

Chapter 1



GEORGE WASHINGTON'S BIRTHDAY

Fifteen miles south of Washington, D.C., abreast the Potomac River where it flows through the verdant countryside of Virginia, stands Mount Vernon, the home and tomb of George Washington, first president of the United States. Many a calendar has, under the date February 22, a note saying something like *Birth of George Washington, 1732*. But the Washington family Bible, preserved at Mount Vernon, has the following entered within its covers:

George Washington, son to Augustine and Mary his wife, was born ye 11th day of February 1731/32 about 10 in the morning, and was baptized on the 30th of April following.

Throughout his life, Washington celebrated his birthday on February 11, and he was not mistaken. Nor is that calendar hanging on your wall incorrect: the date known as Washington's Birthday is indeed February 22. In this book we are going to see how this paradox can be reconciled. But in doing so we will open up a whole can of worms (or Pandora's box, if you prefer the allusion).

George Washington's birthday is as good a starting point as any for our tortuous trip through the history (and future) of the calendar, because it introduces several points which we need to explain if we are to understand the workings of our systems for keeping time and dating events. Let's face it, if there is one thing other than health that controls our lives, it's time.

In his best-seller entitled *A Brief History of Time*, British physicist Stephen Hawking wrote that he had been advised to avoid using any equations in his book because every equation was reckoned to cut potential sales in half. I'm going to ignore that advice here, as you'll see—I have confidence in you—and start off with an equation. And here it is: $T = \$$.

If you need that spelled out in words, it says “time is money,” and most will realize the truth of that. One could claim that to be the best-known equation in modern society, ahead of $F = ma$ and even $E = mc^2$. (My publisher will now be having fits of apoplexy—three equations in the first few paragraphs!) So, time is money, and in a capitalist society we see in every minute of every day how the logic of that affects all that we do, as Adam Smith's famous “invisible hand” guides us in our actions: make a buck wherever and whenever we can.

Except that we don't. Imagine the following scene. One morning you are lying asleep in bed when your alarm rings, demanding attention. Switching off the obnoxious clarion call, what do you do? Leap from bed, shower, shave and dress for the office, grab a cup of coffee, and rush for the subway? Or slumber a while, then rise at your leisure, dress in sloppy joes, and amble down to your favorite greasy spoon for two eggs scrambled, bottomless coffee, and a perusal of the sports scores in the voluminous weekend newspaper?

Obviously, I'm comparing a working day with the weekend. But when (and how?) did that familiar seven-day cycle begin? Strange though it may seem, the course you take after tacking that damned alarm clock actually depends upon the date of Augustus Caesar's triumphal march into Alexandria after defeating Cleopatra and Mark Antony: because that's the day (August 30 in 30 B.C., a Sunday) from which our weekly cycle begins, unbroken over the two millennia since.

As we will see, Augustus made several other contributions to the calendar, so it is hardly surprising that a month is named for him. His adoptive father and predecessor as supreme ruler of Rome, Julius Caesar, is also remembered in a month name, as *he* should be, since it was he who gave our calendar much of the form which it has today. But there are other famous (and some not-so-famous) men who have left their mark on the calendar, even if they are monthless. They may be long-since dead, but how do Pope Gregory XIII, Lord Chesterfield, and Constantine the Great all continue to affect your life? And who was Denis the Little? As we'll see, it was Denis's work which led to our year numbers, and hence the instant at which a new century and new millennium is celebrated. Trouble is, he got it wrong.

Resolving Washington's Birthdate

As I wrote, there are several points arising from that inscription in the Washington family Bible which need explaining, if we are to proceed knowledgeably along the road bringing us to an understanding of our complicated calendrical system.

