(By Ernest L. Martin)

Computing the Biblical Calendar

The biblical calendar is a lunar-solar one. Whereas a calendar which is strictly lunar uses motions exclusively of the moon for the determination of its month and year lengths and a solar calendar concerns itself only with motions of the sun for determining its year lengths, the sacred calendar, on the other hand, combines both moon and sun motions in arriving at the length of its months and years.

SOLAR CALENDARS: Calendars which utilize only sun motions pay no attention to the motions of the moon. While a solar year may be divided into 12 months, this is merely for convenience - no astronomical reasons are relevant. Solar calendars accept the proposal that a year's length is approximately 365 days and 6 hours long, and that this astronomical fact is all that is needed to construct a calendar. (The mean astronomical year is actually 365 days 5 hours, 48 minutes and 46 seconds.) While solar calendars suit most ordinary requirements in a satisfactory way, the biblical legislation demands that each month be introduced by the appearance of the new moon (Ex. 12:2 and Num. 10:10). This brings the lunar motions into the matter in a highly relevant way.

LUNAR CALENDARS: Calendars which are exclusively lunar, pay no attention whatever to the length of the solar year. They are only interested in lunar motions. That is, each month begins at a new moon, the next month commences at the next new moon, etc. The passing of 12 lunations (lunation: the moon making one complete journey in its orbit around the earth) equals one lunar year. The average time it takes the moon to circumnavigate the earth is 29 days 12 hours 44 min., 3.3 sec. In 12 lunar months (a lunar year) the accumulated lapse is 354 days 8 hours 48 min. 40 sec. What is the difference between the average length of the solar year and that of the lunar year?

365d.	5h.	48 min.	46 sec.
354d.	8h.	48 min.	40 sec.
10d.	21h.	0 min.	6 sec.

Thus, a purely lunar calendar has a year of 12 months which is 10 days 21 hours and 6 seconds shorter than the actual solar year. Another way of expressing it: the lunar year comes around a most 11 days earlier each year in its relationship to the solar year. The calendar of the Muhammadans is a modern example. If the Muhammadan year commenced on January 1 as our present solar year does, then after one year the Muhammadan's would celebrate their new year about 11 days earlier, or on December 20. Let another Muhammadan year of 12 months pass, and their new year would then be near December 9. Let another year pass and it would occur about November 28. It will be noticed, by this example, that the Muhammadan years will find their new years occurring about 11 days earlier each year (the whole calendar circulating backwards through the seasons). After an interval of just over 33 years, they will have gone backwards through one entire year relative to solar time.

While the biblical revelation compels us to start each month at a new moon, to have a strictly lunar calendar, as the Muhammadans, is prohibited. The Bible states quite emphatically that God's holy days must always occur in their specified seasons of the solar year. Fancy having Passover, as it does in 1972, occur on March 29 (it is really celebrated just after sunset the night before i.e. March 28). On a strictly lunar calendar, the Passover a year hence, in 1973, would occur on March 18. It would be March 7 in 1974, February 25 in 1975, February 15 in 1976 (this is a leap year), February 4 in 1977, January 24 in 1978, January 13 in 1979 and January 2 in 1980. So, in a short 8 years, Passover would have left its springtime

setting (where it is required to be) and gone back into the depth of winter. It can easily be seen why a lunar calendar by itself cannot be used.

Thus, a solar calendar alone is not usable because it disregards the moon and a lunar calendar alone is likewise unusable because it disregards the sun.

THE BIBLICAL CALENDAR: The biblical calendar combines both solar and lunar motions and is called a lunar-solar calendar. Each month in the Sacred Calendar must start with a new moon but the beginning of the biblical year must start in the Spring season.

On the surface the biblical calendar may look more lunar than solar, in the sense that each new year begins with a new moon and like the Muhammadan calendar, the beginning of a year may be 11 days earlier on the solar year than the previous year. In a two year period it can be 22 days earlier relative to solar time. But in a third year, when the calendar year would be about 33 days earlier than the actual solar year, an extra month is inserted into the biblical year (such a year would have 13 months in it) which causes the year to begin once more very near the actual solar year. These extra months are inserted in the biblical calendar at certain specific periods of time. Within a period of 19 years, every 3rd, 6th, 8th, 11th, 14th, 17th and 19th years are 13 month years in the biblical calendar. These are called Intercalary years and the extra month is called the Intercalary Month. Thus, seven years within a 19 year period are Intercalary. The remaining twelve years (i.e. 1, 2, 4, 5, 7, 9, 10, 12, 13, 15, 16 and 18) are regular 12 month years and these years are called Common.

NUMERICAL FACTORS: We are normally used to recording the passage of time in days, years, minutes and seconds. The early Jews, when working with calendar time periods, also used days and hours but they avoided using minutes and seconds. It was found more practical to divide one hour into 1080 parts (called halakim). We will do the same in these lessons. Thus, one hour (or 60 of our minutes) was reckoned as 1080 halakim. Half an hour (30 minutes) would obviously be 540 halakim. Quarter of an hour (15 minutes) equals 270 halakim. Following on, one minute (or 60 seconds) was 18 halakim. Half a minute (30 seconds) was 9 halakim. Ten seconds equals 3 halakim and one second, is ·3 of a halak. (Sometimes it is necessary to divide a halak - the singular of halakim is halak. If so, one halak equals 76 regiim. Half a halak would be, of course, 38 regiim. The regiim are seldom used and it is not overly important to remember them.)

Since we will always use halakim (i.e. one hour equals 1080 halakim) instead of minutes and seconds it will pay the student to familiarize himself with this method.

Thus, the time it takes, on average, for the moon to go around the earth (observing its apparent movement) is 29d. 12h. 44 min. 3.3 sec. or, in halakim: 29d. 12h. 793 halakim.

In 12 lunar months (equalling one lunar year), we simply take 12 x 29d. 12h. 793 hal. and the answer is 354d. 8h. 876 hal. In a 13 month year (known as the intercalary year) it is 13 x 29d. 12h. 793 hal. and the answer is 383d. 21h. 589 hal.

Features to remember:

One lunar month: 29d. 12h. 793 hal.

One common lunar year: 354d. 8h. 876 hal.

One intercalary lunar year: 383d. 21h. 589 hal.

WHAT ARE NINETEEN YEAR TIME CYCLES? The 19 year time cycle is an important feature of the biblical calendar. As stated before, lunar motions and solar motions in the heavens are not harmonious to each other. The Lunar year of 12 lunations is shorter than the solar year by about 11 days. Thus, disharmony is apparent. Yet, it was long ago observed by early astronomers that after a period of 19 solar years, the positions of the sun and moon, seen within the background of the fixed stars, reoccur to almost a perfect synchronization. That is, if you take a theodolite (an instrument for measuring angles) and obtain proper degree settings on the sun, moon and stars, and then one solar year later (at the exact same time of day) obtain proper degree settings on the sun, moon and stars, it will be found that the moon, especially, will be nowhere near where it was a year earlier. But go on for 19 solar years and not only will the sun be where it was once before, but also the moon will be virtually in the same position. (There is not an exact agreement, but it is so close that for all practical purposes we can consider all the angles the same as they were 19 years before.) In other words, every 19 solar years, the heavenly bodies seem to return to the exact positions. This synchronization is very useful in combining lunar and solar motions in order to construct a workable calendar. The following illustration will help to show how the 19 year time cycle in the biblical calendar works.

THE BEAUTY OF THE NINETEEN YEAR CYCLE:

The estimated length of the solar year as utilized by the biblical calendar, expressed in days, hours, halakim (parts) and regiim is the following:

365d. 5h. 997 hal. 48 reg.

Since the foregoing amount of time is the estimated length of the solar year, what is the length of a common lunar year in the biblical calendar? It is:

354d. 8h. 876 hal. 0 reg.

Thus we see immediately that the lunar year is shorter than the estimated solar year. How much shorter? Subtract the common lunar year from the solar year. The answer:

365d. 5h. 997 hal. 48 reg.
354d. 8h. 876 hal. 0 reg.

10d. 21h. 121 hal. 48 reg. (the lunar year is shorter by this much)

If we picked a beginning of a year when the moon and sun were in conjunction or in perfect harmony with one another, and then start them off on their annual treks, in one year's time the lunar year would be earlier than the solar year by, of course - as stated above - 10d. 21h. 121 hal. 48 reg. If we allowed this to continue for two years, the discrepancy would now be 2 x 10d. 21h. 121 hal. 48 reg. If it went on for 3 years the discrepancy would be 3 x 10d. 21h. 121 hal. 48 reg. And if it went on 4, 5, 6 or even 19 years, the lunar year would be occurring earlier than the solar year by 10d. 21h. 121 hal. 48 reg. each year. If nothing were done about this, in a little over 33 years (just like in the Muhammadan calendar), the lunar year would have gone backwards through the whole solar year (each year beginning about 11 days earlier than the former).

As stated before, this is not allowed to happen in the biblical calendar. About every third year (actually, as mentioned before, every 3rd, 6th, 8th, 11th, 14th, 17th and 19th years), an extra lunar month is added to the biblical year to bring the lunar year back into close agreement with the solar. This formula keeps the biblical year within its proper seasons.

The following illustration will show how this is worked out over a 19 year period. (As mentioned earlier, astronomically speaking, this is the time when the sun and moon positions within the background of the fixed stars return to their relatively exact positions as 19 years formerly.) In this illustration, the estimated length of the solar year will be 365d. 5h. 997 hal. 48 reg. Let us notice what happens. (Remember also that one halak (or part) is 76 regiim.)

TABLE A

Estimated length of the solar years:	365d.	5h.	997 hal.	48 reg.
Length of 12 lunar months.	354d..	8h.	876 hal.	
The lunar year occurs earlier than the solar by:	- 10d.	21h.	121 hal.	48 reg.
Two lunar years are earlier than the solar by:	- 21d.	18h.	243 hal.	20 reg.
Three lunar years are earlier than the solar by:	- 32d.	15h.	364 hal.	68 reg.
But in the 3rd year an extra month is added:	+ 29d.	12h.	793 hal.	0 reg.
The deficit now between the lunar year and the solar has been reduced to:	- 3d.	2h.	651 hal.	68 reg.
After 3 more years the accumulated deficit is again -32d. 15h. 364 hal. 68 reg.	- 32d.	15h.	364 hal.	68 reg.
Added to the previous deficit, the deficit now amounts to:	- 35d.	17h.	1016 hal.	60 reg.
But in the 6th year an extra month is added:	+ 29d.	12h.	793 hal.	

The deficit now between the lunar year and the solar has been reduced to:	-	6d.	5h.	223 hal. 60 reg.
After only <u>two years</u>, on this occasion, the accumulated deficit amounts to - 21d. 18h. 243 hal. 20 reg.	-	21d.	18h.	243 hal. 20 reg.
Added to the previous deficit, the deficit now amounts to:	-	27d.	23h.	467 hal. 4 reg.
But in the 8th year an extra month is added:	+	29d.	12h.	793 hal.
In the 8th year there is no longer a deficit between the lunar year and the solar, but rather the lunar is now ahead of the solar by:	+	1d.	13h.	325 hal. 72 reg.
After 3 more years the accumulated deficit is:	-	32d.	15h.	264 hal. 68 reg.
Added to the previous excess, the deficit now amounts to:	-	31d.	2h.	38 hal. 72 reg.
But in the 11th year an extra month is added:	+	29d.	12h.	793 hal.
The deficit now between the lunar year and the solar has been reduced to:	-	1d.	13h.	325 hal. 72 reg.
After 3 more years the accumulated deficit is:	-	32d.	15h.	364 hal. 68 reg.
Added to the previous deficit, the deficit now amounts to:	-	34d.	4h.	690 hal. 64 reg.
But in the 14th year an extra month is added:	+	29d.	12h.	793 hal.
The deficit now between the lunar year and the solar has been reduced to:	-	4d.	15h.	977 hal. 64 reg.
After 3 more years the accumulated deficit is:	-	32d.	15h.	364 hal. 68 reg.
Added to the previous deficit, the deficit now amounts to:	-	37d.	7h.	262 hal. 56 reg.
But in the 17th year an extra month is added:	+	29d.	12h.	793 hal.

The deficit now between the lunar year and the solar has been reduced to:	- 7d.	18h.	549 hal.	56 reg.
After only <u>two years</u>, on this occasion, the accumulated deficit is:	- 21d.	18h.	243 hal.	20 reg.
Added to the previous deficit, the deficit now amounts to:	- 29d.	12h.	793 hal.	0 reg.
But in the 19th year an extra month is added:	+ 29d.	12h.	793 hal.	
And after 19 full years, the coincidence is exact:	0d.	0h.	0 hal.	0 reg.

Thus, after 19 years and the addition of seven extra months at prescribed intervals of time (in the 3rd, 6th, 8th, 11th, 14th, 17th and 19th years), we have a <u>PERFECT</u> agreement between solar time and lunar time. This way, we can maintain the biblical calendar within its solar seasons without ever going far out of them and at the same time keep every month (indeed, every year) starting with a new moon. The 19 year time cycle affords a very convenient way of having a lunar-solar calendar and to meet every requirement of the biblical legislation.

<u>COMPUTING THE BIBLICAL CALENDAR:</u> All calendars must have a beginning. They must also have regular intervals of time which can be added to the beginning (called the benchmark) for the figuring out of subsequent years. For computation purposes, the year in which the biblical calendar commences is 3761 B.C.

