatures of both sexes were sacrificed each year." Oviedo (vol. 3, p. 498) raises the estimate to ten thousand. This author (vol. 3, p. 499) also charges that during the massacre at Cholula by Cortes in 1519, the native allies "carried over twenty thousand creatures, small and large, which were sacrificed"—a manifest absurdity. With respect to the whole country, Torquemada writes (vol. 2, p. 120), "The first bishop . . . Frai Juan de Zumarraga, says in a letter, which he wrote on notable things of this Land, that every year twenty thousand children were sacrificed, according to count." Zumarraga's value, even though "according to count," must be scaled down drastically. Nevertheless, if we remember that these sacrifices were carried on at perhaps one hundred cities, towns and other religious centers, we may conclude that at least 2,000 infants and small children were wiped out annually.

Such a number of deaths, out of a population of surely at least two millions, would increase the mortality rate by no more than a very few tenths of one per cent. This in itself is unimportant but as a symptom of a general tendency it has definite significance, for although child sacrifice as practised could not of and by itself seriously check population increase, it was performed far too extensively to justify on purely ceremonial grounds.

The fact has been mentioned that people were sacrificed not only at Tenochtitlan but also at many other towns. The *Codex Ramirez*

(p. 101) says: "... in this way they sacrificed all prisoners of war . . . and the same thing was done by all neighboring nations, imitating the Mexicans in their rites and ceremonies . . . This feast of Huitzilopuchtli was general throughout the land . . . and so . . . there was no province nor village which did not celebrate the feast in the said manner." Regarding this same feast, Duran (vol. III, p. 61) says ". . . in all the provinces of the Land, the feast was general." Ixtlilxochitl (*Historia Chichimeca*, p. 268) adds ". . . beside those referred to, they sacrificed many during the kingdom, in the city of Mexico as well as in Tezcucó and Tlacopan and other populous towns and capitals of provinces under the empire . . . and in those provinces outside the empire, it was about the same." The early conquerors are quite explicit concerning the wide extent of the custom. Thus states Bernal Díaz (p. 138-140) after describing the condition of certain Totonac towns, ". . . we found the same thing in every town we afterwards entered," and ". . . but as many readers will be tired of hearing of the great number of Indian men and women whom we found sacrificed in all the towns and roads we passed, I shall go on with my story without stopping to say any more about them." Among the towns specifically mentioned as conducting such rites are Tezcucó, Tlacopan (Ixtlilxochitl), Cholula (Torquemada), Tlahquiltenango (*Codice Mauricio de la Arena*), Tlaxcala, Hueyozingo, Calpa, Tepeaca, Tecalca, Atotonilca, Quaquechulteca (Duran, vol. III, p. 60), Coatepec (Duran, vol. III, p. 151), Cotaxtla, Cempoala, Xocotlan (Bernal Díaz, pp. 138, 181). It is clear, therefore, in making any numerical estimate that, although Tenochtitlan was the most important single center, the outlying towns and provinces can by no means be neglected.

We have a few direct statements with respect to total numbers annually sacrificed. That of Zumarraga previously quoted, 20,000, although children (*criaturas*) are specifically mentioned, may have referred to all persons. This would correspond to that of Gomara who says (p. 285) ". . . and there was no year with under twenty thousand persons sacrificed, and over fifty thousand according to other references, in the land conquered by Cortes; but if even ten thousand, it was a great butchery . . ." Provisional acceptance of these Spanish estimates would place the number anywhere from 10,000 to 50,000 per year.

More numerous are statements with reference to individual festivals at specific towns. Duran (p. 60) maintains that at the principal fiesta,



to Huitzilopochtli, more than 1,000 persons were customarily killed throughout all Central Mexico. At that of Xipe he says (p. 203) at least 6,000 were killed. At the 14th month, according to Motolinia (p. 38) “. . . they sacrificed, according to the size of the village, in some twenty, in others thirty, in others forty, and even fifty and sixty; in Mexico they sacrificed one hundred and over.” If there were 100 towns and the average number was 40 then the total for this festival would be 4,000. There were 18 festivals per year—to correspond with the Aztec months—in other words, almost continuous activity in the temples. If the above three cases may be regarded as representative, the average would be about 3,000 per month or 54,000 per year. But most of the fiestas were on a smaller scale. Accordingly the average may be reduced to 1,000, the annual rate to 18,000.

