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Patrick Geddes – Biologist or Gardener?

Walter Stephen

As a starting point I should like to take the cover of Philip Boardman's *The Worlds of Patrick Geddes,* which lists the attributes of Patrick Geddes as 'Biologist, Town Planner, Re-educator, Peace-warrior'.[1] One hundred and fifty years to the day after the publication of *The Origin of Species,* Luath Press published my *The Evolution of Evolution: Darwin, Enlightenment and Scotland*, in which there were two chapters relating Patrick Geddes and Charles Darwin. In one I took Geddes as a case study of the influence of Darwin on the next generation, and in *Patrick Geddes and Charles Darwin* I sketched in Patrick Geddes's role as an interpreter and promulgator of Darwin's ideas. I became more conscious than ever that Geddes's reputation mainly derived from Town Planning and Sociology. His Biology was forgotten, or merely ignored as being *passé,* yet as one interested in gardens he did have a certain reputation. The entry in *Who's Who* of 1930 (Appendix A) was presumably based on information provided by Geddes himself and shows the value Geddes himself set on his work in biology and in parks and gardens.

Biology is a science and as such is firmly embedded in the cognitive domain, being concerned with observation, recording and experimentation. For Geddes a garden was a microcosm of the earth and a didactic instrument for studying it. The garden provides beauty of colour and shape and seasonal change as well as a practical enrichment of diet. Beyond this, a garden may affect the emotions in a pagan way as one identifies with particular trees, or spiritually as one witnesses the annual miracle – in our climate – of the resurrection of life from dry twigs and seeds. There is a sensuous pleasure in the feel of the soil, the smell of a freshly-picked tomato, the sight of potato drills marching perfectly towards the horizon, or the slice of a sharp spade being driven into the ground. There is pride in producing something beautiful or useful by one's own efforts in cunning association with nature.

For Geddes, 'greening the environment' was an essential part of urban planning (see Fig. 1).

[1] Philip Boardman, *The Worlds of Patrick Geddes: Biologist, Town Planner, Re-educator, Peace-warrior* (London, 1978).

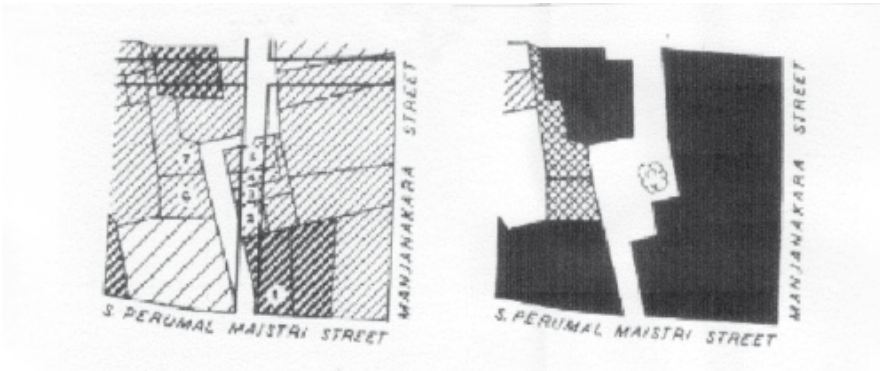

Fig. 1 The Impact of a Single Tree
(On the left, original 'redevelopment' proposal in an Indian city, Madura. On the right, the Geddes solution)
(from Patrick Geddes in India, 1947)

Geddes's gardens were a safe and non-controversial focus for community cooperation and development, and a training ground for community action.

Working with one's hands, sheer physical labour, satisfaction at the end of a hard day, were part of the attraction of the garden for Geddes. Famously, at the *Collège des Ecossais*, he would grab the hands of a student and, half-ferociously, say:

> Aha! Look at them—how clean and white and useless; the hands of a paper-gentleman. My young friend, I shall turn you over to Malépine the head-gardener, this very afternoon. From him and blisters, perspiration and honest fatigue you will discover that the only way to learn anything is to take part in life. Daily labour is the basic, age-old path to both health and intelligence simply because it is a basic part of life in this world.[2]

Geddes was seventy when he wrote from Montpellier:

> Here now these seven weeks, hard at work building and gardening, and with constant supervision of both; half a dozen gardeners at it—not to speak of masons, tilers etc. I've not had such a time since making

[2] Ibid., 402

> Dundee garden, and building Ramsay Garden – for though this is a much smaller affair, it is more complex.[3]

