

The Sabbath And The International Date Line

1.0 INTRODUCTION

The biblical 7th-day Sabbath is from Friday sunset to Saturday sunset and since the Jews have preserved the 7-day weekly cycle since our Lord Jesus' visited their synagogues on the Sabbath, the Church of God can be confident that the 7-day weekly Sabbath cycle has been preserved to this day: at least where Jesus taught in the Promised Land. As the apostles spread Christianity from Jerusalem to Damascus, Antioch, Ephesus, Athens and Rome, the Sabbath cycle travelled with them. When travelling in N.T. times westward or eastward from Jerusalem travellers would barely notice the change in time that accompanies a change in longitude and so there was no mistaking about the 7-day Sabbath cycle in locations reasonably close to Jerusalem. Possibly for that reason no mention is found in the Bible concerning the Sabbath cycle for places whose longitude differs significantly from Jerusalem.

In recent years some in the Church of God have questioned the validity of the 7th-day Sabbath for locations that are (1) near the secular International Date Line (IDL), (2) north of the Arctic or south of the Antarctic circles or (3) east of Jerusalem or of Eden. The Bible gives no guidance for reckoning the Sabbath in such places and this has caused some to invent new rules. One rule being that at no place on Earth should the Sabbath begin before it does in Jerusalem or Eden. The case of Eden is based on Genesis 2:1-3 where God is claimed to have first observed the Sabbath and that therefore Eden must continue to lead the Sabbath day.

Although the case for Eden seems persuasive it may not be assumed God rested in Eden for God may well have rested in Heaven where His throne is and Heaven is beyond the reach of man's meridians and IDLs.

We must also consider that man assumes only sunset marks the start of a 24-hour day but a careful reading of Genesis chapter 1 shows there may be another way. Genesis chapter 1 shows that for days 1, 2 and 3 there was no sunlight and therefore also no sunset, because God turned on the Sun's light only on the 4th day. Therefore God is able to determine without the aid of the sunset when days 1, 2 and 3 began and so presumably also for the remaining days including the Sabbath. Man needs sunset to tell when days begin but apparently not God. See also Section 2.0 of my paper *The Biblical Sunset-to-Sunset Day* (Ref. P11 see Section 8.0 References).

When it is insisted that the Sabbath must begin at Eden and if it is further assumed Eden was located between the Euphrates and Tigris rivers, then the IDL would have to be located there. This means the IDL would have to pass over inhabited land when Adam's growing family expanded from the original Garden of Eden. It will be shown that it is impractical to have an IDL pass through populated areas. This alone rules out an IDL at Jerusalem, the Promised Land or Eden.

Let us recognize that the Sabbath may have begun in Heaven or even at some Pacific IDL referenced from Greenwich or Jerusalem rather than an IDL at Jerusalem or at Eden as some are assuming. When man makes up unbiblical rules this invariably involves making assumptions which this paper shows are never fully considered.

The secular world has adopted a 0⁰ longitude reference meridian through Greenwich near London and an *International Date Line* (IDL) at longitude 180⁰ east (or west) of Greenwich. The idea being that days begin at the IDL which runs conveniently through the Pacific Ocean and from there extends in a continuous manner around the world to the same IDL. Some may deem this incorrect for locations east of Eden because they insist the Sabbath must begin at Eden but where Eden was they can not tell. They also fail to consider whether God observed that first Sabbath in Eden or in Heaven and whether God marked the start of the Sabbath by sunset or by another means. Or whether God reckoned the Sabbath from some Pacific IDL for which He had created that enormous ocean!

This paper illustrates the biblical continuity of the Sabbath as observed at Jerusalem through the accounts of Ezra who travelled from Babylon to Jerusalem and of Paul who travelled from Jerusalem to Rome.

There remains the further question whether Greenwich is the right place for the 0⁰ longitude reference meridian because it seems that the meridian of Jerusalem should be a serious contender for that. If it is Jerusalem than the IDL would presumably be 180⁰ east (or west) of Jerusalem. This would greatly secure the present Sabbath for places like Fiji and Tonga. It must be remembered that the Bible is silent on all these considerations.

