NEWTON AND THE APPLE TREE
—from Lincolnshire to Bariloche, and back

Guillermo Abramson[1]
Instituto Balseiro, Centro Atómico Bariloche and CONICET
Bariloche, Argentina

Just like here at the Newton Institute, we have a descendent of the famous apple tree that inspired the Law of Universal Gravitation. I have pilgrimaged to Newton's house to visit it, and I will tell you my experience, the story of the tree as told by Newton to his friends, and how we got one.

This is the written version of a non-technical talk that I delivered at the Isaac Newton Institute on 4th October, 2023, and which can be seen in the YouTube channel of the Institute, at: youtu.be/rDzakVApgWA.

In the garden of the Isaac Newton Institute, Cambridge, next to the Gatehouse building, there is this apple tree, a descendent from the famous apple tree at Isaac Newton's home, the one that may have inspired him the law of universal gravitation.

[1] E-mail: guillermo.abramson@ib.edu.ar

At my institute, in Bariloche, we also have a tree grafted from Newton's!

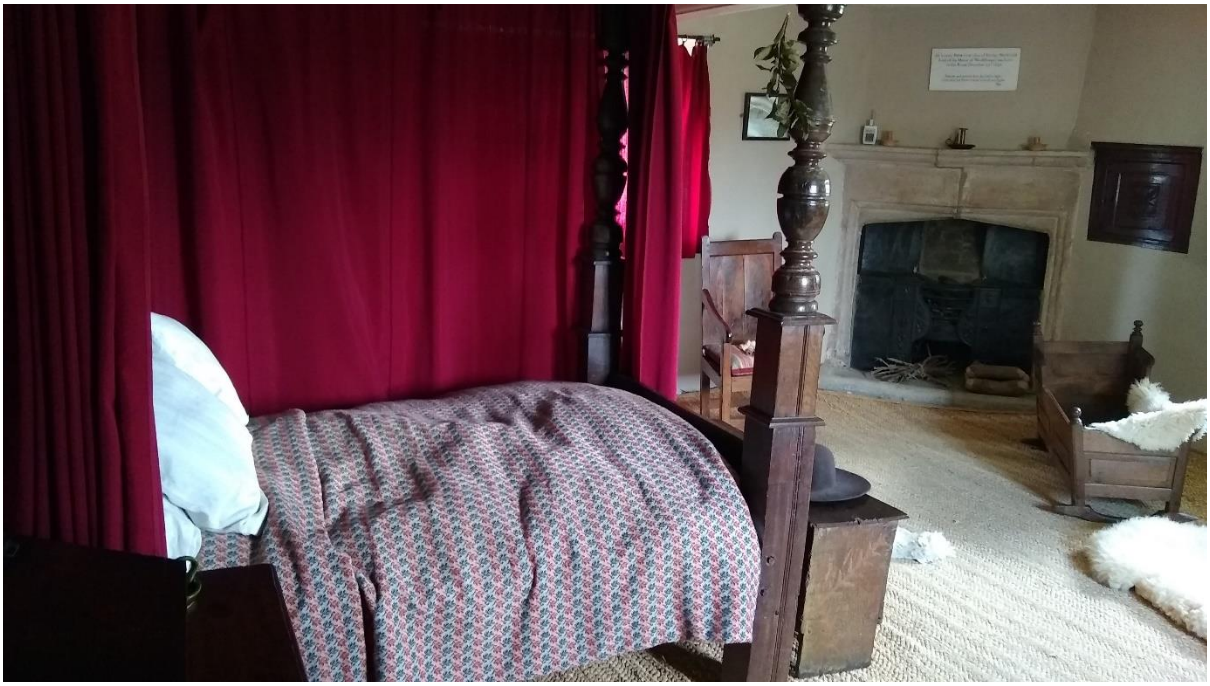
Being in Cambridge this semester, moreover at the Newton Institute, and so close to Newton's country home, I wanted to pay a visit. So I went, and I will tell you a little about my expedition, the tree and Newton, and a few things I know about the story.

Isaac Newton's home is at Woolsthorpe-by-Colsterworth, which is this little village near Grantham, 100 km northwest from Cambridge. The group of buildings at the left form the hamlet which was the Newtons'.

Woolsthorpe Manor is a typical farmhouse, a very solid stone construction with minimal changes since the 17th century. This angle, on the upper floor, with a window to the East and one to the North, was his mother's room. Hannah was the daughter of James Ayscough and Margery Blythe, and she married Isaac, a prosperous (and illiterate) farmer (a "yeoman").

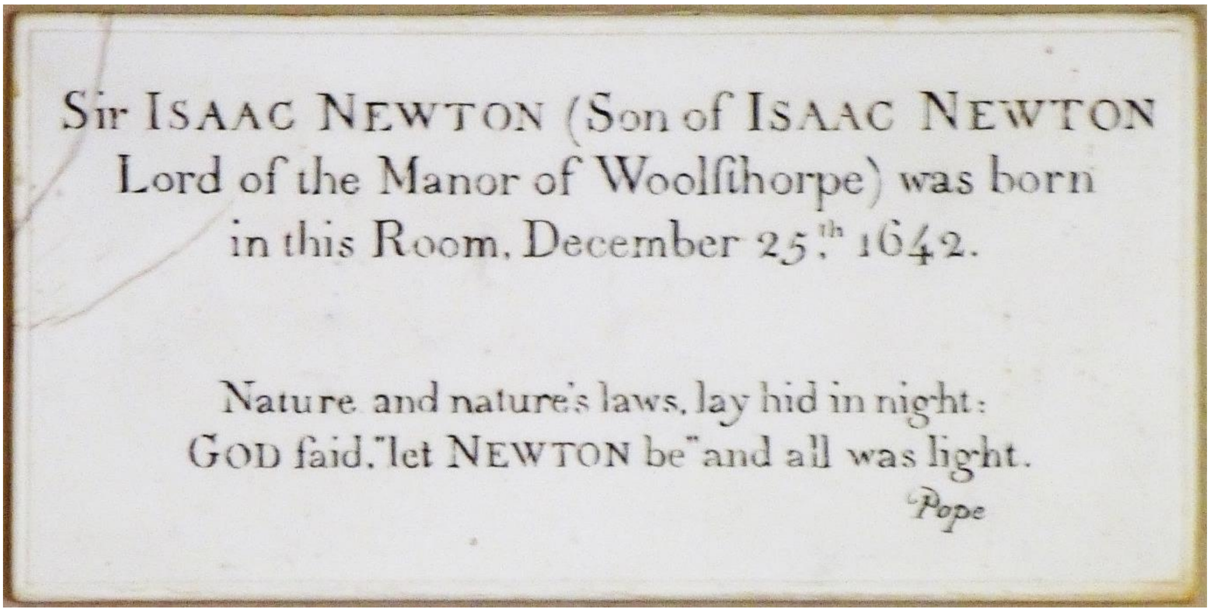
The house is appropriately held together by integral signs! The doors are unusually small for todays standards, even small form me. Newton’s coat of arms (a pair of crossing tibiae, like a pirate flag without the skull) has been set over the door. Of course I went inside.

This is the room where Isaac was born. The house is completely furnished as if it were in use. The staff of the National Trust told me that there is no original furniture from the Newtons, but they managed to get a large collection of old objects from that period to furnish the house.

