

# The Problem with the date of Easter

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## Resumo

O estabelecimento de uma data no calendário para a Páscoa, tem sido uma fonte de desacordos entre as diferentes igrejas cristãs nos últimos 2000 anos. Neste artigo vamos analisar a história dos cálculos da data da Páscoa, começando pela sua original coincidência com a Páscoa judia no calendário lunisolar hebraico, passando pelos problemas sócio-políticos causados pelas várias datas obtidas com os diferentes métodos usados para seu cálculo no calendário solar romano. Isto levar-nos-á numa viagem de quatro milénios de histórias de Papas, bispos, monges, reis, rainhas, teólogos, astrónomos, matemáticos, calculistas, colonos e terroristas, passando pela Babilónia, por Jerusalem, Roma, Leptis Magna, Alexandria, Bizâncio, Niceia, Éfeso, Esmirna, Atenas, a Cítia Menor, Cantuária, Whitby, Iona, A Ilha Santa e Belfast.

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Teremos de aprender também alguma astronomia e alguma matemática.

**Palavras-Chave:** Páscoa, *Pesach*, calendários lunares e solares, cálculos.

### **Abstract**

The location of Easter in the calendar has been a source of disagreement among the Christian Churches for over 2000 years. In this paper, we will explore the history of the calculation of the date of Easter, from its original coincidence with Passover in the Hebrew lunisolar calendar, through the political and sociological problems caused by differences among the methods used for calculating its date in the Roman solar calendar. This will take us a journey through four millennia of popes, bishops, monks, kings, queens, theologians, astronomers, mathematicians, computists, settlers and terrorists from Babylon, Jerusalem, Rome, Leptis Magna, Alexandria, Byzantium, Nicea, Ephesus, Smyrna, Athens, Scythia Minor, Canterbury, Whitby, Iona, the Holy Isle and Belfast.

And we will also have to learn some astronomy and mathematics.

**Keywords:** Easter, Passover, lunar and solar calendars, computus.

## 1. Calendars and Festivals

When is Easter? In the Western Christian churches, Easter is on the first Sunday after the first ecclesiastical full moon following the spring equinox, which could be any Sunday between 22 March and 25 April (US Naval Observatory, 2016).

But in the Eastern Orthodox churches of Russia, Greece, Bulgaria, Egypt, Ethiopia, Syria etc. it can be later than that. And this disagreement has persisted for 2000 years (World Council of Churches, 2007).

In order to understand why, we must start with a different question:

When is Passover?

The Torah set Aviv (now Nisan) as "the first of months": *this month shall be unto you the beginning of months; it shall be the first month of the year to you*<sup>2</sup>.

This *ecclesiastical new year* was the basis for counting months and festivals. In the Hebrew calendar, each new moon is *Rosh Chodesh*, the start of a month and each day starts at sunset. The **full moon** of Nisan, **Nisan 14**, *Erev Pesach*<sup>3</sup>, the night on which Passover begins.

As *Pesach* is a **spring festival**, it should fall just after **the vernal equinox**. If the twelfth full moon after the previous *Pesach* precedes the equinox, a leap month (*Adar Sheni*) is inserted near the end of the previous year. This **luni-solar** calendar is based on 21<sup>st</sup> century BC Sumerian and Babylonian astronomy (Steele 2007).

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<sup>2</sup> Exodus 12:2 and Deuteronomy 16:1.

<sup>3</sup> Leviticus 23:4–6.

This year (2016), *Pesach* was very late. The equinox was on March 20 but *Erev Pesach* was on April 22. To understand how all this relates to the **Easter Problem**, we must first study the motion of heavenly bodies.

Our measurement of time has always been governed by the relative movements of the Sun, the Earth and the Moon. And the Talmud says it is our duty to understand them!

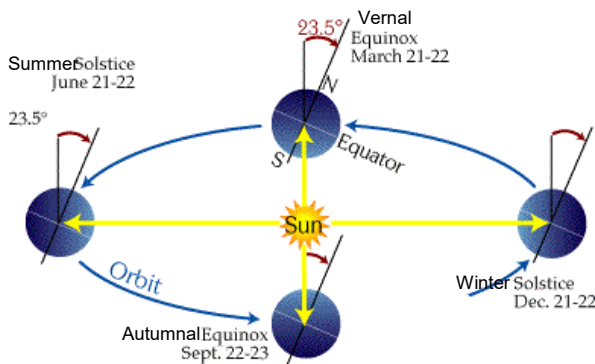
*R. Samuel b. Nahmani said in R. Johanan's name:*

