

**JAMES HUTTON'S EDINBURGH
THE HISTORICAL, SOCIAL AND POLITICAL BACKGROUND**

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Opening address at the 1997 Conference organised by The Royal Society of Edinburgh celebrating Hutton's work on the occasion of the 200th Anniversary of Hutton's Death.

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Hutton's Edinburgh: Preface

James Hutton was an accomplished field geologist. He systematically tested his conjectures, and those of others, by seeking new observations which were either consistent with those conjectures or provided reasons for rejecting them (McIntyre & McKirdy, 1997). Everyone interested in the history of science will agree with Playfair who, in his *Life of Dr Hutton*, wrote: "It would be desirable to trace the progress of an author's mind in the formation of a system where so many new and enlarged views of nature occur, and where so much originality is displayed" (Playfair, 1805, p.55). This was my subject in 1957 at Herbert Evans' History of Science Club in Berkeley (a modern incarnation of the Oyster Club), and also in toasting Hutton at the Banquet of the Geological Society of America in San Diego in March 1961 (McIntyre, 1963). Following Tomkeieff's example (1948), I tried to see Hutton in his historical context.

Herbert Butterfield's argued that historical understanding is achieved by "making the past our present and attempting to see life with the eyes of another century than our own" (*The Whig interpretation of History*, 1931/1951, p.16). Developing this thesis, Colin Russell declared that it is "perverse to imagine that the practitioners of science operate in a cultural vacuum. They, and we, are affected by the prevailing climate of opinion and this will have a profound effect on how science is perceived" (*Whigs and Professionals*, Nature, 1984, Vol.308, p.777). Nevertheless, Hutton is often presented as if he lived in isolation. It was therefore a pleasure to give the opening address at the Conference in Edinburgh marking the bicentennial of Hutton's death. I attempted to sketch *Hutton's Edinburgh* – the environment in which Hutton made his great contribution to our understanding of Earth's history.

"Scientists grope their way, seeking to divine where they are going from where they are coming; they reach into the future as well as the past". They think they see networks of concepts extending though time: these "are not whiggish sins but the essence of science in action" (Edward Harrison, *Whigs, prigs and historians of science*, Nature, 1987, Vol.329, p. 214). My text was longer than could be accommodated in the Proceedings of the 1997 Hutton Conference, and I am grateful to *Earth Sciences History* for agreeing to make it available.

Abstract

James Hutton (1726-1797) was born and bred in Edinburgh. Having decided to be a farmer, he went to Norfolk aged twenty-four to learn new methods of husbandry. From that base, he travelled widely and developed an interest in geology. In 1767 he left his Berwickshire farm and returned to Edinburgh, where he became a valued member of the remarkable group of men who founded the Royal Society of Edinburgh and made the city an unrivalled intellectual centre of the age.

Edinburgh was a capital without the distractions of king and parliament. When the Industrial Revolution began, many disciplines were already represented by men of world-renown who knew each other –

many, indeed, were related. There were still no boundaries between narrowly defined disciplines; there was shared interest in all knowledge.

Geological structure had constricted Edinburgh's growth, keeping the compact Old Town on its ancient defensive ridge. The North Bridge, completed soon after Hutton's return to Edinburgh, made possible the planned New Town, in dramatic architectural and intellectual contrast to the mediaeval city. The beauty and interest of Edinburgh's scenery is the result of an active geological past. Consequently, in a small and accessible space, rocks of different character are exposed in a natural geological laboratory.

James Hutton did not live in an ivory tower. War, rebellion, and revolution, both political and industrial, all had their influence. In a turbulent world, a decade of peace (1783-1793) was another factor making possible Hutton's great contribution to modern geology.

Acknowledgements

I am indebted to many more people than can be named here. First to my parents who ensured that, like them, I was born and raised in Edinburgh, and then to the four Edinburgh men who were my teachers; in particular to Dr A.M. Cockburn who, when I left for California in 1954 gave me Chambers' *Traditions of Edinburgh* inscribed "From one Edinburgh callant to another". To Arthur Holmes who talked to me about Hutton and introduced me to his friend Professor S.I. Tomkeieff. To the Edinburgh Geological Society, on whose Committee I served in 1947 when Tomkeieff gave a memorable address on *James Hutton and the Philosophy of Geology* marking the 150th anniversary of Hutton's death. To Pomona College for providing a great library and an environment conducive to intellectual inquiry. To Professors Learnihan, Kemble, Woods, and Poland of Pomona's history department, and to my friends Iain Gordon Brown, H. Stanton Hill, George H. Clark, Dan F. Merriam, K.E. Iverson, Sheila D. McIntyre, and my wife Ann, each of whom has given me encouragement and suggestions over several decades, and to Norman E. Butcher, Dennis R. Dean, and Richard Jemielita who have worked with me in recent years. In 1997 Professor Celal Sengor joined me in visits to localities associated with Hutton in Edinburgh and throughout Scotland; I found our discussions stimulating, useful, and enjoyable.

I am grateful to the John Simon Guggenheim Memorial Foundation for a Fellowship in 1969 to study the *Rise of Scottish Geology*, and to the Universities of St Andrews and Edinburgh for the privilege of honorary staff positions and the use of their libraries during my retirement. The Scottish Record Office, the National Library of Scotland, and the Edinburgh Public Library have made available their invaluable resources; Mr Thomas B. Smyth, Archivist of the Black Watch Museum in Perth, was also very helpful.

I thank Professor G.Y. Craig and the Royal Society of Edinburgh's Organising Committee for the invitation to give the opening address, on *Hutton's Edinburgh*, at the Conference commemorating the bicentennial of James Hutton's death. This historical essay is an expanded version of that address—is an anthology of the writings of many scholars, and I am alone responsible for the selection of the material and for remaining errors. Objectivity, like beauty, is perhaps in the eye of the beholder. Space does not permit me to do justice to all sides of each issue, but I have cited references to authors who have

different viewpoints. Readers might well begin by reading the final reference – Professor Youngson on bias in the writing of history.

I dedicate this essay to Sir John Clerk, Bart. of Penicuik and Lady Clerk, who continue so generously their family's long tradition of patronage, friendship, and support to all who take an interest in Scottish art, science, and history. I am grateful, once again, for permission to quote and refer to documents in the Clerk Muniments.

Hutton's Edinburgh: Introduction

This paper sketches the social, historical, and political background of James Hutton and the Edinburgh of his time.

At the suggestion of the Conference Organising Committee and Scottish Natural Heritage, a small book on *James Hutton: The Founder of Modern Geology* was published by The Stationery Office during the week of the Conference (McIntyre & McKirdy, 1997). Although addressed to a general readership, this book contains previously unpublished Huttonian material. It shows Hutton to have been a first-class, enthusiastic, and tireless field geologist. Dennis Dean's augmented edition of Hutton's own eminently readable account of geology in the field and in the study was also published during the Conference (Hutton, 1997). These resources being available, the Committee decided that the opening address should deal with Hutton's Edinburgh – the intellectual, social, and political environment that made Hutton's geology possible.

In his novel *Guy Mannering* (1815, Chap.39), Walter Scott describes how Counsellor Pleydell, an Edinburgh advocate, thrust letters of introduction into his visitor's hand: "Mannering was gratified with seeing that they were addressed to some of the first literary characters in Scotland. 'To David Hume, Esq.' 'To John Home, Esq.', 'To Dr Ferguson.', 'To Dr Black', 'To Lord Kaimes', 'To Mr. Hutton', 'To John Clerk, Esq., of Eldin', 'To Adam Smith, Esq.', 'To Dr. Robertson'. "Upon my word, my legal friend has a good selection of acquaintances – [A man] must rub up his faculties a little, and put his mind in order, before he enters this sort of society". The present paper is intended to serve as a letter of introduction to that very company. Ideally it should be illustrated by portraits; for, as Carlyle wrote: "Often I have found a Portrait superior in real instruction to half-a-dozen written *Biographies* – or rather, I have found that the Portrait was as a small lighted *candle* by which the *Biographies* could for the first time be *read*, and some human interpretation be made of them" (Thomas Carlyle, 1967, p.174). Robert Louis Stevenson, reviewing an Exhibition of *Some Portraits by Raeburn*, tells of a lady, returned to Edinburgh after an absence of nearly sixty years, who said "I could see none of my old friends until I went into the Raeburn Gallery and found them all there" (Stevenson, 1913, p.141-142). Portraits of many people mentioned in this paper are in the National Portrait Gallery of Scotland, the University of Edinburgh (Rice, 1957), and the Royal Society of Edinburgh. For portraits of John Clerk of Eldin see David Brooke, 1971, and McIntyre & McKirdy, 1997 (which also includes Raeburn's portrait of Hutton).

This is the story of interrelationships and connections between an extraordinary group of highly intelligent people set against a background – sometimes indeed it becomes the foreground – of national and international events of importance and interest. Hutton was one of the central figures. He was seventy years old when he died, but to understand his environment we must reach back, albeit briefly, to events 200 years before he was born, and allude to happenings almost two decades after his death.

On the first mention of a person, in most cases, I give dates of birth and death. By remembering Hutton's own dates, it is then easy to relate all other dates to events in Hutton's life. The essential Huttonian dates to keep in mind are: **1726** Hutton was born; **1750** he returned to Scotland from the Continent; **1767** he moved back to Edinburgh; **1785** his *Theory of the Earth* was presented to the Royal Society of Edinburgh and published in **1788**; **1795** Hutton's *Theory* was published in expanded form in two volumes; and **1797** Hutton died.

The subject is vast: the *dramatis personae* includes more than 150 remarkable characters; the range of talent is great, and the interconnections are astonishing. We have here pioneers not in geology only; we meet distinguished lawyers, statesmen, soldiers, sailors, historians, scientists, engineers, and literary men. Despite the constraints of time and space, it is hoped that the paper conveys something of the scope and character of the Edinburgh that Hutton knew (Chambers, 1949; Topham, 1777).

Consider **William Smellie** (1740-1795) a largely self-taught Edinburgh man with an enormous breadth of interest and accomplishment (Kerr, 1811). Although apprenticed to a printer at the age of twelve, five years later he won the Silver Medal of the Philosophical Society (parent of the Royal Society of Edinburgh) for the most accurate edition of a Latin classic. At the age of twenty he helped to found the Newtonian Club for self improvement. In 1777 he founded the Crochallan Club, one of the most popular of Edinburgh's convivial clubs (Rogers, 1884; Chambers, 1949; McElroy, 1969). Smellie was printer for both **David Hume** (1711-1776) and **Robert Burns** (1759-1796). He played an important part in producing the first edition of the Encyclopaedia Britannica (1771), to which he contributed major scientific articles. He became a member of the Philosophical Society (Emerson, 1981), and was a founding member of the Royal Society of Edinburgh. Smellie was an accomplished botanist and antiquary, and a versatile linguist – teaching himself Hebrew in order to print a Hebrew dictionary (Kerr, 1996).

Henry Home, **Lord Kames** (1696-1782) was a lawyer, judge, writer, and influential critic (Ross, 1972); a friend of **Benjamin Franklin** (1706-1790) and **David Hume**, and sponsor of **Adam Smith** (1723-1790). Yet, though Smellie was 44 years his junior, Kames adopted him as a friend, and trusted him as a literary confidant. In the end, Smellie wrote biographies of Kames, Hume, and Smith (Smellie, 1800). It was Smellie who recorded this perceptive analysis of Edinburgh culture:

"Mr Amyat, King's Chymist, a most sensible and agreeable English gentleman, resided in Edinburgh for a year or two. [John Amyatt of London was a member of the Edinburgh Philosophical Society and was consequently a non-resident founding fellow of the Royal Society of Edinburgh]. He one day surprised me [William Smellie] with a curious remark. There is not a city in Europe, said he, that enjoys such a singular and noble privilege. I asked, What is that privilege? He replied, Here I stand at what is called the Cross of Edinburgh, and can in a few minutes, take fifty men of genius and learning by the hand. The fact is well known; but to a native of that city, who has all his days been familiarised with it, and who has not travelled in other countries, that circumstance, though very remarkable, passes unnoticed: Upon strangers, however, it makes a deep impression. In

London, in Paris, and other large cities of Europe, though they contain many literary men, the access to them is difficult; and even after that is obtained, the conversation is, for some time, shy and constrained. In Edinburgh the access of men of parts is not only easy, but their conversation and the communication of their knowledge are at once imparted to intelligent strangers with the utmost liberality. The philosophers of Scotland have no nostrums. They tell what they know, and deliver their sentiments without disguise or reserve. This generous feature was conspicuous in the case of Mr Hume. He insulted no man, but, when the conversation turned upon particular subjects whether moral or religious, he expressed his genuine sentiments with freedom, with force, and with a dignity which did honour to human nature" (Smellie, 1800, p.161-162. Rosaline Masson compiled an excellent anthology of further descriptions that evoke the history and character of Edinburgh and its citizens (Rosaline Masson, 1912).

Benjamin Franklin knew Edinburgh well (Clark, 1983; Van Doren, 1939). On his first visit, in 1759, he met, amongst others, **Adam Smith**, **William Robertson** (1721-1793), and **Adam Ferguson** (1723-1816). Franklin and his son, William, were guests of **Henry Home** [pronounced Hume, and later to become **Lord Kames**] in Berwickshire, only 6 miles from the family home of **David Hume** at Ninewells, and 10 miles from Slighhouses, which **Hutton** was farming at the time. Franklin had already met Hume in London. Home delighted to entertain at Kames, his country house, and Hutton could have been invited there; for they shared deeply-held interests in agricultural improvement. When Franklin returned in 1771, he stayed with Hume in his new house in St David Street and was the guest of Lord Kames at Blair Drummond, in Perthshire, which Kames' wife had inherited five years before. Among Franklin's "distinguished acquaintances in the medical faculty" were **Joseph Black** (1728-1799), **William Cullen** (1710-1790), and **James Russell** (d.1773), all of whom were Hutton's close friends (Letter to William, January 30, 1772 in Franklin, *Papers*, Vol.19, p.50). Hutton was living in Edinburgh at the time, and it would be surprising if he and Franklin failed to meet. (For Black and Cullen see Crowther, 1962; Daiches, 1996; Donovan, 1973; Ferguson, 1805; Kent, 1950; Ramsay, 1918; Robinson, 1970; Simpson, 1982; Thomson, 1997).

Franklin, then, had a close connection with Edinburgh, where, as he said in 1760, "At this time there happen to be collected a set of as truly great men, professors of the several branches of knowledge, as have ever appeared in any age or country" [Horn, 1967, p.70 gives the date 1776 (which seems unlikely), and gives his source as Sachse, 1956, p.56; Sachse in Footnote 53 gives his source as Nolan, 1938, p.50; and Nolan in turn gives his source, in Footnote 15, as "See letter, Franklin to Deborah, London 1760" in Smyth's Collection of Franklin's Writings; Smyth, 1906, Vol.4 for 1760-1764, gives 3 letters from Franklin to Deborah, none including this quotation. A somewhat similar but weaker statement is in Franklin to Thomas Bond, London, February 5, 1772 (Franklin, *Papers*, Vol.19, p.62)]. Franklin and his son William were two of the nine Honorary Fellows of the Royal Society of Edinburgh elected when the Society was constituted in 1783. William Franklin later became Governor of New Jersey, and unlike his father was a loyalist during the American revolution (Skempe, 1994).

One of Edinburgh's special characteristics was neatly summarised by Franklin in the following words:

The "*disputatious turn* –Persons of good sense, I have observed, seldom fall into it except lawyers, university men, and men of all sorts that have been bred in Edinborough" (Franklin, 1949, p.19; Smyth's *The Writings of Benjamin Franklin*, 1905-1907, Vol.1, p.240).

Despite Hutton's innovations in farming; his pioneering work in industrial chemistry; his tests of coal for the use of revenue officers; his close connection with James Watt; and his years of work on the Forth and Clyde Canal, some writers criticise him as an impractical theorist, "loftily dismissive of utilitarian science" – as much a theologian as a scientist. These writers are wrong. Hutton was a highly capable and enthusiastic field geologist (McIntyre & McKirdy, 1997; Leveson, 1996) with a deep interest in useful applications (e.g. Clow, 1947, 1952; Multhauf, 1965; Joan Eyles, 1979; Jean Jones, 1982, 1983, 1985).

Hutton had an "exquisite relish for whatever is beautiful and sublime in science"; the implications of his geological discoveries "were matter, not of transient delight but of solid and permanent happiness" (Playfair, 1805, p.91-92). He loved to share the pleasure he had from his discoveries. While out on his own, he had found granite veins in North Glen Sannox, Arran, and it was characteristic that his first reaction was to return to Brodick for **John Clerk, junior** (1757-1832), who had missed the discovery: "Not contented with this view of those two alpine bodies, in that jaunt which I had taken alone, I wished to give Mr Clerk the same satisfaction" (Hutton, 1997, p.222).

In the last letter (1775) **Franklin** wrote to **Kames**, he said: "I almost envy the Abilities you continue to possess of instructing, delighting, and being useful at so late a Period in Life". As Ian Simpson Ross appropriately remarked: "*Delighting, instructing, and being useful* were the great aims of all the men of letters of the Enlightenment" (Ross, 1972, p.200-201). This was true for James Hutton beyond all others.

2. Some Notable Edinburgh Characters: chiefly Lawyers and Disputants

The Court of Session is the highest court of law in Scotland, and advocates raised to the Bench are known by honorary titles, often taken from their family estates. The General Assembly, to this day the highest court of the Church of Scotland, still meets once a year in Edinburgh, where its debates provided splendid opportunities for young advocates serving as Elders. As the lawyers outnumbered both ministers and professors, lawyers dominated intellectual life. The spirited character of Edinburgh in Hutton's times cannot be better introduced than by looking at highlights of the careers of some of these men.

Alexander Wedderburn (1733-1805) entered Edinburgh University aged thirteen. This was not an unusual age for entry; when they went to University, **Lord Kelvin** (1824-1907) was only ten, **Colin Maclaurin** (1698-1746) and **David Hume** were eleven, **William Robertson** was twelve, Professor **Thomas Charles Hope** (1766-1844) was thirteen, and **Hutton** and **Adam Smith** were somewhat late starters at fourteen. Young Wedderburn must have been remarkable, however, for while still a teenager he was "respected and cherished" by Robertson, Adam Smith, and David Hume, with all of whom he maintained life-long friendships.

Wedderburn came from a prominent legal family; in their own times, both his father and grandfather were judges in the Court of Session (Chambers, *Biographical Dictionary of Eminent Scotsmen*, 1835, Vol.4). Preparing for a career in law, he took lessons in English pronunciation and went to London, armed with a letter of introduction from Hume. On his return to Edinburgh, Wedderburn was admitted to the Scottish bar at the age of 21 (John Ramsay, 1888, p.438-441). In 1756 he wrote the preface to the (original) *Edinburgh Review*. Brilliant and ambitious, Wedderburn sharpened his skill as a debater in the General Assembly, even defending Hume from threatened ecclesiastical censure (A.H. Millar in DNB; John Campbell, 1845-47, Vol.6, p.1-366).

In 1757, a senior opposing counsel, who had lost a case to **Wedderburn**, took exception to the young man's manner, calling him a "presumptuous boy". Wedderburn made a sarcastic reply for which he was instructed to apologise. Instead, taking off his gown and laying it on the bar, he addressed the Bench with these words: "My Lords, I neither *retract* or *apologise*, but I will save you the trouble of *deprivation*; there is my gown, and I will never wear it more; *virtute me involvo*" [I wrap myself in my integrity] (John Campbell, 1845-47, Vol.6, p.1-366; Mossner, 1954 p.279-280). He set out that night for London, and was called to the English bar soon after his arrival (A.H. Millar in DNB). His successful Parliamentary career culminated in his becoming Lord Chancellor in 1793 (the first Scotsman to do so) with the titles Lord Loughborough and Earl of Rosslyn. One of his duties as Lord Chancellor was to preside over the House of Lords.

"The two most remarkable figures at the Scots bar in their own or any other time were the Hon. Henry

Erskine and John Clerk, afterwards Lord Eldin” (Watt, 1912, p.17). **Henry Erskine** (1746-1817), 2nd son of the 10th Earl of Buchan, was a student of Adam Ferguson’s (Fergusson, 1882). Like Wedderburn and many other distinguished lawyers, he learned his debating skill at the General Assembly. During his highly successful career at the bar, Erskine succeeded **Henry Dundas, Viscount Melville**, (1742-1811) both as Lord Advocate and Dean of the Faculty of Advocates (John Campbell, 1845-1847, Vol.6, p.367-709). Erskine, the “silver-tongued”, was considered to be by far the most eloquent and witty speaker at the Scottish bar. When he opened a speech with the words “I shall be brief, my Lords”, the Bench’s response was “Hoots, man, Harry, dinna be brief, dinna brief!” (Watt, 1912, p.19). Because of his courageous and enlightened stand against the draconian legislation on sedition and treason in 1796, he lost his position as Dean of Faculty to **Robert Dundas** (1758-1819), Melville’s nephew and son-in-law (Tytler, 1790). The vote was determined by political pressure; voters were afraid of the consequences for their careers if they voted otherwise. Some, like **Francis Jeffrey** (1773-1850) later confessed shame at having failed to stand on principle, and Erskine’s thirty-eight supporters became referred to as “the virtuous number of thirty-eight” (Cockburn, 1852, Vol.1, p.94-95; Carlyle, 1932, p.308-342). **Robert Burns** wrote a satirical ballad contrasting **Henry Erskine** – “This Hal for genius, wit, and lore/Among the first was number’d – with **Robert Dundas** – “Bob’s purblind mental vision” (Burns, 1986, p.562-563; Mackay, 1992, p.378-379).

In your heretic sins may you live and die,
Ye heretic Eight-and-Thirty!
But accept, ye sublime majority,
My congratulations hearty!
With your honors, as with a certain King,
In your servants this is striking,
The more incapacity they bring
The more they’re to your liking.

At a dinner where the Chairman proposed “the health of the gentlemen of the Faculty who had done themselves the honour of voting for Mr Erskine’s re-nomination to the deanship”, the comment was made “Mr President, would it not be sufficient to propose the health of the *gentlemen* of the Faculty?”

Henry’s younger brother, **Thomas Erskine** (1750-1823), wished to have an army career, but his father could not afford to buy him a commission; so, aged fourteen, he joined the Navy as a midshipman (John Campbell, 1845-1847, Vol.6, p.367-709). He was later promoted lieutenant, and while at sea was struck by lightning. On his father’s death he purchased a commission as an infantry officer, but a chance meeting with the Lord Chief Justice persuaded Erskine to make the law his career, and a further stroke of luck assured his success. Newly called to the bar in 1788 (the year Hutton’s *Theory* was published), his chance remark at a dinner party earned him a junior position in an important case. The **4th Earl of Sandwich** (Charles Montagu, 1718-1792) – the man who in 1762, at the gaming tables, invented the sandwich – then powerful First Lord of the Admiralty, had been accused of bribery and had lodged a libel action for defamation. Erskine’s speech, opposing the Solicitor General, settled the case and brought Erskine instant fame. The following year, 1779, he successfully represented **Admiral Keppel**

(1725-1786) at his court-martial – the London mob going wild with delight at the outcome (Keppel, 1842). Among many other triumphs, Erskine in 1781 successfully defended **Lord George Gordon** (1751-1793) against a charge of treason (Hibbert, 1959a); and in 1792 defended **Thomas Paine** (1737-1809), accused of treason for publication in 1791 of *The Rights of Man* (Foner, 1945; Aldridge, 1959; Ayer, 1988; Keane, 1995). He defended many of those accused of sedition in the 1790s. Erskine's success was phenomenal; he made more money than any barrister had ever done before. According to the Encyclopaedia Britannica (1929), Thomas Erskine “was probably the greatest advocate the English bar has ever seen”. On becoming Lord Chancellor he presided over the English legal system as his brother did over the Scots bar.

Edinburgh provided England with yet another Lord Chancellor. **Lord Henry Brougham** (1778-1868), whose grandmother was **William Robertson's** sister, entered Edinburgh University at the age of 14. While still himself a student, Brougham proposed a student society for the study of Newtonian Philosophy, and published two papers on optics and one on logic in the Royal Society of London's *Philosophical Transactions* (Olson, 1975; John Campbell, 1845-1847, Vol.8, p.213-596). He became an advocate in 1800, and was an active contributor to the *Edinburgh Review* from its beginning in 1802 (Clive, 1957; Greig, 1948; Pottinger, 1992). Brougham, in fact, reviewed Hutton's *Theory of the Earth*. Brougham's political career was, however, in London, where in 1820 he made a bold defence of George IV's Queen Caroline during her trial before the House of Lords. Brougham played a major role in founding London University (1828), and in 1830 he became Lord Chancellor. (John Campbell, 1845-1847, Vol.8, p.213-596. For his contemporaries see Brougham, 1845-1846).

Sydney Smith (1771-1845) was the principal founder of the *Edinburgh Review*, proposing for it the motto: *Tenui musam meditamus avena* – “We cultivate literature on a little oatmeal”. The motto actually used was, however, *Judex damnatur cum nocens absolvitur* – “The judge is condemned when the guilty is acquitted”. It is reported that after George III had read the *Edinburgh*, he said: “He [Sydney Smith] is a very clever fellow, but he will never be a bishop” (George Russell, 1905, p.40). When Lord Grey (Charles Grey, 2nd Earl Grey, 1764-1845) became Prime Minister in 1831, his comment was “Now I shall be able to do something for Sydney Smith” (Pearson, 1934, p.30).

Smith, an English clergyman acting as a tutor, came north with his pupil in 1798 and stayed in Edinburgh for five years. He famously described Scotland as “This garret of the earth – that knuckle-end of England – that land of Calvin, oat-cakes and sulphur” (Russell, 1905, p.28). Smith caught the intellectual tone of Edinburgh Society in this telling vignette: “I overheard a young lady of my acquaintance, at a dance in Edinburgh, exclaim, in a sudden pause of the music, “What you say, my Lord, is very true of love in the *abstract*, but –” (Pearson, 1934, p.33) And, in a letter written in 1814, Sydney Smith gave a shrewd summary of the questioning attitude that was probably necessary for the Scottish Enlightenment to flourish: “If you were sailing from Alicant to Aleppo in a storm, and if (after sailors had held up the image of a Saint and prayed to it) the storm were to abate, you would be more sorry for the encouragement of superstition than rejoiced for the preservation of your life; – and so would every other man born and bred in Edinburgh” (Sydney Smith, 1956, p.105-106).

Francis Jeffrey and **Francis Horner** (1778-1817) were the other two men who participated in founding

the *Edinburgh Review*. After the first few months of publication, Jeffrey became Editor. He was admitted to the bar in 1794, and became successively Dean of Faculty, Lord Advocate, and Judge, taking the title Lord Jeffrey (Carlyle, 1932; Cockburn, 1952; Gray, 1914, 1925; Greig, 1948; Lockhart, 1819). It was he who wrote the appreciation of **Professor John Playfair** (1748-1819), Hutton's biographer, for the published *Works of John Playfair* (1822). **Professor Dugald Stewart** (1753-1828), who had been Playfair's colleague, contributed a letter approving what Jeffrey had written.

Francis Horner entered Edinburgh University aged fourteen. To rid himself of his Scots accent he left Edinburgh in 1795 for two years in Middlesex. Returning to Edinburgh, he was called to the bar in 1800. He went back to London in 1803, was called to the English bar, entered Parliament, and was considered one of the best speakers in the House. His younger brother, **Leonard Horner** (1785-1864), who had been a pupil at the High School with Brougham, studied Chemistry in Edinburgh, taking a great interest in mineralogy. He followed his brother to London in 1804, where he was elected to the newly formed Geological Society. He was Secretary of the Society from 1810-1814, and President from 1845-1847 and again from 1860-1862. In 1832 **Charles Lyell** (1797-1875) married Leonard Horner's daughter Mary. It was Leonard Horner who gave the manuscript of the incomplete third volume of Hutton's *Theory of the Earth* to the Geological Society. He had received the historic manuscript from **Lord Webb Seymour** (1777-1819, son of the 10th Duke of Somerset), who probably inherited it from John Playfair; for in 1814 Playfair and Webb Seymour had jointly reported on the geology of Glen Tilt to the Royal Society of Edinburgh.

Walter Scott (1771-1832) [later created baronet as the famous Sir Walter Scott] and his friend **William Clerk** (1770-1847) studied together for their law examinations and were called to the bar on the same day in 1792. Scott had a high opinion of his friend's ability. Long afterwards Scott described him as "a man of the most acute intellects and powerful apprehension. – I have known him intimately since our College days; and to my thinking, never met a man of greater powers, or more complete information of all desirable subjects". Scott's prediction was unfortunately fulfilled: "Clerk will, I am afraid, leave the world little more than the report of his powers. He is too indolent to finish any considerable work" (Walter Scott, 1900, Vol.1, p.44-46, 123-129; Vol.4, p.351-352, etc).

A drawing by **William Clerk** became the picture of Hermitage Castle in Scott's *Minstrelsy of the Scottish Border* (1802). In *Redgauntlet* (1824) Clerk appears as Darsie Latimer, Scott portraying himself as Alan Fairford. Clerk's father, **John Clerk of Eldin** (1728-1812) – Hutton's friend and field companion – told a story that in *The Antiquary* (1816), belongs to Jonathan Oldbuck (For the Clerks and antiquarianism, see Iain Brown, 1974, 1980, 1987). The character Dousterswivel is based on the German geologist **Rudolph Erich Raspe** (1737-1794) – who recognised the volcanic origin of basalt in Germany, and with whom Hutton was personally acquainted (Hutton, 1997, p.256); while **Hutton** himself appears in Chapter 13 (Crockett, 1932).

Another of Scott's early and life-long friendship was with **Adam Ferguson** (1771-1855), the son of **Professor Adam Ferguson**, and it was in young Adam Ferguson's company that Scott discovered the romantic scenery of Perthshire, memorably described in *The Lady of the Lake* (1810). It was also

through this friendship that, in Professor Ferguson's home, in the presence of **Hutton** and **Black**, Scott had his only meeting with **Robert Burns** (Lockhart, 1900, Vol.1, p.114-117; Gray, 1925, Chapter 10; Mackay, 1992, p.266-267). Hutton and Black are portrayed in a well-known picture of the scene; the original, signed in 1892 by the artist Charles Martin Hardie, hangs in Scott's home at Abbotsford. Ferguson, sitting by the fire, has a poker in his hand – an allusion to the Poker Club, whose name, proposed by Ferguson, suggests the stirring up of discussion on the Militia question.

While in Edinburgh, Burns wrote one of his most famous poems, *Ae fond kiss, and then we sever!*. It was addressed to Professor Colin Maclaurin's niece – the daughter of Christian Maclaurin (d.1767) – Agnes Craig "Nancy" McLehose (b.1758), Burns' Clarinda (Mackay, 1992, p.368-377 et seq.; Burns, 1986, p.434).

Through Scott's influence, **Adam Ferguson** was later named Keeper of the Regalia in Scotland. **Ferguson** and the great portrait painter **Henry Raeburn** (1756-1823) were both knighted on the occasion of George IV's visit to Edinburgh in 1822, an event largely stage-managed by Scott (Iain Brown, Spring 1996).

Lawyers were prominent in Edinburgh's intellectual and political life because, whenever possible, a family of importance made sure that one or more of its members were in the legal profession. Politics and the Law were closely associated, and patronage was essential for position and advancement. For example, lacking the approval of the **3rd Duke of Argyll** (1682-1761) **David Hume** had no chance of a Chair in Edinburgh (1745) or Glasgow (1752) – and who now remembers the successful candidates Professors Cleghorn and Clow? (See Hume, 1967).

