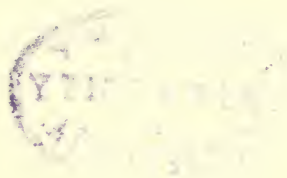

SMITHSONIAN INSTITUTION

BUREAU OF ETHNOLOGY: J. W. POWELL, DIRECTOR

THE MAYA YEAR

BY

CYRUS THOMAS

WASHINGTON

GOVERNMENT PRINTING OFFICE

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PREFATORY NOTE.

By W J McGee.

I.

In many respects the aboriginal culture of the Western Hemisphere attained highest development in Yucatan, the land of the Maya. Here the Spanish explorers found cities of peculiar yet noble architecture; a people of great individuality and native force, yet of refined manners, clothed in woven and dyed cotton stuffs; a definitely organized system of government; a literature and history inscribed on animal and vegetal parchments and carved in stone or painted on walls; and even a highly developed calendaric and chronologic system. Despite the greed and bigotry of the invaders, who saw nothing good beyond their own selfish aims, despite the diversity of tongues and modes of thought, the civilization of the East and that of the West stood so near the same plane as to blend at some points; and the cities of Copan, Palenque, Chichen Itza, and Uxmal came to be known throughout the world of growing civilization.

Although Columbus appears to have encountered representatives of the Maya people in his fourth voyage, it was not until 1517 that the Spaniards, under Francisco Hernandez de Cordova, first landed on the shores of Yucatan. They found that peninsula divided into eighteen or nineteen independent petty states or provinces, each ruled by a hereditary chief, the villages in each province having a subordinate organization under a local ruler, frequently a junior member of the reigning family; the partition of land being communal and changing from year to year. The several provinces were feebly united in a confederation; but this major institutional element was less perfectly developed than among the Aztecs and several other American peoples.

While the appellation "Maya" applies specifically to the aboriginal inhabitants found in Yucatan and their descendants, the same appellation, or the compound term Maya-Kiche, is usually applied to the various peoples of the same linguistic stock, including several tribes in or bordering on Guatemala and Mexico. The languages of these several tribes are closely related and, despite certain common elements

with the Aztec and perhaps with other neighboring stocks, markedly distinct from all others.

The early history of the Maya people is lost in the unwritten past; but from the few remaining Maya and Aztec traditions and codices, from the modern native books of Yucatan and Mexico, and from the early Spanish chronicles it appears that the people were not autochthonous, but entered Yucatan from northward, probably as one of the two principal branches of a race represented also by the Aztecs. Evidence of this relation is found also in the existence of a prominent branch of the Maya linguistic family, the Huastecas, a formerly populous tribe found by the Spaniards on the shores of the Gulf of Mexico about the river Panuco; for the Huastecas play a prominent part in the Aztec traditions and records. The descendants of the ancient Mayas remain an important element in the population of Yucatan. In 1862 it was estimated that there were nearly or quite 200,000 pure-blood Indians and perhaps 100,000 mixed bloods using the Maya tongue.

The Maya language may be characterized as analytic rather than synthetic. In comparison with the native American languages generally it is remarkably simple in construction. It is largely monosyllabic and, like the English, is essentially a language of vocables, the formal grammar being simple and inconspicuous. Phonetically, also, it is highly developed, the Spaniards finding but six phonetic elements new to their tongue. For these reasons the language is remarkably facile. It has long been observed that foreigners acquire the Maya more readily than the Spanish; and the remarkable persistence of the tongue in comparative purity attests an inherent strength which can be ascribed only to its economy as a vehicle of expression. In its simplicity of construction, its wealth of vocabulary and dearth of formal grammar, in the differentiation of its phonetic elements, and in several minor respects the Maya tongue is analogous to the English. So in language as in culture, and indeed in physical development, the Maya may be regarded as the Saxon of the Western Hemisphere.

The graphic system of the ancient Mayas was from the first discriminated by the Spaniards from that of Mexico. It is exemplified in manuscript books and codices, as well as in tablets and inscriptions carved in the stones or painted on the plaster of the walls of their domiciles, palaces, and temples. The system was largely hieroglyphic and known chiefly or solely by priests and nobles. The Spanish chronicles, as well as the records themselves, so far as interpreted, indicate that it was a composite system comprising pictures, ideograms, and phonetic characters. From the rounded forms of the characters the system has been called *calculiform*.

The Maya numeral system is elaborate. Its basis is vigesimal, the cardinal numbers running from one to twenty; and the higher numeration is also vigesimal, each unit comprising twenty of the next lower order and forming one-twentieth of the next higher. According to

Berendt and Brinton, the numeration was definite and expressed in specific terms up to 64,000,000. The vigesimal character and some of the terms indicate that the system was initiated through counting on the fingers, and perhaps also on the toes; but the concepts of the count appear to have interacted with industrial, calendaric, and, perhaps, mythologic concepts, and so the stages in the development of the system, like those of our own Arabic system, are lost, probably never to be regained.

The Maya calendar system recorded by the Spanish conquerors was of highly elaborate character, being determined apparently (1) by the system of numeration, (2) by the seasons, and (3) by the phases of the moon, together with the customary recognition of the day as a primary unit; but in this system, too, the stages of development are sometimes obscure. It is to be observed that hitherto the calendar system of the codices has been, in some respects, inharmonious with that of the modern Maya and Spanish chronicles.

II.

The autographic records or records proper of the Mayas are of two classes: (1) codices written in the aboriginal graphic system, chiefly or wholly before the Conquest; (2) "Books of Chilan Balam" and other manuscripts written in the Maya language but in characters introduced by the early missionaries and conquerors. According to Brinton, Chilan Balam " * * * is not a proper name, but a title, and in ancient times designated the priest who announced the will of the gods and explained the sacred oracles."[1]

The latter records were at one time numerous, probably every village being supplied with one and the name of the village being added to the title; but by far the greater part have disappeared. The earliest were composed before the close of the sixteenth century; many were added during the seventeenth century; but most were written during the later half of the eighteenth century. The records comprise chronicles of events of local or general nature, prophecies, astrologic and divinatory inscriptions, and a variety of matters of little consequence save as indices to modes of thought and methods of expression. Students of the subject are under a profound obligation to Dr. Daniel G. Brinton, of Philadelphia, for the publication of a number of these "books," with translations and notes, in the first volume of his Library of Aboriginal American Literature, under the title, "The Maya Chronicles."

The codices, which are of special importance as autographic records of perhaps the highest aboriginal culture on the Western Hemisphere, existed in considerable numbers at the time of the Conquest. Unhappily their value was not appreciated by the conquistadores, and they fell under the ban of the missionaries and most of them were destroyed

[1] The Maya Chronicles, Philadephia, 1882, p. 70.

or secreted and lost. Diego de Landa, the second bishop of Yucatan, alone burned 27 aboriginal codices among other articles relating to the early condition of the Mayas. A few of these invaluable records are said to remain in private possession, and a very few, preserved in public institutions, are accessible to students.

The accessible codices are formed of a peculiar paper made by macerating the leaves of the maguey (or century plant) and beating or felting the fiber and afterward sizing with a white varnish. Each codex consists of a long sheet, folded backward and forward like a screen or map, or like the ordinary Japanese book; but, unlike the Oriental books, both sides of the paper were used and the sheet was not bound save by attaching boards to the outer folds as in dissected maps. The records comprise figures and characters inscribed or painted in brilliant colors, forming chronicles much like the books of Chilan Balam.

Probably by reason of the proscription of the codices, the few that reached Europe seem to have been conveyed surreptitiously in private hands and to have found their way, accidentally and unnoted, into libraries and museums where three, four, or five of them were subsequently discovered by appreciative students. These are as follows:

1. The Dresden codex, preserved in the Royal Library at Dresden. It comprises 39 leaves, of which 35 are inscribed on both sides and 4 on one side only. Although existing in two unequal parts, this codex was long regarded as a unit; but Förstemann gives strong reasons for considering each part a separate document, either complete in itself or a portion of a distinct book. This codex is reproduced in Lord Kingsborough's work, and was photographed in colors by Förstemann in 1880. It is chiefly from this codex, or from the principal part if there are two, that Dr. Thomas's conclusions are drawn.

2. The Codex Troano, named from its possessor, Don Juan de Tro y Ortolano of Madrid. It comprises 35 leaves or 70 pages, and is probably incomplete. It was reproduced by chromolithography in Paris under the direction of the Abbé Brasseur (de Bourbourg) in 1869.

3. The Codex Cortesianus, named from the family of the conqueror, which is by some supposed to be a second part of the Codex Troano. It is preserved in the Royal Archeologic Museum of Madrid. This codex was reproduced by photography in Paris in 1883, and another edition, in colors, has recently been published.

4. The Codex Peresianus, of the Bibliotheque Nationale, Paris, named by Rosny from an inscription including the word "Perez," which accompanied the document and which is supposed to be the name of a former owner. This is merely a fragment, comprising 11 leaves or 22 pages. A reproduction of this codex also has been published. The inscription is highly artistic.

In addition to the codices and the books of Chilan Balam, autographic records of the Maya are found in mural inscriptions and sculptures,

and many of these have been reproduced by photography and other methods, notably in the excellent drawings by Catherwood. Many of the mural records remain to be transcribed by future students, though they are rapidly disappearing under the influence of a torrid climate and the neglect of an inappreciative population; but these various data for the history of one of the most remarkable peoples of the Western Hemisphere have not been finally systemized. The works of Kingsborough and Catherwood, of Berendt and Brinton, of Thomas, Seler, and Förstemann, and of other students of the Maya are, however, noteworthy and important.

III.

The most primitive peoples take note of days, or rather of the nights by which activity is arrested; and in this recognition of a natural alternation of events, calendars and chronologic systems take root. Most primitive peoples, too, like many of the lower animals, take note of the march of the seasons; and some savage races reckon time rudely by summers, or perhaps rather by winters, during which the activity of the year is arrested. The recognition of these diurnal and annual periods gives rise to solar calendars, though no cases are known in which the solar calendar has become an important element in chronology except in conjunction with other elements.

Many savages, and probably all barbarous peoples, take note of the phases of the moon, and some of them reckon time by moons, although, as in the solar reckoning, it is commonly the dark or change of the moon that fixes the time unit. These lunations form the basis for lunar calendars; but no cases are known in which a lunar calendar alone has determined a complete chronologic system.

A day measures the rotation and a year the revolution of the earth; and while the periods are not commensurable, the discrepancy (something less than a quarter of a day) is so slight as to escape attention save in the higher stages or under peculiar conditions of barbarism, or in civilization. A lunation measures the revolution of the moon, and this cycle is not commensurable with either of the terrestrial movements; yet the earth, sun, and moon are so related in space and in movement that eclipses occasionally occur, and the eclipse, being a striking phenomenon and one mysterious to the primitive mind, gives another basis for time reckoning, and from this basis lunisolar calendars have sprung in different countries; and most important calendars forming the warp of the chronology of the world are of this character. The ancient Chaldeans and the Chinese and the astronomers of ancient Greece carried observation of eclipse cycles to high perfection, and the Chaldean saros of eighteen years, the Chinese tchang and Grecian Metonic cycle of nineteen years, the Grecian Callippic cycle (known long before in China) extending over seventy-six years, the Chaldean naros of six hundred years, and perhaps also the Chinese Great Year, com-

prising four thousand six hundred and seventeen solar years, indicate the delicacy of observation and the accuracy of record at the dawn of civilization; even the Aztecs, neighbors, and kinfolk of the Mayas, were said by Houzeau to have had a lunisolar calendar more exact than the Julian calendar, though this is doubted by many.

The real or apparent motions of the planets have also given rise to calendaric elements, particularly in the astrologic and mystical systems which have clung to the chronologic calendar in all stages of development even up to the present time; and it has been suggested that planetary elements enter subordinately into the Maya calendar. The planetary calendar is not known, however, to alone form a useful basis for chronology.

Although the incommensurability of terrestrial rotation and revolution is inconspicuous, yet when the observation of barbarous peoples is sharpened by chronologic records based on the lunisolar calendar, they perceive that the zenith or sunrise star of the new year gradually changes its apparent position and slowly circles the heavens through the centuries to resume its old relative position in nearly a millennium and a half; and thus a basis is afforded for a highly exact calendar, independent of the eclipse cycle, which may be called sidero-solar. This period is the Sothic cycle of the ancient Egyptians; and Zelia Nuttall finds indications of its recognition by the ancient Aztecs.

While all definite calendars forming the basis of chronology among primitive and cultured peoples have grown out of these astronomic cycles, other elements have commonly been introduced. These elements are of diverse character; days of rest or feasting are fixed through religious observance and market days through domestic needs, and thus weeks of five, seven, thirteen, or some other number of days are impressed on the calendar; seasons of planting and harvesting, with the times of feasting dependent thereon, come to be recognized through their relations to agriculture, and are also impressed on the calendar; and in some cases the time-periods for the maturing of crops and for fetal development appear also to enter the calendaric system. So through the multiplication of astronomic bases and through the infusion of artificial bases, the calendars of cultured peoples become highly complex and long periods are required for their development.

Among the results of this complexity of calendars may be mentioned a tendency toward the development of mysticism, a tendency exemplified by the astrology of our own budding civilization and the hieroglyphics of Egypt and Yucatan, which were understood of the few only. Indeed, even in our own day, though the calendaric bases are free to all, it is but the few who take the time to comprehend them while the many are content with the applications wrought out for their use. Thus the development of calendars marks an early stage in that differentiation of function among individuals which began in savagery, waxed in barbarism and earlier civilization, and culminates in enlightenment.

The hybrid origin and mystical character of early calendaric systems is constantly to be borne in mind in the study of the symbols in which the aboriginal calendars of the Western Hemisphere are recorded.

The early Spanish chronicles and the books of Chilan Balam, written in the Maya language but in Spanish characters, indicate that the native calendar system of Yucatan was highly elaborate.

The days were grouped in two ways: First, they were named in four series of five each up to 20, this grouping probably representing an outgrowth of the vigesimal system of numeration, though the group was called *u* (moon or month); and 18 of these months, with five intercalary days, formed the year, which was apparently determined (as indicated by the intercalation) by more or less refined astronomic observation. Thus there were 73 five-day periods (which might be called "weeks" were not that term preoccupied in a less desirable way) in a year, on four and only four of which the year might begin; and accordingly (1) these four days—Kan, Muluc, Ix, Cauac—were especially designated as dominical days or "year-bearers," and also came to hold special place in religious and domestic observance; and (2) the years were grouped in series of four, each distinguished by the day on which it began, "Year Kan," "Year Muluc," etc. Thus this grouping of the days would seem, except for the name "month," to represent a nearly pure solar calendar modified by arbitrary time distinctions springing originally from the vigesimal system of counting, both calendar and counting being strengthened and more firmly fixed by the interaction. In the second place the days were numbered in groups of 13, and such a group is commonly called by students of the Maya calendar a "week", and 28 of these "weeks," with one day added, formed the year. This arrangement gave rise (1) to a series of 13 years, forming a period called by the Mayas a "katun of days" and by the Spaniards an "indiction;" and (2) to a longer series of 52 years elapsing before a "year-bearer" of given name and number would again form the new year. The origin of the essential part of this arrangement is obscure; possibly the primary period of 13 days represents a semilunation (perhaps introduced from the sacred year); but it is also possible that it represents a curious concept found among various primitive and some higher peoples, in which seven is a mystical or perfect number that on doubling (or recounting) becomes 13, the central unit in the group of objects or directions being reckoned in the first counting but not in the second. But whatsoever the origin of this number, the other elements in the grouping grow out of the arbitrary adjustment of the initial element to the solar year. It is significant that a 52-year cycle was recognized among other aboriginal peoples of the Western Hemisphere.

In addition to the arrangement growing out of the grouping of days, the years were grouped arbitrarily either through the vigesimal system

of counting or for some obscure reason in such manner as to give a long cycle recorded in the Spanish chronicles and in the books of Chilan Balam, though there is doubt as to its duration. According to some students 20 years were grouped as a "katun" which was divided into five series of four years each (independent of the four-year groups determined by the dominical days), called "tzuc" by the Mayas, "lustros" by the Spaniards; and it was the custom to record or verify the chronology by erecting carved stones, each called like the period a "katun," at the end of each twentieth year, in a historical monument. Now since the days of the "week" were numbered from 1 to 13 and the years of the "katun" from 1 to 20, a new "katun" could not commence on the same number-day until a period of 13 x 20 years had elapsed; and in this way a cycle of 260 years was formed. This period, developed from the chronicles by Brinton, was called an "ahau katun," or chief cycle, collectively, though each 20-year period within it bore the same name; and "each * * * was represented in the native calendar by the picture or portrait of a particular personage who in some way was identified with the katun, and his name was given to it."* According to later students, notably Juan Pio Perez and Dr. Thomas, the katun comprised 24 years, which would make the duration of the ahau katun 312 years. The 13 katuns in this long cycle were numbered in the following curious order, which has been a subject of much discussion—

13, 11, 9, 7, 5, 3, 1, 12, 10, 8, 6, 4, 2.

The foregoing grouping of days and years constitutes what may be called the secular calendar and the basis for the chronology of the Mayas; but there was another and more mystical or sacred calendar system employed to some extent, which is by some regarded as the original or essential system. In this system the 13-day "weeks" were grouped in series of 20 forming a 260-day period called the sacred year, or what is known among the Zuñis, according to Cushing, as the "kernel of the year." There is some question whether these 260-day periods were used independently as a consecutive time-measure parallel though not coincident with the secular calendar; but it seems more probable that this esoteric time-measure grew out of industrial and domestic requirements formulated by priests or chiefs, and that it represented an arbitrarily chosen period of 10 lunations (20 semi-lunations) in each year during which crops were developed or gestation was completed, or during which ceremonies connected with these natural processes ran their course. Whatever be the origin of this subordinate calendaric system, there seems insufficient reason for believing that it subserved important chronologic purposes.

* Maya Chronicles, p. 58.

It is clearly to be understood that knowledge of the calendaric system of the Mayas is derived chiefly from the Spanish and modern Maya chronicles rather than from the codices. Hitherto it has not been known that the year of the codices included 365 days; and it is Dr. Thomas' purpose in the present publication to demonstrate that, properly interpreted, the Dresden codex comprises records of 365-day years. In thus harmonizing the autographic chronicles of the ancient Mayas with the sometimes ambiguous chronicles of the Spaniards and modern Mayas, Dr. Thomas not only makes a useful addition to our knowledge of a highly interesting people but corroborates strongly the authenticity of the codices and the accuracy of both series of chronicles.

THE MAYA YEAR

By Cyrus Thomas

INTRODUCTION.

According to the earlier authors whose works have been preserved, the calendar system found in use among most of the tribes of Mexico and Central America at the time of the Conquest was as follows: The year consisted of eighteen months of twenty days each, with five supplemental days added at the close of the eighteenth month, or of 365 days. Each day of the month had a name, and they were also numbered, but up to thirteen only, the year being thus divided into what may be called "weeks" of thirteen days each. This peculiar arrangement resulted in forming four year-series—that is, years commencing with four different days. As the years, without some arbitrary change, could begin only with these four days, following one another in definite order, they are denominated the "dominical days," or "year-bearers."

An examination of the codices has shown that the months referred to in the time series contain twenty days, each day having its distinct symbol and all numbered as above stated; and that eighteen months were counted to the year. If, therefore, it can be shown that the year used consisted of 365 days the system of the codices will be brought into complete harmony with the authorities referred to.

The object of this paper is to present what is believed to be clear and positive proof that the time system of the Dresden codex is based on the year of 365 days, which necessarily results in forming four series of years, each with its particular year-bearer or dominical day. Some evidence is also presented to show that the same calendar system was used in the inscriptions at Palenque, Lorillard, and Tikal.

I desire to acknowledge here my indebtedness to Dr. E. Förstemann, of Dresden, for his suggestion to me, in a private communication, that a more thorough examination of the series on plates 46–50 of the Dresden codex might result in determining the length of the year.

Chapter I.

DISCUSSION OF THE TIME SERIES OF THE DRESDEN CODEX.

A somewhat extended discussion of the numerals on plates 46–50 of the Dresden codex will be found on pages 294–305 of the paper entitled "Notes on the Maya Codices," in the Sixth Annual Report of the Bureau of Ethnology. There is, however, one point connected with these plates which is of more importance than anything else found on them, but of which only incidental mention was made. This relates to the month symbols and the numbers attached thereto. Since writing that article I have discovered the significance of these numbers, and from them have obtained positive evidence that, in this instance, the author of the codex refers to a year of 365 days (which requires the addition of five supplementary days to the year of eighteen 20-day months), and to the four year-series having the four different "year-bearers." To avoid going over the discussion again, the reader is referred to that paper. It is necessary, however, in order that what follows may be understood, to repeat in part the statements made therein. As pointed out in that paper, these five plates are peculiar, and seem to have no direct relation to any other part of the codex.