<u>POINT ONE</u>: The year 3761 B.C. is considered the year of creation. (It really is not, but for the present we will recognize it as such.) All biblical years prior to the Exodus are reckoned as beginning in the Autumn. (Exodus 12:1 begins a new method of starting the year - in the Springtime with the month of Abib - or Nisan, as it was later called.) Before the Exodus, however, all years commenced in the Autumn - actually with the month of Tishri. (Today, on our Spring-to-Spring reckoning for the year, the month of Tishri is the 7th month. In the time of Adam and in all the period before the Exodus, Tishri - in the Autumn - was the first month of the year.) For calendar purposes, the month of Tishri <u>begins</u> the year.

<u>POINT TWO</u>: The beginning of the month of Tishri - and consequently the beginning of a new year - <u>is always at a new moon period</u>. In its journey around the earth, the moon comes between the earth and the sun <u>once</u> every month. When the moon is exactly between the earth and sun, it is known as the time of the astronomical <u>new</u> moon (when a new month begins). As stated before, it takes, on the average, 29d. 12h. and 793 halakim for the moon to go completely around the earth and back to its former position exactly between earth and sun. The complete circling of the earth by the moon, as observed from the earth, is called a <u>lunation</u>. And the point of

the astronomical new moon (when the moon is exactly between earth and sun) is called the conjunction. This conjunction in Hebrew is called the MOLAD. Thus, the MOLAD (or conjunction) represents the astronomical new moon. From one MOLAD to another is one lunation, or a period of 29d. 12h. 793 halakim.

The MOLAD of Tishri begins the biblical year. If we know at what time the MOLAD of Tishri occurred in 3761 B.C., we then know the benchmark from which we can figure the months and years of all subsequent time. This has been accurately computed. The Molad of Tishri in 3761 B.C. occurred on the 2nd day of the week (on a Monday), on hour 5 of that day and 204 halakim past the hour.

POINT THREE: The biblical day always commences at sunset - not at midnight! Here in the British Isles, at the latitude of London, the sun in the wintertime sets about 4 p.m. In summer it doesn't set until about 9 p.m. But the biblical calendar has as its geographical center, Jerusalem. And ideally, each calendar day, based upon Jerusalem time, commences at 6 p.m. (not one minute before or one minute after). While even at Jerusalem, sundown occurs at different times according to whether it is summer or winter, yet for calendar calculation, the new day always begins at 6 p.m. Never forget this! So, when we understand that the Molad of Tishri for 3761 B.C. was the 2nd day of the week (on a Monday) at hour 5 and 204 halakim past that hour, it is to be understood that it means 5 hours and 204 halakim past 6 p.m. Jerusalem time. (Expressed in our modern midnight to midnight reckoning, 5 hours past 6 p.m. is 11 p.m. and 204 halakim past that hour means about 12 minutes past the hour of eleven or 11:12 p.m. This would be, of course, on Sunday night, but since the biblical day starts at 6 p.m. the previous evening, we will consider it to be Monday just before midnight.) The point to remember is that the biblical day always starts at sunset (not midnight) and that the calendar day always begins at 6 p.m., Jerusalem time. The Molad of Tishri for "creation" is 2nd day of the week, 5th hour of the day and 204 halakim past the hour - all reckoned from 6 p.m., not from midnight.

THE DAY OF THE WEEK: In our first exercises we will only be interested in the Day of the Week (plus hour and halakim) on which the Molad of Tishri occurs. There are only seven days in a week. So, if the Molad of Tishri is:

2nd day 5th hour and on 204 halakim in 3761 B.C. -

it is to be understood that the "2nd day" refers to the Day of the Week - a Monday. If the day be 1 it is Sunday (really, it commences Saturday night at 6 p.m., Jerusalem time). If the day is 2, it is Monday. Day 3 is Tuesday. Day 4 is Wednesday. Day 5 is Thursday. Day 6 is Friday. Day 7 is Sabbath or Saturday.

For example, if we mention 6d. 14h. 0 hal. it is to be understood that the Molad of Tishri is on Friday and exactly at hour 14 past 6 p.m. (there are no halakim in this example). If we say 3d. 22h. 876 hal., we mean Tuesday, 22 hours past 6 p.m. and 876 halakim beyond the 22nd hour. One more example. If we mention the Molad of Tishri as 2d. 20h. 385 halakim, we mean it occurs on Monday, the 2nd day of the week, at the 20th

hour past 6 p.m. (Jerusalem time) and 385 halakim past that 20th hour.

For the time being, we are only interested in what Day of the Week (one out of seven), in what hour of the day, and in what halak past the hour, that the Molad of Tishri occurs. Nothing else is presently required.

What then is our benchmark with which we will work? It is 3761 B.C., the 2nd day of the week, the 5th hour of the day and 204 halakim past the hour. Or, expressed simply, the Molad of Tishri for 3761 B.C. is

2d. 5h. 204 halakim

CALCULATIONS: How many days, hours and halakim are there in one lunation (one orbit of the moon around the earth - or, to express it another way, from one new moon to the next)? It is 29d. 12h. 793 hal. How many days, hours and halakim are there in 12 lunations - or one common lunar year? Simply take 12 x 29d. 12h. 793 hal. and the answer is 354d. 8h. 876 hal. This is clear. Now for a problem.

If the Molad of Tishri for 3761 B.C. is 2d. 5h. 204 hal., on what day of the week, hour of the day and halak past the hour will the Molad of Tishri occur one year later, in 3760 B.C.? Simply add 354d. 8h. 876 hal. to the benchmark of 2d. 5h. 204 hal. and you will have the answer. Remember we are only interested in the Day of the Week on which the Molad of Tishri occurs.) So if the Molad for 3761 B.C. is on the 2nd day of the week, on what day of the week will it be 354 days later? Note that 354 days itself is 4 days over a full week. That is, seven days into 354 will go 50 times with 4 left over. The 4 days left over are important because they tell us that 354 days has an extra 4 days over 50 full weeks. And since we are, at present, only interested in the day, hour and halakim on which the Molad of Tishri occurs in the following year, we need add to the benchmark of 2d. 5h. 204 hal. (for 3761 B.C.) only a 4d. 8h. 876 hal. and we will arrive at the day of the week 354 days hence (or the beginning of the next year). Thus, on what day of the week will the Molad of Tishri occur in 3760 B.C.?

2d. 5h. 204 hal.	3761 B.C.
(35)4d. 8h. 876 hal.	(one common lunar year)
6d. 13h. 1080 hal.	answer

(But notice carefully. The halakim in the right hand column of the answer are 1080 hal. which amounts to exactly one hour. Thus, the actual answer is: 6d. 14h. 0 hal. for 3760 B.C.)

The Molad of Tishri for 3760 B.C. is then on a Friday (the 6th Day of the Week) at 14 hours past 6 p.m. Jerusalem time.

What would the Molad of Tishri be for 3759 B.C. - one more year hence? Simply add another 354 days 8h. 876 hal. (or, using the short-cut method - 4 days 8h. 876 hal.).

6d.	14h.	0 hal.	(3760 B.C.)
4d.	8h.	876 hal.	(one common lunar year)
10d.	22h.	876 hal.	(3759 B.C.)

Is there a 10th day of the week as shown in the answer immediately above? No! There are only seven days in a week. But if I asked you what the 8th day of the week was, you would probably say it represented the 1st day of the week or Sunday, because it is one day beyond the 7th day which is Saturday or the Sabbath. In like manner, what is the 10th day of the week? Actually it is the 3rd day or a Tuesday. So, what is the final answer for the Molad of Tishri in 3759 B.C.? It is

3d. 22h. 876 hal.

THE INTERCALARY YEAR: As mentioned earlier, the 3rd year of a 19 year time cycle has 13 months in it. So, if one lunation equals 29d. 12h. 793 hal. then every intercalary year will have 13 x 29d. 12h. 793 hal. or 383d. 21h. 589 hal. Notice that 383 days are 5 days over a full week (Simply take 7 into 383 and the number of days over a full week - the remainder - will be 5).

Now notice that in 3759 B.C. the Molad of Tishri was 3d. 22h. 876 hal. When will the Molad of Tishri commence in 3758 B.C. - one year hence? Simply add 383d. 21h. 589 hal. (or in short-cut form, since we are only interested in the Day of the Week on which the Molad occurs, add simply 5d. 21h. 589 hal.).

3d.	22h.	876 hal.	= 3759 B.C.
5d.	21h.	589 hal.	= one 13 month year.
8d.	43h.	1465 hal.	= 3758 B.C.

or, broken down, it is:

2d. 20h. 385 hal. = 3758 B.C.

(If you do not understand how this was arrived, go back over the last point carefully.)

POINTS TO REMEMBER: For every common year of 12 months length, simply add to the benchmark of 2d. 5h. 204 hal. a further 4d. 8h. 876 hal. And, for each intercalary year, simply add a further 5d. 21h. 589 hal. This is all you have to do for figuring the day of the week, hour of the day and halakim for the Molad of Tishri within the first 19 year time cycle.

But what about figuring what the Molad of Tishri will be for a complete 19 year cycle from 3761 B.C. i.e. for the year 3742 B.C.? This is simple. How many common years of 12 months duration are there in 19 years? There are 12. And how many intercalary years? Answer: there are 7. Thus, 12 x 354d. 8h. 876 hal.(common years) and 7 x 383d. 21h. 589 hal. (intercalary years) added together will equal 6939d. 16h. 595 hal.

How many days above a full week are 6939 days? Take 7 into 6939 and the remainder is 2. Thus, to find out the day of the week, hour of the day and halakim for the Molad of Tishri one 19 year time cycle from 3761 B.C. (i.e. for 3742 B.C.), simply add 6939d. 16h. 595 hal. (or in the short-cut form, 2d. 16h. 595 hal.) to the benchmark of 2d. 5h. 204 hal. for 3761 B.C. and the answer is apparent.

2d.	5h.	204 hal.	= 3761 B.C.
2d.	16h.	595 hal.	= lapse in one 19 year time cycle
4d.	21h.	799 hal.	= 3742 B.C.

The Molad of Tishri for 3742 B.C. is on a Wednesday, on hour 21 and 799 halakim past the hour.

IMPORTANT: For each succeeding 19 year time cycle, simply add another 2d. 16h. 595 hal. to the benchmark of 2d. 5h. 204 hal. in 3761 B.C. Thus, if the Molad of Tishri is required for 3723 B.C. (exactly two 19 year time cycles from 3761 B.C.), then simply take 2 x 2d. 16h. 595 hal. and add it to the benchmark of 2d. 5h. 204 hal. Thus, to go even further, if the Molad of Tishri in 1861 B.C. be required(which is exactly 100 nineteen year time cycles from 3761 B.C.) then take 100 x 2d. 16h. 595 hal. and add it to 2d. 5h. 204 hal. in 3761 B.C. and you have the exact answer. On the other hand, if it was 1860 B.C. (one year beyond 100 nineteen year time cycles) that you wanted, then you would take 100 x 2d. 16h. 595 hal. as before, and then add one common year of 4d. 8h. 876 hal. (for each common year in a 19 year cycle accumulates to this amount of time), and then add both answers to 2d. 5h. 204 hal. of 3761 B.C. and you will have the exact answer for 1860 B.C. But further, if you wished to know the Molad of Tishri for 1858 B.C. (this is the beginning of a fourth year inside a 19 year time cycle - that is, three full years have now passed inside the 101th 19 year time cycle) you simply take 100 x 2d. 16h. 595 hal., add to this two common years (i.e. 2 x 4d. 8h. 876 hal.) plus add the third year which is intercalary, which is 5d. 21h. 589 hal. Add these three figures to the benchmark of 2d. 5h. 204 hal. in 3761 B.C. And you have the answer. (By the way, the answer is 4d. 19h. 485 hal. for the Molad of Tishri in 1858 B.C.)

TABLES FOR ADDING TO THE BENCHMARK OF 3761 B.C.

The first table is for common years inside any 19 year time cycle. Simply add the excess time over full weeks for each common year to the benchmark of 2d. 5h. 204 hal. in 3761 B.C. Remember, we are only interested in days of the week, so that one common year of 354d. 8h. 876 hal. represents (in short-cut form) 4d. 8h. 876 hal. above a full week. To repeat, one common year is 4d. 8h. 876 hal. over a full week and each of the 12 years within a 19 year time cycle is, of course, an extra 4d. 8h. 876 hal.

TABLE B

COMMON YEARS

Years	Excess over full weeks		
1.	4d.	8h.	876 hal.
2.	1d.	17h.	672 hal.
3.	6d.	2h.	468 hal.
4.	3d.	11h.	264 hal.
5.	0d.	20h.	60 hal.
6.	5d.	4h.	936 hal.
7.	2d.	13h.	732 hal.
8.	6d.	22h.	528 hal.
9.	4d.	7h.	324 hal.
10.	1d.	16h.	120 hal.
11.	6d.	0h.	996 hal.
12.	3d.	9h.	792 hal.

There are seven intercalary years of 383d. 21h. 589 hal. each. Expressed as days over full weeks, the accumulated time (in short-cut form) is 5d. 21h. 589 hal. Each of the intercalary years is an extra 5d. 21h. 585 hal. within any 19 year time cycle.

TABLE C

INTERCALARY YEARS

Years	Excess over full weeks		
1.	5d.	21h.	589 hal.
2.	4d.	19h.	98 hal.
3.	3d.	16h.	687 hal.
4.	2d.	14h.	196 hal.
5.	1d.	11h.	785 hal.
6.	0d.	9h.	294 hal.
7.	6d.	6h.	883 hal.