From the death of Argyll on into the next century, Scotland was effectively ruled by the Lord Advocate, a powerful political position; patronage of all kinds, including church, law, politics, and academia were in his hands. **Henry Dundas** (later **Lord Melville**) held the positions of Solicitor General (1766-1775), and Lord Advocate (1775-1783). On his brother's death in 1787, he declined to follow as Lord President of the Court of Session, but as Home Secretary (1791-1794) he controlled law and order in Britain and had political control of India and the Colonies (Fry, 1992). He became Secretary for War (1794-1801), and in 1800 was appointed Lord Privy Seal of Scotland. **James Boswell** (1740-1795) – biographer of Dr Johnson (1709-1784) and himself a Scots advocate and the son of a judge – referred to Henry Dundas as "Harry IX" (Fry, 1992, p.142; Cockburn, 1874, p.185). Thomas Erskine presided over Melville's trial for impeachment in 1806.

For most of his professional life **Robert Dundas** was **Henry Erskine**'s legal opponent. His ancestry [see genealogical tree 1] provides a dramatic illustration of how power was kept by Edinburgh's closely-knit legal families. His father, grandfather, great grandfather, and great-great grandfather were all Senators (judges) of the College of Justiciary, each taking the title Lord Arniston. His father and grandfather both held the positions of Solicitor General, Lord Advocate, and Lord President of the Court of Session (Tytler, 1790). His uncle was the all-powerful **Henry Dundas, Viscount Melville**, whose daughter Robert married. Robert Dundas has been referred to as both Melville's protégé and factotum.

Robert Dundas was only 26 when in 1784 he became Solicitor General. In this position he succeeded **Ilay Campbell** (1734-1823), who himself succeeded **Henry Erskine** as Lord Advocate and went on to become Lord President. When Henry Erskine was defeated in 1796, it was Robert Dundas who was voted Dean of Faculty; this was a time when any criticism of the government could result in a charge of sedition.

For thirty years the arbiter of taste and style was **Henry Home**, raised to the Bench as **Lord Kames** in 1752. Although his education had been in his father's house, it was not very different from University education at that time; Edinburgh only abandoned the Regent system (one teacher taking his pupils through all subjects) in 1708, after which each Professor was responsible for one specialised subject. While young, Home developed what became a life-long interest in the soil and all aspects of agriculture, but at the age of about sixteen Home was sent to Edinburgh to learn law in the office of a Writer to the Signet, and was called to the bar in 1724.

Home was a founding Member of the Philosophical Society, becoming Vice-President and contributing papers to its Transactions. About 1735 he began his long friendship with his Berwickshire neighbour, **David Hume**. In 1747-48 Home's interest in agriculture became serious. Like Hutton, Home used English methods of ploughing, and was one of the first in Scotland to adopt scientific farming methods (Handley, 1953, 1963).

In the years 1748-1751, Home persuaded **Adam Smith** to give lectures on rhetoric, literary criticism, and economics. These well-attended lectures led to Smith's appointment to a Chair in Glasgow in 1751 (William Scott, 1937). **Lord Kames** (to use his title as a judge) was deeply interested in the subjects of Smith's lectures, and is said to have played a part in the foundation of the Chair of Rhetoric in Edinburgh University in 1760 (Gray, 1914, p.25; cf. Dalzel, 1862, p.428). As we have seen, **Benjamin Franklin** was Kames' guest in 1759 and 1771.

Kames published several books, including *The Elements of Criticism* (1762), *The Gentleman Farmer* (1766), and *Sketches of the History of Man* (1774); it has been claimed that Kames did more to further an interest in philosophy and literature than all the men of law had done for a century before. He actively supported the project for a canal linking the Forth and Clyde (Ross, 1972, p.328-329), which must surely have brought him into contact with **Hutton**, who was on the management committee (Jean Jones, 1982). The Forth and Clyde Canal, which was approved by Act of Parliament in 1768, was opened for sea-to-sea navigation in 1790. Kames worked, indeed, for all aspects of Scotland's improvement. Adam Smith said: "We must every one of us acknowledge Kames for our master" (Rae, 1895, p.31). Surprisingly, however, even on the Bench, Kames could be profane, vindictive, and brutal: Sentencing his chess-playing friend Matthew Hay for murder, Kames declared: "That's checkmate to you, Matthew!" (Gray, 1914, Chapter 1; Ross, 1972, p.308, 310-311).

When raised to the Bench in 1776, **Robert Macqueen** (1722-1799) took the title **Lord Braxfield** (Ramsay, 1888, Vol.1, p.380-393; Cockburn, 1874, p.99-103; Gray, 1914, Chapter 5; Roughead, 1919, 1922). He became Lord of Justiciary (one of five judges specially commissioned by the sovereign to try

criminal cases) in 1780, and Lord Justice-Clerk (chief criminal judge) in 1788 (Hutton's year again). Even by the high standards of Edinburgh's legal profession, Braxfield was recognised as a great drinker – [His] success at the Bar, conspicuous as it was, was eclipsed by his success in the tavern" (Gray, 1914, p.103). Braxfield presided over some of the most famous and infamous trials in Scottish legal history, earning the title of the "Hanging Judge". Walter Scott, his neighbour in George Square, dedicated his thesis *Concerning the disposal of dead bodies of criminals* (1792) to Lord Braxfield. Robert Louis Stevenson (1850-1894) portrayed Braxfield in his novel *Weir of Hermiston* (1896), and Braxfield appears again in a more recent novel, *The Justice-Clerk* (1923) by W.D. Lyell. Reviewing the Raeburn exhibition in 1876, Robert Louis Stevenson wrote of Braxfield: "He has left behind him an unrivalled reputation for rough and cruel speech; and to this day his name smacks of the gallows" (Stevenson, 1913, p.146).

For a more recent reference see: Brian D. Osborne: *Braxfield the hanging judge?* Argyll Publishing, 1997

Kames, Hume, Smith, and many others took elocution lessons to rid their speech of Scotticisms, but Braxfield like Hutton and the John Clerks (father and son) – spoke broad Scots. Unlike Hutton (Olson, 1975; Peter Jones, 1984), however, Braxfield sneered at subjects such as art, literature, and philosophy. Although an expert in law, he had no conception of justice; he revelled in the power his position on the Bench gave him to inflict pain on those he despised. "Bring me prisoners and I'll find them law" was one of his sayings (Cockburn, 1888, Vol.1, p.87). Another was "Hang a thief when he is young, and he'll no' steal when he is auld" (Watt, 1912, p.15). To a prisoner defending himself, Braxfield said: "Ye're a vera clever chiel', man, but ye wad be nane the waur o' a hanging" (Lockhart, 1900, Vol.3, p.373). It is said that when the father of Francis and Leonard Horner was entering the jury-box, Braxfield whispered: "Come awa, Maister Horner, come awa, and help us to hang [meaning any judicial punishment] ane o' thae daammed scoondrels" (Cockburn, 1874, p.102; Ross, 1972, p.309).

He was a coarse, domineering, tyrannical, and brutal bully. Gerrald, defending himself on a charge of sedition in 1794, said "even our Saviour himself was a reformer", to which Braxfield retorted: "Muckle He made o' that, He was hangit" (John Galt, 1821, p.280; Cockburn, 1974, p.102 & 1888, Vol.2, XIII; Watt, 1912, p.16). Gerrald's crime was to have argued for Parliamentary reform (Ramsey, 1794). Braxfield accused him of trying to overturn "our present happy Constitution – the happiest, the best, and the most noble Constitution in the world" (Cockburn, 1888, p.149). Braxfield, of course, had the last word; he sentenced Gerrald to transportation for fourteen years.

Margarot, also defending himself before Braxfield in 1794, asked the following questions from his place in the dock (Cockburn, 1888, Vol.2, XI, p.28-33; Gray, 1914, Chapter 5; Joyce, 1951, Chapter 6): text-indent: length 18px

- "I call on my Lord Justice-Clerk. First, my lord, are you on oath?"
- "Did you dine at Mr Rothead's in the course of last week?"

- "Did any conversation take place with regard to my trial?"
- "Did you use these words: "What would you think of giving Margarot a hundred lashes together with [transportation to] Botany Bay'?"
- "Did a lady say to you that the mob would not allow you to whip me? And, my lord, did you not say that the mob would be better for losing a little blood?"
- "These are the questions, my lord, that I wish to put to you in the presence of the Court. Deny them, or acknowledge them."

Supported by his colleagues on the Bench, Braxfield refused to respond to the charges. As **Charles Fox** (1749-1806) said in Parliament: "God help the people who have such judges!" (Bewley, 1981, p.192)

John Clerk [See genealogical tree 2] was the eldest son of Hutton's friend and colleague, **John Clerk of Eldin** (Watt, 1912, p.21). **William Clerk**, Scott's friend already mentioned, was a younger brother. Their mother, Susanna Adam, was a sister of **Robert Adam** (1728-1792), the renowned architect (Fleming, 1962), and first cousin of William Robertson (See genealogical tree 3). John Clerk was called to the bar in 1785, was named Solicitor General in 1806, and raised to the Bench in 1823, taking the title **Lord Eldin** from his father's property at Lasswade, near Edinburgh (Gray, 1914, Chapter 11). By coincidence, **John Clerk's** nomination as Solicitor General appeared in the same Gazette as did the instalment of **Henry Erskine** as Lord Advocate and **Scott's** as Clerk of Session. John Clerk's portrait is one of the most striking of **Sir Henry Raeburn's** portraits. Clerk had known Raeburn well ever since he was a law student (Watt, 1912, p.182). An engraving of this portrait was published in 1815, when Clerk was 51 (personal communication, Dr David Mackie).

John Clerk had a contracted leg, which made him limp. One day he overheard a lady say to her companion, "That's John Clerk, the lame lawyer", he turned round and said, "No, madam. the lame *man*, not the lame *lawyer*" (Watt, 1912, p.21). Like **Hutton**, John Clerk spoke broad Scots: "the powerful direct Scots of the able, highly educated man, a speech faded now [1912] from human memory". Addressing the House of Lords, Clerk argued that "the *watter* had rin that way for forty years". The Lord Chancellor, much amused, asked: "Mr Clerk, do you spell water in Scotland with two 't's?", to which Clerk replied: "Na, my Lord, we dinna spell watter wi' twa t's, but we spell maineers wi' twa n's" (Dean Ramsay, Author's copyright edition, undated, p.147; see also Rogers, 1884, Vol.3, p.168-169)

John Clerk was thirty when he accompanied **Hutton** to Arran in 1787, and it is clear that they got on well together. Looking for the contact between granite and the surrounding country rock they followed the Cataract [Cnocan] Burn to Glenshant Hill – arduous terrain for a lame man. Hutton shares his excitement with us in the following description: "By reason of moss and vegetation we had a very interrupted view of the immediate junction of the granite and schistus, which here appears in many places upon the summits of bare rock standing up among the heath and moss. ... Having once got hold of the clew, or caught the scent, we traced back (with more animation than could have been expected from such an innocent chase) the object of our investigation all the way to the Cataract rock. Great veins of

granite may be seen traversing the schistus, and ramifying in all directions". Despite Clerk's lameness they climbed Goat Fell, the highest mountain on the island, and "slipped down" to see a dyke a little way below the summit – "an idea which could not have entered the head of any sober person who was not a mineralist" (Hutton, 1997, p.222-226).

Although Clerk shared this important field experience with Hutton, he did not become a geologist. The reason is that, a year later (the year Hutton's *Theory* was published), he found fame as an advocate in the trial of **Deacon Brodie** (1741-1788). Brodie, a Member of the Town Council by day and a burglar by night, led a double life that inspired Robert Louis Stevenson to write his well-known tale, *Dr Jekyll and Mr Hyde* (1886). As the result of an abortive attempt on the Excise Office in Chessel's Court, Brodie was brought to trial. Adam Smith (Dugald Stewart, 1794; Rae, 1895; Hirst, 1904; Fay 1956; Ross 1995) was Commissioner of the Excise and lived at Panmure House, across the road from Chessel's Court, and only a stone's throw from Hutton's house at St John's Hill (Butcher, 1997, 1998).

Braxfield as Lord Justice-Clerk, presided over Brodie's trial with four other judges (Creech, 1788; Aeneas Morison, 1788; Peter Mackenzie, 1890, Vol.2, Chapter 14; Roughead, 1921; Gibson, 1977) The prosecution was led by **Ilay Campbell** (Lord Advocate) and **Robert Dundas** (Solicitor General). Brodie was represented by **Henry Erskine** (Dean of Faculty) assisted by **Charles Hay** (1747-1811), who, like Erskine, had been called to the bar in 1768. Hay was raised to the Bench in 1806, taking the title Lord Newton (Gray, 1914, Chapter 9).

John Clerk was Counsel for George Smith, a penniless locksmith from England who had assisted Brodie at the Excise Office. It was Clerk's first case in the Justiciary Court, and the other Counsel had at least seventeen years more experience, but Clerk made such a name for himself that, at the height of his power, he is said to have had nearly half the business of the Court of Session.

There are several contemporary accounts of the trial. One book is by Aeneas Morrison, Clerk's Agent, another by **William Creech** (1745-1815), a member of the Jury, a friend of Lord Kames, and Scotland's leading publisher and bookseller. Creech founded the Speculative Society, and his literary levees were important social gatherings. Creech published books by Edinburgh authors such as Blair, Cullen, Gregory, Henry Mackenzie, and most notably Robert Burns, who wrote a poem in his honour: "*May I be Slander's common speech , ... when I forget thee, Willie Creech*" (Burns, 1986, p.277-279). Creech was Lord Provost of Edinburgh in 1811-1813. (For a biography see Creech, 1815; for a sketch see Cuthbertson, 1939).

The trial took place on the 27th and 28th of August, 1788, and was reported in some detail in *The Edinburgh Advertiser* for August 26/29. That an advertisement for Creech's book on the trial appeared in the same issue of the *Advertiser* says much for Creech's business acumen! The trial began at nine a.m. on Wednesday. After drinking "nearly a bottle of claret", Clerk began his speech to the Jury at one a.m. on Thursday morning, and at three a.m. he was followed by Erskine. "About half past four in the morning, the Lord Justice-Clerk, who had never once left the Court, began to sum up the evidence on both sides" (William Creech, 1788, p.212). Braxfield finished his address to the Jury at six a.m., after

which the Court adjourned until one p.m., when the Jury returned a guilty verdict; the judges pronounced death sentences (Aeneas Morison, 1788, p.238). In his address to the prisoners, Braxfield said that he (of all people!) hoped they would improve the short time they had now to live, by a sincere repentance of their crimes, and in obtaining forgiveness of Heaven for their past offences. "God", Braxfield told the prisoners, "always listened to those who seek him with sincerity" (Aeneas Morison, 1788, p.255; William Creech, 1788, p.225; William Roughead, 1921, p.209).

Ainslie, the lookout-man on the night of the crime, had been caught and imprisoned. His life would be spared if he testified against Brodie and Smith; so he turned King's evidence. Clerk objected when the Lord Advocate introduced Ainslie as a witness for the prosecution, and the following exchange took place:

- Clerk: "That infernal witness was convicted of *felony* in England, and how dare he to come here to be received as a witness?"
- Lord Advocate (interfering): "He has, I have shown you, received his Majesty's free pardon".
- Clerk: "Yes, I see: but, gentlemen of the jury, I ask you, on your oaths, can his Majesty make a *tainted* scoundrel an HONEST man? (Great applause in Court).

The point is echoed in one of **Robert Burns** best known poems, *A Man's a Man for a' That*, which has "a central place in the psalmody of radicalism" (Burns, 1986, p.535-536):

- The rank is but the guinea's stamp,
The man's the gowd for a' that. [gold]
... ..
A prince can mak a belted knight,
A marquis, duke, an a' that!
But an honest man's aboon his might [above]
– Guid faith, he mauna fa' that! [mustn't try to do that]

Although Burns had left Edinburgh before the trial, he had many Edinburgh friends and the account of the proceedings would surely have reached him. For a short time Burns was, in fact, a near-neighbour of Brodie's.

On 7th December 1786 Burns wrote to his friend Gavin Hamilton: "My **Lord Glencairn** and the Dean of Faculty, Mr **Henry Erskine**, have taken me under their wing, and in all probability I shall soon be the tenth worthy, and eighth wise man of the world" (Burns, 1990, p.66). Glencairn's brother was married to Erskine's sister.

James Cunningham (1749-1791), **14th Earl of Glencairn**, invited Burns to his home and introduced him to his friends and to his former school-fellow and tutor, **William Creech**, the juryman who, only

four months before the trial, published the Edinburgh edition of Burns' poems. Burns said of Glencairn: "my best Friend, my first and my dearest Patron & Benefactor; the man to whom I owe all that I am & have!" (Burns, 1990, p.506). It was through Glencairn's influence that Burns got the job he wanted with the Excise, and when Glencairn died, aged only 42, Burns wrote a *Lament* ending with the beautiful lines (Burns, 1986, p.423-425):

- The mother may forget the child
That smiles sae sweetly at her knee;
But I'll remember thee, Glencairn,
And a' that thou hast done for me!

Burns paid Glencairn a further tribute by naming his son, born in January 1794, James Glencairn Burns.

Charles Hay, who assisted Erskine in Brodie's defence, was another friend of Burns. **Hay** and **Burns** were both members of the hard-drinking Crochallan Fencibles, to which Burns was introduced by the Club's founder, **William Smellie**, and it was for the Crochallan that Burns wrote his bawdy *The Merry Muses of Caledonia*.

Hay, as the Crochallan's *Major and Muster-Master General*, and Smellie as *Executioner*, were in charge of "drilling" – i.e. "hazing" – the recruits. Hay was famous for "law, punch, whist, claret and worth", and Raeburn's portrait of this "Mighty Goth" makes it easy to believe that Hay's "bibulous performances were really remarkable at a time when drinking records were not easily established". Supervised by Charles Hay, the Crochallan probably did Burns' constitution no good at all.

James Boswell, diarist and biographer, gives us a picture of a day in an Edinburgh advocate's life: "Drinking never fails to make me ill bred. ... I had been sick without being sensible of it. ... I however grew so well as to be able to get up and go to the Parliament House [law courts] at nine. I was still quite giddy with liquor, and, squeamishness having gone off, I was in good, vigorous, sparkling frame, and did what was necessary to be done in several causes, and was most entertaining amongst my brother lawyers. ... I dined with [Lord Monboddo and two other judges]. I was in prodigious spirits, and drank beer copiously to allay the thirst of last night's drinking. We had a deal of merriment; and I drank old hock, which cooled my fever and really sobered me" (Boswell, 1960, p.242: 23 July 1774).

John Clerk, himself was no mean toper. A favourite story relates that early one morning he stopped in the street to ask a servant-girl "Where is John Clerk's house?" "Why, *you're* John Clerk!", she said in astonishment. "Yes, but it's his house I want", he answered (Watt, 1912, p.23).

While Clerk was addressing the Jury in the Brodie trial, he was interrupted and admonished by Braxfield. Clerk thereupon sat down. (Peter Mackenzie, 1890, Vol.2, p.102-104).

- Braxfield: "Are you done, sir, with your speech?"

- Clerk: "No, my lord, I am not."
- Braxfield: "Then go on, sir, at your peril."
- Clerk: "No, my lords, I won't proceed in any such way. You have interrupted me – you have snubbed me in the line of my defence."
- Braxfield: "Then we must now call upon the learned Dean of Faculty to proceed with his address, which the Court will hear with the greatest attention."
- Erskine: Shook his head, as if declining to do so.
- Braxfield: "Very well, the Court will proceed now and discharge its duty."
- Braxfield was about to charge the Jury when Clerk leapt to his feet, and shaking his clenched fist uttered these astounding words: "Hang my client if you daur, my Lord, without hearing me, his counsel, in his defence."

The record shows that Clerk's remarks were frequently punctuated by "Consternation in Court", "Sensation in Court", or by "Great applause". **Lord Cockburn** (1779-1854) said of John Clerk: "He did not take his fee, plead the cause well, hear the result, and have done with it; but gave the client his temper, his perspiration, his nights, his reason, his whole body and soul, and very often the fee to boot" (Cockburn, 1852, Vol.1, p.202). Thirty years after the trial of Deacon Brodie and George Smith, Walter Scott's son-in-law and biographer, **John Gibson Lockhart** (1794-1854), gave us this word-portrait of **John Clerk** – the man who was Hutton's companion when Hutton first saw an unconformity and dykes of glass:

"It is impossible to imagine a physiognomy more expressive of the character of a great lawyer and barrister ... – how the habits of mind have stamped their traces on every part of the face! What sharpness, what razor-like sharpness, has indented itself about the wrinkles of his eye-lids; the eyes themselves so quick, so gray, such bafflers of scrutiny, such exquisite scrutinizers, how they change their expression – it seems almost how they change their colour – shifting from contracted, concentrated blackness, through every shade of brown, blue, green, and hazel, back into their own open, gleaming gray again! How they glisten with disdain!"

" ... He seems to be affected with the most delightful and balmy feelings, by the contemplation of some soft-headed, prosing driveller, racking his poor brain, or bellowing his lungs out – all about something which he, the smiler, sees through so thoroughly, so distinctly. Blunder follows blunder; the mist thickens about the brain of the bewildered hammerer; and every plunge of the bog-trotter – every deepening shade of his confusion – is attested by some more copious infusion of Sardonic suavity, into the horrible, ghastly, grinning smile of the happy Mr Clerk. How he chuckles over the solemn spoon [simpleton] whom he hath fairly got into his power!"

"When he rises, at the conclusion of his display, he seem to collect himself like a kite above a covey of

partridges; he is in no hurry to come down, but holds his victim with his glittering eye,' and smiles sweetly, and yet more sweetly, the bitter assurance of their coming fate; then out he stretches his arm, as the kite may his wing, and changing the smile by degrees into a frown, and drawing down his eye-brows from their altitude among the wrinkles of his forehead, and making them to hang like fringes quite over his diminishing and brightening eyes, and mingling a tincture of deeper scorn in the wave of his lips, and projecting his chin, and suffusing his whole face with the very livery of wrath, how he pounces with a scream upon his prey – and, may the Lord have mercy upon their unhappy souls!"

"It is truly a delightful thing, to be a witness of this mighty gladiator, scattering everything before him, like a king, upon his old accustomed arena; with an eye swift as lightning to discover the unguarded point of his adversary, and a hand steady as iron to direct his weapon, and a mask of impenetrable stuff, that throws back, like a rock, the prying gaze that would dare to retaliate upon his own lynx-like penetration – what a champion is here! It is no wonder that every litigant in this convenanting land, should have learned to look upon it as a mere tempting of Providence to omit retaining John Clerk."

"If ever I have seen any countenance which I should consider as the infallible index of originality and genius – such is the countenance of Mr Clerk; and everything he says and does is in perfect harmony with its language" (Lockhart, 1819, Vol.2, Letter 32, p.43-52).

In 1809, as a lad of fourteen, **Thomas Carlyle** (1795-1881) walked the seventy miles from the village of Ecclefechan, Dumfriesshire, to become a student at Edinburgh University. In his *Reminiscences*, written 57 years later, he describes how, on his arrival, he was taken to see the sights of the city: Many famous people were pointed out to him, but "The only figure I distinctly recollect, and got printed on my brain that night, was **John Clerk** – whose grim strong countenance with its black far-projecting brows and look of great sagacity fixed him in my memory" (Thomas Carlyle, 1932, p.310). Clerk was then about the age he was when Raeburn painted his portrait.

John Clerk and **Walter Scott**, who knew each other well, both died in 1832. Lockhart tells how "At the meetings of the Bannatyne he [Walter Scott, the founder of the Bannatyne Club] regularly presided from 1823 to 1831; and in the chair on their anniversary dinners, surrounded by some of his oldest and dearest friends, Thomas Thomson (the Vice-President), **John Clerk** (Lord Eldin), the Chief Commissioner [William] Adam [nephew of Robert Adam, George Clerk-Maxwell (1715-84), and John Clerk of Eldin], the Chief Baron Shepherd, **Lord Jeffrey**, Mr Constable, ... and Mr David Laing, the Secretary of the Club, he from this time forward was the unfailing source of merriment within the limits of becoming mirth'" (Lockhart, 1900, Vol.4, p.93).

Although **Hutton** tells us that **John Clerk** made geological drawings, Clerk's interest was more in people than in rocks. Through his mother he inherited some of the artistic taste and skill of **Robert Adam**'s family, and on his death he left an important art collection. Hundreds of people came to the auction held in his house at 16 Picardy Place in 1833; in fact so many came that the floor collapsed, and about eighty people fell to the floor below; many were injured and one was killed. The large picture, *The Adoration of the Kings* (Oil on Canvas. 1.830x2.350m) by the Venetian painter Jacopo Bassano (1510-

1592) – it was formerly thought to have been by Titian – was Item 113. It is perhaps the most important painting owned by the National Gallery of Scotland. We need to imagine this splendid picture in John Clerk's home.

One more member of the legal profession deserves mention because his association with Hutton gives us a rare glimpse of Hutton's social life after his return to Edinburgh in 1767. **James Burnet** (1714-1799) – sometimes spelled with two t's (e.g. DNB and Kay 1877) – was raised to the Bench as **Lord Monboddo** (Knight, 1900). He was an individualist, in his judgements often being a minority of one. In *Some Old Scots Judges*, Forbes Gray devoted two chapters to Monboddo; they immediately follow the initial chapter, which is on Lord Kames. (Gray, 1914). The chapter on Monboddo's Writings is devastating:

"Incoherent, discursive, archaic, lifeless, Monboddo discovered no new law, proclaimed afresh no doctrine that had become partially obscured. His legacy to the human race consisted of certain fantastical ideas which caused his contemporaries to laugh and succeeding generations to blaspheme. ... But", said Forbes Gray, "he is at least entitled to the credit of having, in an age when science was still in swaddling clothes, employed a sound scientific method". Instead of theorising, Monboddo studied "the manners and customs of savage races, interviewed travellers, and sought to obtain authentic information", a procedure which Hutton would certainly have approved of.

Even in his eighties **Monboddo** made annual journeys by horseback to London, where he conversed with some of the most eminent men, and frequently even with the King. In Edinburgh he gave weekly *learned* suppers, which Scott mentions in *Guy Mannering* (1815, Chapter 49, Note 7). On these occasions Monboddo's regular guests were Joseph **Black**, James **Hutton**, **John Hope** (1725-1786) (Regius Professor of Medicine & Botany; President of the Edinburgh College of Physicians; and father of the distinguished Professor of Chemistry, **Thomas Charles Hope**), and William **Smellie** the printer (Watt, 1912, p.13-14).

Kay (1877, Plate 99, p.247-248) published a print showing **Hutton** making a spirited demonstration of some point to **Monboddo**. As Kay remarks, Hutton apparently had the matter "at his *finger-ends*". In the background a small figure with a *tail*, is an allusion to Monboddo's belief that we are all born with tails, which the midwives cut off. Another print by Kay shows Monboddo in conversation with Kames and **Hugo Arnot** (1749-1786), author of *The History of Edinburgh*, [1779] 1788 (Chambers, 1949, p.12-13). Monboddo took 26 years to write his two six-volume books. Kames, on the other hand, was a more prolific author. When Kames asked if Monboddo had read his latest book, Monboddo replied: "No, my lord, you write a great deal faster than I am able to read" (Watt, 1912, p.12).

For all his eccentricities and his veneration of the ancient Greeks, **Monboddo** was a kind and generous man. He was an early supporter and friend of **Burns**, and it was Monboddo's youngest daughter, Elizabeth (1766-1790), whose beauty and grace made a deep impression on Burns in December 1786: "the heavenly Miss Burnet ... There has not been any thing nearly like her, in all the combinations of Beauty, Grace, and Goodness the great Creator has formed, since Milton's Eve on the first day of her existence". She is the only person named in his *Address to Edinburgh*. Elizabeth Burnett died of

tuberculosis little more than three years after Burns first saw her, and the Elegy he wrote in her memory is well known.

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3. Enlightenment from 1759 to 1795

Of all the truly great figures of the Scottish Enlightenment, only **David Hume** (1711-1776), **James Hutton** (1726-1797), and **Walter Scott** (1771-1832) were born and educated in Edinburgh. Some historians would define the Enlightenment as lasting from the Union of the Scottish and English Parliaments in 1707 until the death of Scott in 1832. More commonly, however, the Scottish Enlightenment is taken to be the more restricted period from 1760 to 1790 – though we might extend this to include publication of Hutton's two-volume *Theory of the Earth* in 1795. The starting date of 1760 is also arbitrary; Hume and Smith, for example, were both active participants earlier.

For an overview of the history of the period in Scotland see Mathieson, 1910 and Craik, 1911. For general accounts of the Scottish Enlightenment see: Buckle, 1970; Berry, 1997; Roy Campbell, 1982; Chitnis, 1976; Daiches, 1964, 1986; 1996; Davie, 1991; Graham, 1901; Hampson, 1982; Joyce, 1951; and Rendall, 1978. For the industrial revolution see Hamilton, 1932, 1963; MacKinnon, 1921; Mathias, 1989; Maxwell, 1916; and particularly Porter, 1973. For literature see C. Gregory Smith, 1919.

A review of some of the intellectually significant events of this period in Scotland provides a context for Hutton, who was 34 years old in 1760, and 69 years old in 1795. After mentioning an event of significance at some particular date, I digress to give related information from later, or sometimes earlier, dates. Names of especial importance are identified in bold type where this could aid a reader searching for connections.

1759: Adam Smith published his *Theory of Moral Sentiments* – a work indispensable for the understanding of his better known book, *An Inquiry into the Nature and Causes of the Wealth of Nations*. When Smith died in 1790, his executors were his close friends Joseph Black and James Hutton.

Benjamin Franklin received an LL.D. degree from St Andrews in February 1759, and was ever afterwards known as Dr. Franklin. Franklin visited Edinburgh and met **Hume, Smith, Ferguson**, and probably **Robertson**. Although never honoured by Edinburgh University, Franklin was admitted "Burgess & Gildbrother of Edinburgh" in September 1759.

Robert Burns was born on 25th January 1759

1760: John Roebuck (1718-1794) founded the Carron Ironworks (Roy Campbell, 1961). Among other products, these works made the guns called carronades, which were to play an important role in naval warfare.

In 1792 Burns sent four carronades to the new Legislative Assembly in Paris. He had visited the Carron Works in 1787, and not being admitted he wrote the following lines (Burns, 1990, p.286; Mackay, 1992,

p.335, 412, 499-502):

- We cam na here to view your warks
In hopes to be mair wise,
But only, lest we gang to Hell,
It may be nae surprise.

Roebuck had studied chemistry and medicine in Edinburgh and Leyden. He practised medicine and had his own chemical laboratory in Birmingham before inventing the lead-chamber process for producing sulphuric acid and setting up a manufacturing plant in Prestonpans in 1749. This was one of the principal events marking the beginning of industrial chemistry. He received the Freedom of the City of Edinburgh for "eminent services done to his country". As a member of the Philosophical Society, Roebuck was a founding Fellow of the Royal Society of Edinburgh. He was one of the first to see the importance of the steam engine, becoming **James Watt's** (1736-1819) partner and financial backer as early as 1768. Watt must have sunk under his disappointments if he "had not been supported by the friendship of Dr Roebuck". Roebuck's coal-mining activities unfortunately brought about his financial ruin, his creditors considering as worthless his share in Watt's steam-engine (Jardine, 1798).

1760-64: Joseph Black distinguished between quantity and intensity of heat (extensive and intensive properties). His major contribution to chemistry was his introduction of the chemical balance and the use of quantitative methods (Crowther, 1962, p.41-46; Simpson, 1982).

Black's discovery of 'fixed air' (CO₂) was published by the Philosophical Society of Edinburgh in 1756 (Black, 1963; see also Dobbin, 1935). In the decade from about 1755 to 1765, Black – supported by **James Watt**, **John Robison** (1739-1805), and **William Irvine** (1743-1787) – took the first steps in developing a science of thermodynamics by discovering latent heat (1761) and measuring the latent heat of steam (1764). Carnot's cycle, it must be remembered was not formulated until 1824; the first law of thermodynamics (Joule) not until the early 1840s; and the second law (Kelvin) not until 1851. (For Watt, Robison, and Irvine, see Kent, 1950; Cardwell, 1963, 1971; Playfair, 1815, 1822; Crowther, 1962; Donovan, 1973, 1978).

