JOHN NAPIER

400 /

1617-2017

BEYOND LOGARITHMS & BONES

*A short history of
John Napier and his legacy*

GARY SEATH

Preface

Welcome to *Beyond Logarithms & Bones.*

The purpose of this book is to provide a very short, historical account of the life and legacy of John Napier (1550-1617) and has been produced in support of a wider programme of activities to commemorate 400 years since his death.

The *Genesis, Transition, Creativity* and *Legacy* themes are supported by images which capture coloured powders striking a pale background. The acute sense of impact and vibrant colour represent the illumination of mathematical and scientific fields of inquiry which, thanks to John Napier's vision and ingenuity, advanced humanity's understanding of the world, the planets and stars. Throughout this book, a series of references have been included as a means to provide the reader with expert commentary in support of what has been written by the author.

The references have been cited from the following publications:

Flesh and Bones by Francis Shennan

The Life & Works of John Napier by Brian Rice, Enrique Gonzalez-Velasco and Alexander Corrigan

John Napier by Lynn Gladstone-Millar

The Author also wishes to thank Dr Garry Tee, Department of Mathematics & Department of Computer Science at *Auckland University*, New Zealand for his expertise and support.

John Napier

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GENESIS

Chapter 1: The Early Years

"The world into which John Napier was born was uncertain and dangerous. In the years leading up to his birth, the stage was set for the unfolding of the terrible drama which was to grip Scotland during most of the decades of his life and which was to put in peril the chances of fulfilling his great potential."

The *Reformation* acquired the hearts and minds of many within sixteenth century Scotland. As a sovereign state in its own right, King James V refused to follow Henry VIII, King of England, in converting Scotland to Protestantism and attempted to ban the distribution of *Lutheran* script. His death in December 1542 removed a critical obstacle to the movement's progress in Scotland.

The one week old daughter of King James V, Mary (Queen of Scots), was crowned Queen of Scotland in September 1543 at Stirling Castle. Her mother, Mary of Guise, was appointed as Regent and the crowning of a minor in Scotland was viewed by Henry VIII as an opportunity to seize control in the North. By virtue of Scotland's alliance with France, troops were sent to Scotland in anticipation of aggressive action from the south.

Henry VIII

Henry VIII invaded Scotland several times in an attempt to force the marriage of his son, Prince Edward, to the infant Queen Mary, a period which is known as the *Rough Wooing*. The catastrophic defeat incurred by the Scottish at the Battle of *Pinkie Cleugh* in 1547 led to the infant Queen Mary leaving Scottish shores for France, which led to further political and social chaos.

Amidst the backdrop of uncertain, dangerous times, John Napier was born in the medieval tower house of Merchiston Castle in 1550, the exact date of his birth is unknown. He was born into a family of wealth and privilege which owned considerable lands in Scotland, including Merchiston, Blairnavaidis, the Isle of Inchmone, Edinbellie, Gartness, Pultrielands, Ardewnan, Calziemuck and Auchinlesh. Members of the Napier family held important positions of influence within Edinburgh, including The Governor of Edinburgh Castle and the Lord Provost. Behind the relatively safe walls of Merchiston Castle, the young John Napier lived with his father Archibald, the Seventh Laird of Merchiston, mother Janet Bothwell and siblings Francis and Janet.

Very little is known regarding John Napier's early years but it is most likely he received private tuition at Merchiston Castle, which was a common educational route for one of noble birth to receive prior to a university education and further study in Europe.

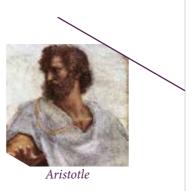*Battle of Pinkie Cleugh*

In 1563 John Napier, aged thirteen, enrolled at the *University of St Andrews* where he attended *St. Salvator's* College and lodged with the college's principal, John Rutherford. At that time it was not unusual for someone so young to matriculate at university and *determinant students*, what would be described as an undergraduate today, could graduate at the age of fifteen.

*"For the young Bejans the curriculum was daunting.
They were immediately plunged into the study of rhetoric and logic,
and after this metaphysics, physics and the ethics of Aristotle."* [1]

Within three months of beginning his studies, John Napier experienced the tragedy of the sudden loss of his mother. Despite such a devastating setback for one so young, the situation provided an opportunity to immerse himself in day-to-day life at *St Salvator's*, which was overseen by academic staff and senior students. On a weekly basis, students engaged in sports and theological debates presided over by one of the school Masters.

Aristotle

*"The disputants were exorted to avoid altercation usually practised in
schools and not to bite and devour one another like dogs; but to behave
as men desirous of mutual instruction, and as the servants of Christ, who
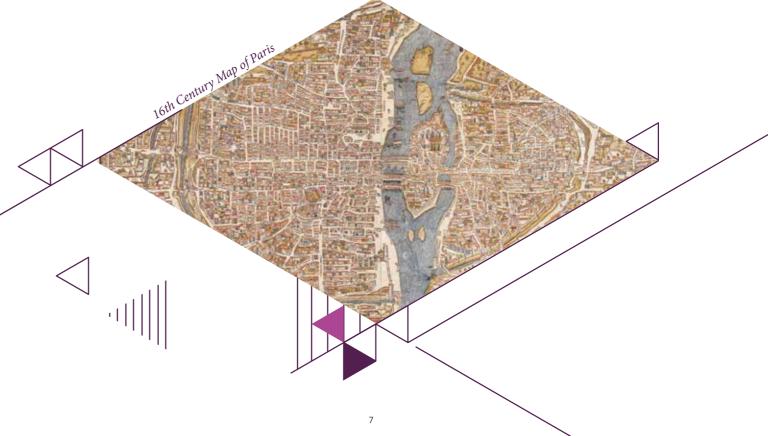ought not to strive, but to be gentle to all."*

By the time John Napier had the opportunity to participate in theological debate at the *University of St Andrews*, Scotland was a protestant country. The Scottish Parliament's decision to adopt protestant doctrine in August 1560, without doubt, encouraged many spirited debates at *St Salvator's* influencing, in turn, the young *Bejans* greatly as they keenly absorbed interpretation, argument and counter-argument. The sermons delivered by Christopher Goodman from *St Salvator's* pulpit introduced the topic of religious apocalypse to the young John Napier, who later acknowledged his influences in developing his own passions on the subject.

John Knox

Merchiston Castle

MERCHISTON TOWER, NEAR EDINBURGH.

1   *Bejan was the title attributed to a first year student at St Salvators*

Chapter 2: European Adventure

*"For whatever reason, perhaps the learning of the Greek language, perhaps more
general academic frustration, perhaps a consequence of his mother's death, or
perhaps simply following the common practice for the sons of families of standing
to complete their studies in Europe, he left the university prematurely and we lose
Napier once again, and certainly to parts of continental Europe."*

There is no record that John Napier progressed to a second year at the *University of St Andrews*. Historians tend to agree that he left from Leith for Europe in 1564 to continue his studies, but his destination uncertain.

*"When Adam Bothwell, the Bishop of Orkney, had advocated a period of study abroad for his
nephew, he knew very well that this might mean a separation of several years for John and
his family, and therefore much anxiety. The safe arrival of correspondence could never be
guaranteed, and any news of a traveller's well-being or otherwise was hard to come by. On
the continent, as at home, people ran the daily risk of catching smallpox, typhoid, malaria and
the plague. Life expectancy was short everywhere."*

Travelling abroad in the sixteenth century was a very dangerous proposition. Travellers faced the perils of the sea, disease and pirates as well as the threat of highwaymen along continental routes towards established towns. It is very likely that John Napier would not have travelled alone to Europe and was accompanied by a servant, to look after his possessions, and a tutor to negotiate customs and study arrangements.