In the upper left-hand corner of each plate there are four day columns, all more or less injured. Each column evidently contained originally thirteen days, or, more correctly speaking, the symbol for one day repeated thirteen times. In every case the day in the first (left-hand) column and that in the third column are the same. As the numbers attached to them are absolutely unreadable in Kingsborough and partly obliterated in the photograph, I give here restorations (table 1) for the benefit of those studying this codex. This restoration is easily made by finding the order of the series, which can be obtained from plates 49 and 50 of the photographic copy.

The red numerals at the bottom of each of these plates of the codex are as follows:

11	4	12	0
16	10	10	8

The upper numbers stand for months, the lower ones for days. These are counters used to denote the intervals between the corresponding days in the columns, thus: From III Cib (first column, plate 46) to II Cimi (second column, same plate) is 4 months and 10 days; from II Cimi to V Cib (third column) is 12 months and 10 days; from V Cib to XIII Kan (fourth column) is 8 days; and from XIII Kan (last column, plate 46) to II Ahau (first column, plate 47) is 11 months and 16 days. This holds good throughout to the last column on plate 50, using the first day in each column. It is also true if the second day or any other day in the column is used, provided the count is carried through the entire

series with the corresponding (horizontal) days; that is to say, if the count begins with the fifth day of the first column of plate 46, the fifth day of each column must be used successively, taking the plates in the order of numbering. This shows that the whole is one continuous series, and that after the count has gone through the first cross line (or top line) of the five plates it goes back to the commencement of the second line, then to the third, next to the fourth, and so on until the last name in the right hand column of plate 50 is reached.

For present purposes it will be necessary to use only one of these lines or series. The first or top days of the columns, commencing with III Cib (or 3 Cib),* may therefore be selected.

It is necessary now to give the names of the months and the numbers attached to them exactly in the order in which they stand on the plates, placing over them the corresponding first days of the columns above (see table 2). The counters or intervals are also added below. It is to be understood that the counter below a column indicates the interval between the day over the preceding column and the day over the column under which it is found. For example, 4 (months) and 10 (days) under the second column of plate 46 indicate the interval between 3 Cib, first column, and 2 Cimi, second column.

In this table the portions of the series found on a plate are given together, with the plate number over them, as "plate 46," "plate 47," etc. The upper cross line of each plate is the upper line of days of the day columns; the next line below this gives the months and numbers of the days of the month of the first month series. These two upper lines and the two lines at the bottom, consisting of months and days and forming the counters or intervals, are all that will be used in the explanation which follows.

In order that the reader may observe the positions which the symbols corresponding with these names and numbers occupy on the plates, a facsimile of plate 50 is introduced (plate 1).

Attention should be confined to the left half of the plate. The two cross lines of open dots and short lines at the bottom (colored in the original) are the counters referred to. Immediately over these is the bottom line of hieroglyphs corresponding with the lowest line of months on plate 50 as given in table 2, viz, "[20] Xul – 10 Zac – 15 Tzec – 3 Xul." The sixth cross line of hieroglyphs, on plate 50, counting from the bottom upward, corresponds with the second line of months as given in table 2, viz, "15 Cumhu – [20] Tzec – 10 Kayab – 18 Kayab." Then, moving up over the lines of black numerals to the fifth line of hieroglyphs above them, which line stands immediately below the day columns, we find the symbols representing the upper line of months in the table, viz, "10 Kankin – [20] Cumhu – 5 Mac – 13 Mac."

* For convenience the Arabic numerals will be used throughout this paper, except where necessity requires the introduction of Roman notation.

Table 1.

DAY COLUMNS OF THE DRESDEN CODEX (RESTORED).

PLATE 46.

III Cib	II Cimi	V Cib	XIII Kan
XI Cib	X Cimi	XIII Cib	VIII Kan
VI Cib	V Cimi	VIII Cib	III Kan
I Cib	XIII Cimi	III Cib	XI Kan
IX Cib	VIII Cimi	XI Cib	VI Kan
IV Cib	III Cimi	VI Cib	I Kan
XII Cib	XI Cimi	I Cib	IX Kan
VII Cib	VI Cimi	IX Cib	IV Kan
II Cib	I Cimi	IV Cib	XII Kan
X Cib	IX Cimi	XII Cib	VII Kan
V Cib	IV Cimi	VII Cib	II Kan
XIII Cib	XII Cimi	II Cib	X Kan
VIII Cib	VII Cimi	X Cib	V Kan

PLATE 47.

II Ahau	I Oc	IV Ahau	XII Lamat
X Ahau	IX Oc	XII Ahau	VII Lamat
V Ahau	IV Oc	VII Ahau	II Lamat
XIII Ahau	XII Oc	II Ahau	X Lamat
VIII Ahau	VII Oc	X Ahau	V Lamat
III Ahau	II Oc	V Ahau	XIII Lamat
XI Ahau	X Oc	XIII Ahau	VIII Lamat
VI Ahau	V Oc	VIII Ahau	III Lamat
I Ahau	XIII Oc	III Ahau	XI Lamat
IX Ahau	VIII Oc	XI Ahau	VI Lamat
IV Ahau	III Oc	VI Ahau	I Lamat
XII Ahau	XI Oc	I Ahau	IX Lamat
VII Ahau	VI Oc	IX Ahau	IV Lamat

PLATE 48.

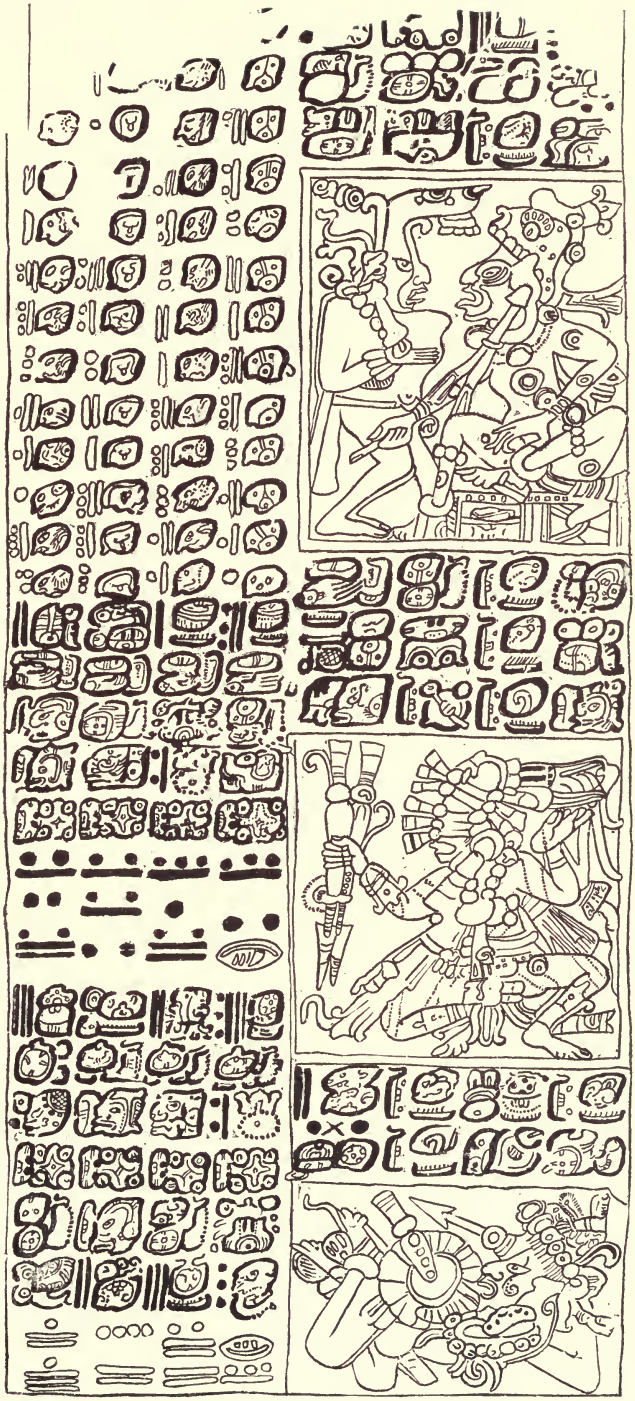
I Kan	XIII Ix	III Kan	XI Eb
IX Kan	VIII Ix	XI Kan	VI Eb
IV Kan	III Ix	VI Kan	I Eb
XII Kan	XI Ix	I Kan	IX Eb
VII Kan	VI Ix	IX Kan	IV Eb
II Kan	I Ix	IV Kan	XII Eb
X Kan	IX Ix	XII Kan	VII Eb
V Kan	IV Ix	VII Kan	II Eb
XIII Kan	XII Ix	II Kan	X Eb
VIII Kan	VII Ix	X Kan	V Eb
III Kan	II Ix	V Kan	XIII Eb
XI Kan	X Ix	XIII Kan	VIII Eb
VI Kan	V Ix	VIII Kan	III Eb

PLATE 49.

XIII Lamat	XII Ezanab	II Lamat	X Cib
VIII Lamat	VII Ezanab	X Lamat	V Cib
III Lamat	II Ezanab	V Lamat	XIII Cib
XI Lamat	X Ezanab	XIII Lamat	VIII Cib
VI Lamat	V Ezanab	VIII Lamat	III Cib
I Lamat	XIII Ezanab	III Lamat	XI Cib
IX Lamat	VIII Ezanab	XI Lamat	VI Cib
IV Lamat	III Ezanab	VI Lamat	I Cib
XII Lamat	XI Ezanab	I Lamat	IX Cib
VII Lamat	VI Ezanab	IX Lamat	IV Cib
II Lamat	I Ezanab	IV Lamat	XII Cib
X Lamat	IX Ezanab	XII Lamat	VII Cib
V Lamat	IV Ezanab	VII Lamat	II Cib

PLATE 50.

XII Eb	XI Ik	I Eb	IX Ahau
VII Eb	VI Ik	IX Eb	IV Ahau
II Eb	I Ik	IV Eb	XII Ahau
X Eb	IX Ik	XII Eb	VII Ahau
V Eb	IV Ik	VII Eb	II Ahau
XIII Eb	XII Ik	II Eb	X Ahau
VIII Eb	VII Ik	X Eb	V Ahau
III Eb	II Ik	V Eb	XIII Ahau
XI Eb	X Ik	XIII Eb	VIII Ahau
VI Eb	V Ik	VIII Eb	III Ahau
I Eb	XIII Ik	III Eb	XI Ahau
IX Eb	VIII Ik	XI Eb	VI Ahau
IV Eb	III Ik	VI Eb	I Ahau



COPY OF PLATE 50 DRESDEN CODEX.

Where there are no numbers attached to the months, the twentieth or last day is to be understood, as, for example, in the last line above mentioned, where the month "Cumhu" is given without any number, 20 Cumhu is to be understood. We have prefixed the numeral in brackets, thus indicating its absence in the original.

As we shall have occasion to refer to it repeatedly, I introduce the compound calendar (table 3) adopted in my previous works to avoid the necessity of writing out the long series of days of the years referred to. But instead of commencing with the usual year-bearers, Kan, Muluc, Ix, Cauac, this table, as will be evident to those familiar with the Maya calendar, begins with the days with which, in the usual plan, the months close; viz, Akbal, Lamat, Ben, Ezanab. The reason for this will be given further on.

For a full explanation of the Maya calendar the reader is referred to my previous works*; the following brief explanation is given for the benefit of readers who may not have an opportunity of referring to these works.

The Maya year, according to the early Spanish authors, contained three hundred and sixty-five days and consisted of two unequal parts, as follows: Three hundred and sixty days, or the year proper, divided into eighteen months of twenty days each; and the five intercalary days required to complete the number three hundred and sixty-five added at the end.

The eighteen months were named and numbered as follows: 1 Pop, 2 Uo, 3 Zip, 4 Tzoz, 5 Tzec, 6 Xul, 7 Yaxkin, 8 Mol, 9 Chen, 10 Yax, 11 Zac, 12 Ceh, 13 Mac, 14 Kankin, 15 Muan (or Moan), 16 Pax, 17 Kayab, 18 Cumhu (or Cumku). As the year always commenced with the month Pop, the others following in the order given, the number of each is readily ascertained from the name, and the name from the number.

Each month consisted of twenty days, named as follows: Kan, Chicchan, Cimi, Manik, Lamat, Muluc, Oc, Chuen, Eb, Ben (or Been), Ix, Men, Cib, Caban, Ezanab, Cauac, Ahau, Ymix, Ik, Akbal. The order or sequence here given was always maintained, though the month did not always begin with the same day, since, according to the peculiar arrangement of the calendar, it might begin with Kan, Muluc, Ix, or Cauac; or, as appears to be the rule in the Dresden codex and as given in our table 3, with Akbal, Lamat, Ben, and Ezanab.† If it began with Kan, the second day would be Chicchan, the others following as given above; if with Muluc, then Oc would be the second day, Chuen the third, and so on; if with Ix, then Men would be the second day,

* "A Study of the Manuscript Troano" (Contributions to North American Ethnology, Vol. v), 1882, pp. 7–12; "Aids to the Study of the Maya Codices," 6th Ann. Rep. Bur. Eth., 1888, p. 275.

† It is probable, as will be shown hereafter, that this system was derived from the Tzental calendar.

Table 2.

NAMES AND NUMBERS OF THE MONTHS.

PLATE 46.

3 Cib.	2 Cimi	5 Cib	13 Kan
4 Yaxkin	14 Zac	19 Tzec	7 Xul
		1	1
11	16	10	11
16	6	16	4
8 Zac	19 Muan	4 Yax	12 Yax
19 Kayab	4 Tzoz	14 Pax	2 Kayab
11 months.	4 months.	12 months.	0 months.
16 days.	10 days.	10 days.	8 days.

PLATE 47.

2 Ahau	1 Oc	4 Ahau	12 Lamat
3 Cumhu	8 Tzoz	18 Pax	6 Kayab
2	2	3	3
5	9	4	4
0	10	0	8
3 Tzoz	13 Mol	18 Uo	6 Zip
13 Yax	3 Muan	8 Chen	16 Chen
11 months.	4 months.	12 months.	0 months.
16 days.	10 days.	10 days.	8 days.

PLATE 48.

1 Kan	13 Ix	3 Kan	11 Eb
17 Yax	7 Muan	12 Chen	[20] Chen*
3	4	4	4
16	2	15	15
3	14	4	12
2 Muan	7 Pop	17 Mac	5 Kankin
7 Zip	17 Yaxkin	2 Uo	10 Uo
11 months.	4 months.	12 months.	0 months.
16 days.	10 days.	10 days.	8 days.

PLATE 49.

13 Lamat	12 Ezanab	2 Lamat	10 Cib
11 Zip	1 Mol	6 Uo	14 Uo
5	5	6	6
9	13	8	8
8	18	8	16
16 Yaxkin	6 Ceh	11 Xul	19 Xul
6 Kankin	16 Cumhu	1 Mac	9 Mac
11 months.	4 months.	12 months.	0 months.
16 days.	10 days.	10 days.	8 days.

PLATE 50.

12 Eb	11 Ik	1 Eb	9 Ahau
10 Kankin	[20] Cumhu†	5 Mac	13 Mac
7	7	8	8
2	7	1	2
12	2	12	0
15 Cumhu	(20) Tzec	10 Kayab	18 Kayab
(20) Xul‡	10 Zac	15 Tzec	3 Xul
11 months.	4 months.	12 months.	0 months.
16 days.	10 days.	10 days.	8 days.

*The symbol at this point in the codex is unquestionably that of the month Yax with a prefix in the form of two small circles. The proper date is as unquestionably 20 Chen.

†The symbol at this point is that of the month Pop with the double circular prefix, but the proper date is 20 Cumhu.

‡The symbol at this point, as may be seen by referring to the lower left-hand corner character of plate I, is that of the month Xul with the double circular prefix. The correct date is 20 Xul. Dr. Seler believes that this prefix is a symbol for 20. That it is used in this codex and on the Palenque tablet where 20 is applicable, is undoubtedly true; yet the fact that in two instances out of three it is attached to the symbol of the month which follows, and not to that showing the true date, throws some doubt on this supposition. As the count in the series gives the true date in the two instances where the symbol does not, it is thought better to give this than to insert the name of the latter, as this might lead the reader astray.

Cib the third, and so on to Akbal; then followed Kan, just as we would name the seven days of our week, commencing, for instance, with Wednesday, then Thursday, Friday, Saturday, Sunday, Monday, etc. As each month contained twenty days, each having a name, it follows that each month of a given year would begin with the first day of that year. If the year began with Kan, the last day of the eighteenth month—Cumhu—would, as a matter of course, be Akbal, the last of the twenty.

The five added days were named in regular order, following the close of the month Cumhu, and in the year beginning with Kan would be Kan, Chicchan, Cimi, Manik, and Lamat. The next day—Muluc—would begin the following year, and hence all the months of that year

Table 3.

DAYS AND MONTHS OF THE FOUR SERIES OF YEARS.

Akbal column.	Lamat column.	Ben column.	Ezanab column.	1 14	2 15	3 16	4 17	5 18	6	7	8	9	10	11	12	13	Numbers of the months.
																	Days of month.
Akbal	Lamat	Ben	Ezanab	1	8	2	9	3	10	4	11	5	12	6	13	7	1
Kan	Muluc	Ix	Cauac	2	9	3	10	4	11	5	12	6	13	7	1	8	2
Chicchan	Oc	Men	Ahau	3	10	4	11	5	12	6	13	7	1	8	2	9	3
Cimi	Chuen	Cib	Ymix	4	11	5	12	6	13	7	1	8	2	9	3	10	4
Manik	Eb	Caban	Ik	5	12	6	13	7	1	8	2	9	3	10	4	11	5
Lamat	Ben	Ezanab	Akbal	6	13	7	1	8	2	9	3	10	4	11	5	12	6
Muluc	Ix	Cauac	Kan	7	1	8	2	9	3	10	4	11	5	12	6	13	7
Oc	Men	Ahau	Chicchan	8	2	9	3	10	4	11	5	12	6	13	7	1	8
Chuen	Cib	Ymix	Cimi	9	3	10	4	11	5	12	6	13	7	1	8	2	9
Eb	Caban	Ik	Manik	10	4	11	5	12	6	13	7	1	8	2	9	3	10
Ben	Ezanab	Akbal	Lamat	11	5	12	6	13	7	1	8	2	9	3	10	4	11
Ix	Cauac	Kan	Muluc	12	6	13	7	1	8	2	9	3	10	4	11	5	12
Men	Ahau	Chicchan	Oc	13	7	1	8	2	9	3	10	4	11	5	12	6	13
Cib	Ymix	Cimi	Chuen	1	8	2	9	3	10	4	11	5	12	6	13	7	14
Caban	Ik	Manik	Eb	2	9	3	10	4	11	5	12	6	13	7	1	8	15
Ezanab	Akbal	Lamat	Ben	3	10	4	11	5	12	6	13	7	1	8	2	9	16
Cauac	Kan	Muluc	Ix	4	11	5	12	6	13	7	1	8	2	9	3	10	17
Ahau	Chicchan	Oc	Men	5	12	6	13	7	1	8	2	9	3	10	4	11	18
Ymix	Cimi	Chuen	Cib	6	13	7	1	8	2	9	3	10	4	11	5	12	19
Ik	Manik	Eb	Caban	7	1	8	2	9	3	10	4	11	5	12	6	13	20

would begin with Muluc. Muluc being the first day, Lamat would necessarily be the last, and the five added days at the end of the year would be Muluc, Oc, Chuen, Eb, and Ben, making Ix the first of the following year. Then, Ix being the first, Ben would be the last day; and the five added days being Ix, Men, Cib, Caban, and Ezanab, the following year would begin with Cauac. Cauac in turn being the first day, Ezanab would be the last, and the five added days would then be Cauac, Ahau, Ymix, Ik, and Akbal, making Kan the first of the next year, thus completing the series in four years, and beginning anew with the fifth.* The numbering of the days, however, was peculiar,

* It must be borne in mind that this description applies to the usual Maya calendar; and that to adapt it to what, as stated above, appears to be the rule in the Dresden codex, wherever Kan, Muluc, Ix, and Cauac are spoken of as dominical days, or first days of the month, Akbal, Lamat, Ben, and Ezanab must be substituted. Therefore the month given would begin with 1 Akbal and end with 7 Ik.

and did not correspond with the number in a month, but was limited to thirteen. To illustrate this, a list of the days of one month, numbered according to this method, commencing with 1 Kan (see table 4) is introduced.

Table 4.

DAYS OF THE MONTH.