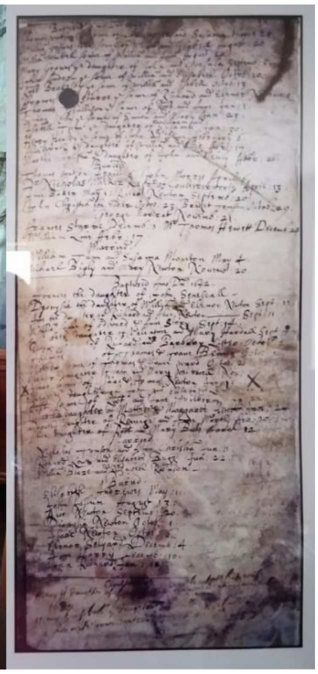


Isaac was born on Christmas day, 1642, as a plaque above the chimney reminds, bearing the epitaph proposed by Alexandre Pope for Newton's burial:

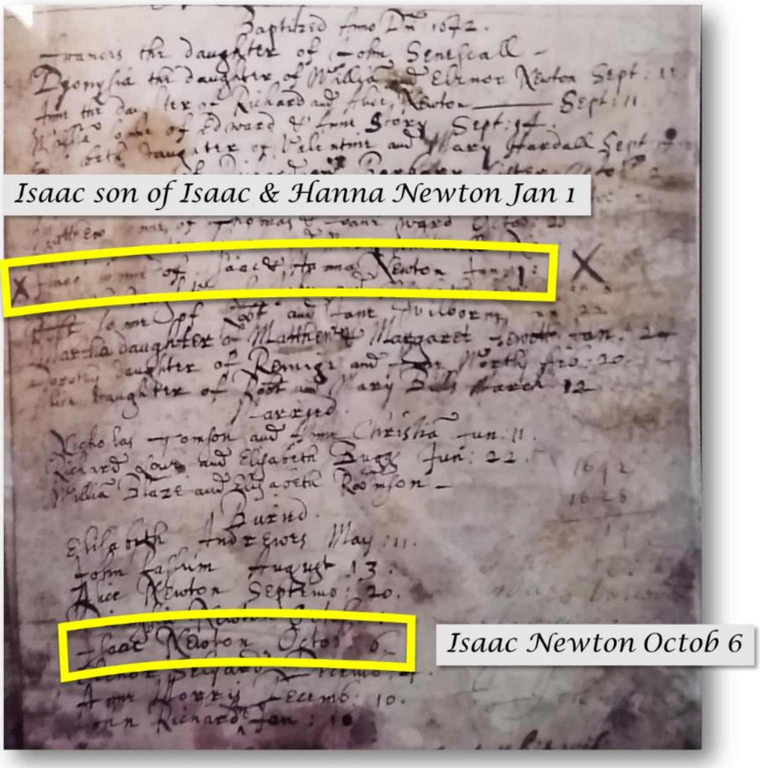
«Nature and nature's laws, lay hid in night: God said, "let Newton be" and all was light. »



He was baptized in this church, St. John the Baptist, in the nearby town of Colsterworth, 500 m from the hamlet, and in this font. His baptism is written in this document.



In the same page we can see the register of his father's burial, 6th October, a few months before his birth. There are other Newtons born the same year, his cousins for sure, and also two more Newton deaths.



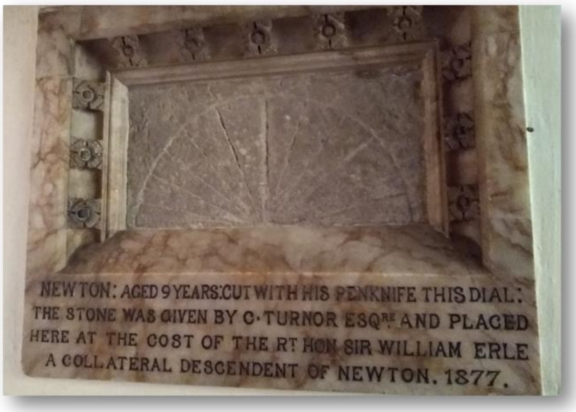
Isaac was premature, and his mother used to say that he was so small when he was born, that he could have fit in quarter jar. A manuscript by John Conduitt, lifelong friend of Newton and husband of his favorite niece Catherine Barton, tells the following:

«S^{r} I. Newton told me he had often heard from his mother that when he was born he was so little they could haue put him into a quart pot & so unlikely to liue that two women who were sent to My Lady Packenham at North Witham for some thing for him sate down on a stile by the way & said to one another they need not make haste for the child would certainly be dead before they could get back.»

There is an organ in the church, which apparently occupies the place of the Newton chapel, where Isaac and Hannah, and other members of the family, are buried. This is also where Isaac wanted to be buried, but he was put in Westminster Abbey in London, as a hero of the nation.

Behind the organ there is a small door with a sign impossible to resist. The door was locked, but there was nobody around, and you see that there is only a curtain behind, so I unlocked it and went around the organ to find this sundial, mounted upside down on the wall. It is said to be his first sundial. Several accounts mention the love of Newton for sundials and the Sun's movement since his childhood; for example:

«He was very diligent in observing the shadow of the sun in the yard of the house where he boarded & used to drive pegs against the walls & roof to mark the hours & half hours by the shade w^{ch} by degrees he made so exact that every body \the family/ knew what a clock it was by \generally consulted/ Isaac's dial as it was com̄only called – I cannot help observing here that even to the time of his death <16r> he retained this custom of making constant observations in the rooms he cheifly used where the shade of the sun fell.»



He was very diligent in observing the shadow of the sun in the yard of the house where he boarded & used to drive pegs against the walls & roof to mark the hours & half hours by the shade w^{ch} by degrees he made so exact that every body \$^{the\ family}$/ knew what a clock it was by \$^{generally\ consulted}$/ Isaac's dial as it was com̄only called – I cannot help observing here that even to the time of his death he retained this custom of making constant observations in the rooms he cheifly used where the shade of the sun fell.

Hannah married Rev. Barnabas Smith when Isaac was 3, moved to his house a mile away and left Isaac in the care of Margery, her mother, who raised Isaac during his infancy. Hannah had three children with Smith. When Barnabas also died, Hannah returned to Woolsthorpe and stayed there.

There are many extraordinary things in the house, and among them a number of sketches, scratched on the walls, discovered when the 19th century wall paper was removed, some of them very recently. In the room seen on the left in the picture above, which is a dining hall, there are two of the most notable ones.

This is one of them, the picture of a windmill, which may have been carved by little Isaac himself.

He was fond of mills as a boy, and of mechanical devices in general. It is told to have made mechanical models, even of the mill with a mouse inside to power it:

«A new windmill happening to be sett up near Grantham Sr Isaac's imitating spirit was soon excited, & by frequently prying into the fabric of it as they \whilst the workmen/ were about it he made such a model as was allowed to be as clean & curious a piece of workmanship as the original, he would some times

sett it upon the top of the house where he lodged & cloth it with sail cloth so that the wind would readily take it & he had contrived the inside in such a manner that he could make a mouse turn it; sometimes by tying a string to the tail of the mouse & pulling it the mouse would go forward by way of resistance in a \sort of/ turnspit wheel & so make the Mill go, sometimes & at other times he would put a little corn above the wheel w^{ch} *the Mouse would turn \the wheel/ by endeavouring to get at the corn; he called the Mouse his Miller & would often joke upon his eating up the corn.»*

Another drawing shows the tower of a church. It may be the Colsterworth parish, that perhaps had a spire in the 17th century (now it does not).

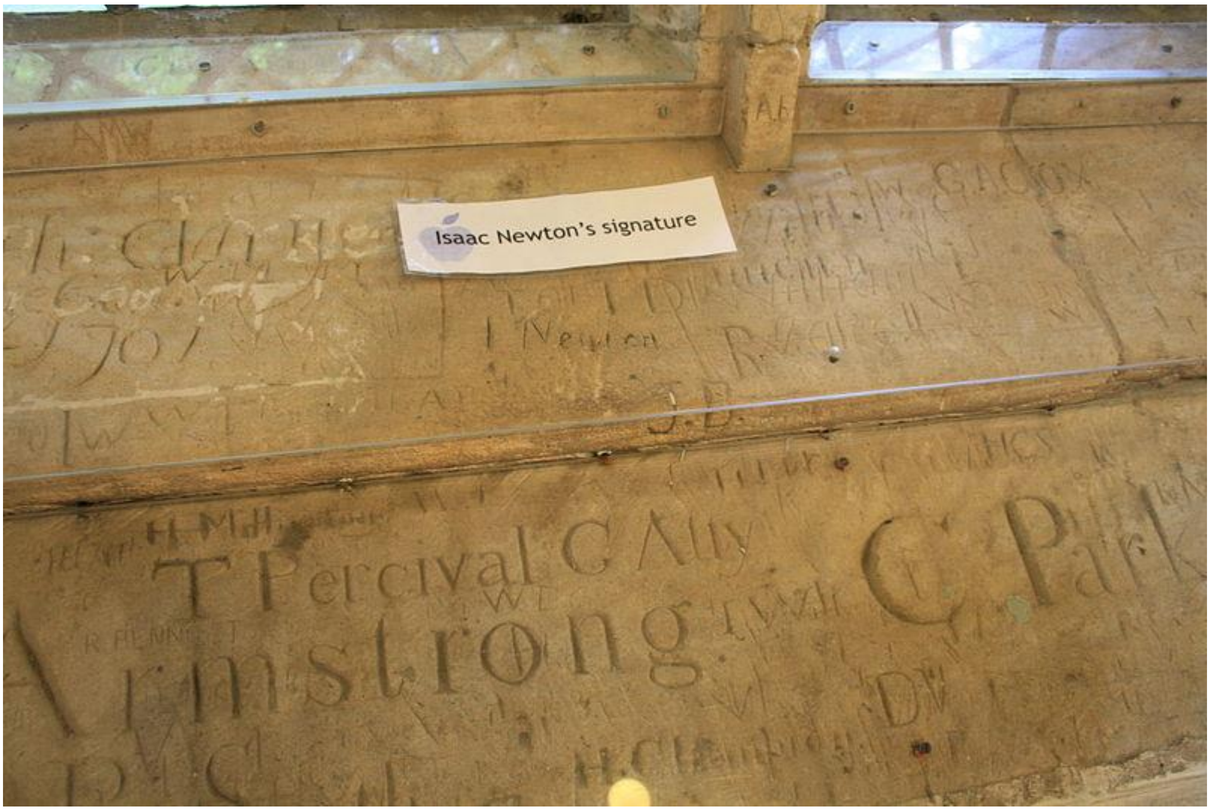
But I was told by the staff gentleman that it was the magnificent St. Wulfram, in Grantham. At the age of 12 Isaac was sent to the Grammar School, just opposite the church. Grantham is 15 km from Woolsthorpe, so Newton stayed there, boarding at the house of Mr. Clarke, the apothecary.

