In Our Time

Melvyn Bragg

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The Calendar

The calendar orders the lives of millions of people. It is an invention that gives meaning to the passing of time, it marks out our daily existence. It links us to the arcane movements of the heavens and the natural rhythms of the earth. It is both deeply practical and profoundly sacred.

But where does this strange and complex creation come from? Why does the week last seven days but the year twelve months? Who formed these concepts and through them shaped our lives? The answers involve Babylonian astronomers and Hebrew theologians, Roman emperors and English scholars. Isaac Newton, for instance, designed a calendar said to be mathematically flawless but no one could understand it. Gregory XIII seems to have got it right.

With me to discuss the calendar are Robert Poole, Reader in History at St Martin's College, Lancaster, and author of *Time's Alteration: Calendar Reformation in Early Modern England*; Kristen Lippincott, Deputy Director of the National Maritime Museum in Greenwich; and Peter Watson, Research Associate at the McDonald Institute for Archaeological Research at Cambridge University, and author of *A Terrible Beauty: A History of the People and Ideas that Shaped the Modern Mind*.

Kristen Lippincott, what were the first calendars based on?

KRISTEN LIPPINCOTT: The best way to think about the calendar is to put yourself back in the shoes of ancient man. You're sitting there in the middle of some field, watching the daily rhythms, and the first rhythm that you really notice, beyond day and night, is the waxing and waning of the moon. You notice that every twenty-eight days you get a full moon back, and almost all of the early calendars are lunar calendars. In fact we have lunar calendars dating back to 10,000 BC.

The next big cycle that you notice is the cycle of the year, and the first one is usually by the stars. When certain bright stars appear on the horizon, it marks the beginning of a new year. And then the third thing that you notice is that the sun is in the same place in the sky after 365 days. So those are the three basic kinds of calendars that you can have: a lunar calendar, a sidereal or star calendar, or a solar or sun calendar.

MELVYN BRAGG: Were these seen to be useful for diurnal existence from the very beginning?

KRISTEN LIPPINCOTT: Certainly we find that most early calendars, and most religious calendars, are lunar based, because it's something seen in the moon every night, waxing and waning, it's something that is ingrained very much in people's souls, if you like. Those of us who live in cities now don't really notice it. You can imagine, before electric lights, whether or not it was a full moon really mattered to people's lives, and so we find that most of the early religious calendars are lunar and are very deeply ingrained.

Beyond this, of course, the stars and the sun mark the seasons, so they tell you when to plant, when to reap, when to sow. Also things like navigation were based on calendars. There's a passage, I think in Homer, where it says: 'don't sail unless the Pleiades are rising on the horizon with the sun.'

MELVYN BRAGG: And then Hesiod talks about farming and agriculture with regard to the seasons.

KRISTEN LIPPINCOTT: All his *Works and Days* is saying is 'when the slug climbs the tree, that's the time when Orion is rising'. It really gives you a very good calendar that still works today.

MELVYN BRAGG: And that kind of country lore – 'when the slug climbs the tree' – lingered on in this country, in country areas, until quite recently.

KRISTEN LIPPINCOTT: Certainly the *Farmers' Almanac*, which you can still buy – not at any newsstand, but it is available – tells you that kind of folklore, which is true. It's based on observation.

MELVYN BRAGG: Peter Watson, as I understand it the first sophisticated calendar was developed by the Babylonians, who were mathematicians and astronomers. Could you tell us about that calendar?

PETER WATSON: As Kristen says, they noticed that there are twelve lunations, twelve months in a year, more or less. They had their twelve months, then they had an extra period. This has happened all over the world. A sort of thirteenth month of varying lengths, generally regarded as unlucky. But it was the Babylonians who devised this system based on sixty, sixty being the lowest common multiple of twelve and thirty, or roughly the number of days in a month. The Babylonians therefore gave us minutes and seconds, as well as weeks and years and days. The Latinisation of this is still based on sixty.