Thus, if you want the Molad of Tishri for 3747 B.C. (which is the beginning of the 15th year of the first 19 year time cycle from 3761 B.C.), observe that there are 5 intercalary years to be considered and 9 common years. Simply add the accumulated days over full weeks for 5 intercalary years (i.e. 1d. 11h. 785 hal.) and add that to the accumulated days over full weeks for 9 common years (i.e. 4d. 7h. 324 hal.), add both figures together and then add the sum to the benchmark for 3761 B.C. (i.e. to 2d. 5h. 204 hal.) and you will have the Molad of Tishri for 3747 B.C.

	2d.	5h.	204 hal.	Benchmark for 3761 B.C.
	4d.	7h.	324 hal.	9 common years
	1d.	11h.	785 hal.	5 intercalary years
	7d.	23h.	1313 hal.	answer not reduced
or	1d.	0h.	233 hal.	final answer

The two foregoing tables allow us to compute years within any 19 year time cycle, but what if we wish to go from cycle to cycle - even down to our own time? The answer is simple. Since the accumulated time in one 19 year time cycle equals 6939 days, 16 hours and 595 halakim, this represents (in short-cut form) 2d. 16h. 595 hal. over a full week. Thus, for each 19 year time cycle we wish to use, we simply add up 2d. 16h. 595 hal. for each cycle. Thus, one cycle equals 2d. 16h. 595 hal., but <u>two</u> cycles represent (2 x 2d. 16h. 595 hal.) 5d. 9h. 110 hal. Note the following table.

TABLE D

19 YEAR TIME CYCLES

Cycles	Excess over full weeks		
1.	2d.	16h.	595 hal.
2.	5d.	9h.	110 hal.
3.	1d.	1h.	705 hal.
4.	3d.	18h.	220 hal.
5.	6d.	10h.	815 hal.
6.	2d.	3h.	330 hal.
7.	4d.	19h.	925 hal.
8.	0d.	12h.	440 hal.
9.	3d.	4h.	1035 hal.
10.	5d.	21h.	550 hal.
20.	4d.	19h.	20 hal.
30.	3d.	16h.	570 hal.
40.	2d.	14h.	40 hal.
50.	1d.	11h.	590 hal.
60.	0d.	9h.	60 hal.
70.	6d.	6h.	610 hal.
80.	5d.	4h.	80 hal.
90.	4d.	1h.	630 hal.
100.	2d.	23h.	100 hal.
200.	5d.	22h.	200 hal.
300.	1d.	21h.	300 hal.

Thus, if you want the Molad of Tishri in 3742 B.C. (exactly <u>one</u> 19 year time cycle from the benchmark), simply add 2d. 16h. 595 hal. to the benchmark of 2d. 5h. 204 hal. and you have the answer. If it is 100 nineteen year time cycles hence (i.e. 1861 B.C.), then add, according to the table 2d. 23h. 100 hal. to the benchmark of 2d. 5h. 204 hal. If you wish to find the beginning of the 234th nineteen year time cycle from "creation" (i.e. 686 A.D.) (this means that <u>233</u> complete 19 year time cycles have passed - please do not say that 234 complete nineteen year time cycles have passed, because you want the beginning halak of the 234th nineteen year cycle. This means that 233 <u>full</u> cycles have passed and that the year 686 A.D. is the beginning of the 234th cycle. Add up only 233 cycles, not 234.)

This is done simply. According to the table, 200 cycles show an accumulation of time over full weeks to be:

	5d.	22h.	200 hal.
Add to this 30 time cycles:	3d.	16h.	570 hal.
Add further 3 time cycles:	1d.	1h.	705 hal.
Total:	9d.	39h.	1475 hal.

Or, broken down to lowest denomination

	3d.	15h.	395 hal.

Now add the answer of 3d. 15h. 395 hal. to the benchmark of 3761 B.C.

	2d.	5h.	204 hal.
	3d.	15h.	395 hal.
The final answer is:	5d.	20h.	599 hal.

Thus, the commencement of the 234th nineteen year time cycle from "creation" (233 complete 19 year time cycles <u>have passed</u>)is 5d. 20h. 599 hal.

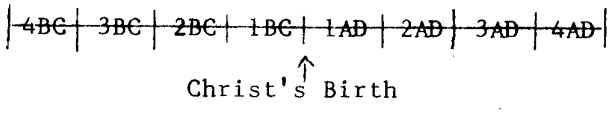
Suppose, however, you wished to go on a further 10 years and find the Molad of Tishri for 696 A.D.? This would be 10 full year <u>inside</u> the 234th nineteen year time cycle. In this case, we must consult the former two tables. Since 696 A.D. would be the commencement of the 11th year of a nineteen year cycle - then 10 full years will have passed. Three of those years (the 3rd, 6th and 8th) would be intercalary and the remaining 7 would be common. Look at the tables B and C on page 11.

7 common years of accumulated time over full weeks would be.		2d.	13h.	732 hal.
3 intercalary years of accumulated time over full weeks would be:		3d.	16h.	687 hal.
We have already found that 233 completed 19 year time cycles added in the benchmark of 3761 B.C. (i.e. for 686 A.D.) equalled:		5d.	20h.	599 hal.
Add this all together and you will have the Molad of Tishri in 696 A.D.	=	10d.	49h.	2018 hal.
Or, brought to the lowest denomination of days over full weeks	=	5d.	2h.	938 hal.

Thus, the Molad of Tishri for 696 A.D. would be on a Thursday at 2 hours past 6 p.m. (Jerusalem time) and 938 halakim past that hour.

<u>WORK A PROBLEM</u>: Work out the Molad of Tishri for 1959 A.D. This should now be simple and will occasion no difficulty. (<u>CAUTION</u>: How many years are there between 3761 B.C. and 1959 A.D.? Most people simply add up all the years before Christ, in this case 3761 years, and add that number to all the years which have occurred after Christ, in this case 1959 years. That

would equal 5720 years. But you would be wrong! There are only 5719 years between 3761 B.C. and 1959 A.D. Why? The answer is simple - there is no 0 B.C. or 0 A.D. Look at this for a moment. The year preceeding Christ's birth was 1 B.C., not zero B.C. and also from the time of His birth to His first birthday was 1 A.D. not zero A.D. The following illustration will show what really happened.



Now, assume that each of the vertical lines begins a year (the time when Christ was born). If you went from the vertical line representing 4 B.C. to the one representing 3 B.C. that would be one year. But suppose you went from the 4 B.C. line to the beginning of 3 A.D.? Would this amount to 4 years before His birth and 3 years after His birth amounting to seven years? No! Count it for yourself. There are only 6 years between the two dates. This is because there is no zero year in our common reckoning. Thus, from 3761 B.C. to 1959 A.D. is not 5720 years, but only 5719 years. You should subtract one diget from your sum when you add the B.C. and A.D. dates together. You will then be correct.)

As it turns out, 1959 A.D. is the commencement of the 302nd 19 year time cycle from "creation." That is, a complete 301 cycles have passed from 3761 B.C. What, then, is the Molad of Tishri for 1959 A.D.? It is now quite easy to figure. Take the accumulated time over full weeks as given in Table D (page 12) for 300 nineteen year time cycles, plus 1 more nineteen year cycle to give the accumulated time for 301 completed cycles. Then, add that sum to the benchmark of 2d. 5h. 204 hal. for 3761 B.C. and you have the answer. It will be 6d. 19h. 19 hal.

The Molad of Tishri occurs on Friday, at hour 19 (from 6 p.m. Jerusalem time) and 19 halakim past that hour.

FIRST RULE FOR POSTPONEMENT FOR TISHRI ONE: We now come to an important factor in the biblical calendar. Up to now we have been concerned only with when the Molad of Tishri occurs. The Molad can occur at any time of the week, on any hour of the day and any halak of the hour. But there is an ancient rule that it is not the molad (or exact conjunction of the moon earth and sun) that counts for the beginning of the calendar day called the First of Tishri. It is not the Molad which is all important, but rather it is the appearance of the crescent of the moon that really counts. Actually, a man with good vision on a cloudless evening, might be able to see a thin sliver of a crescent (i.e. the first reflection of the sun's light being observed from the right side of the moon) within about 15 to 19 hours after the conjunction or the molad. Ideally, however, the rules of the calendar state that a man might theoretically observe the crescent as early as 6 hours after the conjunction, but not a moment earlier. Since in ancient times, it was the appearance of the crescent of the moon which made all the differences, it was determined that, whereas the Molad of Tishri (that is, the actual conjunction) might occur at any time of the day, the crescent of the moon must occur on the First of Tishri as far as

the calendar was concerned. (A second rule of postponement, to be discussed shortly, will modify this rule under certain circumstances.) It was determined, theoretically, that the crescent could be observed only after 6 hours had passed beyond the time of conjunction (the Molad). Thus, we come to the first rule of postponement for Tishri One.

Rule One: If the Molad of Tishri occurs on or after hour 18 of a day, the First day of Tishri on the calendar (i.e. the first calendar day of Tishri) must be postponed to the next day. That is, if the Molad of Tishri occurs at 5d. 17h. 1079 hal., the First of Tishri can occur on that Thursday and does not have to be postponed, but if the Molad occurs at 5d. 18h. 0 hal. or later, the First of Tishri as a calendar day, must be postponed to the following day because on that following day the crescent of the moon, theoretically, will first appear.

Thus, look at the Molad of Tishri for 1959 A.D. It was 6d. 19h. 19 hal. The Molad of Tishri occurs on the 6th day of the week, Friday, but it occurred passed hour 18 and so Tishri One on the calendar, is postponed from Friday to a Sabbath.

This is an important rule and it never varies. Don't foret it!

SECOND RULE FOR POSTPONEMENT OF TISHRI ONE:

The second rule is simple but the reason for it has puzzled many people. There is no need for this puzzlement as we shall soon see.

The second rule is this: on no account can the First of Tishri (that is to say, the Day of Trumpets - which, by the way is the First of Tishri) - on no account can it occur on a Sunday, a Wednesday or a Friday. Thus, the 1st, 4th and 6th days of the week are prohibited days for Tishri One. Why is this? The answer is plain. The autumn is the time of general harvest - people are working and gathering in the latter harvest right up to a day or two of the Feast of Tabernacles. The harvest was important and had to be gathered in. (Spiritually speaking, the latter harvest denotes the complete harvest of all the people of the earth after Christ returns. This harvesting is so important that nothing is allowed to interfer with it except God's weekly and annual Sabbaths which are both days of rest.)

Now in the Autumn time when such an abundance of food has been harvested and to be made ready for the great feasts of God, it is almost mandatory that each of the Sabbath days, especially in the autumn season, have adequate preparation days. But suppose we had Tishri One - which is the Day of Trumpets - occur on a Sunday? The day previous to it is the weekly Sabbath and it is prohibited to prepare food for a feast on that day. But Trumpets is to be a day of feasting with all types of food and drink. If the weekly Sabbath and the Day of Trumpets be in tandem, the Day of Trumpets, and its significance, suffers as a result of the Sabbath proscription on preparing food. So, God has a calendar system in which He honours His weekly Sabbath but at the same time does not violate the preparation for the Day of Trumpets. In this case, He simply postpones the First of Tishri (Trumpets) to a Monday. By doing this, there is a preparation

day for the Feast which otherwise would not be there. That is a main reason why Sunday is a day on which the First of Tishri can never occur.

But what about Friday? This is likewise a prohibitive day. And for the same reason. If Trumpets occurs on a Friday there is no preparation day for the weekly Sabbath, and in the autumn time when there is an abundance of fruits to prepare, it is absolutely necessary that there be a preparation day for the weekly Sabbath.

But not only are Sundays and Fridays proscribed, Wednesday is also a prohibitive day for the First of Tishri (Trumpets). Why is this? Wednesday is in the middle of the week and there would be no Sabbaths in tandem there! This is apparent only at first glance. The truth is, if Tishri One happened on a Wednesday, the Day of Atonement (Tishri Ten) would actually occur on a Friday and Friday would be in tandem to the weekly Sabbath. Because of this, Wednesday is also prohibitive.

(In the Springtime, when there are no great harvests, weekly and annual Sabbaths are allowed to occur in tandem, simply because there is not much food to prepare at that time anyway. But in Autumn, it is entirely different. God wants all of His Sabbaths, annual and weekly, to be observed correctly and to have preparation days.)

Thus, the second rule of postponement is this: if the Molad of Tishri occurs on a Sunday, Wednesday or Friday, the First of Tishri must occur on the following day.

(There is a further point to make at this juncture. Sometimes we have a combination of both the first and second rules of postponement. For example, suppose the Molad of Tishri occurred at 5d. 21h. 121 hal. Notice that the hour is beyond hour 18. This automatically means that Tishri One is postponed to the following day, the 6th day of the week, a Friday. But, Friday is a prohibitive day for Tishri One. So, the day is further postponed to the Sabbath. These "double postponements" occur quite frequently, so be on the look-out for them.)

WORK A PROBLEM: When is the First of Tishri of 1972? What we wish to find is simply the day of the week on which the Molad of Tishri occurs, and then, using the rules of postponement, we can deduce when the First of Tishri will be.

