

Historic Irish Links to France, Germany and the wider World

Introduction. Over its history, Ireland has been active both on the European stage and further afield. The Living Communities, in this work, reviews certain important involvements.

I The Island of Saints and Scholars

Ireland had little contact with the Roman Empire. Gaelic democracy and civilization developed, giving peace and prosperity for over a thousand years. Learning, commerce, agriculture, metal-work and shipbuilding thrived. Disputes were settled in duly constituted courts of law. Epic tales underscored our identity and set out the values of a just society. Music and sport were important in daily life.



Dun Conor, Inishmaan, Aran Islands. 1986 © With the kind permission of [Jim Fitzpatrick](#)

The Roman Empire gradually declined, with growing hostilities around its borders. Germanic tribes, including Vandals, Franks, Goths (an ancient East-Germanic tribe) and Saxons overcame the Empire. The Huns, another assailant, were skilful horsemen from north-central Asia. The city of Rome was besieged by Visigoths in 410 and was sacked when slaves opened the Salarian Gate. Vandals sacked Rome in 455 and Ostrogoths sacked and depopulated it in 546.

Authors often refer to ‘barbarian invaders’ during the Dark Ages, lasting from c550-1300 AD, after the fall of Rome. The invaders were not barbarian. To survive, in those days, people needed a robust culture with a legal system and social structures. There were, however, ‘Dark Ages’ - because the Roman civilisation, and all that went with it, was being replaced by superior force.

Ireland had been attacked neither by Rome nor the Vandals. Our monasteries were centres for both general and theological education. Clonard, established in 520, attracted thousands of students. Some came from as far away as the Orient. During the ‘Dark Ages’, Irish monks went out across Europe, to reintroduce Latin-based

civilisation. They are referred to as ‘Saints and Scholars’, by popular acclaim, and with good reason.

In 563 **St. Columcille**, a man of aristocratic blood, sailed in a leather-covered boat, called a ‘currach’, to the Gaelic Isle of Iona (off Scotland), with twelve companions. He began a movement - ‘**Peregrinatores pro Christo**’ - or ‘Exiles for Christ’. Eventually it stretched from Iceland and the Faroes in the West and to the European mainland in the East. In addition to evangelisation, in the time of Charlemagne, Irish monks became court scholars. Indeed, no court in Europe was complete without its Irish scholar.

St. Brendan the Mariner was said twice to have crossed Atlantic. Latin Monastic records of an epic voyage, c565-572, say that he had reached ‘a new land, far to the west’ – thought to be North America. Etchings found in Clay County, Kentucky, support this. Tim Severin, in his 1978 book ‘The Brendan Voyage’, describes sailing 4,500 miles in a sixth-century currach, to show that the journey was possible and that the records are credible.

St. Columban went by currach to Brittany, France, in c585. He established the monasteries of Annegray, Luxeuil and Fontaine, in the kingdom of Burgundy, now part of France. Burgundian nobles endowed the abbey there and many became monks. He preached for full moral reform. More Irish monks joined him. So numerous were the monks at Luxeuil that separate choirs were formed to keep up perpetual praise, the **Laus perennis**.

Luxeuil, originally a Celtic settlement, became the most celebrated school in Christendom. Both monks and the sons of nobility all received education there. Curricula contained the classics, the arts, law, history, and physics. Methods of husbandry and gardening were improved and the use of the forge taught. Despite the freedoms allowed under the **Council of Constantinople of 381**, French bishops disagreed with Columban for keeping his monasteries independent of bishops, in the Gaelic style.

Not far from Luxeuil was the Abbey of Lure, another great Irish foundation, built for the aging **St. Deicolus** by Berthelde, widow of the Lord of Lure. The Saint was known for his irrepressible good humour. In later times, the Abbot here was numbered amongst the **Princes of the Holy Roman Empire**.

