Chapter 2
Scotland & England

2.1 Scottish Origin and Early Years

Daniel McAlpine, was a highly intelligent and perceptive man. He learned from his experiences and applied what he learned to the benefit of those lucky enough to find themselves under his influence either in the classroom, a lecture theatre, a meeting, an excursion or through the legacy of his published work. He was a red-headed Scot, born into a typical middle class Scottish Presbyterian family, which placed great emphasis on gaining a high quality education, and the rigorous application of this to their daily lives and activities. These attitudes and values were strong among Scots from the middle of the eighteenth century, the dawn of the Scottish Enlightenment.

Daniel was born on 21st January 1849 in Dalry, Ayrshire, Scotland, the third son of Daniel and Flora McAlpine. During the next 2 years the family moved 5 miles south west to Saltcoats 2 miles from Ardeer where his father, a staunch Presbyterian and Gaelic scholar, taught at the Ardeer School. At the time, Scotland was more egalitarian than England especially regarding the importance of and access to education as a societal right. There is little doubt that McAlpine Snr held these views. In Ardeer, young Daniel and his three brothers received basic educations. Daniel was grounded in Latin and Greek, which he could speak, and learned French and German, of which in later years he claimed only a working knowledge. From the mid to late 1860s he taught at the Adeer School as a pupil teacher (Wedge 1984).

2.2 Fascination with Geology

When he was 20 years old he took a clerical job in the work's office of the Egheiton Company's Lugar Iron Works in Cumnock 25 miles south east of Saltcoats. According to the 1871 census, Daniel was then living in Auckenleck, not far from Cumnock, where his interest became strongly focussed on geology. The emergence

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of geology as a science began in Scotland through the observations of James Hutton during the second half of the 18th century.

According to Repcheck (2003), "Starting around 1750, a small group of academics, amateur scholars, government officials, clergymen and inventors, all about the same age and centred on Edinburgh, made broad and seminal contributions to Western collective knowledge within a single generation. This flowering of philosophic theory, economic processes, analyses of history and especially scientific work, is now known as *The Scottish Enlightenment*". The men involved often gathered at *Newhailes*, the grand home of Sir David Dalrymple, at Musselburgh a little out of Edinburgh, to philosophise about new-age ideas. Among the enlightened gentlemen were Adam Smith who developed the field of modern economics, Joseph Black who isolated carbon dioxide and was among the pioneers of modern chemistry, and Black's former assistant, James Watt whose perfection of the practical steam engine essentially powered the industrial revolution. Another much less known but critically important thinker was James Hutton, whom Repcheck referred to as *The Man Who Found Time*. His fascination with the nature of rock types, the contortions of rock layers and the resultant topography led him to the conclusion that the age of the earth was immeasurably greater than the 6,000 years laid down by the Church. Charles Darwin later acknowledged that it was Hutton's insight that provided the key to his developing the theory of evolution (Repcheck 2003). Hutton was an excellent speaker and could explain his ideas clearly, but he was no author which rendered his book *Theory of the Earth with Proofs and Illustrations* published in 1795, incomprehensible to most readers and it remained for Charles Lyle (Repcheck 2003) to launch the science of geology into the public arena with the publication of his book, *Principles of Geology*.

During his three plus years in Cumnock, Daniel looked into the possibility of making Geology his career and at the end of January 1872 he wrote to Professor Archibald Gieke, occupant of the foundation Chair of Geology at Edinburgh University, about the prospects of a career in geology. Geike (1872) replied that apart from the geological survey of Great Britain, which was then in progress, prospects were limited, but suggested that he might consider undertaking his own survey of an ore outcrop in a chalk deposit near Cumnock and write it up. Presumably Gieke considered that such a study if well done, might impress a mining company sufficiently to gain McAlpine entry in to the field. McAlpine decided otherwise but it seems that it was his interest in geology that inspired him to seek entry into the Royal School of Mines the following year, and it is evident that his initial choice of subjects favoured that path. At the beginning of 1879, Professor A.C. Ramsay (1879) wrote from the Royal School of Mines confirming McAlpine's obtaining a first class pass in geology. His interest in geology persisted for many years.

Daniel and his brother Archibald were similar in temperament and ability. Each became highly competent lecturers in the natural sciences and, in later life each was highly respected by their students and peers as experts in their fields. Each was esteemed for his inspirational teaching, and students in both Scotland and Australia remembered them fondly. It seems however that their primary education took different paths. While Daniel had his basic education in Ardeer, as a young boy Archibald was sent to the Free Church School in Dumbarton, north west of Glasgow.