It will be seen that Tishri in 1972 is the beginning of the 14th year of a nineteen year time cycle. This means that 13 full years inside a 19 year cycle have passed But what 19 year time cycle is 1972 within from 3761 B.C.? We are in the 302nd cycle. That means, up to 1959 A.D. 301 complete 19 year cycles have passed, By the use of Tables B, C. and D we ought to find out, quite easily, on what day of the week the Molad of Tishri in 1972 occurs.

2d.	5h.	204 hal.	=	Molad of Tishri 3761 B.C. (the benchmark)
1d.	21h.	300 hal.	=	300 nineteen year cycles
2d.	16h.	595 hal.	=	1 nineteen year cycle
2d.	14h.	196 hal.	=	4 intercalary years to consider
4d.	7h.	324 hal.	=	9 common years to consider
11d.	63h.	1619 hal.		Total

or

6d. 16h. 539 hal. (reduced to number of days over a full week.)

Since the Molad of Tishri in 1972 is 6d. 16h. 539 hal., we might be inclinded to say the First of Tishri would be on the 6th day of the week, Friday, but this is not so. Friday (along with Sunday and Wednesday) are prohibitive days, so Tishri One will be the following day, on a weekly Sabbath. (Sabbaths superimposed upon one another are entirely permissible.)

This completes the information on how to figure on which day of the week the First of Tishri will occur. Our next lesson will consider on what day of our present Gregorian calendar Tishri One can happen.

ON WHAT DAY OF OUR SOLAR YEAR DOES TISHRI ONE OCCUR?

In 45 B.C. Julius Caesar reformed the Roman calendar. He made the year, after an Egyptian model, exactly 365d. and 6 hours long. He was a little more than eleven minutes too long, but suffice to say for that age he was fairly accurate.

Our present calendar is basically the old Julian calendar of 365 days for each year and every fourth year it has 366 days - a February 29th. However, since Julius' calendar was about eleven minutes too long each year, Pope Gregory in 1582 had to bring in the Gregorian corrections. These we will talk about later, but for now it will reward us to look only at the old Julian calendar as our model in determining on what day of the year the First of Tishri occurs in any given year.

It has been stated that the Molad of Tishri for 3761 B.C. happened on the 2nd day of the week, hour 5 and 204 halakim past the hour. We express it as : 2d. 5h. 204 hal.

Now what day was this expressed in Julian solar time? This 2nd day of the week in 3761 B.C. was October 7th on the old Julian calendar. (Remember that God's days commence at sunset while Julius' days start at midnight. To be quite accurate, the Molad of "Creation" was October 6th and just after 11 p.m. by Julius' reckoning. We, however, will continue to use "God's method" and begin our days at 6 p.m. Jerusalem time, so we will fudge slightly on Julius and call that day October 7th. It will be much clearer later on if we adopt this method of beginning the day at 6 p.m. (God's way) than at midnight the Roman way.)

Julius' solar year was exactly 365 days 6 hours and zero halakim long. In other words, it was exactly 365¼ days. So, every fourth year was a leap

year - February 29th was added - and all returned to normal.

But God's year of twelve months (a common lunar year) is only 354 days, 8 hours and 876 halakim long. What, then, is the difference? A simple subtraction will supply the answer.

365d.	6h.	0 hal.	(Julius')
354d.	8h.	876 hal.	(God's)
- 10d.	21h.	204 hal.	

Thus, the biblical year is shorter, or comes around quicker, than the Julius solar year by 10d. 21h. 204 hal.

Since the beginning benchmark in 3761 B.C. for the day of the week was 2d. 5h. 204 hal. and the day on Julian's calendar was October 7th, we can easily obtain when the Molad of Tishri will occur, on the Julian calendar, by simply subtracting 10 days, 21 hours and 204 halakim from the common benchmark. By doing so, this is what we obtain.

October 7th	5h.	204 hal.
- 10d.	21h.	204 hal.

Answer: ?

Before giving the answer, perhaps it would be helpful to call attention to a method of subtraction which will be very helpful in our use of Julian calculations. Note that the entry above is for October 7th. We are told to subtract 10 days, 21 hours and 204 halakim from it. This, of course, is simple enough. But to subtract 10 days from October 7th is awkward. Suppose, on the other hand, you made October 7th to be a September date? It sounds silly but suppose it were done? Since there are 30 days in September, and October 7th is 7 days beyond September 30th, could we not say that October 7th is, or represents, September 37th? It is absurd to do so under ordinary circumstances, but in this case it becomes a helpful method for calculating. Let us, then, say that October 7th is September 37th (which of course it is). Now we can easily subtract.

Sept. 37th	5h.	204 hal.	(3761 B.C.)
- 10d.	21h.	204 hal.	
Sept. 26th	8h.	0 hal.	(answer for 3760 B.C.)

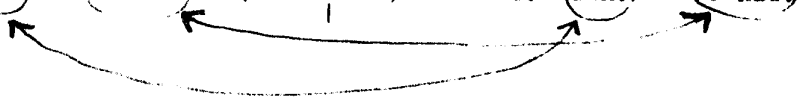
It will be noticed that the next biblical year (for 3760 B.C.) begins over 10 days earlier than the Julian date - in fact, almost 11 days earlier. The Molad of Tishri in 12 months time in the biblical calendar has now gone backwards on the solar calendar to Sept. 26th 8h. 0 hal.

In the earlier part of these lessons, when we were dealing only with the day of the week on which the Molad of Tishri occurred, we noticed that the benchmark for 3761 B.C. was, as mentioned many times before, 2d. 5h. 204 hal. and when we went forward 354d. 8h. 876 hal. (or four days over a full week we added only the short-cut form of 4d. 8h. 876 hal.), we obtained the following:

2d.	5h.	204 hal.	(3761 B.C.)
4d.	8h.	876 hal.	(one common year)
6d.	13h.	1080 hal.	
	of		
6d.	14h.	0 hal.	(3760 B.C.)

This was for the Day of the Week. Now let us compare this day-of-the-week sum to the Julian day-of-the-month figures we have just been working with.

Day of the Julian Month Calculations				Day of the Week Calculations		
Sept. 37th	5h.	204 hal.	(3761 B.C.)	2d.	5h.	204 hal.
- 10d.	21h.	204 hal.		+ 4d.	8h.	876 hal.
Sept. 26th	(8h.)	(0 hal.)	(3760 B.C.)	6d.	(14h.)	(0 hal.)



Notice a similarity here. The halakim are exactly the same. Note, though, that the calculations for the Julian day of the month is 6 hours shy of the Day of the Week calculations. This is caused by Julius' 6 hours which he tacked on to his 365 day year. If you add 6 hours to the left hand side (i.e. Julius' side), your hours would then be exactly even with the hours on the right hand side - the Day of the Week side. With this done, you have now adjusted Julius' calendar by 6 hours to conform with "God's time" as shown in the right hand, day-of-the-week column. The answer, now, after the 6 hour adjustment, is September 26th 14h. 0 hal. This exactly agrees with the standard of God on the day-of-the-week side. (It just as well be mentioned now, that the real standard for adjustment of any hours (halakim are never adjusted) is to always adjust Julius upward to conform with the day-of-the-week figures. The biblical Day of the Week calculations are the standard, not Julius'. You'll understand why later.)

Now that we have adjusted Julius' by adding 6 hours (to make Julius conform to God's standard), we observe complete agreement for the Molad of Tishri in 3760 B.C. - one year away from our benchmark of 3761 B.C. When, then, is the First of Tishri? Recall the rules for postponement. Only on certain days can the First of Tishri occur. Sunday, Wednesday and Friday are prohibitive days. Since the day-of-the-week column tells us that the Molad of Tishri in 3760 is 6d. 14h. 0 hal., the First of Tishri cannot occur on that day because it is a Friday. Tishri One (or the Day of Trumpets) must be postponed to Sabbath.

Now look at the left hand column and again to Julius' figures. After the adjustment of 6 hours to make it agree with the standard, the Molad of Tishri came out to be Sept. 26th 14 h. 0 hal. This was fine, but this September 26th, we are told from the right hand column, was a Friday. And because Friday was prohibited, the First of Tishri moved to a Sabbath. This means that Sept. 27th, or the Sabbath, is Tishri One for 3760 B.C. - not September 26th.

Now what about 3759 B.C. - one more year hence? Let's put down the two columns once more: the Day of the Week (God's standard) on the right hand side and Julius' figures on the left. Here is what we obtain.

Day of the Julian Month Calculations		Day of the Week Calculations
Sept. 26th 8h. 0 hal.	(3760 B.C.)	6d. 14h. 0 hal.
- 10d. 21h. 204 hal.		+ 4d. 8h. 876 hal.
Sept. 15th 10h. 876 hal.		10d. 22h. 876 hal.
again		of
Sept. 15th 10h. 876 hal.	(3759 B.C.)	3d. 22h. 876 hal.

Again there is exact agreement in the halakim - both are 876 halakim. But the hours are different, this time by 12 hours. If we add 12 hours to the left hand column, we get exactly the same answer as on the right. We should do this to arrive at the standard. (In the previous year it will be noticed that Julius' calculations were only 6 hours shy of the standard, this time he is 12 hours shy. Next year, he will be 18 hours out of phase. But in the fourth year, because every fourth year there is a leap year in the Julian calendar, Julius himself added 24 hours (by the addition of February 29th). So in a leap year, the standard day-of-the-week column on the right will agree exactly (days, hours and halakim) with the Julius calculations on the left. But one year after a leap year, Julius is again 6 hours short, two years after he is 12 hours short, three years after (or one before) a leap year he is 18 hours shy, but on each leap year, both right and left hand columns will agree exactly.)

Up to now we have acknowledged the Molad of Tishri on the Julian calendar as Oct. 7th 5h. 204 hal. and we further calculated the following two years: 3760 B.C. and 3759 B.C. But what about calculating for 3758 B.C. which is an intercalary year of 13 months in the biblical calendar?

For the first two years of a 19 year time cycle, the biblical years are only 354d. 8h. 876 halakim long. But the 3rd year (as indeed is the 6th, 8th, 11th, 14th, 17th and 19th years) God adds an extra 13th month of 29d. 12h. 793 halakim to His year. This intercalary year is 383d. 21h. 589 hal. in length. These 383 days, plus hours and halakim, are, of course, much longer than Julius' solar year. But how much longer? Let us see.

383d.	21h.	589 hal.	(God's intercalary year length)
365d.	6h.	0 hal.	(Julius' year length)
+ 18d.	15h.	589 halakim.	

Thus, in an intercalary year, the biblical year is 18 days, 15 hours and 589 halakim longer. This addition of an extra month keeps God's calendar from slipping away backwards through the seasons. As a result of adding at regular intervals these seven extra months in a 19 year time cycle, biblical calendar reckoning is again brought forward to make it agree more closely with the actual seasons. So what do we have?

In 3759 B.C. the Molad of Tishri was September 15th 10h. 876 halakim. (This is without adding the 12 hours to make it agree with the standard.) But what will the Molad of Tishri be in 3758 B.C.? This is an intercalary year in God's calendar. And since God's intercalary year is 383 d. 21h. 589 halakim long and we have found that this is 18d. 15h. 589 hal. longer than Julius' solar year, all we have to do is to add these 18 days, plus hours and halakim, to the figures we obtained in 3759 B.C. and we have the Molad of Tishri for 3758 B.C.

Sept.	15th	10h.	876 hal.	(3759 B.C.)
+	18d.	15h.	589 hal.	(an intercalary year)
Sept.	33rd	25h.	1465 hal.	
		or		
Sept.	34th	2h.	385 hal.	(actual answer for 3758 B.C.)

And since Sept. 34th is actually October 4th, the true answer is October 4th 2h. 385 hal. This is for the day of the Julian month.

But on what day of the week does this occur? Our right hand column needs to be figured to give us our standard. (In fact, it is better to figure always the day-of-the-week first to give you the standard.) Let us now work the day of the week.

3d.	22h.	876 hal.	(3759 B.C.)
5d.	21h.	589 hal.	(intercalary year)
8d.	43h.	1465 hal.	
	or		
2d.	20h.	385 hal.	(3758 B.C.)

Notice that the previous day of the Julian month is exactly the same as the day-of-the-week standard given above, but Julius is now 18 hours away from the standard. To bring the two into agreement, add (always add) those 18 hours to Julius and all becomes equal.

Observe that this Molad of Tishri in 3758 B.C. is 2d. 20h. 385 halakim. This hour is beyond hour 18 of the day and the First of Tishri must be moved from Monday (the 2nd day of the week) to a Tuesday. Since the 2nd day was October 4th, and the First of Tishri must be moved to Tuesday, or October 5th.

Let us go one more year in this survey and compare the standard Day of the Week with the Julian day of the month.

Day of the Julian Month Calculations					Day of the Week Calculations		
Sept.	34th	2h.	385 hal.	(3758 B.C.)	2d.	20h.	385 hal.
-	10d.	21h.	204 hal.		+ 4d.	8h.	876 hal.
Sept.	23rd	5h.	181 hal.		6d.	28h.	1261 hal.
		the same				or	
Sept.	23rd	5h.	181 hal.	(3757 B.C.)	7d.	5h.	181 hal.

Notice that even the hours and halakim agree exactly in this year. That's because 3757 B.C. is a leap year and Julius inserts his extra 24 hours to bring matters back evenly. The First of Tishri will be on a Sabbath, September 23rd.