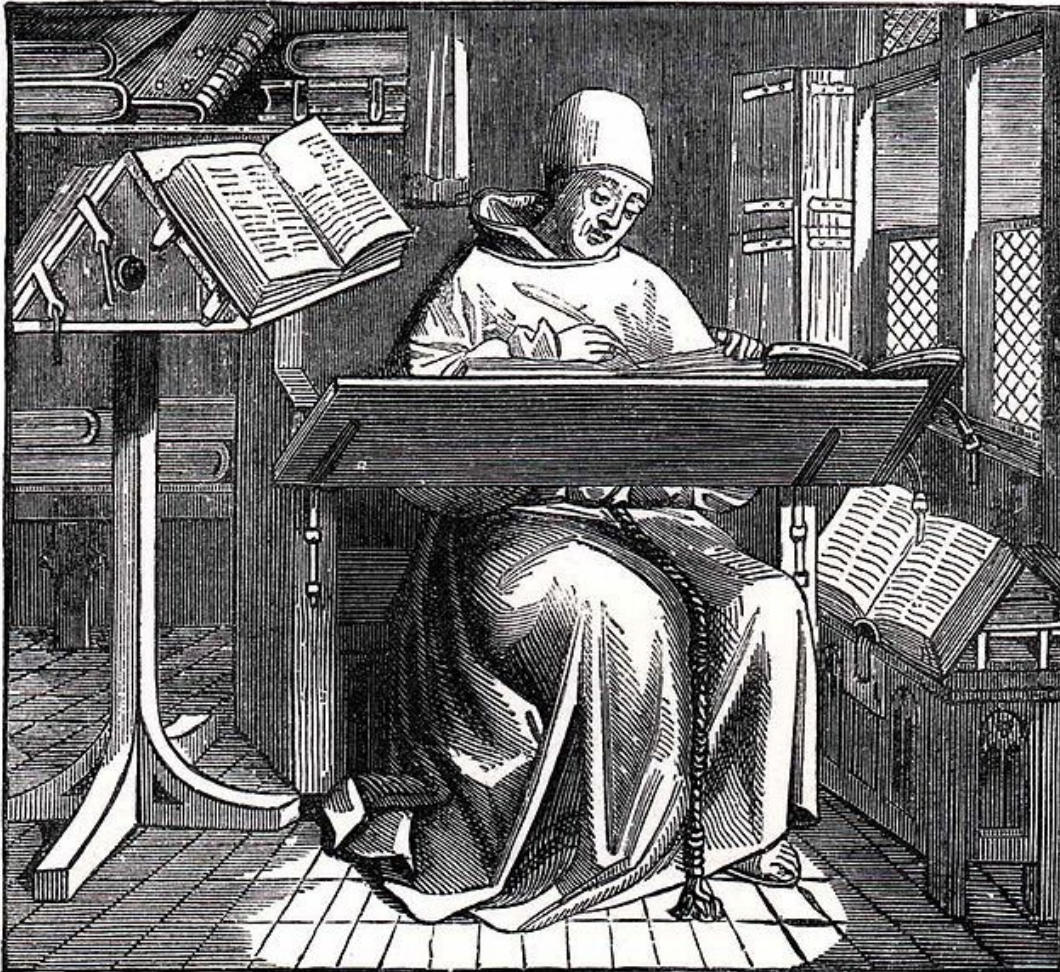
In bringing the Faith to the Rhine basin, Columban’s monks rowed their boats, singing his Latin ‘**boat song**’. He set up a community at Bregenz, today in the westernmost part of Austria. He engaged with the Alemanni in Switzerland. He founded a monastery at Bobbio in Italy. **Sigisbert**, another follower of St Columban, laboured in eastern Helvetia: he founded the monastery of Dissentis in Rhaetia, an area today divided between Switzerland, France, Germany and Italy.

Desire for a solitary life drew **St. Fiacre** to a hermitage near Meaux, France, in 628. Here he transformed wooded glades into gardens, to provide vegetables for poor people. This charity has earned for him the title of patron saint of gardeners. **St. Foillan** and **St. Ultan**, brothers of **St. Fursey**, became apostles in the south of the Duchy of Brabant, today part of Belgium. **St. Ouen** brought the influence of Irish monks to Rouen, a city in Normandy. Monasteries at Jouarre, Rebais, Jumièges, Leuconaus and Fontanelle may be attributed to Columban or his disciples.

St. Gall spent thirty years of his life in Helvetia, occupying himself in teaching, preaching, and prayer. He learned the Alemannian tongue and is entitled the Apostle of Alemannia, a territory most of which later became Swabia, in Germany. Many of his monks excelled as musicians and poets, while others were noted for their skill in the fine arts and calligraphy. Gall gave his name to a town and a canton in Switzerland.

St. Fridolin founded a monastery on the island of Säckingen, near Basle. It was developed by nuns. In 1307, during the period of the Holy Roman Empire, the Abbess was elevated to the rank of **Prince of the Holy Roman Empire**. The monastery of Honau, on an island near Strasburg, and that of Altomünster in Bavaria, owe their foundation to the Irish monks **Tuban** and **Alto**. In 648, St. Fursey set up a monastery near Chelles and the Marne River in France. **St Cathaldus** was Bishop of Tarentum in the south of Italy. He is still venerated as the patron of that Italian See.

In 643, **St. Kilian**, with his companions, **Totnan** and **Colman**, arrived in Franconia, Germany. They preached at Würzburg and other places in Thuringia. Killian was martyred in Würzburg, where he is honoured as patron and apostle.



SCRIPTORIUM MONK AT WORK. (From *Lacroix*.)

credit: cerebralboinkfest.blogspot.com

Firghil was appointed abbot and bishop of a monastery in Salzburg, in 745. From here, he evangelized Moravia, now in the easternmost part of the Czech Republic. He was versed in mathematics, geography, and astronomy. He was the first to teach the Sphericity of the Earth and, in consequence, the existence of the Antipodes. It was this same teaching upon which **Copernicus** and later astronomers built.

Siadhal was a philologist at Liège, about 845. He wrote an introduction to the logic of Aristotle and other works.