And the first division of this was called '*pars minuti prima*' in Latin, the 'first small division', and that phrase became corrupted to 'minute' and the second division was '*pars partes minutae seconde*', and that phrase in time became corrupted to 'second'. And then they also noticed that as the sun rises it passes through the stars and this idea comes down to us, via the Greeks, as the Zodiac – the Greek word 'zodion', meaning 'little animal'. Some of the stars in the sky were shapes. As the Babylonians saw it they looked like animals, and so this is how we arrive at both the Zodiac and the fact that it is a circle around a point, which we now divide into 360 degrees. It's all related to the same system.

MELVYN BRAGG: What did they do with the days that were left over?

PETER WATSON: This was called the intercollated month and it was regarded, not just in Babylon but in other early cultures around the world, as very bad luck. You were very careful about what you did on those days and some cultures don't even give this period a name. To name it was to make it even worse luck.

MELVYN BRAGG: Would you consider this to be a great legacy that the Babylonians passed on? Was this brought together for the first time in an extensive and coherent form by them?

PETER WATSON: Yes. The smaller parts of the calendar are the Babylonian legacy. As I say, everybody could notice the year and the months. The Babylonians regarded the seventh day, the fourteenth day, the twenty-first day and the twenty-eighth day as unlucky, and there were various taboos on what you could do on those days, and there you see the beginning of the week. They also regarded the twentieth day as very lucky, because the twentieth day of any one month was the forty-ninth day of the previous month. That's seven times seven, regarded as lucky. And the 'full moon day' was known as the 'shabatum', I think I've got that right. When the Jews then went into exile in Babylon, they appropriate the word as 'Shabbat', the Sabbath, the day on which you don't really do any work. That has come down to us from the Babylonians, and we still have the word and the concept of the Sabbath.

MELVYN BRAGG: Who did the Babylonians pass this calendar on to, who took it to the next stage?

PETER WATSON: I think both the Greeks took a lot of it on and, in time, the Romans. And the Romans eventually developed through the Julian reforms many new things. But the astrological influence that the Babylonians seemed to have started round about 500 BC has come down to us in the astrological week that we still essentially use.

MELVYN BRAGG: You mentioned the Romans – how did the early Roman calendar work?

PETER WATSON: According to legend the first king of Rome, Romulus, had a ten-month calendar.

MELVYN BRAGG: Why was that?

PETER WATSON: It began in March. To begin with they seem not to have had any words for what we now call January and February. People may have wondered why September, which is the ninth month, is based on a word that means seventh, and this is because originally the Roman year started after the spring equinox in March.

MELVYN BRAGG: So they just didn't bother with those? They had two fallow months there that they weren't even going to count?

PETER WATSON: Not to begin with, no.

MELVYN BRAGG: They didn't count them at all?

PETER WATSON: No. Then later on, the second king of Rome, I think it was, introduced February and January. And to begin with February came before January and later still this was changed and January started the year. But they also had, the same as the Babylonians, this overlap period, this intercollated thirteenth month, which they call 'Mercedonius', which is our word 'mercenary', meaning 'wages', because this was when all the people got paid. That eventually dropped out and we come to the Julian reforms.

MELVYN BRAGG: Let's talk about the Julian reforms with you, Robert Poole. What did Julius Caesar find wrong about the calendar that he thought needed reforming?

ROBERT POOLE: He found that the calendar, the Roman calendar, which had been more or less inherited wholesale from Egypt, had slipped out of sync with the year by very nearly a hundred days. This was partly because the Egyptian measurement of the year at 365 and a quarterish days was not quite right but partly also because these intercalary days and months had been manipulated for various political purposes to influence the dates of elections and the length of terms of office.

MELVYN BRAGG: You mean the days that didn't really count, the priests and politicians would just use to extend their stay in office?

ROBERT POOLE: That's right. And for some reason the balls had all rolled to one side of the snooker table. All the days had accumulated and the year was nearly three months out of sync. What should have been the time of the spring equinox was actually being counted in winter. So, in 45 BC there was a great year of confusion, which consisted of 445 days, which put everything back on line, and then Caesar got his astronomer, Sosigenes the Greek, to come up with a new calculation of the year, and they got it at 365 and a quarter days, and Caesar instituted the system of leap years – one day extra every four years – that kept the calendar more or less on track for many centuries to come. They were only eleven minutes out, on average, for each

year, and it was centuries before anybody even noticed, so it was remarkably accurate.