There has been much speculation as to where John Napier may have visited and whether he enrolled in a course of academic study in Europe. In the 1930's, W.R. Thomas conducted an investigation and made inquiries at Bordeaux, Paris, Geneva, Basel, Amsterdam, Marburg and Jena. His research proved unsuccessful as no matriculation record was found.
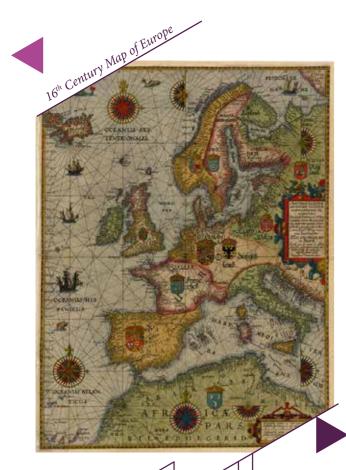
16th Century Map of Paris

The *University of Paris (College de la Sorbonne)* was an established, well respected academic institution whose reputation alone attracted students from across Europe. The reputational capital, as well as the prestige of further study at the *College de la Sorbonne*, may have proved sufficient reason for Archibald Napier to send his young son to Paris. However, given the Napier family's allegiances to the protestant faith, France was a catholic country and in a state of civil war at the time John Napier left Scotland for Europe. That said, significant gains had been made by the Protestant *Huguenots* both in Paris and within the academic institution.

"There were amazingly few places in Europe at that time where classical Greek could be studied. Basel had only two Greek scholars and Geneva more than two. In England and France, what Greek scholarship there was often tended to be poor."

Had theology proven the focus for John Napier's visit to Europe, the university at Geneva would have provided the expert tutelage in Greek necessary to understand religious text. The spread of *Calvinism* during the sixteenth century led to many European followers pouring into Geneva, which had voted to leave the guardianship of the Roman Catholic Church in the 1530's. John Calvin later established a Theological Academy in Geneva which provided an academic and theological grounding for the training of ministers, lawyers and doctors.

John Calvin

16th Century Map of Europe

It is also believed that Christopher Goodman spent a number of months in Geneva, prior to his time at *St Salvator's*. In Geneva, the university's principal Greek teacher was Franciscus Portus, who was highly regarded in Europe. Geneva proved a popular academic destination during this time for Scottish students, many of whom lodged with Henry Scrimgeour, a Scottish Professor of the Arts, during their studies.

Historians also suggest John Napier may have visited a number of further countries within Europe during this time, including Holland, Italy and Germany. An accurate record of John Napier's european movements may never be found but it is certain that the experience provided a thorough grounding in philosophy, theology, mathematics and science as well as exposure to the *Renaissance* arts, culture and customs.

TRANSITION

Chapter 3: A Return to Conflict

Historians generally agree that John Napier returned to Scotland in 1571, aged twenty-one years. Scotland was engulfed in one of its darkest periods in history where the glowing embers of conspiracy, murder and rivalry of the past ten years served to fuel the inferno of the *Marian Civil War*. The return of Mary Queen of Scots to Scotland in 1561 served to heighten tensions between the catholic and protestant faiths. In the spirit of diplomacy, the catholic Mary Queen of Scots vowed to tolerate *Protestantism* as the officially adopted religion of Scotland, a gesture which served to quell a modicum of the tension.

Mary Queen of Scots arrival in Leith in 1561

Her decision to marry Lord Darnley in 1565 proved highly unpopular, and a rebellion of Protestant Lords was led by the Earl of Moray. The rebellion was defeated and the Earl of Moray fled in exile to England. Lord Darnley's hedonistic lifestyle, plotting and promiscuous nature was no secret within court and it was of little surprise that the marriage deteriorated rapidly. Lord Darnley subsequently forfeited many royal privileges and lost considerable face when David Rizzio was preferred as Royal Secretary. Many believed that David Rizzio had significant influence on Mary Queen of Scots, and supposedly played an instrumental role in the subsequent proposal of a parliamentary bill in 1566 to confiscate the lands belonging to the Earl of Moray and his fellow conspirators involved in the rebellion, an action which had fatal consequences for Rizzio.

"On Saturday 09 March, three days before the bill was due to go to Parliament, Mary was at supper in her apartments at Holyrood with a dozen relations and friends, including Rizzio. A group of armed men, led by Darnley and Lord Ruthven, broke in, dragged Rizzio from the room and stabbed him fifty-six times."

The Earl of Moray returned to Scotland two days later alongside a number of his fellow Lords, who threatened further acts of aggression if the parliamentary act should be passed. Mary Queen of Scots chose to pardon the 1565 rebels in an attempt to avoid further violence and bloodshed. However, the nobles involved in the murder of David Rizzio, would not avoid punishment.

Lord Darnley was murdered at Kirk O' Field on 10 February 1567 in mysterious circumstances. It has been reported that an explosion took place but Lord Darnley was found outside, strangled.

The Earl of Bothwell was believed to be conspirator in chief with regards to the murder of Lord Darnley. Within three months of Lord Darnley's death, Mary Queen of Scots married the Earl of Bothwell. The marriage proved hugely detrimental to Mary Queen of Scots, who lost the support of the Scottish nobility and was now considered a co-conspirator in the murder of her late husband, Lord Darnley. As a result, Mary Queen of Scots was forced to abdicate her throne and was imprisoned in Loch Leven Castle and her infant son, James VI, was crowned King and the Earl of Moray appointed as Regent.

Lord Darnley

The Earl of Moray

Thus, John Napier returned to a Scotland in a state of civil war where troops loyal to Mary Queen of Scots were resolutely defending Edinburgh Castle from troops loyal to the infant King James VI. The Napier family home at Merchiston Castle was situated along Ediburgh's southern approach and of key strategic importance in terms of supplies and movement of troops. Despite Archibald Napier's reluctance to involve his family in the fighting, his allegiances were questioned by both sides during that time and his movements were restricted by the newly appointed regent, the Earl of Moray. It is, therefore, most likely that Archibald Napier remained at Merchiston Castle during the times of the Marian Civil War but whether or not his family remained with him, is uncertain.

An outbreak of the plague had also reached Edinburgh in 1568 and continued to claim victims, which suggests that it is likely that the Napier family moved to their estates in Lennox or Menteith to minimize exposure. Life within the city walls was brutal during the time of the plague. By order of the city's council, families affected by the plague had to leave their property, taking all their possessions to the Burgh Muir, which lay adjacent to Napier Lands. Historians report that the boundary walls were laden with the dead and dying.

Troops loyal to the infant King James VI were garrisoned at Merchiston Castle as a means to prevent vital supplies reaching the Queen's supporters in the city of Edinburgh. In May 1572, a unit of the Queens' troops led by Captain Scugall, advanced from the city and laid siege to Merchiston Castle. The outbuildings and castle were captured but dogged resistance prevented the tower from being taken. As momentum was lost, the Queen's troops burned the outbuildings in an attempt to break the resilience of the defenders. Having been alerted to the siege, a large contingent of the King's troops rode from Leith, led by the Laird of Blairwhain. The relief force, having negotiated its way through cannon fire from Edinburgh Castle to reach Merchiston Castle, successfully drove them back into the city. Captain Scugall was fatally wounded during the withdrawal.

The Queen's troops returned to Merchiston Castle in June, led by the Earl of Huntly and supported by an artillery battery. The timing of the attack proved opportune as many of the King's troops were engaged at the siege of *Niddrie-Seyton Castle*, which left Merchiston Castle vulnerable to attack. Extensive damage was inflicted on Merchiston Castle leading to structural decimation and the collapse of battlements. During the attack, forty cattle and sheep were rounded up by the Queen's forces as a means to bolster depleting supplies. The attack proved highly successful and what remained of the defensive force inside Merchiston Castle entered into negotiations with the Earl of Huntly to agree an honourable withdrawal. However the defenders at Merchiston Castle were gifted some much need respite from the most unlikely of sources.

"According to contemporary accounts a crowd of such country people remained in the area gathered, drawn by the noise. The attackers thought they were reinforcements of the King and sent their artillery back to Edinburgh."

A short time after the withdrawal of the artillery, a considerable number of the King's Calvary returned to Merchiston Castle from Niddrie-Seyton who engaged and forced back the remaining infantry. Merchiston Castle remained in the hands of troops loyal to the infant King James VI for the remainder of the conflict, which ended in a victory for the King's supporters in 1573.

Chapter 4: Family Dynamics

Amidst the backdrop of civil war, plague, conspiracy and murder, John Napier returned to changes in dynamics within his immediate family. Archibald Napier had received the *Order of Knighthood* in 1565 and had completed two terms as Deputy Justice to the Earl of Argyll, *Hereditary Justice - General of the Kingdom of Scotland*. However, by the time civil war broke out in Scotland in 1568, Archibald's reluctance to provide a definitive show of allegiance put him in a precarious position. His reticence led to suspicion and loss of favour, particularly with the Earl of Moray, Regent to King James VI, who restricted his movements to Merchiston Castle for the greater part of the Marian Civil War. Archibald Napier remarried during this time and had chosen his cousin, Elizabeth Mowbray of Barnbougall, as his wife.