The beauty of physical labour was not always appreciated by lesser mortals. Geddes's daughter Norah wrote on 19 October 1910:

> This afternoon Miss Le Maistre and I and two helpers were working in the Open Spaces. While I was alone in the King Wall, hordes of boys came in and made a regular bear garden, watering the soaking ground, tying the hose in knots, scraping up the ash, threatening each other with the dangerous ends of the hoes, and swinging on the posts. They declared at intervals that they were all on strike. I took it more or less as a joke and got them off in a little while to the West Port carrying some tools. Of course the problem is a difficult one. Where enough to give so many to do in a small garden?[4]

And again on 20 November:

> I am very tired of grubbing in the Open Spaces and count on this week being the last – one thousand small bulbs, at 50 for 1/–, have just been landed on us and I wonder how many of the miserable things will flower … Mr Mears seems very active just now and sends me strange diagrams, and discourses on art and symbolism.[5]

Geddes was a biologist and a gardener. Which should we celebrate the more?

Patrick Geddes 'grew up in a garden' in Mount Tabor on the Kinnoull Hill, a developing leafy suburb of Perth. The home was:

> modest enough in ordinary ways, but with a large garden – ample fruit bushes, apples and great old wild cherry trees; with vegetables mainly cared for by my father, and a fair variety of flowers, to which my mother

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[3] Ibid., 360

[4] Paddy Kitchem *A Most Unsettling Person: An Introduction to the Ideas and Life of Patrick Geddes* (London, 1975), 227.

[5] Ibid. Mr Mears was Geddes's right-hand man and was to become Captain and Sir Frank. He and Norah were married in 1915. The firm he founded, Sir Frank Mears Associates, was headed up in the late 20th century by Robert Naismith, who lived in the Geddes Flat in Ramsay Garden for twenty-five years and bequeathed it to the National Trust for Scotland.

> was devoted. I trotted by turns after both; and thus learned to help; as also to climb, to tame the robins, to keep pets and so on.[6]

Measuring and calculating were taught by the action of planting potatoes. Making a box was a balanced curriculum in itself, developing the cognitive, the affective and the psycho-motor domains. No work was done on the Sabbath, Alexander Geddes being a Free Kirk elder; but the family would walk round the garden, admiring and identifying flowers and planning the next seasonal operation. Around was the varied landscape of Kinnoull, the Tay and the countryside about them, so that: 'By the time I was ten or twelve, I was fully in my naturalist's life.' When Patrick was aged nine his brother, from New Zealand, wrote:

> I am happy … that you are always keeping up your place as a gentleman and scholar. You will soon be fit to come to a decision what you will want to be. Whether philosopher, gardener, astronomer, or militiaman.[7]

When Geddes was in his teens his father built for him a laboratory for his investigations, where he set up his private museum. When he left school he worked in the bank, then spent a period in 'home studies' before moving on to Edinburgh University (for a week) and the Royal School of Mines (from 1907 the Imperial College of Science) in London. On 5 January 1871, while still at school, he was nominated (aged 16) for membership of the Perthshire Society for Natural History and on 8 February 1872 he was elected to the Library Committee, attending virtually all the meetings before he moved on.[8]

There were several good libraries in Perth, which Geddes used to the full.[9] Among the membership of the PSNS who were to be useful to Geddes

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[6] Patrick Geddes, 'The Education of Two Boys, the Sixth of Talks from My Outlook Tower', *Survey*, Vol. 54 (1 February 1925), 573.

[7] Geddes Family Correspondence, letter of John McKail Geddes to Patrick Geddes, Dunedin, 18 May 1863.

[8] Incidentally, in the PSNS minutes, Geddes was still being recorded as 'Peter'. Geddes was baptised 'Peter'. For the complex story of the discovery of his birthhouse, his gradual change of name and his father's mysterious preferment, see *Where was Peter Geddes born?* by Walter Stephen, in W. Stephen (ed.), *A Vigorous Institution* (Edinburgh, 2007) and the updated *Where was Patrick Geddes born? The Last Word?* (Edinburgh, 2008).

[9] For example, The *Second Supplement to the Catalogue of the Perth Mechanics' Library (1876)* included *The Expression of the Emotions in Man and Animals*. By Charles Darwin.

were Dr Buchanan White, its first President, an all-round biologist with a link to Darwin and the London scientific establishment, and generator of a formidable list of papers, and James Geikie, expert on the Ice Age and Prehistoric Man, who succeeded his brother as Murchison Professor of Geology at Edinburgh.