MELVYN BRAGG: How successfully was this reform implemented? Did people begin to take the calendar more seriously because it was more accurate?

ROBERT POOLE: We don't have any records or information about that. The interesting thing is that you could actually put all these extra days in a year and it doesn't seem to have had any massive ill-effects in a slow agricultural society that didn't always calculate very precisely by days.

MELVYN BRAGG: Did it have any other uses, this calendar that Caesar implanted? We know him best in this country as a general, or whatever title he had, a warlord in some way. Did it help those administrative, military arrangements to have a more accurate calendar?

ROBERT POOLE: It certainly helped taxation. In fact the Roman cycle of taxation, the Indiction, remained in use in the Christian Church until the early modern period. The Romans were famous for being extremely well-organised people and the taxation system was helped no end by having accurate years.

PETER WATSON: Maybe we should point out that Julius Caesar was assassinated the year after the changes, and a lot of people thought that this was because he interfered with the calendar.

MELVYN BRAGG: He was assassinated under the old system, on the Ides of March, wasn't he?

PETER WATSON: That's right, yes.

MELVYN BRAGG: What about those Ides – was that the way the Roman calendar worked before Caesar got hold of it?

ROBERT POOLE: I'd have to pass that one over to Peter, the classicist.

PETER WATSON: Their month was divided into the Kalends, which started on the new moon – that's where our word 'calendar'

comes from – into the Ides, which was on the full moon – Ides I think is derived from the word meaning 'to divide' – and the Nones, which was eight days before. They'd numbered the days and this was the system in use in Rome really until Christian times. And the astrological week that we use now caught on because astrology became very popular in Augustan Rome.

MELVYN BRAGG: Can we talk about the Christian calendar now, Kristen Lippincott? When did the Christians start to have a voice in the calendar?

KRISTEN LIPPINCOTT: The early Christians just kept on with the Roman calendar and didn't really change it at all, except probably with a man named Dionysius Exiguus or, as we often say, Denis the Short. He was the one that said why should we good Christians be keeping a Roman calendar, shouldn't we have a calendar based on the life of Christ? So he was the first one that really focused on the day of Easter, and that's when the problems started to arise with the calendar because Easter is, essentially, an inheritance from a lunar calendar and the Roman civil year is, essentially, a solar calendar, and one of the problems with the lunar cycles and the solar cycles is they don't match. That's to say they only line up once every nineteen years and this is why Easter's a moveable feast. It slides backwards and forwards in the civil calendar and this is when the problem began, because people said how are we going to start to fix our religious feasts, how are we even going to know when the religious feasts happen, when we've got this problem? And for about 500 years almost every educated monk was involved in calendar studies.

MELVYN BRAGG: And just to restate for people who may not be as up to date with early Christian history: the idea of dating Easter correctly was astoundingly important to early Christians, wasn't it? Crucial is a better word.

KRISTEN LIPPINCOTT: Yes. If your whole religion – that's perhaps putting it too broadly – but if you are a Christian one of the main reasons you are a Christian is because on a certain day, with a certain kind of celestial configuration, Christ was reborn. If you don't know what day that is, then this becomes really worrying.

One of the things that was established in the fourth century was that the Council of Nicaea said we must fix the date of Easter, we must know when this happens and they came up with a formula that's quite complex, and I probably won't remember it correctly, so please someone jump in and help me . . .

MELVYN BRAGG: Shall I push it over to Robert, he's worked it out. Can you tell us why it was so difficult a day, Easter, Robert Poole, and what factors were involved that made it difficult?

ROBERT POOLE: It's not just a matter of combining a lunar calendar with a solar calendar and the two not fitting. There are also political or religious considerations because Christ was crucified around about the time of the Jewish feast of the Passover, which is lunar, but the one thing the early Christians wanted to do was to distance themselves from the Jewish calendar, the Jewish religion and Jewish practice. So they had to find a method of having an Easter which on the one hand would track the Passover, so that Easter was happening at the right time of the year, but on the other hand it wouldn't actually reproduce it.