In 870 **Heiric of Auxerre**, the French Benedictine theologian, wrote: “Almost all of Ireland, disregarding the sea, is migrating to our shores with a flock of philosophers.”

In the 9th century, the astronomer **Dungal** founded the University of Pavia with branches in other Italian cities. **Dicuil** was a monk and geographer in the Frankish Kingdom, c820. He wrote an astronomical and later a geographical work. **John of Ireland** was a missionary bishop to the **Wends in Mecklenburg**, who were descendents of the Vandals. He was martyred in 1066, as recorded by Adalbet of Bremen, Metropolitan of Scandanavia.

Irish monasteries known as the **Schottenklöster** spread from Ratisbon, nowadays called Regensburg, to all over Germany and to Austria, Bohemia, Poland and Russia. The monks had even reached **Kiev**, then a Viking settlement, by 1089. Apart from their work of preaching the Gospel, monks imparted their knowledge of agriculture, built asylums, hospitals and refuges and introduced the arts and sciences.

So numerous were Irish monks in France and Belgium, that **Hospitalia Scottorum**, Hospices for the Irish, had been set up and were referred to at the Council of Meaux, in 845.

In Ratisbon, special monasteries were erected for Irish monks. The most renowned of these dates from 1067, when **Marianus the Irishman**, with his companions, **John** and **Candidus**, arrived in Bavaria and were welcomed by **Bishop Otto**. Many joined them from Ireland. Eventually, to house the growing community, the Abbey of St. James's of the Scots was built - along with several others during the twelfth and thirteenth centuries - including St. James's at Erfurt and St. Peter's at Ratisbon, St. James's at Würzburg, St. Giles's at Nuremberg, St. Mary's at Vienna, St. James's at Constance, St. Nicholas's at Memmingen, Holy Cross at Eichstatt, a Priory at Kelheim and another at Öls in Silesia, which today belongs to Poland.

Ratisbon and its dependent abbeys, as is set forth in the Papal letters of 1218, possessed priories in Ireland, and from these novices were usually obtained. The subjugation of Ireland by England, says **Wattenbach**, impacted upon the Irish monasteries and their rôle in Germany came to an end.

Perspective threatens Truth: Some authors, writing in English, have said that ‘Ireland’s Christian Golden Age’ has been exaggerated in fantastic tales. These authors assume for themselves an unassailable authority. However, it is in error for them to belittle how the ancients described the world. A certain scholarship is required to unravel their lore. Stories may have been told with dark humour or with oblique references, for example, which people at the time appreciated. Over centuries, layers of such allusions can build up. In his documentary shown on the BBC, Michael Wood uncovers the hard truths behind one of the oldest of all Greek myths: ‘Jason and the Golden Fleece’. (http://watchdocumentary.com/watch/in-search-of-myths-and-heroes-jason-and-the-golden-fleece-video_8292787b8.html)

Gaelic Ireland produced men of iron will who went forth, travelling on foot as did their Master, and in great numbers, throughout the Continent of Europe. They built monasteries, tilled the land and taught the message of Christianity, as well as Mathematics, Latin, Greek, Hebrew, rhetoric, poetry, natural science and history – to both the highest and the lowest. Without their legacy, Christianity would most likely not have been there to divide, in later centuries.

The Venerable Bede, the Northumbrian monk and author, wrote in c.731 A.D.: "It was now that many noble English and others of inferior rank, leaving their native country, withdrew to Ireland to cultivate letters or lead a life of greater purity. Some became monks, others attended the lectures of celebrated teachers; these the Irish

most cheerfully received and supplied, without any recompense, with food, books, and instruction."

Johann Lorenz von Mosheim wrote, in c.1750 A.D.: "That the Hibernians were lovers of learning and distinguished themselves in those times of ignorance, by the culture of the sciences beyond all other European nations, travelling the most distant lands, with a view to improve and communicate their knowledge, is a fact with which I have long been acquainted, as we see them in the most authentic records of antiquity discharging, with the highest reputation and applause, the functions of doctors in France, Germany, and Italy..."

II Na Géanna Fiáine (The Wild Geese)

The English introduced the '**Penal Laws**', in 1559, to "stifle 'Popery' and native Irish society". The remaining Catholic nobility were to be dispossessed. Catholics were denied education, property, livestock and weapons. The people were heavily to be fined for not attending Protestant religious services. With a 'Mass Rock' used as an altar, in remote locations, the people still secretly attended Mass. The penalty for doing this was death. Inducements to or persecution of ordinary people, to change their religion and loyalties have never worked in this country, in keeping with our sense of identity.

Munster (in the South) was driven into hopeless rebellion. **Lord Grey** ordered his army to kill the tenants and livestock of Gaelic Lords and to burn their crops. There was slaughter and starvation. Famine and plague lasted long after hostilities. By 1589 one third of the population was dead. The manuscript, called the '**Annals of the Four Masters**', says: "the lowing of a cow or the whistle of a ploughboy could scarcely be heard from Dún Chaoin to Cashel" (i.e. in all the province).