1 Kan	6 Muluc	11 Ix	3 Cauac
2 Chicchan	7 Oc	12 Men	4 Ahau
3 Cimi	8 Chuen	13 Cib	5 Ymix
4 Manik	9 Eb	1 Caban	6 Ik
5 Lamat	10 Ben	2 Ezanab	7 Akbal.

As will be seen on inspection of this table, the year in this instance commences with Kan, the other nineteen days, following in regular order as heretofore given, numbered consecutively from one to thirteen, then commencing again with one, the month ending with 7 Akbal. The second month, Uo, begins with 8 Kan; the day numbered 13 is now Muluc, and is followed by 1 Oc, and so on to the end of the year. The last day of Cumhu in this case (in which the year begins with 1 Kan) will be 9 Akbal, and the last of the five intercalary days will be 1 Lamat; it follows, therefore, that the first day of the next year will be 2 Muluc. Running through this second year in the same way, commencing it with 2 Muluc, followed by 3 Oc, 4 Chuen, and so on, it is found that the third year will begin with 3 Ix; continuing this process, it may be ascertained that the fourth year will commence with 4 Cauac, the fifth with 5 Kan, the sixth with 6 Muluc, the seventh with 7 Ix, the eighth with 8 Cauac, the ninth with 9 Kan, the tenth with 10 Muluc, the eleventh with 11 Ix, the twelfth with 12 Cauac, the thirteenth with 13 Kan, the fourteenth with 1 Muluc, the fifteenth with 2 Ix, the sixteenth with 3 Cauac, and so on.

It is evident from this enumeration that no year, after the first, commences with a day numbered 1 until thirteen have been completed, thus forming a period of thirteen years, or, as it is designated, "A week of years" or "Indiction." By continuing the above process, it is found that no year will again commence with 1 Kan until 52 (or 13 by 4) are completed.

The accompanying table for one year (table 5) shows the order of the numbers attached to the days. This, however, like table 3, commences with what, in the usual method of counting, is the last instead of the first day of the month—in this case Akbal instead of Kan is the initial day.

The object in view at present is to prove from the codices the following points, viz, *first*, that the year consisted of 365 days, which number was made up by adding five days at the end of the eighteenth month; *second*, that the four year-series, commencing with the four different

year-bearers, was the system followed. If these points can be demonstrated, the calendar system of the codices will be settled beyond dispute, and another link connecting this ancient script with the Mayas will be furnished.

As the demonstration of these points depends chiefly on the series running through plates 46–50 of the Dresden codex, in which the months are introduced, thus fixing absolutely the dates, there is

Table 5.

THE MONTHS, DAYS, AND NUMERALS FOR ONE YEAR.

Months.	Pop.	Uo.	Zip.	Tzoz.	Tzec.	Xul.	Yaxkin.	Mol.	Chen.	Yax.	Zac.	Ceh.	Mac.	Kankin.	Muan.	Pax.	Kayab.	Cumhu.
Days.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Akbal	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3
Kan	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4
Chicchan	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5
Cimi	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6
Manik	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7
Lamat	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8
Muluc	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9
Oc	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10
Chuen	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11
Eb	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12
Ben	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13
Ix	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1
Men	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2
Cib	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3
Caban	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4
Ezanab	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5
Cauac	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6
Ahau	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7
Ymix	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8
Ik	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9

Intercalary days	Akbal	10
	Kan	11
	Chicchan	12
	Cimi	13
	Manik	1

inserted in table 6 a continuous series of days running through the eight years and two months covered by one line of the series above mentioned —that is, one line commencing with the left column of plate 46 and ending with the right column of plate 50. This is given because it will require considerable study and familiarity with this complicated system to follow the discussion, if table 3 (page 21) alone is used, though it will be necessary to refer to that table to understand some of the statements given below.

Table 6.

A CONTINUOUS SERIES OF DAYS FOR EIGHT YEARS.

Days.	*Months.*	*Days.*	*Months.*	*Days.*	*Months.*
9 Lamat	Pop	9 Ben		9 Ezanab	
10 Muluc		10 Ix		10 Cauac	
11 Oc		11 Men		11 Ahau	
12 Chuen		12 Cib		12 Ymix	
13 Eb		13 Caban		13 Ik	
1 Ben		1 Ezanab		1 Akbal	
2 Ix		2 Cauac		2 Kan	
3 Men		3 Ahau		3 Chicchan	
4 Cib		4 Ymix		4 Cimi	
5 Caban		5 Ik		5 Manik	
6 Ezanab		6 Akbal		6 Lamat	Mol
7 Cauac		7 Kan		7 Muluc	
8 Ahau		8 Chicchan		8 Oc	
9 Ymix		9 Cimi		9 Chuen	
10 Ik		10 Manik		10 Eb	
11 Akbal		11 Lamat	Tzec	11 Ben	
12 Kan		12 Muluc		12 Ix	
13 Chicchan		13 Oc		13 Men	
1 Cimi		1 Chuen		1 Cib	
2 Manik		2 Eb		2 Caban	
3 Lamat	Uo	3 Ben		3 Ezanab	
4 Muluc		4 Ix		4 Cauac	
5 Oc		5 Men		5 Ahau	
6 Chuen		6 Cib		6 Ymix	
7 Eb		7 Caban		7 Ik	
8 Ben		8 Ezanab		8 Akbal	
9 Ix		9 Cauac		9 Kan	
10 Men		10 Ahau		10 Chicchan	
11 Cib		11 Ymix		11 Cimi	
12 Caban		12 Ik		12 Manik	
13 Ezanab		13 Akbal		13 Lamat	Chen
1 Cauac		1 Kan		1 Muluc	
2 Ahau		2 Chicchan		2 Oc	
3 Ymix		3 Cimi		3 Chuen	
4 Ik		4 Manik		4 Eb	
5 Akbal		5 Lamat	Xul	5 Ben	
6 Kan		6 Muluc		6 Ix	
7 Chicchan		7 Oc		7 Men	
8 Cimi		8 Chuen		8 Cib	
9 Manik		9 Eb		9 Caban	
10 Lamat	Zip	10 Ben		10 Ezanab	
11 Muluc		11 Ix		11 Cauac	
12 Oc		12 Men		12 Ahau	
13 Chuen		13 Cib		13 Ymix	
1 Eb		1 Caban		1 Ik	
2 Ben		2 Ezanab		2 Akbal	
3 Ix		3 Cauac		3 Kan	
4 Men		4 Ahau		4 Chicchan	
5 Cib		5 Ymix		5 Cimi	
6 Caban		6 Ik		6 Manik	
7 Ezanab		7 Akbal		7 Lamat	Yax
8 Cauac		8 Kan		8 Muluc	
9 Ahau		9 Chicchan		9 Oc	
10 Ymix		10 Cimi		10 Chuen	
11 Ik		11 Manik		11 Eb	
12 Akbal		12 Lamat	Yaxkin	12 Ben	
13 Kan		13 Muluc		13 Ix	
1 Chicchan		1 Oc		1 Men	
2 Cimi		2 Chuen		2 Cib	
3 Manik		3 Eb		3 Caban	
4 Lamat	Tzoz	4 Ben		4 Ezanab	
5 Muluc		5 Ix		5 Cauac	
6 Oc		6 Men		6 Ahau	
7 Chuen		7 Cib		7 Imix	
8 Eb		8 Caban		8 Ik	

Days.	*Months.*
9 Akbal	
10 Kan	
11 Chicchan	
12 Cimi	
13 Manik	
1 Lamat	Zac
2 Muluc	
3 Oc	
4 Chuen	
5 Eb	
6 Ben	
7 Ix	
8 Men	
9 Cib	
10 Caban	
11 Ezanab	
12 Cauac	
13 Ahau	
1 Ymix	
2 Ik	
3 Akbal	
4 Kan	
5 Chicchan	
6 Cimi	
7 Manik	
8 Lamat	Ceh
9 Muluc	
10 Oc	
11 Chuen	
12 Eb	
13 Ben	
1 Ix	
2 Men	
3 Cib	
4 Caban	
5 Ezanab	
6 Cauac	
7 Ahau	
8 Ymix	
9 Ik	
10 Akbal	
11 Kan	
12 Chicchan	
13 Cimi	
1 Manik	
2 Lamat	Mac
3 Muluc	
4 Oc	
5 Chuen	
6 Eb	
7 Ben	
8 Ix	
9 Men	
10 Cib	
11 Caban	
12 Ezanab	
13 Cauac	
1 Ahau	
2 Ymix	
3 Ik	
4 Akbal	
5 Kan	
6 Chicchan	
7 Cimi	
8 Manik	
9 Lamat	Kankin
10 Muluc	
11 Oc	
12 Chuen	

Days.	*Months.*
13 Eb	
1 Ben	
2 Ix	
3 Men	
4 Cib	
5 Caban	
6 Ezanab	
7 Cauac	
8 Ahau	
9 Ymix	
10 Ik	
11 Akbal	
12 Kan	
13 Chicchan	
1 Cimi	
2 Manik	
3 Lamat	Muan
4 Muluc	
5 Oc	
6 Chuen	
7 Eb	
8 Ben	
9 Ix	
10 Men	
11 Cib	
12 Caban	
13 Ezanab	
1 Cauac	
2 Ahau	
3 Ymix	
4 Ik	
5 Akbal	
6 Kan	
7 Chicchan	
8 Cimi	
9 Manik	
10 Lamat	Pax
11 Muluc	
12 Oc	
13 Chuen	
1 Eb	
2 Ben	
3 Ix	
4 Men	
5 Cib	
6 Caban	
7 Ezanab	
8 Cauac	
9 Ahau	
10 Ymix	
11 Ik	
12 Akbal	
13 Kan	
1 Chicchan	
2 Cimi	
3 Manik	
4 Lamat	Kayab
5 Muluc	
6 Oc	
7 Chuen	
8 Eb	
9 Ben	
10 Ix	
11 Men	
12 Cib	
13 Caban	
1 Ezanab	
2 Cauac	
3 Ahau	

	Days.	*Months.*
	4 Ymix	
	5 Ik	
	6 Akbal	
	7 Kan	
	8 Chicchan	
	9 Cimi	
	10 Manik	
	11 Lamat	Cumhu
	12 Muluc	
	13 Oc	
	1 Chuen	
	2 Eb	
	3 Ben	
	4 Ix	
	5 Men	
	6 Cib	
	7 Caban	
	8 Ezanab	
	9 Cauac	
	10 Ahau	
	11 Ymix	
	12 Ik	
	13 Akbal	
	1 Kan	
	2 Chicchan	
	3 Cimi	
	4 Manik	
Five intercalary days.	5 Lamat	
	6 Muluc	
	7 Oc	
	8 Chuen	
	9 Eb	
	10 Ben	Pop
	11 Ix	
	12 Men	
	13 Cib	
	1 Caban	
	2 Ezanab	
	3 Cauac	
	4 Ahau	
	5 Ymix	
	6 Ik	
	7 Akbal	
	8 Kan	
	9 Chicchan	
	10 Cimi	
	11 Manik	
	12 Lamat	
	13 Muluc	
	1 Oc	
	2 Chuen	
	3 Eb	
	4 Ben	Uo
	5 Ix	
	6 Men	
	7 Cib	
	8 Caban	
	9 Ezanab	
	10 Cauac	
	11 Ahau	
	12 Ymix	
	13 Ik	
	1 Akbal	
	2 Kan	
	3 Chicchan	
	4 Cimi	
	5 Manik	
	6 Lamat	

Days.	*Months.*
7 Muluc	
8 Oc	
9 Chuen	
10 Eb	
11 Ben	Zip
12 Ix	
13 Men	
1 Cib	
2 Caban	
3 Ezanab	
4 Cauac	
5 Ahau	
6 Ymix	
7 Ik	
8 Akbal	
9 Kan	
10 Chicchan	
11 Cimi	
12 Manik	
13 Lamat	
1 Muluc	
2 Oc	
3 Chuen	
4 Eb	
5 Ben	Tzoz
6 Ix	
7 Men	
8 Cib	
9 Caban	
10 Ezanab	
11 Cauac	
12 Ahau	
13 Ymix	
1 Ik	
2 Akbal	
3 Kan	
4 Chicchan	
5 Cimi	
6 Manik	
7 Lamat	
8 Muluc	
9 Oc	
10 Chuen	
11 Eb	
12 Ben	Tzec
13 Ix	
1 Men	
2 Cib	
3 Caban	
4 Ezanab	
5 Cauac	
6 Ahau	
7 Ymix	
8 Ik	
9 Akbal	
10 Kan	
11 Chicchan	
12 Cimi	
13 Manik	
1 Lamat	
2 Muluc	
3 Oc	
4 Chuen	
5 Eb	
6 Ben	Xul
7 Ix	
8 Men	
9 Cib	
10 Caban	

Days.	*Months.*
11 Ezanab	
12 Cauac	
13 Ahau	
1 Ymix	
2 Ik	
3 Akbal	
4 Kan	
5 Chicchan	
6 Cimi	
7 Manik	
8 Lamat	
9 Muluc	
10 Oc	
11 Chuen	
12 Eb	
13 Ben	Yaxkin
1 Ik	
2 Men	
* 3 Cib	
4 Caban	
5 Ezanab	
6 Cauac	
7 Ahau	
8 Ymix	
9 Ik	
10 Akbal	
11 Kan	
12 Chicchan	
13 Cimi	
1 Manik	
2 Lamat	
3 Muluc	
4 Oc	
5 Chuen	
6 Eb	
7 Ben	Mol
8 Ix	
9 Men	
10 Cib	
11 Caban	
12 Ezanab	
13 Cauac	
1 Ahau	
2 Ymix	
3 Ik	
4 Akbal	
5 Kan	
6 Chicchan	
7 Cimi	
8 Manik	
9 Lamat	
10 Muluc	
11 Oc	
12 Chuen	
13 Eb	
1 Ben	Chen
2 Ix	
3 Men	
4 Cib	
5 Caban	
6 Ezanab	
7 Cauac	
8 Ahau	
9 Ymix	
10 Ik	
11 Akbal	
12 Kan	
13 Chicchan	
1 Cimi	

Days.	*Months.*
2 Manik	
3 Lamat	
4 Muluc	
5 Oc	
6 Chuen	
7 Eb	
8 Ben	Yax
9 Ix	
10 Men	
11 Cib	
12 Caban	
13 Ezanab	
1 Cauac	
2 Ahau	
3 Ymix	
4 Ik	
5 Akbal	
6 Kan	
7 Chicchan	
8 Cimi	
9 Manik	
10 Lamat	
11 Muluc	
12 Oc	
13 Chuen	
1 Eb	
2 Ben	Zac
3 Ix	
4 Men	
5 Cib	
6 Caban	
7 Ezanab	
8 Cauac	
9 Ahau	
10 Ymix	
11 Ik	
12 Akbal	
13 Kan	
1 Chicchan	
* 2 Cimi	
3 Manik	
4 Lamat	
5 Muluc	
6 Oc	
7 Chuen	
8 Eb	
9 Ben	Ceh
10 Ix	
11 Men	
12 Cib	
13 Caban	
1 Ezanab	
2 Cauac	
3 Ahau	
4 Ymix	
5 Ik	
6 Akbal	
7 Kan	
8 Chicchan	
9 Cimi	
10 Manik	
11 Lamat	
12 Muluc	
13 Oc	
1 Chuen	
2 Eb	
3 Ben	Mac
4 Ix	
5 Men	

Days.	*Months.*
6 Cib	
7 Caban	
8 Ezanab	
9 Cauac	
10 Ahau	
11 Ymix	
12 Ik	
13 Akbal	
1 Kan	
2 Chicchan	
3 Cimi	
4 Manik	
5 Lamat	
6 Muluc	
7 Oc	
8 Chuen	
9 Eb	
10 Ben	Kankin
11 Ix	
12 Men	
13 Cib	
1 Caban	
2 Ezanab	
3 Cauac	
4 Ahau	
5 Ymix	
6 Ik	
7 Akbal	
8 Kan	
9 Chicchan	
10 Cimi	
11 Manik	
12 Lamat	
13 Muluc	
1 Oc	
2 Chuen	
3 Eb	
4 Ben	Muan
5 Ix	
6 Men	
7 Cib	
8 Caban	
9 Ezanab	
10 Cauac	
11 Ahau	
12 Ymix	
13 Ik	
1 Akbal	
2 Kan	
3 Chicchan	
4 Cimi	
5 Manik	
6 Lamat	
7 Muluc	
8 Oc	
9 Chuen	
10 Eb	
11 Ben	Pax
12 Ix	
13 Men	
1 Cib	
2 Caban	
3 Ezanab	
4 Cauac	
5 Ahau	
6 Ymix	
7 Ik	
8 Akbal	
9 Kan	

Days.	*Months.*
10 Chicchan	
11 Cimi	
12 Manik	
13 Lamat	
1 Muluc	
2 Oc	
3 Chuen	
4 Eb	
5 Ben	Kayab
6 Ix	
7 Men	
8 Cib	
9 Caban	
10 Ezanab	
11 Cauac	
12 Ahau	
13 Ymix	
1 Ik	
2 Akbal	
3 Kan	
4 Chicchan	
5 Cimi	
6 Manik	
7 Lamat	
8 Muluc	
9 Oc	
10 Chuen	
11 Eb	
12 Ben	Cumhu
13 Ix	
1 Men	
2 Cib	
3 Caban	
4 Ezanab	
5 Cauac	
6 Ahau	
7 Ymix	
8 Ik	
9 Akbal	
10 Kan	
11 Chicchan	
12 Cimi	
13 Manik	
1 Lamat	
2 Muluc	
3 Oc	
4 Chuen	
5 Eb	
Five intercalary days. 6 Ben	
7 Ix	
8 Men	
9 Cib	
10 Caban	
11 Ezanab	Pop
12 Cauac	
13 Ahau	
1 Ymix	
2 Ik	
3 Akbal	
4 Kan	
5 Chicchan	
6 Cimi	
7 Manik	
8 Lamat	
9 Muluc	
10 Oc	
11 Chuen	
12 Eb	

Days.	*Months.*
13 Ben	
1 Ix	
2 Men	
3 Cib	
4 Caban	
5 Ezanab	Uo
6 Cauac	
7 Ahau	
8 Ymix	
9 Ik	
10 Akbal	
11 Kan	
12 Chicchan	
13 Cimi	
1 Manik	
2 Lamat	
3 Muluc	
4 Oc	
5 Chuen	
6 Eb	
7 Ben	
8 Ix	
9 Men	
10 Cib	
11 Caban	
12 Ezanab	Zip
13 Cauac	
1 Ahau	
2 Ymix	
3 Ik	
4 Akbal	
5 Kan	
6 Chicchan	
7 Cimi	
8 Manik	
9 Lamat	
10 Muluc	
11 Oc	
12 Chuen	
13 Eb	
1 Ben	
2 Ix	
3 Men	
4 Cib	
5 Caban	
6 Ezanab	Tzoz
7 Cauac	
8 Ahau	
9 Ymix	
10 Ik	
11 Akbal	
12 Kan	
13 Chicchan	
1 Cimi	
2 Manik	
3 Lamat	
4 Muluc	
5 Oc	
6 Chuen	
7 Eb	
8 Ben	
9 Ix	
10 Men	
11 Cib	
12 Caban	
13 Ezanab	Tzec
1 Cauac	
2 Ahau	
3 Ymix	