As a further complication, the Christian holiday was a Sunday whereas the Jewish one was a Saturday. The eventual result was the formula that Easter should be on the first Sunday on or after the first full moon after the vernal equinox, the spring equinox, which was defined as 21 March and not the actual natural equinox. And it was this fixing of Easter to a date and not to an actual natural event that caused it to drift out when the calendar drifted out over succeeding centuries.

MELVYN BRAGG: When did they actually get down to really fixing that?

PETER WATSON: Well, I think it's useful to say that for the first Christians time . . .

MELVYN BRAGG: We're talking about the first three centuries AD, three or four centuries?

PETER WATSON: Yes, time really wasn't very important because they all thought that Christ was coming again in their lifetime.

So they didn't actually pay too much attention to time to begin with. Then there's a really amazing coincidence that Kristen has mentioned, this nineteen-year cycle, which was pretty accurate but not quite accurate. This chap Victorius of Aquitaine found out that if you multiply it by twenty-eight it's even more accurate.

So, if you're still with me, we're on nineteen times twenty-eight, which gives you 532, and Denis the Small, he doesn't know it's year 532 at the time. If anything it's year 287 after the accession of Diocletian, the Roman emperor. So Denis does the calculations and by an astounding coincidence he finds that Christ was born exactly 532 years ago. In other words, the moon and the stars and the sun are in exactly the same position in the year he's doing this calculation as the year Christ was born, according to him. Therefore this is surely a sign from God that I'm in the right place at the right time and this idea of dating everything from the birth of Jesus is a sign from God saying yes, go ahead and do it.

MELVYN BRAGG: That was when the AD dating began?

ROBERT POOLE: Yes, and the previous reference point was the reign of Diocletian. Diocletian was famously a persecutor of Christians, so the birth of Christ was obviously a much, much better date for the Christian Church by then.

MELVYN BRAGG: Did Bede, the Venerable Bede, when he wrote his *Ecclesiastical History of the English Speaking Peoples*, did he bring dates to bear in there? Was he using the dating system that we've been talking about?

KRISTEN LIPPINCOTT: Most of the great, what we might call mathematicians, or you could call them religious men, of the Middle Ages were very interested in how the calendar worked. One of the things that Bede recognised, because there had been enough of a time difference from the early calendar, is that the equinox was slipping, the actual celestial equinox, was slipping backwards against the calendar. He was one of the first people to say we're going to have to do something about this calendar because we are slipping out of line with the stars.

MELVYN BRAGG: So there's the artificial and the natural, almost in competition all the time, certainly often in contradiction, aren't they? Did they realise that at the time?

ROBERT POOLE: It was realised by monks and astronomers and those who observed the sky, but it didn't really matter in everyday life. Plenty of civilisations, the entire Middle Eastern world, the entire Islamic world, work on lunar calendars that are very precise, the moon is very regular, but these calendars don't quite match the solar year, the new year. Every now and again there's an intercalary month.

It doesn't matter too much whether you're anything up to two or three weeks out in the seasons in an agricultural society. But of course it does matter when you're talking about calculating the date of Easter and it was a source of great embarrassment to the Christian Church that Islamic scholars would point out that their Easter, the Christians' famous Holy Day that was supposed to be on this first Sunday on or after the first full moon after the equinox, wasn't happening anywhere near the equinox at all. It was happening on completely the wrong date, and this appeared to undermine the claims of the Christian Church to be the true church.

PETER WATSON: Kristen is right. Easter is central to a Christian and to celebrate it in those days too early meant that you were guilty of hubris, you didn't need God for salvation. To celebrate it too late meant you didn't care. In both senses it was sacrilegious. The ancient kings in Egypt, when they came into office, had to swear that they would not change the calendar. Even today, I think, to change the Jewish calendar would need a meeting of the Great Sanhedrin, which is almost unthinkable. Yes, it was very, very important, and then a whole lore, in Christianity, developed around this, that the spring equinox was the day of maximum light because you had twelve hours of sunlight and twelve hours of moonlight. The moon had borrowed light from the sun, just as we 'borrow' our salvation from Christ. This is how the importance of Easter really grew and why so much time and energy went into settling the date, not just for the year you were in, but for future years.