TABLES FOR RECKONING THE JULIAN DAY OF THE MONTH:

What we have learned so far is that one common year in the biblical calendar is shorter that the Julian year by 10d. 21h. 204 hal. This figure is subtracted from the benchmark. If there is a two year period to consider, then the difference is 2 x 10d. 21h. 204 hal. Three years difference would be 3 times the figure, etc. But in intercalary years, the biblical year of 13 months is longer than the Julian year by 18d. 15h. 589 hal. This figure is added to the benchmark. If, in a 19 year time cycle, there are two intercalary years which have passed inside the cycle, then you reckon 2 x 18d. 15h. 589 hal. and add it to the benchmark. If there are three years to consider, then add 3 times the figure, etc. Because of these facts, tables can now be constructed for the amounts to be subtracted in common years and the amounts to be added in intercalary years. Let us see.

TABLE E

Amounts to be subtracted in common years

1	-	10d.	21h.	204 hal.
2	-	21d.	18h.	408 hal.
3	-	32d.	15h.	612 hal.
4	-	43d.	12h.	816 hal.
5	-	54d.	9h.	1020 hal.
6	-	65d.	7h.	144 hal.
7	-	76d.	4h.	348 hal.
8	-	87d.	1h.	552 hal.
9	-	97d.	22h.	756 hal.
10	-	108d.	19h.	960 hal.
11	-	119d.	17h.	84 hal.
12	-	130d.	14h.	288 hal.

TABLE F

Amounts to be added in intercalary years

1	+	18d.	15h.	589 hal.
2	+	37d.	7h.	98 hal.
3	+	55d.	22h.	687 hal.
4	+	74d.	14h.	196 hal.
5	+	93d.	5h.	785 hal.
6	+	111d.	21h.	294 hal.
7	+	130d.	12h.	883 hal.

Notice the difference between the sums of the subtracted amounts (Table E) and the added ones (Table F).

- 130d.	14h.	288 hal.	(total common years)
+ 130d.	12h.	883 hal.	(total intercalary years)
	- 1h.	485 hal.	(difference in 19 years)

Thus, in one 19 year time cycle, God's year is still shorter than the actual solar year by a minus 1 hour and 485 halakim.

Expressed in another way, note the following. A complete 19 year time cycle using God's calculations is: 12 x 354d. 8h. 876 hal. (12 of God's common years) plus 7 x 383d. 21h. 589 hal. (7 of God's intercalary years) which gives a grand total of 6939d. 16h. 595 hal. for the complete 19 year time cycle. Now, what is the length of time in 19 of Julius' years? To find out, simply take 19 x 365d. 6h. 0 hal. (since there are 365¼ days to each of Julius' years). This grand total is 6939d. 18h. 0 hal. Now, what is the difference between the two?

6939d.	18h.	0 hal.	(Julian)
6939d.	16h.	595 hal.	(God's)
	- 1h.	485 hal.	

Notice that the difference in the sums of Table E and Table F is exactly the same as the calculation immediately above - a minus 1 hour and 485 halakim. Placing the two sums side by side will better help to illustrate it.

- 130d.	14h.	288 hal.		6939d.	18h.	0 hal.	(Julius' 19 years)
+ 130d.	12h.	883 hal.		6939d.	16h.	595 hal.	(God's 19 years)
	- 1h.	485 hal.			- 1h.	485 hal.	(God's is shorter)

From this, we can easily see that God's 19 year time cycle is exactly 1 hour and 485 halakim <u>shorter</u> than the Julian 19 years. This simple fact will help us to figure the exact difference between God's cycle and Julius' 19 years from one 19 year time cycle to another.

As an example, let us look again at the beginning benchmark for 3761 B.C. It is October 7th 5h. 204 hal. - this is the Molad of "Creation." If we wish to find the Molad of Tishri in 3742 B.C., which is exactly 19 years hence, simply add the minus 1 hour 485 halakim to the benchmark and you have the correct answer.

October 7th	5h.	204 hal.	(3761 B.C.)
	- 1h.	485 hal.	(difference between God's and Julian's 19 years)
October 7th	3h.	799 hal.	(3942 B.C.)

For another 19 year cycle, simply add another <u>minus</u> of 1 hour 485 halakim.

October 7th 3h. 799 hal. (3742 B.C.)
- 1h. 485 hal.

October 7th 2h. 314 hal. (3723 B.C.)

In other words, simply add a minus 1 hour and 485 halakim to each 19 year time cycle you wish to compute from the benchmark of 3761 B.C. and you will have correct answers for the year you desire.

TABLE FOR RECKONING DIFFERENCE BETWEEN GOD'S 19 YEARS AND JULIAN'S 19 YEARS

TABLE G

1	- 0d.	1h.	485 hal.
2	- 0d.	2h.	970 hal.
3	- 0d.	4h.	375 hal.
4	- 0d.	5h.	860 hal.
5	- 0d.	7h.	265 hal.
6	- 0d.	8h.	750 hal.
7	- 0d.	10h.	155 hal.
8	- 0d.	11h.	640 hal.
9	- 0d.	13h.	45 hal.
10	- 0d.	14h.	530 hal.
20	- 1d.	4h.	1060 hal.
30	- 1d.	19h.	510 hal.
40	- 2d.	9h.	1040 hal.
50	- 3d.	0h.	490 hal.
60	- 3d.	14h.	1020 hal.
70	- 4d.	5h.	470 hal.
80	- 4d.	19h.	1000 hal.
90	- 5d.	10h.	450 hal.
100	- 6d.	0h.	980 hal.
200	-12d.	1h.	880 hal.
300	-18d.	2h.	780 hal.
400	-24d.	3h.	680 hal.

(It is to be understood that you figure the Day of the Week computations first. This is in order to obtain the standard for postponement rules. Then you figure the Julian calculations. You will note that the "hours' column" in the Julian calculations will be 6, 12, 18 or ZERO hours out of phase with the standard Day of the Week figures.)

Let us now go way ahead to our own time and figure the Molad of Tishri for 1959 A.D. This year is 5719 years away from 3761 B.C. or exactly 301 nineteen year time cycles will have passed. The Molad of Tishri will be the beginning of the 302nd cycle. (Note again that you only figure 301 cycles to reach 1959 A.D. because 1959 is merely the beginning of cycle 302 and none of that cycle has yet occurred. This is vitally important to remember in your calculations.)

Julian Solar Calculations				Day of the Week Calculations (Work first)			
Oct. 7th	5h.	204 hal.	(3761 B.C.)	2d.	5h.	204 hal.	(3761 B.C.)
-18d.	2h.	780 hal.	(300 cycles)	1d.	21h.	300 hal.	(300 cycles)
	-1h.	485 hal.	(1 cycle)	2d.	16h.	595 hal.	(1 cycle)
Sept.19th	1h.	19 hal.	(1959 A.D.)	6d.	19h.	19 hal.	(1959 A.D.)

It will be observed that the two answers are exactly the same with the exception of the "hours." The Julian side is 18 hours lower than it should be. But if 18 hours are added to the Julian side, all is equal. This shows that 1959 A.D. is one year before a leap year.

If we wish to go on from 1959 to the Molad of Tishri for 1971 A.D., then simply add 4 intercalary year calculations on the Day of the Week side (4 x 5d. 21h. 589 hal. = 2d. 14h. 196 hal. - see Table B) and 4 intercalary year calculations on the Julian side (4 x 18d. 15h. 589 hal. = +74d. 14h. 196 hal. - see Table F). But there are 8 common years from 1959 to 1971 A.D. So, 8 common year calculations on the Day of the Week's side (8 x 4d. 8h. 876 hal. = 6d. 22h. 528 hal. - see Table C). And 8 common year calculations on the Julian side (8 x 10d. 21h. 204 hal. = -87d. 1h. 552 hal. - see Table E). Let us see what we obtain.

Julian Solar Calculations				Day of the Week Calculations (work first)			
Sept. 19th	1h.	19 hal.	(1959 A.D.)	6d.	19h.	19 hal.	(1959 A.D.)
+ 74d.	14h.	196 hal.	(intercalary)	2d.	14h.	196 hal.	(intercalary)
- 87d.	1h.	552 hal.	(common)	6h.	22h.	528 hal.	(common)
Sept. 6th	13h.	743 hal.	(1971 A.D.)	2d.	7h.	743 hal.	(1971 A.D.)
	+18h.	(year before leap year)					
Sept. 7th	7h.	743 hal.	(final 1971 A.D.)	2d.	7h.	743 hal.	(final 1971 A.D.)

The first of Tishri would be on a Monday (the 2nd day of the week -- which is not a prohibitive day) and this answers to September 7th on the Julian Calendar. (Note that the last phrase "on the Julian Calendar" is underlined. The fact is, Sept. 7th is the correct day ON THE JULIAN CALENDAR, but we today do not reckon any longer by that calendar. We now go by the GREGORIAN CALENDAR. This means we must add 13 days to September 7th in order to have the correct day on our present Gregorian Calendar. So, 13 days added to Sept. 7th equals September 20th. The true day, then, for the First of Tishri in 1971 A.D. is Monday, September 20th.)

WHAT IS THE GREGORIAN CALENDAR? The old Julian Calendar was begun by Julius Caesar in 45 B.C. He reckoned the year as having an ideal length of 365¼ days. Julius' astronomers must have known that this length was slightly longer than the real astronomical year, but saying it was exactly 365¼ days long was ideal for constructing a workable solar calendar. This meant that the ¼ day, in four years, would amount to a whole day and then a February 29th could be added. This made a perfectly comprehendable and convenient calendar. The only trouble was the fact that this "ideal" calendar was a little over 11 minutes too long. In two years time, the

whole calendar would be some 22 minutes ahead of true solar time. In three years, 34 minutes. In six years over an hour ahead. And in about 125 years, the calendar would be one whole day ahead of true solar time. If this went on for 1250 years, the Julian Calendar would be (and did become) a full 10 days ahead of true solar time. That is, when Julius' Calendar said it was January 1st, it was really only December 22nd true solar time.

In the year 1582 A.D., it was reckoned that this movement of the whole calendar going progressively ahead of true solar time, could go on no longer. By this year, the Julian Calendar was 13 days ahead of actual solar time. A decision was made by Pope Gregory XIII to adjust this discrepancy. He decided to take 10 days out of one Julian month and to "foreget they ever existed". The month he selected was October. By ridding October 1582 of 10 of its days, it consequently meant a reduction of that whole year length by 10 days. The final result brought the calendar back into line with true solar time. (Though the Julian Calendar was really 13 days out of phase with solar time by 1582 A.D., it was decided to take out only 10 days from the calendar. The other 3 days were dealt with by allowing Spring - the Vernal Equinox - to occur on March 21 or 22 and not as it was in Julius' time on March 25th. See Hales' Chronology, vol.1, pp.52,53.)

Gregory XIII caused October 5, 1582 to become October 15th. This effectively took 10 days out of the Julian Calendar - making that particular October to contain only 21 days instead of its regular 31. (Note that the change did not involve any alteration in the day-of-the-week sequence. Sunday was still Sunday and Sabbath was still Sabbath. Only the day of the month was changed.)

To prevent the Julian Calendar from further moving out of the seasons, it was decided by Gregory XIII to drop out 3 days every 400 years. Thus, 1700, 1800, 1900 should ordinarily be leap years on the old Julian Calendar. But it was decided by Gregory to drop February 29th from those 3 years. However, every 400 years, beginning with 1600 A.D., then on to 2000, 2400, 2800 A.D., etc., February 29th would be retained. By adopting these rules we have our present Gregorian Calendar.

What does all this mean for us? Simply this: In ALL our computations for the Molad of Tishri relative to the Day of the MONTH, we have been using up to now the old Julian Calendar. This will give us a proper date for Tishri One to October 5, 1582. But after that date we must adopt Gregorian rules. Gregory XIII added 10 days to solar time (or, really, took them out of the calendar) in 1582. We must also add the Gregorian corrections to all our Julian dates. The following table will show what to do.

TABLE H

For dates before 1582	- no change is necessary
From 1582 to 1699	- add 10 days to Julius
From 1700 to 1799	- add 11 days to Julius
From 1800 to 1899	- add 12 days to Julius
From 1900 to 2099	- add 13 days to Julius

Take for example, the Molad of Tishri for 1971 (The calculations for this are on page 25). The calculations follow:

Julian Solar Calculations	Day of the Week Calculations
Sept. 7th 7h. 743 hal. (1971)	2d. 7h. 743 hal. (1971)

The standard, Day-of-the-Week calculations, on the right hand side, show that the First of Tishri will be on the 2nd day of the week, a Monday. (No postponements are necessary in this case.) That particular Monday, so our Julian calculations show us, was September 7th. And so it was - Julian time! But the year we are working with is beyond 1582 A.D. and well within the Gregorian period. In fact, we must (from 1900 to 2099 A.D.) add 13 days to all Julian dates to arrive at proper dates for today. This means that September 7th (Julian) is really September 20th (Gregorian). That is the answer. And remember, you must always add the extra days to arrive at a proper date anytime after 1582 A.D.

HOW TO CONSTRUCT A 12 MONTH CALENDAR

Let us suppose we wish to make a proper biblical calendar from Autumn of 1971 to Autumn of 1972 - this would be one of God's years. The first thing we need to do is to find out how many days there are in that biblical year. Actually, because of the rules of postponement, a biblical year of 12 months can contain 353 days, 354 days or even 355 days. (It is the rules of postponement that causes us to have these three different year lengths.) The common year can never be less than 353 or more than 355 days in length!