First, look at the date given in the inscription: February 11. That seems simple enough, except that a baby born at the same instant in a Catholic country (in Rome, or Madrid, or Mexico, say) would have been said to have entered the world on February 22. Perish the thought, could America have been *behind* Mexico, at least in terms of the date? Yes, indeed. At the time Virginia was still a British colony, and as a knock-on effect from the schism between Britain and the Roman Catholic Church in the first half of the sixteenth century, when the pope refused to grant King Henry VIII an annulment of his marriage to Catherine of Aragon, such places were still using the calendar introduced by Julius Caesar, rather than the reformed calendar which Pope Gregory XIII substituted in 1582. In the eighteenth century, Britain and its colonies were quite literally behind the times, still using the Julian rather than the Gregorian system, even though most of the Protestant nations in Europe had already fallen in line with the Catholic reckoning of

dates. But take heart: it took Russia and several other countries until the early twentieth century to abandon the Julian calendar, which is why the so-called October Revolution in 1917 actually occurred on November 7. Britain and her dominions were late in bowing to the inevitable, but not the last. It took Turkey until 1925 to adopt the calendar which is now the global standard (notwithstanding the fact that there are dozens of alternative calendars still in parallel use), which is rather surprising because the builder of Istanbul played a major part in the story of our dating system.

Second, what is the meaning of “1731/32” in that inscription? In calendrical terms that’s called “double-dating” and it’s meant to avoid confusion. So let me confuse you. The actual date was February 11, 1731. But nowadays we would call it February 22, 1732. From the previous paragraph you may have come to terms with the idea that two calendars may have been in use in different countries with a few (actually eleven, at the time) days deviation between them, but now it looks like the year numbers were different, too. Well, yes: some of the time. The thing is that, although back in 46 B.C. Julius Caesar had legislated for the year to start on January 1, and of course we celebrate New Year on that date nowadays, for many centuries Britain and the colonies had a system in which the year officially began on March 25. Going back to Washington’s time, the sequence of dates on the calendar used by his parents was this:

March 25, 1731

. . . then dates as usual until . . .

December 31, 1731

January 1, 1731

. . . then dates as usual until . . .

March 24, 1731

. . . and then celebrations since the next day was . . .

March 25, 1732: *Happy New Year!*

When Washington was born it was still 1731 on that system, although down Mexico way they thought it was 1732. And now one can read some significance into the use of “on the 30th of April following” for the date of his baptism. At that time young George was about eleven weeks old, but the event occurred in the year following his birth (1732, or 1732/33 using double-dating), even though in retrospect we have placed his birth and baptism in the same year.

Third, how many days between his birth and his baptism? Even though there are more days than we have fingers and toes, I’m sure we can all count them: just so long as we know whether we should include a February 29 or not. So, was there a leap year day in there? If Washington was born in 1731, surely that must have been a common year (the converse of a leap year), so that February had only twenty-eight days? Well, no. The rule employed was that the second year number in the double-date was used. Since 1732 is

divisible by four, there were twenty-nine days in the month that George Washington was born.

The British Calendar Reform

In that era people were quite used to such convolutions. If you look at Samuel Pepys' *Diary* (the full unabridged version, most editions having been severely censored because the original was licentious enough to bring a blush from even Lady Chatterley's Lover), you'll find that he wrote in "New Year" on January 1, but did not change the year numbers until March 25. With other countries already working on the Gregorian calendar, but the British being unwilling even to mention the name of the pope (the "Anti-Christ of Rome" was how they referred to him), those engaged in trade and commerce, or diplomatic exchanges, had to find some way of unambiguously dating all documents. For many years the British would need to add "N.S." (for New Style) after a date given on their amended calendar (New Year on January 1, dates ten days different in the seventeenth century, eleven in the eighteenth), and "O.S." (Old Style) for their previous system, which they refused to abandon until 170 years after the papal revision. Except that the Scottish (perhaps just to spite the English) went halfway in that they adopted January 1 for New Year from 1600.