	Days.	*Months.*
	4 Ik	
	5 Akbal	
	6 Kan	
	7 Chicchan	
	8 Cimi	
	9 Manik	
	10 Lamat	
	11 Muluc	
	12 Oc	
	13 Chuen	
	1 Eb	
	2 Ben	
	3 Ix	
	4 Men	
*	5 Cib	
	6 Caban	
	7 Ezanab	Xul
	8 Cauac	
	9 Ahau	
	10 Ymix	
	11 Ik	
	12 Akbal	
*	13 Kan	
	1 Chicchan	
	2 Cimi	
	3 Manik	
	4 Lamat	
	5 Muluc	
	6 Oc	
	7 Chuen	
	8 Eb	
	9 Ben	
	10 Ix	
	11 Men	
	12 Cib	
	13 Caban	
	1 Ezanab	Yaxkin
	2 Cauac	
	3 Ahau	
	4 Ymix	
	5 Ik	
	6 Akbal	
	7 Kan	
	8 Chicchan	
	9 Cimi	
	10 Manik	
	11 Lamat	
	12 Muluc	
	13 Oc	
	1 Chuen	
	2 Eb	
	3 Ben	
	4 Ix	
	5 Men	
	6 Cib	
	7 Caban	
	8 Ezanab	Mol
	9 Cauac	
	10 Ahau	
	11 Ymix	
	12 Ik	
	13 Akbal	
	1 Kan	
	2 Chicchan	
	3 Cimi	
	4 Manik	
	5 Lamat	
	6 Muluc	
	7 Oc	
	8 Chuen	
	9 Eb	
	10 Ben	
	11 Ix	
	12 Men	
	13 Cib	
	1 Caban	
	2 Ezanab	Chen
	3 Cauac	
	4 Ahau	
	5 Ymix	
	6 Ik	
	7 Akbal	
	8 Kan	
	9 Chicchan	
	10 Cimi	
	11 Manik	
	12 Lamat	
	13 Muluc	
	1 Oc	
	2 Chuen	
	3 Eb	
	4 Ben	
	5 Ix	
	6 Men	
	7 Cib	
	8 Caban	
	9 Ezanab	Yax
	10 Cauac	
	11 Ahau	
	12 Ymix	
	13 Ik	
	1 Akbal	
	2 Kan	
	3 Chicchan	
	4 Cimi	
	5 Manik	
	6 Lamat	
	7 Muluc	
	8 Oc	
	9 Chuen	
	10 Eb	
	11 Ben	
	12 Ix	
	13 Men	
	1 Cib	
	2 Caban	
	3 Ezanab	Zac
	4 Cauac	
	5 Ahau	
	6 Ymix	
	7 Ik	
	8 Akbal	
	9 Kan	
	10 Chicchan	
	11 Cimi	
	12 Manik	
	13 Lamat	
	1 Muluc	
	2 Oc	
	3 Chuen	
	4 Eb	
	5 Ben	
	6 Ix	
	7 Men	
	8 Cib	
	9 Caban	
	10 Ezanab	Ceh
	11 Cauac	
	12 Ahau	
	13 Ymix	
	1 Ik	
	2 Akbal	
	3 Kan	
	4 Chicchan	
	5 Cimi	
	6 Manik	
	7 Lamat	
	8 Muluc	
	9 Oc	
	10 Chuen	
	11 Eb	
	12 Ben	
	13 Ix	
	1 Men	
	2 Cib	
	3 Caban	
	4 Ezanab	Mac
	5 Cauac	
	6 Ahau	
	7 Ymix	
	8 Ik	
	9 Akbal	
	10 Kan	
	11 Chicchan	
	12 Cimi	
	13 Manik	
	1 Lamat	
	2 Muluc	
	3 Oc	
	4 Chuen	
	5 Eb	
	6 Ben	
	7 Ix	
	8 Men	
	9 Cib	
	10 Caban	
	11 Ezanab	Kankin
	12 Cauac	
	13 Ahau	
	1 Ymix	
	2 Ik	
	3 Akbal	
	4 Kan	
	5 Chicchan	
	6 Cimi	
	7 Manik	
	8 Lamat	
	9 Muluc	
	10 Oc	
	11 Chuen	
	12 Eb	
	13 Ben	
	1 Ix	
	2 Men	
	3 Cib	
	4 Caban	
	5 Ezanab	Muan
	6 Cauac	
	7 Ahau	
	8 Ymix	
	9 Ik	
	10 Akbal	
	11 Kan	
	12 Chicchan	
	13 Cimi	
	1 Manik	
	2 Lamat	

Days.	*Months.*
3 Muluc	
4 Oc	
5 Chuen	
6 Eb	
7 Ben	
8 Ix	
9 Men	
10 Cib	
11 Caban	
12 Ezanab	Pax
13 Cauac	
1 Ahau	
2 Ymix	
3 Ik	
4 Akbal	
5 Kan	
6 Chicchan	
7 Cimi	
8 Manik	
9 Lamat	
10 Muluc	
11 Oc	
12 Chuen	
13 Eb	
1 Ben	
2 Ix	
3 Men	
4 Cib	
5 Caban	
6 Ezanab	Kayab
7 Cauac	
8 Ahau	
9 Ymix	
10 Ik	
11 Akbal	
12 Kan	
13 Chicchan	
1 Cimi	
2 Manik	
3 Lamat	
4 Muluc	
5 Oc	
6 Chuen	
7 Eb	
8 Ben	
9 Ix	
10 Men	
11 Cib	
12 Caban	
13 Ezanab	Cumhu
1 Cauac	
* 2 Ahau	
3 Ymix	
4 Ik	
5 Akbal	
6 Kan	
7 Chicchan	
8 Cimi	
9 Manik	
10 Lamat	
11 Muluc	
12 Oc	
13 Chuen	
1 Eb	
2 Ben	
3 Ix	
4 Men	
5 Cib	
6 Caban	

Days.	*Months.*
7 Ezanab	Five intercalary days.
8 Cauac	
9 Ahau	
10 Ymix	
11 Ik	
12 Akbal	Pop
13 Kan	
1 Chicchan	
2 Cimi	
3 Manik	
4 Lamat	
5 Muluc	
6 Oc	
7 Chuen	
8 Eb	
9 Ben	
10 Ix	
11 Men	
12 Cib	
13 Caban	
1 Ezanab	
2 Cauac	
3 Ahau	
4 Ymix	
5 Ik	
6 Akbal	Uo
7 Kan	
8 Chicchan	
9 Cimi	
10 Manik	
11 Lamat	
12 Muluc	
13 Oc	
1 Chuen	
2 Eb	
3 Ben	
4 Ix	
5 Men	
6 Cib	
7 Caban	
8 Ezanab	
9 Cauac	
10 Ahau	
11 Ymix	
12 Ik	
13 Akbal	Zip
1 Kan	
2 Chicchan	
3 Cimi	
4 Manik	
5 Lamat	
6 Muluc	
7 Oc	
8 Chuen	
9 Eb	
10 Ben	
11 Ix	
12 Men	
13 Cib	
1 Caban	
2 Ezanab	
3 Cauac	
4 Ahau	
5 Ymix	
6 Ik	
7 Akbal	Tzoz
8 Kan	
9 Chicchan	

Days.	*Months.*
10 Cimi	
11 Manik	
12 Lamat	
13 Muluc	
* 1 Oc	
2 Chuen	
3 Eb	
4 Ben	
5 Ix	
6 Men	
7 Cib	
8 Caban	
9 Ezanab	
10 Cauac	
11 Ahau	
12 Ymix	
13 Ik	
1 Akbal	Tzec
2 Kan	
3 Chicchan	
4 Cimi	
5 Manik	
6 Lamat	
7 Muluc	
8 Oc	
9 Chuen	
10 Eb	
11 Ben	
12 Ix	
13 Men	
1 Cib	
2 Caban	
3 Ezanab	
4 Cauac	
5 Ahau	
6 Ymix	
7 Ik	
8 Akbal	Xul
9 Kan	
10 Chicchan	
11 Cimi	
12 Manik	
13 Lamat	
1 Muluc	
2 Oc	
3 Chuen	
4 Eb	
5 Ben	
6 Ix	
7 Men	
8 Cib	
9 Caban	
10 Ezanab	
11 Cauac	
12 Ahau	
13 Ymix	
1 Ik	
2 Akbal	Yaxkin
3 Kan	
4 Chicchan	
5 Cimi	
6 Manik	
7 Lamat	
8 Muluc	
9 Oc	
10 Chuen	
11 Eb	
12 Ben	
13 Ix	

Days.	*Months.*
1 Men	
2 Cib	
3 Caban	
4 Ezanab	
5 Cauac	
6 Ahau	
7 Ymix	
8 Ik	
9 Akbal	Mol
10 Kan	
11 Chicchan	
12 Cimi	
13 Manik	
1 Lamat	
2 Muluc	
3 Oc	
4 Chuen	
5 Eb	
6 Ben	
7 Ix	
8 Men	
9 Cib	
10 Caban	
11 Ezanab	
12 Cauac	
13 Ahau	
1 Ymix	
2 Ik	
3 Akbal	Chen
4 Kan	
5 Chicchan	
6 Cimi	
7 Manik	
8 Lamat	
9 Muluc	
10 Oc	
11 Chuen	
12 Eb	
13 Ben	
1 Ix	
2 Men	
3 Cib	
4 Caban	
5 Ezanab	
6 Cauac	
7 Ahau	
8 Ymix	
9 Ik	
10 Akbal	Yax
11 Kan	
12 Chicchan	
13 Cimi	
1 Manik	
2 Lamat	
3 Muluc	
4 Oc	
5 Chuen	
6 Eb	
7 Ben	
8 Ix	
9 Men	
10 Cib	
11 Caban	
12 Ezanab	
13 Cauac	
1 Ahau	
2 Ymix	
3 Ik	
4 Akbal	Zac

Days.	*Months.*
5 Kan	
6 Chicchan	
7 Cimi	
8 Manik	
9 Lamat	
10 Muluc	
11 Oc	
12 Chuen	
13 Eb	
1 Ben	
2 Ix	
3 Men	
4 Cib	
5 Caban	
6 Ezanab	
7 Cauac	
8 Ahau	
9 Ymix	
10 Ik	
11 Akbal	Ceh
12 Kan	
13 Chicchan	
1 Cimi	
2 Manik	
3 Lamat	
4 Muluc	
5 Oc	
6 Chuen	
7 Eb	
8 Ben	
9 Ix	
10 Men	
11 Cib	
12 Caban	
13 Ezanab	
1 Cauac	
2 Ahau	
3 Ymix	
4 Ik	
5 Akbal	Mac
6 Kan	
7 Chicchan	
8 Cimi	
9 Manik	
10 Lamat	
11 Muluc	
12 Oc	
13 Chuen	
1 Eb	
2 Ben	
3 Ix	
4 Men	
5 Cib	
6 Caban	
7 Ezanab	
8 Cauac	
9 Ahau	
10 Ymix	
11 Ik	
12 Akbal	Kankin
13 Kan	
1 Chicchan	
2 Cimi	
3 Manik	
4 Lamat	
5 Muluc	
6 Oc	
7 Chuen	
8 Eb	

Days.	*Months.*
9 Ben	
10 Ix	
11 Men	
12 Cib	
13 Caban	
1 Ezanab	
2 Cauac	
3 Ahau	
4 Ymix	
5 Ik	
6 Akbal	Muan
7 Kan	
8 Chicchan	
9 Cimi	
10 Manik	
11 Lamat	
12 Muluc	
13 Oc	
1 Chuen	
2 Eb	
3 Ben	
4 Ix	
5 Men	
6 Cib	
7 Caban	
8 Ezanab	
9 Cauac	
10 Ahau	
11 Ymix	
12 Ik	
13 Akbal	Pax
1 Kan	
2 Chicchan	
3 Cimi	
4 Manik	
5 Lamat	
6 Muluc	
7 Oc	
8 Chuen	
9 Eb	
10 Ben	
11 Ix	
12 Men	
13 Cib	
1 Caban	
2 Ezanab	
3 Cauac	
* 4 Ahau	
5 Ymix	
6 Ik	
7 Akbal	Kayab
8 Kan	
9 Chicchan	
10 Cimi	
11 Manik	
* 12 Lamat	
13 Muluc	
1 Oc	
2 Chuen	
3 Eb	
4 Ben	
5 Ix	
6 Men	
7 Cib	
8 Caban	
9 Ezanab	
10 Cauac	
11 Ahau	
12 Ymix	

Days.	*Months.*	*Days.*	*Months.*	*Days.*	*Months.*
13 Ik		3 Oc		7 Cauac	
1 Akbal	Cumhu	4 Chuen		8 Ahau	
2 Kan		5 Eb		9 Ymix	
3 Chicchan		6 Ben		10 Ik	
4 Cimi		7 Ix		11 Akbal	
5 Manik		8 Men		12 Kan	
6 Lamat		9 Cib		13 Chicchan	
7 Muluc		10 Caban		1 Cimi	
8 Oc		11 Ezanab		2 Manik	
9 Chuen		12 Cauac		3 Lamat	Yaxkin
10 Eb		13 Ahau		4 Muluc	
11 Ben		1 Ymix		5 Oc	
12 Ix		2 Ik		6 Chuen	
13 Men		3 Akbal		7 Eb	
1 Cib		4 Kan		8 Ben	
2 Caban		5 Chicchan		9 Ix	
3 Ezanab		6 Cimi		10 Men	
4 Cauac		7 Manik		11 Cib	
5 Ahau		8 Lamat	Tzoz	12 Caban	
6 Ymix		9 Muluc		13 Ezanab	
7 Ik		10 Oc		1 Cauac	
8 Akbal		11 Chuen		2 Ahau	
9 Kan		12 Eb		3 Ymix	
10 Chicchan		13 Ben		4 Ik	
11 Cimi		1 Ix		5 Akbal	
12 Manik		2 Men		6 Kan	
		3 Cib		7 Chicchan	
13 Lamat	Pop	4 Caban		8 Cimi	
1 Muluc		5 Ezanab		9 Manik	
2 Oc		6 Cauac		10 Lamat	Mol
3 Chuen		7 Ahau		11 Muluc	
4 Eb		8 Ymix		12 Oc	
5 Ben		9 Ik		13 Chuen	
6 Ix		10 Akbal		1 Eb	
7 Men		11 Kan		2 Ben	
8 Cib		12 Chicchan		3 Ix	
9 Caban		13 Cimi		4 Men	
10 Ezanab		1 Manik		5 Cib	
11 Cauac		2 Lamat	Tzec	6 Caban	
12 Ahau		3 Muluc		7 Ezanab	
13 Ymix		4 Oc		8 Cauac	
1 Ik		5 Chuen		9 Ahau	
2 Akbal		6 Eb		10 Ymix	
3 Kan		7 Ben		11 Ik	
4 Chicchan		8 Ix		12 Akbal	
5 Cimi		9 Men		13 Kan	
6 Manik		10 Cib		1 Chicchan	
7 Lamat	Uo	11 Caban		2 Cimi	
8 Muluc		12 Ezanab		3 Manik	
9 Oc		13 Cauac		4 Lamat	Chen
10 Chuen		1 Ahau		5 Muluc	
11 Eb		2 Ymix		6 Oc	
12 Ben		3 Ik		7 Chuen	
13 Ix		4 Akbal		8 Eb	
1 Men		5 Kan		9 Ben	
2 Cib		6 Chicchan		10 Ix	
3 Caban		7 Cimi		11 Men	
4 Ezanab		8 Manik		12 Cib	
5 Cauac		9 Lamat	Xul	13 Caban	
6 Ahau		10 Muluc		1 Ezanab	
7 Ymix		11 Oc		2 Cauac	
8 Ik		12 Chuen		3 Ahau	
9 Akbal		13 Eb		4 Ymix	
10 Kan		1 Ben		5 Ik	
11 Chicchan		2 Ix		6 Akbal	
12 Cimi		3 Men		7 Kan	
13 Manik		4 Cib		8 Chicchan	
1 Lamat	Zip	5 Caban		9 Cimi	
2 Muluc		6 Ezanab		10 Manik	

Five intercalary days.

Days.	*Months.*
11 Lamat	Yax
12 Muluc	
13 Oc	
1 Chuen	
2 Eb	
3 Ben	
4 Ix	
5 Men	
6 Cib	
7 Caban	
8 Ezanab	
9 Cauac	
10 Ahau	
11 Ymix	
12 Ik	
13 Akbal	
1 Kan	
2 Chicchan	
3 Cimi	
4 Manik	
5 Lamat	Zac
6 Muluc	
7 Oc	
8 Chuen	
9 Eb	
10 Ben	
11 Ix	
12 Men	
13 Cib	
1 Caban	
2 Ezanab	
3 Cauac	
4 Ahau	
5 Ymix	
6 Ik	
7 Akbal	
8 Kan	
9 Chicchan	
10 Cimi	
11 Manik	
12 Lamat	Ceh
13 Muluc	
1 Oc	
2 Chuen	
3 Eb	
4 Ben	
5 Ix	
6 Men	
7 Cib	
8 Caban	
9 Ezanab	
10 Cauac	
11 Ahau	
12 Ymix	
13 Ik	
1 Akbal	
2 Kan	
3 Chicchan	
4 Cimi	
5 Manik	
6 Lamat	Mac
7 Muluc	
8 Oc	
9 Chuen	
10 Eb	
11 Ben	
12 Ix	
13 Men	

Days.	*Months.*
1 Cib	
2 Caban	
3 Ezanab	
4 Cauac	
5 Ahau	
6 Ymix	
7 Ik	
8 Akbal	
9 Kan	
10 Chicchan	
11 Cimi	
12 Manik	
13 Lamat	Kankin
1 Muluc	
2 Oc	
3 Chuen	
4 Eb	
5 Ben	
6 Ix	
7 Men	
8 Cib	
9 Caban	
10 Ezanab	
11 Cauac	
12 Ahau	
13 Ymix	
1 Ik	
2 Akbal	
3 Kan	
4 Chicchan	
5 Cimi	
6 Manik	
7 Lamat	Muan
8 Muluc	
9 Oc	
10 Chuen	
11 Eb	
12 Ben	
13 Ix	
1 Men	
2 Cib	
3 Caban	
4 Ezanab	
5 Cauac	
6 Ahau	
7 Ymix	
8 Ik	
9 Akbal	
10 Kan	
11 Chicchan	
12 Cimi	
13 Manik	
1 Lamat	Pax
2 Muluc	
3 Oc	
4 Chuen	
5 Eb	
6 Ben	
7 Ix	
8 Men	
9 Cib	
10 Caban	
11 Ezanab	
12 Cauac	
13 Ahau	
1 Ymix	
2 Ik	
3 Akbal	

Days.	*Months.*
4 Kan	
5 Chicchan	
6 Cimi	
7 Manik	
8 Lamat	Kayab
9 Muluc	
10 Oc	
11 Chuen	
12 Eb	
13 Ben	
1 Ix	
2 Men	
3 Cib	
4 Caban	
5 Ezanab	
6 Cauac	
7 Ahau	
8 Ymix	
9 Ik	
10 Akbal	
11 Kan	
12 Chicchan	
13 Cimi	
1 Manik	
2 Lamat	Cumhu
3 Muluc	
4 Oc	
5 Chuen	
6 Eb	
7 Ben	
8 Ix	
9 Men	
10 Cib	
11 Caban	
12 Ezanab	
13 Cauac	
1 Ahau	
2 Ymix	
3 Ik	
4 Akbal	
5 Kan	
6 Chicchan	
7 Cimi	
8 Manik	
Five intercalary days. 9 Lamat	
10 Muluc	
11 Oc	
12 Chuen	
13 Eb	
1 Ben	Pop
2 Ix	
3 Men	
4 Cib	
5 Caban	
6 Ezanab	
7 Cauac	
8 Ahau	
9 Ymix	
10 Ik	
11 Akbal	
12 Kan	
13 Chicchan	
1 Cimi	
2 Manik	
3 Lamat	
4 Muluc	
5 Oc	

Days.	*Months.*
6 Chuen	
7 Eb	
8 Ben	Uo
9 Ix	
10 Men	
11 Cib	
12 Caban	
13 Ezanab	
1 Cauac	
2 Ahau	
3 Ymix	
4 Ik	
5 Akbal	
6 Kan	
7 Chicchan	
8 Cimi	
9 Manik	
10 Lamat	
11 Muluc	
12 Oc	
13 Chuen	
1 Eb	
2 Ben	Zip
3 Ix	
4 Men	
5 Cib	
6 Cauac	
7 Ezanab	
8 Cauac	
9 Ahau	
10 Ymix	
11 Ik	
12 Akbal	
13 Kan	
1 Chicchan	
2 Cimi	
3 Manik	
4 Lamat	
5 Muluc	
6 Oc	
7 Chuen	
8 Eb	
9 Ben	Tzoz
10 Ix	
11 Men	
12 Cib	
13 Caban	
1 Ezanab	
2 Cauac	
3 Ahau	
4 Ymix	
5 Ik	
6 Akbal	
7 Kan	
8 Chicchan	
9 Cimi	
10 Manik	
11 Lamat	
12 Muluc	
13 Oc	
1 Chuen	
2 Eb	
3 Ben	Tzec
4 Ix	
5 Men	
6 Cib	
7 Caban	
8 Ezanab	
9 Cauac	

Days.	*Months.*
10 Ahau	
11 Ymix	
12 Ik	
13 Akbal	
1 Kan	
2 Chicchan	
3 Cimi	
4 Manik	
5 Lamat	
6 Muluc	
7 Oc	
8 Chuen	
9 Eb	
10 Ben	Xul
11 Ix	
12 Men	
13 Cib	
1 Caban	
2 Ezanab	
3 Cauac	
4 Ahau	
5 Ymix	
6 Ik	
7 Akbal	
8 Kan	
9 Chicchan	
10 Cimi	
11 Manik	
12 Lamat	
13 Muluc	
1 Oc	
2 Chuen	
3 Eb	
4 Ben	Yaxkin
5 Ix	
6 Men	
7 Cib	
8 Caban	
9 Ezanab	
10 Cauac	
11 Ahau	
12 Ymix	
13 Ik	
1 Akbal	
2 Kan	
3 Chicchan	
4 Cimi	
5 Manik	
6 Lamat	
7 Muluc	
8 Oc	
9 Chuen	
10 Eb	
11 Ben	Mol
12 Ix	
13 Men	
1 Cib	
2 Caban	
3 Ezanab	
4 Cauac	
5 Ahau	
6 Ymix	
7 Ik	
8 Akbal	
9 Kan	
10 Chicchan	
11 Cimi	
12 Manik	
13 Lamat	