How many days, then, are there in the year starting with the First of Tishri 1971 and ending with the First of Tishri 1972 - in other words, one full year? First, find out the date for Tishri One in 1971. It was Sept. 20th and on a Monday. Then what of 1972? Since it is the 13th year of a 19 year time cycle, we know that the biblical year is a common, 12 month year. Let's now compute the Molad of Tishri for 1972.

Julian Solar Calculations				Day of the Week Calculations			
Sept.	6th	13h.	743 hal.	2d.	7h.	743 hal.	(1971 A.D.)
	-10d.	21h.	204 hal.	+ 4d.	8h.	876 hal.	(common year)
Aug.	26th	16h.	539 hal.	6d.	16h.	539 hal.	(1972 A.D.)

Thus, the Molad of Tishri in 1972 is on Friday the 6th day of the week. But this day is a prohibitive one. The First of Tishri (as the first day of the Month) must be transferred to Sabbath. Since that 6th day of the week was August 26th, the postponement rule transfers the First of Tishri to August 27th. Now, add 13 days to August 27th (to obtain a proper Gregorian date) and you have September 9th, which is on a Sabbath.

How many days are there from Monday, September 20th in 1971 (which began Tishri in 1971) and Sabbath, September 9th in 1972 (which began Tishri in 1972)? Remember, in this case, that 1972 is a leap year in the

Julian (and Gregorian) Calendar - it has a February 29th and consequently has 366 days in the year. From September 20th back to September 9th is an internal of 11 days (The First of Tishri in 1972 begins 11 days earlier than 1971 on the solar calendar). Now, subtract 11 days from 366 days (the length of the solar year - when it is a leap year) and we have a 355 day year on God's calendar from 1971 to 1972.

In God's calendar, all 12 month common years have either 353, 354 or, 355 days. In our example just above, the year had 355 days. This is called a FULL common year. It it has 354 days it is called an ORDINARY common year. If only 353 days, it is called a DEFECTIVE common year.

Now notice a table giving the day lengths of the various months in a 12 month common year.

TABLE I

ORDINARY COMMON YEAR OF 354 DAYS

(Nisan)	1st	month	= 30 days	
	2nd	"	= 29 days	
	3rd	"	= 30 days	
	4th	"	= 29 days	
	5th	"	= 30 days	
	6th	"	= 29 days	
(Tishri)	7th	"	= 30 days	
	8th	"	= 29 days	(in a FULL YEAR of 355 days, the 8th month is changed to have 30 days)
	9th	"	= 30 days	(In a DEFICIENT YEAR of 353 days, the 9th month is changed to have 29 days)
	10th	"	= 29 days	
	11th.	"	= 30 days	
	12th	"	= 29 days	

Since the biblical year from Autumn 1971 to Autumn 1972 is a FULL YEAR of 355 days, the 8th month will have 30 days in it, not 29 as in the ORDINARY year or in the DEFICIENT YEAR.

From this data you can easily construct a biblical calendar superimposed upon our present Gregorian calendar. Simply place Tishri One in 1971 on top of Monday, September 20th. Make sure God's 8th month has 30 days in it. Carry on through the calendar year, and you will find Tishri One is 1972 occurring on Sabbath, September 9th. It's as simple as that.

WHAT ABOUT THE 13 MONTH INTERCALARY YEARS? For intercalary years an extra month of 30 days is added to the calendar. These 30 extra days give us 3 extra year lengths to consider. A DEFICIENT INTERCALARY YEAR is (353 + 30) 383 days. An ORDINARY INTERCALARY YEAR is (354 + 30) 384 days. A FULL INTERCALARY YEAR is (355 + 30) 385 days. Notice the table just above. FULL years have the 8th month changed from 29 to 30 days. ORDINARY years see no change whatever. DEFICIENT years have the 9th month changed from 30 to 29 days. In other words, there is no difference in dealing with this factor, no matter if the year is COMMON or INTERCALARY. The major difference, however, in INTERCALARY years, is the added month of 30 days.

Where do we place this extra month?

A common fallacy is to think that the extra month is merely tacked on to the end of the year and becomes the 13th month. This is not the case! In a 13 month year, it is the 12th month that is the added month, not the 13th. (There is a rule that the month preceeding Nisan, must always have 29 days. But the added month has 30 days in it. This means that ADAR I is the extra month, NOT ADAR II)

SUMMARY: Once you have constructed the biblical calendar for 1971 to 1972 and superimposed it on the Gregorian Calendar, you will then know all the dates of the various memorial and holy days for that year. It is as simple as that.

QUICK WAY TO FIND PASSOVER DATE: There is really no need to make a complete calendar for a whole year in order to find when Passover (or any other holy day) occurs. Of course, making a calendar for a whole year is a sure way of determining the dates of the festivals, but there are some short-cuts.

Suppose you wish to know when Passover is (Nisan 14) for 1971? If you find out the Molad of Tishri in the Autumn of 1971, and then find out when the First of Tishri is (as a calendar day) you merely have to count 164 days backwards through the preceeding months and you will land exactly on Nisan 14 - which is Passover. (This reckoning of 164 days must be EXclusive. Do not count Tishri One in your calculations, but do count Nisan 14 as the 164th day.)

We can now use an interesting short-cut. Note that the First of Tishri in 1971 is on Monday.

Going back from Monday to a point 164 days earlier, will bring you to what day of the week? The answer is simple. 164 days is three days more than a full week. (That is, 164 divided by 7 gives a remainder of 3 days.) Now, what is 3 days before Monday - not counting Monday itself? That would be Friday. And Friday is Passover in 1971. (Actually, the Passover service was held just after sundown on the previous night i.e. on Thursday evening, simply because God's week days are reckoned from sundown to sundown.)

To find the day of the month on our present solar calendar when Passover (Nisan 14) occurs, count back 164 days from September 20th (which was the First of Tishri). You must count exclusively i.e. do not count September 20th itself, but count September 19th as the first of the 164 days.

An illustration will show how it's done.

September	= 19	days to count
August	= 31	" " "
July	= 31	" " "
June	= 30	" " "
May	= 31	" " "
Total so far:	142	days

But we must go back 164 days. 142 from 164 means we must enumerate 22 days back into April to reach Passover day.

April 30 = 1 day
" 29 = 2 days
" 28 = 3 "
" 27 = 4 "
" 26 = 5 "
" 25 = 6 "
" 24 = 7 "
" 23 = 8 "
" 22 = 9 "
" 21 = 10 "
" 20 = 11 "
" 19 = 12 "
" 18 = 13 "
" 17 = 14 "
" 16 = 15 "
" 15 = 16 "
" 14 = 17 "
" 13 = 18 "
" 12 = 19 "
" 11 = 20 "
" 10 = 21 "
April 9 = 22 "

Thus, Nisan 14 is actually April 9th (on a Friday) in 1971. (Remember, that Passover service itself would be the previous evening just after sundown on April 8th.)

The Holy Days for the Unleavened Broad period can now be figured easily. The First day is April 10th, a Sabbath, and the Last day is April 16th, a Friday.

Pentecost is figured by counting 50 days <u>from</u> the Sunday that occurs within the Days of Unleavened Bread.

This is the short-cut method of figuring the Spring Festivals.

For Autumn festivals it's even easier. The First of Tishri in 1971 is Monday, September 20th - which is itself the Day of Trumpets. The 10th of Tishri (The Day of Atonement) is 10 days hence - <u>inclusive</u> reckoning. Atonement would be Wednesday, September 29th. The First Day of Tabernacles is 15 days from Trumpets - counting <u>inclusively</u> - and would be Monday, October 4th. The Last Great Day is 22 days from Trumpets - again counting <u>inclusively</u> - and would be Monday, October 11th. Thus, to find all the Holy Days in any given year, you merely determine the First of Tishri (Trumpets) for that year and count backwards for Passover and the Spring festivals, and count forward for the final festivals in the Autumn.

<u>FINAL RULES FOR POSTPONEMENTS</u>: There are two more rules for the postponement of Tishri One. These rules occur less frequently than the 18 hour rule and the Sunday, Wednesday and Friday prohibitions. These next two postponement

rules effect only COMMON YEARS in God's calendar. As stated before, no common year can contain fewer than 353 days and no more than 355 days. (Likewise, no intercalary year has fewer than 383 or more than 385 days.) The first of these two new rules of postponement must be invoked to prevent a common year from having 356 days in its length. The second rule is to prevent an intercalary year just prior to a common year having only 382 days. (For a complete explanation of these rules, see Burnaby, The Jewish and Muhammadan Calendars, pp. 72-76.) It will be profitable to number these two new rules, as rules 3 and 4, to distinguish them from the former two rules, which are rules 1 and 2.

RULE 3: In a COMMON YEAR, if the Molad of Tishri reaches 3d. 9h. 204 hal. (for one halak less, the rule doesn't apply), the First of Tishri must be postponed to the following day, a Wednesday. But"Tishri One"according to rule 2, cannot occur on Wednesday and so, the First of Tishri must be postponed further to Thursday. This is to prevent this common year from having 356 days.

RULE 4: In a COMMON YEAR which follows immediately after an INTERCALARY YEAR, the Molad of Tishri reaches 2d. 15h. 589 hal. (for one halak less, the rule doesn't apply), the First of Tishri must be postponed to the following day, a Tuesday. This is to prevent the previous intercalary year from having only 382 days.

SUMMARY: Up to now, all of the pertinent data for figuring a proper calendar from 142 A.D. up to about 2500 A.D. has been given. It is now time to turn to the rules for computing calendar dates prior to 142 A.D. - that is, in the time of Christ and before. All the rules are exactly the same except one!! That one exception will now be explained.

HOW TO COMPUTE THE CALENDAR IN CHRIST'S TIME: There is one small feature in God's calendar figures which makes it necessary to adjust the interval of intercalary years within a 19 year time cycle about every 2350 years. That feature is simply this: God's assumed length of calendar year is not perfectly astronomical. That is, God's ideal length of the years as interpreted by His calendar, is not the same as God's actual length of the year as observed by the motion of the heavens.

You will recall that Julian's year was reckoned as being 365d. and 6 hours long. But the true astronomical length of the year is 365d. 5h. 48 min. 46 sec. Thus, Julius' year was 11 minutes and 14 seconds too long. From its inception in 45 B.C., it began to creep forward on true solar time. This amounted to a whole day's difference in about 125 years. Of course, in 1250 years, it was 10 days ahead of true solar time. So, in 1582, Gregory XIII adjusted the calendar in order to bring the civil calendar back into line with true solar time.

God's calendar is similar. The estimated length of the biblical year is not as far off as Julian's, but like Julian's, IT IS ALSO TOO LONG by 6 minutes 39⅓ seconds.

As stated before, the true length of the solar year is 365d. 5h.

48 min. 46 sec., but the ideal length of God's solar year, as expressed in His calendar computations, is 365d. 5h. 55 min. 25⅓ sec. (or 365d. 5h. 997 hal. 48 reg.). Thus, God's ideal year length is 6 minutes 39⅓ seconds too long on true solar time. This means that the whole biblical calendar is creeping forward on true solar time by 6 minutes 39⅓ seconds each year. The difference amounts to a whole day in about 216 years. And in 2160 years, the calendar will be 10 days ahead of true solar time. If this went on for 6480 years, God's calendar would be 30 days (or a whole month ahead of solar time). If it were allowed to go on for 6480 years, then the simple dropping of a month in one year would adjust the calendar back to where it belonged and it again would be in agreement with actual solar time. But if it were left so that 30 days accumulated (i.e. supposing that civilization would last that long and that the astronomical length of the solar year stayed the same), an almost intolerable situation would develop for the celebration of God's festivals. They are always to be held in their own special seasons, but we would find Passover, in some of the years in a 19 year time cycle, occurring almost as late as June 1st - that is way, way beyond its proper season, which is early Spring.

The biblical calendar cannot be allowed to creep forward on the seasons that much. But how far can it be allowed to go ahead?

The extreme limit to which the biblical calendar can creep ahead of true solar time is: 10 days, 21 hours, 121 halakim and 48 regiim. Since 6 minutes 39⅓ seconds of going ahead equals about 120 halakim each year, it can be seen that a long time will have to pass before the calendar has reached the extreme limit. In fact, it takes just about 2350 years.

So, just as Gregory XIII took away 10 days from the Julian year in 1582 A.D. to bring it back to true solar time, how does the biblical calendar take 10d. 21h. 121 hal. 48 reg. out of it in order to get the calendar back to true solar time at the elapse of 2350 years?

Let us recall a former illustration. Look on page 4 and notice how we went through a complete 19 year time cycle - comparing God's months with the estimated solar time. The conclusion of the exercise saw complete and perfect coincidence between the solar years for 19 years and God's years for 19 years. BUT, this perfection and coincidence was made possible only by accepting an IDEAL length of the solar year, notably: 365 days, 5 hours, 997 halakim and 48 regiim. All worked out fine IF we used that length of year. But this is just the problem. It is that very length which is too long by 6 minutes 39⅓ seconds. Nevertheless, by using this ideal (but astronomically wrong) length, it becomes necessary to adjust the biblical calendar backwards to true solar time after 2350 years. Or expressed differently, it must be moved back when 10d. 21h. 121 hal. 48 reg. has been reached. Why?

The answer is clear. Let us go back to the illustration on page 4 (i.e. Table A) and reproduce the first part of it.