2.0 LONGITUDE, DISTANCE AND TIME

The following table shows the relationships between longitude, time and distance travelled along the Equator. The first row shows that the 360-degrees longitude measured along Earth's equator corresponds to a time difference of 24 hours and a distance around the Equator of approximately 40,000 kms. The second row shows another significant measure, namely that every 15 degrees of longitude corresponds to precisely 1 hour of time difference. That time difference applies for every 15 degrees of longitude regardless of latitude. The third row tells us that 1 degree of longitude corresponds to a time difference of 4 minutes and again this applies to any latitude. Finally the

fourth row shows that a longitude difference of one minute of arc corresponds to a time difference of just 4 seconds. The equatorial distance for this is precisely one nautical mile.

	Longitude Difference	Time Difference	Equatorial Distance	
			Kilometres	Miles
1	360 ⁰ (degrees)	24 hours	39,942	24,818
2	15 ⁰ (degrees)	1 hour	1,664	1,034
3	1 ⁰ (degree)	4 minutes	111	69.
4	1' (minute)	4 seconds	* 1.852	1.15

* 1.852 km = 1 nautical mile or 1 minute of arc

This means that at a given latitude when two locations differ by 1 degree of longitude their respective sunsets differ by 4 minutes. Likewise when their longitudes differ by 15 degrees their respective sunsets differ by 1 hour. Of course they may decide to synchronize their clocks to permit office hours to agree in order to facilitate commerce but nevertheless the sun will set in one location one hour before it does in the other.

The longitude of Cairo (Egypt) is 31⁰ 15' and of Jerusalem is 35⁰ 14' east of Greenwich, a difference of almost exactly 4⁰ of longitude. From the table this corresponds to a time difference of $4 \times 4 = 16$ minutes. Although Egypt and Israel may share the same time zone, sunset at Jerusalem precedes sunset at Cairo by 16 minutes.

3.0 THE NEED FOR AN INTERNATIONAL DATE LINE

The need for an International Date Line (IDL) can be seen from Captain Cook's journal of his first voyage across the Pacific sailing in a mainly westerly direction from England via Cape Horn across the Pacific Ocean towards Australia and then to Batavia (today's Jakarta) in the former Dutch East Indies. The following extract from his journal shows Captain Cook was one day out by Batavia's calendar.

[Arrival at Batavia.] (*Note Captain Cook's dates are for October 1770*)
 Wednesday, 10th, according to our reckoning, but by the people here Thursday, 11th. At 4 o'Clock in the P.M. Anchor'd in Batavia road, where we found the Harcourt Indiaman from England, 2 English Country Ships,* (* A country ship is a vessel under the English flag, but belonging to a port in English possessions abroad.) 13 Sail of large Dutch Ships, and a number of small Vessels. As soon as we Anchor'd* (* The Endeavour took nine days, and had to anchor fifteen times, in getting from Java Head, at the entrance of Sunda Strait, to Batavia, a distance of 120 miles.) I sent Lieutenant Hicks a shore to acquaint the Governor of our Arrival, and to make an excuse for not Saluting; as we could only do it with 3 Guns I thought it was better let alone.

Batavia's longitude is approximately 105⁰ east of Greenwich and so Batavia should be 7 hours ahead of Greenwich. Presumably by Captain Cook reckoning Batavia was 255⁰ west of Greenwich and so 17 hours behind Greenwich time. Therefore the time difference between Batavia and his journal must have been $7 + 17 = 24$ hours, which is one day.

Captain Cook had not allowed for having crossed the meridian that is 180⁰ west of Greenwich and where is today's IDL. He should not have seen his Batavia longitude being 255⁰ west of Greenwich but as 75⁰ west of that 180⁰-east-of-Greenwich meridian. This would have made his Batavia position $180^0 - 75^0 = 105^0$ east of Greenwich, which would have agreed with the Dutch reckoning of Batavia's longitude and date.

Although an IDL is inevitable on a rotating Earth it brings with it a major problem because when crossing the IDL we either gain or lose a day (e.g. when it is Thursday west of the IDL then it is Wednesday east of the IDL). As a result it is impractical to position an IDL over inhabited land for it is impossible to administer a society where the IDL divides towns and even streets or houses into two different days.

As a result the IDL must be positioned over an ocean that effectively stretches from North to South Pole, which means it must be either the Atlantic or the Pacific Ocean. Since the world's modern circumnavigators were European and England led the way with precision navigating, the meridian of Greenwich was made the 0⁰ reference meridian. As a result its associated IDL was 180⁰ east (west) of Greenwich and conveniently located over the Pacific Ocean. Even then it was necessary to deviate the IDL from its nominal 180⁰ meridian to pass around the Aleutian Islands, through the Bering Strait and around the Tonga Islands.