MELVYN BRAGG: Was this the time when the sacred and the scientific became intensely intertwined?

KRISTEN LIPPINCOTT: They wouldn't have made those kinds of distinctions. They were scientists because they were looking for answers to religious problems and it's one of those things that waxes and wanes itself. Sometimes people will believe in dogma under the aegis of religion, sometimes they believe in dogma under the aegis of science, but just to add to what Peter was saying, there's another matter. In addition to both things that have been said, if Easter was moving backwards against the equinox, there's a possibility that you'd have Easter backing in hundreds of years, backing up against Christmas, and the horror of horrors would be that you'd sacrifice Christ before he was born. So anyone with any kind of sense of deep time realised that was on the cards.

MELVYN BRAGG: Can we move to 1582 when there was a major reform of the calendar under Pope Gregory XIII? Robert Poole, why was this necessary and what did he do? Was he worried about the problem that Kristen's been bringing up?

ROBERT POOLE: He was worried about the problem of Easter in particular, yes. The calendar reform of the Roman Catholic Church of 1582 has been a good subject for Catholic historians because there's a traditional story told about the Protestant rise of science, and yet here we have the Catholic reform of the calendar which appears to present a big scientific correction before the Protestant rise of science. But in fact if you look back the Catholic reform of the calendar was an act of the Counter-Reformation, an act of piety to do with the date of Easter.

From the late Middle Ages the Catholic Church had been aware, and very anxious, that the date of Easter was wrong. Copernicus was set on the job, and his book was eventually published. *De Revolutionibus* in 1543 was in fact meant to be a first draft of reform of the calendar, but he went a bit too far back to basics. And they didn't get around to the actual calendar reform until the Counter-Reformation Council of Trent. The Counter-Reformation Council of Trent was a failure in bringing the whole of Christendom, of western

Christendom, back together, but they could at least have a single reformed calendar, promulgated by the Roman Catholic Church under papal authority, and it would be obvious. It was generally accepted that the calculations were right, so at least that was one small thing that could become universal, a new calendar.

MELVYN BRAGG: What did this imply when they re-created it? Did the days change, the weeks, what happened?

ROBERT POOLE: They knocked ten days out of October 1582. It was promulgated by a papal bull, but very few countries, even Catholic countries, simply accepted the papal bull. They nearly all had some kind of law or civil decree that said they were reforming the calendar, not because the pope says so but because it's the right thing to do, and because we say so. Even one or two Protestant states picked up the reform, parts of the Netherlands, for example.

MELVYN BRAGG: As I understand it, it was more quickly accepted by Catholics than by Protestants, some of whom, including this country, resisted it for a very long time.

KRISTEN LIPPINCOTT: Well, they thought it was a papist plot. They were saying wait a minute, you're taking away ten of our days. What's this all about? And it's interesting because certainly when it was presented at the court of Elizabeth I, her best scientist, he's often called 'the Magus', her best scientist, John Dee, said of course it makes sense. But the politicians rallied round and elbowed Dee out of the way and said no, something sneaky's going on here and we must stick to our own calendar.

MELVYN BRAGG: Well, they were rightly anxious about what the pope said, as he'd put a price on the head of Elizabeth I. Not a man to be trusted in the courts of London. But Dee did his own calculation and came up with much the same as came out from the Council of Trent.

KRISTEN LIPPINCOTT: He was a brilliant mathematician. Unfortunately in later ages we see him as some sort of crazy astronomer and magician, but he had the right kind of ideas.

MELVYN BRAGG: What were the consequences of England and other Protestant countries resisting this Gregorian calendar, and how long did they resist for? What happened? One date in this part of Europe, another date in the other part of Europe?

PETER WATSON: Britain, I think, didn't go on to the new calendar until 1752, so there was nearly two hundred years when they were using a different calendar. It wasn't quite as important then as it is now. You know, you didn't get 'chariot-lag' or 'galleon-lag' like you get jet-lag.