In the same house lived Katherine Storer (mentioned as Mrs. Vincent in the following), daughter of the landlady Mrs. Clarke. Katherine is the girl that Isaac left behind when he moved to Cambridge, and the source of the few anecdotes we know from his teenage years.

«M^{rs} Vincent who was daughter in law to M^{r} Clark where S^{r} Isaac boarded & lived in the same house with him several years, says he was always spent most of his time \\$^{when}$/ out of school in making knick knacks & models in wood of several kinds for w^{ch} purpose he had got little saws hatchets ham̄ers & a whole shop full of tools w^{ch} he used with great dexterity, that he would often make little tables & cupboards & other utensils for her & her playfellows to sett their babies & trinkets upon, nor was he less usefull to his school fellows making lanthorns for them of crimpled paper & kites & was very \\$^{particularly}$/ exact in settling their proportions & finding out the proper places where the strings were to be fastened –M^{rs} Vincent remembers particularly a cart he made with 4 wheels in w^{ch} he would sit & by turning a windlass or capstern about make it carry him wither he pleased.»

In her old years, Katherine remembered Isaac as a *"sober, silent, thinking lad"* that *"entertained a love for her… but her portion being not considerable, and he being the fellow of a college, it was incompatible with her fortunes to marry".* Isaac never married, but he maintained a fondness for Katherine. He kept in touch, sent her money when she was in distress and asked about her into his eighties.

The school was closed, which was a pity because there is his signature on a windowsill, next to many of his schoolmates.



The Ayscoughs had a higher social position than the Newtons, and Isaac's uncle had been to Cambridge University. Also, the brother-in-law of his landlord in Grantham was a fellow of Trinity College, and played a part in convincing Hannah to send Isaac to the university, and perhaps also in the admission process. Hannah had wanted Isaac to remain in charge of the farm, but the guy repeatedly showed that he was not cut for the task (letting the sheep and the swine escape, losing the horse, etc.). So, to Trinity he went, at the age of 17. The travel, probably by wagon, took 3 days and two nights.

Just when Isaac graduated as a Bachelor, the University closed on account to an epidemic which came to be known as the Great Plague of London, in the summer of 1665. It was a very serious epidemic, with 100 000 deaths, one quarter of the population of London, in 18 months. It was the last major bubonic plague epidemic to occur in England, an outbreak of the pandemic that had started in the 14th century and lasted until 1750. In the 14th century it had devastated the whole continent.

During the lockdown, Newton returned to Woolsthorpe. Another three days and two nights, I imagine, compared to our hour and a quarter in a Citroen C1. He stayed 18 months, which he called his miracle (or wonder) year. His room was the one on the right corner of the upper floor, in this image.

It is a large room, very warmly recreated. Since there are witnesses saying that he used to sketch on the walls, they have even reproduced some of his notebook sketches in carbon. By the way, it is also for this that they believe that most of the children sketches were made by him.

«The walls, & ceelings were full of drawings, which he had made with charcole. There were birds, beasts, men, ships, plants, mathematical figures, circles, & triangles.»

In one of the corners there is a division (seen at he left of the image above) where he had a small study. It is barely larger that the thing that I arranged at my home during the COVID lockdown, where I wrote my textbook on Analytical Mechanics.

There is a window on this wall (which is this one, second from the top), facing south, so there is plenty of sun. And with the sun coming through it, he made his famous experiments with the prism. Actually, the room was identified as his because it is the only one with a distance of 22 feet from the window to the wall, as described in his notebook.

Now they have a lamp to provide a fixed reconstruction of the experiment, with or without sun.

I have seen the actual prism in Wren Library, Trinity College:

He had bought it at the Sturbridge Fair in Cambridge, which was organized by this small chapel since 1211. It is the Leper Chapel, which still exists at the end of Newmarket Street:

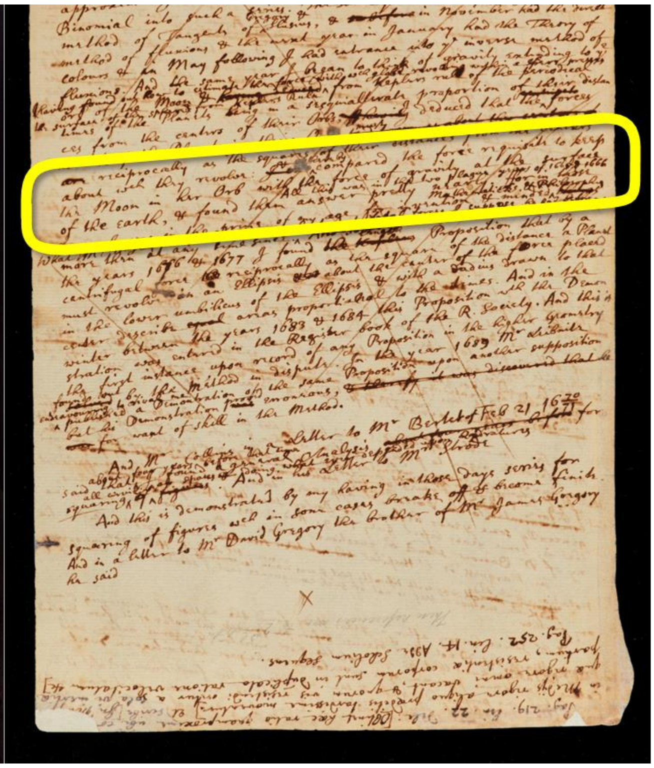
The Leper Chapel, St. Mary Magdalene, home of the Sturbridge Fair since 1211
(the largest fair in Europe in the 16^{th}-17^{th} centuries)

The fair had grown to occupy all the Sturbridge Common, north of the chapel up to the river, and it was the largest fair in Europe in the 16^{th}-17^{th} centuries. Newton also bought here the Book of Euclid and many other things.

Chesterton is across the river (to the left of the following picture) from the common, and there is a beautiful 16^{th} century pub just across the bridge. Did Isaac stopped there for a pint during some warm summer afternoon after buying some boog in the Fair?