4.0 SHORT JOURNEYS FROM JERUSALEM

Let us examine the Exodus when Israel travelled over a period of 40 years from Egypt to the Promised land. It was shown in Section 2.0 that the Sun sets at Jerusalem 16 minutes before it does in Egypt. Israel killed the Passover

lambs in Egypt immediately following the sunset that commences the Abib-14 Passover day in Egypt. At the completion of the Exodus when Israel observed the Passover in the Promised land they would have killed the Passover lambs also immediately after the sunset that begins the Abib-14 Passover day. However in the Promised Land this would be 16 minutes earlier than in Egypt.

It is similar with the Friday sunset that begins the weekly Sabbath. As Israel travelled from Egypt to the Promised land the 7-day Sabbath cycle was marked for them through the withholding of manna on the Sabbath (Exod 16:26). They could not have experienced any discontinuity in time as they travelled from Egypt to the Promised Land for surely that would have been recorded in the Bible. Time must have been continuous between Egypt and the Promised Land and possibly none were aware of the 16 minutes time difference between Egypt and Jerusalem.

When Nebuchadnezzar took Judah captive to Babylon the Jews would have travelled eastward some 10 or 15 degrees of longitude to a place where the sun sets about an hour earlier than at Jerusalem. Since they did not have watches they would not have noticed this change in time. Nor would they have noticed that during their eastward journey to Babylon the daily 24-hour cycle was slightly shortened. Once at Babylon they would have settled back to a 24-hour daily cycle without being aware Babylon's 24-hour cycle was one hour ahead of that of Jerusalem.

Likewise when Ezra travelled westward from Babylon to Jerusalem he would not have noticed the slightly lengthened daily 24-hour cycle as he travelled towards Jerusalem. Of course once at Jerusalem Ezra would again experience the normal daily 24-hour cycle of that city but may have been unaware this is about one hour behind Babylon's 24-hour daily cycle.

In those days man had no accurate clocks and so Ezra is unlikely to have noticed that the Sun set later and later as he travelled westward. He would have seen the Sun set and taken that to mark the end of another day and the start of the next day. On the sixth day of the week (Friday) Ezra would have taken sunset to mark the start of the Sabbath irrespective of his being at Babylon, or somewhere between Babylon and Jerusalem or at Jerusalem. There is certainly nothing in the Bible to indicate to the contrary.

It would have been similar for Paul as he travelled from Jerusalem eastward to Damascus and westward to Ephesus, Athens and Rome. Had Paul or Ezra found a need to change the Sabbath due to changes in longitude as they travelled, then surely they would have warned us in the Bible. No such warning is given in the Bible and so we may conclude that God's biblical servants observed the Sabbath from Friday sunset to Saturday sunset, wherever they found themselves on Earth and after continuously relating this to Jerusalem's Sabbath.

So there was no Biblical International Date Line (IDL) east of Jerusalem to at least Babylon or west of Jerusalem to at least Rome. Therefore time changed continuously from Babylon through Jerusalem to Rome. By extension this continuous time change must have extended even further east than Babylon and further west than Rome: even all the way to a notional IDL in the Pacific.

The Bible reveals in 1 Kings 10:22 that Solomon's ships spent up to three years at sea and in connection with this Stephen M. Collins in his book, *The "Lost" Ten Tribes of Israel...Found!* claims Solomon's ships entered the Pacific Ocean and crossed the Atlantic Ocean to reach America (Ref. Steven Collins' book, see Section 8.0 References). Therefore there is no biblical justification for claiming that the IDL should be at Jerusalem or at Eden.

5.0 TIME ZONES

With virtual instant radio and television broadcasts and telephone communications the notion of a shared clock by a region with shared community interests has become important. This may embrace several countries as for the European Economic Community (EEC). Biblical days begin at sunset and every one degree change of longitude means a 4-minute difference in sunset times. Although this represents a 111 km span at the equator at latitude 60⁰ this distance is halved to only 55 km. Such small distances are unacceptable to modern man whose country may measure over a 1000 km from east to west as for France and Germany. As a result man has adopted time zones that straddle even 15⁰ to 30⁰ of longitude. Although this may mean that at the eastern end of the time zone the sun sets at 5 pm, at the centre at 6 pm and at the western end at 7 pm, this does not concern modern man for his secular day begins at a nominal midnight regardless of this being 11 pm, 12 midnight or 1 am depending on his location in the time zone. When man used the Sun as his primary clock then 24-hour days naturally began with the local sunset and time varied in a continuous manner as the setting Sun's shadow moved westward across the face of Earth.