2.3 Undergraduates in London

During Daniel's three and a half years clerking at the Iron Works in Cumnock, Archibald's and his interests in the sciences increased to the point where in January 1873 they enrolled at the Royal College of Science London, the Rev'd Paterson (1873) having supplied a testimony to their good character. In 1874, the Registrar of the University of London, W.B. Carpenter (1874), advised Daniel that he had matriculated as a student of the University of London at the June examination. In August the following year it was confirmed that he had attended the various courses and passed all his exams (Carpenter 1875b, c, d, e, f). All the subjects including organic and inorganic chemistry studied between 1873 and 1875 were listed but did not include botany. Other documents list botany and biology, which were studied between 1874 and 1876. Professor Sir Thomas Huxley[A1] delivered the lectures in biology, Sir William Thiselton-Dyer[A1] in botany, Professor A.C. Ramsay[A1] in mineralogy, Sir Archibald Geikie[A1] in geology, and Professor R. Ethridge[A1] in palaeontology (Wedge 1984; White 1986). He excelled in all these subjects and apparently was eligible to take out his degree by 11th August 1875, but curiously it was never conferred. No reason for this was given and no explanation has been found. It seems likely that Daniel's focus on a career in geology was redirected through the inspiring courses given by Huxley and Thiselton-Dyer, which switched his main interest from the physical to the biological sciences. This was possibly the reason he decided to complete both two-year courses in botany and biology by extending his undergraduate course from 3 to 4 years. It is also possible that the study of biology and botany were not available to non-matriculated students.

While Daniels' family believed he took out his degree on 11th August 1875, University of London records do not confirm it. McAlpine never cited any degree for himself in any publication, whereas on the title page of the *Biological Atlas*, published jointly with his brother Archibald (McAlpine and McAlpine 1880), the authors are given as "D. M'Alpine F.C.S., Lecturer on Biology and Botany, Edinburgh, Honourman in the Science and Arts Department, University of London, etc., and A.N. M'Alpine B.Sc. (Hons.) London, Lecturer in Botany, School of Medicine Edinburgh, Professor of Botany and Natural History, New Veterinary College Edinburgh, and Associate of the Royal College of Science, Ireland." Nevertheless, in spite of not holding a degree, Daniel McAlpine received a rigorous tertiary education, which served him well.

Three of his lecturers exerted substantial and long lasting influence on him. Professor Huxley not only encouraged and supported him in the production of Atlases on Biology (McAlpine and McAlpine 1880), Botany (McAlpine 1882, 1883a) and Zoology (McAlpine 1881a, b), but also through his own love of Australia and his hope to have returned there to a teaching post at the University of Sydney 20 years earlier, Huxley may have planted the idea of going to Australia in McAlpine's mind. It was through Professor Thiselton-Dyer that he met Sir Joseph Hooker who supported McAlpine' establishment in Australia, and also Mordacai Cooke who probably encouraged McAlpine to send him collections of Australian

fungi and who later provided McAlpine with specimens of Australian fungi collected by early European explorers and other collectors. McAlpine maintained his friendship with Thiselton-Dyer (1904) over 30 years. Similarly Professor Gieke and McAlpine began an association in 1872, which spanned 50 years.

2.4 Teaching Atlases and English Texts

It is evident from McAlpine's comments in his Forward to the *Biological Atlas*, that during his undergraduate course he had noted a need for pictorial guides to assist students in their studies of practical biological subjects, which at the time were unavailable. It is also evident from his comments that Huxley encouraged and assisted him in providing them such that many of the macroscopic and microscopic illustrations in the *Biological Atlas* were prepared from specimens dissected and studied in the Biological Laboratory of the Royal School of Mines, London. These illustrations were in watercolour, carefully labelled, and explained in English!

In the introduction to the 1989 reproduction by Bracken Books, London, *of The Botanical Atlas – Guide to the Practical Study of Plants* by Daniel McAlpine, Dr. S.M. Walters (1989) described the intellectual environment of the era during which McAlpine found his way into botany. He also outlined the development of botanical science during the nineteenth century and in particular the fascination with life revealed under the microscopic. He described the excitement aroused through the study of cryptogamic botany, the manner in which it was taught and the intellectual attraction it engendered. Walters made the point that, while the morphology and anatomy of flowers and fruits of Phanerogams were generally well know by the sixteenth and seventeenth centuries, comparative knowledge of the Cryptogams was limited prior to about 1840, after which a revolutionary advance in interest and knowledge occurred. The widespread epidemic of the potatoes murrain (Large 1940) throughout Europe and the discovery of its cause (Berkeley 1846) no doubt played important roles in the strong rise in interest in microorganisms. But so too did developments in Europe.