It was with Dr. **Irvine** that **Hutton** and **John Clerk** of Eldin had planned to visit the island of Arran in 1787, but Irvine died in the spring (Hutton, 1997, p.191) and John Clerk junior took his father's place.

Hutton's ideas apparently began to form a theory during the decade 1755-1765, and Playfair reported that: "The theory of the earth had been a subject of discussion with them [Hutton and Black] for many years, and Dr **Black** subscribed entirely to the system of his friend" (Playfair, 1805, p.96).

1761: Sir James Hall (1761-1832) of Dunglass was born.

This friend of Hutton is recognised as the founder of experimental geology. He became the second President (1812-1820) of the Royal Society of Edinburgh, and was himself succeeded in office by Sir

Walter Scott (1820-1832).

1762: David Hume completed his six-volume *History of England*.

Hume's intimate friend, the Rev. **William Robertson** (Robertson, 1996; Dugald Stewart, 1801, 1997), had published his highly praised *History of Scotland* in 1759. Robertson's *History of Charles V* (1769) made Voltaire exclaim "It makes me forget all my hurts", and the Empress Catherine the Great said "It is my constant companion on all my travels". His *History of America* was published in 1777, and his *Ancient India* in 1791. Robertson, Historiographer-Royal, was Leader of the Moderate Party in the General Assembly of the Church of Scotland from 1752-1780, and Principal of the University of Edinburgh during its years of greatness from 1762-1793. It was under Robertson's leadership that the Royal Society of Edinburgh was founded (Neil Campbell, 1983). At the Society's first General Meeting in 1783 Robertson was elected one of the four Presidents of the Literary Class; one of the other Presidents was **Ilay Campbell**, the Lord Advocate who prosecuted Deacon Brodie, and whose copies of the Society's *Transactions* are now in the Library of the University of California at Los Angeles.

Hutton sent his draft Preface [c.1787] for *The Theory of the Earth* to **Robertson** for his advice. Robertson re-wrote the Preface, but Hutton followed Robertson's recommendation that it should not be published. Dennis Dean, who first published the two versions of the Preface (Dean, 1975) is of the opinion that Hutton's published Abstract [1785] was also paraphrased by Robertson from Hutton's original (White, 1973; Dean, 1992, Appendix 4, p.275-276).

In 1762, as a young man of 23, **John Robison** was the Board of Longitude's representative in charge of Harrison's chronometer on its test voyage to Jamaica (Playfair, 1815; Sobel, 1995, p.120-121).

Robison studied in Glasgow under **Black**, whom he succeeded as Professor of Chemistry in 1766 when Black transferred to Edinburgh (John Mackenzie, 1935). In 1772 the Empress Catherine the Great appointed Robison to the mathematical chair at the Imperial Naval Academy at Cronstadt. Robison, with his fluent knowledge of the Russian language, and his personal connections, made possible the link between Russia and the Royal Society of Edinburgh. Robison came to Edinburgh as Professor of Natural Philosophy in 1774, and was the first Secretary of the Royal Society of Edinburgh, holding that office until 1798. He published Black's *Lectures on the Elements of Chemistry* (1803), and **Playfair**, who wrote Robison's biography as well as **Hutton's**, reckoned that Robison's articles for the Encyclopaedia Britannica would make a volume of a thousand pages.

1763: Watt began the repair of a model of the Newcomen steam engine (Dickinson, 1927, 1936, 1963).

Watt recorded that it was his friend **Robison** who, in 1759, first directed his attention to the subject of steam-engines, and who suggested the idea of "applying the power of the steam-engine to the moving of wheel-carriages, and to other purposes".

1764: In 1764 Adam Smith left on the Grand Tour with Henry Scott, **3rd Duke of Buccleuch** (1746-

1812) who was aged 18. In 1783 the Duke became the first President of the Royal Society of Edinburgh.

Roebuck moved to Kinneil House, near Bo'ness, where he leased the coal-field and salt-works from the Duke of Hamilton (Dickinson, 1936, p.51, 57-66, 81, 86-87). Long afterwards Kinneil House was **Dugald Stewart's** residence in retirement (1810).

1765: It was at Kinneil that **Watt** perfected his model of the steam engine. What was probably his first working engine was erected in the Burn Pit colliery at Kinneil in 1765. **Black** lent **Watt** what was then the large sum of £1,200 (Robinson, 1970), the loan being taken over later by **Roebuck**, who at the time was developing the blast furnaces at Carron (Jardine, 1798).

Hutton recorded that he had found "sea shells in the travelled soil a considerable height above the level of the sea" in various places. Kinneil is one of the places he mentioned: "Above Kinneil [Kinneil], there is a bed of oyster shells some feet deep appearing in the side of the bank, about 20 or 30 feet above the level of the sea, which corresponds with old sea banks. .. There are many other marks of a sea beach upon a higher level than the present, but I mention only those which I can give with certainty" (Hutton, 1795, Vol.2, p.166).

1767: Professor **Adam Ferguson** (Small, 1862-1864; Fagg, 1968) published his *Essay on the History of Civil Society*, an early contribution to the development of sociology.

In **1745**, **Ferguson**, whose mother tongue was Gaelic, joined the Black Watch as Chaplain, and there is a well-known story that Ferguson charged, sword in hand, at the Battle of fontenoy. The story is told by Sir **Walter Scott**, who probably heard it from his boyhood friend, young Adam Ferguson, the Professor's son (Walter Scott, 1827, p.196; Lockhart,1900, Vol.4, p.41n). The story is also told by General Stewart of Garth (1772-1829), who helped Scott make the arrangements for George IV's visit to Edinburgh in 1822 (David Stewart, 1822). As Professor Jane Bush Fagg has pointed out, the Battle was fought on 11th May; Ferguson was licensed to preach by the Dunkeld Presbytery on 2nd July; and he joined his Regiment in Flanders in September – clearly too late to participate in the Battle of fontenoy (Fagg, 1968, p.19-21). A month after Ferguson's arrival in Flanders, his Regiment was ordered to return to England. Prince Charles Edward Stuart had landed in Scotland in July, and in November the Black Watch was sent to Kent to guard against a possible French invasion.

Hume was Secretary to **General James St Clair** [Sinclair] (d.1762), commander of the British forces in Flanders and leader of the assault at Quimperly Bay in October 1746. Professor Fagg has suggested that **Ferguson** and **Hume** first met on the Continent at this early date (Fagg, 1968, p.27). As the Black Watch withdrew from the Continent a month after Ferguson's arrival, such a meeting would have had to be in Flanders; the opportunity was of very short duration. Sadly, what remained of the Black Watch Records (which always travelled with the Regiment) were lost in a shipwreck off Ostend in 1793. Professor Fagg is now inclined to think that **Ferguson** met **Hume** in the living room of **Robert Adam's** family in Edinburgh (private communication, May 1997). Wherever it was that they first met, their army experiences would have provided much of mutual interest.

Ferguson and **Hume** were life-long friends; in his Will, Hume named Ferguson along with **Jean d'Alembert** (1717-1783) and **Adam Smith**. Ferguson, in his turn, named Robert Adam's nephew, **William Adam** (1751-1839), **John Clerk** of Eldin, and **James Russel** the younger (1754-1836) as his executors. From 1752-1757 Hume was Keeper of the historic Advocates' Library (now the National Library of Scotland), a position from which he withdrew in 1757 to allow Ferguson to be appointed in his place (Gray, 1925, Chapter 11; Fagg, 1968, p.45-47; Mossner, 1954, p.251, 255-256; Brown, 1989). Ferguson was subsequently Professor of Natural Philosophy (1759-1764), Professor of Moral Philosophy (1764-85), and nominally Professor of Mathematics (1785-1816) (For the integration of moral philosophy and natural philosophy in Edinburgh see Olson, 1975). Hume said of Ferguson that he had more Genius than any of the others, "as he had made himself so much Master of a Difficult Science, viz. Natural Philosophy, which he had never Studied but when at College, in 8 months so as to be able to Teach it" (Small, 1862-1864).

We need to pause here to distinguish between two Professor **James Russells**, father and son [Russell was often spelled Russel]. When attempting to construct eighteenth-century genealogical trees one encounters difficulties because the word "cousin" was still often used with the meaning of the Latin word *consanguineus*: persons "related by descent from a common ancestor, but not a brother or sister" (OED). The use of "cousin" in the narrow sense of "child of one's uncle or aunt" is modern, which is why we should speak of "first cousin" or "full cousin" to avoid misunderstanding. John Clerk junior, in the obituary of his uncle, George Clerk (1715-84), said: "He married ... his cousin-german Dorothy Clerk-Maxwell, heiress of Middlebie in Dumfries-shire" (John Clerk junior, 1788, p.55). He was alluding to the fact that the couple had a common grandfather (John Clerk of Penicuik, 1st Baronet) – the fathers of George and Dorothea were brothers. This relationship is what today we usually mean by "cousin". Similarly, "nephew" formerly meant descendant in general and grandson in particular.

There is, however, no ambiguity in the following statement: "The mother of Joseph Black [1728-1799], and the mother of James Russel [senior (d.1773)], late Professor of Natural Philosophy in the University of Edinburgh, were sisters; and the mother of Adam Ferguson was their aunt" (Ferguson, 1805, p.102). Ferguson goes on to say that as a student in Edinburgh, "he [Black] as well as Adam Ferguson, lived with their relation James Russel., whose singular correctness, and precision of thought, in various branches of science, could not fail to be of use to all who approached him" (op.cit. p.103). Although we do not know Professor Russel's date of birth, he was not a Professor when Ferguson and Black were students. Russel, in fact, was the unsuccessful candidate for the Chair in 1759 when Ferguson was elected, and in 1764, when Ferguson moved to the Chair of Moral Philosophy, Russel (a surgeon-apothecary) succeeded him in Natural Philosophy, holding this Chair until his death in 1773. Little is known about him other than that Hutton and Franklin were his friends, and that about 1771 Dugald Stewart was one of his students.

Ferguson says that Russel was a "relation", without telling us what the relationship was. According to Sir William Ramsay, however: "In 1751 Black went to Edinburgh to finish his medical studies [under Professor William Cullen], and lived with his *first cousin*, Mr James Russell, Professor of Natural Philosophy there, whose mother, a Miss Gordon, was sister to Black's mother" (William Ramsay, 1918,

p.17, italics added). In this paper, genealogical tree 4, relating Ferguson, Black, and Russell, depends upon on the accuracy of these statements.

James Russell, the son of Professor James Russell and his wife Margaret Balfour, was elected a Fellow of the Royal College of Surgeons (Edinburgh) in 1777. As a member of the Philosophical Society he was a founding Fellow of the Royal Society of Edinburgh, which he served as Vice-President. He practised as a surgeon in the city, becoming President of the College of Surgeons in 1796-1797. Through his own initiative he became the first Regius Professor of Clinical Surgery, a position he held from 1803-1833. **Hutton** was a friend of both James Russells, father and son, and it was the son who, as his doctor, attended **Hutton** on his death bed (Playfair, 1805, p.88).

The *Memoir* on the life of Professor Andrew Dalzel includes a genealogical tree showing the *Connexion of Some Edinburgh Families* (Dalzel, 1862, p.61). According to this authority, Principal Robertson's daughter Eleanor married John Russell, C.S., and they had a son, John Russell, P.C.S. If C.S. stands for College of Surgeons, and P.C.S. for President of the College of Surgeons, perhaps these two "John Russells" are confused with the two Professors, father and son, James Russell referred to here.

Andrew **Dalzel** (1742/3? -1806), Professor of Greek and Librarian of the University, wrote a *History of the University of Edinburgh* published in 1862 (Cockburn, 1874, p.16-18). It was he who reported that the University's mace had been stolen [by Deacon Brodie], and who arranged for the University to have a new mace and a seal for the ceremonial laying of the foundation stone of Robert Adam's new University building in 1789. Dalzel succeeded his father-in-law, Dr **John Drysdale** (1718-1788), as Principal Clerk to the General Assembly. Drysdale, twice Moderator of the General Assembly, had been a school friend of Robert Adam in Kirkcaldy, and was married to Adam's sister Mary. Their daughter Anne Drysdale married Dalzel. Robert Adam's other sister, Susanna, married **John Clerk** of Eldin. Differing spellings of **Susanna Adam**'s name have been given, but Susanna is how she signed each page of her Marriage Contract, witnessed by her brothers in 1753. (The text of the Contract refers, however, to "Susan Adams". SRO GD18/1882).

Huttonian and other connections are abundant. When the Royal Society of Edinburgh was founded, **Dalzel** was elected Secretary of its Literary Section. At Christmas 1787 he wrote: "I have been employed as one of a small committee for conducting the publication of the first volume of the Transactions of the Royal Society of Edinburgh [1788, containing **Hutton**'s *Theory of the Earth*], which is now on the point of being launched into the world, – I was going to say, into eternity, but that is rather an ambiguous expression. The vignette for the title is furnished by **Robert Adam**". Robert Adam and **William Robertson** were first cousins, and as already noted, Robertson's sister became the grandmother of Lord Chancellor **Brougham**.

Ferguson and **Black** were closely related; Ferguson's mother was the sister of Black's grandfather, and in 1766, Ferguson married Black's niece [See genealogical tree 4]. When Ferguson was abroad, as he was for many months at a time, his wife (with as many as six children) moved into her bachelor uncle's home, where the **Robertsons** helped to look after them. Ferguson wrote Black's biography (Ferguson,

1805). **Benjamin Franklin** and **James Hutton** were among Ferguson's other close friends.

1768: Construction of the Forth and Clyde canal began. **Hutton** was a member of the Management Committee from 1767-1775 (Jean Jones, 1982). If Hutton did not already know them, this would have brought him into contact with Lord **Kames** and the engineers James **Watt** and John **Smeaton**.

1769: **Watt** took out his first patent. **Black's** student, **Benjamin Rush**, graduated in Edinburgh in 1768 and was appointed in 1769 to the first American Chair of Chemistry, at the University of Philadelphia. Rush was one of the signers of the Declaration of Independence.

1770: **John Clerk of Eldin** began a productive period of at least twelve years as an etcher (Clerk of Eldin, 1855; Lumsden, 1925, 1962). There are, however, no known examples of his work earlier than 1772 or later than 1778. Clerk apparently learned the technique from his "good friend" **Paul Sandby** (1725-1809) – the "father of water-colour art" – who was in Scotland as draughtsman for the Board of Ordnance from 1746 to 1751. Sandby was a favourite of George III; Queen Charlotte, the Princes, and Princess Dashkov were among his pupils (Herrmann, 1986).

In 1775 Sandby thanked Clerk for etchings, including examples executed by Clerk's two sons, John and William "which are wonderfully clever and shew great spirit and Genius, which", he wrote, "I am not at all surprised at when the Parent stock is known, for a Clerk ingrafted on a choice sprig of Adam must of course produce most excellent fruit". Sandby was then experimenting with "Aquatinta". Although the process was still closely guarded, he gave his "dear friend" details of the procedure. "I think you will be much pleased on trial of these hints", Sandby wrote, "which I beg you will not tell to any save the young Artist your son [John]" (Hardie, 1933).

As late as 1782 Clerk was still etching, for he wrote to Robert Adam, thanking him for "the Aquatinta Process". Clerk recounted that his son John had been on the point of disclosing the secret "one day at Sir William Forbes's but I being there at the time stoped [sic] him luckily". Lumsden, the authority on the Clerk etchings, was "inclined to doubt the authorship of the one little plate (No.38), which shows signs of having been properly aquatinted". He thought it may have been by John junior (afterwards Lord Eldin) The present writer has a copy of this print. (John Clerk of Eldin to Robert Adam, 15 December 1782, SRO GD18/4223; Lumsden, 1925a&b; 1926; Hardie, 1933).

1771: **Walter Scott** was born in Edinburgh on 15th August. His nurse concealed the fact that she had consumption, but she fortunately confided in Dr **Black**, who was probably responsible for saving the lives of both nurse and child (Lockhart, 1900, Vol.1, p,11). Black had therefore the unique experience of being not only a distinguished Professor of Chemistry but sometime physician to **Hume** (d. 1776) and **Scott** (b.1771), as well as to others, such as Ferguson and possibly Hutton.

The *Encyclopaedia Britannica* was published in 1771. **William Smellie**, the editor, was responsible for "the complement and entire conducting of the first edition" (Chamber's *Biographical Dictionary ...* 1835, Vol.4, p.247).

Benjamin Franklin paid a three-week visit to Edinburgh, where, except for five days with Kames at Blair Drummond and two or three days in Glasgow, he stayed with Hume in his new house on St David Street (The spelling of Edinburgh street names follows Harris, 1996). Edinburgh's literary circle gave Franklin a generous welcome. Hume and Kames held dinner parties, and on the eve of Franklin's departure, all were Ferguson's guests. Although we know that Kames and Black were at dinner at Hume's house, we have no record of Hutton's presence at these parties, nor of Hutton's membership of any of the numerous social clubs, other than the Oyster Club. It is tempting to believe that Hutton (whose M.D. thesis was on the circulation of the blood) might have been a member of the Circulation Club, at whose annual dinner on the anniversary of the birth-day of Dr Harvey, the Sons of Aesculapius, commemorated the discovery of the circulation of the blood by the circulation of the glass.

1772: Hutton found "alkali in a stony body" (Playfair, 1805, p.47), and **Black's** pupil **Daniel Rutherford** (1749-1819), discovered nitrogen (Dobbin, 1935; Weeks, 1934). Rutherford, who was later Professor of Botany (1786-1819), was **Walter Scott's** uncle; i.e. Professor John Rutherford (who was twice married) was Professor Daniel Rutherford's father and Walter Scott's grandfather.

1773: Samuel Johnson (1709-1784) and **James Boswell** visited Edinburgh on their way to the Hebrides and again on their return journey en route for London.

When Philip Dormer Stanhope (1694-1773), 4th Earl of Chesterfield died in 1773, his heir was not his natural son, to whom he wrote the famous *Letters to his Son*, but his godson, Philip Stanhope (1755-1815). **Adam Smith** recommended **Adam Ferguson**, then Professor of Natural Philosophy, as tutor to the 19-year old 5th Earl. To the annoyance of the Town Council, Ferguson abandoned his classes (though he continued to draw his salary) and was absent on the Continent for two years. As his substitute he had recommended **Hutton's** friend, Dr **James Lind** (1736-1812) who had accompanied Sir **Joseph Banks** (1743-1820) on his voyage to Iceland in 1772 (O'Brian, 1987), and as a member of the Philosophical Society was a founding member of the Royal Society of Edinburgh. While Ferguson was abroad with his pupil, he visited Switzerland, and afterwards maintained a correspondence with the alpinist and geologist **Horace-Benedict de Saussure** (1740-1799), whom Hutton quoted extensively in his *Theory of the Earth* (1795).

1774: After surveying the route for the Caledonian Canal, **Watt** left Scotland to join **Matthew Boulton** in Birmingham, taking his prototype steam-engine from Kinneil with him (Dickinson, 1936, p.81-85; Mitchell, 1883; Robinson, 1969; Smiles, 1865).

1776: David Hume died on 25th August 1776, his monument being designed by his friend **Robert Adam** (Brown, 1991). **James Boswell**, who, only seven weeks before, had interviewed Hume on the subject of death and dying, inspected the open grave and watched the funeral from behind a wall, before going to the Library to read some of Hume's writings, but having an encounter with a young lady on the way.

Sir **John Hall** of Dunglass died nine days after Hume, both at the age of 65. **James Hall** inherited the title at the age of fifteen.

Publication of **Adam Smith's** *The Wealth of Nations*; the first volume of **Edward Gibbon's** *The Decline and Fall of the Roman Empire*; and James Keir's *On the crystallisation observed in Glass*. The last of these supplied inspiration for Sir James Hall's classic experiments in the 1790s.

1777: Hutton published his book on the Distinction between Coal and Culm, and its implication for taxation (Hutton, 1777).

1778: John Clerk of Eldin made his last identifiable etchings.

1779: John Clerk of Eldin journeyed to the North, finding granite veins in the River Garry north-west of Blair Atholl, investigating the vitrified fort of Craig Phadraig at Inverness, and collecting graphic granite at Portsoy.

Hume's *Dialogues concerning Natural Religion* was published. Hume, not daring to publish the book in his own lifetime, had asked **Adam Smith** to publish it posthumously. Smith refused, on the grounds that it would destroy his own career. Facts like this should be remembered when revisionist historians discuss Hutton's apparently "religious" references. Freedom of speech has always had limits.

In a codicil to his Will, Hume decreed that "if my Dialogues from whatever Cause, be not published within two Years and a half of my Death ... the property shall return to my Nephew, David [**David Hume** (1757-1838), Professor of Scots Law, Sheriff, and Baron of the Exchequer Court], whose Duty, in publishing them as the last Request of his Uncle, must be approved by all the World" (Mossner, 1954, p.592-593).

The Russian **Princess Catherina Romanovna Vorontsov Dashkov** (1744-1810), the friend of Diderot and Voltaire, toured Europe from 1768 to 1782. During that time she spent "several years" in Edinburgh, living at "Holyrood House, the ancient palace of the Sovereigns". The Princess had assured Principal Robertson that her thirteen-year-old son, Paul, "was entirely fit and able to be a student since he had a perfect knowledge of Latin, mathematics, history, geography, French and German, and had sufficient command of English to understand everything, though he did not speak it fluently enough yet" (Dashkov, 1958, p.146).

Dr **Cullen** was her doctor. Princess Dashkov made the acquaintance of other University professors, describing them in words reminiscent of Playfair's account of the Oyster Club (quoted below): they were all "esteemed for their intelligence, intellectual distinction and moral qualities. Strangers alike to envy and to the pretentiousness of smaller minds, they lived together in brotherly amity, their mutual love and respect making of them a group of educated and intelligent people whom it was always an immense pleasure to see and whose conversation never failed to be instructive. ... The immortal Robertson, Blair [the famous preacher Rev. Hugh Blair (1718-1800)], Smith and Ferguson came twice a

week to spend the day with me". It is not surprising that in her Memoirs the Princess recorded that "this period of my existence was both the happiest and most peaceful that has ever fallen to my lot in this world" (Dashkov, 1958, p.147). Her son sat his public examination for the Master of Arts degree in May 1779. His success was such that the audience, which was "prodigiously numerous", could not refrain from clapping.

1780-81: Ferguson was unwell and was treated by **Joseph Black**, his friend, kinsman, and physician. He went for treatment to Bath, where he remained for several months. Years later (1797) **Horace-Benedict de Saussure** had a similar illness and asked Black for an account of Ferguson's case.

About this time Playfair became acquainted with Hutton.

1781-83: Sir James Hall was a student at Edinburgh University, taking classes from **John Robison** (Natural Philosophy), **Joseph Black** (Chemistry), **Adam Ferguson** (Moral Philosophy), and **John Walker** (1731-1803) (Natural History).

1782: Henry Home, Lord Kames died.

1783: Ferguson published his *History of the Progress and Termination of the Roman Republic*.

The Royal Society of Edinburgh received its Royal Charter, which includes the names, amongst others, of **George Clerk [Maxwell]**, **Robertson**, **Cullen** (Professor of Chemistry and Medicine: Black's teacher and predecessor first in Glasgow and then in Edinburgh), **Alexander Monro secundus** (1733-1817) (Professor of Anatomy), **Ferguson**, **Robison**, and **Adam Smith**.

The Society's initial twelve Counsellors included Monro, Black, Hutton, Stewart, Playfair, Smith, and Ferguson, already mentioned. Two of the other Counsellors were **John Maclaurin** (1734-1796) and Professor **John Hope**. John Maclaurin (raised to the Bench as Lord Dreghorn), was the eldest son of **Professor Colin Maclaurin** who had been influential in bringing the Society into being; John Hope, Professor of Botany and Medicine, 1761-1786, was the father of **Thomas Charles Hope**, the eminent Professor of Chemistry who succeeded Black and held the Chemistry Chair from 1795-1844 (Grant, 1884; Kent, 1950). Among the first Officers of the Society were **Robison**, **Cullen**, **Clerk-Maxwell**, **Robertson**, and **Blair**, already mentioned.

The two Secretaries of the Physical Section were **John Walker** and **James Gregory** (1753-1821). Walker was Professor of Natural History, 1779-1803 (Walker, 1966). James Gregory was the son of **John Gregory** (1724-1773), formerly Professor of Philosophy (i.e. Mathematics, Natural Philosophy, and Moral Philosophy) in Aberdeen, and Professor of the Practice of Physic in Edinburgh. Professor Gregory died very suddenly in 1773, aged 49, and his son, James, then a student aged 23, gave the lectures in his father's place, and was appointed to the Chair of Medicine in 1776. James' grandfather was **James Gregorie** (1666-1742), Professor of Medicine in Aberdeen; his great-grandfather was **James Gregorie** (1638-1675), the famous mathematician and inventor of the reflecting telescope. The name

Gregorie (later Gregory) was taken by the MacGregors after 1603, when the entire clan was outlawed and the name MacGregor proscribed on pain of death (Prebble, 1971). The famous Rob Roy MacGregor, alias Campbell, lived from 1671-1734. At least 14 Professors descended from the Rev. John Gregorie (d.1650), minister of Drumoak (10 miles south-west of Aberdeen) – six occupied the Edinburgh Chairs of Mathematics (3), Medicine (2), and Chemistry; three were appointed at the age of 22 or 23.

In 1782 Princess Dashkov returned to Moscow, where she was appointed Director of the Academy of Arts and Sciences. In 1783 – the year that the Royal Society of Edinburgh received its Charter – the Princess founded the Imperial Academy of Sciences of St Petersburg, and Catherine the Great appointed her the Academy's first President. On Princess Dashkov's nomination, Joseph Black was elected a Foreign Member of the Academy (Ramsay, 1918, p.117; Crowther, 1962, p.89. The date is 1784 according to Encyclopaedia Britannica, 1929, Vol.15, p.68).

1783-86: Sir James Hall travelled on the Continent, where he visited the active volcanoes of Vesuvius, Etna, and Lipari. In Paris he became a friend of Lavoisier (Chaldecott, 1968).

1784: Watt and his business partner **Matthew Boulton** (1728-1809) were nominated by **Hutton** and elected Fellows of the Royal Society of Edinburgh at the Society's second General Meeting.

Sir James Hall, while abroad, was elected a Fellow of the Royal Society of Edinburgh.

Black was already teaching the new chemistry of **Antoine Lavoisier** (1743-1794). Lavoisier called Black "The illustrious Nestor of the chemical revolution" and in a letter said to him "I consider you my Master". (Chambers Biographical Dictionary, 1835, Vol.1, p.211; Crowther, 1962, p.12). Guerlac, however, states: "Of Joseph Black, often described as a major influence upon him, Lavoisier clearly knew nothing at first hand until 1773 or perhaps late 1772, for Black's famous *Essay on Magnesia Alba* was for long unavailable in French" (Guerlac, 1966, p.12-16, and 1975, p.77).

1785: The earliest Chemical Society in the world, the **Edinburgh University Chemistry Society**, was founded by **Black**'s students (Kendall, 1942, 1947, 1952). It should be remembered, too, that the Political Economy Club of Glasgow was founded about 1743, and the Literary Society of Glasgow in 1752; **Adam Smith** was a student in Glasgow 1737-1740, before going to Balliol College, Oxford, 1740-1746.

Hutton's *Theory of the Earth* was read to the Royal Society of Edinburgh (Victor Eyles, 1950, 1955). As Hutton was unwell, the first part of the paper was communicated by **Black**, Hutton communicating the second part. In the autumn of 1785 Hutton and **John Clerk of Eldin** looked for granite veins and found them in Glen Tilt.

About this time Sir **Richard Arkwright** (1732-1792) helped to found water-powered textile factories at New Lanark on the Clyde and at Stanley on the Tay.

1786: Hutton and **John Clerk of Eldin** found basaltic dykes on the Clyde, raised beaches at Loch Ryan, and granite veins in Galloway. John Clerk drew a cross-section of the Midlothian coal basin (McIntyre & McKirdy, 1997, p.23-24).

1786-88: Robert Burns visited Edinburgh (McVie, 1969). In 1771 **Henry Mackenzie** (1745-1831) had published *The Man of Feeling* – a book Burns prized "next to the Bible" and carried everywhere with him. (For Mackenzie see Thompson, 1931; Henry Mackenzie, 1927). After **Dugald Stewart** showed Mackenzie a copy of the Kilmarnock edition of Burns' poems (1786), Mackenzie wrote a glowing review in *The Lounger* (9th December 1786), published by **William Creech**. In this review **Mackenzie** created the image of Burns as the "Heaven-taught ploughman". (Robert Burns 15th January 1783 in Robert Burns, 1990, p.54-55; James Mackay, 1992, p.92, 256-257).

At the age of eighteen **Dugald Stewart** taught his father's classes in mathematics. He also introduced an astronomy class, filled in for Professors **Dalzel** in Greek, **Robison** in Natural Philosophy, and **Ferguson** in Moral Philosophy, Belles Lettres and Political Economy. From 1785-1810 Dugald Stewart succeeded Ferguson as Professor of Moral Philosophy. His father, **Matthew Stewart**, and **Adam Smith** had been colleagues in Glasgow; which explains why it was Dugald Stewart who wrote Smith's biography. (Dugald Stewart, 1794; Veitch, 1877).

Dugald Stewart was a teacher of immense influence at a time when students came to Edinburgh when, because of war with France, they were unable to go on the Grand Tour in the Continent. Men such as Sydney Smith, Francis Horner, Lord Webb Seymour, Lord Jeffrey, Lord Brougham, Henry Erskine, and Lord Cockburn attended his lectures. Many of his students went on to careers of highest importance; the list includes two future Prime Ministers, two Lord Chancellors, one Chancellor of the Exchequer, two Attorney Generals, a Lord Advocate, three Foreign Secretaries, two Home Secretaries, two early Councillors of the Geological Society of London, the leader of the Scots bar, and several Senators of the Court of Session. As students, **Lord Palmerston** and **Lord Daer** boarded with him.

The *Edinburgh Review* is said to have been born in Stewart's classroom. "To me, **Lord Cockburn** wrote, "his lectures were like the opening of the heavens. I felt I had a soul. His noble views, unfolded in glorious sentences, elevated me into a higher world" (Cockburn, 1874, p.22). Dugald Stewart's Monument on the Calton Hill is a well-known Edinburgh landmark. It stands a few feet from **Playfair's** Monument, and overlooks **David Hume's** grave, the North Bridge, and Princes Street. Above it towers the Monument to **Admiral Nelson** (1758-1805), killed at the Battle of Trafalgar (1805), from which the visitor can see the grave of **Adam Smith** in the Canongate, and Panmure House which was Smith's last home and where he died with his friends **Black** and **Hutton** beside him.

1787: Creech published the Edinburgh edition of **Burns'** poems. **Adam Ferguson** invited a small party to his home in Sciennes House to meet the poet. This was the only time that **Robert Burns** (aged 28) and **Walter Scott** (aged 16) met. **Hutton**, **Black**, and **Dugald Stewart**, were present along with the famous aeronaut Lunardi (1759-1806) (Small, 1862-1864, p.647; Lockhart, 1900, Vol.1, p.115-116).

Hutton visited Arran with **John Clerk**, junior. Later the same year Hutton discovered the unconformity at Jedburgh, which **John Clerk of Eldin** illustrated in Hutton's *Theory of the Earth* in 1795.

In November 1787 **Ferguson** wrote to **de Saussure** (1740-1799), who, three months before, had made the first ascent of Mont Blanc. The letter illustrates the close relationship between Ferguson and Hutton:

"[Mr Hutton] has long worshipped the same Divintys [sic] with you and embraced every specimen of stone or earth with a most pious attention. His Ideas are magnificent and what is more precious and more different in science formed with a scrupulous regard to reality, You have some account of them in the paper he has furnished me, to be sent by these gentlemen to you. He had directed a copy for you to the Secretary of the Academy of Agriculture at Paris of which he is a member: but as the copy I now send may arrive before the other he is willing to indulge my request of having this duplicate for the purpose. He has likewise joined a copy of his theory of Rain [The second paper in the first volume of the Transactions of the Royal Society of Edinburgh, 1788]. It would be a great pleasure to him and to me to pay our respects at Geneva and visit your mountains. There is a company here [the Oyster Club?] in which it has often been mentioned, but we should draw different ways some to contemplate the Earth, others the Country ancient and Modern and I am particular to follow the Tract of my Friends the Romans" – The reference is, of course, to Ferguson's book on the Roman Republic (Merolle, 1995, Vol. 1, p.332).