It is widely held that John Napier returned from Europe to assist with the management of his family's estates. At that time a decision was made to marry Elizabeth Stirling of Keir whose father, Sir James, had served alongside Archibald Napier at the Courts of Justice. A marriage contract was drawn up which invested John Napier with the baronies of Edinbellie-Napier and Merchiston, and the title *The Fear of Merchiston*. In addition to the aforementioned lands, ownership of the family lands of Merchiston, Pultrielands, half the lands of Ardewnan and a third of the lands of Auchinlesh were also transferred. The marriage was suspended until the cessation of the conflict and a Royal Charter was granted to John Napier and Elizabeth Stirling in October 1572. John and Elizabeth Napier married and took up residence in Gartness, Stirlingshire in 1573, where a new home was built which included a spacious garden and orchard. Their son Archibald was born at Gartness in 1576 and a daughter, Jane, soon followed.

John Napier settled into married life at the family estate in Gartness, Stirlingshire. He assisted his father with the management of the day-to-day running of the family's estates, its servants and tenants as well as the protection of its boundaries. It is believed that John Napier began work in earnest with regards to mathematical and theological investigation at Gartness, and spent many hours deep in study within the rich, vibrant and stimulating colours of the Gartness Estate courtyard and orchard.

Elizabeth Napier

Historians have indicated that establishing the optimum sensory environment for academic study was very important to John Napier. For instance, the continued cascade of a stream at the bottom of the orchard proved to be of little distraction to Napier, whereas, the intermittent sounds emanating from the village mill did prove disruptive. As a result, John Napier often asked the mill owner to cease activities whilst he was engaged in his investigations and development of theory.

Elizabeth Napier sadly died in 1579, aged just twenty-seven years old. Within a few years, John Napier remarried and had five sons and daughters with his new wife, Agnes Chisholm, daughter of Sir James Chisholm of Cromlix. Agnes was a second cousin to John Napier's first wife, Elizabeth as well as second cousin to his father, Archibald Napier. Like his father, John Napier had married into a family with strong allegiances to the catholic faith. His father in law, Sir James Chisholm of Cromlix, later played a significant role in the conspiracy of the *Spanish Blanks* which was an attempt by Scottish catholic Earls to encourage Spanish intervention to quell protestantism in Scotland in 1593.

Chapter 5: Sixteenth Century Problem Solving

John Napier's Black Cockerel

It is inevitable that John Napier travelled to Merchiston Castle as well as other estates belonging to his family on a regular basis and engaged in a diverse body of work. By virtue of overseeing the management of the Pultrielands (Poultry Lands), John Napier was appointed the King's Poulterer. An annual gift of the finest specimens were made to the King and it is reported that John Napier famously saved one particular black cockerel from its inevitable fate and chose to keep it as a pet.
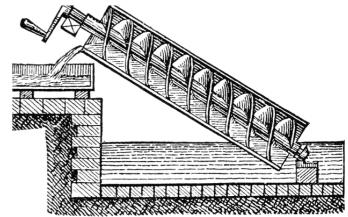
"One amusing tale about this pet (cockerel) was that he used it to trap a thief in the household. He told his servants that his bird could tell honesty from dishonesty, and would crow when a thief stroked its neck. He then sprinkled soot all over the cockerel, tied it up in a dark room, and instructed all of his servants to go in one by one and stroke the bird. The thief was soon found out, for he was afraid to stroke it, and was the only one to come out with clean, but guilty hands."

John Napier demonstrated a novel, ingenious approach to problem solving through his duties and resolving conflict with his peers. A specific example includes an argument with the Laird of Roslin, whose pigeons were landing on John Napier's Merchiston lands and eating the grain.

"Napier said he would get the better of him. Roslin scoffed. Was it sorcery, the household and neighbours thought, that made the pigeons the next day reel about on the ground, unable to fly away from Napier's servants grasping hands? Not a bit of it. Napier had soaked peas in wine and spread them all over the field. The pigeons loved the peas, but drunken pigeons cannot fly."

Agriculture had suffered greatly during the time of civil war in Scotland and this had led to a deficit of vital grains, including corn, maize and barley. Established agricultural techniques, passed down through generations of experience, now proved ineffective and a succession of poor harvests led to starvation, suffering and hardship. John Napier played an important role with regards to introducing a series of agricultural innovations in an attempt to turn the tide.

The *Archimedes Screw*, an irrigation tool attributed to the Greek philosopher during his time in Egypt in the third century BC, comprised a wooden screw, placed inside a tight-fitting cylinder. The handle of the screw was turned, through either manpower, wind or cattle, as a means to draw water through the cylinder from the earth. John Napier devised an improved version of the *Archimedes Screw* which, thanks to a monopoly granted by the King, provided a cheap, manageable solution for many who worked the land during that time and beyond.

An illustration of the Archimedes Screw

"A colonel McKenzie, who had done some research into Napier's work, discovered that while stationed in India in 1786 the form of Archimedes Screw used by the natives of the Portuguese colony of Goa was based on Napier's version. He concluded that one of Napier's machines, or a description of it, had been taken out to the subcontinent by Portuguese merchants."

In 1598 John Napier worked alongside his son, Archibald, to publish a detailed set of instructions concerning the distribution of salts to various varieties of soil. The publication named Archibald as the author, who was granted a patent from King James VI, but it is generally believed that much of the extensive research had been carried out by his father.

"Clearly much thought and experimentation had gone into the patent to prove its efficacy so it is doubtful that Archibald, who was only 23 years old at the time, was responsible for this."

The application of salt required careful, measured application and it was believed to encourage optimal conditions within the soil in order to yield greater quantities of grains and grass. Farmers were encouraged to apply the salts to their fields no later than 11 November, a day referred to as *Martinmas* (the festival of St Martin) in the publication, to provide adequate time for the salt to interact with the soil. The salts were also applied to pasture lands where cattle had dropped their dung as a means to ensure they would return to pasture once the grass had returned.

Chapter 6:
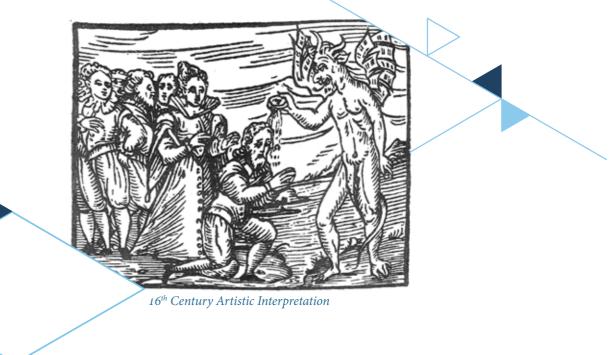# Eccentricity, Witchcraft & Hidden Treasure

Demonstrating novel and ingenious approaches to problem solving and displaying eccentric personality traits served only to arouse suspicion within sixteenth century Scottish society. Many of John Napier's eccentricities were perceived by nobles, simple towns' folk and tenants alike as evidence to suggest John Napier was engaged in witchcraft, the black arts and necromancy. Furthermore, his tendencies of wearing elaborate, long dark gowns and skull caps, spending long periods alone and pacing up and down paths for long periods of time added further fuel to the fires of suspicion.

"He used frequently to walk out in his night-gown and cap. This, with some things which to the vulgar appeared rather odd, fixed on him the character of a warlock. It was firmly believed, and currently reported, that he was in compact with the devil; and that the time he spent in study was spent in learning the black art, and holding conversations with Old Nick."

Arousing suspicion of witchcraft was a dangerous proposition in the sixteenth century and, at times, little or no evidence was required to impose a penalty of death by burning at the stake. It is without question that John Napier flirted perilously close to the mark by exhibiting eccentric tendencies, however, he wasn't formally accused or brought to account under the charges of witchcraft.

"However, like many of his well-educated contemporaries Napier did practice alchemy, something that was considered perfectly legitimate at the time and openly acknowledged."