Walters (1989) linked this burst of interest and enterprise, to the growth of German scholarship that accompanied the development of scientifically and technologically minded Universities, which gradually replaced the older classical ones. These Universities sprang up and flourished between the end of the Napoleonic Wars after 1815 and the unification of the German States in 1871. By then, the development of the microscope had reached a point, which allowed detailed study of cryptogamic organisms, with much of the resultant literature published in German. In 1839, Prince Albert of Saxe-Coburg and Gotha married Queen Victoria of Britain. Prince Albert had a keen interested in and a broad knowledge of the emerging sciences and industrial developments in Europe and became a driving force in the development of British science and industry. His activities created such interest and awareness that British students sought to complete their scientific education by attending one of the great German Universities of the day under such

Professors as de Bary at Strasburg, von Nägli at Münich, Pringsheim in Berlin, Sachs in Würtzburg and Strasburger in Jena, the city where Carl Zeiss founded his optical equipment factory in 1846, and produced arguably the most advance microscopes of the time. However, literature and texts produced from these institutions were all in German and thereby not accessible to most British students.

By the early 1870s, Thomas Huxley and Thiselton-Dyer were teaching biology and botany respectively to a new generation of biologists destined to teach a new science curriculum throughout the newly established National Schools introduced after the Education Act of 1872 (Walters 1989). That same year Huxley transferred his Department of Science, originally called the Royal School of Mines and Science, to South Kensington (Walters 1989) but must have retained his laboratories at the Royal School of Mines. At the time, however, the best modern texts were available only in German, as was the case when Daniel McAlpine became interested in biology and found there were few modern text books in English and no texts at all for teaching practical courses in biological subjects. Thus from about 1876, Daniel and Archibald McAlpine began work on providing such help.

In 1878, Dr. Arnold Dodel-Port at the University of Zurich and his wife Carolyn began publishing a series of first class texts and illustrations for the production of wall charts used in lecture halls and as illustrations for a *Botanical Atlas* (Dodel-Port and Dodel-Port 1878–1883), which was published in ten sections over 5 years. It is now evident that prior to McAlpine's completing his studies at South Kensington, either on his own initiative or at the suggestion of Huxley, his brother Archibald McAlpine and he began preparing their own *Biological Atlas* plus wall charts to provide illustrations to compliment the lectures of Huxley and others. In the acknowledgements made in their *Biological Atlas* (McAlpine and McAlpine 1880), the brothers stated that their illustrations were prepared either from dissections and microscopic preparations made in the Biology Laboratory at the Royal School of Mines or copied from reliable sources, all of which were acknowledged at the top of pages containing the legends to plates and figures in the atlas. Preparation of their *Biological Atlas* appears to have begun before McAlpine became aware of what the Dodel-Ports were doing because 3 years later, in the preface to Volume 2 (Cryptogams) of the *Botanical Atlas*, dated December 1882, McAlpine (1883a) expressly thanked Professor Dodel-Port for allowing him free and full use of the figures in his *Anatomical and Physiological Atlas of Botany* (Dodel-Port and Dodel-Port 1878–1883). Although the Dodel-Ports would have begun preparing material for their atlas at much the same time as the McAlpine brothers began preparing theirs, there is no acknowledgements of the Dodel-Ports in the McAlpines' *Biological Atlas* suggesting it was begun on the McAlpines' own initiative or following a suggestion by Huxley.

At the top of the legends to the illustrations in the two volumes of the *Botanical Atlas*, McAlpine (1883a) acknowledged the source of each illustration. For some, however, he made no acknowledgement indicating that he was the artist (Figs. 2.1 and 2.2). For others, he states that the illustrations were adapted from those of others often two or more authors (Figs. 4.1 and 5.5), while some were exact copies (Fig. 2.3).