Another item of evidence consists of the famous skull counts made by the Spanish soldiers. There appear to be two of these. The first was by Bernal Diaz who states (p. 181) that at the town of Xocotlan “. . . in the plaza . . . there were piles of human skulls so regularly arranged that one could count them, and I estimated them at more than a hundred thousand. I repeat again that there were more than one hundred thousand of them.” The second was by Andrés de Tápia who examined, at Cortes' request, the great temple at Tenochtitlan. In his *Relacion* (p. 583), he describes the method of arrangement, then says: “. . . the writer and a certain Gonzalo de Umbria counted the cross sticks which were stretched from pole to pole, as I have described, and multiplying by five skulls per cross piece we found there to be one hundred thirty-six thousand heads, without those of the towers.” The towers were two in number, of considerable size, made of “lime and skulls of the dead, without any other stone.”

The veracity of these statements, and of the others cited above, has been seriously questioned by modern historians. As much discretion is necessary, however, in rejecting them as in accepting them. The early chroniclers, such as Motolinia, Gomara, and Duran, derived their figures from the statements of others, such as elderly natives and pioneer Spanish. Hence these figures are second-hand, perhaps subject to exaggeration and certainly to inaccuracy in detail, although I doubt if they deliberately distorted what they knew to be facts. Bernal Diaz and Andrés de Tápia are in a different category. They were actual participants in the conquest, eyewitnesses of the events they described. Both can be

accused of personal bias with reference to the politics of the day, the merits of Cortes and similar matters. But they both state emphatically that they actually counted the skulls in question and as accurately as they were able. They had no motive for falsification and both were reliable, competent soldiers. I can therefore see no reason for not accepting their figures at face value.

With respect to Xocotlan (and Diaz is positive in his identification of the town with no likelihood that he confused it with Mexico) we do not know how long the skulls had been collected. However, it is doubtful whether they antedated the period of Aztec domination, that is to say, the middle of the fifteenth century. If so, seventy years is a fair estimate. Diaz says there were "more than" 100,000, but we may use the flat value. Then the annual increment was approximately 1430.

In Tenochtitlan we have better dating. The temple was built previous to and dedicated in 1487, thirty-two years prior to Tápia's count. This would mean an average of 4,250 sacrifices per year, including the colossal slaughter which accompanied the dedication. Indeed, if we deduct 20,000 for the dedication, the subsequent rate would be 3,630. On the other hand the skulls reported by Tápia as embedded in the towers are not included in this calculation.

Accepting the rates above indicated for Tenochtitlan and Xocotlan, it becomes necessary to extrapolate to the entire region, a process which inevitably involves a large element of assumption. Tezcoco, nearly as large as Tenochtitlan, may be assigned 2,000 sacrifices per year and the remaining lake towns perhaps 500. Hueyozingo and Cholula may have accounted for 1,000 each. At Tlaxcala it is said by Gomara (vol. 2, p. 274) that at the regular 4-year festival 400 were killed at the big temple, 300 in each of the other three *barrios* and in each of the other 28 towns of the province "algunos"—let us say 1,500 in all. Motolinia (p. 57) gives an estimate of 1,200 for the same festival. Counting in the routine monthly festivals, the annual average must have amounted to at least 2,500. Tepeaca, Chalco and vicinity may be allotted 1,000, the Morelos towns, 1,000, the Toluca Valley, 500, and southern Hidalgo and northern Puebla, another 1,000. The total for the Nahuatl confederacy and its immediate neighbors would then be approximately 15,700. In the outlying regions, Guerrero and the south coast, the Totonacapan, the Huasteca, the Mixteca, the Zapoteca, the Tarascan territory in Michoacan, sacrifices were performed but on a much less

extensive scale. If we allow 4,000 to 5,000 for these areas, the general total would amount to 20,000 per year.

A third source of information comes from the reports of war captives sacrificed. These were often reserved for special occasions such as the coronation of kings and dedication of temples. The most sensational single such butchery recorded took place at the dedication of the new temple at Tenochtitlan in 1487, an occasion which may serve as a prototype. The estimates of the slain which appear in the chronicles are almost unbelievable. The *Codex Telleriano-Remensis* (p. 141) says 20,000, Torquemada (vol. 1, p. 186) 72,344, Tezozomoc (p. 268) 80,400, Duran (p. 346) 80,400. The commemoration stone at the National Museum indicates 20,000 (Tezozomoc, p. 519, footnote), a figure accepted by Orozco y Berra (*Ann. Mus. Nac.*, vol. 1, p. 61).

In spite of the many detailed accounts we have no adequate description of how the sacrificial operation was performed. The standard statement is that the victim was thrown back downwards on the stone, being held by five men, his chest "opened" and his heart "snatched out" or "torn out" by the high priest or chief officiator. Immediately the body was thrown down a long flight of steps while the heart was offered to the god with appropriate ritual. Some estimate of the time consumed is possible. To seize the prisoner, already directly in front of the stone, and throw him down would not consume more than a minute, despite his struggles. What happens next depends upon the type of operation employed.