1788: Hutton's *Theory of the Earth* was published in the first volume of the *Transactions of the Royal Society of Edinburgh*. **Henry Mackenzie** edited this famous volume (Thompson, 1931, p.286. I do not know the authority for Thomson's assertion, but it happens that I own Mackenzie's copy of the volume).

Franklin's letter of 22nd September 1782 to the Abbé Soulavie (1752-1813) on geology was read to The American Philosophical Society in 1788. Observing that marine strata are found both in the hills of Derbyshire and below sea-level in the coal mines, Franklin concluded that some parts of England had been depressed while other parts had been uplifted: "Such changes in the superficial parts of the globe seemed to me unlikely to happen", Franklin said, "if the earth were solid to the centre. I therefore imagined that the internal parts might be a fluid more dense, and of greater specific gravity than any of the solids we are acquainted with; which therefore might swim in or upon that fluid. Thus the surface of the globe would be a shell, capable of being broken and disordered by the violent movements of the fluid in which it rested. ... Superior beings smile at our theories, and at our presumption in making them. ... It has long been a supposition of mine that the iron contained in the substance of this globe, has made it capable of becoming as it is a great magnet" (Franklin, 1905-1907, Vol.8, p.597-603; see also Dean, 1989). Arthur Holmes began his first lecture in Edinburgh on Advanced Physical Geology (19th October 1943) by referring to Franklin's theory of the Earth's fluid interior before developing his own views on continental drift and convection currents in the mantle (My lecture notes from Holmes' class are in Edinburgh University library).

In **1788 Sir James Hall** gave a spirited exposition of Lavoisier's *new Theory of Chemistry* at three successive meetings of the Royal Society of Edinburgh. At the next meeting **Hutton** answered with a

paper defending the Phlogiston theory (Allchin, 1994). An "extra ordinary" meeting was then called at which Hutton made further observations on Phlogiston, to which Hall in turn replied. Hall, who was 35 years younger, had a most unusual relationship with Hutton. Having publicly crossed swords on so controversial an issue, the two might not have remained on speaking terms; yet only three weeks later Hall entertained Hutton and Playfair at his home at Dunglass, from which the three together made the memorable excursion to the unconformity at Siccar Point. Late that summer Hall, following up on Hutton's observations on granite, undertook arduous field work in Galloway and was the first to walk out the boundary of a granite pluton.

1789: The foundation stone of **Robert Adam's** new University building (now the "Old Quad") was laid in great ceremony. To commemorate the occasion the Town Council donated a new mace to take the place of the original stolen two years before by **Deacon Brodie**, then (as a Councillor) a trustee of the University. The mace displays the University's new Coat of Arms, designed for the occasion by the Lord Lyon King of Arms. The names of Lord Provost Thomas Elder and **William Creech** (then acting as College Bailie) are inscribed on this new mace (Grant, 1884, Appendix G, p.250-252).

1790: An accident at the Leith glass-house at the end of 1789 or the beginning of 1790 provided the impetus for **Hall's** experiments, which he began in 1790 (Hall, 1794, 1805; Flett, 1921; Victor Eyles, 1961, 1963).

At a meeting of the Royal Society of Edinburgh on 4th January 1790, **Hutton** and **Hall** both presented their observations on granite; the second part of Hall's paper being held over to the meeting of 1st March, when Hutton himself was in the chair. Hall concluded that "if the glass produced by the fusion of granite had been allowed to cool with sufficient slowness, it might have crystalized [sic], producing a granite similar to that which was originally melted" (Hall, 1794, p.11). In this paper Hall describes how a porphyritic rock would form when, after slow cooling "in the bowels of the earth", the liquid is forced upward and "being spread thin upon the surface, and exposed to the air, would lose its heat suddenly" (Hall, 1794, p.12).

Adam Smith died on 17th July aged 67, regretting that "he had done so little"; Hutton recorded Smith's farewell words: "We must adjourn this meeting to some other place" (Dugald Stewart, 1794, p.131n). **Black** and **Hutton**, as Smith's executors, were authorised to publish some of his papers but instructed to burn the rest, and passages in Smith's posthumous *History of Astronomy* (Adam Smith, [1795], 1982), are similar to some of Hutton's. (For parallels between political economy and geology see Rashid, 1981, and Celal Sengor, to be published).

In 1790, only eight months after publication of **Lavoisier's** *Traité élémentaire de Chimie ...* in Paris (1789), a translation by Black's student Robert Kerr was published in Edinburgh as *Elements of Chemistry in a new systematic order, containing all the modern discoveries*.

Sir William Johnstone Pulteney founded the Chair of Agriculture in 1790. It was possibly the earliest in any country, and was the first Edinburgh Chair founded by the gift of a private individual. This no doubt

was of considerable interest to Hutton. The creation of the Chair caused much distress and jealousy involving the Town Council and several of the Professors who felt their respective rights had been infringed (British Association, 1921, p.166; Grant, 1884, Vol.1, p.344-347, Vol.2, p.456).

1791: Sir James Hall revisited **Lavoisier** in Paris, but the events of 1793 ended their contact.

1792: The Chemical Society of Philadelphia, the first in America, was founded. Its roots go back to Joseph Black. Benjamin Rush, the founder, was Black's student.

1794: Lavoisier was guillotined. "The story that Lavoisier appealed at his trial for time to complete some scientific work and that the presiding judge replied, 'The Republic has no need of scientists,' is apocryphal. Authentic, however, is the remark of Lagrange, shortly after Lavoisier's execution: 'It took them only an instant to cut off that head, and a hundred years may not produce another like it'" (Henry Guerlac, 1975, p.130).

Hutton's paper on Granite was published.

1795: Hutton's *Theory of the Earth* was published in 2 volumes.

Thomas Charles Hope, the discoverer of strontium, became joint Professor of Chemistry, occupying the Chair with distinction from 1795-1844.

1796: Robert Burns died on 21st July, aged 37.

1797: Hutton died on 26th March aged 70. "Dr Hutton's health had begun to decline in 1792; and he was seized with a severe illness during the summer of 1793, which, after some intervals of convalescence, terminated at last in his death, upon the 26th March 1797" (Kay, 1877, p.56). "On Saturday the 26th of March he suffered a good deal of pain; but, nevertheless, employed himself in writing, and particularly in noting down his remarks on some attempts which were then making towards a new mineralogical nomenclature. In the evening he was seized with a shivering, and his uneasiness continuing to increase, he sent for his friend Mr Russel, who attended him as his surgeon. Before he could possibly arrive, all medical assistance was in vain: Dr Hutton had just strength left to stretch out his hand to him, and immediately expired" (Playfair, 1805, p.88). This friend was Mr **James Russell**, younger, who was then President of the College of Surgeons in Edinburgh.

1798: Sir James Hall began a series of 500 separate experiments that kept him busy, often seven days a week, until 1805. On 17th January 1798 Hall succeeded in making a glass by melting a piece of whinstone. Ten days later, by cooling the molten glass slowly he produced a stony, crystalline substance "in texture completely resembling whinstone" (Hall, 1805, p.46-50). Hall added the following footnote: "I showed this result at a meeting of the Society [the Royal Society of Edinburgh] on 5th February" (Hall, 1805, p.48). Through the courtesy of Mr Kamal S. Siddiqui, British Geological Survey,

the present writer was privileged to display this specimen (labelled by Hall himself) when giving an invited lecture at the Third International Symposium on Experimental Petrology and Geochemistry, held in Edinburgh in April 1990, marking the bicentennial of the beginning of Hall's experimental work.

Professor **T.C. Hope** (who suggested the term *crystallite* for "these crystallized substances, obtained from the glasses") successfully reproduced Hall's results; as did "Mr Boswell of Auchinleck"; i.e. Sir **Alexander Boswell** (1775-1822), eldest son of **James Boswell** (Dr Johnson's biographer), and grandson of Alexander Boswell (1706-1782), the judge Lord Auchinleck.

Black had thought experiments would probably not succeed and that they were unnecessary "as the proofs of fusion are so certain and the analogy in favour of Hutton's view of the matter is so strong". It is well known that Hutton disapproved of those who "judge of the great operations of the mineral kingdom, from having kindled a fire, and looked into the bottom of a little crucible" (Hutton, 1795, Vol.1, p.251; Hall, 1805, p.45). Before we patronisingly dismiss Hutton, we should recall that he had reason to suspect that the scale of any possible experiments would yield unambiguous or even negative results, which his critics would use to refute his theory. Dawson has examined Henry Sorby's thin-sections of Sir James Hall's specimens experimentally fused rocks. The basaltic crystallites are in fact not completely crystallised but contain glass (Dawson, 1992).

1799: Black died on 26th November. He was sitting at table with a measured quantity of milk diluted with water. When the end came he put down the cup on his knees without spilling a drop. In his Will he divided his property into 10,000 shares so that he could allot to his friends the exact proportions he intended (Ferguson, 1805, p.117).

4. Historical Background

1603: The King Leaves Edinburgh

To understand the political background of Edinburgh in Hutton's day we must go back briefly to 1566 when Mary Queen of Scots (1542-1587) gave birth to her son James (1566-1625) in a tiny room in Edinburgh Castle overlooking the black basalt cliff of the Castle Rock. In 1567, only thirteen months later, Mary was forced to abdicate and her infant son was crowned King James VI. (For general background see Lynch, 1991, and Smout, 1969. Tranter, 1991, is a more informal but eminently readable introduction. Tomkeieff, 1948, 1950, Macgregor, 1950, and McIntyre, 1963, touch on historical matters relating more directly to Hutton).

Mary's grandmother, Margaret Tudor (1489-1541), was the Queen of James IV (1473-1513) of Scotland, the sister of Henry VIII (1491-1547) of England, and the daughter of Henry VII (1457-1509). Consequently, Mary's father, James V (1512-1542) of Scotland, was a nephew of Henry VIII of England and first-cousin of Henry's children Edward VI (1537-1553), Queen Mary (1516-1558), and Queen Elizabeth (1533-1603). Through Margaret Tudor's second marriage (to Archibald, 6th Earl of Angus) she was also grandmother of James' father, Henry Stuart, Lord Darnley (1545-1567). James VI could therefore trace his descent from Henry VII of England through both his father and mother [See genealogical tree 5].

Is the correct spelling of the name *Stewart* or *Stuart*? In answering this often-asked question I follow Antonia Fraser, who points out that although Mary Queen of Scots was born a *Stewart* (like her father, James V), she became a *Stuart* on her marriage to Henry Stuart, Lord Darnley. Moreover as the Anglo-French spelling of her name – Stuart – was adopted on her behalf during her upbringing in France, and always used by her, it is reasonable to refer to James VI and his descendants as a Stuart dynasty (Antonia Fraser, 1969, p.5n).

Queen Elizabeth, the last legitimate descendant of Henry VIII, died about three o'clock in the morning on the 24th March 1603 (by the Scottish calendar). Some six hours later Sir Robert Cary slipped out of London to carry the news to Edinburgh. "He had ridden as never man rode before, spur and gallop, spur and gallop all the way, through that day and the next and the next, the two intervening nights hardly excepted; and here he is at Holyrood on the evening of the third day, – an incredible ride!" (David Masson, 1892, p.61-75). Throwing himself on his knees, he told James VI of Scotland: "Queen Elizabeth is dead, and your majesty is King of England". Ten days later King James VI & I left Edinburgh for London, where he told the English Parliament: "I govern Scotland with my pen – which my ancestors could not do by the sword". Although the Court went with him, the Scottish Parliament remained in Edinburgh: one king and two nations.

1688: “The Glorious Revolution”

James VI’s grandson, James VII of Scotland and II of England (1633-1701), succeeded to the throne in 1685 on the death of his brother, Charles II (1630-1685). In 1688 the actions of James VII, provoked concern that he would re-establish the Roman Catholic religion. The previous year he had appointed a commission to visit all universities “and to place only such persons in them as were agreeable to the King’s system of religion and government”. James VII, then aged 55, had, however, no male heir, and his daughters, Mary and Anne were Protestants. There was consternation, therefore, when the Queen gave birth to a son: Catholics claiming that their prayers had been answered; Protestants alleging that a child had been fraudulently substituted as the King’s son. Five months later, in November 1688, William of Orange (1650-1702) landed with an army backed by international finance. William’s claim to the throne was that he was both the King’s nephew and son-in-law; his mother was the King’s sister, and his wife, Mary (1662-1694), was the King’s elder daughter. A Scots army sent to oppose his landing went over to William’s side, and King James fled to France, no doubt remembering how Parliament had beheaded Charles I, his own father. His supporters were called Jacobites, *Jacobus* being Latin for James (Insh, 1952; Lenman, 1995).

England quickly accepted the ‘Glorious Revolution’, welcoming William of Orange and his wife Mary. Scotland, on the other hand, was fiercely torn between the Jacobites – those loyal to the deposed Catholic King – and the supporters of Protestant William and Mary. In April 1689 the Scottish Convention met under the guns of Edinburgh Castle, which was commanded by the Jacobite Duke of Gordon, and offered the throne to William and Mary. John Graham of Claverhouse, Viscount Dundee, raised the Highland clans, and in June routed King William’s army at the Battle of Killiecrankie. But Dundee was killed, and without its victorious general, the Jacobite army was soon afterwards defeated at Dunkeld. The Catholic and Episcopalian cause was lost nine months after James’s departure.

1690: Presbyterian Inquisition

In 1690 Presbyterianism was established in Scotland, and the General Assembly of the Kirk met in Edinburgh. William and Mary were offered and accepted the Scottish Crown, and a “Presbyterian Inquisition” was established. All kinds of Prelacy were outlawed; not only Catholicism but also Episcopacy. An Oath of Allegiance to William and Mary was imposed, and failure to comply with its letter was the excuse for the infamous Massacre of Glencoe in 1692. All Ministers of the Gospel were to pray for King William and Queen Mary or lose their positions – it was useless to plead illness or that the edict had arrived after the prescribed date. Episcopalian curates were literally dragged from their homes, and their furniture and books burnt. Those who fled from the violence were afterwards deprived of their positions “for deserting their charges”. The Presbyterian ministers who took their places were, for the most part, “grimly religious and bigoted”, believing that “to know the Lord’s word was worth all the pagan learning of the world” (Graham, 1928, p.267-277).

The Scottish Parliament passed an Act for the Visitation of Universities in 1690 (Bower, 1817-1830). It stated: “Our Sovereign Lord and Lady, the King and Queen’s Majesties and the three Estates of

Parliament considering how necessarie it is for the advancement of Religion and Learning and for the good of the Church and peace of the Kingdom that the universities, colledges, and schoolls be provided and served with pious, able and qualified professors, principalls, regents, masters, and others bearing office therein well affected to their Majesties and the established government of Church and State. Therefore ...from this time forth, no Professors, Principalls, Regents, Masters, or others bearing office in any university, colledge, or schooll within this Kingdome be either admitted or allowed to continue in the exercise of their saids functions but such as doe acknowledge and profess, and shall subscribe to the confession of faith ratified and approven by this present Parliament, and alsoe sweare and subscribe the oath of allegiance to their Majesties; ... and such as shall be found to be erroneous, scandalous, negligent, insufficient, or disaffected to their Majestie's Government, or who shall not subscribe the Confession of faith, sweare and subscribe the oath of allegiance and submit to the government of the Church now settled by Law to purge out and remove" (spelling as quoted by Agnes Grainger Stewart, 1901, p.55-57).

Alexander Monro (d.1715), Principal of the University, and five of the ten members of the Senatus Academicus were tried and dismissed. David Gregorie (1661-1708), the distinguished Professor of Mathematics (1681-1693), who taught Newton's philosophy in Edinburgh many years before it was accepted in Cambridge, resigned rather than subscribe to the Westminster Confession of Faith. With Newton's support, Gregorie (changing his name to Gregory) became Savilian Professor of Astronomy in Oxford, where the same ordinances were not enforced. (For a first-hand account of *The Presbyterian Inquisition* see Monro, 1691).

1707: Parliament Leaves Edinburgh

William and Mary died childless, Mary in 1694 and William in 1702. William was therefore succeeded by Mary's sister, Anne (1665-1714), and one of Queen Anne's early actions was to appoint a Commission to negotiate a Treaty of Union between Scotland and England (Donaldson, 1970, p.268-277). One of the Commissioners was 31 year-old [Sir] **John Clerk** (1676-1755), later second Baronet of Penicuik, the father of Hutton's friends **George Clerk-Maxwell** (later the fourth Baronet), and **John Clerk of Eldin**, and grandfather of the brothers **John Clerk** (later **Lord Eldin**) and **Will Clerk** (Sir John Clerk, 1892, 1993; Ian Brown 1987). Votes in the Scottish Parliament were traded for personal advantage, bribery, and expectation of patronage, and in 1707 the Parliaments of the two countries were united (Daiches, 1977). Edinburgh became a capital without King, Court, or Parliament. The Treaty of Union (called in England an "Act of Parliament"), however, preserved the Law, the Church, and the Universities in Scotland. This is why lawyers, clergymen, and academics were prominent in Edinburgh throughout Hutton's lifetime.

Henry Grey Graham has recounted that: "From 1690 to about 1725 there was a dreary stagnation of all intellectual life and destitution of scholarship in Scotland" (Graham, 1928, p.449). Hutton, born in 1726, entered the University in 1740, consequently escaping the worst excesses of the appalling educational system:

“To make the difficulty of learning as great as possible, and as if to make the whole system as useless as possible, the instruction was imparted in Latin. Many a poor boy who had in a village school just scraped enough knowledge to make him ambitious, and whose father had scraped enough of meal or money to keep him in food, came to the college and heard everything said in what was an unknown tongue; in it the professor prayed, lectured, examined; in that language boys barely acquainted with their own tongue were expected to repeat ponderously inept Aristotelian definitions, and to remember professorial prolixities on Grotius and Puffendorf. Their minds were strained by disquisitions they could not follow, crammed with terminology no dictionary could explain, and full of technical phrases no classical author had ever used.” (Graham, 1928, p.454).

It is, indeed, difficult to understand how, in the intellectual, religious, and political climate that obtained up to and through Hutton’s own childhood, even a genius like his could have blossomed. It should be no cause for surprise that Hutton’s contributions to a proper understanding of the history and development of this Earth were made in the second half of the eighteenth century – they could hardly have been made earlier, and even in the last decades of the century, Hume, Smith, Burns, and Hutton had to tread warily to avoid bringing down the wrath of Church and Government on their heads. To judge Hutton while ignoring his historical context, as revisionist historians too often do, is to condemn without hearing the evidence. (For a general history of the time, with much interesting information, see Craik, 1911).

1714: Jacobites and Hanoverians

In 1701 the English Parliament approved the *Act of Succession*, requiring all future sovereigns to be members of the Church of England, but no similar Act was approved by the Scottish Parliament which still met in Edinburgh.

Queen Anne died childless in 1714. She had given birth fifteen times, but none of her children had survived more than two years. The only living descendants of Charles I were Catholic. They were the son and grandsons of James VII; namely, the “Old Pretender”, James Stuart (1688-1766), and his two sons, Charles Edward Stuart (1720-1788), the “Young Pretender”, and Henry Benedict, Cardinal York (1725-1807), who on the death of his brother in 1788 (the year Hutton published *The Theory of the Earth*) assumed the title Henry IX. The Elector of Hanover was, however, a Protestant, and his grandmother, Elizabeth (1596-1662), Queen of Bohemia, was a daughter of James VI and sister of Charles I [See genealogical tree 6]. The Whig Government, representing the commercial as opposed to the land-owning interests, invited the Elector to London in 1714 as King George I (1660-1727), though he knew nothing of the language or the culture of his new subjects.

1715, 1719: Jacobite Risings for James VIII

Though Scotland was forced to accept the Hanoverian Succession, many believed that Scotland retained the right to choose its own king, and in 1715-1716 a second Jacobite Rising took place, under the Earl of Mar (Baynes, 1970; Sinclair-Stevenson, 1971; Tayler, 1936). The Old Pretender was proclaimed James VIII, but he arrived in Scotland after the Battle of Sherrifmuir, when the prospect of regaining the throne

was irretrievably lost.

A third Rising in favour of the Stewart cause took place in 1719, when a Jacobite force supported by Spanish soldiers was defeated in Glen Shiel. In order to subdue and police the Highlands, General (later Field Marshal) **George Wade** (1673-1748) was sent on a reconnaissance in 1724. Acting on his report, the Government appointed Wade Commander-in-Chief in Scotland, and in 1725 he began construction of his famous network of military roads. The lines attributed to William Caulfield, Inspector of Roads 1732-1767, are well known:

- “Had you seen these roads before they were made,
You would lift up your hands and bless General Wade.”

The formidable task of building a road from Dunkeld to Inverness, the route of the present A9, was accomplished by Wade between 1726 (the year of Hutton’s birth) and 1737 (Haldane, 1962, p.11; Mitchell, 1883; Salmond, 1938). Even after the road was completed, Lord Lovat, in 1740, took eleven days to go by coach from Inverness to Edinburgh, breaking an axle three times on the way! Even on horseback it took five or six days to ride from Morayshire to Edinburgh (Graham, 1928, p.40-41). Another road went from Stirling, Crieff, and Aberfeldy to join the main road from Dunkeld at Dalnacardoch. Another went from Fort William along the Great Glen to Inverness (Rogers, 1884, Vol.1, p.220-223).

Playfair reported that in 1764 **Hutton** made a geological excursion to the North of Scotland with **George Clerk-Maxwell** “a gentleman distinguished for his abilities and worth, with whom Dr **Hutton** had the happiness to live in habits of the most intimate friendship. They set out by the way of Crieff, Dalwhinnie, Fort Augustus, and Inverness; from thence they proceeded through Easter-Ross into Caithness, and returned along the coast by Aberdeen to Edinburgh” (Playfair, 1805, p.45). They were, in the main, following Wade roads.

At the age of sixteen, William Murray (1705-1793) (the future Lord Mansfield and Lord Chief Justice) set off for London on a pony which he had instructions to sell to meet his expenses at his journey’s end. In 1750 a weekly stagecoach service began between Edinburgh and London, the journey taking five days. By the end of the century the London coach, with four inside passengers and one outside, took only three days and two nights. Leaving Edinburgh in the morning, Glasgow could be reached in the afternoon of the following day, passengers spending the night at Shotts. A stagecoach service began between Edinburgh and Glasgow in 1749, the journey taking 12 hours. A coach service from Aberdeen to Edinburgh took only three days. (Rogers, 1884, Vol.1, p.219-223; Graham, 1928, p.41-44). We are told that, while in Glasgow, **Adam Smith** often “ran through by coach” to visit his Edinburgh friends, though before the road was improved the journey took thirteen hours (Rae, 1895, p.101).

Benjamin Franklin was surprised at the good roads found in England. In a letter written in June 1764, he wrote: “You wonder how I did travel 72 miles in a short winter day on my Landing in England. But the roads here are so good, with PostChaises & fresh Horses every ten or twelve Miles, that it is no

difficult Matter. A Lady that I know has come from Edinburgh to London, being 400 miles, in three Days and a half” (Franklin, 1905-1907, Vol.4, p.382).

The great difficulty and hardships of eighteenth century travel must be appreciated when we remember that **Hutton** was a field geologist with a personal knowledge of British geology that few, if any, could have equalled.. If genius means, as Thomas Carlyle put it, a “transcendent capacity of taking trouble, first of all”, then Hutton well deserves the title (Thomas Carlyle, 1969, p.43). He travelled on foot, on horseback, and in a chaise from the English Channel to Caithness. Hutton’s problem was the wearing out of his breeches by long hours of riding (Jean Jones et al, 1994, p.648).

1745: Rising for Prince Charles

A fourth and more serious Jacobite Rising took place in 1745-1746 (Blaikie, 1975; Tayler, 1938; Tomassen, 1962; Youngson, 1985). On the 23rd July 1745, Prince Charles Edward Stuart (the Young Pretender) landed in the West Highlands with seven men, no arms, and no money. Ignoring informed advice, but appealing to romantic ideals, within two months the Prince had gathered an army, marched south, defeated General Cope at Prestonpans, and held court in Holyrood Palace (Brown & Cheape, 1996). Although it was a Highland army that occupied Edinburgh, the Jacobite Risings were totally opposed by the men of the Scottish Enlightenment, even by the native Gaelic speakers **Colin Maclaurin** and **Adam Ferguson**. Many of the ladies, on the other hand, wore the white cockade and paid court to Bonnie Prince Charlie at his Court in Holyrood Palace.

John Witherspoon (1723-1794) became famous as the only clergyman to sign the *Declaration of Independence*. **Hutton** was three years younger than Witherspoon, but as both were educated in Edinburgh, it is possible they knew each other. The number of students in 1768 (the nearest available year) is estimated to have been under 600; twenty years earlier the number would have been much smaller. After taking an MA in 1739, Witherspoon continued studies in theology until 1743, and so overlapping with Hutton who attended the University between 1740 and 1747.

Although **Witherspoon** was a parish Minister, at the outbreak of the 1745 Rising he marched at the head of a group of volunteers loyal to the government. They were captured by the rebels at the Battle of Falkirk in 1746 and imprisoned in Doune Castle. It is said that Witherspoon escaped, using a rope of knotted blankets. Later he was much in demand as a preacher, and in 1768 he accepted an invitation to become President of Princeton, New Jersey, a position he filled with great distinction, building up the College and its library, and introducing the Edinburgh system of instruction (Witherspoon, 1802; Collins, 1925; J.A.V. Butler in Kent, 1950, p.152-153; Stohlman, 1976). The Rev. **John Home** (1722-1808), the author of the highly regarded but controversial play *Douglas*, was another young clergyman who had volunteered to fight against the rebels (Henry Mackenzie, [1822] 1997, reviewed by **Walter Scott**, 1827.). Like Witherspoon, he was captured at Falkirk and imprisoned in Doune; he, too, is said to have escaped on the make-shift rope of blankets.

David Hume and **John Home**, who were distant relatives, disputed the spelling of their name (both

pronounced "Hume"). David used to address John as "Mr John Hume, *alias* Home". When David suggested they should decide the issue by drawing lots, John said: "Nay – for if you lose you take your own name, and if I lose I take another man's name". French claret was the traditional Scots drink, but after the Union Portuguese tariffs were reduced and port became the cheaper drink; hence John Home's epigram (Lockhart, 1900, Vol.3, p.195):

- Firm and erect the Caledonian stood,
Old was his mutton, and his claret good;
"Let him drink port," the English statesman cried –
He drank the poison, and his spirit died.

A few days before David Hume died he added the following codicil to his will: "I leave to my friend, Mr John Home of Kilduff, ten dozen of my old claret at his choice; and one single bottle of that other liquor called port. I also leave to him six dozen of port, provided that he attests, under his hand, signed *John Hume*, that he has himself alone finished that bottle at two sittings. By this concession he will at once terminate the only two differences that ever arose between us concerning temporal matters" (Boswell, 1887, Vol.2, p.320n).

William **Robertson**, then minister of Gladsmuir, "carried a musket as a private in the Edinburgh Volunteers" (John Campbell, 1847, Vol.6, p.6). Along with Alexander **Carlyle** and other fellow ministers and University colleagues, Robertson had volunteered to serve in the "College Company" and was learning how to handle arms. Professor **Maclaurin** was in charge of strengthening the City Wall and generally organising the defence of the city. When the Jacobite army entered Edinburgh, Maclaurin fled to England, where he was the guest of the Archbishop of York. He returned to Edinburgh where he died in 1746 from an illness apparently brought on by exposure to extreme cold. The Lord Provost, **Archibald Stewart**, M.P. for the city and David Hume's good friend and benefactor, had the misfortune to be jailed by the Jacobites for failing to co-operate, and then imprisoned for fourteen months in the Tower of London by the Hanoverian Government before being tried and acquitted of having surrendered the city. Hutton was a medical student, present in Edinburgh during these exciting times.

By the 4th December the Jacobite army was within 130 miles of London. But lack of support, and dissension within his own command, forced the Prince to retreat to Scotland. The Highland army was heartened by a January victory at Falkirk, but met its ultimate defeat at Culloden on 16th April 1746. Although the purpose of Wade's Military Roads had been to promote the "civilisation" and control of the Highlands after the 1715 and 1719 Jacobite Risings, it is ironic that in 1745 the Highland army, under Prince Charles and Lord George Murray, used the new roads to avoid the Government soldiers.

The seat of the Duke of Atholl is at Blair Castle, where the River Tilt meets the Garry. During the 1745 Rising, James Murray (the 2nd Duke) was for the Government while his older brother (William) and two younger brothers (Charles and George) were prominent supporters of Prince Charles. The Duke fled in 1745 and his exiled older brother, William, captured the Castle. The following year the youngest brother, Lord George Murray, Lieutenant-General of the Jacobite army, laid siege to the Castle – the last

Castle in Britain to be besieged (Tomassen, 1958). The Duke later remodelled the building, removing the battlements and turrets, and transformed the castle into a house; so that in 1785 **Hutton** called it "the house of Blair". In 1868 the 7th Duke restored the Castle to something like its former appearance.

Lord George Murray's son, John, succeeded his uncle as 3rd Duke. When **Hutton** and **Clerk of Eldin** visited Glen Tilt in 1785, their host was the 30-year old 4th Duke, John Murray (1755-1830) who had succeeded his father in 1774. It is interesting to reflect that on that geologically famous expedition to Glen Tilt in search of granite veins, Hutton and John Clerk of Eldin were entertained by the grandson of Prince Charles' Lieutenant-General. Two years after Hutton's visit, **Robert Burns** spent two nights at "Athole-House". The Duke was away, but Burns was welcomed by the Duchess. **William Wordsworth** (1770-1850) and his sister Dorothy visited Blair Atholl in 1803, and rested on the same seat overlooking the Tilt where Burns had sat five years earlier.

Politically Correct English

After the Union of Parliaments in 1707, when patronage depended upon personal communication, the requirements of business made it essential for Scottish people to make themselves understood – in fact to disguise their speech – in London. **David Hume** was no Jacobite, but when he went to London in 1745 he was ashamed of his provincial speech. We must remember that by December, when Prince Charles' army was only 130 miles from London, letters were censored and a "a Scottish accent might have proved dangerously provocative" (Mossner, 1954, p.187). Even twenty years later, **Hume**, writing to **Adam Smith** from London, reported that Scotsmen were hated.

The third verse of the National Anthem is not usually sung now, but it was popular at the time:

- God grant that Marshal Wade / May by Thy mighty aid / Victory bring!
May he sedition hush / And like a torrent rush / Rebellious Scots to crush.
God save the King!

In 1770, Alexander Carlyle suggested that "to every Man Bred in Scotland, The English Language was in some respects a Foreign Tongue, the precise Value and Force of whose Words and Phrases he Did not Understand" (Alexander Carlyle, 1910, p.543; 1973, p.265); and Mossner has suggested that Edinburgh established the first chair of English in the British Isles because English was almost a foreign language! (Mossner, 1954, p.371). Because Scots needed to make themselves understood in London, considerable efforts were made in Edinburgh to teach "pure English": Lists of Scotticisms to be avoided were drawn up; lectures were given; and Societies were founded to promote that aim.