After McAlpine began teaching in Edinburgh in 1875, his awareness of the need to have up-to-date modern supporting literature, available in English, resulted in his

Fig. 2.1 Frontice Piece from McAlpine's Botanical Atlas Vol. 1 (1882) (Courtesy of the Royal Botanic Gardens Library, Melbourne)

writing *Short Notes for Biology Students* (McAlpine 1877). Then, having discovered the Dodel-Ports' publications, and noting that the reviewer for *Nature*, had acclaimed the Dodel-Ports' Atlas the finest botanical text of its day, and saying it should be available in English, McAlpine began translating it. Dodel-Port's *Erläuternder Text aus Anatomisch-physiologischen Atlas der Botanik für Hoch- und Mittleschulen* was a 424 page document, and while he translated it along with legends and labels to figures McAlpine compiled four Atlases of his own (McAlpine 1881a, b, 1882, 1883a) comprised 240 pages of text and 70 Plates containing 1,388 coloured Figures, many produced by McAlpine himself, all accurately labelled and accompanied with brief explanatory notes. Finally he wrote *Atlas of Elementary Physiology*

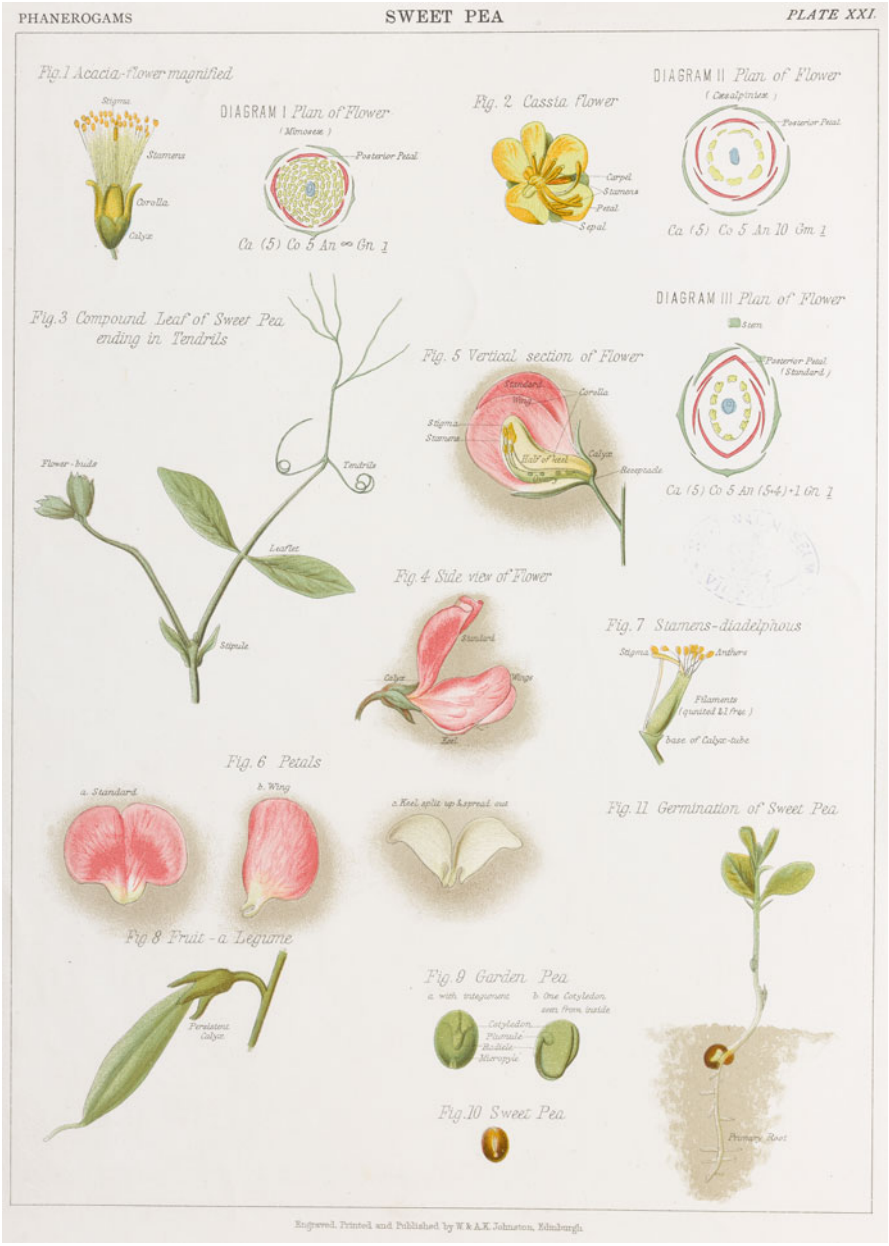

Fig. 2.2 The Sweet Pea Botanical Atlas Vol 1, Plate XXI (1882) (Courtesy of the Royal Botanic Gardens Library, Melbourne)