Torquemada (vol. 2, p. 117) after pointing out that the victim was bent nearly double, backward over the stone, states ". . . the supreme priest arrived armed with a knife, and opened him very deftly, and wide open in the chest, and in such a manner that it was scarcely heard or seen . . ." Motolinia (p. 38) says the chest was opened "with great strength" and "rapidly". The Anonymous Conqueror, who had exceptionally good access to information, states (p. 52), "He plunges the knife into the breast, opens it and tears out the heart . . . and this as quickly as one might cross himself." Pomar, in the *Relacion de Tezcoco*, (p. 17) specifies that the chest was opened "from one teat to the other."

It seems evident that the incision was made by a single hard blow with the obsidian knife directly through ribs and sternum such that a wide aperture was formed through which the priest could grasp and tear out the heart. A competent and practised operator should be able

to finish within one minute. Another minute should suffice to throw the body down the steps (performed by assistants), stretch the heart toward the shrine, smear the idol with blood and throw the heart in a dish (performed by the priest). Three minutes thus appears a reasonable time during which a single sacrifice could be accomplished, although perhaps under great pressure and by omitting some of the ritual it could be done in two. As an absolute minimum the latter estimate may be accepted.

At the dedication ceremony there were four lines of captives, such that four could be killed simultaneously (Duran, p. 345). The king started but soon tired and was replaced by priests who worked in shifts. Rotating in this manner the process was kept going continuously (Tezozomoc, p. 517) for four days. Now two minutes per victim, four at a time, means 120 per hour. Assuming actual continuous operation for 96 hours (i.e., four days), the total would have been 11,520. Duran states in detail that the four lines extended up the temple steps from (1) the Cuyoacan road "casi una legua," (2) from the Calzada de Señora de Guadalupe, also nearly one league, (3) up the Calle de Tacuba and (4) east to the lakeshore. Calling a Spanish league equal to three English miles, each line was then about two miles long. The captives must have been in single file and if a linear space of three feet standing room is allowed for each the total comes to 1,760 times 2 times 4, or approximately 14,100. These are both considerably smaller than any of the historical estimates but if we include the sacrifices which must have been performed in the adjacent temples and "cues" the figure of 20,000 accepted by Orozco y Berra appears wholly reasonable. The values of 70,000 to 80,000 mentioned by Duran, Ixtlilxochitl and Torquemada seem wholly out of line unless they were referring to the entire Nahua confederacy, in which case such numbers are possible but not probable. It is better, I think, to adhere to the more conservative and better authenticated estimate of 20,000 victims in Tenochtitlan and its immediate environs.

There are a few other cases of wholesale slaughter in the temple for which an actual numerical estimate is offered (most of these by Duran):

1442	War with Chalco	500 persons	(Duran, p. 144)
1447	Huasteca	6,000	" (Bancroft, <i>Native Races</i> , V:418)
1476	Tliliquitepec	700	" (Duran, p. 298, p. 301)
1477	Metztititlan	40	" (Duran, p. 313)
1499	Tehuantepec	17,400	" (Ixtililxochitl, <i>Hist. Chich.</i> , p. 272)
1503	Icpatepec	5,100	" (Duran, p. 423)
1506	Tlaxiaco	1,000	" (Duran, p. 501)
1507	Tututepec (2 campaigns)	3,650	" (Tezozomoc, p. 631)

The sum of the captives taken for sacrifice in the nine campaigns listed above, plus the holocaust of 1487, is 54,390, an average of nearly 700 per year. But these are only a few outstanding cases. In Appendix I are listed as many campaigns as can be clearly distinguished from the historical records, together with estimated battle casualties. Owing to the highly specialized mode of warfare developed by all the Mexican tribes, the number of captives was fully as large as that of the actual killed and perhaps may have been much larger. The total casualties incurred by both sides in wars in which the Aztecs participated, according to this compilation, was 248,700. Certain adjustments must be made, however, before accepting a final value. The first two wars, those waged at the time of the formation of the tripartite alliance, should be deleted, since the number of captives sacrificed was at that era relatively small. This leaves 192,700, a figure which includes the losses of the Aztecs themselves. Since the latter, however, were the dominant people, and were almost always the victors, their loss was definitely smaller than that of their opponents. A ratio of 2 to 1 in favor of the Aztecs would not be excessive. Hence the enemy losses in battle dead and likewise in captives would approach 130,000. If this figure is spread over the ninety years from 1430 to 1520 the annual average is 1,440. Finally, some account must be taken of the numerous raids and skirmishes which left no historical trace. Including these we may arrive at an annual average of 2,000 war captives sacrificed at Tenochtitlan. This appears a sounder estimate than the 700 mentioned above which was based upon an obviously incomplete record.