David Hume and **Adam Smith** helped to found the Select Society in 1754. The Select boasted "of having for its members a set of the ablest men Scotland ever produced". The Society set out to import teachers "qualified to instruct gentlemen in the knowledge of the English tongue, the manner of pronouncing it with purity, and the art of public speaking". **Thomas Sheridan** (1719-1788) – father of the dramatist – gave intensive courses on the problems Scots have in speaking English correctly; several

hundred "gentlemen" attended his lectures. In 1761, The Select Society sponsored a new "Society for Promoting the Reading and Speaking of the English Language in Scotland". The Directors of this new Society included such notable Edinburgh figures as **Kames, Robertson, Ferguson**, and James Boswell's father, **Lord Auchinleck** (McElroy, 1969, p.48-67).

Balance of Power in Europe

The War of the Austrian Succession (1740-1748) was nominally about whether Maria Theresa (1717-1780) could succeed as heiress to her father, Charles VI (1685-1740), Archduke of Austria and Holy Roman Emperor, the last male heir of the Habsburg dynasty. When Frederick II of Prussia seized Silesia, however, all Europe took sides in the dispute, each country intent to further its own ends. Britain wanted the balance of power to be maintained, and entered the war because France had become Prussia's ally. When George II (1683-1760), sword in hand, led the combined British and Hanoverian army to victory at Dettingen in 1743, it was the last time that a British monarch led his troops on the field of battle! At the Battle of Fontenoy, in May 1745, Marshal Saxe (1696-1750) inflicted a severe defeat on the Duke of Cumberland (1721-65), George II's son. It was at this battle that **Adam Ferguson**, the 22-year old Chaplain of the Black Watch, was said to have charged with his Regiment.

The previous year Marshal Saxe had been chosen to command a proposed invasion of England on behalf of James VII's son, the Old Pretender. Prince Charles, taking advantage of the British army's involvement on the Continent, began his own invasion, landing in the West Highlands just two months after the Battle of Fontenoy. A year later, on the 16th April 1746, the Duke of Cumberland defeated Prince Charles' army at Culloden (Jeremy Black, 1993). Throughout the Highlands the Duke's savage orders of reprisal were obeyed to the letter (Speck, 1995; Youngson, 1973). The estates of those who had been 'out' in the '45 were confiscated, and Hutton's friend **George Clerk-Maxwell** was appointed to the Commission for Annexed Estates. **John Clerk of Eldin**, George's younger brother, was appointed Secretary to the Commission in 1783 until the Commission was dissolved in 1784 (Jean Jones, personal communication). Both brothers visited the Highlands with **Hutton** himself.

Having failed to get the Moral Philosophy Chair in Edinburgh, **David Hume** accepted an invitation from General James St Clair [Sinclair] to become his Secretary, and in September 1746 Hume sailed to France with the General. The object of the expedition was to attack the port where the French East India Company kept supplies and stores, which suggests that the government used the war for commercial advantage. What is, however, called the "War of the Austrian Succession" came to an end with rejoicing at the Peace of Aix-la-Chapelle in October 1748, the occasion for which Handel composed his well-known *Music for the Royal Fireworks*.

Driving France out of North America

The Seven Years' War (1756-1763) was an attempt by a broad European coalition to restrict or destroy the power of Frederick (1712-1786) "the Great" of Prussia. For Britain the war was a struggle with France for overseas territory; a struggle out of which the British Empire was born (Williams, 1966).

There had, indeed, been undeclared warfare between Britain and France in the American Mid-West ever since 1754; so, instead of sending troops to the Continent, Britain blockaded French ports and destroyed French shipping.

General **James Wolfe** (1727-1759) and his troops sailed up the St Lawrence in 1759 with the intention of attacking the city of Quebec (Hibbert, 1959b). Although only 32, he was an experienced soldier; among much else, he had served under Wade in Scotland and was on the Duke of Cumberland's staff at Culloden (Findlay, 1928). **John Robison**, who later became the first Secretary of the Royal Society of Edinburgh, was with the fleet as a midshipman. He happened to be on duty in the boat in which the General visited some of his posts the night before the battle. **Playfair**, who wrote the biographies of both Hutton and Robison, and who in 1805 succeeded Robison as Professor of Natural Philosophy, recounts the story (Playfair, 1815): "As they rowed along, the General, with much feeling, repeated nearly the whole of Gray's *Elegy* [Thomas Gray (1716-1771): *Elegy written in a Country Churchyard*, 1750], (which had appeared not long before, and was yet but little known,) to an officer who sat with him in the stern of the boat; adding as he concluded, that he would prefer being the author of that poem to the glory of beating the French to-morrow". Using a brilliant strategy, Wolfe's men climbed the Heights of Abraham and surprised the French garrison. Both commanders were killed in the battle, but Quebec surrendered, the French withdrew to Montreal, and a year later all Canada was British.

Why France encouraged American Independence

To understand how members of Hutton's circle of friends were involved in the great events of 1763 to 1783 we need to recognise the roles played on the world stage by men well known to them: particularly (in chronological order) **Charles Townshend** (1725-1767), **Franklin**, **Wedderburn**, **George Johnstone** (1730-1787), **John Clerk of Eldin**, and **Adam Ferguson**. We need also to understand why and how France helped to bring about American independence.

The War of the Austrian Succession had little to do with the Habsburg dynasty. The European countries were bitterly jealous of one another and unscrupulous in their enmities. Wars were fought and coalitions made for economic advantage and prestige. To further these goals, which were often personal as well as national, competitors were reduced and if possible humbled; treachery and corruption were normal; and countries were "divided like cheese", without any consideration of the wishes of the unfortunate inhabitants. Big fish ate little fish, and any opportunity to foment unrest and rebellion in another country was taken as god-given. In Hutton's time, the "auld alliance" between Scotland and France was a romantic notion; France supported Jacobite Risings in Scotland for down-to-earth reasons (McLynn, 1981).

To a large extent, the Seven Years' War was a battle of competition between Britain, France, and Spain over the control of colonial markets. In their desire for a quick peace, France and Spain had ceded most of their American territories. At the Peace of Paris (1763), **Choiseul** (1719-1785), the French Foreign Minister, chose the rich West Indies over the cold barren wastes of Canada. France wanted revenge, and Choiseul foresaw that, without a French presence on their northern border, the American colonists

would no longer need British protection: sooner or later they would demand independence. In order to encourage the break up of the British empire, Choiseul sent secret agents to the British colonies as early as 1764, and his successor, **Vergennes** (1717-1787), used his great diplomatic skill to ensure that American independence was achieved. Today Americans continue to express gratitude toward France, but it is naïve to imagine that France's motives were altruistic (James B. Scott, 1926). Ever since the humiliating losses inflicted on her in 1763, France, with single-minded purpose, sought ways to get even with Britain. Vergennes was determined to weaken France's traditional enemy by promoting American independence and thereby destroying the British stranglehold on American markets. Unrest in the American colonies was the signal France had waited for.

All this was, however, lost on **George III** (1738-1820, accession 1760) and his Ministers, who insisted that the Colonies must submit to the Mother Country, and that American independence would never be an alternative. (Mumby, 1923; Pemberton, 1938; Thomas, 1976; Valentine, 1967; Walpole, 1845; Whitely, 1996). For sympathetic treatments of King George and Lord North, see John Brooke, 1972, Chapter 5).

Charles Townshend and Taxation of the American Colonies

The population of the American colonies had increased five-fold in sixty years and most of the colonists had never seen Britain. The British Government, however, failed to appreciate how greatly circumstances had changed. The evidence is seen in the history of taxation imposed on the American colonies. Initially it seemed reasonable to expect the colonists to contribute towards the cost of their defence and support, but taxation on normal goods was seen as unfair taxation without representation. In response to strong protests, the Stamp Act of 1765 was repealed in 1766, but the Government continued to maintain it had the right to impose taxation on the Colonies. The "authority of the Mother Country" was not to be questioned. A few months later, **William Pitt** (1708-1778) again became Prime Minister, but, suffering from increasingly serious ill-health, he accepted a peerage and entered the House of Lords (For background see especially Ritcheson, 1954).

The witty, brilliant, but irresponsible **Charles Townshend** (1725-1767), a strong advocate of the recently repealed Stamp Act, was appointed Chancellor of the Exchequer in August 1766. His speeches are said to have been "unrivalled in parliamentary history for wit and recklessness". Taking advantage of the Prime Minister's absence from the Commons, Townshend – "like a schoolboy on a lark" – persuaded Parliament to pass the so-called Townshend Acts of 1767. These Acts imposed new taxes on items such as glass, paper, and tea. Aged only 42, Townshend died suddenly in September 1767 before the full consequences of the Acts were known. It was the year that **Hutton** left his Berwickshire farms and returned to Edinburgh.

The Townshend Acts took the Americans by surprise; they were furious at this arbitrary imposition of taxes; Boston merchants boycotted British goods, and British troops were sent to maintain order. After the Boston "Massacre" of 1770, most of the Townshend Acts were repealed, but the tax on tea remained as a symbol of Parliament's right to levy tax on the Colonies. Pitt, in the House of Lords, said: "They

[the Americans] must be subordinate. ... this is the mother country, they are the children; they must obey, and we prescribe". The result was the Boston "Tea Party" in 1773. Townshend's tea duty had in fact precipitated rebellion and it led ultimately to the loss of the American colonies. (For Townshend, see Fitzgerald, 1866; Namier & Brooke, 1964; and Thomas, 1987).

Charles Townshend was well known in Edinburgh. The Rev. Alexander "Jupiter" **Carlyle** (1722-1805) (a close friend of **Robertson, Smith, Hume, and Ferguson**) had met him in Leyden where they had been students together in 1745-1746 (Alexander Carlyle, 1973, p.86-88, 93-94). In 1754 Townshend married the Earl of Dalkeith's widow, the eldest daughter of the 2nd Duke of Argyll (1678-1743), whose brother, the 3rd Duke (1682-1761), was the most powerful man in Scotland. Townshend received the Freedom of the City of Edinburgh in 1758, and in 1759 the Select Society suspended its rules for one meeting in order to hear him speak. Carlyle recorded: "[Charles Townshend] Silec'd us all with a Torrent of Colloquial Eloquence, which was highly Entertaining, for he Gave us all our own Ideas over again, Embodied in the finest Language and Deliverd in the Most Impressive Manner. Like a Meteor Charles Dazzled for a Moment, But the Brilliancy soon faded away and left no very strong impression" (Alexander Carlyle, 1973, p.199).

Townshend, Adam Smith, & the Duke of Buccleuch

Townshend's stepson, **Henry Scott, 3rd Duke of Buccleuch** (1746-1812), had succeeded his grandfather, the 2nd Duke, in 1751 at the age of five, three years before Townshend married the boy's widowed mother. It might be said that **Townshend**, as a political operator, knew what he was about. "The universal tribute of Townshend's colleagues allows him the possession of boundless wit and ready eloquence, marred by an unexampled lack of judgement and discretion". (Encyclopaedia Britannica, 1929, Vol, 22, p.336). Horace Walpole (1717-1797), 4th Earl of Orford, said of Townshend: "A man endowed with every talent, who must have been the greatest man of his age if he had only common sincerity, common steadiness, and common sense" (Horace Walpole, 1845, Vol.3, p.72).

The **Duke of Buccleuch** was educated at Eton and had never been to his father's home at Dalkeith since his infancy, because his stepfather was afraid "he would grow up too Scotch in accent and feeling". In 1764 **Townshend** was so taken with **Adam Smith's** *Theory of Moral Sentiments* that he asked Smith to be tutor to the young Duke (then eighteen) and take him and his brother, the Hon. Hew Campbell Scott, to Europe on the Grand Tour. Hume, in a letter to Adam Smith dated 12th April 1759, wrote "Charles Townshend, who passes as the cleverest fellow in England, is so taken with the performance [Smith's *A Dissertation on the Origin of Languages*, added to the third edition of *The Theory of Moral Sentiments*, 1767] that he said to Oswald [James Oswald of Dunnikier, 1715-69] he would put the Duke of Buccleugh under the Author's care, and would make it worth his while to accept that charge" (Dugald Stewart, 1794, p.93). It was Carlyle's view, however, that "Townshend had chosen Smith not for his Fitness for the Purpose, but for his own Glory in having Sent an Eminent Scottish Philosopher to travel with the Duke" (Alexander Carlyle, 1973, p.142). Smith and the Duke thereafter maintained the most cordial relationship and respect for one another. They both received the Freedom of the City of Edinburgh in 1770; and when the Royal Society of Edinburgh was founded (1783), the **Duke of**

Buccleuch was named its first President and **Adam Smith** (along, of course, with his friend **Hutton**) was elected to the Society's first Council.

Smith left London with his pupils at the beginning of 1764 and remained on the Continent for two years. They travelled in France, visiting Voltaire in Geneva, before returning to Paris. It has been thought that they arrived in time for a week or two with Hume before Hume left Paris with Rousseau in January 1766, but this is now thought doubtful (Ross, 1995, p.209). According to Rae, Hew Scott, Smith's younger pupil, aged 18, "was assassinated in the streets of Paris" in October 1766, Smith and the Duke leaving for London immediately afterwards. No motive or explanation was given, and Ross has now provided evidence that Hew Scott died of a fever (Ross, 1995, p.218-219).

David Hume in Paris and Edinburgh, 1763-1771

Hume had spent the previous three years (1763-1766) at the Embassy in Paris under Sir **Robert Walpole's** (1676-1745) nephew, **Francis Conway** (1719-1794), Marquis of Hertford. Hume then left Paris to become Under Secretary of State in the Northern Department (1767-1769) on the invitation of Lord Hertford's brother, **General Henry Conway**. The General, later Field Marshal, had been aide-de-camp to both **General Wade** and the **Duke of Cumberland**, serving at Fontenoy, Culloden, and Flanders. His wife was a sister of the young **Duke of Buccleuch's** mother (who married **Townshend**); the two sisters were daughters of the 2nd Duke of Argyll.

Hume returned to Edinburgh in August 1769, staying in James's Court until his house in Edinburgh's New Town was ready. In the Spring of 1771 he moved to St David Street, where his first guest, his friend **Benjamin Franklin**, stayed with him for three weeks. Franklin visited with many old friends, and later spoke of David Hume as one "who entertain'd me with the greatest Kindness and Hospitality".

1774: Wedderburn's Attack on Franklin

On the basis of letters written by the Governor and Lieutenant-Governor, the Massachusetts House of Representatives petitioned the British Government to remove these officials from office. "No legal action was involved: the petition did not ask for justice but for the exercise of wisdom" (Editor's comment, *The Papers of Benjamin Franklin*, 1978, Vol.21, p.39). **Franklin** was summoned to appear before the Privy Council on 11th January 1774. (Accounts of the proceedings – which were not fully recorded – are given in Smyth's *Writings of Franklin*, Vol.10, p.263-271, and in *The Papers*, Vol.21, p.19-23, 37-70). Believing that the matter was one of politics and not of law, Franklin appeared without Counsel; the agent for the defence, however, cunningly stated: "I well know Dr Franklin's great abilities, and wish to put the defence of my friends more upon a parity with the attack; he will not therefore wonder that I chuse to appear before your Lordships with the assistance of Council [sic]" (*The Papers*, Vol.21, p.21). His Counsel was none other than Alexander **Wedderburn**, who believed in taking strong measures against American colonists. Wedderburn was now Solicitor General, an officer of the Crown, and "one of the most formidable lawyer-orators in Britain".

The final hearing before the Privy Council was held on 19th January, only nine days after news of the Boston Tea Party reached London. Tempers were short; for the Government considered that advocacy of independence was sedition. Lord **Gower** (Granville Leveson-Gower, 1721-1803), the Lord President, was in the chair; Gower was all for “reducing the Americans to submission” (DNB). **Lord North**, the Archbishop of Canterbury, the Bishop of London, the Lord Chief Justice, Lord Shelburne, Lord George Germain, and Edmund Burke were among the unprecedented number of thirty-five members present, and there was a crowded audience (*The Papers*, Vol.21, p.43n; *Writings*, Vol.10, p.266). Wedderburn’s personal attack on Franklin lasted more than an hour. One observer said that Wedderburn “poured forth such a torrent of virulent abuse on Dr Franklin as never before took place within the compass of my knowledge of judicial proceedings, his reproaches appearing to me incompatible with the principles of law, truth, justice, propriety, and humanity” (*The Papers*, Vol.21, p.40n). Jeremy Bentham “was not more astonished at the brilliancy of his [Wedderburn’s] lightning, than astounded by the thunder that accompanied it ... The ear was stunned at every blow ... the table groaned under the assault” (*Writings*, p.269-270). Franklin said the mood was like that at a bull-baiting (*The Papers*, Vol.21, p.41, 112-115), but what hurt most was being called a man who had forfeited all respect – “a man of three letters: *homo trium literarum*” – the three-letter word *fur* being the Latin for *thief* (*The Papers*, Vol.21, p.49). Next day **Franklin** was deprived of his position as Deputy Postmaster-General of the Colonies.

Wedderburn played to his audience; the Privy Councillors laughed aloud, Lord North alone behaving with decorum. “When the Councilors [sic] applauded the speech and then threw out the petition, they took a stand that for all their laughter was no laughing matter” (Editorial comment: *The Papers*, Vol.21, p.42. Also Franklin, *idem* p.78-83, 86-96, 112-115). Wedderburn was undoubtedly a great advocate, superbly skilled in adversarial legal battle, but woefully lacking in diplomatic sense. The Privy Council was no better. **Franklin**, who remained standing throughout the proceedings, “was dressed in a full dress suit of spotted Manchester velvet, and stood *conspicuously erect*, ... his countenance as immovable as if his features had been made of wood” (*The Papers*, Vol.21, p.41). Until then Franklin had worked with all his power to maintain the unity of the British Empire, but on that day Wedderburn, and the Privy Council, turned him into an enemy. Wedderburn’s speech and its reception “must always be remembered as the critical incident which converted Franklin into a stubborn opponent of the British government, and changed the American sentiment toward him from lukewarm admiration to inflamed respect, enthusiasm, and affection” (*Writings*, Vol.10, p.271; see also Currey, 1978; Stourzh, 1969).

- “Sarcastic Sawney, swol’n with spite and prate
On silent Franklin poured his venal hate.
The calm philosopher, without reply,
Withdrew and gave his country liberty.”
Horace Walpole: *Writings*, Vol.10, p.271n

(I am indebted to Dr Iain G. Brown for pointing out that, as indeed the OED states, Sawney is a derisive term used in England for Scotsmen. In Scotland, Alexander is commonly shortened to Sandy and pronounced “Sawn-dy”.)

Franklin himself wrote: “When I see that all petitions and complaints of grievances are so odious to

government, that even the mere pipe which conveys them becomes obnoxious, I am at a loss to know how peace and union is to be maintained or restored between the different parts of the empire. ... Where complaining is a crime, hope becomes despair” (*The Papers*, Vol.21, p.93-94).

Edmund Burke, who had been present, spoke of Wedderburn “laying on beyond all bound and decency” (Phillips Russell, 1927, p.195). **Hume**, torn between two friendships, wrote to **Adam Smith** expressing his concern about Wedderburn’s “most cruel” attack (David Hume, 1932, Vol.2, p.286-287; Adam Smith, 1987, No.140; Franklin, *The Papers*, Vol.21, 113n).

A year later, Lord Sandwich spoke bitterly in the House of Lords against a Plan presented by Lord Chatham, denouncing it as apparently the work of an American. “Turning to me”, wrote Franklin (who was present in the House), “he fancied he had in his Eye the Person who drew it up, one of the bitterest and most mischievous Enemies this Country has ever known. This drew the Eyes of many Lords upon me: ...[but] I kept my Countenance as immoveable as if my Features had been made of Wood”(*The Papers*, Vol.21, p.581).

George III and his Ministers failed to understand what was happening and were determined to “reduce the Americans to unconditional submission” (George III, 1927-1928; Namier, 1961). Among those who, for their various reasons, promoted this futile policy were **Lord North**, Prime Minister from 1770-1782; Charles **Townshend**, Chancellor of the Exchequer (until his death in 1767); **Lord Gower**, President of the Privy Council; the Earl of **Sandwich**, First Lord of the Admiralty; Alexander **Wedderburn**, Solicitor General; **William Eden** (1744-1814), head of the Secret Service (later Lord Auckland); **George Johnstone**, Governor of West Florida from 1763-1767; and others. Many of these had a relationship to Hutton’s friends.

1776: Declaration of Independence

As punishment for the Boston Tea Party, the Government in 1774 passed four Coercive or Intolerable Acts. When the Continental Congress responded in 1775 with an economic boycott, the King declared the Colonies to be in rebellion (Thomas, 1992). Advised by William **Eden**, **Lord North** appointed **Admiral Lord Richard Howe** (1726-1799) and his brother, **General Sir William Howe** (1729-1814) – then Commander of the forces in America – as a Peace Commission. Lord Howe and Franklin had been on friendly terms; indeed in correspondence, Franklin saluted Lord Howe with “affection” (*Writings*, Vol.6, p.457-466). But Franklin wrote with a sense of weariness: “I have not the Vanity, my Lord, to think of intimidating by thus predicting the Effects of this War; for I know it will in England have the Fate of all my former Predictions, not to be believed till the Event shall verify it” (Franklin to Lord Howe, July 20, 1776: *Writings*, Vol.6, p.460; *Papers*, Vol.22, p.520).

In June 1776 Lord Howe arrived in America, where he proclaimed himself and his brother Peace Commissioners and called on the rebels to return to their duty. With such a message, the mission was hopeless from the outset, but as the Declaration of Independence was signed in Philadelphia on 4th July and the Howes did not meet with Congress until September, the mission proved a disastrous failure.

Franklin, one of the five committee members who drafted the *Declaration*, knew from bitter personal experience how adamantly the British government insisted that the Americans must do as they were told, and his treatment by the Privy Council, had greatly increased his standing with his colleagues in Congress.

In 1776, when taxation of the American colonies was being debated, Adam Ferguson accepted a commission to write a pamphlet supporting the government's right to tax the Americans. His position was clear: "If [the colonies] will accept of no security below that of independency, and total separation of commonwealth; this I apprehend, they must acquire at the point of the sword. ... I am afraid the sword may strike as well as be raised; and till they exculpate themselves from the design of withdrawing their allegiance ... the wounds they receive will appear to come from the hands of justice ..." (quoted by Fagg, 1968, p.152-153). His contribution doubtless helped to secure Ferguson a place as Secretary of the Peace Commission of 1778, though one might question the wisdom of sending negotiators who had already publicly expressed such uncompromising views.

Meantime Beaumarchais (1732-1799), a French agent in London (and author of *The Barber of Seville* and *The Marriage of Figaro*), recommended that France should secretly supply the Americans with money and munitions, a plan approved by Louis XVI. Franklin arrived in France on 4th December 1776 to seek an alliance (Sparks, 1829-1830; Stevens, 1889-1898; Corwin, 1916; Stinchcombe, 1969, 1980; Wharton, 1889). This was a clear signal that the Americans had all but abandoned the prospect of reconciliation with Britain.

1777-1778: Saratoga and a Treaty of Alliance

Events in America went from bad to worse for the British Government. General John **Burgoyne** (1722-1792) surrendered at Saratoga on 17th October 1777, a battle which "well might be ranked among the *fifteen decisive battles of the world*" (Bemis, 1935, p.61; but see Dull, 1975, p.90). The dramatic news took 46 days to travel, reaching London on 3rd December 1777 and Paris the next day. **Vergennes** was cautious: Britain had more ships ready and manned, and should the American rebellion collapse, France might be left standing alone against Britain (McKay, 1951). Yet he desperately wanted the rebellion to succeed, and he feared that the news from Saratoga might persuade Lord North to save the British empire by offering terms that Congress would accept – perhaps Home Rule as a Dominion. His concern was justified, because **Lord North** introduced a conciliatory bill in November 1777. Had it passed promptly, history might have been very different; but Parliament adjourned for Christmas holidays, not to resume until late January 1778 (S.E. Morison, 1965, p.254, Bemis, 1957, p.54-55).

Two days after the news of Saratoga reached London, **Eden**, head of the Secret Service, sent his right-hand man, Paul **Wentworth**, to negotiate with **Franklin** and his colleagues in Paris; and Franklin kept up the pressure on Vergennes by informing him of these meetings with Wentworth. At the same time, in this battle of intelligence and counter-intelligence, Dr Edward **Bancroft**, personal secretary and adviser to the Commissioners, was on Eden's payroll, reporting everything that the Commissioners were doing. Remarkably, Bancroft retained his confidential position with Franklin throughout the war, even

“assisting” him during the peace negotiations of 1782-1783 (Bemis, 1924; Einstein, 1933; Ritcheson, 1954, p.234-235; Dull, 1982, Vol.72, p.33-34. For another kind of espionage, practised by French Engineers, see Bradley, 1992).

North was in despair, but the King refused to accept his resignation. Eden persuaded the Prime Minister to propose a plan for peace with all urgency. Ignoring the Cabinet, North relied on **Eden**, **Wentworth**, and Eden’s close friend **Wedderburn**, who produced drafts from which the final Conciliatory Bill was prepared for the House of Commons by Attorney General Edward **Thurlow** (1731-1806) (Burns, 1986, p.406). “North drove himself without pity. By late January, though near physical and mental collapse, he had at least a plan” (Ritcheson, 1954, p.260). North presented the plan to the Cabinet on 11th February, and next day Parliament approved it. North knew from Bancroft, however, that the Franco-American treaty of alliance had already been secretly signed, but Parliamentary procedure on the bills could not be completed until 9th March. In a desperate attempt to forestall ratification of the French treaties, a ship left for America on 14th February with copies of Lord North’s proposal: North offered Home Rule within the empire, the details to be negotiated by a Peace Commission that would follow as soon as possible. (Ritcheson, 1954, p.258-263, 1969; Bemis, 1957, p.67).

Meanwhile, on the other side of the Channel, **Vergennes**, had no time to lose. By mid-December 1777, he knew that both Franklin and Deane had been contacted by British agents, and on 23rd December Noailles, the French ambassador in London, reported that Lord North was preparing a plan of reconciliation for the reopening of Parliament on 29 January 1778 (Dull, 1975, p.91). Vergennes, rightly, did not expect North to wait for Parliament before submitting his peace plans to the Americans (Dull, 1975, p.91n).

In this game of poker, **Vergennes** remained cautious; his dockyards were busy building the needed battleships (though there was a shortage of suitable timber), and he still hoped that Spain would join the proposed Franco-American alliance. On 8th January 1778 **Gérard**, Vergennes’ private secretary, asked the Commissioners what was required to stop them talking with British agents. They replied, “a treaty of amity and commerce”. Gérard agreed in principle and proposed that their countries conclude not only a commercial treaty but also a treaty of military alliance – this was necessary to preclude the Americans making a separate peace: American independence had to be a necessary condition for peace (Bemis, 1947, p.28; Dull, 1985, p.92).

Finally, on 6th February 1778, France secretly signed two treaties with the Commissioners: the Treaty of Amity and Commerce, and the Treaty of Alliance. It was a historic occasion: these treaties were the first formal agreements between the United States of America and a foreign power; here at last the United States of America received international recognition as an independent free state. It did not escape notice that as his country’s Ambassador, **Franklin** signed the articles of Amity and Alliance with France wearing “the identical Manchester cloak of velvet which he last wore when he stood under the pitiless storm of **Wedderburn**’s vituperation”. Without speaking a word, it was Franklin rather than Wedderburn who was justified in proclaiming *virtute me involvo* – I wrap myself in my integrity. (John Campbell, *Lives of the Lord Chancellors*, Vol.6, p.100, incorrectly relates this episode to the Peace

Treaty of 1783; but see the story told by Edward Bancroft and Joseph Priestley quoted in *Writings*, Vol.10, p.267, 271-272; *The Papers*, Vol.21, p.41; Franklin, 1818, Vol.1, p.358-359n).

On 27th February 1778, Franklin wrote from Paris: “The King agrees to make common cause with the United States, if England attempts to obstruct the commerce of his subjects with them. ... The great principle in both treaties is a perfect equality and reciprocity; no advantage being demanded by France, or privileges in commerce, which states may not grant to any and every nation. ... In short, the King has treated us generously and magnanimously; taking no advantage of our present difficulties to exact terms which we would not willingly grant when established in prosperity and power” (Carl Van Doren, 1946, p.434). France, of course, encouraged American rebellion because to do so it was clearly to its own advantage!

Although British intelligence knew about the Franco-American treaties, Britain was not ready for war with France, and possibly with Spain as well (Dull, 1975, p101n). At the same time **Vergennes** waited in the hope of support from the Spanish navy; but the Spanish treasure fleet had not returned, and Spain was afraid that its own colonists might follow the example of the Americans and demand independence. By late February, knowing that North intended to offer conciliatory terms, Vergennes could wait no longer. The French frigate carrying the treaties was dispatched but delayed by weather and did not leave France until 27th February, six days after the British frigate left England with the proposed bills of conciliation (Dull, 1975, p.103; see also Ritcheson, 1954, p.274).

Vergennes sent a copy of the Treaty of Amity and Commerce (post-dated 7th March) to Noailles in London, who delivered it to the King on 13th March. Although the Treaty of Alliance was not disclosed by Vergennes, the Secret Service had delivered copies of both treaties to London within forty-two hours of their signing (Bemis, 1957, p.65-66). Stormont, the British ambassador to France, was recalled; Noailles returned to Paris, and war was inevitable. Both sides acted warily; neither was ready, and defensive treaties risked being invoked against the perceived aggressor. On 20th March 1778, Louis XVI received the American Commissioners as representatives of an independent nation. During all these negotiations, the Secret Service had supplied the British Government with every detail of meetings and decisions, and even of nearly every shipment of munitions (Bemis, 1957, p.65-66).

It took about two months for the two frigates to cross the Atlantic, and the French ship had to avoid interception by the British patrols. Lord North’s proposals arrived first, but Congress unanimously rejected them on 22nd April. Franklin commented that the terms offered were two years too late (Dull, 1975, p.104). Congress was debating whether or not to receive Lord North’s Peace Commissioners when they should arrive. Then, on 2nd May, Silas Deane’s brother, Simeon, arrived with copies of the treaties. Such was the enthusiasm that greeted the news of **Franklin**’s diplomatic success, that Congress ratified the treaties two days later (Bemis, 1947, p.31; Bemis, 1957, p.66-68; Dull, 1975, p.103-104; Ritcheson, 1954, p.273).

1778: Adam Ferguson in America

Lord North's plan, drafted by **Eden** and **Wedderburn**, called for a Peace Commission to go to America to negotiate the Conciliatory Proposals. The idea was first urged on Lord North by Eden in a letter of 7th December 1777, and it was to Eden that North largely left the selection of Commissioners. Eden declared that he was ready to sacrifice himself in any service thought useful to the public, but he confided to Wedderburn (3rd March, 1778) that he wanted to divorce his own political fate from that of the North Government, which he reckoned was about to collapse. Eden fully intended to be the “efficient Commissioner”, the man making the decisions, and Wedderburn, who was in charge of drafting the Commission’s instructions “to treat, consult, and agree upon the means of quieting the disorders in the American Colonies”, kept in close contact with Eden (Ritcheson, 1954, p.264-265).

The commission was accordingly headed by Eden’s old school-friend, Frederick Howard (1748-1825), 5th Earl of **Carlisle**, then close to thirty years old and well-known as a “man of fashion and pleasure”, who was nevertheless a Knight of the Thistle (the Sovereign’s gift – the Thistle is the most ancient British Order of Chivalry) and son-in-law of Lord Gower, President of the Privy Council. Horace Walpole (1717-1797), 4th Earl of Orford, described Carlisle as “very fit to make a treaty that would not be made” (DNB, 1975, p.10). **Richard Jackson** (d.1787) was the next candidate approached. He was then Solicitor to the Board of Trade, and was so well informed that he was known as “Omniscient Jackson”. In 1765 Jackson had warned the House of Commons against imposing the Stamp Tax, and he now bluntly told Eden, Thurlow, and Wedderburn (29/30th March) that war with France would destroy the empire; American independence must be immediately recognised in order to forestall such an event. His position being totally at variance with the view held by Eden and Wedderburn, Jackson declined to serve on the Commission. (Ritcheson, 1954, p.263-266).