Estimated length of the solar year:	365d.	5h.	997 hal.	48 reg.
Length of 12 lunar months.	354d.	8h.	876 hal.	
The Lunar year occurs earlier than the solar by:	- 10d.	21h.	121 hal.	48 reg.
(Notice that this difference is the exact amount of time that God's calendar is allowed, over 2350 years, to creep out of true solar time.)				
Two lunar years are earlier than the solar by:	- 21d.	18h.	243 hal.	20 reg.
Three lunar years are earlier than the solar by:	- 32d.	15h.	364 hal.	68 reg.
But in the 3rd year an extra month is added.	+ 29d.	12h.	793 hal.	
The deficit now between the lunar year and the solar has been reduced to:	- 3d.	2h.	651 hal.	68 reg.
(You can then continue on through the 19 year time cycle, and at the end of it there would be perfect coincidence)				
	0d.	0d.	0 hal.	0 reg.

But now to the problem. How can we drop, after a 2350 period, 10 days 21 hours 121 halakim 48 regiim from the calendar (as Gregory XIII had to do with the Julian Calendar)? It is not by taking out 10 days from one of God's months, like Gregory did with Julian. There is a much better way, an ingenious way, an authorized way, of doing it.

HOW TO ADJUST THE CALENDAR: Let us repeat the illustration given above and the manner of adjustment will become clear.

Estimated length of the solar year:	365d.	5h.	997 hal.	48 reg.
Length of 12 lunar months:	354d.	8h.	876 hal.	
The lunar year occurs earlier than the solar by:	- 10d.	21h.	121 hal.	48 reg.
Two lunar years are earlier than the solar by:	- 21d.	18h.	243 hal.	20 reg.
Three lunar years are earlier than the solar by:	- 32d.	15h.	364 hal.	68 reg.
But in the 3rd year an extra month is supposed to be added:	(But wait! While an extra month should be added in this 3rd year, let us delay it - in this case - to the 4th year. We will then have the following answer.)			

Four lunar years are earlier than the solar by: - 43d. 12h. 486 hal. 40 reg.

Now, in the 4th year (delaying it one year) an extra month is added. + 29d. 12h. 793 hal.

(In continuing further through the 19 year time cycle and by maintaining the regular intervals of the intercalary years, a "new" set of intercalary year sequences emerge. Instead of the 3rd, the new intercalary year is now the 4th. Instead of the 6th, it now becomes the 7th. No longer the 8th but the 9th. Not the 11th, but the 12th. Not the 14th but the 15th. Not the 17th but the 18th. Not the 19th but the 1st. And AT THE END OF THE 19 YEAR TIME CYCLE instead of a perfect coincidence, you will have a MINUS 10d. 21h. 121 hal. 48 reg. You will have effectively taken out of the calendar that precise amount of time.)

- 10d. 21h. 121 hal. 48 reg.

Even though this one 19 year time cycle has 10d. 21h. 121 hal 48 reg. taken out of it, all subsequent 19 years time cycles will again have a perfect coincidence of 0d. 0h. 0 hal. 0 reg. For a further 2350 years without any further change taking place. Yet, the interval for intercalary years in the cycles for the next 2350 years will no longer be 3, 6, 8, 11, 14, 17 and 19. For another 2350 years they will now be 4, 7, 9, 12, 15, 18 and 1 (or put the "1" back at the front and you have the normal way of expressing it.).

What does all this have to do with figuring the calendar in Christ's time? Much in every way. As stated before, those 6 min. 39⅓ sec. will accumulate, in 2350 years, to the extreme limit of allowance for the calendar to be out of phase from true solar time. About 2500 A.D. on our present calendar, the allowance will have reached its limits and the intercalary year sequence in a 19 year time cycle will have to be changed as explained above. But several centuries ago it had formerly reached its limit and had to be adjusted to our present intercalary sequence of 3, 6, 8, 11, 14, 17 and 19. It can be measured how far our present biblical calendar has crept forward on true solar time. Calculating backwards, we can show that our present intercalary arrangement began in 142 A.D. Before that date, the intercalary years within the sequence were one year ahead of our present ones. Thus, the intercalary years before 142 A.D. were 2, 5, 7, 10, 13, 16 and 18.

All you must do to figure any calendar date for times before 142 A.D.

(and going back 2350 years before that date) is to follow all the rules given in this paper in finding the Molad of Tishri, the First of Tishri, etc., but the only difference is to count the intercalary years in a 19 year cycle to be 2, 5, 7, 10, 13, 16 and 18, rather than 3, 6, 8, 11, 14, 17 and 19 as they are now. The beauty of this is apparent when the calendar is thoroughly understood, because it allows us to keep all the benchmarks we are familiar with, such as:

2d. 5h. 204 hal. = Molad of "Creation"
Oct.7th 5h. 204 hal. = Molad of "Creation" on Julian Calendar.

Everything remains the same, except that the intercalary years in the 19 year cycle are 2, 5, 7, etc.

WHEN WAS CHRIST CRUCIFIED? Using this one extra necessary point, concerning the intercalary years, let us now compute the day of the week, and the day of the solar year, in which Christ died. In other words, let's figure the date of Passover in 31 A.D.

Notice that 31 A.D. is 3791 years from 3761 B.C. - the benchmark. This means that 199 complete 19 year time cycles have passed and 10 years inside a cycle have also passed. Consulting the tables, we find out the accumulated time from the benchmark for 199 nineteen cycles then add on 10 years inside the next cycle. (It is here that we must be careful. Remember the intercalary years in those days were 2, 5, 7, 10, 13, 16 and 18. This means we figure up 4 intercalary years and 6 common years because 2, 5, 7 and 10 are intercalary years back in that age.) Once all these factors are added together, we will obtain the Molad of Tishri for 31 A.D. Check to see if any rules of postponements are necessary. Once the First of Tishri is obtained, count back 164 days and you will have Passover in 31 A.D.

Let's work the problem using the tables.

Day of the Julian Month Calculations				Day of the Week Calculations		
Oct. 7th	5h.	204 hal.	(3761 B.C.)	2d.	5h.	204 hal.
- 6d.	0h.	980 hal.	(100 cycles)	2d.	23h.	100 hal.
- 5d.	10h.	450 hal.	(90 cycles)	4d.	1h.	630 hal.
- 0d.	13h.	45 hal.	(9 cycles)	3d.	4h.	1035 hal.
+74d.	14h.	196 hal.	(4 intercalary)	2d.	14h.	196 hal.
-65d.	7h.	144 hal.	(6 common)	5d.	4h.	936 hal.
Oct. 4th	11h.	941 hal.	(31 A.D.)	18d.	51h.	3101 hal.
	+ 18h.	(year before a leap year)			or	
Oct. 5th	5h.	941 hal.	(31 A.D.)	6d.	5h.	941 hal.
First of Tishri postponed to following day, October 6th.				First of Tishri postponed to following day, a Sabbath.		

The Day of Trumpets in 31 A.D. is a Sabbath, October 6th. (Note that no Gregorian corrections are necessary because this year was long before 1582 A.D.)

Passover is always 164 days prior to the First of Tishri, and since 164 days is 3 days beyond a full week, all we need do is to count 3 days backwards, exclusively, from Tishri One, which was a Sabbath, and we count Friday (1), Thursday (2), and Wednesday (3). Passover, then, in 31 A.D. was a Wednesday.

Now enumerate backwards 164 days on the Julian Calendar. Remember to do it exclusively - do not count October 6th which is Tishri One.

5 days	to	consider	in October
30 days	"	"	" September
31 days	"	"	" August
31 days	"	"	" July
30 days	"	"	" June
31 days	"	"	" May

158 days up to the 1st May.

Carrying on backwards, we get:

159 = April 30
160 = April 29
161 = April 28
162 = April 27
163 = April 26
164 = April 25

Passover in 31 A.D., the day Christ was crucified, was a Wednesday, April 25th on the Roman calendar.

THE CONTROVERSY THAT RAGED ONCE THE JEWS ADJUSTED THE CALENDAR, PROPERLY, IN 142 A.D.

There was some research, several years ago, about the date for this adjustment in the calendar. Some astronomical tables seemed to suggest that 66 A.D. would have been the proper date for the adjustment. However, 142 A.D. had all the historical proof on its side (and in fact, this is now proved to be the true date for the adjustment). In sorting out this important historical and calendar problem, Dr. Hoeh and I exchanged a number of letters sorting out the truth. The following exerpts from one of my letters to Dr. Hoeh, sums up the major conclusions to the matter.

"The 66 A.D. date for the calendar adjustment of the Jews is given encouragement because Dr. Neugebauer's equinoctal tables reflect a speeding up of time relationships. He surely does not base his findings on the "secular acceleration" of the moon. That, of course, has nothing to do with equinoctal matters.

The 66 A.D. date may in one way be right. Of all the years between about 20 B.C. and 70 A.D., the year 66 A.D. is the most attractive relative to a calendar change.

There is historical evidence that in 66 a general meeting of the Great Beth Din was convened (Edersheim, Times, vol. I, page 239, note 1). This authoritative assembly was called primarily to enact the corrupt 18 anti-gentile decrees. However, there is no evidence that a calendar question was at stake in this particular meeting. On the surface, I would tend to doubt that this 66 A.D. assembly of the Great Beth Din was in any way connected with the calendar. At this meeting, though, blood flowed between the two Pharisaical schools with the Hillel schism getting the worst of it. There was hardly any question more touchy than the calendar and this "drawing of blood" could indicate they had more important things to discuss than the 18 decrees (which they all seemed to agree on).

But Josephus, as far as I am aware, passes over this meeting as one of no consequence. He does mention, though, writing about 75 A.D., that Passover had to occur after the equinox -- a custom which ceased only after the cycle change. If such a change was made in 66, in an authoritative manner, it becomes difficult for me to understand why he would be so dogmatic over the necessity of the full moon being in Aries.

Regardless of these secular sources, we have the testimony of the New Testament. In this case, its testimony is its silence on such an important question as this. The custom of the Church, up to the death of John, as far as I am able to discern, was to follow Jewish computation in calendar matters. This, of course, doesn't prove one way or the other whether a cycle change was accomplished in 66. The early Church could have easily recognized the change and tacitly accepted it as the proper thing to do. But, I am presently inclined to believe that subsequent historical evidence shows that no change was effected in 66 and that the silence in the Jewish and Gentile churches (true and heretical) about any Passover question precludes a change taking place so early. There would have undoubtedly (and especially) been some Gentile reaction to a change even at this early date. But there was none!

In fact, even in Rome and Corinth, as late as 100 A.D., those Churches were clearly abiding by the ancient Jewish computation for the calendar. Not only that, there is plain evidence that they were observing the Holy Days correctly and in a manner completely after the Jewish calendar reckoning (not, however, observing the 15th of Nisan as Passover, etc.).

I think that the letter of (so-called) Clement of Rome to the Corinthians, alleged to be Paul's companion (I strongly doubt this), is a remarkable evidence of the Sacred Calendar being used in those Churches as late as 100 A.D. (there are several apparent interpolations of Clement's letter by a later hand which betrays Catholic teaching -- even this is minor -- but many chapters could hardly be Catholic). In particular, chapter 40 is referring to the appointed seasons of the true Sacred Calendar. No other interpretation is possible. Dr. Carrington hits the nail on the head when he writes: "Since Clement goes on to refer to the high priests, the priests, and the Levites, it is clear that the 'appointed seasons' which he regards as essential must be those of the Levitical Law, that is to say, Pascha, Pentecost, New Year,Day of Atonement, Tabernacles. If words have any meaning at all, a Liturgical year of the Hebrew type must have

been well established in Rome and in Corinth by the 90's" (Primitive Christian Calendar, p.41).

By reading Clement (ch. 40), it will be apparent that the writer is referring to the Sacred Calendar -- the one used by the Jewish Church of old. And the writer distinctly says that Christ had commanded the Church to observe these Biblical times and seasons. "We ought to do in order all things which the Lord (Christ) hath required us to observe at stated times. The offerings (tithes) and sacred services, which it is our duty to render, he hath commanded to be presented neither carelessly nor irregularly, but at appointed times and hours" (ch. 40).

The writer intimates the necessity of keeping the Holy Days as a fact known to both Churches, and that Christ had prescribed these seasons for divine worship. The lack of any reference to any particular season by name clearly shows that both the Corinthian and Roman Chruches, about 100 A.D., didn't need any explanation. They knew the Holy Seasons the writer had in mind. There is no Sunday or Easter mentioned in Clement's writing. No wonder, then, that Dr. Carrington of Toronto, without reservation, says that Clement (or whoever it was) had reference to the Passover, Pentecost, Trumpets, Atonement and Tabernacles. Even modern scholarship is beginning to recognize these facts. And, it is about time!

The reason for mentioning Clement's reference is because I think it will help us in our question. Up to this time (100 A.D.), there is no record of an authoritative change in the calendar cycles -- either by the Jews or early Christians. Rome and Corinth were merely following the Churches of Judaea and Asia, as if it were the natural thing. The latter were following the common Jewish reckoning. There was no controversy over the Holy Days. No disputes; no arguments or discussions; no squabbling or bickering. It was taken for granted by both churches and by all others that the Sacred Calendar was in every way proper and in order. There was no epithetical talk of the calendar being "Jewish" and that Christians should refrain from following it. No! But soon after 100 A.D. we are confronted with just the opposite feelings.