The Tápia skull count gives an average of 4,250 sacrifices for Mexico during the last thirty-three years of the empire. But since the number is known to have reached its maximum in the generation preceding the Spanish Conquest, the two estimates are not seriously at variance. Extrapolating the war captive figures to the whole territory in a manner similar to that used with the skull counts, we get an annual average

for ninety years of 9,400. To these must be added the children, slaves, and others not taken in warfare, say 2,500, giving a total of approximately 12,000.

To summarize the preceding discussion the values obtained for annual sacrifice rate in Central Mexico are:

- |  |               |
|--|---------------|
| A. Direct estimates by the Spanish, covering last years prior to the conquest..... | 10,000-50,000 |
| B. Descriptions of individual festivals, covering last years .....                 | 18,000        |
| C. Skull counts, covering last 30-40 years.....                                    | 20,000        |
| D. War captive estimate, covering last 90 years...                                 | 12,000        |

Considering the sources of numerical information available, the four methods yield results surprisingly in agreement. Allowing for changes over a century, 10,000 to 20,000 persons were sacrificed per year, with an over-all mean of approximately 15,000.

To secure an exact appreciation of the magnitude of human sacrifice as a demographic factor, the possible birth and death rates should be considered. We have no direct information concerning these variables but it is known that among virile, moderately healthy primitive peoples, uncontaminated by venereal or epidemic disease, the death rate seldom rises over 40 or 50 per thousand persons per year. For purely illustrative purposes let us assume the latter value to have been characteristic of Central Mexican civilization. Furthermore, let us assume that the total population approximated 2,000,000. Then the basic, non-sacrifice death rate would have been 100,000 per year. Therefore a mean annual sacrifice rate of 15,000 would have augmented the death rate by roughly fifteen per cent, a quantity which, over one or two generations, could have been of material significance in aiding to control the population density.

The conclusion appears warranted that the first issue set forth previously, i.e., could human sacrifice have been sufficiently extensive to affect population trends, must be answered in the affirmative on the basis of available numerical data. The second issue, i.e., was human sacrifice the manifestation of an urge toward population control, can be answered by no means categorically. Absolute proof for such an hypothesis is wholly lacking. Yet the possibility cannot be lightly dismissed that a religious institution was unconsciously directed, one might

almost say perverted, to a social and biological end during the later phases of Aztec domination.

Our interest in military operations is here confined to the magnitude of battle casualties. For a detailed discussion of other matters reference may be made to the treatise of Bandelier (1877), which has never been surpassed in its scholarly treatment of the subject.

The period which began with the founding of Tenochtitlan in 1325 and coincided roughly with the first century of Aztec autonomy appears to have been remarkably free from armed operations of any kind. There is no recorded war or expedition from 1300 to 1350. Bancroft (*Native Races*, V: 347) states that Tezcoco, during the reign of Techotl (1305-1357) was "almost entirely undisturbed by civil or foreign wars." Meanwhile at Tenochtitlan, according to the *Codex Ramirez* (Radin translation), "they were at peace and increased in numbers, mingling in business and social intercourse with the surrounding peoples;" and "the second king, Huitzilihuitl" (1359-1375) "ruled . . . during a time of great tranquillity and peace."

In 1349 or 1350 occurred the war between Tezcoco and the group of migrating Nahuas known as Teochichimecs. A very bloody battle took place which resulted in the defeat of the invaders. In 1384 there was fighting on the eastern plateau between Tlaxcala and an allied group. In 1395 the Aztecs attacked the town, or province of Xaltocan and crushed the rebellious inhabitants. These three are the only campaigns of sufficient consequence to have been recorded prior to the great struggle for supremacy between the allies and Atzacapotzalco which began about 1415. The inference is plain, and has been commented on by many writers, that during this long era of quiet the Nahua tribes, the Aztecs, Culhuas, and Tepanecs particularly but also doubtless the Chalcans, Hueyozincans and Tlaxcalans were increasing in number and developing their agricultural and economic resources. Beginning at approximately 1415, however, the tripartite alliance launched its career of conquest and from that time wars were incessantly waged. It is, therefore, the final century prior to the arrival of the Spaniards during which warfare may have had a significant bearing on the status of population.