An ill-judged Spanish intervention led to the defeat by the English of the last Gaelic armies, from Ulster (in the North), at Kinsale in 1600. The vanquished Chieftains and their retinues sailed from Donegal to the Spanish Netherlands in 1607. The people called this the '**Flight of the Earls**'. 'Earl' is an English title. The Earls sought Spanish help for a rebellion. King [Philip III](#) saw that they were with their families.

In 1610, the northern counties were given over to Protestant (English and Lowland Scots) settlers. Every year on the **12th of July**, they still hold marches, which mark local extinctions of Catholic life.

In 1688, Prince William of Orange, a Dutch prince related by marriage to England's King James II, was declared ruler of England. The new Protestant ascendancy in England feared that James, a Catholic convert, would reclaim their properties. James had garnered support in Ireland, amongst the old Norman nobles. They had not seen fit to change their Catholic religion because of the Treaty of Augsburg (1555) or because Henry VIII had had marital issues. King Louis XIV, in return for 5,000 Irish troops, agreed to finance James' attempts to regain his throne from Ireland. However, James ran away from Ireland to France.

In 1641, the new Lord Lieutenant, **Oliver Cromwell**, arrived with his Puritan army. He determined to eradicate not just Catholicism but the Irish problem. He returned to England in 1650, **leaving a quarter of our entire population dead.**

For all this, in 1691, William was forced by the Irish commander, **Patrick Sarsfield**, to sign the Treaty of Limerick. It granted religious freedom and restored civil rights to Catholics. It allowed 14,000 Irish soldiers to go to the Continent, where Irish soldiery already had a name. In the following hundred years, some 500,000 fighting men – known as **the Wild Geese** - entered the battlefields of Europe.



The Battle of Moira, 1980 © With the kind permission of Jim Fitzpatrick

In 1609, the Swedish Army of **King Gustav Adolphus** had recruited Irish soldiers. In August 1631, they were sketched at Stettin by the Nuremberg printer **Georg Koler**. The Swedes distrusted the Irish, as they were Catholics. These then joined Polish and German armies, in large numbers. The Spanish raised Irish Regiments in 1633 (O'Neill), 1637 (O'Donnell) and 1640 (Fitzgerald). They raised other Irish Regiments between 1646 and 1669.

By now the French too had learned the value of the Irish Soldier. In 1632, King Louis XIII hired 3,000 Irishmen to form the Walls Regiment. Other Irish Regiments were formed in the French service: Rodrigh (1615-1650), Coosle (1635-50), O'Reilly (1639-40) and Castelnau (1650-1664). **The number of Irish soldiers in France swelled substantially after Treaty of Limerick.**

In France in 1692, there were two Irish forces: the Irish Brigade of the French Army under Justin MacCarthy, Viscount Mountcashel, and the Jacobite Army of James II under Patrick Sarsfield, Lord Lucan. Plans for another invasion of Ireland were dashed by the French naval defeat at **La Hogue** in 1692: James was forced to release his Irish Army for service with the French. Now a Marshall of France, Sarsfield died of wounds received at the battle of Neerwinden, in 1693. His last words were: "**would that it were for Ireland**".

The use of firearms was considered ignoble in Europe for a long time. The Irish usually engaged the enemy at close quarters. Le Maréchal Maurice de Saxe, noted that his French troops, though gallant in a charge, lacked the discipline to hold a line under attack. Irish regiments served France in its major battles at Steenkirk (1692), Neerwinden (1693), Marsaglia (1693), Barcelona (1697), Blenheim (1704), Malplaquet (1709), Fontenoy (1745), Lauffeld (1747) and Rossbach (1757).

The 18th century started with the death of King Charles II of Spain. Austria, England, Prussia, Portugal and Holland opposed his nominated successor, Prince Philip of Anjou, grandson of the King of France. The French had Spain, Bavaria, Mantua (Lombardy), Savoy and Cologne as allies. France immediately approached James III to

reorganise a Jacobite Army, recruited from amongst the Irish. The Irish Brigade regiments included Galmoy, Bourke, Berwick, Dorrington, Albermarle and Sheldon.

In 1702, the Austrian allies attacked the French Garrison at **Cremona** (Italy). The Austrian side also boasted of Irish officers, including a McDonnell {of ancient Mayo Galloglas (Scots mercenary) stock} and a Taffe. The defence of Cremona against tremendous odds, on the 31st Jan 1702, is legend. The Irish inflicted heavy casualties on the Austrians, whose German allies lost over half their number. It might be noted (in today's context of economic disarray) that **Prince Eugene of Austria** tried unsuccessfully to bribe the Irish to change sides.

In 1704, at Blenheim, three Irish Regiments held the town of **Oberglau** and covered the retreat of the French and Bavarian forces. At Ramilles, in 1706, the Irish captured the flags of Churchill's Regiment and of a Scottish Regiment in the Dutch Army. The war of succession ended in that year with a French victory. **35,000 Irish lives were lost.**

The Venetian Republic, threatened by Turkey, recruited an Irish unit in 1702, under Francis Terry. He later became a Brigadier General. The unit saw service in Croatia and Bohemia. In 1717, the Regiment became the Regiment of Terry and served Venice until the fall of the Republic, in 1797.