Well, we seem to have understood the date now. As we'll see later, when George Washington was aged twenty an edict from London changed the calendar in Old Virginnny, and throughout what was to become the fledgling United States of America; indeed, throughout Britain, and Ireland, and all the colonies. Eleven days were struck from the calendar, with September 2, 1752, being followed by September 14. This meant that there were only 355 days in 1752 (11 less than 366, because it was a leap year). But 1751 was even shorter than that, because it lacked January 1 through March 24: the calendar reform by the British Parliament meant that 1751 was curtailed simply because the legislation called for the civil New Year to be moved to January 1. Again it's best to look at the sequence of dates (and we'll ignore the double-dating for simplicity):

March 25, 1750–March 24, 1750	(365 days)
March 25, 1751–December 31, 1751	(282 days)
January 1, 1752–December 31, 1752	(but with September 3–13 missing: 355 days)
January 1, 1753–December 31, 1753	(365 days)

So, where did January 1 through March 24 of 1751 go? If it's confusing to us now, what was it like for the people of the time? One way to answer that question would be to look back at the public response to this upset of the calendar, except that this was some decades before the *Times* of London (or, of course, the *Washington Post*) was founded. But the calendar was of great importance

to people then, and almanacs proliferated. One of the major almanacs in the American colonies was written and published by Benjamin Franklin, and as we'll later see he had a few things to say about this imposition.

March 25 was abandoned as the date of the New Year in the civil calendar in the eighteenth century, then, although as we will be discovering its importance echoes on in other spheres of life, such as the ecclesiastical calendar (depending upon your church). The British have never totally abandoned it, as follows. While the financial years in the United States have occasionally been shifted around, the income tax year in Britain still ends with April 5: in the eighteenth century, when the calendar was reformed, April 5 was the Gregorian equivalent of March 25 on the Julian calendar. But don't let me fool you with a subterfuge like that in my previous sentence: I wrote that the British tax year *ends* with April 5, whereas that date would be the *start* of the year in a straightforward change between the Gregorian and the Julian calendars, so that there might be thought to be an anomaly of one day. Even today this causes confusion for people, and explanations for the apparent anomaly range from it being a fix by tax accountants to confusion in the 1750s over whether 1752 would be a leap year or not. In fact, although March 25 was the *first* day of the legal year it was actually counted as the *last* day of the financial quarter, so that an income tax year to start on April 6 (Gregorian) was the correct eleven day jump in dates. To make it even more confusing, the British adopted a *financial* year (for the government book-keeping rather than the income tax returns of individuals) starting on April 1 from 1854.

The Old Style March 25, then, has not given up its grip on the lives of the British, and we'll be learning that it affects all of us in one way or another. As an astronomer I have to say that March 25 actually has a lot going for it, illogical as it may seem: its origin as a significant point in the year arises from the fact that it was near the date of the vernal equinox (and hence the start of spring) at around the time that Christ was born. It would seem logical to start the year with some astronomically defined juncture, even if we gave it some other label than "March 25." But the whole story of this book is of human responses to multifarious concerns, many of them being religious rivalries, and as the Vulcan Mr. Spock in *Star Trek* would tell you, humans rarely follow logic.

So When Is Washington's Birthday?

So what of the Washington's Birthday public holiday in the United States? We have seen that in effect his birthday was changed during his lifetime, from February 11 to the twenty-second, although he persisted in celebrating it on the eleventh. Nowadays one thing is clear: February 22 is listed in reference books as the date when his birth occurred.

Ah, but that is not quite the same as the public holiday which is scheduled in the official U.S. calendar for each year. Public holidays are funny things:

some occur on the same date regardless of the day of the week (like Independence Day on July 4), while others occur on a certain day of the week regardless of the day of the month (like Thanksgiving, on the fourth Thursday in November). But people often like to have public holidays on Mondays, giving three-day weekends rather than odd days off work midweek. Thus Canada has *its* Thanksgiving on the second Monday in October; then again, by having Thanksgiving on a Thursday many in the United States manage to end up with a four-day weekend break. In 1968 the official U.S. government statutes were changed to define Washington's Birthday (the public holiday, that is) as the third Monday in February. That means that it falls between February 15 and 21, inclusive, which means that it is *never* commemorated on either of the days one might legitimately recognize: February 11 (Julian) or February 22 (Gregorian).

What Time of Day Was Washington Born?