A reputation for sorcery may have, perhaps, provided sufficient motivation for Robert Logan of Restalrig to approach John Napier in 1594 for assistance in finding hidden treasure. Robert Logan, who had been denounced as an outlaw and had frequently escaped both punishment and retribution, was in possession of *Fast Castle* located on the east coast of Scotland where he believed undiscovered treasures lay.

16th Century Artistic Interpretation

"This leaves us with the mystery of why a man of Napier's distinction should wish to be associated with a man of Logan's notoriety. The lure of money, especially as there was no guarantee of reward, does not seem sufficiently strong. A more likely reason for Napier would have been the opportunity to see if he really did have the power to divine hidden objects. Knowledge rather than gold would be the temptation."

It is uncertain that John Napier was aware of Robert Logan's reputation at the time the contract was signed by both parties. Napier was contracted to use his powers of sorcery as a means to find the treasures believed to be hidden within *Fast Castle* in return for a third of the fortune and safe passage back to Edinburgh.

"As the written contract remained in existence, its terms could not have been fulfilled. This would mean their arrangement probably ended in one of three ways: that Napier did not make the dangerous journey to Logan's clifftop fastness, that he did so but the contract was breached in some other way, or that having done his part Napier found Logan's notion of compensation to be unsatisfactory."

Fast Castle

CREATIVITY

Chapter 7: Religious Apocalypse

*"The Plaine Discovery itself is to modern eyes a curious mixture of bigotry, scholarship and humility...
The subject of the book, the biblical Apocalypse attributed to the apostle St John, is so obscure that even
Calvin had admitted that he could not understand it."*

John Napier's long-held interest in the subject of religious apocalypse culminated in the publication of *Plaine Discovery of the Whole Revelation of St John* in 1593. It was published at a time when protestantism in England and Scotland faced significant threats from abroad and closer to home.

Defeat of the Spanish Armada

The *Spanish Armada* attempted to transport troops to England in 1588 as a means to remove Elizabeth I from the throne and reinstate Catholicism. The *Spanish Armada* was successfully defeated following a series of naval engagements. However, the 1592 *Spanish Blanks Conspiracy*, which involved a number Scottish nobles conspiring to support an invasion of thirty-thousand Spanish troops to land on the west coast of Scotland, contributed to a continued sense of suspicion and tension. It is most likely that such events would have served to stoke existing fires of contempt within John Napier, who was deeply committed to the protestant faith and vehemently critical of *Catholicism*.

Front Cover of Plaine Discovery

"Denunciation and vilification of the papacy and its church were the most dominant themes of Plaine Discovery. Every part of the work was loaded with anti-Catholic language and imagery, from the dedicatory and introductory epistles to the tables that summarised the revelation and the poems included by Napier."
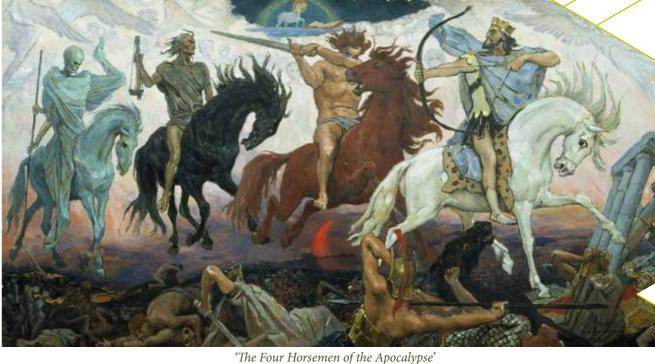
Within *Plaine Discovery of the Whole Revelation of St John*, John Napier presented thirty-six propositions based on his interpretations of the prophecies within the B*ook of Revelations*, which he substantiated further with commentary and historical notes of proof cited from the *Bible*. He used his interpretations and historical notes of proof to construct a detailed timeline towards the day God will serve his judgment, leading to the destruction of the world and the creation of a new heaven and earth. Within the *Book of Revelations*, St John described the opening of seven seals, the sounding of seven trumpets and a period of four jubilees. In *Plaine Discovery*, John Napier matched events in history to definitively state how long the seals, trumpets and jubilees lasted.

According to Napier, the seven seals were opened in turn in seven year intervals, angels sounding their trumpets every 245 years and a period of jubilee would last 49 years. In *Plaine*

Discovery, John Napier identified the Pope as the *Antichrist* and the Roman and Islamic empires represented the *wicked kingdoms* on earth as well as the true enemy of true Christians. Many significant historical milestones pertaining to the *wicked kingdoms* were interpreted by John Napier to represent the opening of the seals and the sounding of the trumpets as described by St John.

St John introduced the subject of the seals in the fifth chapter of *Revelations* and described a scroll presented to Christ in heaven with seven seals which indicated a series of events leading to the day of God's judgement on earth. According to St John, the opening of the first four seals dispatched the *Four Horsemen of the Apocalypse* with the sole purpose of inflicting religious deception, war, famine and pestilence.

*"So I looked, and behold, a pale horse. And the name of him who
sat on it was death, and Hades followed with him. And power was
given to them over a fourth of the Earth, to kill with sword, with
hunger, with death and by beasts of the earth."*

*'The Four Horsemen of the Apocalypse'
Victor Mikhailovich Vasnetsov*

John Napier referred to the baptism of Christ in 29 AD and the writing of the four gospels by *Matthew, Mark, Luke* and *John* as the historical references for when the first four seals were opened. According to Napier, such references were 'acts of divine mercy' served upon Christians prior to the corruption, suffering and persecution carried forth by the Four Horsemen. John Napier described the rise of Nero and his infamous persecution of Christians as the two historical notes of reference for the opening of the fifth and sixth seals. The opening of the seven seals marked, as Napier believed, the beginning of a great antichristian darkness. The end of the Roman Emperor Vespasian's rule in 71 AD, during the period described as the Flavian Dynasty, was the historical note of proof that Napier believed indicated the opening of the seventh seal, when a period of suspended persecution against Christians began.

*"The period denoted by the trumpets was the longest in Christian history and was concerned
primarily with the corruption of the church and growing dominance of the papacy as the Anti-
christ, ending with a new hope that came in the form of the Protestant Reformation."*

Throughout the period of the seven trumpets, John Napier continued to refer to the persecution of Christians at the hands of the *Roman Empire* as well as the corrupting influence of the Papacy as well as the rise of *Islam* in the East within his historical notes of proof. In *Plaine Discovery*, Napier referred to the Papacy as *Gog* and *Islam* as *Magog* and made his first reference to *Islam* in the third proposition.

"The star and locusts of the fifth trumpet, are not the great Anti-christ and his clergy, but the dominator of the Turks and his army, who began their dominion in Anno Christi 1051."

The seventh trumpet heralded the great turning point according to John Napier, who referred to Protestant *Reformation* activities in 1541. It is unclear what specific activities John Napier referred to, which can be said for several of his historical notes of proof within *Plaine Discovery*, but historians believe his interpretations alluded to the establishment of the movement and its prominent figures.

"The period of the four jubilees, occurring every 49 years, was special for Napier's scheme because it represented a shift from allegorical interpretations about historical and contemporary events to predictions about the future. It was the most positive period for Napier because it included the victory of god's true church over the church of the Antichrist."

'The Seven Trumpets of the Apocalypse'
Albrecht Durer

According to John Napier, the period of the first jubilee began in 1541 and referred to the Reformation as the historical note of proof in which he believed the truth was brought to light with regards to the Gospels. Napier believed the second jubilee began in 1590, just three years prior to publishing Plaine Discovery. In the *Book of Revelations*, St John described hearing an angel declare that Babylon would be destroyed and John Napier interpreted this to mean the fall of Rome. Within his commentary, Napier also referred to the recent defeat of the *Spanish Armada* and the succession of France's first protestant King, Henry IV, as acts of divine providence which indicated God's favour towards the protestant faith.

King Henry IV of France

"Napier's fascination with mathematics found an outlet in his calculations of the approximate date of the end of the world, based on numbers and various books of the Bible and the Talmudic Prophecy of Elias."

According to his research, John Napier believed the world would endure for a total of six thousand years, in three cycles of two thousand years under the *Law of Nature*, *Mosaic Law* and the *Law of Christ*. Napier referred to *Matthew 24:22* as a means to propose that it was God's will to shorten the final period of two thousand years to spare suffering on earth.