Irish soldiers were highly prized in the 18th century. **Frederick the Great** had one Regiment entirely of Irishmen - kidnapped from other armies. Chroniclers have noted it was perhaps his most effective unit. With the disbandment of Irish units in Spanish and French service, Irishmen drifted into other Armies. The Austrian and Russian Imperial forces became home to many of **the Wild Geese**. By the mid-18th century there was a thriving military community in Austria. Peter the Great of Russia hired 30 Irish and Scottish Officers, to modernise his Army. Many of these played crucial roles in the expansion of the Russian Empire, the conquest of Finland, the Baltics and the Crimea. The most famous was Marshall Peter de Lacy. His and other Irish portraits are to be found in the Hermitage Museum in St. Petersburg.

Austria's Marshals numbered amongst them **Maximilian von Browne** (1705-1757), his son Count Ulysses von Browne (died 1731), Franz de Lacy (1725-1801) and Carl O'Donnell, Count of Tyrconnel (1769-1824) - a relative of the Spanish **Field Marshall Henry O'Donnell** (1769-1834). Nine Irishmen gave their names as Colonels of Austrian Regiments.

The French and Spanish continued to use Irish Units. The French kept the Irish out of the Scottish Rising of 1715. In that year, the Irish Brigade of France stood only 3,300 strong. It was re-organised into 5 infantry regiments, each of one battalion: Dillon, Berwick, O'Brien, Lee and Dorrington and one cavalry regiment - Nugent. The war between France and Spain had the Irish of both armies fighting each other, until 1720. Such is a soldier's lot.

In 1740, the War of the Austrian succession started. In 1744, Lally reformed the Irish Brigade, to include the Regiments of Lally, Dillon, Clare, Berwick, Roth, Bulkeley and Fitzjames' horse. The Irish Brigade won its greatest victory **at Fontenoy** on 11th May, 1745, when they swept the Saxon from the field, again at bayonet point, with the Gaelic battle cry "**Cuimhnigí ar Luimneach agus ar Fheall na Sacsanach!**" – "Remember Limerick and Saxon Treachery". King William of Orange had concluded the Treaty of Limerick in 1691, with the Irish commander, Patrick Sarsfield. The English Parliament (not the Crown) subsequently broke the Treaty. By this time, many Irish nobles had left their sorely reduced country and gone to Europe either to continue the fight against England or to seek their fortune. The then leaderless people back home faced into unspeakable colonial repression, from which there was no escape.

Louis XV, for his part, rode to the Irish Bivouac at Fontenoy and thanked the officers. He acknowledged that the Penal Laws had so savagely reduced their country that it could no longer provide fighting men. He said: “Cursed be the laws which deprive me of such subjects”.

In August of 1798 a French fleet, under **le Général Humbert**, came to Ireland, to support insurrection against the English. He, **a gallant soldier of fortune**, landed in County Mayo with 1,100 men and took Killala. 5,000 local volunteers joined him, including men from Ceathrú Thaidhg in Mayo. The English **General Lake** believed in the heavy use of force. He was instrumental in a further reign of unparalleled terror, conducted throughout the land.

Humbert achieved spectacular victories, for a time, and even proclaimed the **Provisional Republic of Connaught** (the western province).

III Irish Scientists

All through Gaelic history, the character of the people was marked by generosity and by adventure, Celtic traits which required both an ultimate discipline and some disregard for self. After the demise of the Gaelic Order (or Civilisation), the spirit of the people and their innate love of learning lived on. Connections with France and Germany, in history and folklore, became an almost forgotten memory. Gaelic Ireland survived only in remote, areas. An emerging body of Irish scientists spoke to their own community, across all nations.

This new scholarly class came from Anglo-Irish (English settler) and Anglicised Irish backgrounds. As time went on, the two traditions increasingly accommodated one another. A list of some scientists from the 17th to the 20th century, who achieved lasting fame, now follows. Those Irish scientists who labour in the modern day will, by all accounts, do us no less proud.

As to what it is to be Irish, a lead comes from the great lexicographer, **the Rev. Patrick S. Dineen, S.J.** He explained the word ‘Gall’ (‘foreigner’) in 1927 as a term ‘applied in succession to Gauls, Franks, Danes, Normans and English’. His own commitment to our Gaelic heritage would be another factor to take into account. To be Irish, therefore, may be taken to mean any person who makes their home in Ireland and acquires an affiliation with our ancient culture.

Scholars on this island have, through the centuries, sought to answer the great questions of the day. The following narrative describes the quest by scientists to describe worlds both tangible and intangible. It begins off when two other worlds – the native Gaelic and the Anglo-Saxon worlds - lived together as strangers on the Emerald Isle.