Sir Robert Pullar subsidised several Geddes ventures. In 1899 Sir Robert gave Geddes a cheque for £3000 to further the holding of an international school in Paris and to recruit a committee of intellectual leaders from Europe, Britain and America. This resulted in the Summer School of 1900 in Edinburgh, run by The International Association for the Advancement of Science, Arts and Education. Sir Robert saw the school in action and 'was immensely charmed with the results of his visit'. He was not so impressed by the amount of fees gathered in by the Summer School and was unwilling to finance it again.

James Martin White of Balruddery regularly supported Geddes causes and in 1888 made an endowment of £6,000 towards a Chair of Botany at Dundee, in memory of his father. This meant that Geddes could teach for half the year for half a salary and could thus have his cake and eat it – he now had a measure of financial security but had plenty of opportunity to range far and wide.

On the evidence of *The Education of Two Boys* in *Talks from the Outlook Tower* in 1925 and *Memories and Reflections* in the *Young Barbarian* of 1928, starting with 'the wise father' Geddes had received an education of Head, Heart and Hand years long before he had even heard of Dewey.

At the Royal School of Mines Geddes was soon put on to his own research. He discovered an error in Huxley's work. Generously, Huxley insisted that Geddes write a paper, with three plates, which Huxley presented to the Zoological Society as a correction of his work by a pupil. Huxley found a place for Geddes as a demonstrator at Kew and put him up for the Sharpe Scholarship at University College. Here took place the first recorded meeting of Darwin and Geddes.

This crucial incident took place in J Burdon Sanderson's laboratory at University College and was described by Geddes in 1931 as a 'vivid and

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Illustrated. London, 1872. 1 volume, and *The Movements and Habits of Climbing Plants*. By Charles Darwin, MA, Illustrated. London, 1875. 1 volume. Also the minute of the PSNS Annual Meeting of 1872 records: 'The following books have been added to the library of the Perthshire Society of Natural Science – By purchase – *'Descent of Man'* – Darwin'.

memorable lesson in biology.' Geddes was filling in some spare moments by examining samples of pond-water through a microscope. The first slide revealed nothing much of interest and he was about to get a fresh sample when someone gently pushed him aside. A big beard came over his shoulder, and there was Darwin! The famous scientist, who had come in unnoticed, looked in the barren microscope field without saying a word. Then he broke out:

> … positively shouting for joy: 'I say! They're moving, they're moving! Sanderson! Sanderson! Come and see, they're MOVING! Look at that!'
>
> Was not here a vivid and memorable lesson in biology – this literally Pan-ic intoxication of ecstasy, in our oldest of veterans, greatest of masters, before this simplest spectacle of life?[10]

At the risk of stating the obvious, it was the emotion of Darwin that moved Geddes, the intellect was taken for granted.

Early in 1878 Geddes had 'a sharp illness' and was advised to take a holiday out of London. Huxley sent him to Roscoff and its marine laboratory station, to which he returned for a summer's work. This is how Professor Aubrey Manning describes the Roscoff interlude in *A Vigorous Institution*.

> Then came France, and a crucial exposure at Roscoff. Here the sandy beaches famously turn bright green at low tide as myriads of flatworms – *Convoluta roscoffensis* – whose skin is packed with green algae living within them, rise to the surface to allow these single-celled plants to photosynthesise. Geddes was one of the pioneers in the study of such symbiosis – the close association of two organisms from which both derive benefit. We now know that such associations played a key role billions of years ago in the evolution of the cells which make up all complex forms of life.
>
> However in the 1870s Geddes was describing – often for the first time – the way animals, lacking themselves the ability to synthesise complex molecules using the light energy from the sun, could by sheltering single-celled plants benefit from their chlorophyll. He wrote some papers on the distribution of chlorophyll in animals

[10] Walter Stephen, *The Evolution of Evolution: Darwin, Enlightenment and Scotland* (Edinburgh, 2009), 126.