*'How do we know that it is one's duty to calculate the cycles and planetary courses?*

*Because it is written, "for this is your wisdom and understanding in the sight of the peoples":*

*what wisdom and understanding is in the sight of the peoples?*

*Say, that is the science of cycles and planets<sup>4</sup>.*

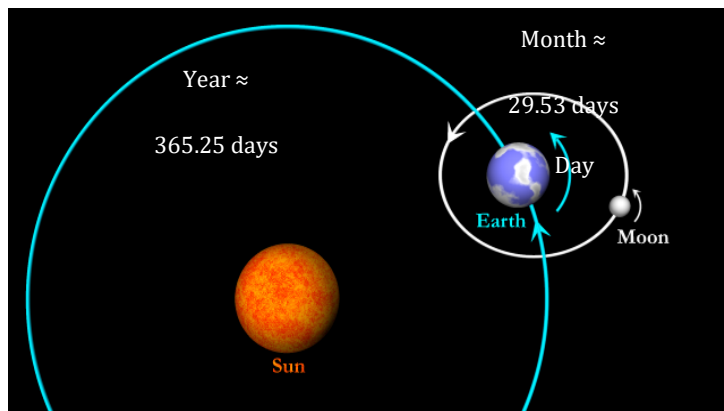


The Earth's axis of rotation is at an angle of 23.5° to the plane of its orbit, so as it moves around its orbit, the ratio of day to night changes, resulting in the **Seasons** (Khavrus

2010). Day and night are equal at the *equinoxes* (L. equal night). At the **Vernal Equinox**, daytime is increasing in the Northern Hemisphere, which marks the beginning of Spring here and of Autumn in the Southern.

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<sup>4</sup> Babylonian Talmud, Tractate Shabbat 75a.



Agriculture and **festivals** require accurate prediction of the seasons, hence the development of **calendars**.

The phases of the moon were used to define **months** which allow a finer measurement of time than the equinoxes and solstices.

Babylonian astronomers knew that the Earth orbits the sun (almost) exactly 19 times while the moon orbits the Earth 235 times (Neugebauer 1975).

$$19 \times 365,25 = 6939,75$$

$$235 \times 29,53 = 6939,55$$

**So 19 years is about 235 months.**

This *enneadecaeteris* (from Gk. 19) is known as the *Metonic cycle*, after the Greek astronomer, Meton of Athens (432BCE), who probably learned it from the Babylonians, who used it to define their **luni-solar** calendar on which the Hebrew calendar is based.

The Babylonian months are Nisanu, Aru, Simanu, Dumuzu, Abu, Ululu Tishritum, Samna, Kislimnu, Tebetum, Shabatu, Adaru.

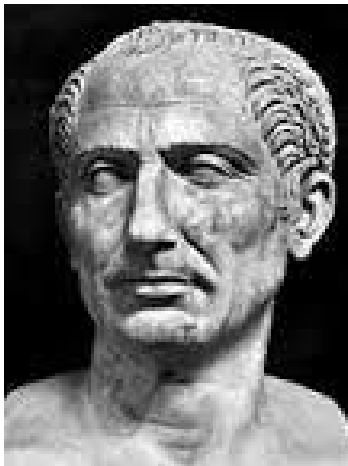
The Hebrew months are Nisan, Iyar, Sivan, Tamuz, Av, Elul, Tishri, Cheshvan, Kislev, Tevet, Shevat, Adar.

The Metonic Cycle is exploited in the remarkable **Antikythera mechanism (ca.200 BCE)**, a



mechanical analogue computer capable of predicting many calendar events, including eclipses (Freeth 2006).

In 46BCE, Julius Caesar introduced a new **solar** calendar to the Roman Empire, consisting of 365 days divided into 12 months with



one extra day added in every year whose number is divisible by 4, giving an average length of year of 365.25 days.

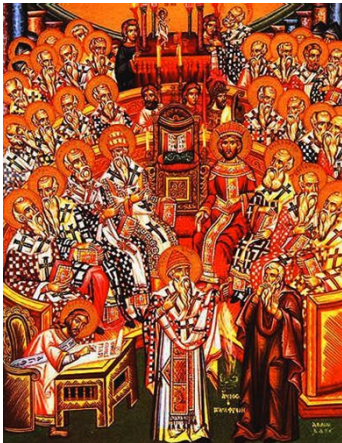
Actually, the so-called 'Tropical' year consists of 365.24219 days. Not much of a difference, but enough to make the equinoxes gradually move in the Julian calendar (Richards 2013).