The size of armies as frequently stated by the sixteenth century writers is so huge as to call forth an immediate charge of gross exaggeration. Nevertheless there is some reason to believe that the exaggeration was not as great as might be supposed. Duran (p. 166), com-

menting on the Aztec power in the middle of the fifteenth century, avers that the central authority could easily field an army of 100,000 men, including those drawn from the home provinces. Now Bandelier (1877) points out that in Anahuac every citizen over the age of 15 years was a warrior and liable for military service. He elsewhere mentions that the city of Tenochtitlan was divided into four *barrios*, each of which was divided into 3 to 4 smaller districts. Each of the latter furnished on the average 300 men. This means a mobile reserve, for the ranks, of 3,600 to 4,800, say 4,000. But to these conscripts must be added the *principales* or nobles whose entire life was devoted to fighting. Their number was large, perhaps equal to that of the citizen soldiers. If so, then Tenochtitlan could put at least 8,000 men into a campaign. Tezcoco could furnish as many, Atzcopotzalco and Tlacopan nearly as many. When the smaller towns of the valley of Mexico are included, 100,000 is by no means an unreasonable estimate.

Some of the values for size of armies which have been mentioned are as follows:

- 1349. Tezcoco and allies against the Teochichimecs. Allied army 100,000 (Veytia, II: 165).
- 1415. Tepanecs and Aztecs against Tezcoco. Allies had 200,000 (Bancroft, *Native Races*, V: 372-379).
- 1428. Mexico, Tezcoco and allies against Tepanecs. In initial operations allies had about 100,000. Chalco and vicinity added another 20,000 (Veytia, III: 93-106). In final campaign allies had 300,000, including 100,000 from Tezcoco and 70,000 from Mexico and Tlatelulco. Tepanecs had 300,000 (Veytia, III: 127). In view of the desperate nature of this conflict, these figures may not be extremely exaggerated. Ixtlilxochitl (*Relaciones historicas*, p. 382, p. 407) cites substantially the same numbers.
- 1430. Mexico and allies against various towns. Allies had 100,000, including 10,000 from Tlaxcala and Hueyozingo (Veytia, III: 157).
- 1458. Mexico against Coixtlahuaca, second campaign. Mexico raised an army of 20,000 (Duran, p. 201).
- 1476. Mexico against Tarascans. Mexican army 32,200, Tarascan 50,000 (Tezozomoc, p. 421), Mexican 24,000, Tarascan 40,000 (Duran, p. 288).
- 1494. Mexico against tribes of Tehuantepec. Aztecs started with an army of 200,000 and were joined by 100,000 allies (Duran, p. 397, p. 400). So many were in the army that not a man could be seen on the streets of the towns in the valley of Mexico (Duran, p. 370).
- 1503. Mexico against Icpatepec and Nopallan. This was a war purely to capture sacrificial victims. Mexican army 60,000 (Duran, p. 423).



- 1506. Mexico against Hueyozingo. 100,000 combatants on both sides (Duran, p. 451).
- 1506. Mexico against tribes of the Mixteca. Army of 200,000 (Duran, p. 455).
- 1515. Mexico against Quetzaltepec and Tototepec. Montezuma set out with all the troops at his command: 400,000 men and boys (Duran, p. 446).

Although some of these figures are excessive, others bear the stamp of quite reasonable accuracy. On the whole, the repetition of values ranging from 100,000 to 200,000, on the part of all contemporary writers, some of whom had known participants in these campaigns, must indicate that the Nahuatl armies were of the order of magnitude designated. Otherwise we must ascribe to these writers not only an incredible mendacity but also an incredible ignorance.

In the absence of any compelling argument to the contrary we may accept as fact that the Nahuatl confederacy was accustomed to operate with armies 100,000 strong and if a real emergency arose might levy as many as 300,000 men.

For ordinary wars the mobile field army of approximately 100,000 men could be called into action. This consisted no doubt of the best fighting strength available—all the young men from 18 to 30 years of age plus a certain number of older men from the officer, or noble, class. This age and sex group usually included about ten per cent of the total population. The core of Aztec military power lay in the capital, Tezcoaco, the valley of Mexico and adjacent portions of the modern states of Mexico, Hidalgo, Puebla, Guerrero and Morelos. Hence in the latter half of the fifteenth century this central region may have had a population of one million. Another million should be added to account for partially conquered tribes and hostile nations such as the Tlaxcaltecs, Tarascans, Huastecs, Totonacs, Mixtecs, Zapotecs and numerous minor linguistic or ethnic groups, thus indicating a total population for all Central Mexico of at least two million, probably more.