> which were classics of their type. Darwin wrote to him with special congratulations.[11]

Then came the Sorbonne and a week in Naples, studying their marine laboratory, towards which, in 1873, Darwin had contributed £75. On an invitation from Professor Cossar Ewart of Aberdeen Geddes now established the Scottish Zoological Station at Cowie, south of Aberdeen, the first in Great Britain.[12]

Geddes's oldest brother was a banker in Mexico City and Geddes was next awarded £50 by the British Association to conduct palaeontological and zoological research in Mexico. He collected crayfish for Huxley, assorted reptiles and crustaceans for the British Museum and specimens of flora for himself. In Mexico overwork and cumulative eye strain, exacerbated by the excessively bright sunlight, brought about a collapse in Geddes's health. For a time he was a blind invalid. Although he recovered, for a long time it has been suggested that he was no longer capable of putting in long hours at the microscope and thus began taking an interest in wider matters than descriptive biology.

This is probably too simplistic. His enforced idleness certainly gave him the opportunity to think deeply about a range of matters, which found an outlet in his 'thinking machines', but he was also able to mix teaching and research successfully for a further decade. In Edinburgh he had become, by 1881, Patrick Geddes F.R.S.E., Assistant to Professor of Botany, Edinburgh. As well as being Professor, Alexander Dickson was Regius Keeper of the Royal Botanic Garden in Edinburgh, meaning that Geddes had now a formal connection with a great garden.

Appropriately the Royal Botanic Garden was to become a place of romance. In the 1880s, it was closed on the Sabbath but Geddes was able to gain entry and take in with him Anna Morton, to whom he proposed and

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[11] Aubrey Manning, 'The Regeneration of Edinburgh by Patrick Geddes' in Walter Stephen (ed.), *A Vigorous Institution: The Living Legacy of Patrick Geddes* (Edinburgh, 2007), 28.

[12] Anne-Michelle Slater, 'The Light before the Darkness' in Walter Stephen (ed.), *A Vigorous Institution*, 103–22. It was unlikely to be a coincidence that Huxley had been elected Lord Rector at Aberdeen in 1872. James Cossar Ewart was Conservator of the Zoological and Anatomical Museums in University College, London from 1875 to 1878, when he and Geddes met. He held the Chair of Natural History at Aberdeen 1878–1882, when he took up the Chair of Natural History at Edinburgh and was appointed to the Fishery Board for Scotland as scientific advisor.

who accepted. Happening to have in one pocket an aggregate of opal from Mexico and in the other a geological hammer, Geddes split the opal. To seal their engagement, Anna was given one piece while Patrick retained the other, matching, piece.

Their second home was in James Court, off the Lawnmarket in Edinburgh, where both threw themselves into good works. A dark, dingy, near-slum was cheered up and the indwellers given a sense of purpose by the organisation of window boxes, bulb plantings and flower festivals. At this time, too, Geddes began the process of identifying scraps of 'idle' land in the overcrowded Old Town and persuading the local people to bring some greenery into their depressing environment. In *Beginnings of a Survey of Edinburgh*, Geddes claimed that – despite its overcrowding – within the 'Historic Mile' of Edinburgh there were no less than seventy-five pieces of open space, measuring about ten acres in all.

> Ten or a dozen of these have already been reclaimed into gardens, accessible to school and street children and to women, to the people generally, whilst others are in preparation as circumstances and scanty funds allow. [13]

Geddes was able to claim a civilising effect for the gardens:

> Despite all that is too commonly said of rough population and the rest, no mischief worth mentioning is ever done. The gardens are appreciated, and their educating, civilising influence already plain, and spreading in ways too varied and complex for consideration here.[14]

Geddes always found it difficult to match development with maintenance and a pattern developed in which Geddes would get projects started and a local group, like the Edinburgh Social Union, the Town and Gown Association, or the Outlook Tower Open Spaces Committee, would take over, with varying results.

At this time, also, Geddes wrote voluminously, partly to increase his income and partly to establish himself professionally. He wrote over thirty articles for the *Encyclopaedia Britannica* and *Chambers' Encyclopaedia.* These should not be

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[13] Patrick Geddes, 'Beginnings of a Survey of Edinburgh', *Scottish Geographical Magazine*, Vol. xxxv (1919). 203.

[14] Ibid., 203 – 4.

