Biographical Portrait

PATRICK MATTHEW—FOREST GENETICIST

(1790–1874)

BY JOHN E. BARKER

During the 1600s and 1700s, degraded forests around many European towns had led to localized wood shortages and development of widespread concern regarding the poor forest conditions. Strong pressure arose for the development of ways in which to improve management of such forests. This led to the development during the 1700s and 1800s of what is today, the science of forestry. While forestry had its roots in the practical skills of the earlier forest artisans, something more was required. Foresters of the day were characteristically empiricists who based their activities on recipe-like forest practices. A different approach was taken by the cameralists who attempted to generalize practices based on scientific analysis. It was a period of lively debate between these two groups as foresters everywhere took up the challenge of improving forest management.

Much of the credit for developing a scientific basis for forestry is attributed to early German foresters of that period such as von Zanthier, Pfeil, Cotta, Hartig. There were many others whose contributions were significant and received recognition. In one case, however, a truly remarkable contribution was made which has gone virtually unnoticed.

Patrick Matthew, a Scottish forester from Errol, on the Firth of Tay, published a book, *Naval Timber and Arboriculture*,[1] in 1831, presenting his views on a range of forestry practices of the day. His book, in general, was a summary of the forestry practices of the early 1800s, practices which Matthew found to be 'imperfect and inaccurate". His view of why this was so was, in his words,

....the knowledge of the art and the power of communicating that knowledge, are of so different a character ..... that those write who cannot act and those who can are incompetent to write.—a sentiment directly attributable to Heinrich Cotta.[2]

Matthew also pointed out the deleterious effects of dysgenic selection (high-grading) on the inherent quality of the forests. He outlined, very clearly, the principles of natural selection and further, applied this theory to practices influencing the genetic qualities of forests. Interestingly, his book was published eleven months before Darwin sailed on the *Beagle*.

The most interesting and unique parts of the book dealt with what Matthew called:

... a law universal in Nature, tending to render every reproductive being as the best possibly suited to its condition ..... As Nature, in all her modifications of life, has a power of increase far beyond what is needed……those individuals who possess not the requisite strength, swiftness, hardihood, or cunning, fall prematurely without reproducing ...

The same principle was put forth by Darwin and Wallace twenty-seven years later.

W. J. Dempster has published an interesting book which gives us insight into some of the details of Matthew's life and character.[3] Patrick Matthew was born in 1790 in Scotland near Dundee. His parents were relatively well-to-do farmers and as a result, he was able to obtain a good education, apparently attending Edinburgh University although he did not receive a degree. Instead he returned to the family estate at Gourdie Hill in 1807 to manage the large family apple and pear orchards where he no doubt, became aware of the influence of heredity and variation during his cross breeding and selection activities there.

Matthew had difficulty in reconciling the Linnaean concept of immutable species with his observation that species differences are often difficult to define or as he stated "which certainly under culture, soften into one another." This observation led him to speculate on the origin of species. By interpreting the geological record as giving evidence for environmental changes, and by applying his direct observations that species under domestication could change under artificial selection, Matthew stated:

Is the inference then unphilosophic, that living things which are proved to have a circumstance-suiting power—a very

slight change of circumstance by culture inducing a corresponding change of character—may have gradually accommodated themselves to the variations of the elements surrounding them … The progeny of the same parents, under great difference of circumstance, might in several generations, even become distinct species, incapable of co-reproduction.

His book was received with quite mixed feelings judging from the published reviews. One of these disclaimed any participation in his laws of nature[4], another dismissed them as pert nonsense[5], while a third received them as original contributions.[6] Perhaps the most accurate indication of the book's reception is found in one of Matthew's letters.[7] He mentions a university professor who said that if he were to bring such ideas before his class he would be likely to be placed in the pillory.

His work generally appears to have had little impact within the scientific community of the day. When Darwin and Wallace proposed their ideas on the origin of species in 1858, Matthew claimed priority for the idea.[8] Darwin freely acknowledged this claim *(I freely acknowledge that Mr. Matthew has anticipated by many years the explanation which I have offered of the origin of species...)* but denied any prior knowledge of the book either by him or by any other naturalist with whom he was acquainted. This may have been because much of the material was presented in an appendix of Matthew's book or because the title *Naval Timbers* held little attraction for a naturalist and he had simply not bothered to read it.