The losses incurred by the Central Mexican peoples during the final century before the Spanish Conquest obviously cannot be determined with rigid and formal precision. On the other hand, there is enough available data to furnish a basis for a rational estimate. Most of the principal campaigns from 1415 to 1519 have been recorded although the memory of numerous minor wars, raids and skirmishes must have been lost. For some of the more important battles, actual numerical

statements have been given with respect to casualties; for many others an indication of the severity is apparent from the expressions "many killed," "great slaughter," and the like. A literal acceptance of such figures and statements would be unwarranted and much allowance has to be made for the universal tendency toward overstatement for the sake of emphasis. Nevertheless they frequently provide a basis for a fair guess or estimate.

Another point of difficulty is the confusion as to time and place which characterizes the contemporary or later accounts of these operations. In almost every individual instance sources differ with respect to the exact year and exact locale. To attempt a really thorough examination of all details would be a tedious and perhaps impossible task. Therefore in the compilation of campaigns about to be given, there are undoubtedly repetitions, omissions and flat falsities. Despite these acknowledged shortcomings, however, the list is probably reasonably complete and sufficiently accurate to yield a satisfactory over-all survey. The dates are according to the older authorities where available; otherwise I have followed the chronology of Bancroft. The numerical estimates are based where possible on quantitative statements by the Aztec and Spanish historians. The latter are primarily Tezozomoc, Ixtlilxochitl, Duran, Torquemada and Veytia, and in a few cases the *Codex Ramirez* and *Codex Telleriano-Remensis*. Bancroft's account is also very useful although he also necessarily depends upon the sixteenth century authors. In estimating probable casualties, many contributing factors are considered, such as relative size of armies, intensity of battles, importance of the occasions as gauged by the political issues involved, and success of the resistance offered by the enemy. Finally the estimates include casualties on both sides. (See list in Appendix I).

The total estimated casualties incurred by both sides in the listed wars, raids, and campaigns, including those killed in battle, those who died of wounds and those who, as non-combatants were massacred by victorious troops, amount to 288,700 persons. The list given is, however, by no means complete. The tripartite alliance must have participated in dozens of minor and small-scale conflicts which were too insignificant to merit permanent record in tradition or in written script. Particularly must this have been true during the confused final fifty years of Aztec domination. To account for these as a whole it will therefore be legitimate to increase the estimate by twenty-five per cent,

thereby raising it to 360,900. Moreover, during the period while the Aztecs and their allies were extending their power from Guerrero to Tehuantepec, the other peoples of Central Mexico were by no means at perfect peace with each other. The Nahuatl groups on the eastern plateau, such as the Tlaxcalans and Hueyozincas, were conducting perpetual if intermittent war with each other. Likewise the peripheral tribes such as the Zapotecs, Mixtecs, Tarascans, Totonacs, etc., were raiding and counterraidering. No one knows the full extent of these hostilities but in the aggregate they must have had an intensity at least one-half that characterizing the operations of the triple alliance. If so, the casualties would have amounted to 180,500. The grand total then would have been 541,400, or, in round numbers, 540,000.

At first glance this appears a very large number, perhaps excessive. But the losses were distributed fairly evenly over somewhat more than a century: 104 years from 1415 to 1519. The annual rate of loss, therefore, would have been about 5,200. The mean population throughout this century was probably between 1,500,000 and 2,500,000, say 2,000,000. The direct annual war losses in population, based on these calculations, were then 0.25 per cent. On the assumption that the basic death rate was 50 per thousand and that the population was 2,000,000, the death rate was increased 5 per cent by warfare.

War and human sacrifice together, according to historical evidence, may have accounted for twenty per cent of the mortality in Central Mexico, or, otherwise expressed, may well have increased the normal mortality by about twenty per cent. The final conclusion is consequently justified that these two factors were an important instrumentality in controlling population increase and maintaining a proper balance between the number of inhabitants and their maximum available economic resources.

#### SUMMARY

In Central Mexico, immediately prior to the Spanish Conquest, the population was reaching the maximum consistent with the means of subsistence. Simultaneously the intensity of warfare rose steadily and the institution of human sacrifice, which depended for victims largely upon war captives, underwent an almost pathological development. An analysis of contemporary documentary sources reveals that the mean

annual number of battle casualties reached approximately 5,000 and the corresponding value for sacrificial victims 15,000 during the last half century of Aztec domination. Assuming a probable final population for the area of at least 2,000,000, and a normal death rate of 50 per thousand, the effect of warfare and sacrifice would have been very effective in checking an undue increase in numbers. The suggestion is advanced that these methods may have been developed as a group, or social, response to the need for population limitation.