This "taking it for granted" attitude by the Gentile churches soon changed. Why did a great controversy begin to rage among the Gentile Churches after the early part of the 2nd century? Why such a hostile attitude among various groups concerning the dating of (in particular) the Passover? These controversies did not build up slowly over a period of years, but they come on the scene abruptly. Even Hurlbut recognizes a completely different "Christian" Church the last half of the second century than the one at the close of the first century. I am absolutely convinced that the one major cause for this radical change was urged because the Jews saw a change was necessary in regard to 19 year time cycles. When it was made, many of the Gentiles rebelled at their decision. This explains why all of a sudden there were controversies springing up everywhere relative to the Passover.

Is it not true that Polycarp went to Rome to convince Anicetus that,

after all, the Jews were right in adjusting the cycle? Anicetus mentions that his two predecessors had made the change to a Sunday near the full moon. This change in Rome would have occurred just before 150 A.D. Anicetus was about 162. I am inclined to believe that Anicetus' predecessors heard of the Jewish change and not understanding the reasons behind it, decided (whether in a deceived manner or deliberately, I hesitate to say) that if the Jews could be so "arbitrary" in their Passover dates, then so could the "Christian" Romans. Thus, they decided to have Passover on the resurrection day, so they thought, near the full moon. Anicetus probably saw the "common sense" of this reasoning and continued to follow it. Polycarp and the eastern churches, however, saw the gravity of the whole matter, and he journeyed to Rome in order to convince Anicetus of his error.

And it is only after 142 A.D. that we have the real Paschal controversies raging. Eusebius gives us some important information regarding the beginning of the controversy. He states that Melito, bishop of Sardis, wrote several works. Among his most important was "On the Passover." Eusebius quotes from the beginning of this work: "In the time of Servillius Paulus (164 A.D.), proconsul of Asia, at the time when Sagaris was martyred, there was great strife about the Passover which fell according to rule (i.e. the ancient rule) in those days, and this was written" (Eccl. His. IV, 26:3).

The strife was really over what rule was to be followed -- the ancient rule which existed in the time of Christ (the 2,5, 7, 10, etc.) -- or the new rule (the 3, 6, 8, 11, etc.) that the Jews were required to use. It could hardly be plainer.

The new rule for the arrangement of the cycle caused a great deal of consternation throughout the Christian world. It had never before entered anyone's mind that the Sacred Calendar was in any way Jewish -- it had always been thought of as God's Calendar. But this new Jewish ruling, to most Gentiles, smacked of Jewish sectarianism. They were wondering whether to follow the calendar which Christ and the Apostles used or this arbitrary one, so they thought, of the Jews. Many of the Gentiles, while agreeing in principle with the fact that Passover should not be allowed to creep out of its proper season, completely disparaged the Jews' method for rectifying the situation. The Gentile Christians probably reasoned that they had more authority than the "Christ-rejecting" Jews to determine the proper time for Passover. So the Romans came up with the idea of a Sunday near the full moon. I think this explanation tells us a lot!

From this time forward, it became known as Judaizing to keep the new cycle arrangement. Before the cycle change, the Calendar was known as God's; after the change, the new calendar was called the Jews' and to abide by it was called Judaizing. The Gentiles failed to see that God had given the calendar computation to the Jews for custody just as He had given them the Old Testament.

We do know, however, that Rome's and the West's decision to observe a Sunday was not accepted everywhere. Certainly, the Jewish Christians, or those who had been closely associated with the Apostles, probably saw the necessity of a cycle change and naturally accepted the new Jewish

ruling (the Jews were the custodians of the calendar anyway).

Though, many Gentiles refused to recognize the New Jewish determination of the cycle and they vehemently defended the old cycle arrangement which existed in Christ's day. We have available Anatolius' letter, a mathematician of Alexandria, recorded by Eusebius, in which he stoutly condemns the Jews for their new calendar. I am not putting words into Anatolius' mouth by saying this, for I know he is referring to the cycle change effected by the Jews in his condemnation. Notice what Anatolius says, about a century after the Paschal controversy began: "Wherefore we maintain that those who place the first month (Nisan) in it (the zodiacical sign before the equinox), and determine by it the fourteenth of the Passover, commit no slight or common blunder. And it is not an opinion of our own; but it was known to the Jews of old, even before Christ, and was carefully observed by them." Anatolius is appealing to the old rule that Passover should never occur before the equinox, and in this letter he is condemning the Jews for what he considers their heretical change in the calendar. Now notice that he refers to many important ancient sources which clearly and absolutely prove that before 142 A.D., Passover was never celebrated before Spring began. "This (truth) may be learned from what is said by Philo, Josephus, and Musaeus; and not only by them, but also by those yet more ancient, the two Agathobuli, surnamed 'Masters', and the famous Aristobolus (2nd century B.C.), who was chosen among the seventy interpreters of the sacred and divine Hebrew Scriptures (i.e. the LXX) by Ptolemy Philadelphus and his father... These writers, explaining questions in regard to the Exodus, say that all alike should sacrifice the Passover offerings after the vernal equinox, in the middle of the first month."

Eusebius, himself, admits that Anatolius is indeed correct in his researches, but notice how Anatolius disparages his own findings. "I know that many other things have been said by them (i.e. Philo, Josephus, Aristobolus, etc.), some of them probable, and some of them approaching absolute demonstration, by which they endeavour to prove that it is altogether necessary to keep the Passover and the Feast of Unleavened Bread after the equinox. But I (Anatolius) refrain from demanding this sort of demonstration for matters from which the veil of the Mosaic law has been removed" (Eccl. Hist.,VII, 32:14-19).

In regard to this Anatolius, Dr. Butcher says in his Ecclesiastical Calendar, pp. 264, 265: "Anatolius, bishop of Laodicea, an Alexandrian... (was) a great geometer and otherwise the most learned man of the age, made use of the famous Metonic Cycle of nineteen years in constructing his Paschal canon, taking for the Equinox the 19th of March. He proved from several ancient Jewish writers themselves that the Passover should never be kept before the Vernal Equinox, and therefore that their (he is speaking of the Jews) cycle was erroneous."

There can be no question about the fact that Anatolius was endeavouring to show the Jews, and some "Judaizing" Christians who followed them, that they were wrong in their "new" calendar, with the cycle change. His reason was that the Passover was now, in the new mode, occurring before the equinox. Of course, Anatolius was himself in error for maintaining that the old rule was correct (which had only been applied

since the days of Ezra -- not however by Ezra -- when there was no chance of Passover coming before the equinox). Anatolius does, however, effectively prove beyond doubt that in Christ's day the Passover never occurred before Spring.

The controversy raged over the 17th year in a 19 year time cycle. In this year, the Passover occurs the earliest of all. When the Jewish officials made the change in 142 A.D., the Passover in year 17 went two days BEFORE the Spring Equinox and consistently stayed BEFORE the Equinox for the next 430 years after 142A.D. after that date, the Passover, even in this early year, no longer occurred after the Equinox because of the calendar's creeping forward on the seasons.

With the above, what else do we have? We also have important evidence by Peter, bishop of Alexandria, about 295 A.D. getting into the controversy. This bishop entered into the Paschal Controversy in a big way. In his Fragments (Ante-Nicene Fathers, vol.6, pp. 280-1), he plainly argues that the Jews, up to the time of the destruction of Jerusalem (70 A.D.), were in every way correct in the determination of Passover. Notice how Peter mentions this: "the first month amongst the Hebrews was appointed by law, which WE KNOW to have been observed by the Jews up to the destruction of Jerusalem, because this has been handed down by the Hebrew tradition. But after the destruction of the city it was mocked at by some hardening of the heart..."

Then Peter continues: "But if they (the Jews) knew not Him who sent, and Him who was sent, there is no reason to doubt but that they have been ignorant of the Passover as prescribed by the law, so as not merely to err in their choice of the place, but also in reckoning the beginning of the month, which is first amongst the months of the year, on the fourteenth day of which, being accurately observed, AFTER the equinox, the ancients celebrated the Passover according to the divine command; whereas the MEN OF THE PRESENT DAY (the Jews) now celebrate it before the equinox, and that altogether through negligence and error, being ignorant how they celebrate it in their season..."

"Whether therefore the Jews erroneously SOMETIMES (i.e. because of cycle differences) celebrate their Passover according to the course of the moon in the month Phamenoth, or according to the intercalary month, every third year in the month Pharmuthi, matters not to us (Gentiles)."
Then this Peter relates how, he felt, the Jews had turned to idolatry and spiritual fornication because of their cycle re-arrangement (para. 4).

And, in summing up his argument, Peter says: "Therefore, up to the period of the Lord's Passion, and at the time of the last destruction of Jerusalem under Vespasian, the Roman emperor (70 A.D.), the people of Israel, rightly observing the fourteenth day of the lunar month, celebrated on it the Passover of the law, has been briefly demonstrated" (ibid., p.282).

If these Fragments of Peter, bishop of Alexandria, mean anything at all, then we should look for the cycle re-arrangement by the Jews to have occurred after 70 A.D. -- not before!

I think the evidence given above goes a long way in showing that it was not 66 A.D. in which the change was made. If the change had occurred while the apostles were at headquarters, the Gentiles would have had no reason whatever for the Paschal Controversey of the 2nd century. The Roman and Corinthian Churches were in complete agreement with the Jews over the calendar about the year 100 A.D. But all of a sudden, actually quite abruptly, we find a full-fledged controversy raging immediately after 150 A.D. What was the controversy? It was over the Passover.

And, an important point to remember is that the controversy was not between Passover and Easter. No! It was over when Passover was to be held. With the Jews and the new cycle or the old cycle arrangement? Or was it to be with the Western Churches on a set Sunday near the full moon? The Paschal controversy was clearly over this cycle change effected by the Jews.

Not only do we find the Passover arguments centered in the East, where the Jews effected the cycle change, but the news spread like wildfire. All Asia Minor was effected. Even the churches of Gaul (whether true or heretical) were brought into the conflict.

I am quite sure this shows that 142 A.D. was the time of the change. This is especially brought home when we read Graetz's History of the Jews relative to the first half of the 2nd century. "Under the patriarchate of Simon III (140-163 A.D.) a great quarrel arose concerning the feast days and the leap year, which threatened to cause a permanent schism between the Babylonian and the Palestinian communities -- a result which was only averted by the exercise of much diplomacy" (vol. 3, p.500).

This makes it pretty plain! It was at this time that the quarrel over the leap years (which means the cycle) was raged even among the Jews.

This controversy is described in detail in another section of Graetz. He states that a new Sanhedrin was established, after the destruction of Jamnia in 135 A.D., at a place in Galilee called Usha. The first step of this new Sanhedrin was "to re-arrange the calendar which had fallen into disorder in the course of the persecution." "This Sanhedical college issued a call to all surviving scholars to assemble in Ushal for a Synod. Many responded to the call..." (History, vol. 2, p. 333).

"While the Galilean teachers (of Usha) were endeavouring to infuse new life into the Jewish religious body, to restore the Sanhedrin, and to perpetuate the oral law by means of comprehensive codifications, the Babylonian communities were on the point of creating a schism in Judaism were it not for the shrewd tactics of R. Simeon. R. Hanania... attempted to create a new center of Judaism in Babylonia during the period of persecution in Judea...He organized a Sanhedrical in Nahor-Pakod...with himself as president. The Babylonian communities, hitherto dependent for their religious guidance upon Judaea, but now deprived of it because of the destruction of all religious institutions in the mother country (135 A.D.), joyously welcomed the creation of a Sanhedrin of their own, and gladly submitted to its decisions and ordinances. Hanania ordained leap years and festivals in accord with the principles which were in vogue in Judaea (i.e. after the old 2, 5, etc. method). However, upon the

organization of the Sanhedrin at Usha (in Galilee), the new college could not permit the existence of another body that would threaten the unity of Judaism, and divide it into an Eastern and a Western Church" (History, vol.2, pp. 341, 342).

Actually, the Jewish communities of Babylon and the West finally accepted the Usha Sanhedrin, but not without great contention. The greatest point which divided the two Sanhedrins was over the calendar. The Babylonians argued that the old Palestinian cycle arrangement could still be continued. However, those of Usha finally convinced the Babylonians that such was impossible. The Babylonians were in the end convicted of the need to change the cycle. This, of course, was done. The acceptance of the calendar change by the Babylonian and Western Jews did, in fact, keep the Jewish communities together. The change was clearly in 142 A.D. as we have always maintained (at least, the evidence is strongly in favour of that date).

I think that when the truth is known, Polycarp and many of the other true saints of God saw the necessity of letting the Jews lead in this calendar decision. However, there were many other professing Christians who, like at first the Babylonian Jews, refused to abandon the old cycle, which existed when Christ was here. However, the majority of so-called Christians decided to follow the example of Rome. They "threw up their hands" in bewilderment at the Jews and decided that since the Jews seemed to be so arbitrary with their calendar arrangement, they would determine Passover for themselves in the way that seemed best to them. These latter people, among them the Romans, determined not to "Judaize" with the "Christ-rejecting" Jews. In consequence of their action, they cut themselves off from God by refusing to adhere to a change that was clearly proper. "

With this historical material, the basic calendar material has been made available. Experience over the years has demonstrated beyond doubt that the only way to master the subject is to work many, many calendar computations. Once it is thoroughly understood, it is still necessary, to stay proficient, that calculations be continued at least once every six months. This way, the rules and the methods will keep fresh in a person's mind.

Truly, the biblical calendar is a marvel. It shows God's handiwork, not only in the heavens, but in God's reflection of those heavens in calculations showing beautiful symmetry.

> "The heavens declare the glory of God; and the firmament showeth his handiwork. Day unto day uttereth speech, and night unto night sheweth knowledge."