It was during his lockdown stay at Woolsthorpe that Newton invented the fluxion infinitesimal calculus, revolutionized the sciences of optics and mechanics, and discovered the law of universal gravitation. He tells us that in his own words, in the manuscript of a letter to Pierre de Maizeaux (ca. 1714):

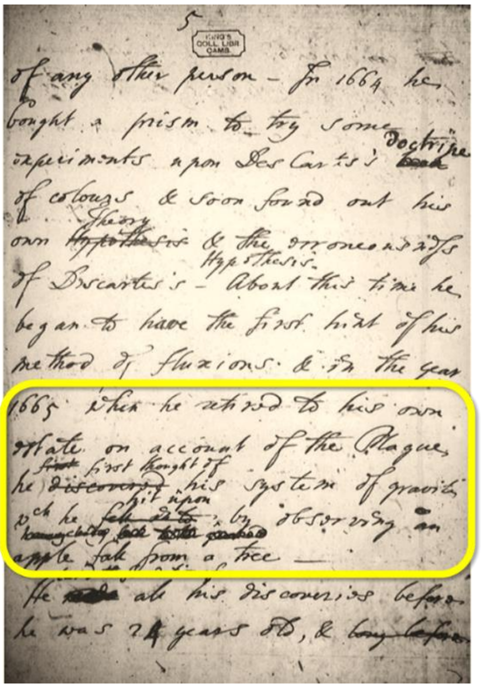
«[I] thereby compared the force requisite to keep the Moon in her Orb with the force of gravity at the surface of the earth, & found them answer pretty nearly. All this was in the two plague years of 1665 & 1666. For in those days I was in the prime of my age for invention & minded Mathematicks & Philosophy more then at any time since.»



From the eastern window of his room you can see the tree, the famous apple tree. So let's talk about the tree.

Newton doesn't mention trees or apples in any of his own writings. But he told the same story to many of his friends, including his favorite nephew, Catherine, the daughter of his half-sister Hannah, who told it to Voltaire, who was the first to have it in print. This one is by John Conduitt, who later married Catherine:

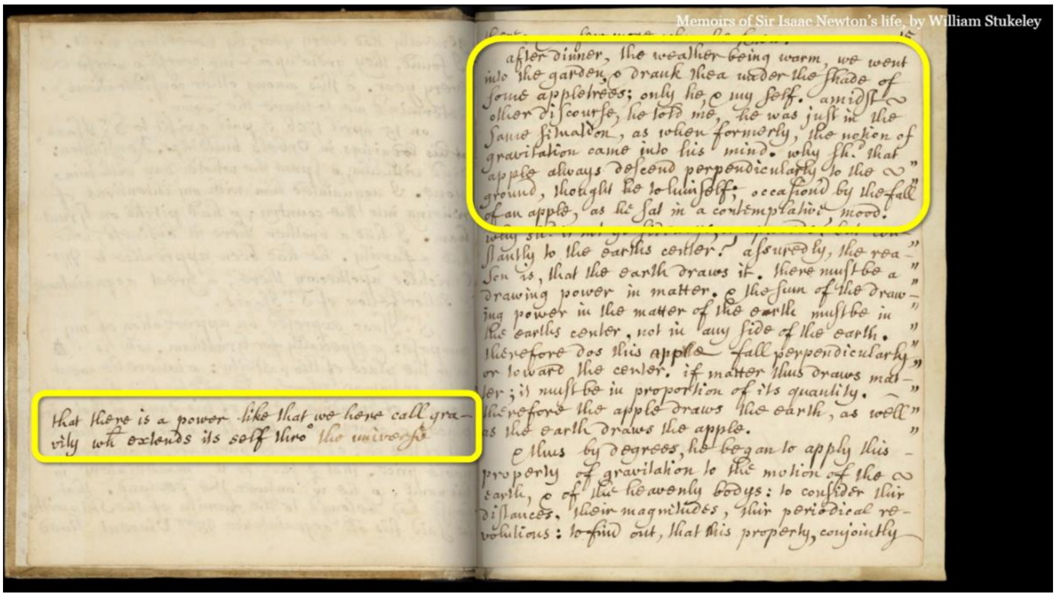
«...in the year 1665 when he retired to his own estate on account of the Plague he discovered \first thought of/ his system of gravitation w^ch^ he \hit upon/ by observing an apple fall from a tree.»


5

of any other person — In 1664 he bought a prism to try some experiments upon Des Cartes's doctrine of colours & soon found out his own theory & the erroneousness of Descartes's hypothesis — About this time he began to have the first hint of his method of fluxions & in the year 1665 when he retired to his own estate on account of the Plague he first thought of his system of gravity wch he hit upon by observing an apple fall from a tree — He made all his discoveries before he was 24 years old, & long before

All of them coincide in the fact that it is was AN apple, from A tree, as if retelling a particularly well remembered event.

This is another one, by William Stuckeley:



that there is a power like that we here call gravity wch extends its self thro' the universe

after dinner, the weather being warm, we went into the garden, & drank thea under the shade of some appletrees; only he, & my self. amidst other discourse, he told me, he was just in the same situation, as when formerly, the notion of gravitation came into his mind. why sh. that apple always descend perpendicularly to the ground, thought he to himself; occasion'd by the fall of an apple, as he sat in a contemplative mood. why should it not go sideways, or upwards? but constantly to the earths center? assuredly, the reason is, that the earth draws it. there must be a drawing power in matter. & the sum of the drawing power in the matter of the earth must be in the earths center, not in any side of the earth. therefore dos this apple fall perpendicularly, or toward the center. if matter thus draws matter; it must be in proportion of its quantity. therefore the apple draws the earth, as well as the earth draws the apple. & thus by degrees, he began to apply this property of gravitation to the motion of the earth, & of the heavenly bodys: to consider their distances, their magnitudes, their periodical revolutions: to find out, that this property, conjointly

«After dinner, the weather being warm, we went into the garden, and drank tea under the shade of some apple trees, only he, and myself. Amidst other discourse, he told me, he was just in the same situation, as when formerly, the notion of gravitation came into his mind. "Why should that apple always descend perpendicularly to the ground," thought he to him self: occasioned by the fall of an apple, as he sat in a contemplative mood.

[…] Assuredly, the reason is, that the earth draws it. There must be a drawing power in matter.

[…] It must be in proportion of its quantity, therefore the apple draws the earth, as well as the earth draws the apple.»

This drawing power is gravity, a well-known force on the surface of the Earth. He mentions that the apple falls vertically, and not sideways, as if the force is pointed towards the center of the Earth. It sounds trivial now, but it was not in the 17th century, nobody had understood it like this. Heavy bodies fell because there it's where they belong, as taught by Aristotle. And here comes the strike of genius:

«That there is a power like that we here call gravity which extends its self through the universe. Thus by degrees, he began to apply this property of gravitation to the motion of the earth, and of the heavenly bodys.»

He realized it should be the same force, the one that makes apples fall from trees, and the one that makes the Moon NOT fall from its orbit. It was the first unification of the laws of Physics: that of the movement of heavenly bodies with the movement of objects on the surface of the Earth. It sounds trivial now, but it was not so in the 17th century, it was revolutionary.

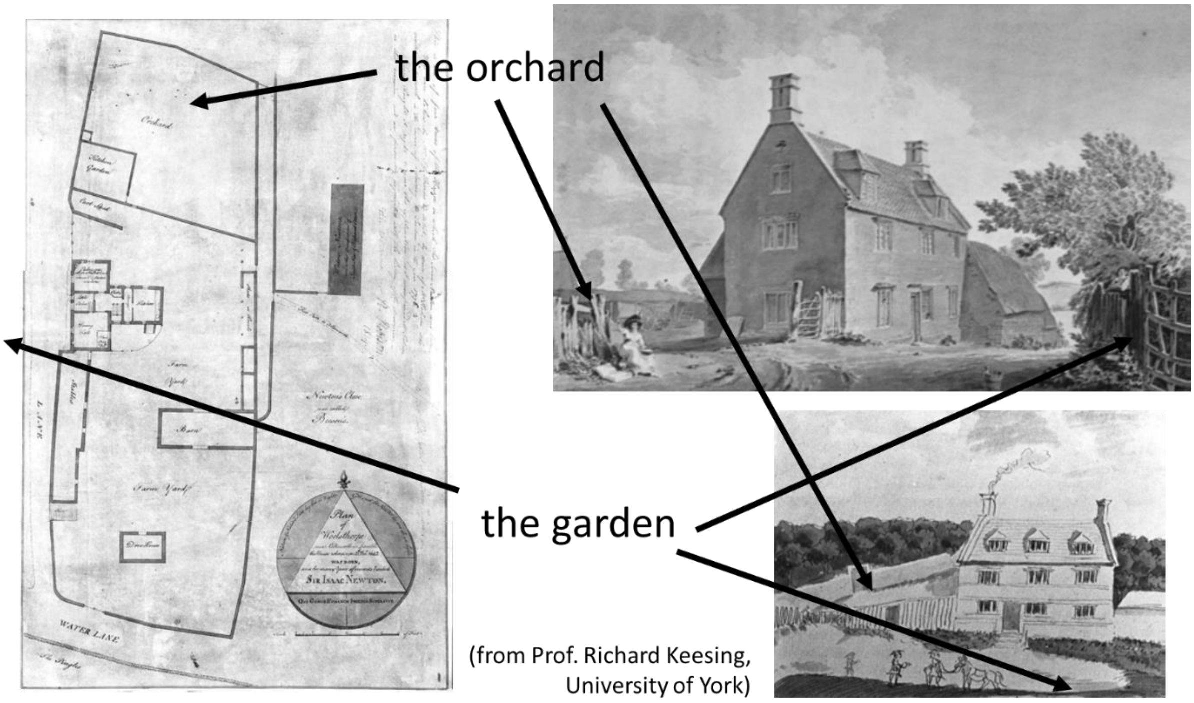
So, how do we know it was THIS tree? On the one hand, it is an old tree, it has been studied and it is 400 years old. And it is in the garden, not in the orchard, where there were surely several apple and other fruit trees. This one was in the house garden, and it may very well have been the single one there.