KRISTEN LIPPINCOTT: But there were other problems. One of the things that we think about was the 'us' versus 'them'. If you think about it, the calendar, regardless of whether you were using a Julian calendar or a Gregorian calendar, from country to country and sometimes even from town to town, the date on which you started the year changed. There were six different days that people would begin the year on. So you could be in February and it could be February 1501 or February 1502. The day or the year wasn't something that was really solidified until much later.

MELVYN BRAGG: So the major difference with the Julian calendar was the difference of catching up on those days. Were there any other refinements on the Julian calendar?

ROBERT POOLE: Essentially the difference between Julian and Gregorian was the matter of the ten days that were different. There was a real patchwork of dates as Kristen says, particularly in Central Europe in all the German Protestant and Catholic princedoms. You could travel through several calendar zones in one day if you had a fast-enough coach. It created genuine difficulties with diplomatic correspondence and with the confusion of dates between diplomats.

KRISTEN LIPPINCOTT: And certainly for historians. The big health warning for any historian who thinks that if it says 15 February 1502 he knows what day it is, that's a complete misunderstanding of how the calendars worked in those days. We don't know what year it was unless they marked it 'old style', 'new style', 'German style', 'Italian style', 'Faroese style', 'Milanese style' . . .

MELVYN BRAGG: What effect did it have on the economy of these countries, their connecting economies?

KRISTEN LIPPINCOTT: I really don't think it had that much effect, because not only were the calendars different, weights and measures were different and distances were different, and it was just the kind of thing that you accepted. The same way that we cross the border and we realise that we have to give up our pounds for euros, they would give up their calendar, their time, their measurements and their distances, and that was just something that they accepted. It wasn't until travel became much more common that people started to realise that it was an inconvenience.

PETER WATSON: Yes, I think so. The other thing that happened around this time, the fifteenth and sixteenth centuries, is that the great voyages of discovery took place, and calendars around the world were discovered, in India, in Central America, in China, and found to be different. They were found to be very different in some ways and yet very similar in other ways. Most calendars end up with about 360 days in the year, twelve times thirty, and then something left over, and this was true in Central America, this was true in China, this was true in India, although India had six seasons, China had cycles of ten days, cycles of twelve days, all interlocking.

The Jesuits thought that this is proof that these people were not saved and needed Christian help. They didn't have much success in changing that. As late as 1953, after Britain left India, Nehru, who was on a special commission to look at the Indian calendar, found that there were thirty calendars in use in 1953 in India. But again it was mainly, as Kristen says, an agricultural, fairly slow-moving society, and I think you can make too much of what we would think – that chaos would ensue. But we've only had the International Date Line since, what, 1886. So we've only been living with just over a century of what you might call 'jet time', where minutes matter rather than years.

MELVYN BRAGG: It was in the middle of the eighteenth century that England finally accepted the Gregorian calendar. Why did they think that they could unbend then?

KRISTEN LIPPINCOTT: I think it's a combination of things. The religious split between Catholicism and Protestantism wasn't quite as strong during that particular period and also it had to do with the increased trade in the continent – if you're bringing a lot of merchandise back and forth, you want to know what day it is.

MELVYN BRAGG: Robert Poole, did the calendar reform in England go smoothly? In 1750, it was done by Lord Chesterfield, as I understand it. What did he do?

ROBERT POOLE: The originator, if you like the guiding light, was Lord Chesterfield, who'd been ambassador in France and who'd had trouble writing to his mistress back in England, having to date the correspondence correctly. Chesterfield was well connected in the Royal Society and government and so was able to pilot a calendar reform bill through parliament. And what it did was to bring the English, or now British, Julian calendar in line with the continental calendar by removing eleven days from September 1752, so that Wednesday 2 September was followed by Thursday 14 September, and there were eleven days simply missing.

KRISTEN LIPPINCOTT: And it's wonderful if you look at diaries, like ladies' diaries or farmers' diaries of the period, because they just say 'this month is missing many days', and there's just a big blank in the middle of the calendar, usually with a little floral decoration.