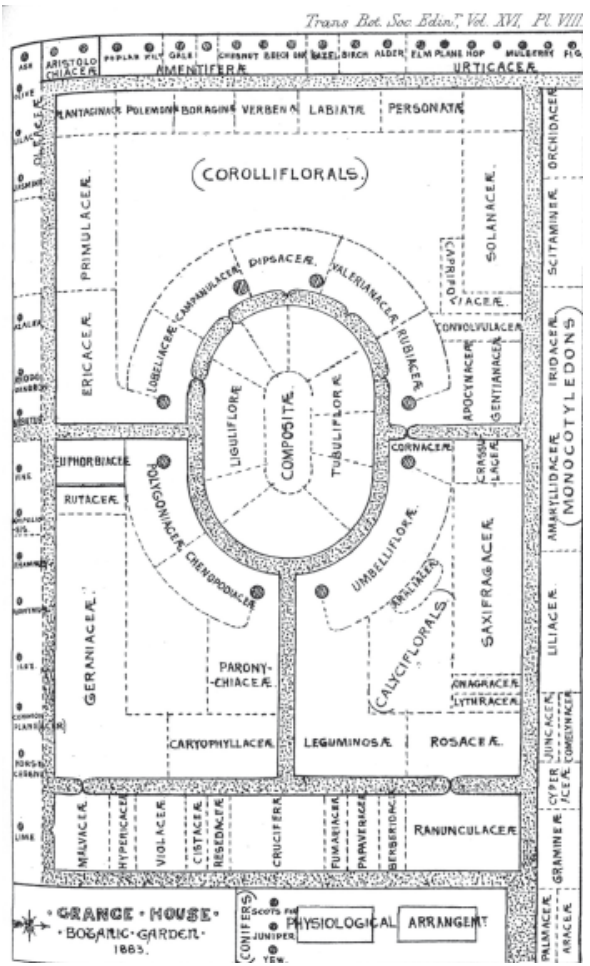

Fig.2 Grange House Botanic Garden, 1883
(from Trans.Bot.Soc.Edin. Vol. XVI)

dismissed as ephemeral hackwork and must have had a wide currency. For example, all over the English-speaking world, if talk turned to Evolution, the answer might be 'look it up in the encyclopaedia'—where one would find eighteen dense pages by Geddes.

Some topics, like Manioc and Aloe, are straightforwardly descriptive, but worth examining to assess the state of knowledge at the time and the range of Geddes's sources. Given the nature of biology, much will have changed, but Geddes material survived until *Chambers'* 1923 edition. For what we might

call the big Darwin-related issues it is possible to trace a development from straight recording and explanation to a recognition that, as well as Huxley's 'struggle for survival', there was cooperation in nature and that 'creation's final law' was not struggle but love.

One paper, published in 1883, was *A Type Botanic Garden*, which described a garden he had planned and constructed for a school in the Grange district of Edinburgh, and which was to be the first of many such ventures.[15]

The second part of the paper went on from description to justification and was to be repeated many times, often at greater length.

In 1879 Geddes had applied (unsuccessfully) for the newly created Chair of Zoology at Queen's College, Manchester. He now cast around frantically for similar posts which would reflect his growing competence and experience. This is where Darwin re-enters the relationship.

In 1880 Geddes wrote to Darwin asking permission to copy figures for his article on *Insectivorous Plants* in *Encyclopaedia Britannica.* Having been sent a reprint of the article, Darwin, on 9 December 1881, wrote as follows:

> Dear Sir,
>
> You were so kind as to send me a few days ago your article in the *Encyclopaedia Britannica.* I have now looked through it and it seems to me wonderfully well done, and you have managed to give in the space a surprising amount of information.
>
> Permit me to add that I read with admiration your researches on the presence of chlorophyll in the animal kingdom.
>
> I remain, dear Sir, Yours faithfully,
>
> Charles Darwin.[16]

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[15] Who were Geddes's clients? Grange House Boarding School for Young Ladies, Grange Loan, Edinburgh had 40 windowed rooms. The Principal was Mrs Helen Nutt (37 in 1891), who had a daughter of seven. Her husband was Whaley B. Nutt, Teacher of Vocal Physiology and Elocution. There were 32 boarders, teenage girls. Three staff lived in, two teachers of English and Music and one of French and German. On Census night 1891 there were 11 live-in servants and one visitor.
Grange House was 'a plain little castellated house' of 1613 'with only three chimneys and one circular turret.' Sir Thomas Dick Lauder, of Morayshire Floods fame, 'enlarged and made the ornate edifice … with oriel windows and clustering turrets.' The OS 25-inch map of 1893–4 shows a parcel of the policies which matches the size of the Geddes garden. No other evidence remains as the house was demolished, a new street made and the policies filled with Edwardian villas and interwar bungalows.

[16] Darwin Correspondence Project, Letter 13542, Darwin to Geddes, 9 December 1881.