Eden then considered Sir William Johnstone (d.1805), who had assumed his wife’s name, **Pulteney**, and on his wife’s death had acquired her property and was reputed to be one of the wealthiest men in the Empire (Burns, 1986, p.406). But Pulteney was in Paris, vainly trying to negotiate with Franklin (Dull, 1982, p.53; Ritcheson, 1954, p.266). **Eden** and **Wedderburn** next turned to **George Johnstone**, Pulteney’s younger brother, a Dumfriesshire man and former Governor of West Florida. Johnstone had joined Burke in ridiculing Carlisle in the House as a man “fond of dress and gaming” – a poor basis for the close relationship that would follow. Moreover, as Johnstone had declared strongly against American independence (Fagg, p.158), it would be hard to imagine that he would be welcomed in America.

Governor Johnstone, as he liked to be called, had the faults of a bully. In 1757 a Court-Martial had found him guilty of insubordination and disobedience. For many years Johnstone had “confined himself to his favourite talent of haranguing in the house of commons” (Charnock, 1794-1798, Vol.6, p.494). This propensity led to a duel, and in 1770 he forced a duel on **Lord George Germain** (1716-1782), who from 1775 to 1782 was Secretary of State for the Colonies. On another occasion Johnstone killed his opponent.

As a vocal member of the House, and a man ready with a pistol, **Johnstone** was “useful to his party” and he had powerful friends – indeed in 1779 George III expressed interest in Johnstone’s promotion, and a month later Johnstone was named Commander-in Chief at Lisbon with the rank of Commodore.

The naval historian John Knox Laughton (1830-1915) said that Johnstone was: “distinguished by his shameless and scurrilous utterances”, summing him up in these words: “He used to be commonly styled Governor’, though with very little reason; he is, even now, sometimes described as a politician, with even less. That he was commodore and had command of a squadron was unfortunately true; he seems to have had courage, but was without self-restraint, temper, or knowledge” (DNB, 1975, p.1092). Johnstone agreed to be a Commissioner only provided that American independence was not an option (Ritcheson, 1954, p.266-267). **John Clerk of Eldin**’s letters and notes suggest that he knew Johnstone well enough to correspond with him on naval tactics; but whether Johnstone gave Clerk assistance, or was qualified to give assistance on these matters is another question.

The fourth Commissioner, **General Sir William Howe**, was to join the others on their arrival in America. He, too, was opposed to American independence. It was therefore an unlikely collection of diplomats that sailed from England on 21 April 1778 to negotiate peace with Americans who were fighting for independence. (Bemis, 1957, p.66-68; Dull, 1975, p.104n; Dull, 1982, p.33-34). Moreover, the Commission set off in the face of the opinion of those who knew America best that the terms to be offered would surely be rejected (Ritcheson, 1954, p.267).

Eden had grandiose ideas: the Commissioners would be Privy Councillors with ambassadorial rank, and their ship, the *Trident*, would fly a Commodore’s pennant. George III, however, adamantly refused to make the Commissioners Privy Councillors: “Parade is not the object of the mission, but business” (Ritcheson, 1954, p.265-266). Eden had demanded and received permission to take Mrs Eden to America, and despite crowded conditions on the ship, Mrs Eden required one cabin for herself and another for her four female servants. In addition, Carlisle’s personal secretary, and a friend with no official position were also travelling. Yet Eden violently objected when Lord North proposed that the vessel should carry a passenger, even though this was **Lieutenant-General Charles Cornwallis** (1738-1805), 2nd Earl Cornwallis, who was travelling to take up his appointment as Second-in-Command of the British forces in America under **Sir Henry Clinton** (Ritcheson, 1954, p.265, 272).

It was into this bizarre company that James **Hutton**’s friend, “the quick-witted”, “quick tempered” – and “sometimes bad-tempered” – **Adam Ferguson**, was introduced as Secretary to the Commission (Fagg, 1968, p.60, 116, 165). His acquaintance with **Johnstone** was of long standing, which probably accounts for his appointment, though this had the King’s approval (Fagg, 1968, p.159, 168). Johnstone’s “intemperate disposition” was common knowledge, and **Pulteney** (Johnstone’s elder brother) “knew full well how hotheaded Johnstone could be”; Professor Fagg suggests that Pulteney may have felt that if anyone could restrain his brother, it was Ferguson, whom Pulteney had known since the early days of Edinburgh’s Poker Club (Fagg, 1968, p.160-161).

Ferguson himself was not an easy person. He quarrelled even with his old friend **Adam Smith**, and only when he learned that Smith was dying did he go back to visit him on friendly terms (Rae, 1895, p.433; Ross, 1997, p.191, 404). It seems remarkable that this boatload of touchy passengers survived the journey without a duel. The *Trident* set sail for New York on 21st April and took 45 days to cross the Atlantic (Dull, 1975). It would be illuminating to know what they talked about, closely confined as they

were in a space with few comforts. On his return, Ferguson must have had many stories to tell his Edinburgh friends. No doubt Hutton heard them; for he had a great interest in other people and their experiences.

On 27th May the *Trident* met a British man-of-war, which reported that both commanders-in-chief, Howe and Clinton, were at Philadelphia. Accordingly the *Trident* changed direction in order to meet them, little suspecting that Germain's top-secret orders were for the British forces to withdraw from Philadelphia in preparation for a surprise attack on St Lucia (Ritcheson, 1954, p.253-254, 272; Dull, 1975, p.123; Dull, 1985, p.100).

The *Trident* arrived at the mouth of the Delaware on 5th June only to discover that the troop withdrawal from Philadelphia was already underway. Two days later they learned from **Clinton** that Germain's orders were dated 21 March, more than three weeks before their own departure from England! Clinton insisted, moreover, that his orders gave him no discretion to delay his departure. **Eden** was furious; had he not been trusted, he wrote to his friend **Wedderburn**, with "the most sacred secrets of their unfortunate government" and the only secret which had ever been kept from him was this which sacrificed his public character. Eden never forgave Lord North for what he considered a gross betrayal – "North earned the vindictive spite of William Eden, whereby that harassed First Minister's last years in office were rendered hell on earth" (Ritcheson, 1954, p.272-276).

A further shock was in store for the ill-fated Commissioners; for they learned that Congress had already ratified the copies of the Franco-American treaties that Simeon Deane (Silas Deane's brother) had brought from France (Ritcheson, 1954, p.273-274; Dull, 1975, p. 104). Both treaties were ratified May 4, 1778, two days after they had been delivered (Bemis, 1957, p.67). While the British army was evacuating Philadelphia, the Commissioners boarded the *Trident*, and sailed for New York.

By this time, France had decided that its most effective strategy was to maintain a sufficient force in the Channel to require the British to keep a presence there, while sending **Admiral d'Estaing** with a squadron sufficient to crush the scattered British naval forces in North American waters (Jeremy Black, 1988; Tracy, 1988). Accordingly, d'Estaing sailed from Toulon on 13th April with twelve ships of the line and five frigates. With him was **Gérard, Vergennes'** right-hand man during the Franco-American negotiations, and now appointed French Minister Plenipotentiary to the United States. British intelligence knew of the fleet's departure but not of its destination. It could have been intercepted at Gibraltar, but the home fleet was not ready and, besides, Britain did not want to be blamed for starting hostilities. If the Toulon fleet was going no further than Brest, to attack it would, under the defensive alliance, prevent Britain calling on Dutch aid (Dull, 1975, p.109-112).

D'Estaing's fleet arrived off Philadelphia a few days after the British had left. On landing in Philadelphia on 12th July, Gérard received an enthusiastic welcome; Congress "wined and dined him with the turtles and drinks which the British peace commissioners, by way of ingratiating, had recently caused to be sent to some of its members to prepare their digestions for Lord North's peace offers" (Dull, 1975, p.123; Bemis, 1957, p.68). Finding that the British fleet had gone to New York,

d'Estaing followed and blockaded the harbour with Howe trapped inside.

Everything the Commissioners tried to do went wrong. The **Marquis de Lafayette** (1757-1834), the young Frenchman of twenty who had volunteered his services to Washington, took offence at a remark made by **Johnstone** about the French and challenged **Carlisle** to a duel (DNB, 1975, p.1013; Fagg, 1968, p.187). More seriously, **Johnstone** brought the wrath and contempt of Congress on the Commission by foolishly trying to bribe two Members of Congress. Johnstone, indeed, was forced to withdraw from the Commission and return to England. As Howe had never served as a Commissioner, the Commission was now reduced to Carlisle and Eden. The British peace manoeuvre had been an utter failure. On 27th November, **Carlisle**, **Eden**, and **Ferguson** embarked for England leaving behind them “an unsuccessful, embarrassing, and distressing Task” (Ritcheson, 1954, p.283). They reached Plymouth on 19th December, 1778 (Ritcheson, 1954, p.283; Fagg, 1968, p.188, 190), and on 29th May 1779, Ferguson wrote his last letter as Secretary of the Commission (Fagg, 1968, p.198), and returned to Edinburgh in July, having been away from his teaching duties for over a year.

1778: The Battle of Ushant (Ile d'Ouessant)

On 13th March 1778 Noailles, the French Ambassador, informed the British Government that France had acknowledged the independence of the United States by signing a treaty of commerce; the treaty of alliance was not mentioned. Although this meant war, both sides were reluctant to strike the first blow. The **Earl of Sandwich**, First Lord of the Admiralty, knowing that the navy was not ready for battle, persuaded the King to appoint **Admiral Augustus Keppel** (1725-1786) – a Whig and therefore a political enemy – Commander-in-Chief of the Channel fleet; which the King did in person on 22nd March 1778.

It was not until 9th July 1778 that Keppel was able to lead 24 ships of the line into the Channel to encounter the French fleet of 32 ships. Battle was joined on 27th July off Brest (Ushant), but the rear of the British fleet, under Admiral **Sir Hugh Palliser** (1723-1796), failed to obey Keppel's signal to close with the enemy, and the French fleet escaped. (Charnock, 1794-1798).

Dull's account is brief: “Luckily for France, fleet actions in the eighteenth century were seldom decisive. **D'Orvilliers** met **Keppel** 65 miles off Ile d'Ouessant and on 27 July the two fleets fought a general engagement which resulted in over 1,000 casualties and considerable damage to both fleets, but not the capture of any ships. Both fleets then returned to port” (Dull, 1975, p.122). Creswell devotes a chapter to the battle (Creswell, 1972, Chapter 8). News of the activities of the fleet, and letters from the principals, appeared in the *Edinburgh Evening Courant* and the *Edinburgh Advertiser* from 1 July onwards, keeping Edinburgh citizens informed of the developments week by week (Hannay, 1898-1909).

After the fleet returned to port, a newspaper report accused **Palliser** of not following orders. Palliser angrily demanded that **Keppel** should publicly contradict what Palliser regarded as a scandalous report. This Keppel refused to do, with the result that he was court-martialled on the charge of misconduct and neglect of duty. A letter from Palliser published in the *Edinburgh Evening Courant* on 11 November was

read in Edinburgh with great interest, and by none more carefully than by **John Clerk of Eldin**, who wrote about it to his brother-in-law **Robert Adam** on 5 December and to his sister-in-law Miss Peggie Adam a few days later.

“Since we have had **Sir Hugh Palliser’s** letter about the Naval Engagement – and not at first understanding it I have taken some pain in following him thro [sic] his description, which led me on to draw plans according to his description ... and to Conclude **Adam Ferguson** when he comes home is of the Best to Consult upon this head [namely, to whom should the drawings be shown] ... I hold it a truth – that it is as easy to construct a plan of a Naval Battle as of a Battle on dry land – Upon all Occasions we have hundreds of plans for every land Battle – But I have never seen one that ought to be considered at all for a Sea Battle” “ ... as you must know I have a violent Passion for all such pieces of knowledge. I fell to work upon his [Palliser’s] letter and drew, following him step by step till I made myself master of the Subject (SRO GD 18/4209/1-2 with permission from Sir John Clerk of Penicuik).

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So opened John Clerk of Eldin’s research into Naval Tactics, which occupied him so intensely during all the years while Britain was at war with France, and which concentrated his geological activities into the decade of Peace from 1783 to 1793 (Moffatt, 1974).

In his biography of Hutton, **Playfair** says this about **John Clerk of Eldin**: “Though not bred to the sea, he is well known to have studied the principles of naval war with unexampled success; and though not exercising the profession of arms, he has viewed every country through which he has passed with the eye of a soldier as well as a geologist” (Playfair, 1805, p.97). We see the truth of Playfair’s words in these letters Clerk wrote to Robert and Peggie Adam.

With a “violent passion” (as he himself admits), Clerk involved all his friends in this project, so vital to the conduct of the war with France: Playfair reviewed Clerk’s ideas in a paper to the Royal Society of Edinburgh, and Adam Smith’s notes on Clerk’s Naval Tactics demonstrate his interest.

1779: Admiral Keppel’s Court-martial

Keppel’s court-martial began on 7th January 1779 on board ship in Portsmouth and lasted for five weeks. There were three charges, each capital offences for which, in 1757, Admiral **John Byng** (1704-1757) had been court-martialled and shot on the quarter-deck of a ship-of-the-line – and to add to the drama, Keppel had been a member of the Court that found Admiral Byng technically guilty. Keppel’s chief prosecutor was none other than **Sir Hugh Palliser** himself, and the **Earl of Sandwich** had packed the Court. There were thirteen judges. **Tom Erskine**, in this his first big case, argued the defence. Almost every captain in the fleet was called to testify, and the newspaper accounts were read avidly in Edinburgh. The result was overwhelming: the charges were pronounced “malicious and ill-founded” and Keppel was honourably acquitted. On hearing the news, the mob rioted, the admiralty gates were torn down; windows of official buildings smashed; Palliser’s house burnt down, and his sister, who escaped,

went mad. Keppel was acclaimed a hero, and Sir Joshua Reynolds (1723-1792) painted Keppel's portrait six times.

1779: John Paul Jones, the Selkirks, and Sir James Hall of Dunglass

The American war came close to home when, from August to October 1779, **John Paul Jones** (1747-1792) – the “founder of the American navy” cruised round the British Isles (Johnson, 1947; John Paul Jones, 1972, 1979; S.E. Morison, 1981; Thursfield, 1920). He scared the citizens of Edinburgh when he appeared off Leith. John Paul Jones grew up on the Solway and knew the coast well. While there he attempted to abduct **Dunbar Douglas** (1722-1799), **4th Earl of Selkirk**, who fortunately was away from his home on St Mary's Isle. The Earl's silver was taken, but John Paul Jones returned it.

It was at the Earl of Selkirk's table in 1793 that Burns gave the famous extempore Selkirk Grace. The Earl's 2nd son, Basil **Lord Daer** (1759-1794) was a friend of Burns; and it was with the fifth son, **Thomas Douglas**, later 5th Earl of Selkirk (1771-1820), who outlived all his brothers, that **Sir James Hall of Dunglass**, the father of experimental geology, made the first circuit of a granite pluton. Sir James Hall married Dunbar Douglas' daughter Helen. The 5th Earl was a remarkable philanthropist and developer, founding settlements on Prince Edward Island, the Red River Colony, and elsewhere in Canada, primarily for the benefit of families evicted from their homes in the Scottish Highlands.

1781: The Surrender of Cornwallis at Yorktown

Admiral de Grasse left France on 22nd March 1781 with a bigger booty in mind than the Earl of Selkirk's silver (James, 1926). Through Rochambeau, the French commander in America, General Washington knew that Admiral de Grasse was on his way to the West Indies, but on 11th June 1781 a letter, written at sea on 29th March, brought the exciting news that de Grasse expected to arrive in American waters before the end of July and wanted pilots and military intelligence. On 20th June a ship carrying the pilots and information that de Grasse needed left for a rendezvous in the West Indies. So began what Dull has called “the major phase of the most important and most perfectly executed naval campaign of the age of sail” (Dull, 1975, p.238-249).

On 3rd August Admiral Hood, off Antigua, learned that thirty American pilots for Chesapeake Bay and the Delaware had arrived in French Santo Domingo. He immediately sent a sloop to carry the news to Admiral Graves in New York, but the sloop was captured and taken to Philadelphia, and the significance of the pilots was lost (Adams, 1931, p.37). On 14th August Rochambeau received word from de Grasse that his destination in the West Indies was a feint, and that he was bringing his entire fleet to the Chesapeake. It was a brilliant strategy. Washington was overjoyed to hear the astonishing news, and immediately prepared to send all the troops at his disposal to meet de Grasse in Virginia.

Cornwallis was at that time engaged in fortifying Yorktown, Virginia, close to the mouth of Chesapeake Bay where de Grasse was heading. Lord Cornwallis had been one of the few peers opposed to the

measures that had led to the rebellion – a fact that would not have endeared him to Carlisle, Eden, and Johnstone on that long voyage to America – but he was a loyal soldier and, despite his political views, had been appointed second-in-command to Sir Henry Clinton, Howe’s successor as Commander-in-Chief of the British forces in America. Protesting what he perceived to be the incompetence of both Howe and Clinton, Cornwallis submitted his resignation, but the King refused to accept it. Although he had protested to Clinton that his force was not strong enough to hold Yorktown, he had express orders to fortify himself there. Clinton was in New York. Little did Cornwallis know that Washington was making haste to besiege him, and that de Grasse would arrive on 30th August with French troops, siege artillery, and supplies, supported by 28 ships of the line! (For critical studies of the relationships between Generals Cornwallis and Clinton see Adams, 1931; Wickmire, 1971; and Willcox, 1964).

Hood had joined Graves in New York, and on 31st August they put to sea to take on what they believed was Barras’ little fleet which had left Rhode Island. On that same day Cornwallis learned that between thirty and forty ships had entered Chesapeake Bay. It was only on 1st September that the British commanders realised what had happened – they faced the entire French West Indies fleet of battleships (Adams, 1931, p.41-44).

In the meantime, Admiral Hood with 14 ships of the line had joined Admiral Graves in New York, and had persuaded Graves to sail to the Chesapeake to protect Cornwallis. On 5th September de Grasse drove off the smaller British fleet, allowing Commodore Barras to take seven ships of the line laden with supplies and siege artillery into the Bay. Washington and Rochambeau joined de Grasse on 17th September on board the 110-gun *Ville de Paris*, the largest battleship afloat, where they planned the capture of Cornwallis’ army. Because of Clinton’s failure to intercept Rochambeau and Washington, and because of Graves’ failure to intercept Barras or dislodge de Grasse, Cornwallis was doomed (Dull, 1975, p.246).

American Independence was assured when Cornwallis surrendered at Yorktown on 19th October. At midnight on 25th November 1781 (for it took 37 days for the news to reach London), Lord George Germain received General Clinton’s despatch warning that the surrender of Cornwallis was imminent and inevitable. Together with Stormont and Thurlow, Germain went at once to the Prime Minister, who threw up his arms as though hit in the breast by a musket ball and cried out “Oh God! It is all over”, understanding the significance of the news he had dreaded to receive. (Whiteley, 1996, p.195). He was right, and the news from Yorktown also brought an end to the King’s system of personal government. George III wrote a declaration of abdication, but for some reason never sent it. (For sympathetic treatments of George III and Lord North, see John Brooke, 1972, Chapter 6). Ferguson knew Cornwallis well: not only had they travelled together to America, but while there Ferguson “dined out of Town at Lord Cornwallis’s” (Fagg, 1968, p.184). The news of his surrender must have been received with dismay by Hutton and Ferguson’s other friends in Edinburgh.

By 9th February 1782, Germain was no longer Secretary of State for the American Colonies. His successor lasted only a month; the Rockingham Ministry took office on 27th March and there was never again need to fill the position. With the fall of Lord North’s Government, the Tories were swept out of

every level of government, their places taken at last by their Whig enemies. Keppel was made a peer and appointed to succeed the Earl of Sandwich as First Lord of the Admiralty.

1782: Battle of the Saints

Battleships were built to carry guns rather than to be either fast or manoeuvrable. Because their fire-power had to be delivered as broadsides, the fleets went into action in “line of battle”. Consequently naval tactics commonly involved opposing fleets sailing past one another in parallel lines (Macintyre, 1979; Mahan, 1890, 1897, 1913, 1991; Warner, 1971, 1976, 1979). **John Clerk of Eldin**, however, after studying all the great engagements of the British fleet during the eighteenth century, concluded that it would be better to “break the enemy’s line”. He published his analysis in a privately printed *Essay on Naval Tactics* dated 1st January 1782 (Clerk of Eldin, 1782, 1790, 1804).

Clerk made strenuous efforts to bring his conclusions to the attention of the authorities; though he was greatly frustrated in doing this. Adam Ferguson, William Adam (now an influential politician – who wounded Fox in a duel before becoming his staunch ally), and others were Clerk’s agents, and apparently (though this has been questioned) brought his ideas to the attention of **Admiral Rodney** (1719-1792) before the fleet sailed for the West Indies on 16th January 1782. Lord Rodney’s copy of Clerk’s book, with the Admiral’s detailed notes in his own hand, is preserved in the Clerk family archives. On 12th April Rodney won a great victory over the French fleet near the small islands called “the Saints” between Guadeloupe and Dominica in the Windward Islands. Rodney captured Admiral de Grasse in his flagship, the *Ville de Paris*. (Hannay, 1891; Macintyre, 1962; Spinney, 1969; Thursfield, 1920; Welch, 1964)

John Clerk had recommended that the British fleet should break through the French line, firing broadsides down the length of the adjoining enemy ships as they went through. The enemy line would be in confusion; the ships in the van would be unable to turn back, and those in the rear would be overwhelmed. Although Clerk’s role has been hotly debated, there is no doubt that Rodney took the *Formidable* through the enemy’s line, as recommended by Clerk. (Anon., 1821, 1830, 1934; Jeffrey, 1830; Mundy, 1830 & 1836; Playfair, 1821; Southey, 1897, Appendix H; Thursfield, 1920).

Rodney wrote an account of the Battle in his own hand for his friend General Robert Clerk, Clerk of Eldin’s kinsman, and this historic document is included in the Clerk of Penicuik family papers (SRO GD18/4243). A key passage describes the encounter of the two opposing fleets – two parallel lines firing broadsides while sailing past one another. Rodney wrote: “ ... the British Admiral’s ship the *Formidable* reach’d the Enemys forth [sic] ship from their van and began a very close action within half Musquet shot and continued such action close along the Enemy’s Line under an easy sail till an opening appear’d at the third ship astern of the Enemys Admiral which gave an opportunity of breaking their line and putting their Rear in the utmost confusion”.

Just eight days after the Battle, though the news of it had, of course, not yet reached London, the new Whig Government wished to recall Rodney, who was not only a Tory but Lord George Germain’s

friend. Accordingly, on 18th May, Pigot, an officer with less experience, sailed from Plymouth to replace the country's most successful commander. On the very day that Pigot set sail, **Lord James Cranstoun** (1755-1796), Captain of Rodney's flagship, arrived in England with Rodney's despatches and the news of the greatest British victory of the entire war. Pigot was pursued in vain.

John Clerk recorded: Lord Cranstoun "did me the honour to seek me out, and was so kind as to furnish a number of sketches, and even to assist with a great part of the description. Lord Cranstoun, "being perfectly master of the whole transaction" told Clerk that "the *Formidable* had fired near eighty broadsides". **George Cranstoun** (d. 1850), (the judge Lord Corehouse) long afterwards wrote an account of Lord Cranstoun's visit.

George Cranstoun, whose sister Helen became **Dugald Stewart's** second wife (Chambers' DES), was **John Clerk, Lord Eldin's** colleague, but it was through **Will Clerk**, John's brother, that Cranstoun became **Walter Scott's** early and intimate friend and literary confidant. It was to George Cranstoun and **William Erskine** (1769-1822) (Lord Kinneder) that Scott read the opening stanzas of the *Lay of the Last Minstrel*. Scott dedicated the Third Canto of *Marmion* to Erskine and wrote the epitaph for Erskine's wife – who was **John Robison's** daughter.

The Battle of the Saints has been recognised as one of the twelve most interesting naval battles in history (Creswell, 1972, Chap.12; Chatterton, 1975, Chap.5; Mahan, 1980, Chap.9). It prevented France from sending another fleet to North America for months, and allowed British warships to control American coastal waters. By giving Britain command of the sea, it provided Britain with one of its few bargaining points in the negotiations culminating in the Treaties of Paris. De Grasse's nephew, also a naval officer and ex-prisoner of war, arrived at Versailles on 17 August. He brought the extraordinary news that Lord Shelburne, who was now Prime Minister, had asked Lieutenant-General de Grasse to convey to France Shelburne's own terms of peace (Dull, 1975, p.293). The Treaties between Britain and America, and between Britain, France, and Spain, were signed at Versailles on 3rd September 1783, little more than two months after the Royal Society of Edinburgh held its first general meeting.

As evidence of how small the eighteenth-century world was, it is interesting to note that on 1st October 1768 Franklin and Rodney sat at the same dinner table, though not immediately next to one another. They were guests of King Christian X of Denmark on his visit to London. The seating arrangement of the 18 people at the table is recorded (Carl Van Doren, 1946, p.182-183).

Thirty-five years after the Battle of the Saints, Walter Scott paid a personal tribute: "The late John Clerk of Eldin; a name never to be mentioned by Britons without respect and veneration, since, until his systematic Essay upon Naval Tactics appeared, the breaking of the line (whatever professional jealousy may allege to the contrary) was never practised on decided and defined principles. His suavity, nay, simplicity of manner, equalled the originality of his genius. This trifling tribute is due from one, who, honoured with his regard from boyhood, has stood by his side, while he was detailing and illustrating the system which taught British seamen to understand and use their own force, at an age so early, that he can remember having been guilty of abstracting from the table some of the little cork models by which Mr

Clerk exemplified his manoeuvres; unchecked but by his good humoured raillery, when he missed a supposed line-of-battle ship, and complained that the demonstration was crippled by its absence.” (Walter Scott, 1827, p.101n).

On 17th April 1790 Benjamin Franklin died. The French Constituent Assembly mourned for three days.

1789-1793: Reaction to the French Revolution

The Bastille fell on 14th July 1789. Louis XVI was guillotined on 21st January 1793, and on 1st February 1793 the French revolutionary government declared war. (For Scotland and the French Revolution see Meikle, 1912, Cockburn, 1888). Except for the time between October 1801 and May 1803, the two countries were at war for the next 22 years. Britain, however, retained command of the sea, and Nelson’s victory over the combined French and Spanish fleets at the Battle of Trafalgar on 21st October 1805 kept Napoleon (1769-1821) on the Continent. Napoleon was, of course, finally defeated by the Duke of Wellington (1769-1852) at Waterloo in 1815.

When the Bastille fell, many advocates of liberty, having sympathised with the Americans in their struggle against what was perceived to be a tyrannical government, found it natural to support the cause of freedom. **Wordsworth**, who as a Cambridge undergraduate arrived in France on the eve of 14th July 1790, described in well-known words how the Revolution appeared to an enthusiast at its commencement:

- “Bliss was it in that dawn to be alive,
But to be young was very heaven!”

With “not less than Gallic zeal” burning in his heart, he returned to France at the end of 1791 in order to share in the radiant happiness of the Revolution. He thought high purpose was sufficient qualification and considered putting himself forward as a leader of the Girondist party. But lack of money (an unglamorous reason) forced Wordsworth to leave France at the end of 1792, leaving behind his French daughter, who was born in December. It was well that he did so; three weeks later the King was executed, and many of Wordsworth’s friends went to the guillotine a few months afterwards.

Wordsworth returned to England a “patriot of the world”. He had a new loyalty and he glowed in the ardour of one newly converted. When war came, he felt driven to choose between his country and liberty, and like his friend **Coleridge** (1772-1834) he had no doubt which claim was higher.

- “For ne’er, O Liberty! with partial aim
I dimmed thy light or damped they holy flame;
But blessed the paeans of delivered France,
And hung my head and wept at Britain’s name.” Coleridge, 1798

James Watt (1769-1848), the son of Hutton’s friend the great engineer, went to Paris in 1789 and was

another enthusiastic youth who became caught up in the Revolution. Indeed in March of 1793, after war had been declared, Burke censured him in Parliament for having carried the British Flag into the hall of the Revolutionary Assembly. Young Watt, who apparently had no hesitation in becoming embroiled with the French leaders, on one occasion intervened to prevent a duel between Danton and Robespierre. Robespierre, thinking he might be a British spy, assailed him in the Assembly, and although Watt gave a spirited rejoinder he was forced to return home to Birmingham (Crowther, 1962, p.151).

In July 1793 Watt senior wrote to his friend Black: “Young men will presume to think for themselves and of all their father’s possessions set least value upon their experience. I much dread the consequences of the opinions on Government which have been propagated of late with so much industry. The Rabble of this country are the mine of Gunpowder that will one day blow up and violent will be the explosion” (Robinson & McKie, 1970, p.195)

To idealists such as Wordsworth, Coleridge, and young Watt, the cause of Freedom excused even the frightful excesses of the Reign of Terror. Unfortunate though these horrors were, they were transient, and seen as apparently necessary in the struggle for human Freedom:

- “Ye storms, that round the dawning East assembled,
The Sun was rising, though ye hid his light” Coleridge

Consequently these men had sympathy only with the French: “When with open war Britain opposed the liberties of France” (Wordsworth – forgetting that it was France that declared war). It was not, indeed, until French armies invaded Switzerland in 1798 that Wordsworth and Coleridge recoiled in horror as they saw the very foundations of their moral world uprooted.

- “But now, become oppressors in their turn,
Frenchmen had changed a war of self-defence
For one of conquest, losing sight of all
Which they had struggled for.”
Wordsworth

“Forgive me, Freedom! O forgive those dreams!
I hear thy voice, I hear thy loud lament,
From bleak Helvetia’s icy caverns sent –

Are these thy boasts, Champion of human kind?” – Coleridge

1790-1795: The Rights of Man

On a visit to Paris in 1790, **Thomas Paine** (1737-1809) was presented with the key to the Bastille, which he was to pass on to Washington. Burke’s *Reflections on the French Revolution* came out in November, and while Paine was still in Paris he began writing his reply to it: *The Rights of Man*,

dedicated to Washington and published in March 1791. Back in England in September 1792, Paine gave an address to the Friends of the People which his supporters knew would not easily be forgiven by the authorities. He sailed for France only twenty minutes before the warrant for his arrest arrived from London, and in December he was tried for treason in his absence.

Paine retained Clerk's friend, **Tom Erskine**, who felt obligated as an advocate to defend his client to the utmost of his ability. The Prince of Wales (the future George IV), apparently not understanding the fundamental principle of the legal system that guarantees a fair trial to every accused person, put very improper pressure on Erskine, but to Erskine's credit he resisted. In his defence of John Horne Tooke a year later, Erskine referred publicly to the incident. "I assert", he said, "that there was a conspiracy to shut out Mr Paine from the privilege of being defended: he was to be deprived of counsel, and I who now speak to you, was threatened with loss of office if I appeared as his advocate. I was told in plain terms that I must not defend Mr Paine. I did defend him, and I did lose my office".

The Reign of Terror in France, following the King's execution, produced the violent reaction of those in authority, especially in Edinburgh, where advocacy of universal suffrage was deemed seditious, all innovation treasonable. Standing tall above the graves of Hume and Playfair in the Old Calton cemetery is a tall obelisk, the grim reminder of the political trials of the "martyrs of parliamentary reform", 1793-1794. Advocates of universal suffrage were derided from the bench and sentenced to transportation to Botany Bay. Their treatment by **Lord Braxfield** was so outrageous that protests were made in Parliament, but to no avail. In 1795, the year that Hutton's two-volume *Theory of the Earth* was published, **Robert Watt** (unrelated to the famous engineer) was publicly beheaded in the High Street of Edinburgh – his head was raised by the Executioner who exclaimed "Here is the head of a traitor! Before the executioner raised his axe, **George Baird** – who had succeeded William Robertson as Principal of the University – stood at the prisoner's side and "prayed in a devout and ardent manner, singularly adapted to the mournful occasion" (Blanchard, 1795, p.85-93). **Walter Scott** came to town for the spectacle (Lockhart, 1900, Vol.1, p.195-198).