**By the 16<sup>th</sup> century, the Julian calendar was 11 days 'slow'.**

## 2. The Quartodeciman Controversy

According to the Apostle John, Jesus was killed just before Passover<sup>5</sup>, but the Last Supper could not have been a Pesach Seder because that ritual was developed by Rabbinic Judaism at least 70 years later<sup>6</sup>. **John** celebrated Easter on **Erev Pesach** but the apostles **Peter and Paul** celebrated it on a **Sunday**, the weekday of the resurrection.

The Popes of Asia Minor, since **Polycarp** (d. 167), who was appointed Bishop of Smyrna by John<sup>7</sup>, followed the Johannine



*Quartodeciman* (Nisan 14) practice. But the Popes of Rome, since **Sixtus 1** (d.124), followed the *Sunday* practice of Peter and Paul. **Pope Anicetus** (d. 168) agreed to differ with Polycarp on this matter but several synods subsequently ruled in favour of Rome. After the 193 synod in Rome, **Pope Victor 1** (d.199), the first African Pope, excommunicated Polycrates of Ephesus for refusing to toe the Roman line, but recanted after being rebuked by his

Bishops<sup>8</sup>. At the First Council of Nicea in 325, Emperor **Constantine the Great** (272-337) cut through many ecclesiastical arguments, including the Easter question<sup>9</sup>. The Council agreed that all Christians

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<sup>5</sup> John 19: 14

<sup>6</sup> Babylonian Talmud, Tractate Pesachim 10.

<sup>7</sup> Tertullian, De praescriptione haereticorum 32.2.

<sup>8</sup> Eusebius Pamphilius, Church History, Life of Constantine, 5.24.

<sup>9</sup> op cit, 5.23.

should observe a common date of **the first Sunday after the first full moon after the Vernal equinox.**

But the date of the Vernal equinox itself was not agreed across the Empire. Because of the inaccuracies of the Julian calendar, Rome used March 18, while Alexandria used the more correct date of March 21 and Antioch used the Hebrew date. As a result, **Alexandria and Milan celebrated Easter 387 on April 25, 5 weeks after Rome!** (von Döllinger 1840).

### 3. The Computus

A common agreed date became critical in 389, when **Emperor Theodosius I** (347-395), the last to reign over both Rome and Byzantium, made Easter official and abolished all pagan festivals<sup>10</sup>. The date of Easter for each year needed to be set well in advance and circulated throughout the Empire. This meant that every see had to be given

a table (or *laterculus*) giving the date in each year, which, in turn, required

a method (or *computus*) for calculating the date of Easter in any given year.

A computus must relate the **solar calendar**, in which the Vernal equinox is located, to the **lunar calendar**, in which the full moons are located.

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<sup>10</sup> Codex Theodosianus XVI.1.2.



In 390, **Theodosius** approved a *laterculus* devised by **Theophilus of Alexandria** containing a calculated date for Easter in each year from 380 to 479 (Mosshammer 2008).

In the 5<sup>th</sup> century, **Augustalis**, first Bishop of Toulon, issued *De Rationae Paschae*, a *laterculus* based on an 84-year variant of the Metonic cycle giving the date of Easter for 100 years (Krusch 1880).

In 525, at the request of **Pope John I** (470-526), both the Alexandrine and the Augustalis laterculi were replaced by an improved 532-year table devised by the brilliant Scythian friar **Dionysios Exiguus** (Dennis the Humble, 470-544), who also introduced the term 'Anno Domini' into year numbering and was the first Latin writer to use the concept of zero in arithmetic. (Blackburn & Holford-Strevens 1999).

#### 4. The Church in Britain

Meanwhile, Coptic Christians, including Joseph of Arimathea and Aristobulus had brought a Johannine Church to Britain and Ireland as early as the 1st Century<sup>11</sup>. The monks on Iona and Holy Isle founded the Celtic Church and developed their own tabular computus, known as the *Insular Laterculus*, that placed Easter on **the Sunday falling in the seven-day period from the 14th to the 20th of its lunar month**, according to a variant of the Augustalis



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<sup>11</sup> [Gildas. De Excidio et Conquestu Britanniae.](#)

laterculus modified to fit with the more accurate Julian calendar (Mosshammer 2008).