James Geikie's comment was: 'I hear with very great pleasure what you say as to old Father Darwin. His letters are very precious …' [17]

In 1882, four months later, Geddes applied for the Chair of Natural History in Edinburgh. Darwin supported the application as follows:

Down, 27th March 1882

Dear Sir,

I have read several of your biological papers with very great interest, and I have formed, if you will permit me to say so, a high opinion of your abilities. I can entertain no doubt that you will continue to do excellent service in advancing our knowledge in several branches of science. Therefore I believe that you are well fitted to occupy any chair of natural history, for I am convinced that example is fully as important as precept for students.

I remain, dear Sir, Yours faithfully,

Charles Darwin[18]

The outcome was that Isaac Bayley Balfour was appointed and proved to be a superbly organised Professor and Regius Keeper while Geddes's friend came up with the part-time Chair at Dundee, which gave Geddes enough security for him to engage in an ever widening series of enterprises.

His time at Dundee is often passed over as a kind of sinecure but for 31 years he spent part of nearly every year living in or near the city. He set up the University College garden and established other parks and gardens in the city. He sparked off some valuable surveys and did some inspirational teaching, while others were delegated to do the bread-and-butter work of getting the students through the exam. 'Better fifty days of Geddes than a cycle of the schools!'[19]

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[17] James Geikie (1839–1915) was for two years President of the Perthshire Society of Natural Science. He was Director of the Geological Survey in Scotland and succeeded his brother in the Murchison Chair of Geology and Mineralogy in the University of Edinburgh. His best-remembered work was *The Great Ice Age and its Relation to the Antiquity of Man* (1874).

[18] Darwin Correspondence Project, Letter 13746, Darwin to Geddes, 27 March 1882.

[19] From *The New Education or Botany, 1905* by 'Semper Idem' in *'Forget the Silly Notion that I'm here to teach you Botany: Patrick Geddes at University College, Dundee'* by Matthew Jarron, in Matthew Jarron (ed.), *The Artist and The Thinker: John Duncan and Patrick Geddes in Dundee* (Dundee, 1904).

Deforestation is the antithesis of gardening, but gardening may form part of the cure. In 1897 Geddes and Anna spent three months in Cyprus in the agricultural rehabilitation – a kind of large-scale gardening – of that devastated Mediterranean landscape. (Politics made sure few of his remedies were tried). He returned to the theme time and time again, and at length in, for example, *'Cities and the Soils they come from'*, the second of his *'Talks from the Outlook Tower'* (1925).

A glance at the bibliography shows that Geddes's individual writings on Biology tailed off when he was in his forties and heavily engaged in planning and sociology. But there were several collaborations with J. Arthur Thomson, up to *Life: Outlines of General Biology,* published in 1931, the year before Geddes died and when he was 77.

It is an interesting coincidence that, in 1797, James Hutton (*Theory of the Earth*) died and Charles Lyell (*Principles of Geology*) was born, marking the end of the Stone Age in Evolution. The Bronze Age ended in 1882 when Darwin died and Walther Flemming discovered what were to be called chromosomes.

With this last fact in mind Geddes's articles of the 1880s on *Variation and Selection* and *Cell Theory*, and his papers of 1883 and 1886 on *Cell Theory* and *Variation in Plants* would merit some re-examination. How up-to-date were they? Did they take account of the 'new' biology? And if they did, who was perceptive enough to commission Geddes to write for these great, authoritative, encyclopaedias?

In 1900, Mendel's work[20] was rediscovered by Hugo de Vries and Carl Correns and quickly replicated. Biologists flocked to the theory and there was vigorous debate in the first two decades of the twentieth century, evolving into the 'modern synthesis of evolutionary biology' combining Mendelian genetics and Darwin's theory of natural selection. Geddes lived through this period. How did he react to this new knowledge? Did he participate in the debate? Did his teaching reflect the changing nature of biology?

J. Arthur Thomson (1860–1931) switched from theology at Edinburgh to science, under the influence of Geddes. They were lifelong friends, Thomson ending up as Professor at Aberdeen and being knighted two years before Geddes. Thomson was the perfect foil for Geddes. He wrote well.

[20] Gregor Mendel (1822–84) – 'father of modern genetics' – studied variation in plants in his monastery garden, resulting in 'Mendel's Laws of Inheritance'. His definitive paper of 1866 was published locally, in Brno, and made little impact, receiving only three citations in the next 35 years.