In 1793 Braxfield gave Thomas Muir fourteen years in Botany Bay for lending a friend a copy of *The Rights of Man* (Cockburn, 1888, Vol.1, p.144-183; Logue, 1976, p.13-37; Bewley, 1981).

When **Joseph Gerrald** defended himself on a charge of sedition in 1794, asked that Braxfield, the Lord Justice Clerk, be disqualified because he had publicly prejudged the case. Gerrald also objected to the presence of **William Creech** (Burns' publisher) on the Jury, on the grounds that before the trial he had stated that he would convict the prisoner. Both objections were overruled. **Robert Burns** (who had sent guns to France) must have narrowly escaped punishment for verses such as "But while we sing *God save the King*, We'll ne'er forget the people!" (Burns, 1986, p.537-538).

Since the use of the innocuous word *unconformity* in its modern geological sense was not introduced until 1829 (John Phillips), Hutton used a circumlocution; e.g. "after the vertical strata had been broken and erected, the horizontal strata had been deposited upon the vertical strata, then forming at the bottom of the sea" (Hutton, 1795, Vol.2, p.432). Summarising what Hutton showed him at Siccar Point, Playfair

spoke of *revolutions*: “An epocha still more remote presented itself, when even the most ancient of these rocks, instead of standing upright in vertical beds, lay in horizontal planes at the bottom of the sea, and was not yet disturbed by that immeasurable force which has burst asunder the solid pavement of the globe. *Revolutions* still more remote appeared in the distance of this extraordinary perspective” (Playfair, 1805, p.72-73). “Here, then, we have a series of great natural *revolutions* in the conditions of the earth’s surface, of which, as the author of this theory has remarked, we neither see the beginning nor the end” (Ibid, p.55) [Italics added].

Hutton published his two-volume *Theory of the Earth* in 1795, in the very time and place of the notorious sedition trials of 1793-1797. In it he argued that as a farmer rotates his crops, so revolutions are necessary in order to maintain a habitable planet. This could have been dangerous doctrine. To appreciate the risk in proclaiming that revolutions were natural in the history of the Earth, we need to remember how legal process was abused in Edinburgh, and used against anyone suspected of disturbing the status quo. Leonard Wilson rightly said “The danger to religion and morality seemed particularly serious to [Hutton’s critic] Kirwan because the French Revolution has severely shaken the whole basis of social order in Europe. The church was central to the social order in Great Britain and any idea which undermined its doctrines seemed to endanger society itself and threatened the interests of the governing and landowning classes” (Wilson, 1972, p.72-73). The Americans may have won their freedom under the banner of *No Taxation Without Representation!*, but in Edinburgh, twenty years later, Lord Braxfield asserted from the Bench that in this country it is “the landed interest, which alone have the right to be represented”, and to deny it was sedition or even treason (Cockburn, 1888, Vol.1, p.177).

Revisionist historians, judging Hutton on the basis of his theological references, may not appreciate the delicate situation that obtains when speech is not as free as we may innocently think it is and always has been. In *The Decline and Fall of the Roman Empire*, Hutton’s contemporary Edward Gibbon (1737-1794) used irony “with consummate art and felicity” in his discussion of Christianity because “an attack on Christianity laid a writer open to prosecution and penalties under the statues of the realm (9 and 10 William III c. 22 still unrepealed). Gibbon’s stylistic artifice both averted the peril of prosecution and rendered the attack more telling” (John B. Bury, *Encyclopedia Britannica*, 1929, Vol.10, p.331-332).

A hundred years earlier half the Professors of Edinburgh University were dismissed for refusing to sign the Westminster Confession of Faith, and 150 years after Hutton’s death, Professors at the University of California were dismissed for refusing to sign an Oath. What would a Senator Joseph McCarthy and a House Committee on Un-American Activities make of the claim that revolutions were inevitable and necessary? In the early 1950s McCarthy “rooted out” subversives and destroyed the careers and reputations of thousands of patriotic Americans, yet he had a country-wide following. The historian Samuel Elliot Morison said “Nobody who did not live through that period will ever believe what a sound and fury [it] made up” (Morison, 1965, p.1076); and so it was with Hutton’s Edinburgh.

1805: John Clerk of Eldin’s Naval Tactics and Trafalgar

Hutton enjoyed highly productive activity during a decade of peace, but when war broke out John Clerk

of Eldin's main concern once again became naval tactics, geology taking second place. Clerk's *Essay on Naval Tactics* was first issued privately, fifty copies being "handed out among friends", and the edition generally referred to as the first was not published until 1790. Only Part 1 was issued at that time: the Royal Society of Edinburgh's copy belonged to James Clerk-Maxwell, great-grandson of Sir George Clerk-Maxwell, 4th Baronet and brother of the author. Parts 2-4 were published in 1797, the year Hutton died. A second edition was published in 1804, in time for Nelson to use it at Trafalgar. Nelson attacked in two lines of battle, cutting the allied fleet into three pieces. (Nelson, 1845, Vol.6, p.89-92; Bennett, 1977, p.137-149; Howarth, 1969, p.131-210; Terraine, 1976).

Philip Durham (1763-1845), later Admiral Durham, was Captain of the *Defiance* at Trafalgar. Despite being wounded and his ship badly damaged, Durham wrote to Clerk eight days after the battle. Durham enclosed his own copy of Nelson's Memorandum (signed by Nelson and countersigned by his second in command, Admiral Collingwood) instructing the Captains how the battle was to be fought.

"Captain Durham sensible of the many advantages which have accrued to the British Nation from the publication of Mr Clarke's Naval Tactics, & particularly from that part of them which recommends breaking through the Enemy's line, begs to offer him the enclosed form of Battle which was most punctiliously attended to in the very brilliant and glorious Action of the twenty first of October – Mr Clarke [sic] will perceive with great pleasure that the present form of Battle is compleatly [sic] accordant with his own notions, and it is now sent as a Token of respect from Capt. Durham to one who has merited so highly from his Country.

H.M.S. Defiance
off Cadiz, 19th October 1805"

There is a considerable literature on Clerk's contribution to naval tactics, and the bibliography gives the principal references. Chatterton says that no important book on naval tactics had been published before John Clerk's in 1782:

"This book had a great influence on the imparting of sound principles, and such distinguished admirals as Rodney, Howe, Duncan, St, Vincent, and Nelson, owed much to the lessons therein exhibited. In a letter, for instance, dated 1806, Sir T.M. Hardy [Commander of the *Victory*, who was with Nelson when he died] wrote these words: 'Our departed friend, Lord Nelson, read Mr Clerk's works with great attention, and frequently expressed approbation of them in the fullest manner; he also recommended his captains to read them with attention, and said that many good hints might be taken from them. He most approved of the attack from to windward, and considered that breaking through the enemy's line absolutely necessary to obtain a great victory'" (Chatterton, 1975, p.154)."

Thursfield gives this evaluation:

"It is certain that, in his grasp of tactical principles and of their application in action,

Nelson was as far ahead of the ideas in vogue at the time as he overtopped all others in his consummate genius for war. He was, as we learn from Beatty's narrative [Dr William Beatty was Nelson's surgeon on the *Victory*], a frequent reader of Clerk of Eldin's *Naval Tactics*, and it is certain that the Memorandum we are considering was not a little indebted to that famous and illuminating work, though, as I shall hope to show hereafter, it greatly improved on Clerk's methods and suggestions" (Thursfield, 1920, p.16).

It seems that by giving up geological studies for naval tactics, John Clerk of Eldin may have helped to keep Napoleon's armies on the continent.

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5. Physical Setting

Edinburgh Castle is built on a plug of basalt that solidified in the feeding-pipe of a Lower Carboniferous volcano long since destroyed by erosion. The Castle rock stands high because it is more resistant than the surrounding sedimentary rocks, which dip at a low angle to the east. During the Ice Age, an ice-sheet moved eastwards across the Edinburgh area. Although the ice was so thick that Corstorphine Hill and Arthur's Seat were only small obstacles in its path, the Castle rock gave some protection to the sedimentary rocks in its lee, which along with the easterly dip, accounts for the mile-long ridge of the High Street and Canongate extending from the Castle down to the Palace of Holyrood. The ridge is accentuated by the horseshoe-shaped hollow gouged by the ice, that is now the site of Princes Street Gardens, the Grassmarket, and the Cowgate. To the east, rising above the intrusive sill of the Salisbury Crags, is Arthur's Seat, the relic of a tilted and deeply eroded volcano, of which Calton Hill, at the east end of Princes Street, is a fragment.

The ridge from the Castle to the Palace was early chosen as a defensive site. The Nor' Loch, in the hollow where the railway is today, gave some protection against attack from the north, and a wall protected the town's other flanks. Thomas Carlyle gave us a picture of the mediaeval city as it was a hundred years before Hutton was born: "Westward on its sheer blue rock towers up the Castle of Edinburgh, and slopes down eastward to the Palace of Holyrood; old Edinburgh Town, a sloping high-street and many steep side lanes, covers like some wrought tissue of stone and mortar, ... with many a gnarled embossment, church steeple, chimney-head, Tolbooth, and other ornament or indispensability, back and ribs of that same eastward slope, – after all not so unlike some crowned couchant animal, of which the Castle were crown, and the life-breath those far-spread smoke-clouds and vapour-clouds rising up there for the last thousand years or so. At the distance of two hundred years or more this thing I see. Rhinoceros Edinburgh lies in the mud: southwards a marshy lake or South Loch, now about to be drained; northwards a marshy lake or North Loch, which will not be drained for the next one hundred and thirty years" (Thomas Carlyle, 1902, p.253).

The population of Edinburgh at the time of the 1991 Census was 418,914. As Arnot observed in 1788 "To ascertain, with any tolerable precision, the number of inhabitants in a great city, is a matter attended with considerable difficulty". Arnot went on to say: "The number of separate families then in Edinburgh, Leith, and their environs, as ascertained by the survey A.D. 1775, amounted to 13,806, which, multiplied by six, gives the number of inhabitants to be 80,836 (Hugo Arnot, 1788, p.330, 339). Elsewhere we read that the population of Edinburgh, which is thought to have been about 20,000 in 1707, had by 1755 grown to about 31,000 (40,500 including Leith), and to 67,000 in 1800 (Encyclopaedia Britannica, 1929, Vol.7, p.959; Kyd, 1975, p.15; MacKinnon, 1921, p.21; Maitland, 1753, p.220-221; Malcolm, 1951, p.72; Mullan, 1996, p.257-258. For general demography see Flinn, 1977). It is not always clear, unfortunately, to what specific areas the figures given refer. The Old Town, protected by the City Wall, was confined to the upper part of the ridge, on which tall tenements housed a

compressed and intimate population. The Old Town is only about one mile long and half a mile wide (Maitland, 1753, with a map dated 1742; Hugo Arnot, 1788, with a map dated 1787). Mossner, Hume's biographer, likened eighteenth century Edinburgh to modern Manhattan! (Mossner, 1954, p.37).

Visitors from England and the Continent were amazed at the height of the buildings. When Dr Johnson visited Edinburgh on his way to the Hebrides in 1773, Robertson, Ferguson, and Boswell took him on a walking tour. They looked up from the Cowgate to the highest building, "being thirteen floors or storeys from the ground upon the back elevation, the front wall being built upon the edge of the hill and the back wall rising from the bottom of the hill several storeys before it comes to a level with the front wall" (Boswell, 1936, p.25). As James Mackay has remarked, "The skyscrapers themselves symbolised the stratification of Edinburgh society, with the different levels of society occupying the same tenement, but on different floors: the poorer classes occupied the lower storeys, closer to the noise and the smells of the street, while the merchant classes lived in the upper storeys, with the nobility in the flats at the top of the building" (James Mackay, 1992, p.253). The plan of the Old Town resembles the bones of a herring, with the High Street the backbone, supporting closes and wynds (narrow passage ways) at right angles. In the eighteenth century sewage was thrown from the windows, and the High Street was an open drain. Boswell recorded Johnson's complaint: "I smell you in the dark!" (James Boswell, 1936, p.12).

The Castle dominates the skyline, and the Old Town shelters below; but the last time the Castle's guns were fired in anger they were aimed at the Town, which had capitulated to Prince Charles' Highland army.

Great changes took place in Hutton's adult lifetime. The city no longer needed to be restricted to a defensive position on the ridge. It was time for expansion and fresh thinking. The contrast between the old narrow closes and Robert Adam's elegant buildings in the New Town illustrate the change. In 1772 the North Bridge was completed, inviting expansion northwards from the city's medieval bounds. At the north end of the bridge, Robert Adam's Register House, begun in 1774, made a splendid entrance into the New Town from the Old. David Hume was one of the first to build in the New Town; he moved there in May 1771, before the North Bridge was completed, and it was there that Franklin was his guest.

The South Bridge continued the route of the North Bridge and gave access to the development of new residential areas south of the town. The South Bridge was completed in 1788, just in time for the laying of the foundation stone of Robert Adam's new building for the University.

6. Landmarks in Hutton's Career

1727-1747: Edinburgh

James Hutton was born in Edinburgh on 3rd June 1726. This was the year that Dr Beringer published illustrations of what he believed to be genuine fossils, but which had in fact been fabricated by his Iago-like enemies (Sanders, 1960; Beringer, 1963; Jahn, 1963a & b). Three years earlier, with financial help from Fellows of the Royal Society [London], the great Swiss naturalist, Scheuchzer, had published a natural history of Switzerland that included illustrations and descriptions of what were believed to be flying dragons (Scheuchzer, 1723). The science of geology was still in a primitive state.

James Hutton's father, William Hutton, a merchant in Edinburgh, had been City Treasurer for some years, but he died while James was very young, and James was brought up by his mother. James entered the University as a student of humanity in November 1740, at the age of fourteen.

While Hutton was a student in Edinburgh, Black was studying medicine and chemistry in Glasgow, taking advantage of the fact that Cullen, then Professor of Medicine, had begun to give lectures on chemistry, a subject never before taught in Glasgow University. Black transferred to Edinburgh in 1752, where, in 1754, he received the M.D. degree for his discovery of fixed air' (CO₂) (Black 1756; Dobbin, 1935). Like Black, with whom Hutton was so closely associated in later years, Hutton developed an early and life-long interest in chemistry. While still a student he and his friend James Davie experimented on the production of sal ammoniac from the city soot, these experiments later becoming the basis of a profitable chemical business.

The careers of Cullen and Black show how closely allied the subjects of medicine and chemistry were considered, and recognition of this led Hutton to become a medical student, which he did from 1744-1747. His years as a student in Edinburgh therefore coincided with the War of the Austrian Succession (1740-1748), and included the 1745 Jacobite Rising, when Edinburgh was taken by the Jacobite army (see Brown & Cheape, 1996). As we have seen, Church Ministers and University teachers left to bear arms against Prince Charles; Professor Maclaurin organised the defence of the city.

Maclaurin, a Glasgow graduate, was appointed to the Chair of Mathematics at Aberdeen at the age of nineteen after ten days of competitive examination. He was only 21 when he was admitted to the Royal Society [London] and his friendship with Newton began. He transferred from Aberdeen to the Chair of Mathematics in Edinburgh in 1725, coming with Newton's personal recommendation. The monument marking Maclaurin's grave in Greyfriars uses the words *Newtone ipse suadente*. Newton, indeed, offered to pay an annual contribution towards Maclaurin's salary. Maclaurin was a brilliant and popular teacher, teaching with authority not only as a distinguished mathematician, but as Newton's friend and expositor.

Edinburgh pioneered the teaching of Newton's Principles. Like many others, Hume, who left the University in 1725 (or possibly 1726), was greatly influenced by Newton's philosophy (Hurlbutt, 1985). Perhaps Hume learned about Newton's work from James Gregorie (1666-1742) *secundus*, because Maclaurin did not succeed Gregorie until November that year, and the Hume family spent the winter of 1725-1726 in Edinburgh. It is also possible that Hume learned from Maclaurin's writings, which were in English rather than Latin. What happened at that time is uncertain because Gregorie was unwell, and for some time Maclaurin was joint-Professor. Adam Smith, too, was influenced by Newton (Hetherington, 1983; Raphael, 1988).

All around, Hutton saw palpable evidence of what he believed to be the "necessary" decay and destruction of rocks. But he also saw that most rocks are themselves the consolidated products of destruction of still older rocks. He concluded that as blood circulates in the microcosm, so matter circulates in the macrocosm. Hutton wrote:

"We are thus led to see a circulation in the matter of this globe, and a beautiful economy in the works of nature. This earth, like the body of an animal, is wasted at the same time that it is repaired. It has a state of growth and augmentation; it has another state, which is that of diminution and decay. This world is thus destroyed in one part, but it is renewed in another; and the operations by which this world is thus constantly renewed, are as evident to the scientific eye, as are those in which it is necessarily destroyed" (Hutton, 1795, Vol. 2, p.562).

Hume's similar words, with which Hutton must have been familiar, are:

"Now if we survey the universe, so far as it falls under our knowledge, it bears a great resemblance to an animal or organized body, and seems actuated with a like principle of life and motion. A continual circulation of matter in it produces no disorder: A continual waste in every part is incessantly repaired: The closest sympathy is perceived throughout the entire system: And each part or member, in performing its proper offices, operates both to its own preservation and to that of the whole. The world, therefore, I infer, is an animal, and the Deity is the SOUL of the world, actuating it, and actuated by it" (Philo in David Hume, [1779] 1985, p.170-171).

We do not know the content of the classes Hutton took from Maclaurin, but perhaps Maclaurin's *Account of Sir Isaac Newton's Philosophical Discoveries* (published posthumously in 1748) planted a geological seed that flourished later in Hutton's mind.

"It has been demonstrated by ingenious men, that great revolutions have happened in former times on the surface of the earth, particularly from the phaenomena of the Strata; which sometimes are found to lie in a very regular manner, and sometimes to be broken and separated from each other to very considerable distances, where they are found again in the same order; from the impressions of plants left upon the hardest bodies dug deep out of the earth, and in places where such plants are not now found to grow; and from bones of animals both of the land and sea, discovered some hundreds of yards beneath

the present surface of the earth, and at very great distances from the sea" (Maclaurin, 1748, p.390).

The Bible reports that God looked on the Earth "and saw that it was good"(Genesis, Chap.1); Hutton and others have come to the same conclusion. Hutton's interpretation was that the Earth was made for man – the alternative being hardly possible 200 years ago:

“Here is a compound system of things, forming together one whole living world; ... the matter of this active world is perpetually moved, in that salutary circulation by which provision is so wisely made for the growth and prosperity of plants, and for the life and comfort of its various animals” (Hutton, 1795, Vol. 2, p.560). “Thus, the circulation of the blood is the efficient cause of life; but, life is the final cause, not only for the circulation of the blood, but for the revolution of the globe’ (ibid, p.546). “We perceive a fabric, erected in wisdom, to obtain a purpose worthy of the power that is apparent in the production of it. ... This globe of the earth is a habitable world; and on its fitness for this purpose, our sense of wisdom in its formation must depend” (Hutton, 1788, p.209) “The globe of this earth is evidently made for man”(ibid, p.216).

Maclaurin's posthumous book would be known to both Hume and Hutton, and we find suggestive parallels in the writing of Maclaurin and Hutton. The following are examples (For the design argument see Hume, 1985; Mossner, 1978; Hurlbutt, 1985)

Maclaurin: “Newton infers, from the structure of the visible world, that it is governed by *One Almighty, and All-wise Being*” (Maclaurin, 1748, p.377; see also Strong, 1952).

Hutton:“**almighty power**, and **supreme wisdom** [are] employed for sustaining that beautiful system” (Hutton, 1795, Vol.1, p.275); “We may perceive the most perfect **wisdom** in the actual constitution of things” (Hutton, 1795, Vol.2, p.89); “We perceive a fabric, erected in **wisdom**” (Hutton, 1788 p.209); “Would [Kirwan] deny that ... a philosopher, who looks into the operations of nature, may not plainly read the **power** and **wisdom** of the Creator” (Hutton: 1795, Vol.1, p.224); “it would be absurd to suppose any thing but **wisdom** could have designed this system of the earth” (Hutton, 1795, Vol. 2, p.527-528).

Maclaurin:“ The plain argument for the existence of the Deity, obvious to all and carrying irresistible conviction with it, is from **the evident contrivance and fitness of things for one another**, which we meet throughout all parts of the Universe. ... A manifest contrivance immediately suggests a contriver.” (Maclaurin, 1748, p.381).

Hutton: “This globe of the earth is a habitable world; and on its **fitness** for this purpose, our sense of **wisdom** in its formation must depend”. (Hutton, 1788, p.209); “Such, indeed, is the **admirable contrivance** of the system ... ” (Hutton, 1795, Vol.2, p.197).

Maclaurin:“The simplicity of the laws that prevail in the world, the **excellent disposition of things**, in order to obtain the best ends, and the **beauty** which adorns the work of nature, far superior to any thing

in art, suggest his **consummate Wisdom**. The usefulness of the whole scheme, so **well contrived for the intelligent beings** that enjoy it, with the **internal disposition** and moral structure of those being themselves, shew [sic] his unbounded **Goodness**" (Maclaurin, 1748, p.381).

Hutton: "a world contrived in **consummate wisdom**; a **world peculiarly adapted to the purposes of man**" (Hutton 1788, p.294-295); "a world maintaining an almost endless diversity of plants and animals, by the **disposition** of its various parts ... The necessary consequence of this **disposition of things**, where the matter of this active world is perpetually moved, in that salutary circulation by which provision is so **wisely** made for the growth and prosperity of plants, and for the life and comfort of its various animals" (Hutton, 1795, Vol.2, p.560); "a **beautiful economy** in the works of nature". (Hutton, 1795, Vol.2, p.262); "a world **beautifully calculated** for the growth of plants and nourishment of animals" (Hutton, 1997, p.89)

Maclaurin: "The laws of nature are constant and regular, and, for ought we know, all of them may be resolved into one general and extensive power" (Maclaurin, 1748, p.387).

Hutton: "Theory of the Earth; or an investigation of the laws observable in the composition, dissolution, and restoration of land upon the globe" (Hutton, 1788, p.209); "we must read the transactions of time past, in the present state of natural bodies; and for the reading of this character, we have nothing but the laws of nature, established in the science of man by his inductive reasoning. (Hutton, 1795, Vol.1, p. 373).

Playfair: "Amid all the revolutions of the globe the economy of Nature has been uniform, and her laws are the only things that have resisted the general movement. The rivers and the rocks, the seas and the continents have been changed in all their parts; but the laws which direct those changes, and the rules to which they are subject, have remained invariably the same." (Playfair, 1802, Paragraph 374, p.421-422).

1747-1750: Paris, Leyden, London, and Edinburgh

Hutton spent the years 1747-1749 studying chemistry and anatomy in Paris. He received the M.D. degree from Leyden for his thesis *De Sanguine et Circulatione in Microcosmo*. Towards the end of 1749 Hutton returned to London, where he was disappointed to find that there were no prospects for his employment as a medical practitioner. He wrote in some despair to his Edinburgh friends, and was relieved to learn that, in his absence, James Davie had achieved some success in the production of sal ammoniac. Hutton returned to Edinburgh in the summer of 1750.

It will be recalled that Adam Smith gave courses of well-attended public lectures in Edinburgh in the years 1748-1751, and it would be surprising if Hutton had not attended the last of these. This we identify as the first period when Hutton had an opportunity to meet Smith. Hume was studying privately at the family home at Ninewells in Berwickshire from 1749-1751. As Hume already knew and had a great respect for Smith, it is likely enough that Hume, too, might have been in Edinburgh to hear Smith's lectures. Although we know that Hutton and Smith became very close friends, we do not know when

they first met. There is no evidence that Hutton and Hume ever met, though that they did not seem inconceivable: Smith was Hume's executor, and Black was his doctor. Robertson and Ferguson were among Hutton's closest friends, as they were also of Hume's.

1750-1752: Established in Berwickshire

Having inherited farming property in Berwickshire from his father, Hutton (as Playfair tells us) "resolved to apply himself to agriculture" (Jones; 1985, Withers, 1994). His decision was confirmed when he met Sir John Hall of Dunglass (1711-1776), a gentleman "of ingenuity and taste for science, and also much conversant with the management of country affairs" (Playfair, 1805, p.43). Sir John was born the same year as David Hume (he was therefore fifteen years older than Hutton), and died nine days after Hume, both were aged sixty-five.

David's older brother, John Hume at Ninewells, and Henry Home at Kames were amongst the first to introduce modern methods of farming to Scotland. They knew each other and it seems highly probable that Hutton would visit these neighbours, with whom he would have much in common and from whom he could get help and advice in his new occupation. Dunglass is on the main road to Edinburgh; as the crow flies it is less than nine miles from Hutton's farm at Slighhouses. David Hume's family home at Ninewells is little over three miles from Slighhouses, while Henry Home's estate at Kames is less than ten miles.

David did much of his studying at Ninewells, and while there he paid many social visits. Mossner says of him: "He was constantly back and forth to Edinburgh, occasionally visited Glasgow and the West of Scotland, got to Kirkcaldy in Fife, rode over to Berwick frequently [10 miles], and was, of course, a common visitor to his neighbours in the Merse and the Border country" (Mossner, 1954, p.146). Hutton at Slighhouses was one of his closest neighbours.

Things changed in 1751/52: Adam Smith was appointed to the Chair of Logic in Glasgow; David Hume's older brother married; and David and his sister moved to Edinburgh, where David was elected one of the Secretaries of the revived Philosophical Society, originally founded by Colin Maclaurin.

In 1752 Hume was appointed Keeper of the historic Advocates' Library, a position that gave him access to the books he needed. By this time he had a national reputation. Adam Smith transferred to the Chair of Moral Philosophy in Glasgow, and although Hume was denied the vacated Chair, Hume adopted Smith as his literary counsellor. Robertson became leader of the Moderate party at the General Assembly, a position he held with distinction until 1780; Black transferred to Edinburgh University; and Hutton went to Norfolk.

1752-1754: Hutton in England

During the first half of the eighteenth century great advances had been made in English agriculture. This was especially so in Norfolk, where land was enclosed and the "Norfolk" or four-course rotation (roots,

barley, clover, wheat) produced greatly improved yields of both crops and animals. A leader in this advance was Charles Townshend (1674-1738), the 2nd Viscount, who in 1730 retired from a very active political career to devote himself to agricultural improvements on his estate in Norfolk. It was a tribute to him that he became known as "Turnip Townshend", because the adoption of turnip husbandry revolutionised British farming. This Charles Townshend was the grandfather of the Charles Townshend (1725-1767) who was the author of the notorious Townshend Acts that precipitated the American Revolution.

As Hutton was "never disposed to do things by halves, he determined to study rural economy in the school that was then reckoned the best", and in 1752 he set off for Norfolk (Playfair, 1805, p.43). But while there he made many journeys on foot into different parts of England, and began making those observations which later led him to formulate his *Theory of the Earth*. Playfair quotes from a letter Hutton wrote to Sir John Hall in 1753. Though the main object of his journeys was to obtain information in agriculture, yet it was in the course of them that "to amuse himself on the road", he first began to study geology. He had become very fond of studying the surface of the Earth, and looked "with curiosity" into every natural or artificial exposure. Hutton extended his travels by visiting the Low Countries, which had been the source of many of the improvements he had found in Norfolk. He returned to Berwickshire at the end of the summer of 1754.

1754-1767: Farming in Berwickshire

Though Hutton seems to have devoted these thirteen years mainly to the improvement of his Berwickshire farms, he must have been pondering the meaning of the geological observations he had made on his travels. Moreover his two farms are on contrasting terrains a fact that is unlikely to have escaped his thoughtful observation (Jean Jones, 1985). Playfair thought that it was about 1760, when Hutton was 34, that Hutton's ideas began to come together to form a theory. No doubt he made visits to Edinburgh during those years, but we have no records. Black, sent an important abstract of Hutton's Theory to Princess Dashkov on 27th August 1787 (Black's letter is in Edinburgh University Library: Gen. 873 / III / 36-39. The text is in Ramsay, 1918, p.117-125). In this letter Black said: "Dr Hutton had found this system or the principal parts of it more than 20 years ago and he has found reason to be more and more confirmed in it by his study of Fossils ever since that time". If Black is correct, then the theory predated 1767.

Black received his M.D. degree from Edinburgh in 1754, but it seems unlikely that he and Hutton met before 1766 when Black returned to Edinburgh as Professor of Chemistry (Robison filling the vacant position in Glasgow).

The Seven Years War (1756-1763) occupied many of those years, and Hume was frequently in London. After the war Hume was Secretary to the Embassy in Paris (1763-1766), and for a few months in 1765 was *chargé d'affaires* until the Duke of Richmond arrived towards the end of the year. Adam Smith took the young Duke of Buccleuch and his brother, the Hon. Hew Scott, to the Continent in 1764, but it seems that they may have missed Hume and Rousseau who left for London on 3rd January 1766. Hume

returned to Ninewells in September 1766, though only for a few weeks – another possible opportunity for Hutton and Hume to meet, but whether they did is unknown.

Sir James Hall of Dunglass was born in 1761 and succeeded to the Baronetcy at the age of fifteen on his father's death in 1776.

The Clerks of Penicuik, in Midlothian, owned an extensive area of the Midlothian coal-basin, which they had mined for several generations. The second Baronet, the father of George Clerk-Maxwell and John Clerk of Eldin, wrote a *Dissertation on Coal* in 1740 (SRO GD18/1069), and John Clerk of Eldin wrote a short (undated) essay *Of the Coal Country in the Neighbourhood of Edinburgh*. (SRO GD18/1143) Being his father's seventh son, John Clerk of Eldin was not a wealthy man; he had to struggle to bring up a family of three sons and four daughters. In 1762 he purchased the small coal-field of Pendrich, or Pittendriech, near Lasswade, from the Marquis of Lothian for 2,000 guineas (SRO GD18/247/101/4/2/2). He had entertained the hope of great expectations, but he had borrowed from the bank and his indebtedness was a serious problem. In an undated draft letter, Clerk acknowledges his indebtedness to "our most benevolent and worthy friend Doctor Hutton" (SRO GD18/5486/53/1). Because the mine had ceased to be profitable, the Marquis intended to move the miners (colliers) to another and more profitable colliery.

Most people know that "No taxation without representation" was the battle cry in America, but few remember that until 1799 Scottish colliers were slaves – even their children were permanently indentured (Acts of 1775, Cap.28, p.296-298 and 13th June 1799, Cap.56, p.119-120). In 1761/62 the Pendrich miners – or someone acting for them – appealed to the Court of Session: they claimed only that their slavery was to the mine and not to the coal owner. It was a test case: the Marquis contested the claim, and the Court supported him; i.e. the colliers belonged to him, and could be moved at his pleasure (SRO GD18/1095; GD 247/101/4/2/2; GD18/1113. If a collier ran away, he was punished for stealing someone else's property, and an iron collar with the name of his owner was put round his neck. Other punishments included tying a man's hands behind his back and making him run backwards before the horse that toiled round and round to drive the engine that powered equipment. (Anon., 1899; Arnot, 1955; Barrowman, 1898; Bremner, 1969, p.1-31; Roy Campbell, 1968, Chap.5; Duckham 1968, 1969; Franks, 1842; Gray, 1933; Johnston, 1974, p.69-64, 216-233; McNeill, 1884).

Because Clerk could not afford to pay a manager, he had to direct the operation himself. Thus Clerk had extensive knowledge of sedimentary rocks and their structure, which must have been of great use to Hutton.