"And except those dayes shulde be shortened, there shulde no flesh be saued: but for the electes sake those dayes shalbe shortened." [2]

Therefore, John Napier predicted that the world would end in 1688 upon the completion of the fourth jubilee period of 49 years.

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2 Mathew 24:22

Chapter 8: Machines of War

"It is a measure of the diversity of Napier that while he was seeking inspiration to foretell the end of God's world in the Plaine Discovery, he was also concerning himself with inventing machines of war."

At the same time as John Napier's *Plaine Discovery of the Whole Revelation of St John* was published in 1593, revelations regarding the *Affair of the Spanish Blanks* were revealed. The attempt by Scottish Catholic Earls to gain support from the Spanish King to quell Protestantism in Scotland, sparked a renewed sense of fervour in terms of papist conspiracies.

It is unclear when John Napier began working on his designs, or if the impending threat of a second Spanish invasion was indeed the catalyst, but he submitted a list of inventions to the Government titled *Secrett inventionis, profitabill and necessary in the defence of this lland, and withstanding Strangers, enemies of God's truth and religion* in 1596. He described methods of harnessing the sun's power as a weapon using parabolic mirrors and detailed blueprints of what we regard today as a tank, submarine and an artillery cannon as a means to repel enemy attacks from land and sea.

An illustration depicting the theory of using the sun and parabolic mirrors to repel an attack from the sea
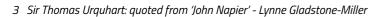
The second Spanish Armada never set sail for British shores, and John Napier's weaponry remained as drawings and descriptions which, upon his instructions, were destroyed a short time after his death. Legend has it, however, that Napier constructed a prototype of his tank which was buried on the lands at Gartness. In a tract titled *Discovery of a Most Exquisite Jewel*, written by Sir Thomas Urquhart of Cromarty in 1652, it is suggested that John Napier successfully tested one of his weapons.

John Napier kept many of his designs private, which were burned a short time before his death in 1617. According to Sir Thomas Urquhart, John Napier was asked why he wished to keep his designs secret, by an old acquaintance, a short time before his death in 1617.

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3   *Sir Thomas Urquhart: quoted from 'John Napier' - Lynne Gladstone-Miller*

Chapter 9: Logarithms & the Pace of Discovery

Discovering the fastest sea routes to the spice islands had been of significant importance to European countries such as Spain and Portugal during the fifteenth and sixteenth centuries. Christopher Columbus led a fleet of three ships, the *Nina*, *Pinta* and *Santa Maria* on an expedition to pioneer a new, shorter route to Asia in 1492 and a successful circumnavigation of the world was achieved by Ferdinand Magellan in 1522.

Knowledge and progressive theories, within the field of astronomy had also progressed rapidly during this time. Nicholas Copernicus described how the earth moved around the sun in 1543, through his publication *On the Revolutions of the Heavenly Spheres* and many of his theories were developed further by Kepler, whose 1609 publication *New Astronomy* presented his *first and second laws* of planetary motion.

As the gateways to the world and the stars were explored through scientific study and expedition, dated navigational methods and long, complicated calculations threatened both the momentum and accuracy of discovery. This is particularly pertinent to the aforementioned 1492 expedition led by Christopher Columbus who, upon arrival in the Bahamas, incorrectly identified the landmass as Japan and proceeded to incorrectly identify China when he had actually reached Jamaica.

"In the field of mathematics, Napier's discovery was momentous. Although the navigators on the great voyages now taking place had quadrants for their charts instead of the astrolabe which Columbus had used, they still had to calculate enormous, cumbersome, error-prone calculations to find out exactly where they were. The invention of logarithms released the navigators from all of this. For them and for the architects, merchants, bankers and most of all the astronomers life was changed completely - and immediately. When Kepler, the Imperial mathematician at Prague in 1601, calculated the orbit of the planet Mars without the benefit of logarithms, it took him four years."

John Napier published *Mirifici Logarithmorum Canonis Descriptio* in 1614, which included ninety pages of logarithmic tables as well as thirty-seven pages of instruction to make the process of carrying out long, complicated calculations easier. The publication was published in Latin, which was the common language used by academics at the time. The system Napier described focused on a relationship between arithmetical and geometric progressions which produced a series of *logarithms* and *anti-logarithms*.

Presented below is a table of *logarithms* (top row) and *anti-logarithms* (bottom row) to illustrate the concept in a very basic sense. The table of *logarithms* and *anti-logarithms* can be used to work out a series of multiplication and division calculations as well as a method to identify the square, square root and cube of numbers.

To calculate 16 x 64, the *anti-logarithms* 16 and 64 are identified and represented by the logarithms 4 and 6. The *logarithms* are added together to make 10 and the answer 1024 is provided.

4 + 6

0	1	2	3	4	5	6	7	8	9	10
1	2	4	8	16	32	64	128	256	512	1024

A logarithm is the power to which a base number must be raised to achieve a desired result. The logarithmic formula derives from the exponential formula **f(x) = b^x**, where b represents the base and x is the power. The following table represents an exponential function with a base two system.

x	-2	-1	0	1	2	3
f(x)	1/4	1/2	1	2	4	8

To provide an example, when 8 = f(x) it would read 8 = 2^3.

The logarithmic formula f(x) = log b^x enables us to express the same solution but in a different way. Using the same example as before, the formula now reads $\log_2 8 = 3$.

Therefore, returning to the earlier calculation 16 x 64 = 1024, the solution can be expressed using either the exponential and logarithmic formula:

Exponential Formula: 1024 = 2^{10}
Logarithmic Formula: $\log_2 1024 = 10$

The above tables and formulae utilise two as its base number, which can be expressed as 2^n. This theory was introduced in a 1544 publication titled *Arithmetica Integra*, written by a German Monk and Mathematician called Michael Stifel. However, 2^n presents a significant problem because the *common ratio* of the *geometric* progression is spaced too far apart and, therefore, provides insufficient scope to multiply numbers out with the *arithmetical* and *geometric* progression.

"It was the genius of Napier that would overcome this problem. The Descriptio gave us the finished table of logarithms at the end of two books on the mathematics of the subject."

What John Napier introduced through *Mirifici Logarithmorum Canonis Descriptio* was a series of logarithmic tables which utilised the decimal point to express a number closer to one as its power base, which was 0.9999999 (r^n). By doing so extended the range of factors exponentially and its subsequent impact and application to science, exploration and commerce was colossal.

"Napier knew about the use of the decimal point. It had been introduced before in several parts of the world and its use had been explained by Simon Stevin (1548-1620), of Bruges, in his book La Thiende ("The Tenth in Flemish") of 1585. But his notation for decimal fractions was exceedingly cumbersome, and so almost no use was made of Stevin's version of the decimal fractions. Napier's consistent and clear use of it in the Constructio may have contributed to its subsequent popularity."

Mirifici Logarithmorum Canonis Descriptio

Having read *Mirifici Logarithmorum Canonis Descriptio* Henry Briggs, Professor of Mathematics at Gresham College, travelled from London to Edinburgh to visit John Napier in 1615. The discussions which were held focussed on revising and simplifying logarithms to $\log_{10}$ (1) = 0. Having agreed upon this revision, Briggs completed his revised tables in 1624, which are what we call the *Common Logarithmic Table* today.

This book will now use the table of Common Logarithms as a means to demonstrate how to multiply and divide using logarithms, which have been reduced to two decimal places.

N	1	2	3	4	5	6	7	8	9	10	11
Log	0.00	0.30	0.47	0.60	0.69	0.77	0.84	0.90	0.95	1.00	1.04

MULTIPLICATION

To multiply using Logarithms the following formula is used:
Log (AB) = Log A + Log B

In this example we shall identify the solution to 5 x 2 using logarithms, expressed in the formula:

Log (5x2) = Log 5 + Log 2

Log (5x2) = 0.69 + 0.30 = 0.99

Because 0.99 is > log 9 (0.95) and < log 11 (1.04) the solution log 10 is identified, and the answer is 10.