He stuck to his last. He restrained Geddes from some of his worst excesses, and sometimes persuaded him into actions he was reluctant to tackle. As Boardman says: 'He was the one colleague who had patience, guile and skill enough to collaborate with PG and see that biological results got published'. Geddes and he collaborated in six books on biology from 1889 to 1931, in other words, over the same period as the modern synthesis was being thrashed out.

In general terms we know that Thomson was the dominant partner in the sense that he wrote much more than half of the text of the later books and had to keep pushing Geddes to come up with his share. But what about the underlying ideas? On a stylistic basis it would seem simple to separate out Thomson's elegant passages from Geddes's fractured chunks. I suspect, however, that the task of disentangling their thoughts and assessing the state of Geddes's knowledge and understanding of biology in his later years may not be easy. More work is required on this.

On the question of 'Geddes – biologist or gardener?' this paper has mainly taken a narrative and descriptive line. The next step requires some analysis to assess the quality of Geddes's achievement. Over a long life there was much change in all the fields in which Geddes chose to intervene. How much did he help to create change? And how much did he himself change? Is answering these questions what would have been called in Geddes's early days a *vera causa,* a complex of issues worth pursuing, or is it merely antiquarianism, interesting but unimportant?

Instead of Dewey's education in three domains, an alternative educational model involving three stages was put forward by A. N. Whitehead in *The Aims of Education* (1929). There was the Age of Exploration, during which the child absorbed information as a black hole absorbs matter. Then came the Age of Specialisation when one went deeper and deeper, followed by the Age of Generalisation, when one stood back from the accumulation of minutiae and began to create a big picture. The cynic might say that the Age of Generalisation arrives when someone senior finds keeping up with the young bloods difficult and retreats to write an overview of the subject. It is possible to see Geddes's biological life in this way, entering the Age of Generalisation at a comparatively early stage.

Going back to the education started by his father, Geddes was educated in – and advocated for others – 'Head, Heart and Hand'. In the cognitive domain were his research, his papers and his books, as was some of his university garden work. But his community garden work – to say nothing of

his planning and sociology – was firmly in the affective domain. Even in his teaching, it was the affective that remained once the dust had settled.

In 1932 S.A. Robertson, a former student at Geddes's *Collège des Ecossais* and mentioned by Professor Macdonald in his paper, paid *A Scottish Tribute* on the death of Geddes.

> Even a noble soul like Huxley could see in life essentially 'a gladiator's show'. Geddes … challenged the verdict in his books, in his lectures, in the flood of vivacious speech which leaped from him like a fountain. I recall the thrill which went through an audience as he traced the basal feature of all life to be the sacrifice of the mother for her offspring and closed by saying … 'So life is not really a gladiator's show; it is rather – a vast mother's meeting'.[21]

The garden was not so much an end in itself but rather a tool for changing how people thought and behaved. And we have seen Geddes's attitude to work and skills development – the psycho-motor domain. Dewey's triad is the recipe for the education of the whole person and to ask 'biologist or gardener?' is to set up a false antithesis. Rather we should be saying: 'Patrick Geddes – Biologist – Gardener – Worker' or, recognising, that these categories flowed into each other in the case of Geddes, –

'Patrick Geddes – Biologistgardenerworker'.

APPENDIX A
Extract from Who's Who – 1930

GEDDES, Patrick, late Professor of Sociology and Civics, University of Bombay; Professor of Botany (retired), Univ. College, Dundee (St. Andrews Univ.); Senior Resident of Univ. Hall, Edinburgh; Director of the Cities and Town Planning Exhibition; b. 1854; y.s. of late Capt. Alex. Geddes; m. 1st, 1886, Anna (d. 1917), e.d. of Frazer Morton, merchant, Liverpool; two s.one d.; 2nd, 1928, Lilian, 2nd d. of late John Armour Brown, Moredun, Paisley. Educ.: Perth Academy, Royal School of Mines, University Coll., London; Sorbonne: Univs. Of Edinburgh, Montpellier etc.. Successively Demonstrator of Physiology at

[21] S. A. Robertson, *A Moray Loon* (Edinburgh and London, 1933), 1 – 2.