In 1764 Hutton made an important geological tour to the north of Scotland with George Clerk-Maxwell, later Sir George Clerk-Maxwell, 4th Baronet of Penicuik, "a gentleman distinguished for his abilities and worth, with whom Dr Hutton had the happiness to live in habits of the most intimate friendship" (Playfair, 1805, p.45). George Clerk-Maxwell, an older brother of John Clerk of Eldin, was elected one of the four Presidents of the Physical Section of the Royal Society of Edinburgh at its foundation in 1783. Like Hutton he had been a member of the Philosophical Society. Apart from

geology, which was the object of the excursion, George Clerk-Maxwell and Hutton shared an interest in agricultural improvements. Perhaps that was what brought them together. George Clerk-Maxwell was the first of three members of the Clerk family who, on different occasions, accompanied Hutton on vitally important geological excursions. His nephew, John Clerk (later Lord Eldin) wrote an account of his life, which (along with Hutton's *Theory*) was published in the first volume of the Royal Society of Edinburgh's *Transactions* (1788). There we read that George Clerk-Maxwell was a Commissioner for the Annexed Estates (1752), a Trustee for Fisheries, Manufactures and Improvements (1760), and Commissioner of the Customs (1763). "Mr Clerk was well acquainted with every branch of Natural History. To Mineralogy he had paid particular attention, from its immediate connection with his mining operations".

In 1765 Hutton and Davie entered into a regular partnership for the commercial production of sal ammoniac (Playfair, 1805, p.42-46; Clow & Clow, 1942, 1947, 1952. Also Ellis, 1760; Pococke, 1887).

1767: Return to Edinburgh

Hutton left Berwickshire and moved to Edinburgh in 1767. Playfair tells us that "he left Berwickshire entirely, and became resident in Edinburgh, giving his undivided attention from that time to scientific pursuits. Among other advantages which resulted to him from this change of residence, we must reckon that of being able to enjoy, with less interruption, the society of his literary friends, among whom were Dr Black, Mr Russel, professor of Natural Philosophy, Professor Adam Ferguson, Sir George Clerk, Mr Clerk of Elden [sic], Dr James Lind, now of Windsor, and several others" (Playfair, 1805, p.46). The James Russel referred to was Professor James Russell, senior, (d.1773)

From 1767-1774 Hutton was an active member of the Executive Committee for the Forth and Clyde Canal, and if he didn't already know Kames and Watt, their common involvement with the Canal Project would have soon brought them together (Jean Jones, 1982). Sir John Hall of Dunglass was now an old and trusted friend, and George Clerk-Maxwell would no doubt have introduced Hutton to his brothers, Sir James Clerk (d.1782) 3rd Baronet, and John Clerk of Eldin. Hutton's relationship with the Clerks of Penicuik House would, of course, have guaranteed Hutton a wide circle of friends with interests in the arts, the sciences, law, politics, agriculture, manufacture, mining, and improvements of all kinds. Sir George Clerk-Maxwell had two sons: John (d.1798), who became the 5th Baronet; one of Raeburn's greatest portraits is of this Sir John and his wife. From the second son, James (d.1793), two lines descend – the Clerks of Penicuik and the Clerk-Maxwells; James was the grandfather of the famous physicist, James Clerk-Maxwell (1831-1879) [See genealogical tree 2].

According to Playfair, Hutton became a member of the Philosophical Society of Edinburgh at that time. The Society published volumes of *Essays* in 1754, 1756, and 1771, but although Hutton contributed several papers to the Society, they were presented after 1771 and before the incorporation of the Royal Society of Edinburgh in 1783. Only one of these papers was published, *On Certain Natural Appearances of the Ground on the Hill of Arthur's Seat* (Hutton, 1790). It was read to the Philosophical Society in June 1778. Hutton explains that it was Ferguson who had suggested project in the summer of

1776, and who had then "carried" Black and Hutton to the place. We therefore know that by 1776 Hutton had made field observations with George Clerk-Maxwell, Watt, Ferguson, and Black.

Smith spent two months at Dalkeith in 1767, where the young Duke of Buccleuch (Smith's former pupil) had brought his bride to celebrate his 21st birthday – it was the Duke's first visit to Dalkeith. From 1767-1773 Smith was in Kirkcaldy, hard at work on *The Wealth of Nations*. In 1769 Hume challenged Smith to visit him in Edinburgh: "I am glad to have come within sight of you , and to have a view of Kirkcaldy from my windows ... I want to know what you have been doing, and purpose to exact a rigorous account of the method in which you have employed yourself during your retreat. I am positive that you are in the wrong in many of your speculations, especially when you have the misfortune to differ from me" (Mossner, 1954 p.561). Hume was of course joking, though Dr Johnson was probably not when, speaking of the Catholics, he said to Boswell: "In every thing in which they the Catholics differ from us they are wrong" (Boswell, 1887, p.407). Smith was back in Edinburgh briefly in 1770 in order to receive the freedom of the city From 1773-1776 he was in London, incorporating material supplied by Benjamin Franklin and other friends in London, and recasting the text, which was finally published in 1776. (The following year Hutton published a pamphlet on criteria useful to revenue officers who needed to distinguish between different grades of coal.) Smith then returned Kirkcaldy, but visited Edinburgh briefly in July 1776, when he joined some of Hume's close friends for a farewell dinner.

When Smith received his appointment as Commissioner of Customs in 1778, (George Clerk-Maxwell had been a Commissioner since 1763), Smith moved to Edinburgh. His new home was Panmure House in the Canongate, only a few minutes walk from Hutton's house in St John's Hill, and here Smith lived until he died in 1790. Black and Hutton knew him well during these years, and were his literary executors.

Hume was in London as Under Secretary of State from 1767-1769, returning to Edinburgh in August 1769. Franklin was Hume's guest in the new house in 1771, and Hutton may have attended one of the many dinner parties given during Franklin's visit. The opportunity for Hutton to meet Hume was therefore most likely between 1769 and Hume's death in 1776.

Though Robert Adam spent a lot of time in London, his family lived in Edinburgh. He and David Hume were good friends, and Adam in fact designed Hume's tomb (Iain Brown, 1991). John Clerk of Eldin, was Robert Adam's brother-in-law, friend and correspondent. Clerk wrote the contemporary biography of Robert Adam, and one of Clerk's daughters inherited the great architect's drawings, which are now in the Soane Museum in London. It is possible that the Adam connection might have given Hutton the opportunity to meet Hume.

Robison returned from Russia in 1774 to take up his appointment in Natural Philosophy. Hutton would probably meet him through Black and Ferguson. In 1774 Robison's old friend Watt joined Boulton in Birmingham, and one of his first actions on his arrival was to invite Hutton to join him on a 'jaunt' to the Cheshire salt-mines; an invitation which Hutton accepted. Cheap fuel made it possible to tolerate

inefficient engines in coal mines, but Cornish tin mines had no local source of coal. For this reason most of the customers for Watt and Boulton's new, efficient engines were in Cornwall, which explains why Watt was able to draw a geological map of Cornwall. Hutton had personally examined "almost all of England and Wales, (excepting *Devon and Cornwall*)" (Hutton, 1795, Vol.1, p.213) [Italics added].

Finally, we note that it was in the ten years of Peace, 1783-1793, when he was accompanied first by John Clerk of Eldin and John Clerk, junior, and then by Playfair and Hall, that Hutton achieved his geological triumphs.

The Oyster Club

In October 1784, less than six months before Hutton's seminal *Theory of the Earth* was presented to the Royal Society of Edinburgh, Barthélemy Faujas de Saint Fond (1741-1819), arrived from France (Faujas, 1797, 1799, 1907). Formerly a successful lawyer, Faujas was then a distinguished scientist with a very practical bent; the following year he became Royal Commissioner of Mines, and in 1793 he was appointed Professor of Geology at the National Museum of Natural History in Paris. In 1784 his *Minéralogie des Volcans* was newly published; six years earlier he had produced a magnificent volume on the extinct volcanoes of Central France. Faujas recognised that the columnar basalts of France were volcanic, and having read Sir Joseph Banks (1743-1820) on the columns at Fingal's cave on Staffa (1772, published by Pennant, 1774, p.261-271, with 6 plates), he had been determined to visit the island. He arrived in Edinburgh having successfully made the difficult journey, and he had no hesitation in recognising the volcanic origin of the famous columns.

In Faujas's words, the hills behind the town of Edinburgh [he probably meant the Salisbury Crags and Samson's Ribs] "are composed of basaltic lava. This substance, which, at one time, must have been liquefied, exhibits prismatic septa occasioned by the cooling of the lava. There is here, however, none of that astonishing regularity displayed in the prismatic columns of the cave of Fingal ... The rapid mode in which this lava probably cooled, may have prevented this beautiful effect from taking place". While giving Faujas credit, it must, however, be admitted that Faujas mistakenly thought many of the greywackes and shales of the Southern Uplands were volcanic. He was a convinced neptunist in his interpretation of so-called "trap" rocks and "toad-stones".

While in Edinburgh, Faujas visited James Hutton, principally because Hutton was reputed to have a collection of agates and other stones. Faujas reported that though he was unimpressed with Hutton's collection, he had enjoyed conversing with this "modest philosopher" who, he said, was then "busily employed in writing a work on the theory of the earth". Faujas found more of interest in the company of Joseph Black (1728-99), the "learned chymist", whom he visited as often as possible, and whose "profound knowledge" he greatly respected.

It is strange that Faujas seems to have shown little interest in the nature of Hutton's theory, especially because Black was very familiar with it. Black in fact read the first part of Hutton's paper to the Society in 1785 when Hutton was indisposed, and on 27 August 1787 Black sent a long and important account

of Hutton's *Theory* to Princess Dashkov for the Imperial Academy of Sciences of St Petersburg (Edinburgh University Special Collections, Gen.873/III/36-39; Ramsay, 1918, p.117-125).

Other distinguished men that Faujas met in Edinburgh included William Cullen and William Robertson, but it was the "venerable philosopher", Adam Smith, whom Faujas visited most frequently. Learning that Faujas loved music, Smith invited him to attend a musical recital. This turned out to be the annual bagpipe competition at which only the classical Ceol Mor (great music) was played. The competitions in 1783 and 1785 were won by Donald MacIntyre, but it is not known whether he competed in 1784 when Smith and Faujas were in the audience. Faujas reported that "the competitors afterwards formed themselves into a line two deep, and marched in that order to the castle of Edinburgh, which", he rightly assures us, "is built on a volcanic rock".

The three close friends, Adam Smith, Joseph Black, and James Hutton, founded a club known as the Oyster Club (or Adam Smith's Club), which met weekly. Among the regular members were Henry Mackenzie, Dugald Stewart, John Playfair, Sir James Hall, Robert Adam, John Clerk of Eldin, and Burns' friend Lord Daer, the eldest son of the 4th Earl of Selkirk (John Rae, 1895, p.334-338, 416-419). Playfair described how "round them was soon formed a knot of those who knew how to value the familiar and social converse of these illustrious men. As all three possessed great talents, enlarged views, and extensive information, without any of the stateliness and formality which men of letters think it sometimes necessary to affect; as they were all three easily amused; were equally prepared to speak and to listen; and as the sincerity of their friendship had never been darkened by the least shade of envy; it would be hard to find an example, where every thing favourable to good society was more perfectly united, and every thing adverse more entirely excluded. The conversation was always free, often scientific, but never didactic or disputatious; and as this club was much the resort of the strangers who visited Edinburgh, from any object connected with art or with science, it derived from thence an extraordinary degree of variety and interest" (John Playfair, 1805, p.98-99). It is very likely that Faujas, who knew all three of the founders, attended the club.

Sir Henry Raeburn painted the well-known portrait of Hutton about 1790 (Dr David Mackie, personal communication). During Hutton's final years, although ill and in pain for much of the time, Hutton wrote a prodigious amount – on philosophy, physics, agriculture, and his enlarged *Theory of the Earth*, 1795 and 1797. Adam Smith died in 1790, James Hutton in 1797, and Joseph Black in 1799. Smith is buried in the Canongate Churchyard. Hutton and Black are buried in Greyfriars (Butcher, 1997), a few paces from such other notable Edinburgh men as William Robertson, Colin Maclaurin, Walter Scott's father, and the Halls of Dunglass.

7. Epilogue

James Hutton is rightly regarded as the founder of modern geology, and a very large literature is devoted to consideration of this assertion and its implication. His geological importance have been described and thoroughly documented elsewhere (see Dean, 1992; Hutton, edited by Dean, 1997; and McIntyre and McKirdy, 1997). But to think of him simply as a geologist is a mistake. Hutton's interests were much wider. He was a man of his time, as all of us are creatures of our individual environments. Hutton lived in a truly remarkable community, with its own peculiar constraints and defects, but nevertheless a community of highly intelligent men who had broad interests and who were (usually) "equally prepared to speak and to listen". They were bold and original thinkers. They included men involved in matters of national and even international importance. Many spanned a great range of both subject matter and personal experience. Directly or through his immediate friends, such as Adam Smith and Adam Ferguson, Hutton seems never to have been more than one step away from men as diverse as James Watt, Benjamin Franklin, William Eden (of the Secret Service), Lord Cornwallis, and three Lord Chancellors, as well as thinkers of the first rank in many varied disciplines.

James Hutton, with his unique contribution to knowledge of our planet's history, was close to the centre of this community, not only by virtue of his life-span but, thanks to his generous and warm personality, by his friendships with some of the most brilliant men of the age. This paper will have achieved its object if the reader gains a feeling for the broad cultural, social, and political environment in which Hutton lived. If we could reproduce the intellectual climate that made Hutton and his friends possible, we would have found the philosopher's stone.

The following quotations from Playfair help us see the man that his friends loved and respected:

"A brighter tint of gaiety and cheerfulness spread itself over every countenance when the Doctor entered the room. ... The acquisition of fortune, and the enjoyments which most directly address the senses, do not call up more lively expressions of joy in other men, than hearing of a new invention, or being acquainted with a new truth, would, at any time, do in Dr Hutton. This sensibility to intellectual pleasure, was not confined to a few objects, nor to the sciences which he particularly cultivated; he would rejoice over Watt's improvements on the steam-engine, or Cook's discoveries in the South Sea, with all the warmth of a man who was to share in the honour or the profit about to accrue from them. The fire of his expression, on such occasions, and the animation of his countenance and manner, are not to be described; they were always seen with delight by those who could enter into his sentiments, and often with great astonishment by those who could not".

"With this exquisite relish for whatever is beautiful and sublime in science, we may easily conceive what pleasure he derived from his own geological speculations. The novelty and grandeur of the objects offered by them to the imagination, the simple and uniform order given to the whole natural history of

the earth, and, above all, the views opened of the wisdom that governs nature, are things to which hardly any man could be insensible; but to him they were matter, not of transient delight but of solid and permanent happiness”.

“On attending to their conversation, and the way in which they treated any question of science or philosophy, one would say that Dr Black dreaded nothing so much as error, and that Dr Hutton dreaded nothing so much as ignorance; that the one was always afraid of going beyond the truth, and the other of not reaching it”.

Concluding thoughts:

“What dust of extinct lions sleeps peaceably under our feet everywhere! The soil of this world is made of the dust of Life, the geologists say; ... ” Thomas Carlyle: *Historical Sketches of Notable Person and Events in the Reigns of James I and Charles I*, Edited by Alexander Carlyle, London: Chapman & Hall, [1898] 1902, p.70

“How many brave men have lived before Agamemnon! ...Their crumbled dust makes up the soil our life-fruit grows on.” Thomas Carlyle: *Past and Present, Book 2: The Ancient Monk*, London: Chapman & Hall [1843] 1891, p.111.

Appendix on the Clerks of Penicuik and the Clerk-Maxwell line

Having mentioned the Clerks of Penicuik, and pointed out that no fewer than three of its members helped Hutton in the field, a slightly fuller account of the family is appropriate [see genealogical tree 2]. Sir John Clerk (1676-1755), the second Baronet is the central figure— “the most notable virtuoso in the Scotland of his day” (Brown, 1987). Antiquarian, architect, connoisseur and patron of the arts, John Clerk was one of the Commissioners chosen to negotiate the Treaty of Union (1707) between Scotland and England. His financial acumen was early recognised, and he was appointed a Baron of the Scottish Court of Exchequer, the guardian of Crown revenues in Scotland. In 1740, the year Hutton entered Edinburgh University, this John Clerk wrote a *Dissertation on Coal* illustrated by cross-sections of folded and faulted strata found in that part of the Midlothian coal field belonging to his family (McIntyre & McKirdy, 1997, p.46).

Clerk’s wife had died in 1701 after delivering her first child, named John after his father, grandfather, and great-grandfather. Young John was sent to school at Eton, where he did well, but returned to study at Edinburgh University; for his father was sure that all subjects other than English language could be better acquired in Edinburgh than in either Oxford or Cambridge. Moreover his father knew that Scotsmen with an English education “would always have a stronger inclination for England than for their own Country“ (Clerk, 1892, p.99). Sadly, in 1722 young John, who had shown much promise, died only a few months after his grandfather.

The Baron married again and from this second marriage he had sixteen children. The eldest, James

(1709-1782), succeeded as the third Baronet. We are concerned particularly with the third son, born after the suppression of the 1715 Jacobite Rising and named George (1715-1784) after the Hanoverian King George I; and John (1728-1812), the first son born after the death of his brother, whose name he was given. This George Clerk was Hutton's companion on the excursion to the North of Scotland in 1764. Playfair tells us that George Clerk was "a gentleman distinguished for his abilities and worth, with whom Dr Hutton had the happiness to live in habits of the most intimate friendship". We know George's brother John as John Clerk of Eldin, Hutton's companion in Glen Tilt (1785) and Galloway (1786), and whose son John (later Lord Eldin) was Hutton's companion in Arran (1787).

The Baron's brother William (1681-1721) married Agnes Maxwell, heiress of Middlebie, an estate in Dumfriesshire. Dorothea, their only child, was left an orphan, and at the age of seven or eight was under the Baron's guardianship, her mother having "left it upon her" to marry her cousin George Clerk (Clerk, 1892, p.96n, 134, 144-145, 251-252). The marriage took place "privately" in 1735, George being 20 and Dorothea 17. The estate of Middlebie passed to Dorothea as heiress in her own right. The entail required that any heir must adopt the title Maxwell, and for this reason George adopted the name George Clerk-Maxwell.

Succeeding his brother James in 1782, George became the fourth Baronet. At the first meeting of the Royal Society of Edinburgh, he was elected one of the Presidents of the Physical Class, but he died in 1784. Sir George Clerk-Maxwell's obituary (dated July 5, 1784) written by his nephew, John Clerk of Eldin's son John, was published in the first volume of the Society's *Transactions* – the volume containing Hutton's *Theory of the Earth*. In the *Transactions* Clerk-Maxwell is hyphenated, as it is in *The Dictionary of National Biography*, which lists Sir George Clerk-Maxwell under Clerk.

Sir George Clerk-Maxwell had two sons. John, the elder of the two, succeeded as 5th Baronet, but had no heir. James, the younger son, had two sons: the older son, George, succeeded his uncle, becoming the 6th Baronet, with the title Sir George Clerk of Penicuik, and from him the Clerks of Penicuik are descended; John, the younger son, carried the Clerk-Maxwell name and inheritance, and his son was the great nineteenth century physicist James Clerk-Maxwell of Middlebie. (*Burke's Peerage Baronetage and Knightage*, 1970, which also hyphenates Clerk-Maxwell).

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I am indebted to many more people than can be named here. First to my parents who ensured that, like them, I was born and raised in Edinburgh, and then to the four Edinburgh men who were my teachers; in particular to Dr A.M. Cockburn who, when I left for California in 1954, gave me Chambers' *Traditions of Edinburgh* inscribed "From one Edinburgh callant to another". To Arthur Holmes who talked to me about Hutton and introduced me to his friend Professor S.I. Tomkeieff. To the Edinburgh Geological Society, on whose Committee I served in 1947 when Tomkeieff gave a memorable address on *James Hutton and the Philosophy of Geology* marking the 150th anniversary of Hutton's death. To Pomona College for providing a great library and an environment conducive to intellectual inquiry. To Professors Learnihan, Kemble, Woods, and Poland of Pomona's history department, and to my friends Iain Gordon Brown, H. Stanton Hill, George H. Clark, Dan F. Merriam, K.E. Iverson, Sheila D. McIntyre, and my wife Ann, each of whom has given me encouragement and suggestions over several decades, and to Norman E. Butcher, Dennis R. Dean, and Richard Jemielita who have worked with me in recent years. In 1997 Professor Celal Sengor joined me in visits to localities associated with Hutton in Edinburgh and throughout Scotland; I found our discussions stimulating, useful, and enjoyable.

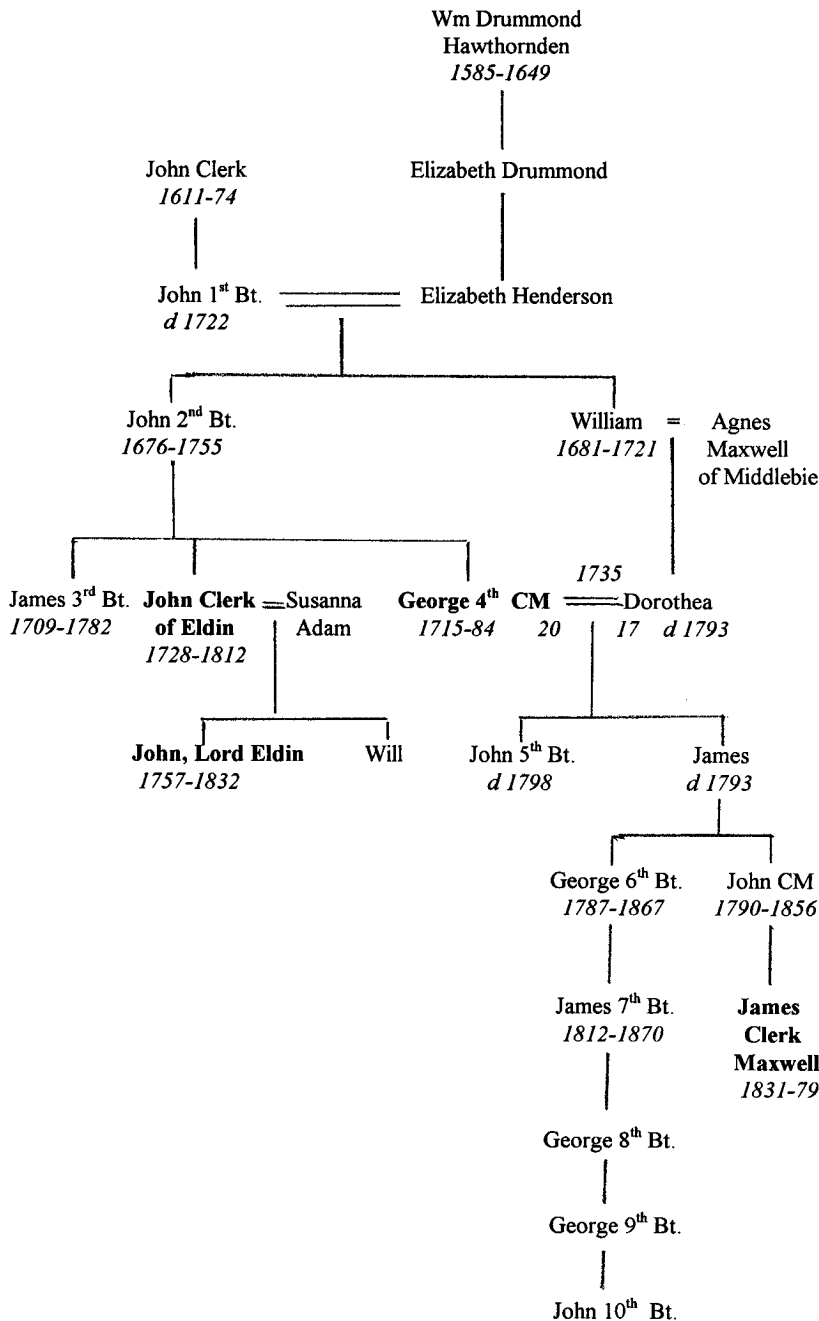
I am grateful to the John Simon Guggenheim Memorial Foundation for a Fellowship in 1969 to study the *Rise of Scottish Geology*, and to the Universities of St Andrews and Edinburgh for the privilege of honorary staff positions and the use of their libraries during my retirement. The Scottish Record Office, the National Library of Scotland, and the Edinburgh Public Library have made available their invaluable resources; Mr Thomas B. Smyth, Archivist of the Black Watch Museum in Perth, was also very helpful.

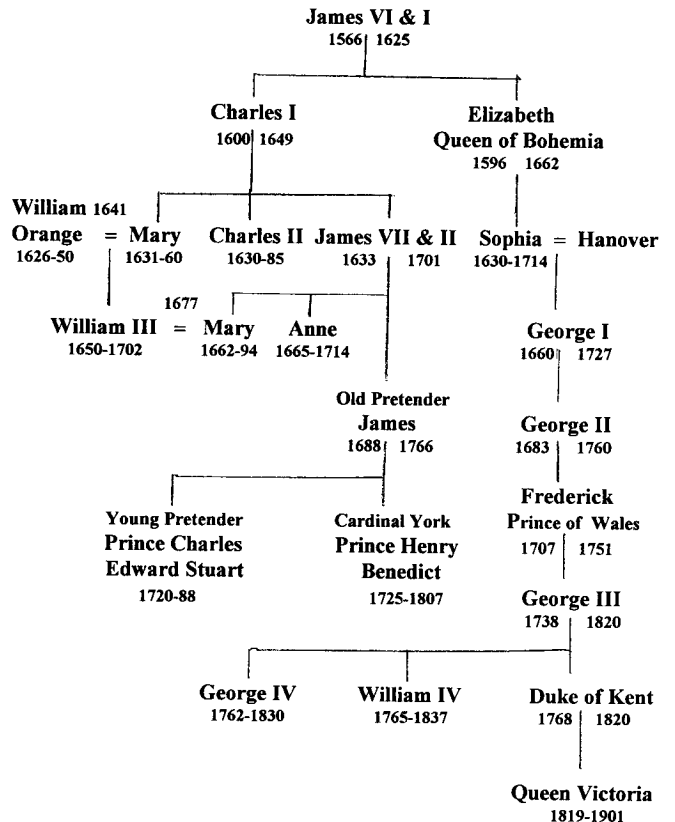
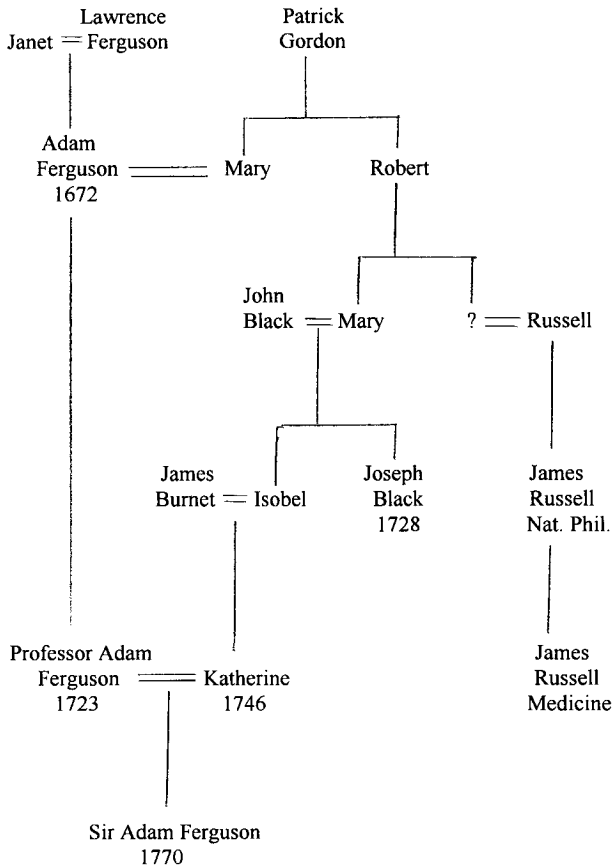
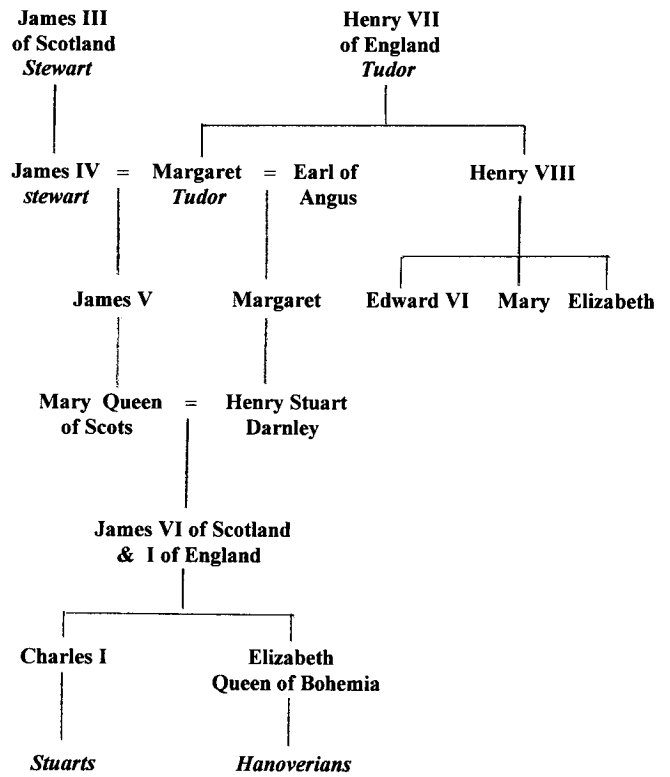
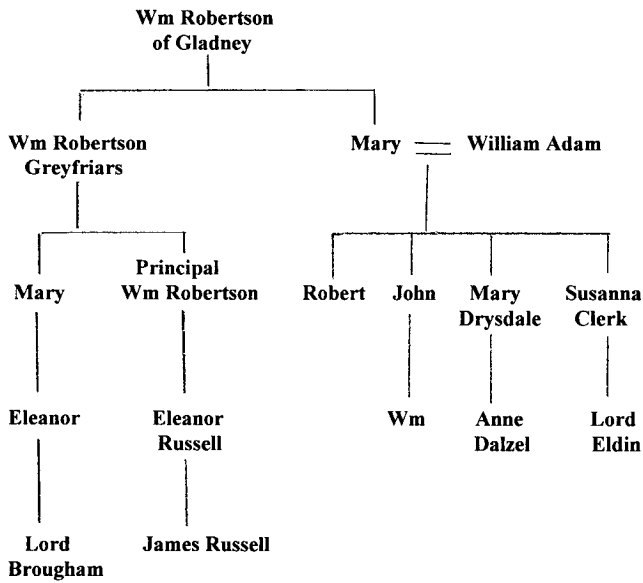
I thank Professor G.Y. Craig and the Royal Society of Edinburgh's Organising Committee for the invitation to give the opening address, on *Hutton's Edinburgh*, at the Conference commemorating the bicentennial of James Hutton's death. This historical essay – an expanded version of that address – is an anthology of the writings of many scholars, and I am alone responsible for the selection of the material and for remaining errors. Objectivity, like beauty, is perhaps in the eye of the beholder. Space does not permit me to do justice to all sides of each issue, but I have cited references to authors who have different viewpoints. Readers might well begin by reading the final reference – Professor Youngson on bias in the writing of history.

I dedicate this essay to Sir John Clerk, Bart. of Penicuik and Lady Clerk, who continue so generously their family's long tradition of patronage, friendship, and support to all who take an interest in Scottish art, science, and history. I am grateful, once again, for permission to quote and refer to documents in the Clerk Muniments.

Genealogical Trees

1. The Dundas Dynasty
2. The Clerks of Penicuik and the Clerk-Maxwells
3. Robertson and Adams
4. Ferguson, Black, and Russells
5. James Stuart's claim to the thrones of Scotland and England
6. Jacobite and Hanoverian descendants of James VI & I





James Hutton's Edinburgh: The Historical, Social, and Political Background

Donald B. McIntyre

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This bibliography relates to the historical, social, and political background of Hutton's Edinburgh, which is the subject of this paper. It is not a bibliography relating to Hutton's contributions to geology. In 1986, at the request of the Institute for Advanced Studies in the Humanities, Edinburgh University, I prepared a bibliography of 350 items relating to James Hutton's geology. An extensive bibliography on Hutton as a geologist is readily available in Dennis Dean's *James Hutton and the History of Geology* referred to below.

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