The 1600s

Robert Boyle, born in Lismore Castle, Co. Waterford (1627-1691), formulated in 1662 what is now called **Boyle’s Law**. It describes the relationship between gases and atmospheric pressure, contributing to the later development of engines. Boyle questioned **Alchemy**, the pseudo-scientific predecessor of chemistry. He taught that chemistry was for finding out of what substances were made. He introduced the term ‘**analysis**’ and has been called ‘**The Father of Chemistry**’.



Robert Boyle – credit: The Granger Collection, New York

The 1700s

Dr. William James MacNeven, from Co. Galway (1763-1841), took part in the 1798 rebellion. The English banished him from Ireland for life. He went to the U.S. in 1805. He earned the title '**The Father of Modern Chemistry**'. There is a monument in St. Paul's Chapel, New York (www.museumplnat.com), in his honour. The inscription reads: "in the cause of his native land sacrificed the bright prospects of his youth and passed years in poverty and exile..".

Aeneas Coffey, from Calais and Dublin (1780–1852), was educated in Trinity College. He invented the world's first **heat-exchange device** in 1830. It led to the production by distillation of spirits with a high alcohol content.

Robert Emmet, a Dubliner (1778-1803), came from a Protestant family (i.e. Anglo-Irish stock) who disagreed with the exclusion of Catholics from the English Parliament. His family also supported the American Revolution. Emmet excelled at chemistry and mathematics in Trinity College.

A **great folk hero**, he became the leader of an uprising, against the English, in 1803. In that year, in the Dublin mountains above Rathfarnham, he successfully tested **rocket-propelled missiles**. These are still remembered locally. The famous U.S. engineer, Robert Fulton, met Emmet in Paris and assured him of the value of rocketry.

The uprising failed before it began, when explosives accidentally detonated. Emmet was arrested. His **speech from the dock** is legendary, in his unwavering belief in 'the Throne of Heaven' (i.e. Almighty God) and his repudiation of a predetermined sentence. His defense lawyer had been bought by the Crown. Emmet notes, through the Judge's harangues, departures from legal procedure. He was hanged in public, in a cruel manner, at the young age of 25. He was then beheaded. His head was displayed on a spike, to frighten the people.

The 1800s

William Rowan Hamilton, from Dublin (1805-1864), became Professor of Astronomy at Trinity College and Royal Astronomer of Ireland. At the age of 9 he could speak 13 languages. Hamilton introduced the terms **scalar and vector** into mathematics. He developed the **Theory of Quaternions**, which has important applications in higher mathematics.

Hamilton was inimical to liberal Protestant opinion, which favoured independence of the Irish colony from England. He wrote to his friend, the poet **William Wordsworth**: “I do not look with pleasure on the prospect, now too visible, of a gradual or sudden progress to a Republic...”.

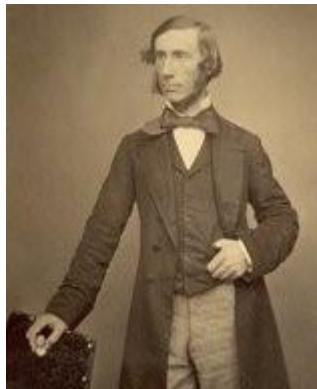
Robert Mallet, from Dublin (1810-1881), studied in Trinity College. He used dynamite explosions to measure the speed of shock waves through the ground. For his work on earthquakes, he has been called ‘**The Father of Seismology**’. He introduced this last word, as well as the word ‘**epicentre**’.

Francis Rynd, a doctor from Dublin (1811-1861), invented a **drip-needle** for introducing drugs into the vein. The successful use of a hypodermic syringe for fluid injection was reported in 1845, for the relief of neuralgia.

George Boole, from Lincoln, England (1815-1864), was the first Professor of Mathematics at Queen’s College, Cork (University College Cork today). Boole, called ‘**The Father of Computer Science**’, developed a branch of mathematics, called Boolean Algebra. This is used today in designing electronic computers and goods.

Sir George Gabriel Stokes, from Skreen Co. Sligo (1819-1903), was tutored in Mathematics by Francis Newman, brother of **John Henry Newman**, who was beatified on 19 September 2010. (Beatification is the penultimate step in the Roman Catholic Church's process of declaring someone a Saint.) In 1852, George Stokes won the Rumford Medal for his paper on **how light bends** in passing from one medium to another.

John Tyndall, from Leighlin Bridge, Carlow (1820–1893), pioneered work on radiant heat, the germ theory of disease, glacier motion, sound and the diffusion of light in the atmosphere. He was the first to explain how the scattering of light in the atmosphere causes a **blue colour in the sky**. He also explained how the gases in the atmosphere trap heat and keep the earth warm (**the greenhouse gas effect**). He invented the light pipe which later led to development of fibre optics.



John Tyndall - credit: [Wikimedia Commons](#)

Arthur Leared, a Wexford doctor (1822-1879), invented the modern **binaural (double earpiece) stethoscope** in 1851. He also later discovered the importance of pancreatic juices in the digestion of fats.