DIVISION

To divide using logarithms the following formula is used:
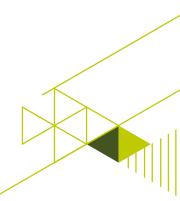**Log (A/B) = Log A - Log B**

In this example we shall identify the solution 10 / 2 using logarithms, which can be expressed as:

Log (10/2) = Log 10 - Log 2

Log (10/2) = 1.00 - 0.30 = 0.70

Because 0.70 is > log 4 (0.60) and < Log 6 (0.77) the solution Log 5 is identified, and the answer is 5.

Logarithms were used as a means to carry out multiplication, division as well as a method to identify the square, square root and cube, cube root, etc until the development of electronic calculating devices during the twentieth century.
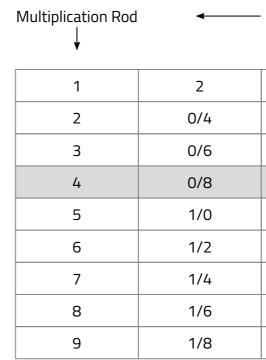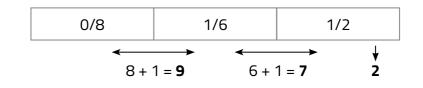
Chapter 10: Rabdologiae

Despite the academic acclaim attributed to *Mirifici Logarithmorum Canonis Descripto*, John Napier published *Rabdologiae* in 1617 as a means to assist in making mathematics accessible to wider audiences. The publication introduced a series of mathematical innovations, designed to simplify calculations, which included *Calculating Rods*, *Promptuary device* and *Local Arithmetic* system.
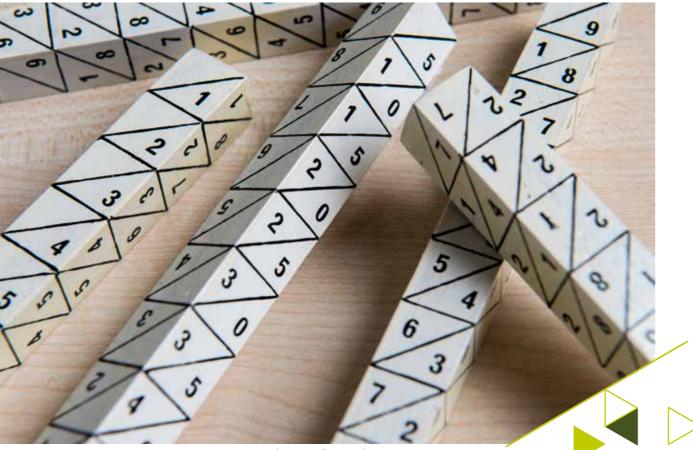
CALCULATING RODS

His system of rods were colloquially named *Napier's Bones* because the earliest versions were made of ivory and resembled skeletal fingers. Napier's new system was widely adopted and proved complex calculations could be accomplished correctly without advanced knowledge and put to common use. John Napier's calculating rods are four-sided with a series of heading numbers and their respective multiples are organised vertically in diagonal segments. Because the rods are four-sided John Napier devised a basic rule that opposite heading number must equal nine. A multiplication rod completes the set as a means to facilitate the process of executing the process of calculation.

A replica set of Napier's Bones

To calculate 4 x 243 using *Napier's Bones*, the heading rods two, four and three are placed together and the multiplication rod is placed to the left of the aforementioned. A series of numbers are presented along the fourth column of the heading rods and the various numbers, within the confines of the brackets, are added together to provide the answer, which is 972.

Multiplication Rod   ←   Heading Rods →

1	2	4	3
2	0/4	0/8	0/6
3	0/6	1/2	0/9
4	0/8	1/6	1/2
5	1/0	2/0	1/5
6	1/2	2/4	1/8
7	1/4	2/8	2/1
8	1/6	3/2	2/4
9	1/8	3/6	2/7

0/8	1/6	1/2

8 + 1 = **9**   6 + 1 = **7**   **2**

PROMPTUARY

"The instrument consists of two sets of flat strips, one set Napier called the number or vertical strips and the other the aperture or horizontal strips. The multiplicand is laid out vertically with number strips and the multiplier horizontally with the aperture strips. The desired product is then read out through the apertures."

Napier's *Promptuary* is an ingenious adaptation of his calculating rods which converted his rectangular, vertical arrangement of values of *Napier's Bones* into the structure of a square. The squares were engraved onto two highly contrasting subset strips, titled *direct* and *transverse*, which used a series of letters as a reference to position the numbers and apertures correctly.

The *direct* strips uses the lowercase letters a–i (red) to assign unitary value and the same in upper case letters (blue) to represent value in tens.
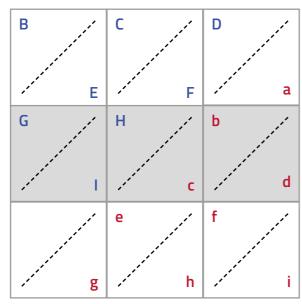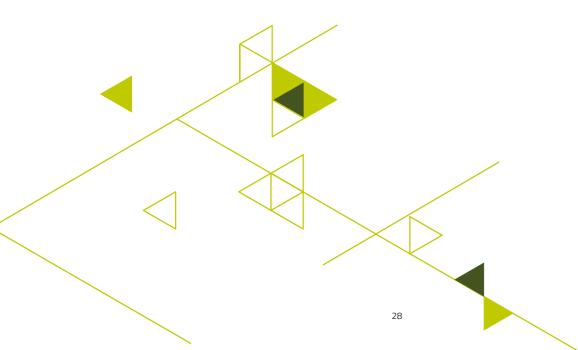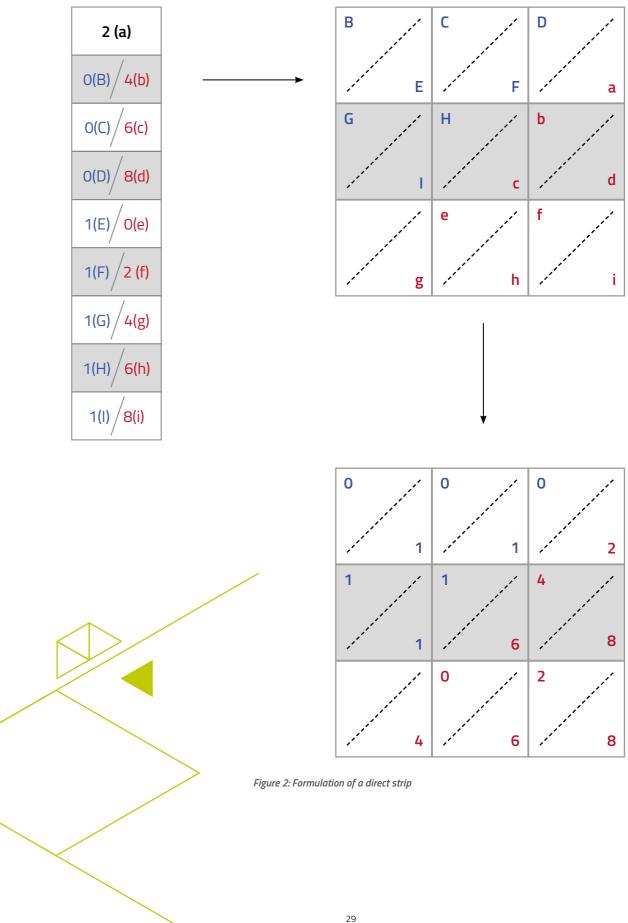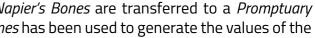

Figure 1: Napier's Square

The figure below illustrates how the values from *Napier's Bones* are transferred to a *Promptuary* paradigm. In this example, the two rod of *Napier's Bones* has been used to generate the values of the second direct square strip of the *Promptuary*.