After the Romans left, the south and east of Britain was largely Anglo-Saxon and pagan, while the north and west were Celtic and Christian.

In 595, **Pope Gregory I** (540-604, the Great, of plainchant fame) on seeing pale-skinned English boys from Deira (between the Humber and the Tees) at a slave market, exclaimed (according to the Venerable Bede), *Non Angli, sed Angeli* ("They are not Angles but angels") who



should be rescued from the wrath (*de ira*)<sup>12</sup>. He sent **Augustine**, prior of St Andrew's Abbey in Rome, to convert **King Aethelbeht of Kent** (552—616), who had married a Christian Merovingian princess. In



597, St Aethelbeht became the first Christian King among the English and St Augustine became first Archbishop of Canterbury (Stenton 1971). Missionaries were sent throughout the land but were resisted by the Celtic Bishops.

**King Oswiù of Berenicia** (642-670) was exiled as a boy to Holy Isle where he was educated by the Celtic Church (Yorke 1990). In 643, he unified Northumbria by marrying **Princess Eanflæd of Kent** (626-685), daughter of King Edwin of Deira and granddaughter of Æthelbeht. Eanflæd was born on the evening before Easter and educated at Canterbury, so she and Oswiù relied on different



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<sup>12</sup> Bede, *Historia ecclesiastica gentis Anglorum*.

computi for the date of Easter but this wasn't a problem until **665** when, as the Venerable Bede tells us<sup>13</sup>, ***Easter was kept twice in one year, so that when the King had ended Lent and was keeping Easter, the Queen and her attendants were still fasting and keeping Palm Sunday and, of course, abstaining from sexual activity during Lent.***

Now it became urgent to reconcile Iona and Rome. The *computus* was the main issue, but there were others, such as the shape of monks' tonsures.

In **664**, Alchfrith, Oswiu's son and sub-king in Deira, (who had recently expelled Ionan monks from the monastery of Ripon and given it to Wilfrid, a Northumbrian churchman recently returned from Rome), persuaded Oswiu to convene a Church council, or *synod*, to resolve the differences. Hilda, a Northumbrian noblewoman and Celtic adherent, offered to host it at Streonshalh Monastery, which later became **Whitby Abbey**<sup>14</sup>.



The Celtic Church was represented by Hilda and Colmán, Bishop of Northumbria. The Roman advocate was Wilfrid, supported by Eanflaed's chaplain Romanus and Agilbert, a Frankish bishop. The argument rested on whether the practices of Paul (Celtic) or Peter (Roman) took precedence in ecclesiastical matters.

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<sup>13</sup> op. cit.

<sup>14</sup> op. cit.

Oswiu decided in favour of Peter, the holder of the keys of heaven, **which doomed the Celtic Church to oblivion**<sup>15</sup>.

## 5. The Irish Troubles



1000 years later, the Protestants who broke with Rome in the 16th century Reformation, imagined the Celtic churches, and even **St Patrick** himself, to have been early examples of Protestantism free of the errors of the 'Romish' Church. In 1688, the Glorious Revolution replaced the Roman Catholic King of England, **James II**, by the Protestant **William of Orange**, and his wife, James's daughter **Mary**. In 1690, James' attempt to regain the crown ended in Ireland at the **Battle of the Boyne** and William sent boatloads of Scottish Presbyterians to colonize the Ireland and subdue the Fenians (McBride 2001). The **Orange Order**<sup>16</sup>, founded shortly afterwards by working class Ulster Presbyterians, sought to guarantee that **the Protestant succession would never again be challenged by Rome**. The rise of Irish nationalism in the predominantly Catholic south erupted into rebellion against British rule in **Easter 1916** that led to the establishment of the Irish Free State in 1922, leaving Ulster under British rule. And the Troubles that blighted Irish life for most of the 20th century came to an end, officially at least, with the agreement signed on **Good Friday 1998** ( McEvoy 2008).



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<sup>15</sup> George Buchanan, *Rerum Scoticarum Historia* (1582).

<sup>16</sup> [https://en.wikipedia.org/wiki/Orange\\_Order](https://en.wikipedia.org/wiki/Orange_Order).

**And all because, one Easter long ago, the ruler of a minor kingdom on the fringes of civilisation was sexually frustrated. But you won't find that in the history books!**

## 6. The Gregorian Calendar

In 1582, Pope Gregory XIII issued the bull *Inter gravissimas* in order to "restore" the Vernal Equinox, and the dates of Easter, to their "proper places" (where they had been at the time of the Council of Nicea) and would be prevented from being moved away again<sup>17</sup>.