## CITATIONS

- BANCROFT, H. H. 1876. *The Native Races of the Pacific States of North America*. Vol. V., Primitive History. *New York*.
- BANDELIER, A. F. 1877. On the Art of War and the Mode of Warfare of the Ancient Mexicans. Harvard University, *Peabody Museum Reports*, II: 95-161.
- CAMARGO, DOMINGO MUÑOZ. *Historie de la Republique de Tlaxcallan*. In: *Nouvelles Annales de Voyages*. 1843. Vol. XCVIII: 129-204, and Vol. XCIX: 129-197.
- CODEX BOTURINI. Translation by Paul Radin, 1920. *Univ. Calif. Publ., Amer. Arch. Ethnol.*, Vol. XVII: 33.
- CODEX MAGLIABECCHI. In: *The Book of the Life of the Ancient Mexicans*. By Zelia Nuttall. *Berkeley, Calif.*, 1903.
- CODEX MAURICIO DE LA ARENA. By Manuel Mazari, 1926. *Anales Mus. Nac. Mex.*, Ser. IV, Vol. IV: 273-278.
- CODEX RAMIREZ. Translation by Paul Radin, 1920. *Univ. Calif. Publ., Amer. Arch. Ethnol.*, Vol. XVII: 67.
- CODEX TELLERIO-REMENSIS. Translation by Paul Radin, 1920. *Univ. Calif. Publ., Amer. Arch. Ethnol.*, Vol. XVII: 45.
- DIAZ DEL CASTILLO, BERNAL. *The Discovery and Conquest of Mexico*. Translation by A. P. Maudslay. Edit., E. D. Ross and E. Power. *New York*, 1928.
- DURAN, DIEGO. *Historia de las Indias de Nueva España y Islas de Tierra Firme*. Edit., Jose F. Ramirez. *Mexico*, 1867.
- GÓMARA, FRANCISCO LOPEZ DE. *Historia de la Conquista de Mexico*. Edit., J. R. Cabañas. *Mexico*, 1943.
- IXTLILXOCHITL, FERNANDO DE ALVA. *Historia Chichimeca and Relaciones Historicas*. Both in: *Kingsborough's Antiquities of Mexico*, Vol. IX. *London*, 1848.
- MENDIZABAL, M. O. 1933. Los Otomies no Fueron los Primeros Pobladores del Valle de Mexico. *Anales Mus. Nac. Mex.*, Ser. IV, Vol. VIII: 611-629.
- MOTOLINIA (BENEVENTE), TORIBIO DE. *Historia de los Indios de la Nueva España*. Edit., D. S. Garcia. *Barcelona*, 1914.
- OROZCO Y BERRA, M. *Dedicacion del Templo Mayor de Mexico*. *Anales Mus. Nac. Mex.*, Ser. I, Vol. 1: 60-74.

- OVIEDO Y VALDES, GONZALO FERNANDEZ. *Historia General de las Indias*. Edition of Madrid, 1853.
- POMAR, JUAN BAUTISTA. *Relacion de Tezcoco, 1582*. In: *Nueva Coleccion de Documentos para la Historia de Mexico*. By J. Garcia Icazbalceta. Vol. III. *Mexico*, 1891.
- PREUSS, K. T. and E. MENGIN. 1938. *Die Mexikanische Bilderhandschrift Historia Tolteca, Chichimeca*. *Baessler's Archiv: Beiträge zur Völkerkunde*, Vol. XXI: 2-66.
- RITOS ANTIQUOS, *Sacrificios é Idolotrias de los Indios de la Nueva Espana*. Written by an anonymous Friar in 1541. In: *Kingsborough's Antiquities of Mexico*, Vol. IX. *London*, 1848.
- SAHAGUN, BERNARDINO DE. *Historia General de las Cosas de Nueva Espana*. Edition of Pedro Robrero. *Mexico*, 1938.
- TÁPIA, ANDRES DE. *Relacion sobre la Conquista de Mexico*. In: *Coleccion de Documentos para la Historia de Mexico*. By J. Garcia Icazbalceta. Vol. II. *Mexico*, 1866.
- TEZOZOMOC, HERNANDO ALVARADO. *Cronica Mexicana*. Edit., J. M. Vigil. *Mexico*, 1878.
- TORQUEMADA, JUAN DE. *Monarquia Indiana*. Edition of Madrid, 1723.
- VEYTIA, MARIANO. *Historia Antigua de Mexico*. Edit., C. F. Ortega. *Mexico*, 1836.