ROBERT POOLE: Or sometimes with a very complicated explanation.

MELVYN BRAGG: What were the consequences?

ROBERT POOLE: Well, the consequences were quite mixed, because the calendar was only half reformed. The Act stated that anything, any human or Church date should simple move with the new calendar, so that for example Christmas Day, 25 December, would actually come eleven days sooner after the calendar reform. There were now eleven days fewer before Christmas, so Christmas was actually moved forward in the natural year, which may account for the fact that we don't have many white Christmases. Christmas used to be on our 5 or 6 January. That's when old Christmases were, more or less around Twelfth Night now.

However, there were two important exceptions made. One exception was for fairs. If you imagine a Michaelmas Fair on 29 September. Michaelmas is a time when apples ripen, you can bring your Michaelmas Fair forward eleven days in the natural year, but you can't make the apples ripen any sooner and your Michaelmas goose isn't going to be fat enough for the corporation feast. So fairs were to go with the old calendar. Your Michaelmas Fair was to happen, in the future, on 10 October, and if you think about it, this means that there are eleven days fewer between old Michaelmas and the new Christmas Day, so the relationship between the human year, the civil calendar, the Church calendar and the natural year was permanently disrupted. In the case of Chester you can see this. Chester had a mayor-making, a major celebration, on St Denis's Day, which was when the St Denis Day Fair was held in Chester. What happened was that the Act brought the mayor-making forward by eleven days but left the fair in the same natural position. The two were sundered and they had to bring in an amendment to the Calendar Reform Act which was hurriedly tacked on to an Act for preventing cattle distemper to bring the two back together again.

KRISTEN LIPPINCOTT: They say there were riots in the street, but I haven't seen any evidence that there were. You know, people waving banners saying 'Give us back our eleven days' seems to be a myth. But people were very concerned about taxes, because if you've lost eleven days of income, but you still have to pay tax for a year, did you have to pay that eleven days' worth of income? One of the things that did not change was the tax year. The old English year ended on 25 March, and one of the reasons why we still pay taxes beginning on 6 April is that it is eleven days after 25 March.

PETER WATSON: Because New Year's Day used to be in March and was changed at the same time.

ROBERT POOLE: Yes. That was purely a local convention, that was nothing to do with the Gregorian or Julian calendar. Pepys dated the New Year in his diary as 1 January, all the newspapers were 1 January, all the almanacs were then, but for certain legal purposes

it was still 25 March, so the legal year started on 1 January too, but the tax year was left, in effect, where it is now.

MELVYN BRAGG: Is there an inference that somehow the natural year and the calendar year got out of sync, and we're still living with the consequences of this, which are not entirely happy?

ROBERT POOLE: We're still living with the tax year that starts on 6 April. The old tax year ends, in effect, on what is old Lady Day. But yes, in the upper echelons of society, amongst educated people, it was now normal to keep diaries and almanacs and to follow time day by day, but lower down in society people were still regulated much more roughly by feast days. They would date things according to so many weeks or so many Sundays after Michaelmas, and now that calculation, that relationship, was lost to people.

KRISTEN LIPPINCOTT: But then the question that's fundamental is, and perhaps what you're really asking is – does it really matter? I mean, does it matter if you have a certain fair when the apples ripen and it's called 10 October or it's called 21 October – does it really matter? And this is one of the things that I'm always surprised at when people talk about time or calendars, or they write to me at the museum. They think these things are real, that they're true. They forget that all of our timekeeping measurements are man-made. It's something we've created, so it's more or less making a rod for our own back. If things don't work, it's our fault.

MELVYN BRAGG: Peter Watson, has this now become the accepted calendar, the Gregorian calendar? Is it on the way to being a global calendar?

PETER WATSON: Oh, I think it's a global calendar now, yes. There are still remnants of other calendars. One, for example, is the Olympic cycle. There was a calendar, or a cycle, in ancient Greece called the octaeteris, which was another cycle which went out of kilter and was corrected every eight years, and so the Greeks held the Olympic Games – twice in an octaeteris – every four years, and we still have that four-year cycle. So there are remnants, I think, all over

the world. And of course the Islamic calendar is different, the Jewish calendar is different, and . . .