When Newton died, the house passed to John Newton, the great grandson of Robert Newton, Isaac's uncle, who sold it to a wealthy land owner, Edmund Turnor, who purchased it just to increase his lands. The Turnors never lived there, but lent it to the Woollertons, who used it for sheep keeping for centuries. The property was finally purchased by the Royal Society in 1942, for the tricentennial of Newton's birth, and given in perpetuity to the National Trust.

John Newton: inherited in 1726
Edmund Turnor: purchased in 1733
Edmund Turnor: succeeded in 1769
Edmund Turnor FRS: succeeded in 1805
Christopher Turnor: succeeded in 1829
Christopher Turnor: succeeded in 1886
Herbert Turnor: succeeded in 1940
Pilgrim Trust and Royal Society: purchased in 1942
National Trust: received in 1943

Newton was very famous, even during his lifetime, and at the beginning of the 19th century we know that there were pilgrims (like myself) visiting the place, and the locals showed them THE tree: *«The apple tree is now remaining and is showed to strangers.»*, wrote Edmund Turnor FRS. The tone of the statement is purely factual, and one concludes that Turnor accepted this tree as the one from which the famous apple fell, for it had been growing on what was one of the family farms from a time long before his birth.

This may well had been going on for more than a century, with an oral tradition about the right tree. Even if 130 years is a long time, the fortune that there was a single occupant, who didn't own the house, contributed to the fact that there were very little alterations during the 18th century.

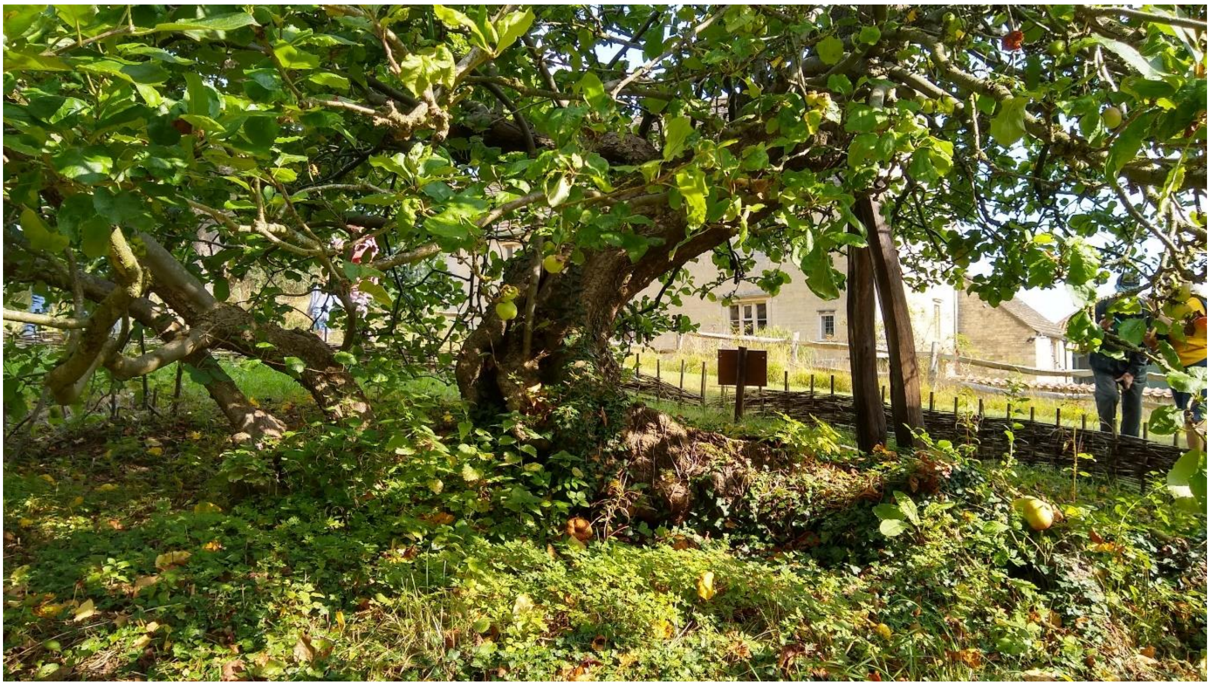


Above: Plan and Watercolor by JC Barrow (1797), and drawing by W Stuckeley (1721). None of them show the tree. Not even the one by Stuckeley, who later wrote the story told to him by Newton. Perhaps he didn't know about it at the time.

The most incredible fact about the tree is that it was blown down in a storm in 1816. It was a great commotion in the village, somebody brought a saw and cut some branches to preserve the wood.

But the tree didn't die, and today you can see the trunk with a large and thick horizontal part, as was seen in the drawings after the storm. So, that's the tree.

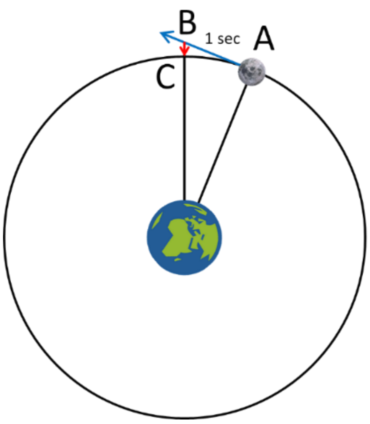


A box made of the wood cut after the storm can be seen in the house, together with a flock of Newton’s hair and other relics.

A cutting taken from the tree after the storm was grafted at Belton House, a large stately house near Grantham. Grafting is the most common practice to reproduce fruit trees, because it produces essentially clones, identical to the original plant. From that tree a new one was reproduced at the East Malling Research Station, an institute specialized in fruit trees, from which most of the other newer ones come.

We can never be sure about what Newton thought and calculated when making this connection between earthly and heavenly movements. But there are a number of drawings and paragraphs in notebooks and letters that give some hints. Here is a modernized argument.

Imagine the Moon in a circular orbit. Without the action of a centripetal force, the Moon would follow the straight-line A-B according to Galileo's principle. If this is the same force that makes an apple fall, then the height of the fall during 1 second should be related to the corresponding distance fallen by the apple. Newton realized that he could calculate these magnitudes rather easily and check. If the action of the Earth decayed as the square of the distance, as in the law of illumination discovered by Kepler, the two distances should be related by a factor of 3600, because the Moon is 60 times farther away from the center of the Earth than the apple.