It corrected the accumulated errors In the Julian calendar by 'losing' 11 days, **Julian Thursday, 4 October 1582**, being followed by **Gregorian Friday, 15 October 1582**. It also reduced the error by decreasing the number of leap years. A century year would be a leap year only if divisible by 400, So 1600 was a leap year but 1800 was not.

France, Italy, Poland, Portugal and Spain adopted the new calendar immediately. Turkey held out until January 1st, 1927, after the fall of the Ottoman Empire. The British Empire didn't switch until The Calendar (New Style) Act of 1750 decreed that Wednesday, September 2, 1752 would be followed by Thursday, September 14, 1752 (Blackburn & Holford-Strevens 1999).

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<sup>17</sup> <http://www.bluewaterarts.com/calendar/NewInterGravissimas.htm>

One result of this delay was that, although **Shakespeare and Cervantes both died on April 23, 1616, they did not die on the same day!**

Another was that the start of the British Tax Year changed from March 25 (Lady Day, the Feast of the Annunciation) to April 5 then to April 6 in 1800, which was no longer a leap year. Tories accused Whigs of “stealing 11 days”. Many people complained about moving religious festivals, including Easter<sup>18</sup>.



## 7. Recent Failed Proposals

In 1923, the Pan-Orthodox Congress of Constantinople<sup>19</sup> proposed that Easter was to be **the Sunday after the midnight-to-midnight day at the meridian of the Church of the Holy Sepulchre in Jerusalem (35°13'47.2"E) during which the first full moon after the vernal equinox occurs.**

In 1928, a UK Act of Parliament allowed for Easter Sunday to be **fixed on the first Sunday after the second Saturday in April**, but it was never commenced. In 1999, a further bill was introduced to commence the 1928 Act, but it was not passed<sup>20</sup>.

In 1982, the **Virgin Mary** appeared in Soufanieh, Damascus, to **Myrna Nazzour**, telling her to pray for peace and Church unity. In

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<sup>18</sup><http://www.historic-uk.com/HistoryUK/HistoryofBritain/Give-us-our-eleven-days>.

<sup>19</sup> [https://en.wikipedia.org/wiki/Revised\\_Julian\\_calendar](https://en.wikipedia.org/wiki/Revised_Julian_calendar)

<sup>20</sup> Hansard, Thursday 11 Mar 1999, Easter Act 1928 (Commencement) Bill [H.L.]

1990, she was told there would be **no more messages until the Churches agreed on the date of Easter** (Fox 2002).

In 1997, the World Council of Churches at Aleppo proposed that Easter be defined as **the first Sunday following the first astronomical full moon following the astronomical vernal equinox, as determined from the meridian of Jerusalem**<sup>21</sup>.

None of these were effective.

In January 2016, **Justin Welby**, Archbishop of Canterbury, announced that he was working with **Pope Francis** to agree on a fixed date for Easter together with **Orthodox Patriarch Bartholomew I of Constantinople** and **Coptic Orthodox Pope Tawadros II**<sup>22</sup>. In June 2015, Pope Francis announced that he had come to an agreement with Pope Tawadros and **Patriarch Ignatius Aphrem II of the Syriac Orthodox Church of Antioch**<sup>23</sup>. Meanwhile, **Patriarch Kiril of Moscow and all Rus** and Bartholomew I are to review their own disagreement. In February 2016, the Russian and Roman Patriarchs met for the first time in 1000 years, but Easter was not on the agenda<sup>24</sup>.

But a fixed date, on say the second or third Sunday in April, is unlikely to be agreed by all **the Eastern Churches who still use the Julian Calendar**.

**WATCH THIS SPACE!**

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<sup>21</sup><https://www.oikoumene.org/en/resources/documents/commissions/faith-and-order/i-unity-the-church-and-its-mission/towards-a-common-date-for-easter/index>

<sup>22</sup> <http://www.bbc.co.uk/news/uk-35326237>

<sup>23</sup><http://en.wataninet.com/coptic-affairs-coptic-affairs/church-affairs/popes-francis-and-tawadros-agree-one-easter-for-all/14914>

<sup>24</sup> [https://en.wikipedia.org/wiki/Joint\\_Declaration\\_of\\_Pope\\_Francis\\_and\\_Patriarch\\_Kirill](https://en.wikipedia.org/wiki/Joint_Declaration_of_Pope_Francis_and_Patriarch_Kirill)

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