Days.	*Months.*
1 Muluc	
2 Oc	
3 Chuen	
4 Eb	
5 Ben	Chen
6 Ix	
7 Men	
8 Cib	
9 Caban	
10 Ezanab	
11 Cauac	
12 Ahau	
13 Ymix	
1 Ik	
2 Akbal	
3 Kan	
4 Chicchan	
5 Cimi	
6 Manik	
7 Lamat	
8 Muluc	
9 Oc	
10 Chuen	
11 Eb	
12 Ben	Yax
13 Ix	
1 Men	
2 Cib	
3 Caban	
4 Ezanab	
5 Cauac	
6 Ahau	
7 Ymix	
8 Ik	
9 Akbal	
10 Kan	
11 Chicchan	
12 Cimi	
13 Manik	
1 Lamat	
2 Muluc	
3 Oc	
4 Chuen	
5 Eb	
6 Ben	Zac
7 Ix	
8 Men	
9 Cib	
10 Caban	
11 Ezanab	
12 Cauac	
13 Ahau	
1 Ymix	
2 Ik	
3 Akbal	
4 Kan	
5 Chicchan	
6 Cimi	
7 Manik	
8 Lamat	
9 Muluc	
10 Oc	
11 Chuen	
12 Eb	
13 Ben	Ceh
1 Ix	
2 Men	
3 Cib	
4 Caban	

Days.	*Months.*
5 Ezanab	
6 Cauac	
7 Ahau	
8 Ymix	
9 Ik	
10 Akbal	
11 Kan	
12 Chicchan	
13 Cimi	
1 Manik	
2 Lamat	
3 Muluc	
4 Oc	
5 Chuen	
6 Eb	
7 Ben	Mac
8 Ix	
9 Men	
10 Cib	
11 Caban	
12 Ezanab	
13 Cauac	
1 Ahau	
2 Ymix	
3 Ik	
4 Akbal	
5 Kan	
6 Chicchan	
7 Cimi	
8 Manik	
9 Lamat	
10 Muluc	
11 Oc	
12 Chuen	
13 Eb	
1 Ben	Kankin
2 Ix	
3 Men	
4 Cib	
5 Caban	
6 Ezanab	
7 Cauac	
8 Ahau	
9 Ymix	
10 Ik	
11 Akbal	
12 Kan	
13 Chicchan	
1 Cimi	
2 Manik	
3 Lamat	
4 Muluc	
5 Oc	
6 Chuen	
7 Eb	
8 Ben	Muan
9 Ix	
10 Men	
11 Cib	
12 Caban	
13 Ezanab	
1 Cauac	
2 Ahau	
3 Ymix	
4 Ik	
5 Akbal	
6 Kan	

Days.	*Months.*
7 Chicchan	
8 Cimi	
9 Manik	
10 Lamat	
11 Muluc	
12 Oc	
13 Chuen	
1 Eb	
2 Ben	Pax
3 Ix	
4 Men	
5 Cib	
6 Caban	
7 Ezanab	
8 Cauac	
9 Ahau	
10 Ymix	
11 Ik	
12 Akbal	
13 Kan	
1 Chicchan	
2 Cimi	
3 Manik	
4 Lamat	
5 Muluc	
6 Oc	
7 Chuen	
8 Eb	
9 Ben	Kayab
10 Ix	
11 Men	
12 Cib	
13 Caban	
1 Ezanab	
2 Cauac	
3 Ahau	
4 Ymix	
5 Ik	
6 Akbal	
7 Kan	
8 Chicchan	
9 Cimi	
10 Manik	
11 Lamat	
12 Muluc	
13 Oc	
1 Chuen	
2 Eb	
3 Ben	Cumhu
4 Ix	
5 Men	
6 Cib	
7 Caban	
8 Ezanab	
9 Cauac	
10 Ahau	
11 Ymix	
12 Ik	
13 Akbal	
1 Kan	
2 Chicchan	
3 Cimi	
4 Manik	
5 Lamat	
6 Muluc	
7 Oc	
8 Chuen	

Days.	*Months.*
9 Eb	
Five intercalary days. 10 Ben	
11 Ix	
12 Men	
13 Cib	
1 Caban	
2 Ezanab	Pop
3 Cauac	
4 Ahau	
5 Ymix	
6 Ik	
7 Akbal	
8 Kan	
9 Chicchan	
10 Cimi	
11 Manik	
12 Lamat	
13 Muluc	
1 Oc	
2 Chuen	
3 Eb	
4 Ben	
5 Ix	
6 Men	
7 Cib	
8 Caban	
9 Ezanab	Uo
10 Cauac	
11 Ahau	
12 Ymix	
13 Ik	
1 Akbal	
2 Kan	
3 Chicchan	
4 Cimi	
5 Manik	
6 Lamat	
7 Muluc	
8 Oc	
9 Chuen	
10 Eb	
11 Ben	
12 Ix	
13 Men	
1 Cib	
2 Caban	
3 Ezanab	Zip
4 Cauac	
5 Ahau	
6 Ymix	
7 Ik	
8 Akbal	
9 Kan	
10 Chicchan	
11 Cimi	
12 Manik	
*13 Lamat	
1 Muluc	
2 Oc	
3 Chuen	
4 Eb	
5 Ben	
6 Ix	
7 Men	
8 Cib	
9 Caban	

Days.	*Months.*
10 Ezanab	Tzoz
11 Cauac	
12 Ahau	
13 Ymix	
1 Ik	
2 Akbal	
3 Kan	
4 Chicchan	
5 Cimi	
6 Manik	
7 Lamat	
8 Muluc	
9 Oc	
10 Chuen	
11 Eb	
12 Ben	
13 Ix	
1 Men	
2 Cib	
3 Caban	
4 Ezanab	Tzec
5 Cauac	
6 Ahau	
7 Ymix	
8 Ik	
9 Akbal	
10 Kan	
11 Chicchan	
12 Cimi	
13 Manik	
1 Lamat	
2 Muluc	
3 Oc	
4 Chuen	
5 Eb	
6 Ben	
7 Ix	
8 Men	
9 Cib	
10 Caban	
11 Ezanab	Xul
12 Cauac	
13 Ahau	
1 Ymix	
2 Ik	
3 Akbal	
4 Kan	
5 Chicchan	
6 Cimi	
7 Manik	
8 Lamat	
9 Muluc	
10 Oc	
11 Chuen	
12 Eb	
13 Ben	
1 Ix	
2 Men	
3 Cib	
4 Caban	
5 Ezanab	Yaxkin
6 Cauac	
7 Ahau	
8 Ymix	
9 Ik	
10 Akbal	
11 Kan	
12 Chicchan	
13 Cimi	

Days.	*Months.*
1 Manik	
2 Lamat	
3 Muluc	
4 Oc	
5 Chuen	
6 Eb	
7 Ben	
8 Ix	
9 Men	
10 Cib	
11 Caban	
12 Ezanab	Mol
13 Cauac	
1 Ahau	
2 Ymix	
3 Ik	
4 Akbal	
5 Kan	
6 Chicchan	
7 Cimi	
8 Manik	
9 Lamat	
10 Muluc	
11 Oc	
12 Chuen	
13 Eb	
1 Ben	
2 Ix	
3 Men	
4 Cib	
5 Caban	
6 Ezanab	Chen
7 Cauac	
8 Ahau	
9 Ymix	
10 Ik	
11 Akbal	
12 Kan	
13 Chicchan	
1 Cimi	
2 Manik	
3 Lamat	
4 Muluc	
5 Oc	
6 Chuen	
7 Eb	
8 Ben	
9 Ix	
10 Men	
11 Cib	
12 Caban	
13 Ezanab	Yax
1 Cauac	
2 Ahau	
3 Ymix	
4 Ik	
5 Akbal	
6 Kan	
7 Chicchan	
8 Cimi	
9 Manik	
10 Lamat	
11 Muluc	
12 Oc	
13 Chuen	
1 Eb	
2 Ben	
3 Ix	
4 Men	

Days.	*Months.*
5 Cib	
6 Caban	
7 Ezanab	Zac
8 Cauac	
9 Ahau	
10 Ymix	
11 Ik	
12 Akbal	
13 Kan	
1 Chicchan	
2 Cimi	
3 Manik	
4 Lamat	
5 Muluc	
6 Oc	
7 Chuen	
8 Eb	
9 Ben	
10 Ix	
11 Men	
12 Cib	
13 Caban	
1 Ezanab	Ceh
2 Cauac	
3 Ahau	
4 Ymix	
5 Ik	
6 Akbal	
7 Kan	
8 Chicchan	
9 Cimi	
10 Manik	
11 Lamat	
12 Muluc	
13 Oc	
1 Chuen	
2 Eb	
3 Ben	
4 Ix	
5 Men	
6 Cib	
7 Caban	
8 Ezanab	Mac
9 Cauac	
10 Ahau	
11 Ymix	
12 Ik	
13 Akbal	
1 Kan	
2 Chicchan	
3 Cimi	
4 Manik	
5 Lamat	
6 Muluc	
7 Oc	
8 Chuen	
9 Eb	
10 Ben	
11 Ix	
12 Men	
13 Cib	
1 Caban	
2 Ezanab	Kankin
3 Cauac	
4 Ahau	
5 Ymix	
6 Ik	
7 Akbal	
8 Kan	

Days.	*Months.*
9 Chicchan	
10 Cimi	
11 Manik	
12 Lamat	
13 Muluc	
1 Oc	
2 Chuen	
3 Eb	
4 Ben	
5 Ix	
6 Men	
7 Cib	
8 Caban	
9 Ezanab	Muan
10 Cauac	
11 Ahau	
12 Ymix	
13 Ik	
1 Akbal	
2 Kan	
3 Chicchan	
4 Cimi	
5 Manik	
6 Lamat	
7 Muluc	
8 Oc	
9 Chuen	
10 Eb	
11 Ben	
12 Ix	
13 Men	
1 Cib	
2 Caban	
3 Ezanab	Pax
4 Cauac	
5 Ahau	
6 Ymix	
7 Ik	
8 Akbal	
9 Kan	
10 Chicchan	
11 Cimi	
12 Manik	
13 Lamat	
1 Muluc	
2 Oc	
3 Chuen	
4 Eb	
5 Ben	
6 Ix	
7 Men	
8 Cib	
9 Caban	
10 Ezanab	Kayab
11 Cauac	
12 Ahau	
13 Ymix	
1 Ik	
2 Akbal	
3 Kan	
4 Chicchan	
5 Cimi	
6 Manik	
7 Lamat	
8 Muluc	
9 Oc	
10 Chuen	
11 Eb	
12 Ben	

Days.	*Months.*
13 Ix	
1 Men	
2 Cib	
3 Caban	
4 Ezanab	Cumhu
5 Cauac	
6 Ahau	
7 Ymix	
8 Ik	
9 Akbal	
10 Kan	
11 Chicchan	
12 Cimi	
13 Manik	
1 Lamat	
2 Muluc	
3 Oc	
4 Chuen	
5 Eb	
6 Ben	
7 Ix	
8 Men	
9 Cib	
10 Caban	
Five intercalary days: 11 Ezanab	
12 Cauac	
13 Ahau	
1 Ymix	
2 Ik	
3 Akbal	Pop
4 Kan	
5 Chicchan	
6 Cimi	
7 Manik	
8 Lamat	
9 Muluc	
10 Oc	
11 Chuen	
12 Eb	
13 Ben	
1 Ix	
2 Men	
3 Cib	
4 Caban	
5 Ezanab	
6 Cauac	
7 Ahau	
8 Ymix	
9 Ik	
10 Akbal	Uo
11 Kan	
12 Chicchan	
13 Cimi	
1 Manik	
*2 Lamat	
3 Muluc	
4 Oc	
5 Chuen	
6 Eb	
7 Ben	
8 Ix	
9 Men	
*10 Cib	
11 Caban	
12 Ezanab	
13 Cauac	
1 Ahau	
2 Ymix	

Days.	*Months.*
3 Ik	
4 Akbal	Zip
5 Kan	
6 Chicchan	
7 Cimi	
8 Manik	
9 Lamat	
10 Muluc	
11 Oc	
12 Chuen	
13 Eb	
1 Ben	
2 Ix	
3 Men	
4 Cib	
5 Caban	
6 Ezanab	
7 Cauac	
8 Ahau	
9 Ymix	
10 Ik	
11 Akbal	Tzoz
12 Kan	
13 Chicchan	
1 Cimi	
2 Manik	
3 Lamat	
4 Muluc	
5 Oc	
6 Chuen	
7 Eb	
8 Ben	
9 Ix	
10 Men	
11 Cib	
12 Caban	
13 Ezanab	
1 Cauac	
2 Ahau	
3 Ymix	
4 Ik	
5 Akbal	Tzec
6 Kan	
7 Chicchan	
8 Cimi	
9 Manik	
10 Lamat	
11 Muluc	
12 Oc	
13 Chuen	
1 Eb	
2 Ben	
3 Ix	
4 Men	
5 Cib	
6 Caban	
7 Ezanab	
8 Cauac	
9 Ahau	
10 Ymix	
11 Ik	
12 Akbal	Xul
13 Kan	
1 Chicchan	
2 Cimi	
3 Manik	
4 Lamat	
5 Muluc	
6 Oc	

Days.	*Months.*
7 Chuen	
8 Eb	
9 Ben	
10 Ix	
11 Men	
12 Cib	
13 Caban	
1 Ezanab	
2 Cauac	
3 Ahau	
4 Ymix	
5 Ik	
6 Akbal	Yaxkin
7 Kan	
8 Chicchan	
9 Cimi	
10 Manik	
11 Lamat	
12 Mulue	
13 Oc	
1 Chuen	
2 Eb	
3 Ben	
4 Ix	
5 Men	
6 Cib	
7 Caban	
8 Ezanab	
9 Cauac	
10 Ahau	
11 Ymix	
12 Ik	
13 Akbal	Mol
1 Kan	
2 Chicchan	
3 Cimi	
4 Manik	
5 Lamat	
6 Mulue	
7 Oc	
8 Chuen	
9 Eb	
10 Ben	
11 Ix	
12 Men	
13 Cib	
1 Caban	
2 Ezanab	
3 Cauac	
4 Ahau	
5 Ymix	
6 Ik	
7 Akbal	Chen
8 Kan	
9 Chicchan	
10 Cimi	
11 Manik	
12 Lamat	
13 Mulue	
1 Oc	
2 Chuen	
3 Eb	
4 Ben	
5 Ix	
6 Men	
7 Cib	
8 Caban	
9 Ezanab	
10 Cauac	

Days.	*Months.*
11 Ahau	
12 Ymix	
13 Ik	
1 Akbal	Yax
2 Kan	
3 Chicchan	
4 Cimi	
5 Manik	
6 Lamat	
7 Mulue	
8 Oc	
9 Chuen	
10 Eb	
11 Ben	
12 Ix	
13 Men	
1 Cib	
2 Caban	
3 Ezanab	
4 Cauac	
5 Ahau	
6 Ymix	
7 Ik	
8 Akbal	Zac
9 Kan	
10 Chicchan	
11 Cimi	
12 Manik	
13 Lamat	
1 Mulue	
2 Oc	
3 Chuen	
4 Eb	
5 Ben	
6 Ix	
7 Men	
8 Cib	
9 Caban	
10 Ezanab	
11 Cauac	
12 Ahau	
13 Ymix	
1 Ik	
2 Akbal	Ceh
3 Kan	
4 Chicchan	
5 Cimi	
6 Manik	
7 Lamat	
8 Mulue	
9 Oc	
10 Chuen	
11 Eb	
12 Ben	
13 Ix	
1 Men	
2 Cib	
3 Caban	
4 Ezanab	
5 Cauac	
6 Ahau	
7 Ymix	
8 Ik	
9 Akbal	Mac
10 Kan	
11 Chicchan	
12 Cimi	
13 Manik	
1 Lamat	

Days.	*Months.*
2 Mulue	
3 Oc	
4 Chuen	
5 Eb	
6 Ben	
7 Ix	
8 Men	
9 Cib	
10 Caban	
11 Ezanab	
12 Cauac	
13 Ahau	
1 Ymix	
2 Ik	
3 Akbal	Kankin
4 Kan	
5 Chicchan	
6 Cimi	
7 Manik	
8 Lamat	
9 Mulue	
10 Oc	
11 Chuen	
12 Eb	
13 Ben	
1 Ix	
2 Men	
3 Cib	
4 Caban	
5 Ezanab	
6 Cauac	
7 Ahau	
8 Ymix	
9 Ik	
10 Akbal	Muan
11 Kan	
12 Chicchan	
13 Cimi	
1 Manik	
2 Lamat	
3 Mulue	
4 Oc	
5 Chuen	
6 Eb	
7 Ben	
8 Ix	
9 Men	
10 Cib	
11 Caban	
12 Ezanab	
13 Cauac	
1 Ahau	
2 Ymix	
3 Ik	
4 Akbal	Pax
5 Kan	
6 Chicchan	
7 Cimi	
8 Manik	
9 Lamat	
10 Mulue	
11 Oc	
12 Chuen	
13 Eb	
1 Ben	
2 Ix	
3 Men	
4 Cib	
5 Caban	

Days.	*Months.*
6 Ezanab	
7 Cauac	
8 Ahau	
9 Ymix	
10 Ik	
11 Akbal	Kayab
12 Kan	
13 Chicchan	
1 Cimi	
2 Manik	
3 Lamat	
4 Muluc	
5 Oc	
6 Chuen	
7 Eb	
8 Ben	
9 Ix	
10 Men	
11 Cib	
12 Caban	
13 Ezanab	
1 Cauac	
2 Ahau	
3 Ymix	
4 Ik	
5 Akbal	Cumhu
6 Kan	
7 Chicchan	
8 Cimi	
9 Manik	
10 Lamat	
11 Muluc	
12 Oc	
13 Chuen	
1 Eb	
2 Ben	
3 Ix	
4 Men	
5 Cib	
6 Caban	
7 Ezanab	
8 Cauac	
9 Ahau	
10 Ymix	
*11 Ik	
Five intercalary days. 12 Akbal	
13 Kan	
1 Chicchan	
2 Cimi	
3 Manik	
4 Lamat	Pop
5 Muluc	
6 Oc	
7 Chuen	
8 Eb	
9 Ben	
10 Ix	
11 Men	
12 Cib	
13 Caban	
1 Ezanab	
2 Cauac	
3 Ahau	
4 Ymix	
5 Ik	
6 Akbal	
7 Kan	
8 Chicchan	

Days.	*Months.*
9 Cimi	
10 Manik	
11 Lamat	Uo
12 Muluc	
13 Oc	
1 Chuen	
2 Eb	
3 Ben	
4 Ix	
5 Men	
6 Cib	
7 Caban	
8 Ezanab	
9 Cauac	
10 Ahau	
11 Ymix	
12 Ik	
13 Akbal	
1 Kan	
2 Chicchan	
3 Cimi	
4 Manik	
5 Lamat	Zip
6 Muluc	
7 Oc	
8 Chuen	
9 Eb	
10 Ben	
11 Ix	
12 Men	
13 Cib	
1 Caban	
2 Ezanab	
3 Cauac	
4 Ahau	
5 Ymix	
6 Ik	
7 Akbal	
8 Kan	
9 Chicchan	
10 Cimi	
11 Manik	
12 Lamat	Tzoz
13 Muluc	
1 Oc	
2 Chuen	
3 Eb	
4 Ben	
5 Ix	
6 Men	
7 Cib	
8 Caban	
9 Ezanab	
10 Cauac	
11 Ahau	
12 Ymix	
13 Ik	
1 Akbal	
2 Kan	
3 Chicchan	
4 Cimi	
5 Manik	
6 Lamat	Tzec
7 Muluc	
8 Oc	
9 Chuen	
10 Eb	
11 Ben	
12 Ix	