William Thomson, from Belfast and better known as **Lord Kelvin** (1824-1907), was the Professor of Natural Philosophy (Physics), at Glasgow University. He was knighted for his work in laying of the Atlantic Telegraph Cable, from Newfoundland to Valentia, in Cork in 1865. His interest in the measurement of temperature led him to introduce a temperature scale used in scientific work - **the Kelvin Scale**: it begins at -273.15°C , a temperature called ‘**Absolute Zero**’ or 0°K .

George Johnstone Stoney, from Birr Co Offaly (1826-1911), worked in the field of conceptual physics: he is not widely known. During the Famine, his family lost their land, with the demise of their Catholic tenants. He became Professor of Natural Philosophy at Queen's College, Galway (NUI Galway today). He was the first to propose concept of 'an atom of electricity', which he later named **the 'electron'**

John Phillip Holland, from Liscannor, Co. Clare (1841-1914), built a submarine in the US. He had developed the design at school, in Ireland, encouraged by his Science teacher, a Christian Brother called Dominic Burke. His financial backing came from the Fenians, Irish revolutionaries, active after the devastation of the Famine.

By 1883, Holland had built the **Fenian Ram**. It carried a crew of three and could dive more than 45 feet below the surface. Disagreement over practicalities, however, led to the vessel being abandoned.



John Holland - credit: U.S. Naval Historical Center

A later, improved model, the Holland IV, carried a crew of 15, and had torpedo tube. Assistant Navy Secretary **Theodore Roosevelt** and other military officials procured the boat in 1900, the first US Navy commissioned submarine. Holland had to sell it for less than half the development costs.

Agnes Mary Clerke, from Skibbereen, Co. Cork (1842-1907), was a prolific astronomical writer. A crater on the moon was named after her in 1881 – **Clerke's Crater**, near the landing site of Apollo 12.

George Francis FitzGerald, from Dublin's Mount Street (1851-1901), was Professor of Natural and Experimental Philosophy at Trinity. He was the first to propose the theory for producing radio waves, under laboratory conditions. The German physicist, **Heinrich Herz**, confirmed the theory experimentally. His work on moving bodies laid the groundwork for **Einstein's Special Theory of Relativity**.

John Joly, a physicist from Hollywood, Co. Offaly (1857-1933), was educated in Trinity College. He invented the meldometer for measuring the melting points of minerals and the photometer for measuring light intensity. With **Sir Ernest Rutherford**, he studied the age of rocks using radioactive decay readings. He also co-pioneered the use of **radiation for cancer treatment**.

Lucien Bull, from Dublin and Paris (1876-1972), pioneered **high speed photography** with Étienne-Jules Marley, a French cinematographer. Bull devised a camera which could capture objects flying at high speed and also show continuous motion. He patented an improved version of the **electrocardiogram (ECG)** in 1908. He held a number of high positions, including Head of the French National Office of Research and Invention.

Tom Dillon, from Co. Sligo (1884-1971), taught science at the **Loreto Convent, Dalkey**. Later, he advised the I.R.A. on explosives. He escaped arrest during the Rising but was eventually imprisoned, in England, in 1918. On release, Dillon became Professor of Chemistry at University College, Galway. He had a distinguished career. **He was a fluent Irish-speaker.**

Sir James Martin, from Co. Down (1893-1981), invented the world's first **ejector seat**. His device was first tested with a crash dummy in 1945. The invention was adopted by the RAF as a safety device in warplanes.

Dr. James Drumm, also from the County Down (1896-1974), invented the nickel-zinc rechargeable battery in 1930. It was used in battery-powered railcars. He was man before his time, who pioneered **emission-free transport**.

The 1900s

William Robert Fitzgerald Collis, a doctor and writer from Dublin (1900-1975), pioneered the technique for feeding premature infants via a **nasal tube** as opposed to spoon feeding. He also invented a simple and affordable incubator for premature infants.

Kathleen Lonsdale, from Newbridge Co. Kildare (1903-1971), became Professor of Chemistry at University College, London. With **X-ray crystallography**, she demonstrated that the benzene ring is flat. She was the first woman elected to Fellowship of the Royal Society, in 1945. She was a dedicated pacifist and was **sent to jail** in 1943 for her convictions.

Edward J Conway, from Nenagh (1894-1965), was awarded a D.Sc. by the National University of Ireland in 1927 and was made Professor of Biochemistry and Pharmacology in University College Dublin, in 1932.

Conway established an internationally recognised research laboratory, which attracted support from the Rockefeller Foundation, the U.S. National Institutes of Health, the U.S. Air Force and the Medical Research Council of Ireland. He led the way internationally in research into kidney functions. He developed '**the Conway burette**' which has become standard equipment for microanalysis.

Ernest Walton, from Dungarvan Co. Waterford (1903-1995) and John Cockcroft, in Cambridge, were the **first to split the atom**, in 1931. They vindicated Einstein's equation, $E=MC^2$ and successfully converted matter into energy. In 1951 they were jointly awarded the **Nobel Prize for Physics**. Ernest Walton died at the age of 91, the last survivor of the golden age of atomic physics in the 1920s and '30s.