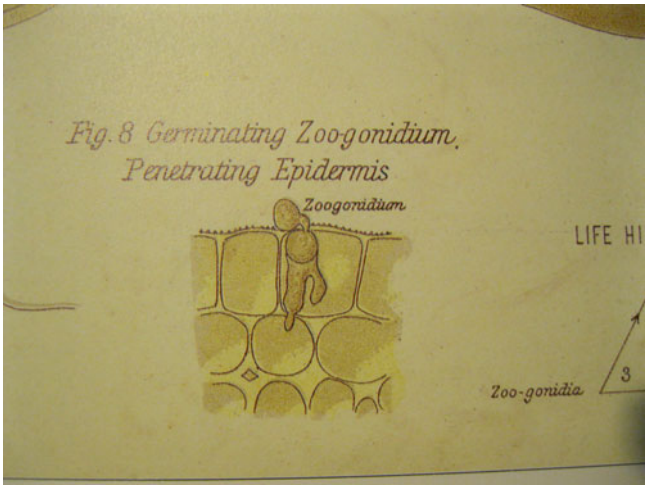

Fig. 2.3 I infection hypha of *Phytophthora infestans* copied from De Bary. Botanical Atlas Vol. 2, Plate XII, Fig. 8 (1883) (Courtesy of the Royal Botanic Gardens Library, Melbourne)

and Physiological Anatomy (McAlpine 1883b) basically a rewrite of the Dodel-Ports' work, but with his own amendments and additions.

Walters (1989) lauded the importance of McAlpine's atlases, particularly the two part *Botanical Atlas* claiming that by 1883, when the *Botanical Atlases* first appeared, the revolutionary advance in knowledge of and interest in cryptogamic botany had happened and an exciting new evolutionary picture of the whole Plant Kingdom and its essential unity of basic structure was presented, for the first time, to British students, in English. Thus McAlpine had a done a great service to all British students in the late nineteenth century.

2.5 Academia in Edinburgh

Daniel was appointed Lecturer in Agriculture, Botany, Biology and Geology at the Watt Institute and School of Arts, Edinburgh, in 1875. Ms Helen Taylor (2012), archivist for Heriot Watt University confirmed McAlpine's starting date, a year earlier than cited by other authors (Fish 1976; Wedge 1984; White 1986). One possible explanation for confusion over the date was that his initial lecture commitment was not a heavy one, and at the time he was single. Thus, provided he fulfilled his lecture commitments and because he was preparing teaching material, it appears that the Director of the Watt Institute enabled him to spent time in London completing his studies of biology and botany and working on the *Biological Atlas*.

In addition to working on the *Biological Atlas* with his brother in London, after his appointment to the Watt Institute, he attended a special course in agricultural chemistry for the instruction of science teachers held at Rothamstead Experimental

Station, and passed the examination (Anon. 1881). Rothamstead was part of the University of London, the institution which, conferred degrees and diplomas obtained through study there, as well as at other associated establishments. Because one of his duties at the Watt Institute was teaching Agriculture where knowledge of applied chemistry was of increasing importance, it is understandable that McAlpine attend the course at Rothamstead. However, he was also an able student of chemistry having gained the distinction of Honourman in both organic and inorganic chemistry during his undergraduate studies in London. Possibly as a consequence of his scholarship as a chemist, on 5th December 1878 he was admitted as a Fellow into the British Chemical Society [FCS] (Anon. 1879; Geike 1879), now a component of the Royal Chemistry Society.

McAlpine was never idle and must have left those around him breathless! From 1875 until he left Scotland for Australia he was continuously busy preparing and delivering lectures and practical classes and developing teaching charts and other texts to support his own lectures and practical classes. He augmented his lecturing income from the sale of his charts and atlases, the latter being sold cheaply to students and others. This was necessary because Isabella and he were married in 1878, established their own home in Edinburgh and begun a family, and the income from the Watt Institute alone was not enough. According to Wedge (1986) this was possibly a reason he did not take out his degree because of the costs associated with doing so. At the same time it is not known just how long after completing their studies in London that the brothers continued returning to complete the illustrations for their *Biological Atlas*. In their preface to it they state that," the Atlas was produced in recognition of the need of students to handle, dissect and study field specimens for themselves. The Atlas is provided as a guide to be use in association with texts by Huxley, Nicholson, Macalister, Sachs, M'Nab, etc." It is of some interest to note that in a letter thanking McAlpine for sending him a copy of the Atlas, Charles Darwin (1881) issued a warning that lecturers would need to be on their guard to avoid students simply copying illustrations from the atlas rather than drawing the specimens put before them!

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