Days.	*Months.*
13 Men	
1 Cib	
2 Caban	
3 Ezanab	
4 Cauac	
5 Ahau	
6 Ymix	
7 Ik	
8 Akbal	
9 Kan	
10 Chicchan	
11 Cimi	
12 Manik	
13 Lamat	Xul
1 Muluc	
2 Oc	
3 Chuen	
4 Eb	
5 Ben	
6 Ix	
7 Men	
8 Cib	
9 Caban	
10 Ezanab	
11 Cauac	
12 Ahau	
13 Ymix	
1 Ik	
2 Akbal	
3 Kan	
4 Chicchan	
5 Cimi	
6 Manik	
7 Lamat	Yaxkin
8 Muluc	
9 Oc	
10 Chuen	
11 Eb	
12 Ben	
13 Ix	
1 Men	
2 Cib	
3 Caban	
4 Ezanab	
5 Cauac	
6 Ahau	
7 Ymix	
8 Ik	
9 Akbal	
10 Kan	
11 Chicchan	
12 Cimi	
13 Manik	
1 Lamat	Mol
2 Muluc	
3 Oc	
4 Chuen	
5 Eb	
6 Ben	
7 Ix	
8 Men	
9 Cib	
10 Caban	
11 Ezanab	
12 Cauac	
13 Ahua	
1 Ymix	
2 Ik	
3 Akbal	

Days.	*Months.*
4 Kan	
5 Chicchan	
6 Cimi	
7 Manik	
8 Lamat	Chen
9 Muluc	
10 Oc	
11 Chuen	
12 Eb	
13 Ben	
1 Ix	
2 Men	
3 Cib	
4 Caban	
5 Ezanab	
6 Cauac	
7 Ahau	
8 Ymix	
9 Ik	
10 Akbal	
11 Kan	
12 Chicchan	
13 Cimi	
1 Manik	
2 Lamat	Yax
3 Muluc	
4 Oc	
5 Chuen	
6 Eb	
7 Ben	
8 Ix	
9 Men	
10 Cib	
11 Caban	
12 Ezanab	
13 Cauac	
1 Ahau	
2 Ymix	
3 Ik	
4 Akbal	
5 Kan	
6 Chicchan	
7 Cimi	
8 Manik	
9 Lamat	Zac
10 Muluc	
11 Oc	
12 Chuen	
13 Eb	
1 Ben	
2 Ix	
3 Men	
4 Cib	
5 Caban	
6 Ezanab	
7 Cauac	
8 Ahau	
9 Ymix	
10 Ik	
11 Akbal	
12 Kan	
13 Chicchan	
1 Cimi	
2 Manik	
3 Lamat	Ceh
4 Muluc	
5 Oc	
6 Chuen	

Days.	*Months.*
7 Eb	
8 Ben	
9 Ix	
10 Men	
11 Cib	
12 Caban	
13 Ezanab	
1 Cauac	
2 Ahau	
3 Ymix	
4 Ik	
5 Akbal	
6 Kan	
7 Chicchan	
8 Cimi	
9 Manik	
10 Lamat	Mac
11 Muluc	
12 Oc	
13 Chuen	
1 Eb	
2 Ben	
3 Ix	
4 Men	
5 Cib	
6 Caban	
7 Ezanab	
8 Cauac	
* 9 Ahau	[End]
10 Ymix	
11 Ik	
12 Akbal	
13 Kan	
1 Chicchan	
2 Cimi	
3 Manik	
4 Lamat	Kankin
5 Muluc	
6 Oc	
7 Chuen	
8 Eb	
9 Ben	
10 Ix	
11 Men	
12 Cib	
13 Caban	
1 Ezanab	
2 Cauac	
3 Ahau	
4 Ymix	
5 Ik	
6 Akbal	
7 Kan	
8 Chicchan	
9 Cimi	
10 Manik	
11 Lamat	Muan
12 Muluc	
13 Oc	
1 Chuen	
2 Eb	
3 Ben	
4 Ix	
5 Men	
6 Cib	
7 Caban	
8 Ezanab	
9 Cauac	

Days.	*Months.*
10 Ahau	
11 Ymix	
12 Ik	
13 Akbal	
1 Kan	
2 Chicchan	
3 Cimi	
4 Manik	
5 Lamat	Pax
6 Muluc	
7 Oc	
8 Chuen	
9 Eb	
10 Ben	
11 Ix	
12 Men	
13 Cib	
1 Caban	
2 Ezanab	
3 Cauac	
4 Ahau	
5 Ymix	
6 Ik	
7 Akbal	
8 Kan	
9 Chicchan	
10 Cimi	
11 Manik	
12 Lamat	Kayab
13 Muluc	
1 Oc	
2 Chuen	
3 Eb	
4 Ben	
5 Ix	
6 Men	
7 Cib	
8 Caban	
9 Ezanab	
10 Cauac	
11 Ahau	
12 Ymix	
13 Ik	
1 Akbal	
2 Kan	
3 Chicchan	
4 Cimi	
5 Manik	
6 Lamat	Cumhu
7 Muluc	
8 Oc	
9 Chuen	
10 Eb	
11 Ben	
12 Ix	
13 Men	
1 Cib	
2 Caban	
3 Ezanab	
4 Cauac	
5 Ahau	
6 Ymix	
7 Ik	
8 Akbal	
9 Kan	
10 Chicchan	
11 Cimi	
12 Manik	

	Days.	Months.	Days.	Months.	Days.	Months.
Five intercalary days.	13 Lamat		3 Cib		7 Chicchan	
	1 Muluc		4 Caban		8 Cimi	
	2 Oc		5 Ezanab		9 Manik	
	3 Chuen		6 Cauac		10 Lamat	
	4 Eb		7 Ahau		11 Muluc	
			8 Ymix		12 Oc	
	5 Ben	Pop	9 Ik		13 Chuen	
	6 Ix		10 Akbal		1 Eb	
	7 Men		11 Kan		2 Ben	Mol
	8 Cib		12 Chicchan		3 Ix	
	9 Caban		13 Cimi		4 Men	
	10 Ezanab		1 Manik		5 Cib	
	11 Cauac		2 Lamat		6 Caban	
	12 Ahau		3 Muluc		7 Ezanab	
	13 Ymix		4 Oc		8 Cauac	
	1 Ik		5 Chuen		9 Ahau	
	2 Akbal		6 Eb		10 Ymix	
	3 Kan		7 Ben	Tzec	11 Ik	
	4 Chicchan		8 Ix		12 Akbal	
	5 Cimi		9 Men		13 Kan	
	6 Manik		10 Cib		1 Chicchan	
	7 Lamat		11 Caban		2 Cimi	
	8 Muluc		12 Ezanab		3 Manik	
	9 Oc		13 Cauac		4 Lamat	
	10 Chuen		1 Ahau		5 Muluc	
	11 Eb		2 Ymix		6 Oc	
	12 Ben	Uo	3 Ik		7 Chuen	
	13 Ix		4 Akbal		8 Eb	
	1 Men		5 Kan		9 Ben	Chen
	2 Cib		6 Chicchan		10 Ix	
	3 Caban		7 Cimi		11 Men	
	4 Ezanab		8 Manik		12 Cib	
	5 Cauac		9 Lamat		13 Caban	
	6 Ahau		10 Muluc		1 Ezanab	
	7 Ymix		11 Oc		2 Cauac	
	8 Ik		12 Chuen		3 Ahau	
	9 Akbal		13 Eb		4 Ymix	
	10 Kan		1 Ben	Xul	5 Ik	
	11 Chicchan		2 Ix		6 Akbal	
	12 Cimi		3 Men		7 Kan	
	13 Manik		4 Cib		8 Chicchan	
	1 Lamat		5 Caban		9 Cimi	
	2 Muluc		6 Ezanab		10 Manik	
	3 Oc		7 Cauac		11 Lamat	
	4 Chuen		8 Ahau		12 Muluc	
	5 Eb		9 Ymix		13 Oc	
	6 Ben	Zip	10 Ik		1 Chuen	
	7 Ix		11 Akbal		2 Eb	
	8 Men		12 Kan		3 Ben	Yax
	9 Cib		13 Chicchan		4 Ix	
	10 Caban		1 Cimi		5 Men	
	11 Ezanab		2 Manik		6 Cib	
	12 Cauac		3 Lamat		7 Caban	
	13 Ahau		4 Muluc		8 Ezanab	
	1 Ymix		5 Oc		9 Cauac	
	2 Ik		6 Chuen		10 Ahau	
	3 Akbal		7 Eb		11 Ymix	
	4 Kan		8 Ben	Yaxkin	12 Ik	
	5 Chicchan		9 Ix		13 Akbal	
	6 Cimi		10 Men		1 Kan	
	7 Manik		11 Cib		2 Chicchan	
	8 Lamat		12 Caban		3 Cimi	
	9 Muluc		13 Ezanab		4 Manik	
	10 Oc		1 Cauac		5 Lamat	
	11 Chuen		2 Ahau		6 Muluc	
	12 Eb		3 Ymix		7 Oc	
	13 Ben	Tzoz	4 Ik		8 Chuen	
	1 Ix		5 Akbal		9 Eb	
	2 Men		6 Kan		10 Ben	Zac

Days.	*Months.*	*Days.*	*Months*	*Days.*	*Months.*
11 Ix		11 Manik		11 Ahau	
12 Men		12 Lamat		12 Ymix	
13 Cib		13 Muluc		13 Ik	
1 Caban		1 Oc		1 Akbal	
2 Ezanab		2 Chuen		2 Kan	
3 Cauac		3 Eb		3 Chicchan	
4 Ahau		4 Ben	Ceh	4 Cimi	
5 Ymix		5 Ix		5 Manik	
6 Ik		6 Men		6 Lamat	
7 Akbal		7 Cib		7 Muluc	
8 Kan		8 Caban		8 Oc	
9 Chicchan		9 Ezanab			
* 10 Cimi		10 Cauac			

The reader, in making use of this list, must bear in mind that it is one continuous series of consecutive days, without a single break from beginning to end. The second column on each page follows the end of the first, and the third the end of the second; and the first column of each page follows the third column of the preceding page throughout the table. The reason for commencing the list with 9 Lamat will appear hereafter.

Before proceeding further it is necessary to give the reasons for concluding that in the series now under consideration the count is not from the first day of the month, that is to say, from Kan, Muluc, Ix, and Cauac, as appears to have been the usual custom, but from the last days, that is to say, from Akbal, Lamat, Ben, and Ezanab. Referring to table 2, under plate 46, it will be seen that 3 Cib is there given as the fourth day of the month Yaxkin, and 5 Cib as the nineteenth day of the month Tzec. Now, if the year, and consequently the months also, began with Ix, then Cib would be the third day; but if it commenced with Ben, as shown in the "Ben column" in table 3, it would be the fourth day. If the year commenced with Kan, then Cib would be the thirteenth day, and the fourteenth if it commenced with Akbal. If the year began with Muluc, it would be the eighth day, and the ninth if it commenced with Lamat. If the year began with Cauac, Cib would be the eighteenth day, and the nineteenth if it commenced with Ezanab.

It is evident, therefore, that the dates given can be explained only on the theory that the count began with the day usually considered the last of the month in Ix years. This being true, it may be, as maintained by Dr. Seler, that at the time and place where the Dresden codex was formed it was the custom to commence the years with Akbal, Lamat, Ben, and Ezanab, instead of with Kan, Muluc, Ix, and Cauac, which would make the count begin with the last day of the month.

Although I have heretofore expressed some doubt concerning this point, yet, since the series can be traced on either plan, I have concluded to follow Dr. Seler's suggestion, and have constructed the preceding calendar tables on this plan. This obviates the necessity of using double dates, and also brings this system into harmony with the Tzental calendar.

Referring now to table 2 (page 20), and beginning with 3 Cib, on plate 46, the days may be counted, using the intervals at the bottom of the plate—11 months, 16 days; 4 months, 10 days; 12 months, 10 days; and 0 months, 8 days—which are given in red symbols in the original. According to these intervals, 4 months and 10 days must be counted from 3 Cib, the fourth day of Yaxkin, to reach 2 Cimi, the fourteenth day of Zac. From this point 12 months and 10 days must be counted to reach 5 Cib, the nineteenth day of the month Tzec; then 8 days to reach 13 Kan, the seventh day of the month Xul; next 11 months and 16 days to reach 2 Ahau, the third day of the month Cumhu on plate 47; and so on.

As heretofore explained, the counter under a column indicates the interval between the day over the preceding column and the day over the column under which it stands. As there is a counter under the first (left-hand) column of plate 46, with which the record begins, it must denote that the count commences with a day 11 months and 16 days preceding 3 Cib, the fourth day of Yaxkin. It may also be observed in the figure columns between the upper and lower lines of month names that the first column is 11 months and 16 days; hence the series must begin with a day 11 months and 16 days preceding that over this column.

In counting intervals of time, as is well understood, the first interval includes the first and last days thereof, while those which follow exclude the last day reached and commence with the following day. Thus, from Sunday to Saturday is seven days; to the next Saturday is seven days, and so on. So it is necessary to commence with 3 Cib, the fourth day of Yaxkin, which is marked on the list of days (table 6) with an asterisk, and count back 11 months and 16 days, or 236 days. As Yaxkin is always the seventh month of the year, then from the commencement of the year to the fourth day of Yaxkin (including both days) must be 6 months and 4 days, or 124 days. Counting back this number of days from 3 Cib, 10 Ben (the first day of the month Pop) is reached, and this is the first day of the year. This year is, therefore, 10 Ben, according to the system adopted, and by turning to table 3 it is seen that Cib can be the fourth day of the month only in Ben years. Counting back the five intercalary days of the preceding year 4 Manik, the last day of the preceding year proper, and consequently of the months, is next reached. Lamat must, therefore, be the first day of the months and of the year. One hundred and twenty-nine days being now counted, 107 more remain, and these, commencing with 4 Manik, bring us to 2 Ymix, the fourteenth day of the month Mac. The count therefore begins, in fact, with 2 Ymix, which is the fourteenth day of the month Mac, the thirteenth month of the year 9 Lamat.

That Ymix was generally placed as the first of the series among the Maya tribes is evident from the lists which have been preserved by

early authors. For example, the Maya, Tzental, and Quiché-Cakchiquel lists are usually given as follows:

Usual day names in the Maya, Tzental, and Quiché-Cakchiquel dialects.

	MAYA.	TZENTAL.	QUICHÉ-CAK.
1	Ymix (or Imix)	Imox	Imox
2	Ik	Igh	Ik
3	Akbal	Votan	Akbal
4	Kan	Ghanan	Kat
5	Chicchan	Abagh	Can
6	Cimi	Tox	Camey
7	Manik	Moxic	Queh
8	Lamat	Lambat	Canel
9	Muluc	Molo	Toh
10	Oc	Elab	Tzi
11	Chuen	Batz	Batz
12	Eb	Euob	Ee
13	Ben	Been	Ah
14	Ix (or Hix)	Hix	Balam
15	Men	Tziquin	Tziquin
16	Cib	Chabin	Ahmak
17	Caban	Chic	Noh
18	Ezanab	Chinax	Tihax
19	Cauac	Cahogh	Caok
20	Ahau	Aghaual	Hunahpu

Why Ymix was not chosen as one of the "year-bearers" is a mystery which is not yet solved. It is probable, however, that this order came down from a time previous to the adoption of the four-year series. It is evident from Landa's language and from some series in the codices that Ymix was selected as the day with which to begin certain chronologic periods. This author's language, which is somewhat peculiar, is as follows:

> It is curious to note how the dominical letter always comes up at the beginning of its year, without mistake or failing, and that none of the other twenty letters appear. They also use this method of counting in order to derive from certain letters a method of counting their epochs and other things, which, though interesting to them, does not concern us much here. It is enough to say that the character or letter with which they begin their computation of the days of their calendar is always *one Ymix*, which is this,  , which has no certain or fixed day on which it falls. Because each one changes its position according to his own count; yet, or all that, the dominical letter of the year which follows does not fail to come up correctly.*

It seems probable that a wrong inference has been drawn from this language by writers. It does not declare that the "dominical letter" was Ymix; on the contrary, a careful analysis of his language

*Relacion de las Cosas de Yucatan, p. 236.

shows clearly that he refers thereby to the year bearers, as he says, "They also use this method of counting in order to derive from certain letters a method of counting their epochs and other things." But the list of days commenced with "one Ymix," and this was considered the commencement of their calendar as Ce Cipactli was of the Nahautl calendar. He also expressly distinguished the "dominical letter" from this day. As he says, it "* * * has no certain or fixed day on which it falls. Because each one changes its position according to his [its] own count; yet, for all that, the dominical letter of the year which follows does not fail to come up correctly." Now it is apparent from this language that by "dominical letter" he alludes to the year-bearer and not to Ymix. It is possible, therefore, that the illustration given him was from a series like that now under consideration, which started with this day.

Returning now to 3 Cib in the list of days (table 6), the count must be carried forward 4 months and 10 days (or 90 days). As this is the fourth day of the seventh month (Yaxkin), this should reach the fourteenth day of Zac, the eleventh month; this is 2 Cimi, which agrees with the record, plate 46. Now, counting forward 12 months and 10 days, it will require (since 2 Cimi is the fourteenth day of the eleventh month, Zac) 7 months and 6 days to reach the end of the year, which in this case, not counting the five intercalary days, will be 5 Eb. If there were no intercalary days, then the next year would commence with 6 Ben, as the days must always follow one another in regular sequence. As 5 months and 4 days remain to make up the 12 months and 10 days, if the count is continued, commencing with 6 Ben and without allowing for the five intercalary days, 5 Cib is reached, and this is the proper day as given in the third column of plate 46. But instead of being the nineteenth day of the fifth month, Tzec, it is the fourth day of the sixth month, Xul, for the months of this year would all commence five days earlier than is given in the table. As this extends five days beyond the date given in the codex (third column, plate 46), it proves beyond controversy that the five days should be added before commencing the next year. In order to make this clear, the several steps of the count forward, from 2 Cimi, the fourteenth day of the eleventh month, Zac, will be noted.

Counting 6 days, 8 Eb, the last day of Zac is reached; then follows the month Ceh, 20 days; Mac, 20 days; Kankin, 20 days; Muan, 20 days; Pax, 20 days; Kayab, 20 days; and Cumhu, 20 days, ending with 5 Eb, making in all 7 months and 6 days (or 146 days). Adding to these the 5 intercalary days—6 Ben, 7 Ix, 8 Men, 9 Cib, and 10 Caban—the sum is 7 months and 11 days (or 151 days), leaving 4 months and 19 days (or 99 days) of the 12 months and 10 days to be counted. The reader will also observe that the next day of the list is 11 Ezanab, the first day of the month Pop, and consequently the first

day of a new year; therefore the count of this year begins with 11 Ezanab. It would be well in this connection to refer to the calendar, table 3 (page 21), as occasion will arise to use it. We count now the month Pop, 20 days; Uo, 20 days; Zip, 20 days; Tzoz, 20 days; then to the nineteenth day of the month Tzec makes 4 months and 19 days to complete the 12 months and 10 days. This carries the count to 5 Cib, the nineteenth day of the month Tzec, which agrees with the date over the third column, plate 46. Eight days more reach 13 Kan, the seventh day of the month Xul, the date over the fourth column of plate 46. Counting 11 months and 16 days from 13 Kan, the seventh day of Xul, 2 Ahau, the third day of the eighteenth month, Cumhu, is reached. This accords with the date over the first column of plate 47. As the next count is 4 months and 10 days it is evident that it runs into the next year, which, as the present is 11 Ezanab, should, under the system above outlined, be 12 Akbal. Counting 17 days, 6 Caban, the last day of the month is reached; five more carry the count to 11 Ik, the last of the intercalary days, and the close of the complete year.

As the next day is 12 Akbal, the first of the month Pop, it is the commencement of another year. As 22 days, or 1 month and 2 days, have now been counted, there remain of the 4 months and 10 days only 3 months and 8 days (or 68 days). These bring the count to 1 Oc, the eighth day of the month Tzoz, the date over the second column of plate 47. Continuing the count, 12 months and 10 days more we reach 4 Ahau, the eighteenth day of the month Pax, the date over the third column of plate 47. Eight days more extend to 12 Lamat, the sixth day of the month Kayab. The count must now be carried forward 11 months and 16 days in order to reach the first day of the first column in plate 48. Counting forward from this point 1 month and 14 days (or 34 days), we reach 7 Ik, the end of Cumhu, and hence the close of the year proper. Adding the five intercalary days—8 Akbal, 9 Kan, 10 Chicchan, 11 Cimi, and 12 Manik,—13 Lamat, the first day of the month Pop is reached, and with it the beginning of another year. As 1 month and 19 days have now been counted, there remain of the 11 months and 16 days, the period of 9 months and 17 days. Starting with 13 Lamat, the first day of Pop, this brings the reckoning to 1 Kan, the seventeenth day of the month Yax, the date over the first column of plate 48. Four months and 10 days more extend to 13 Ix, the seventh day of Muan, the date over the second column of plate 48. Twelve months and ten days more would extend to 3 Kan, the twelfth day of Chen; but as this runs into the next year, the steps are noted.