6.0 SHOULD THE WEEKLY SABBATH BEGIN IN OR BE RECKONED FROM JERUSALEM?

It has been argued that no place on Earth should begin the Sabbath before Jerusalem or before Eden. There is no such rule in the Bible and it has already been pointed out with Nebuchadnezzar taking the Jews to Babylon and later Ezra travelling back to Jerusalem that there can be no doubt that the Sabbath begins in Babylon before at least Jerusalem.

There is only one way of preventing the Sabbath from beginning before it does in Jerusalem or Eden and that is to place the IDL at Jerusalem or Eden – that is assuming we can determine where Eden was, which of course we can not do!

That would mean the IDL would have to pass over inhabited land and that would ensure no one could sensibly observe the Sabbath in towns that straddle the IDL. That alone rules out the notion of a Jerusalem-start or an Eden-start of the Sabbath.

God gave to the Jews (Levites) stewardship over the O.T. Hebrew Scriptures, the sacred calendar and the Sabbath cycle (Ref. paper P6 see Section 8.0 References). This suggests that Jerusalem rather than Greenwich should be the location of Earth's 0⁰ reference meridian. So rather than having the Sabbath begin at Jerusalem, the Sabbath should be reckoned from Jerusalem. Then man can reckon the Sabbath (Saturday) westward from Jerusalem to London, the Americas and all the way to an IDL reckoned 180⁰ west of Jerusalem, and also eastward from Jerusalem across Asia, Australia, New Zealand and all the way to the same IDL but now reckoned 180⁰ east of Jerusalem.

Since Jerusalem's longitude is some 35⁰ east of Greenwich moving the 0⁰ reference meridian to Jerusalem means the IDL would too have to be moved 35⁰ further east from its present location. This would place the IDL east of Cook Island but unfortunately over Alaska but which is largely uninhabited and some is north of the Arctic circle

For the Fiji islands a Jerusalem 0⁰ reference meridian would secure their current Sabbath because the IDL would then be 35⁰ further east than at present. It would also strengthen the Tongan Sabbath.

7.0 WHERE SHOULD WE LIVE?

I believe it is not a blessing to live where the IDL casts doubts over the determination of the Sabbath. French Polynesia may be doubtful even when considered for a Jerusalem 0⁰ reference meridian and corresponding IDL. It is also not a blessing to live north of the Arctic circle as in Narvik (Norway), where sunsets are not discernible for much of the year and so making it impossible to determine the start and finish of the Sabbath. It seems best to migrate from such locations to where sunsets visibly determine the start of the Sabbath.

I believe when man sincerely observes the Sabbath to the best of his knowledge and in the spirit that God intended this will be acceptable by God in the absence of a clear biblical instruction.

8.0 REFERENCES

The following papers give some information on the Jewish calendar which may be helpful and which are available at my Internet home page www.rightly-dividing.net :

- (P6) *Noah's 365 Days In The Ark*
- (P8) *The Seventh Day Remains The Christian Sabbath!*
- (P11) *The Biblical Sunset-to-Sunset Day.*
- Book: *The "Lost" Ten Tribes of Israel...Found!* by Steven M. Collins (currently out of print)

9.0 CONCLUSION

This paper is intended for Sabbatarians in the Church of God. It is argued that there is a case for Sabbatarians to considering a 0⁰ reference meridian passing through Jerusalem instead of Greenwich. This would move the International Date Line 35⁰ further east than at present. Although that solves the problem for many Pacific Islands, it would worsen matters for Alaska. However it is also argued that living north or even near the Arctic circle is not a blessing and that Sabbatarians should consider migrating from there. Otherwise this paper claims that the current IDL suffices for determining the Sabbath for most of the world. Frankly members of the Church of God should rather consider the more weightier matters of salvation and knowing who is the Creator God of the O.T. over which the Church of God remains confused.

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