## APPENDIX I

*Campaigns and estimated battle casualties*

1415-1420	War between the Tepanecs of Atzacapotzalco plus the Aztecs against Tezcoco. Five campaigns.....	34 000
1425-1428	War between the allies (Mexico and Tezcoco) and the Tepanecs. Resulted in the formation of the triple alliance .....	22 000
1430	Allies against Huexotla, Coatlichan and eight other towns .....	4 000
1432	Aztecs against Coyuhuacan and two other towns.....	1 000
1434	Aztecs against Quautitlan and Tultitlan.....	1 000
1434	Aztecs against Xochimilco and Cuitlahuac.....	1 100
1435	Aztecs against Quanhuahuac.....	1 000
1443	Aztecs against Chalco.....	2 000
1443	Revolt of Tlatelulco.....	500
1443	Revolt of Tulancingo.....	500
1448	Allies against Cohuixco and Mazatlan.....	500
1457-8	Allies against the Mixteca, two invasions.....	20 000
1458-9	Aztecs against Cozamoloapan and Quauhtochco.....	2 000
1457-9	Allies against the Totonacs.....	3 000
1459	Aztecs against Chalco.....	5 000
1460	Allies against the Huasteca.....	3 000
1460	Allies against Tepeaca, Quautinchan, Acatzingo.....	2 000
1467	Tezcoco against Zumpango.....	500
1468	Aztecs against Hueyozingo and Atlixco.....	1 000
1469	Allies against Tehuantepec.....	5 000
1472	Aztecs against Xuchitepec.....	500
1473	Revolt of Tlatelulco.....	1 500
1474	Allies against Matlazincas.....	3 000
1476	Allies against Tarascans.....	25 000
1476	Aztecs against Tliliquepec.....	300
1480	Aztecs against Meztitlan.....	500
1481	Allies against Cuextlan.....	2 000
1483	Aztecs against Tlaxotepec.....	300
1483	Tezcoco against Hueyozingo.....	2 000
1486	Allies against various peoples, including Xiquipilco, the Tzuicoacas and Topenecas of Jalisco, the Zapotecs, Nauhltan and Tlacopan.....	2 000
1488	Aztecs against Chinantla and Cinacantlan.....	1 000
1489	Tlacopan against Cuextlan.....	500
1489	Allies against four towns on southern coast.....	1 000
1490	Aztecs against Quautla (Cuextlan).....	500
1490	Allies against Hueyozingo.....	500

1491	Allies against Huastecs and Totonecs.....	2 000
1491	Cholula against Tepeaca.....	1 000
1491	Aztecs against Oztoman and other towns in Guerrero	10 000
1495	Allies against Mazatecs and Zapotecs (Tehuantepec)	40 000
1498	Aztecs against Atlixco.....	500
1500	Allies against towns of Cuextlan and the Huesteca....	1 000
1503	Aztecs against Nopallan, Icpatepec and three others...	2 000
1503	Mexico, Hueyozingo and Cholula against Tlaxcala....	10 000
1506	Allies against the Mixteca. Destroyed Yanhuítlan, Tlaxiaco, Zozolan.....	20 000
1506	Aztecs against Iztitlan.....	1 000
1506	Aztecs against Atlixco and Hueyozingo.....	1 000
1506	Aztecs against Tetutepec and Quetzaltepec.....	1 000
1507	Aztecs against Hueyozingo or Cholula.....	10 000
1509	Aztecs against Amatlan.....	500
1511	Tezcoco against Tlaxcala.....	2 000
1512	Aztecs against Tlaxiaco.....	2 000
1512	Aztecs against Xuchitepec and Icpatepec.....	1 000
1512	Aztecs against Malinaltepec and Izquixchitlan.....	1 000
1512	Aztecs against Hueyozingo and Atlixco.....	500
1513	Aztecs against Yopizincas.....	500
1512-1515	Numerous raids and campaigns. Indistinguishable in detail. Places vary according to account. Places men- tioned: Quetzalapan, Quimichintepec, Nopala, Tututepec (Northeast of Mexico), Tutupepec (on the south coast), Itztlauquetaloca, Mictlanzingo, Xaltianquizco, Icpaltepec, Quetzaltepec, Cihuapohualoyan, Cuexcom- axtlahuacan .....	25 000
1517	Mexico against northern Culhuas.....	1 000
1517	Aztecs against Tarascans.....	2 000
1517-1519	Allies against Tlaxcala.....	5 000
1517-1519	Allies against numerous revolting provinces. Matzti- tecas and Zapotecs mentioned.....	2 000