Counting forward from 13 Ix, the seventh day of Muan, to 8 Manik, the last day of Cumhu, there are found to be 3 months and 13 days; and the five intercalary days reach 13 Eb, the last day of the year. Following this is 1 Ben, the first day of the month Pop, and also of the next year. As 3 months and 18 days have been counted, there remain 8 months and 12 days out of the 12 months and 10 days. Counting these,

3 Kan, the twelfth day of Chen (the date over the third column of plate 48) is reached; and 8 days more terminate with 11 Eb, the twentieth day of Chen, which is the date over the fourth column of plate 48.

The method of reckoning having been set forth in the preceding paragraphs, the further count may now be indicated more briefly.

Starting with the last mentioned date, 11 months and 16 days extend to 13 Lamat, the eleventh day of Zip, the date over the first column of plate 49. This count passes from a Ben year to an Ezanab year, including the five intercalary days. It is needful also to note the order and number of the years in passing, as this is a very important part of the Maya calendar. By looking back over the list of days, and noting the first day of the month Pop in the different years, the names and numbers of the years are found. Beginning with 9 Lamat, the year containing 2 Ymix, the first day of our series, 10 Ben follows, next 11 Ezanab, then 12 Akbal, 13 Lamat, 1 Ben, and 2 Ezanab, the year now reached.

Counting forward 4 months and 10 days from 13 Lamat, 12 Ezanab, the first day of Mol is reached, the date over the second column of plate 49. Then 12 months and 10 days extend to 2 Lamat, the sixth day of Uo, in the year 3 Akbal; and eight days more reach 10 Cib, the fourteenth day of Uo, the date over the fourth column of plate 49. Eleven months and 16 days more reach 12 Eb, the tenth day of Kankin, the date over the first column of plate 50; and 4 months and 10 days more end with 11 Ik, the twentieth day of Cumhu. Counting now 12 months and 10 days (including the five intercalary days), 1 Eb, the fifth day of the month Mac, in the year 4 Lamat is reached; and eight days more carry the count to 9 Ahau, the thirteenth day of Mac, the date over the fourth column of plate 50.

This is the end of the series formed by the top line of days of the columns on plates 46–50, reading from left to right, and taking the plates in the order of numbering. This line, and the order in which the dates have been taken, is shown in table 1 (page 18).

That it is necessary to count the five intercalary days at the end of each year is rendered evident by the following facts:

1. The dates given on the plates can not be assigned to any year-series in which all the years commence with a given day, which must necessarily be the case if but 360 days are counted to a year. As evidence of this, it is only necessary to call attention again to the fact that Cib is the fourth day of the month only in the years beginning with the day Ben; while Ahau (first column, plate 47) is the third day of the month only in years commencing with the day Ezanab, and is the eighteenth day (third column, plate 47) only in years beginning with the day Akbal; while Kan is the seventeenth day (first column, plate 48) only in years beginning with the day Lamat.

2. As has been shown by the list of days, the dates given can be reached (using the counters on the plates) only by adding the five supplemental days at the end of each year.

3. As shown by this list, the years follow each other in the order heretofore given, that is to say, 9 Lamat, 10 Ben, 11 Ezanab, 12 Akbal, 13 Lamat, 1 Ben, 2 Ezanab, 3 Akbal, and 4 Lamat, the upper line of days ending with 9 Ahau, the thirteenth day of the thirteenth month, Mac, of the last named year.

The entire series, commencing with 2 Ymix, the thirteenth day of Mac, in the year 9 Lamat, and ending with 9 Ahau, the twelfth day of Mac, in the year 4 Lamat, consists of 2,920 days, or precisely eight years of 365 days each.*

Having reached the end of the series consisting only of the top days of the columns, the question arises, Does the series continue to the second line of days, and so on to the end of the bottom, or thirteenth horizontal line? If so, counting 11 months and 16 days from 9 Ahau, over the last column of plate 50, should reach 11 Cib, the fourth day of Yaxkin, which is the second day of the first column of plate 46, and the beginning of the second horizontal line of days. This line, as will be seen by turning to the series of columns heretofore given in table 1 (page 18), is as follows:

Plate 46–	11 Cib.	10 Cimi.	13 Cib.	8 Kan.
47–	10 Ahau.	9 Oc.	12 Ahau.	7 Lamat.
48–	9 Kan.	8 Ix.	11 Kan.	6 Eb.
49–	8 Lamat.	7 Ezanab.	10 Lamat.	5 Cib.
50–	7 Eb.	6 Ik.	9 Eb.	4 Ahau.

The lines follow each other in a single continuous series. Turning now to 9 Ahau (in table 6, page 39) the thirteenth day of Mac, in the year 4 Lamat, the day with which the first line ended, and counting from this 11 months and 16 days, including the five supplemental days at the end of the year, 11 Cib, the fourth day of Yaxkin in the year of 5 Ben is reached. This is the second day of the first column on plate 46. A count of 4 months and 10 days more reaches 10 Cimi, the fourteenth day of the month Zac, which is the second day of the second column of plate 46. And so the count may be continued to 1 Ahau, the last day of the fourth column on plate 50, and the last of the complete series of thirteen lines, covering in all a period of 104 years, or two cycles. But to complete this series only the upper line of months on table 2 has been used. This series, as above stated, ends with 1 Ahau, the thirteenth day of Mac, the thirteenth month of the year 9 Lamat, but a year of a different cycle from that in which the count began. If the count is carried 11 months and 16 days from this date it will reach 3 Cib, the fourth day of Yaxkin in the year 10 Ben, precisely the year in which the first 3 Cib is found. This shows that the series is complete, as it returns to the starting point.

* It will be seen by reference to my paper entitled "Aids to the study of the Maya codices," 6th Ann. Rep. Bur. Ethn., p. 302, that the conclusion there reached is shown by the discovery here explained to be incorrect. I had not found at that time satisfactory evidence of the introduction of the five supplemental days or of the four series of years.

This result must necessarily be true, as the series comprises exactly two cycles (i. e., between Cib and Cib—the count back to Ymix being arbitrary); moreover, it contravenes the supposition that one or more days are added after certain periods to compensate for the fraction of a day required to render the year exact. Even were these added days without names, the numbering would go on, and would become manifest in the count. To assume that they were added without name or number is a mere hypothesis. If the count runs through 104 years according to the regular system, without the loss or addition of a day, very positive evidence will be required to show the addition of these compensating days.

It may be said that the foregoing count has not extended through the entire series, and that added days may be found somewhere before the end is reached. But the contrary is readily shown by referring to table 1. As all the days in a column are the same, and the intervals the same for all the horizontal lines, it is evident that the number of days in each horizontal line is the same. It is therefore certain that there are no supernumerary days in the entire series.

The count given above also shows that the series just examined, which is based on the upper line of month symbols, does not form a connection with that of the second line of month symbols which commences with 3 Cib, the ninth day of the month Zac* in the year 3 Lamat. This series, although using the same day columns and the same counters or intervals as those of the first line of month symbols, must necessarily be distinct; for if continuous it should commence with precisely the same date as the first, since it starts a new cycle, or perhaps more correctly at the same point in the cycle as the first. If this second series is traced through in the same way as the first, it is necessary to remember to count back 11 months and 16 days from 3 Cib, the ninth day of Zac, to ascertain the initial day of the series. This is found to be 2 Ymix, the nineteenth day of the month Kayab in the year 2 Akbal. It is worthy of notice that here also the count begins with Ymix, and, like the other, 2 Ymix; but a study of the system will make it apparent that this result must necessarily follow unless there is an arbitrary break, or a duplication of one or more days.

The lowest of the three series, in which the first date on plate 46 is 3 Cib, the nineteenth day of Kayab, if traced back is found also to commence with 2 Ymix. As 3 Cib, the nineteenth day of Kayab, falls in the year 3 Ezanab, counting back 11 months and 16 days reaches 2 Ymix, the fourth day of the month Xul of the same year.

*The 8 Zac in the second month line, first column, plate 46, is an evident mistake on the part of the scribe, as Cib can never be the eighth day of the month, according to the calendar followed above. According to the usual system, where the years begin with Kan, Muluc, Ix, Cauac, it would be the eighth day of the Muluc years. This looks a little like a slip back to a usual method, where the scribe was trying to follow an unusual system.

As each of the three series consists of 104 years, the three together make 312 years, the length of one grand cycle. However, as they do not form a continuous series, it can not be maintained that they were intended to embrace that period; in fact, if arranged consecutively, in the order of time, there will be a break or interval between the close of the first series and the commencement of the second amounting to 19 years, and between the second and third a break of 27 years. It is therefore probable that all these series cover substantially the same period, that is, that they overlap one another. I shall not enter, at present, into a discussion of Dr. Förstemann's opinion that this series refers to the revolution of the planet Venus.

Chapter II.

DISCUSSION OF OTHER TIME SERIES.

An examination of other series which can be traced, and are of sufficient length to furnish a test, shows very clearly that they can all be explained in accordance with the year of 365 days and the four-year system, and that they contain nothing inconsistent therewith. In fact, as will be seen below, every series which does not give the days of the month, like that discussed in the previous chapter, will fit into the year of 365 days and the four year-series, and also into the year of 360 days. But the latter must always begin with the same day; for it is evident to everyone that years of 360 days, consisting of eighteen months of twenty days each, the twenty days having each a distinct name and always following one another in the same order, must commence with the same day, unless there is an arbitrary change.

On plate 30 of the Dresden codex there are the four day-columns here given, with the red numeral XI over each. This red numeral, as explained in a former paper,* is the "week" number to be joined to each day of the column over which it is placed. The record is as follows:

XI	XI	XI	XI
Ahau	Chicchan	Oc	Men
Caban	Ik	Manik	Eb
Ix	Cauac	Kan	Muluc
Chuen	Cib	Ymix	Cimi
Lamat	Ben	Ezanab	Akbal

Extending from the right of this group, and running through the lowest division to the middle of plate 33, there is a numeral series consisting of nine pairs of numbers, each pair the same (13 and XI), the former black, the latter red. The black is the counter or interval, and the red the week number of the day reached. The sum of the black numbers (9×13) is 117, which is the interval between the successive days of each column; thus, from 11 Ahau to 11 Caban is 117 days, and so on down to Lamat, the last day of the left-hand column. From 11 Lamat to 11 Chicchan, the first day of the second column, is also 117 days, and so on to the last day of the fourth column. These four columns, therefore, form one continuous series of 2,223 days, commencing with 11 Ahau and ending with 11 Akbal; but by adding 117 more days

*"Aids to the Study of the Maya Codices," op. cit., pp. 290-291.

to complete the cycle to 11 Ahau—which appears to be the plan of these series—the total is 2,340 days, or 9 cycles of 260 days each, or, in other words, nine sacred years.

Turning now to table 3 (page 21), and selecting 11 Ahau in either column and counting forward continuously, using the same day column without adding the five days, it will be seen that the proper days will be reached.* For example, Ahau, the third day in the Ezanab column, may be selected, and the count may be carried from 11 opposite in the fourth number column. Continuing from this 117 days, 11 Caban, the twentieth day of the ninth number column is reached; 117 days from this (going back to the first column when the thirteenth is completed) ends with 11 Ix, the seventeenth day of the second number column; 117 more with 11 Chuen, the fourteenth day of the eighth number column; 117 more with 11 Lamat, the eleventh day of the first column; and so on to the end. It is evident, therefore, that the series can be traced in years of 360 days, if these years begin with the same day.

An attempt will now be made to trace it in accordance with the usual calendar system. However, as it appears to be usual in this codex to begin the years and months with the days usually considered the last, as has been found true of the series on plates 46–50, it may be taken for granted that the same rule holds good here. If the reader has learned how to count by the compound calendar, table 3, it may be used in following the explanation. As there is nothing whatever in the series to indicate the years to which it is applied, it must be considered of general application, and may begin in any year. The year 1 Akbal, in which 11 Ahau falls on the eighteenth day of the thirteenth month, Mac, may therefore be selected. Carrying the count forward from this date 117 days, or five months and seventeen days, the next year, which should be 2 Lamat, is entered. Counting now five months and two days (or 102 days), 9 Ik, the last day of the year proper, is reached, and five days more end with 1 Manik, the last of the added days; 2 Lamat will therefore be the first day of the next year. As 107 days have now been counted, the further count of 10 days, commencing with 2 Lamat, extends to 11 Caban, the second day in the left-hand column of our series. This is the tenth day of the first month, Pop, of the year 2 Lamat. Counting forward from this, 117 days reaches 11 Ix, the seventh day of the seventh month, Yaxkin. As this is the third day in the series, the count is carried forward 117 days more and reaches 11 Chuen, the fourth day of the thirteenth month, Mac; and 117 days more reaches 11 Lamat, the last day of the column. This is found to be the first of the supplemental days of the year 2 Lamat. In taking the next step, four days are counted in this year and 113 days in the year 3 Ben. This period of 117 days closes with 11 Chicchan, the first day of the second column of the series given above.

*For the method of using this calendar, the reader is referred to my "Study of the Manuscript Troano," op. cit., pp. 11-13.

It is manifest from this examination that all series constructed on the plan of this one are adjustable to the calendar system with the year of 365 days and the four year-series.

Referring now to the long series on plates 53–58 of the same codex, the first five columns from the commencement in the upper division of plate 53 are given, inserting two corrections in the upper numerals which the counters below show to be required. These corrections, however, which were first made by Dr. Förstemann, and are absolutely necessary to the order of the series, in no way affect the question now at issue. The series is as follows:

		1	1	2
8	17	7	15	6
17	14	2	14	16
6 Kan	1 Ymix	6 Muluc	1 Cimi	9 Akbal
7 Chicchan	2 Ik	7 Oc	2 Manik	10 Kan
8 Cimi	3 Akbal	8 Chuen	3 Lamat	11 Chicchan
8	8	7	8	8
17	17	8	17	17

The numbers below the columns denote the intervals in months and days; thus, from 6 Kan to 1 Ymix, is 8 months and 17 days; from 1 Ymix to 6 Muluc is 7 months and 8 days; from 6 Muluc to 1 Cimi is 8 months and 17 days; and so on. As there is also an interval of 8 months and 17 days under the first column, it is necessary to count back 8 months and 17 days from 6 Kan to find the initial day of the series. The numerals over the columns indicate the sum of the intervals, at any given column, from the initial day of the series. Thus the numbers in the lowest line may be considered days, or units of the first order, of which twenty make one unit of the second order; the second line may be considered months, or, as Dr. Förstemann holds, units of the second order, of which eighteen make a unit of the third order; and the upper line years (of 360 days), or units of the third order, one of which equals 360 units of the first order. Hence, the numbers $\begin{cases} 1 \\ 7 \\ 2 \end{cases}$ over the third column equal $360+140+2=502$ days, or 1 year (of 365 days), 6 months and 17 days.

As there is nothing in the series to indicate the year in which it begins, it may be assumed to commence in a year in which Kan is the seventeenth day of the month. This is found to be a Lamat year, and counting back 8 months and 17 days from 6 Kan, 12 Lamat is reached; and this, as it is the first day of a month, may be assumed to be the first day of a year. According to this reckoning 6 Kan of the first column of the series will be the seventeenth day of the ninth month, Chen, of the year 12 Lamat. Counting forward from this day, 8 months and 17 days carries the reckoning to 1 Ymix, the fourteenth day of the eighteenth month, Cumhu, which is the first day of the second column

of the series. Counting forward from this 7 months and 8 days, 6 Muluc, the first day of the third column should be reached, but the count passes into the second year. Counting forward 6 days which remain of the month Cumhu and the 5 intercalary days, 12 Eb is reached; hence the next year must begin with 13 Ben. Having counted 11 days, there remain 6 months and 17 days of the period of 7 months and 8 days. Commencing with 13 Ben, the first day of the month Pop, this period closes with 6 Muluc, which is the seventeenth day of the seventh month Yaxkin.

It is evident, therefore, that this series and all those similarly constructed can be explained according to the usual calendar system; and this will hold good if the count is begun in any one of the four years. It will be found true in the example just given if the reckoning begins with 6 Kan of the Akbal, Ben, and Ezanab years. A little study of the calendar will show that this must necessarily be true of all series regularly formed in which the months and days of the month are not given. As proof of this a short series arbitrarily formed for illustration, in which the intervals differ from one another, is presented:

			1
	6	12	3
	7	1	5
1 Kan	11 Chuen	8 Chicchan	10 Muluc
	6	5	9
	7	14	4

In this, as in the last example, the numbers below indicating the intervals are given in months and days. Turning to table 3 (page 21), 1 Kan, the second day of the year 13 Akbal, may be selected. It is, therefore, the second day of the month Pop. Counting forward, 6 months and 7 days we reach 11 Chuen, the ninth day of the month Yaxkin; then 5 months and 14 days end with 8 Chicchan, the third day of the thirteenth month, Mac. Assuming that the year consists of 365 days, there will remain to be counted in this year (13 Akbal) 5 months and 17 days, and the 5 intercalary days. This leaves to be counted 3 months and 2 days of the interval of 9 months and 4 days under the last column of the series. As the next year must, according to the rule, be 1 Lamat, the count commences with 1 Lamat, the first day of the month Pop; and being carried forward 3 months and 2 days extends to 10 Muluc, the second day of the fourth month Tzoz of the year 1 Lamat, and the last day of the series.

As proof that this series is constructed on the same plan as that on plates 53–58 of the Dresden codex, except that the intervals are arbitrarily given, it may be pointed out that each may also be traced on the theory that the year consisted of 360 days which always commenced with the same day. As the method of proving this has been shown above, further demonstration would seem to be unnecessary.

We conclude, therefore, that the only satisfactory proof from the codices in regard to the calendar system used therein is to be found in series which, like that on plates 46–50 of the Dresden codex, give the months and days of the month. Nevertheless it can readily be seen how the dates given in the other series may become fixed and determinate as regards their practical use if they were intended for this purpose. Referring again to that portion of the series on plates 53–58 of the Dresden codex, given above, the third column, in which the days are 6 Muluc, 7 Oc, 8 Chuen, may be selected. Let us suppose the priest wishes to determine at what time in the year the ceremony or observance referred to by this column and the written characters above is to take place. Of course he knows the name and number of the passing year. Let us suppose it is 2 Ben. By turning to his calendar or by counting the days he soon ascertains that 6 Muluc, 7 Oc, and 8 Chuen can fall, in this year, only on the seventeenth, eighteenth, and nineteenth days of the third month, Zip, and sixteenth month, Pax.

It is apparent, therefore, that if intended for any practical use, the time of year in which any of the dates of the series will fall can readily be determined for the passing year. There are, however, several of the numeral series of the Dresden codex which must have been inserted for other than a practical purpose in the sense indicated. In fact, some of them appear, so far as our knowledge yet extends, to have been given rather as exhibitions of the scribe's mathematical attainments than otherwise. Perhaps, however, Dr. Förstemann may be right in supposing they refer to the time periods of heavenly bodies.

As the chief object of this paper is accomplished in presenting the evidence that the various series of the codices can be traced according to the usual Maya calendar with the simple change of one day in beginning the list, and that the series on plates 46–50 of the Dresden codex can be explained only in accordance with that calendar, it is unnecessary to enter at present into a discussion of the objects and uses of these time periods. It is probable that these questions will not receive entirely satisfactory answers except through the interpretation of the written characters. The same is probably true of the signification of the day and month names which has recently occupied the attention of Dr. Edward Seler and Dr. D. G. Brinton.

Although they have added to our knowledge of the relation of the various calendars to one another, and have shown that probably most, if not all, of the corresponding day names are intended to express substantially the same ideas, yet the uncertainty which hangs about most of the definitions given is not likely to be dispelled until further advancement has been made in deciphering the written characters or further information has been obtained in regard to the origin and development of the calendar.

Chapter III.

CALENDAR OF THE INSCRIPTIONS.

One important result of the proof herein presented—i. e., that the calendar system of the Dresden codex was based on the year of 365 days and the four year-series commencing with the days Akbal, Lamat, Ben, and Ezanab—is that it enables students to decide positively that the same system was used in the inscriptions of Palenque, Lorillard City, and Tikal.

As proof of this, reference may be made first to the following combinations of day and month symbols on the Palenque tablet. The order in which the glyphs of this inscription are to be read, as first shown in my "Study of the Manuscript Troano" and now generally admitted, is by double columns, from left to right, commencing at the top; thus one reads across the top glyphs of the first two columns, then the next two glyphs, and so on to the bottom. The scheme of numbering the characters for reference is that adopted by Dr. Rau in his "Palenque Tablet."