How far the Moon "falls" in 1 sec?
(Euclid, geometry)

How far an apple falls in 1 sec?
(Galileo)

$$\frac{x}{BC} \stackrel{?}{=} 60^2 = 3600$$

The fall of the Moon can be calculated by geometry, using trigonometry and the Euclid that he had bought at the Stumbridge Fair. One needs to know the angle alpha that the Moon advances in 1 s (using the period of the moon's orbit, which Newton knew), and the radius of the Earth. This was not well measured at the time, and Newton used the value of a degree of latitude commonly used for navigation:

$$OB \cos\alpha = 60R$$

$$BC = OB - 60R = 60R\left(\frac{1}{\cos\alpha} - 1\right)$$

$$\alpha = 360° \frac{1\ \mathrm{s}}{27.3 \times 86400\ \mathrm{s}} = 0.003663°$$

$$R = \frac{\text{circ.}}{2\pi} = \frac{360° \times 60\ \text{miles/deg}}{2\pi} = 5531\ \mathrm{km}$$

$$BC = 0.000678193\ \mathrm{m}$$

The fall of the apple obeys the law discovered by Galileo, which Newton also knew:

$$x = \tfrac{1}{2} g\, t^2 = \tfrac{1}{2} 9.8 \times (1)^2 = 4.9\ \mathrm{m}$$

When we compare the two magnitudes, the result is close but not quite 3600:

$$\frac{x}{BC} = \frac{4.9}{0.000678} = 4161$$

This stopped Newton in his tracks, and let him thinking if perhaps the celestial movements were in part due to gravitation and in part due to the theory of vortices proposed by Descartes.

Actually, the reason were the 60 miles per degree, which are too little. Shortly afterwards, Jean Picard made the first accurate measurement of a degree of latitude of the meridian of Paris, and arrived at a value of 110.46 km[2]. With this, the radius of the Earth becomes 6329 m, and

$$BC = 0.0013474\ \mathrm{m}$$

$$\frac{x}{CB} = \frac{4.9}{0.001347} = 3637$$

Which is a much better result!

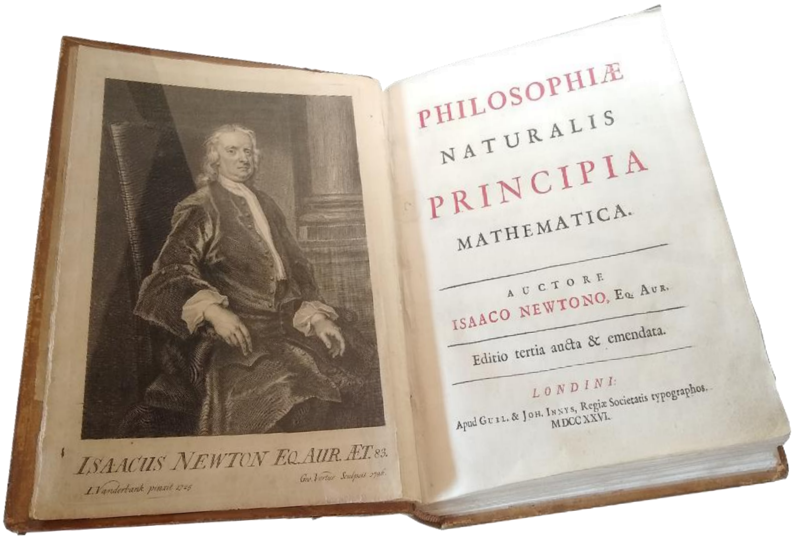
Newton wrote about this to Halley, showing that, following his law, the orbits of the planets were the ellipses discovered by Kepler. Halley published it as *De motu corporum in gyrum*, which was a tremendous best seller. In the *Scholium* to Problem 5, in version III of *De motu*, Newton says:

«For one kind of centripetal forces is gravity: and the centripetal force by which our moon is restrained in its monthly motion around the earth appeared to me, in proportion to the force of gravity on the surface of the earth, as nearly as the square of the distance from the center of the earth.»

[2] After my talk, it was pointed out to me by Prof. Keesing, that Richard Norwood measured the degree of latitude between the years 1633 and 1635 and published it in *The Seamans Practice* in 1637. It thus predates Picard's measurement by 30 years, and it was as accurate as his. Norwood's book was very popular amongst seamen navigators and was in its fifth edition 1680, when Newton remade his calculation at the instance of Halley.

While composing *De motu*, Newton discovered the power of his new mathematical methods, which allowed him to tackle many hard problems: the orbits of the comets, the anomalous movement of the Moon, the precession of the equinoxes, the tides, the movement of many bodies, the viscous fluids, the shape of the Earth and many more. He worked non-stop for one year and a half and completed the monumental *Principia Mathematica Philosophiae Naturalis* (1687), the most influential work of the Scientific Revolution, which eventually brought us the amazing technical civilization we now enjoy.

They have this third edition of the *Principia* at Woolsthorpe:



But Newton wrote it here in Cambridge. He was elected fellow of Trinity in 1667, received his Master of Arts in 1668 and was recognized as a genius by Isaac Barrow (the first professor of mathematics of the College) and others. Barrow resigned his chair of Professor in favor of Newton in 1670. He came to live in an apartment in this building near the main entrance of Trinity:

From the outside, from Trinity St., it is this part of the building, with a small garden where a sapling of the apple tree also grows.

I haven't visited his apartment (I don't know if it is possible), but there was an open day to visit the Wren Library, which is normally closed to visitors.

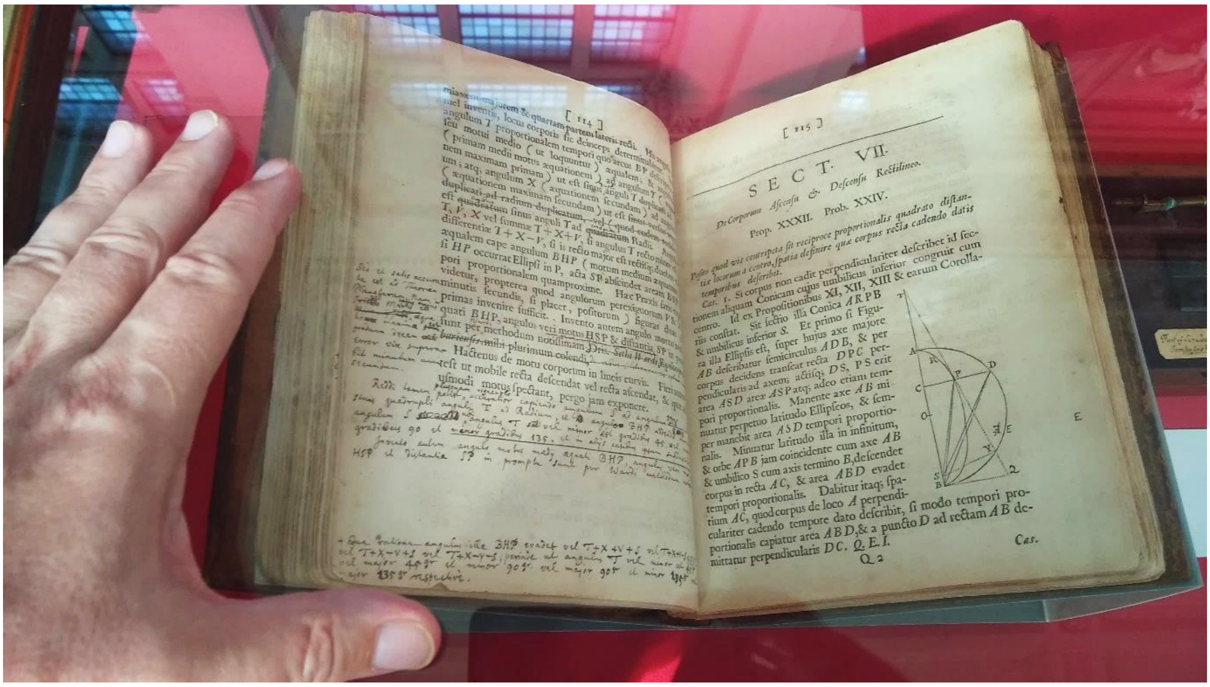
The library was designed and built by Christopher Wren, architect, astronomer, founder of the Royal Society and friend of Newton's. Wren, together with Robert Hooke, had reconstructed many buildings after the Fire of London, including St. Paul's Cathedral.