Figure 2: Formulation of a direct strip

The system is used to determine the positioning of the transverse strip's aperture windows which serve to mask over the direct strips to present the solution. Figure 3 below demonstrates how the fifth vertical position of *Napier's Bones* presents the positioning of the aperture windows of the fifth *transverse* strip of the *Promptuary*.
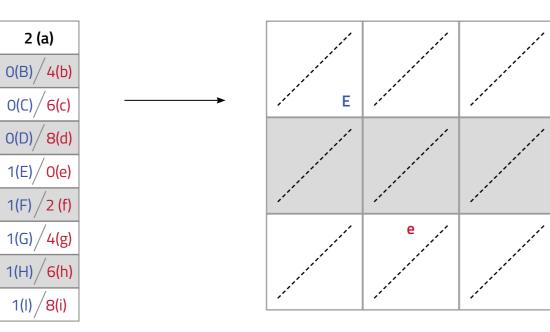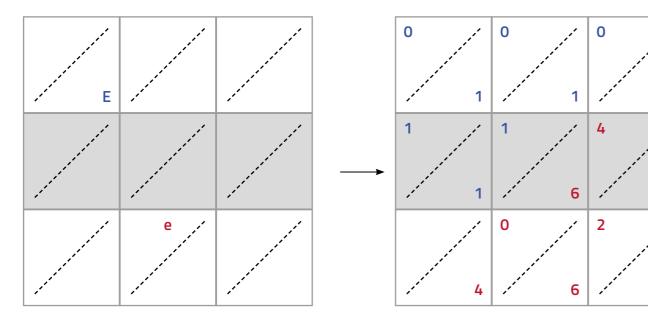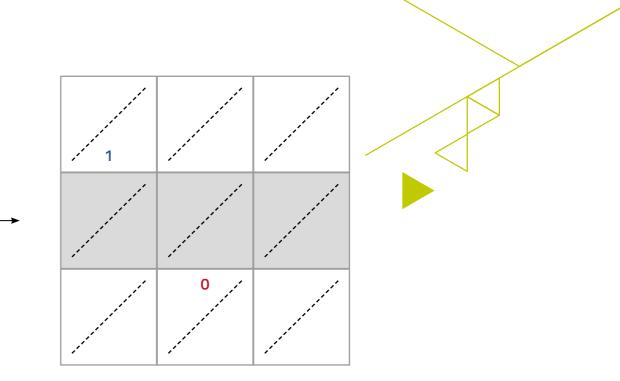

Figure 3: Formulation of a transverse strip

The final illustration demonstrates the configuration of both *direct* and *transverse strips* to provide a solution. In this example, the previous *direct* and *transverse* formulations have been brought together and the basic calculation of 5 x 2 has been calculated using the *Promptuary*. The *direct strips* are configured vertically and the *transverse strips* horizontally to provide the solution. Therefore, when the fifth *transverse strip* masks over the two *direct strip*, the solution of ten is presented through the apertures.

Figure 4: Producing a solution using the Promptuary

LOCAL ARITHMETIC

"Local Arithmetic, another ingenious invention of Napier, is the art of calculating by means of counters properly placed on a chess board or similar table."

Local Arithmetic, as John Napier conceded, was created for mere amusement rather than significant mathematical breakthrough. Within the method, Napier described moving counters on a chess board as a means to carry out addition, subtraction, multiplication, division and the extraction of roots. The board includes a *lateral* (right) and *inferior* (left) margin based on arithmetical geometric progression, described by Napier as local numbers. In the example below the margins employ a progression focused on base two numbers, i.e. 2, 4, 8, 16, 32 and so on.

16384	8192	4096	2048	1024	512	256	128	64	32	
8192	4096	2048	1024	512	256	128	64	32	16	
4096	2048	1024	512	256	128	64	32	16	8	
2048	1024	512	256	128	64	32	16	8	4	
1024	512	256	128	64	32	16	8	4	2	
512	256	128	64	32	16	8	4	2	1	

Figure 5: An adapted example of Napier's Local Arithmetic Board

In the example below, the multiplicand (24) and the multiplier (36) factors are broken down in to base two progressions. The multiplicand is broken down using the lateral (right) margin and the multiplier uses the inferior (left) margin. Based on the local arithmetic progression, the largest number which does not exceed twenty-four must be identified. In this case it is the number sixteen and an '1' mark is placed to the right of the margin next to the sixteen place setting.

The sixteen is then subtracted from twenty-four which leaves eight and a further '1' is marked next to the eight place setting to the right of the margin. Because eight subtracted from eight leaves zero, 'o' markings are placed in the fourth, second and first place settings to the right of the margin. Having completed this part of the process the binary code '11000' has been created down the side of the lateral margin, which is the number twenty-four. A similar process is applied for the multiplier, which focuses on the inferior margin. The lowest number which does not exceed thirty-six is thirty-two and a marker is placed below its place setting. The process continues in the same fashion to the multiplicand and the binary code '100100' is presented, which is the number thirty-six.

16384	8192	4096	2048	1024	512	256	128	64	32	0
8192	4096	2048	1024	512	256	128	64	32	16	1
4096	2048	1024	512	256	128	64	32	16	8	1
2048	1024	512	256	128	64	32	16	8	4	0
1024	512	256	128	64	32	16	8	4	2	0
512	256	128	64	32	16	8	4	2	1	0
				1	0	0	1	0	0	

Figure 6: Plotting of binary points to the Local Arithmetic Board

The sixteen is then subtracted from twenty-four which leaves eight and a further '1' is marked next to the eight place setting to the right of the margin. Because eight subtracted from eight leaves zero, 'o' markings are placed in the fourth, second and first place settings to the right of the margin. Having completed this part of the process the binary code '11000' has been created down the side of the lateral margin, which is the number twenty-four. A similar process is applied for the multiplier, which focuses on the inferior margin. The lowest number which does not exceed thirty-six is thirty-two and a marker is placed below its place setting. The process continues in the same fashion to the multiplicand and the binary code '100100' is presented, which is the number thirty-six.

16384	8192	4096	2048	1024	512	256	128	64	32	0
8192	4096	2048	1024	512	256	128	64	32	16	1
4096	2048	1024	512	256	128	64	32	16	8	1
2048	1024	512	256	128	64	32	16	8	4	0
1024	512	256	128	64	32	16	8	4	2	0
512	256	128	64	32	16	8	4	2	1	0
				1	0	0	1	0	0	

Figure 7: Placing of counters on the Local Arithmetic Board

512 + 256 + 64 + 32 = 864

LEGACY

Chapter 11: A Legacy Begins

"I have not done perfectly as I would, but zealously as I could."[4]

Memorial Plaque at St Cuthbert's

BURIAL PLACE

It is widely reported that John Napier experienced poor health for a number of years prior to his death on 04 April 1617, and it is suspected that he suffered significantly from gout. The burial place of John Napier remains a mystery today and historians have identified two potential locations. A number of the Napier family are buried at *St Giles* and the Napiers of Merchiston and Wrighthouses coats of arms appear on a commemorative stone describing the church as the family burial place. Understandably, some may assume John Napier may have been buried there. However, a treatise published by James Hume of Godscroft in 1636 claimed John Napier was buried at *St Cuthbert's Church*, which was Napier's parish church and where he served as an Elder for most of his adult life.
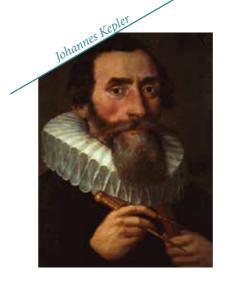
LOGARITHM METHODOLOGY

"Some years ago my father, of ever venerated memory, published the Description of the Canon of Wonderful Logarithms; but the construction and method of generating it he, for certain reasons , was unwilling to commit to types, as he mentions of the seventh and the last pages of the Logarithms, until he knew how it was judged of and criticised by those who are versed in this department of letters.

"But since his death, I have been assured from undoubted authority that this new invention is much thought of by the most able mathematicians, and that nothing would delight them more than if the construction of his wonderful canon, or so much at least as might to illustrate it, were published for the benefit of the world." [5]

John Napier's logarithmic methodology was published in 1619 by his son, Robert, which was titled *Constructio*. Robert Napier worked alongside Henry Briggs on the project, who added his own commentary to the publication. Briggs was an English mathematician, who visited Napier in 1615 and 1616, and later developed a common logarithm system.

Robert also collected many of his father's mathematical notes and papers, which were later published under the title *De Arte Logistica* by his descendant, Mark Napier, in 1839.