The final thing to discuss concerning the inscription detailing Washington's birth is the time of day: "about 10 in the morning." What does that mean? In those days a quoted time had a rather different implication from our understanding of the time nowadays: there were no railway trains to catch, no time signals on the hour over the radio, no continuous transmission of precise reference points from satellites far above. There was no nationwide coordinated time system, since there was no telegraph to carry the signals. There was no standard time for the whole of the east coast; from Virginia to New York was several days by ship or horse, and rather further to Boston. The time was set by the available technology, and the local need.

That just meant that the time followed the sun: midday was when the sun crossed the meridian, reaching its highest point in the sky, and George Washington entered the world about two hours before that, about forty miles south of Mount Vernon, in Westmoreland County. If his father possessed a reasonably accurate watch or clock, and the same sort of astronomical equipment as Charles Mason and Jeremiah Dixon used to survey their eponymous line dividing Maryland and Pennsylvania a few decades later, then he would have been able to tell the time more accurately. But to what benefit? One can define midday as being the time of meridian crossing, but with our modern definition of the day (which makes all days the same length, whereas in reality they're not) the sun is on the meridian at midday on only four days during each year.

There are ways to answer the question "What time is it?" too numerous to list. The only sensible way to answer is, "It all depends . . ." It all depends on whether you're worried about missing a television program, about how long it is until your next birthday, or what the time is to the nearest nanosecond for some complicated physics experiment. George Washington was born at about ten in the morning, and that means a couple of hours prior to the time when

the sun passed closest to overhead. No more accuracy is needed. No more accuracy would have been possible without major effort.

Astronomical Cycles

Astronomy, however, has been introduced into our story. By making precise observations of the Sun, or perhaps other celestial bodies, the time of day *could* have been deduced more accurately. The length of the day depends upon the rate at which Earth spins on its axis. The year depends on the time taken to circuit the Sun, and it was a refinement of the measurements of that duration which eventually led to the calendar reform which moved Washington's birthdate. Once upon a time the month was determined by the time taken by the Moon to orbit Earth, as the word *month* suggests, but that linkage was abandoned, at least in our dominant Western calendar. Other societies and religions, such as Islam, persist in using dating systems based on the Moon rather than the Sun. As we will see, these various astronomical factors define and control our calendar, although it's not as simple as one might think. And the week? Well, that's a different matter—a peculiarly human one, involving religion and astrology—as we'll also discover.

Later I will outline how the cycles of the sky are defined, and how they have contributed to the ways in which we keep time in our calendar. Throughout, the comparisons I will be making are with the dominant calendar in human affairs, which is usually termed the *Gregorian calendar*, the origin of which we glimpsed above. As we will see at length, this might be termed the *Western calendar* since it is the calendar of what is usually termed the *Western world*. Terminology can be confusing. For example, the country where I live (Australia) is part of this Western world even though its name indicates it to be a southern land, and one would also count a country with a very similar title in English (Austria) as being part of the West despite its name in the tongue of its inhabitants, Österreich, actually meaning “eastern nation”!

The story of this book is the story of the calendar which is the world standard for business and communications, and which I presume is familiar to all readers, even though they may live in countries which use other dating systems, or may be members of religions which use parallel but independent calendars. What is *not* familiar to the vast majority of people is why that calendar—indeed, *any* calendar—is the way it is. By the time you finish reading this tome, my intention is that you will have a much greater appreciation of the intricacies of astronomy, history, and human foibles that have shaped our system of labeling the days. Many questions will be answered, but be warned: you may be left with more puzzles than you started with, because there are many things we just do not know about the calendar's evolution. What will be clear to you is the fact that the calendar has had a much greater effect upon human destiny than you may have fondly imagined. It's not just about numbering the days: it's about the rises and falls of empires and religions, about internecine squab-

bling and one-upmanship, about controlling the masses and subverting your rivals. The calendar story is one of human strife and aspirations.

To give you some idea of the breadth and spectrum of the matters to be discussed, in the next chapter I will give a summary of the topics we are going to cover. Following that I will give a succinct account of the various astronomical factors which control the lengths of the units of time—the year, the month, the day, and the second—which shape all calendars. After that, the calendar story will begin in earnest.