KRISTEN LIPPINCOTT: The Chinese calendar.

PETER WATSON: Yes. You know, these people live quite happily. Jews in Britain live quite happily with both calendars, don't they, and so do the Indians. You can make too much of the difficulties. I think you don't have to be a master mathematician to live with the fact. We live with the fact that some months are thirty days, some are thirty-one. We manage, don't we?

ROBERT POOLE: The simple point about the calendar is that people always imagine that time should be mathematical and regular, that we should have something like an equivalent of the metric system and in the French Revolution they did try to metricate the calendar into ten days, ten-day weeks, but it just didn't work. It didn't, it just wasn't accepted.

PETER WATSON: Mainly because they only had a day off every ten days!

ROBERT POOLE: Yes, it was deeply unpopular. But what you have to accept is that the elements of the calendar simply don't divide into each other, they're incommensurable. It's like Alan Bennett's vicar and the sardine tin of life, whatever you do there's always a little bit left in the corner.

PETER WATSON: In the Russian Revolution they had a week of five days, with no time off, and you can imagine how popular that was. I did a couple of books out of Russia and there was a practice there, as well as this five-day week, in Communist Russia for people to work on Saturday mornings for the good of the state. They would work for nothing. This was after the weekend had been reintroduced in the Second World War, and if you did work on a Saturday morning you were known as a 'subotnik', and this is the same word as 'Shabbat', still surviving in Communist Russia. So the Babylonian idea is still there until very recently, the last ten years.

MELVYN BRAGG: How accurate is the present calendar?

ROBERT POOLE: Technically . . .

KRISTEN LIPPINCOTT: Good enough.

ROBERT POOLE: Good enough. Technically the standard of time is the number of how many millions of vibrations of a caesium atom – I don't know where they keep the actual atom … but there is a theoretical standard. The interesting thing is that people have come up with all sorts of reform calendars. There's a sort of international standard calendar that was invented in Sweden which is much too boring to be popular. And whatever you do, in the end, all of these calendars, all these caesium atom vibrations, they all end up being adjusted back to the solar year. We get the extra pip now and again. The fundamental standard remains the solar year, and really if we want a different calendar we're going to have to go and colonise another planet.

PETER WATSON: It is getting shorter though, isn't it, by a few seconds every century?

KRISTEN LIPPINCOTT: That's why we add the pips. It's a nice sort of circle because what we're trying to do is bring it back almost to Homer and Hesiod, so that you know that when the Pleiades are rising on the horizon you shouldn't go sailing.

MELVYN BRAGG: That's what it's come to, has it?

ROBERT POOLE: If you want to know the time, ask an historian.

PETER WATSON: But to reinforce Kristen's point. There was an Easter Act in Britain in 1928 which said that we could celebrate Easter as on the first Sunday after the second Saturday in April, but we never bothered implementing it because we know what to do now and so the mystery's gone out of it. You just have to imagine that there are seven planets circling each other, so that the gravity is changing the configuration all the time, and this reinforces Robert's point that at any particular time the situation is untidy.

MELVYN BRAGG: Well, you said earlier, Kristen, that it's all artificial and I agree with you, intellectually you're right, it is

artificial, but I would say now many people in the world are much more calendar-driven than they are natural-day driven.

KRISTEN LIPPINCOTT: The funny thing is that we as human beings have fallen so in love with our own structures that we think that they're true. People have this thing on their wrist and they think it controls their day. People have a calendar, therefore they use it to control their day. Try throwing away your wristwatch – you still live.

MELVYN BRAGG: But you don't control your day if you have to trade in Hong Kong.

KRISTEN LIPPINCOTT: Exactly.

MELVYN BRAGG: Or get to Frankfurt by such and such a time, or even get to Carlisle by such and such a time.

PETER WATSON: Who would want to do that?

MELVYN BRAGG: Too many people when I catch the train! And with that I'm off to Euston.

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