On the right slab at T8 is the symbol 1 Kan, followed at S9 by 2 Kayab. This gives the year 6 Akbal. At S10 is 11 Lamat, followed at T10 by 6 Xul. As Lamat is the sixth day of the month only in Akbal years, this gives 10 Akbal as the year. Attention is also called to the fact that Kan is the second day of the month only in years commencing with Akbal. It is evident, therefore, that the calendar system of the Dresden codex is followed here. At U17, is 5 Kan, followed by 12 Kayab, which refers to the year 12 Ben. But one month symbol can be determined with certainty on the left slab. At D3 is 4 Ahau, followed at C4 by 8 Cumhu, giving the year 8 Ben. There are other combinations on this tablet by which the year series in which they are found may be ascertained, but the number of the year can not be determined as the month symbols are as yet unknown. For example, at X10 is 7 Kan, followed at W11 by 17 —(?) [month unknown]. As Kan is the seventeenth day of the month only in Lamat years (see table 3, page 21), it is known to belong to this year series, but the number of the year can not be determined without knowing the month referred to. It is possible that the month names used in this inscription are not the same throughout as those which have come down to us; or it may be that the symbols of some differ from those found in the Dresden codex. However, the symbols for Kayab, Xul, and Cumhu can be determined with reasonable if not positive certainty, a fact which, together with the other agreements noticed, renders it quite certain that the system followed in the two records is substantially the same. It is also sig-

nificant that if the four years above determined are placed in proper order, they will all fall in the same decade; thus:

6 *Akbal*	7 (Lamat)	8 *Ben*	9 (Ezanab)
10 *Akbal*	11 (Lamat)	12 *Ben*	13 (Ezanab)

Those in italics are the years determined by the symbols; the others are introduced to show the order in which they must follow one another.

On one of the casts made at Lorillard City by Charney, we find 3 Ymix followed by 14 —(?) [month not determined]. By turning to table 3, the reader will observe that Ymix can be the fourteenth day of the month only in Lamat years. As the name of the month is unknown, the number of the year can not be given.

It may be observed in passing that there appear, from Charney's casts, to be two classes of inscriptions at this locality, one of which is much older than the other, the former allied to but apparently older than those at Palenque, and the other allied to those of Tikal. These differences on the one hand and similarities on the other are quite marked.

On one of the Bernoulli inscriptions of Tikal, 3 Ahau is followed by 3 Mol (?). Although the identification of the month symbol is not beyond question, it is known that Ahau can be the third day of the month only in Ezanab years. In the same inscription 13 Akbal is followed by 1 —(?) [month unknown]. By reference to table 3, it will be seen that this must be the first day of the first or fourteenth month of the year 13 Akbal. On the same inscription also 11 Ik is followed by 15 —(?) [month unknown]. As Ik can be the fifteenth day of the month only in Lamat years, three out of the four year-series are thus ascertained. The proof is therefore positive that the same calendar system was used in the inscriptions at the three places named as in the Dresden codex.

It may of course be claimed that it does not necessarily follow from the identity in form of the day symbols that the names were the same. However, the evidence appears to be sufficient to prove that the calendar system was the same, and to render it highly probable if not certain that the significations of the day names, so far as determined, are substantially the same as those of the Maya calendar. It is true, though, that several symbols are found in these inscriptions which have numerals attached and apparently stand for days and months, yet are wholly different from any found in the Maya codices; and this fact indicates that the day and month names are not the same throughout, and hence pertain to other but closely allied calendars.

According to Dr. Brinton,* the dominical days or year-bearers of the Tzental calendar were Lambat (= Lamat), Ben, Chinax (= Ezanab), and Votan (= Akbal). This is in precise agreement with the calendar system of the Dresden codex and the inscriptions.

* "The Native Calendar of Central America and Mexico," p. 12.

Chapter IV.

ORIGIN OF THE CALENDAR.

I had not intended to offer at this time any suggestions in regard to the origin of the singular calendar described in the foregoing pages; but since the subject has recently been brought into discussion, both in this country and in Europe, it would seem fitting to refer to some data which apparently have a bearing on the question. According to Dr. Brinton:*

> We know to a certainty that essentially the same calendar system was in use among the Nahuas of the valley of Mexico and other tribes of the same linguistic family resident in Tlascallan and Meztitlan, Soconusco, Guatemala, and Nicaragua; that it prevailed among the Mixtecs and Zapotecs; and that of the numerous Mayan tribes, it was familiar to the Mayas proper of Yucatan, the Tzentals and Zotzils of Chiapas, the Quichés and Cackchiquels of Guatemala, and to their ancestors, the builders of the ruined cities of Copan and Palenque. There is no direct evidence that it had extended to the Huastecas of Maya lineage, on the Rio Panuco; but it was in vogue among the Totonacos, their neighbors to the south, on the Gulf of Mexico. The Pirindas, Matlazincas, and Tarascos of Michoacan had also accepted it, though perhaps not in a complete form. The Chiapanecs or Mangues, part of whom lived in Nicaragua and part in Chiapas, had also adopted it. The tribes above named belong to seven entirely different linguistic stocks, but were not geographically distant. Outside of the area which they occupied no traces of the calendar system, with its many and salient peculiarities, have been found, either in the New or Old World.

Two things are to be noted in any attempt to trace this singular calendar to its origin: first, that wherever we have found it, the peculiarities are substantially developed; and, second, that we find no traces of it among other American tribes than those named. It would be rash, however, to assume from these facts that it was not gradually developed from a simpler form. Where is this bud, this germ to be found? Notwithstanding the derision such propositions usually encounter, I present briefly some reasons for believing that we must look beyond the borders of our continent for it.

The special features of this calendar (though not all peculiar to it) are as follows: The division of the year into 18 months of 20 days, each day of the month having its special name; the intercalation of 5 days at the end of the last month to complete the 365; the method of counting by thirteens; the 9 "Lords of the night;" and the sacred period of 260 days.

I think we may safely assume that the natural basis of the division into months, or rather of the count by months, was the revolution and

*Native Calendar, op. cit., p. 5.

phases of the moon; that the mathematical basis was the count by the fingers, five being the primary week or period; and that a mystical reference to the cardinal points played a prominent part in its formation. The want of conformity of this system to the return of the seasons and the rising of certain constellations becoming apparent, the year of definite or approximately definite length, determined chiefly by the stars, came into use.

The religious festivals and ceremonies being governed chiefly by the phases of the moon, the effort properly to adjust the lunar and sidereal periods has given rise to different calendar systems, the approach to accuracy depending largely on the advance in culture and reliance on the sidereal measure.

Although the references to the calendars in use among the Polynesians and Melanesians are brief and incomplete, and generally confused from a lack on the part of writers of a correct knowledge of the system, yet, when carefully studied, they seem to furnish a clue to the origin of the Mexican and Central American calendar. As proof of this statement we present here some references, culled from the voluminous literature relating to the Pacific islands and their inhabitants.

Rev. Sheldon Dibble, who was the teacher of history in the Mission Seminary at Lahainaluna, writes as follows in his "History of the Sandwich Islands":*

Before proceeding further with the narrative it may be proper here to notice their ancient division of time and some few ancient traditions.

It is said that their division of time was made by their first progenitor, Wakea, at the time of his domestic quarrel, to which we have already alluded. Be this true or false, the tradition shows that their division of time was very ancient.

In their reckoning, there were two seasons, summer and winter. When the sun was perpendicular and moved toward the north, and the days were long, and the trees bore fruit, and the heat was prevalent—that was summer. But when the sun was perpendicular and moved toward the south, and the nights were lengthened, and the trees without fruit, and the cold came—that was winter. There were also six months in each season. Those of the summer were: Ikiki, Kaaona, Hinaiaeleele, Kamahoemua, Kamahochope, and Ikua. The winter months were: Welehu, Makalii, Kaelo, Kaulua, Nana, and Weio. These twelve months united constituted one year. Welehu was the completion of the year, and from Makalii the new year was reckoned. In one year there were nine times forty nights. The nights were counted by the moon. There were thirty nights in each month, seventeen of which were not very light, and thirteen were; the different nights (and days) deriving their names from the different aspects of the moon, while increasing, at the full, and waning. The first night was called Hilo (to twist), because the part then seen was a mere thread; the next, a little more plain, Hoaka (crescent); then Kukahi, Kulua, Kukolu, Kupua, Olekukahi, Olekulua, Olekukolu, Olekupau. When the sharp points were lost in the moon's first quarter, the name of that night was Huna (to conceal); the next, on its becoming gibbous, Mohalu, then Hua; and when its roundness was quite obvious, Akua. The nights in which the moon was full or nearly so, were Hoku, Mahealani, and Kolu. Laaukukahi was the name of the night in which the moon's decrease became perceptible. As it continued to diminish the nights were called Olaaukulua, Laaupau, Olekukahi, Olekulua, Olepau, Kaloakukahi, Kaloakulua, Kaloapau. When the

*Edition of 1843, pp, 24–26.

moon was very small the night was Mauli, and that in which it disappered, Muku. The month of thirty days is thus completed.

From each month four periods were selected, in which the nights were consecrated, or tabu. The following are the names: Kapuku, Kapuhua, Kapukaloa, and Kapukane. The first consisted of three nights, commencing with Hilo and terminating with Kulua; the second was a period of two nights, beginning with Mohalu and ending with Akua; the two nights, from Olepau to Kaloakulua; the fourth from Kane to Mauli.

It is mostly in reference to the sacred seasons that I have here introduced their division of time. The method of reckoning by the moon led, of course, to many irregularities. On a future page I may perhaps notice some of them.

On another page he makes the following statement: *

Those who took the most care in measuring time measured it by means both of the moon and fixed stars. They divided the year into twelve months, and each month into thirty days. They had a distinct name for each of the days of the month, as has been shown on a former page, and commenced their numbering on the first day that the new moon appeared in the west. This course made it necessary to drop a day about once in two months, and thus reduce their year into twelve lunations instead of three hundred and sixty days. This being about eleven days less than the sidereal year, they discovered the discrepancy and corrected their reckoning by the stars. In practice, therefore, the year varied, being sometimes twelve, sometimes thirteen, lunar months. So, also, they sometimes numbered twenty-nine and sometimes thirty days in a month.

Though their system was thus broken and imperfect, yet, as they could tell the name of the day and the name of the month when any great event occurred, their time can be reduced to ours by a reference to the phase of the moon at the time. But when the change of the moon takes place about the middle of our calendar month, then we are liable to a mistake of a whole month. We are liable to another mistake of a day from the uncertainty of the day that the moon was discovered in the west. Having nothing to rely upon except merely their memories, they were also liable to numerous mistakes from that source.

Although it is evident from this language that the author did not thoroughly understand the system, a careful examination will enable students to get at the main points, and, by the aid of a later writer, to gain a tolerably correct idea of the calendar. It is distinctly stated in each extract, notwithstanding the apparent contradiction in the latter, that the year consisted of twelve months and that there were thirty days (or nights) in each month. This, if there was no intercalation, would give 360 days to the year. This is confirmed by the additional statement that "in one year there were nine times forty nights," which I am inclined to believe would have been more correctly given by saying "there were forty times nine nights in a year."

It will be observed that in the second extract the author tries to explain the relation of the lunations to the twelve divisions of the sidereal year, arriving at the conclusion that "in practice" the years, and also the months, varied in length. Yet he states distinctly that those who took most care in measuring time (probably the priests) "measured it by means both of the moon and fixed stars;" and that at length having discovered a discrepancy of eleven days in their reckoning, they corrected

* P. 108.

it "by the stars." It is apparent, therefore, that the Hawaiians had a determinate sidereal year, and as he again avers that each of the thirty days of the month had its specific name (though he does not give them all), we may suppose that this error arose from a failure to intercalate the proper number of days, and not by dropping from an extra month. This supposition we find is confirmed by Judge Fornander in his "Polynesian Race,"* who says: "It is known that the Hawaiians who counted twelve months of thirty days each, intercalated five days at the end of the month *Welehu*, about December 20, which were tabu days dedicated to the festival of the god *Lono*; after which the new year began with the first day of the month *Makalii*." He also quotes from Dibble the second extract given above and corrects it thus: "Mr. Dibble omits to mention that the 'correction' of their reckoning 'by the stars' was made by the intercalation [the five days] I have referred to." "It thus appears," he continues, "that the Hawaiians employed two modes of reckoning—by the lunar cycles, whereby the monthly feasts or kapu-days were regulated; and the sidereal cycle, by which the close of the year and the annual feast of Lono was regulated."† The same writer asserts that the public sacrifices and kapu days were observed only *during eight months* of the year, and discontinued during the months of Ikuwa, Welehu, Makalii, and Kaela, when in the month of Kaulua they recommenced.

The names of the months and days as given by him are as follows:

MONTHS.

1 Makalii	4 Nana	7 Kaaona	10 Hilinama
2 Kaela	5 Welo	8 Hinaieleele	11 Ikuwa
3 Kaulua	6 Ikiiki	9 Hilinehu	12 Welehu

DAYS.

1 Hilo	11 Huna	21 Ole-ku-kahi
2 Hoaka	12 Mohalu	22 Ole-ku-lua
3 Kukahi	13 Hua	23 Ole-pau
4 Ku-lua	14 Akua	24 Kaloa-ku-kahi
5 Ku-kolu	15 Hoku	25 Kaloa kulua
6 Ku-pau	16 Mahealani	26 Kaloa-pau
7 Ole-ku-kahi	17 Kulu	27 Kane
8 Ole-ku-lua	18 Laau-ku-kahi	28 Lono
9 Ole-ku-kolu	19 Laau-ku-lua	29 Mauli
10 Ole-ku-pau	20 Laau-pau	30 Muku

Now, the points in which this Hawaiian calendar agrees with that of Mexico and Central America may be specially noted, since the former may have furnished the basis of some of the peculiarities of the latter.

First, attention is called to the fact that the Hawaiians had two periods—one the sidereal year of 365 days, or twelve months of thirty days each and five added days; the other the sacred period of about 240

* Vol. I, p. 119 (1878). † Vol. I, p. 120, note.

days, or eight months. The Mexicans and Central Americans had their regular or sidereal year of 365 days, consisting, however, of eighteen months of twenty days each and five added days; and they, too, had a sacred year or period of 260 days. There are, however, four points in what has been mentioned in which they agree: The length of the year; the intercalation of five days; the fact that this intercalation was by adding the five days at the end of the last month; and in having a sacred period of about two-thirds of the year. As this sacred period included eight months of thirty days, or 240 days, it varied but little in length from that of the Mexicans, which embraced 260 days. The Zuñis, according to Mr. Cushing, had a sacred period of between eight and nine lunar months. This period was the portion of the year considered sacred, or during which religious observances of a certain character took place. Possibly this was not strictly observed in practice at the time of the Spanish conquest, but used, nevertheless, as a period in their calendar system. If one such period was included in each year then the system is not comparable with the Hebrew and Chaldeo-Assyrian twofold manner of commencing the year; nor with the Egyptian system by which the lunar and solar years were made to coincide at the end of each "Apis period" of twenty-five years.

That this sacred period was included in, or formed a part of, each year among the Hawaiians is positively stated in the above extract from Judge Fornander's work. Mr. Cushing also informs me that it was so with the Zuñis. That it was also true in regard to the Mexican calendar seems to be indicated in some of the time series in the Mexican codices. For example, in the Borgian codex (and all were formed on the same plan) the time series on plates 31–38 (to be read to the left) is bordered above and below by a line of symbolic figures, each line containing 52, or the two together 104. These added to the 260 of the five interior lines, give 364, lacking but one day of the complete year. As they exactly fill out the spaces according to the scheme, we may suppose this to be the reason why the odd day was omitted; or it is possible there was some other reason understood by the priests. At any rate, the explanation given is not a rash one. It is a singular coincidence that in an ancient Javanese manuscript five days of the calendar are represented in the same manner by symbolic figures.*

Bastian, speaking of the Maori, makes a remark which implies that this people also had a sacred period. He says, "They * * * reckoned *nine months* and then *three months* from the tenth month or Ngakuru, the unemployed months (March, April, May,) in which season the Kumara were harvested and the planting began again in June."† Although apparently relating to agricultural pursuits, we must bear in mind the fact that these among aboriginal tribes were largely regulated by religious ceremonies.

* Crawfurd, "Indian Archipelago," vol. I, plate 7.

† Inselgruppen, p. 199.

A statement by Crawfurd leads to the belief that there was also a portion of the year considered sacred by the Javanese. It is as follows:

For astrological purposes the thirty *wukus* are divided into six periods, each of which is considered to be unpropitious to some portion of animal or vegetable nature. The first is considered unpropitious to man, the second to quadrupeds, the third to trees, the fourth to birds, the fifth to seeds or vegetables, and the sixth to fishes. Each of these divisions has been said to consist of thirty-five days or seven Javanese weeks, which would make the ancient Javanese year a cycle of 210 days. I rather suspect that it consisted of twice that number, or 420, and that the *wukus* expressed fortnights or half lunations. This interesting point would be determined by investigations conducted in the island of Bali, where I have reason to believe that this civil, or rather ritual year or period still obtains. *

The second point in which the Hawaiian calendar resembles the Mexican is the intercalation of five days—which were considered tabu days—at the end of the last month to complete the year. The fact that this was true in reference to the calendars of some of the peoples of the Old World does not affect the bearing of this fact on the question under discussion, as the Polynesians (at least the lighter-colored race; and it is among them only that these more advanced calendars are found) are admitted to have had their origin at some point in southeastern Asia; in other words, that they probably pertain to the Malay race. Hence it is not impossible or even improbable that some Polynesian customs may be traced back to the Old World. The same may be said of the fact that each day of the month has its name, another point in which the calendars of Hawaii and Mexico agree. It is true that in the former the month consisted of thirty days, while in the latter it contained only twenty; but of this we shall speak farther on.

This naming of the days was true of other Polynesian calendars, as that of Society Islands, of Marquesas, Samoa, New Zealand, etc., also of the old Javanese calendar. In some cases the days appear to have had two names, one series being that of the deities supposed to preside over them. This appears to have been true of the old Samoan, New Zealand, and Javanese calendars, and Dr. Seler states that the same was true of the Mexican calendar. The importance of this fact in this connection is that Mr. Taylor gives us, in his "Te Ika a Maui,"† the names of the thirty deities who preside over the days of the month, together with the things over which they preside. In this list we find the pigeon (though the corresponding word in the Hawaiian language signifies the kite); also the shark, stone, dog, lizard, wind, dew, and birds or bird in the general sense. Now it is a somewhat strange coincidence that we find the following among the Mexican days: An unknown sea monster which may be a shark, swordfish, or alligator (the same uncertainty applies to the Maori day); wind; water; dog; the eagle (in the corresponding Tzental and Quiché names "bird in general"); lizard, and flint. Is this coincidence merely accidental? If it stood alone, it would be best to assume this to be the case, but when

* Op. cit., p. 295. † Pp. 135–136.

it is in line with the other coincidences mentioned such an explanation is not satisfactory.

The statement in the preceding quotation from Dibble, that "in one year there were nine times forty nights," would certainly not have been used by him unless there had been a method of counting by nines. This brings at once to mind the method the Mexicans had of counting, for some special purposes, by nines. This count, as in the Hawaiian calendar, referred to the nights, and the period was supposed to be ruled over by the so-called "Nine lords of the night." These periods are marked on the time series of the Mexican codices by footprints.

Another statement in the same quotation, which, to say the least, is remarkable, is that "There were thirty nights in each month, seventeen of which were not very light and thirteen were." Why this division unless it accorded with some method the natives had of dividing the month? It is this method of counting by thirteens in the Mexican and Central American calendar which Dr. Brinton rightly regards as one of its most puzzling features. He says, "It has usually been stated that the number 13 represents one-half the number of days during which the moon is visible between its heliacal conjunctions, and that it owed its selection to this observation." This, however, he does not deem entirely satisfactory, as there is, he remarks, an obvious difficulty in this theory since "According to it the calendar ought not to take note of the days when the moon is in conjunction, as otherwise after the very first month it will no longer correspond with the sequence of natural events from which it is assumed to be derived; but as these days are counted, it would appear, although the lunar relations of the calendar in later days can not be denied, that it had some other origin."*

If we had a full explanation of the division to which Mr. Dibble alludes, it is quite probable we could solve the riddle. In fact, the little that is given seems to meet precisely the objection which Dr. Brinton interposes. That the number was used in some mythical sense, or had some reference to religious ceremonies, is quite probable. At any rate, the fact that the Hawaiians counted thirteen nights of the moon as light is sufficient to raise the presumption that from this fact it came into use. The fact, however, that this number was in use among the Hawaiians as a time counter forms another link connecting the calendars of the two regions.

I do not find in any of the authorities I have at hand that the five-day period, so often used in connection with the Mexican and Central American calendar, was in vogue among the Polynesians; but, according to Crawfurd,† the Javanese week formerly consisted of five days.

In this connection we may mention a very singular coincidence in reference to the assignment of days and colors to the cardinal points.

*Native Calendar, op. cit., p. 7.

†Indian Archipelago, vol. 1, p. 289. Rienzi's account in Oceanie is simply a repetition of Crawfurd's remarks.