John Stewart Bell, from Belfast (1928-1990), studied at Queen's University, Belfast. He joined **CERN** (le Conseil Européen pour la Recherche Nucléaire - the European Nuclear Research Council) in Geneva, in 1960. It runs the nuclear particle accelerator. Here, he developed what is called Bell's Theorem, of significance in a branch of science called quantum physics. This underlies modern technologies such as mobile telephones.

**An Dr Liam SS Réamonn
September 2011**

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**Useful Reading
Part I**

- 1) Discovering the Mysteries of ancient America: Frank Joseph, Zecharia Sitchin, 2006
- 2) The Island of Saints and Scholars: Seán McMahon, 2001
- 3) The History of Canada Online (The Viking saga)
- 4) An Ecclesiastical History of Ireland. Rev. John Lanigan, Prof. of the University of Pavia, Vol. III, 1822 (Google Books)
- 5) The Abbey Library of St Gall. Johannes Duft (Stiftsbibliothekar in der Stiftsbibliothek St Gallen), 1999
- 6) St. Gallus, Bregentz. Anton Bereuter, Pfarrer (Missionsdirektor von St Gallus), 1993
- 7) The Project Gutenberg EBook - The Glories of Ireland: Edited by Joseph Dunn and P.J. Lennox:
 - The Island of Saints and Scholars. Canon D'Alton, M.R.I.A., LL.D.
 - Irish Monks in Europe. Rev. Columba Edmonds, O.S.B.
- 8) Dr. Wilhelm Wattenbach (Heidelberg, Berlin) - Die Kongregation der Schottenklöster in Deutschland – Zeitschrift für Christliche Archäologie und Kunst, Leipzig 1856
- 9) Saint Columban of Luxeuil. Les amis de St Colomban, 1948
- 10) Ar Lorg Naomh Columbáin. An tAthair Derry Healy, 2002
- 11) St Columban. Liam Griffiths SSC, 1981
- 12) An Outline History of the Catholic Church, Vol. 1. Rev. Reginald F. Walker, CSSp, MA, HDipEd, 1961

Part II

- 1) Patrick Sarsfield and the Williamite War. Piers Wauchope, 1992
- 2) Riches of Clare: Clare's Wild Geese. Clare Champion, 2003
- 3) The Lally Wild Geese. Seán Ryan, 2002
- 4) Des 'oies sauvages' au Tigre européen. Le Courier, 2009
- 5) Na Géanna fiáine (the Wild Geese). The honourable Society of the Irish Brigade, 2000
- 6) Irish Regiments in France Database (NUI, Maynooth) <http://www.irishineurope.com/about/research/irish-regiments-franceV>
- 7) Wherever Green is worn: the Story of the Irish Diaspora, Tim Pat Coogan, 2002
- 8) The Flight of the Earls. John McCavitt, 2005
- 9) Kildare County Council <http://kildare.ie/library/1798-rebellion/glossary.asp>
- 10) The story of the Irish race : a popular History of Ireland, Seumas MacManus
- 11) Familia 1998: Ulster Geneological Review: Number 14. Trevor Parkhill

Part III

- 1) Robert Boyle <http://www.ingeniousirelandonline.ie/ga/stories/st0004.xml>
- 2) Emmet's Military Technology, History Ireland, Issue 3, Autumn 2002, Vol. 11
- 3) Humanity Dick, the eccentric Member for Galway – the story of Richard Martin, Animal Rights Pioneer 1754-1834, Peter Phillips (Google Books)
- 3) The Irish Scientist, (William Rowan Hamilton) 2005 Yearbook www.irishscientist.ie
- 5) Cayley-Purser, Home of Science Information www.cayley-purser.ie/Four_Famous_Irish_Scientists
- 6) Irish Scientists and Inventors, Irish Patents Office www.patentsoffice.ie
 - Mary Mulvihill: *Ingenious Ireland*, TownHouse & CountryHouse Ltd. Dublin, 2002.
 - Charles Mollan, William Davis and Brendan Finucane: *Irish Innovators in Science and Technology*, Royal Irish Academy and Enterprise Ireland, 2002.
- 7) Ireland's Scientific Heritage, William Reville, University College, Cork. (The Irish Times, December 14, 2000.) <http://understandingscience.ucc.ie/pages/irishscientists.htm>
- 8) Chemistry in Action Issue 46, Hon. Editor Peter E. Childs,

<http://www.ul.ie/~childsp/CinA/Issue46/HomePage.html>

9) *ars technica* New experiments with quantum entanglement suggest that reality might be overrated, John Timmer <http://arstechnica.com/science/news/2007/04/new-experiments-with-quantum-entanglement-suggest-that-reality-might-be-overrated.ars>

10) Stanford Encyclopedia of Philosophy <http://plato.stanford.edu/entries/qt-epr/>