In addition to the evolutionary aspects of his ideas, Matthew had extended his arguments on natural selection to include what might be called a "social survival of the fittest" and violently attacked the laws of entail and hereditary nobility, arguing that the laws of inheritance were strangling the abilities of highly capable people who happened to be in the wrong social class. Since most influential naturalists of the period were likely members of the social class that he was attacking, such content would hardly have encouraged support for his ideas. In a letter written in 1867, Matthew complained about being actively excluded from discussions on natural selection by the British Association for the Advancement of Science. On rejection of a paper offered to a meeting of the Association, he wrote:

With regard to one of these papers on what is termed Darwin's Theory of Natural Selection, but which theory was published by me about 30 years before Darwin (honourably acknowledged in his last edition by Darwin) at a time when man was scarcely ready for such thoughts, surely I had the best right to be heard on this subject. Yet others were allowed to speak upon it, and its parent denied to do so.[9]

For whatever reasons, the scientific establishment of the period ignored Matthew's contribution.

It is curious that Matthew did not pursue his ideas on natural selection further. After publishing *Naval Timbers & Arboriculture*, he apparently lost interest in the topic. Perhaps it was because of the intellectual climate of the time but he believed that no direct proof was possible in one man's lifetime and was content to accept his theory as an axiom[10] from which proper forestry procedures could be derived, rather than emphasize it's evolutionary aspects. In the years following 1831, he moved on to other interests and in 1839, published a second book, *Emigration Fields*,[11] which emphasized the benefits of emigration to countries similar to Great Britain (particularly New Zealand) as a means of spreading British influence around the globe.

Matthew used his ideas to formulate a number of recommendations for improvement of silvicultural practices. He espoused principles that are still valid and form a central theme in the forest genetics and silviculture we practice today. The poorness of the practices of his time may have been recognized earlier by others but his arguments against such practices, a direct out-growth of his precocious Darwinian concepts, were certainly original. The following quote illustrates this point.

... man is influential in preventing deterioration, by careful selection of the largest or most valuable as breeders; but in timber trees the opposite course has been pursued. The large growing varieties being so long of coming to produce seed, that many plantations are cut down before they reach this maturity, the small growing and weakly varieties, known by early and extreme seeding, have been continually selected as reproductive stock, from the ease and convenience with which their seed could be procured; ... May we, then, wonder that our plantations are occupied by a sickly short-lived puny race, incapable of supporting existence in situations where their own kind had formerly flourished ...

He even went so far as to suggest that some form of seed certification might be desirable by advocating:

That nurserymen should attest the variety of their timber plants, sowing no seeds but those gathered from the largest, most healthy, and luxuriant growing trees....

Matthew was a forester who both wrote and practiced, in accordance with the Cotta dictum, but his ideas have not been widely recognized or acknowledged. It is perhaps timely to restate the values of his contribution to forestry and science in general. □

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NOTES

1. Matthew, Patrick. 1831. *On Naval Timber and Arboriculture—with critical notes on authors who have recently treated the subject of planting.* Edinburgh : Adam Black. 391 pps.
2. *Forest History Today*, Fall 2000. Forest History Society. p.27–28.
3. Dempster, W.J. 1983. *Patrick Matthew and Natural Selection.* Paul Harris Publishing, Edinburgh.156 pps.
4. *United Services Journal*, No. 33, August, 1831, p.457
5. *Quarterly Review*, Vol. 49, 1833, p.126
6. *Louden's Gardener's Magazine*, Vol 8, 1832, p.702
7. *The Gardener's Chronicle and Agricultural Gazette*, April 21, 1860, p.368
8. *The Gardener's Chronicle and Agricultural Gazette*, April 7, 1860, p. 312
9. Dempster, W.J. 1983. *Patrick Matthew and Natural Selection*. Paul Harris Publishing, Edinburgh. p 125.
10. *The Gardener's Chronicle and Agricultural Gazette*, April 7, 1860, p. 433.
11. Matthew, Patrick, 1839. *Emigration fields, North America, the Cape, Australia, and New Zealand : describing these countries, and giving a comparative view of the advantages they present to British settlers.* Edinburgh : Printed by Neill & Co.