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4   John Napier: quoted from 'John Napier' - Lynne Gladstone-Millar
5   Robert Napier: quoted from 'John Napier' - Lynne Gladstone-Millar

Johannes Kepler

ASTRONOMY

It is believed that Johannes Kepler first read *Mirifici Logarithmorum Canonis Descriptio* in 1617, who had recently moved to Prague as a result of his appointment as Imperial Mathematician. He inherited the task of completing the *Rudolphine Tables*, which was an early astronomical log of the position of the stars and planets. This task relied heavily upon identifying an effective, reliable method of executing long calculations and, using logarithms, Kepler completed the *Rudolphine Tables* in 1627. Kepler later published his own logarithmic theories and tables in 1624, titled *Chilias Logarithmorum.*

SLIDE RULE

Around the same time as Kepler was working on his planetary tables, *logarithms* were being used as a means to devise primitive forms of what is described as a *Slide Rule* today. In 1620, Edmund Gunter applied John Napier's *logarithms* to a two foot rule, which was developed further by William Oughtred who introduced the concept of logarithmic scales which could slide independently. The *Slide Rule* continued to be developed and variations were used throughout the twentieth century. The slide rule was used extensively by organisations such as *NASA*, whose engineers used the device to make calculations as a means to build rockets and plan the mission which landed *Apollo 11* on the moon.

CALCULATING MACHINES

Rabdologiae inspired others in the field of science and mathematics to design their own calculating devices based on Napier's ingenious *Bones*, *Promptuary* and *Local Arithmetic* inventions. Wilhelm Schickhard, a German professor of Hebrew and astronomy, successfully invented his *Calculating Clock* device in 1623, which utilised a system of calculating cylinders based on Napier's Bones. The device added and subtracted six-digit numbers and a bell was attached to indicate an overflow of capacity. Shickhard's original model was destroyed as a result of a workshop fire but his designs were found during the nineteenth century.

EDINBURGH NAPIER UNIVERSITY MERCHISTON CAMPUS

Merchiston Campus

Merchiston Tower was saved from demolition in 1958, restored and integrated as part of a campus for a new college named after John Napier. In 1964, Napier Technical College opened its doors to 800 students which offered courses including coppering, cabinet making, boat building, chemistry and engineering. Today, Edinburgh Napier University is home to over 19,500 students from over 140 countries and Merchiston Campus is the base for the school of Arts and Creative Industries, Computing and Engineering. Facilities include 500 PC Computing Centre, state-of-the-art music studios as well as industry standard tv, radio and newsroom studios. Merchiston Tower houses a bust of John Napier and a replica set of *Napier's Bones* and *Promptuary.*

Conclusion

Ingenuity, vision and wisdom, light years ahead within the cosmos of numbers, symbols and sequence.

John Napier's ingenious invention of logarithms decoded previously unexplored complexities within mathematics and inspired contemporaries, as well as future generations, to pursue and realise their own academic achievements in many fields of scientific inquiry. His later introduction of a series of calculating devices ensured mathematics was applied to common use and enabled the development of entrepreneurialism.

Napier's dedication to the protestant faith is well-documented and it is suggested by some historians that he considered *Plaine Discovery of the Whole Revelation of St John* as his finest work. He remained dedicated to his parish of St Cuthbert's, where he served for many years as a Church Elder, which is believed to be his final resting place. Furthermore, his passion for theology may provide an important clue as to where he visited in Europe during his formative years.

The times in which John Napier lived were tumultuous, dark as well as sinister and many of his lesser-known inventions, including his machines of war and *Archimedes Screw* and *Common Salts*, were borne out as a direct response to impending invasion from the Catholic Spain as well as infertile lands as a result of years of civil war and English conquest. Myth, mystery and intrigue are commonly associated with the man behind logarithms, whose eccentric behaviour led many within sixteenth century Scottish society suspecting him of being involved in the occult, witchcraft and necromancy. There is no evidence to support this theory and John Napier was never brought to trial under the charge of witchcraft.

Today, logarithms are an integral part of science, engineering and computing, thanks to the vision of John Napier and his legacy. *Logarithms* and calculating devices are embedded within the maelstrom of accelerated culture and, like the oxygen we breathe, a thorough understanding of the scientific composition is unnecessary in order to benefit from its application. The life of John Napier was extraordinary, it was a life beyond logarithms and bones.

Appendix 1: 'A Cosmos of Numbers'

Alexander McCall Smith has written a specially commissioned poem for Edinburgh Napier University's John Napier 400 Commemorative Programme, titled 'A Cosmos of Numbers'.

He would not have imagined
That we, his successors in the city,
Would be here at all –
He thought the world
And all it contained, known and unknown,
Would end long before this –
He calculated the date, the very year,
Seventeen hundred, or thereabouts,
When prophecy would come to pass;
In that calculation, fortunately,
He was wrong; we are here
And his house still stands,
Surrounded by a different
Sort of energy: young people
Beginning something important –
Their future, under his eye.
What he did was extraordinary:
A man who worked by himself
A stranger in a cosmos of numbers,
But guided by the desire
To understand, to make sense
Of the complex mathematics
That lies beneath everything –
Our firmament, our sky,
The particles that make
Our interior selves; all
Depend on numbers
To stay together, to move
In their proper orbit;
This man, this mapper of shape,
Looks down at us from
Monument and portrait,
Understands and appreciates
The university that proclaims his spirit,
That adds up and multiplies
That human curiosity at the heart,
At the numbered centre of our world.

Appendix 2: Napery Theory

Clan Napier is one of the smallest clans in Scotland, with no known septs or dependent names. The Napier name has been recorded in documents in Scotland as early as the 12th century and the common spelling of Napier has been used since the late 17th century. Several alternative spellings were used prior to that point, including Naeper, Naiper and Napeir. Where the Napier name derives from remains a mystery and many theories have been presented.

The Napery Theory believes that the Napier name may derive from a time when surnames were first used around the beginning of the 12th century, which were attributed to an individual based on territory, occupations and patronymics as well as nicknames, personal traits and religious festivals. In the English Dictionary 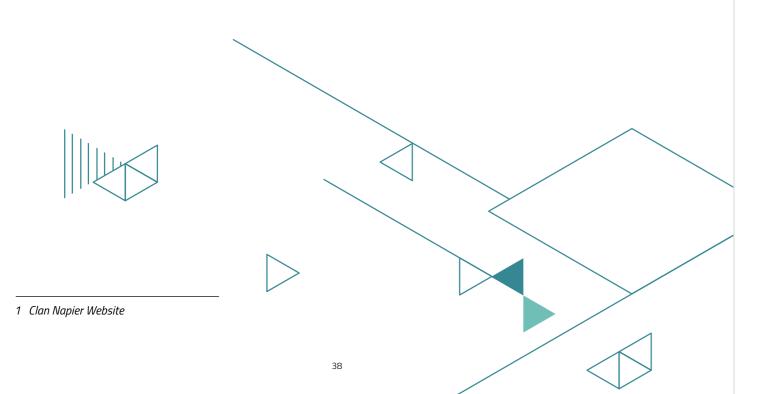Napery has two definitions, one of which states 'The charge or custody of the royal linen; the position of office of Naperer'. Therefore, it is proposed that the name Napier derives from a time a descendant held a position within a Royal Household as the Keeper of the Royal Linen.

"Suppose a son of one of the Earls of Lennox in the 12th century, was given the position of "Napper" (napkin bearer) or "Keeper of the Linen" in the royal household, it is quite possible that he might call himself "Lennox le Napper", or something similar, which in time could have become just Lennox Naper and eventually just Naper. It is reported that early Napiers did call themselves Lennox alias Napier. It is as good a theory as any other one." [1]
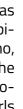

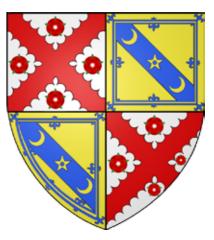1   *Clan Napier Website*

Appendix 3: Napier Coats of Arms

This coat of arms would have been used by John Napier and his descendants up until 1701. The basic arms of a red saltire and four roses, with straight edges, are those of the Celtic Earls of Lennox. Note that this particular coat of arms has engrailed, jagged edges on the saltire which represents the arms of a second son.

In 1701, the Napier of Merchiston coat of arms was amended to recognise the fact that the 6th Lord Napier was actually the son of Scott of Thirlestane who, therefore, changed his name to Napier. To signify the change the arms of Scott of Thirlestane were incorporated to the engrailed, red saltire and rose of the Earls of Lennox.

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