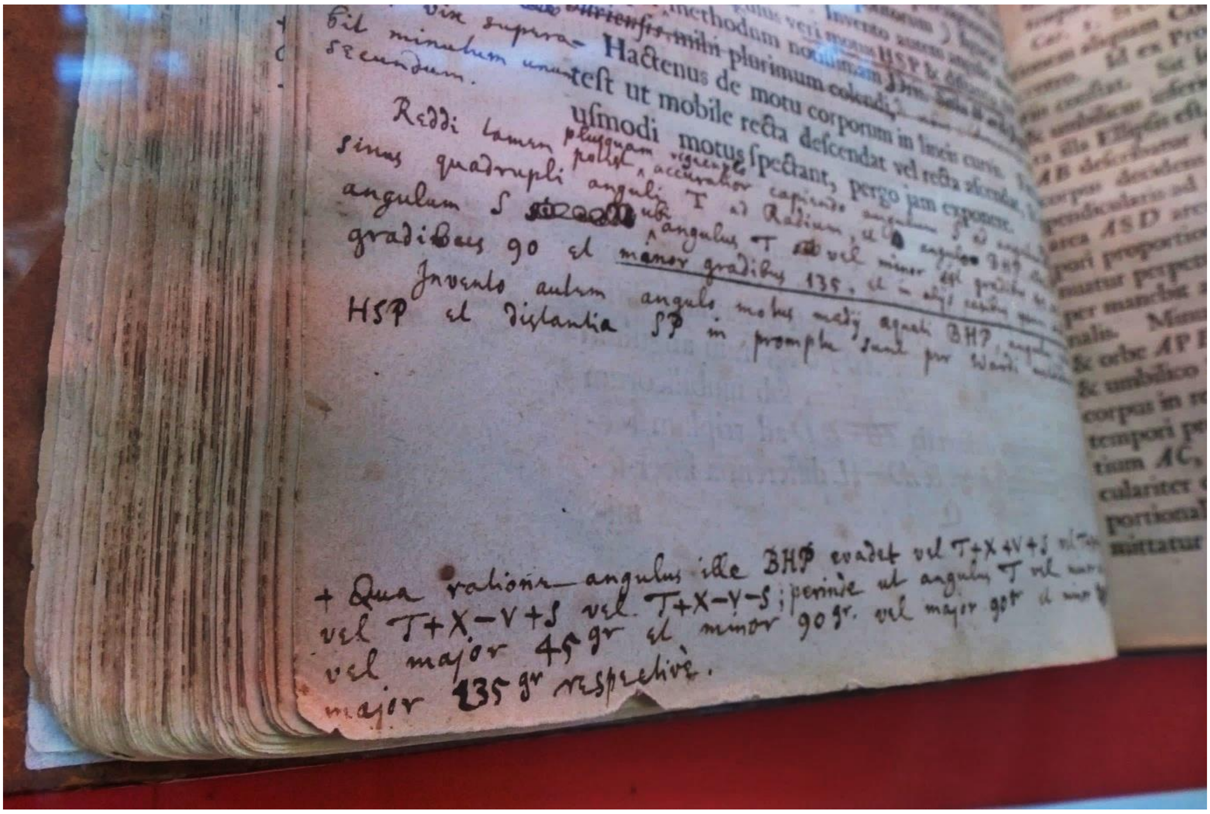
There is a colored glass window made 80 years after the library, by the Italian immigrant artist Giovanni Batista Cipriani. In it, we see Newton being presented to King George III by Fame (the Muse of the College). Britannia (as Pallas Athenea?) behind and Francis Bacon taking notes while looking at us.

At Wren they have more objects that belonged to Newton: the prism and a walking stick, more hair (what's with the hair?!), a small notebook of expenses, a few drawing instruments, etc.

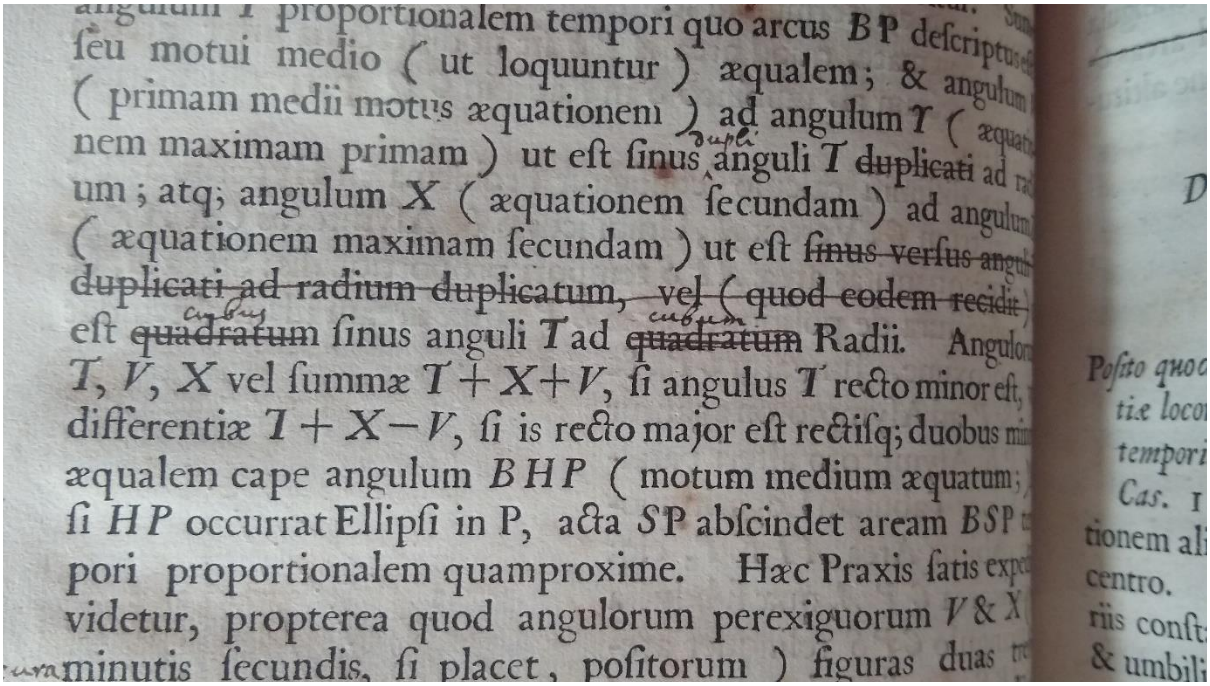
They also exhibit his own copy of the first edition of the *Principia:*

It is heavily annotated in the margins, with many corrections in the text:





For example, see these two *quadratum* changed to *cubus*. So, if your own copy of the *Principia* is a first edition, beware that there are mistakes.


angulum T proportionalem tempori quo arcus BP deſcriptus
ſeu motui medio (ut loquuntur) æqualem; & angulum
(primam medii motus æquationem) ad angulum T (æqua
nem maximam primam) ut eſt ſinus anguli T ~~duplicati~~ ad ra
um; atq; angulum X (æquationem ſecundam) ad angulum
(æquationem maximam ſecundam) ut eſt ~~ſinus verſus angu~~
~~duplicati ad radium duplicatum, vel (quod eodem recidit)~~
eſt ~~quadratum~~ ſinus anguli T ad ~~quadratum~~ Radii. Angulo
T, V, X vel ſummæ T+X+V, ſi angulus T recto minor eſt,
differentiæ T+X−V, ſi is recto major eſt rectiſq; duobus mi
æqualem cape angulum BHP (motum medium æquatum;
ſi HP occurrat Ellipſi in P, acta SP abſcindet aream BSP t
pori proportionalem quamproxime. Hæc Praxis ſatis exp
videtur, propterea quod angulorum perexiguorum V & X
minutis ſecundis, ſi placet, poſitorum) figuras duas

Poſito quo
tiæ loco
tempori
Cas. 1
tionem al
centro.
riis conſt
& umbili

To finish, let me tell you how the tree got from here…

…to here?