Univ. Coll., London; of Zoology at Univ. at Aberdeen; of Botany at Edinburgh; Lecturer on Natural History in School of Medicine, Edinburgh; with intervals of travel, e.g. exploration in Mexico, visits to Continental universities, zoological stations, and botanic gardens, as also to Cyprus and the East, to U.S.A. etc. *Studies:* geography, biology, history, art, social economy and civics. Educational work (besides teaching) mainly in organisation of University Halls, Edinburgh and Chelsea, each as a beginning of collegiate life, e.g. at Edinburgh, with its Summer Meeting and Outlook Tower. This is a regional, geographic, and synthetic type-museum, with associated undertakings of geotechnic and social purpose e.g. city improvement (Old Edinburgh, etc.), gardens, parks etc. Publishing house (Geddes and Colleagues) associated with Celtic and general literature and art, with geography, education and synthetics. Actively occupied in city improvement, town-planning, and educational initiatives at home, on continent and in India, etc. and with University designs (India, Jerusalem, etc), and development of Cite Universitaire Mediterraneanne at Montpellier. *Publications:* Evolution of Sex, Evolution, Sex, Biology and Life in Evolution (jointly with Prof. J. Arthur Thomson); Chapters in Modern Botany; City Development; Cities in Evolution; The Life and Work of Sir Jagadis C. Bose, F.R.S., 1920; The Coming Polity (with V.V. Branford); Ideas at War (with Prof. Gilbert Slater); Our Social Inheritance (with V.V. Branford), etc. *Recreations:* gardening, rambling. *Address:* Outlook Tower, Univ. Hall, Edinburgh; c/o Sociological Society, Leplay House, 65 Belgrave Road, S.W.1; Collège des Ecossais, Montpellier, France.

APPENDIX B – BIBLIOGRAPHY of PATRICK GEDDES as BIOLOGIST or GARDENER

Encyclopaedia Entries

Encyclopaedia Britannica (1875–89)	***Chambers' Encyclopaedia (1883–92)***
Insectivorous Plants,	Agave,
Mangrove,	Algae,
Manioc,	Aloe,
Mimosa,	Aquatic Animals,
Millet,	Aquatic Plants,

Morphology,
Parasitism,
Protoplasm,
Reproduction,

Sex,
Variation and Selection*.

Bark,
Bast,
Branch,
Bud,
Cycads,
Ferns,
Flower,
Fruit,
Fungi,
Leaf
Botany,
Cell,
Cell Theory,
Darwin*,
Darwinian Theory*,
Evolution*.

Papers

On the Life History of Spirillum(1878)
Sur la Fonction de la Chlorophylle chez les Planaires vertes (1878)
Sur la Chlorophylle animale et la physiologie des planaires vertes (1879)
On the Mechanism of the Odontophore in certain Mollusca (1879)
On the Anatomy and Physiology of Convoluta Schultzii (1879)
On the Phenomena of Variegation and Cell-Multiplication in a Species of Enteromorpha (1880)
Observations sur la Fluide Perivisceral des Oursins (1880)
On the Coalescence of Amoeboid Cells into Plasmodia, and on the So-called Coagulation of Invertebrate Perivisceral Fluids (1880)
On the Relations between Plants and Animals and the Gases of the Atmosphere (Ellis Physiology Prize, 1876–81)
Report to Committee of British Association on Researches in Mexico (1880 & 1880)
On the Morphology of the Cell (1881)
Su rune Nouvelle Sous-classe d'Infusoires (1881)
On Chlamydomyxa Labyrinthuloides (1881 & 1882)
On the Nature and Functions of the 'Yellow Cells' of Radiolarians and Coelenterates (1882)

A Re-statement of the Cell Theory (1883)
On Variation in Plants (1886 & 1886)
Theory of Growth, Reproduction, Sex, and Heredity (1886 & 1886)
A Synthetic Outline of the History of Biology (1886)
On the Nature and Causes of Variation in Plants and Animals (1887 & 1887)
On the Factors of Variation in Plants and Animals (1887)
On the Origin of Thorns and Prickles (1887)
On the Origin of Evergreens (1888)
A Restatement of the Theory of Organic Evolution (1888)
*Chapters in Modern Botany (1893)**
City Development: A Study of Parks, Gardens … (1904)
Summer in an Old Scots Garden (1907)

In conjunction with Mr. Beddard

Sur l'Histologie des Pedicellaires et des Muscles de l'Oursin (1881)
On the Histology of the Pedicellariae and the Muscles of Echinus sphaera (1881)

In collaboration with J. Arthur Thomson

History and Theory of Spermatogenesis (1886)
*The Evolution of Sex (1889)**
A Biological Approach (1904)
Evolution (1912)
Sex (1914)
Biology (1925))
*Life: Outlines of General Biology (1931)**

= quoted in *'The Evolution of Evolution'*