During a work travel to the UK, the president of the Atomic Energy Agency, who was a Navy captain but also a physicist from my institute, learned that he could ask for a cutting of the Newton tree from the East Malling Station. So, he asked the Argentine naval aggregate in London to ask.

es posible obtener gajos del célebre "Manzano de Newton", que le habría inspirado la formulación de la Ley de Gravitación Universal, solicitándolos a:

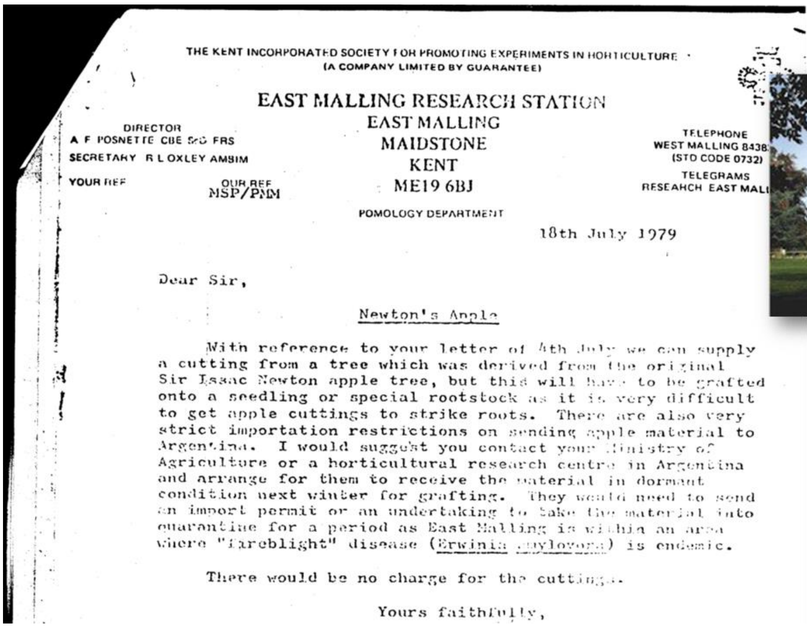
The Director,
East Malling Research Station,
East Malling, Kent, England.

Dicho dato suscitó mi interés por tratar de obtener un retoño del árbol histórico a fin de plantarlo en nuestro Centro Atómico Bariloche, en homenaje al eminente hombre de ciencia. Es por [illegible] -neas pensando que posiblemente pueda Ud. brinda[illegible] guirlo.

(Gentileza Biblioteca Leo Falicov y su Archivo Histórico)

CARLOS [illegible] MADERO
[illegible]
PRESIDENTE

A certain M. S. Parry, Director of the Pomology Department, quickly answered that it was certainly possible, at no cost, and recommended the procedure to reproduce the cuttings.



THE KENT INCORPORATED SOCIETY FOR PROMOTING EXPERIMENTS IN HORTICULTURE
(A COMPANY LIMITED BY GUARANTEE)

EAST MALLING RESEARCH STATION
EAST MALLING
MAIDSTONE
KENT
ME19 6BJ

DIRECTOR
A F POSNETTE CBE ScD FRS
SECRETARY R L OXLEY AMSIM

TELEPHONE
WEST MALLING 8438
(STD CODE 0732)
TELEGRAMS
RESEARCH EAST MALLING

YOUR REF
OUR REF
MSP/PMM

POMOLOGY DEPARTMENT

18th July 1979

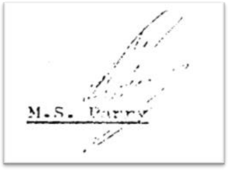
Dear Sir,

Newton's Apple

With reference to your letter of 4th July we can supply a cutting from a tree which was derived from the original Sir Isaac Newton apple tree, but this will have to be grafted onto a seedling or special rootstock as it is very difficult to get apple cuttings to strike roots. There are also very strict importation restrictions on sending apple material to Argentina. I would suggest you contact your Ministry of Agriculture or a horticultural research centre in Argentina and arrange for them to receive the material in dormant condition next winter for grafting. They would need to send an import permit or an undertaking to take the material into quarantine for a period as East Malling is within an area where "fireblight" disease (Erwinia amylovora) is endemic.

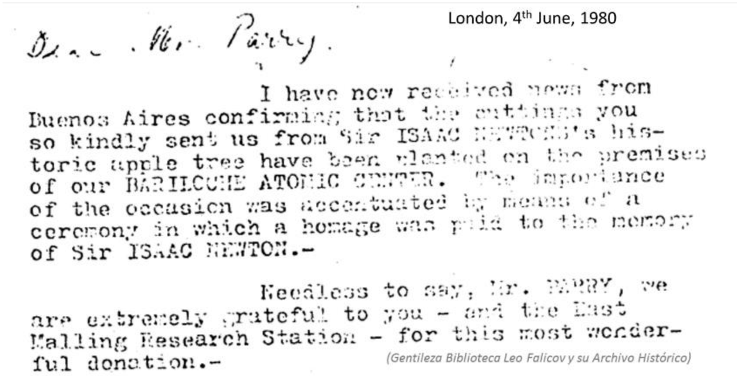
There would be no charge for the cuttings.

Yours faithfully,



M.S. Parry

They were received in Buenos Aires, grafted on local rootstock, and one of them was planted in Bariloche in 1980.



London, 4th June, 1980

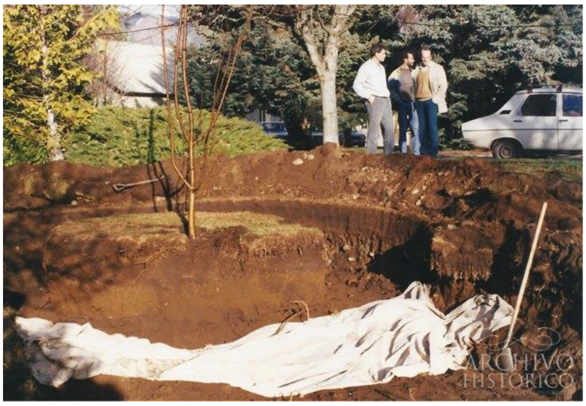
Dear Mr. Parry.

I have now received news from Buenos Aires confirming that the cuttings you so kindly sent us from Sir ISAAC NEWTON's historic apple tree have been planted on the premises of our BARILOCHE ATOMIC CENTER. The importance of the occasion was accentuated by means of a ceremony in which a homage was paid to the memory of Sir ISAAC NEWTON.-

Needless to say, Mr. PARRY, we are extremely grateful to you - and the East Malling Research Station - for this most wonderful donation.-

(Gentileza Biblioteca Leo Falicov y su Archivo Histórico)

This was 6 years before I arrived as a student, and I remember the sapling, very small and weak. It was not planted in a good place, which was prone to flooding, so it was decided to move it. This was done in 1990, with great care, and the result was fantastic.



It immediately started to grow and bear fruit.

In blossom it is amazing!

and in March we collect the apples and make jam, chutney and pie when we can.

It is getting old, so a couple of years ago we invited experts from the Agriculture Faculty of our university, who are working on it.

They even started to reproduce it successfully:

The first one was given to the Ministry of Science in Buenos Aires:

Minuto YA !
@MinutoYa

La UNCuyo entregó el primer retoño del Manzano de Newton al Ministerio de Ciencia.
minutoya.com/nota/138287-la...
#Mendoza #Newton #Retoño
@FCAUNCuyo @UNCUYO
@filippinimf

minutoya.com
La UNCuyo entregó el primer retoño del manzano de Newton al Ministerio de Ciencia -...

10:23 · 8/4/22 · Twitter Web App

And the Minister and the President of CONICET invited me to come and talk at the ceremony. Not every day you see a theoretical physicist holding a spade.

We are very fortunate to have so many clones of Newton's tree to inspire future generations, because trees do not live forever. The one that was growing in the University of Cambridge Botanic Garden was blown down by storm Eunice in 2022!

Acknowledgments

The author would like to thank the Isaac Newton Institute for Mathematical Sciences, Cambridge, for support and hospitality during the programme *Mathematics of movement: an interdisciplinary approach to mutual challenges in animal ecology and cell biology* where work on this paper was undertaken. This work was supported by EPSRC grant no EP/R014604/1.

Most pictures are mine. Exceptions are: Baby in a jar (made with MS Edge), Belton House, Botanic Garden tree (from a newspaper), reproductions of manuscripts from library scans, UNCuyo grafts, letters and old photos by Instituto Balseiro Library, and a few from Prof. Richard Keesing, University of York, to whom I also thank his warm and informative correspondence.

Bibliography

I read several journal articles and biographies about these matters, and haven't kept track of what I learned from which one. I can recommend R. G. Keesing's article: *The history of Newton's apple tree of Newton*, Contemporary Physics, 39:5, 377-391, DOI: 10.1080/001075198181874. On more technical aspects, I enjoyed: *Newton's Principia for the Common Reader*, by S. Chandrasekhar, and *The Background To Newton's* Principia, John Herivel. And, of course, it is wonderful to be able to read the manuscripts scanned by the universities. Many are found in The Newton Project (www.newtonproject.ox.ac.uk), and in the Cambridge University Library (cudl.lib.cam.ac.uk/collections/newton/1).